MEMORANDUM

TO: **Laramie County Planning Commission**

FROM: **Sonny M Pourchot, Associate Planner**

DATE: **January 6th, 2026**

TITLE: **PUBLIC HEARING regarding the Project Jade Site Plan and the BFC Power and Cheyenne Power Hub Project Site plan located in Sections 5 and 7, T12N, R66W, of the 6th P.M., Laramie County, WY.**

EXECUTIVE SUMMARY

Tallgrass Integrated Solutions, LLC and WY DC 1, LLC, have submitted site plan applications for the above listed projects. The projects are two separate actions but have been combined into one report for ease of readability.

The purpose of these two projects is to develop a data center (Project Jade) and a power plant (BFC Power and Cheyenne Power Hub Project) within the newly formed Switchgrass Industrial Park. Due to these projects having significant impact on the surrounding area, they are seeking Board approval. Project Jade's site will be developed on Section 5, a 600-acre parcel, and consist of five (5) data center buildings, two (2) support buildings, and further associated infrastructure. BFC Power and Cheyenne Power Hub's site will be developed on Section 7, a 659-acre parcel, and consist of two (2) power generation facilities and further associated infrastructure to support the power generation facilities.

BACKGROUND

Switchgrass Industrial Park is comprised of 1375.32 acres, zoned PUD from a prior Board approval on October 7th, 2025, and the rules of the PUD are attached to this report for reference.

Pertinent Laramie County Land Use Regulations or Statutory Provisions include:

Section 1-3-100 governing public notice
Section 2-4-111 governing PUD – Planned Unit Development zone district.
Section 3-1-109(f)(vi) governing General Requirements for New Site Plans.

DISCUSSION

The Laramie County Comprehensive Plan designates this area as Ag and Range Land (AGR), which are areas that are far removed from the providers of public services and have relatively lower levels of road access. Primary uses are agricultural crops and livestock production and associated residential uses. Any new developments in this area shall address water availability, public land access, cultural resource preservation, and road and connectivity. A portion of this acreage is listed as Gateway Corridors (GC), which are corridors into the county and its communities that help establish a first impression about the quality and character of each area. These gateways typically include highway-oriented development and high-quality development. Appropriate uses may include a mix of commercial, industrial, office, and public facilities.

PlanCheyenne designates this area as Agricultural/Rural (AR), which supports a range of agricultural and residential uses. Should this area be developed for wind energy or other energy production facilities they may be appropriate but should be located away from the urban area. The proposed action complies with both plans.

Agency comments are still being addressed regarding proper access and internal roads for fire apparatus vehicles and fire protection water supplies, access and drainage easements need to be recorded and on file with this department prior to approval, and a thorough review of the traffic impact study and the updated drainage report are still in the process of being reviewed by WYDOT.

Public notice was published, and neighbor notice letters were sent by first class mail. Staff received written comments from adjacent landowners, which have been attached for review. Public comments were received regarding these projects at the public hearing on September 11th, 2025, regarding the zone change, but were not relevant at the time, but should now be addressed within this staff report. Richard Juschka, regarding encroachment from the data mining facilities on residents and the amount of water that is to be used for the facilities once they are established. Chris Coulson, regarding noise decibels for the project, water usage, and the economic factors that will impact the Cheyenne area.

Based on Section 3-1-109(f)(vi) of the LCLUR, Staff finds this application is in conformance with the plans and policies of Laramie County.

RECOMMENDATION and FINDINGS

Based on evidence provided, staff recommends the Board find that:

a. This application is in conformance with section 2-4-111 governing PUD – Planned Unit Development zone district.
b. This application is in conformance with section 3-1-109(f)(vi) governing General Requirements for New Site Plans.

and the Board approves the site plans for Project Jade and the BFC Power and Cheyenne Power Hub Project with the following conditions:

1. **All agency comments will be addressed and/or corrected prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**
2. **Access and Drainage easements will be recorded with the County Clerk's Office prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**

PROPOSED MOTION FOR PROJECT JADE SITE PLAN

I move to grant approval of the Project Jade Site Plan permit, and adopt the findings of facts a and b of the staff report with the following conditions:

1. **All agency comments will be addressed and/or corrected prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**
2. **Access and Drainage easements will be recorded with the County Clerk's Office prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**

PROPOSED MOTION FOR BFC POWER AND CHEYENNE POWER HUB PROJECT SITE PLAN

I move to grant approval of the BFC Power and Cheyenne Power Hub Project Site Plan permit, and adopt the findings of facts a and b of the staff report with the following conditions:

1. **All agency comments will be addressed and/or corrected prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**
2. **Access and Drainage easements will be recorded with the County Clerk's Office prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**

ATTACHMENTS

Attachment 1: Location and Jurisdiction Map for both Projects
Attachment 2: Pre-Application Notes
Attachment 3: Applicant Justification Letter for both Projects
Attachment 4: Agency Review Comments with Applicant Responses for both Projects
Attachment 5: Drainage Plans for Project Jade and BFC/Cheyenne Power Hub
Attachment 6: Traffic Impact Study for Switchgrass Industrial Park
Attachment 7: Public Comments
Attachment 8: Resolution – Project Jade
Attachment 9: Resolution – BFC Power and Cheyenne Power Hub Project
Attachment 10: Resolution Exhibit A – Site Plan for Project Jade
Attachment 11: Resolution Exhibit B – Site Plan for BFC Power and Cheyenne Power Hub Project
Attachment 12: Exhibit C – Switchgrass PUD Recorded Rules

Laramie County, WY

Laramie County Planning and Development Office

3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
building@laramiecountywy.gov

PERMIT

PA-25-00056

PRIVATE COMMERICAL NEW CONSTRUCTION

SITE ADDRESS: 154 US 85 CHEYENNE
PRIMARY PARCEL: 12660510000200
PROJECT NAME: TALLGRASS DATA CENTER

ISSUED: 08/06/2025

EXPIRES:

APPLICANT: LAZY D GRAZING ASSOC INC
1609 WCR 120
CARR, CO 80612
612-867-3314

OWNER: LAZY D GRAZING ASSOC INC
1609 WCR 120
CARR, CO 80612

Detail Name	Detail Value
Meeting Date	08/06/2025
MEETING AM OR PM	PM
Application Types	Site Plan
Attendees	In Person (3966 Archer Pkwy)
Property Interest	Owner
Detailed Project Narrative	data center
Staff Attending	Staff
Application Fees	Yes
Copy of Pre-App Notes	REQUIRED FOR APPLICATION SUBMITTAL
Project Narrative Letter	Yes
Warranty Deed and/or Lease Agreement	Yes
Development Action	Site Plan
Drainage Plans	Yes
Drainage Study	Yes
Traffic Study	Yes
Public Safety Fees Acknowledgement Letter	No
Community Facility Fees Acknowledgement Letter	No
WY DEQ Chapter 23 Study/Submittal Letter	No
Development Agreement	No
Roadway Maintenance Plan	No

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Road/Easement Use Agreement	TBD
Right-of-Way Construction Permit	Upon Construction
Engineer Review - Paid by Applicant	Yes
Environmental Health Review/Approval	Yes
Environmental and Services Impact Report	No
GESC Permit	Yes, Standard
Floodplain Development Permit	No
Perimeter Fence Construction per W.S.S. 18-5-319	No
Public Notice, Paid by Applicant	Yes
Newspaper Legal Notice, Paid by Applicant	No
Adjacent Property Owner Letter, Paid by Applicant	Yes
Miscellaneous Notes	The project is a Site Plan for the proposed AI Data Center facility to be located west of US 85 and south of Chalk Bluff Road. Project parties will include Crusoe, DPR, and Tallgrass. A zone change to a PUD zone district is currently going through the planning process for this new business park being established by Tallgrass. Approx. 350-500 f/t employees. This facility will consist of four buildings along with a power plant. Construction will be all buildings completed within weeks of each other. *** WYDOT (Taylor McCort 307-745-2117) is the contact for the access permits off Highway 85 and Road 223. He requests a Traffic Impact Study for both the construction period and operation period. The study will serve for both the power plant and data centers. Permits through WYDOT will be needed for fiber in and out of the site and to be aware of the packed corridor on S. Greeley Highway and I-25. Show where construction employee parking will be if onsite.

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Miscellaneous Notes (2)	Public Works (Molly Cook 307-633-4302) If other accesses will be used permits will be required from Public Works. The interior roads will be private roads but be aware they must be built to meet IFC requirements that require a minimum of 20 feet. *** BOPU (Frank Strong 307-637-6430) said he'd like a meeting to discuss water and sewer. BOPU will only provide service to the Data Center with the Power Plant using a well and septic.The cooling system is closed and will reuse the approx. 2 million gallons of water it requires. *** Fire District #1 (Jeff Shaffer 307-274-1622) asked about the proximity of perimeter roads and overhead lines.
Miscellaneous Notes (3)	Building Permits (Dan Peters 307-775-7462) said that temporary offices wold require a building permit and be requested at time of grading permit. Dan would like to have a meeting to discuss plans when completed. *** A grading permit will be required and can be submitted concurrent with the Site Plan, but would be at their risk the plan wasn't approved. Include BMP map along with the DEQ permit when applying. ****Environmental Health (307-633-4090) will provide a list of vendors for port a pots. *****County Engineer (Scott Larson 307-634-9064) will review the site plan application and can be contacted with any questions. ***** Costs for the site plan includes permit fees, notification of adjoining property owners, signs, and engineer review fees. The permit will be approved administratively and take approximately 6 weeks from submission to approval. Discussion with the BOCC indicated they would regulate the project so Industrial Siting Council will not be involved.

CONDITIONS

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* Disclaimer: These are intended as guidance only. Fee calculations are determined at the time of application, and issues that arise during review periods are not always anticipated at pre-application stage. Public Records Act: This document and any documents provided by the applicant to Planning may constitute a public record under W.S.S. 16-4-201 et seq. Applicants are advised not to divulge any information at a Pre-Application Meeting with Planning that they do not yet desire to be public information.

* A traffic study may be required for any site plan, subdivision permit, or access request for any development and shall be required for any project or development that will generate 100 or more trips during any hour or over 200 trips per day. Traffic studies shall be prepared by a qualified civil engineer licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice engineering in Wyoming. The applicant and the engineer shall meet with the County prior to preparation of the traffic study to discuss specific issues or concerns. The Director of Planning and Development may waive a traffic study based on estimated ADT, and peak hour trips, or existing road or site conditions, including adequate pedestrian access.

* Requests for waivers for drainage impact studies shall be made in writing to the Laramie County Public Works Department. The County shall review the request and approve the grant for a waiver or identify the level of study required for the proposed development action. Laramie County Public Works may waive the requirement for drainage study based on the following: a. Information is provided to substantiate there are no potential drainage problems at the site or downstream of the site (including impacts to downstream floodplains). b. The development or redevelopment will not result in an increase in the historic impervious area. c. The development or redevelopment of an area is immediately adjacent to a major drainageway that is capable of conveying the fully developed basin 100-year flood without impact to the base flood elevation. d. The development or redevelopment is unlikely to create drainage problems.

* A waiver or alternative to the required landscaping may be presented to the Planning and Development Director for review. The Director shall approve the proposed alternative landscape plan based on the following criteria: A. the proposed alternative meets or exceeds the intent of this regulation, and B. the proposed alternative is well-integrated with the surrounding landscaping and land uses, and C. the proposed alternative meets the goals of Laramie County Comprehensive Plan and; D. the purpose of the required site plan is to legalize an existing use and the impact or benefits of the landscape plan on the property would be minimal; or E. the landscaping as required would prohibit reasonable use of the property.

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PERMIT

PA-25-00101

PRE-APPLICATION MEETINGS

SITE ADDRESS: 154 US 85 CHEYENNE
PRIMARY PARCEL: 12660510000200
PROJECT NAME: SWITCHGRASS DATA CENTER SITE PLAN

ISSUED: 10/23/2025
EXPIRES: 04/21/2026

APPLICANT: Travis Sinclair
5956 Sherry Ln
Dallas, TX 75225
7135038728

OWNER: LAZY D GRAZING ASSOC INC
1609 WCR 120
CARR, CO 80612

Detail Name	Detail Value
Meeting Date	10/23/2025
MEETING AM OR PM	AM
Application Types	Site Plan
Attendees	Online (Teams Meeting)
Property Interest	Owner
Detailed Project Narrative	Site plan for Switchgrass data center, power plant.
Staff Attending	JA DP SP CC TM ME SL
Application Fees	Yes
Copy of Pre-App Notes	REQUIRED FOR APPLICATION SUBMITTAL
Project Narrative Letter	Yes
Warranty Deed and/or Lease Agreement	Yes
Development Action	Site Plan
Drainage Plans	Yes
Drainage Study	Yes
Traffic Study	Yes
Public Safety Fees Acknowledgement Letter	No
Community Facility Fees Acknowledgement Letter	No
WY DEQ Chapter 23 Study/Submittal Letter	No
Development Agreement	No
Roadway Maintenance Plan	TBD

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Road/Easement Use Agreement	TBD
Right-of-Way Construction Permit	Yes
Engineer Review - Paid by Applicant	Yes
Environmental Health Review/Approval	Yes
Environmental and Services Impact Report	No
GESC Permit	Yes, Standard
Floodplain Development Permit	No
Perimeter Fence Construction per W.S.S. 18-5-319	No
Public Notice, Paid by Applicant	Yes
Newspaper Legal Notice, Paid by Applicant	Yes
Adjacent Property Owner Letter, Paid by Applicant	Yes
Miscellaneous Notes	Power plant in section 7: This entire section will contain the power plant facility. WYPDES will be required. The areas that are described as “future development” can be phased for the future requirements if they are listed on the site plan and the site plan shows phasing. Otherwise the site plan will need an amendment when this portion is ready for construction. BOCC has requested that this site plan go before them for approval just for public transparency. The site plan process will include pertinent agency review and possible corrections to the site plan. Once the site plan review process has been completed it will go before BOCC for approval, denial, or table for a later date.

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Miscellaneous Notes (2)	Upon approval a Certificate of Review (COR) will be issued along with an approved site plan that the site will need to be built to accordingly. Grading permits can be issued “at risk” with a letter of request so dirt work can begin prior to approval of the site plan. The COR will trigger your ability to pull building permits. Periodic site inspections from the Planning Department will occur during the construction phase. Upon completion of phased work or overall site work a Certificate of Compliance and/or Certificate of Occupancy will be issued allowing operations. Seth Lloyd City of Cheyenne: Unless you need BOPU water, the city doesn’t have any comments for section 7. WYDOT Ralph Engineer: They control Terry Ranch and US 85, there are worksheet manuals for traffic signals and ROW work will need permitting.
Miscellaneous Notes (3)	WYDOT cont’d: US 85 ROW is getting pretty loaded with utilities so work here will be limited. Taylor McCort: Traffic Impact study is req’d and is already in process. Headquarters personnel will look at a project of this magnitude. Kimley-Horn: will request further discussion with Taylor for access permits for the projects. They will not need all four access points. Fees for the projects: Site plan $500, development action sign $26, Engineer review fees TBD actual costs, legal ad TBD actual costs, first class mailers to adjacent owners within 500 feet TBD actual costs. Landscape will be reviewed by the Engineer and these are in accordance with the PUD.

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Crusoe

Laramie County

Data Center Site Plan Application

Project Jade

Crusoe Energy

Laramie County, Wyoming

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Attachment A. Pre-Application Meeting Materials

Attachment B: Site Plan Application Form

Attachment C: Proof of Ownership

Attachment D: Phasing Plan

Attachment E: Site Plan

Executive Summary

WY DC 1, LLC (the “Applicant” and “Owner”), intends to build a data center campus (the “Project) within Laramie County, Wyoming approximately 8 miles south of Cheyenne. The site is generally located west of the CanAm Highway (US 85) and about 1 mile south of Terry Ranch Road (SR 223).

Project Jade includes the development of Section 5, a 600-acre parcel of undeveloped land. This will include a site plan, mass grading and a full design package for five (5) data center buildings and two (2) support buildings, and associated infrastructure.

The Project layout was developed to minimize noise, wildlife impacts, visual impacts, and traffic impacts to the surrounding community, while maximizing use of the available land. Identified impacts will be mitigated by measures and commitments detailed in this application. The location of the Project is proposed to be in a rural section of the county and is surrounded by privately owned land and rural development.

The Applicant is confident that the location of this project will not substantively diminish the environment or community character of this region of Laramie County or the State of Wyoming. The Project Owner will construct and operate the facilities in compliance with all applicable local, state, and federal codes, laws, orders, regulations, and rules.

1.0 Application Information

1.1 Applicant Overview and Background

WY DC 1, LLC (the Applicant), will be the developer and owner of the Project. The Applicant is an indirect subsidiary of Crusoe Energy LLC, a technology-driven company specializing in the development of sustainable infrastructure for artificial intelligence (AI) workloads.

Zenith Rathore
Crusoe Energy Systems
255 Fillmore St #300,
Denver, CO 80206
zrathore@crusoe.ai

1.2 Application Details

Project Jade will follow the permitting process detailed Laramie County Land Use Regulations. A pre-application meeting was held with Laramie County on August 6, 2025. The Applicant's pre-application meeting minutes can be found in *Attachment A. Pre-application Meeting Materials*. Please refer to *Attachment B. Site Plan Application Form* for the completed application form.

In accordance with the Site Plan review process, the Applicant has submitted a hard copy and an electronic copy of the completed Site Plan Application, along with the application fee.

1.3 Proof of Ownership

Please refer to *Attachment C. Proof of Ownership* for proof of ownership consisting of Project site lease agreements.

2.0 Project Description

2.1 Project Purpose

The goal of Project Jade is to provide a new data center campus in partnership with Tallgrass Energy. The proposed Project layout has been developed to maximize the available Project area while also minimizing noise, visual, and traffic impacts to the surrounding community and environment.

2.2 Project Nature and Location

The Project area is on private grasslands in Laramie County, Wyoming, approximately 715.92 Acres. The Project is located southeast of Cheyenne. The Project is bound to the north by parcel numbers 12660410000600 and 13663230000300, to the west and south by parcel numbers 12660210000200 and, to the east by US 85. Regional access to the site will be primarily provided via US-85.

The Project will consist of multiple buildings built in discrete phases. Each phase will include a Data Center, and a Battery Energy Storage System (BESS) developed on private land. For more details

about major and dependent project components, please refer to Sections 2.5 and 2.6. Preliminary project information for each phase is summarized in Table 1.

The approximate central coordinates are:

- : LAT/LONG: 41°02'10.71", -104°45'54.97"

Project Information	Project Jade
Location	West of US-85, and North of South Cheyenne Solar
Data Centers	5 Buildings
Approximate Fenced Area	362 acres

Table 1. Preliminary Project Summary

2.2.1 Project Legal Description

The legal descriptions for the Project Jade site are below.

Project Legal Description:
Township 12 North, Range 66 West of the 6th P.M., Laramie County, Wyoming
Situated in Section 5

2.3 Project Construction

Construction activities are planned to proceed in six (6) distinct phases. Phase 1 will include the master infrastructure to serve the site such as detention ponds, the looped road system and utility trunklines. Phase 2 of development includes Building 1 with associated infrastructure such as, duct banks, utility tie-ins to the master services and other essential systems. Phase 3 will encompass the construction of Building 2 and its supporting infrastructure. Phase 4 will encompass Building 3 and its supporting infrastructure. Phase 5 will involve Building 4 and its supporting infrastructure. Phase 6 will comprise of Building 5 and all remaining site infrastructure. Phasing is only related to completion of the construction for that area. Overall the construction of the site will proceed as one continuous process. Throughout all phases, Best Management Practices (BMPs) for erosion control, including temporary ponds, will be implemented. All construction activities will be conducted in full compliance with applicable County codes and safety regulations.

2.4 Project Site Plan

A Project Site Plan, illustrating preliminary layout, design and access can be referenced in *Attachment E Site Plan.* The Site Plan conforms to the requirements outlined in *Section 2-2-125 (e)* of the Laramie County Land Use Regulations

2.5 Major Project Components

The major project components are listed below.

Data Center

A Data Center is a large-scale facility designed to support high-density computing workloads, such as artificial intelligence, cloud services, and enterprise data processing. Each Data Center will house a large number of computer servers operating simultaneously.

BESS System

A Battery Energy Storage System (BESS) stores electricity in batteries and provides backup power during outages, reducing the need for diesel generators. Additionally, it helps lower energy costs through peak shaving and improves power quality by stabilizing voltage and frequency.

Duct Banks

A duct bank in a data center is an underground or enclosed pathway that houses and protects electrical and communication cables. It helps organize and shield critical wiring from physical damage, moisture, and temperature changes, ensuring reliable power and data transmission.

Equipment Type	Quantity
Data Center Building	5
BESS	40 (8 per building)
Security Office	1

Table 2. Project Jade Component Summary

2.6 Dependent Project Components

Dependent Project components consist of access roads and security fencing. Access roads include paved, gravel, and compact earth roads, which will provide vehicular access to major project components. Primary access will be constructed off US 85. Security fencing will be comprised of wildlife exclusion fencing to surround the proposed infrastructure.

Construction Laydown Area

Two temporary laydown yards will be developed and utilized during construction. The laydown yards will be approximately 15 acres and 66 acres located in two areas adjacent to the site to support development. The Project is expected to be built concurrently while using "Just in Time methods", wherein materials would be delivered on site as close to installation as possible to minimize the size of staging areas and to spread equipment throughout the Project site.

2.7 Land Use

The Project is proposed to be developed on private land that is currently used for seasonal cattle grazing, and is surrounded by rural, agricultural private land. The Project area is located in Fire District 1 and in Laramie County Tax District 0101. The Project area is zoned as a Planned Unit Development (PUD), as approved on October 7th, 2025, through the Switchgrass Industrial Park.

The nearest residential areas to Project Jade include a low-density single-family residence 0.1 miles east of the project area and rural, single-family residences 0.5 miles north of the project area (north of active oil wells). A single residence is located 1.34 miles south of the southwest corner of the project area.

2.8 Project Waste Management

Federal and State of Wyoming waste management regulations will be followed during the development of the Project. Title 40 of the Code of Federal Regulations, the Resource Conservation and Recovery Act, gives the Environmental Protection Agency (EPA) the authority to control and regulate material waste. All necessary steps outlined by the EPA will be taken during the construction and operation of the Project to minimize waste generation. The state of Wyoming does not have explicit regulations regarding waste management and typically defers to Federal Regulations.

All waste generated at the Project site during the construction and operation of the facility will be appropriately classified as hazardous or nonhazardous and will be handled accordingly. All construction personnel will be responsible for waste classification prior to storage and disposal of substances at the Project site. An on-site project coordinator will be designated, who will be responsible for ensuring all contractors are following proper classification and management procedures.

General Nonhazardous waste may include metal, paper, wood, glass, plastics and concrete waste. This waste will be stored in designated containers in a designated nonhazardous waste area on the Project site. Metal, paper, wood and glass will be recycled if possible and properly disposed of, at licensed off-site processing facilities. Concrete waste will be segregated from other non-hazardous waste and will be recycled by a licensed concrete recycler. In the event there is liquid waste, it will be stored in designated wash areas and hauled offsite to limit environmental impacts. Excess soil generated during construction earthwork activities will be balanced with cut areas on site and used as fill as much as possible. Soil will be stockpiled onsite in a manner that follows proper erosion control practices.

General hazardous waste commonly produced during construction may consist of equipment cleaning wastes, spent batteries, and excess oil and paint. If there are used oil filters on site, they will be drained of all free-flowing oil prior to being recycled. All hazardous waste will be properly identified, stored and recycled while on site and will be hauled for off-site processing by licensed contractors. All hazardous storage containers will be properly labeled as HAZARDOUS WASTE and labels will include material name, type of waste, name and address of source and start date of accumulation for proper tracking and documentation. Hazardous waste will be stored away from non-hazardous waste in a designated and protected storage area. Hazardous waste will not be improperly stored and will be periodically inspected for compliance.

When waste is being transported, proper care will be taken to ensure spills do not occur in transit. In the unlikely event of a spill, site managers, contractors, sub-contractors, and anyone else present on

site will follow Wyoming Department of Environmental Quality (WYDEQ) spill reporting standards on the Wyoming DEQ's Spill and Complaint website.

Sanitary waste generated on site during construction will be collected and contained in portable, chemical toilets with secondary containment in place. The waste will be removed periodically by licensed tanker trucks and transported to the nearest wastewater treatment plant.

3.0 Project Decommissioning

It is anticipated that the decommissioning of all Buildings will occur in phases. Unless the facilities are purchased by another entity, the Project will be decommissioned by the Owner.

3.1 Revegetation

The Project owner will complete vegetation restoration of the Project area as described within the Planned Unit Development (PUD), approved October 7th, 2025. Vegetation restoration components include erosion control, noxious weed prevention and treatment, revegetation, and soil preparation.

Revegetation will include native or adaptive perennial vegetative cover that will be equal to or better than the original condition. After backfilling, grading and contouring, and the replacement of topsoil, revegetation be completed in a manner to most efficiently accommodate the retention of moisture and control erosion within the Project.

The Project owner will reseed reclaimed areas with a native seed mix chosen for site specific conditions. The determination of where and when to reseed and the associated seeding methods and rates will be made based on the nature of disturbance and condition of soils. There is anticipated to be no reseeding in areas where decommissioning and prior project activities have left sufficient native vegetation in place, or where vegetation has recovered to a sufficient level.

Revegetation efforts will use a combination of seed mixes, turf sod or plugs, dormant cuttings, and containerized plants. This process will involve the planting of vegetation that is appropriate for the Project setting and is also in line with the vegetation community previously observed.

The timing of revegetation efforts will occur at an appropriate time in relation to season (light and temperature) and hydrology (soil moisture). Seeding is typically best accomplished through dormant fall planting. Dormant cuttings are most successful when established during the spring season. Containerized plants do best when planted during rainy periods within the active growing season. If the correct timing is not feasible, supplemental irrigation may be necessary depending hydrologic conditions of the particular year.

4.0 Public Involvement

4.1 Public Notification

Public notices in the form of property sign posting and letters to property owners in the area will be provided, in accordance with the Laramie County Land Use Regulations.

4.2 Public Meeting

A Public Open House Meeting will be determined to be held by the Owner and Laramie County, to share information about the Project and discuss any concerns with the public.

A letter will be mailed notifying adjacent landowners and potentially interested agencies of the Project and the open house meeting, along with a project fact sheet. The notifications were also sent to preliminary agencies, or any organizations deemed to have interest in the Project.

4.3 Community Response

The Applicant will proactively conduct community outreach to inform and engage the public. As detailed in Sections 4.1 and 4.2, affected landowners, local governments, and stakeholders will be provided notice of the Project in accordance with Laramie County regulations, and have been given the opportunity to provide comments, questions, or feedback. Additionally, Applicant contact information including a physical address and email address have also been provided to the public.

In addition to feedback from the general public, the Applicant will actively communicate with the Laramie County Fire District #1.

5.0 Project Impacts and Mitigation

The following section describes anticipated Project impacts and associated mitigation measures. No unmitigated impacts from the Project are anticipated to occur.

5.1 Visual Impacts

There are no public airports in the immediate vicinity of the Project area. The closest Federal Aviation Administration (FAA)-registered airstrip, airfield or helipad to the Project area is a private runway labeled as Radio Ranch (FAA identifier WY46), which is approximately 4.2 miles due west from the Project area, on the west side of I-85/I-25. The next closest airfield is also a private runway labeled as Sloan (FAA identifier WY45), which is located approximately 5.7 miles due north from the Project area. The closest public airport is the Cheyenne Regional Airport (FAA identifier CYS), located approximately 6.1 miles northwest of the Project area. The closest military airfield is the Francis E Warren Air Force Base, located over 9 miles northwest of the Project area. There are no known sensitive viewsheds, visual easements, or scenic byways in the vicinity of the Project area.

The nearest residential areas to Project Jade include a low-density single-family resident 0.1 miles east of the project area and rural, single-family residences 0.5 miles north of the project area (north of

active oil wells). A single residence is located 1.34 miles south of the southwest corner of the project area.

5.1.1 Visual Conditions

Given the rural nature of the Project location, its rolling landscape, topography and landscape will provide a natural visual buffer between adjacent parcels and the facility.

The proposed location of the Project is on rural, agricultural lands dominated by shortgrass prairie approximately 4 miles southeast of the City of Cheyenne in southeastern Wyoming. Visual conditions in the immediate area include rural agricultural lands, unpaved roads, and pockets of single-family residential development east and north of the Project. Oil and gas development occurs north and west of the Project. A solar farm (South Cheyenne Solar) is located to the south of the Project.

5.2 Cultural Resources

A Class I Cultural Resource Inventory was completed by a licensed professional for the Project Site which yielded no adverse effect on historic properties. If any potential historic or archaeological resources are uncovered during the Project duration, State and County Historic Preservation Offices should be notified immediately.

5.3 Impacts on Public Roads

A Traffic Impact Study will be provided on the Project's background, existing and future access to the Project site, existing roadways adjacent to the site, and construction and post construction impacts.

5.3.1 Existing and Future Site Access

Regional access to the Project will be provided by US-85. During and following construction of the Project, direct access is proposed from one full movement access along the southeast side of the site to US-85. An additional access to the northeast of the site will be provided for emergency ingress and egress.

5.3.2 Construction Impacts

It is anticipated that truck traffic (deliveries) will utilize US-85 to access the Project site. The distribution of arrivals for construction worker trips was derived based on distances to nearby cities and populations. The City of Cheyenne is located approximately 4 miles northwest. The City of Greeley is located approximately 50 miles south. Due to the proximity of the Site to the City of Cheyenne, traffic is expected to predominantly approach from the northwest. Analysis of the existing street network, the proposed project construction, and expected traffic volumes resulted in the need for no offsite improvements or recommendations to accommodate level of service.

5.3.4 Operational Impacts

After Project Jade site has been constructed, the number of trips generated by the Data Center in standard operations is expected to be significantly less than during the construction period. The Project will have weekly site visits by operational personnel. Therefore, traffic impacts related to the

operation of the Project are anticipated to be insignificant and not require roadway improvements other than additional taper lanes provided along US-85.

5.4 Hydrology

The Applicant has conducted a hydrology study to evaluate the hydrologic and hydraulic characteristics of the Project area. Flood depths, flow velocities, and scour depths for the 100-year, 24-hour were studied under existing conditions. The existing topography of the Project is hilly with areas that slope into existing channels, which are tributary to Porter Creek to the north and to Simpson Creek to the southeast, and eventually flow to the Wyoming Adams & Bunker Reservoir 1 and Eagle Rock Reservoirs. The Project area generally drains from the south to the north.

5.4.1 Floodplain Review

The Project is located on Federal Emergency Management Agency (FEMA) FIRM Panels 56021C1375F (effective 1/17/2007). The site is designated as FEMA Zone X. FEMA Zone X contains areas of 0.2% annual chance flooding and areas determined by FEMA to be outside the 0.2% annual chance floodplain.

5.5 Drainage

The Applicant has performed a drainage analysis to identify the impacts of Project development. In the existing condition, the peak flow from the site area for the 100-year 1-hour storm event is 835 cubic feet per second (cfs). Construction of the Project is not anticipated to increase stormwater runoff flow rates around the Project site.

5.6 Biological Resources

The Applicant has completed a Biological Assessment via a licensed professional and is confident that the location of this project will not substantively diminish the environmental character of this region of Laramie County, nor at the state and federal level. An Endangered Species Assessment has been completed by a design professional which showed that no habitat or individuals of federally-listed species were observed within the study area.

5.7 Aquatic Resources

A preliminary Waters of the United States (WOTUS) assessment was conducted for the project site by a design professional which did not yield jurisdictional waters. The Applicant is confident that the location of this project will not substantively diminish the integrity or ecological character of aquatic resources in this region of Laramie County, nor at the state or federal level. The Project has been thoughtfully designed to minimize potential impacts on water bodies, wetlands, and associated aquatic habitats, and will maintain active engagement with local, state, and federal agencies throughout the development process to ensure continued protection and responsible stewardship of these resources.

5.8 Vegetation and Pests

Due to the presence of oil and gas and ranching activities in the area, grassland vegetation species have the potential to be both native and non-native species. The Applicant will monitor and/or manage for noxious weeds included in the State of Wyoming and Laramie County noxious weed lists until final reclamation is achieved. Vegetation control techniques that will be implemented include chemical, mechanical, biological, and cultural treatments.

6.0 References

Attachment A. Pre-Application Meeting Materials

Laramie County, WY

Laramie County Planning and Development Office

3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

PERMIT

PA-25-00056

PRE-APPLICATION MEETINGS

SITE ADDRESS: 154 US 85 CHEYENNE
PRIMARY PARCEL: 12660510000200
PROJECT NAME: TALLGRASS DATA CENTER

ISSUED: 08/06/2025
EXPIRES:

APPLICANT: LAZY D GRAZING ASSOC INC
1609 WCR 120
CARR, CO 80612
612-867-3314

OWNER: LAZY D GRAZING ASSOC INC
1609 WCR 120
CARR, CO 80612

Detail Name	Detail Value
Meeting Date	08/06/2025
MEETING AM OR PM	PM
Application Types	Site Plan
Attendees	In Person (3966 Archer Pkwy)
Property Interest	Owner
Detailed Project Narrative	data center
Staff Attending	Staff
Application Fees	Yes
Copy of Pre-App Notes	REQUIRED FOR APPLICATION SUBMITTAL
Project Narrative Letter	Yes
Warranty Deed and/or Lease Agreement	Yes
Development Action	Site Plan
Drainage Plans	Yes
Drainage Study	Yes
Traffic Study	Yes
Public Safety Fees Acknowledgement Letter	No
Community Facility Fees Acknowledgement Letter	No
WY DEQ Chapter 23 Study/Submittal Letter	No
Development Agreement	No
Roadway Maintenance Plan	No
Road/Easement Use Agreement	TBD

DRAFT

Laramie County, WY

Laramie County Planning and Development Office

3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

Right-of-Way Construction Permit	Upon Construction
Engineer Review - Paid by Applicant	Yes
Environmental Health Review/Approval	Yes
Environmental and Services Impact Report	No
GESC Permit	Yes, Standard
Floodplain Development Permit	No
Perimeter Fence Construction per W.S.S. 18-5-319	No
Public Notice, Paid by Applicant	Yes
Newspaper Legal Notice, Paid by Applicant	No
Adjacent Property Owner Letter, Paid by Applicant	Yes
Miscellaneous Notes	The project is a Site Plan for the proposed AI Data Center facility to be located west of US 85 and south of Chalk Bluff Road. Project parties will include Crusoe, DPR, and Tallgrass. A zone change to a PUD zone district is currently going through the planning process for this new business park being established by Tallgrass. Approx. 350-500 f/t employees. This facility will consist of four buildings along with a power plant. Construction will be all buildings completed within weeks of each other. *** WYDOT (Taylor McCort 307-745-2117) is the contact for the access permits off Highway 85 and Road 223. He requests a Traffic Impact Study for both the construction period and operation period. The study will serve for both the power plant and data centers. Permits through WYDOT will be needed for fiber in and out of the site and to be aware of the packed corridor on S. Greeley Highway and I-25. Show where construction employee parking will be if onsite.

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3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

Miscellaneous Notes (2)	Public Works (Molly Cook 307-633-4302) If other accesses will be used permits will be required from Public Works. The interior roads will be private roads but be aware they must be built to meet IFC requirements that require a minimum of 20 feet. *** BOPU (Frank Strong 307-637-6430) said he'd like a meeting to discuss water and sewer. BOPU will only provide service to the Data Center with the Power Plant using a well and septic.The cooling system is closed and will reuse the approx. 2 million gallons of water it requires. *** Fire District #1 (Jeff Shaffer 307-274-1622) asked about the proximity of perimeter roads and overhead lines.
Miscellaneous Notes (3)	Building Permits (Dan Peters 307-775-7462) said that temporary offices wold require a building permit and be requested at time of grading permit. Dan would like to have a meeting to discuss plans when completed. *** A grading permit will be required and can be submitted concurrent with the Site Plan, but would be at their risk the plan wasn't approved. Include BMP map along with the DEQ permit when applying. ****Environmental Health (307-633-4090) will provide a list of vendors for port a pots. *****County Engineer (Scott Larson 307-634-9064) will review the site plan application and can be contacted with any questions. ***** Costs for the site plan includes permit fees, notification of adjoining property owners, signs, and engineer review fees. The permit will be approved administratively and take approximately 6 weeks from submission to approval. Discussion with the BOCC indicated they would regulate the project so Industrial Siting Council will not be involved.

CONDITIONS

Laramie County, WY

Laramie County Planning and Development Office

3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

* Disclaimer: These are intended as guidance only. Fee calculations are determined at the time of application, and issues that arise during review periods are not always anticipated at pre-application stage. Public Records Act: This document and any documents provided by the applicant to Planning may constitute a public record under W.S.S. 16-4-201 et seq. Applicants are advised not to divulge any information at a Pre-Application Meeting with Planning that they do not yet desire to be public information.

* A traffic study may be required for any site plan, subdivision permit, or access request for any development and shall be required for any project or development that will generate 100 or more trips during any hour or over 200 trips per day. Traffic studies shall be prepared by a qualified civil engineer licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice engineering in Wyoming. The applicant and the engineer shall meet with the County prior to preparation of the traffic study to discuss specific issues or concerns. The Director of Planning and Development may waive a traffic study based on estimated ADT, and peak hour trips, or existing road or site conditions, including adequate pedestrian access.

* Requests for waivers for drainage impact studies shall be made in writing to the Laramie County Public Works Department. The County shall review the request and approve the grant for a waiver or identify the level of study required for the proposed development action. Laramie County Public Works may waive the requirement for drainage study based on the following: a. Information is provided to substantiate there are no potential drainage problems at the site or downstream of the site (including impacts to downstream floodplains). b. The development or redevelopment will not result in an increase in the historic impervious area. c. The development or redevelopment of an area is immediately adjacent to a major drainageway that is capable of conveying the fully developed basin 100-year flood without impact to the base flood elevation. d. The development or redevelopment is unlikely to create drainage problems.

* A waiver or alternative to the required landscaping may be presented to the Planning and Development Director for review. The Director shall approve the proposed alternative landscape plan based on the following criteria: A. the proposed alternative meets or exceeds the intent of this regulation, and B. the proposed alternative is well-integrated with the surrounding landscaping and land uses, and C. the proposed alternative meets the goals of Laramie County Comprehensive Plan and; D. the purpose of the required site plan is to legalize an existing use and the impact or benefits of the landscape plan on the property would be minimal; or E. the landscaping as required would prohibit reasonable use of the property.

DRAFT

Attachment B:
Site Plan Application Form

Site Plan Application - Laramie County, Wyoming

Give Application To:
Laramie County Planning and Development
3966 Archer Parkway – Cheyenne, WY 82009
planning@laramiecounty.com

Complete Application, Required Documents and Initial Payment Required at Time of Filing.

Pre- Application Meeting Date 0806/2025

Name of Project Project Tembo - Switchgrass Industrial Data Center

OWNER ttach a separate sheet if there are additional property owners

Name LAZY D GRAZING ASSOC INC Phone 970 381-5397

Address 1609 WCR 120 City CARR State CO Zip Code 80612

Email Lazy DClub@Gmail.com

APPLICANT

Name Crusoe Energy Systems LLC Phone

Address 255 Fillmore St #300 City Denver State CO Zip Code 80206

Email smartin@crusoe.ai

LOCATION

Legal Description Section 5, Twp 12N, Range 66W

Site Address 154 HWY 85 Site Area: Acres 620.75 *or* Site Square Feet

Site Location Description (If Address is Unavailable) Township 12 North, Range 66 West of the 6th P.M Laramie County, Wyoming, Situated in Section 5, West of Hwy 85 and South of Terry Ranch Road

Current Zoning PUD Current Land Use Agricultural/Rural

DEVELOPMENT INFORMATION

Description of proposed use(s).

Data center campus, to include data center buildings, parking, access roads, & temporary construction structures

Required Documents/Initial fee due at time of submittal. Determined at Pre-Application meeting.
Site Plan Drawing, Landscape Plan Drawing, Digital copy of all files.
Pre-Application Notes, Project Narrative Letter, Warranty Deed.FAA Approval, if necessary
GESC Permit Application, Drainage and or Traffic Study or Waiver Request Letter, Sign details.

I hereby certify that I am the owner/applicant named herein and that I have familiarized myself with the rules and regulations with respect to the filing of this application and that the foregoing statements and answers contained on the application and in required documents are true and accurate to the best of my knowledge. I understand that the Site Plan approved by the Laramie County Planning and Development Office represents a commitment by me to carry out the construction of the project as represented. Any and all modification to the "Approved Site Plan" must be coordinated through the Laramie County Planning and Development Office, at which time a determination will be made as to the need for an amended Site Plan and/or additional Administrative or Board review. I also understand that the site will be examined during the final inspection for compliance with the "Approved Site Plan" of record. NOTE: unapproved modifications to the site may be cause for non-issuance of a "Certificate of Compliance". The undersigned do hereby agree to pay all fees associated with this application. It is understood an incomplete submittal will not be accepted. **ORIGINAL SIGNATURE OF BOTH THE OWNER AND THE APPLICANT ARE REQUIRED FOR SUBMISSION OF THIS APPLICATION**

Signature of Owner [signature] Date October 14, 2025

Printed Name LAZY D GRAZING ASSOCIATION, INC.

Signature of Applicant Date

Printed Name

Attachment C: Proof of Ownership

136

RECORDED MAY 19 1965 AT 12:27 O'CLOCK P.M.

69759

RECEPTION NO. LESTER R. GOPP, Recorder

BOOK 815

SPECIAL WARRANTY DEED

THIS DEED, Made this 17th day of May, 1965, between TERRY LAND AND LIVESTOCK COMPANY, INC., a corporation duly organized and existing under and by virtue of the laws of the State of Wyoming, of the first part, and LAZY D GRAZING ASSOCIATION, a corporation duly organized and existing under and by virtue of the laws of the State of Colorado, of the second part;

WITNESSETH, That the said party of the first part, for and in consideration of the sum of Ten Dollars and other good and valuable considerations, to the said party of the first part, in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has granted, bargained, sold and conveyed and by these presents does grant, bargain, sell, convey and confirm unto the said party of the second part, its successors and assigns forever, all that certain property, real estate, premises and appurtenances situated in the County of Laramie, and State of Wyoming set forth and described on Schedule "A" attached hereto and by this reference made a part hereof; together with all improvements located thereon, and all water, water rights, storage, ditches and canals appurtenant thereto or used in connection therewith; also together with all and singular the hereditaments and appurtenances thereunto belonging, or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof; and all the estate, right, title, interest, claim and demand whatsoever, of the said party of the first part, either in law or equity, of, in and to the above bargained premises, with the hereditaments and appurtenances; EXCEPTING and RESERVING therefrom however, unto TERRY LAND AND LIVESTOCK COMPANY, INC., party of the first part, its successors and assigns, all gas, casinghead gas, oil, and other minerals valuable as a source of petroleum in and under said lands and appurtenances thereto, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for gas, casinghead gas, oil, and other minerals valuable as a source of petroleum in and under said lands, and storing, handling, transporting and marketing same therefrom with the right to remove all property and improvements placed thereon by party of the first part, its successors and assigns;

TO HAVE AND TO HOLD, the said premises above bargained and described with the appurtenances, unto LAZY D GRAZING ASSOCIATION, the said party of the second part, its successors and assigns forever.

And the said party of the first part, for itself and its successors covenants and agrees to and with the said party of the second part, its successors and assigns, the above bargained premises in the quiet and peaceable possession of the said party of the second part, its successors and assigns against all and every person or persons lawfully claiming or to claim the whole or any part thereof, by, through or under the said party of the first part, to WARRANT AND FOREVER DEFEND, subject however to all easements, rights-of-way, covenants, conditions, restrictions and reservations, and to the 1965 general property taxes.

IN WITNESS WHEREOF, The said party of the first part has caused its corporate name to be hereunto subscribed by its _____ President, and its corporate seal to be hereunto affixed, attested by its _____ Secretary, the day and year first above written.

ATTEST:

Secretary

TERRY LAND AND LIVESTOCK COMPANY, INC.

By: Paul Etchepare
President

STATE OF COLORADO)
) ss.
CITY AND COUNTY OF DENVER)

On this 17th day of May, 1965 before me appeared Paul Etchepare to me personally known, who, being by me duly sworn did say that he is the _____ President of TERRY LAND AND LIVESTOCK COMPANY, INC., and that the seal affixed to said instrument is the corporate seal of said corporation and that said instrument was signed and sealed in behalf of said corporation by authority of its board of directors and said Paul Etchepare acknowledged said instrument to be the free act and deed of said corporation.

Given under my hand and Notarial Seal the day and year first above written.

Florence H. Morris
Notary Public

My Commission Expires: My Commission expires Jan. 14, 1969

191.10

SCHEDULE "A"

Attached to and forming a part of Special Warranty Deed dated May 17, 1965 between TERRY LAND AND LIVESTOCK COMPANY, INC., of the first part, and LAZY D GRAZING ASSOCIATION, of the second part.

TOWNSHIP 12 NORTH, RANGE 66 WEST OF THE 6TH P.M.

Section 5: All
Section 6: E½
Section 7: All
Section 8: S½
Section 9: All, EXCEPT that part conveyed to State of Wyoming described in Book 564 at page 425.
Section 15: All in State of Wyoming
Section 17: All
Section 19: Lots 1, 2, 3 and 4 in State of Wyoming
Section 21: Lots 2, 3 and 4 in State of Wyoming

TOWNSHIP 13 NORTH, RANGE 66 WEST OF THE 6TH P.M.

Section 31: S½

Attachment D: Phasing Plan



LEGEND

- PROPERTY LINE
- LOT LINE
- EXISTING EASEMENT LINES
- PROPOSED EASEMENT LINES
- CURB AND GUTTER
- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- PHASE 5
- PHASE 6

PHASING NOTES:

PHASE 1: ALL DEVELOPMENT WITHIN PHASE 1 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS. DEVELOPMENT SHALL INCLUDE INFRASTRUCTURE REQUIRED FOR THE FOLLOWING BUILDING PHASES. TWO DETENTION PONDS AND TRUNKLINE STORMWATER INFRASTRUCTURE FOR EACH BUILDING WILL BE BUILT IN PHASE 1 FOR STORMWATER MITIGATION THROUGHOUT THE CONSTRUCTION PROJECT. THE MAIN SANITARY SEWER, WATER AND ROADWAY INFRASTRUCTURE WILL BE BUILT IN PHASE 1, INCLUDING STUBS FOR BUILDINGS 1-4.

PHASE 2: ALL DEVELOPMENT WITHIN PHASE 2 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS. THIS DEVELOPMENT WILL INCLUDE THE CONSTRUCTION OF BUILDING 1, AND ASSOCIATED STORM, WATER AND SANITARY UTILITIES UTILIZING THE STUBS PROVIDED IN PHASE 1. THE ANCILLARY BUILDINGS AND ASSOCIATED UTILITIES WILL ALSO BE COMPLETED WITHIN PHASE 2 OF DEVELOPMENT.

PHASE 3: ALL DEVELOPMENT WITHIN PHASE 3 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS. THIS DEVELOPMENT WILL INCLUDE THE CONSTRUCTION OF BUILDING 2, AND ASSOCIATED STORM, WATER AND SANITARY UTILITIES UTILIZING THE STUBS PROVIDED IN PHASE 1.

PHASE 4: ALL DEVELOPMENT WITHIN PHASE 4 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS. THIS DEVELOPMENT WILL INCLUDE THE CONSTRUCTION OF BUILDING 3, AND ASSOCIATED STORM, WATER AND SANITARY UTILITIES UTILIZING THE STUBS PROVIDED IN PHASE 1.

PHASE 5: ALL DEVELOPMENT WITHIN PHASE 5 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS. THIS DEVELOPMENT WILL INCLUDE THE CONSTRUCTION OF BUILDING 4, AND ASSOCIATED STORM, WATER AND SANITARY UTILITIES UTILIZING THE STUBS PROVIDED IN PHASE 1.

PHASE 6: ALL DEVELOPMENT WITHIN PHASE 6 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS. THIS DEVELOPMENT WILL INCLUDE THE CONSTRUCTION OF BUILDING 5, AND ASSOCIATED STORM, WATER AND SANITARY UTILITIES UTILIZING THE STUBS PROVIDED IN PHASE 1.

GENERAL NOTES:

1. THE DEVELOPER SHALL CONSTRUCT ANY OFF-SITE ROADWAY OR EMERGENCY CROSSINGS IMPROVEMENTS PER LARAMIE COUNTY STANDARDS NECESSARY TO FACILITATE EMERGENCY VEHICULAR ACCESS TO THE SITE.

NORTH

GRAPHIC SCALE IN FEET
0 250 500 1000

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

NO.	REVISION	BY	DATE	APPR

Kimley»Horn
2025 KIMLEY-HORN AND ASSOCIATES, INC.
6200 South Syracuse Way, Suite 300
Greenwood Village, Colorado 80111 (303) 228-2300

DESIGNED BY: CRM
DRAWN BY: CMS
CHECKED BY: SAL
DATE: 11/14/2025

PROJECT JADE
LARAMIE COUNTY, WYOMING
SITE PLAN
PHASING PLAN

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
296242000

DRAWING NAME
296242_PHASING PLAN.DWG

EX-1

G:\MCV\CC2025\KIMLEY-HORN\296242000_LARAMIE COUNTY DATA CENTER\PROJECT FILES\CAD\PLANSHEETS\SITE PLAN\SITE PLAN - PARCEL 5

Attachment E: Site Plan



NORTH

GRAPHIC SCALE IN FEET
0 125 250 500
SCALE: 1" = 250'

CONFIDENTIAL

Kimley»Horn
6200 SOUTH SYRACUSE WAY
SUITE 300
GREENWOOD VILLAGE, COLORADO, 80111
303.228.2300

NOTE: THIS PLAN IS CONCEPTUAL IN NATURE

DWG NAME
LAST SAVED
C:\ACCDOCS\KIMLEY-HORN\296242000_LARAMIE COUNTY DATA CENTER\PROJECT FILES\ADMIN\CORRESPONDENCE\LETTERS\LARAMIE COUNTY SITE PLAN NARRATIVE\APPENDICES\CRUSOE\XBM.DWG
11/4/2025 8:41 AM

Laramie County

Site Plan Application

BFC Power and Cheyenne Power Hub Project

Tallgrass Integrated Logistics Solutions, LLC

Laramie County, Wyoming

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Attachments

Attachment A. Pre-Application Meeting Materials

Attachment B: Site Plan Application Form

Attachment C: Proof of Ownership

Attachment D: Site Plan

Executive Summary

Tallgrass Integrated Logistics Solutions, LLC ("Tallgrass ILS", the "Applicant" and "Owner"), intends to build a power plant (project named "BFC Power and Cheyenne Power Hub Project" or the "Project") within Laramie County, Wyoming approximately 6 miles south of Cheyenne, to support a planned data center within the Switch Grass Industrial Park. The site is generally located west of U.S. Highway ("US-85") and about 2 miles south of Terry Ranch Road ("SR 223").

The Project includes the development of Section 7, an approximately 659-acre parcel of undeveloped land. This will include a Site Plan package as required by Laramie County. The Site Plan package for the Project includes: a Grading Erosion and Sediment Control ("GESC") permit application, a Traffic Impact Study and Drainage Study, pre-application meeting notes, a project narrative, a warranty deed, a Site Plan and Landscape Plan. Tallgrass ILS will own the property located within the existing Switchgrass Industrial Park and have overall site control. BFC Power LLC and Cheyenne Power Hub LLC are proposing to construct their respective phases of the BFC Power Project and Cheyenne Power Hub Project on the property which includes power generation facilities that will produce electricity for a proposed co-located data center. The development will include road improvements to make the necessary connections to U.S. Highway 85.

The Project layout was developed to minimize noise, wildlife impacts, visual impacts, and traffic impacts to the surrounding community, while maximizing use of the available land. The location of the Project is proposed to be in a rural section of the county and is surrounded by privately owned land and rural development.

The Project Owner will construct and operate the facilities in compliance with all applicable local, state, and federal codes, laws, orders, regulations, and rules.

1.0 Application Information

1.1 Applicant Overview and Background

Tallgrass Integrated Logistics Solutions, LLC ("Tallgrass ILS", the "Owner" or the "Applicant"), will be the developer and owner of the Project. Tallgrass is a leading infrastructure company focused on safely, reliably, and sustainably delivering energy. The primary contact for Tallgrass ILS is:

Travis Sinclair
Tallgrass Integrated Logistics Solutions, LLC
370 Van Gordon Street
Lakewood, CO 80228
travis.sinclair@tallgrass.com

1.2 Application Details

The Project will follow the permitting process detailed by Laramie County Land Use Regulations. A pre-application meeting was held with Laramie County on October 23, 2025. The Applicant's pre-application meeting minutes can be found in *Attachment A. Pre-application Meeting Materials*. Please refer to *Attachment B. Site Plan Application Form* for the completed application form.

In accordance with the Site Plan review process, the Applicant is submitting an electronic copy of the completed Site Plan Application, along with the application fee.

1.3 Proof of Ownership

Please refer to *Attachment C. Proof of Ownership* for proof of ownership consisting of Project site lease agreements.

2.0 Project Description

2.1 Project Purpose

Tallgrass ILS is proposing to build a power cogeneration facility, the BFC Power and Cheyenne Power Hub Project, in Section 7, Township 12N, Range 66W, Laramie County, Wyoming. The proposed project will be located within the Switchgrass Industrial Park. The power generation facility will provide power for a planned data center to be located within the boundary of the proposed Industrial Park.

2.2 Project Nature and Location

The Project area is on private grasslands in Laramie County, Wyoming, approximately 659 acres. The project area includes Tract 4 (83.96 acres) and Tract 5 (575.44 acres) of the Switchgrass Industrial Park. The project is located south of Cheyenne. The project is bound to the north and east by parcel numbers 12660210000200 and 12660510000200, to the west by parcel 12670210000100 and, to the south by parcel number 12661810100200. Regional access to the site will be primarily provided via

US-85.

The approximate central coordinates are:

- : LAT/LONG: 41.022293°, -104.819811°

Project Information	BFC Power and Cheyenne Power Hub Project
Location	West of US-85, and West of South Cheyenne Solar
Approximate Fenced Area	555 acres

Table 1. Preliminary Project Summary

2.2.1 Project Legal Description

The legal descriptions for the Project site are below.

Project Legal Description:
Township 12 North, Range 66 West of the 6th P.M., Laramie County, Wyoming
Situated in Section 7.

2.3 Project Construction

The construction the Project will be accomplished in three distinct work phases. The first phase is site preparation, the second is construction of the facility, and the third phase is clean-up and final reclamation of the non-operating areas of the facility.

2.4 Project Site Plan

A Project Site Plan, illustrating preliminary layout, design and access can be referenced in *Attachment D. Site Plan.* The Site Plan conforms to the requirements outlined in *Section 3-1-109 (c)* of the Laramie County Land Use Regulations.

2.5 Major Project Components

The major project components are listed below.

Fuel Cell Yard

A group of cells producing an electric current directly from a chemical reaction.

Combined Cycle Power Plants (CCPP)

Two separate combined cycle turbines.

Temporary Aeroderivative / Light Duty Cycle Turbines

Provide early generation for initial data center loads and for startup and backup power to CCPP units.

Permanent Aeroderivative / Light Duty Simple Cycle Turbines

Provide base load generation to supplement and back-up CCPP units.

2.6 Dependent Project Components

2.7 Land Use

The Project is proposed to be developed on private land that is currently used for seasonal cattle grazing, and is surrounded by rural, agricultural private land. The Project area is located in Fire District 1 and in Laramie County Tax District 0101. The Project area is zoned as a Planned Unit Development ("PUD"), as approved on October 7th, 2025, through the Switchgrass Industrial Park.

2.8 Project Waste Management

Federal and State of Wyoming waste management regulations will be followed during the development of the Project. Title 40 of the Code of Federal Regulations, the Resource Conservation and Recovery Act, gives the Environmental Protection Agency ("EPA") the authority to control and regulate material waste. All necessary steps outlined by the EPA will be taken during the construction and operation of the Project to minimize waste generation. The State of Wyoming does not have explicit regulations regarding waste management and typically defers to federal regulations.

All waste generated at the Project site during the construction and operation of the facility will be appropriately classified as hazardous or nonhazardous and will be handled accordingly. All construction personnel will be responsible for waste classification prior to storage and disposal of substances at the Project site. An on-site project coordinator will be designated, who will be responsible for ensuring all contractors are following proper classification and management procedures.

General Nonhazardous waste may include metal, paper, wood, glass, plastics and concrete waste. This waste will be stored in designated containers in a designated nonhazardous waste area on the Project site. Metal, paper, wood and glass will be recycled if possible and properly disposed of, at licensed off-site processing facilities. Concrete waste will be segregated from other non-hazardous waste and will be recycled by a licensed concrete recycler. In the event there is liquid waste, it will be stored in designated wash areas and hauled offsite to limit environmental impacts. Excess soil generated during construction earthwork activities will be balanced with cut areas on site and used as fill as much as possible. Soil will be stockpiled onsite in a manner that follows proper erosion control practices.

General hazardous waste commonly produced during construction may consist of equipment cleaning wastes, spent batteries, and excess oil and paint. If there are used oil filters on site, they will be drained

of all free-flowing oil prior to being recycled. All hazardous waste will be properly identified, stored and recycled while on site and will be hauled for off-site processing by licensed contractors. All hazardous storage containers will be properly labeled as HAZARDOUS WASTE and labels will include material name, type of waste, name and address of source and start date of accumulation for proper tracking and documentation. Hazardous waste will be stored away from non-hazardous waste in a designated and protected storage area. Hazardous waste will not be improperly stored and will be periodically inspected for compliance.

When waste is being transported, proper care will be taken to ensure spills do not occur in transit. In the unlikely event of a spill, site managers, contractors, sub-contractors, and anyone else present on site will follow Wyoming Department of Environmental Quality ("WYDEQ") spill reporting standards on the Wyoming DEQ's Spill and Complaint website.

Sanitary waste generated on site during construction will be collected and contained in portable, chemical toilets with secondary containment in place. The waste will be removed periodically by licensed tanker trucks and transported to the nearest wastewater treatment plant.

3.0 References

Attachment A. Pre-Application Meeting Materials

Laramie County, WY

Laramie County Planning and Development Office

3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

PERMIT

PA-25-00101

PRE-APPLICATION MEETINGS

SITE ADDRESS: 154 US 85 CHEYENNE
PRIMARY PARCEL: 12660510000200
PROJECT NAME: SWITCHGRASS DATA CENTER SITE PLAN

ISSUED: 10/23/2025
EXPIRES: 04/21/2026

APPLICANT: Travis Sinclair
5956 Sherry Ln
Dallas, TX 75225
7135038728

OWNER: LAZY D GRAZING ASSOC INC
1609 WCR 120
CARR, CO 80612

Detail Name	Detail Value
Meeting Date	10/23/2025
MEETING AM OR PM	AM
Application Types	Site Plan
Attendees	Online (Teams Meeting)
Property Interest	Owner
Detailed Project Narrative	Site plan for Switchgrass data center, power plant.
Staff Attending	JA DP SP CC TM ME SL
Application Fees	Yes
Copy of Pre-App Notes	REQUIRED FOR APPLICATION SUBMITTAL
Project Narrative Letter	Yes
Warranty Deed and/or Lease Agreement	Yes
Development Action	Site Plan
Drainage Plans	Yes
Drainage Study	Yes
Traffic Study	Yes
Public Safety Fees Acknowledgement Letter	No
Community Facility Fees Acknowledgement Letter	No
WY DEQ Chapter 23 Study/Submittal Letter	No
Development Agreement	No
Roadway Maintenance Plan	TBD

Laramie County, WY

Laramie County Planning and Development Office

3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

Road/Easement Use Agreement	TBD
Right-of-Way Construction Permit	Yes
Engineer Review - Paid by Applicant	Yes
Environmental Health Review/Approval	Yes
Environmental and Services Impact Report	No
GESC Permit	Yes, Standard
Floodplain Development Permit	No
Perimeter Fence Construction per W.S.S. 18-5-319	No
Public Notice, Paid by Applicant	Yes
Newspaper Legal Notice, Paid by Applicant	Yes
Adjacent Property Owner Letter, Paid by Applicant	Yes
Miscellaneous Notes	Power plant in section 7: This entire section will contain the power plant facility. WYPDES will be required. The areas that are described as “future development” can be phased for the future requirements if they are listed on the site plan and the site plan shows phasing. Otherwise the site plan will need an amendment when this portion is ready for construction. BOCC has requested that this site plan go before them for approval just for public transparency. The site plan process will include pertinent agency review and possible corrections to the site plan. Once the site plan review process has been completed it will go before BOCC for approval, denial, or table for a later date.

3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

Miscellaneous Notes (2)	Upon approval a Certificate of Review (COR) will be issued along with an approved site plan that the site will need to be built to accordingly. Grading permits can be issued “at risk” with a letter of request so dirt work can begin prior to approval of the site plan. The COR will trigger your ability to pull building permits. Periodic site inspections from the Planning Department will occur during the construction phase. Upon completion of phased work or overall site work a Certificate of Compliance and/or Certificate of Occupancy will be issued allowing operations. Seth Lloyd City of Cheyenne: Unless you need BOPU water, the city doesn’t have any comments for section 7. WYDOT Ralph Engineer: They control Terry Ranch and US 85, there are worksheet manuals for traffic signals and ROW work will need permitting.
Miscellaneous Notes (3)	WYDOT cont’d: US 85 ROW is getting pretty loaded with utilities so work here will be limited. Taylor McCort: Traffic Impact study is req’d and is already in process. Headquarters personnel will look at a project of this magnitude. Kimley-Horn: will request further discussion with Taylor for access permits for the projects. They will not need all four access points. Fees for the projects: Site plan $500, development action sign $26, Engineer review fees TBD actual costs, legal ad TBD actual costs, first class mailers to adjacent owners within 500 feet TBD actual costs. Landscape will be reviewed by the Engineer and these are in accordance with the PUD.

CONDITIONS

* Disclaimer: These are intended as guidance only. Fee calculations are determined at the time of application, and issues that arise during review periods are not always anticipated at pre-application stage. Public Records Act: This document and any documents provided by the applicant to Planning may constitute a public record under W.S.S. 16-4-201 et seq. Applicants are advised not to divulge any information at a Pre-Application Meeting with Planning that they do not yet desire to be public information.

3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

* A traffic study may be required for any site plan, subdivision permit, or access request for any development and shall be required for any project or development that will generate 100 or more trips during any hour or over 200 trips per day. Traffic studies shall be prepared by a qualified civil engineer licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice engineering in Wyoming. The applicant and the engineer shall meet with the County prior to preparation of the traffic study to discuss specific issues or concerns. The Director of Planning and Development may waive a traffic study based on estimated ADT, and peak hour trips, or existing road or site conditions, including adequate pedestrian access.

* Requests for waivers for drainage impact studies shall be made in writing to the Laramie County Public Works Department. The County shall review the request and approve the grant for a waiver or identify the level of study required for the proposed development action. Laramie County Public Works may waive the requirement for drainage study based on the following: a. Information is provided to substantiate there are no potential drainage problems at the site or downstream of the site (including impacts to downstream floodplains). b. The development or redevelopment will not result in an increase in the historic impervious area. c. The development or redevelopment of an area is immediately adjacent to a major drainageway that is capable of conveying the fully developed basin 100-year flood without impact to the base flood elevation. d. The development or redevelopment is unlikely to create drainage problems.

* A waiver or alternative to the required landscaping may be presented to the Planning and Development Director for review. The Director shall approve the proposed alternative landscape plan based on the following criteria: A. the proposed alternative meets or exceeds the intent of this regulation, and B. the proposed alternative is well-integrated with the surrounding landscaping and land uses, and C. the proposed alternative meets the goals of Laramie County Comprehensive Plan and; D. the purpose of the required site plan is to legalize an existing use and the impact or benefits of the landscape plan on the property would be minimal; or E. the landscaping as required would prohibit reasonable use of the property.

Attachment B:
Site Plan Application Form

Docusign Envelope ID: 246B0B85-F0C3-444D-846F-DE7A173F9CBB

Site Plan Application - Laramie County, Wyoming

Give Application To:
Laramie County Planning and Development
3966 Archer Parkway – Cheyenne, WY 82009
planning@laramiecounty.com

Complete Application, Required Documents and Initial Payment Required at Time of Filing.

Pre- Application Meeting Date 11/19/2025

Name of Project BFC Power and Cheyenne Power Hub Project

OWNER ttach a separate sheet if there are additional property owners

Name LazyD Grazing Assoc INC Phone 970-381-5397

Address 1609 WCR 120 City Carr State CO Zip Code 80612

Email LazyDClint@gmail.com

APPLICANT

Name Tallgrass Integrated Logistics Solutions, LLC Phone 214-592-1692

Address 370 Van Gordon Street City Lakewood State CO Zip Code 80228

Email travis.sinclair@tallgrass.com

LOCATION

Legal Description Section 7, Twp 12N, Range 66W

Site Address 154 Highway 85 Site Area: Acres 569 *or* Site Square Feet _____

Site Location Description (If Address is Unavailable) Township 12 North, Range 66 West of the 6th PM, Laramie
Situated in Section 7, West of Highway 85 and South of Terry Ranch Road.

Current Zoning PUD Current Land Use Agricultural/Rural

DEVELOPMENT INFORMATION

Description of proposed use(s).

Power generation plant and associated infrastructure.

Required Documents/Initial fee due at time of submittal. Determined at Pre-Application meeting.
Site Plan Drawing, Landscape Plan Drawing, Digital copy of all files.
Pre-Application Notes, Project Narrative Letter, Warranty Deed.FAA Approval, if necessary
GESC Permit Application, Drainage and or Traffic Study or Waiver Request Letter, Sign details.

I hereby certify that I am the owner/applicant named herein and that I have familiarized myself with the rules and regulations with respect to the filing of this application and that the foregoing statements and answers contained on the application and in required documents are true and accurate to the best of my knowledge. I understand that the Site Plan approved by the Laramie County Planning and Development Office represents a commitment by me to carry out the construction of the project as represented. Any and all modification to the "Approved Site Plan" must be coordinated through the Laramie County Planning and Development Office, at which time a determination will be made as to the need for an amended Site Plan and/or additional Administrative or Board review. I also understand that the site will be examined during the final inspection for compliance with the "Approved Site Plan" of record. NOTE: unapproved modifications to the site may be cause for non-issuance of a "Certificate of Compliance". The undersigned do hereby agree to pay all fees associated with this application. It is understood an incomplete submittal will not be accepted. **ORIGINAL SIGNATURE OF BOTH THE OWNER AND THE APPLICANT ARE REQUIRED FOR SUBMISSION OF THIS APPLICATION**

Signature of Owner See attached signature page Date 11/21/2025

Printed Name _____

Signature of Applicant Signed by: Travis Sinclair DBAD32FF8B6846E... Date 11/21/2025

Printed Name Travis Sinclair

Docusign Envelope ID: 4EE31980-69A8-4923-9118-B185531B2909

Site Plan Application – Laramie County, Wyoming
SIGNATURE PAGE

DocuSigned by:
F48D6635FA9041B...

11/20/2025

Signature of Owner | Date

Juluis E. Peterson, President
Printed Name

Signed by:
Clinton A. DePorter
043D22BFC65A4EC...

11/20/2025

Signature of Owner | Date

Clinton A. DePorter, Secretary
Printed Name

Site Plan Application - Laramie County Planning and Development

1. Application with pre-application meeting notes and digital copy of all files – attached.
2. Project Narrative and Warranty Deed – attached.
3. GESC permit Application – attached.
4. Studies
   4.1 Drainage Study – attached.
   4.2 Traffic Study – attached.
5. Payment of required fees at time of submittal.
6. FAA Approval, if necessary - FAA clearance will be requested by December 15, 2025 in support of the project construction. A copy of the response can be provided upon receipt.
7. Site Plan – attached.
8. Landscape Plan – attached.

Attachment C: Proof of Ownership

136

RECORDED MAY 19 1965 AT 12:27 O'CLOCK P.M.

69759

RECEPTION NO. LESTER R. GOPP, Recorder

BOOK 815

SPECIAL WARRANTY DEED

THIS DEED, Made this 17th day of May, 1965, between TERRY LAND AND LIVESTOCK COMPANY, INC., a corporation duly organized and existing under and by virtue of the laws of the State of Wyoming, of the first part, and LAZY D GRAZING ASSOCIATION, a corporation duly organized and existing under and by virtue of the laws of the State of Colorado, of the second part;

WITNESSETH, That the said party of the first part, for and in consideration of the sum of Ten Dollars and other good and valuable considerations, to the said party of the first part, in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has granted, bargained, sold and conveyed and by these presents does grant, bargain, sell, convey and confirm unto the said party of the second part, its successors and assigns forever, all that certain property, real estate, premises and appurtenances situated in the County of Laramie, and State of Wyoming set forth and described on Schedule "A" attached hereto and by this reference made a part hereof; together with all improvements located thereon, and all water, water rights, storage, ditches and canals appurtenant thereto or used in connection therewith; also together with all and singular the hereditaments and appurtenances thereunto belonging, or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof; and all the estate, right, title, interest, claim and demand whatsoever, of the said party of the first part, either in law or equity, of, in and to the above bargained premises, with the hereditaments and appurtenances; EXCEPTING and RESERVING therefrom however, unto TERRY LAND AND LIVESTOCK COMPANY, INC., party of the first part, its successors and assigns, all gas, casinghead gas, oil, and other minerals valuable as a source of petroleum in and under said lands and appurtenances thereto, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for gas, casinghead gas, oil, and other minerals valuable as a source of petroleum in and under said lands, and storing, handling, transporting and marketing same therefrom with the right to remove all property and improvements placed thereon by party of the first part, its successors and assigns;

TO HAVE AND TO HOLD, the said premises above bargained and described with the appurtenances, unto LAZY D GRAZING ASSOCIATION, the said party of the second part, its successors and assigns forever.

And the said party of the first part, for itself and its successors covenants and agrees to and with the said party of the second part, its successors and assigns, the above bargained premises in the quiet and peaceable possession of the said party of the second part, its successors and assigns against all and every person or persons lawfully claiming or to claim the whole or any part thereof, by, through or under the said party of the first part, to WARRANT AND FOREVER DEFEND, subject however to all easements, rights-of-way, covenants, conditions, restrictions and reservations, and to the 1965 general property taxes.

IN WITNESS WHEREOF, The said party of the first part has caused its corporate name to be hereunto subscribed by its _____ President, and its corporate seal to be hereunto affixed, attested by its _____ Secretary, the day and year first above written.

ATTEST:

Secretary

TERRY LAND AND LIVESTOCK COMPANY, INC.

By: Paul Etchepare
President

STATE OF COLORADO)
) ss.
CITY AND COUNTY OF DENVER)

On this 17th day of May, 1965 before me appeared Paul Etchepare to me personally known, who, being by me duly sworn did say that he is the _____ President of TERRY LAND AND LIVESTOCK COMPANY, INC., and that the seal affixed to said instrument is the corporate seal of said corporation and that said instrument was signed and sealed in behalf of said corporation by authority of its board of directors and said Paul Etchepare acknowledged said instrument to be the free act and deed of said corporation.

Given under my hand and Notarial Seal the day and year first above written.

Florence H. Morris
Notary Public

My Commission Expires: My Commission expires Jan. 14, 1969

191.10

SCHEDULE "A"

Attached to and forming a part of Special Warranty Deed dated May 17, 1965 between TERRY LAND AND LIVESTOCK COMPANY, INC., of the first part, and LAZY D GRAZING ASSOCIATION, of the second part.

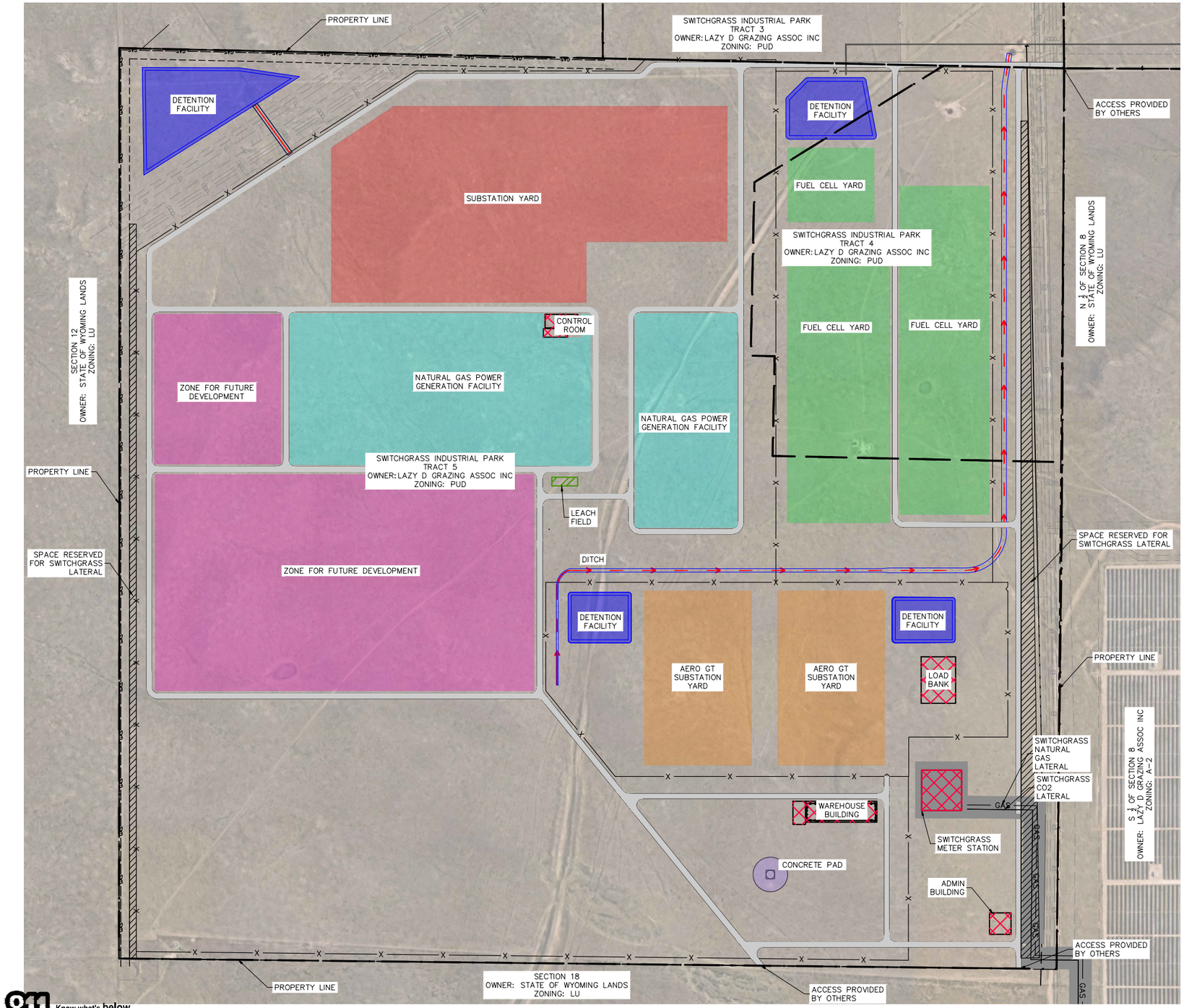
TOWNSHIP 12 NORTH, RANGE 66 WEST OF THE 6TH P.M.

Section 5: All
Section 6: E½
Section 7: All
Section 8: S½
Section 9: All, EXCEPT that part conveyed to State of Wyoming described in Book 564 at page 425.
Section 15: All in State of Wyoming
Section 17: All
Section 19: Lots 1, 2, 3 and 4 in State of Wyoming
Section 21: Lots 2, 3 and 4 in State of Wyoming

TOWNSHIP 13 NORTH, RANGE 66 WEST OF THE 6TH P.M.

Section 31: S½

Attachment D: Site Plan



LEGEND

- DETENTION FACILITY
- FUEL CELL YARD
- SUBSTATION YARD
- ZONE FOR FUTURE DEVELOPMENT
- NATURAL GAS POWER GENERATION FACILITY
- AERO GT SUBSTATION YARD
- CONCRETE PAD
- STOCKPILE
- LEACH FIELD
- OTHER ITEMS
- PROPOSED ROAD
- SWITCHGRASS UTILITY EASEMENT
- DRAINAGE SWALE

NOTES

1. PER THE SWITCHGRASS INDUSTRIAL PARK PLANNED UNIT DEVELOPMENT RULES, ALL BUILDINGS SHALL BE SET BACK AT LEAST 25 FEET FROM ALL EXTERNAL PROPERTY LINES.
2. PER THE SWITCHGRASS INDUSTRIAL PARK PLANNED UNIT DEVELOPMENT RULES, THERE ARE NO HEIGHT LIMITATIONS IN THIS DISTRICT UNLESS OTHERWISE PROVIDED BY STATE OR FEDERAL LAW.

NORTH

GRAPHIC SCALE IN FEET
0 150 300 600

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

NO.	REVISION	BY	DATE	APPR

Kimley»Horn
2025 KIMLEY-HORN AND ASSOCIATES, INC.
6200 South Syracuse Way, Suite 300
Greenwood Village, Colorado 80111 (303) 228-2300

DESIGNED BY: CRM
DRAWN BY: CMS
CHECKED BY: SAL
DATE: 11/21/2025

BFC POWER AND CHEYENNE POWER HUB PROJECT
LARAMIE COUNTY, WYOMING
SITE PLAN
OVERALL SITE PLAN

NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
296242000

DRAWING NAME
OVERALL SITE PLAN.DWG

EX-1

C:\ACCA\ACCDOCS\KIMLEY-HORN\296242000_LARAMIE COUNTY DATA CENTER\PROJECT FILES\CADD\PLANSHEETS\SITE PLAN\SITE PLAN - TALLGRASS

Permit Notes

Permit Number: PZ-25-00076
Parcel Number: 12660510000200
Site Address: 154 US 85
Cheyenne, WY 82007
Applicant: Litsas, Stephen
Owner: LAZY D GRAZING ASSOC INC
Project Description: The goal of Project Jade is to provide a new data center campus in partnership with Tallgrass Energy.

Submitted: 11/14/2025
Technically Complete: 11/17/2025
Approved:
Issued:

Begin Date	End Date	Permit Area	Subject	Note Type	Note Text	Created By
11/18/2025		Application	PZ-25-00076	GENERAL	WAPA is working with developer on this project. We have no conflict at this time.	ROGERS@LARAMIECOUNTYWY.GOV
11/19/2025		Workflow	ENVIRONMENTAL HEALTH REVIEW	GENERAL	If holding tanks are used for construction trailer wastewater, contact Environmental Health (307) 633-4090 for small wastewater permit. If porta-potties are utilized, temporary small wastewater permit is not required. Permanent structures plan to have BOPU water and sewer. If sanitary sewer does not happen, Environmental Health will have additional requirements. If food is provided to employees or customers, a food license is required.	TIFFANY.GAERTNER@LARAMIECOUNTYWY.GOV
11/19/2025	11/19/2025	Workflow	COUNTY REAL ESTATE OFFICE REVIEW	GENERAL	no comments	TERESA.LEMASTER@LARAMIECOUNTYWY.GOV
11/20/2025		Application	PZ-25-00076	GENERAL	1st Review 1.Drawing 22 labels the north access road as Chalk Bluff Road. I assume that was in error and this access road is not proposed to be a dedicated public roadway. 2.I do not see any details or dimensions and radii provided on both the access roadways. Per the LCLUR, the maximum radius allowed is 50 at the access to Hwy 85. I cannot find dimensions for the width of the access roads, etc. to make sure they comply with the regulations. It appears to be approximately 24, which would comply with the minimum requirements. 3.The drawings need to show if there is an existing access easement for both access roads off Hwy 85 or if new easements are being proposed. In either case, the existing and/or proposed access easements need to be shown on the site plan drawing. 4.The drawings show all the property to the north of this site is owned by Mr. Richard Juschka. However, the GIS shows there is a triangular property adjacent to Hwy 85 that is owned by Arp and Hammond Hardware Co. The proposed access road goes through this property; therefore, it needs to be shown on the site plan along with the owners information, zoning information, etc. 5.Per 5-2-104, the NOAA Atlas 14, Volume 12 shall be used for design rainfall intensity data for the specific location of the development. 6.On Sheet 17, there appears to be an error with regards to Pond A. It indicates the Spillway Invert has an elevation of	SCOTT.LARSON@LARAMIECOUNTYWY.GOV

Permit Notes

				6204.25 and the 100-Yr WSEL is listed at 6203.53 and it also indicates there is 1 foot of freeboard, but how can this be when the spillway elevation is higher than the HWL? Similarly, Pond B has almost the same elevation for the 100-year WSEL as it does for the spillway invert, but it also indicates it has 1' of freeboard. 7.Per 3-1-109.g.xxvi, there shall be a drainage easement established and recorded for the area encompassing the detention ponds. The easements shall be shown on the site plan drawing and a copy of the recorded easements shall be provided to the County for their records. 8.Per 5-2-105.b, the Engineers certification in the submitted Drainage Report needs to include the proper verbiage as indicated in this section of the regulations. 9.Per 5-2-103.b, the Drainage Report needs to show the results for all rainfall event frequencies of a 5-year, 10-year, 50-year, and 100-yr. 10.Per 5-2-103.e, post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50-year rate for a 100-year storm event. Drainage planning shall include a design to maintain post-development runoff rates to historic rates for all return periods. Please include in the conclusions section of the Drainage Report the existing and proposed peak flows for the 50-year storm event to show the release for the 100-yr event is at or below the 50-yr pre-development rate. The report currently summarizes the pre and post for the 100-year storm event only. 11.The Traffic Impact Study shows there will ultimately be four accesses that would be tied to this property as well as the proposed power plant. The site plan for this site should include the other access roads and they can be labeled as a future phase. It is assumed that the power plant site may be done by others with a separate submittal, but if this proposed data center can and will use all four accesses in the future, then these need to be shown on the site plan drawing. If the other two accesses will only be used by the proposed power plant and this data center will not have access to the other access roads, then they do not need to be shown on this site plan drawing.	
11/20/2025	Workflow	GIS REVIEW	GENERAL	Addresses are assigned along with the building permit.	CAMBIA.MCCOLLOM@LARAMIECOUNTYWY.GOV
11/21/2025	Application	PZ-25-00076	GENERAL	1.During Construction, There is no information over off peak time. Does the workforce stay on site for lunch or do they drive into the city for lunch? We will need to determine the number of employee trips during off peak. 2.I would like to see more detailed drawings on each intersection access from this site onto public roads.	CHRISTOPHER.YANEY@LARAMIECOUNTYWY.GOV

Permit Notes

11/24/2025		Application	PZ-25-00076	GENERAL	Please define plans for water and sanitary sewer. The phasing sheet (sheet 3) states "the main sanitary sewer, water, and roadway infrastructure will be built in phase 1, including stubs for buildings 1-4". No water or sanitary sewer lines appear to be shown with this submittal (even if they are only going to be connections to a central well or central septic system). Noted: landscape plan states 'no central water' is provided; however, Environmental Health is reviewing under the assumption permanent structures will be connected to the BOPU system. If BOPU water or sanitary sewer is needed for this project, this project will need an Outside User Agreement approval through the governing body of the City of Cheyenne or will need to be annexed to the City of Cheyenne. Outside User Agreements are not guaranteed and annexation could change many aspects of the site plan (at a minimum, jurisdiction submitted to). If proposed to use BOPU services, please meet with BOPU as soon as possible to discuss options and processes. No other comments.	SETH.LLOYD@LARAMIECOUNTYWY.GOV
11/24/2025	11/24/2025	Application	PZ-25-00076	GENERAL	Project must follow all LCLUR. Fire Department access and egress to the site must be accounted for through the LCLUR. Emergency plans should be provided to LCFD #1 and Cheyenne/Laramie County Emergency Management if available.	MATTHEW.BUTLER@LARAMIECOUNTYWY.GOV
11/24/2025	11/24/2025	Application	PZ-25-00076	GENERAL	The conservation district is always concerned about storm water management to minimize impacts to surface water, control of invasive plants and weed mitigation, and reclamation of the disturbed areas. Reclamation is outlined in the permit application, but effort should be taken to minimize a "monoculture" planting/reseeding of disturbed areas. The district would like to see a "native" seed mixture used to establish a native shortgrass prairie landscape. Water consumption is also a concern and would ask that the source of water for construction and continual operations and processes be defined, whether appropriated water, city water, or a new source (well). Draw down of the local aquifer is always a concern. Weed mitigation should be implemented until all disturbed areas are stabilized.	CONSERVATIONDISTRICT@LARAMIECOUNTYWY.GOV
11/26/2025		Application	PZ-25-00076	GENERAL	Please see review added as an attachment.	SUE.KINSLEY@LARAMIECOUNTYWY.GOV

Permit Notes

11/26/2025	Workflow	BUILDING FIRE CODE REVIEW	GENERAL	Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1. Fire Apparatus Roads required per 2024 IFC section 503. Fire protection water Supplies required per 2024 IFC section 507	DANIEL.PETERS@LARAMIECOUNTYWY.GOV
11/26/2025	Workflow	PUBLIC WORKS REVIEW	GENERAL	1. A separate access permit application through Public Works will be required for this tract. Please apply for your Public Works access permit on the SmartGov Portal. Call (307-633-4302) or email (permits@laramiecountywy.gov) Public Works with any questions. 1a. As a heads up, the access approach for this site will have to be paved (from the edge of pavement to the right-of-way line or 20 foot back, whichever is greater) to meet the access road condition (Chalk Bluff Road).	MOLLY.BENNETT@LARAMIECOUNTYWY.GOV
12/01/2025	Workflow	WYDOT REVIEW	GENERAL	1. Nowhere in the report is there a direct comparison of pre and post development discharges, specifically at the same point. Their calcs indicate an increase in discharge from the development of the land, but I can't tell how they keep the historic runoff rates beyond the limits of the project. I'm uncertain how much, if any, discharge is from the ponds. This report should have had some mention of the Power Hub development that has drainage that flows into this project. 2. Developers and landowners should be aware that any work or presence in the right of way created by development/construction for this project will need the appropriate permitting or licensing between the utility owner (or appropriate local agency for fence modifications) and WYDOT District 1 Maintenance (access permits are with D1 Traffic). Utility owners, including governmental entities, will be responsible for the licensing and/or permitting of all utility facilities in the WYDOT right-of-way. Other work in the ROW can be approved through a temporary use permit. Permits (except for access permits) and licenses can be acquired by contacting Michael Elliott (Michael.Elliott@wyo.gov, 307-745-2123).Also, the development must maintain historic drainage corridors so that drainage is not diverted to other entry points to the R/W. If drainage is affected in the highway right-of-way, a drainage study needs to demonstrate that post-development discharge rates are metered at or below pre-development rates for 2, 5, 10, 25, 50 and 100 year events and will need to be reviewed by WYDOT Bridge/Hydraulics Program. 3. The traffic study is being reviewed and I am working with Engineers to get back comments. WYDOT have received some temporary construction access permits and they are currently being reviewed.	TAYLOR.MCCORT@LARAMIECOUNTYWY.GOV

Permit Notes

					Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118). To obtain an access permit application (Access application (M-3A)) see the following link: https://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html The attached KMZ file is for location reference only, not official project or property limits.	
12/04/2025	12/04/2025	Application	PZ-25-00076	GENERAL	Please see the attached project permit recommendations from the Wyoming Game and Fish Department. Thank you!	WYGAMEFISHDEPT@LARAMIECOUNTYWY.GOV

December 19, 2025

Laramie County Planning and Development Office
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Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

***RE:* Project Jade Site Plan Review (PZ-25-00076) - COMMENT RESPONSE LETTER**

Dear Mr. Arnold,

Thank you for the comments on 11th December, 2025 for the above-mentioned project. In an effort to address your comments concisely and simplify your review of the Site Plan, we have summarized your comments and our responses below.

WAPA Review

1. WAPA is working with developer on this project. We have no conflict at this time.
   - *Response: Thank you.*

Environmental Health Review

2. If holding tanks are used for construction trailer wastewater, contact Environmental Health (307) 633-4090 for small wastewater permit. If porta-potties are utilized, temporary small wastewater permit is not required. Permanent structures plan to have BOPU water and sewer. If sanitary sewer does not happen, Environmental Health will have additional requirements. If food is provided to employees or customers, a food license is required.
   - *Response: DPR is currently working with Environmental Health for handling of wastewater flows during construction. Regarding Permanent Structures, this project does not drain to BOPU water and sewer; County applications will be submitted for on-site septic systems. Water will be provided by the Adjacent Site Plan Application (PZ-25-00078).*

County Real Estate Office Review

3. No comments
   - *Response: Acknowledged, thank you.*

Engineers Review

4. Drawing 22 labels the north access road as Chalk Bluff Road. I assume that was in error and this access road is not proposed to be a dedicated public roadway.
   - *Response: This was done in error and has been removed.*

5. I do not see any details or dimensions and radii provided on both the access roadways. Per the LCLUR, the maximum radius allowed is 50 at the access to Hwy 85. I cannot find dimensions for the width of the access roads, etc. to make sure they comply with the regulations. It appears to be approximately 24, which would comply with the minimum requirements.

- *Response: A detailed sheet has been added with dimensions and radii for both access roadways. These details are also being coordinate with WYDOT to obtain the appropriate permits for driveway construction.*

6. The drawings need to show if there is an existing access easement for both access roads off Hwy 85 or if new easements are being proposed. In either case, the existing and/or proposed access easements need to be shown on the site plan drawing.
   - *Response: Proposed easements to the site from Hwy 85 have been reflected within the updated Site Plan.*
7. The drawings show all the property to the north of this site is owned by Mr. Richard Juschka. However, the GIS shows there is a triangular property adjacent to Hwy 85 that is owned by Arp and Hammond Hardware Co. The proposed access road goes through this property; therefore, it needs to be shown on the site plan along with the owners information, zoning information, etc.
   - *Response: This information has been added to the site plan.*
8. Per 5-2-104, the NOAA Atlas 14, Volume 12 shall be used for design rainfall intensity data for the specific location of the development.
   - *Response: Rainfall intensity has been updated to the NOAA Atlas 14, Volume 12.*
9. On Sheet 17, there appears to be an error with regards to Pond A. It indicates the Spillway Invert has an elevation of 6204.25 and the 100-Yr WSEL is listed at 6203.53 and it also indicates there is 1 foot of freeboard, but how can this be when the spillway elevation is higher than the HWL? Similarly, Pond B has almost the same elevation for the 100-year WSEL as it does for the spillway invert, but it also indicates it has 1' of freeboard.
   - *Response: The 5, 10, 50, and 100 year flows will be controlled by the proposed outlet control structure. An emergency spillway will convey the 500-year flows. The maximum depth of flow across the spillway will not exceed 1 foot. Additionally, 1 foot minimum of freeboard will be provided from the top of the flows across the spillway to the top of pond.*
10. Per 3-1-109.g.xxvi, there shall be a drainage easement established and recorded for the area encompassing the detention ponds. The easements shall be shown on the site plan drawing and a copy of the recorded easements shall be provided to the County for their records.
    - *Response: Limits of proposed detention pond easements have been shown on the Site Plan. When recorded, these will be provided to the County for your records.*
11. Per 5-2-105.b, the Engineers certification in the submitted Drainage Report needs to include the proper verbiage as indicated in this section of the regulations.
    - *Response: Engineer certification verbiage has been updated to verbiage in 5-2-105.b.*
12. Per 5-2-103.b, the Drainage Report needs to show the results for all rainfall event frequencies of a 5-year, 10-year, 50-year, and 100-yr.
    - *Response: 5-year, 10-year, 50-year, and 100-year pre and post results have been added.*
13. Per 5-2-103.e, post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50-year rate for a 100-year storm event. Drainage planning shall include a design to maintain post-development runoff rates to historic rates for all return periods. Please include in the conclusions section of the Drainage Report the existing and proposed peak flows for the 50-year storm event to show the release for the 100-yr event is at or below the 50-yr pre-development rate. The report currently summarizes the pre and post for the 100-year storm event only.

- *Response: Conclusion has been updated to reflect 100-year release rate adhering to the existing 50-year rate.*

14. The Traffic Impact Study shows there will ultimately be four accesses that would be tied to this property as well as the proposed power plant. The site plan for this site should include the other access roads and they can be labeled as a future phase. It is assumed that the power plant site may be done by others with a separate submittal, but if this proposed data center can and will use all four accesses in the future, then these need to be shown on the site plan drawing. If the other two accesses will only be used by the proposed power plant and this data center will not have access to the other access roads, then they do not need to be shown on this site plan drawing.
    - *Response: Traffic Study has not been resubmitted with this Package; it is pending additional detail to be provided from WYDOT regarding background traffic (per WYDOT's request). It will be updated and shared with both the County and WYDOT once WYDOT is able to provide the requested background data. Regarding Access Points, they will be shared between the Power Plant and the Data Center. Two of which will be shown on the Data Center Site Plan; the other two will be shown on the Power Plan Site Plan.*

GIS Review

15. Addresses are assigned along with the building permit.
    - *Response: Acknowledged, thank you.*

Traffic Review

16. During Construction, There is no information over off peak time. Does the workforce stay on site for lunch or do they drive into the city for lunch? We will need to determine the number of employee trips during off peak.
    - *Response: It is anticipated that the craft workers will remain on-site during the work shift.*

17. I would like to see more detailed drawings on each intersection access from this site onto public roads.
    - *Response: Drawings for the two intersection access points have been added. It is anticipated the construction-documentation level will be provided with the Building Department review.*

Utility Review

18. Please define plans for water and sanitary sewer. The phasing sheet (sheet 3) states "the main sanitary sewer, water, and roadway infrastructure will be built in phase 1, including stubs for buildings 1-4". No water or sanitary sewer lines appear to be shown with this submittal (even if they are only going to be connections to a central well or central septic system).
    - *Response: Water will be provided by the adjacent Power Plant parcel (Parcel 6). It will be sourced from on-site wells, and will not be connected to the BOPU system. Septic will be provided on-site on a per-building basis. The location of the septic field have been provided on the Site Plan submission. The appropriate County permits will be obtained for these septic fields.*

19. Noted: landscape plan states 'no central water' is provided; however, Environmental Health is reviewing under the assumption permanent structures will be connected to the BOPU system.

    If BOPU water or sanitary sewer is needed for this project, this project will need an Outside User Agreement approval through the governing body of the City of Cheyenne or will need to be annexed to the City of Cheyenne.

Outside User Agreements are not guaranteed and annexation could change many aspects of the site plan (at a minimum, jurisdiction submitted to). If proposed to use BOPU services, please meet with BOPU as soon as possible to discuss options and processes.

No other comments.

- *Response: Permanent structures will not be connected to the BOPU system. Water will be from wells on the Power Plant property (Parcel 6).*

Fire Review

20. Project must follow all LCLUR. Fire Department access and egress to the site must be accounted for through the LCLUR. Emergency plans should be provided to LCFD #1 and Cheyenne/Laramie County Emergency Management if available.
    - *Response: Acknowledged, thank you. Details on gate access, etc will be provided with the Building Department submittals.*

Conservation District Review

21. The conservation district is always concerned about storm water management to minimize impacts to surface water, control of invasive plants and weed mitigation, and reclamation of the disturbed areas. Reclamation is outlined in the permit application, but effort should be taken to minimize a "monoculture" planting/reseeding of disturbed areas. The district would like to see a "native" seed mixture used to establish a native shortgrass prairie landscape. Water consumption is also a concern and would ask that the source of water for construction and continual operations and processes be defined, whether appropriated water, city water, or a new source (well). Draw down of the local aquifer is always a concern. Weed mitigation should be implemented until all disturbed areas are stabilized.
    - *Response: Native Seed is proposed for areas of disturbance on-site, requiring reclamation. Water will be provided from new wells installed on Section 6. The water will be provided by the Power Plant; it is understood that they will be sourcing from deep aquifers to avoid impacting the shallow, local aquifer systems.*

State Engineer's Office/Ground Water Division

22. Drilling of any water well requires an approved permit before work commences. The State Engineer water right permit grants the applicant the right to seek to develop a water supply to meet the proposed needs. It does not guarantee that water will be physically available.
    - *Response: Thank you, there will be no drilling of any water wells with this specific application.*

23. Any new proposed wells must be constructed in strict compliance with the State Engineer's Office Rules and Regulations, Part III, Water Well Minimum Construction Standards. Any deviation from the established Minimum Construction Standards must be approved in advance by Ground Water Staff.
    - *Response: There are no new proposed wells associated with this specific application.*

24. Any well or borehole not intended for use must be appropriately plugged and abandoned in accordance with the aforementioned rules and regulations.
    - *Response: Acknowledged. No new wells are associated with this specific application. Any existing wells will be plugged and abandoned in accordance with the rules and regulations.*

25. With limited exceptions, a Wyoming licensed water well drilling contractor must drill and construct new wells, and a Wyoming licensed pump installation contractor must install pumps.
    - *Response: There are no proposed wells with this specific application.*

26. Any wells developed for purposes that are not encompassed by the definition of domestic or stock use mandate adjudication by the Board of Control.
    - *Response: There are no proposed wells with this specific application.*

27. The proposed ponds/reservoirs associated with the project require permitting through the Surface Water Division (307-777-6475) per Wyoming Statute 41-3-301.
    - *Response: No ponds are proposed; only stormwater detention facilities. These will be permitted as stormwater detention only via the County.*

Building Fire Code Review

28. Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1.
    - *Response: Premises identification will be in accordance with 2024 IFC section 205. This will be provided during the Building Permit Department review.*

29. Fire Apparatus Roads required per 2024 IFC section 503.
    - *Response: Acknowledged, thank you.*

30. Fire protection water Supplies required per 2024 IFC section 507
    - *Response: Fire protection water to be supplied through proposed on-site hydrants.*

Public Works Review

31. A separate access permit application through Public Works will be required for this tract. Please apply for your Public Works access permit on the SmartGov Portal. Call (307-633-4302) or email (permits@laramiecountywy.gov) Public Works with any questions.
    - *Response: Permits will be obtain via WYDOT. Additional access to the parcel will be demonstrated to the County when legally obtained.*

32. As a heads up, the access approach for this site will have to be paved (from the edge of pavement to the right-of-way line or 20 foot back, whichever is greater) to meet the access road condition (Chalk Bluff Road).
    - *Response: Acknowledged, the access approach for this site will be paved.*

WYDOT Review

33. Nowhere in the report is there a direct comparison of pre and post development discharges, specifically at the same point. Their calcs indicate an increase in discharge from the development of the land, but I can't tell how they keep the historic runoff rates beyond the limits of the project. I'm uncertain how much, if any, discharge is from the ponds. This report should have had some mention of the Power Hub development that has drainage that flows into this project.
    - *Response: The site has been designed to maintain historical peak discharge rates. This is demonstrated by the Detention Facility release rates now included within the report. We strive to work with WYDOT to provide these comparison locations in your desired locations.*

34. Developers and landowners should be aware that any work or presence in the right of way created by development/construction for this project will need the appropriate permitting or licensing between the utility owner (or appropriate local agency for fence modifications) and WYDOT District

1 Maintenance (access permits are with D1 Traffic). Utility owners, including governmental entities, will be responsible for the licensing and/or permitting of all utility facilities in the WYDOT right-of-way. Other work in the ROW can be approved through a temporary use permit. Permits (except for access permits) and licenses can be acquired by contacting Michael Elliott (Michael.Elliott@wyo.gov, 307-745-2123). Also, the development must maintain historic drainage corridors so that drainage is not diverted to other entry points to the R/W. If drainage is affected in the highway right-of-way, a drainage study needs to demonstrate that post-development discharge rates are metered at or below pre-development rates for 2, 5, 10, 25, 50 and 100 year events and will need to be reviewed by WYDOT Bridge/Hydraulics Program.

- *Response: Acknowledged, thank you. Appropriate permits will be applied for post finalization of the Traffic Impact Study. Historic Drainage Patterns will be adhered to.*

35. The traffic study is being reviewed and I am working with Engineers to get back comments. WYDOT has received some temporary construction access permits and they are currently being reviewed.

    Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118). To obtain an access permit application (Access application (M-3A)) see the following link:

    https://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html

    The attached KMZ file is for location reference only, not official project or property limits.

    - *Response: Acknowledged, thank you for your assistance so far in obtaining access permits. We will continue to work with WYDOT to continue to resolve remaining comments.*

Wyoming Game and Fish Department Review

36. Reduce impacts to pronghorn and mule deer – The proposed site provides yearlong habitat to pronghorn and mule deer, which use the open landscape south of Cheyenne for foraging, raising fawns, and movement through to other essential seasonal habitats. Both the Chalk Hills Pronghorn Herd Unit and the Goshen Rim Mule Deer Herd Unit are substantially below their population objectives due to various impacts to these herds, including habitat conversion and other anthropogenic threats. Suburban and industrial developments, fencing, and road networks in and around the City of Cheyenne have increasingly limited the available habitat for these ungulate species. Conversion of rangeland habitat to industrial development effectively eliminates this habitat from use and also creates a movement barrier for big game that need to move between seasonal habitats in order to survive.
    We recommend the following measures be considered for conditions of the Project Jade Data Center permit:
    - **Maintain a minimum of 300 feet between the fenced perimeter of the Project and the Highway 85 right-of-way fence-line.** Maintaining an open pathway for big game to move between the Project and the surrounding industrial development in this area, such as the South Cheyenne Solar and Project Jade Data Center facilities, is critical to avoid creating complete barriers to big game movement across the greater landscape.
        - *Response: Over 300 feet has been maintained for the fenced perimeter of the Project, from the edge of Right-of-Way for Highway 85. In addition, the project fence line is not within 300 ft of the solar farm's fence line.*

- **Do not fence the site's access road from Highway 85 to the Project.** Fencing this area presents a serious threat to big game via entanglement and movement barriers, and further risks wildlife-vehicle collisions on Highway 85.
- If this access road must be fenced, ensure the fencing used is wildlife-friendly, with the following specifications:
    - The fence should be constructed of either three or four wire strands.
    - The bottom wire should be smooth and at least 16", preferably 18" or more, high.
    - There should be at least 12" between the top two wires.
    - The top wire or rail should be smooth wire or rail and be a maximum of 42", and preferably no more than 40", above the ground.
    - *Response: The site access will not have fencing that runs parallel to the access road within 300 feet of the US-85 right-of-way.*

- **Fence the minimum amount of area possible inside the Project.** Exclusionary perimeter fencing around Project Infrastructure renders all habitat inside the perimeter of the fence entirely unsuitable and inaccessible for pronghorn and mule deer. We recommend that perimeter fencing closely encircle the planned Phases of the Project, leaving any areas without buildings or Battery Energy Storage System (BESS) infrastructure open and unfenced.
    - *Response: In further discussions with Wyoming Game & Fish, we will need to continue to preserve the secured perimeter of the site. Where practical, we will pull in the fence line.*

- **Fence each Phase discretely and leave big game movement pathways a minimum of 200 feet wide between discrete fenced blocks, if possible.** Maintaining unfenced movement pathways between fenced blocks can facilitate pronghorn and mule deer movement through and past the facility.
    - *Response: In further discussions with Wyoming Game & Fish, we will need to continue to preserve the secured perimeter of the site (as opposed to providing corridors between buildings).*

- **Minimize impacts from water retention ponds.** We recommend the following measures to avoid inadvertent impacts to big game from permanent and temporary retention ponds, which can attract wildlife:
  o Develop the minimum number of detention ponds required.
  o Place detention ponds outside of exclusionary perimeter fencing if at all possible, or alternatively, a minimum of 200 feet inside the fencing.
    - *Response: Both Detention Facilities have been placed outside of the fence line.*

37. **Avoid destruction of swift fox dens and migratory bird nests** – Wildlife surveys conducted in this area have identified a number of Wyoming SGCN that may live and breed in this area. These include swift fox and a number of migratory birds such as chestnut-collared longspur, thick-billed longspur, grasshopper sparrow, mountain plover, upland sandpiper, and others. Additional non-SGCNmigratory birds likely breed at the site.

    Swift fox pups and migratory bird nestlings are dependent on den and nest sites and are at risk of being killed by construction activities. As such, we recommend the following clearance surveys for

occupied migratory bird nests and active swift fox dens in and around the project area be made a condition of the Project's permit:

- For swift fox, the Department recommends surveys occur in all potentially suitable habitat in and within 0.25 miles of all project development. We recommend these surveys be conducted prior to any ground-disturbing activity which occurs between April 1 and September 30. Remote trail cams may be utilized to identify species presence. If active dens are identified, a 0.25-mile buffer is recommended until pups leave the den site or the species is no longer using the den.
- For migratory bird nests, the Department recommends surveys occur in and within 300 feet of all project development. We recommend these surveys be conducted prior to any ground-disturbing activity occurring between April 1 and July 31. The Department and the U.S. Fish and Wildlife Service can recommend a suitable buffer for any occupied nest.
- Clearance surveys should be conducted within 5 days (120 hours) of the initiation of construction activities.
- Migratory bird nests or swift fox dens that are identified via incidental observation should also be marked and buffered.

Protect nesting raptors – The proposed project site and surrounding area contains suitable raptor nesting habitat for species such as burrowing owl, ferruginous hawk, Swainson's hawk, and others. A number of raptor species are Wyoming SGCN, and disturbances such as construction activity and human presence can affect nesting success, population stability, and population viability. As such, the Department recommends the following recommendations be made a condition of the Project's permit:

- Perform surveys for nesting raptors, including burrowing owls, within 1 mile of the project area prior to any vegetation clearing or ground-disturbing activities during the raptor nesting season (February 1-August 1). Special attention should be paid to probable nesting habitat such as stands of cottonwood trees, stands of conifers, lone trees, cliffs, rock outcrops, and prairie dog colonies.
- If any raptor nests are detected, follow the seasonal and spatial buffers provided in Appendix A.

- *Response: Our current plans have construction beginning prior to the aforementioned nesting seasons, and thus do not anticipate the need to conduct surveys referenced above. However, if construction starts within the aforementioned nesting seasons, proper wildlife surveys will be conducted and shared with the Wyoming Game and Fish Department.*

38. **Prevent the spread of invasive annual grasses and noxious** weeds – Noxious weeds and invasive annual grasses (IAGs) can cause significant harm to the ecosystem when introduced. Ground-disturbing activities can create an environment that facilitates establishment by unwanted plants. They significantly reduce the quality of wildlife habitat and their presence increases the probability of catastrophic wildfire. The potential economic impacts to the State of Wyoming are severe, and once these species become established, eradication is difficult and costly. Prevention of establishment remains the best way to keep Wyoming's habitats free of noxious weeds and IAGs.

The most significant known threat to Wyoming is from cheatgrass, medusahead, and ventenata. To prevent the spread of noxious weeds and IAGs, we recommend the following measures be made conditions of the permit:

- Prevent introduction and establishment by cleaning vehicles and equipment prior to movement to a new location in order to minimize the potential for transporting seeds.
- Develop and implement a plan to assess, treat, and monitor for noxious weeds and invasive plants at the project scale and in the adjacent landscape where they are present.
- Work with the Laramie County Weed and Pest District to implement and fund long-term plans for successful restoration of disturbed sites. Additional information on prevention and treatment options for these grasses can be found at www.invasivegrasses.com.

- *Response: The Site Contractor will work with the Laramie County Weed and Pest District to develop a noxious weed plan to address these concerns.*

We appreciate your comments of these plans. Please contact me at 720-647-6231 or Stephen.litsas@kimley-horn.com should you have any questions.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.



Stephen Litsas, PE

Permit Notes

Permit Number: PZ-25-00076
Parcel Number: 12660510000200
Site Address: 154 US 85
Cheyenne, WY 82007
Applicant: Litsas, Stephen
Owner: LAZY D GRAZING ASSOC INC
Project Description: The goal of Project Jade is to provide a new data center campus in partnership with Tallgrass Energy.

Submitted: 11/14/2025
Technically Complete: 11/17/2025
Approved:
Issued:

Begin Date	End Date	Permit Area	Subject	Note Type	Note Text	Created By
11/18/2025		Application	PZ-25-00076	GENERAL	WAPA is working with developer on this project. We have no conflict at this time.	ROGERS@LARAMIECOUNTYWY.GOV
11/19/2025		Workflow	ENVIRONMENTAL HEALTH REVIEW	GENERAL	If holding tanks are used for construction trailer wastewater, contact Environmental Health (307) 633-4090 for small wastewater permit. If porta-potties are utilized, temporary small wastewater permit is not required. Permanent structures plan to have BOPU water and sewer. If sanitary sewer does not happen, Environmental Health will have additional requirements. If food is provided to employees or customers, a food license is required.	TIFFANY.GAERTNER@LARAMIECOUNTYWY.GOV
11/19/2025	11/19/2025	Workflow	COUNTY REAL ESTATE OFFICE REVIEW	GENERAL	no comments	TERESA.LEMASTER@LARAMIECOUNTYWY.GOV
11/20/2025		Application	PZ-25-00076	GENERAL	1st Review 1.Drawing 22 labels the north access road as Chalk Bluff Road. I assume that was in error and this access road is not proposed to be a dedicated public roadway. 2.I do not see any details or dimensions and radii provided on both the access roadways. Per the LCLUR, the maximum radius allowed is 50 at the access to Hwy 85. I cannot find dimensions for the width of the access roads, etc. to make sure they comply with the regulations. It appears to be approximately 24, which would comply with the minimum requirements. 3.The drawings need to show if there is an existing access easement for both access roads off Hwy 85 or if new easements are being proposed. In either case, the existing and/or proposed access easements need to be shown on the site plan drawing. 4.The drawings show all the property to the north of this site is owned by Mr. Richard Juschka. However, the GIS shows there is a triangular property adjacent to Hwy 85 that is owned by Arp and Hammond Hardware Co. The proposed access road goes through this property; therefore, it needs to be shown on the site plan along with the owners information, zoning information, etc. 5.Per 5-2-104, the NOAA Atlas 14, Volume 12 shall be used for design rainfall intensity data for the specific location of the development. 6.On Sheet 17, there appears to be an error with regards to Pond A. It indicates the Spillway Invert has an elevation of	SCOTT.LARSON@LARAMIECOUNTYWY.GOV

Permit Notes

				6204.25 and the 100-Yr WSEL is listed at 6203.53 and it also indicates there is 1 foot of freeboard, but how can this be when the spillway elevation is higher than the HWL? Similarly, Pond B has almost the same elevation for the 100-year WSEL as it does for the spillway invert, but it also indicates it has 1' of freeboard. 7.Per 3-1-109.g.xxvi, there shall be a drainage easement established and recorded for the area encompassing the detention ponds. The easements shall be shown on the site plan drawing and a copy of the recorded easements shall be provided to the County for their records. 8.Per 5-2-105.b, the Engineers certification in the submitted Drainage Report needs to include the proper verbiage as indicated in this section of the regulations. 9.Per 5-2-103.b, the Drainage Report needs to show the results for all rainfall event frequencies of a 5-year, 10-year, 50-year, and 100-yr. 10.Per 5-2-103.e, post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50-year rate for a 100-year storm event. Drainage planning shall include a design to maintain post-development runoff rates to historic rates for all return periods. Please include in the conclusions section of the Drainage Report the existing and proposed peak flows for the 50-year storm event to show the release for the 100-yr event is at or below the 50-yr pre-development rate. The report currently summarizes the pre and post for the 100-year storm event only. 11.The Traffic Impact Study shows there will ultimately be four accesses that would be tied to this property as well as the proposed power plant. The site plan for this site should include the other access roads and they can be labeled as a future phase. It is assumed that the power plant site may be done by others with a separate submittal, but if this proposed data center can and will use all four accesses in the future, then these need to be shown on the site plan drawing. If the other two accesses will only be used by the proposed power plant and this data center will not have access to the other access roads, then they do not need to be shown on this site plan drawing.	
11/20/2025	Workflow	GIS REVIEW	GENERAL	Addresses are assigned along with the building permit.	CAMBIA.MCCOLLOM@LARAMIECOUNTYWY.GOV
11/21/2025	Application	PZ-25-00076	GENERAL	1.During Construction, There is no information over off peak time. Does the workforce stay on site for lunch or do they drive into the city for lunch? We will need to determine the number of employee trips during off peak. 2.I would like to see more detailed drawings on each intersection access from this site onto public roads.	CHRISTOPHER.YANEY@LARAMIECOUNTYWY.GOV

Permit Notes

11/24/2025		Application	PZ-25-00076	GENERAL	Please define plans for water and sanitary sewer. The phasing sheet (sheet 3) states "the main sanitary sewer, water, and roadway infrastructure will be built in phase 1, including stubs for buildings 1-4". No water or sanitary sewer lines appear to be shown with this submittal (even if they are only going to be connections to a central well or central septic system). Noted: landscape plan states 'no central water' is provided; however, Environmental Health is reviewing under the assumption permanent structures will be connected to the BOPU system. If BOPU water or sanitary sewer is needed for this project, this project will need an Outside User Agreement approval through the governing body of the City of Cheyenne or will need to be annexed to the City of Cheyenne. Outside User Agreements are not guaranteed and annexation could change many aspects of the site plan (at a minimum, jurisdiction submitted to). If proposed to use BOPU services, please meet with BOPU as soon as possible to discuss options and processes. No other comments.	SETH.LLOYD@LARAMIECOUNTYWY.GOV
11/24/2025	11/24/2025	Application	PZ-25-00076	GENERAL	Project must follow all LCLUR. Fire Department access and egress to the site must be accounted for through the LCLUR. Emergency plans should be provided to LCFD #1 and Cheyenne/Laramie County Emergency Management if available.	MATTHEW.BUTLER@LARAMIECOUNTYWY.GOV
11/24/2025	11/24/2025	Application	PZ-25-00076	GENERAL	The conservation district is always concerned about storm water management to minimize impacts to surface water, control of invasive plants and weed mitigation, and reclamation of the disturbed areas. Reclamation is outlined in the permit application, but effort should be taken to minimize a "monoculture" planting/reseeding of disturbed areas. The district would like to see a "native" seed mixture used to establish a native shortgrass prairie landscape. Water consumption is also a concern and would ask that the source of water for construction and continual operations and processes be defined, whether appropriated water, city water, or a new source (well). Draw down of the local aquifer is always a concern. Weed mitigation should be implemented until all disturbed areas are stabilized.	CONSERVATIONDISTRICT@LARAMIECOUNTYWY.GOV
11/26/2025		Application	PZ-25-00076	GENERAL	Please see review added as an attachment.	SUE.KINSLEY@LARAMIECOUNTYWY.GOV

Permit Notes

11/26/2025	Workflow	BUILDING FIRE CODE REVIEW	GENERAL	Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1. Fire Apparatus Roads required per 2024 IFC section 503. Fire protection water Supplies required per 2024 IFC section 507	DANIEL.PETERS@LARAMIECOUNTYWY.GOV
11/26/2025	Workflow	PUBLIC WORKS REVIEW	GENERAL	1. A separate access permit application through Public Works will be required for this tract. Please apply for your Public Works access permit on the SmartGov Portal. Call (307-633-4302) or email (permits@laramiecountywy.gov) Public Works with any questions. 1a. As a heads up, the access approach for this site will have to be paved (from the edge of pavement to the right-of-way line or 20 foot back, whichever is greater) to meet the access road condition (Chalk Bluff Road).	MOLLY.BENNETT@LARAMIECOUNTYWY.GOV
12/01/2025	Workflow	WYDOT REVIEW	GENERAL	1. Nowhere in the report is there a direct comparison of pre and post development discharges, specifically at the same point. Their calcs indicate an increase in discharge from the development of the land, but I can't tell how they keep the historic runoff rates beyond the limits of the project. I'm uncertain how much, if any, discharge is from the ponds. This report should have had some mention of the Power Hub development that has drainage that flows into this project. 2. Developers and landowners should be aware that any work or presence in the right of way created by development/construction for this project will need the appropriate permitting or licensing between the utility owner (or appropriate local agency for fence modifications) and WYDOT District 1 Maintenance (access permits are with D1 Traffic). Utility owners, including governmental entities, will be responsible for the licensing and/or permitting of all utility facilities in the WYDOT right-of-way. Other work in the ROW can be approved through a temporary use permit. Permits (except for access permits) and licenses can be acquired by contacting Michael Elliott (Michael.Elliott@wyo.gov, 307-745-2123).Also, the development must maintain historic drainage corridors so that drainage is not diverted to other entry points to the R/W. If drainage is affected in the highway right-of-way, a drainage study needs to demonstrate that post-development discharge rates are metered at or below pre-development rates for 2, 5, 10, 25, 50 and 100 year events and will need to be reviewed by WYDOT Bridge/Hydraulics Program. 3. The traffic study is being reviewed and I am working with Engineers to get back comments. WYDOT have received some temporary construction access permits and they are currently being reviewed.	TAYLOR.MCCORT@LARAMIECOUNTYWY.GOV

Permit Notes

					Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118). To obtain an access permit application (Access application (M-3A)) see the following link: https://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html The attached KMZ file is for location reference only, not official project or property limits.	
12/04/2025	12/04/2025	Application	PZ-25-00076	GENERAL	Please see the attached project permit recommendations from the Wyoming Game and Fish Department. Thank you!	WYGAMEFISHDEPT@LARAMIECOUNTYWY.GOV
12/09/2025		Parcels	12660510000200	POP-UP	IF YOU RECEIVE ANY PUBLIC RECORDS REQUEST, PLEASE TALK TO JUSTIN BEFORE DOING ANYTHING WITH THEM FOR THIS PARCEL.	SONIA.CHRISTENSEN@LARAMIECOUNTYWY.GOV
12/22/2025		Application	PZ-25-00076	GENERAL	2nd review - no comments.	SETH.LLOYD@LARAMIECOUNTYWY.GOV
12/23/2025		Workflow	ENGINEERS REVIEW	GENERAL	2nd Review 1.Prior to any construction activities, the drainage easements for the detention ponds shall be recorded and copies of the recorded easements shall be given to the County for their records.	SCOTT.LARSON@LARAMIECOUNTYWY.GOV
12/23/2025		Workflow	PUBLIC WORKS REVIEW	GENERAL	2nd review: 1. All previous comments have been acknowledged and/or addressed. 2. No further comments.	MOLLY.BENNETT@LARAMIECOUNTYWY.GOV
12/23/2025	12/23/2025	Application	PZ-25-00076	GENERAL	Response to comments from the Wyoming Game and Fish Department. Thank you!	WYGAMEFISHDEPT@LARAMIECOUNTYWY.GOV
12/24/2025		Workflow	ENVIRONMENTAL HEALTH REVIEW	GENERAL	Temporary wastewater tanks are permitted and inspected. Permanent commercial small wastewater permits will be submitted when engineers have them ready. Nothing additional is required at this time.	TIFFANY.GAERTNER@LARAMIECOUNTYWY.GOV
12/29/2025		Workflow	BUILDING FIRE CODE REVIEW	GENERAL	Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1. Fire Apparatus Roads required per 2024 IFC section 503. Fire protection water Supplies required per 2024 IFC section 507.	DANIEL.PETERS@LARAMIECOUNTYWY.GOV

Permit Notes

12/29/2025	Workflow	WYOMING STATE ENGINEER'S OFFICE	GENERAL	Good morning, Regarding the referenced applications, I attempted to upload a comment but the step reviews had been removed. Regarding the State Engineer's Office Review indicating ponds/reservoirs (i.e. water detention facilities) needing a permit from the SEO: Although the response letter indicated they would be permitted through the County, please note that any pond/reservoir/water detention facility or other impoundment used to hold water that cannot evacuate the water within a 24 hour period must be permitted through the State Engineer's Office. If you have other questions regarding permitting the water detention facilities, please contact Ryan Mikesell, Assistant Administrator, Surface Water at 307-777-6202. Thank you, Sue Kinsley Wyoming State Engineer's Office Natural Resources Analyst Ground Water Division 307-777-2975	SONNY.HOOPS@LARAMIECOUNTYWY.GOV

Permit Notes

Permit Number: PZ-25-00078
Parcel Number: 12660510000200
Site Address: 154 US 85
Cheyenne, WY 82007
Applicant: Litsas, Stephen
Owner: LAZY D GRAZING ASSOC INC
Submitted: 11/21/2025
Technically Complete: 11/24/2025
Approved:
Issued:
Project Description: Tallgrass ILS will own the property located within the existing Switchgrass Industrial Park, and have overall site control. BFC Power LLC and Cheyenne Power Hub LLC are proposing to construct their respective phases of the BFC Power Project and Cheyenne Power Hub Project on the property which includes power generation facilities that will produce electricity for a proposed co-located data center.

Begin Date	End Date	Permit Area	Subject	Note Type	Note Text	Created By
11/24/2025		Application	PZ-25-00078	GENERAL	1.This site will have 5,000 construction workers visiting the site daily and the traffic study is answering the AM and PM peak hours. I would like to know the off-peak hours (lunch) with 5,000 construction workers visiting the site daily.	CHRISTOPHER.YANEY@LARAMIECOUNTYWY.GOV
11/25/2025		Application	PZ-25-00078	GENERAL	What is the plan for water on this site? It appears sanitary sewer will be taken care of by the leach field shown on the site plan, but there are multiple fire hydrants shown on the plan set and I don't see a water tower. Is central (BOPU) water proposed? If so, annexation or an outside user agreement is required. Outside user agreements are approved by the governing body of the City of Cheyenne and are not guaranteed. Annexation may change development requirements (at a minimum, jurisdiction for submittals). No other comments on the unincorporated County site plan.	SETH.LLOYD@LARAMIECOUNTYWY.GOV
11/26/2025		Workflow	COUNTY ASSESSOR REVIEW	GENERAL	No concerns, as long as parent parcel 12660510000200 remains intact. Any splitting up of the parent parcel will require new legal descriptions for all, with associated conveyances.	CANDICE.MCCART@LARAMIECOUNTYWY.GOV
12/01/2025	12/01/2025	Workflow	COUNTY REAL ESTATE OFFICE REVIEW	GENERAL	no comments	TERESA.LEMASTER@LARAMIECOUNTYWY.GOV
12/02/2025	12/02/2025	Application	PZ-25-00078	GENERAL	As with any development in Laramie County the district voices concern of consumptive draw down of the local aquifer from either existing wells or a new well as a source water for construction and operations of the facility. A defined source of water is not stipulated in submittals the district reviewed.	CONSERVATIONDISTRICT@LARAMIECOUNTYWY.GOV
12/03/2025		Application	PZ-25-00078	GENERAL	Please see the attached review letter.	SUE.KINSLEY@LARAMIECOUNTYWY.GOV
12/03/2025		Workflow	BUILDING FIRE CODE REVIEW	GENERAL	Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1. Fire Apparatus Roads required per 2024 IFC section 503. Fire protection water Supplies required per 2024 IFC section 507	DANIEL.PETERS@LARAMIECOUNTYWY.GOV

Permit Notes

12/03/2025	Workflow	ENGINEERS REVIEW	GENERAL	1st Review 1.Per 3-1-109.g.ix, existing and proposed access roads need to be shown and this includes out to Highway 85. The dimensions for the existing access road, radii, etc. coming off Hwy 85 need to be shown. The site plan only shows the access road on the property. 2.Per 3-1-109.g.xii, the location and widths of proposed sidewalks need to be shown. I assume there will be sidewalks from the parking areas to the buildings (i.e. warehouse and admin). 3.Per 3-1-109.g.xiv, the dimensions, height and setbacks need to be shown for all proposed buildings. 4.Per 3-1-109.g.xvi, location and type of proposed trash containment need to be shown. Will there be dumpsters for the warehouse and admin buildings? 5.Per 3-1-109.g.xviii, the parking lots need to be dimensioned showing the aisle dimensions/widths, access dimensions, etc. Only the parking stalls have been dimensioned via a legend. 6.Per 3-1-109.g.xxvi, the detention ponds require a drainage easement be established and recorded for the area encompassing the detention ponds and the easements need to be shown on the site plan drawing. 7.The site plan drawing does not show information on the detention pond outlets as described in the Drainage Report. In addition, it would be helpful to label the ponds on the site plan as indicated in the Drainage Report (Pond A, B, etc.) 8.The engineers certification on page 2 of the Drainage Report needs to follow the certification requirements per 5-2-105. 9.Per 5-2-104, the NOAA Atlas 14, Volume 12 shall be used for design rainfall intensity data for the specific location of the development. It appears the Drainage Report used the rainfall data in the old regulations. 10.Per 5-2-103.e, post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50yr rate for a 100-yr storm event. The design of the outlet structures shall maintain post-development runoff rates to historic rates for all return periods (5-yr, 10-yr, and 50-yr). 11.The Traffic Impact Study and its recommendations appear to be appropriate for this development, but WYDOT will have the final say on the study.	SCOTT.LARSON@LARAMIECOUNTYWY.GOV
12/03/2025	Workflow	WYDOT REVIEW	GENERAL	1.The traffic study is being reviewed and I am working with Engineers to get back comments. 2. Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all	TAYLOR.MCCORT@LARAMIECOUNTYWY.GOV

Permit Notes

					access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118). To obtain an access permit application (Access application (M-3A)) see the following link: https://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html 3. Developers and landowners should be aware that any work or presence in the right of way created by development/construction for this project will need the appropriate permitting or licensing between the utility owner (or appropriate local agency for fence modifications) and WYDOT District 1 Maintenance (access permits are with D1 Traffic). Utility owners, including governmental entities, will be responsible for the licensing and/or permitting of all utility facilities in the WYDOT right-of-way. Other work in the ROW can be approved through a temporary use permit. Permits (except for access permits) and licenses can be acquired by contacting Michael Elliott (Michael.Elliott@wyo.gov, 307-745-2123).Also, the development must maintain historic drainage corridors so that drainage is not diverted to other entry points to the R/W. If drainage is affected in the highway right-of-way, a drainage study needs to demonstrate that post-development discharge rates are metered at or below pre-development rates for 2, 5, 10, 25, 50 and 100 year events and will need to be reviewed by WYDOT Bridge/Hydraulics Program. 4. Nowhere in the report is there a direct comparison of pre and post development discharges, specifically at the same point. Their calcs indicate an increase in discharge from the development of the land, but I can't tell how they keep the historic runoff rates beyond the limits of the project. I'm uncertain how much, if any, discharge is from the ponds.	
12/04/2025		Workflow	GIS REVIEW	GENERAL	Addresses are issued with the building permits. Please include a clear access route from nearest public road (South Greeley HWY) to the site with the plot plan.	CAMBIA.MCCOLLOM@LARAMIECOUNTYWY.GOV
12/05/2025	12/05/2025	Application	PZ-25-00078	GENERAL	Please see the attached recommendations from the Wyoming Game and Fish Department. Thank you!	WYGAMEFISHDEPT@LARAMIECOUNTYWY.GOV
12/08/2025		Workflow	ENVIRONMENTAL HEALTH REVIEW	GENERAL	DPR Construction is working on commercial wastewater holding tanks and inspection. Kimley Horn Engineer is meeting with us today to go over small wastewater systems in Wyoming and associated requirements.	TIFFANY.GAERTNER@LARAMIECOUNTYWY.GOV
12/08/2025	12/08/2025	Application	PZ-25-00078	GENERAL	Ensure that all LCLUR are following, to include but not limited to fire department access and egress as well as water supply.	MATTHEW.BUTLER@LARAMIECOUNTYWY.GOV

December 19, 2025

Laramie County Planning and Development Office
Justin Arnold
3966 Archer Pkwy
Cheyenne, WY 82009
(307) 633-4303
www.laramiecountywy.gov
planning@laramiecounty.com

***RE:* Tallgrass Site Plan Review (PZ-25-00078) - COMMENT RESPONSE LETTER**

Dear Mr. Arnold,

Thank you for the comments on 11th December, 2025 for the above-mentioned project. In an effort to address your comments concisely and simplify your review of the Site Plan, we have summarized your comments and our responses below.

Traffic Review

1. This site will have 5,000 construction workers visiting the site daily and the traffic study is answering the AM and PM peak hours. I would like to know the off-peak hours (lunch) with 5,000 construction workers visiting the site daily.
   - *Response: It is anticipated that the craft workers will remain on-site during the work shift.*

Water Review

2. What is the plan for water on this site? It appears sanitary sewer will be taken care of by the leach field shown on the site plan, but there are multiple fire hydrants shown on the plan set and I don't see a water tower. Is central (BOPU) water proposed? If so, annexation or an outside user agreement is required. Outside user agreements are approved by the governing body of the City of Cheyenne and are not guaranteed. Annexation may change development requirements (at a minimum, jurisdiction for submittals).
   No other comments on the unincorporated County site plan.
   - *Response: Water is planned to come from wells in section 6. Central (BOPU) water is not proposed, and annexation will not be required.*

County Assessor Review

3. No concerns, as long as parent parcel 12660510000200 remains intact. Any splitting up of the parent parcel will require new legal descriptions for all, with associated conveyances.
   - *Response: Parent parcel 12660510000200 will remain intact.*

County Real Estate Office Review

4. No comments
   - *Response: Acknowledged, thank you.*

Conservation District Review

5. As with any development in Laramie County the district voices concern of consumptive draw down of the local aquifer from either existing wells or a new well as a source water for

construction and operations of the facility. A defined source of water is not stipulated in submittals the district reviewed.
- *Response: Water will be coming from new wells in section 6.*

State Engineer's Office/Ground Water Division Review

6. Drilling of any water well requires an approved permit before work commences. The State Engineer water right permit grants the applicant the right to seek to develop a water supply to meet the proposed needs. It does not guarantee that water will be physically available.
   - *Response: Acknowledged, thank you.*
7. Any new proposed wells must be constructed in strict compliance with the State Engineer's Office Rules and Regulations, Part III, Water Well Minimum Construction Standards. Any deviation from the established Minimum Construction Standards must be approved in advance by Ground Water Staff.
   - *Response: Acknowledged, thank you.*
8. Any well or borehole not intended for use must be appropriately plugged and abandoned in accordance with the aforementioned rules and regulations.
   - *Response: Acknowledged, thank you. Abandoned wells and boreholes will be properly plugged.*
9. With limited exceptions, a Wyoming licensed water well drilling contractor must drill and construct new wells, and a Wyoming licensed pump installation contractor must install pumps.
   - *Response: Acknowledged, thank you. Licensed contractors with appropriate Wyoming licensure will be utilized.*
10. Any wells developed for purposes that are not encompassed by the definition of domestic or stock use mandate adjudication by the Board of Control.
    - *Response: Acknowledged, thank you.*
11. The proposed ponds/reservoirs associated with the project require permitting through the Surface Water Division (307-777-6475) per Wyoming Statute 41-3-301.
    - *Response: Acknowledged, thank you. At this time, no surface reservoirs are proposed. We will have stormwater detention ponds, which are to be permitted through the County.*

Building Fire Code Review

12. Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section502.1.
    - *Response: Premises identification will be in accordance with 2024 IFC section 205*
13. Fire Apparatus Roads required per 2024 IFC section 503.
    - *Response: Acknowledged, thank you.*
14. Fire protection water Supplies required per 2024 IFC section 507
    - *Response: Fire protection water to be supplied through proposed on-site hydrants.*

Engineers Review

15. Per 3-1-109.g.ix, existing and proposed access roads need to be shown and this includes out to Highway 85. The dimensions for the existing access road, radii, etc. coming off Hwy 85 need to be shown. The site plan only shows the access road on the property.
    - *Response: The Site Plan will contain location of access roads with proposed easements with a note indicating that legal access is pending. Once the easement has been finalized and*

recorded, a copy will be provided to Laramie County for their records. Driveway improvements have been submitted directly to WYDOT for approval.

16. Per 3-1-109.g.xii, the location and widths of proposed sidewalks need to be shown. I assume there will be sidewalks from the parking areas to the buildings (i.e. warehouse and admin).
    - *Response: The location and widths of proposed sidewalks are now being shown. Sidewalks are only proposed at the Warehouse and Control Room Buildings.*
17. Per 3-1-109.g.xiv, the dimensions, height and setbacks need to be shown for all proposed buildings.
    Response: Dimensions and heights have been provided. Setbacks are hundreds of feet from the nearest property line; we seek thoughts from the County on the best way to convey this information.
18. Per 3-1-109.g.xvi, location and type of proposed trash containment need to be shown. Will there be dumpsters for the warehouse and admin buildings?
    - *Response: Proposed trash containment has been included within the Site Plan, located at the Warehouse Building.*
19. Per 3-1-109.g.xviii, the parking lots need to be dimensioned showing the aisle dimensions/widths, access dimensions, etc. Only the parking stalls have been dimensioned via a legend.
    - *Response: A detailed view of the parking areas have been added with dimensions/widths.*
20. Per 3-1-109.g.xxvi, the detention ponds require a drainage easement be established and recorded for the area encompassing the detention ponds and the easements need to be shown on the site plan drawing.
    - *Response: The Site Plan contains proposed easements. Once the easement has been finalized and recorded, a copy will be provided to Laramie County for their records.*
21. The site plan drawing does not show information on the detention pond outlets as described in the Drainage Report. In addition, it would be helpful to label the ponds on the site plan as indicated in the Drainage Report (Pond A, B, etc.)
    - *Response: Detention pond outlet details will be provided in future construction documents submissions, approved by the Building Department. Additional verbiage has been added to the report indicating that the release rates the other defined storms will not exceed the calculated existing release rates. The ponds are now labeled on the site plan to match the Drainage Report.*
22. The engineers certification on page 2 of the Drainage Report needs to follow the certification requirements per 5-2-105.
    - *Response: Acknowledged, the Engineer's Certification has been updated accordingly.*
23. Per 5-2-104, the NOAA Atlas 14, Volume 12 shall be used for design rainfall intensity data for the specific location of the development. It appears the Drainage Report used the rainfall data in the old regulations.
    - *Response: Rainfall Intensity has been updated to the NOAA Atlas 14, Volume 12.*
24. Per 5-2-103.e, post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50yr rate for a 100-yr storm event. The design of the outlet structures shall maintain post-development runoff rates to historic rates for all return periods (5-yr, 10-yr, and 50-yr).
    - *Response: 5 YR, 10 YR, 50 YR and 100 YR Pre and Post results have been added.*

25. The Traffic Impact Study and its recommendations appear to be appropriate for this development, but WYDOT will have the final say on the study.
    - *Response: Acknowledged, thank you. Traffic Study has not been resubmitted with this Package; it is pending additional detail to be provided from WYDOT regarding background traffic (per WYDOT's request). It will be updated and shared with both the County and WYDOT once WYDOT is able to provide the requested background data.*

WYDOT Review

26. The traffic study is being reviewed and I am working with Engineers to get back comments.
    - *Response: Acknowledged, thank you. We will continue to work with WYDOT to continue to resolve their comments.*

27. Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118). To obtain an access permit application (Access application (M-3A)) see the following link: https://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html
    - *Response: Post approval of the Traffic Impact Study, Access Permits will be applied for.*

28. Developers and landowners should be aware that any work or presence in the right of way created by development/construction for this project will need the appropriate permitting or licensing between the utility owner (or appropriate local agency for fence modifications) and WYDOT District 1 Maintenance (access permits are with D1 Traffic). Utility owners, including governmental entities, will be responsible for the licensing and/or permitting of all utility facilities in the WYDOT right-of-way. Other work in the ROW can be approved through a temporary use permit. Permits (except for access permits) and licenses can be acquired by contacting Michael Elliott (Michael.Elliott@wyo.gov, 307-745-2123). Also, the development must maintain historic drainage corridors so that drainage is not diverted to other entry points to the R/W. If drainage is affected in the highway right-of-way, a drainage study needs to demonstrate that post-development discharge rates are metered at or below pre-development rates for 2, 5, 10, 25, 50 and 100 year events and will need to be reviewed by WYDOT Bridge/Hydraulics Program.
    - *Response: Acknowledged, thank you. Appropriate permits will be applied for post finalization of the Traffic Impact Study. Historic Drainage Patterns will be adhered to.*

29. Nowhere in the report is there a direct comparison of pre and post development discharges, specifically at the same point. Their calcs indicate an increase in discharge from the development of the land, but I can't tell how they keep the historic runoff rates beyond the limits of the project. I'm uncertain how much, if any, discharge is from the ponds.
    - *Response: The site has been designed to maintain historical peak discharge rates. This is demonstrated by the Detention Facility release rates now included within the report. We strive to work with WYDOT to provide these comparison locations in your desired locations.*

GIS Review

30. Addresses are issued with the building permits. Please include a clear access route from nearest public road (South Greeley HWY) to the site with the plot plan.
    - *Response: Primary access to the Site is via US-85, south of the Solar Farm.*

Wyoming Game and Fish Department Review

31. Reduce impacts to pronghorn and mule deer – The proposed site provides yearlong habitat to pronghorn and mule deer, which use the open landscape south of Cheyenne for foraging, raising fawns, and movement through to other essential seasonal habitats. Both the Chalk Hills Pronghorn Herd Unit and the Goshen Rim Mule Deer Herd Unit are substantially below their population objectives due to various impacts to these herds, including habitat conversion and other anthropogenic threats. Suburban and industrial developments, fencing, and road networks in and around the City of Cheyenne have increasingly limited the available habitat for these ungulate species. Conversion of rangeland habitat to industrial development effectively eliminates this habitat from use and also creates a movement barrier for big game that need to move between seasonal habitats in order to survive.
    We recommend the following measures be considered for conditions of the BFC Power and Cheyenne Power Hub Project's Laramie County permit:
    - **Maintain a minimum of 300 feet between the fenced perimeter of the Project and any other fenced right-of-way or project perimeter.** Maintaining an open pathway for big game to move between the Project and the surrounding industrial development in this area, such as the South Cheyenne Solar and Project Jade Data Center facilities, is critical to avoid creating complete barriers to big game movement across the greater landscape.
        - *Response: Over 300 feet has been maintained for the fenced perimeter of the Project, from the edge of Right-of-Way for Highway 85. In addition, a corridor has been provided along the eastern border of Parcel 7, between the Power Plant and the Solar Farm.*
    - **Do not fence the site's access road from Highway 85 to the Project.** Fencing this area presents a serious threat to big game via entanglement and movement barriers.
        - *Response: We do not anticipate installing a fence along the access road.*
    - **Fence the minimum amount of area possible inside the Project by removing the southwest corner of the project, currently labeled as "zone for future development" and/or unlabeled open space, from being enclosed in exclusionary perimeter fencing.** Exclusionary perimeter fencing around Project Infrastructure renders all habitat inside the perimeter of the fence entirely unsuitable and inaccessible for pronghorn and mule deer, and creates a movement barrier for animals that need to move across the landscape. We recommend the southwest portion of Section 7, labeled "zone for future development" or unlabeled and not illustrated for any development plans, be excluded from perimeter fencing. If a future development in this portion of the lease area later requires fencing, it may be added at that time.
        - *Response: The fencing limits have been pulled further within, particularly within the SW corner of the project, to address this concern. Fencing continues to sit outside the "Zone for Future Development", per our discussions with Game & Fish.*
    - **Minimize impacts from retention ponds by moving outside exclusionary perimeter fencing or at least 200 feet inside perimeter fencing.** A number of "detention facilities", which the Department interprets to be water retention ponds, are shown to be located inside the Project immediately adjacent to perimeter fences. Temporary and permanent water retention ponds can attract wildlife, leading to big game entanglement, big game entrapment inside perimeter fencing, avian-fence collisions, and other serious wildlife issues. As such, we recommend:
      o Develop the absolute minimum number of retention ponds required.
      o Place retention ponds outside of exclusionary perimeter fencing, or alternatively, a

minimum of 200 feet inside the fencing.
    - *Response: Detention Facilities A & B have been placed outside of the fence line. Detention Facilities E & F are placed 200 feet away from the exterior fence line.*

- **Do not entrap big game inside perimeter fencing.** As the Project is being constructed and fenced, big game can inadvertently become trapped inside the exclusionary perimeter fencing if fencing is constructed without first clearing the entire facility of any resident or nomadic big game individuals. It is a violation of W.S. 23-1-102 and 103 to entrap big game inside a high fence.
    - *Response: During construction, the contractor will minimize the potential for big game to become entrapped during the placement of the exterior fence. During operation, the facility will be manned 24-hours a day. Procedures will be put in place to contact Game & Fish in the event big game is spotted inside of the fenced perimeter.*

32. **Avoid destruction of swift fox dens and migratory bird nests** – Wildlife surveys conducted in this area have identified a number of Wyoming SGCN that may live and breed in this area. These include swift fox and a number of migratory birds such as chestnut-collared longspur, thick-billed longspur, grasshopper sparrow, mountain plover, upland sandpiper, and others. Additional non-SGCN migratory birds likely breed at the site.

    Swift fox pups and migratory bird nestlings are dependent on den and nest sites and are at risk of being killed by construction activities. As such, we recommend the following clearance surveys for occupied migratory bird nests and active swift fox dens in and around the project area be made a condition of the Project's permit:

    - For swift fox, the Department recommends surveys occur in all potentially suitable habitat in and within 0.25 miles of all project development. We recommend these surveys be conducted prior to any ground-disturbing activity which occurs between April 1 and September 30. Remote trail cams may be utilized to identify species presence. If active dens are identified, a 0.25-mile buffer is recommended until pups leave the den site or the species is no longer using the den.
    - For migratory bird nests, the Department recommends surveys occur in and within 300 feet of all project development. We recommend these surveys be conducted prior to any ground-disturbing activity occurring between April 1 and July 31. The Department and the U.S. Fish and Wildlife Service can recommend a suitable buffer for any occupied nest.
    - Clearance surveys should be conducted within 5 days (120 hours) of the initiation of construction activities.
    - Migratory bird nests or swift fox dens that are identified via incidental observation should also be marked and buffered.

    Protect nesting raptors – The proposed project site and surrounding area contains suitable raptor nesting habitat for species such as burrowing owl, ferruginous hawk, Swainson's hawk, and others. A number of raptor species are Wyoming SGCN, and disturbances such as construction activity and human presence can affect nesting success, population stability, and population viability. As such, the Department recommends the following recommendations be made a condition of the Project's permit:

    - Perform surveys for nesting raptors, including burrowing owls, within 1 mile of the project area prior to any vegetation clearing or ground-disturbing activities during the raptor nesting

season (February 1-August 1). Special attention should be paid to probable nesting habitat such as stands of cottonwood trees, stands of conifers, lone trees, cliffs, rock outcrops, and prairie dog colonies.

- If any raptor nests are detected, follow the seasonal and spatial buffers provided in Appendix A.

  - *Response: Our current plans have construction beginning prior to the aforementioned nesting seasons, and thus do not anticipate the need to conduct surveys referenced above. However, if construction starts within the aforementioned nesting seasons, proper wildlife surveys will be conducted and shared with the Wyoming Game and Fish Department.*

33. **Prevent the spread of invasive annual grasses and noxious** weeds – Noxious weeds and invasive annual grasses (IAGs) can cause significant harm to the ecosystem when introduced. Ground-disturbing activities can create an environment that facilitates establishment by unwanted plants. They significantly reduce the quality of wildlife habitat and their presence increases the probability of catastrophic wildfire. The potential economic impacts to the State of Wyoming are severe, and once these species become established, eradication is difficult and costly. Prevention of establishment remains the best way to keep Wyoming's habitats free of noxious weeds and IAGs.

    The most significant known threat to Wyoming is from cheatgrass, medusahead, and ventenata. To prevent the spread of noxious weeds and IAGs, we recommend the following measures be made conditions of the permit:

    - Prevent introduction and establishment by cleaning vehicles and equipment prior to movement to a new location in order to minimize the potential for transporting seeds.
    - Develop and implement a plan to assess, treat, and monitor for noxious weeds and invasive plants at the project scale and in the adjacent landscape where they are present.
    - Work with the Laramie County Weed and Pest District to implement and fund long-term plans for successful restoration of disturbed sites. Additional information on prevention and treatment options for these grasses can be found at www.invasivegrasses.com.

      - *Response: We will work with the Laramie County Weed and Pest District to develop a noxious weed plan to address these concerns.*

34. **Prevent the spread of aquatic invasive species** – Aquatic invasive species (AIS) are organisms that are not native to Wyoming and can cause significant harm to an ecosystem when introduced. Harmful impacts can occur to municipal water supplies, fishing and boating-related recreation, agriculture, aquaculture, and other commercial activities. The potential economic impacts to the State of Wyoming could be severe if these non-native species are introduced into our water systems. Once these organisms become established in a waterbody, there is very little that can be done to remove them. Prevention is the best way to keep a water body safe from AIS.

    The most significant known threat to Wyoming is from zebra and quagga mussels based on their proximity and demonstrated impacts in neighboring states. Other AIS include New Zealand mudsnail, Asian carp, rusty crayfish, and several species of aquatic plants.

    The spread of AIS from one body of water to another is a violation of Wyoming state statute (WS § 23-1-102 & §§ 23-4-201 through 205) and Wyoming Game and Fish Commission Regulation.
    To prevent the spread of AIS, the following is required:

- Equipment that was in contact with a water positive for zebra/quagga mussels (currently none in Wyoming) within the last 30 days is required to undergo inspection by an authorized inspector prior to contacting a Wyoming water.
- From March through November, all water hauling equipment and watercraft entering the state by land must be inspected before contacting a water of the state.
- Equipment used in any Wyoming water that contains AIS, must be Cleaned, Drained and Dried before use in another water. Wyoming waters with AIS can be found at: https://wgfd.maps.arcgis.com/apps/webappviewer/index.html?id=935acbec194f4d42823af3db59272409.
- When equipment that has been in contact with any Wyoming water is moved from one 4th level watershed (8-digit Hydrological Unit Code) to another within Wyoming, it must be Cleaned, Drained and Dried. Specific guidance is available at: https://wgfd.wyo.gov/watercraft-inspection-information.

    - *Response: Acknowledged, thank you.*

Environmental Health Review

35. DPR Construction is working on commercial wastewater holding tanks and inspection. Kimley Horn Engineer is meeting with us today to go over small wastewater systems in Wyoming and associated requirements.
    - *Response: Correct. We believe that all parties are currently working in accordance with the County's Environmental Health comments. However, to alleviate confusion, the request by DPR is specific to PZ-25-00076 (this application is PZ-25-00078)*

Fire Review

36. Ensure that all LCLUR are following, to include but not limited to fire department access and egress as well as water supply.
    - *Response: Acknowledged, thank you. Details on gate access, etc will be provided with the Building Department submittals.*

We appreciate your comments on these plans. Please contact me at 720-647-6231 or Stephen.litsas@kimley-horn.com should you have any questions.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.



Stephen Litsas, PE

Permit Notes

Permit Number: PZ-25-00078
Parcel Number: 12660510000200
Site Address: 154 US 85
Cheyenne, WY 82007
Applicant: Litsas, Stephen
Owner: LAZY D GRAZING ASSOC INC
Project Description: Tallgrass ILS will own the property located within the existing Switchgrass Industrial Park, and have overall site control. BFC Power LLC and Cheyenne Power Hub LLC are proposing to construct their respective phases of the BFC Power Project and Cheyenne Power Hub Project on the property which includes power generation facilities that will produce electricity for a proposed co-located data center.
Submitted: 11/21/2025
Technically Complete: 11/24/2025
Approved:
Issued:

Begin Date	End Date	Permit Area	Subject	Note Type	Note Text	Created By
11/24/2025		Application	PZ-25-00078	GENERAL	1.This site will have 5,000 construction workers visiting the site daily and the traffic study is answering the AM and PM peak hours. I would like to know the off-peak hours (lunch) with 5,000 construction workers visiting the site daily.	CHRISTOPHER.YANEY@LARAMIECOUNTYWY.GOV
11/25/2025		Application	PZ-25-00078	GENERAL	What is the plan for water on this site? It appears sanitary sewer will be taken care of by the leach field shown on the site plan, but there are multiple fire hydrants shown on the plan set and I don't see a water tower. Is central (BOPU) water proposed? If so, annexation or an outside user agreement is required. Outside user agreements are approved by the governing body of the City of Cheyenne and are not guaranteed. Annexation may change development requirements (at a minimum, jurisdiction for submittals). No other comments on the unincorporated County site plan.	SETH.LLOYD@LARAMIECOUNTYWY.GOV
11/26/2025		Workflow	COUNTY ASSESSOR REVIEW	GENERAL	No concerns, as long as parent parcel 12660510000200 remains intact. Any splitting up of the parent parcel will require new legal descriptions for all, with associated conveyances.	CANDICE.MCCART@LARAMIECOUNTYWY.GOV
12/01/2025	12/01/2025	Workflow	COUNTY REAL ESTATE OFFICE REVIEW	GENERAL	no comments	TERESA.LEMASTER@LARAMIECOUNTYWY.GOV
12/02/2025	12/02/2025	Application	PZ-25-00078	GENERAL	As with any development in Laramie County the district voices concern of consumptive draw down of the local aquifer from either existing wells or a new well as a source water for construction and operations of the facility. A defined source of water is not stipulated in submittals the district reviewed.	CONSERVATIONDISTRICT@LARAMIECOUNTYWY.GOV
12/03/2025		Application	PZ-25-00078	GENERAL	Please see the attached review letter.	SUE.KINSLEY@LARAMIECOUNTYWY.GOV
12/03/2025		Workflow	BUILDING FIRE CODE REVIEW	GENERAL	Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1. Fire Apparatus Roads required per 2024 IFC section 503. Fire protection water Supplies required per 2024 IFC section 507	DANIEL.PETERS@LARAMIECOUNTYWY.GOV

Permit Notes

12/03/2025	Workflow	ENGINEERS REVIEW	GENERAL	1st Review 1.Per 3-1-109.g.ix, existing and proposed access roads need to be shown and this includes out to Highway 85. The dimensions for the existing access road, radii, etc. coming off Hwy 85 need to be shown. The site plan only shows the access road on the property. 2.Per 3-1-109.g.xii, the location and widths of proposed sidewalks need to be shown. I assume there will be sidewalks from the parking areas to the buildings (i.e. warehouse and admin). 3.Per 3-1-109.g.xiv, the dimensions, height and setbacks need to be shown for all proposed buildings. 4.Per 3-1-109.g.xvi, location and type of proposed trash containment need to be shown. Will there be dumpsters for the warehouse and admin buildings? 5.Per 3-1-109.g.xviii, the parking lots need to be dimensioned showing the aisle dimensions/widths, access dimensions, etc. Only the parking stalls have been dimensioned via a legend. 6.Per 3-1-109.g.xxvi, the detention ponds require a drainage easement be established and recorded for the area encompassing the detention ponds and the easements need to be shown on the site plan drawing. 7.The site plan drawing does not show information on the detention pond outlets as described in the Drainage Report. In addition, it would be helpful to label the ponds on the site plan as indicated in the Drainage Report (Pond A, B, etc.) 8.The engineers certification on page 2 of the Drainage Report needs to follow the certification requirements per 5-2-105. 9.Per 5-2-104, the NOAA Atlas 14, Volume 12 shall be used for design rainfall intensity data for the specific location of the development. It appears the Drainage Report used the rainfall data in the old regulations. 10.Per 5-2-103.e, post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50yr rate for a 100-yr storm event. The design of the outlet structures shall maintain post-development runoff rates to historic rates for all return periods (5-yr, 10-yr, and 50-yr). 11.The Traffic Impact Study and its recommendations appear to be appropriate for this development, but WYDOT will have the final say on the study.	SCOTT.LARSON@LARAMIECOUNTYWY.GOV
12/03/2025	Workflow	WYDOT REVIEW	GENERAL	1.The traffic study is being reviewed and I am working with Engineers to get back comments. 2. Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all	TAYLOR.MCCORT@LARAMIECOUNTYWY.GOV

Permit Notes

					access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118). To obtain an access permit application (Access application (M-3A)) see the following link: https://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html 3. Developers and landowners should be aware that any work or presence in the right of way created by development/construction for this project will need the appropriate permitting or licensing between the utility owner (or appropriate local agency for fence modifications) and WYDOT District 1 Maintenance (access permits are with D1 Traffic). Utility owners, including governmental entities, will be responsible for the licensing and/or permitting of all utility facilities in the WYDOT right-of-way. Other work in the ROW can be approved through a temporary use permit. Permits (except for access permits) and licenses can be acquired by contacting Michael Elliott (Michael.Elliott@wyo.gov, 307-745-2123).Also, the development must maintain historic drainage corridors so that drainage is not diverted to other entry points to the R/W. If drainage is affected in the highway right-of-way, a drainage study needs to demonstrate that post-development discharge rates are metered at or below pre-development rates for 2, 5, 10, 25, 50 and 100 year events and will need to be reviewed by WYDOT Bridge/Hydraulics Program. 4. Nowhere in the report is there a direct comparison of pre and post development discharges, specifically at the same point. Their calcs indicate an increase in discharge from the development of the land, but I can't tell how they keep the historic runoff rates beyond the limits of the project. I'm uncertain how much, if any, discharge is from the ponds.	
12/04/2025		Workflow	GIS REVIEW	GENERAL	Addresses are issued with the building permits. Please include a clear access route from nearest public road (South Greeley HWY) to the site with the plot plan.	CAMBIA.MCCOLLOM@LARAMIECOUNTYWY.GOV
12/05/2025	12/05/2025	Application	PZ-25-00078	GENERAL	Please see the attached recommendations from the Wyoming Game and Fish Department. Thank you!	WYGAMEFISHDEPT@LARAMIECOUNTYWY.GOV
12/08/2025		Workflow	ENVIRONMENTAL HEALTH REVIEW	GENERAL	DPR Construction is working on commercial wastewater holding tanks and inspection. Kimley Horn Engineer is meeting with us today to go over small wastewater systems in Wyoming and associated requirements.	TIFFANY.GAERTNER@LARAMIECOUNTYWY.GOV
12/08/2025	12/08/2025	Application	PZ-25-00078	GENERAL	Ensure that all LCLUR are following, to include but not limited to fire department access and egress as well as water supply.	MATTHEW.BUTLER@LARAMIECOUNTYWY.GOV

Permit Notes

12/09/2025	Parcels	12660510000200	POP-UP	IF YOU RECEIVE ANY PUBLIC RECORDS REQUEST, PLEASE TALK TO JUSTIN BEFORE DOING ANYTHING WITH THEM FOR THIS PARCEL.	SONIA.CHRISTENSEN@LARAMIECOUNTYWY.GOV
12/22/2025	Application	PZ-25-00078	GENERAL	2nd review - np comments.	SETH.LLOYD@LARAMIECOUNTYWY.GOV
12/23/2025	Application	PZ-25-00078	GENERAL	Response to comments from the Wyoming Game and Fish Department. Thank you!	WYGAMEFISHDEPT@LARAMIECOUNTYWY.GOV
12/23/2025	Workflow	ENGINEERS REVIEW	GENERAL	2nd Review 1.It is common and industry standard to have two-way traffic aisles in parking lots to be a minimum of 24' wide. The current plan calls for 15', which would make it impossible for one vehicle to enter the parking lots while one vehicle is leaving the parking lots. 2.The dimensions for the existing and proposed access roads, radii, etc. coming off Hwy 85 need to be shown. Sheet 2 shows the access roads, but no dimensions (width) or radii are shown. 3.Per 3-1-109.f.viii, a full set of complete civil engineering design plans shall be issued with the site plan application. These plans shall meet standard engineering practice and consist of a title page, notes as necessary, detailed grading plan, plan and profiles for any proposed water, sanitary sewer, or storm sewer, details for outlet structures of any detention ponds, plan and profiles for any roadways, paving/concrete details, and other details as necessary. The site plan drawing does not show information on the detention pond outlets as described in the Drainage Report. 4.Prior to any construction activities, the drainage easements for the detention ponds shall be recorded and copies of the recorded easements shall be given to the County for their records.	SCOTT.LARSON@LARAMIECOUNTYWY.GOV
12/24/2025	Workflow	ENVIRONMENTAL HEALTH REVIEW	GENERAL	Commercial small wastewater application is available here: https://clcpublichealth.org/wp-content/uploads/2025/08/Small-Wastewater-Residential-App-2025.pdf. Contact Environmental Health for questions at (307) 633-4091	TIFFANY.GAERTNER@LARAMIECOUNTYWY.GOV

Permit Notes

12/29/2025		Workflow	WYOMING STATE ENGINEER'S OFFICE	GENERAL	Good morning, Regarding the referenced applications, I attempted to upload a comment but the step reviews had been removed. Regarding the State Engineer's Office Review indicating ponds/reservoirs (i.e. water detention facilities) needing a permit from the SEO: Although the response letter indicated they would be permitted through the County, please note that any pond/reservoir/water detention facility or other impoundment used to hold water that cannot evacuate the water within a 24 hour period must be permitted through the State Engineer's Office. If you have other questions regarding permitting the water detention facilities, please contact Ryan Mikesell, Assistant Administrator, Surface Water at 307-777-6202. Thank you, Sue Kinsley Wyoming State Engineer's Office Natural Resources Analyst Ground Water Division 307-777-2975	SONNY.HOOPS@LARAMIECOUNTYWY.GOV
12/29/2025	12/29/2025	Workflow	BUILDING FIRE CODE REVIEW	DEFICIENCY	No fire apparatus access shown for turbine buildings. Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1. Fire Apparatus Roads required per 2024 IFC section 503. Fire protection water Supplies required per 2024 IFC section 507.	DANIEL.PETERS@LARAMIECOUNTYWY.GOV

DRAINAGE REPORT

Project Jade
Laramie County, Wyoming

Prepared for:
Crusoe Energy Systems, Inc.
[Zenith Rathore]
[zrathore@crusoe.ai]

Prepared By:
Kimley-Horn and Associates, Inc.
6200 South Syracuse Way, Suite 300
Greenwood Village, CO 80111
(720) 647-6231

December 16, 2025

Kimley»Horn

ENGINEER'S CERTIFICATION

I hereby attest that this report for the Preliminary Drainage design of Project Jade was prepared by me, or under my direct supervision, in accordance with the provisions of THE LARAMIE COUNTY LAND USE REGULATIONS for the responsible parties thereof. I understand that Laramie County does not and shall not assume liability for drainage facilities designed by others.

Stephen Litsas, P.E
Registered Professional Engineer
State of Wyoming No. 21508



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INTRODUCTION

Location

The Site is located on private grasslands in Laramie County, Wyoming, approximately +/-640 Acres. The project is located southeast of Cheyenne. The project is bound to the north by parcel numbers 12660410000600 and 13663230000300, to the west and south by parcel numbers 12660210000200 and, to the east by parcels 12660410000600 and 12660420300100.

Project Name and Parcel Number:
Project Jade. Parcel No. 12660510000200.

Developer/Owner:
Crusoe Energy Systems, Inc. (255 Fillmore Street, Suite 300 Denver, CO 80206)

Section Township Range:
Project Jade is located within Section 5, Township 12 North, Range 66 West of the 6th P.M., in Laramie County Wyoming. The Site excludes the South Cheyenne Substation located in the most northwestern edge of Section 5, approximately 24.38 acres.

Vicinity Map
A vicinity map is provided below for reference
(not to scale, north arrow indicated in lower right corner):



Proposed Development

The proposed development (the Project) consists of 5 Data Center buildings and associated equipment yards, internal roadways, surface parking, and landscaping.

The project includes two main site access points, both connect to highway 85 one to the northeast and one the southeast.

The site will include 2 proposed detention ponds to provide water quality treatment for the entire contributing on-site and off-site area. The proposed ponds will included a outlet structure, emergency spillway, maintenance path, and trickle channel. Additionally, a proposed 30' wide channel will route offsite flows from the west and south through the site, around pond A and outfall into the existing swale.

An NRCS soil study for the project area was obtained to determine soil characteristics of the Site. The results of this study show that approximately 75.1% of soils consist of Evanston loam, type B soil, 17.5% consist of poposhia-trimad complex, type B soil, 2.91% consist of bayard fine sandy loam, type A soil, and 2.1% consist of Ascalon loam, type B. 1.9% of soils consist of Poposhia silt loam, type B. 0.6% ipson-Evanston complex, type B This preliminary drainage report is based upon the assumption the majority of the site is Type B soils. A custom NRCS Web Soil Survey is provided in **Appendix D.**

A large portion of the Site generally sheet flows north offsite with slopes between 3% and 30%. Along the southwestern boundary, select areas of the site drain off-site the existing condition. The proposed Project is expected to drain all to the north and are anticipated to have no negative impacts to downstream stormwater infrastructure.

The development of this project results in an potential overall imperviousness of 45% for the entire disturbed, on-site area (450.50 acres) (see **Appendix A & C** for a summary of how this area and imperviousness was calculated). A majority of the runoff generated on the Site will surface flow on-site to proposed storm sewer infrastructure, and further sheet flowing into the existing swales matching existing drainage patterns.

Variance Requests

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HISTORIC DRAINAGE

Overall Basin Descriptions

The drainage areas of the site are shown for the site as Pre-construction and Post-construction Plans within **Appendix C.** Pre-construction drainage basins were analyzed to calculate the peak existing runoff for the design storm. Post-construction basins were analyzed to calculate the peak flow with the current proposed land cover conditions.

Overall Drainage Patterns Through Property

The following sections describe each existing sub-basin as detailed on the preliminary drainage map (**Appendix C**) for this Site and Table 1 summarizes their characteristics.

Existing Sub-basin EX-1

Sub-basin EX-1 is ±869.67-acres along the western portion of the site including portions of sections 5, 6, 7 and 8 comprised of existing native grass. Runoff generated at this sub-basin sheet flows from south to north into an existing swale which flows beyond the edge of the project through the adjacent South Cheyenne Substation swales and into an existing culvert which ultimately outfalls into Porter Creek.

Existing Sub-basin EX-2

Sub-basin EX-2 is ±280.45-acres along the northeastern portion of the site comprised of existing native grass. Runoff generated at this sub-basin sheet flows north towards the existing swale beyond the edge of the Project Site and into an existing culvert located under HWY 85 and ultimately into Porter creek.

Existing Sub-basin EX-3

Sub-basin EX-3 is ±83.57-acres along the southeastern portion of the site comprised of existing native grass. Runoff generated at this sub-basin sheet flows south beyond the edge of the Project Site into an existing culvert located under HWY 85 and ultimately into Simpson Creek.

Table 1. Summary of Existing Sub-Basins related to this Project
(CUHP Modeling, **See Appendix A**)

Existing Sub-basins	Area (AC)	Imp.	100-Year Flow (cfs)
EX-1	869.67	2.0%	737
EX-2	280.45	2.0%	418
EX-3	83.57	2.0%	110

Existing Sub-Basins within Sub-Basin EX-1

The following section describes the division of sub-basin EX1 by section line, drainage pattern and outfall location. Portions of sub–Basin EX-1 will be detained on site within a proposed detention pond. The remaining sub basins within Sub-basin EX1 will be routed through section 5 by a proposed drainage channel. This channel will be sized to accommodate additional flows from Section 8, providing capacity for future development if needed.

Existing Sub-basin EX-1A
Sub-basin EX-1A is ±426.00-acres within northern portion of section 7 and is comprised of existing native grass. Runoff generated at this sub-basin sheet flows north towards the existing swale though the site and the South Cheyenne Substation and into an existing culvert which ultimately outfalls into Porter Creek.

Existing Sub-basin EX-1B
Sub-basin EX-1B is ±68.57-acres within the northwestern portion of section 8 and is comprised of existing native grass. Runoff generated at this sub-basin sheet flows north towards the existing swale though the site and the South Cheyenne Substation and into an existing culvert which ultimately outfalls into Porter Creek.

Existing Sub-basin EX-1C
Sub-basin EX-1C is ±235.00-acres within the western portion of section 8 and is comprised of existing native grass. Runoff generated at this sub-basin sheet flows south towards flows south beyond the edge of section 8 into an existing culvert located under HWY 85 and ultimately into Simpson Creek.

Existing Sub-basin EX-1D
Sub-basin EX-1D is ±120.80-acres along the eastern portion of section 6 and represents existing native grass. Runoff generated at this sub-basin sheet flows east towards the existing swale though the site and the South Cheyenne Substation and into an existing culvert which ultimately outfalls into Porter Creek.

Existing Sub-basin EX-1E
Sub-basin EX-1E is ±254.00-acres along the western portion of the site, section 5 and is comprised of existing native grass. Runoff generated at this sub-basin sheet flows north towards the existing swale and is routed through South Cheyenne Substation and into an existing culvert which ultimately outfalls into Porter Creek.

Table 2. Summary of Existing Sub-Basin 1 Division related to this Project
(CUHP Modeling, **See Appendix A**)

Existing Sub-basins	Area (AC)	Imp.	100-Year Flow (cfs)
EX-1A	426.00	2.0%	476
EX-1B	68.57	2.0%	96
EX-1C	235.00	2.0%	324
EX-1D	120.80	2.0%	119
EX-1E	245.00	2.0%	269
		Total:	1,284

According to the FEMA Food Plain Map effective January 17, 2007, this area is not included within the flood plain per FEMA FIRM Panel 56021C1375F (included in **Appendix D**).

Outfalls Downstream from Property

In the existing condition, the majority of the site drains north to the Porter Creek. The southeasternmost part of the site drains south towards Simpson Creek. Wyoming Adams & Bunker Reservoir 1 and Eagle Rock Reservoir are the receiving waters of the project site. Runoff is conveyed to Eagle Rock Reservoir through Simpson Creek, and runoff is conveyed to Wyoming Adams & Bunker Reservoir 1 through Porter Creek. Runoff conveyed through Eagle Rock Reservoir ultimately flows to Adams & Bunker Reservoir 1. The existing drainage patterns will be maintained in the proposed condition with the exception of existing basin EX-3. Existing Basin EX-3 currently flows (110 CFS) south towards Simpson creek, in the proposed condition these flows will be routed north through proposed detention pond B which outfalls into Porter Creek. Both Porter Creek and Simpson Creek ultimately converge at the Adams & Bunker Reservoir 1. Refer to Existing Conditions Map located in **Appendix C**.

DESIGN CRITERIA

Hydraulic Criteria

This report evaluates the predevelopment runoff of the Project (including Data facility footprint, access drives, and substation pads) and addresses the stormwater requirements of Laramie County and the state of Wyoming.

Hydrologic Design Criteria

The table below notes the hydrologic design criteria used in the analysis. The Colorado Urban Hydrograph Procedure was used for hydrologic analysis per the Unified Development Code, City of Cheyenne, Adopted January 23, 2012.The parameters listed below without a value can vary depending on the surface conditions, soil type, etc. Refer to **Appendix A** for possible values.

Table 3. Summary of CUHP Modeling Values used

Parameter		Value	Unit	Reference
Percent Imperviousness		-	%	Urban Storm Drainage Criteria Manual (USDCM), Chapter 6, Table 6-3
Maximum Depression Storage: Pervious		0.4	inches	USDCM CUHP User's Manual, Table 6-6
Maximum Depression Storage: Impervious		0.1	Inches	USDCM CUHP User's Manual, Table 6-6
Horton's Infiltration Parameters: Initial Rate		-	in/hr	USDCM CUHP User's Manual, Table 6-7
Horton's Infiltration Parameters: Final Rate		-	in/hr	USDCM CUHP User's Manual, Table 6-7
Horton's Infiltration Parameters: Decay Coefficient		-	1/sec	USDCM CUHP User's Manual, Table 6-7
1-hr Point Rainfall	100-Year Storm	2.68	inches	NOAA Atlas 14, Volume 12
	10-Year Storm	1.56		
Storm Runoff, Q		-	cfs	

Rainfall and Storm Design Frequencies

According to the Laramie County Land Use Regulations, the design storms for the Project are the 10-year (Industrial) and 100-year frequency events. The rainfall P1 values for the rainfall

intensity values were provided in the *NOAA Atlas 14, Volume 12*. One-hour rainfall depths used for the calculations at the site are as outlined below along with **Appendix A**:

Table 4. Summary of rainfall depths provided within the Laramie County Land Use Regulations.

Rainfall Depths						
	2-year	5-year	10-year	25-year	50-year	100-year
1-hr	0.89”	1.25”	1.56”	1.99”	2.33”	2.68”

Stormwater Runoff

The stormwater runoff for both the existing and proposed conditions was calculated using the Colorado Urban Hydrograph Procedure (CUHP). The 10-year and 100-year, 1-hour storm event were analyzed for pre- drainage basins. The flow path for the basins can be seen in **Appendix C**. The precipitation data used for the 10-year and 100-year, 1-hour storm event is based on the *NOAA Atlas 14, Volume 12*. A summary of the CUHP calculation findings is shown in the table below; more calculations are shown in **Appendix A**, Hydrologic Calculations.

Table 5. Summary of Existing vs Proposed Impervious and flow data.

	Existing	Proposed
Area	450.50 ac	450.50ac
Imperviousness	2.0%	52%
Q_{10}	133 cfs	555 cfs
Q_{100}	617 cfs	1302 cfs

Water Quality and Detention

The required detention volume, 100 yr volume were calculated using the methods outlined in Volume 2 of the Mile High Flood District drainage criteria manual. Both Pond A and Pond B were designed in accordance with the Criteria’s volume and release rate within the MFHD-Detention Spreadsheet. See **Appendix C** for MFHD-Detention Version 4.06 sizing spread sheets.

DRAINAGE PLAN

This report evaluates the predevelopment runoff of the project and addresses the stormwater requirements of Laramie County and the State of Wyoming.

General Concept

All runoff generated from the Site will be conveyed northward through the proposed storm sewer infrastructure into two proposed detention ponds, identified as Pond A and Pond B.

Discharge from Pond A will outfall into an existing swale, which routes flow north through the adjacent South Cheyenne Substation swales and into an existing culvert. This culvert ultimately discharges into an existing swale in the property to the north and through an existing culvert crossing Hwy 85 which ultimately flows into Porter Creek, which then flows into Adams & Bunker Reservoir 1.

Per the drainage analysis for the South Cheyenne Substation site (**See Appendix E**), the three large box culverts (5'x16') located north of the substation appear to be appropriately sized to convey runoff from the entire contributing watershed, which encompasses approximately 850 acres across Sections 5, 6, 7, and 8. This watershed is represented as existing basin EX-1 in the Existing Basins Drainage Map included in **Appendix C**. Although the proposed site improvements will not increase existing runoff flows, the capacity of the existing swale and culvert infrastructure will be evaluated to confirm adequacy under current and future conditions. Any recommendations for upsizing culverts or modifying the swale configuration will be documented in the Final Drainage Report.

Pond B will discharge through proposed storm infrastructure offsite to the north, entering a proposed drainage easement offsite on the property north of the site. From there, flow will continue into an existing swale and culvert system crossing Highway 85, ultimately converging with Porter Creek, which then flows into Adams & Bunker Reservoir 1.

In addition, a roof drain network will collect runoff from the building roofs and convey the runoff to the proposed storm sewer network, with the exception of select building roof drains. The roof flows that are not routed into the below grade storm infrastructure are expected to outfall onto adjacent asphalt and further into the downstream surface inlet. In no scenario will roof flows be routed over pedestrian sidewalks. The storm sewer network, including roof drains, will be sized to accommodate the 100-year storm even (these calculations will be provided within the Final Drainage Report).

An overall schematic of the existing drainage routing/proposed ponds has been included in **Appendix C**.

Proposed Sub-basin Descriptions

A Proposed Preliminary Drainage Map (**Appendix C**) has been provided to illustrate the following sub-basins proposed with this project. Individual sub-basin details such as runoff and imperviousness percentages are provided in **Appendix A**. The 100-year peak flows for each sub-basin are also provided in **Appendix A.**

Sub-basin A

Sub-basin A-1 is ±168.93-acres, consisting of the western half of the site including the site features and the entirety of Building 5. The site will be designed off the 100-year runoff flow. Storm intake for the buildings listed above will include roof drain downspouts, some routed directly to the proposed storm sewer. The remaining roof drain downspouts will sheet flow over proposed surfaces, including asphalt, concrete, and landscaping, and be directed to the drainage system. Storm infrastructure for the proposed site will be sized to include the 100-year runoff from the roof as well as runoff from its respective basin (as part of the Final Drainage Report).

Sub-basin B

Sub-basin B-1 is ±281.82-acres, consisting of the eastern half of the site including the site features and the entirety of Buildings 1,2,3 &. The site will utilize roof drain downspouts; some will be routed below grade into the proposed storm system. The remaining roof downspouts will sheet flow onto the asphalt and into the proposed drainage system. Storm infrastructure for the

proposed site will be sized to include the 100-year runoff from the roof as well as runoff from its respective basin (as part of the Final Drainage Report).

Proposed Detention Ponds Locations and Outfalls

The proposed drainage of the Project will adhere to the existing drainage pattern of the Site with the exception of existing basin EX-3. Existing Basin EX-3 currently flows (110 CFS) south towards Simpson creek, in the proposed condition these flows will be routed north through proposed detention pond B which outfalls into Porter Creek. The stormwater onsite is split roughly through the center with a highpoint ridge located from south to north and most of the site will either flow west (Basin A) or North (Basin B). The stormwater will be routed to the ponds through proposed pipe network and proposed roadways.

Both detention ponds will detain flows before releasing through an outlet structure at flow rates at or below the calculated flow rates provided in the Existing CUHP (Colorado Urban Hydrograph Procedure) models, See **Appendix B**. The area (acres) used to calculate these existing flows were the limits of construction for each of the proposed major basins. Onsite flows within Basins A and B will be conveyed via public storm drain to the proposed detention ponds located in the western edge and along the northern boundary of the Site.

Basin A has a total tributary area of 168.93 acres, with an imperviousness of 40.00%. This conservative assumption provides flexibility for future site development within the Pond A watershed, such as the addition of a building, additional structures or increased paved surfaces. As the final site layout is determined, the pond design will be revised accordingly to reflect actual impervious conditions. Pond A has been sized to attenuate the 100-year event, providing 36.09 acre-feet of storage.

Basin B has a total tributary area of 261.50 acres with an imperviousness of 66.00%. This conservative assumption provides flexibility for future site development within the Pond B watershed, such as the addition of structures or increased paved surfaces. As the final site layout is determined, the pond design will be revised accordingly to reflect actual impervious conditions. Pond B has been sized to attenuate the 100-year events, providing 64.49 acre-feet of storage.

After the water has been detained, Pond A will be routed in the existing swale located to the north of the pond, ultimately being routed around the adjacent South Cheyenne Substation swales and into an existing box culvert which outfalls into Porter Creek. Pond B will be routed through proposed storm infrastructure into a drainage easement on the property north of the site into an existing swale which outfalls into Porter Creek.

Based on existing conditions modeled using the CUHP methodology and the Larime County Land use regulations, the maximum allowable release rate for both ponds shall not exceed the a pre-development (or historic) 50-Year rate for a 100-Year Storm event. Therefore, Pond A was calculated to be 207.00 (cfs) and 347.00 (cfs)for Pond B. However, the current design of the Pond A outlet structure limits the release rate to 133.90 (cfs), and Pond B releases at 153.90 (cfs), resulting in an over-detained condition. This conservative design approach provides additional storage capacity, which contributes to mitigating downstream erosion and reducing impact on existing stormwater infrastructure. The emergency overflow route for Pond A

continues into the existing swale. The emergency overflow route for Pond B continues to sheet flow into an existing swale offsite of the property line. The 5, 10, 50 and 100 year flows will be controlled by the proposed outlet control structure. An emergency spillway will convey the 500 year flows. The maximum depth of flow across the spillway will not exceed 1 foot. Additionally, 1 foot minimum of freeboard will be provided from the top of the max depth across the spillway to the top of pond. Preliminary sizing calculations for both of the detention ponds are provided in **Appendix B**.

Table 6. Summary of Proposed Pond data.

Proposed Detention Facilities Property Summary		
	Pond A	**Pond B**
Area	168.93 Acres	261.5 Acres
Imperviousness	40.00 %	66.00 %
Pond A Summary		
Description	**Required**	**Provided**
100-Yr Detention Volume	14.373 AC-FT	36.092 AC-FT
100-Yr Release Rate*	205.00 CFS	133.90 CFS*
Pond B Summary		
Description	**Required**	**Provided**
100-Yr Detention Volume	34.596 AC-FT	64.493 AC-FT
100-Yr Release Rate*	259.00 CFS	153.90 CFS*

* Per 5-2-103 Post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50-Year rate for a 100-Year Storm event.

Table 7. Summary of Pond A existing vs proposed flow rates.

Pond A		
Desing Storm	**Pre-Development**	**Post-Development**
5 YR	22 cfs	14.3 cfs
10 YR	60 cfs	22.4 cfs
50 Yr	206 cfs	96.0 cfs
100 YR	270 cfs	133.9 cfs

Table 8. Summary of Pond B existing vs proposed flow rates.

Pond B		
Desing Storm	**Pre-Development**	**Post-Development**
5 YR	26 cfs	28.7 cfs
10 YR	73 cfs	59.4 cfs
50 Yr	261 cfs	145.0 cfs
100 YR	347 cfs	153.9 cfs

Proposed Drainage Swale

Swale O-1 is a proposed trapezoidal swale with a 30-foot bottom width, designed to collect overland flow from offsite sub-basins EX-1A, EX-1B, EX-1C, and EX-1D. These sub-basins are located in Sections 6, 7, and 8, situated to the south and west of the project site. The swale is aligned along the western boundary of the site and follows existing drainage patterns, conveying flow from south to north toward design point O-1. The swale will route stormwater through the site and discharge into an existing drainage swale that bypasses the South Cheyenne Substation, ultimately entering an existing culvert and outfalling into Porter Creek.
Swale O-1 was hydraulically modeled using Bentley's FlowMaster software and sized to convey the 100-year design storm. The swale features a bottom slope of 0.50%, maximum side slopes of 3:1, and a total depth of 5.10 feet. Under the 100-year storm event, the swale is designed to convey a peak flow of 1015 cfs, resulting in a flow depth of approximately 3.7 feet. Detailed hydraulic computations and open channel cross sections are provided in **Appendix B**.

CONCLUSIONS

This drainage report evaluates existing and proposed stormwater conditions for a 450.5-acre data center development in Laramie County, Wyoming. The undeveloped site currently consists of native grassland divided into three sub-basins (EX-1 through EX-3), which drain north to Porter Creek and south to Simpson Creek, ultimately discharging into Adams & Bunker Reservoir 1.

The proposed development modifies the drainage pattern by redirecting runoff from EX-3 northward to Porter Creek. Two new sub-basins, A-1 and B-1, will be established, each supported by dedicated stormwater infrastructure. Stormwater will be conveyed via roof drain systems, storm sewers, and two detention ponds—Pond A (36.01 acre-feet) and Pond B (52.79 acre-feet). These facilities are designed in accordance with Mile High Flood District (MHFD) criteria to meet water quality and peak flow requirements for the 10-year and 100-year, 1-hour storm events.

Release rates for the existing basins were calculated using the CUHP method. The post-development peak flow rates from the detention ponds will not exceed existing conditions. Specifically, the existing 100-year peak flows are 266 cfs for Pond A and 341 cfs for Pond B, while the proposed 100-year flows are reduced to 133.90 cfs and 153.90 cfs, respectively.

Additionally, a proposed swale (Swale O-1) will intercept offsite runoff from Sections 6, 7, and 8, located southwest of the project area. This swale will run along the western boundary of the site and discharge into an existing swale north of Pond A. Designed with a trapezoidal cross-section (5.1 feet deep with 3:1 side slopes), Swale O-1 is sized to convey a 100-year storm event flow of 1015 cfs.

For Pond A, the pre-development flow rates are higher than the proposed post-development rates across all design storms. For the 5-year storm, the flow decreased from 22 cfs to 14.3 cfs. Similarly, the 10-year storm flow reduced from 60 cfs to 22.4 cfs. For larger events, the 50-year storm dropped from 206 cfs to 96.0 cfs, and the 100-year storm decreased from 270 cfs to 133.9 cfs. 100 yr release rate to discharge at no greater than a pre-development (or historic) 50-Year rate per Laramie County Land Use Regulations.

For Pond B, the pre-development flow rates are higher than the proposed post-development. The 5-year storm flow decreased slightly from 26 cfs to 28.7 cfs. The 10-year storm reduced from 73

cfs to 59.4 cfs. For the 50-year storm, the flow dropped from 261 cfs to 145.0 cfs, and for the 100-year storm, it decreased from 347 cfs to 153.9 cfs. 100 yr release rate to discharge at no greater than a pre-development (or historic) 50-Year rate per Laramie County Land Use Regulations.

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6. Laramie County. (2025, August 5th). *Laramie County Land Use Regulations*. https://www.laramiecountywy.gov/files/sharedassets/public/v/1/planning/documents/planning/lclur-rewrite-document-titles/08.27.2025-lclur-master.pdf

Appendix A – Hydrologic Computations

IMPERVIOUS CALCULATIONS

Pond A	168.93		
	Acres	Imperv %	AC*IMP
Grassland:	106.93	0.02	2.1386
Paved/Roof:	62	1	62
Total:	168.93		64.1386
		Imperv:	37.97%

Pond B	281.64		
	Acres	Imperv %	AC*IMP
Grassland:	99.7	0.02	1.994
Paved/Roof:	181.94	1	181.94
Total:	281.64		183.934
		Imperv:	65.31%

WHOLE SITE IMPERV

TOTAL	450.57		
	Acres	imperv	AC*Imp
Paved	243.94	1	243.94
Grassland	206.63	0.02	4.1326
Total:	450.57		248.0726
		Imperv:	55%

NOAA Atlas 14, Volume 12, Version 2
Location name: Cheyenne, Wyoming, USA*
Latitude: 41.0428°, Longitude: -104.7994°
Elevation: 6212 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Carl Trypaluk, Dale Unruh, Michael St.Laurent, Austin Jordan, Rama Sesha Sridhar Mantripragada, Sandra Pavlovic, Greg Fall, Fernando Salas

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	**0.291** (0.248-0.337)	**0.382** (0.329-0.448)	**0.536** (0.457-0.637)	**0.667** (0.558-0.801)	**0.853** (0.689-1.04)	**0.998** (0.782-1.24)	**1.15** (0.863-1.46)	**1.30** (0.935-1.72)	**1.51** (1.02-2.13)	**1.67** (1.07-2.47)
10-min	**0.403** (0.345-0.468)	**0.530** (0.457-0.621)	**0.744** (0.633-0.883)	**0.926** (0.775-1.11)	**1.18** (0.956-1.44)	**1.38** (1.08-1.72)	**1.59** (1.20-2.02)	**1.80** (1.30-2.39)	**2.10** (1.41-2.95)	**2.32** (1.48-3.42)
15-min	**0.468** (0.400-0.544)	**0.616** (0.531-0.721)	**0.864** (0.736-1.03)	**1.08** (0.900-1.29)	**1.37** (1.11-1.68)	**1.61** (1.26-1.99)	**1.85** (1.39-2.35)	**2.10** (1.51-2.78)	**2.44** (1.64-3.43)	**2.70** (1.72-3.98)
30-min	**0.571** (0.488-0.663)	**0.751** (0.647-0.879)	**1.05** (0.897-1.25)	**1.31** (1.10-1.57)	**1.68** (1.35-2.04)	**1.96** (1.54-2.43)	**2.25** (1.70-2.87)	**2.56** (1.84-3.39)	**2.97** (2.00-4.18)	**3.29** (2.10-4.85)
60-min	**0.679** (0.581-0.788)	**0.893** (0.770-1.05)	**1.25** (1.07-1.49)	**1.56** (1.30-1.87)	**1.99** (1.61-2.43)	**2.33** (1.83-2.89)	**2.68** (2.02-3.41)	**3.04** (2.18-4.03)	**3.53** (2.38-4.97)	**3.91** (2.50-5.77)
2-hr	**0.780** (0.673-0.904)	**1.03** (0.890-1.20)	**1.44** (1.23-1.71)	**1.79** (1.50-2.15)	**2.29** (1.85-2.80)	**2.68** (2.09-3.33)	**3.08** (2.30-3.93)	**3.49** (2.48-4.64)	**4.05** (2.68-5.71)	**4.49** (2.81-6.61)
3-hr	**0.841** (0.730-0.971)	**1.11** (0.963-1.29)	**1.55** (1.33-1.84)	**1.93** (1.62-2.31)	**2.46** (1.99-3.01)	**2.88** (2.24-3.58)	**3.30** (2.46-4.22)	**3.74** (2.64-4.97)	**4.34** (2.84-6.11)	**4.81** (2.98-7.07)
6-hr	**0.977** (0.855-1.11)	**1.27** (1.12-1.46)	**1.75** (1.52-2.05)	**2.16** (1.85-2.56)	**2.75** (2.26-3.30)	**3.20** (2.54-3.91)	**3.67** (2.78-4.59)	**4.15** (2.98-5.39)	**4.81** (3.20-6.61)	**5.32** (3.36-7.65)
12-hr	**1.19** (1.07-1.32)	**1.49** (1.35-1.67)	**1.99** (1.78-2.25)	**2.42** (2.14-2.76)	**3.03** (2.60-3.49)	**3.51** (2.94-4.09)	**4.00** (3.25-4.77)	**4.52** (3.53-5.59)	**5.23** (3.86-6.84)	**5.78** (4.08-7.92)
24-hr	**1.46** (1.35-1.59)	**1.76** (1.62-1.92)	**2.27** (2.08-2.49)	**2.71** (2.47-2.98)	**3.34** (2.99-3.70)	**3.84** (3.39-4.29)	**4.36** (3.77-4.97)	**4.90** (4.14-5.79)	**5.65** (4.60-7.08)	**6.24** (4.93-8.19)
2-day	**1.73** (1.60-1.87)	**2.05** (1.90-2.22)	**2.59** (2.39-2.82)	**3.06** (2.80-3.34)	**3.72** (3.35-4.09)	**4.25** (3.78-4.72)	**4.79** (4.19-5.43)	**5.36** (4.58-6.30)	**6.13** (5.08-7.66)	**6.74** (5.43-8.83)
3-day	**1.90** (1.75-2.06)	**2.24** (2.07-2.43)	**2.81** (2.59-3.06)	**3.30** (3.01-3.61)	**3.99** (3.59-4.41)	**4.54** (4.02-5.07)	**5.09** (4.44-5.83)	**5.67** (4.84-6.74)	**6.46** (5.35-8.15)	**7.07** (5.72-9.36)
4-day	**2.03** (1.88-2.20)	**2.39** (2.22-2.60)	**2.99** (2.75-3.26)	**3.50** (3.20-3.83)	**4.22** (3.79-4.67)	**4.78** (4.23-5.36)	**5.35** (4.66-6.14)	**5.94** (5.07-7.08)	**6.73** (5.59-8.52)	**7.35** (5.97-9.76)
7-day	**2.34** (2.17-2.54)	**2.75** (2.55-2.99)	**3.43** (3.16-3.73)	**3.99** (3.64-4.37)	**4.77** (4.30-5.28)	**5.37** (4.79-6.04)	**5.98** (5.25-6.89)	**6.59** (5.69-7.89)	**7.41** (6.24-9.42)	**8.03** (6.63-10.7)
10-day	**2.61** (2.42-2.82)	**3.07** (2.84-3.32)	**3.81** (3.50-4.14)	**4.42** (4.03-4.82)	**5.26** (4.74-5.81)	**5.89** (5.26-6.62)	**6.52** (5.75-7.52)	**7.15** (6.22-8.57)	**7.98** (6.79-10.2)	**8.60** (7.19-11.5)
20-day	**3.46** (3.22-3.75)	**4.04** (3.75-4.37)	**4.96** (4.56-5.37)	**5.69** (5.20-6.19)	**6.66** (6.04-7.36)	**7.38** (6.64-8.28)	**8.07** (7.20-9.29)	**8.74** (7.71-10.5)	**9.58** (8.34-12.2)	**10.2** (8.77-13.6)
30-day	**4.17** (3.88-4.51)	**4.84** (4.49-5.22)	**5.89** (5.42-6.35)	**6.71** (6.14-7.28)	**7.78** (7.07-8.57)	**8.56** (7.73-9.59)	**9.30** (8.34-10.7)	**10.0** (8.89-11.9)	**10.8** (9.56-13.8)	**11.4** (10.0-15.3)
45-day	**5.15** (4.80-5.55)	**5.92** (5.50-6.37)	**7.13** (6.56-7.66)	**8.06** (7.39-8.71)	**9.27** (8.44-10.2)	**10.1** (9.18-11.3)	**10.9** (9.84-12.5)	**11.7** (10.4-13.9)	**12.5** (11.2-15.8)	**13.1** (11.7-17.4)
60-day	**6.00** (5.61-6.47)	**6.86** (6.39-7.37)	**8.19** (7.56-8.80)	**9.22** (8.48-9.95)	**10.5** (9.63-11.5)	**11.5** (10.4-12.8)	**12.3** (11.1-14.1)	**13.1** (11.8-15.5)	**14.0** (12.6-17.6)	**14.6** (13.2-19.3)

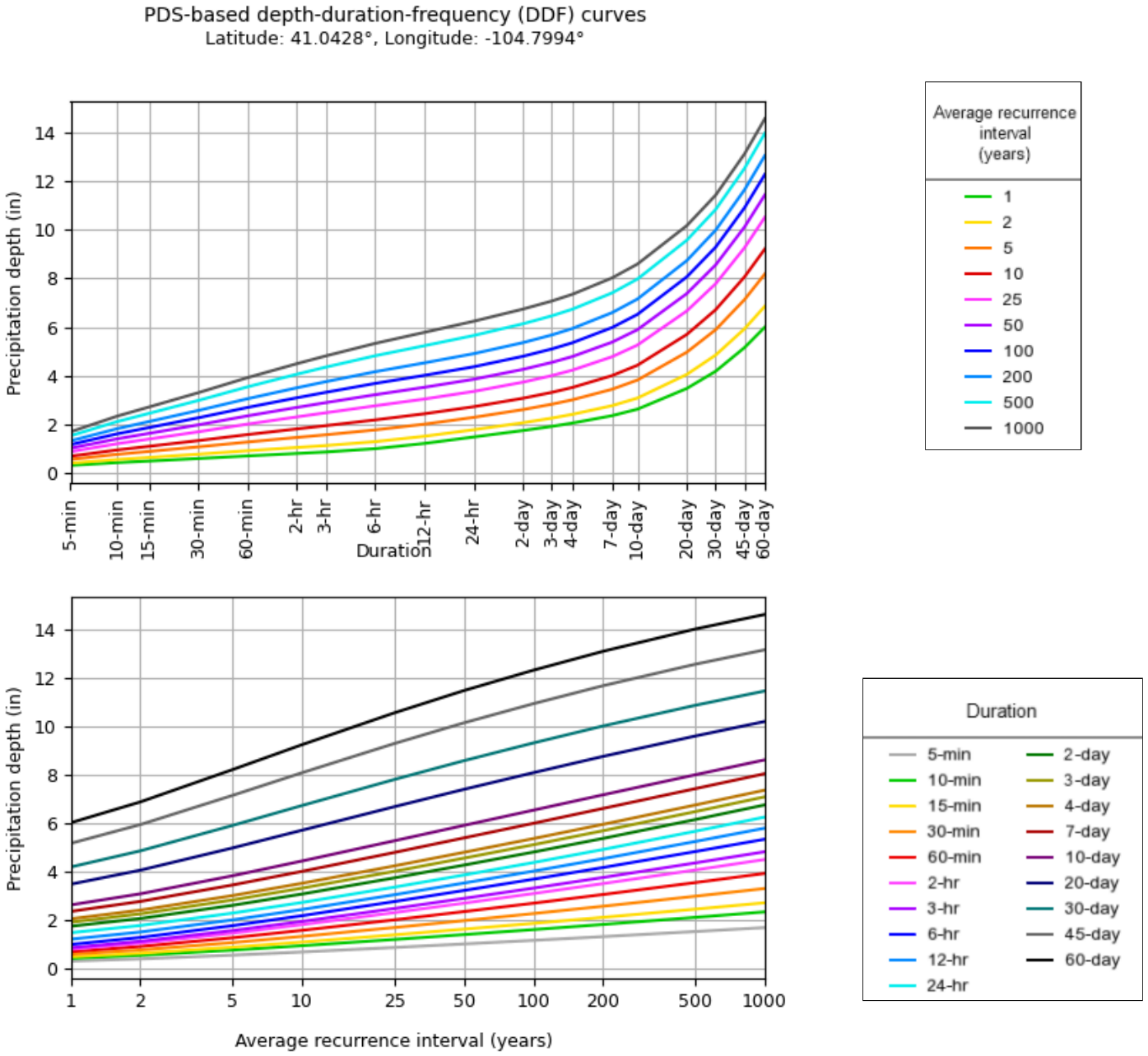
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

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PF graphical



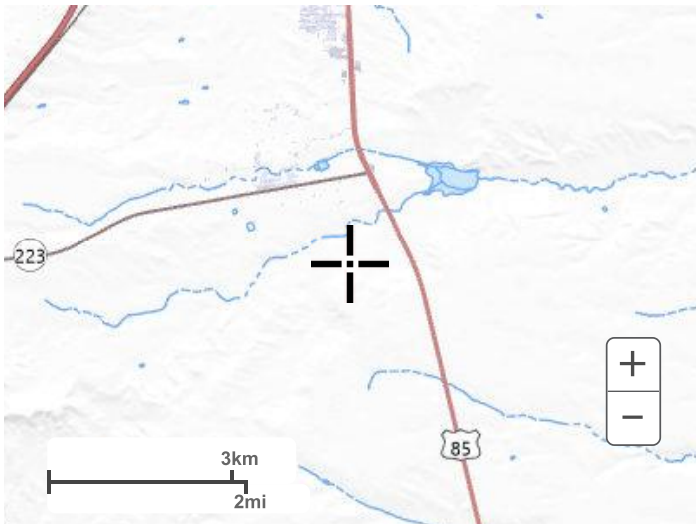
NOAA Atlas 14, Volume 12, Version 2

Created (GMT): Mon Dec 15 21:24:55 2025

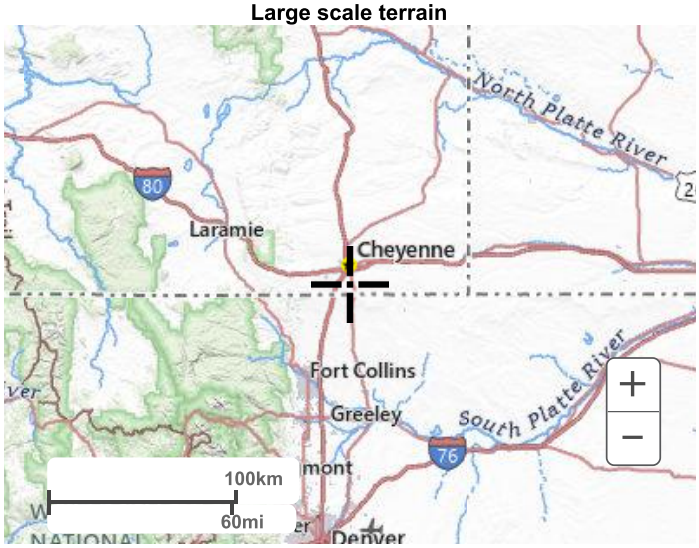
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Maps & aerials

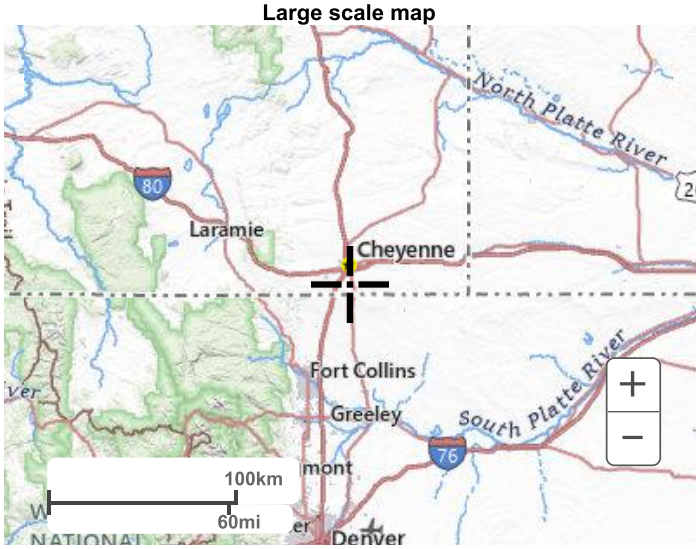
Small scale terrain



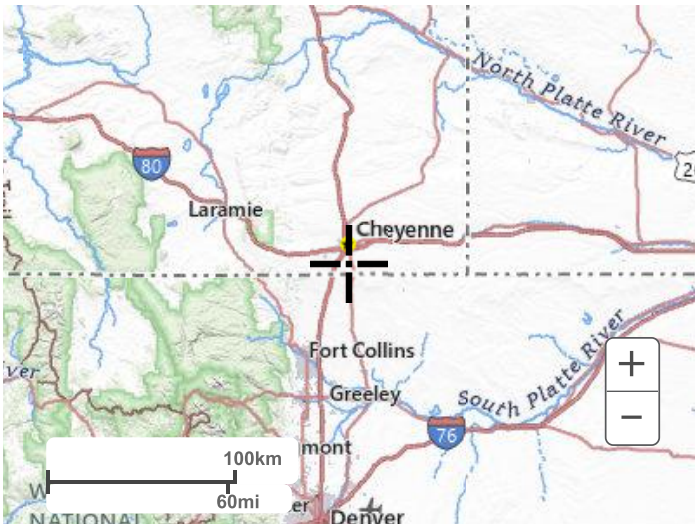
Large scale terrain



Large scale map



Large scale aerial



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EXISTING INPUTS

CUHP SUBCATCHMENTS

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (acre)	Length to Centroid (ft)	Length (ft)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
EX1		100 YR	869.67	5575	10367	0.011	2	0.35	0.1	4.5	0.0018	0.6	0
EX2		100 YR	280.45	2378	4248	0.033	2	0.35	0.1	4.5	0.0018	0.6	0
EX3		100 YR	83.57	1384	2689	0.0135	2	0.35	0.1	4.5	0.0018	0.6	0
EX1A		100 YR	426	3167	5976	0.013	2	0.35	0.1	4.5	0.0018	0.6	0
EX1B		100 YR	68.57	1283	3811	0.05	2	0.35	0.1	4.5	0.0018	0.6	0
EX1C		100 YR	235	1624	4002	0.011	2	0.35	0.1	4.5	0.0018	0.6	0
EX1D		100 YR	120.8	2482	4547	0.013	2	0.35	0.1	4.5	0.0018	0.6	0
EX1E		100 YR	254	3340	5690	0.02	2	0.35	0.1	4.5	0.0018	0.6	0
FUTURE POND A		100 YR	168.93	1635	3647	0.034	2	0.35	0.1	4.5	0.0018	0.6	0
FUTURE POND B		100 YR	281.81	2597	4960	0.018	2	0.35	0.1	4.5	0.0018	0.6	0

Typical Depression Losses for Various Land Covers (All Values in Inches)

Land Cover	Range in Depression (Retention) Losses	Recommended
Impervious:		
Large paved areas	0.05 - 0.15	0.1
Roofs-flat	0.1 - 0.3	0.1
Roofs-sloped	0.05 - 0.1	0.05
Pervious:		
Lawn grass	0.2 - 0.5	0.35
Wooded areas and open fields	0.2 - 0.6	0.4

Recommended Horton's Equation Parameters

NRCS Hydrologic Soil Group	Infiltration (inches per hour)		Decay Coefficient - a
	Initial - f_i	Final - f_o	
A	5.0	1.0	0.0007
B	4.5	0.6	0.0018
C	3.0	0.5	0.0018
D	3.0	0.5	0.0018

Comment			
1Hr Depth	1.25	NOAA Atlas 14 Point Precipitation Frequency Estimates: CO (Note: Use 60-minute recurrence interval depth)	
Return Period	5	Years	
Time	Depth	CurveValue	
0:05	0.025		0.02
0:10	0.046		0.037
0:15	0.109		0.087
0:20	0.191		0.153
0:25	0.313		0.25
0:30	0.163		0.13
0:35	0.073		0.058
0:40	0.055		0.044
0:45	0.045		0.036
0:50	0.045		0.036
0:55	0.038		0.03
1:00	0.038		0.03
1:05	0.038		0.03
1:10	0.038		0.03
1:15	0.031		0.025
1:20	0.028		0.022
1:25	0.028		0.022
1:30	0.028		0.022
1:35	0.028		0.022
1:40	0.019		0.015
1:45	0.019		0.015
1:50	0.019		0.015
1:55	0.019		0.015
2:00	0.016		0.013
2:05	0		

Comment			
1Hr Depth	1.56	NOAA Atlas 14 Point Precipitation Frequency Estimates: CO (Note: Use 60-minute recurrence interval depth)	
Return Period	10	Years	
Time	Depth	CurveValue	
0:05	0.031		0.02
0:10	0.058		0.037
0:15	0.128		0.082
0:20	0.234		0.15
0:25	0.39		0.25
0:30	0.187		0.12
0:35	0.087		0.056
0:40	0.067		0.043
0:45	0.059		0.038
0:50	0.05		0.032
0:55	0.05		0.032
1:00	0.05		0.032
1:05	0.05		0.032
1:10	0.05		0.032
1:15	0.05		0.032
1:20	0.039		0.025
1:25	0.03		0.019
1:30	0.03		0.019
1:35	0.03		0.019
1:40	0.03		0.019
1:45	0.03		0.019
1:50	0.03		0.019
1:55	0.027		0.017
2:00	0.02		0.013
2:05	0		

Comment			
1Hr Depth	2.33	NOAA Atlas 14 Point Precipitation Frequency Estimates: CO (Note: Use 60-minute recurrence interval depth)	
Return Period	50	Years	
Time	Depth	CurveValue	
0:05	0.03		0.013
0:10	0.082		0.035
0:15	0.117		0.05
0:20	0.186		0.08
0:25	0.35		0.15
0:30	0.583		0.25
0:35	0.28		0.12
0:40	0.186		0.08
0:45	0.117		0.05
0:50	0.117		0.05
0:55	0.075		0.032
1:00	0.075		0.032
1:05	0.075		0.032
1:10	0.056		0.024
1:15	0.056		0.024
1:20	0.042		0.018
1:25	0.042		0.018
1:30	0.033		0.014
1:35	0.033		0.014
1:40	0.033		0.014
1:45	0.033		0.014
1:50	0.033		0.014
1:55	0.033		0.014
2:00	0.033		0.014
2:05	0		

Comment			
1Hr Depth	2.68	NOAA Atlas 14 Point Precipitation Frequency Estimates: CO (Note: Use 60-minute recurrence interval depth)	
Return Period	100	Years	
Time	Depth	CurveValue	
0:05	0.027		0.01
0:10	0.08		0.03
0:15	0.123		0.046
0:20	0.214		0.08
0:25	0.375		0.14
0:30	0.67		0.25
0:35	0.375		0.14
0:40	0.214		0.08
0:45	0.166		0.062
0:50	0.134		0.05
0:55	0.107		0.04
1:00	0.107		0.04
1:05	0.107		0.04
1:10	0.054		0.02
1:15	0.054		0.02
1:20	0.032		0.012
1:25	0.032		0.012
1:30	0.032		0.012
1:35	0.032		0.012
1:40	0.032		0.012
1:45	0.032		0.012
1:50	0.032		0.012
1:55	0.032		0.012
2:00	0.032		0.012
2:05	0		

5 YR EXISTING RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	EX1A	EX1B	EX1C	EX1D	EX1E	FUTURE POND A	FUTURE POND B
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
20	0.01	0.04	0.01	0.02	0.01	0.03	0.01	0.01	0.03	0.02
25	0.44	1.36	0.47	0.70	0.51	0.96	0.24	0.45	1.22	0.76
30	4.20	12.30	4.15	6.61	4.38	8.76	2.25	4.25	10.73	7.03
35	11.54	26.31	7.78	17.01	7.41	19.20	5.44	10.72	20.13	16.83
40	20.82	33.14	8.70	26.53	7.80	24.79	7.71	16.10	22.36	23.69
45	30.18	33.12	8.46	32.55	7.33	25.37	8.61	19.05	20.78	26.25
50	38.03	29.84	7.75	34.85	6.48	23.67	8.67	19.73	17.63	25.99
55	44.16	25.60	6.82	34.54	5.75	20.60	8.44	19.34	15.39	24.24
60	48.14	22.56	6.17	32.66	5.14	18.36	8.01	18.29	13.36	21.45
65	50.14	19.81	5.57	29.53	4.57	16.45	7.39	16.68	11.70	19.34
70	50.38	17.57	4.99	26.52	4.10	14.62	6.75	15.10	10.46	17.65
75	49.14	15.88	4.53	24.43	3.73	13.19	6.31	14.01	9.26	15.98
80	46.66	14.23	4.15	22.46	3.37	12.03	5.91	12.99	8.02	14.34
85	43.22	12.53	3.78	20.46	3.00	10.88	5.49	11.93	6.76	13.23
90	39.44	10.82	3.40	18.63	2.63	9.73	5.06	10.90	5.56	12.22
95	37.10	9.14	3.03	17.35	2.26	8.57	4.66	10.13	4.84	11.19
100	35.01	7.68	2.66	16.16	1.91	7.42	4.39	9.48	4.35	10.17
105	32.89	6.92	2.28	14.97	1.69	6.31	4.13	8.85	3.89	9.15
110	30.76	6.30	1.96	13.78	1.54	5.54	3.87	8.22	3.44	8.13
115	28.61	5.69	1.80	12.60	1.41	5.07	3.62	7.59	3.00	7.11
120	26.60	5.08	1.66	11.42	1.28	4.65	3.37	6.96	2.56	6.15
125	25.26	4.49	1.53	10.24	1.15	4.24	3.11	6.34	2.13	5.57
130	24.04	3.90	1.39	9.07	1.02	3.84	2.86	5.71	1.70	5.18
135	22.83	3.31	1.26	7.96	0.89	3.43	2.61	5.09	1.27	4.81
140	21.63	2.74	1.13	7.31	0.77	3.04	2.36	4.50	0.84	4.45
145	20.43	2.16	1.01	6.86	0.64	2.64	2.11	4.14	0.43	4.09
150	19.24	1.59	0.88	6.43	0.52	2.25	1.90	3.90	0.15	3.74
155	18.06	1.02	0.75	6.02	0.39	1.86	1.78	3.68	0.08	3.39
160	16.88	0.48	0.63	5.61	0.27	1.48	1.69	3.46	0.06	3.04
165	15.70	0.17	0.50	5.20	0.15	1.09	1.60	3.24	0.05	2.70
170	14.53	0.11	0.38	4.80	0.05	0.71	1.51	3.02	0.04	2.36
175	13.35	0.08	0.25	4.40	0.03	0.34	1.43	2.81	0.03	2.02
180	12.18	0.06	0.13	4.01	0.02	0.12	1.34	2.60	0.02	1.68
185	11.07	0.04	0.04	3.61	0.01	0.07	1.26	2.39	0.01	1.34
190	10.40	0.03	0.02	3.22	0.01	0.06	1.17	2.18	0.01	1.01
195	9.95	0.02	0.02	2.83	0.01	0.04	1.09	1.98	0.00	0.67
200	9.52	0.01	0.01	2.44	0.01	0.03	1.00	1.77	0.00	0.34
205	9.11	0.01	0.01	2.05	0.00	0.02	0.92	1.56	0.00	0.11
210	8.70	0.01	0.01	1.66	0.00	0.01	0.84	1.36	0.00	0.07
215	8.29	0.00	0.01	1.27	0.00	0.01	0.75	1.15	0.00	0.05
220	7.89	0.00	0.00	0.88	0.00	0.01	0.67	0.94	0.00	0.04
225	7.49	0.00	0.00	0.50	0.00	0.00	0.59	0.74	0.00	0.03
230	7.09	0.00	0.00	0.15	0.00	0.00	0.50	0.53	0.00	0.02
235	6.70	0.00	0.00	0.08	0.00	0.00	0.42	0.33	0.00	0.01
240	6.31	0.00	0.00	0.06	0.00	0.00	0.34	0.13	0.00	0.01
245	5.92	0.00	0.00	0.05	0.00	0.00	0.25	0.05	0.00	0.01
250	5.52	0.00	0.00	0.03	0.00	0.00	0.17	0.04	0.00	0.00
255	5.13	0.00	0.00	0.03	0.00	0.00	0.09	0.03	0.00	0.00
260	4.74	0.00	0.00	0.02	0.00	0.00	0.03	0.02	0.00	0.00
265	4.35	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.00
270	3.96	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00
275	3.57	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00
280	3.18	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
285	2.79	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
290	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
295	2.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300	1.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
305	1.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
310	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
315	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
320	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
325	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
330	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
335	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
340	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
345	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
350	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
385	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
405	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5 YR EXISTING RESULTS

Printouts for Unit Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	EX1A	EX1B	EX1C	EX1D	EX1E	FUTURE POND A	FUTURE POND B
5	41.58	132.01	46.32	66.70	50.16	93.28	23.21	43.22	119.59	72.77
10	123.18	296.10	88.06	186.83	83.56	215.58	60.66	118.51	228.04	187.51
15	224.27	360.87	93.08	289.11	82.83	270.29	84.15	175.52	240.27	258.64
20	324.34	350.39	88.83	349.72	76.80	268.32	91.76	204.41	218.36	280.04
25	404.94	309.20	80.24	368.49	66.20	247.10	90.68	207.49	178.66	272.32
30	467.26	258.47	68.91	360.36	58.24	208.61	87.55	201.20	156.06	251.27
35	505.46	227.68	62.36	337.50	51.80	185.70	82.37	188.50	133.47	216.92
40	522.41	196.90	55.82	299.92	45.35	165.02	75.14	169.39	115.46	194.79
45	521.02	172.65	49.28	265.43	40.29	144.34	67.53	151.17	102.73	176.54
50	504.18	155.49	44.45	244.16	36.57	129.28	63.13	140.08	90.00	158.30
55	474.79	138.33	40.69	222.89	32.85	117.67	58.74	128.99	77.26	140.05
60	435.73	121.17	36.92	201.62	29.12	106.07	54.35	117.90	64.53	129.84
65	391.55	104.01	33.15	182.09	25.40	94.47	49.96	106.81	51.79	119.63
70	369.69	86.85	29.38	170.32	21.68	82.87	45.70	99.39	45.39	109.42
75	347.82	71.46	25.61	158.54	17.95	71.27	43.19	93.15	41.15	99.21
80	325.95	65.74	21.85	146.77	15.99	59.66	40.67	86.92	36.90	89.00
85	304.09	60.02	18.50	134.99	14.75	52.41	38.16	80.68	32.66	78.79
90	282.22	54.30	17.25	123.21	13.51	48.54	35.64	74.44	28.41	68.58
95	261.09	48.58	15.99	111.44	12.27	44.67	33.13	68.20	24.17	58.37
100	249.28	42.87	14.74	99.66	11.03	40.81	30.61	61.96	19.92	53.40
105	237.48	37.15	13.48	87.88	9.79	36.94	28.10	55.73	15.68	50.00
110	225.67	31.43	12.22	76.11	8.55	33.07	25.58	49.49	11.43	46.59
115	213.87	25.71	10.97	70.58	7.31	29.20	23.07	43.25	7.19	43.19
120	202.07	19.99	9.71	66.65	6.06	25.34	20.55	40.10	2.94	39.79
125	190.26	14.27	8.46	62.73	4.82	21.47	18.25	38.02	0.00	36.38
130	178.46	8.55	7.20	58.80	3.58	17.60	17.41	35.94		32.98
135	166.66	2.83	5.94	54.88	2.34	13.73	16.57	33.86		29.58
140	154.85	0.00	4.69	50.95	1.10	9.87	15.73	31.78		26.17
145	143.05		3.43	47.03	0.00	6.00	14.89	29.70		22.77
150	131.24		2.18	43.10		2.13	14.06	27.62		19.37
155	119.44		0.92	39.18		0.00	13.22	25.54		15.97
160	107.64		0.00	35.25			12.38	23.47		12.56
165	101.80			31.32			11.54	21.39		9.16
170	97.86			27.40			10.70	19.31		5.76
175	93.93			23.47			9.86	17.23		2.35
180	89.99			19.55			9.02	15.15		0.00
185	86.06			15.62			8.19	13.07		
190	82.12			11.70			7.35	10.99		
195	78.19			7.77			6.51	8.91		
200	74.25			3.85			5.67	6.83		
205	70.32			0.00			4.83	4.75		
210	66.38						3.99	2.67		
215	62.45						3.16	0.59		
220	58.52						2.32	0.00		
225	54.58						1.48			
230	50.65						0.64			
235	46.71						0.00			
240	42.78									
245	38.84									
250	34.91									
255	30.97									
260	27.04									
265	23.10									
270	19.17									
275	15.23									
280	11.30									
285	7.37									
290	3.43									
295	0.00									

5 YR EXISTING RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
EX1		0.157	0.397	77.8	25.23	40.5	17.83	42.1	524	3,156,902	0.10	312,800	70.0	50	312,696	0.06
EX2		0.157	0.283	36.3	9.39	18.9	6.64	15.7	362	1,018,034	0.10	100,871	40.0	33	100,858	0.12
EX3		0.157	0.188	41.9	7.56	21.8	5.34	12.6	94	303,359	0.10	30,058	40.0	9	30,041	0.10
EX1A		0.157	0.321	54.2	14.84	28.2	10.49	24.7	369	1,546,380	0.10	153,222	50.0	35	153,192	0.08
EX1B		0.157	0.172	38.1	6.54	19.8	4.62	10.9	84	248,909	0.10	24,663	40.0	8	24,670	0.11
EX1C		0.157	0.268	40.4	9.81	21.0	6.94	16.4	273	853,050	0.10	84,524	45.0	25	84,459	0.11
EX1D		0.157	0.220	61.7	11.91	32.1	8.42	19.9	92	438,504	0.10	43,449	50.0	9	43,441	0.07
EX1E		0.157	0.275	57.2	13.56	29.7	9.58	22.6	208	922,020	0.10	91,358	50.0	20	91,356	0.08
FUTURE POND A		0.157	0.243	32.6	7.58	17.0	5.36	12.6	243	613,216	0.10	60,760	40.0	22	60,701	0.13
FUTURE POND B		0.157	0.283	47.2	11.76	24.5	8.31	19.6	280	1,022,970	0.10	101,361	45.0	26	101,305	0.09

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
EX1		5 YR	1.359	1.056	1.963	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX2		5 YR	0.438	0.450	0.805	0.033	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX3		5 YR	0.131	0.262	0.509	0.014	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX1A		5 YR	0.666	0.600	1.132	0.013	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX1B		5 YR	0.107	0.243	0.722	0.050	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX1C		5 YR	0.367	0.308	0.758	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX1D		5 YR	0.189	0.470	0.861	0.013	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX1E		5 YR	0.397	0.633	1.078	0.020	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
FUTURE POND A		5 YR	0.264	0.310	0.691	0.034	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
FUTURE POND B		5 YR	0.440	0.492	0.939	0.018	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51

10 Year Existing Results

Printouts for Storm Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	EX1A	EX1B	EX1C	EX1D	EX1E	FUTURE POND A	FUTURE POND B
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.01
20	0.10	0.31	0.11	0.16	0.12	0.22	0.06	0.10	0.28	0.17
25	4.59	14.33	4.99	7.33	5.37	10.14	2.54	4.74	12.88	7.96
30	18.31	47.44	14.93	28.08	14.90	34.21	9.28	17.90	38.61	28.81
35	40.09	77.70	21.79	55.25	20.27	57.31	16.92	34.21	56.32	52.17
40	65.71	90.59	23.69	78.15	21.09	68.26	21.89	46.76	59.97	67.09
45	90.47	89.68	23.23	92.20	19.98	69.41	23.96	53.37	55.66	72.73
50	111.42	81.12	21.27	97.39	17.95	64.34	24.27	55.12	48.85	71.85
55	127.24	71.16	19.03	96.08	16.01	57.21	23.62	53.93	42.64	66.40
60	137.20	62.52	17.18	90.02	14.23	51.15	22.26	50.59	36.96	59.61
65	141.71	54.80	15.40	81.57	12.64	45.46	20.48	46.15	32.46	53.99
70	141.42	48.75	13.83	74.11	11.38	40.48	18.89	42.23	28.80	48.92
75	137.07	43.84	12.61	68.03	10.33	36.64	17.64	39.07	25.32	44.02
80	129.43	39.12	11.53	62.23	9.30	33.33	16.44	36.05	21.88	40.02
85	119.49	34.38	10.47	56.70	8.26	30.07	15.26	33.07	18.37	36.92
90	110.64	29.59	9.40	52.15	7.21	26.82	14.08	30.45	15.47	33.96
95	104.02	24.97	8.34	48.50	6.17	23.55	13.08	28.35	13.55	31.05
100	97.80	21.57	7.28	45.04	5.31	20.29	12.29	26.48	12.09	28.17
105	91.73	19.40	6.28	41.67	4.75	17.51	11.55	24.67	10.77	25.29
110	85.73	17.55	5.54	38.35	4.32	15.61	10.83	22.91	9.53	22.43
115	79.79	15.82	5.07	35.03	3.93	14.24	10.12	21.15	8.30	19.58
120	74.87	14.13	4.65	31.70	3.56	13.00	9.41	19.39	7.06	17.26
125	71.06	12.45	4.27	28.38	3.19	11.83	8.69	17.62	5.82	15.73
130	67.50	10.77	3.89	25.06	2.83	10.68	7.98	15.85	4.58	14.54
135	64.05	9.10	3.52	22.39	2.46	9.54	7.26	14.09	3.36	13.46
140	60.67	7.44	3.15	20.65	2.10	8.41	6.55	12.66	2.15	12.43
145	57.30	5.80	2.79	19.28	1.75	7.28	5.87	11.71	1.09	11.43
150	53.93	4.18	2.42	18.03	1.39	6.17	5.36	10.98	0.50	10.43
155	50.56	2.56	2.06	16.86	1.04	5.07	5.04	10.32	0.30	9.43
160	47.20	1.26	1.71	15.70	0.69	3.97	4.76	9.69	0.19	8.45
165	43.85	0.60	1.35	14.55	0.36	2.88	4.50	9.08	0.14	7.47
170	40.51	0.36	1.00	13.40	0.16	1.79	4.25	8.47	0.11	6.50
175	37.18	0.24	0.64	12.27	0.09	0.88	4.00	7.86	0.08	5.54
180	33.86	0.18	0.33	11.15	0.06	0.41	3.76	7.26	0.06	4.58
185	31.18	0.14	0.14	10.03	0.04	0.24	3.52	6.67	0.04	3.61
190	29.41	0.11	0.09	8.92	0.03	0.16	3.28	6.08	0.03	2.65
195	28.04	0.08	0.06	7.80	0.03	0.12	3.04	5.49	0.02	1.70
200	26.80	0.06	0.04	6.69	0.02	0.09	2.80	4.90	0.02	0.85
205	25.62	0.04	0.03	5.59	0.01	0.07	2.56	4.31	0.01	0.38
210	24.46	0.03	0.02	4.48	0.01	0.05	2.32	3.72	0.01	0.23
215	23.31	0.02	0.02	3.37	0.01	0.04	2.09	3.14	0.00	0.15
220	22.17	0.01	0.01	2.27	0.00	0.03	1.85	2.55	0.00	0.11
225	21.03	0.01	0.01	1.18	0.00	0.02	1.61	1.96	0.00	0.09
230	19.91	0.01	0.01	0.50	0.00	0.01	1.38	1.38	0.00	0.07
235	18.79	0.00	0.00	0.29	0.00	0.01	1.14	0.80	0.00	0.05
240	17.67	0.00	0.00	0.19	0.00	0.01	0.90	0.37	0.00	0.04
245	16.56	0.00	0.00	0.13	0.00	0.00	0.67	0.19	0.00	0.02
250	15.44	0.00	0.00	0.11	0.00	0.00	0.43	0.12	0.00	0.02
255	14.33	0.00	0.00	0.08	0.00	0.00	0.22	0.08	0.00	0.01
260	13.22	0.00	0.00	0.06	0.00	0.00	0.10	0.06	0.00	0.01
265	12.11	0.00	0.00	0.04	0.00	0.00	0.06	0.05	0.00	0.01
270	11.01	0.00	0.00	0.03	0.00	0.00	0.04	0.04	0.00	0.00
275	9.90	0.00	0.00	0.02	0.00	0.00	0.03	0.03	0.00	0.00
280	8.79	0.00	0.00	0.02	0.00	0.00	0.02	0.02	0.00	0.00
285	7.69	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.00
290	6.58	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00
295	5.48	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
300	4.37	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
305	3.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
310	2.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
315	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
320	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
325	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
330	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
335	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
340	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
345	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
350	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
385	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
405	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Printouts for Unit Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	EX1A	EX1B	EX1C	EX1D	EX1E	FUTURE POND A	FUTURE POND B
5	41.70	132.34	46.42	66.89	50.26	93.52	23.27	43.34	119.85	72.97
10	123.54	296.51	88.13	187.29	83.59	215.90	60.78	118.78	228.23	187.87
15	224.87	360.96	93.08	289.57	82.83	270.41	84.23	175.76	240.25	258.91
20	325.06	350.29	88.81	350.03	76.79	268.27	91.77	204.53	218.27	280.05
25	405.68	309.01	80.21	368.51	66.18	246.99	90.67	207.48	178.62	272.25
30	467.88	258.39	68.89	360.26	58.23	208.46	87.53	201.14	156.02	251.15
35	505.86	227.61	62.35	337.31	51.79	185.64	82.34	188.41	133.43	216.75
40	522.56	196.83	55.81	299.68	45.34	164.97	75.11	169.28	115.45	194.73
45	520.90	172.61	49.26	265.34	40.29	144.29	67.51	151.13	102.71	176.49
50	503.83	155.45	44.45	244.07	36.56	129.25	63.12	140.04	89.98	158.24
55	474.28	138.30	40.68	222.81	32.84	117.65	58.73	128.95	77.24	140.02
60	435.19	121.14	36.91	201.54	29.12	106.05	54.34	117.86	64.51	129.81
65	391.37	103.98	33.14	182.06	25.40	94.45	49.95	106.77	51.77	119.60
70	369.51	86.82	29.38	170.28	21.67	82.84	45.70	99.38	45.39	109.40
75	347.65	71.46	25.61	158.50	17.95	71.24	43.18	93.14	41.14	99.19
80	325.79	65.74	21.84	146.73	15.99	59.64	40.67	86.90	36.90	88.98
85	303.93	60.02	18.50	134.95	14.75	52.40	38.15	80.66	32.65	78.77
90	282.07	54.30	17.25	123.18	13.51	48.53	35.64	74.42	28.41	68.56
95	261.02	48.58	15.99	111.40	12.27	44.67	33.12	68.18	24.16	58.35
100	249.22	42.86	14.73	99.62	11.03	40.80	30.61	61.94	19.92	53.39
105	237.41	37.14	13.48	87.85	9.79	36.93	28.09	55.71	15.67	49.99
110	225.61	31.42	12.22	76.07	8.54	33.06	25.58	49.47	11.43	46.59
115	213.81	25.70	10.97	70.57	7.30	29.20	23.06	43.23	7.18	43.18
120	202.00	19.98	9.71	66.64	6.06	25.33	20.54	40.10	2.94	39.78
125	190.20	14.26	8.45	62.72	4.82	21.46	18.25	38.02	0.00	36.38
130	178.40	8.54	7.20	58.79	3.58	17.59	17.41	35.94		32.97
135	166.60	2.82	5.94	54.87	2.34	13.73	16.57	33.86		29.57
140	154.79	0.00	4.69	50.94	1.10	9.86	15.73	31.78		26.17
145	142.99		3.43	47.02	0.00	5.99	14.89	29.70		22.76
150	131.19		2.17	43.09		2.12	14.05	27.62		19.36
155	119.39		0.92	39.17		0.00	13.22	25.54		15.96
160	107.58		0.00	35.24			12.38	23.46		12.56
165	101.78			31.32			11.54	21.38		9.15
170	97.85			27.39			10.70	19.30		5.75
175	93.92			23.46			9.86	17.22		2.35
180	89.98			19.54			9.02	15.14		0.00
185	86.05			15.61			8.18	13.06		
190	82.11			11.69			7.35	10.98		
195	78.18			7.76			6.51	8.90		
200	74.25			3.84			5.67	6.82		
205	70.31			0.00			4.83	4.75		
210	66.38						3.99	2.67		
215	62.44						3.15	0.59		
220	58.51						2.31	0.00		
225	54.57						1.48			
230	50.64						0.64			
235	46.71						0.00			
240	42.77									
245	38.84									
250	34.90									
255	30.97									
260	27.04									
265	23.10									
270	19.17									
275	15.23									
280	11.30									
285	7.36									
290	3.43									
295	0.00									

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
EX1		0.157	0.396	77.8	25.19	40.5	17.80	42.0	524	3,156,902	0.28	887,793	65.0	142	887,511	0.16
EX2		0.157	0.282	36.3	9.38	18.9	6.63	15.6	362	1,018,034	0.28	286,294	40.0	91	286,258	0.32
EX3		0.157	0.188	41.9	7.54	21.8	5.33	12.6	94	303,359	0.28	85,312	40.0	24	85,264	0.28
EX1A		0.157	0.320	54.2	14.82	28.2	10.47	24.7	369	1,546,380	0.28	434,878	50.0	97	434,792	0.23
EX1B		0.157	0.172	38.1	6.53	19.8	4.62	10.9	84	248,909	0.28	69,999	40.0	21	70,017	0.31
EX1C		0.157	0.268	40.4	9.80	21.0	6.92	16.3	273	853,050	0.28	239,897	45.0	69	239,708	0.30
EX1D		0.157	0.219	61.7	11.89	32.1	8.40	19.8	92	438,504	0.28	123,317	50.0	24	123,295	0.20
EX1E		0.157	0.274	57.2	13.53	29.7	9.56	22.6	208	922,020	0.28	259,293	50.0	55	259,288	0.22
FUTURE POND A		0.157	0.242	32.6	7.57	17.0	5.35	12.6	243	613,216	0.28	172,450	40.0	60	172,285	0.35
FUTURE POND B		0.157	0.283	47.2	11.74	24.5	8.30	19.6	280	1,022,970	0.28	287,683	45.0	73	287,521	0.26

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
EX1		10 YR	1.359	1.056	1.963	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX2		10 YR	0.438	0.450	0.805	0.033	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX3		10 YR	0.131	0.262	0.509	0.014	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX1A		10 YR	0.666	0.600	1.132	0.013	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX1B		10 YR	0.107	0.243	0.722	0.050	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX1C		10 YR	0.367	0.308	0.758	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX1D		10 YR	0.189	0.470	0.861	0.013	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX1E		10 YR	0.397	0.633	1.078	0.020	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
FUTURE POND A		10 YR	0.264	0.310	0.691	0.034	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
FUTURE POND B		10 YR	0.440	0.492	0.939	0.018	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59

50 YEAR EXISTING RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	EX1A	EX1B	EX1C	EX1D	EX1E	FUTURE POND A	FUTURE POND B
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.01
20	0.02	0.05	0.02	0.03	0.02	0.03	0.01	0.02	0.04	0.03
25	0.75	2.33	0.81	1.20	0.88	1.65	0.41	0.77	2.10	1.30
30	23.77	73.66	25.55	37.92	27.44	52.17	13.11	24.52	65.97	41.06
35	77.16	188.79	57.40	116.80	55.69	136.99	38.05	74.12	148.54	117.82
40	154.97	275.29	75.12	206.05	69.12	204.25	61.62	126.39	193.87	189.76
45	244.04	313.14	82.29	280.17	73.22	236.73	77.02	166.47	206.32	235.80
50	330.21	316.12	83.06	328.19	71.59	245.63	85.04	189.26	196.98	257.42
55	406.73	297.06	78.82	351.44	67.60	234.08	88.58	199.76	184.06	260.74
60	466.84	274.87	73.92	354.57	62.64	219.41	88.43	200.27	166.89	247.47
65	508.97	250.76	69.00	340.60	57.76	203.51	85.50	192.82	151.47	232.76
70	532.72	227.55	63.32	319.40	52.63	186.17	80.82	181.48	136.98	217.46
75	539.23	206.07	57.71	299.31	47.88	169.20	76.47	170.83	122.41	200.61
80	529.88	185.06	52.68	278.17	43.22	153.90	71.87	159.58	107.31	182.08
85	506.95	163.82	47.77	255.62	38.56	138.95	67.04	147.61	92.02	166.81
90	474.67	143.01	43.05	233.31	34.11	124.31	62.08	135.33	77.34	152.67
95	447.70	123.01	38.56	215.08	29.78	110.42	57.25	124.91	66.17	139.34
100	421.87	104.48	34.19	198.51	25.57	96.90	53.33	115.81	57.83	126.72
105	396.53	91.75	29.93	183.25	22.37	83.78	49.84	107.55	50.95	114.69
110	371.10	81.60	25.99	168.82	19.96	73.22	46.65	99.80	44.82	102.95
115	346.22	72.91	23.26	155.03	17.96	65.47	43.59	92.41	39.28	91.42
120	321.94	65.00	21.06	141.54	16.17	59.09	40.67	85.23	34.03	80.19
125	302.83	57.73	19.15	128.27	14.53	53.42	37.79	78.16	28.95	71.74
130	286.26	50.69	17.39	115.18	12.97	48.23	34.95	71.18	24.06	65.25
135	271.02	43.91	15.78	102.21	11.47	43.34	32.14	64.24	19.25	59.78
140	256.52	37.39	14.23	92.57	10.04	38.64	29.34	57.38	14.50	54.83
145	242.63	30.94	12.74	85.10	8.63	34.14	26.56	52.15	9.80	50.33
150	228.96	24.58	11.31	78.80	7.25	29.75	23.91	48.15	5.84	46.07
155	215.52	18.22	9.90	73.11	5.87	25.42	22.07	44.78	3.68	41.97
160	202.31	11.92	8.50	67.94	4.49	21.12	20.58	41.76	2.35	38.05
165	189.16	7.19	7.11	63.03	3.11	16.83	19.30	39.01	1.49	34.21
170	176.07	4.54	5.72	58.32	1.84	12.54	18.12	36.40	0.90	30.41
175	162.98	2.90	4.32	53.81	1.15	8.28	17.04	33.90	0.55	26.63
180	149.92	1.82	2.94	49.38	0.73	4.97	16.01	31.51	0.29	22.85
185	136.96	1.11	1.74	45.00	0.47	3.14	15.02	29.16	0.15	19.08
190	127.16	0.65	1.10	40.64	0.28	2.00	14.07	26.84	0.09	15.31
195	119.64	0.35	0.70	36.29	0.17	1.26	13.12	24.53	0.05	11.54
200	113.31	0.18	0.44	31.94	0.10	0.77	12.19	22.22	0.04	7.79
205	107.61	0.11	0.27	27.58	0.05	0.46	11.26	19.92	0.03	4.63
210	102.43	0.07	0.16	23.24	0.03	0.24	10.33	17.61	0.02	2.92
215	97.51	0.05	0.09	18.89	0.02	0.13	9.40	15.31	0.02	1.86
220	92.79	0.04	0.04	14.55	0.01	0.07	8.47	13.00	0.01	1.18
225	88.26	0.03	0.03	10.21	0.01	0.05	7.54	10.70	0.01	0.72
230	83.83	0.02	0.02	5.99	0.01	0.04	6.61	8.40	0.00	0.43
235	79.44	0.01	0.01	3.76	0.00	0.03	5.69	6.10	0.00	0.23
240	75.07	0.01	0.01	2.40	0.00	0.02	4.76	3.83	0.00	0.12
245	70.70	0.00	0.01	1.54	0.00	0.01	3.83	2.34	0.00	0.07
250	66.34	0.00	0.00	0.93	0.00	0.01	2.90	1.48	0.00	0.04
255	61.98	0.00	0.00	0.58	0.00	0.01	1.98	0.95	0.00	0.03
260	57.63	0.00	0.00	0.32	0.00	0.00	1.17	0.59	0.00	0.02
265	53.27	0.00	0.00	0.16	0.00	0.00	0.74	0.36	0.00	0.02
270	48.92	0.00	0.00	0.09	0.00	0.00	0.47	0.21	0.00	0.01
275	44.57	0.00	0.00	0.05	0.00	0.00	0.30	0.11	0.00	0.01
280	40.22	0.00	0.00	0.04	0.00	0.00	0.18	0.06	0.00	0.00
285	35.87	0.00	0.00	0.03	0.00	0.00	0.11	0.03	0.00	0.00
290	31.52	0.00	0.00	0.02	0.00	0.00	0.06	0.02	0.00	0.00
295	27.17	0.00	0.00	0.02	0.00	0.00	0.03	0.02	0.00	0.00
300	22.82	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.00
305	18.47	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00
310	14.13	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
315	9.79	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
320	5.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
325	3.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
330	2.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
335	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
340	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
345	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
350	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
385	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
395	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
405	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

50 YEAR EXISTING RESULTS

Printouts for Unit Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	EX1A	EX1B	EX1C	EX1D	EX1E	FUTURE POND A	FUTURE POND B
5	41.86	132.82	46.57	67.16	50.39	93.86	23.37	43.51	120.23	73.25
10	124.05	297.10	88.24	187.94	83.64	216.36	60.95	119.16	228.51	188.38
15	225.74	361.09	93.07	290.23	82.82	270.57	84.36	176.11	240.22	259.28
20	326.10	350.16	88.79	350.47	76.76	268.21	91.78	204.70	218.15	280.07
25	406.75	308.74	80.18	368.53	66.14	246.83	90.66	207.46	178.55	272.15
30	468.77	258.28	68.88	360.12	58.22	208.24	87.50	201.07	155.96	250.97
35	506.44	227.50	62.33	337.05	51.77	185.57	82.30	188.29	133.37	216.51
40	522.76	196.73	55.79	299.32	45.33	164.89	75.06	169.13	115.42	194.64
45	520.72	172.57	49.25	265.20	40.28	144.22	67.49	151.07	102.68	176.40
50	503.31	155.41	44.44	243.94	36.56	129.22	63.10	139.98	89.95	158.16
55	473.54	138.25	40.67	222.68	32.83	117.62	58.71	128.89	77.21	139.99
60	434.41	121.09	36.90	201.42	29.11	106.01	54.32	117.81	64.48	129.78
65	391.11	103.93	33.14	182.00	25.39	94.41	49.93	106.72	51.74	119.57
70	369.26	86.77	29.37	170.23	21.66	82.81	45.69	99.35	45.38	109.36
75	347.41	71.44	25.60	158.45	17.94	71.21	43.17	93.11	41.13	99.15
80	325.56	65.72	21.83	146.67	15.99	59.60	40.66	86.87	36.89	88.94
85	303.71	60.00	18.50	134.90	14.75	52.39	38.14	80.63	32.64	78.73
90	281.86	54.28	17.24	123.12	13.51	48.53	35.63	74.40	28.40	68.52
95	260.92	48.56	15.99	111.34	12.27	44.66	33.11	68.16	24.15	58.31
100	249.12	42.84	14.73	99.57	11.02	40.79	30.60	61.92	19.91	53.38
105	237.32	37.12	13.48	87.79	9.78	36.92	28.08	55.68	15.66	49.98
110	225.52	31.40	12.22	76.02	8.54	33.06	25.57	49.44	11.42	46.58
115	213.72	25.68	10.96	70.56	7.30	29.19	23.05	43.20	7.17	43.17
120	201.92	19.96	9.71	66.63	6.06	25.32	20.53	40.09	2.93	39.77
125	190.12	14.24	8.45	62.71	4.82	21.45	18.24	38.01	0.00	36.37
130	178.31	8.52	7.20	58.78	3.58	17.58	17.41	35.93		32.96
135	166.51	2.80	5.94	54.85	2.34	13.72	16.57	33.85		29.56
140	154.71	0.00	4.68	50.93	1.10	9.85	15.73	31.77		26.16
145	142.91		3.43	47.00	0.00	5.98	14.89	29.69		22.75
150	131.11		2.17	43.08		2.11	14.05	27.61		19.35
155	119.31		0.92	39.15		0.00	13.21	25.53		15.95
160	107.51		0.00	35.23			12.37	23.45		12.55
165	101.77			31.30			11.54	21.37		9.14
170	97.83			27.38			10.70	19.29		5.74
175	93.90			23.45			9.86	17.21		2.34
180	89.97			19.53			9.02	15.14		0.00
185	86.03			15.60			8.18	13.06		
190	82.10			11.67			7.34	10.98		
195	78.17			7.75			6.50	8.90		
200	74.23			3.82			5.67	6.82		
205	70.30			0.00			4.83	4.74		
210	66.37						3.99	2.66		
215	62.43						3.15	0.58		
220	58.50						2.31	0.00		
225	54.56						1.47			
230	50.63						0.63			
235	46.70						0.00			
240	42.76									
245	38.83									
250	34.90									
255	30.96									
260	27.03									
265	23.10									
270	19.16									
275	15.23									
280	11.30									
285	7.36									
290	3.43									
295	0.00									

50 YEAR EXISTING RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
EX1		0.157	0.395	77.8	25.12	40.5	17.75	41.9	524	3,156,902	1.11	3,489,785	75.0	539	3,488,756	0.62
EX2		0.157	0.281	36.3	9.35	18.9	6.61	15.6	362	1,018,034	1.11	1,125,381	50.0	316	1,125,245	1.13
EX3		0.157	0.188	41.9	7.53	21.8	5.32	12.5	94	303,359	1.11	335,347	50.0	83	335,169	0.99
EX1A		0.157	0.319	54.2	14.78	28.2	10.44	24.6	369	1,546,380	1.11	1,709,440	60.0	355	1,709,104	0.83
EX1B		0.157	0.172	38.1	6.52	19.8	4.61	10.9	84	248,909	1.11	275,156	45.0	73	275,225	1.07
EX1C		0.157	0.267	40.4	9.77	21.0	6.91	16.3	273	853,050	1.11	943,001	50.0	246	942,236	1.05
EX1D		0.157	0.219	61.7	11.86	32.1	8.38	19.8	92	438,504	1.11	484,743	55.0	89	484,658	0.73
EX1E		0.157	0.273	57.2	13.50	29.7	9.54	22.5	208	922,020	1.11	1,019,244	60.0	200	1,019,224	0.79
FUTURE POND A		0.157	0.242	32.6	7.56	17.0	5.34	12.6	243	613,216	1.11	677,877	45.0	206	677,250	1.22
FUTURE POND B		0.157	0.282	47.2	11.71	24.5	8.27	19.5	280	1,022,970	1.11	1,130,839	55.0	261	1,130,182	0.93

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
EX1		50 YR	1.359	1.056	1.963	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
EX2		50 YR	0.438	0.450	0.805	0.033	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
EX3		50 YR	0.131	0.262	0.509	0.014	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
EX1A		50 YR	0.666	0.600	1.132	0.013	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
EX1B		50 YR	0.107	0.243	0.722	0.050	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
EX1C		50 YR	0.367	0.308	0.758	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
EX1D		50 YR	0.189	0.470	0.861	0.013	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
EX1E		50 YR	0.397	0.633	1.078	0.020	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
FUTURE POND A		50 YR	0.264	0.310	0.691	0.034	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71
FUTURE POND B		50 YR	0.440	0.492	0.939	0.018	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.71

100 YEAR EXISTING RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	EX1A	EX1B	EX1C	EX1D	EX1E	FUTURE POND A	FUTURE POND B
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.01
20	0.07	0.22	0.07	0.11	0.08	0.15	0.04	0.07	0.19	0.12
25	3.12	9.71	3.38	4.98	3.64	6.87	1.72	3.22	8.72	5.40
30	34.29	101.47	34.41	54.12	36.38	72.18	18.49	34.86	88.89	57.77
35	104.42	247.04	74.60	155.51	72.29	179.56	50.21	98.31	193.00	155.41
40	205.63	357.86	97.78	270.36	89.89	265.71	80.45	165.52	251.80	247.68
45	321.96	409.74	108.03	367.14	96.24	310.02	100.87	217.93	270.28	308.66
50	435.78	417.57	110.04	431.98	95.18	323.96	112.24	249.41	261.95	339.34
55	538.08	398.56	106.01	465.95	91.15	313.57	117.89	265.26	247.84	346.68
60	621.27	376.31	101.62	475.58	86.64	299.41	119.32	269.36	231.02	335.36
65	683.06	353.39	97.36	465.43	82.16	285.08	117.60	264.24	216.04	322.32
70	721.83	326.91	90.60	444.85	75.75	265.69	113.19	253.42	198.51	306.77
75	737.22	297.11	82.57	421.60	68.59	242.93	107.80	240.80	176.74	285.21
80	730.29	265.36	75.01	393.93	61.57	220.08	101.45	225.73	153.91	259.88
85	703.78	233.61	67.73	362.62	54.74	197.67	94.55	208.81	131.49	237.27
90	664.41	203.36	60.88	331.18	48.37	176.18	87.55	191.57	110.97	216.36
95	628.64	175.17	54.53	304.24	42.27	156.41	80.72	176.40	95.00	196.71
100	593.56	149.58	48.37	279.91	36.47	137.36	75.01	163.12	82.95	178.78
105	557.81	131.22	42.43	257.84	31.94	119.20	70.01	151.19	72.90	161.72
110	521.87	116.61	37.05	237.46	28.49	104.46	65.47	140.24	63.95	145.18
115	486.16	103.78	33.12	217.89	25.55	93.34	61.15	129.76	55.78	129.11
120	451.98	92.23	29.94	198.91	22.93	84.00	57.00	119.60	48.16	113.87
125	424.47	81.53	27.12	180.44	20.52	75.68	52.94	109.71	40.98	101.95
130	401.12	71.45	24.56	162.40	18.26	68.08	48.98	100.08	34.26	92.60
135	379.38	61.99	22.20	144.81	16.15	60.98	45.12	90.51	27.68	84.56
140	358.80	53.10	19.98	131.16	14.18	54.32	41.26	81.18	21.15	77.36
145	339.01	44.26	17.91	120.42	12.25	48.11	37.42	73.81	14.73	70.76
150	319.76	35.48	15.96	111.16	10.34	42.12	33.82	68.05	9.31	64.59
155	301.08	26.71	14.02	102.87	8.44	36.16	31.17	63.11	6.09	58.82
160	282.91	18.15	12.09	95.29	6.54	30.23	29.02	58.70	4.00	53.45
165	264.79	11.55	10.16	88.20	4.65	24.30	27.12	54.67	2.52	48.18
170	246.70	7.56	8.24	81.56	2.92	18.37	25.41	50.90	1.50	42.95
175	228.62	4.93	6.31	75.38	1.90	12.57	23.83	47.37	0.79	37.73
180	210.56	3.09	4.41	69.31	1.25	7.98	22.35	44.08	0.33	32.51
185	192.93	1.80	2.79	63.28	0.80	5.22	20.97	40.87	0.11	27.30
190	179.09	0.92	1.82	57.26	0.48	3.41	19.66	37.67	0.07	22.08
195	168.26	0.36	1.19	51.24	0.26	2.14	18.37	34.48	0.05	16.87
200	158.96	0.14	0.76	45.22	0.11	1.26	17.09	31.29	0.04	11.74
205	150.64	0.09	0.45	39.21	0.04	0.65	15.80	28.11	0.03	7.42
210	143.03	0.06	0.24	33.19	0.02	0.26	14.51	24.92	0.02	4.84
215	135.92	0.05	0.10	27.18	0.01	0.10	13.23	21.73	0.01	3.18
220	129.26	0.04	0.03	21.17	0.01	0.06	11.94	18.55	0.01	2.01
225	123.05	0.03	0.02	15.18	0.01	0.04	10.66	15.36	0.01	1.19
230	116.97	0.02	0.01	9.52	0.01	0.03	9.37	12.18	0.00	0.63
235	110.93	0.01	0.01	6.20	0.00	0.03	8.09	9.00	0.00	0.26
240	104.90	0.01	0.01	4.10	0.00	0.02	6.81	5.93	0.00	0.09
245	98.87	0.00	0.01	2.62	0.00	0.01	5.53	3.80	0.00	0.06
250	92.84	0.00	0.00	1.58	0.00	0.01	4.24	2.50	0.00	0.04
255	86.81	0.00	0.00	0.87	0.00	0.00	2.98	1.62	0.00	0.03
260	80.78	0.00	0.00	0.38	0.00	0.00	1.88	1.00	0.00	0.02
265	74.76	0.00	0.00	0.12	0.00	0.00	1.22	0.57	0.00	0.02
270	68.74	0.00	0.00	0.07	0.00	0.00	0.81	0.28	0.00	0.01
275	62.72	0.00	0.00	0.05	0.00	0.00	0.51	0.10	0.00	0.01
280	56.70	0.00	0.00	0.04	0.00	0.00	0.30	0.04	0.00	0.00
285	50.69	0.00	0.00	0.03	0.00	0.00	0.16	0.03	0.00	0.00
290	44.67	0.00	0.00	0.02	0.00	0.00	0.07	0.02	0.00	0.00
295	38.65	0.00	0.00	0.02	0.00	0.00	0.02	0.02	0.00	0.00
300	32.64	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00
305	26.62	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00
310	20.60	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
315	14.63	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
320	9.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
325	5.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
330	3.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
335	2.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
340	1.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
345	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
350	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
385	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
395	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
405	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Printouts for Unit Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	EX1A	EX1B	EX1C	EX1D	EX1E	FUTURE POND A	FUTURE POND B
5	41.91	132.96	46.61	67.24	50.43	93.96	23.39	43.56	120.34	73.34
10	124.20	297.27	88.27	188.13	83.65	216.49	61.00	119.27	228.59	188.52
15	225.98	361.12	93.07	290.42	82.82	270.62	84.40	176.21	240.21	259.39
20	326.40	350.12	88.78	350.59	76.76	268.19	91.78	204.75	218.11	280.08
25	407.05	308.66	80.16	368.54	66.13	246.79	90.66	207.46	178.53	272.13
30	469.03	258.24	68.87	360.08	58.21	208.18	87.50	201.05	155.94	250.91
35	506.61	227.47	62.33	336.97	51.77	185.54	82.29	188.26	133.36	216.45
40	522.82	196.70	55.79	299.22	45.33	164.87	75.04	169.08	115.41	194.62
45	520.67	172.56	49.24	265.16	40.28	144.20	67.48	151.05	102.68	176.38
50	503.17	155.40	44.44	243.91	36.56	129.21	63.09	139.96	89.94	158.14
55	473.33	138.23	40.67	222.65	32.83	117.61	58.70	128.88	77.21	139.98
60	434.18	121.07	36.90	201.39	29.11	106.00	54.32	117.79	64.47	129.77
65	391.03	103.91	33.13	181.99	25.39	94.40	49.93	106.70	51.73	119.56
70	369.19	86.75	29.37	170.21	21.66	82.80	45.69	99.34	45.38	109.35
75	347.34	71.44	25.60	158.43	17.94	71.20	43.17	93.10	41.13	99.14
80	325.49	65.72	21.83	146.66	15.99	59.59	40.66	86.87	36.89	88.93
85	303.64	60.00	18.50	134.88	14.75	52.39	38.14	80.63	32.64	78.72
90	281.79	54.28	17.24	123.11	13.51	48.52	35.63	74.39	28.40	68.51
95	260.89	48.56	15.99	111.33	12.27	44.66	33.11	68.15	24.15	58.30
100	249.09	42.84	14.73	99.55	11.02	40.79	30.59	61.91	19.91	53.38
105	237.29	37.12	13.48	87.78	9.78	36.92	28.08	55.67	15.66	49.98
110	225.49	31.40	12.22	76.00	8.54	33.05	25.56	49.43	11.41	46.58
115	213.69	25.68	10.96	70.55	7.30	29.18	23.05	43.19	7.17	43.17
120	201.89	19.96	9.71	66.63	6.06	25.32	20.53	40.09	2.92	39.77
125	190.09	14.24	8.45	62.70	4.82	21.45	18.24	38.01	0.00	36.37
130	178.29	8.52	7.19	58.78	3.58	17.58	17.40	35.93		32.96
135	166.49	2.80	5.94	54.85	2.34	13.71	16.57	33.85		29.56
140	154.69	0.00	4.68	50.93	1.09	9.85	15.73	31.77		26.16
145	142.89		3.43	47.00	0.00	5.98	14.89	29.69		22.75
150	131.09		2.17	43.07		2.11	14.05	27.61		19.35
155	119.29		0.91	39.15		0.00	13.21	25.53		15.95
160	107.49		0.00	35.22			12.37	23.45		12.54
165	101.76			31.30			11.53	21.37		9.14
170	97.83			27.37			10.70	19.29		5.74
175	93.90			23.45			9.86	17.21		2.33
180	89.96			19.52			9.02	15.13		0.00
185	86.03			15.60			8.18	13.05		
190	82.10			11.67			7.34	10.97		
195	78.16			7.74			6.50	8.89		
200	74.23			3.82			5.66	6.81		
205	70.30			0.00			4.83	4.74		
210	66.36						3.99	2.66		
215	62.43						3.15	0.58		
220	58.50						2.31	0.00		
225	54.56						1.47			
230	50.63						0.63			
235	46.70						0.00			
240	42.76									
245	38.83									
250	34.89									
255	30.96									
260	27.03									
265	23.09									
270	19.16									
275	15.23									
280	11.29									
285	7.36									
290	3.43									
295	0.00									

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
EX1		0.157	0.395	77.8	25.10	40.5	17.74	41.8	524	3,156,902	1.53	4,828,923	75.0	737	4,827,530	0.85
EX2		0.157	0.281	36.3	9.35	18.9	6.61	15.6	362	1,018,034	1.53	1,557,225	50.0	418	1,557,038	1.49
EX3		0.157	0.187	41.9	7.52	21.8	5.32	12.5	94	303,359	1.53	464,030	50.0	110	463,787	1.32
EX1A		0.157	0.319	54.2	14.77	28.2	10.44	24.6	369	1,546,380	1.53	2,365,404	60.0	476	2,364,939	1.12
EX1B		0.157	0.171	38.1	6.51	19.8	4.60	10.9	84	248,909	1.53	380,741	45.0	96	380,837	1.40
EX1C		0.157	0.267	40.4	9.77	21.0	6.90	16.3	273	853,050	1.53	1,304,859	50.0	324	1,303,793	1.38
EX1D		0.157	0.218	61.7	11.85	32.1	8.37	19.8	92	438,504	1.53	670,753	60.0	119	670,637	0.99
EX1E		0.157	0.273	57.2	13.49	29.7	9.53	22.5	208	922,020	1.53	1,410,359	60.0	269	1,410,333	1.06
FUTURE POND A		0.157	0.242	32.6	7.55	17.0	5.34	12.6	243	613,216	1.53	937,999	45.0	270	937,140	1.60
FUTURE POND B		0.157	0.282	47.2	11.70	24.5	8.27	19.5	280	1,022,970	1.53	1,564,776	55.0	347	1,563,860	1.23

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
EX1		100 YR	1.359	1.056	1.963	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX2		100 YR	0.438	0.450	0.805	0.033	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX3		100 YR	0.131	0.262	0.509	0.014	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX1A		100 YR	0.666	0.600	1.132	0.013	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX1B		100 YR	0.107	0.243	0.722	0.050	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX1C		100 YR	0.367	0.308	0.758	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX1D		100 YR	0.189	0.470	0.861	0.013	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX1E		100 YR	0.397	0.633	1.078	0.020	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
FUTURE POND A		100 YR	0.264	0.310	0.691	0.034	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
FUTURE POND B		100 YR	0.440	0.492	0.939	0.018	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75

CUHP SUBCATCHMENTS

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi^2)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
A		100 YR	0.2639531	0.280113636	0.7217803	0.02	40	0.35	0.1	4.5	0.0018	0.6	0
B		100 YR	0.4400625	0.491856061	0.9393939	0.02	66	0.35	0.1	4.5	0.0018	0.6	0

Typical Depression Losses for Various Land Covers (All Values in Inches)

Land Cover	Range in Depression (Retention) Losses	Recommended
Impervious:		
Large paved areas	0.05 - 0.15	0.1
Roofs-flat	0.1 - 0.3	0.1
Roofs-sloped	0.05 - 0.1	0.05
Pervious:		
Lawn grass	0.2 - 0.5	0.35
Wooded areas and open fields	0.2 - 0.6	0.4

Recommended Horton's Equation Parameters

NRCS Hydrologic Soil Group	Infiltration (inches per hour)		Decay Coefficient - a
	Initial - f_i	Final - f_o	
A	5.0	1.0	0.0007
B	4.5	0.6	0.0018
C	3.0	0.5	0.0018
D	3.0	0.5	0.0018

Printouts for Storm Hydrographs

flow in cfs

time in minutes	A	B
5	0.00	0.00
10	0.00	0.00
15	6.30	17.69
20	23.89	73.98
25	62.99	183.06
30	99.36	278.44
35	106.86	296.03
40	97.02	264.04
45	84.65	226.56
50	75.01	196.55
55	66.41	170.17
60	58.19	147.29
65	51.12	131.90
70	46.35	120.70
75	42.35	108.64
80	37.98	94.39
85	33.68	80.46
90	29.60	69.40
95	25.83	62.97
100	21.82	57.73
105	18.48	52.25
110	16.43	47.91
115	15.21	44.78
120	14.13	41.91
125	11.88	35.50
130	9.30	26.85
135	7.18	19.67
140	5.55	14.47
145	4.28	10.55
150	3.24	7.47
155	2.42	5.21
160	1.79	3.64
165	1.33	2.43
170	0.94	1.47
175	0.64	0.75
180	0.40	0.27
185	0.22	0.03
190	0.09	0.00
195	0.02	0.00
200	0.00	0.00

Printouts for Unit Hydrographs

flow in cfs

time in minutes	A	B
5	259.09	386.67
10	362.97	692.70
15	308.43	608.94
20	238.11	439.53
25	186.53	330.54
30	155.73	263.54
35	126.92	196.54
40	98.11	137.11
45	71.64	114.78
50	62.03	92.44
55	52.43	70.11
60	42.83	47.78
65	33.23	25.44
70	23.63	3.11
75	14.03	0.00
80	4.42	
85	0.00	

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.094	0.241	21.8	5.53	11.3	3.91	9.2	364	613,216	0.53	325,515	35.0	107	324,892	0.63
B		0.082	0.363	18.7	6.56	9.7	4.39	11.2	704	1,022,353	0.85	868,205	35.0	296	868,558	1.05

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A		5 YR	0.264	0.280	0.722	0.020	40.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.80	0.20	37.71
B		5 YR	0.440	0.492	0.939	0.020	66.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.91	0.29	64.29

Printouts for Storm Hydrographs

flow in cfs

time in minutes	A	B
5	0.00	0.00
10	0.00	0.00
15	9.29	25.86
20	31.61	98.22
25	97.15	247.80
30	152.02	376.98
35	160.02	395.32
40	144.47	350.17
45	126.44	301.47
50	111.09	260.70
55	97.52	224.32
60	85.23	194.85
65	74.85	176.49
70	68.26	162.67
75	63.57	149.48
80	57.80	133.11
85	50.34	112.76
90	42.64	93.25
95	35.63	81.19
100	29.61	74.24
105	25.56	69.47
110	23.29	66.02
115	21.65	62.98
120	19.88	58.58
125	16.60	49.06
130	12.98	36.90
135	9.98	26.85
140	7.64	19.60
145	5.81	14.30
150	4.34	10.29
155	3.24	7.32
160	2.43	5.16
165	1.82	3.38
170	1.30	1.98
175	0.87	0.96
180	0.53	0.32
185	0.27	0.03
190	0.11	0.00
195	0.02	0.00
200	0.00	0.00

Printouts for Unit Hydrographs

flow in cfs

time in minutes	A	B
5	261.64	387.10
10	365.97	694.86
15	309.39	609.66
20	238.70	439.84
25	186.18	330.79
30	155.70	263.38
35	126.39	195.96
40	97.09	137.05
45	71.54	114.58
50	61.77	92.10
55	52.00	69.63
60	42.23	47.16
65	32.46	24.69
70	22.69	2.22
75	12.92	0.00
80	3.15	
85	0.00	

10 YR PROPOSED RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.094	0.243	21.6	5.52	11.2	3.90	9.2	367	613,216	0.78	479,753	35.0	160	478,754	0.95
B		0.082	0.363	18.7	6.54	9.7	4.37	11.2	706	1,022,353	1.14	1,167,229	35.0	395	1,167,631	1.40

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A		10 YR	0.264	0.280	0.722	0.020	40.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.80	0.20	38.11
B		10 YR	0.440	0.492	0.939	0.020	66.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.91	0.29	64.58

50 YEAR PROPOSED RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	A	B
5	0.00	0.00
10	0.95	2.62
15	10.72	30.55
20	29.25	91.95
25	74.35	209.39
30	225.36	470.60
35	328.78	688.67
40	346.38	724.80
45	320.61	659.70
50	289.32	582.91
55	257.74	509.96
60	225.16	434.69
65	195.86	372.94
70	167.42	326.26
75	145.67	282.38
80	125.37	238.66
85	106.64	196.41
90	88.62	157.07
95	71.80	122.76
100	56.44	102.23
105	43.24	89.38
110	35.40	80.94
115	30.52	75.01
120	27.38	71.11
125	22.41	61.03
130	17.14	45.96
135	12.87	33.34
140	9.65	24.34
145	7.31	17.81
150	5.45	12.72
155	4.04	9.05
160	3.00	6.48
165	2.26	4.34
170	1.63	2.62
175	1.10	1.33
180	0.67	0.46
185	0.35	0.02
190	0.13	0.00
195	0.01	0.00
200	0.00	0.00

Printouts for Unit Hydrographs

flow in cfs

time in minutes	A	B
5	265.19	387.70
10	370.14	697.85
15	310.62	610.62
20	239.48	440.25
25	185.65	331.13
30	155.63	263.14
35	125.62	195.15
40	95.60	136.96
45	71.37	114.30
50	61.37	91.63
55	51.36	68.97
60	41.36	46.30
65	31.35	23.64
70	21.35	0.98
75	11.34	0.00
80	1.33	
85	0.00	

50 YEAR PROPOSED RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.094	0.245	21.3	5.51	11.1	3.89	9.2	371	613,216	1.61	989,877	40.0	346	987,307	2.05
B		0.082	0.364	18.6	6.51	9.7	4.36	11.2	709	1,022,353	1.98	2,021,693	40.0	725	2,022,150	2.57

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A		50 YR	0.264	0.280	0.722	0.020	40.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.80	0.20	38.66
B		50 YR	0.440	0.492	0.939	0.020	66.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.91	0.29	64.99

Printouts for Storm Hydrographs

flow in cfs

time in minutes	A	B
5	0.00	0.00
10	0.58	1.60
15	10.79	30.22
20	31.95	99.32
25	90.14	236.26
30	268.68	540.17
35	402.83	814.43
40	428.40	874.08
45	403.79	808.10
50	367.45	721.55
55	331.81	637.82
60	297.93	557.25
65	267.17	492.39
70	228.70	430.98
75	193.67	362.61
80	161.93	294.71
85	133.63	232.38
90	109.09	178.81
95	86.96	135.68
100	66.95	109.87
105	50.06	94.17
110	39.91	83.17
115	33.48	75.59
120	29.03	70.16
125	23.14	59.14
130	17.12	43.94
135	12.39	31.90
140	9.02	23.41
145	6.84	17.30
150	5.14	12.46
155	3.87	8.87
160	2.91	6.35
165	2.19	4.24
170	1.57	2.56
175	1.06	1.29
180	0.64	0.44
185	0.33	0.01
190	0.12	0.00
195	0.01	0.00
200	0.00	0.00

Printouts for Unit Hydrographs

flow in cfs

time in minutes	A	B
5	266.18	387.87
10	371.31	698.69
15	310.95	610.89
20	239.69	440.36
25	185.82	331.23
30	155.60	263.07
35	125.39	194.92
40	95.17	136.93
45	71.32	114.21
50	61.25	91.50
55	51.18	68.78
60	41.10	46.06
65	31.03	23.34
70	20.96	0.62
75	10.89	0.00
80	0.81	
85	0.00	

100 YEAR PROPOSED RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.094	0.245	21.3	5.50	11.1	3.89	9.2	373	613,216	2.02	1,239,654	40.0	428	1,236,383	2.54
B		0.082	0.364	18.6	6.51	9.7	4.35	11.2	710	1,022,353	2.37	2,427,521	40.0	874	2,427,973	3.10

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A		100 YR	0.264	0.280	0.722	0.020	40.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.80	0.20	38.81
B		100 YR	0.440	0.492	0.939	0.020	66.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.91	0.29	65.11

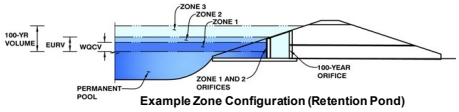
Appendix B – Hydraulic Computations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: Jade

Basin ID: Pond A



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	**EDB**	
Watershed Area =	168.93	acres
Watershed Length =	3,811	ft
Watershed Length to Centroid =	1,170	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	40.00%	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 =	User Input	

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) =	2.532	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	7.096	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.89 in.) =	4.379	acre-feet	0.89	inches
5-yr Runoff Volume (P1 = 1.25 in.) =	7.433	acre-feet	1.25	inches
10-yr Runoff Volume (P1 = 1.56 in.) =	10.950	acre-feet	1.56	inches
25-yr Runoff Volume (P1 = 1.99 in.) =	17.848	acre-feet	1.99	inches
50-yr Runoff Volume (P1 = 2.33 in.) =	22.573	acre-feet	2.33	inches
100-yr Runoff Volume (P1 = 2.68 in.) =	28.261	acre-feet	2.68	inches
500-yr Runoff Volume (P1 = 3.04 in.) =	33.462	acre-feet	3.04	inches
Approximate 2-yr Detention Volume =	3.912	acre-feet		
Approximate 5-yr Detention Volume =	6.088	acre-feet		
Approximate 10-yr Detention Volume =	8.963	acre-feet		
Approximate 25-yr Detention Volume =	11.185	acre-feet		
Approximate 50-yr Detention Volume =	12.215	acre-feet		
Approximate 100-yr Detention Volume =	14.373	acre-feet		

Define Zones and Basin Geometry

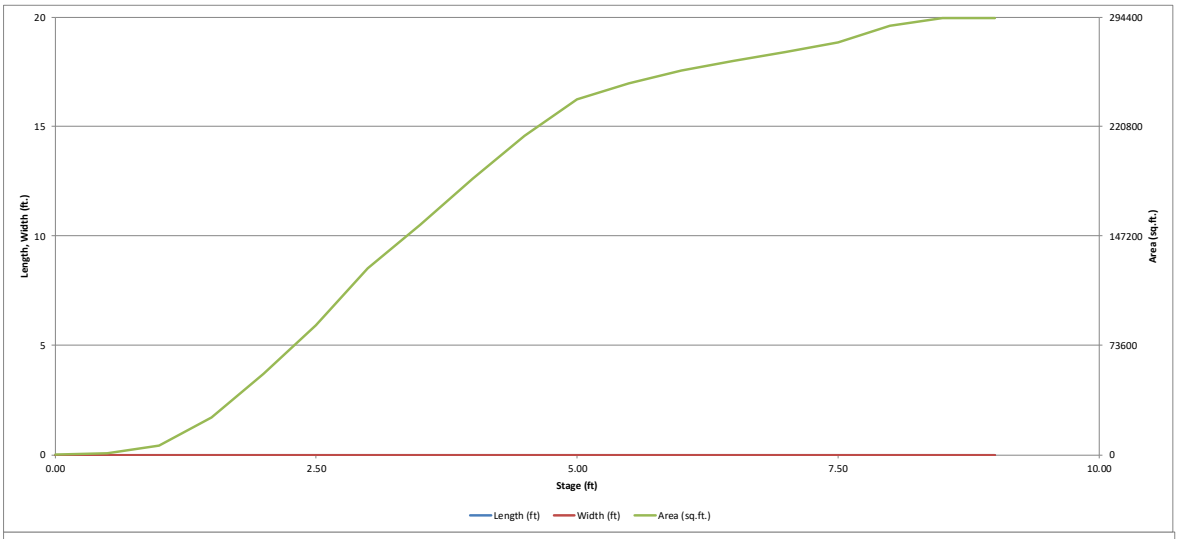
Zone 1 Volume (WQCV) =	2.532	acre-feet
Zone 2 Volume (EURV - Zone 1) =	4.564	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	7.277	acre-feet
Total Detention Basin Volume =	14.373	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention 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

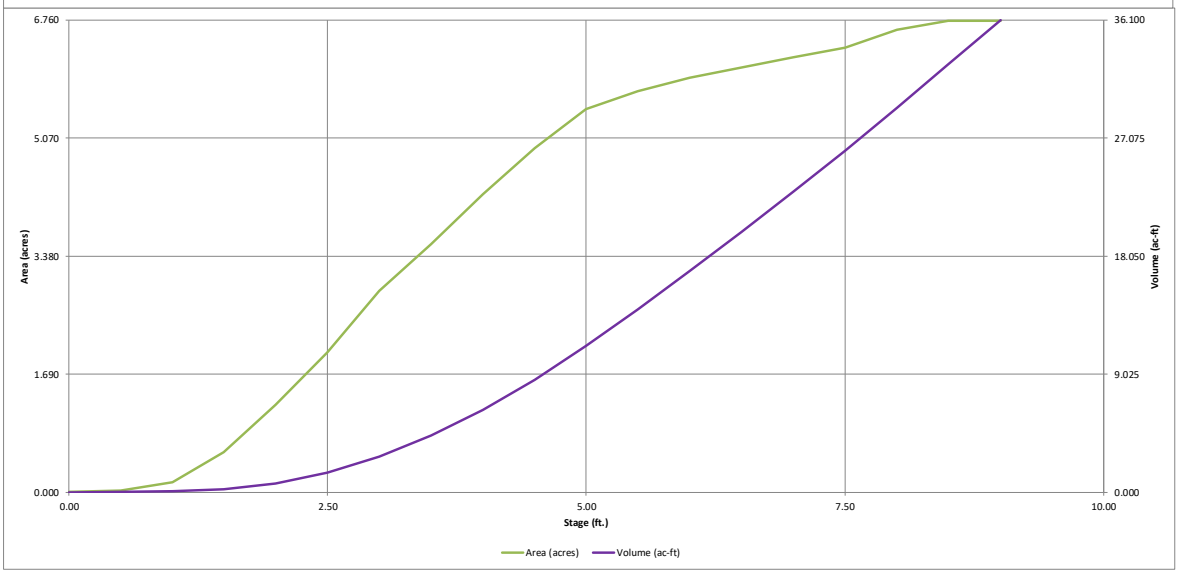
Depth Increment = 1.00 ft

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	--	--	--	500	0.011		
6197	--	0.50	--	--	--	822	0.019	330	0.008
6197.5	--	1.00	--	--	--	6,124	0.141	2,067	0.047
6198	--	1.50	--	--	--	24,919	0.572	9,827	0.226
6198.5	--	2.00	--	--	--	54,465	1.250	29,673	0.681
6199	--	2.50	--	--	--	87,290	2.004	65,112	1.495
6199.5	--	3.00	--	--	--	125,454	2.880	118,298	2.716
6200	--	3.50	--	--	--	154,554	3.548	188,300	4.323
6200.5	--	4.00	--	--	--	185,806	4.266	273,390	6.276
6201	--	4.50	--	--	--	214,446	4.923	373,453	8.573
6201.5	--	5.00	--	--	--	239,025	5.487	486,820	11.176
6202	--	5.50	--	--	--	249,892	5.737	609,050	13.982
6202.5	--	6.00	--	--	--	258,369	5.931	736,115	16.899
6203	--	6.50	--	--	--	264,904	6.081	866,933	19.902
6203.5	--	7.00	--	--	--	271,101	6.224	1,000,934	22.978
6204	--	7.50	--	--	--	277,363	6.367	1,138,050	26.126
6204.5	--	8.00	--	--	--	288,399	6.621	1,279,491	29.373
6205	--	8.50	--	--	--	294,101	6.752	1,425,116	32.716
6205.5	--	9.00	--	--	--	294,101	6.752	1,572,166	36.092

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)



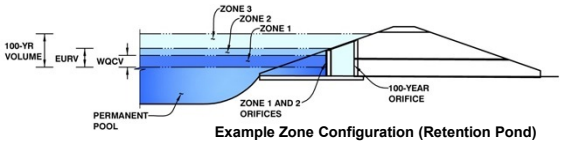


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

Project: Jade

Basin ID: Pond A



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.94	2.532	Orifice Plate
Zone 2 (EURV)	4.19	4.564	Rectangular Orifice
Zone 3 (100-year)	5.57	7.277	Weir&Pipe (Restrict)
Total (all zones)		14.373	

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

Calculated Parameters for Underdrain

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)	WQ Orifice Area per Row =	1.042E-01	ft^2
Depth at top of Zone using Orifice Plate =	2.94	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	15.00	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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							
Orifice Area (sq. inches)	15.00							

	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)

	Zone 2 Rectangular	Not Selected			Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	3.00	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	4.50	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	5.87	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.50	N/A	feet
Vertical Orifice Height =	12.00	N/A	inches				
Vertical Orifice Width =	54.00		inches				

Calculated Parameters for Vertical Orifice

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			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	5.75	N/A	feet
Overflow Weir Front Edge Length =	30.00	N/A	feet	Overflow Weir Slope Length =	5.15	N/A	feet
Overflow Weir Grate Slope =	4.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	9.73	N/A	
Horiz. Length of Weir Sides =	5.00	N/A	feet	Overflow Grate Open Area w/o Debris =	122.30	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	61.15	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	12.57	N/A	ft^2
Outlet Pipe Diameter =	48.00	N/A	inches	Outlet Orifice Centroid =	2.00	N/A	feet
Restrictor Plate Height Above Pipe Invert =	48.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	7.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.99	feet
Spillway Crest Length =	250.00	feet	Stage at Top of Freeboard =	8.99	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	6.75	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	36.02	acre-ft

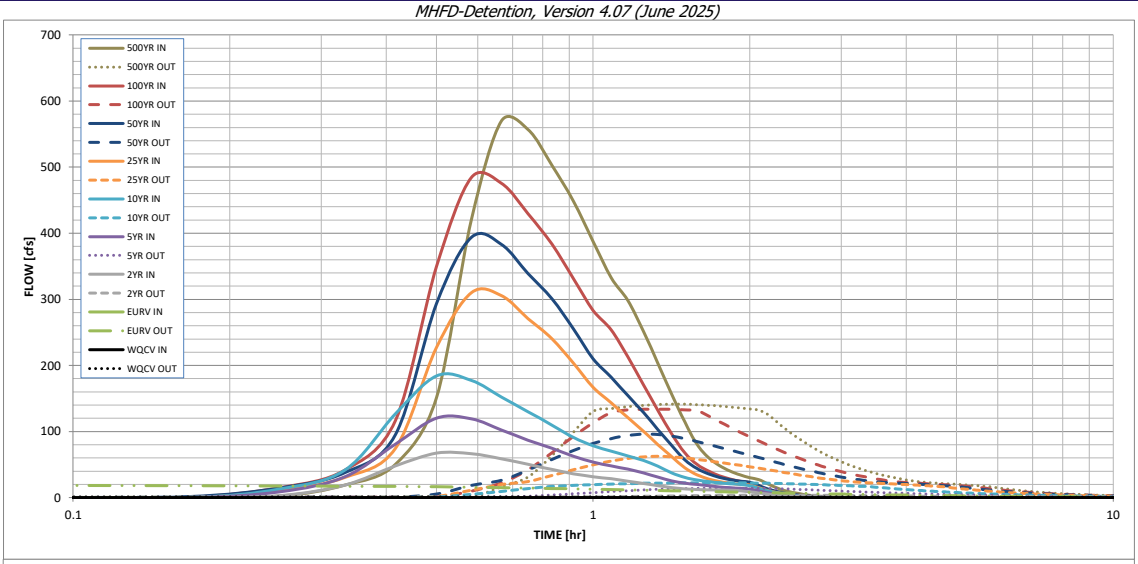
Calculated Parameters for Spillway

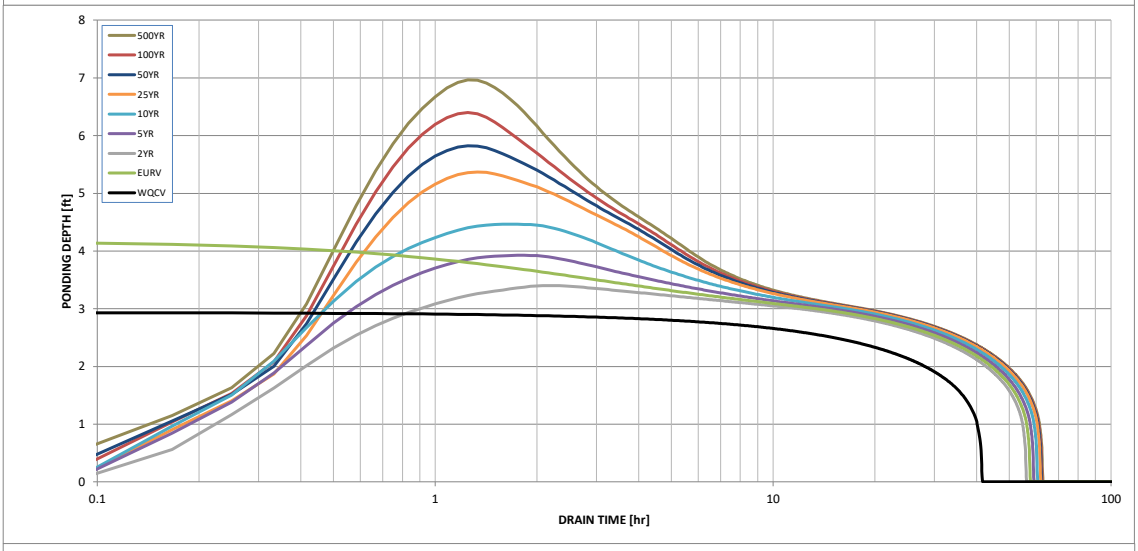
Routed Hydrograph Results — *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

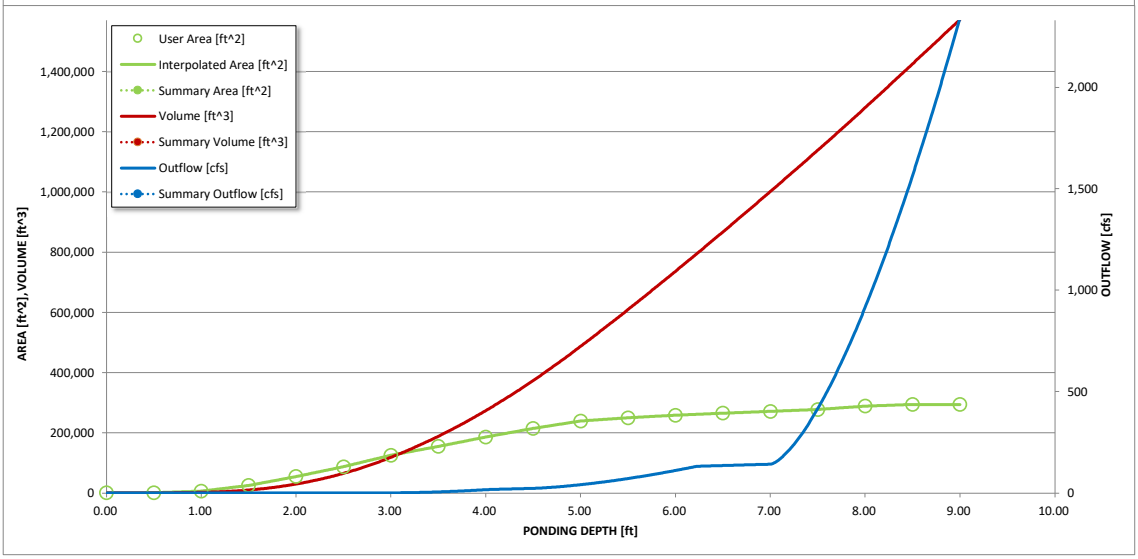
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.89	1.25	1.56	1.99	2.33	2.68	3.04
CUHP Runoff Volume (acre-ft) =	2.532	7.096	4.379	7.433	10.950	17.848	22.573	28.261	33.462
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	4.379	7.433	10.950	17.848	22.573	28.261	33.462
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	5.3	29.4	69.9	168.8	225.4	295.1	354.6
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.03	0.17	0.41	1.00	1.33	1.75	2.10
Peak Inflow Q (cfs) =	N/A	N/A	67.2	120.4	184.2	309.9	393.6	484.4	569.8
Peak Outflow Q (cfs) =	0.9	18.8	3.9	14.3	22.4	62.4	96.0	133.9	141.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.5	0.3	0.4	0.4	0.5	0.4
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	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	0.5	0.8	0.8
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) =	40	53	53	54	54	51	49	46	44
Time to Drain 99% of Inflow Volume (hours) =	**41**	56	55	57	58	58	57	56	56
Maximum Ponding Depth (ft) =	2.94	4.19	3.40	3.93	4.47	5.37	5.83	6.40	6.97
Area at Maximum Ponding Depth (acres) =	2.77	4.52	3.41	4.15	4.87	5.67	5.86	6.05	6.21
Maximum Volume Stored (acre-ft) =	2.546	7.110	3.975	5.940	8.377	13.240	15.838	19.235	22.730

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.

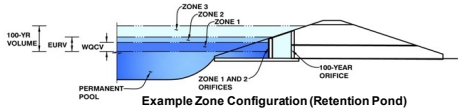
	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0	0.00	0.00	0.00	0.00	0.00	1.34	0.82	2.46
	0:15:00	0	0.00	3.05	8.84	13.03	10.68	14.75	14.95	18.82
	0:20:00	0	0.00	19.06	31.70	41.65	30.63	37.87	41.63	50.34
	0:25:00	0	0.00	48.08	81.20	126.74	74.74	95.40	116.75	151.33
	0:30:00	0	0.00	67.24	120.42	184.17	227.41	293.53	349.55	420.29
	0:35:00	0	0.00	66.25	119.23	177.44	309.91	393.64	484.39	569.84
	0:40:00	0	0.00	58.82	102.27	151.91	305.50	383.15	475.54	556.85
	0:45:00	0	0.00	50.34	86.82	130.06	270.98	339.00	429.60	502.84
	0:50:00	0	0.00	42.49	74.44	109.63	240.42	300.98	383.33	448.57
	0:55:00	0	0.00	36.15	62.80	91.03	203.51	255.28	331.36	387.70
	1:00:00	0	0.00	31.58	53.84	78.56	166.93	210.25	283.56	332.65
	1:05:00	0	0.00	28.46	47.92	70.25	143.32	181.93	253.85	298.51
	1:10:00	0	0.00	24.95	43.06	63.07	120.95	154.44	212.95	251.43
	1:15:00	0	0.00	21.40	37.24	56.09	100.20	128.67	170.74	202.80
	1:20:00	0	0.00	18.16	30.91	47.48	80.07	102.74	131.62	156.43
	1:25:00	0	0.00	15.33	25.46	37.52	61.94	79.03	96.67	114.61
	1:30:00	0	0.00	13.33	21.82	30.50	45.27	57.39	67.75	80.73
	1:35:00	0	0.00	12.27	19.93	26.61	34.68	44.10	50.42	60.56
	1:40:00	0	0.00	11.78	17.95	24.12	28.38	36.00	40.21	48.52
	1:45:00	0	0.00	11.50	16.17	22.36	24.42	30.79	33.12	40.08
	1:50:00	0	0.00	11.33	14.89	21.17	21.73	27.21	28.29	34.34
	1:55:00	0	0.00	10.23	13.95	19.96	20.05	24.91	24.88	30.26
	2:00:00	0	0.00	8.97	12.94	18.16	18.89	23.29	22.48	27.35
	2:05:00	0	0.00	7.10	10.27	14.22	14.96	18.34	17.31	21.06
	2:10:00	0	0.00	5.27	7.51	10.30	10.79	13.16	12.43	15.08
	2:15:00	0	0.00	3.91	5.52	7.46	7.82	9.49	9.01	10.90
	2:20:00	0	0.00	2.88	4.03	5.41	5.70	6.89	6.62	8.01
	2:25:00	0	0.00	2.09	2.86	3.87	4.05	4.88	4.74	5.72
	2:30:00	0	0.00	1.48	1.98	2.73	2.84	3.42	3.31	3.99
	2:35:00	0	0.00	1.03	1.38	1.92	2.03	2.44	2.36	2.84
	2:40:00	0	0.00	0.68	0.93	1.27	1.37	1.64	1.58	1.89
	2:45:00	0	0.00	0.40	0.58	0.76	0.84	0.99	0.95	1.14
	2:50:00	0	0.00	0.20	0.31	0.38	0.43	0.51	0.48	0.57
	2:55:00	0	0.00	0.08	0.13	0.14	0.16	0.18	0.17	0.19
	3:00:00	0	0.00	0.02	0.02	0.02	0.02	0.01	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 STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: Jade

Basin ID: Basin B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	**EDB**	
Watershed Area =	281.82	acres
Watershed Length =	4,815	ft
Watershed Length to Centroid =	2,251	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	66.00%	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 =	User Input	

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) =	6.060	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	20.331	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.89 in.) =	12.924	acre-feet	0.89	inches
5-yr Runoff Volume (P1 = 1.25 in.) =	19.862	acre-feet	1.25	inches
10-yr Runoff Volume (P1 = 1.56 in.) =	26.696	acre-feet	1.56	inches
25-yr Runoff Volume (P1 = 1.99 in.) =	37.976	acre-feet	1.99	inches
50-yr Runoff Volume (P1 = 2.33 in.) =	46.228	acre-feet	2.33	inches
100-yr Runoff Volume (P1 = 2.68 in.) =	55.503	acre-feet	2.68	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	66.987	acre-feet		inches
Approximate 2-yr Detention Volume =	11.808	acre-feet		
Approximate 5-yr Detention Volume =	17.620	acre-feet		
Approximate 10-yr Detention Volume =	23.976	acre-feet		
Approximate 25-yr Detention Volume =	28.815	acre-feet		
Approximate 50-yr Detention Volume =	31.220	acre-feet		
Approximate 100-yr Detention Volume =	34.596	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	6.060	acre-feet
Zone 2 Volume (EURV - Zone 1) =	14.270	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	14.265	acre-feet
Total Detention Basin Volume =	34.596	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	

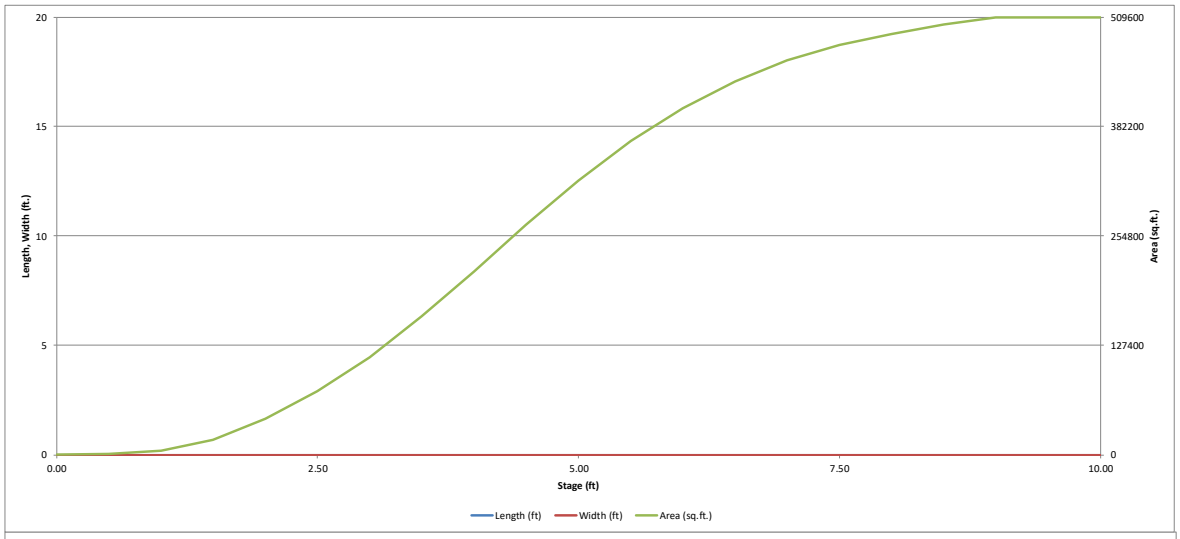
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	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

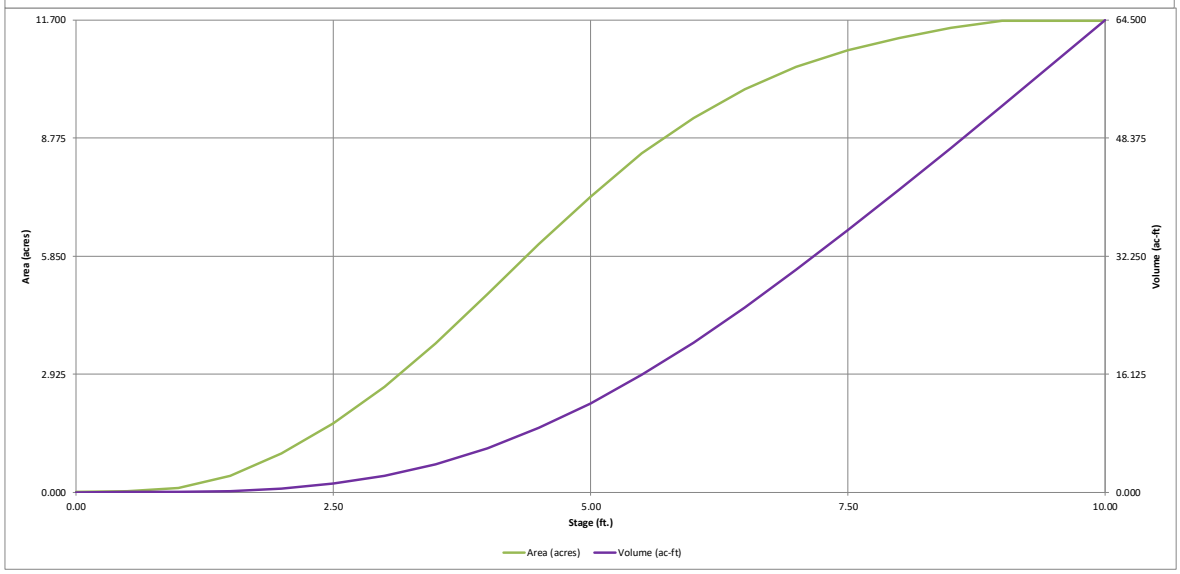
Depth Increment = 0.50 ft

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	--	--	--	500	0.011		
6192.5	--	0.50	--	--	--	661	0.015	290	0.007
6193	--	1.00	--	--	--	4,608	0.106	1,607	0.037
6193.5	--	1.50	--	--	--	17,579	0.404	7,154	0.164
6194	--	2.00	--	--	--	41,927	0.963	22,030	0.506
6194.5	--	2.50	--	--	--	74,085	1.701	51,033	1.172
6195	--	3.00	--	--	--	113,669	2.609	97,972	2.249
6195.5	--	3.50	--	--	--	160,928	3.694	166,621	3.825
6196	--	4.00	--	--	--	213,709	4.906	260,280	5.975
6196.5	--	4.50	--	--	--	267,913	6.150	380,685	8.739
6197	--	5.00	--	--	--	319,081	7.325	527,434	12.108
6197.5	--	5.50	--	--	--	365,444	8.389	698,565	16.037
6198	--	6.00	--	--	--	403,555	9.264	890,815	20.450
6198.5	--	6.50	--	--	--	434,612	9.977	1,100,356	25.261
6199	--	7.00	--	--	--	459,152	10.541	1,323,797	30.390
6199.5	--	7.50	--	--	--	476,933	10.949	1,557,819	35.763
6200	--	8.00	--	--	--	490,117	11.252	1,799,581	41.313
6200.5	--	8.50	--	--	--	500,857	11.498	2,047,325	47.000
6201	--	9.00	--	--	--	509,413	11.695	2,299,892	52.798
6202	--	10.00	--	--	--	509,413	11.695	2,809,305	64.493

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)



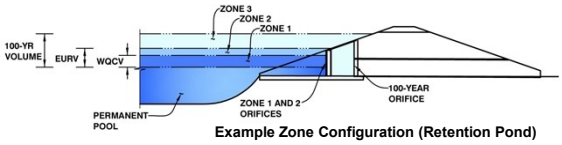


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

Project: Jade

Basin ID: Basin B



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	4.02	6.060	Orifice Plate
Zone 2 (EURV)	5.99	14.270	Rectangular Orifice
Zone 3 (100-year)	7.40	14.265	Weir&Pipe (Restrict)
Total (all zones)		34.596	

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

Calculated Parameters for Underdrain

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)	WQ Orifice Area per Row =	2.153E-01	ft^2
Depth at top of Zone using Orifice Plate =	3.80	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	31.00	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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							
Orifice Area (sq. inches)	31.00							

	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)

	Zone 2 Rectangular	Not Selected			Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	3.80	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	1.67	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	5.95	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.42	N/A	feet
Vertical Orifice Height =	10.00	N/A	inches				
Vertical Orifice Width =	24.00		inches				

Calculated Parameters for Vertical Orifice

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			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.15	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	5.65	N/A	feet
Overflow Weir Front Edge Length =	30.00	N/A	feet	Overflow Weir Slope Length =	5.02	N/A	feet
Overflow Weir Grate Slope =	10.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	9.49	N/A	
Horiz. Length of Weir Sides =	5.00	N/A	feet	Overflow Grate Open Area w/o Debris =	119.24	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	59.62	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	12.57	N/A	ft^2
Outlet Pipe Diameter =	48.00	N/A	inches	Outlet Orifice Centroid =	2.00	N/A	feet
Restrictor Plate Height Above Pipe Invert =	48.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.99	feet
Spillway Crest Length =	310.00	feet	Stage at Top of Freeboard =	9.99	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	11.69	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	64.38	acre-ft

Calculated Parameters for Spillway

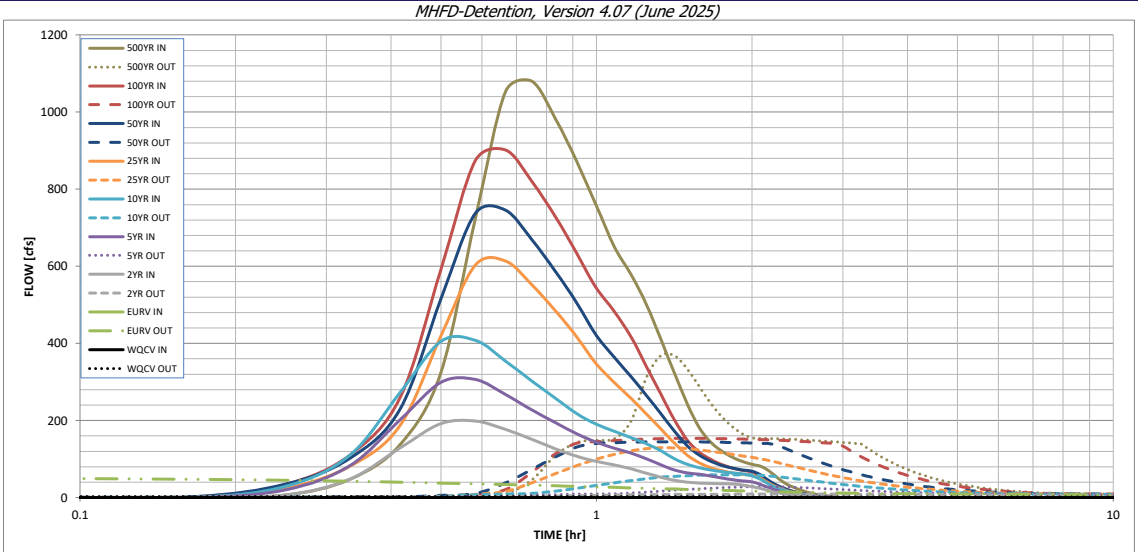
Routed Hydrograph Results

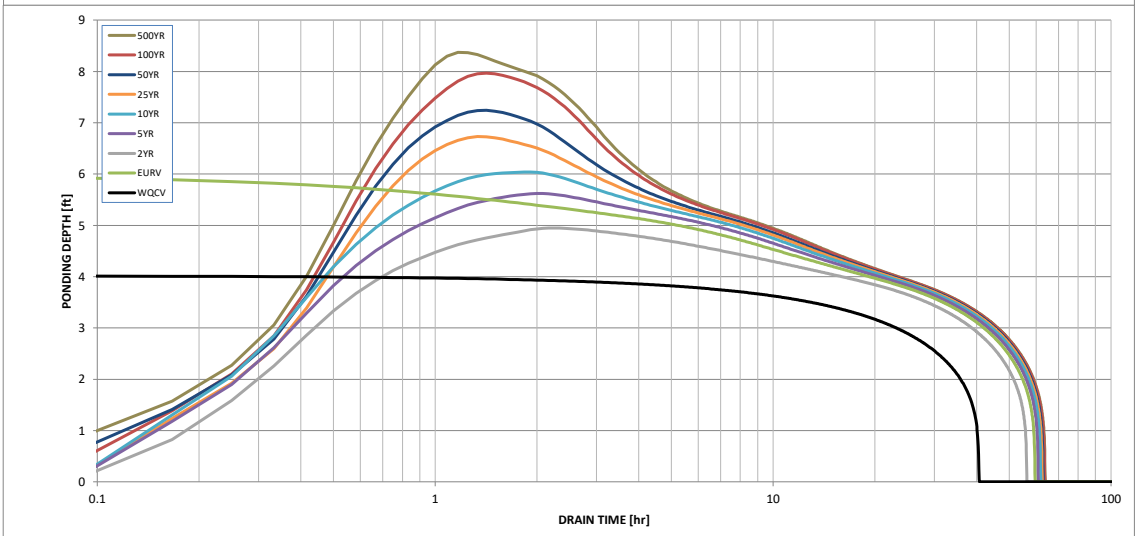
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

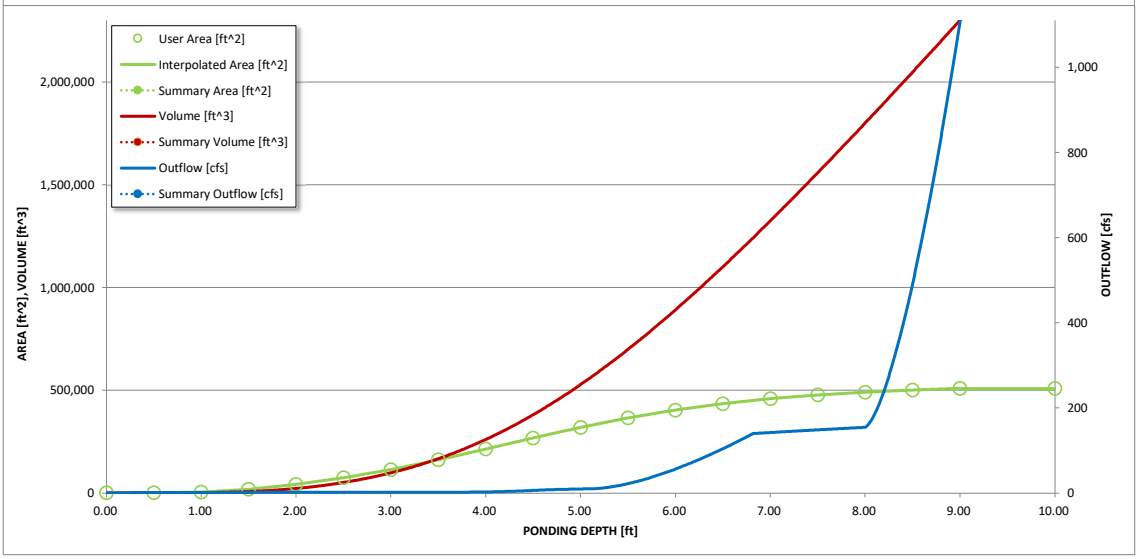
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.89	1.25	1.56	1.99	2.33	2.68	3.14
CUHP Runoff Volume (acre-ft) =	6.060	20.331	12.924	19.862	26.696	37.976	46.228	55.503	66.987
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	12.924	19.862	26.696	37.976	46.228	55.503	66.987
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	6.6	35.6	87.0	216.9	290.8	381.6	482.6
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.13	0.31	0.77	1.03	1.35	1.71
Peak Inflow Q (cfs) =	N/A	N/A	198.6	306.1	407.6	613.8	745.4	901.9	1080.3
Peak Outflow Q (cfs) =	2.5	53.5	9.2	28.7	59.4	129.3	145.0	153.9	368.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	0.7	0.6	0.5	0.4	0.8
Structure Controlling Flow =	Vertical Orifice 1	Overflow Weir 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	0.35	N/A	0.1	0.4	1.0	1.1	1.1	1.2
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) =	39	54	53	55	55	53	52	50	48
Time to Drain 99% of Inflow Volume (hours) =	**40**	58	55	59	59	59	59	58	58
Maximum Ponding Depth (ft) =	4.02	5.99	4.95	5.62	6.04	6.73	7.24	7.97	8.37
Area at Maximum Ponding Depth (acres) =	4.96	9.25	7.18	8.60	9.31	10.23	10.74	11.23	11.43
Maximum Volume Stored (acre-ft) =	6.074	20.358	11.673	17.056	20.729	27.483	32.943	40.863	45.395

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.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	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]
5.00 min	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	2.99	1.82	6.47
	0:15:00	0	0.00	7.07	20.15	29.47	23.99	34.64	34.33	47.81
	0:20:00	0	0.00	47.97	83.09	110.16	81.91	102.40	110.94	137.33
	0:25:00	0	0.00	129.05	201.58	272.75	186.73	229.22	259.22	324.65
	0:30:00	0	0.00	192.31	299.02	405.25	419.27	515.53	592.20	725.77
	0:35:00	0	0.00	198.57	306.13	407.59	603.70	738.34	874.80	1053.40
	0:40:00	0	0.00	176.65	267.30	354.11	613.80	745.45	901.88	1080.25
	0:45:00	0	0.00	151.09	227.24	302.43	552.08	668.91	820.37	981.78
	0:50:00	0	0.00	126.59	194.18	257.28	483.94	586.33	727.65	870.74
	0:55:00	0	0.00	107.10	165.52	217.24	415.92	504.14	632.18	756.28
	1:00:00	0	0.00	93.79	143.65	190.34	346.38	420.47	542.81	650.20
	1:05:00	0	0.00	84.64	128.38	171.84	298.54	363.38	482.71	578.87
	1:10:00	0	0.00	74.58	115.42	155.55	257.38	313.88	416.98	500.82
	1:15:00	0	0.00	63.21	100.90	139.46	216.78	264.92	339.84	409.51
	1:20:00	0	0.00	52.78	84.98	121.36	177.51	217.03	267.21	322.57
	1:25:00	0	0.00	44.77	71.63	100.78	141.11	172.19	200.93	242.51
	1:30:00	0	0.00	40.20	64.25	86.33	110.05	134.00	148.88	180.37
	1:35:00	0	0.00	37.93	60.51	77.57	90.22	109.47	117.60	142.87
	1:40:00	0	0.00	36.70	55.89	71.58	77.66	93.76	98.74	120.13
	1:45:00	0	0.00	35.99	50.50	67.27	69.55	83.51	85.75	104.40
	1:50:00	0	0.00	35.45	46.39	64.32	63.97	76.44	76.91	93.71
	1:55:00	0	0.00	32.80	43.46	61.39	60.38	71.82	70.69	86.16
	2:00:00	0	0.00	28.66	40.60	56.76	57.83	68.54	66.31	80.82
	2:05:00	0	0.00	23.21	33.75	46.53	49.06	58.01	55.61	67.77
	2:10:00	0	0.00	17.13	24.70	33.80	35.84	42.28	40.59	49.41
	2:15:00	0	0.00	12.38	17.75	24.11	25.60	30.14	29.07	35.35
	2:20:00	0	0.00	8.88	12.70	17.26	18.39	21.62	21.05	25.59
	2:25:00	0	0.00	6.31	8.87	12.23	12.99	15.25	14.95	18.17
	2:30:00	0	0.00	4.35	6.02	8.47	9.00	10.56	10.34	12.56
	2:35:00	0	0.00	2.92	4.10	5.83	6.29	7.38	7.23	8.77
	2:40:00	0	0.00	1.83	2.71	3.77	4.18	4.89	4.79	5.81
	2:45:00	0	0.00	1.01	1.61	2.16	2.49	2.91	2.85	3.45
	2:50:00	0	0.00	0.45	0.79	1.01	1.23	1.44	1.40	1.69
	2:55:00	0	0.00	0.16	0.25	0.30	0.40	0.47	0.45	0.54
	3:00:00	0	0.00	0.01	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

Swale O-1 100 YR Flow (EX01,EX02,EX03,EX04)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

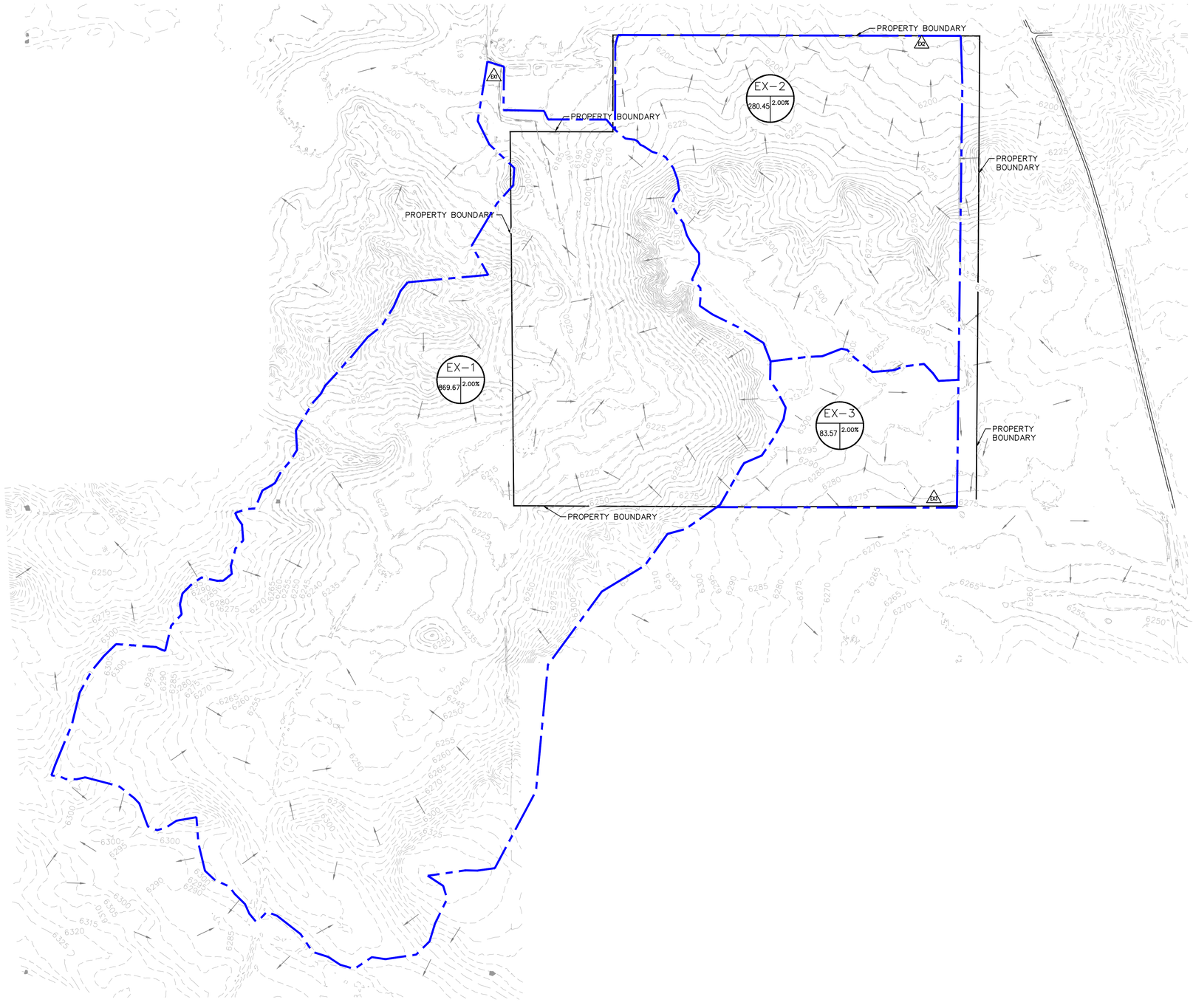
Input Data	
Roughness Coefficient	0.035
Channel Slope	0.006 ft/ft
Left Side Slope	33.000 %
Right Side Slope	33.000 %
Bottom Width	30.00 ft
Discharge	1,015.00 cfs

Results	
Normal Depth	3.7 ft
Flow Area	153.4 ft²
Wetted Perimeter	53.7 ft
Hydraulic Radius	2.9 ft
Top Width	52.53 ft
Critical Depth	3.0 ft
Critical Slope	0.014 ft/ft
Velocity	6.62 ft/s
Velocity Head	0.68 ft
Specific Energy	4.40 ft
Froude Number	0.683
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	3.7 ft
Critical Depth	3.0 ft
Channel Slope	0.006 ft/ft
Critical Slope	0.014 ft/ft

Appendix C – Drainage Maps



EXISTING DRAINAGE LEGEND

- # / AC — # = BASIN DESIGNATION; AC = AREA IN ACRES
- # — # = DESIGN POINT
- EXISTING BASIN BOUNDARY
- EXISTING FLOW ARROW

NORTH

GRAPHIC SCALE IN FEET
0 300 600 1200

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

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2025 KIMLEY-HORN AND ASSOCIATES, INC.
6200 South Syracuse Way, Suite 300
Greenwood Village, Colorado 80111 (303) 228-2300

DESIGNED BY: CRM
DRAWN BY: CMS
CHECKED BY: SAL
DATE: 12/17/2025

PROJECT JADE
LARAMIE COUNTY, WYOMING
SITE PLAN
EXISTING DRAINAGE MAP

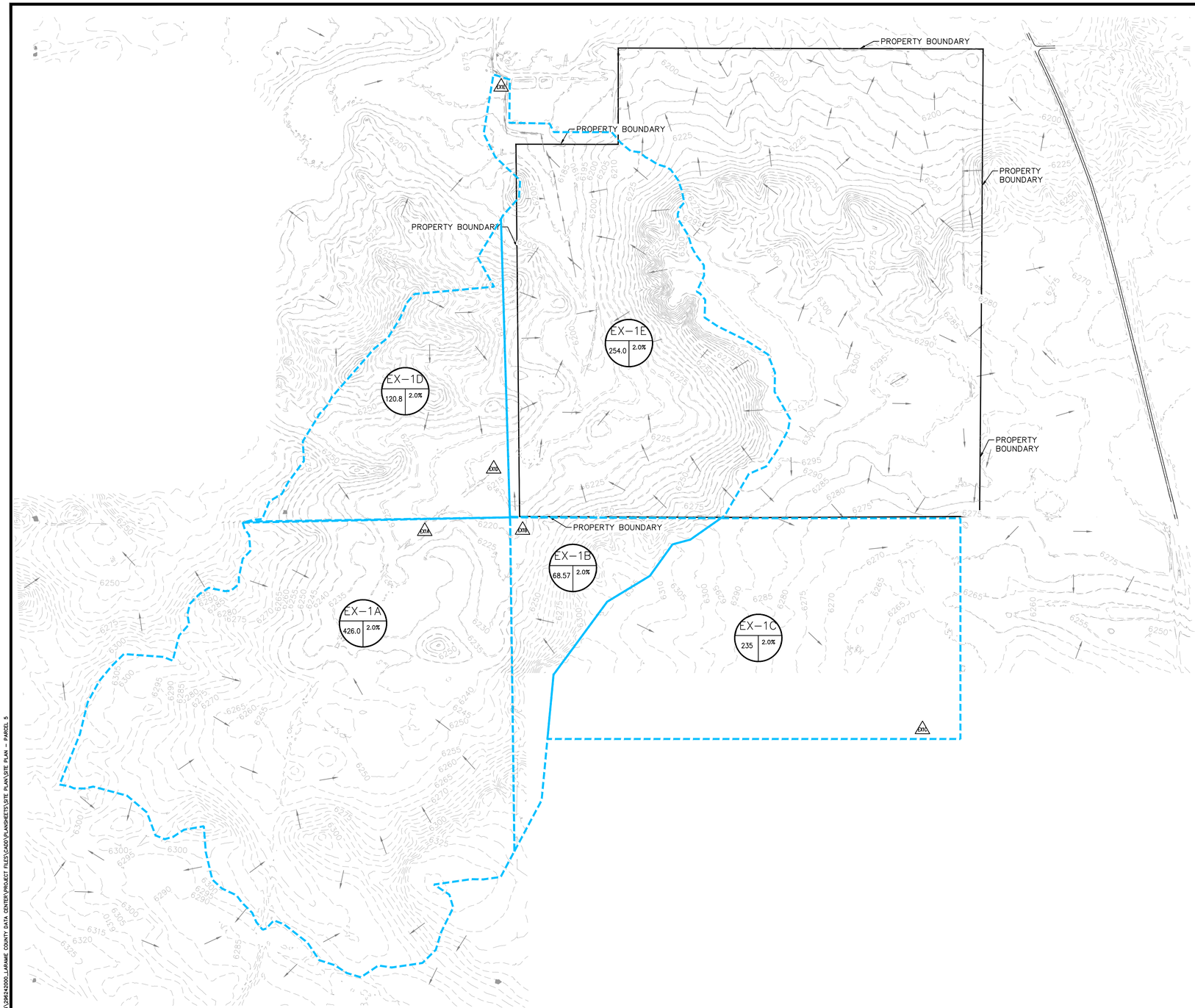
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Kimley-Horn and Associates, Inc.

PROJECT NO.
296242000

DRAWING NAME
296242_OV DRAINAGE.DWG

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CONFIDENTIAL



EXISTING DRAINAGE LEGEND

- # / AC = # = BASIN DESIGNATION; AC = AREA IN ACRES
- # = DESIGN POINT
- EXISTING BASIN BOUNDARY
- EXISTING FLOW ARROW

NORTH

GRAPHIC SCALE IN FEET
0 300 600 1200

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

NO.	REVISION	BY	DATE	APPR.

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DESIGNED BY: CRM
DRAWN BY: CMS
CHECKED BY: SAL
DATE: 12/17/2025

PROJECT JADE
LARAMIE COUNTY, WYOMING
SITE PLAN
EXISTING DRAINAGE MAP BASIN A

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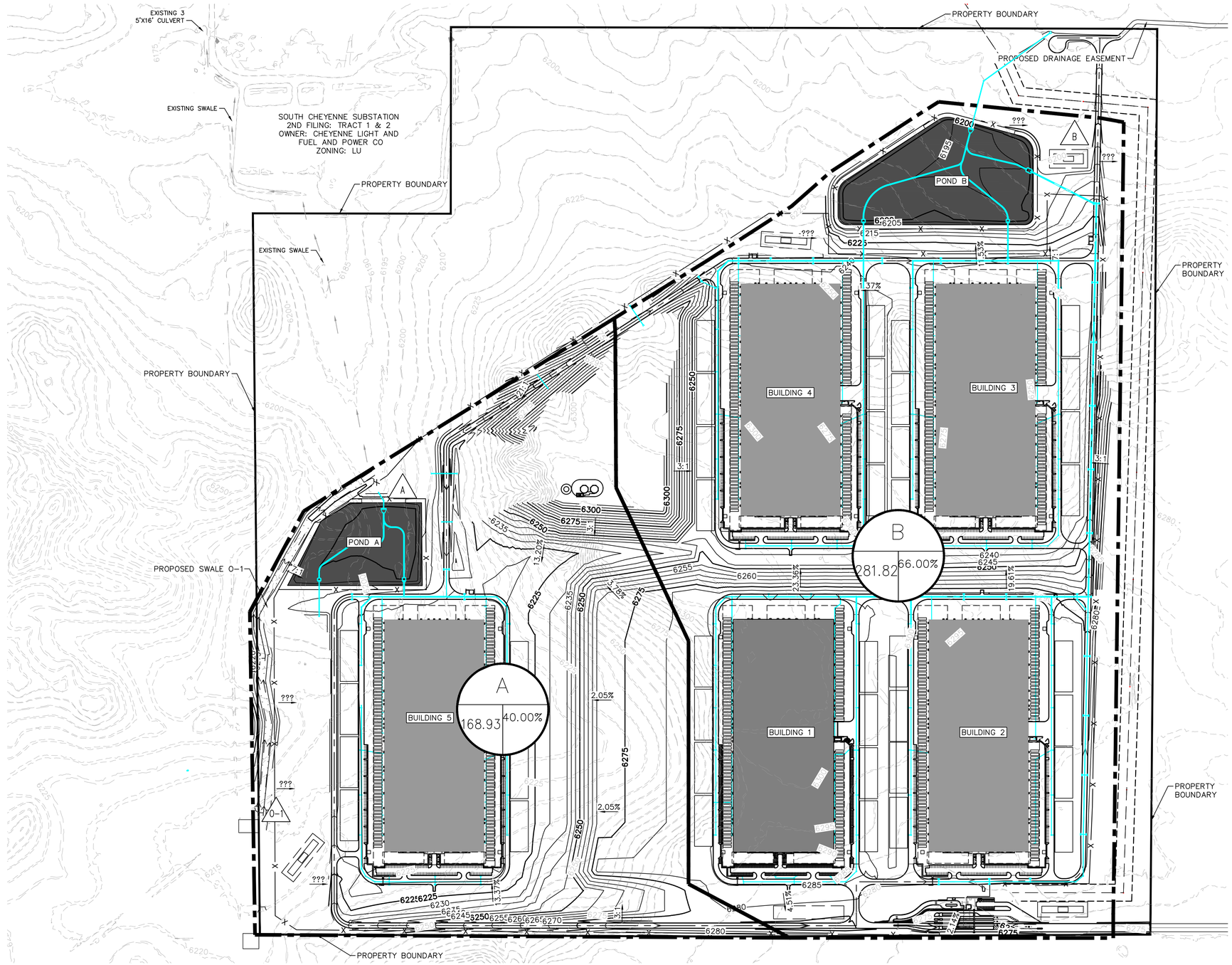
PROJECT NO.
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DRAWING NAME
296242_OV DRAINAGE.DWG

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PROPOSED DRAINAGE LEGEND

# = BASIN DESIGNATION
AC = AREA IN ACRES
% = PERCENT IMPERVIOUSNESS

= DESIGN POINT

PROPOSED BASIN BOUNDARY

PROPOSED FLOW ARROW

PROPOSED STORM LINE

GENERAL NOTES

1. ALL EXISTING FEATURES NOT SHOWN ON THIS PLAN AND NOT SHOWN TO BE REMOVED ARE TO REMAIN.
2. ALL EXISTING VEGETATION WITHIN THE LIMITS OF DISTURBANCE SHALL BE REMOVED AS FOLLOWS:
   - 2.1. ALL EXISTING TREES SHALL BE CUT FLUSH WITH THE GROUND, EXCEPT IN AREAS WHERE ROOT STRUCTURES WILL INTERFERE WITH INSTALLATION OF STRUCTURAL FOUNDATIONS, OR TRENCHING OPERATIONS; IN SUCH CASES REMOVE ALL ROOTS.
   - 2.2. ALL EXISTING SHRUBS SHALL BE CUT FLUSH WITH THE GROUND, EXCEPT IN AREAS WHERE ROOT STRUCTURES WILL INTERFERE WITH INSTALLATION OF STRUCTURAL FOUNDATIONS; IN SUCH CASES, REMOVE ALL ROOTS.
   - 2.3. ALL EXISTING GRASSES SHALL BE MOWED AS SHORT AS POSSIBLE.
   - 2.4. IN AREAS OF GRADING, ALL VEGETATION SHALL BE CLEARED AND GRUBBED PER THE RECOMMENDATIONS IN THE FUTURE PROJECT GEOTECHNICAL REPORT.
   - 2.5. IN AREAS OF EXISTING AGRICULTURAL LAND, ALL CROPS SHALL BE REMOVED AND SOIL SHALL BE DISKED AND ROLLED, AS NEEDED, TO AID IN ESTABLISHMENT OF PERMANENT VEGETATION. REFER TO LANDSCAPE PLANS.
3. DAMAGE TO ANY KNOWN EXISTING UTILITIES AND SERVICES TO REMAIN SHALL BE REPAIRED AND/OR REPLACED IN KIND AT CONTRACTOR'S OWN EXPENSE.
4. DUST CONTROL MEASURES SHALL BE IMPLEMENTED DURING DEMOLITION INCLUDING BUT NOT LIMITED TO WATERING DIRT ACCESS ROADS.
5. IN AREAS OF PROPOSED GRADING, TOP SOIL SHALL BE STRIPPED AND STOCKPILED AWAY FROM NATIVE EXCAVATED SOIL PRIOR TO GRADING. CONTRACTOR SHALL GRADE SITE SUCH THAT THE FINAL GRADES SHOWN ON THESE PLANS ARE MET AFTER THE TOP SOIL IS RESPREAD. IN THE EVENT THAT LESS THAN 6" OF CUT OR FILL IS REQUIRED, TOPSOIL STRIPPING MAY NOT BE REQUIRED. HOWEVER, THE CONTRACTOR SHOULD ENSURE THAT FOLLOWING COMPLETION OF GRADING, A MINIMUM OF 6" OF TOPSOIL IS PRESENT AND ENSURE THE FINISH GRADE FACILITATES POSITIVE DRAINAGE.
6. RIGHT-OF-WAY LINES AND UTILITY EASEMENT LINES PER FINAL SURVEY.

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NO.	REVISION	BY	DATE	APPR

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DATE: 12/17/2025

PROJECT JADE
LARAMIE COUNTY, WYOMING
SITE PLAN
PROPOSED DRAINAGE MAP

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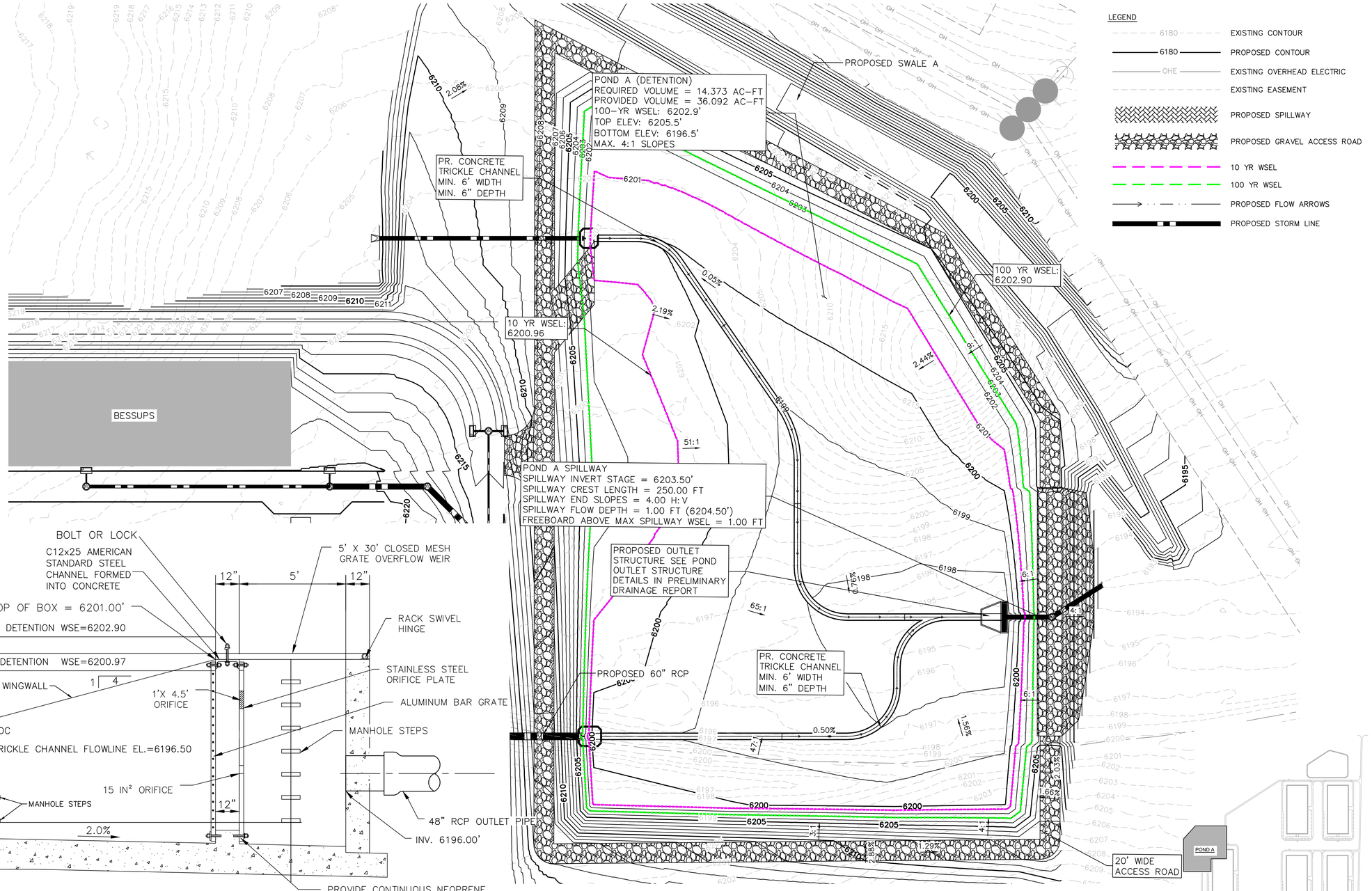
PROJECT NO.
296242000

DRAWING NAME
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17

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NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
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PROJECT JADE
LARAMIE COUNTY, WYOMING
SITE PLAN
PROPOSED POND A

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296242000

DRAWING NAME
296242_POND & SWALE.DWG

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POND B SPILLWAY
SPILLWAY INVERT STAGE = 6200.00'
SPILLWAY CREST LENGTH = 310.00 FT
SPILLWAY END SLOPES = 4.00 H:V
SPILLWAY FLOW DEPTH = 1.00 FT (6201.00')
FREEBOARD ABOVE MAX SPILLWAY WSEL = 1.00 FT

POND B (DETENTION)
REQUIRED VOLUME = 34.596 AC-FT
PROVIDED VOLUME = 64.493 AC-FT
100-YR WSEL: 6199.97'
TOP ELEV: 6202.0'
BOTTOM ELEV: 6192.0'
MAX. 4:1 SLOPES

PR. CONCRETE TRICKLE CHANNEL
MIN. 6' WIDTH
MIN. 6" DEPTH

PROPOSED 84" RCP

PR. CONCRETE TRICKLE CHANNEL
MIN. 6' WIDTH
MIN. 6" DEPTH

20' WIDE ACCESS ROAD

10 YR WSEL: 6198.04

100 YR WSEL: 6199.97

PROPOSED 78" RCP

PROPOSED 78" RCP

LEGEND

6180	EXISTING CONTOUR
6180	PROPOSED CONTOUR
OHE	EXISTING OVERHEAD ELECTRIC
	EXISTING EASEMENT
	PROPOSED SPILLWAY
	PROPOSED GRAVEL ACCESS ROAD
	10 YR WSEL
	100 YR WSEL
	PROPOSED FLOW ARROWS
	PROPOSED STORM LINE

POND B

NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

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PROJECT JADE
LARAMIE COUNTY, WYOMING
SITE PLAN
PROPOSED POND B

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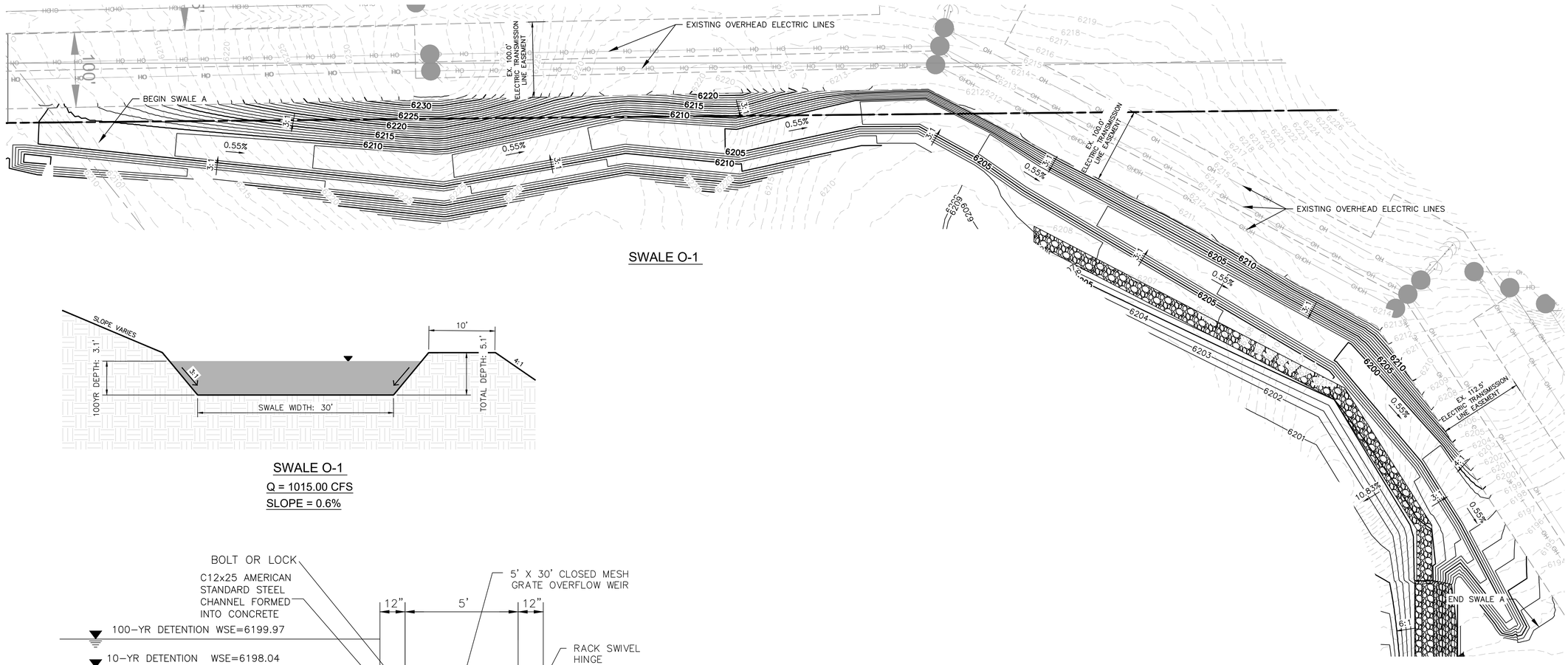
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296242000

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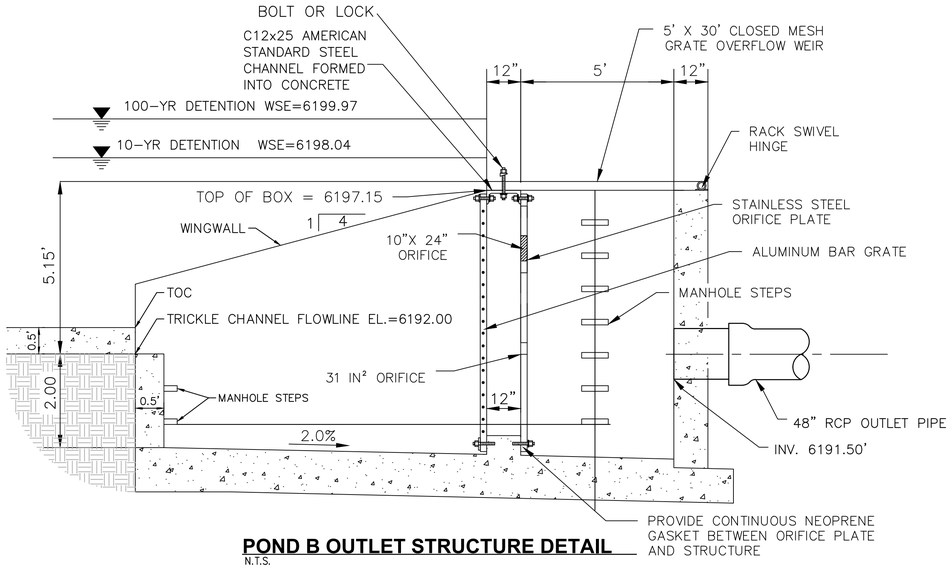


SWALE O-1

SWALE O-1

Q = 1015.00 CFS

SLOPE = 0.6%

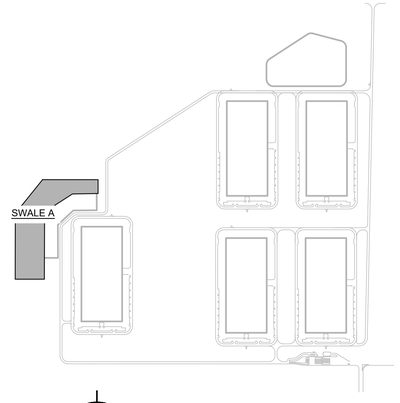


POND B OUTLET STRUCTURE DETAIL
N.T.S.

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LEGEND

- 6180 — EXISTING CONTOUR
- 6180 — PROPOSED CONTOUR
- OHE — EXISTING OVERHEAD ELECTRIC
- EXISTING EASEMENT
- PROPOSED SPILLWAY
- PROPOSED GRAVEL ACCESS ROAD
- 10 YR WSEL
- 100 YR WSEL
- PROPOSED FLOW ARROWS
- PROPOSED STORM LINE



NORTH

GRAPHIC SCALE IN FEET
0 35 70 140

NO.	REVISION	BY	DATE	APPR.

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PROJECT JADE
LARAMIE COUNTY, WYOMING
SITE PLAN
PROPOSED SWALE A

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Appendix D – NCRS Soils Report and FEMA MAPS

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. An average offset between NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) has been computed for each Laramie County flooding source. This offset was then applied to the NGVD 29 flood elevations that were not revised during the creation of this countywide format FIRM. The offsets for each flooding source shown on this firm are shown in the Laramie County Vertical Datum Offset Table below. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey Website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services, NOAA, N/NGS12
National Geodetic Survey SSMC-2, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov

Base map information shown on this FIRM was provided by the Laramie County GIS Department and the City of Cheyenne GIS Department. These data are current as of 2004

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov.

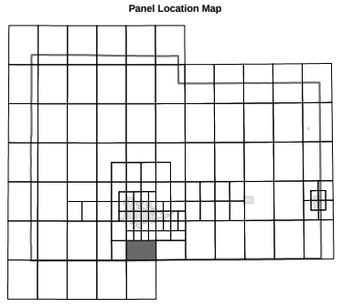
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA Map** (1-877-338-2627) or visit the FEMA website at http://www.fema.gov.

Laramie County Vertical Datum Offset Table

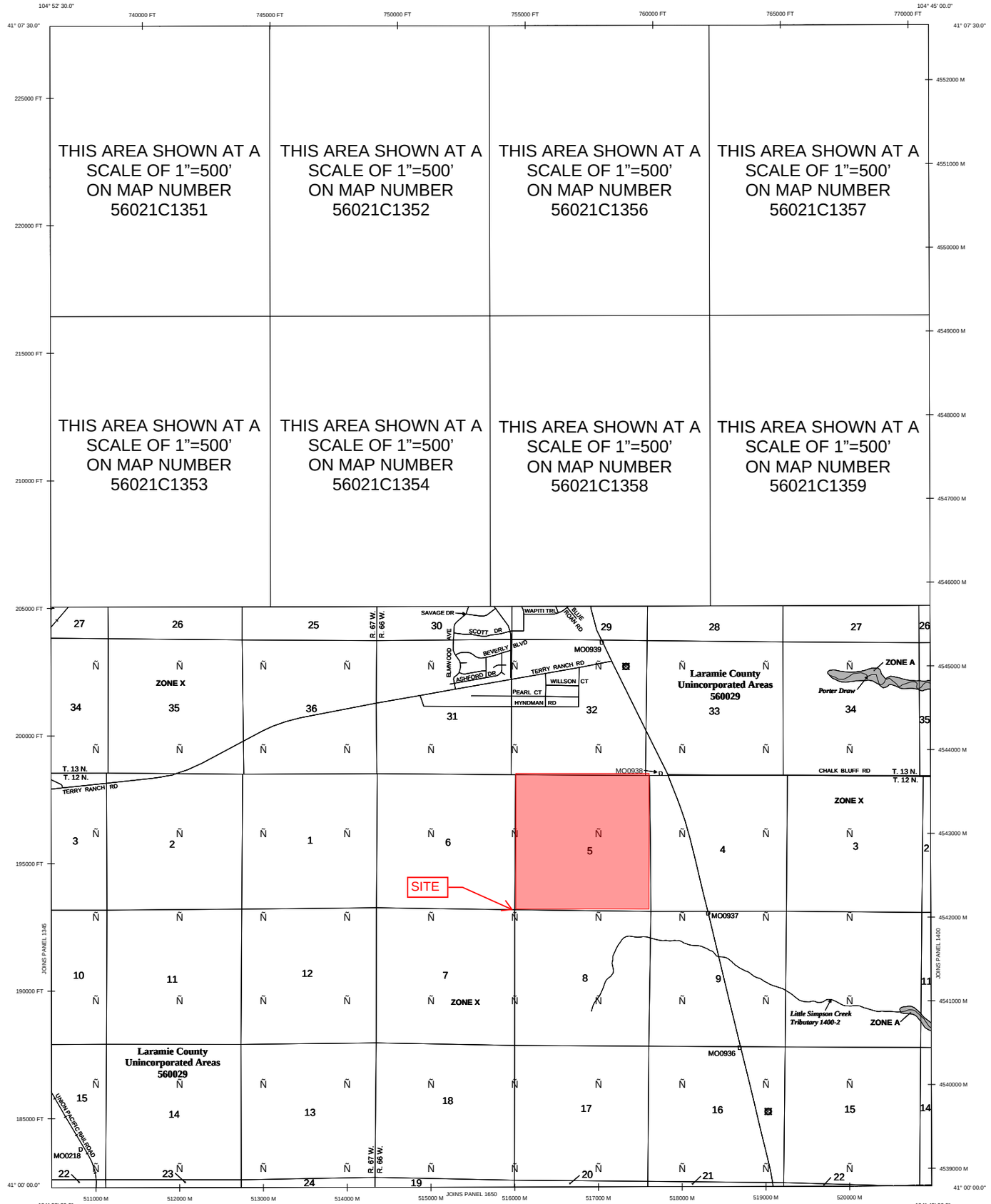
Flooding Source	Vertical Datum Offset (ft)
Allison Draw	3.33
Allison Draw Split Flow Path	3.33
Clear Creek	3.33
Crow Creek	3.33
Dry Creek	3.33
South Fork Allison Draw	3.33
Western Hills Draw (North Fork Dry Creek)	3.33
Wyoming Hereford Ranch Reservoir No. 1 - Emergency Spillway	3.33

Example: To convert Clear Creek elevations to NAVD 88, 3.33 feet were added to the NGVD 29 elevations.

Panel Location Map



This digital Flood Insurance Rate Map (FIRM) was produced through a cooperative partnership between Laramie County, the City of Cheyenne, and the Federal Emergency Management Agency (FEMA). Laramie County and the City of Cheyenne have implemented a long-term approach of floodplain management to reduce the costs associated with flooding. As part of this effort, Laramie County has joined in a Cooperating Technical Partner agreement with FEMA to produce this digital FIRM. Additional flood hazard information and resources are available from local communities, Laramie County and the City of Cheyenne.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
104° 50' 37.5" , 39° 30' 00"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276000 M	1000-meter Universal Transverse Mercator grid ticks, zone 13
3180000 FT	5000-foot ticks: Wyoming State Plane coordinate system, east zone (FIPSZONE 4901), Lambert Conformal Conic projection
D MO0079	National Geodetic Survey bench mark (see explanation in Notes to Users section of this FIRM panel

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
JANUARY 17, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 600 1200 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1375F

FIRM

FLOOD INSURANCE RATE MAP

LARAMIE COUNTY, WYOMING AND INCORPORATED AREAS

PANEL 1375 OF 1650
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
LARAMIE COUNTY	560029	1375	F

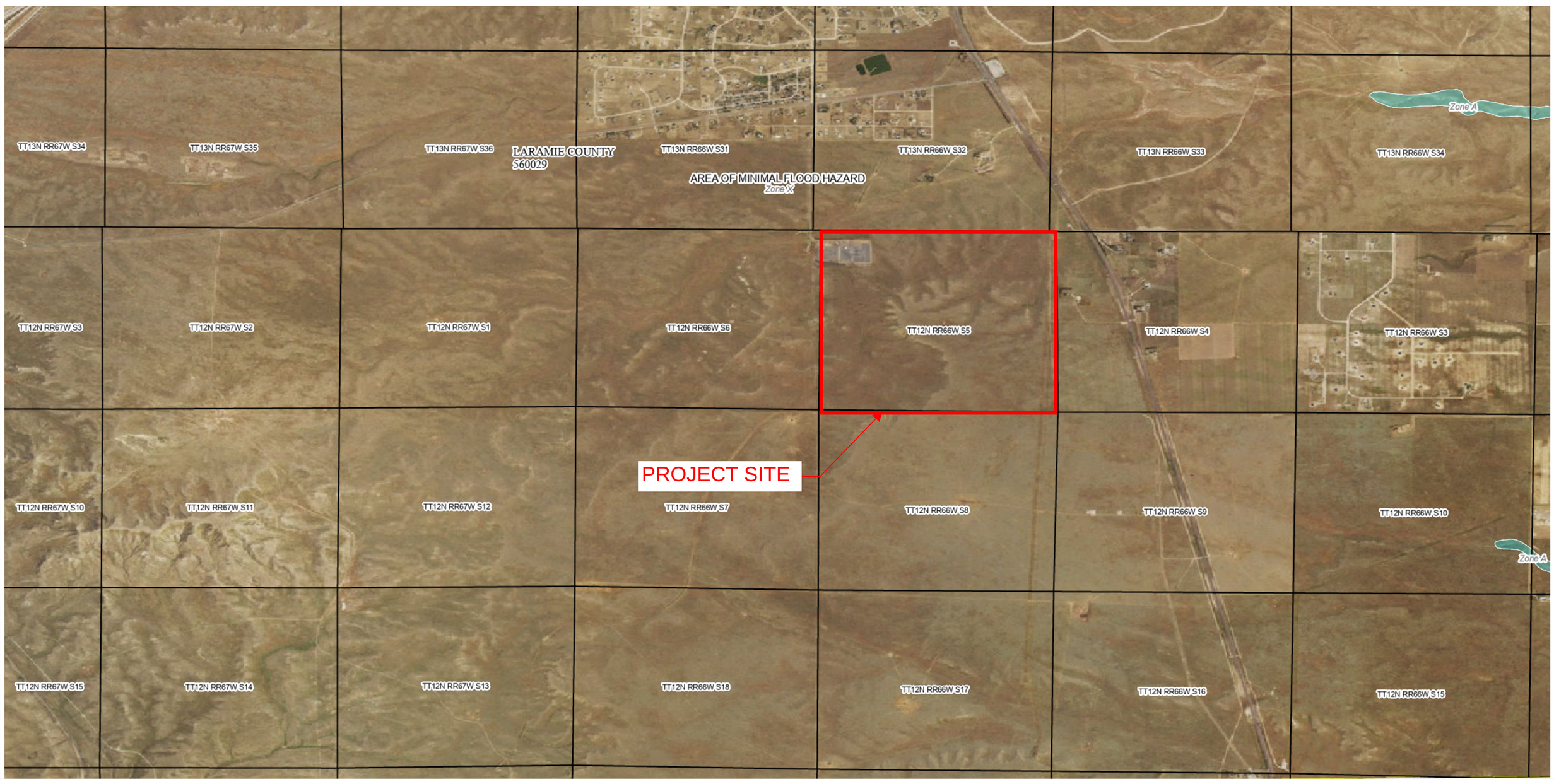
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
56021C1375F

EFFECTIVE DATE
JANUARY 17, 2007

Federal Emergency Management Agency

104°52'33.63"W 41°6'3.82"N



104°45'W 40°57'41.11"N

FLOOD HAZARD INFORMATION

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

SPECIAL FLOOD HAZARD AREAS

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

OTHER AREAS OF FLOOD HAZARD

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

OTHER AREAS

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

GENERAL STRUCTURES

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

OTHER FEATURES

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

LINK> </CLR>for official maps and additional

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **7/31/2025 4:54 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: No elevation features on this FIRM
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 2,000 feet 1:24,000

0 1,000 2,000 4,000 6,000 8,000 Feet

0 210 420 840 1,260 1,680 Meters



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

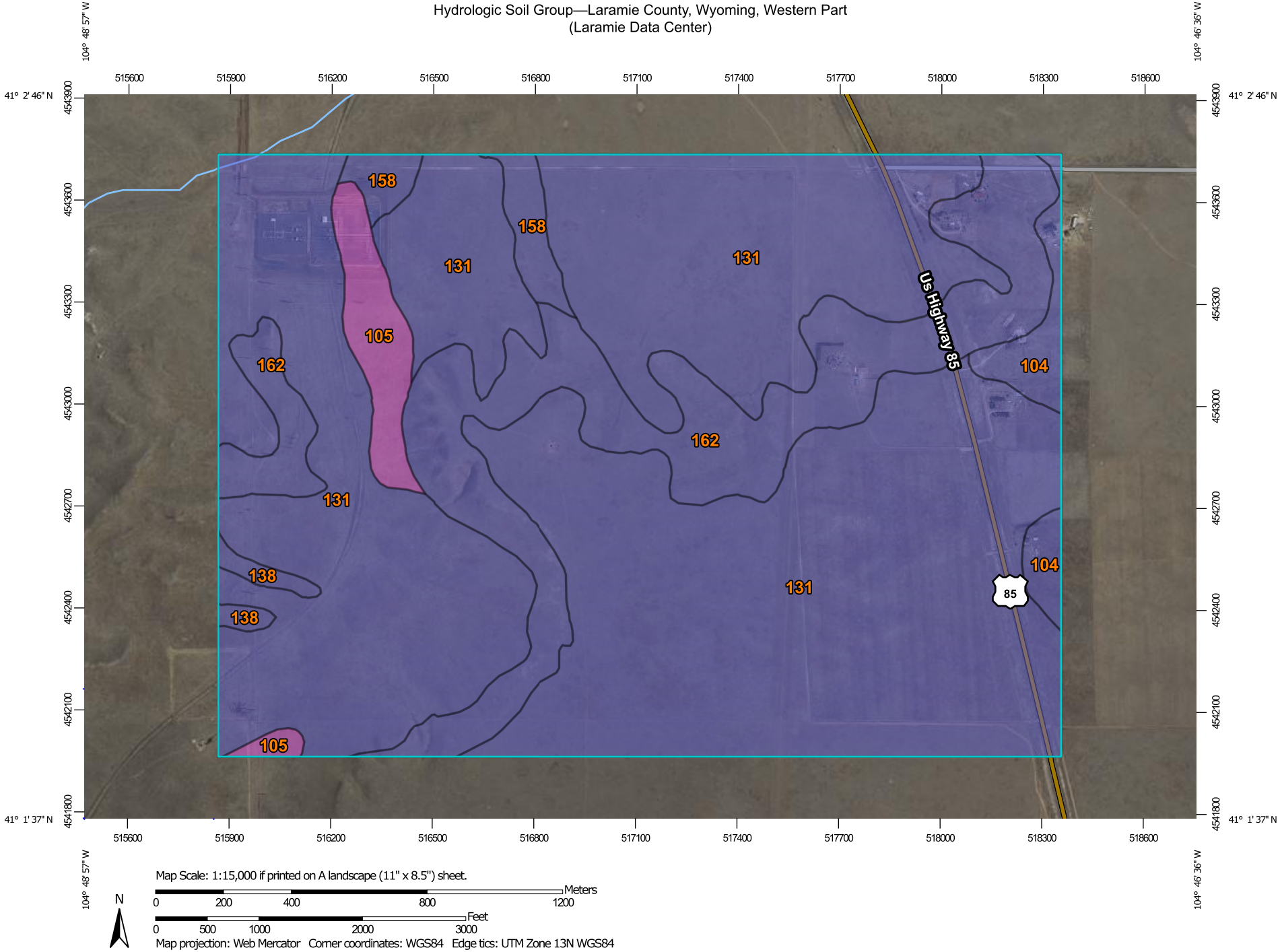
PANEL **1375** OF **1625**

Panel Contains:

COMMUNITY	NUMBER	PANEL
WELD COUNTY	~~080266~~	~~2375~~
LARAMIE COUNTY	560029	1375

MAP NUMBER
56021C1375F
EFFECTIVE DATE
January 17, 2007

Hydrologic Soil Group—Laramie County, Wyoming, Western Part
(Laramie Data Center)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

Soil Survey Area: Laramie County, Wyoming, Western Part
Survey Area Data: Version 17, Sep 10, 2024

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

Date(s) aerial images were photographed: Jul 2, 2022—Aug 8, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
104	Ascalon loam, cool, 0 to 6 percent slopes	B	23.1	2.1%
105	Bayard fine sandy loam, 0 to 15 percent slopes	A	31.2	2.9%
131	Evanston loam, 0 to 6 percent slopes	B	821.5	75.1%
138	Ipson-Evanston complex, 6 to 30 percent slopes	B	6.9	0.6%
158	Poposhia silt loam, 0 to 6 percent slopes	B	20.4	1.9%
162	Poposhia-Trimad complex, 3 to 15 percent slopes	B	191.1	17.5%
Totals for Area of Interest			**1,094.2**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix E – Excerpts from Referenced Documents

CHEYENNE LIGHT FUEL AND POWER

SOUTH CHEYENNE SUBSTATION
SITE DRAINAGE ANALYSIS

DeWild Grant Reckert & Associates Company

Rock Rapids, Iowa

CHEYENNE LIGHT FUEL AND POWER

SITE DRAINAGE ANALYSIS
FOR
SOUTH CHEYENNE SUBSTATION

I hereby certify that this report and drainage plan for the proposed South Cheyenne Substation was prepared by me (or under my direct supervision) for the Owners thereof and that I am a duly registered Professional Engineer under the laws of the State of Wyoming.

Registered Professional Engineer (Civil)
State of Wyoming No. 12921



DGR Project No. 423303

DEWILD GRANT RECKERT & ASSOCIATES COMPANY
CONSULTING ENGINEERS
ROCK RAPIDS, IOWA
SIOUX FALLS, SOUTH DAKOTA
SIOUX CITY, IOWA

CHEYENNE LIGHT FUEL AND POWER

SITE DRAINAGE ANALYSIS
FOR
SOUTH CHEYENNE SUBSTATION

1.0 Project Description

2.0 Pre-Development Conditions

3.0 Post-Development Conditions

4.0 Porter Draw Culvert Design

5.0 Construction Storm Water Runoff

6.0 Downstream Impact

APPENDIX

- Project Plans
- Pre-Development Design Calculations
- Post-Development Design Calculations
- Culvert Design Calculations

1.0 PROJECT DESCRIPTION

1.1 PROJECT SITE INFORMATION

Project/Site Name: South Cheyenne Substation

Project Location: NW 1/4 Section 5, T12N, R66W
Laramie County, Wyoming
Lat. 41˚02'34", Long. 104˚48'32"

1.2 SITE DESCRIPTION

The proposed improvements constitute the South Cheyenne Substation near Cheyenne, Wyoming. All construction activities are to be limited to the private property/easements of Cheyenne Light, Fuel & Power.

The site improvements shall consist of the substation construction including structures. Substation construction will include access and site grading, storm sewer culvert installation, rock surfacing placement and erection of the substation components. The subsoils to be excavated will be sampled and tested during construction. All disturbed areas on the project shall be permanently seeded following finish grading.

The construction plan sheets, attached, show the type, size and depth of the proposed improvements. It is anticipated the construction schedule will be sequenced as to minimize the amount of area disturbed at one time. The topsoil stripping will be completed prior to beginning other site construction, then grading and subgrade preparation will be done. The remaining topsoil stripping shall commence as the construction sequencing requires followed by the construction of the proposed substation.

General site clean-up and permanent seeding shall conclude the construction activities on the project.

The existing site is undeveloped grass covered ranch property all generally draining to Porter Draw. The Project Plans in the Appendix show the existing ground contours (provided by Steil Surveying) as well as the proposed improvements. The Culvert Design Calculations in the Appendix illustrate the Porter Draw watershed and the USGS contours for this vicinity.

1.3 SITE SCOPE

The total area of the project site:

41.1 acres

The estimated area expected to undergo clearing, excavation or grading, including off-site materials sources, access roads, areas for support activities and staging/storage areas:

26.6 acres

2.0 PRE-DEVELOPMENT CONDITIONS

The existing undeveloped ranch property is rolling fair condition grass covered ground with with an existing WAPA overhead electrical line. Using the NRCS Curve Number method of storm water analysis, this property is classified Hydrologic condition B, with the corresponding CN- 69. The analysis rainfall data utilized below was obtained from the USGS Water Resources Investigation 87-4225 for Laramie County, Wyoming.

Duration (Minutes)	Rainfall Intensity (inches per hour)					
	(2 Year)	(5 Year)	(10 Year)	(25 Year)	(50 Year)	(100 Year)
5	3.42	4.75	5.70	6.98	8.00	9.07
10	2.64	3.66	4.38	5.40	6.12	6.90
15	2.20	3.04	3.60	4.36	4.96	5.56
30	1.34	1.96	2.42	3.06	3.56	4.12
60	0.73	1.10	1.41	1.87	2.27	2.73
120	0.41	0.63	0.83	1.16	1.46	1.84
1440	0.06	0.08	0.10	0.13	0.15	0.18

Runoff analysis was completed using TR-55 to calculate time of concentration for the existing property and reviewed for the rainfall events of 5, 10, 50 and 100-year to meet the Laramie County Land Use Regulations (adopted February 15, 2011).

Pre-Development Drainage Analysis

Storm Event Frequency (Years)	Peak Discharge (Cubic Feet/Second)
5	1.68
10	4.83
50	16.43
100	24.71

The Pre-Development Design Calculations Appendix contains the hydrographs for the above mentioned rainfall events.

3.0 POST-DEVELOPMENT CONDITIONS

The South Cheyenne Substation grading and storm sewer improvements will be completed as a single construction project (see Project Plans in the Appendix). Much of the substation pad will be completed with crushed rock surfacing making the combined substation site NRCS CN-92. In order to provide storm water detention to meet Laramie County's detention requirements of a pre-development 50 year storm to meet a developed 100 year storm, the area north of the substation pads will be installed with 12" RCP storm sewer culvert to reduce the runoff rate to those shown in the table below:

Post-Development Drainage Analysis

Storm Event Frequency (Years)	Peak Storm Flowrate (Cubic Feet/Second)	RCP Outlet Discharge (Cubic Feet/Second)
5	20.11	3.42
10	27.40	3.97
50	45.73	5.11
100	56.68	5.63

As a result, the developed 100 year discharge of 5.63 cfs is well below the undeveloped 50 year design storm of 16.43 cfs and is nearly at the 10 year level. The hydrographs for each of these conditions can be seen in the Post-Development Design Calculations Appendix for each storm event utilizing NRCS and TR-55 hydraulic methods.

The detention ponding at the 100 year storm event reaches elevation 6174.68, providing safety free board of over 3' providing additional detention in major precipitation events (Low point of access embankment = 6177.83).

4.0 PORTER DRAW CULVERT DESIGN

The access road for the South Cheyenne Substation crosses Porter Draw including a large drainage basin of 4068 acres +/- (see Culvert Design Calculations watershed plan page in the Appendix). Hydroflow calculations for the 5, 10, 50 and 100 year design storms are also included to show the culvert meets a 100 year design storm (3-5'x16' pre-cast box culverts, see Project Plans in the Appendix). The culverts are each 30' long at 0.50% slope and built to a HL-93 Design Loading. The maximum discharge in a 100 year storm event is 1576.99 cfs without overtopping of the access road. The site development of the substation pads in Section 3.0 are the only significant changes to the watershed; therefore, detention at the Porter Draw crossing is not being considered and is not required by County Land Use Guidelines.

5.0 CONSTRUCTION STORMWATER RUNOFF

The Contractor shall be responsible to control erosion off the site during construction. General Permit to Discharge Storm Water Associated with Large Construction Activity (WYPDES) is necessary for this project (26.6 acres disturbed) and will be obtained by the Owner. Contractor shall use general Best Management Practices while performing work to avoid soil erosion from the site. Contractor shall inspect erosion control devices weekly or after all precipitation of ½" or more and repair deficient areas. The Contractor shall review and follow the recommendations provided in the SWPPP in the appendix of the project specifications. Should site conditions warrant; the SWPPP shall be amended in order to maintain compliance with the permit.

6.0 DOWNSTREAM IMPACTS

The downstream impacts of the substation site will be mitigated by the installation of on-site detention to slow the storm runoff of the site (up to a 100 year design storm) to nearly the existing runoff in a 10 year design storm. Downstream impacts of Porter Draw will be negligible considering the 100 year design of the access drive culverts, as well as the outlet stabilization specified by the plans (Project Plans in the Appendix). The next downstream stormwater structure is the 10' diameter C.M.P. culvert crossing of WY Highway 85 (estimated 15' road embankment).

APPENDIX

PROJECT PLANS

Plot Date: 6/12/2012 4:58:22 PM

SEE SHEET C-011 FOR ENTRANCE DRIVE PLAN

P-1 110LF OF 12" RCP @ 2.5% W/ APRONS
P-2 85LF OF 12"RCP @ 0.40% W/APRONS
P-3 78LF OF 12"RCP @ 0.40% W/APRONS

D-1 250LF OF 4" PERFORATED DRAIN TILE
D-2 50LF OF 4" PERFORATED DRAIN TILE

SILT FENCE (TYP)

CLFP SUBSTATION

WAPA SUBSTATION

PROPOSED GATE (TYP)

PROPOSED FENCE (TYP)

CLFP EASEMENT

WAPA EASEMENT

90.00'

N0° 17' 25"E 944.55'

S0° 04' 50"W 1100.00'

S1° 11' 35"E 155.49'

N89° 53' 06"W 1310.00'

394.00'

486.00'

149.00'

24.00' (TYP)

22.00'

20.00'

20' (TYP)

30.00'

580.00'

670.00'

85.00'

57.00'

231.00'

138.00'

70.00'

R50.00' (TYP)

32+00 34+00 36+00 38+00 40+00 42+00 44+00

6175 6180 6185 6190 6195 6196 6200 6205

0' 25' 50' 100'
SCALE IN FEET

Refer to sheet C-012 for Key Notes

LEGEND - TOPOGRAPHIC SURVEY

- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING BURIED FIBER OPTIC LINE
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF WATER LINE
- PROPOSED EDGE OF ROCK
- EXISTING EASEMENT
- PROPERTY LINE, R.O.W. LINE
- DRAIN TILE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SILT FENCE/DITCH CHECKS/WATTLES
- PERMANENT TURF REINFORCEMENT MAT
- EXISTING POWER POLE, LIGHT POLE
- EXISTING GUY WIRE
- BENCHMARK, SURVEY MARKER
- GRADING DRAINAGE DIRECTION

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers
Rock Rapids, Iowa

DATE	DRAWN BY	NO.	APPROVED BY	REVISION DESCRIPTION
6-12	DLV	0	DLV	SUBSTATION CONTRUCTION

CHEYENNE LIGHT FUEL AND POWER
SOUTH CHEYENNE SUBSTATION

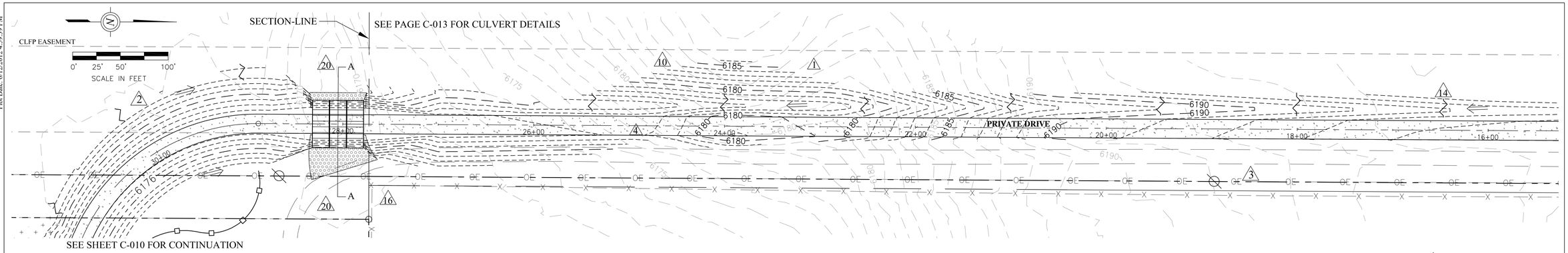
CIVIL SITE PLAN

DRAWN BY DLV DATE 4/12
APPROVED BY PDK DATE 5/12

DWG NO. SCH-C-010 REVISION NO. 0

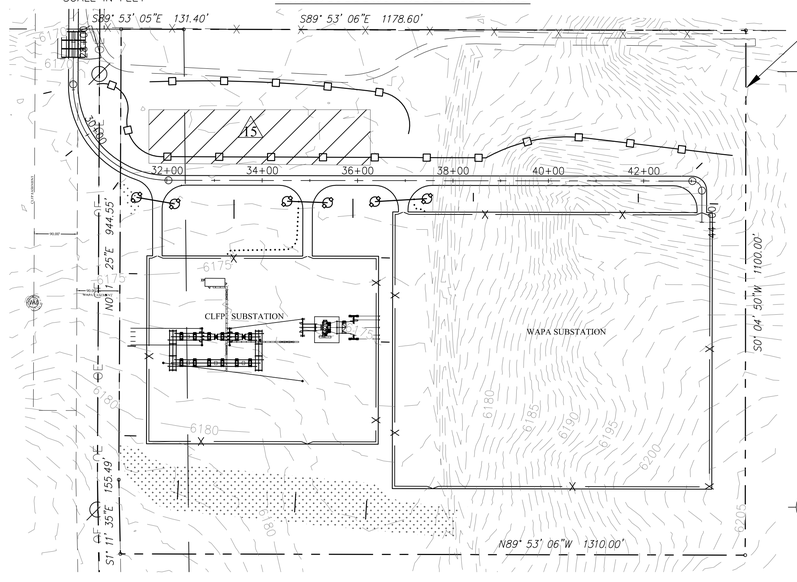
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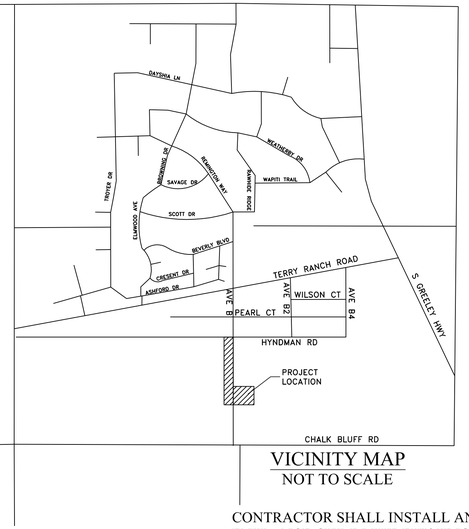


ENTRANCE DRIVE PLAN

SUBSTATION SITE LAYOUT

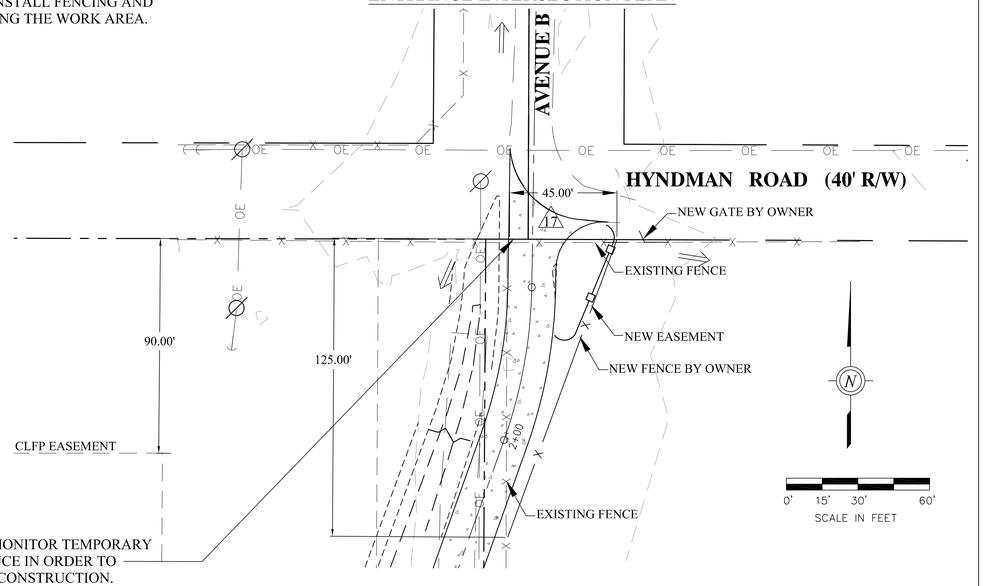


FENCING TO BE INSTALLED AT THE EAST, SOUTH AND WEST PROPERTY LINE BY THE OWNER PRIOR TO CONSTRUCTION, CONTRACTOR SHALL NOT DISTURB FENCE LINE EXCEPT AS NECESSARY TO BUILD THE ENTRANCE ROAD. CONTRACTOR SHALL REINSTALL FENCING AND TEMPORARY GATES AS NECESSARY TO PREVENT CATTLE FROM ENTERING THE WORK AREA.



VICINITY MAP
NOT TO SCALE

ENTRANCE INTERSECTION PLAN



CONTRACTOR SHALL INSTALL AND MONITOR TEMPORARY ENTRANCE CUT-IN THE EXISTING FENCE IN ORDER TO MAINTAIN FUNCTION THROUGHOUT CONSTRUCTION.

LEGEND - TOPOGRAPHIC SURVEY

- OE — EXISTING OVERHEAD ELECTRIC LINE
- FO FO — EXISTING BURIED FIBER OPTIC LINE
- X X — EXISTING FENCE
- X — PROPOSED FENCE
- EXISTING EDGE OF GRAVEL
- W W — EXISTING EDGE OF WATER LINE
- PROPOSED EDGE OF ROCK
- EXISTING EASEMENT
- PROPERTY LINE, R.O.W. LINE
- DRAIN TILE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SILT FENCE/DITCH CHECKS/WATTLES
- PERMANENT TURF REINFORCEMENT MAT
- EXISTING POWER POLE, LIGHT POLE
- EXISTING GUY WIRE
- BENCHMARK, SURVEY MARKER
- GRADING DRAINAGE DIRECTION

Refer to sheet C-012 for Key Notes

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers
Rock Rapids, Iowa

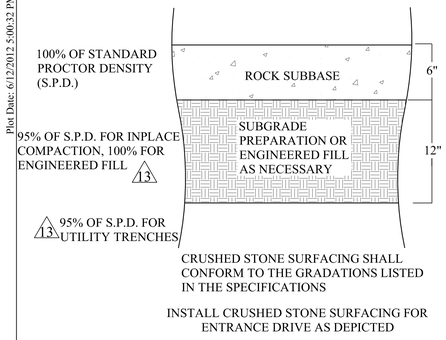
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CHEYENNE LIGHT FUEL AND POWER
SOUTH CHEYENNE SUBSTATION
CIVIL SITE PLAN

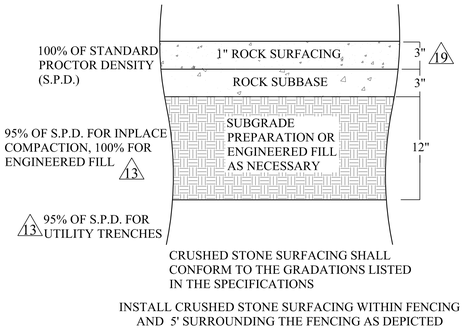
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APPROVED BY PDK DATE 5/12
DWG NO. SCH-C-011 REVISION NO. 0

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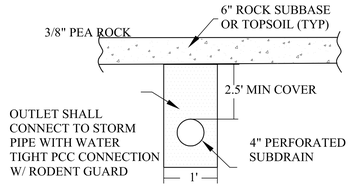
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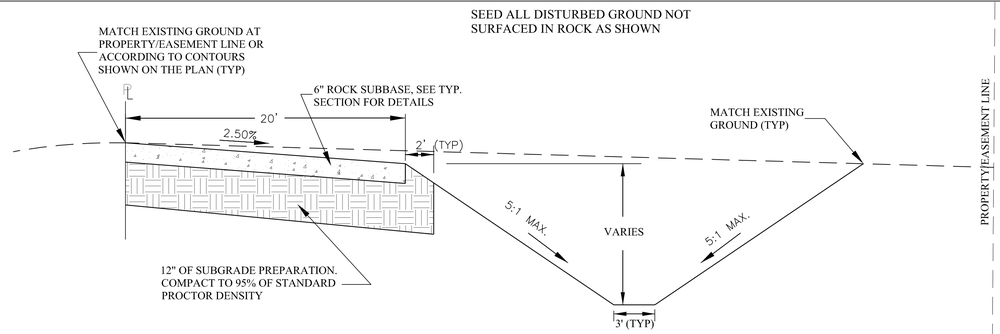
TYPICAL ROCK DRIVEWAY SURFACING SECTION
NOT TO SCALE



TYPICAL ROCK SUBSTATION SURFACING SECTION
NOT TO SCALE



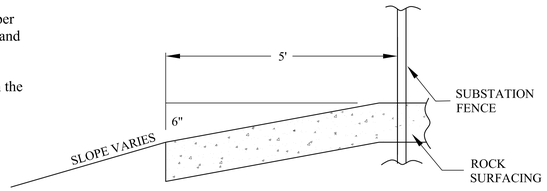
4" PERFORATED SUBDRAIN
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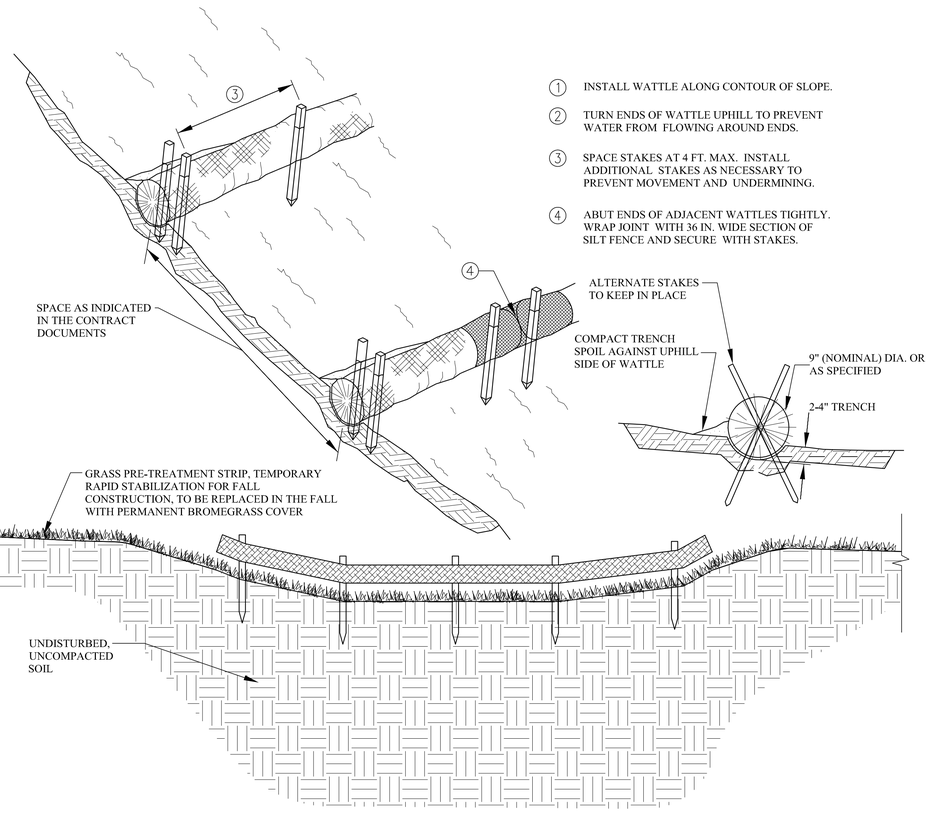
TYPICAL DRIVEWAY SECTION
NOT TO SCALE

CONSTRUCTION NOTES

1. All disturbed areas shall be prepared as shown on the details or described in the specifications.
2. Excavated material shall be utilized on site to build the slopes shown. The Contractor is responsible for excavating, hauling, and disposing of excess fill material not used in the site preparation. Excess material can be wasted on site at the direction of the Owner during construction, extra grading and seeding costs shall be incidental to the excavation bid item.
3. Utilities and other potential obstacles (underground facilities) have been shown only to the extent that they were observed at the surface or were known by Others. The Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data. The Contractor shall have full responsibility for reviewing and checking all such information and data, locating all such facilities, coordination of the work with the owners of such underground facilities during construction, and the safety and protection of all such underground facilities.
4. For rock and gravel surfacing, refer to the details and specifications for preparation and material requirements. Prior to surfacing apply 'SpraKil SK-13' as specified to prevent plant growth.
5. Provide, compact and grade engineered fill or in-place grade as necessary to meet contours shown. Proposed contours are to final top of rock/topsoil; account for 6" granular surfacing/topsoil as shown in the detail. Topsoil excavation and placement shall be incidental to the cost of the excavation bid unit.
6. Contractor shall be responsible to control erosion of the site during construction. General Permit to Discharge Storm Water Associated with Large Construction Activity (WYPDES) is necessary for this project (26.6 acres disturbed) and will be obtained by the Owner. Contractor shall use general Best Management practices while performing work to avoid soil erosion from the site. Contractor shall inspect erosion control devices weekly or after all precipitation and repair any deficient areas. The Contractor shall review and follow the recommendations provided in the SWPPP in the appendix of the specifications. Should site conditions warrant; the SWPPP shall be amended in order to maintain compliance with the permit. All costs shall be incidental to the erosion control items provided in the bid units.
7. Electrical site equipment details and substation crushed rock surfacing to be completed later by Substation Contractor.
8. Contractor will be responsible for all staking for this project. Contact the survey Engineer (Steil Surveying) for coordinate files or dimensioning to complete staking. All costs incidental to the project.
9. Contractor shall review the soils report as completed by I.M.E. All disturbed areas shall be prepared as shown on the details or described in the specifications.
10. All disturbed areas that are not surfaced shall be seeded, fertilized and mulched. Do not disturb area outside construction area shown.
11. Connect RC pipe apron to first pipe with a 1/2" stainless ready rod connection, grade 80. Also provide inlet protection for culvert ends to prevent erosion into the storm pipe. Maintenance costs shall be incidental to the bid item.
12. All site work shall be completed in accordance to the latest Wyoming DOT specifications (2010 edition).
13. For every foot of embankment material installed, the Contractor shall provide the Owner with nuclear density tests in a 50' grid per foot verifying the compaction specified. Failure to provide these test results will result in re-work necessary to provide the base and compaction test results as specified.
14. Ditch checks or wattles (~15') shall be provided every 150' in the drainage ditches on site, maintenance costs shall be included in the bid item included in the bid form
15. Utilize these areas for storage of building materials, on-site fueling and concrete washout areas, handle and contain materials as described in the SWPPP and permitted by the WYDEQ.
16. Storm water discharge location for the project site, the Contractor shall maintain and add storm water controls as necessary throughout construction to prevent soil erosion or hazardous materials from leaving the project site.
17. Install and maintain rock construction entrance to prevent offsite tracking. Rock used shall be removed during the rock surfacing portion of the work, all costs incidental to the rock surfacing bid item.
18. Install permanent turf reinforcement mat (North American Green P-550) for the area depicted.
19. Contractor shall complete work defined in the Bid Form in the specifications. Some of the items depicted in the plan may be completed by others, coordinate work with other Contractors with adjacent work.
20. Install and maintain culvert erosion control protection throughout construction by use of a series of controls including straw bales, silt fence, wattle, etc. to protect the drainage way from erosion of on-site material. All costs shall be incidental to the unit bid price.



FENCE PERIMETER GRADING
NOT TO SCALE



WATTLE INSTALLATION
NOT TO SCALE

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers
Rock Rapids, Iowa

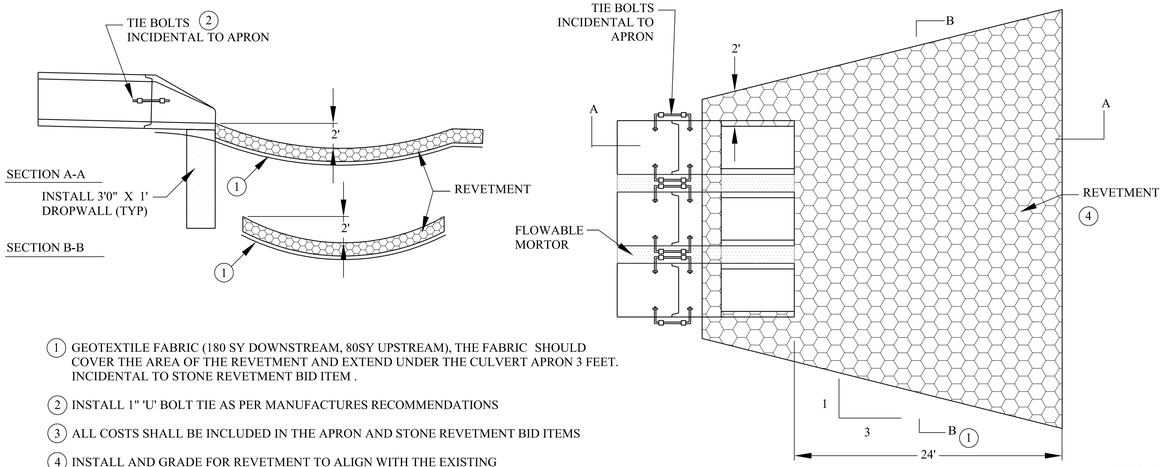
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CHEYENNE LIGHT FUEL AND POWER
SOUTH CHEYENNE SUBSTATION
CIVIL SITE DETAILS

DRAWN BY DLV DATE 4/12
APPROVED BY PDK DATE 5/12
DWG NO. SCH-C-012 REVISION NO. 0

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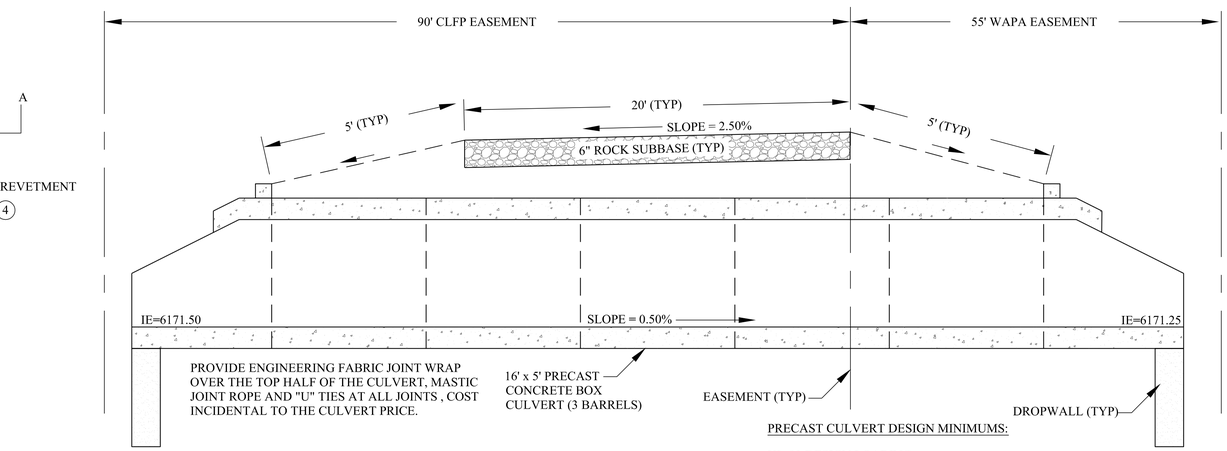
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1. GEOTEXTILE FABRIC (180 SY DOWNSTREAM, 80SY UPSTREAM), THE FABRIC SHOULD COVER THE AREA OF THE REVETMENT AND EXTEND UNDER THE CULVERT APRON 3 FEET. INCIDENTAL TO STONE REVETMENT BID ITEM .
2. INSTALL 1" 'U' BOLT TIE AS PER MANUFACTURES RECOMMENDATIONS
3. ALL COSTS SHALL BE INCLUDED IN THE APRON AND STONE REVETMENT BID ITEMS
4. INSTALL AND GRADE FOR REVETMENT TO ALIGN WITH THE EXISTING CHANNEL AS DEPICTED ON PAGE SCH-C-010.

(300 TONS) SHALL BE NATURAL STONE ACCORDING TO WYDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION. (8-30" DIAMETER) ALL ITEMS TO BE PAID FOR AT THE CONTRACT UNIT PRICE.

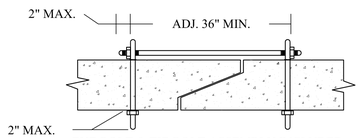
REVETMENT AT APRON
NOT TO SCALE



PRECAST CULVERT DESIGN MINIMUMS:

HL-93 DESIGN LOADING
5000 PSI CONCRETE
65000 PSI (ASTM A497) STEEL YIELD

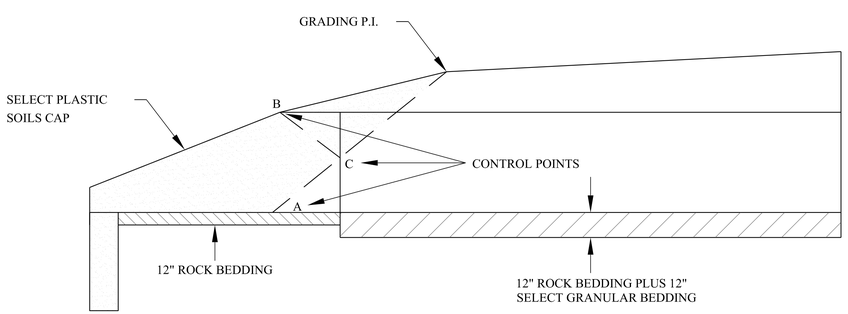
TYPICAL SECTION A-A
NOT TO SCALE



EYE BOLT & TIE BOLT ASSEMBLY INCLUDED IN PRICE BID FOR CONCRETE BOX CULVERT.

DIAMETER OF EYE BOLTS AND ADJUSTABLE TIE BOLT SHALL BE 1 INCH. TIE BOLTS, EYE BOLTS, WASHERS AND NUTS SHALL BE GALVANIZED. STEEL SHALL BE GRADE 60 OR BETTER.

TIE BOLT DETAIL
NOT TO SCALE



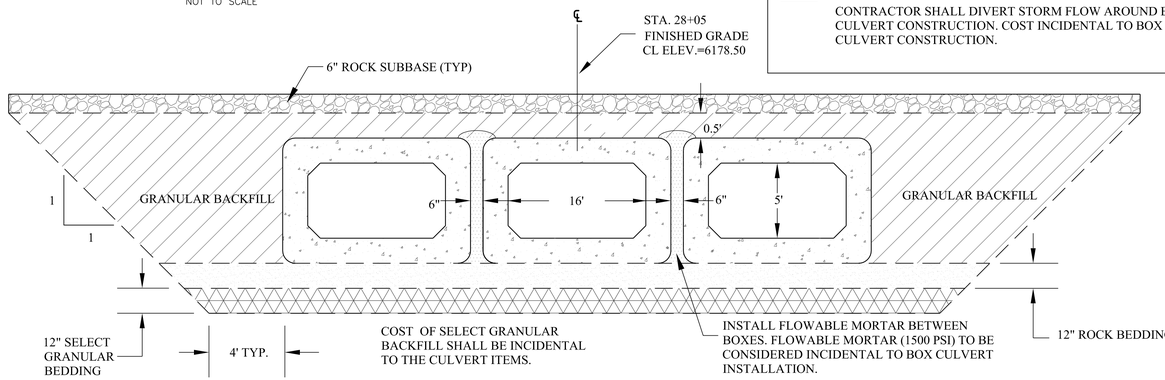
NOTES:
**DO NOT PLACE ANY GRANULAR BEDDING BEYOND THE END OF THE PIPE CULVERT BARREL SECTIONS.

THICKNESS OF PLASTIC SOIL CAP, (B-C) SHALL BE A MINIMUM OF 3 FEET. MINIMUM 50% PASSING THE 200 SIEVE & A MINIMUM 20% CLAY SIZE.

CULVERT WORK TO BE PERFORMED IN DRY CONDITIONS. ALL COST INCIDENTAL TO THE CULVERT AND EMBANKMENT ITEMS.

PLASTIC SOILS CAP TREATMENT
NOT TO SCALE

NOTE:
CONTRACTOR SHALL DIVERT STORM FLOW AROUND BOX CULVERT CONSTRUCTION. COST INCIDENTAL TO BOX CULVERT CONSTRUCTION.



SLOPE TRENCH AS REQUIRED BY FEDERAL & STATE OSHA SAFETY STANDARDS

CROSS SECTION THRU CULVERT
NOT TO SCALE

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers

Rock Rapids, Iowa

DATE	DRAWN BY	NO.	APPROVED BY	REVISION DESCRIPTION
6-12	DLV	0	DLV	SUBSTATION CONTRUCTION

CHEYENNE LIGHT FUEL AND POWER
SOUTH CHEYENNE SUBSTATION
CIVIL SITE DETAILS

DRAWN BY DLV DATE 4/12
APPROVED BY PDK DATE 5/12
DWG NO. SCH-C-013
REVISION NO. 0

P:\04\2433\03\CIVIL\DWG\2433SDETAIL2.DWG

PRE-DEVELOPMENT DESIGN CALCULATIONS

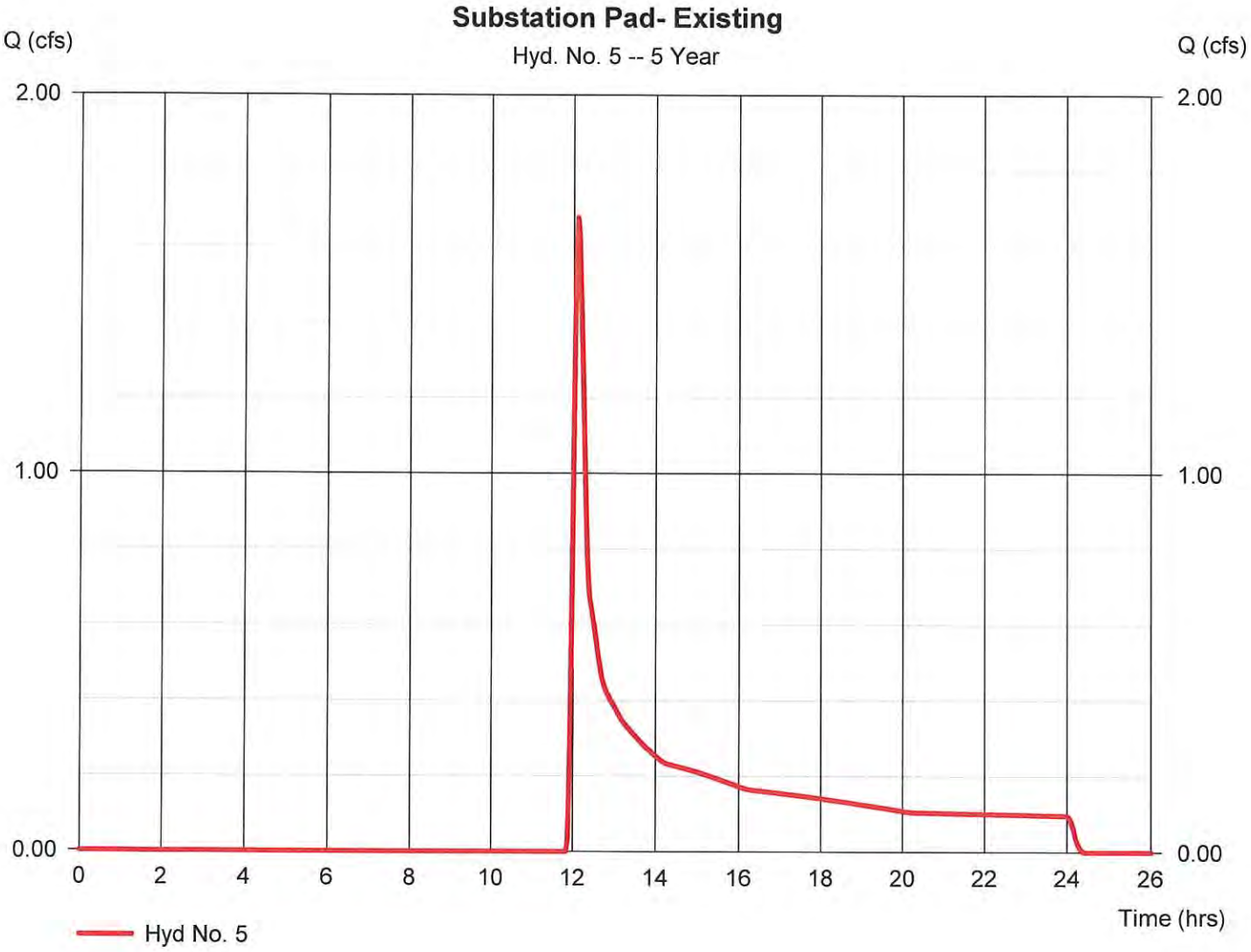
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Jul 23, 2012

Hyd. No. 5

Substation Pad- Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 1.675 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 9,188 cuft
Drainage area	= 13.720 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.90 min
Total precip.	= 1.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



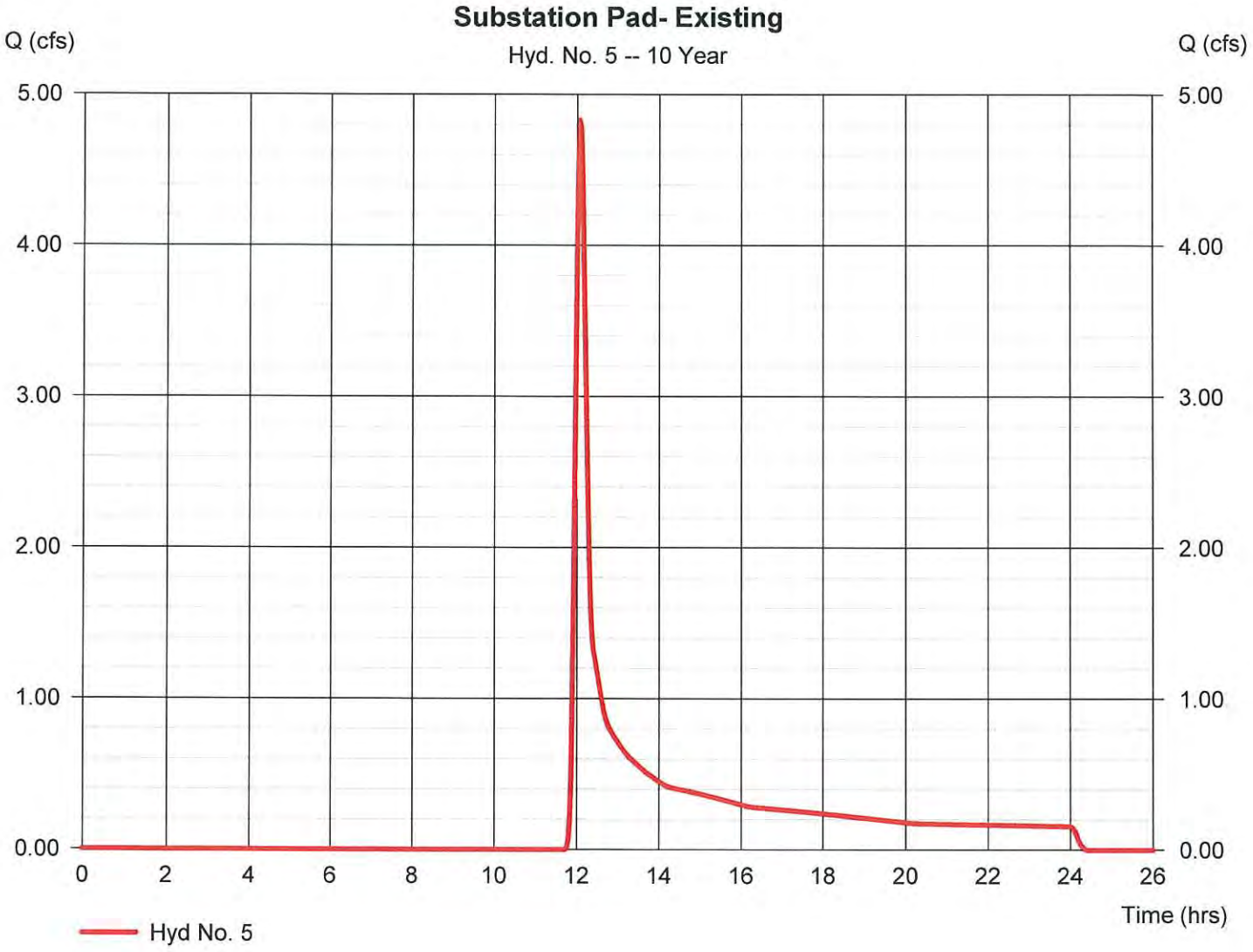
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Jul 23, 2012

Hyd. No. 5

Substation Pad- Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 4.828 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 18,262 cuft
Drainage area	= 13.720 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.90 min
Total precip.	= 2.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



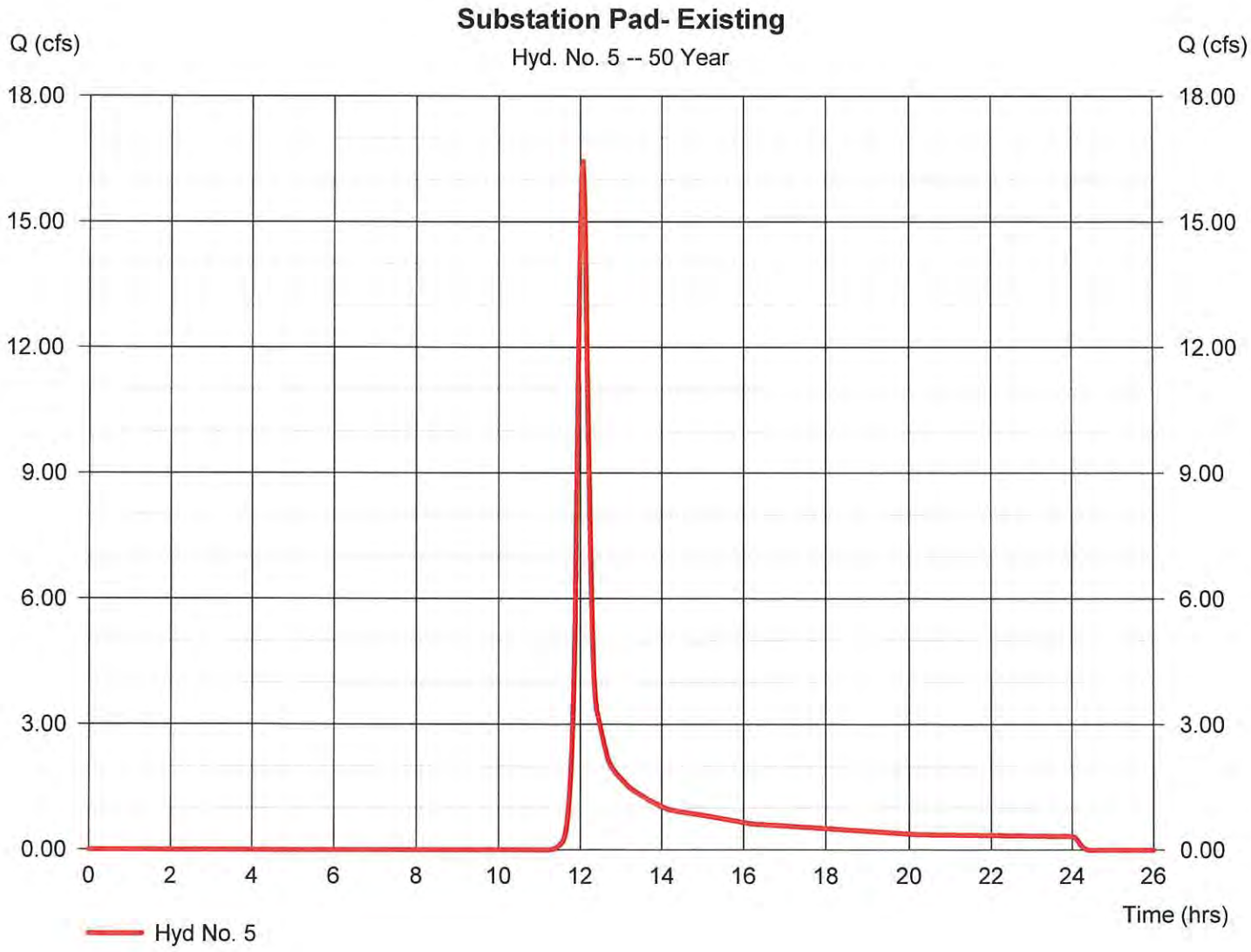
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Jul 23, 2012

Hyd. No. 5

Substation Pad- Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 16.43 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 49,258 cuft
Drainage area	= 13.720 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.90 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



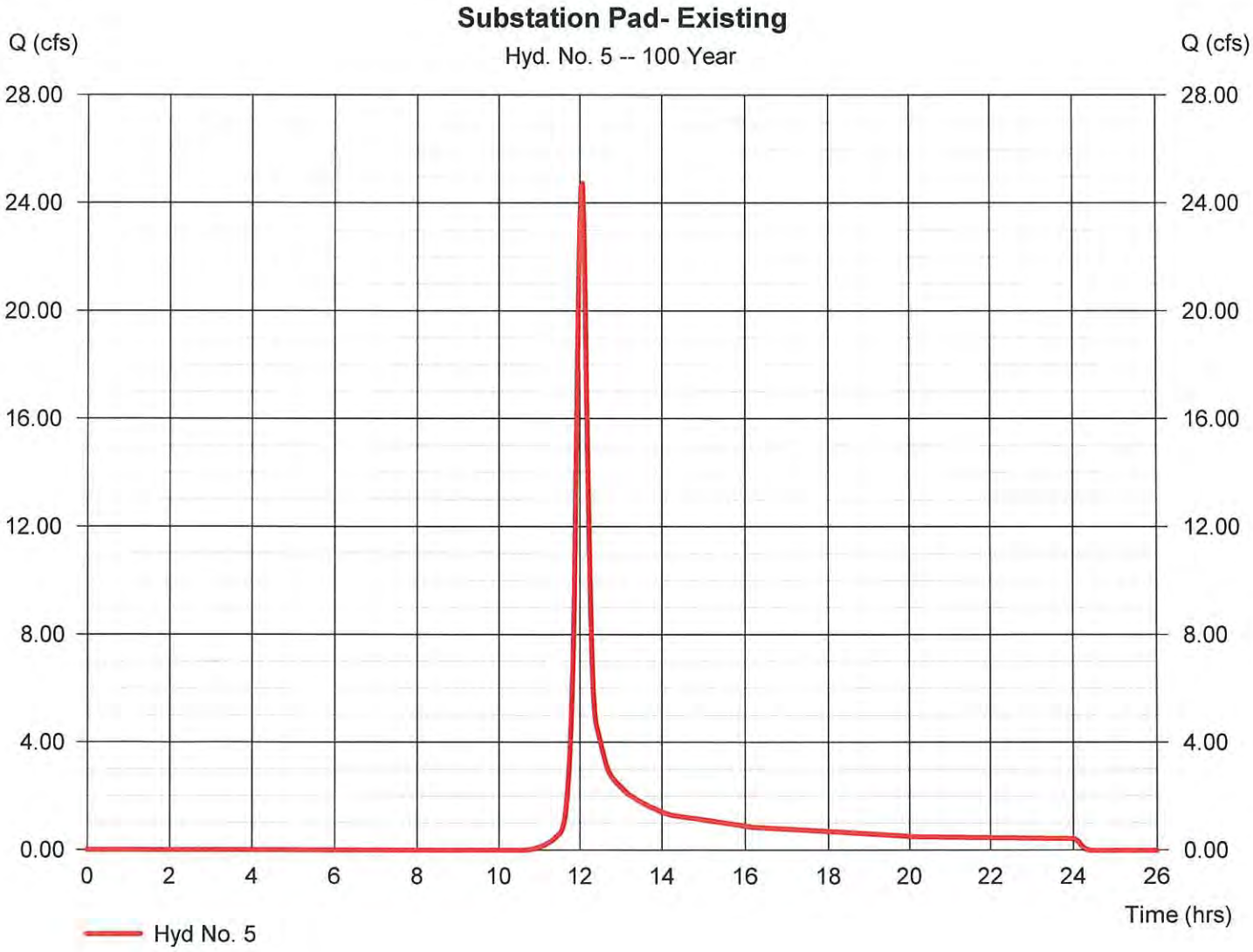
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Jul 23, 2012

Hyd. No. 5

Substation Pad- Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 24.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 71,825 cuft
Drainage area	= 13.720 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.90 min
Total precip.	= 4.32 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



POST-DEVELOPMENT DESIGN CALCULATIONS

Hydrograph Report

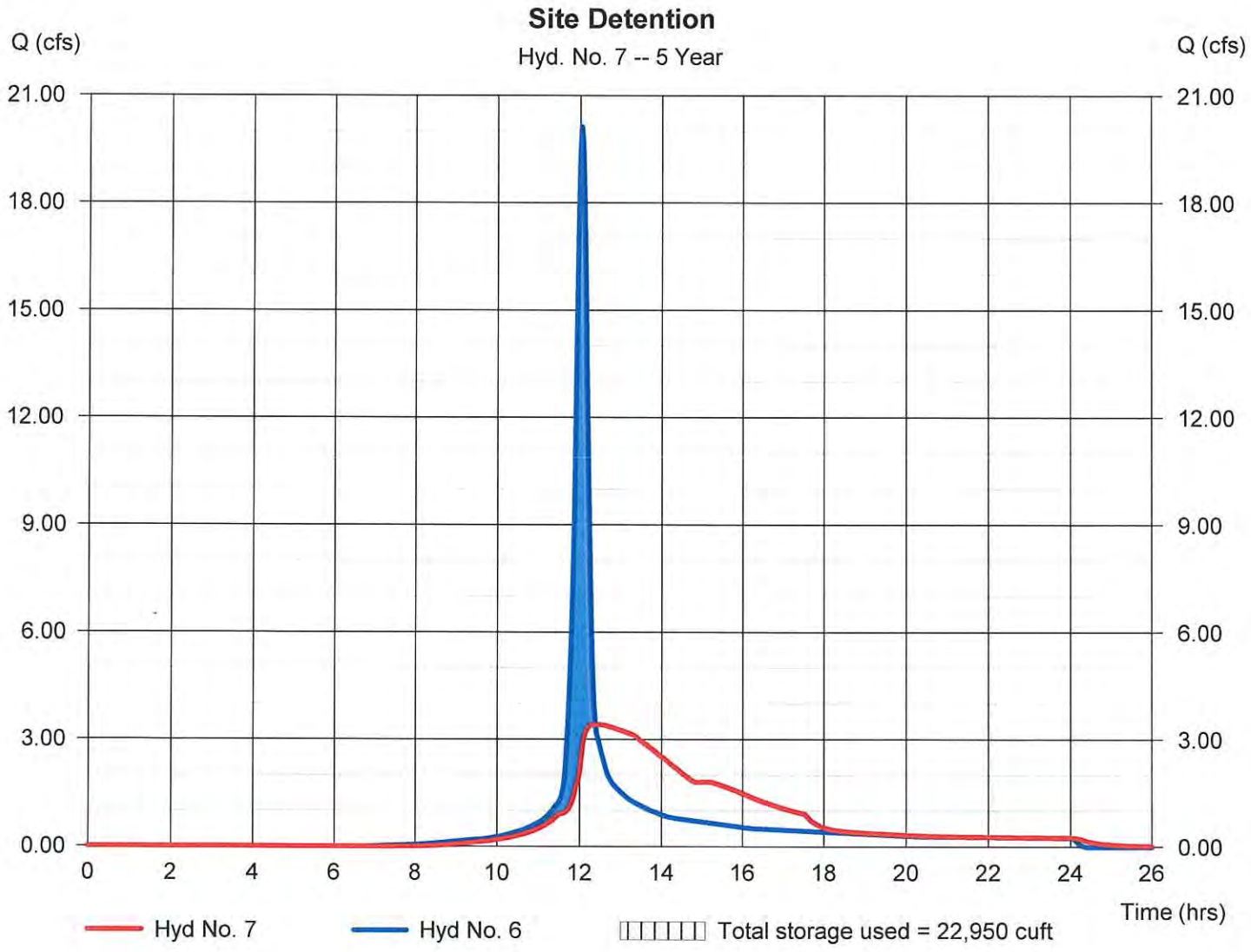
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 7

Site Detention

Hydrograph type	= Reservoir	Peak discharge	= 3.418 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 56,545 cuft
Inflow hyd. No.	= 6 - Substation Pad- Proposed	Max. Elevation	= 6173.15 ft
Reservoir name	= Site Detention	Max. Storage	= 22,950 cuft

Storage Indication method used.



Hydrograph Report

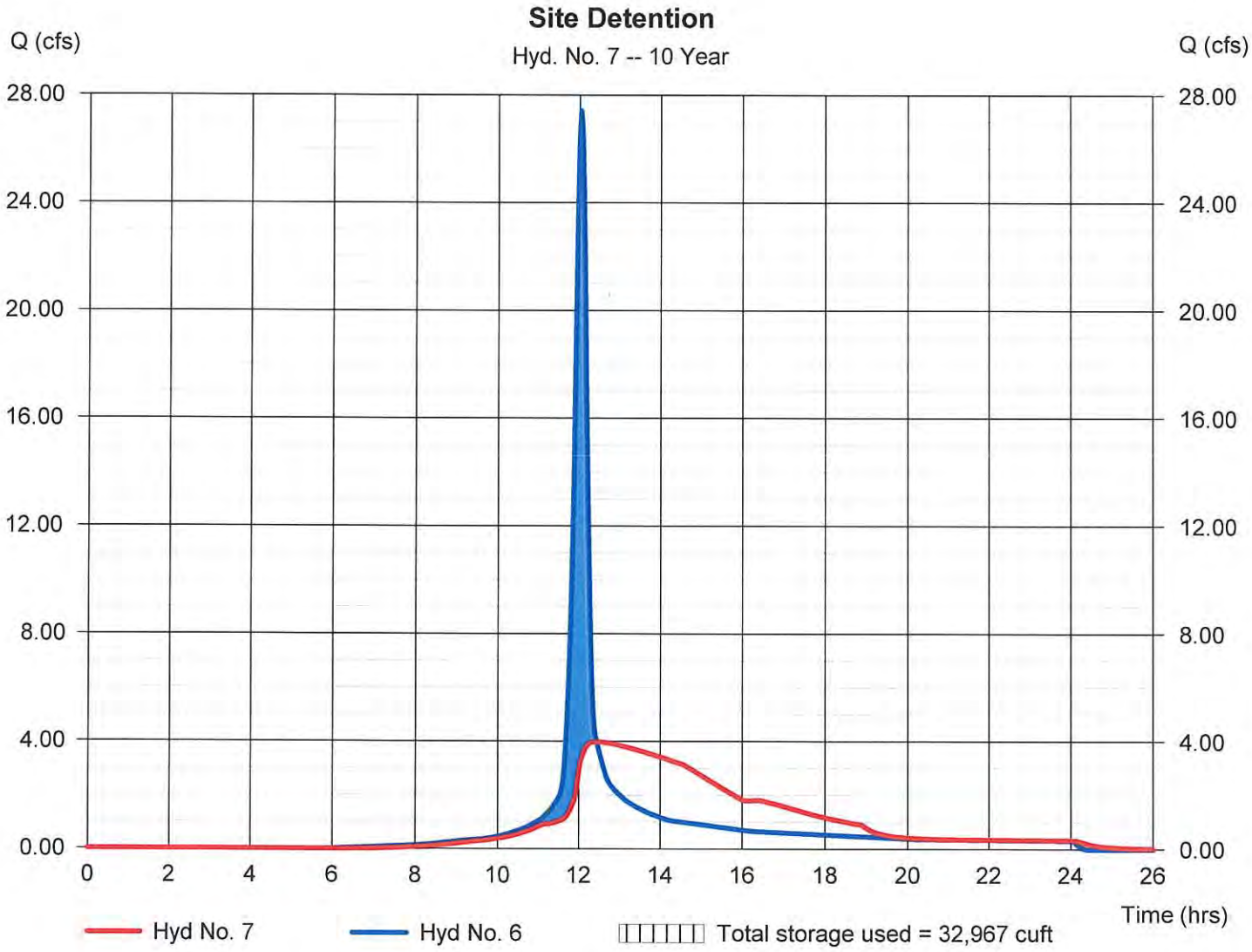
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Friday, Jul 20, 2012

Hyd. No. 7

Site Detention

Hydrograph type	= Reservoir	Peak discharge	= 3.971 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.43 hrs
Time interval	= 2 min	Hyd. volume	= 77,661 cuft
Inflow hyd. No.	= 6 - Substation Pad- Proposed	Max. Elevation	= 6173.46 ft
Reservoir name	= Site Detention	Max. Storage	= 32,967 cuft

Storage Indication method used.



Hydrograph Report

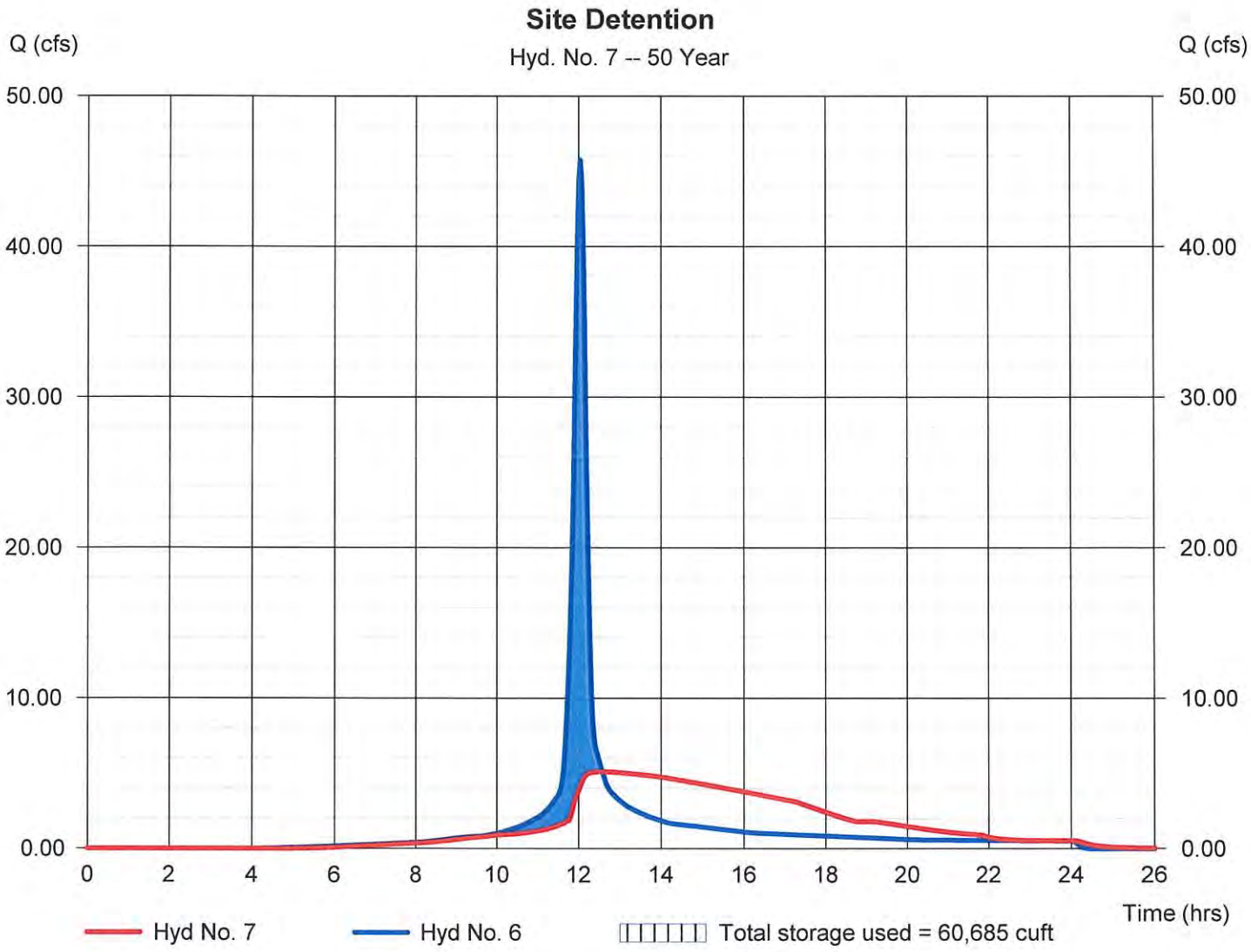
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 7

Site Detention

Hydrograph type	= Reservoir	Peak discharge	= 5.105 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.57 hrs
Time interval	= 2 min	Hyd. volume	= 132,578 cuft
Inflow hyd. No.	= 6 - Substation Pad- Proposed	Max. Elevation	= 6174.25 ft
Reservoir name	= Site Detention	Max. Storage	= 60,685 cuft

Storage Indication method used.



Hydrograph Report

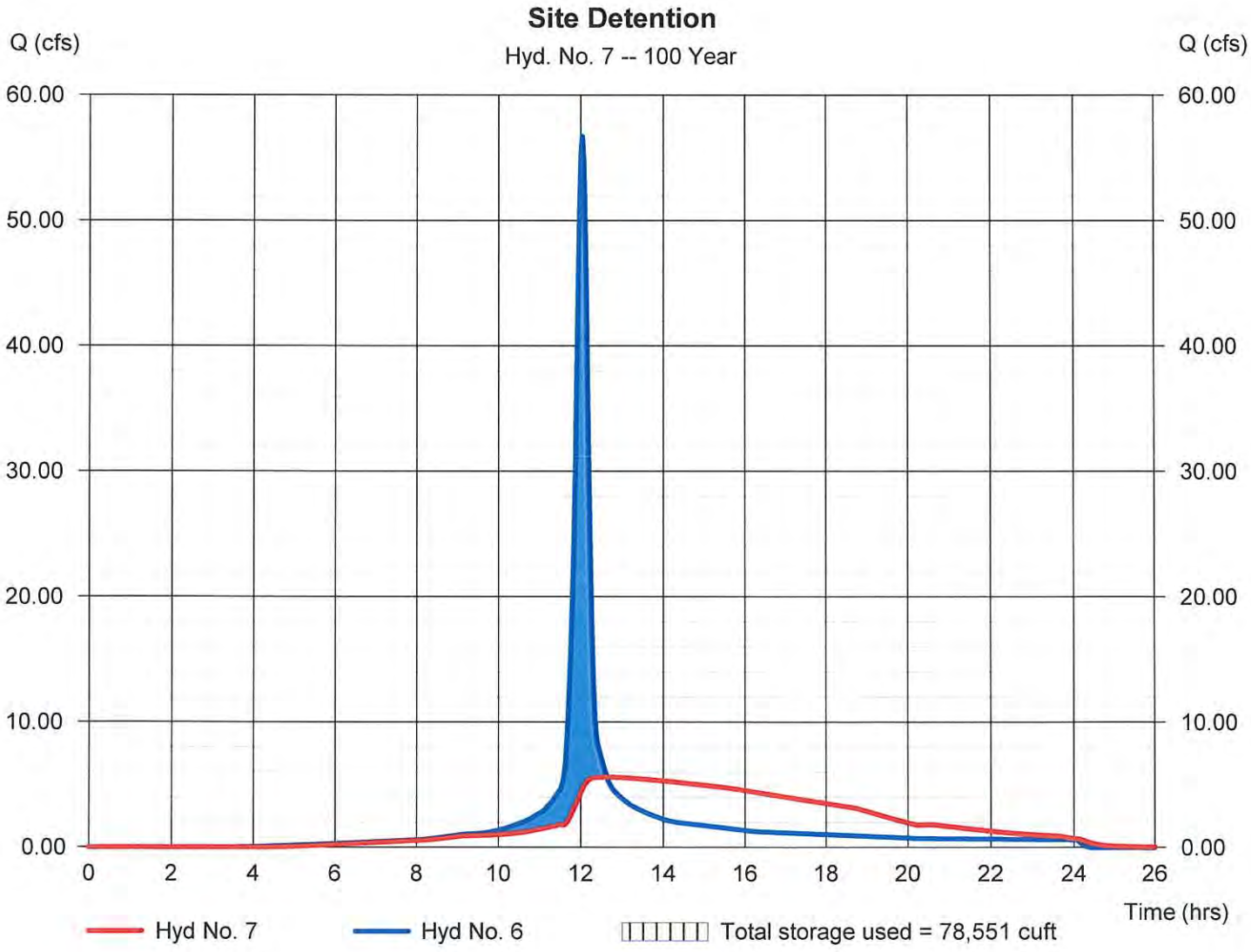
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 7

Site Detention

Hydrograph type	= Reservoir	Peak discharge	= 5.624 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.63 hrs
Time interval	= 2 min	Hyd. volume	= 166,289 cuft
Inflow hyd. No.	= 6 - Substation Pad- Proposed	Max. Elevation	= 6174.68 ft
Reservoir name	= Site Detention	Max. Storage	= 78,551 cuft

Storage Indication method used.



CULVERT DESIGN CALCULATIONS

DRAINAGE EXHIBIT
FOR
BLACK HILLS POWER

PORTIONS OF
T.12N., R.66W.;
T.13N., R.66W.;
T.12N., R.67W.;
T.13N., R.67W.;
LARAMIE COUNTY, WYOMING.

PREPARED APRIL, 2012

WATERSHED BASIN
3218 ACRES +/-

BSD ACRES

TERRY RANCH ROAD

T.13N.
T.12N.

SITE

STEIL SURVEYING SERVICES, LLC
PROFESSIONAL LAND SURVEYORS
1102 W. 18th ST. CHEYENNE, WY. 82001 (307)634-7273
756 GILCHRIST ST. WHEATLAND, WY. 82201 (307)322-9789

Hydrograph Report

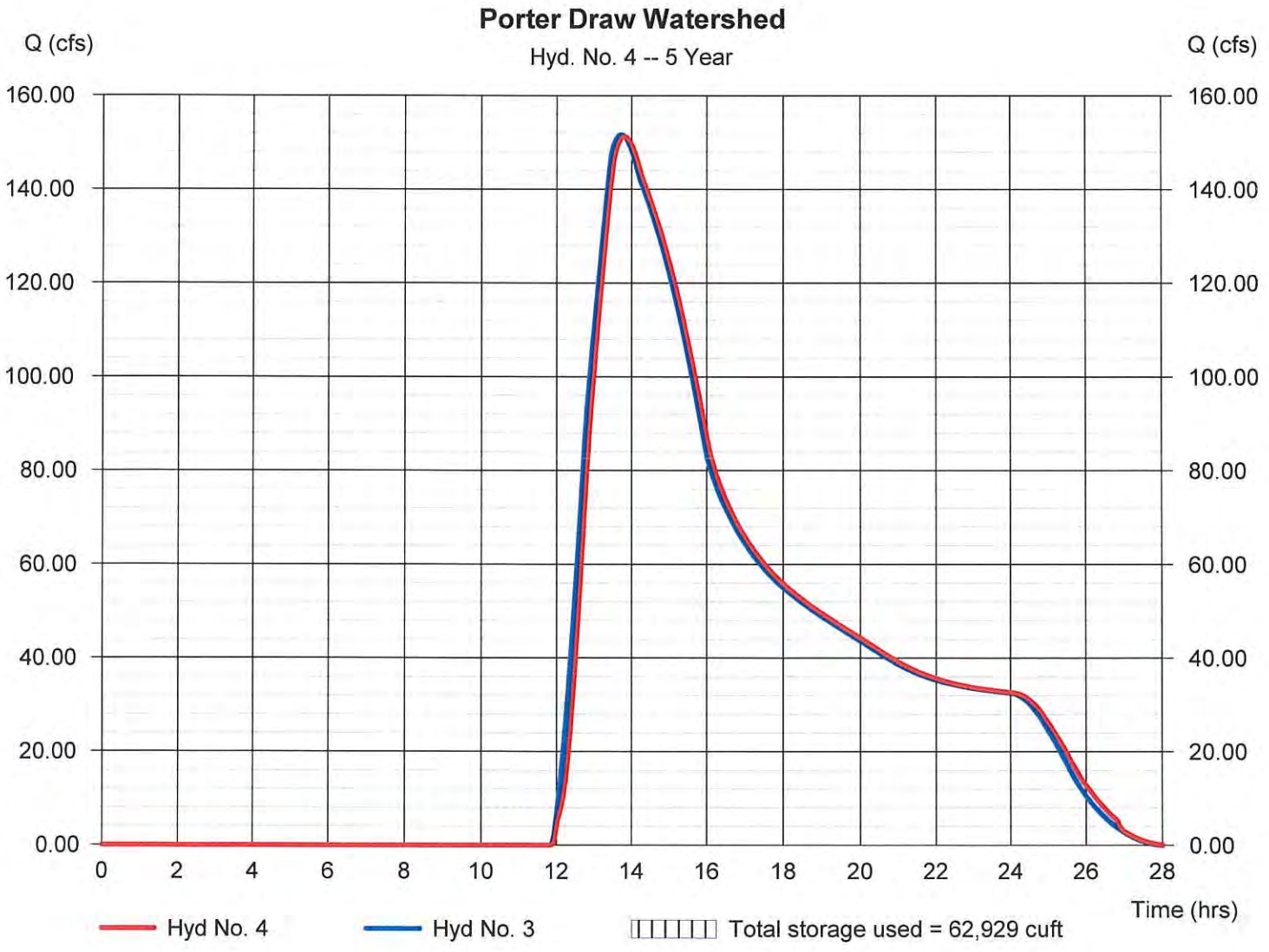
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 4

Porter Draw Watershed

Hydrograph type	= Reservoir	Peak discharge	= 151.15 cfs
Storm frequency	= 5 yrs	Time to peak	= 13.80 hrs
Time interval	= 2 min	Hyd. volume	= 3,120,853 cuft
Inflow hyd. No.	= 3 - Porter Draw Watershed	Max. Elevation	= 6172.95 ft
Reservoir name	= Porter Draw Crossing	Max. Storage	= 62,929 cuft

Storage Indication method used.



Hydrograph Report

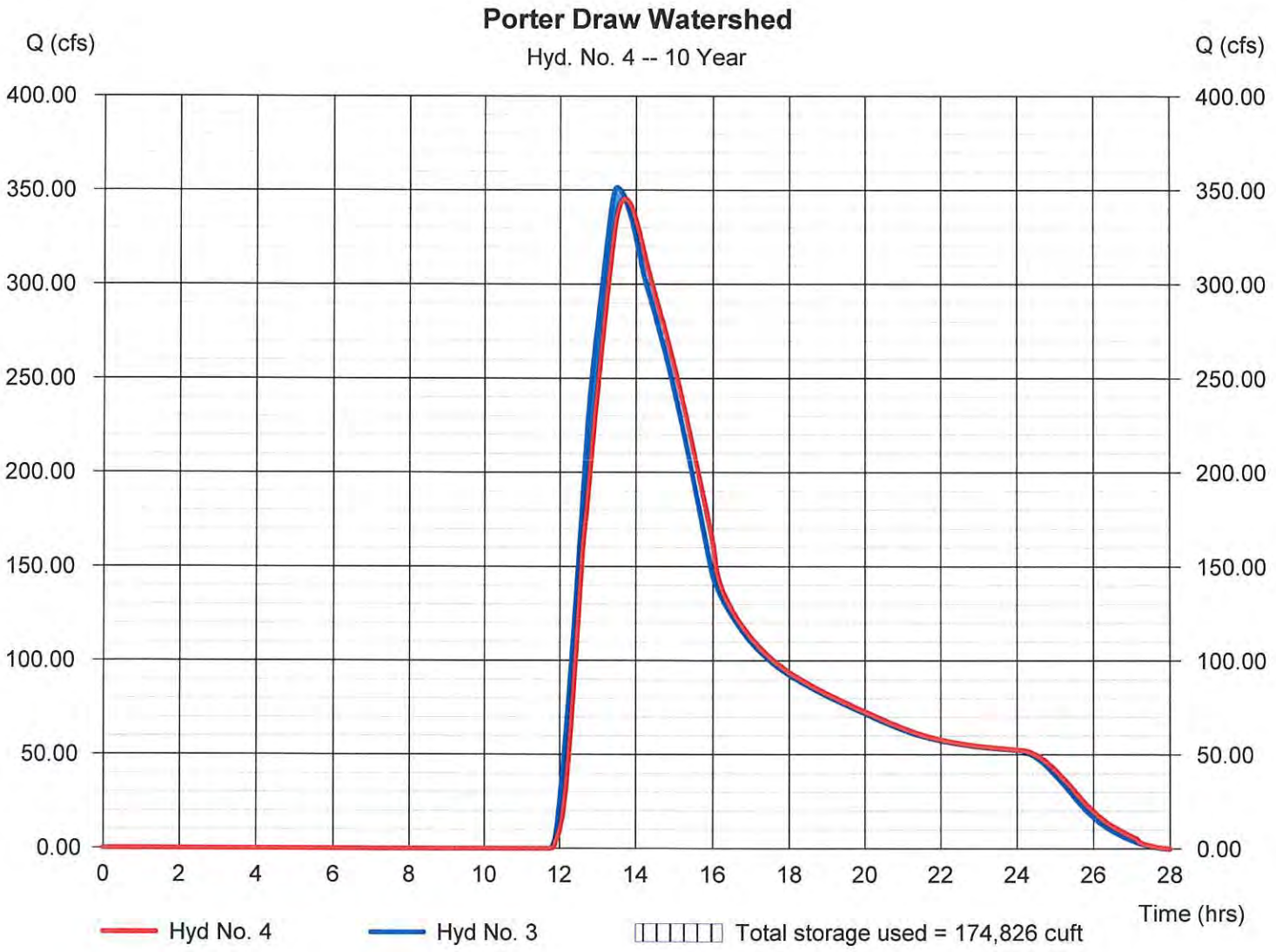
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Friday, Jul 20, 2012

Hyd. No. 4

Porter Draw Watershed

Hydrograph type	= Reservoir	Peak discharge	= 345.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.70 hrs
Time interval	= 2 min	Hyd. volume	= 6,040,552 cuft
Inflow hyd. No.	= 3 - Porter Draw Watershed	Max. Elevation	= 6173.65 ft
Reservoir name	= Porter Draw Crossing	Max. Storage	= 174,826 cuft

Storage Indication method used.



Hydrograph Report

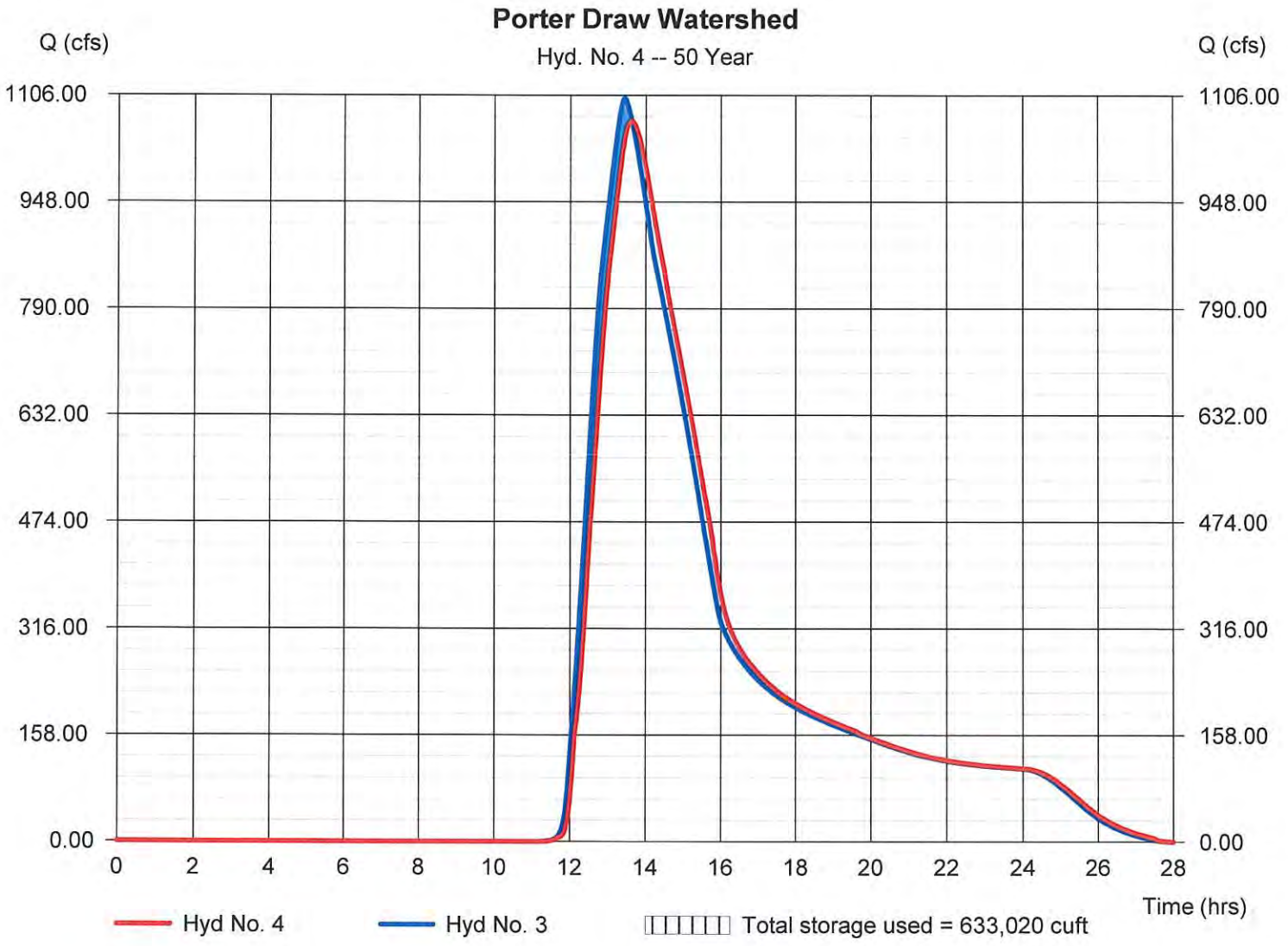
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 4

Porter Draw Watershed

Hydrograph type	= Reservoir	Peak discharge	= 1067.16 cfs
Storm frequency	= 50 yrs	Time to peak	= 13.63 hrs
Time interval	= 2 min	Hyd. volume	= 15,832,038 cuft
Inflow hyd. No.	= 3 - Porter Draw Watershed	Max. Elevation	= 6175.49 ft
Reservoir name	= Porter Draw Crossing	Max. Storage	= 633,020 cuft

Storage Indication method used.



Hydrograph Report

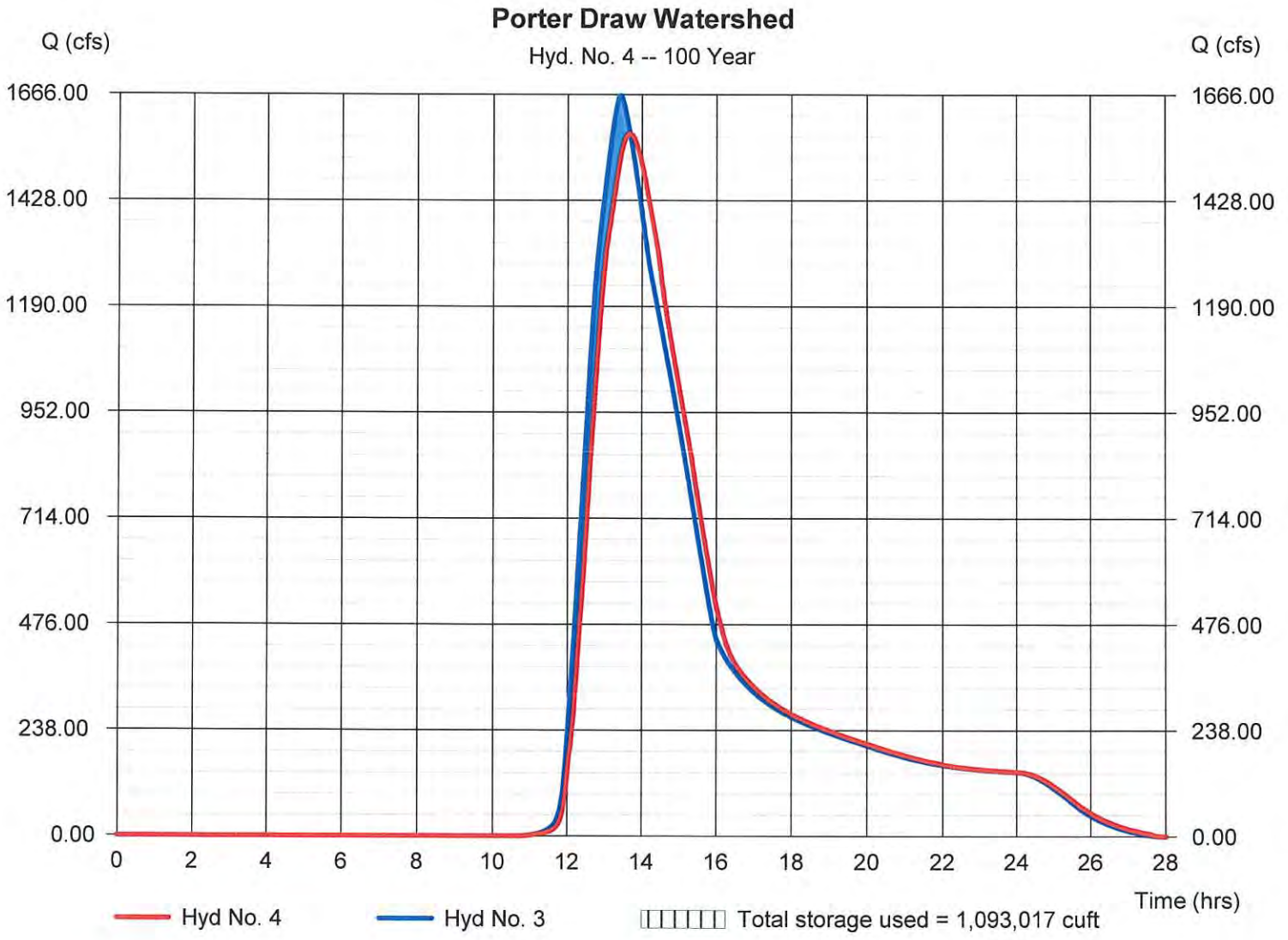
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 4

Porter Draw Watershed

Hydrograph type	= Reservoir	Peak discharge	= 1576.99 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.67 hrs
Time interval	= 2 min	Hyd. volume	= 22,889,976 cuft
Inflow hyd. No.	= 3 - Porter Draw Watershed	Max. Elevation	= 6176.78 ft
Reservoir name	= Porter Draw Crossing	Max. Storage	= 1,093,017 cuft

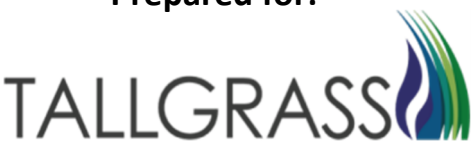
Storage Indication method used.



MASTER DRAINAGE REPORT

Project:
BFC Power and Cheyenne Power Hub Project
Laramie County, Wyoming

Prepared for:



Tallgrass Integrated Logistics Solutions, LLC
[Travis Sinclair]
[travis.sinclair@tallgrass.com]

Prepared By:
Kimley-Horn and Associates, Inc.
6200 South Syracuse Way, Suite 300
Greenwood Village, CO 80111
(720) 647-6231

December 19, 2025

Kimley»Horn

ENGINEER'S CERTIFICATION

I hereby attest that this report for the Preliminary drainage design of BFC Power and Cheyenne Power Hub Project development was prepared by me, or under my direct supervision, in accordance with the provisions of THE LARAMIE COUNTY LAND USE REGULATIONS for the responsible parties thereof. I understand that Laramie County does not and shall not assume liability for drainage facilities designed by others.

Stephen Litsas, PE
Registered Professional Engineer
State of Wyoming No. 21508



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INTRODUCTION

Location

The Site is located on private grasslands in Laramie County, Wyoming, approximately +/- 660 Acres. The Site also receives approximately +/- 78.5 acres of off-site pre-developed flows on-site due to the natural contours surrounding the property. The project is located southeast of Cheyenne. The project is bound to the north and east by parcel numbers 12660210000200 and 12660510000200, to the west by parcel number 12670210000100, and to the south by parcel number 12661810100200.

Project Name and Parcel Number:
BFC Power and Cheyenne Power Hub Project. Parcel No. 12660510000200.

Developer/Owner:
Tallgrass Integrated Logistics Solutions, LLC (370 Van Gordon Street Lakewood, CO 80228)

Section Township Range:
BFC Power and Cheyenne Power Hub Project is located within Section 7, Township 12 North, Range 66 West of the 6th P.M., in Laramie County Wyoming.

Vicinity Map
A vicinity map is provided below for reference.
(not to scale, north arrow indicated in lower left corner):



Proposed Development

The proposed development (the Project) consists of a natural gas power plant and associated equipment yards, site building, internal roadways, surface parking, and landscaping.

Tallgrass ILS is proposing to build a power generation facility, the Tallgrass ILS Site, in Section 7, Township 12N, Range 66W, Laramie County, Wyoming. The proposed Tallgrass ILS Site will be located within the Switchgrass Industrial Park. Tallgrass ILS will own the property located within the existing Switchgrass Industrial Park and have overall site control. BFC Power LLC and Cheyenne Power Hub LLC are proposing to construct their respective phases of the BFC Power Project and Cheyenne Power Hub Project on the property which includes power generation facilities that will produce electricity for a proposed co-located data center. The project will also include road improvements to make the necessary connections to US Highway 85

The site will include 4 proposed permanent detention facilities to provide water quality treatment and detention for the contributing on-site and off-site area. The proposed ponds will include an outlet structure, emergency spillway, maintenance path, and trickle channel. Additionally, the site will include 4 permanent swales within the property. Three of the proposed swales help direct flow into one of the four permanent detention facilities. The remaining swale helps direct two of the pond's outfall discharge and emergency overflow waters off-site following natural drainage patterns, as mentioned in Existing Basin EX-2.

A Natural Resources Conservation Service (NRCS) soil study for the Project area was obtained to determine soil characteristics of the project area. The results of this study show that approximately 67.9% of soils consist of Evanston loam, type B soil, 15.2% consist of Ipson-Evanston complex, type B soil, 11.5% consist of Bayard fine sandy loam, type A soil, and 5.3% consist of Poposhia-Trimad complex, type B soil. This preliminary drainage report is based upon the assumption that the majority of the site is Type B soils. A custom NRCS Web Soil Survey is provided in **Appendix D.**

The northwest portion of the Site has a flow pattern that remains in that quadrant, flowing to a natural low point in the upper northwest corner. The southwest portion of the Site has a flow pattern that remains in that quadrant, flowing to a natural low point in the middle of the southwest quadrant. The northeast portion of the Site contains a series of high and low points, generally keeping flows within the quadrant, with the very northeast corner flowing off-site to the northeast. The southeast portion of the Site contains two high points that direct flow in all directions within the quadrant. The middle section of the Site generally flows toward a series of natural low points running north/south through the Site. The proposed Project is expected to drain two of four detention ponds or a designed swale that conveys drainage off-site to the northeast, where it will be routed through the northeast development.

The development of this project is expected to produce a maximum overall imperviousness of 24.71% for the entire on-site area (+/- 660 acres) (see **Appendix A & C** for a summary of how this area and imperviousness was calculated). A majority of the runoff generated on the Site will flow to the proposed on-site detention facilities via proposed swales, sheet flow, or other storm infrastructure. The discharge from the ponds will sheet flow into the existing swales matching existing drainage patterns.

Variance Requests

There are no variances anticipated for this Project.

HISTORIC DRAINAGE

Overall Basin Descriptions

The drainage areas of the site are shown for the site as Pre-construction and Post-construction Plans within **Appendix C.** Pre-construction drainage basins were analyzed to calculate the peak existing runoff for the design storm. Post-construction basins were analyzed to calculate the minimum required capacity of the on-site detention facilities. The impervious calculations for each basin are in **Appendix A.** All detention and swale calculations take into account existing off-site basins that flow onsite due to natural drainage conditions and contours (**Appendix B**).

Overall Drainage Patterns Through Property

The following sections describe each existing sub-basin as detailed on the preliminary drainage map (**Appendix C**) for this Site and Table 1 summarizes their characteristics.

Existing Basin EX-1

Basin EX-1 is ±97.58-acres along the northwest portion of the site comprised of existing native grass. Runoff generated at this basin sheet flows from south to north into an existing swale which flows beyond the edge of the project through the adjacent property to the north and into an existing culvert which ultimately outfalls into Porter Creek.

Existing Basin EX-2

Basin EX-2 is ±438.46-acres which consist of majority of the site and is comprised of existing native grass. Runoff generated at this basin sheet flows north towards the existing swale at the northeastern edge of the Project Site and ultimately into an existing culvert located under HWY 85 which outfalls into Porter creek.

Existing Basin EX-3

Basin EX-3 is ±123.85-acres along the southern portion of the site comprised of existing native grass. Runoff generated at this basin sheet flows south beyond the edge of the Project Site into an existing culvert located under HWY 85 and ultimately into Simpson Creek.

Existing Basin OS-1

Basin OS-1 is ±8.39-acres along the northwest portion of the site comprised of existing native grass. Due to natural contours and the surrounding land, runoff generated at this basin sheet flows east into basin EX-1. This basin follows the same drainage pattern as basin EX-1 and ultimately outfalls into Porter Creek.

Existing Basin OS-2

Basin OS-2 is ±23.00-acres along the northeast portion of the site comprised of existing native grass. Due to natural contours and the surrounding land, runoff generated at this basin sheet flows east into basin EX-2. This basin follows the same drainage pattern as basin EX-2 and ultimately outfalls into Porter Creek.

Existing Basin OS-3

Basin OS-3 is ±18.36-acres along the northeast portion of the site comprised of existing native grass. Due to natural contours and the surrounding land, runoff generated at this basin sheet flows east into basin EX-3. This basin follows the same drainage pattern as basin EX-3 and ultimately outfalls into Porter Creek.

Existing Basin OS-4

Basin OS-4 is ±28.65-acres along the southwest portion of the site comprised of existing native grass. Due to natural contours and the surrounding land, runoff generated at this basin sheet flows east into basin EX-4. This basin follows the same drainage pattern as basin EX-4 and ultimately into Simpson Creek.

Table 1. Summary of Existing Sub-Basins related to this Project
(Colorado Urban Hydrograph (CUHP) Modeling, **See Appendix A**)
(Flows measured in Cubic Feet per Second (cfs))

Existing Sub-basins	Area (AC)	Imp.	100-Year Flow (cfs)
EX-1	97.58	2.0%	113
EX-2	438.46	2.0%	419
EX-3	123.85	2.0%	93
OS-1	8.39	2.0%	16
OS-2	23.00	2.0%	22
OS-3	18.36	2.0%	20
OS-4	28.65	2.0%	27

Proposed Master Basins

The following section describes the division of existing master basins EX-1 to EX-3 by tributary area. Portions of master basins will be detained on site within a proposed detention or overland flow offsite following the existing drainage patterns.

Proposed Master Basin A

Master basin A is ±177.86-acres within northwestern portion of the site and sits with existing master basins EX-1 and EX-2. This proposed basin is currently comprised of existing native grass. Master basin A is expected to have a maximum total percent impervious of 34.43%, as shown in **Appendix A**. This basin will also receive overland flows from existing basin OS-1. The runoff from this basin will flow northwest where it will be captured by Swale 2. Swale 2 will ultimately discharge into Pond A where it is detained.

Proposed Master Basin B

Master basin B is ±137.67-acres within northern portion of the site and sits with existing master basin EX-2. This proposed basin is currently comprised of existing native grass. Master basin B is expected to have a maximum total percent impervious of 36.39%, as shown in **Appendix A**. The runoff from this basin will flow northwest where it will be captured and detained by Pond B.

Proposed Master Basin C

Master basin C is ±73.62-acres within the western portion of the site and sits with existing master basins EX-1, EX-2, and EX-3. This proposed basin is currently comprised of existing native grass. Master basin C is expected to have a maximum total percent impervious of 5.99%, as shown in **Appendix A**. The runoff from this basin will flow east where it will flow naturally into proposed Swale 3 and ultimately into Swale 1.

Proposed Master Basin D

Master basin D is ±45.25-acres within the eastern portion of the site and sits with existing master basin EX-2. This proposed basin is currently comprised of existing native grass. Master basin D is expected to have a maximum total percent impervious of 9.58%, as shown in **Appendix A**. This basin contains Swale 1 that receives flows from Master basin C, Pond E's outfall, and Pond F's outfall flows as well as existing overland flows from basins OS-2 and OS-3. The runoff from this basin will channelize and flow northeast where it will be released to the EX-2 design point. Flows from the EX-2 design point.

Proposed Master Basin E1

Master basin E1 is ±18.87-acres within the middle of the site and sits with existing master basin EX-2. This proposed basin is currently comprised of existing native grass. Master basin E is expected to have a maximum total percent impervious of 66.18%, as shown in **Appendix A**. The runoff from this basin will flow west where it will be captured and detained by Pond E.

Proposed Master Basin E2

Master basin E2 is ±43.92-acres within the middle of the site and sits with existing master basins EX-2, and EX-3. This proposed basin is currently comprised of existing native grass. Master basin E is expected to have a maximum total percent impervious of 22.08%, as shown in **Appendix A**. The runoff from this basin will flow west where it will be captured by Swale 4. Swale 4 will ultimately discharge into Pond E where it is detained.

Proposed Master Basin F

Master basin F is ±50.84-acres within southwestern portion of the site and sits with existing master basins EX-2 and EX-3. This proposed basin is currently comprised of existing native grass. Master basin F is expected to have a maximum total percent impervious of 36.56%, as shown in **Appendix A**. The runoff from this basin will overland flow north where it will be captured and detained by Pond F.

Proposed Master Basin G

Master basin G is ±3.73-acres within southeastern portion of the site and sits with existing master basins EX-2 and EX-3. This proposed basin is currently comprised of existing native grass. Master basin G is expected to have a maximum total percent impervious of 2.00%, as shown in **Appendix A**. The runoff from this basin will overland flow south where it will follow the existing master basin EX-3 drainage patterns.

Proposed Master Basin H

Master basin G is ±108.17-acres within southwestern portion of the site and sits with existing master basins EX-2 and EX-3. This proposed basin is currently comprised of existing native grass. Master basin G is expected to have a maximum total percent impervious of 2.00%, as shown in

Appendix A. The runoff from this basin will overland flow south where it will follow the existing master basin EX-3 drainage patterns.

Table 2. Summary of Proposed Master Basins

Proposed Master Basins	Area (AC)	Max Imp.	DESIGN POINT
A	177.86	34.43%	POND A
B	137.67	36.39%	POND B
C	73.62	5.99%	EX-2 via Swales
D	45.25	9.58%	EX-2
E1	18.87	66.18%	POND E
E2	43.92	22.08%	POND E
F	50.84	36.56%	POND F
G	3.73	2.00%	EX-3
H	108.17	2.00%	EX-3
TOTAL SITE	659.93	24.71%*	

*Total Impervious is calculated using weighted averages of each individual basin, See **Appendix B** for full site impervious.

According to the Federal Emergency Management Agency (FEMA) Flood Plain Map effective January 17, 2007, this area is not included within the flood plain per FEMA Flood Insurance Rate Map (FIRM) Panel 56021C1375F (included in **Appendix D**).

Outfalls Downstream from Property

In the existing condition, the majority of the site drains north to Porter Creek (EX-1 and EX-2). The southeasternmost part of the site drains south towards Simpson Creek (EX-3). Wyoming Adams & Bunker Reservoir 1 and Eagle Rock Reservoir are the receiving waters of the project site. Runoff is conveyed to Eagle Rock Reservoir through Simpson Creek, and runoff is conveyed to Wyoming Adams & Bunker Reservoir 1 through Porter Creek. Runoff conveyed through Eagle Rock Reservoir ultimately flows to Adams & Bunker Reservoir 1. The existing drainage patterns will be maintained in the proposed condition with the exception of existing basin EX-3. Existing Basin EX-3 currently flows south towards Simpson creek; in the proposed condition +/- 34.2 acres will be routed north through proposed Master basin C, E2, and F which outfalls into Porter Creek following the Existing Basin EX-2 drainage patterns. Both Porter Creek and Simpson Creek ultimately converge at the Adams & Bunker Reservoir 1. Refer to Existing Conditions Map located in **Appendix C**.

DESIGN CRITERIA

Hydraulic Criteria

This report evaluates the predevelopment runoff of the Project (including Data facility footprint, access drives, and substation pads) and addresses the stormwater requirements of Laramie County and the State of Wyoming.

Hydrologic Design Criteria

The table below notes the hydrologic design criteria used in the analysis. The Colorado Urban Hydrograph Procedure was used for hydrologic analysis per the Unified Development Code, City

of Cheyenne, adopted January 23, 2012.The parameters listed below without a value can vary depending on the surface conditions, soil type, etc. Refer to **Appendix A** for possible values.

Table 3. Summary of CUHP Modeling Values used

Parameter		Value	Unit	Reference
Percent Imperviousness		-	%	Urban Storm Drainage Criteria Manual (USDCM), Chapter 6, Table 6-3
Maximum Depression Storage: Pervious		0.4	inches	USDCM CUHP User's Manual, Table 6-6
Maximum Depression Storage: Impervious		0.1	Inches	USDCM CUHP User's Manual, Table 6-6
Horton's Infiltration Parameters: Initial Rate		-	in/hr	USDCM CUHP User's Manual, Table 6-7
Horton's Infiltration Parameters: Final Rate		-	in/hr	USDCM CUHP User's Manual, Table 6-7
Horton's Infiltration Parameters: Decay Coefficient		-	1/sec	USDCM CUHP User's Manual, Table 6-7
1-hr Point Rainfall	100-Year Storm	2.69	inches	NOAA Atlas 14, Volume 12, Version 2
	10-Year Storm	1.56		
Storm Runoff, Q		-	cfs	

Rainfall and Storm Design Frequencies

According to the Laramie County Land Use Regulations, the design storms for the Project are the 10-year (Industrial) and 100-year frequency events. The NOAA Atlas 14, Volume 12, Version 2 One-hour rainfall depths used for the calculations at the site are as outlined below along with **Appendix A**:

Table 4. Summary of rainfall depths provided from NOAA Atlas 14, Volume 12, Version 2.

Rainfall Depths						
	2-year	5-year	10-year	25-year	50-year	100-year
1-hr	0.887"	1.25"	1.56"	1.99"	2.34"	2.69"

Stormwater Runoff

The stormwater runoff for both the existing and proposed conditions was calculated using the Colorado Urban Hydrograph Procedure (CUHP). The 10-year and 100-year, 1-hour storm event were analyzed for pre- drainage basins. The flow path for the basins can be seen in **Appendix C**. The precipitation data used for the 10-year and 100-year, 1-hour storm event is from NOAA Atlas 14, Volume 12, Version 2. A summary of the CUHP calculation findings is shown in the table below; more calculations are shown in **Appendix A**, Hydrologic Calculations.

Table 5. Summary of Existing Impervious and flow data.

	Existing
Area	659.93 ac
Imperviousness	2.0%
Q_{10}	125 cfs
Q_{100}	625 cfs

Water Quality and Detention

The minimum required detention volume, 100-yr volume, was calculated using the methods outlined in Volume 2 of the Mile High Flood District (MHFD) drainage criteria manual. All four ponds A, B, E, and F were designed in accordance with the Criteria's volume and release rate within the MFHD-Detention Spreadsheet. See **Appendix B** for MFHD-Detention Version 4.06 sizing spread sheets.

DRAINAGE PLAN

This report evaluates the predevelopment runoff of the project and addresses the stormwater requirements of Laramie County and the State of Wyoming.

General Concept

Majority of runoff generated from the Site will be conveyed either via storm sewer infrastructure or overland flow to one of the four permanent detention facilities on site, identified as Pond A, Pond B, Pond E, and Pond F.

Discharge from Pond A will outfall into an existing swale, which routes flow north through the adjacent parcel ultimately discharges through an existing culvert crossing US Highway 85 which ultimately flows into Porter Creek, which then flows into Adams & Bunker Reservoir 1.

Per the drainage analysis for the South Cheyenne Substation site (**See Appendix E**), the three large box culverts (5'x16') located north of the substation appear to be appropriately sized to convey runoff from the entire contributing watershed, which encompasses approximately 850 acres across Sections 5, 6, 7, and 8. This watershed is represented as a portion of existing basin EX-1 in the Existing Basins Drainage Map included in **Appendix C**. Although the proposed site improvements will not increase existing runoff flows, the capacity of the existing swale and culvert infrastructure will be evaluated to confirm adequacy under current and future conditions. Any recommendations for upsizing culverts or modifying the swale configuration will be documented as an amendment to this Master Report.

Pond B will discharge through proposed storm infrastructure offsite to the northeast, entering a proposed drainage swale via the development to the northeast of the site. From there, flow will continue into the proposed swale before discharging into an existing swale and culvert system crossing US Highway 85, ultimately converging with Porter Creek, which then flows into Adams & Bunker Reservoir 1.

Per the drainage analysis for the South Cheyenne Substation site (**See Appendix E**), the three large box culverts (5'x16') located north of the substation appear to be appropriately sized to convey runoff from the entire contributing watershed, which encompasses approximately 850

acres across Sections 5, 6, 7, and 8. This watershed is represented as a portion of existing basin EX-2 in the Existing Basins Drainage Map included in **Appendix C**. Although the proposed site improvements will not increase existing runoff flows, the capacity of the existing swale and culvert infrastructure will be evaluated to confirm adequacy under current and future conditions. Any recommendations for upsizing culverts or modifying the swale configuration will be documented as an amendment to this Master Report.

Pond E will discharge through proposed storm infrastructure into proposed Swale 1 north of the pond and routed through the northeast part of the site. The proposed swale will ultimately flow offsite to the northeast, entering a proposed drainage swale via the development to the northeast of the site. From there, flow will continue into the proposed swale before discharging into an existing swale and culvert system crossing US Highway 85, ultimately converging with Porter Creek, which then flows into Adams & Bunker Reservoir 1.

Per the drainage analysis for the South Cheyenne Substation site (**See Appendix E**), the three large box culverts (5'x16') located north of the substation appear to be appropriately sized to convey runoff from the entire contributing watershed, which encompasses approximately 850 acres across Sections 5, 6, 7, and 8. This watershed is represented as a portion of existing basin EX-2 in the Existing Basins Drainage Map included in **Appendix C**. Although the proposed site improvements will not increase existing runoff flows, the capacity of the existing swale and culvert infrastructure will be evaluated to confirm adequacy under current and future conditions. Any recommendations for upsizing culverts or modifying the swale configuration will be documented as an amendment to this Master Report.

Pond F will discharge through proposed storm infrastructure into proposed Swale 1 north of the pond and routed through the northeast part of the site. The proposed swale will ultimately flow offsite to the northeast, entering a proposed drainage swale via the development to the northeast of the site. From there, flow will continue into the proposed swale before discharging into an existing swale and culvert system crossing US Highway 85, ultimately converging with Porter Creek, which then flows into Adams & Bunker Reservoir 1.

Per the drainage analysis for the South Cheyenne Substation site (**See Appendix E**), the three large box culverts (5'x16') located north of the substation appear to be appropriately sized to convey runoff from the entire contributing watershed, which encompasses approximately 850 acres across Sections 5, 6, 7, and 8. This watershed is represented as a portion of existing basin EX-2 in the Existing Basins Drainage Map included in **Appendix C**. Although the proposed site improvements will not increase existing runoff flows, the capacity of the existing swale and culvert infrastructure will be evaluated to confirm adequacy under current and future conditions. Any recommendations for upsizing culverts or modifying the swale configuration will be documented as an amendment to this Master Report.

An overall schematic of the existing drainage routing/proposed ponds has been included in **Appendix C**.

Proposed Detention Ponds Locations and Outfalls

The proposed drainage of the Project will adhere to the existing drainage pattern of the Site with the exception of existing basin EX-3. Existing Basin EX-3 currently flows (93 cfs) south towards Simpson creek, in the proposed condition these flows will overland flow through the property. These flows will not be detained as there currently is no change to the existing basin's percent impervious. In the proposed condition approximately +/- 34.2 acres will be re-routed from EX-3 through proposed basin and ultimately follow EX-2 drainage patterns.

All four detention ponds will detain flows before releasing through an outlet structure at flow rates at or below the calculated flow rates provided in the Existing CUHP models, See **Appendix B**. The area (acres) used to calculate these existing flows were the limits of construction for each of the proposed major basins. Onsite flows within Basins A, B, E, and F will be conveyed via overland flow, swales, or storm sewer infrastructure to the proposed detention ponds throughout the site.

Pond A Tributary Area

Pond A receives flows from master basin A. Basin A has an expected tributary area of 177.86 acres, for the purpose of preliminary pond sizing using the MHFD detention spreadsheet, a design imperviousness of 34.43% was applied. This conservative assumption provides flexibility for future site development within the Pond A watershed. As the final site layout is determined, the pond design will be revised accordingly to reflect actual impervious conditions. Pond A has been sized to attain the 100-year event. Pond A is required to hold a minimum storage capacity of 28.965 acre-feet while providing a 1-foot freeboard. Existing off-site basin OS-1 is also tributary to Pond A, however since this basin is undeveloped, Pond A will not provide any detention for this tributary area. Preliminary sizing calculations for the detention pond are provided in **Appendix B**.

Pond B Tributary Area

Pond B receives flows from master basin B. Basin B has an expected tributary area of 137.67 acres, for the purpose of preliminary pond sizing using the MHFD detention spreadsheet, a design imperviousness of 36.39% was applied. This conservative assumption provides flexibility for future site development within the Pond B watershed. As the final site layout is determined, the pond design will be revised accordingly to reflect actual impervious conditions. Pond B has been sized to attain the 100-year event. Pond B is required to hold a minimum storage capacity of 22.756 acre-feet while providing a 1-foot freeboard. Preliminary sizing calculations for the detention pond are provided in **Appendix B**.

Pond E Tributary Area

Pond E receives flows from master basins E1 and E2. Basins E1 and E2 have a combined expected tributary area of 62.79 acres, for the purpose of preliminary pond sizing using the MHFD detention spreadsheet, a design imperviousness of 35.33% was applied. This conservative assumption provides flexibility for future site development within the Pond E watershed. As the final site layout is determined, the pond design will be revised accordingly to reflect actual impervious conditions. Pond E has been sized to attain the 100-year event. Pond E is required to hold a minimum storage capacity of 10.289 acre-feet while providing a 1-foot freeboard. Preliminary sizing calculations for the detention pond are provided in **Appendix B**.

Pond F Tributary Area

Pond F receives flows from master basin F. Basin F has an expected tributary area of 50.84 acres, for the purpose of preliminary pond sizing using the MHFD detention spreadsheet, a design imperviousness of 36.56% was applied. This conservative assumption provides flexibility for future site development within the Pond F watershed. As the final site layout is determined, the pond design will be revised accordingly to reflect actual impervious conditions. Pond F has been sized to attain the 100-year event. Pond F is required to hold a minimum storage capacity of 8.351 acre-feet while providing a 1-foot freeboard. Preliminary sizing calculations for the detention pond are provided in **Appendix B**.

Table 6. Summary of Proposed Pond data.

Proposed Detention Facilities Property Summary				
	Pond A	**Pond B**	**Pond E**	**Pond F**
Area	177.86 acres	137.67 acres	62.79 acres	50.84 acres
Imperviousness	34.43 %	36.39 %	35.33 %	36.56 %
Minor Storm Event (10-year)				
Minimum Storage Volume (AC-FT)	10.434	8.389	3.744	3.086
Major Storm Event (100-year)				
Minimum Storage Volume (AC-FT)	28.965	22.756	10.289	8.351

Table 7. Summary of Pond A existing vs proposed release rates.

Pond A		
Desing Storm	**Pre-Development**	**Post-Development**
5 YR	10 cfs	10 cfs (MAX)**
10 YR	27 cfs	27 cfs (MAX)**
50 Yr	102 cfs	102 cfs (MAX)**
100 YR	140 cfs	102 cfs (MAX)*

* Per 5-2-103 Post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50-Year rate for a 100-Year Storm event.

**Post-development release rates shall not exceed calculated pre-development(or historic) release rate per storm event.

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Table 8. Summary of Pond B existing vs proposed release rates.

Pond B		
Desing Storm	**Pre-Development**	**Post-Development**
5 YR	8 cfs	8 cfs (MAX)**
10 YR	22 cfs	22 cfs (MAX)**
50 Yr	84 cfs	84 cfs (MAX)**
100 YR	114 cfs	84 cfs (MAX)*

* Per 5-2-103 Post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50-Year rate for a 100-Year Storm event.
**Post-development release rates shall not exceed calculated pre-development(or historic) release rate per storm event.

Table 9. Summary of Pond E existing vs proposed release rates.

Pond E		
Desing Storm	**Pre-Development**	**Post-Development**
5 YR	3 cfs	3 cfs (MAX)**
10 YR	9 cfs	9 cfs (MAX)**
50 Yr	34 cfs	34 cfs (MAX)**
100 YR	46 cfs	34 cfs (MAX)*

* Per 5-2-103 Post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50-Year rate for a 100-Year Storm event.
**Post-development release rates shall not exceed calculated pre-development(or historic) release rate per storm event.

Table 10. Summary of Pond F existing vs proposed release rates.

Pond F		
Desing Storm	**Pre-Development**	**Post-Development**
5 YR	4 cfs	4 cfs (MAX)**
10 YR	11 cfs	11 cfs (MAX)**
50 Yr	40 cfs	40 cfs (MAX)**
100 YR	54 cfs	40 cfs (MAX)*

* Per 5-2-103 Post-development design requirements shall be for a system to maintain total site discharge at no greater than a pre-development (or historic) 50-Year rate for a 100-Year Storm event.
**Post-development release rates shall not exceed calculated pre-development(or historic) flow rate per storm event.

Proposed Drainage Swales

The Project is proposing to install four swales to help route flows throughout the site. All swales were sized using FlowMaster (See **Appendix B**) utilizing the proposed 100-year Master basin flows as calculated using CUHP (See **Appendix A**). For reference of location for any of the swales, refer to **Appendix C**.

Swale 1

Proposed Swale 1 is fully within Master basin D and consists of three separate sections. Swale 1 is anticipated to be a natural earth swale with rip-rap or like kind velocity distributors installed at points where required per the 2025 Laramie County Land Use Regulations. The three sections correlate to how much flow is being discharged into the swale at any one point.

Section 1.a is approximately the first +/- 632 ft where only 2/3^{rds} of Master basin C is tributary to this section of (85.00 cfs). The minimum swale size for section 1.a is 2.5 feet deep with a bottom width of 10.46 feet and 3:1 side slopes. This design takes into account 1 foot of freeboard.

Section 1.b is approximately the next +/- 1,816 ft where the remaining 1/3rd of Master basin C via Swale 3, Swale section 1.a, Pond E discharge, and Pond E emergency overflow are tributary (203.00 cfs). The minimum swale size for section 1.b is 3.0 feet deep with a bottom width of 15.80 feet and 3:1 side slopes. This design takes into account 1 foot of freeboard.

Section 1.c is approximately the remaining +/- 3,618 ft where Swale section 1.b, Existing off-site basins EX-2/EX-3, Pond F discharge, and Pond F emergency overflow are tributary (458.00 cfs). The minimum swale size for section 1.c is 3.0 feet deep with a bottom width of 31.05 feet and 3:1 side slopes. This design takes into account 1 foot of freeboard.

Swale 2

Proposed Swale 2 is fully within Master basin A and consists of one section. Swale 2 is anticipated to be a natural earth swale with rip-rap or like kind velocity distributors installed at points where required per the 2025 Laramie County Land Use Regulations. This swale is anticipated to channelize all of Master basin A's flows (364 cfs) at the proposed road along the northwest corner of the site and runs approximately +/- 349 feet until discharging into Pond A. The minimum swale size is 3.0 feet deep with a bottom width of 20.83 feet and 3:1 side slopes. This design takes into account 1 foot of freeboard.

Swale 3

Proposed Swale 3 is the northern 1/3rd of Master basin C and consists of one section. Swale 3 is anticipated to be a natural earth swale with rip-rap or like kind velocity distributors installed at points where required per the 2025 Laramie County Land Use Regulations. This swale is anticipated to channelize the top third of Master basin C's flows (28.00 cfs) along the eastern boundary of the Master basin C and runs approximately +/- 512 feet until discharging into Swale 1 Section 1.b. The minimum swale size is 2.0 feet deep with a bottom width of 4.27 feet and 3:1 side slopes. This design takes into account 1 foot of freeboard.

Swale 4

Proposed Swale 4 is along the western boundary of Master basin E2 and consists of one section. Swale 4 is anticipated to be a natural earth swale with rip-rap or like kind velocity distributors

installed at points where required per the 2025 Laramie County Land Use Regulations. This swale is anticipated to channelize all of Master basin E2's flows (45.00 cfs) along the western boundary of the Master basin E1 and runs approximately +/- 3,322 feet until discharging into Pond E. The minimum swale size is 2.0 feet deep with a bottom width of 4.03 feet and 3:1 side slopes. This design takes into account 1 foot of freeboard.

CONCLUSIONS

This master drainage report evaluates existing and proposed stormwater conditions for a 660-acre power generation facility in Laramie County, Wyoming. The undeveloped site currently consists of native grassland divided into three on-site master basins (EX-1 through EX-3). EX-1 and EX-2 drain north to Porter Creek and EX-3 drains south to Simpson Creek, ultimately discharging into Adams & Bunker Reservoir 1.

The proposed development modifies the drainage pattern by redirecting runoff from portions of EX-3 northward to Porter Creek (+/- 34.2 acres). Nine new master basins, A through G, will be established, with five master basins supported by dedicated stormwater detention facilities. Stormwater will be conveyed via overland flow or storm sewer infrastructure to four on-site detention facilities—Pond A (28.965 acre-feet minimum), Pond B (22.756 acre-feet minimum), Pond E (10.289 acre-feet minimum), and Pond F (8.351 acre-feet minimum). These facilities are designed in accordance with Mile High Flood District (MHFD) criteria to meet water quality and peak flow requirements for the 10-year and 100-year, 1-hour storm events. Post-development release rates shall not exceed calculated pre-development(or historic) release rate per storm event.

Additionally, four permanent natural earth swales will be constructed within the property. Three of the proposed swales help direct flow into one of the four permanent detention facilities. The remaining swale will direct two of the pond's outfall discharge and emergency overflow waters off-site following natural drainage patterns, as mentioned in Existing Basin EX-2.

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REFERENCES

1. City of Cheyenne. (2012, January 23). *Unified Development Code*. City of Cheyenne Planning and Development Department. https://www.cheyennecity.org/Your-Government/Departments/Planning-and-Development-Department/Unified-Development-Code
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3. DeWild Grant Reckert & Associates Company. *South Cheyenne Substation Site Drainage Analysis*. Cheyenne Light Fuel & Power, 26 July 2012. DGR Project No. 42330
4. Custom Soil Resource Report, Natural Resources Conservation Service, United States Department of Agriculture Web Soil Survey; Aug 22, 2025.
5. Urban Storm Drainage Criteria Manual, Volumes 1-3, Urban Drainage and Flood Control District; Updated January 2021.
6. Flood Insurance Rate Map, Panel 56021C1375F, Federal Emergency Management Agency; January 17, 2007

Appendix A – Hydrologic Computations

Basin A	177.86		
	Acres	Imperv %	AC*IMP
Grassland:	101.86	0.02	2.0372
Gravel/Structure	48	0.65	31.2
Paved/Roof:	28	1	28
Total:	177.86		61.2372
	Imperv:	34.43%	

Basin B	137.67		
	Acres	Imperv %	AC*IMP
Grassland:	81.25	0.02	1.625
Gravel/Structure	22.7	0.65	14.755
Paved/Roof:	33.72	1	33.72
Total:	137.67		50.1
	Imperv:	36.39%	

Basin C	73.62		
	Acres	Imperv %	AC*IMP
Grassland:	70.62	0.02	1.4124
Gravel/Structure	0	0.65	0
Paved/Roof:	3	1	3
Total:	73.62		4.4124
	Imperv:	5.99%	

Basin D	45.25		
	Acres	Imperv %	AC*IMP
Grassland:	41.75	0.02	0.835
Gravel/Structure	0	0.65	0
Paved/Roof:	3.5	1	3.5
Total:	45.25		4.335
	Imperv:	9.58%	

Basin E1	18.87		
	Acres	Imperv %	AC*IMP
Grassland:	1.87	0.02	0.0374
Gravel/Structure	13	0.65	8.45
Paved/Roof:	4	1	4
Total:	18.87		12.4874
	Imperv:	66.18%	

Basin E2	43.92		
	Acres	Imperv %	AC*IMP
Grassland:	34.92	0.02	0.6984
Gravel/Structure	0	0.65	0
Paved/Roof:	9	1	9
Total:	43.92		9.6984
	Imperv:	22.08%	

Basin F	50.84		
	Acres	Imperv %	AC*IMP
Grassland:	26.84	0.02	0.5368
Gravel/Structure	17	0.65	11.05
Paved/Roof:	7	1	7
Total:	50.84		18.5868
	Imperv:	36.56%	

Basin G	3.73		
	Acres	Imperv %	AC*IMP
Grassland:	3.73	0.02	0.0746
Gravel/Structure	0	0.65	0
Paved/Roof:	0	1	0
Total:	3.73		0.0746
	Imperv:	2.00%	

Basin H	108.17		
	Acres	Imperv %	AC*IMP
Grassland:	108.17	0.02	2.1634
Gravel/Structure	0	0.65	0
Paved/Roof:	0	1	0
Total:	108.17		2.1634
	Imperv:	2.00%	

WHOLE SITE IMPERV			
TOTAL	659.93		
	Acres	imperv	AC*Imp
Paved	88.22	1	88.22
Gravel/Structure	100.7	0.65	65.455
Grassland	471.01	0.02	9.4202
Total:	659.93		163.0952
	Imperv:	24.71%	

NOAA Atlas 14, Volume 12, Version 2
Location name: Cheyenne, Wyoming, USA*
Latitude: 41.0193°, Longitude: -104.8112°
Elevation: 6330 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Carl Trypaluk, Dale Unruh, Michael St.Laurent, Austin Jordan, Rama Sesha Sridhar Mantripragada, Sandra Pavlovic, Greg Fall, Fernando Salas

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	**0.288** (0.246-0.334)	**0.380** (0.327-0.445)	**0.534** (0.455-0.635)	**0.666** (0.557-0.799)	**0.852** (0.689-1.04)	**0.999** (0.782-1.24)	**1.15** (0.864-1.46)	**1.31** (0.936-1.73)	**1.52** (1.02-2.14)	**1.69** (1.07-2.48)
10-min	**0.399** (0.341-0.464)	**0.526** (0.454-0.617)	**0.740** (0.631-0.880)	**0.923** (0.772-1.11)	**1.18** (0.955-1.44)	**1.39** (1.08-1.72)	**1.60** (1.20-2.03)	**1.81** (1.30-2.40)	**2.11** (1.42-2.96)	**2.34** (1.49-3.44)
15-min	**0.464** (0.396-0.539)	**0.612** (0.527-0.716)	**0.860** (0.733-1.02)	**1.07** (0.897-1.29)	**1.37** (1.11-1.68)	**1.61** (1.26-2.00)	**1.85** (1.39-2.36)	**2.10** (1.51-2.79)	**2.45** (1.64-3.44)	**2.72** (1.73-4.00)
30-min	**0.565** (0.483-0.657)	**0.746** (0.642-0.873)	**1.05** (0.893-1.25)	**1.31** (1.09-1.57)	**1.67** (1.35-2.04)	**1.96** (1.54-2.43)	**2.26** (1.70-2.87)	**2.56** (1.84-3.40)	**2.98** (2.00-4.20)	**3.31** (2.11-4.88)
60-min	**0.673** (0.575-0.781)	**0.887** (0.764-1.04)	**1.25** (1.06-1.48)	**1.56** (1.30-1.87)	**1.99** (1.61-2.43)	**2.34** (1.83-2.90)	**2.69** (2.02-3.42)	**3.05** (2.19-4.04)	**3.55** (2.38-4.99)	**3.94** (2.50-5.80)
2-hr	**0.777** (0.670-0.901)	**1.02** (0.887-1.20)	**1.44** (1.23-1.71)	**1.79** (1.50-2.15)	**2.29** (1.85-2.80)	**2.68** (2.09-3.34)	**3.09** (2.30-3.94)	**3.50** (2.48-4.65)	**4.08** (2.69-5.73)	**4.52** (2.82-6.65)
3-hr	**0.842** (0.730-0.972)	**1.10** (0.962-1.29)	**1.55** (1.33-1.84)	**1.93** (1.62-2.31)	**2.46** (1.99-3.01)	**2.88** (2.24-3.58)	**3.31** (2.46-4.22)	**3.76** (2.65-4.98)	**4.37** (2.86-6.14)	**4.85** (3.00-7.11)
6-hr	**0.983** (0.860-1.12)	**1.27** (1.12-1.46)	**1.76** (1.52-2.06)	**2.17** (1.85-2.57)	**2.75** (2.26-3.31)	**3.22** (2.55-3.92)	**3.69** (2.79-4.61)	**4.18** (2.99-5.42)	**4.85** (3.22-6.66)	**5.38** (3.38-7.71)
12-hr	**1.21** (1.09-1.34)	**1.50** (1.36-1.68)	**2.00** (1.79-2.27)	**2.43** (2.15-2.78)	**3.05** (2.62-3.52)	**3.54** (2.96-4.12)	**4.04** (3.28-4.81)	**4.56** (3.56-5.64)	**5.29** (3.90-6.92)	**5.85** (4.13-8.01)
24-hr	**1.48** (1.36-1.61)	**1.78** (1.64-1.94)	**2.30** (2.11-2.52)	**2.74** (2.49-3.01)	**3.38** (3.02-3.74)	**3.89** (3.43-4.34)	**4.41** (3.82-5.03)	**4.96** (4.19-5.87)	**5.73** (4.66-7.19)	**6.34** (4.99-8.33)
2-day	**1.75** (1.61-1.89)	**2.07** (1.92-2.25)	**2.63** (2.42-2.86)	**3.10** (2.83-3.39)	**3.78** (3.40-4.16)	**4.32** (3.83-4.79)	**4.87** (4.25-5.52)	**5.44** (4.65-6.41)	**6.24** (5.16-7.80)	**6.86** (5.52-9.00)
3-day	**1.92** (1.77-2.08)	**2.26** (2.10-2.46)	**2.85** (2.62-3.11)	**3.35** (3.06-3.67)	**4.06** (3.64-4.48)	**4.61** (4.08-5.16)	**5.18** (4.51-5.93)	**5.77** (4.92-6.86)	**6.58** (5.44-8.30)	**7.20** (5.81-9.54)
4-day	**2.05** (1.90-2.23)	**2.42** (2.24-2.63)	**3.03** (2.79-3.31)	**3.55** (3.24-3.89)	**4.28** (3.84-4.74)	**4.86** (4.30-5.45)	**5.44** (4.74-6.25)	**6.04** (5.16-7.21)	**6.86** (5.68-8.69)	**7.48** (6.06-9.95)
7-day	**2.35** (2.18-2.55)	**2.78** (2.57-3.01)	**3.47** (3.19-3.77)	**4.04** (3.68-4.42)	**4.84** (4.35-5.36)	**5.45** (4.85-6.13)	**6.06** (5.32-6.99)	**6.69** (5.77-8.02)	**7.52** (6.32-9.58)	**8.15** (6.72-10.9)
10-day	**2.62** (2.43-2.84)	**3.08** (2.86-3.34)	**3.84** (3.53-4.17)	**4.46** (4.07-4.87)	**5.31** (4.78-5.88)	**5.96** (5.32-6.70)	**6.60** (5.82-7.62)	**7.25** (6.28-8.69)	**8.09** (6.86-10.3)	**8.72** (7.27-11.7)
20-day	**3.47** (3.23-3.76)	**4.05** (3.76-4.38)	**4.98** (4.58-5.39)	**5.72** (5.23-6.22)	**6.70** (6.07-7.40)	**7.43** (6.68-8.34)	**8.13** (7.25-9.37)	**8.82** (7.77-10.6)	**9.67** (8.41-12.3)	**10.3** (8.85-13.8)
30-day	**4.18** (3.89-4.52)	**4.85** (4.50-5.23)	**5.90** (5.43-6.36)	**6.73** (6.16-7.30)	**7.81** (7.09-8.61)	**8.60** (7.76-9.63)	**9.35** (8.38-10.7)	**10.1** (8.94-12.0)	**10.9** (9.63-13.9)	**11.5** (10.1-15.4)
45-day	**5.15** (4.80-5.56)	**5.93** (5.51-6.37)	**7.14** (6.57-7.67)	**8.08** (7.40-8.73)	**9.29** (8.46-10.2)	**10.2** (9.21-11.3)	**11.0** (9.88-12.6)	**11.7** (10.5-13.9)	**12.6** (11.2-15.9)	**13.2** (11.8-17.6)
60-day	**6.00** (5.61-6.47)	**6.86** (6.40-7.37)	**8.20** (7.57-8.81)	**9.24** (8.49-9.97)	**10.6** (9.66-11.6)	**11.5** (10.5-12.8)	**12.3** (11.2-14.1)	**13.1** (11.8-15.6)	**14.1** (12.6-17.7)	**14.7** (13.2-19.4)

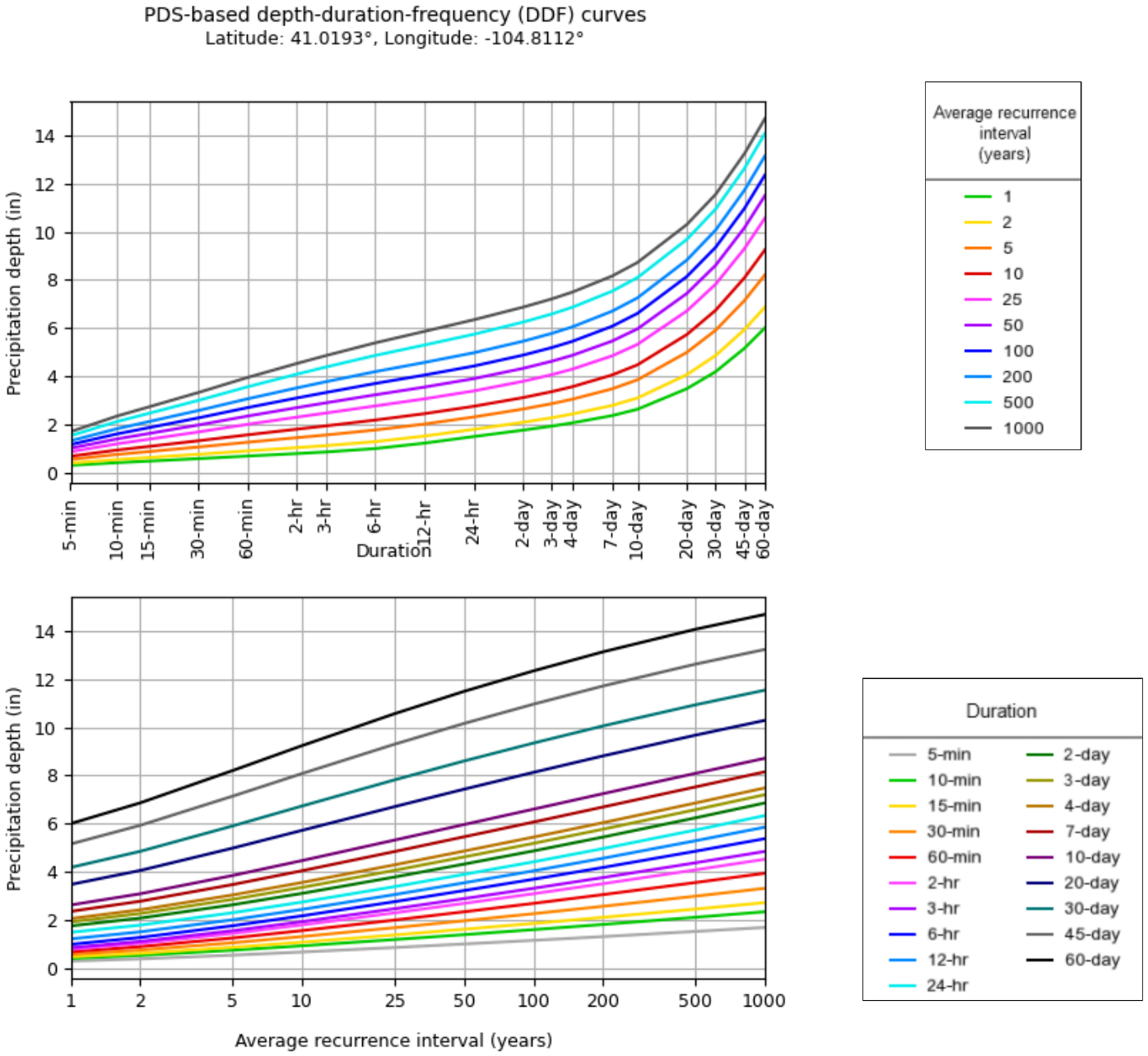
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

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PF graphical



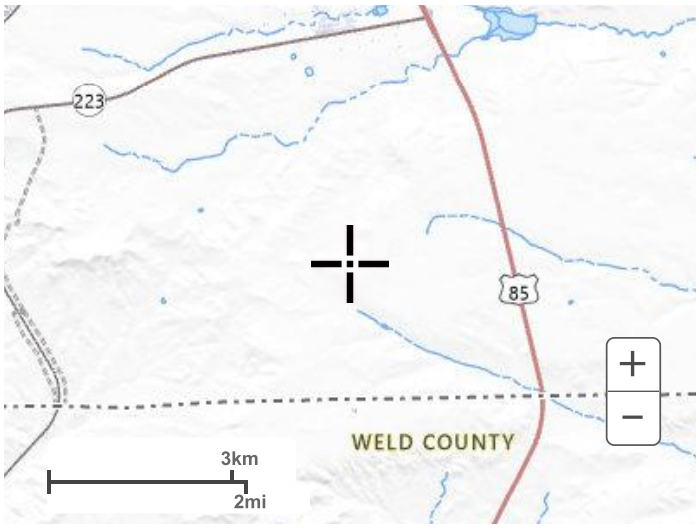
NOAA Atlas 14, Volume 12, Version 2

Created (GMT): Tue Dec 16 21:30:42 2025

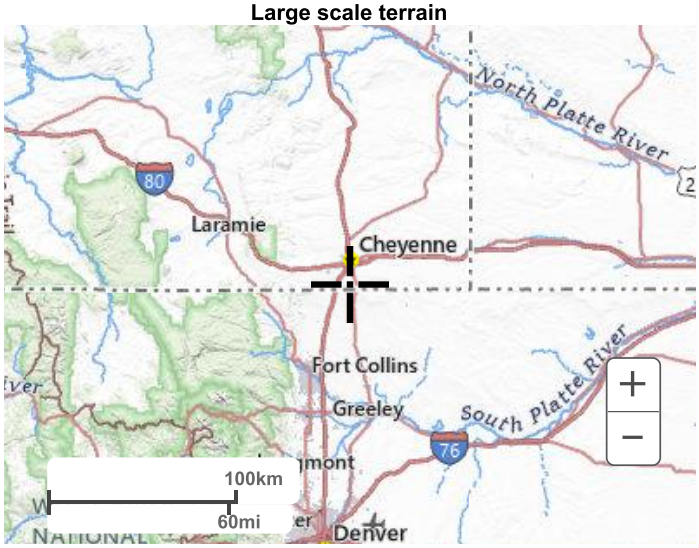
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Maps & aerials

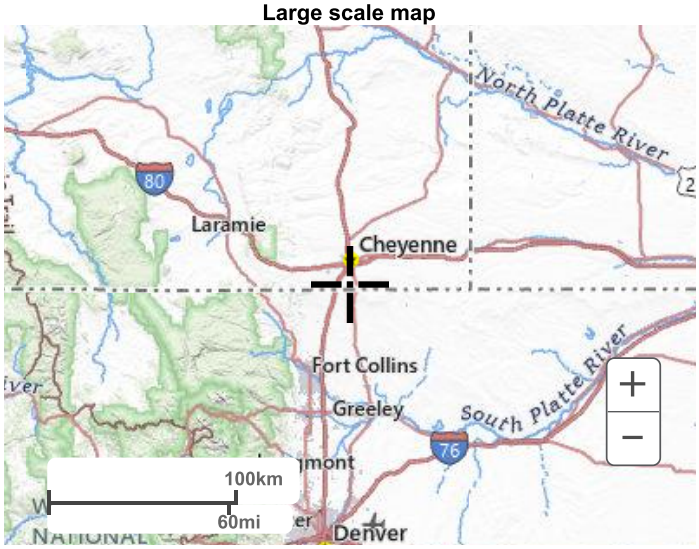
Small scale terrain



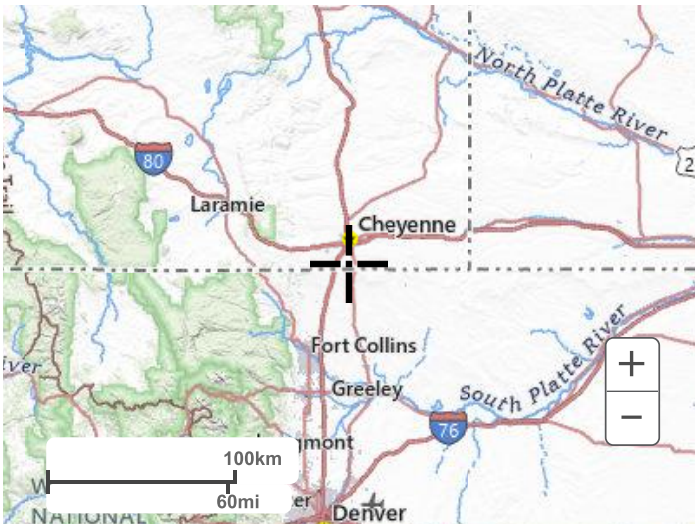
Large scale terrain



Large scale map



Large scale aerial



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Disclaimer

CUHP SUBCATCHMENTS

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (acre)	Length to Centroid (ft)	Length (ft)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
EX1		100 YR	97.58	1406.000001	3187	0.007	2	0.35	0.1	4.5	0.0018	0.6	0
EX2		100 YR	438.46	2957.000001	5572	0.004	2	0.35	0.1	4.5	0.0018	0.6	0
EX3		100 YR	123.85	2288.999999	5073	0.003	2	0.35	0.1	4.5	0.0018	0.6	0
OS1		100 YR	8.39	448.00008	223.99978	0.007	2	0.35	0.1	4.5	0.0018	0.6	0
OS2		100 YR	23	1688.00016	843.99744	0.004	2	0.35	0.1	4.5	0.0018	0.6	0
OS3		100 YR	18.36	1290.000096	644.99952	0.004	2	0.35	0.1	4.5	0.0018	0.6	0
OS4		100 YR	28.65	1758.999792	879.50016	0.003	2	0.35	0.1	4.5	0.0018	0.6	0
(FUTURE) POND A		100 YR	177.86	1629	3257	0.0005	2	0.35	0.1	4.5	0.0018	0.6	0
(FUTURE) POND B		100 YR	137.669	1754	3508	0.00125	2	0.35	0.1	4.5	0.0018	0.6	0
(FUTURE) POND E		100 YR	62.78	1433	2571	0.001	2	0.35	0.1	4.5	0.0018	0.6	0
(FUTURE) POND F		100 YR	50.84	886.99	2110	0.0026	2	0.35	0.1	4.5	0.0018	0.6	0

Typical Depression Losses for Various Land Covers (All Values in Inches)

Land Cover	Range in Depression (Retention) Losses	Recommended
Impervious:		
Large paved areas	0.05 - 0.15	0.1
Roofs-flat	0.1 - 0.3	0.1
Roofs-sloped	0.05 - 0.1	0.05
Pervious:		
Lawn grass	0.2 - 0.5	0.35
Wooded areas and open fields	0.2 - 0.6	0.4

Recommended Horton's Equation Parameters

NRCS Hydrologic Soil Group	Infiltration (inches per hour)		Decay Coefficient - a
	Initial - f_i	Final - f_o	
A	5.0	1.0	0.0007
B	4.5	0.6	0.0018
C	3.0	0.5	0.0018
D	3.0	0.5	0.0018

Comment			
1Hr Depth	1.25	NOAA Atlas 14 Point Precipitation Frequency Estimates: CO (Note: Use 60-minute recurrence interval depth)	
Return Period	5	Years	
Time	Depth	CurveValue	
0:05	0.025		0.02
0:10	0.046		0.037
0:15	0.109		0.087
0:20	0.191		0.153
0:25	0.313		0.25
0:30	0.163		0.13
0:35	0.073		0.058
0:40	0.055		0.044
0:45	0.045		0.036
0:50	0.045		0.036
0:55	0.038		0.03
1:00	0.038		0.03
1:05	0.038		0.03
1:10	0.038		0.03
1:15	0.031		0.025
1:20	0.028		0.022
1:25	0.028		0.022
1:30	0.028		0.022
1:35	0.028		0.022
1:40	0.019		0.015
1:45	0.019		0.015
1:50	0.019		0.015
1:55	0.019		0.015
2:00	0.016		0.013
2:05	0		

Comment			
1Hr Depth	1.56	NOAA Atlas 14 Point Precipitation Frequency Estimates: CO (Note: Use 60-minute recurrence interval depth)	
Return Period	10	Years	
Time	Depth	CurveValue	
0:05	0.031		0.02
0:10	0.058		0.037
0:15	0.128		0.082
0:20	0.234		0.15
0:25	0.39		0.25
0:30	0.187		0.12
0:35	0.087		0.056
0:40	0.067		0.043
0:45	0.059		0.038
0:50	0.05		0.032
0:55	0.05		0.032
1:00	0.05		0.032
1:05	0.05		0.032
1:10	0.05		0.032
1:15	0.05		0.032
1:20	0.039		0.025
1:25	0.03		0.019
1:30	0.03		0.019
1:35	0.03		0.019
1:40	0.03		0.019
1:45	0.03		0.019
1:50	0.03		0.019
1:55	0.027		0.017
2:00	0.02		0.013
2:05	0		

Comment			
1Hr Depth	2.34	NOAA Atlas 14 Point Precipitation Frequency Estimates: CO (Note: Use 60-minute recurrence interval depth)	
Return Period	50	Years	
Time	Depth	CurveValue	
0:05	0.03		0.013
0:10	0.082		0.035
0:15	0.117		0.05
0:20	0.187		0.08
0:25	0.351		0.15
0:30	0.585		0.25
0:35	0.281		0.12
0:40	0.187		0.08
0:45	0.117		0.05
0:50	0.117		0.05
0:55	0.075		0.032
1:00	0.075		0.032
1:05	0.075		0.032
1:10	0.056		0.024
1:15	0.056		0.024
1:20	0.042		0.018
1:25	0.042		0.018
1:30	0.033		0.014
1:35	0.033		0.014
1:40	0.033		0.014
1:45	0.033		0.014
1:50	0.033		0.014
1:55	0.033		0.014
2:00	0.033		0.014
2:05	0		

Comment			
1Hr Depth	2.69	NOAA Atlas 14 Point Precipitation Frequency Estimates: CO (Note: Use 60-minute recurrence interval depth)	
Return Period	100	Years	
Time	Depth	CurveValue	
0:05	0.027		0.01
0:10	0.081		0.03
0:15	0.124		0.046
0:20	0.215		0.08
0:25	0.377		0.14
0:30	0.673		0.25
0:35	0.377		0.14
0:40	0.215		0.08
0:45	0.167		0.062
0:50	0.135		0.05
0:55	0.108		0.04
1:00	0.108		0.04
1:05	0.108		0.04
1:10	0.054		0.02
1:15	0.054		0.02
1:20	0.032		0.012
1:25	0.032		0.012
1:30	0.032		0.012
1:35	0.032		0.012
1:40	0.032		0.012
1:45	0.032		0.012
1:50	0.032		0.012
1:55	0.032		0.012
2:00	0.032		0.012
2:05	0		

5 YEAR EXISTING RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	OS1	OS2	OS3	OS4	(FUTURE) POND	(FUTURE) POND	(FUTURE) POND	(FUTURE) POND
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
25	0.35	0.43	0.10	0.16	0.10	0.12	0.11	0.15	0.15	0.08	0.20
30	3.17	4.09	0.99	1.29	0.88	0.97	0.99	1.39	1.42	0.73	1.78
35	6.73	10.99	2.64	1.41	1.50	1.44	1.79	3.76	3.73	1.83	3.45
40	8.43	18.47	4.32	1.20	1.60	1.49	1.97	6.24	5.87	2.68	3.97
45	8.58	24.20	5.49	1.01	1.59	1.45	1.97	8.06	7.26	3.09	3.98
50	8.25	27.82	6.12	0.85	1.54	1.37	1.92	9.15	7.85	3.17	3.85
55	7.63	29.33	6.29	0.73	1.47	1.27	1.83	9.52	7.91	3.16	3.61
60	6.80	29.30	6.27	0.62	1.37	1.16	1.72	9.53	7.81	3.11	3.30
65	6.26	28.38	6.18	0.52	1.26	1.08	1.58	9.38	7.58	3.04	3.04
70	5.78	26.68	6.02	0.42	1.19	1.01	1.48	9.10	7.24	2.93	2.83
75	5.28	24.34	5.78	0.34	1.12	0.93	1.40	8.70	6.79	2.79	2.64
80	4.79	22.33	5.47	0.29	1.05	0.85	1.31	8.16	6.25	2.63	2.43
85	4.42	20.89	5.10	0.25	0.98	0.79	1.22	7.54	5.92	2.47	2.22
90	4.10	19.52	4.81	0.22	0.91	0.74	1.13	7.15	5.62	2.36	2.07
95	3.79	18.13	4.59	0.18	0.85	0.69	1.06	6.81	5.31	2.25	1.94
100	3.48	16.75	4.38	0.14	0.80	0.64	1.00	6.46	5.00	2.15	1.81
105	3.17	15.51	4.16	0.10	0.75	0.59	0.94	6.11	4.69	2.04	1.68
110	2.86	14.63	3.94	0.07	0.71	0.54	0.89	5.76	4.39	1.93	1.55
115	2.56	13.81	3.73	0.03	0.66	0.49	0.83	5.41	4.13	1.83	1.43
120	2.25	12.99	3.51	0.01	0.62	0.44	0.78	5.07	3.93	1.72	1.30
125	1.96	12.18	3.31	0.01	0.57	0.40	0.72	4.84	3.75	1.64	1.17
130	1.80	11.38	3.17	0.01	0.53	0.35	0.67	4.63	3.57	1.57	1.05
135	1.69	10.58	3.04	0.00	0.48	0.32	0.61	4.42	3.38	1.51	0.93
140	1.58	9.77	2.91	0.00	0.44	0.30	0.56	4.22	3.20	1.45	0.85
145	1.47	8.98	2.79	0.00	0.40	0.28	0.50	4.01	3.02	1.38	0.80
150	1.36	8.18	2.66	0.00	0.35	0.27	0.45	3.81	2.84	1.32	0.76
155	1.25	7.39	2.53	0.00	0.33	0.25	0.42	3.61	2.66	1.26	0.71
160	1.15	6.63	2.41	0.00	0.32	0.23	0.40	3.40	2.48	1.19	0.67
165	1.04	6.15	2.28	0.00	0.30	0.21	0.38	3.20	2.30	1.13	0.62
170	0.94	5.83	2.16	0.00	0.29	0.20	0.36	3.00	2.12	1.07	0.58
175	0.84	5.55	2.03	0.00	0.27	0.18	0.34	2.80	1.94	1.01	0.54
180	0.73	5.26	1.91	0.00	0.26	0.17	0.32	2.60	1.77	0.95	0.49
185	0.63	4.99	1.78	0.00	0.24	0.15	0.30	2.40	1.66	0.88	0.45
190	0.53	4.71	1.66	0.00	0.23	0.13	0.28	2.20	1.59	0.82	0.41
195	0.43	4.44	1.53	0.00	0.21	0.12	0.27	2.03	1.52	0.76	0.37
200	0.32	4.17	1.41	0.00	0.20	0.10	0.25	1.94	1.46	0.70	0.32
205	0.22	3.90	1.32	0.00	0.18	0.09	0.23	1.87	1.39	0.66	0.28
210	0.12	3.63	1.27	0.00	0.17	0.07	0.21	1.80	1.33	0.64	0.24
215	0.04	3.37	1.23	0.00	0.15	0.05	0.19	1.73	1.27	0.61	0.20
220	0.02	3.10	1.18	0.00	0.14	0.04	0.18	1.66	1.21	0.59	0.16
225	0.02	2.84	1.14	0.00	0.12	0.02	0.16	1.59	1.15	0.57	0.11
230	0.01	2.57	1.09	0.00	0.11	0.01	0.14	1.52	1.09	0.55	0.07
235	0.01	2.31	1.05	0.00	0.09	0.00	0.12	1.45	1.03	0.53	0.03
240	0.01	2.04	1.01	0.00	0.08	0.00	0.10	1.38	0.97	0.51	0.01
245	0.00	1.78	0.97	0.00	0.06	0.00	0.09	1.31	0.91	0.49	0.01
250	0.00	1.51	0.92	0.00	0.05	0.00	0.07	1.25	0.85	0.46	0.01
255	0.00	1.25	0.88	0.00	0.03	0.00	0.05	1.18	0.79	0.44	0.00
260	0.00	0.99	0.84	0.00	0.02	0.00	0.03	1.11	0.73	0.42	0.00
265	0.00	0.72	0.80	0.00	0.01	0.00	0.01	1.05	0.67	0.40	0.00
270	0.00	0.46	0.76	0.00	0.00	0.00	0.01	0.98	0.61	0.38	0.00
275	0.00	0.21	0.71	0.00	0.00	0.00	0.00	0.91	0.55	0.36	0.00
280	0.00	0.08	0.67	0.00	0.00	0.00	0.00	0.84	0.49	0.34	0.00
285	0.00	0.05	0.63	0.00	0.00	0.00	0.00	0.78	0.43	0.32	0.00
290	0.00	0.04	0.59	0.00	0.00	0.00	0.00	0.71	0.37	0.30	0.00
295	0.00	0.03	0.55	0.00	0.00	0.00	0.00	0.64	0.31	0.28	0.00
300	0.00	0.02	0.51	0.00	0.00	0.00	0.00	0.58	0.25	0.26	0.00
305	0.00	0.01	0.47	0.00	0.00	0.00	0.00	0.51	0.19	0.24	0.00
310	0.00	0.01	0.42	0.00	0.00	0.00	0.00	0.44	0.13	0.22	0.00
315	0.00	0.01	0.38	0.00	0.00	0.00	0.00	0.38	0.07	0.20	0.00
320	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.31	0.02	0.17	0.00
325	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.24	0.01	0.15	0.00
330	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.18	0.01	0.13	0.00
335	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.11	0.01	0.11	0.00
340	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.05	0.01	0.09	0.00
345	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.02	0.00	0.07	0.00
350	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.01	0.00	0.05	0.00
355	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00
360	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
365	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
385	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
405	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
415	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
420	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
425	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
430	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
435	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
445	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
450	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
455	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5 YEAR EXISTING RESULTS

Printouts for Unit Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	OS1	OS2	OS3	OS4	(FUTURE) POND A	(FUTURE) POND B	(FUTURE) POND E	(FUTURE) POND F
5	34.04	40.76	9.82	16.15	10.02	11.50	11.11	13.83	14.28	7.48	19.63
10	75.81	119.09	28.84	15.13	16.86	15.93	20.23	40.80	40.93	20.38	39.03
15	91.45	201.07	47.04	12.34	16.98	15.70	20.99	68.00	63.95	29.24	42.58
20	90.27	259.85	58.95	10.37	16.63	15.13	20.62	86.59	77.97	33.09	41.76
25	85.99	295.82	65.00	8.52	16.02	14.22	19.92	97.21	82.94	33.17	39.97
30	78.68	308.15	65.68	7.24	15.13	12.97	18.89	99.70	82.43	32.79	37.21
35	68.51	304.32	64.98	6.14	13.98	11.68	17.52	98.78	80.73	32.11	33.48
40	63.13	292.46	63.57	5.04	12.68	10.86	15.82	96.58	77.85	31.12	30.55
45	57.75	272.59	61.47	3.94	11.93	10.04	14.88	93.10	73.81	29.83	28.37
50	52.37	244.69	58.67	3.10	11.18	9.22	13.96	88.34	68.60	28.24	26.20
55	46.99	222.54	55.16	2.74	10.42	8.40	13.04	82.30	62.21	26.34	24.02
60	43.38	208.12	50.96	2.37	9.67	7.74	12.11	74.98	59.06	24.57	21.84
65	40.29	193.70	47.90	2.01	8.92	7.25	11.19	71.32	55.91	23.50	20.35
70	37.20	179.28	45.71	1.64	8.32	6.77	10.37	67.77	52.76	22.42	19.08
75	34.11	164.86	43.52	1.27	7.87	6.28	9.83	64.21	49.60	21.35	17.81
80	31.01	152.06	41.33	0.91	7.43	5.79	9.28	60.65	46.45	20.28	16.54
85	27.92	144.07	39.14	0.54	6.98	5.31	8.74	57.09	43.30	19.20	15.26
90	24.83	136.08	36.95	0.17	6.53	4.82	8.19	53.53	40.72	18.13	13.99
95	21.74	128.08	34.76	0.00	6.09	4.33	7.64	49.98	38.91	17.06	12.72
100	18.65	120.09	32.70		5.64	3.85	7.10	47.90	37.11	16.25	11.45
105	17.39	112.10	31.44		5.20	3.36	6.55	45.88	35.30	15.62	10.18
110	16.36	104.10	30.19		4.75	3.08	6.01	43.85	33.50	15.00	8.90
115	15.33	96.11	28.93		4.31	2.92	5.46	41.82	31.69	14.37	8.23
120	14.30	88.12	27.67		3.86	2.76	4.92	39.80	29.89	13.74	7.81
125	13.27	80.12	26.41		3.41	2.60	4.37	37.77	28.08	13.12	7.38
130	12.24	72.13	25.15		3.26	2.43	4.08	35.75	26.28	12.49	6.96
135	11.21	64.13	23.90		3.12	2.27	3.90	33.72	24.48	11.86	6.53
140	10.18	59.80	22.64		2.97	2.11	3.72	31.69	22.67	11.24	6.11
145	9.15	57.14	21.38		2.82	1.95	3.54	29.67	20.87	10.61	5.68
150	8.12	54.47	20.12		2.67	1.79	3.35	27.64	19.06	9.98	5.26
155	7.08	51.81	18.86		2.52	1.62	3.17	25.61	17.26	9.35	4.84
160	6.05	49.14	17.61		2.37	1.46	2.99	23.59	16.21	8.73	4.41
165	5.02	46.48	16.35		2.22	1.30	2.81	21.56	15.61	8.10	3.99
170	3.99	43.81	15.09		2.08	1.14	2.63	19.81	15.01	7.47	3.56
175	2.96	41.15	13.83		1.93	0.98	2.44	19.13	14.41	6.85	3.14
180	1.93	38.49	12.96		1.78	0.81	2.26	18.46	13.81	6.51	2.72
185	0.90	35.82	12.54		1.63	0.65	2.08	17.78	13.20	6.30	2.29
190	0.00	33.16	12.12		1.48	0.49	1.90	17.11	12.60	6.09	1.87
195		30.49	11.70		1.33	0.33	1.72	16.43	12.00	5.88	1.44
200		27.83	11.28		1.18	0.17	1.53	15.76	11.40	5.67	1.02
205		25.16	10.86		1.04	0.00	1.35	15.08	10.80	5.46	0.60
210		22.50	10.44		0.89	0.00	1.17	14.41	10.20	5.25	0.17
215		19.83	10.03		0.74		0.99	13.73	9.60	5.04	0.00
220		17.17	9.61		0.59		0.81	13.06	8.99	4.84	
225		14.50	9.19		0.44		0.63	12.38	8.39	4.63	
230		11.84	8.77		0.29		0.44	11.70	7.79	4.42	
235		9.18	8.35		0.14		0.26	11.03	7.19	4.21	
240		6.51	7.93		0.00		0.08	10.35	6.59	4.00	
245		3.85	7.51				0.00	9.68	5.99	3.79	
250		1.18	7.09					9.00	5.38	3.58	
255		0.00	6.67					8.33	4.78	3.37	
260			6.25					7.65	4.18	3.16	
265			5.83					6.98	3.58	2.95	
270			5.41					6.30	2.98	2.75	
275			4.99					5.63	2.38	2.54	
280			4.57					4.95	1.78	2.33	
285			4.16					4.27	1.17	2.12	
290			3.74					3.60	0.57	1.91	
295			3.32					2.92	0.00	1.70	
300			2.90					2.25		1.49	
305			2.48					1.57		1.28	
310			2.06					0.90		1.07	
315			1.64					0.22		0.86	
320			1.22					0.00		0.66	
325			0.80							0.45	
330			0.38							0.24	
335			0.00							0.03	
340										0.00	

5 YEAR EXISTING RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
EX1		0.157	0.202	50.0	9.25	26.0	6.54	15.4	92	354,215	0.10	35,097	45.0	9	35,064	0.09
EX2		0.157	0.323	66.7	18.06	34.7	12.77	30.1	308	1,591,610	0.10	157,704	55.0	29	157,717	0.07
EX3		0.157	0.221	88.3	16.51	45.9	11.66	27.5	66	449,576	0.10	44,546	55.0	6	44,544	0.05
OS1		0.157	0.067	24.3	2.75	12.7	1.94	4.6	16	30,456	0.10	3,018	35.0	1	2,961	0.17
OS2		0.157	0.105	63.2	6.62	32.9	4.67	11.0	17	83,490	0.10	8,273	40.0	2	8,273	0.07
OS3		0.157	0.095	54.0	5.45	28.1	3.85	9.1	16	66,647	0.10	6,604	40.0	1	6,598	0.08
OS4		0.157	0.116	63.8	7.20	33.2	5.09	12.0	21	104,000	0.10	10,305	40.0	2	10,302	0.07
(FUTURE) POND A		0.157	0.247	83.6	17.34	43.5	12.25	28.9	100	645,632	0.10	63,972	60.0	10	63,954	0.05
(FUTURE) POND B		0.157	0.228	77.8	15.15	40.5	10.71	25.2	83	499,738	0.10	49,516	55.0	8	49,498	0.06
(FUTURE) POND E		0.157	0.166	88.5	12.76	46.0	9.02	21.3	33	227,891	0.10	22,581	50.0	3	22,582	0.05
(FUTURE) POND F		0.157	0.151	55.9	7.97	29.1	5.63	13.3	43	184,549	0.10	18,286	45.0	4	18,279	0.08

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
EX1		5 YR	0.152	0.266	0.604	0.007	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX2		5 YR	0.685	0.560	1.055	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
EX3		5 YR	0.194	0.434	0.961	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
OS1		5 YR	0.013	0.085	0.042	0.007	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
OS2		5 YR	0.036	0.320	0.160	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
OS3		5 YR	0.029	0.244	0.122	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
OS4		5 YR	0.045	0.333	0.167	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
(FUTURE) POND A		5 YR	0.278	0.309	0.617	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
(FUTURE) POND B		5 YR	0.215	0.332	0.664	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
(FUTURE) POND E		5 YR	0.098	0.271	0.487	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51
(FUTURE) POND F		5 YR	0.079	0.168	0.400	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51

10 YEAR EXISTING RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	OS1	OS2	OS3	OS4	(FUTURE) POND 1	(FUTURE) POND 2	(FUTURE) POND 3	(FUTURE) POND 4
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.08	0.10	0.02	0.04	0.02	0.03	0.03	0.03	0.03	0.02	0.05
25	3.69	4.49	1.08	1.70	1.07	1.22	1.19	1.53	1.57	0.82	2.12
30	12.17	17.73	4.28	3.54	2.99	3.07	3.48	6.06	6.11	3.08	6.51
35	19.80	37.00	8.78	3.59	4.12	3.91	4.98	12.57	12.16	5.78	9.78
40	23.16	55.81	12.89	3.21	4.41	4.09	5.43	18.75	17.34	7.71	10.91
45	23.74	70.22	15.77	2.80	4.46	4.05	5.52	23.29	20.62	8.64	11.09
50	22.92	79.05	17.26	2.36	4.34	3.83	5.39	25.88	22.03	8.92	10.75
55	21.01	82.50	17.73	2.00	4.10	3.52	5.12	26.83	22.29	8.93	10.02
60	19.03	82.12	17.71	1.69	3.81	3.24	4.76	26.87	21.97	8.78	9.19
65	17.49	79.08	17.40	1.40	3.54	3.01	4.42	26.38	21.25	8.53	8.50
70	16.02	73.71	16.86	1.13	3.33	2.79	4.15	25.49	20.18	8.20	7.89
75	14.59	67.57	16.13	0.94	3.13	2.58	3.90	24.23	18.79	7.79	7.31
80	13.36	62.54	15.21	0.82	2.93	2.38	3.66	22.63	17.54	7.33	6.74
85	12.36	58.38	14.28	0.70	2.72	2.21	3.41	21.18	16.61	6.94	6.22
90	11.44	54.37	13.52	0.59	2.53	2.06	3.16	20.09	15.72	6.62	5.80
95	10.55	50.42	12.88	0.48	2.37	1.92	2.96	19.07	14.84	6.31	5.42
100	9.68	46.65	12.26	0.38	2.24	1.78	2.79	18.08	13.97	6.01	5.05
105	8.81	43.54	11.65	0.27	2.11	1.64	2.63	17.10	13.10	5.72	4.69
110	7.94	41.04	11.04	0.17	1.98	1.51	2.48	16.11	12.29	5.42	4.33
115	7.07	38.68	10.44	0.08	1.85	1.37	2.32	15.13	11.63	5.12	3.98
120	6.20	36.37	9.84	0.04	1.73	1.23	2.17	14.29	11.07	4.85	3.62
125	5.52	34.10	9.34	0.03	1.60	1.10	2.01	13.64	10.53	4.63	3.26
130	5.09	31.82	8.94	0.02	1.47	0.98	1.86	13.02	10.01	4.44	2.90
135	4.74	29.55	8.56	0.01	1.35	0.90	1.70	12.43	9.50	4.25	2.60
140	4.41	27.27	8.20	0.01	1.22	0.84	1.55	11.85	8.98	4.07	2.40
145	4.10	25.00	7.84	0.01	1.10	0.79	1.40	11.27	8.46	3.89	2.25
150	3.80	22.74	7.47	0.01	1.00	0.74	1.27	10.69	7.95	3.71	2.12
155	3.50	20.48	7.12	0.00	0.94	0.70	1.19	10.11	7.44	3.53	1.99
160	3.20	18.62	6.76	0.00	0.89	0.65	1.12	9.54	6.93	3.35	1.87
165	2.90	17.37	6.40	0.00	0.85	0.60	1.06	8.96	6.42	3.18	1.74
170	2.61	16.43	6.04	0.00	0.80	0.55	1.01	8.39	5.91	3.00	1.62
175	2.31	15.59	5.69	0.00	0.76	0.51	0.96	7.82	5.40	2.82	1.50
180	2.02	14.78	5.33	0.00	0.72	0.46	0.90	7.25	4.98	2.64	1.37
185	1.73	14.00	4.98	0.00	0.67	0.42	0.85	6.68	4.69	2.47	1.25
190	1.44	13.22	4.62	0.00	0.63	0.37	0.80	6.14	4.47	2.29	1.13
195	1.15	12.45	4.27	0.00	0.59	0.32	0.74	5.75	4.28	2.12	1.01
200	0.86	11.68	3.96	0.00	0.55	0.28	0.69	5.49	4.10	1.97	0.89
205	0.57	10.91	3.74	0.00	0.50	0.23	0.64	5.27	3.92	1.87	0.77
210	0.29	10.15	3.59	0.00	0.46	0.19	0.59	5.06	3.75	1.80	0.65
215	0.13	9.40	3.45	0.00	0.42	0.14	0.54	4.86	3.57	1.73	0.53
220	0.07	8.64	3.33	0.00	0.38	0.10	0.49	4.66	3.40	1.67	0.42
225	0.05	7.89	3.20	0.00	0.34	0.05	0.44	4.47	3.23	1.61	0.30
230	0.03	7.14	3.08	0.00	0.29	0.02	0.38	4.27	3.05	1.55	0.18
235	0.03	6.39	2.96	0.00	0.25	0.01	0.33	4.08	2.88	1.49	0.08
240	0.02	5.63	2.84	0.00	0.21	0.01	0.28	3.88	2.71	1.43	0.04
245	0.02	4.88	2.72	0.00	0.17	0.01	0.23	3.69	2.54	1.37	0.03
250	0.01	4.13	2.60	0.00	0.13	0.00	0.18	3.50	2.37	1.31	0.02
255	0.01	3.39	2.48	0.00	0.09	0.00	0.13	3.31	2.20	1.25	0.01
260	0.01	2.64	2.36	0.00	0.04	0.00	0.08	3.12	2.03	1.19	0.01
265	0.00	1.89	2.24	0.00	0.02	0.00	0.04	2.93	1.87	1.13	0.01
270	0.00	1.14	2.12	0.00	0.01	0.00	0.02	2.74	1.70	1.07	0.01
275	0.00	0.55	2.00	0.00	0.01	0.00	0.01	2.55	1.53	1.01	0.00
280	0.00	0.26	1.89	0.00	0.01	0.00	0.01	2.36	1.36	0.95	0.00
285	0.00	0.16	1.77	0.00	0.00	0.00	0.01	2.17	1.19	0.89	0.00
290	0.00	0.11	1.65	0.00	0.00	0.00	0.00	1.98	1.02	0.84	0.00
295	0.00	0.08	1.53	0.00	0.00	0.00	0.00	1.79	0.85	0.78	0.00
300	0.00	0.06	1.41	0.00	0.00	0.00	0.00	1.60	0.68	0.72	0.00
305	0.00	0.05	1.30	0.00	0.00	0.00	0.00	1.41	0.51	0.66	0.00
310	0.00	0.04	1.18	0.00	0.00	0.00	0.00	1.22	0.34	0.60	0.00
315	0.00	0.03	1.06	0.00	0.00	0.00	0.00	1.03	0.18	0.54	0.00
320	0.00	0.02	0.94	0.00	0.00	0.00	0.00	0.84	0.08	0.48	0.00
325	0.00	0.01	0.82	0.00	0.00	0.00	0.00	0.65	0.04	0.42	0.00
330	0.00	0.01	0.71	0.00	0.00	0.00	0.00	0.46	0.03	0.37	0.00
335	0.00	0.01	0.59	0.00	0.00	0.00	0.00	0.27	0.02	0.31	0.00
340	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.13	0.02	0.25	0.00
345	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.06	0.01	0.19	0.00
350	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.04	0.01	0.13	0.00
355	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.03	0.01	0.07	0.00
360	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.02	0.00	0.03	0.00
365	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00
370	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
375	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
380	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
385	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
405	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
415	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
420	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
425	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
430	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
435	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
445	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
450	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
455	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

10 YEAR EXISTING RESULTS

Printouts for Unit Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	OS1	OS2	OS3	OS4	(FUTURE) POND A	(FUTURE) POND B	(FUTURE) POND E	(FUTURE) POND F
5	34.13	40.88	9.85	16.15	10.04	11.52	11.13	13.87	14.32	7.50	19.68
10	75.92	119.41	28.92	15.13	16.87	15.93	20.25	40.91	41.04	20.43	39.07
15	91.46	201.48	47.12	12.34	16.98	15.70	20.99	68.13	64.05	29.28	42.58
20	90.26	260.22	59.02	10.37	16.63	15.13	20.62	86.70	78.04	33.10	41.76
25	85.97	296.06	65.03	8.51	16.01	14.21	19.92	97.28	82.95	33.17	39.97
30	78.65	308.17	65.68	7.24	15.13	12.97	18.89	99.71	82.42	32.79	37.20
35	68.50	304.26	64.97	6.14	13.97	11.67	17.52	98.77	80.71	32.11	33.47
40	63.12	292.34	63.56	5.04	12.68	10.86	15.82	96.56	77.83	31.12	30.54
45	57.74	272.41	61.46	3.94	11.93	10.04	14.88	93.07	73.78	29.83	28.37
50	52.36	244.48	58.65	3.10	11.17	9.22	13.96	88.30	68.56	28.23	26.19
55	46.98	222.46	55.14	2.74	10.42	8.40	13.03	82.26	62.20	26.33	24.01
60	43.38	208.04	50.93	2.37	9.67	7.74	12.11	74.93	59.05	24.57	21.84
65	40.28	193.62	47.89	2.00	8.92	7.25	11.19	71.31	55.90	23.49	20.35
70	37.19	179.21	45.70	1.64	8.32	6.76	10.37	67.75	52.74	22.42	19.08
75	34.10	164.79	43.51	1.27	7.87	6.28	9.83	64.19	49.59	21.35	17.81
80	31.01	152.03	41.32	0.91	7.43	5.79	9.28	60.63	46.44	20.27	16.53
85	27.92	144.04	39.13	0.54	6.98	5.31	8.73	57.08	43.29	19.20	15.26
90	24.82	136.04	36.94	0.17	6.53	4.82	8.19	53.52	40.71	18.13	13.99
95	21.73	128.05	34.75	0.00	6.09	4.33	7.64	49.96	38.91	17.05	12.72
100	18.64	120.06	32.70		5.64	3.85	7.10	47.90	37.10	16.25	11.45
105	17.39	112.06	31.44		5.20	3.36	6.55	45.87	35.30	15.62	10.17
110	16.36	104.07	30.18		4.75	3.08	6.01	43.84	33.49	15.00	8.90
115	15.33	96.08	28.92		4.31	2.92	5.46	41.82	31.69	14.37	8.23
120	14.30	88.08	27.67		3.86	2.76	4.91	39.79	29.88	13.74	7.80
125	13.27	80.09	26.41		3.41	2.60	4.37	37.76	28.08	13.11	7.38
130	12.24	72.10	25.15		3.26	2.43	4.08	35.74	26.27	12.49	6.96
135	11.21	64.10	23.89		3.12	2.27	3.90	33.71	24.47	11.86	6.53
140	10.17	59.79	22.63		2.97	2.11	3.72	31.68	22.66	11.23	6.11
145	9.14	57.13	21.38		2.82	1.95	3.54	29.66	20.86	10.61	5.68
150	8.11	54.46	20.12		2.67	1.79	3.35	27.63	19.06	9.98	5.26
155	7.08	51.80	18.86		2.52	1.62	3.17	25.61	17.25	9.35	4.84
160	6.05	49.14	17.60		2.37	1.46	2.99	23.58	16.21	8.73	4.41
165	5.02	46.47	16.34		2.22	1.30	2.81	21.55	15.61	8.10	3.99
170	3.99	43.81	15.09		2.08	1.14	2.63	19.81	15.01	7.47	3.56
175	2.96	41.14	13.83		1.93	0.98	2.44	19.13	14.41	6.84	3.14
180	1.93	38.48	12.96		1.78	0.81	2.26	18.46	13.80	6.51	2.72
185	0.90	35.81	12.54		1.63	0.65	2.08	17.78	13.20	6.30	2.29
190	0.00	33.15	12.12		1.48	0.49	1.90	17.11	12.60	6.09	1.87
195		30.48	11.70		1.33	0.33	1.72	16.43	12.00	5.88	1.44
200		27.82	11.28		1.18	0.16	1.53	15.75	11.40	5.67	1.02
205		25.16	10.86		1.04	0.00	1.35	15.08	10.80	5.46	0.60
210		22.49	10.44		0.89	0.00	1.17	14.40	10.19	5.25	0.17
215		19.83	10.02		0.74		0.99	13.73	9.59	5.04	0.00
220		17.16	9.60		0.59		0.81	13.05	8.99	4.83	
225		14.50	9.19		0.44		0.62	12.38	8.39	4.63	
230		11.83	8.77		0.29		0.44	11.70	7.79	4.42	
235		9.17	8.35		0.14		0.26	11.03	7.19	4.21	
240		6.50	7.93		0.00		0.08	10.35	6.59	4.00	
245		3.84	7.51				0.00	9.68	5.98	3.79	
250		1.18	7.09					9.00	5.38	3.58	
255		0.00	6.67					8.33	4.78	3.37	
260			6.25					7.65	4.18	3.16	
265			5.83					6.97	3.58	2.95	
270			5.41					6.30	2.98	2.74	
275			4.99					5.62	2.37	2.54	
280			4.57					4.95	1.77	2.33	
285			4.15					4.27	1.17	2.12	
290			3.73					3.60	0.57	1.91	
295			3.32					2.92	0.00	1.70	
300			2.90					2.25		1.49	
305			2.48					1.57		1.28	
310			2.06					0.90		1.07	
315			1.64					0.22		0.86	
320			1.22					0.00		0.65	
325			0.80							0.45	
330			0.38							0.24	
335			0.00							0.03	
340										0.00	

10 YEAR EXISTING RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
EX1		0.157	0.202	50.0	9.24	26.0	6.53	15.4	92	354,215	0.28	99,614	45.0	24	99,519	0.24
EX2		0.157	0.323	66.7	18.03	34.7	12.74	30.1	308	1,591,610	0.28	447,597	55.0	83	447,632	0.19
EX3		0.157	0.221	88.3	16.48	45.9	11.64	27.5	66	449,576	0.28	126,431	55.0	18	126,426	0.14
OS1		0.157	0.067	24.3	2.75	12.7	1.94	4.6	16	30,456	0.28	8,565	35.0	4	8,405	0.43
OS2		0.157	0.105	63.2	6.61	32.9	4.67	11.0	17	83,490	0.28	23,479	45.0	4	23,481	0.19
OS3		0.157	0.095	54.0	5.44	28.1	3.85	9.1	16	66,647	0.28	18,743	40.0	4	18,727	0.22
OS4		0.157	0.116	63.8	7.19	33.2	5.08	12.0	21	104,000	0.28	29,247	45.0	6	29,241	0.19
(FUTURE) POND A		0.157	0.246	83.6	17.31	43.5	12.23	28.8	100	645,632	0.28	181,566	60.0	27	181,513	0.15
(FUTURE) POND B		0.157	0.228	77.8	15.12	40.4	10.69	25.2	83	499,738	0.28	140,538	55.0	22	140,488	0.16
(FUTURE) POND E		0.157	0.165	88.5	12.73	46.0	9.00	21.2	33	227,891	0.28	64,088	55.0	9	64,092	0.14
(FUTURE) POND F		0.157	0.150	55.9	7.95	29.1	5.62	13.3	43	184,549	0.28	51,899	45.0	11	51,880	0.22

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
EX1		10 YR	0.152	0.266	0.604	0.007	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX2		10 YR	0.685	0.560	1.055	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
EX3		10 YR	0.194	0.434	0.961	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
OS1		10 YR	0.013	0.085	0.042	0.007	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
OS2		10 YR	0.036	0.320	0.160	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
OS3		10 YR	0.029	0.244	0.122	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
OS4		10 YR	0.045	0.333	0.167	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
(FUTURE) POND A		10 YR	0.278	0.309	0.617	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
(FUTURE) POND B		10 YR	0.215	0.332	0.664	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
(FUTURE) POND E		10 YR	0.098	0.271	0.487	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59
(FUTURE) POND F		10 YR	0.079	0.168	0.400	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59

50 YEAR EXISTING RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	OS1	OS2	OS3	OS4	(FUTURE) POND	(FUTURE) POND	(FUTURE) POND	(FUTURE) POND
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01
25	0.68	0.83	0.20	0.32	0.20	0.23	0.22	0.28	0.29	0.15	0.39
30	19.25	23.65	5.70	8.67	5.55	6.29	6.18	8.03	8.27	4.31	11.00
35	48.82	75.22	18.17	11.66	11.31	11.12	13.39	25.72	25.80	12.87	25.49
40	70.59	141.88	33.39	12.09	14.20	13.49	17.26	48.07	45.85	21.39	34.18
45	81.02	204.29	46.87	11.32	15.58	14.45	19.14	68.41	62.75	27.52	38.32
50	85.36	254.67	56.90	10.53	16.28	14.84	20.09	84.29	74.05	30.88	40.16
55	84.84	287.88	62.77	9.32	16.32	14.45	20.24	94.16	80.25	32.79	40.13
60	80.12	305.07	65.98	8.27	15.82	13.71	19.71	99.54	83.25	33.67	38.43
65	75.95	310.33	67.48	7.34	15.13	13.12	18.82	102.03	84.06	33.92	36.59
70	71.43	305.13	67.65	6.12	14.43	12.36	17.97	102.27	82.97	33.58	34.67
75	66.27	289.96	66.57	5.08	13.65	11.53	17.01	100.40	80.04	32.69	32.51
80	60.59	272.29	64.36	4.26	12.82	10.63	16.01	96.56	75.52	31.28	30.17
85	55.67	256.07	61.11	3.60	11.96	9.80	14.95	90.99	71.62	29.64	27.74
90	51.23	239.79	57.90	3.03	11.11	9.09	13.91	86.32	67.82	28.23	25.66
95	47.13	223.24	55.05	2.53	10.34	8.44	12.93	81.90	64.11	26.89	23.84
100	43.28	206.72	52.35	2.06	9.69	7.84	12.11	77.64	60.38	25.60	22.17
105	39.59	191.24	49.72	1.61	9.11	7.25	11.38	73.40	56.76	24.34	20.60
110	36.01	178.59	47.15	1.19	8.55	6.69	10.69	69.30	53.16	23.10	19.09
115	32.48	167.43	44.63	0.77	8.02	6.13	10.04	65.21	49.90	21.87	17.62
120	29.01	157.16	42.13	0.47	7.51	5.59	9.41	61.18	47.24	20.66	16.17
125	25.59	147.39	39.75	0.30	6.99	5.04	8.78	58.01	44.82	19.62	14.74
130	23.14	137.98	37.84	0.19	6.49	4.50	8.16	55.20	42.56	18.72	13.31
135	21.21	128.72	36.13	0.12	5.99	4.07	7.54	52.60	40.38	17.90	11.90
140	19.56	119.59	34.53	0.07	5.49	3.75	6.93	50.10	38.26	17.12	10.81
145	18.07	110.59	32.99	0.04	4.99	3.48	6.32	47.70	36.17	16.37	9.97
150	16.71	101.62	31.50	0.02	4.50	3.24	5.71	45.34	34.12	15.63	9.28
155	15.41	92.68	30.04	0.01	4.16	3.02	5.25	43.01	32.08	14.91	8.65
160	14.17	83.82	28.60	0.01	3.89	2.82	4.89	40.72	30.06	14.20	8.09
165	12.98	76.93	27.18	0.00	3.66	2.62	4.59	38.45	28.04	13.49	7.55
170	11.81	71.69	25.77	0.00	3.44	2.43	4.33	36.18	26.03	12.79	7.03
175	10.65	67.31	24.36	0.00	3.25	2.25	4.08	33.92	24.01	12.09	6.54
180	9.49	63.39	22.96	0.00	3.06	2.06	3.85	31.65	22.01	11.39	6.06
185	8.34	59.82	21.55	0.00	2.89	1.88	3.63	29.39	20.42	10.69	5.58
190	7.19	56.44	20.15	0.00	2.72	1.70	3.42	27.14	19.23	9.99	5.10
195	6.04	53.20	18.75	0.00	2.55	1.52	3.21	25.05	18.23	9.29	4.63
200	4.88	50.10	17.35	0.00	2.38	1.34	3.01	23.58	17.34	8.60	4.15
205	3.73	47.07	16.17	0.00	2.21	1.16	2.80	22.39	16.53	8.06	3.68
210	2.59	44.07	15.30	0.00	2.05	0.97	2.60	21.35	15.77	7.65	3.21
215	1.53	41.08	14.59	0.00	1.88	0.79	2.40	20.41	15.04	7.30	2.73
220	0.96	38.10	13.96	0.00	1.71	0.61	2.19	19.54	14.33	7.00	2.26
225	0.61	35.12	13.39	0.00	1.55	0.43	1.99	18.70	13.65	6.72	1.79
230	0.39	32.14	12.85	0.00	1.38	0.25	1.79	17.90	12.97	6.45	1.31
235	0.24	29.16	12.34	0.00	1.22	0.16	1.58	17.12	12.30	6.20	0.85
240	0.15	26.19	11.84	0.00	1.05	0.10	1.38	16.36	11.62	5.96	0.51
245	0.08	23.22	11.37	0.00	0.89	0.07	1.18	15.60	10.95	5.72	0.33
250	0.04	20.24	10.89	0.00	0.72	0.04	0.98	14.84	10.28	5.48	0.21
255	0.02	17.27	10.42	0.00	0.55	0.02	0.77	14.09	9.61	5.25	0.13
260	0.01	14.30	9.95	0.00	0.39	0.01	0.57	13.33	8.93	5.01	0.08
265	0.01	11.33	9.48	0.00	0.23	0.01	0.37	12.58	8.26	4.78	0.05
270	0.01	8.36	9.02	0.00	0.14	0.00	0.22	11.82	7.59	4.55	0.02
275	0.01	5.42	8.55	0.00	0.09	0.00	0.14	11.07	6.92	4.31	0.01
280	0.00	3.28	8.08	0.00	0.06	0.00	0.09	10.31	6.25	4.08	0.01
285	0.00	2.08	7.61	0.00	0.04	0.00	0.06	9.56	5.58	3.85	0.01
290	0.00	1.33	7.14	0.00	0.02	0.00	0.03	8.81	4.91	3.61	0.00
295	0.00	0.83	6.68	0.00	0.01	0.00	0.02	8.06	4.24	3.38	0.00
300	0.00	0.51	6.21	0.00	0.01	0.00	0.01	7.30	3.57	3.15	0.00
305	0.00	0.30	5.74	0.00	0.00	0.00	0.01	6.55	2.90	2.91	0.00
310	0.00	0.16	5.27	0.00	0.00	0.00	0.00	5.80	2.23	2.68	0.00
315	0.00	0.08	4.81	0.00	0.00	0.00	0.00	5.04	1.56	2.45	0.00
320	0.00	0.05	4.34	0.00	0.00	0.00	0.00	4.29	0.92	2.21	0.00
325	0.00	0.03	3.87	0.00	0.00	0.00	0.00	3.54	0.58	1.98	0.00
330	0.00	0.02	3.40	0.00	0.00	0.00	0.00	2.78	0.37	1.75	0.00
335	0.00	0.02	2.94	0.00	0.00	0.00	0.00	2.03	0.24	1.52	0.00
340	0.00	0.01	2.47	0.00	0.00	0.00	0.00	1.29	0.14	1.28	0.00
345	0.00	0.01	2.00	0.00	0.00	0.00	0.00	0.79	0.09	1.05	0.00
350	0.00	0.01	1.53	0.00	0.00	0.00	0.00	0.50	0.05	0.82	0.00
355	0.00	0.00	1.07	0.00	0.00	0.00	0.00	0.32	0.02	0.58	0.00
360	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.20	0.01	0.35	0.00
365	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.12	0.01	0.22	0.00
370	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.07	0.01	0.14	0.00
375	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.04	0.00	0.09	0.00
380	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.02	0.00	0.06	0.00
385	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00
390	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00
395	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
400	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
405	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
415	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
420	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
425	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
430	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
435	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
445	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
450	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
455	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

50 YEAR EXISTING RESULTS

Printouts for Unit Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	OS1	OS2	OS3	OS4	(FUTURE) POND A	(FUTURE) POND B	(FUTURE) POND E	(FUTURE) POND F
5	34.25	41.05	9.89	16.16	10.07	11.54	11.16	13.93	14.38	7.53	19.75
10	76.06	119.88	29.03	15.13	16.88	15.93	20.27	41.07	41.18	20.49	39.12
15	91.49	202.08	47.24	12.34	16.98	15.70	20.99	68.32	64.21	29.33	42.59
20	90.26	260.75	59.12	10.37	16.63	15.12	20.62	86.86	78.15	33.12	41.76
25	85.94	296.41	65.08	8.51	16.01	14.21	19.92	97.37	82.97	33.17	39.96
30	78.61	308.21	65.68	7.24	15.13	12.96	18.88	99.71	82.42	32.79	37.19
35	68.48	304.17	64.96	6.14	13.97	11.67	17.51	98.76	80.70	32.10	33.45
40	63.10	292.16	63.55	5.04	12.68	10.85	15.81	96.53	77.81	31.11	30.54
45	57.72	272.16	61.43	3.94	11.92	10.04	14.88	93.03	73.75	29.82	28.36
50	52.34	244.17	58.62	3.10	11.17	9.22	13.95	88.25	68.52	28.22	26.19
55	46.96	222.34	55.11	2.74	10.42	8.40	13.03	82.20	62.18	26.32	24.01
60	43.37	207.93	50.90	2.37	9.67	7.74	12.11	74.86	59.03	24.56	21.83
65	40.28	193.52	47.87	2.00	8.92	7.25	11.19	71.28	55.88	23.49	20.35
70	37.18	179.11	45.68	1.64	8.32	6.76	10.37	67.72	52.72	22.41	19.08
75	34.09	164.69	43.49	1.27	7.87	6.28	9.83	64.17	49.57	21.34	17.80
80	31.00	151.98	41.30	0.91	7.42	5.79	9.28	60.61	46.42	20.27	16.53
85	27.91	143.99	39.11	0.54	6.98	5.31	8.73	57.05	43.27	19.19	15.26
90	24.81	136.00	36.92	0.17	6.53	4.82	8.19	53.49	40.70	18.12	13.99
95	21.72	128.00	34.73	0.00	6.09	4.33	7.64	49.94	38.90	17.05	12.71
100	18.63	120.01	32.69		5.64	3.85	7.10	47.88	37.09	16.25	11.44
105	17.39	112.02	31.43		5.20	3.36	6.55	45.86	35.29	15.62	10.17
110	16.36	104.02	30.17		4.75	3.08	6.00	43.83	33.48	14.99	8.90
115	15.33	96.03	28.92		4.30	2.92	5.46	41.81	31.68	14.37	8.23
120	14.29	88.04	27.66		3.86	2.76	4.91	39.78	29.87	13.74	7.80
125	13.26	80.04	26.40		3.41	2.60	4.37	37.75	28.07	13.11	7.38
130	12.23	72.05	25.14		3.26	2.43	4.08	35.73	26.26	12.49	6.96
135	11.20	64.06	23.88		3.12	2.27	3.90	33.70	24.46	11.86	6.53
140	10.17	59.78	22.63		2.97	2.11	3.72	31.67	22.66	11.23	6.11
145	9.14	57.12	21.37		2.82	1.95	3.53	29.65	20.85	10.60	5.68
150	8.11	54.45	20.11		2.67	1.79	3.35	27.62	19.05	9.98	5.26
155	7.08	51.79	18.85		2.52	1.62	3.17	25.59	17.24	9.35	4.83
160	6.05	49.12	17.59		2.37	1.46	2.99	23.57	16.21	8.72	4.41
165	5.02	46.46	16.34		2.22	1.30	2.81	21.54	15.61	8.10	3.99
170	3.99	43.80	15.08		2.08	1.14	2.63	19.80	15.00	7.47	3.56
175	2.96	41.13	13.82		1.93	0.97	2.44	19.13	14.40	6.84	3.14
180	1.93	38.47	12.96		1.78	0.81	2.26	18.45	13.80	6.51	2.71
185	0.90	35.80	12.54		1.63	0.65	2.08	17.78	13.20	6.30	2.29
190	0.00	33.14	12.12		1.48	0.49	1.90	17.10	12.60	6.09	1.87
195		30.47	11.70		1.33	0.33	1.72	16.43	12.00	5.88	1.44
200		27.81	11.28		1.18	0.16	1.53	15.75	11.40	5.67	1.02
205		25.14	10.86		1.04	0.00	1.35	15.08	10.79	5.46	0.59
210		22.48	10.44		0.89	0.00	1.17	14.40	10.19	5.25	0.17
215		19.81	10.02		0.74		0.99	13.73	9.59	5.04	0.00
220		17.15	9.60		0.59		0.81	13.05	8.99	4.83	
225		14.49	9.18		0.44		0.62	12.37	8.39	4.63	
230		11.82	8.76		0.29		0.44	11.70	7.79	4.42	
235		9.16	8.35		0.14		0.26	11.02	7.18	4.21	
240		6.49	7.93		0.00		0.08	10.35	6.58	4.00	
245		3.83	7.51				0.00	9.67	5.98	3.79	
250		1.16	7.09					9.00	5.38	3.58	
255		0.00	6.67					8.32	4.78	3.37	
260			6.25					7.65	4.18	3.16	
265			5.83					6.97	3.57	2.95	
270			5.41					6.30	2.97	2.74	
275			4.99					5.62	2.37	2.53	
280			4.57					4.94	1.77	2.33	
285			4.15					4.27	1.17	2.12	
290			3.73					3.59	0.57	1.91	
295			3.31					2.92	0.00	1.70	
300			2.89					2.24		1.49	
305			2.47					1.57		1.28	
310			2.06					0.89		1.07	
315			1.64					0.22		0.86	
320			1.22					0.00		0.65	
325			0.80							0.44	
330			0.38							0.24	
335			0.00							0.03	
340										0.00	

50 YEAR EXISTING RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
EX1		0.157	0.201	50.0	9.21	26.0	6.51	15.4	92	354,215	1.11	394,861	50.0	85	394,487	0.87
EX2		0.157	0.322	66.7	17.98	34.7	12.71	30.0	308	1,591,610	1.11	1,774,244	65.0	310	1,774,370	0.71
EX3		0.157	0.220	88.3	16.43	45.9	11.61	27.4	66	449,576	1.11	501,164	70.0	68	501,144	0.55
OS1		0.157	0.067	24.3	2.75	12.7	1.94	4.6	16	30,456	1.11	33,950	40.0	12	33,313	1.44
OS2		0.157	0.105	63.2	6.59	32.8	4.66	11.0	17	83,490	1.11	93,070	55.0	16	93,077	0.71
OS3		0.157	0.095	54.0	5.43	28.1	3.84	9.1	16	66,647	1.11	74,294	50.0	15	74,233	0.81
OS4		0.157	0.116	63.8	7.17	33.2	5.07	12.0	21	104,000	1.11	115,933	55.0	20	115,909	0.71
(FUTURE) POND A		0.157	0.246	83.6	17.26	43.5	12.20	28.8	100	645,632	1.11	719,717	70.0	102	719,495	0.57
(FUTURE) POND B		0.157	0.227	77.8	15.08	40.4	10.66	25.1	83	499,738	1.11	557,083	65.0	84	556,887	0.61
(FUTURE) POND E		0.157	0.165	88.5	12.70	46.0	8.98	21.2	33	227,891	1.11	254,042	65.0	34	254,056	0.54
(FUTURE) POND F		0.157	0.150	55.9	7.93	29.1	5.61	13.2	43	184,549	1.11	205,726	50.0	40	205,651	0.79

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
EX1		50 YR	0.152	0.266	0.604	0.007	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
EX2		50 YR	0.685	0.560	1.055	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
EX3		50 YR	0.194	0.434	0.961	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
OS1		50 YR	0.013	0.085	0.042	0.007	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
OS2		50 YR	0.036	0.320	0.160	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
OS3		50 YR	0.029	0.244	0.122	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
OS4		50 YR	0.045	0.333	0.167	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
(FUTURE) POND A		50 YR	0.278	0.309	0.617	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
(FUTURE) POND B		50 YR	0.215	0.332	0.664	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
(FUTURE) POND E		50 YR	0.098	0.271	0.487	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72
(FUTURE) POND F		50 YR	0.079	0.168	0.400	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72

100 YEAR EXISTING RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	OS1	OS2	OS3	OS4	(FUTURE) POND A	(FUTURE) POND B	(FUTURE) POND E	(FUTURE) POND F
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.06	0.07	0.02	0.03	0.02	0.02	0.02	0.02	0.03	0.01	0.03
25	2.58	3.15	0.76	1.18	0.75	0.85	0.83	1.07	1.10	0.57	1.48
30	26.38	33.84	8.16	10.89	7.35	8.16	8.26	11.51	11.78	6.09	14.85
35	63.70	100.69	24.24	15.19	14.67	14.47	17.37	34.38	34.28	16.98	33.11
40	91.69	186.40	43.80	15.62	18.48	17.52	22.46	63.10	60.06	27.93	44.45
45	106.12	267.95	61.40	15.09	20.49	19.06	25.14	89.69	82.09	35.96	50.27
50	112.67	334.60	74.75	14.03	21.58	19.66	26.61	110.72	97.33	40.69	53.13
55	113.14	380.41	83.08	12.80	21.86	19.43	27.08	124.53	106.31	43.55	53.62
60	109.11	406.94	88.23	11.76	21.63	18.88	26.87	132.96	111.53	45.30	52.42
65	105.76	419.37	91.48	10.81	21.16	18.47	26.27	138.10	114.26	46.34	51.05
70	100.99	417.92	92.88	9.00	20.33	17.49	25.30	140.18	114.31	46.48	48.95
75	93.92	402.36	92.20	7.39	19.20	16.27	23.94	138.90	111.29	45.53	45.89
80	85.90	381.18	89.55	6.18	18.01	14.99	22.49	134.35	105.72	43.66	42.53
85	78.69	359.90	85.34	5.20	16.80	13.81	21.00	127.28	100.36	41.43	39.11
90	72.21	337.42	80.96	4.37	15.60	12.78	19.52	120.82	95.07	39.46	36.10
95	66.25	314.13	77.00	3.63	14.50	11.85	18.13	114.70	89.80	37.59	33.47
100	60.82	290.78	73.21	2.95	13.57	10.99	16.96	108.66	84.58	35.77	31.10
105	55.61	268.75	69.50	2.32	12.75	10.17	15.93	102.71	79.41	33.98	28.88
110	50.56	250.36	65.86	1.72	11.97	9.37	14.96	96.85	74.32	32.23	26.74
115	45.64	234.44	62.27	1.17	11.21	8.60	14.04	91.04	69.76	30.49	24.67
120	40.86	219.89	58.76	0.75	10.49	7.84	13.14	85.47	66.01	28.83	22.65
125	36.24	206.06	55.50	0.49	9.77	7.09	12.26	81.02	62.60	27.37	20.67
130	32.75	192.73	52.81	0.32	9.07	6.35	11.40	77.06	59.39	26.11	18.71
135	29.97	179.74	50.39	0.20	8.38	5.76	10.55	73.37	56.31	24.95	16.79
140	27.55	167.11	48.12	0.12	7.69	5.29	9.71	69.84	53.31	23.85	15.26
145	25.39	154.74	45.94	0.06	7.01	4.90	8.87	66.43	50.40	22.78	14.07
150	23.40	142.40	43.84	0.02	6.34	4.55	8.05	63.12	47.56	21.75	13.05
155	21.53	130.08	41.79	0.01	5.86	4.23	7.39	59.89	44.77	20.74	12.14
160	19.79	118.03	39.80	0.01	5.47	3.93	6.88	56.75	41.98	19.76	11.31
165	18.16	108.36	37.85	0.00	5.13	3.65	6.44	53.62	39.20	18.79	10.53
170	16.56	100.84	35.91	0.00	4.82	3.39	6.05	50.49	36.42	17.83	9.80
175	14.97	94.44	33.97	0.00	4.53	3.14	5.70	47.37	33.64	16.86	9.13
180	13.38	88.72	32.03	0.00	4.27	2.89	5.37	44.24	30.91	15.89	8.47
185	11.79	83.50	30.09	0.00	4.02	2.64	5.05	41.12	28.69	14.93	7.81
190	10.20	78.62	28.16	0.00	3.78	2.39	4.76	38.03	26.97	13.96	7.16
195	8.61	74.05	26.22	0.00	3.55	2.14	4.48	35.18	25.52	13.00	6.50
200	7.02	69.80	24.31	0.00	3.32	1.89	4.20	33.07	24.22	12.05	5.85
205	5.43	65.65	22.68	0.00	3.09	1.64	3.92	31.34	23.04	11.29	5.19
210	3.85	61.53	21.43	0.00	2.87	1.39	3.64	29.82	21.93	10.71	4.54
215	2.42	57.42	20.40	0.00	2.64	1.14	3.36	28.44	20.90	10.20	3.89
220	1.58	53.31	19.48	0.00	2.41	0.89	3.08	27.17	19.93	9.76	3.23
225	1.04	49.19	18.64	0.00	2.18	0.64	2.80	25.98	19.00	9.35	2.58
230	0.66	45.09	17.86	0.00	1.95	0.40	2.52	24.86	18.06	8.96	1.93
235	0.40	40.98	17.13	0.00	1.72	0.26	2.24	23.80	17.14	8.61	1.29
240	0.22	36.87	16.45	0.00	1.49	0.17	1.96	22.76	16.21	8.27	0.83
245	0.09	32.77	15.80	0.00	1.26	0.11	1.68	21.71	15.28	7.95	0.54
250	0.03	28.66	15.15	0.00	1.03	0.07	1.40	20.67	14.35	7.62	0.35
255	0.02	24.56	14.50	0.00	0.81	0.04	1.12	19.63	13.42	7.30	0.22
260	0.01	20.46	13.85	0.00	0.58	0.02	0.84	18.59	12.50	6.98	0.13
265	0.01	16.36	13.21	0.00	0.36	0.01	0.56	17.55	11.57	6.66	0.06
270	0.01	12.26	12.56	0.00	0.24	0.00	0.36	16.50	10.64	6.33	0.02
275	0.01	8.27	11.91	0.00	0.16	0.00	0.24	15.46	9.72	6.01	0.01
280	0.00	5.28	11.27	0.00	0.10	0.00	0.15	14.42	8.79	5.69	0.01
285	0.00	3.46	10.62	0.00	0.06	0.00	0.10	13.38	7.87	5.37	0.00
290	0.00	2.26	9.97	0.00	0.03	0.00	0.06	12.34	6.94	5.04	0.00
295	0.00	1.41	9.33	0.00	0.01	0.00	0.03	11.30	6.01	4.72	0.00
300	0.00	0.82	8.68	0.00	0.00	0.00	0.01	10.26	5.09	4.40	0.00
305	0.00	0.41	8.04	0.00	0.00	0.00	0.00	9.22	4.16	4.08	0.00
310	0.00	0.16	7.39	0.00	0.00	0.00	0.00	8.18	3.24	3.76	0.00
315	0.00	0.06	6.75	0.00	0.00	0.00	0.00	7.14	2.31	3.44	0.00
320	0.00	0.04	6.10	0.00	0.00	0.00	0.00	6.10	1.45	3.11	0.00
325	0.00	0.03	5.46	0.00	0.00	0.00	0.00	5.06	0.95	2.79	0.00
330	0.00	0.02	4.81	0.00	0.00	0.00	0.00	4.03	0.63	2.47	0.00
335	0.00	0.02	4.17	0.00	0.00	0.00	0.00	2.99	0.40	2.15	0.00
340	0.00	0.01	3.52	0.00	0.00	0.00	0.00	1.98	0.24	1.83	0.00
345	0.00	0.01	2.87	0.00	0.00	0.00	0.00	1.27	0.13	1.51	0.00
350	0.00	0.01	2.23	0.00	0.00	0.00	0.00	0.83	0.06	1.18	0.00
355	0.00	0.00	1.59	0.00	0.00	0.00	0.00	0.54	0.02	0.86	0.00
360	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.34	0.01	0.55	0.00
365	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.19	0.01	0.36	0.00
370	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.10	0.01	0.24	0.00
375	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.04	0.00	0.15	0.00
380	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.02	0.00	0.09	0.00
385	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.01	0.00	0.05	0.00
390	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00
395	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
400	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
405	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
415	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
420	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
425	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
430	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
435	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
445	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
450	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
455	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

100 YEAR EXISTING RESULTS

Printouts for Unit Hydrographs

flow in cfs

time in minutes	EX1	EX2	EX3	OS1	OS2	OS3	OS4	(FUTURE) POND A	(FUTURE) POND B	(FUTURE) POND E	(FUTURE) POND F
5	34.29	41.10	9.90	16.16	10.08	11.55	11.17	13.95	14.40	7.54	19.76
10	76.11	120.01	29.06	15.13	16.88	15.93	20.28	41.12	41.22	20.51	39.14
15	91.49	202.25	47.28	12.34	16.98	15.70	20.99	68.37	64.25	29.35	42.59
20	90.25	260.90	59.15	10.37	16.63	15.12	20.62	86.91	78.18	33.12	41.76
25	85.93	296.51	65.09	8.51	16.01	14.21	19.92	97.40	82.97	33.17	39.96
30	78.60	308.22	65.68	7.24	15.13	12.96	18.88	99.71	82.42	32.79	37.19
35	68.47	304.15	64.96	6.14	13.97	11.67	17.51	98.76	80.69	32.10	33.45
40	63.09	292.11	63.54	5.04	12.68	10.85	15.81	96.52	77.80	31.11	30.54
45	57.72	272.08	61.43	3.94	11.92	10.04	14.88	93.02	73.74	29.82	28.36
50	52.34	244.08	58.61	3.10	11.17	9.22	13.95	88.24	68.50	28.22	26.18
55	46.96	222.31	55.10	2.74	10.42	8.40	13.03	82.18	62.17	26.32	24.01
60	43.37	207.90	50.88	2.37	9.67	7.74	12.11	74.85	59.02	24.56	21.83
65	40.27	193.49	47.87	2.00	8.92	7.25	11.19	71.27	55.87	23.49	20.35
70	37.18	179.08	45.68	1.64	8.32	6.76	10.37	67.72	52.72	22.41	19.08
75	34.09	164.67	43.49	1.27	7.87	6.28	9.82	64.16	49.57	21.34	17.80
80	31.00	151.97	41.30	0.91	7.42	5.79	9.28	60.60	46.42	20.27	16.53
85	27.90	143.98	39.11	0.54	6.98	5.30	8.73	57.04	43.27	19.19	15.26
90	24.81	135.98	36.92	0.17	6.53	4.82	8.19	53.49	40.70	18.12	13.99
95	21.72	127.99	34.73	0.00	6.09	4.33	7.64	49.93	38.90	17.05	12.71
100	18.63	120.00	32.69		5.64	3.85	7.10	47.88	37.09	16.25	11.44
105	17.39	112.00	31.43		5.20	3.36	6.55	45.85	35.29	15.62	10.17
110	16.36	104.01	30.17		4.75	3.08	6.00	43.83	33.48	14.99	8.90
115	15.32	96.02	28.91		4.30	2.92	5.46	41.80	31.68	14.37	8.23
120	14.29	88.02	27.66		3.86	2.76	4.91	39.78	29.87	13.74	7.80
125	13.26	80.03	26.40		3.41	2.60	4.37	37.75	28.07	13.11	7.38
130	12.23	72.04	25.14		3.26	2.43	4.08	35.72	26.26	12.48	6.96
135	11.20	64.04	23.88		3.12	2.27	3.90	33.70	24.46	11.86	6.53
140	10.17	59.78	22.62		2.97	2.11	3.72	31.67	22.65	11.23	6.11
145	9.14	57.11	21.37		2.82	1.95	3.53	29.64	20.85	10.60	5.68
150	8.11	54.45	20.11		2.67	1.79	3.35	27.62	19.04	9.98	5.26
155	7.08	51.79	18.85		2.52	1.62	3.17	25.59	17.24	9.35	4.83
160	6.05	49.12	17.59		2.37	1.46	2.99	23.56	16.21	8.72	4.41
165	5.02	46.46	16.33		2.22	1.30	2.81	21.54	15.61	8.09	3.99
170	3.99	43.79	15.08		2.08	1.14	2.63	19.80	15.00	7.47	3.56
175	2.96	41.13	13.82		1.93	0.97	2.44	19.13	14.40	6.84	3.14
180	1.92	38.46	12.96		1.78	0.81	2.26	18.45	13.80	6.51	2.71
185	0.89	35.80	12.54		1.63	0.65	2.08	17.78	13.20	6.30	2.29
190	0.00	33.13	12.12		1.48	0.49	1.90	17.10	12.60	6.09	1.87
195		30.47	11.70		1.33	0.33	1.72	16.43	12.00	5.88	1.44
200		27.81	11.28		1.18	0.16	1.53	15.75	11.39	5.67	1.02
205		25.14	10.86		1.04	0.00	1.35	15.08	10.79	5.46	0.59
210		22.48	10.44		0.89	0.00	1.17	14.40	10.19	5.25	0.17
215		19.81	10.02		0.74		0.99	13.72	9.59	5.04	0.00
220		17.15	9.60		0.59		0.81	13.05	8.99	4.83	
225		14.48	9.18		0.44		0.62	12.37	8.39	4.62	
230		11.82	8.76		0.29		0.44	11.70	7.79	4.42	
235		9.15	8.34		0.14		0.26	11.02	7.18	4.21	
240		6.49	7.93		0.00		0.08	10.35	6.58	4.00	
245		3.82	7.51				0.00	9.67	5.98	3.79	
250		1.16	7.09					9.00	5.38	3.58	
255		0.00	6.67					8.32	4.78	3.37	
260			6.25					7.65	4.18	3.16	
265			5.83					6.97	3.57	2.95	
270			5.41					6.29	2.97	2.74	
275			4.99					5.62	2.37	2.53	
280			4.57					4.94	1.77	2.33	
285			4.15					4.27	1.17	2.12	
290			3.73					3.59	0.57	1.91	
295			3.31					2.92	0.00	1.70	
300			2.89					2.24		1.49	
305			2.47					1.57		1.28	
310			2.05					0.89		1.07	
315			1.64					0.21		0.86	
320			1.22					0.00		0.65	
325			0.80							0.44	
330			0.38							0.24	
335			0.00							0.03	
340										0.00	

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
EX1		0.157	0.201	50.0	9.21	26.0	6.51	15.3	92	354,215	1.54	545,247	55.0	113	544,731	1.16
EX2		0.157	0.322	66.7	17.97	34.7	12.70	30.0	308	1,591,610	1.54	2,449,981	65.0	419	2,450,150	0.96
EX3		0.157	0.220	88.3	16.42	45.9	11.60	27.4	66	449,576	1.54	692,036	70.0	93	692,008	0.75
OS1		0.157	0.067	24.3	2.74	12.7	1.94	4.6	16	30,456	1.54	46,881	40.0	16	45,999	1.86
OS2		0.157	0.105	63.2	6.59	32.8	4.65	11.0	17	83,490	1.54	128,517	55.0	22	128,526	0.95
OS3		0.157	0.095	54.0	5.43	28.1	3.84	9.0	16	66,647	1.54	102,590	50.0	20	102,504	1.07
OS4		0.157	0.116	63.8	7.17	33.2	5.07	11.9	21	104,000	1.54	160,087	55.0	27	160,053	0.95
(FUTURE) POND A		0.157	0.245	83.6	17.25	43.5	12.19	28.7	100	645,632	1.54	993,827	70.0	140	993,518	0.79
(FUTURE) POND B		0.157	0.227	77.8	15.07	40.4	10.65	25.1	83	499,738	1.54	769,252	70.0	114	768,983	0.83
(FUTURE) POND E		0.157	0.165	88.5	12.69	46.0	8.97	21.2	33	227,891	1.54	350,796	70.0	46	350,815	0.74
(FUTURE) POND F		0.157	0.150	55.9	7.93	29.1	5.60	13.2	43	184,549	1.54	284,078	55.0	54	283,975	1.05

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
EX1		100 YR	0.152	0.266	0.604	0.007	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX2		100 YR	0.685	0.560	1.055	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
EX3		100 YR	0.194	0.434	0.961	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
OS1		100 YR	0.013	0.085	0.042	0.007	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
OS2		100 YR	0.036	0.320	0.160	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
OS3		100 YR	0.029	0.244	0.122	0.004	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
OS4		100 YR	0.045	0.333	0.167	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
(FUTURE) POND A		100 YR	0.278	0.309	0.617	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
(FUTURE) POND B		100 YR	0.215	0.332	0.664	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
(FUTURE) POND E		100 YR	0.098	0.271	0.487	0.001	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75
(FUTURE) POND F		100 YR	0.079	0.168	0.400	0.003	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75

CUHP SUBCATCHMENTS

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi^2)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
A		100 YR	0.2779063	0.308523	0.617045	0.0091	34.43	0.35	0.1	4.5	0.0018	0.6	0
B		100 YR	0.215109	0.332197	0.664394	0.011	36.39	0.35	0.1	4.5	0.0018	0.6	0
C		100 YR	0.115031	0.277936	0.555871	0.0098	5.99	0.35	0.1	4.5	0.0018	0.6	0
D		100 YR	0.0707031	0.262689	0.52379	0.023	9.58	0.35	0.1	4.5	0.0018	0.6	0
E1		100 YR	0.0294844	0.082008	0.164015	0.0136	66.18	0.35	0.1	4.5	0.0018	0.6	0
E2		100 YR	0.068625	0.325758	0.651515	0.0114	22.08	0.35	0.1	4.5	0.0018	0.6	0
F		100 YR	0.0794375	0.131913	0.263826	0.0285	36.56	0.35	0.1	4.5	0.0018	0.6	0
G		100 YR	0.005828	0.018277	0.036553	0.0109	2	0.35	0.1	4.5	0.0018	0.6	0
H		100 YR	0.169016	0.300852	0.601705	0.005	2	0.35	0.1	4.5	0.0018	0.6	0

Typical Depression Losses for Various Land Covers (All Values in Inches)

Land Cover	Range in Depression (Retention) Losses	Recommended
Impervious:		
Large paved areas	0.05 - 0.15	0.1
Roofs-flat	0.1 - 0.3	0.1
Roofs-sloped	0.05 - 0.1	0.05
Pervious:		
Lawn grass	0.2 - 0.5	0.35
Wooded areas and open fields	0.2 - 0.6	0.4

Recommended Horton's Equation Parameters

NRCS Hydrologic Soil Group	Infiltration (inches per hour)		Decay Coefficient - a
	Initial - f_i	Final - f_o	
A	5.0	1.0	0.0007
B	4.5	0.6	0.0018
C	3.0	0.5	0.0018
D	3.0	0.5	0.0018

5 YEAR PROPOSED RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	A	B	C	D	E1	E2	F	G	H
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	3.13	2.56	0.02	0.04	3.64	0.12	3.20	0.00	0.00
20	12.61	10.34	0.07	0.15	11.11	0.53	10.27	0.00	0.01
25	38.62	30.33	0.99	1.43	23.66	2.29	28.17	0.12	0.30
30	68.64	53.06	4.19	4.31	25.69	5.01	38.55	0.95	2.74
35	81.61	63.08	7.14	6.02	20.77	6.70	34.69	0.86	6.21
40	79.72	62.24	8.11	6.30	16.25	7.23	28.73	0.64	8.27
45	72.91	57.43	8.12	6.16	12.70	7.37	23.59	0.48	8.73
50	66.35	52.56	7.82	5.83	10.38	7.37	19.48	0.35	8.58
55	60.44	48.10	7.27	5.40	8.17	7.22	16.14	0.25	8.15
60	55.44	44.35	6.64	5.03	6.47	6.96	13.91	0.19	7.48
65	51.13	41.26	6.20	4.71	5.49	6.70	12.02	0.15	6.76
70	46.94	38.26	5.80	4.40	5.11	6.50	10.27	0.10	6.27
75	42.45	34.95	5.37	4.08	4.63	6.29	8.24	0.05	5.82
80	37.87	31.39	4.93	3.78	4.17	6.04	6.55	0.02	5.35
85	34.32	28.38	4.58	3.52	3.88	5.77	5.62	0.01	4.89
90	31.70	26.20	4.26	3.26	3.70	5.50	5.14	0.01	4.52
95	29.40	24.47	3.96	3.01	3.59	5.26	4.82	0.01	4.23
100	26.90	22.63	3.66	2.76	3.12	5.04	4.26	0.00	3.94
105	24.27	20.68	3.35	2.51	2.81	4.82	3.84	0.00	3.65
110	21.72	18.80	3.05	2.26	2.62	4.60	3.53	0.00	3.36
115	19.27	16.99	2.75	2.02	2.51	4.39	3.30	0.00	3.08
120	16.81	15.18	2.45	1.81	2.32	4.17	3.04	0.00	2.79
125	13.83	12.84	2.17	1.65	1.46	3.93	2.22	0.00	2.51
130	10.74	10.30	1.98	1.53	0.90	3.66	1.56	0.00	2.22
135	8.39	7.99	1.84	1.42	0.54	3.40	1.09	0.00	1.96
140	6.79	6.27	1.72	1.32	0.31	3.14	0.74	0.00	1.82
145	5.55	5.10	1.60	1.21	0.17	2.89	0.49	0.00	1.71
150	4.53	4.19	1.48	1.11	0.07	2.65	0.33	0.00	1.61
155	3.69	3.46	1.37	1.02	0.01	2.44	0.21	0.00	1.51
160	2.97	2.83	1.26	0.92	0.00	2.29	0.11	0.00	1.41
165	2.37	2.29	1.15	0.83	0.00	2.16	0.05	0.00	1.31
170	1.86	1.83	1.05	0.74	0.00	2.03	0.01	0.00	1.21
175	1.47	1.46	0.94	0.65	0.00	1.92	0.00	0.00	1.12
180	1.16	1.17	0.84	0.57	0.00	1.81	0.00	0.00	1.02
185	0.91	0.93	0.74	0.48	0.00	1.70	0.00	0.00	0.93
190	0.68	0.73	0.63	0.39	0.00	1.60	0.00	0.00	0.83
195	0.50	0.55	0.53	0.30	0.00	1.50	0.00	0.00	0.74
200	0.35	0.40	0.43	0.22	0.00	1.41	0.00	0.00	0.64
205	0.23	0.28	0.33	0.14	0.00	1.32	0.00	0.00	0.55
210	0.14	0.19	0.23	0.08	0.00	1.23	0.00	0.00	0.45
215	0.07	0.11	0.13	0.06	0.00	1.14	0.00	0.00	0.36
220	0.02	0.06	0.07	0.05	0.00	1.05	0.00	0.00	0.26
225	0.00	0.02	0.05	0.04	0.00	0.97	0.00	0.00	0.17
230	0.00	0.00	0.04	0.03	0.00	0.88	0.00	0.00	0.08
235	0.00	0.00	0.03	0.02	0.00	0.80	0.00	0.00	0.03
240	0.00	0.00	0.02	0.02	0.00	0.72	0.00	0.00	0.02
245	0.00	0.00	0.02	0.01	0.00	0.64	0.00	0.00	0.01
250	0.00	0.00	0.01	0.01	0.00	0.56	0.00	0.00	0.01
255	0.00	0.00	0.01	0.01	0.00	0.48	0.00	0.00	0.01
260	0.00	0.00	0.01	0.01	0.00	0.40	0.00	0.00	0.01
265	0.00	0.00	0.01	0.00	0.00	0.32	0.00	0.00	0.00
270	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00
275	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00
285	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00
290	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
295	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00
300	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
305	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
310	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
315	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
325	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
330	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
335	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
340	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
345	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
350	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5 YEAR PROPOSED RESULTS

Printouts for Unit Hydrographs

flow in cfs

time in minutes	A	B	C	D	E1	E2	F	G	H
5	173.81	127.18	30.92	27.97	79.43	16.68	157.27	12.20	28.90
10	284.57	209.71	61.68	43.64	52.12	29.95	129.36	8.95	69.57
15	274.57	203.94	67.45	43.11	34.45	30.88	92.51	6.42	90.28
20	231.32	176.21	65.84	41.29	22.03	30.37	68.91	4.86	92.24
25	192.89	146.44	62.30	38.23	13.89	29.43	51.21	3.38	89.55
30	163.29	125.74	56.83	33.92	9.75	28.04	33.50	2.29	84.28
35	137.80	105.30	50.09	30.80	5.61	26.20	26.28	1.80	76.41
40	121.04	93.54	46.28	28.26	1.47	23.93	20.38	1.31	67.91
45	104.27	81.78	42.47	25.72	0.00	22.28	14.48	0.82	62.93
50	87.51	70.02	38.67	23.19		20.99	8.58	0.32	57.95
55	70.75	58.25	34.86	21.14		19.69	2.68	0.00	52.97
60	56.17	46.49	32.19	19.65		18.39	0.00		47.98
65	50.58	39.75	29.98	18.15		17.09			44.41
70	45.00	35.83	27.76	16.66		15.80			41.55
75	39.41	31.90	25.55	15.17		14.90			38.69
80	33.82	27.98	23.34	13.67		14.13			35.83
85	28.23	24.06	21.12	12.18		13.36			32.98
90	22.65	20.14	18.91	10.69		12.59			30.12
95	17.06	16.22	16.69	9.20		11.82			27.26
100	11.47	12.30	14.48	8.39		11.05			24.40
105	5.88	8.38	13.10	7.89		10.29			21.54
110	0.30	4.46	12.36	7.40		9.52			18.68
115	0.00	0.54	11.62	6.90		8.75			17.62
120		0.00	10.88	6.40		7.98			16.67
125			10.14	5.90		7.21			15.72
130			9.41	5.41		6.44			14.76
135			8.67	4.91		6.02			13.81
140			7.93	4.41		5.76			12.86
145			7.19	3.91		5.51			11.91
150			6.45	3.41		5.25			10.95
155			5.72	2.92		4.99			10.00
160			4.98	2.42		4.74			9.05
165			4.24	1.92		4.48			8.10
170			3.50	1.42		4.22			7.14
175			2.76	0.93		3.97			6.19
180			2.03	0.43		3.71			5.24
185			1.29	0.00		3.46			4.28
190			0.55			3.20			3.33
195			0.00			2.94			2.38
200						2.69			1.43
205						2.43			0.47
210						2.17			0.00
215						1.92			
220						1.66			
225						1.41			
230						1.15			
235						0.89			
240						0.64			
245						0.38			
250						0.12			
255						0.00			

5 YEAR PROPOSED RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.098	0.220	29.1	6.42	15.1	4.54	10.7	286	645,632	0.46	296,501	35.0	82	296,539	0.46
B		0.097	0.212	30.5	6.47	15.9	4.57	10.8	211	499,741	0.48	241,825	35.0	63	241,880	0.46
C		0.146	0.166	51.1	8.00	26.6	5.65	13.3	68	267,240	0.14	36,453	45.0	8	36,430	0.11
D		0.135	0.124	48.6	6.14	25.3	4.34	10.2	44	164,258	0.17	28,091	40.0	6	28,095	0.14
E1		0.082	0.124	11.0	2.55	5.7	1.80	4.2	80	68,498	0.85	58,321	30.0	26	55,871	1.36
E2		0.112	0.109	66.5	7.09	34.6	5.01	11.8	31	159,430	0.31	49,812	45.0	7	49,817	0.17
F		0.096	0.140	15.1	3.13	7.9	2.21	5.2	158	184,549	0.49	89,707	30.0	39	88,247	0.76
G		0.157	0.047	14.0	2.00	7.3	1.41	3.3	12	13,540	0.10	1,341	30.0	1	1,258	0.26
H		0.157	0.212	54.8	10.40	28.5	7.35	17.3	93	392,658	0.10	38,906	45.0	9	38,891	0.08

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A		5 YR	0.278	0.309	0.617	0.009	34.4	0.35	0.10	4.50	0.60	0.0018	0.00	0.69	0.18	31.61
B		5 YR	0.215	0.332	0.664	0.011	36.4	0.35	0.10	4.50	0.60	0.0018	0.00	0.73	0.19	33.72
C		5 YR	0.115	0.278	0.556	0.010	6.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.12	0.06	4.62
D		5 YR	0.071	0.263	0.524	0.023	9.6	0.35	0.10	4.50	0.60	0.0018	0.00	0.19	0.10	7.54
E1		5 YR	0.029	0.082	0.164	0.014	66.2	0.35	0.10	4.50	0.60	0.0018	0.00	0.91	0.29	64.47
E2		5 YR	0.069	0.326	0.652	0.011	22.1	0.35	0.10	4.50	0.60	0.0018	0.00	0.44	0.14	19.07
F		5 YR	0.079	0.132	0.264	0.029	36.6	0.35	0.10	4.50	0.60	0.0018	0.00	0.73	0.19	33.90
G		5 YR	0.006	0.018	0.037	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.00	0.02	1.49
H		5 YR	0.169	0.301	0.602	0.005	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.51

10 YEAR PROPOSED RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	A	B	C	D	E1	E2	F	G	H
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	4.65	3.79	0.02	0.06	5.34	0.18	4.72	0.00	0.00
20	18.41	14.58	0.25	0.38	14.19	0.97	14.18	0.03	0.07
25	62.93	48.20	4.26	4.46	32.82	4.49	46.31	1.28	3.15
30	109.79	83.46	11.89	10.14	34.10	9.12	59.18	2.42	10.90
35	127.50	97.20	17.31	12.90	27.41	11.68	52.34	2.10	18.79
40	123.41	95.24	19.16	13.49	21.45	12.56	43.59	1.69	22.99
45	113.18	87.97	19.37	13.32	16.98	12.87	36.08	1.32	24.22
50	102.30	80.07	18.61	12.51	13.42	12.79	28.67	0.94	23.94
55	92.43	72.65	17.17	11.57	10.72	12.44	23.83	0.69	22.62
60	84.61	66.92	15.80	10.77	8.60	11.94	20.61	0.52	20.69
65	77.83	62.16	14.70	10.05	7.45	11.48	17.75	0.38	18.92
70	71.24	57.52	13.66	9.35	7.05	11.12	15.07	0.24	17.50
75	64.96	52.97	12.63	8.73	6.92	10.79	12.70	0.13	16.15
80	58.89	48.07	11.72	8.18	6.24	10.41	10.44	0.06	14.83
85	53.43	43.46	10.92	7.63	5.30	9.93	8.54	0.04	13.64
90	48.52	39.59	10.17	7.07	4.69	9.41	7.32	0.02	12.67
95	44.05	36.24	9.42	6.51	4.30	8.97	6.50	0.02	11.81
100	39.99	33.23	8.69	5.96	4.05	8.58	5.93	0.01	10.98
105	36.20	30.46	7.97	5.42	3.88	8.23	5.55	0.01	10.17
110	32.56	27.82	7.25	4.89	3.77	7.88	5.27	0.01	9.36
115	28.80	25.12	6.53	4.35	3.58	7.52	4.88	0.01	8.56
120	24.74	22.17	5.81	3.91	3.20	7.14	4.32	0.00	7.75
125	19.98	18.49	5.19	3.59	2.02	6.71	3.09	0.00	6.94
130	15.41	14.61	4.74	3.32	1.25	6.26	2.16	0.00	6.14
135	12.18	11.23	4.41	3.07	0.75	5.80	1.50	0.00	5.52
140	9.91	8.92	4.10	2.84	0.43	5.35	1.03	0.00	5.13
145	8.10	7.31	3.82	2.62	0.22	4.91	0.69	0.00	4.81
150	6.60	6.01	3.54	2.40	0.09	4.50	0.46	0.00	4.51
155	5.35	4.93	3.27	2.19	0.02	4.16	0.28	0.00	4.23
160	4.27	4.01	3.00	1.99	0.00	3.91	0.14	0.00	3.95
165	3.37	3.22	2.74	1.78	0.00	3.68	0.05	0.00	3.67
170	2.63	2.56	2.48	1.59	0.00	3.47	0.01	0.00	3.39
175	2.06	2.02	2.23	1.40	0.00	3.28	0.00	0.00	3.12
180	1.61	1.60	1.98	1.20	0.00	3.09	0.00	0.00	2.84
185	1.25	1.26	1.74	1.01	0.00	2.91	0.00	0.00	2.57
190	0.95	0.98	1.49	0.82	0.00	2.73	0.00	0.00	2.30
195	0.69	0.75	1.24	0.64	0.00	2.56	0.00	0.00	2.03
200	0.47	0.55	1.00	0.45	0.00	2.40	0.00	0.00	1.76
205	0.30	0.38	0.75	0.28	0.00	2.24	0.00	0.00	1.49
210	0.17	0.24	0.51	0.18	0.00	2.08	0.00	0.00	1.23
215	0.07	0.14	0.30	0.14	0.00	1.93	0.00	0.00	0.96
220	0.02	0.06	0.18	0.11	0.00	1.78	0.00	0.00	0.69
225	0.00	0.02	0.13	0.09	0.00	1.63	0.00	0.00	0.42
230	0.00	0.00	0.10	0.07	0.00	1.49	0.00	0.00	0.21
235	0.00	0.00	0.08	0.06	0.00	1.34	0.00	0.00	0.10
240	0.00	0.00	0.06	0.04	0.00	1.20	0.00	0.00	0.06
245	0.00	0.00	0.05	0.03	0.00	1.06	0.00	0.00	0.04
250	0.00	0.00	0.04	0.02	0.00	0.92	0.00	0.00	0.03
255	0.00	0.00	0.03	0.02	0.00	0.78	0.00	0.00	0.02
260	0.00	0.00	0.02	0.01	0.00	0.64	0.00	0.00	0.02
265	0.00	0.00	0.01	0.01	0.00	0.50	0.00	0.00	0.01
270	0.00	0.00	0.01	0.01	0.00	0.38	0.00	0.00	0.01
275	0.00	0.00	0.01	0.00	0.00	0.28	0.00	0.00	0.01
280	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00
285	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00
290	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00
295	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00
300	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00
305	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00
310	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
315	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
325	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
330	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
335	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
340	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
345	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
350	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Printouts for Unit Hydrographs

flow in cfs

time in minutes	A	B	C	D	E1	E2	F	G	H
5	176.66	129.00	31.15	28.23	79.65	16.87	159.06	12.20	28.98
10	288.41	212.19	61.88	43.72	52.17	30.15	129.84	8.94	69.68
15	277.55	205.93	67.48	43.15	34.45	31.02	92.64	6.42	90.34
20	231.99	176.93	65.85	41.31	21.95	30.50	68.95	4.86	92.24
25	193.78	147.12	62.28	38.23	13.87	29.54	50.83	3.38	89.54
30	163.36	125.93	56.79	33.89	9.71	28.12	32.72	2.29	84.25
35	138.19	105.64	50.08	30.80	5.54	26.26	26.12	1.80	76.37
40	120.97	93.61	46.27	28.26	1.38	23.95	20.08	1.31	67.90
45	103.76	81.57	42.46	25.71	0.00	22.34	14.04	0.82	62.92
50	86.55	69.53	38.65	23.17		21.03	8.01	0.32	57.93
55	69.34	57.49	34.84	21.14		19.72	1.97	0.00	52.95
60	56.05	45.46	32.18	19.64		18.41	0.00		47.97
65	50.31	39.63	29.97	18.14		17.10			44.40
70	44.57	35.62	27.75	16.65		15.79			41.54
75	38.83	31.60	25.54	15.15		14.92			38.69
80	33.10	27.59	23.32	13.65		14.14			35.83
85	27.36	23.58	21.10	12.16		13.36			32.97
90	21.62	19.57	18.89	10.66		12.59			30.11
95	15.89	15.55	16.67	9.16		11.81			27.25
100	10.15	11.54	14.46	8.39		11.03			24.39
105	4.41	7.53	13.09	7.89		10.26			21.54
110	0.00	3.52	12.35	7.39		9.48			18.68
115		0.00	11.62	6.89		8.70			17.62
120			10.88	6.39		7.93			16.67
125			10.14	5.89		7.15			15.72
130			9.40	5.39		6.38			14.76
135			8.66	4.89		6.01			13.81
140			7.92	4.40		5.76			12.86
145			7.18	3.90		5.50			11.90
150			6.44	3.40		5.24			10.95
155			5.71	2.90		4.98			10.00
160			4.97	2.40		4.72			9.05
165			4.23	1.90		4.46			8.09
170			3.49	1.40		4.20			7.14
175			2.75	0.90		3.94			6.19
180			2.01	0.41		3.69			5.24
185			1.27	0.00		3.43			4.28
190			0.54			3.17			3.33
195			0.00			2.91			2.38
200						2.65			1.42
205						2.39			0.47
210						2.13			0.00
215						1.87			
220						1.62			
225						1.36			
230						1.10			
235						0.84			
240						0.58			
245						0.32			
250						0.06			
255						0.00			

10 YEAR PROPOSED RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.098	0.222	28.7	6.41	14.9	4.53	10.7	290	645,632	0.70	454,590	35.0	127	454,747	0.72
B		0.096	0.214	30.2	6.46	15.7	4.56	10.8	214	499,741	0.73	365,379	35.0	97	365,455	0.71
C		0.145	0.165	51.1	7.96	26.5	5.63	13.3	68	267,240	0.33	87,823	45.0	19	87,769	0.26
D		0.134	0.123	48.5	6.09	25.2	4.31	10.2	44	164,258	0.37	61,094	40.0	13	61,099	0.30
E1		0.082	0.124	11.0	2.55	5.7	1.80	4.2	80	68,498	1.14	78,375	30.0	34	75,072	1.81
E2		0.111	0.109	66.2	7.05	34.4	4.99	11.8	31	159,430	0.54	85,708	45.0	13	85,710	0.29
F		0.096	0.141	15.0	3.12	7.8	2.21	5.2	159	184,549	0.73	135,364	30.0	59	132,962	1.16
G		0.157	0.046	14.0	2.00	7.3	1.41	3.3	12	13,540	0.28	3,807	30.0	2	3,572	0.65
H		0.157	0.211	54.7	10.38	28.5	7.34	17.3	93	392,658	0.28	110,424	45.0	24	110,382	0.22

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A		10 YR	0.278	0.309	0.617	0.009	34.4	0.35	0.10	4.50	0.60	0.0018	0.00	0.69	0.18	32.09
B		10 YR	0.215	0.332	0.664	0.011	36.4	0.35	0.10	4.50	0.60	0.0018	0.00	0.73	0.19	34.18
C		10 YR	0.115	0.278	0.556	0.010	6.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.12	0.06	4.86
D		10 YR	0.071	0.263	0.524	0.023	9.6	0.35	0.10	4.50	0.60	0.0018	0.00	0.19	0.10	7.89
E1		10 YR	0.029	0.082	0.164	0.014	66.2	0.35	0.10	4.50	0.60	0.0018	0.00	0.91	0.29	64.77
E2		10 YR	0.069	0.326	0.652	0.011	22.1	0.35	0.10	4.50	0.60	0.0018	0.00	0.44	0.14	19.59
F		10 YR	0.079	0.132	0.264	0.029	36.6	0.35	0.10	4.50	0.60	0.0018	0.00	0.73	0.19	34.36
G		10 YR	0.006	0.018	0.037	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.00	0.02	1.58
H		10 YR	0.169	0.301	0.602	0.005	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.59

50 YEAR PROPOSED RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	A	B	C	D	E1	E2	F	G	H
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.50	0.41	0.00	0.01	0.56	0.02	0.51	0.00	0.00
15	5.58	4.54	0.03	0.07	5.73	0.22	5.21	0.00	0.00
20	16.15	13.19	0.10	0.19	12.33	0.75	11.85	0.00	0.01
25	47.28	36.91	1.44	1.94	27.11	2.91	33.85	0.24	0.58
30	158.09	118.34	19.08	17.76	61.10	13.37	112.45	6.50	16.45
35	255.95	190.84	42.30	32.08	59.98	24.39	126.77	7.47	44.43
40	293.13	219.80	56.08	38.94	52.15	30.21	118.23	7.02	68.01
45	287.73	218.65	62.45	41.64	41.29	33.10	101.17	5.98	80.72
50	271.73	207.32	64.86	42.25	34.16	34.61	87.42	5.10	86.88
55	249.28	191.68	63.95	40.64	26.36	34.91	69.37	3.92	88.35
60	226.14	174.33	60.51	38.56	20.59	34.19	57.91	3.18	85.77
65	206.68	160.53	57.61	36.70	16.22	33.05	49.40	2.63	81.06
70	186.19	145.91	54.32	34.37	12.42	31.79	39.33	1.92	76.74
75	164.58	130.69	50.54	31.78	10.45	30.43	30.35	1.30	71.97
80	142.50	114.58	46.46	29.30	8.44	28.96	21.57	0.76	66.75
85	124.02	99.23	42.85	27.08	7.22	27.39	16.22	0.46	61.26
90	109.28	87.68	39.61	24.99	5.98	25.78	12.36	0.28	56.45
95	96.63	78.01	36.60	23.00	5.19	24.18	9.95	0.17	52.25
100	85.42	69.76	33.75	21.08	4.70	22.85	8.30	0.10	48.43
105	75.28	62.27	31.03	19.23	4.42	21.67	7.30	0.06	44.86
110	65.84	55.49	28.37	17.41	4.26	20.56	6.59	0.04	41.44
115	56.78	48.98	25.76	15.62	4.18	19.50	6.13	0.02	38.12
120	48.19	42.75	23.19	13.89	4.14	18.48	5.87	0.01	34.86
125	38.46	35.59	20.65	12.54	2.62	17.39	4.21	0.01	31.64
130	28.51	27.89	18.58	11.47	1.64	16.25	2.93	0.01	28.43
135	21.01	20.74	17.01	10.56	0.98	15.11	2.04	0.00	25.27
140	16.01	15.28	15.70	9.73	0.57	13.98	1.39	0.00	23.05
145	12.38	11.69	14.52	8.97	0.31	12.86	0.92	0.00	21.28
150	9.60	9.08	13.45	8.25	0.13	11.76	0.62	0.00	19.78
155	7.46	7.10	12.45	7.57	0.02	10.73	0.38	0.00	18.41
160	5.76	5.53	11.48	6.92	0.00	9.97	0.20	0.00	17.16
165	4.39	4.29	10.56	6.28	0.00	9.35	0.08	0.00	15.96
170	3.38	3.30	9.67	5.65	0.00	8.80	0.01	0.00	14.82
175	2.63	2.56	8.79	5.03	0.00	8.29	0.00	0.00	13.72
180	2.07	2.03	7.91	4.42	0.00	7.82	0.00	0.00	12.64
185	1.61	1.59	7.04	3.80	0.00	7.38	0.00	0.00	11.57
190	1.22	1.24	6.17	3.19	0.00	6.95	0.00	0.00	10.50
195	0.89	0.94	5.30	2.58	0.00	6.55	0.00	0.00	9.43
200	0.61	0.69	4.44	1.97	0.00	6.15	0.00	0.00	8.37
205	0.39	0.48	3.57	1.37	0.00	5.76	0.00	0.00	7.30
210	0.21	0.31	2.71	0.87	0.00	5.37	0.00	0.00	6.24
215	0.09	0.17	1.86	0.59	0.00	4.99	0.00	0.00	5.17
220	0.02	0.08	1.14	0.40	0.00	4.62	0.00	0.00	4.11
225	0.00	0.02	0.75	0.28	0.00	4.24	0.00	0.00	3.05
230	0.00	0.00	0.50	0.20	0.00	3.87	0.00	0.00	2.00
235	0.00	0.00	0.34	0.14	0.00	3.50	0.00	0.00	1.20
240	0.00	0.00	0.22	0.09	0.00	3.13	0.00	0.00	0.76
245	0.00	0.00	0.15	0.06	0.00	2.77	0.00	0.00	0.49
250	0.00	0.00	0.09	0.05	0.00	2.41	0.00	0.00	0.31
255	0.00	0.00	0.06	0.03	0.00	2.05	0.00	0.00	0.19
260	0.00	0.00	0.04	0.03	0.00	1.68	0.00	0.00	0.11
265	0.00	0.00	0.03	0.02	0.00	1.33	0.00	0.00	0.06
270	0.00	0.00	0.02	0.01	0.00	0.98	0.00	0.00	0.03
275	0.00	0.00	0.02	0.01	0.00	0.67	0.00	0.00	0.02
280	0.00	0.00	0.01	0.01	0.00	0.49	0.00	0.00	0.01
285	0.00	0.00	0.01	0.00	0.00	0.37	0.00	0.00	0.01
290	0.00	0.00	0.01	0.00	0.00	0.28	0.00	0.00	0.01
295	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00
300	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00
305	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00
310	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
315	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
325	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
330	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
335	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
340	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
345	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
350	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

50 YEAR PROPOSED RESULTS

Printouts for Unit Hydrographs

flow in cfs

time in minutes	A	B	C	D	E1	E2	F	G	H
5	180.75	131.58	31.48	28.62	79.95	17.14	161.60	12.20	29.09
10	293.88	215.71	62.18	43.83	52.23	30.44	130.44	8.94	69.84
15	281.72	208.74	67.53	43.21	34.45	31.24	92.77	6.42	90.42
20	232.71	177.85	65.86	41.34	21.85	30.70	68.97	4.86	92.23
25	194.97	148.06	62.26	38.22	13.85	29.71	50.26	3.38	89.52
30	163.36	126.14	56.74	33.85	9.65	28.25	32.11	2.29	84.22
35	138.67	106.09	50.06	30.81	5.45	26.34	25.87	1.80	76.33
40	120.81	93.66	46.25	28.25	1.25	23.97	19.64	1.31	67.88
45	102.95	81.23	42.43	25.70	0.00	22.41	13.40	0.81	62.90
50	85.08	68.79	38.62	23.15		21.08	7.17	0.32	57.92
55	67.22	56.36	34.80	21.14		19.75	0.93	0.00	52.93
60	55.83	43.92	32.18	19.63		18.42	0.00		47.95
65	49.87	39.44	29.96	18.13		17.09			44.39
70	43.92	35.30	27.74	16.63		15.77			41.54
75	37.97	31.15	25.52	15.13		14.94			38.68
80	32.01	27.01	23.30	13.62		14.15			35.82
85	26.06	22.86	21.08	12.12		13.36			32.96
90	20.10	18.72	18.86	10.62		12.58			30.10
95	14.15	14.57	16.64	9.12		11.79			27.24
100	8.19	10.43	14.42	8.38		11.00			24.38
105	2.24	6.28	13.09	7.88		10.21			21.53
110	0.00	2.14	12.35	7.38		9.43			18.67
115		0.00	11.61	6.88		8.64			17.62
120			10.87	6.38		7.85			16.67
125			10.13	5.88		7.06			15.71
130			9.39	5.38		6.28			14.76
135			8.65	4.88		6.01			13.81
140			7.91	4.38		5.75			12.85
145			7.17	3.87		5.48			11.90
150			6.43	3.37		5.22			10.95
155			5.69	2.87		4.96			10.00
160			4.95	2.37		4.69			9.04
165			4.21	1.87		4.43			8.09
170			3.47	1.37		4.17			7.14
175			2.73	0.87		3.91			6.18
180			1.99	0.37		3.64			5.23
185			1.25	0.00		3.38			4.28
190			0.51			3.12			3.33
195			0.00			2.86			2.37
200						2.59			1.42
205						2.33			0.47
210						2.07			0.00
215						1.81			
220						1.54			
225						1.28			
230						1.02			
235						0.76			
240						0.49			
245						0.23			
250						0.00			

50 YEAR PROPOSED RESULTS

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.097	0.225	28.2	6.38	14.7	4.51	10.6	295	645,632	1.55	998,727	40.0	293	998,891	1.65
B		0.096	0.216	29.7	6.43	15.5	4.55	10.7	217	499,741	1.57	786,646	40.0	220	786,748	1.60
C		0.144	0.164	51.0	7.91	26.5	5.59	13.2	68	267,240	1.16	311,022	50.0	65	310,845	0.88
D		0.132	0.122	48.4	6.03	25.2	4.26	10.1	44	164,258	1.21	198,503	50.0	42	198,494	0.93
E1		0.082	0.124	11.0	2.54	5.7	1.80	4.2	81	68,498	1.99	136,351	30.0	61	130,577	3.24
E2		0.110	0.109	65.7	7.00	34.2	4.95	11.7	31	159,430	1.38	219,643	55.0	35	219,616	0.79
F		0.096	0.143	14.7	3.12	7.7	2.20	5.2	162	184,549	1.58	290,936	35.0	127	285,259	2.49
G		0.157	0.046	14.0	2.00	7.3	1.41	3.3	12	13,540	1.11	15,093	35.0	7	14,159	2.00
H		0.157	0.211	54.7	10.35	28.5	7.32	17.3	93	392,658	1.11	437,715	55.0	88	437,547	0.82

50 YEAR PROPOSED RESULTS

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A		50 YR	0.278	0.309	0.617	0.009	34.4	0.35	0.10	4.50	0.60	0.0018	0.00	0.69	0.18	32.79
B		50 YR	0.215	0.332	0.664	0.011	36.4	0.35	0.10	4.50	0.60	0.0018	0.00	0.73	0.19	34.83
C		50 YR	0.115	0.278	0.556	0.010	6.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.12	0.06	5.20
D		50 YR	0.071	0.263	0.524	0.023	9.6	0.35	0.10	4.50	0.60	0.0018	0.00	0.19	0.10	8.40
E1		50 YR	0.029	0.082	0.164	0.014	66.2	0.35	0.10	4.50	0.60	0.0018	0.00	0.91	0.29	65.18
E2		50 YR	0.069	0.326	0.652	0.011	22.1	0.35	0.10	4.50	0.60	0.0018	0.00	0.44	0.14	20.35
F		50 YR	0.079	0.132	0.264	0.029	36.6	0.35	0.10	4.50	0.60	0.0018	0.00	0.73	0.19	35.01
G		50 YR	0.006	0.018	0.037	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.00	0.02	1.71
H		50 YR	0.169	0.301	0.602	0.005	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.72

100 YEAR PROPOSED RESULTS

Printouts for Storm Hydrographs

flow in cfs

time in minutes	A	B	C	D	E1	E2	F	G	H
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.31	0.25	0.00	0.00	0.35	0.01	0.31	0.00	0.00
15	5.57	4.53	0.03	0.07	5.91	0.22	5.35	0.00	0.00
20	18.36	14.56	0.20	0.30	13.74	0.94	13.42	0.02	0.05
25	58.81	45.14	3.25	3.57	30.98	4.00	42.54	0.89	2.20
30	190.64	142.06	25.28	22.71	70.44	16.59	133.58	8.05	22.81
35	314.66	233.88	54.46	41.03	73.48	30.44	158.36	9.76	58.23
40	363.76	272.07	72.39	49.96	63.13	38.03	146.68	9.03	88.41
45	362.45	274.52	81.33	54.09	52.26	42.10	129.97	8.05	105.67
50	345.06	262.60	85.17	55.25	42.59	44.36	111.60	6.82	114.58
55	320.63	245.58	84.85	53.90	34.32	45.13	92.05	5.55	117.62
60	297.12	228.17	82.04	52.24	28.15	44.91	79.84	4.76	116.05
65	278.15	214.75	79.80	50.81	23.37	44.21	70.95	4.18	112.28
70	251.58	196.08	76.12	47.87	16.61	42.77	54.59	2.99	107.91
75	219.47	173.39	70.76	44.12	12.82	40.79	40.46	2.00	101.71
80	186.78	149.54	64.96	40.50	9.24	38.62	27.37	1.22	94.26
85	159.64	127.28	59.68	37.22	7.07	36.33	19.07	0.74	86.53
90	138.67	110.89	54.96	34.20	5.76	34.05	14.01	0.46	79.58
95	121.51	97.88	50.64	31.42	4.90	31.85	10.92	0.29	73.48
100	106.53	86.82	46.67	28.77	4.39	29.99	8.77	0.17	67.98
105	92.89	76.84	42.85	26.21	4.17	28.37	7.35	0.09	62.93
110	80.17	67.66	39.15	23.71	4.08	26.85	6.35	0.04	58.10
115	68.17	58.98	35.55	21.27	4.06	25.40	5.75	0.02	53.42
120	57.03	50.80	32.04	18.96	4.06	24.00	5.56	0.01	48.86
125	44.96	42.01	28.62	17.11	2.57	22.54	4.01	0.01	44.41
130	32.96	32.71	25.77	15.63	1.60	21.05	2.81	0.01	40.00
135	24.10	24.11	23.57	14.35	0.96	19.59	1.97	0.00	35.73
140	18.06	17.61	21.69	13.19	0.56	18.13	1.35	0.00	32.56
145	13.58	13.22	20.02	12.13	0.30	16.69	0.89	0.00	30.02
150	10.18	10.00	18.49	11.14	0.12	15.27	0.60	0.00	27.81
155	7.57	7.55	17.07	10.21	0.02	13.94	0.37	0.00	25.82
160	5.54	5.64	15.74	9.35	0.00	12.94	0.19	0.00	23.99
165	4.04	4.16	14.49	8.51	0.00	12.12	0.07	0.00	22.27
170	3.09	3.06	13.29	7.67	0.00	11.38	0.01	0.00	20.66
175	2.44	2.34	12.10	6.85	0.00	10.71	0.00	0.00	19.17
180	1.95	1.88	10.92	6.02	0.00	10.09	0.00	0.00	17.69
185	1.53	1.50	9.74	5.19	0.00	9.50	0.00	0.00	16.22
190	1.16	1.18	8.55	4.37	0.00	8.96	0.00	0.00	14.74
195	0.84	0.90	7.37	3.55	0.00	8.45	0.00	0.00	13.27
200	0.58	0.66	6.19	2.73	0.00	7.95	0.00	0.00	11.80
205	0.36	0.46	5.02	1.93	0.00	7.45	0.00	0.00	10.34
210	0.19	0.29	3.84	1.26	0.00	6.96	0.00	0.00	8.87
215	0.08	0.16	2.69	0.85	0.00	6.47	0.00	0.00	7.40
220	0.01	0.07	1.73	0.58	0.00	5.98	0.00	0.00	5.93
225	0.00	0.02	1.15	0.39	0.00	5.49	0.00	0.00	4.46
230	0.00	0.00	0.78	0.25	0.00	5.01	0.00	0.00	3.03
235	0.00	0.00	0.51	0.16	0.00	4.53	0.00	0.00	1.93
240	0.00	0.00	0.32	0.09	0.00	4.05	0.00	0.00	1.27
245	0.00	0.00	0.18	0.05	0.00	3.58	0.00	0.00	0.83
250	0.00	0.00	0.09	0.04	0.00	3.10	0.00	0.00	0.52
255	0.00	0.00	0.05	0.03	0.00	2.63	0.00	0.00	0.30
260	0.00	0.00	0.04	0.02	0.00	2.16	0.00	0.00	0.15
265	0.00	0.00	0.03	0.02	0.00	1.69	0.00	0.00	0.06
270	0.00	0.00	0.02	0.01	0.00	1.24	0.00	0.00	0.02
275	0.00	0.00	0.02	0.01	0.00	0.86	0.00	0.00	0.01
280	0.00	0.00	0.01	0.01	0.00	0.61	0.00	0.00	0.01
285	0.00	0.00	0.01	0.00	0.00	0.45	0.00	0.00	0.01
290	0.00	0.00	0.01	0.00	0.00	0.33	0.00	0.00	0.01
295	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00
300	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00
305	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00
310	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00
315	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
325	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
330	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
335	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
340	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
345	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
350	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Printouts for Unit Hydrographs

flow in cfs

time in minutes	A	B	C	D	E1	E2	F	G	H
5	181.89	132.30	31.58	28.73	80.03	17.22	162.31	12.20	29.12
10	295.41	216.69	62.27	43.85	52.24	30.53	130.59	8.94	69.89
15	282.88	209.51	67.54	43.23	34.45	31.30	92.80	6.41	90.44
20	232.86	178.08	65.86	41.35	21.82	30.76	68.97	4.86	92.23
25	195.29	148.31	62.26	38.22	13.84	29.76	50.10	3.38	89.51
30	163.34	126.19	56.72	33.84	9.63	28.29	32.09	2.29	84.21
35	138.80	106.21	50.06	30.81	5.42	26.37	25.80	1.80	76.31
40	120.75	93.67	46.24	28.25	1.21	23.98	19.51	1.31	67.87
45	102.70	81.12	42.43	25.70	0.00	22.43	13.22	0.81	62.89
50	84.65	68.57	38.61	23.14		21.10	6.93	0.32	57.91
55	66.60	56.03	34.79	21.14		19.76	0.64	0.00	52.93
60	55.76	43.56	32.17	19.63		18.43	0.00		47.95
65	49.74	39.38	29.95	18.13		17.09			44.39
70	43.73	35.20	27.73	16.62		15.76			41.53
75	37.71	31.02	25.51	15.12		14.95			38.67
80	31.70	26.84	23.29	13.62		14.15			35.82
85	25.68	22.65	21.07	12.11		13.36			32.96
90	19.66	18.47	18.85	10.61		12.57			30.10
95	13.65	14.29	16.63	9.10		11.78			27.24
100	7.63	10.11	14.41	8.38		10.99			24.38
105	1.61	5.93	13.09	7.88		10.20			21.52
110	0.00	1.75	12.35	7.38		9.41			18.66
115		0.00	11.61	6.88		8.62			17.62
120			10.87	6.37		7.83			16.67
125			10.13	5.87		7.04			15.71
130			9.39	5.37		6.27			14.76
135			8.65	4.87		6.01			13.81
140			7.91	4.37		5.74			12.85
145			7.17	3.87		5.48			11.90
150			6.43	3.37		5.21			10.95
155			5.69	2.86		4.95			10.00
160			4.94	2.36		4.69			9.04
165			4.20	1.86		4.42			8.09
170			3.46	1.36		4.16			7.14
175			2.72	0.86		3.90			6.18
180			1.98	0.36		3.63			5.23
185			1.24	0.00		3.37			4.28
190			0.50			3.11			3.33
195			0.00			2.84			2.37
200						2.58			1.42
205						2.31			0.47
210						2.05			0.00
215						1.79			
220						1.52			
225						1.26			
230						1.00			
235						0.73			
240						0.47			
245						0.21			
250						0.00			

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.097	0.226	28.1	6.37	14.6	4.50	10.6	297	645,632	1.96	1,263,397	40.0	364	1,263,357	2.05
B		0.096	0.217	29.6	6.43	15.4	4.54	10.7	218	499,741	1.98	991,086	45.0	275	991,136	1.99
C		0.143	0.163	51.0	7.89	26.5	5.58	13.2	68	267,240	1.59	423,923	50.0	85	423,686	1.16
D		0.131	0.121	48.4	6.01	25.2	4.25	10.0	44	164,258	1.63	267,590	50.0	55	267,567	1.22
E1		0.082	0.124	10.9	2.54	5.7	1.80	4.2	81	68,498	2.39	163,544	35.0	73	156,608	3.89
E2		0.110	0.109	65.6	6.99	34.1	4.94	11.7	31	159,430	1.79	285,856	55.0	45	285,823	1.03
F		0.096	0.143	14.7	3.11	7.6	2.20	5.2	163	184,549	1.99	366,420	35.0	158	359,141	3.11
G		0.157	0.046	14.0	2.00	7.3	1.41	3.3	12	13,540	1.54	20,842	35.0	10	19,551	2.62
H		0.157	0.210	54.7	10.35	28.5	7.31	17.2	93	392,658	1.54	604,422	55.0	118	604,191	1.09

Summary of CUHP Input Parameters (Version 2.0.1)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A		100 YR	0.278	0.309	0.617	0.009	34.4	0.35	0.10	4.50	0.60	0.0018	0.00	0.69	0.18	32.99
B		100 YR	0.215	0.332	0.664	0.011	36.4	0.35	0.10	4.50	0.60	0.0018	0.00	0.73	0.19	35.02
C		100 YR	0.115	0.278	0.556	0.010	6.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.12	0.06	5.29
D		100 YR	0.071	0.263	0.524	0.023	9.6	0.35	0.10	4.50	0.60	0.0018	0.00	0.19	0.10	8.54
E1		100 YR	0.029	0.082	0.164	0.014	66.2	0.35	0.10	4.50	0.60	0.0018	0.00	0.91	0.29	65.29
E2		100 YR	0.069	0.326	0.652	0.011	22.1	0.35	0.10	4.50	0.60	0.0018	0.00	0.44	0.14	20.56
F		100 YR	0.079	0.132	0.264	0.029	36.6	0.35	0.10	4.50	0.60	0.0018	0.00	0.73	0.19	35.20
G		100 YR	0.006	0.018	0.037	0.011	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.00	0.02	1.74
H		100 YR	0.169	0.301	0.602	0.005	2.0	0.35	0.10	4.50	0.60	0.0018	0.00	0.04	0.02	1.75

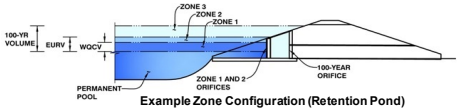
Appendix B – Hydraulic Computations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: TALLGRASS

Basin ID: Pond A



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	EDB	
Watershed Area =	177.86	acres
Watershed Length =	3,258	ft
Watershed Length to Centroid =	1,629	ft
Watershed Slope =	0.010	ft/ft
Watershed Imperviousness =	34.43%	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 =	User Input	

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) =	2.440	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	6.354	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.88 in.) =	3.714	acre-feet	0.88 inches
5-yr Runoff Volume (P1 = 1.25 in.) =	6.808	acre-feet	1.25 inches
10-yr Runoff Volume (P1 = 1.56 in.) =	10.434	acre-feet	1.56 inches
25-yr Runoff Volume (P1 = 1.99 in.) =	17.750	acre-feet	1.99 inches
50-yr Runoff Volume (P1 = 2.34 in.) =	22.901	acre-feet	2.34 inches
100-yr Runoff Volume (P1 = 2.69 in.) =	28.965	acre-feet	2.69 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	35.827	acre-feet	inches
Approximate 2-yr Detention Volume =	3.410	acre-feet	
Approximate 5-yr Detention Volume =	5.436	acre-feet	
Approximate 10-yr Detention Volume =	8.236	acre-feet	
Approximate 25-yr Detention Volume =	10.465	acre-feet	
Approximate 50-yr Detention Volume =	11.504	acre-feet	
Approximate 100-yr Detention Volume =	13.757	acre-feet	

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		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

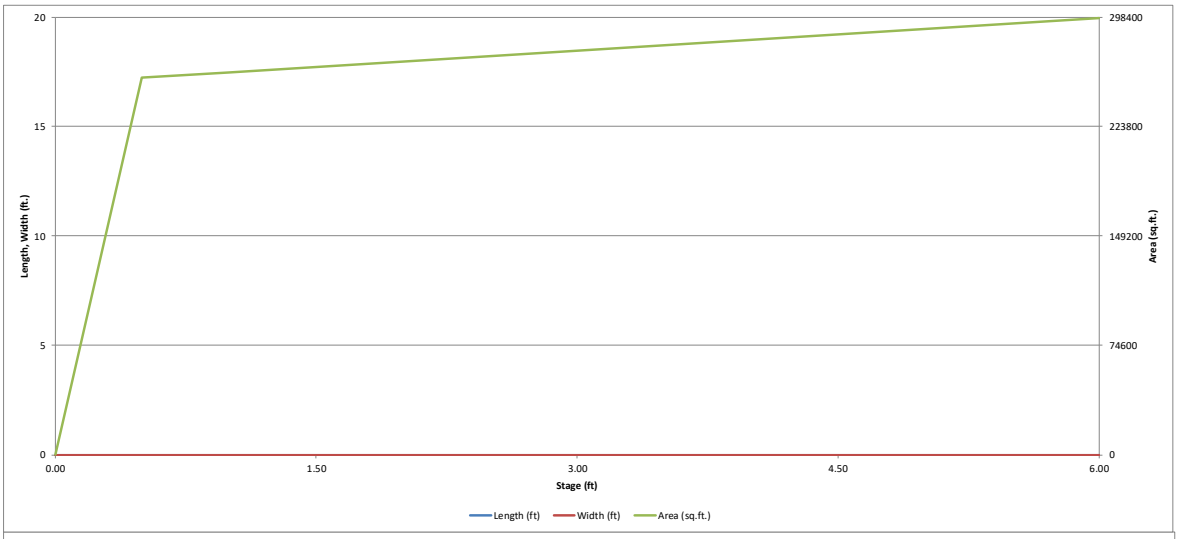
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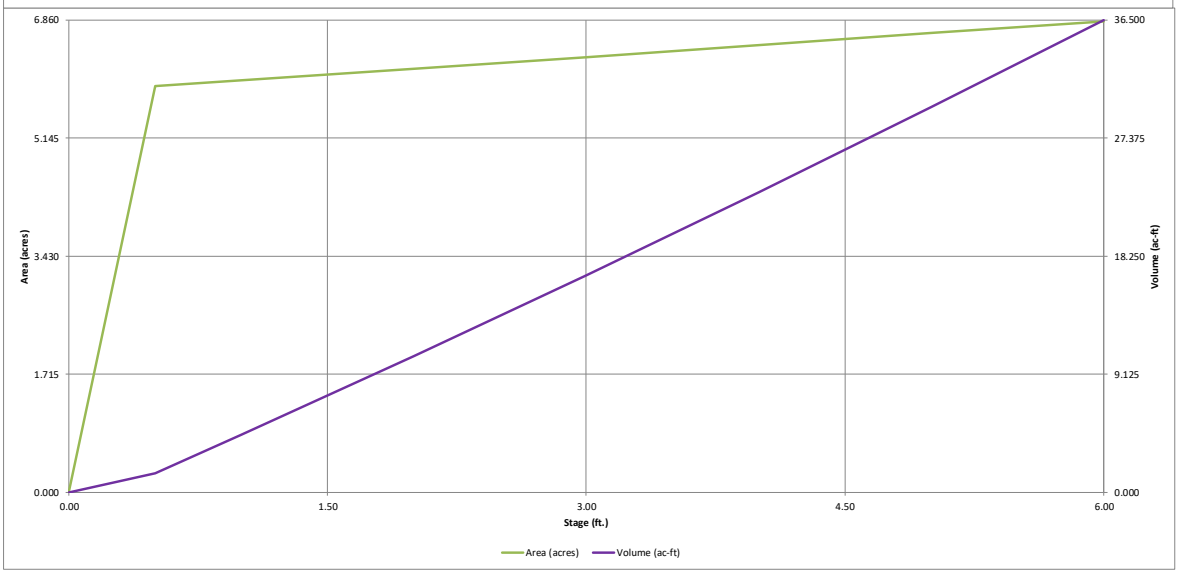
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	500	0.011		
6234.5	--	0.50	--	--	--	257,120	5.903	64,392	1.478
6235	--	1.00	--	--	--	260,623	5.983	193,828	4.450
6236	--	2.00	--	--	--	267,980	6.152	458,129	10.517
6237	--	3.00	--	--	--	275,405	6.322	729,822	16.754
6238	--	4.00	--	--	--	282,898	6.494	1,008,973	23.163
6239	--	5.00	--	--	--	290,460	6.668	1,295,652	29.744
6240	--	6.00	--	--	--	298,090	6.843	1,589,927	36.500

100-Volume min met at 6238.88

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)



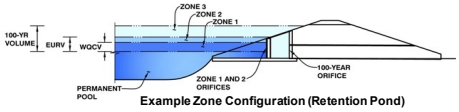


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: TALLGRASS

Basin ID: Pond B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	EDB	
Watershed Area =	137.67	acres
Watershed Length =	3,508	ft
Watershed Length to Centroid =	1,754	ft
Watershed Slope =	0.012	ft/ft
Watershed Imperviousness =	36.39%	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 =	User Input	

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) =	1.952 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	5.221 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.88 in.) =	3.101 acre-feet	0.88	inches
5-yr Runoff Volume (P1 = 1.25 in.) =	5.552 acre-feet	1.25	inches
10-yr Runoff Volume (P1 = 1.56 in.) =	8.389 acre-feet	1.56	inches
25-yr Runoff Volume (P1 = 1.99 in.) =	14.052 acre-feet	1.99	inches
50-yr Runoff Volume (P1 = 2.34 in.) =	18.060 acre-feet	2.34	inches
100-yr Runoff Volume (P1 = 2.69 in.) =	22.756 acre-feet	2.69	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	28.099 acre-feet		inches
Approximate 2-yr Detention Volume =	2.818 acre-feet		
Approximate 5-yr Detention Volume =	4.472 acre-feet		
Approximate 10-yr Detention Volume =	6.701 acre-feet		
Approximate 25-yr Detention Volume =	8.456 acre-feet		
Approximate 50-yr Detention Volume =	9.288 acre-feet		
Approximate 100-yr Detention Volume =	11.039 acre-feet		

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		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

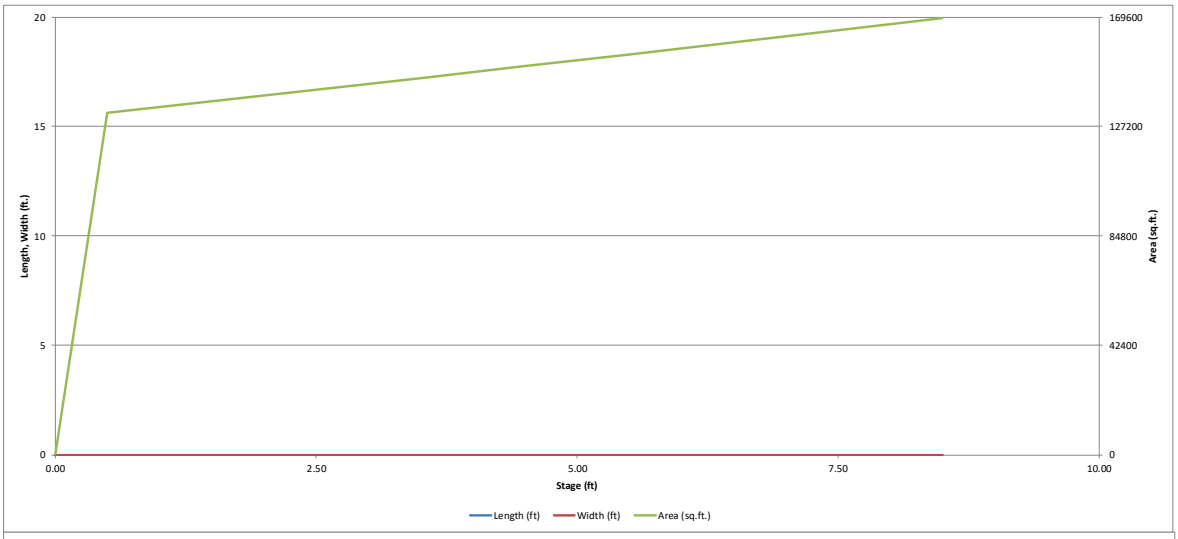
Depth Increment = 1.00 ft

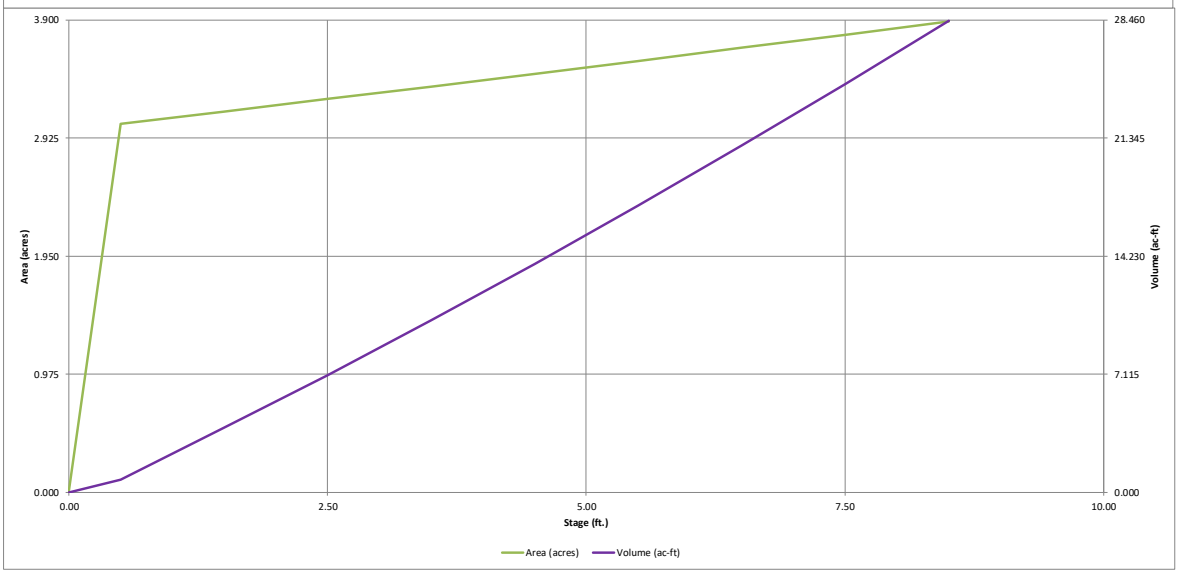
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	500	0.011		
6222	--	0.50	--	--	--	132,578	3.044	33,263	0.764
6223	--	1.50	--	--	--	136,981	3.145	168,043	3.858
6224	--	2.50	--	--	--	141,466	3.248	307,266	7.054
6225	--	3.50	--	--	--	145,969	3.351	450,984	10.353
6226	--	4.50	--	--	--	150,548	3.456	599,242	13.757
6227	--	5.50	--	--	--	155,183	3.563	752,108	17.266
6228	--	6.50	--	--	--	159,875	3.670	909,637	20.882
6229	--	7.50	--	--	--	164,623	3.779	1,071,886	24.607
6230	--	8.50	--	--	--	169,429	3.890	1,238,912	28.442

100-Volume min met at 6228.50

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)



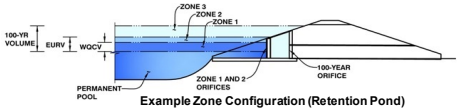


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: TALLGRASS

Basin ID: Pond E



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	EDB	
Watershed Area =	62.79	acres
Watershed Length =	3,440	ft
Watershed Length to Centroid =	1,720	ft
Watershed Slope =	0.018	ft/ft
Watershed Imperviousness =	35.33%	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 =	User Input	

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) =	0.875	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	2.307	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.88 in.) =	1.358	acre-feet	0.88 inches
5-yr Runoff Volume (P1 = 1.25 in.) =	2.459	acre-feet	1.25 inches
10-yr Runoff Volume (P1 = 1.56 in.) =	3.744	acre-feet	1.56 inches
25-yr Runoff Volume (P1 = 1.99 in.) =	6.324	acre-feet	1.99 inches
50-yr Runoff Volume (P1 = 2.34 in.) =	8.148	acre-feet	2.34 inches
100-yr Runoff Volume (P1 = 2.69 in.) =	10.289	acre-feet	2.69 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	12.720	acre-feet	inches
Approximate 2-yr Detention Volume =	1.241	acre-feet	
Approximate 5-yr Detention Volume =	1.974	acre-feet	
Approximate 10-yr Detention Volume =	2.976	acre-feet	
Approximate 25-yr Detention Volume =	3.769	acre-feet	
Approximate 50-yr Detention Volume =	4.141	acre-feet	
Approximate 100-yr Detention Volume =	4.939	acre-feet	

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		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

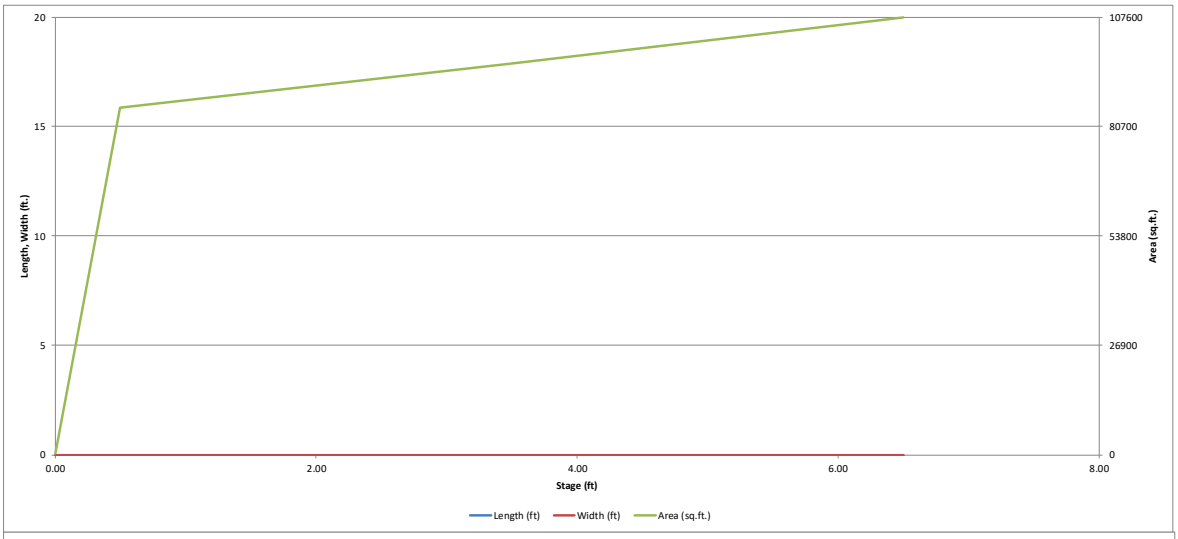
Depth Increment = 1.00 ft

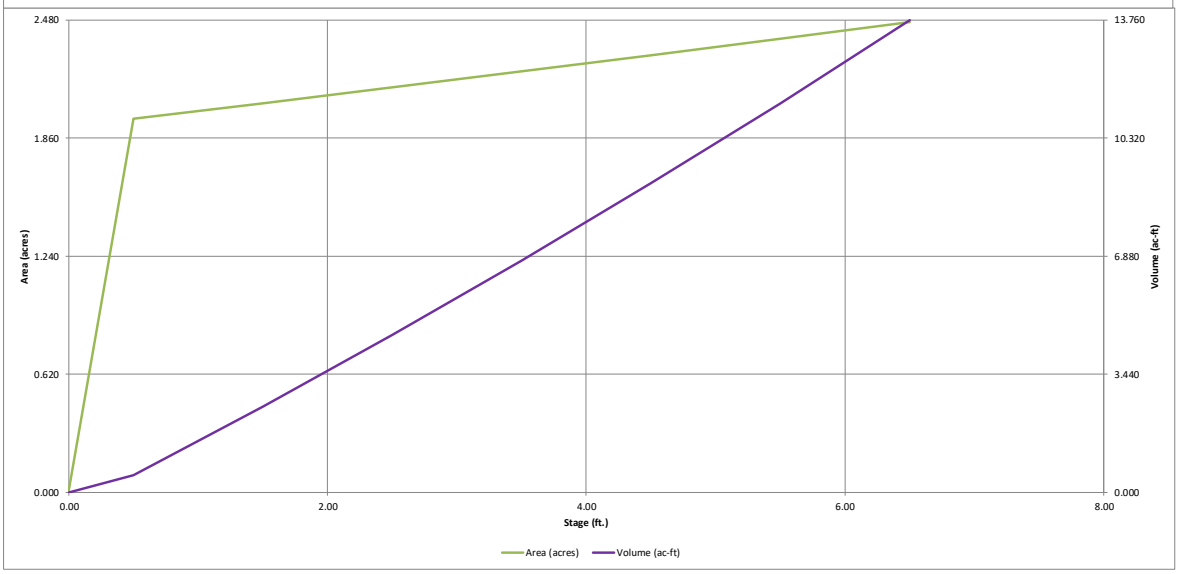
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	500	0.011		
6259	--	0.50	--	--	--	85,381	1.960	21,467	0.493
6260	--	1.50	--	--	--	88,938	2.042	108,626	2.494
6261	--	2.50	--	--	--	92,552	2.125	199,371	4.577
6262	--	3.50	--	--	--	96,222	2.209	293,758	6.744
6263	--	4.50	--	--	--	99,948	2.294	391,843	8.995
6264	--	5.50	--	--	--	103,731	2.381	493,683	11.333
6265	--	6.50	--	--	--	107,571	2.469	599,334	13.759

100-Volume min met at 6263.55

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)



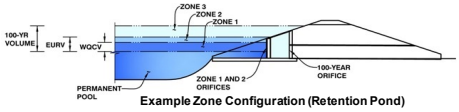


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: TALLGRASS

Basin ID: Pond F



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	EDB	
Watershed Area =	50.84	acres
Watershed Length =	1,676	ft
Watershed Length to Centroid =	838	ft
Watershed Slope =	0.024	ft/ft
Watershed Imperviousness =	36.56%	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 =	User Input	

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) =	0.723 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	1.938 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.88 in.) =	1.145 acre-feet	0.88	inches
5-yr Runoff Volume (P1 = 1.25 in.) =	2.046 acre-feet	1.25	inches
10-yr Runoff Volume (P1 = 1.56 in.) =	3.086 acre-feet	1.56	inches
25-yr Runoff Volume (P1 = 1.99 in.) =	5.161 acre-feet	1.99	inches
50-yr Runoff Volume (P1 = 2.34 in.) =	6.631 acre-feet	2.34	inches
100-yr Runoff Volume (P1 = 2.69 in.) =	8.351 acre-feet	2.69	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	10.309 acre-feet		inches
Approximate 2-yr Detention Volume =	1.047 acre-feet		
Approximate 5-yr Detention Volume =	1.660 acre-feet		
Approximate 10-yr Detention Volume =	2.485 acre-feet		
Approximate 25-yr Detention Volume =	3.134 acre-feet		
Approximate 50-yr Detention Volume =	3.442 acre-feet		
Approximate 100-yr Detention Volume =	4.089 acre-feet		

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		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

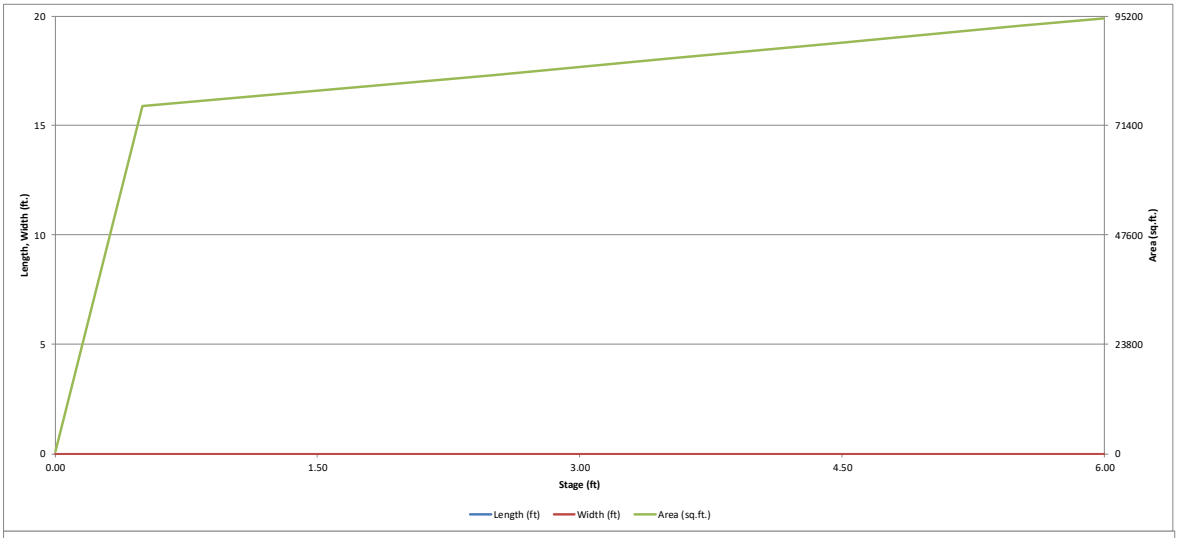
Depth Increment = 1.00 ft

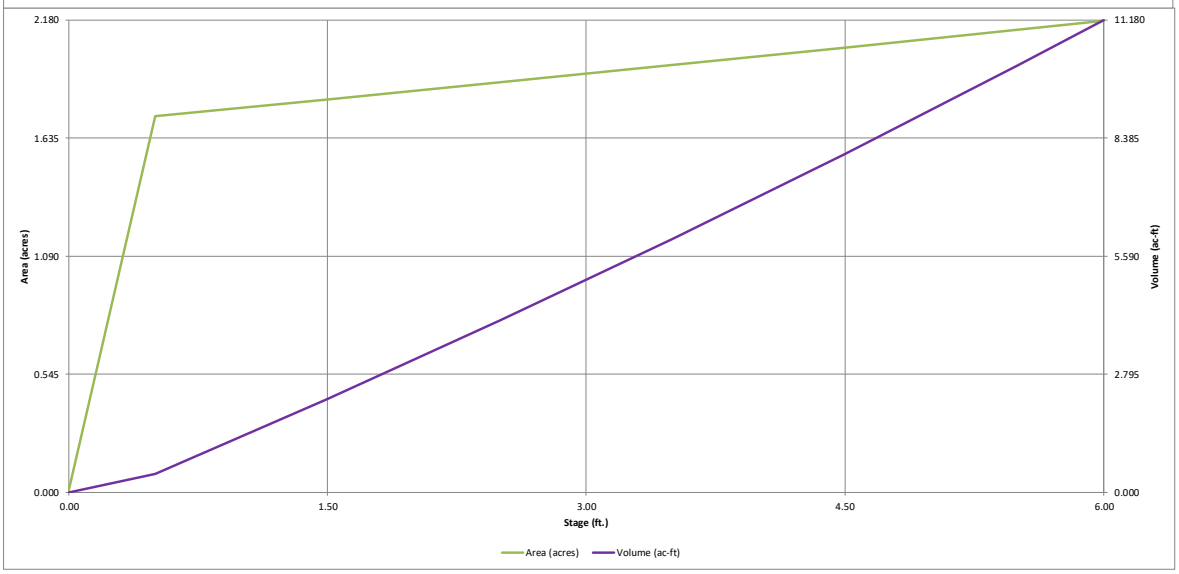
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	500	0.011		
6268	--	0.50	--	--	--	75,570	1.735	19,014	0.437
6269	--	1.50	--	--	--	78,946	1.812	96,272	2.210
6270	--	2.50	--	--	--	82,379	1.891	176,935	4.062
6271	--	3.50	--	--	--	85,868	1.971	261,058	5.993
6272	--	4.50	--	--	--	89,413	2.053	348,699	8.005
6273	--	5.50	--	--	--	93,016	2.135	439,913	10.099
6273.5	--	6.00	--	--	--	94,838	2.177	486,877	11.177

100-Volume min met at 6272.16

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)





Worksheet for Swale 1.a

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.005 ft/ft
Normal Depth	18.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	85.00 cfs

Full channel depth to be 30 in to achieve 1 ft of freeboard

Results	
Bottom Width	10.46 ft
Flow Area	22.4 ft²
Wetted Perimeter	19.9 ft
Hydraulic Radius	13.5 in
Top Width	19.46 ft
Critical Depth	13.6 in
Critical Slope	0.014 ft/ft
Velocity	3.79 ft/s
Velocity Head	0.22 ft
Specific Energy	1.72 ft
Froude Number	0.622
Flow Type	Subcritical

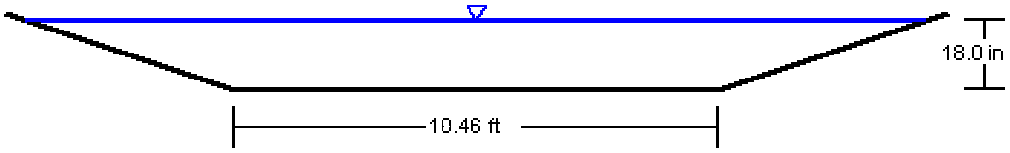
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

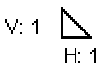
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	18.0 in
Critical Depth	13.6 in
Channel Slope	0.005 ft/ft
Critical Slope	0.014 ft/ft

Cross Section for Swale 1.a

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.005 ft/ft
Normal Depth	18.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	10.46 ft
Discharge	85.00 cfs





Worksheet for Swale 1.b

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.005 ft/ft
Normal Depth	24.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	203.00 cfs

Full channel depth to be 36 in to achieve 1 ft of freeboard

Results	
Bottom Width	15.80 ft
Flow Area	43.6 ft²
Wetted Perimeter	28.5 ft
Hydraulic Radius	18.4 in
Top Width	27.80 ft
Critical Depth	18.7 in
Critical Slope	0.012 ft/ft
Velocity	4.66 ft/s
Velocity Head	0.34 ft
Specific Energy	2.34 ft
Froude Number	0.655
Flow Type	Subcritical

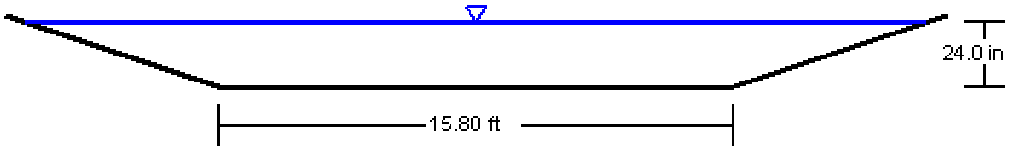
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

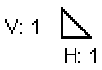
GVF Output Data	
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Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	24.0 in
Critical Depth	18.7 in
Channel Slope	0.005 ft/ft
Critical Slope	0.012 ft/ft

Cross Section for Swale 1.b

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.005 ft/ft
Normal Depth	24.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	15.80 ft
Discharge	203.00 cfs





Worksheet for Swale 1.c

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.008 ft/ft
Normal Depth	24.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	458.00 cfs

Full channel depth to be 36 in to achieve 1 ft of freeboard

Results	
Bottom Width	31.05 ft
Flow Area	74.1 ft²
Wetted Perimeter	43.7 ft
Hydraulic Radius	20.3 in
Top Width	43.05 ft
Critical Depth	21.4 in
Critical Slope	0.012 ft/ft
Velocity	6.18 ft/s
Velocity Head	0.59 ft
Specific Energy	2.59 ft
Froude Number	0.831
Flow Type	Subcritical

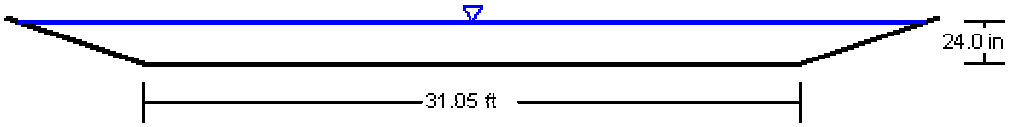
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Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

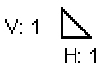
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	24.0 in
Critical Depth	21.4 in
Channel Slope	0.008 ft/ft
Critical Slope	0.012 ft/ft

Cross Section for Swale 1.c

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.008 ft/ft
Normal Depth	24.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	31.05 ft
Discharge	458.00 cfs





Worksheet for Swale 2

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.010 ft/ft
Normal Depth	24.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	364.00 cfs

Full channel depth to be 36 in to achieve 1 ft of freeboard

Results	
Bottom Width	20.83 ft
Flow Area	53.7 ft²
Wetted Perimeter	33.5 ft
Hydraulic Radius	19.2 in
Top Width	32.83 ft
Critical Depth	23.0 in
Critical Slope	0.012 ft/ft
Velocity	6.78 ft/s
Velocity Head	0.72 ft
Specific Energy	2.72 ft
Froude Number	0.935
Flow Type	Subcritical

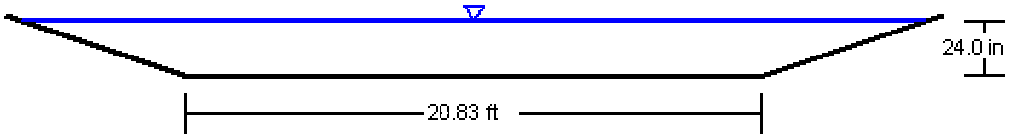
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

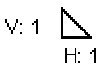
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Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	24.0 in
Critical Depth	23.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.012 ft/ft

Cross Section for Swale 2

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.010 ft/ft
Normal Depth	24.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	20.83 ft
Discharge	364.00 cfs





Worksheet for Swale 3

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.010 ft/ft
Normal Depth	12.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	28.00 cfs

Full channel depth to be 24 in to achieve 1 ft of freeboard

Results	
Bottom Width	4.27 ft
Flow Area	7.3 ft²
Wetted Perimeter	10.6 ft
Hydraulic Radius	8.2 in
Top Width	10.27 ft
Critical Depth	10.7 in
Critical Slope	0.016 ft/ft
Velocity	3.85 ft/s
Velocity Head	0.23 ft
Specific Energy	1.23 ft
Froude Number	0.807
Flow Type	Subcritical

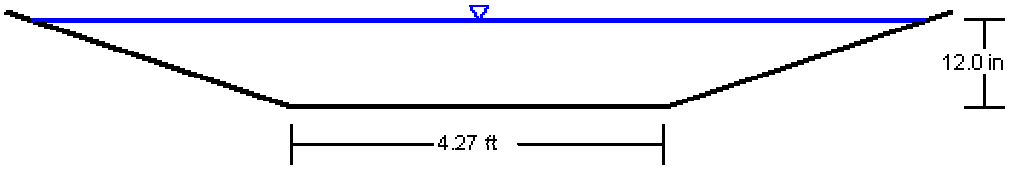
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Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

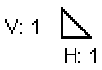
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	12.0 in
Critical Depth	10.7 in
Channel Slope	0.010 ft/ft
Critical Slope	0.016 ft/ft

Cross Section for Swale 3

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.010 ft/ft
Normal Depth	12.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	4.27 ft
Discharge	28.00 cfs





Worksheet for Swale 4

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.028 ft/ft
Normal Depth	12.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	45.00 cfs

Full channel depth to be 24 in to achieve 1 ft of freeboard

Results	
Bottom Width	4.03 ft
Flow Area	7.0 ft²
Wetted Perimeter	10.4 ft
Hydraulic Radius	8.1 in
Top Width	10.03 ft
Critical Depth	14.1 in
Critical Slope	0.015 ft/ft
Velocity	6.40 ft/s
Velocity Head	0.64 ft
Specific Energy	1.64 ft
Froude Number	1.348
Flow Type	Supercritical

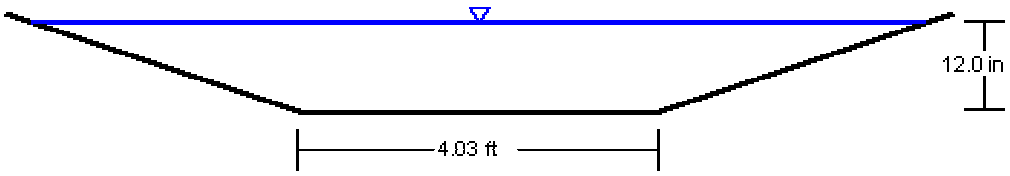
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

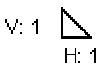
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	14.1 in
Channel Slope	0.028 ft/ft
Critical Slope	0.015 ft/ft

Cross Section for Swale 4

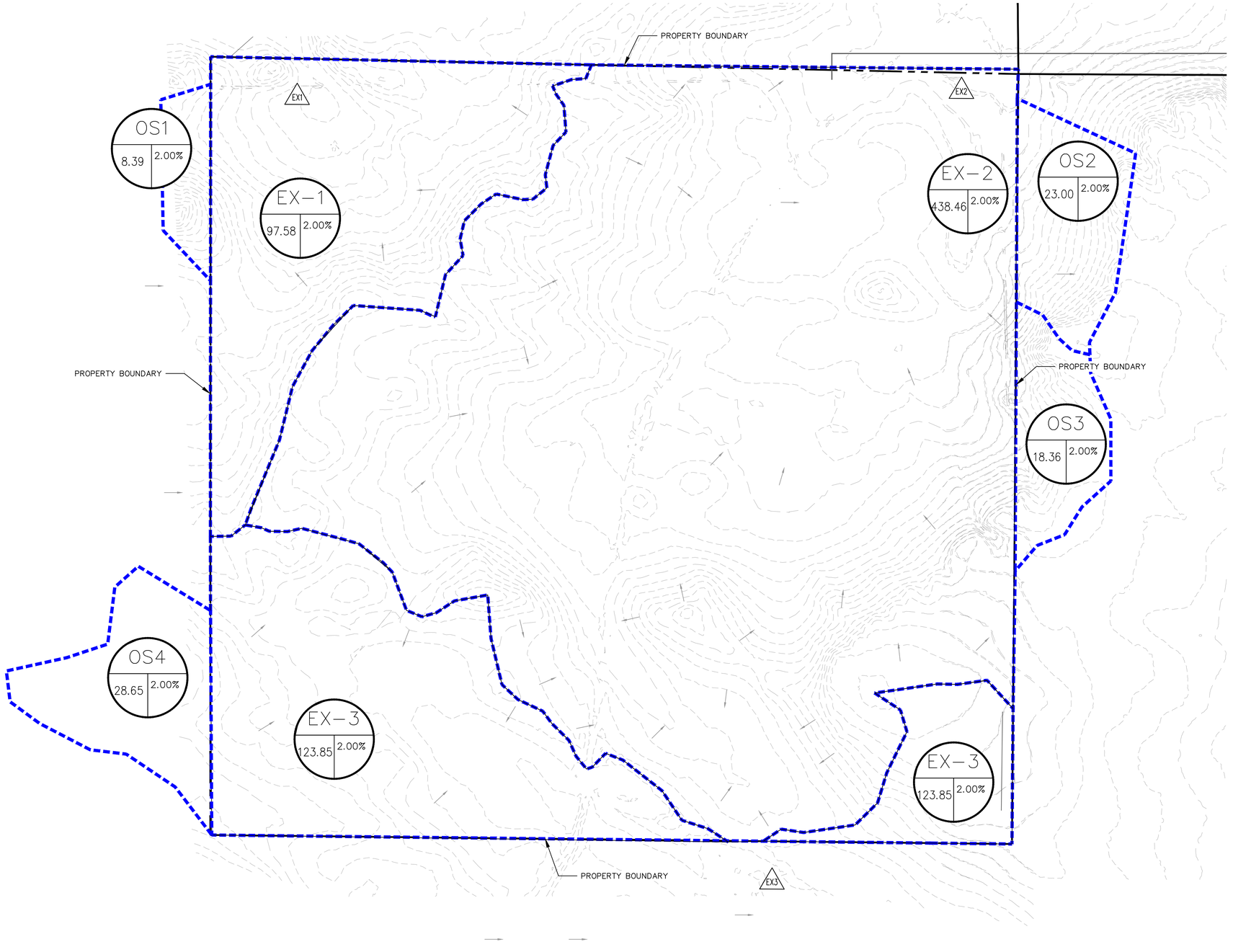
Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.028 ft/ft
Normal Depth	12.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	4.03 ft
Discharge	45.00 cfs





Appendix C – Drainage Maps



EXISTING DRAINAGE LEGEND

- # / AC — # = BASIN DESIGNATION; AC = AREA IN ACRES
- # = DESIGN POINT
- EXISTING BASIN BOUNDARY
- EXISTING FLOW ARROW

NORTH

GRAPHIC SCALE IN FEET
0 175 350 700

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

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2025 KIMLEY-HORN AND ASSOCIATES, INC.
6200 South Syracuse Way, Suite 300
Greenwood Village, Colorado 80111 (303) 228-2300

DESIGNED BY: CRM
DRAWN BY: CMS
CHECKED BY: SAL
DATE: 12/18/2025

BFC POWER AND CHEYENNE POWER HUB PROJECT
LARAMIE COUNTY, WYOMING
SITE PLAN
EXISTING DRAINAGE MAP

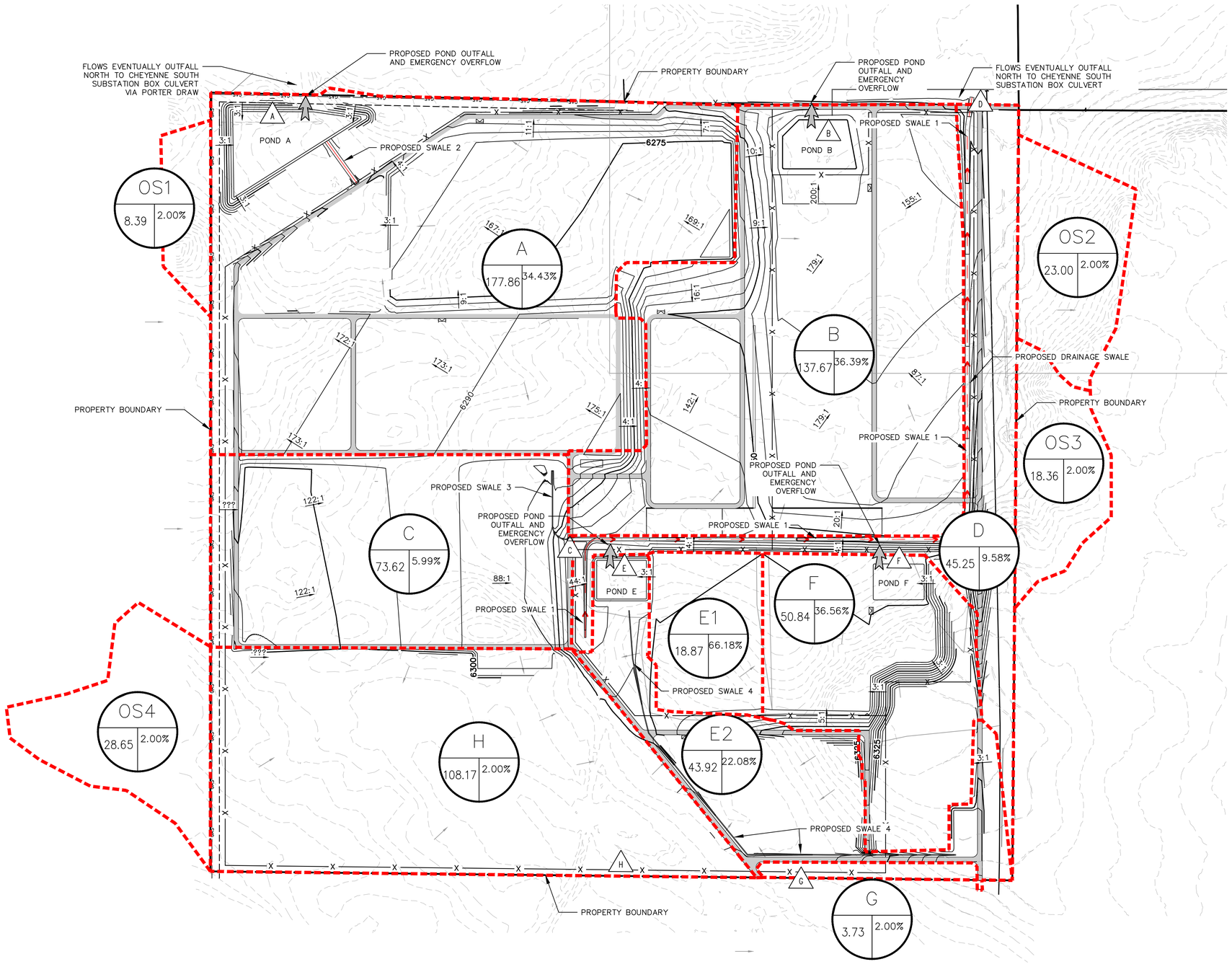
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
296242000

DRAWING NAME
TALLGRASS_DV DRAINAGE.DWG

15

G:\ACV\ACSDOCS\KIMLEY-HORN\296242000_LARAMIE COUNTY DATA CENTER\PROJECT FILES\CAD\PLANSHEETS\SITE PLAN\SITE PLAN - TALLGRASS



PROPOSED DRAINAGE LEGEND

# = BASIN DESIGNATION
AC = AREA IN ACRES
% = PERCENT IMPERVIOUSNESS

= DESIGN POINT

PROPOSED BASIN BOUNDARY

PROPOSED FLOW ARROW

PROPOSED STORM LINE

PROPOSED POND EMERGENCY OVERFLOW/OUTFALL

GENERAL NOTES

1. ALL EXISTING FEATURES NOT SHOWN ON THIS PLAN AND NOT SHOWN TO BE REMOVED ARE TO REMAIN.
2. ALL EXISTING VEGETATION WITHIN THE LIMITS OF DISTURBANCE SHALL BE REMOVED AS FOLLOWS:
   - 2.1. ALL EXISTING TREES SHALL BE CUT FLUSH WITH THE GROUND, EXCEPT IN AREAS WHERE ROOT STRUCTURES WILL INTERFERE WITH INSTALLATION OF STRUCTURAL FOUNDATIONS, OR TRENCHING OPERATIONS; IN SUCH CASES REMOVE ALL ROOTS.
   - 2.2. ALL EXISTING SHRUBS SHALL BE CUT FLUSH WITH THE GROUND, EXCEPT IN AREAS WHERE ROOT STRUCTURES WILL INTERFERE WITH INSTALLATION OF STRUCTURAL FOUNDATIONS; IN SUCH CASES, REMOVE ALL ROOTS.
   - 2.3. ALL EXISTING GRASSES SHALL BE MOWED AS SHORT AS POSSIBLE.
   - 2.4. IN AREAS OF GRADING, ALL VEGETATION SHALL BE CLEARED AND GRUBBED PER THE RECOMMENDATIONS IN THE FUTURE PROJECT GEOTECHNICAL REPORT.
   - 2.5. IN AREAS OF EXISTING AGRICULTURAL LAND, ALL CROPS SHALL BE REMOVED AND SOIL SHALL BE DISKED AND ROLLED, AS NEEDED, TO AID IN ESTABLISHMENT OF PERMANENT VEGETATION. REFER TO LANDSCAPE PLANS.
3. DAMAGE TO ANY KNOWN EXISTING UTILITIES AND SERVICES TO REMAIN SHALL BE REPAIRED AND/OR REPLACED IN KIND AT CONTRACTOR'S OWN EXPENSE.
4. DUST CONTROL MEASURES SHALL BE IMPLEMENTED DURING DEMOLITION INCLUDING BUT NOT LIMITED TO WATERING DIRT ACCESS ROADS.
5. IN AREAS OF PROPOSED GRADING, TOP SOIL SHALL BE STRIPPED AND STOCKPILED AWAY FROM NATIVE EXCAVATED SOIL PRIOR TO GRADING. CONTRACTOR SHALL GRADE SITE SUCH THAT THE FINAL GRADES SHOWN ON THESE PLANS ARE MET AFTER THE TOP SOIL IS RESPREAD. IN THE EVENT THAT LESS THAN 6" OF CUT OR FILL IS REQUIRED, TOPSOIL STRIPPING MAY NOT BE REQUIRED. HOWEVER, THE CONTRACTOR SHOULD ENSURE THAT FOLLOWING COMPLETION OF GRADING, A MINIMUM OF 6" OF TOPSOIL IS PRESENT AND ENSURE THE FINISH GRADE FACILITATES POSITIVE DRAINAGE.
6. RIGHT-OF-WAY LINES AND UTILITY EASEMENT LINES PER FINAL SURVEY.

NORTH

GRAPHIC SCALE IN FEET
0 175 350 700

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

NO.	REVISION	BY	DATE	APPR

Kimley»Horn
2025 KIMLEY-HORN AND ASSOCIATES, INC.
6200 South Syracuse Way, Suite 300
Greenwood Village, Colorado 80111 (303) 228-2300

DESIGNED BY: CRM
DRAWN BY: CMS
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BFC POWER AND CHEYENNE POWER HUB PROJECT
LARAMIE COUNTY, WYOMING
SITE PLAN
PROPOSED DRAINAGE MAP

NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
296242000

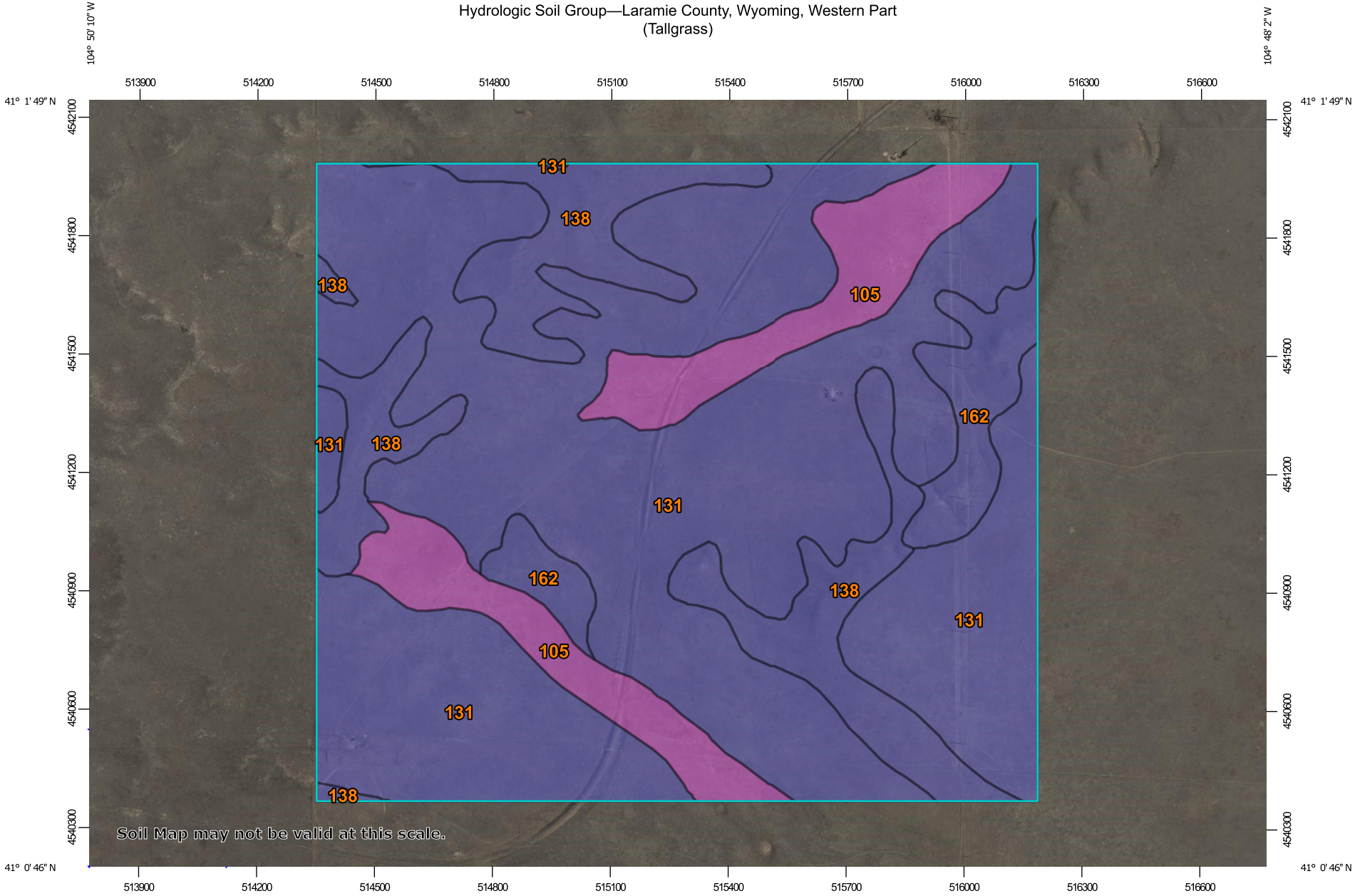
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TALLGRASS_OV DRAINAGE.DWG

16

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Appendix D – NCRS Soils Report and FEMA MAPS

Hydrologic Soil Group—Laramie County, Wyoming, Western Part
(Tallgrass)



Map Scale: 1:13,700 if printed on A landscape (11" x 8.5") sheet.

N

0 200 400 800 1200 Meters

0 500 1000 2000 3000 Feet

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Laramie County, Wyoming, Western Part
Survey Area Data: Version 18, Sep 4, 2025

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

Date(s) aerial images were photographed: Jul 2, 2022—Aug 8, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
105	Bayard fine sandy loam, 0 to 15 percent slopes	A	84.6	11.5%
131	Evanston loam, 0 to 6 percent slopes	B	499.7	67.9%
138	Ipson-Evanston complex, 6 to 30 percent slopes	B	112.0	15.2%
162	Poposhia-Trimad complex, 3 to 15 percent slopes	B	39.2	5.3%
Totals for Area of Interest			**735.5**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

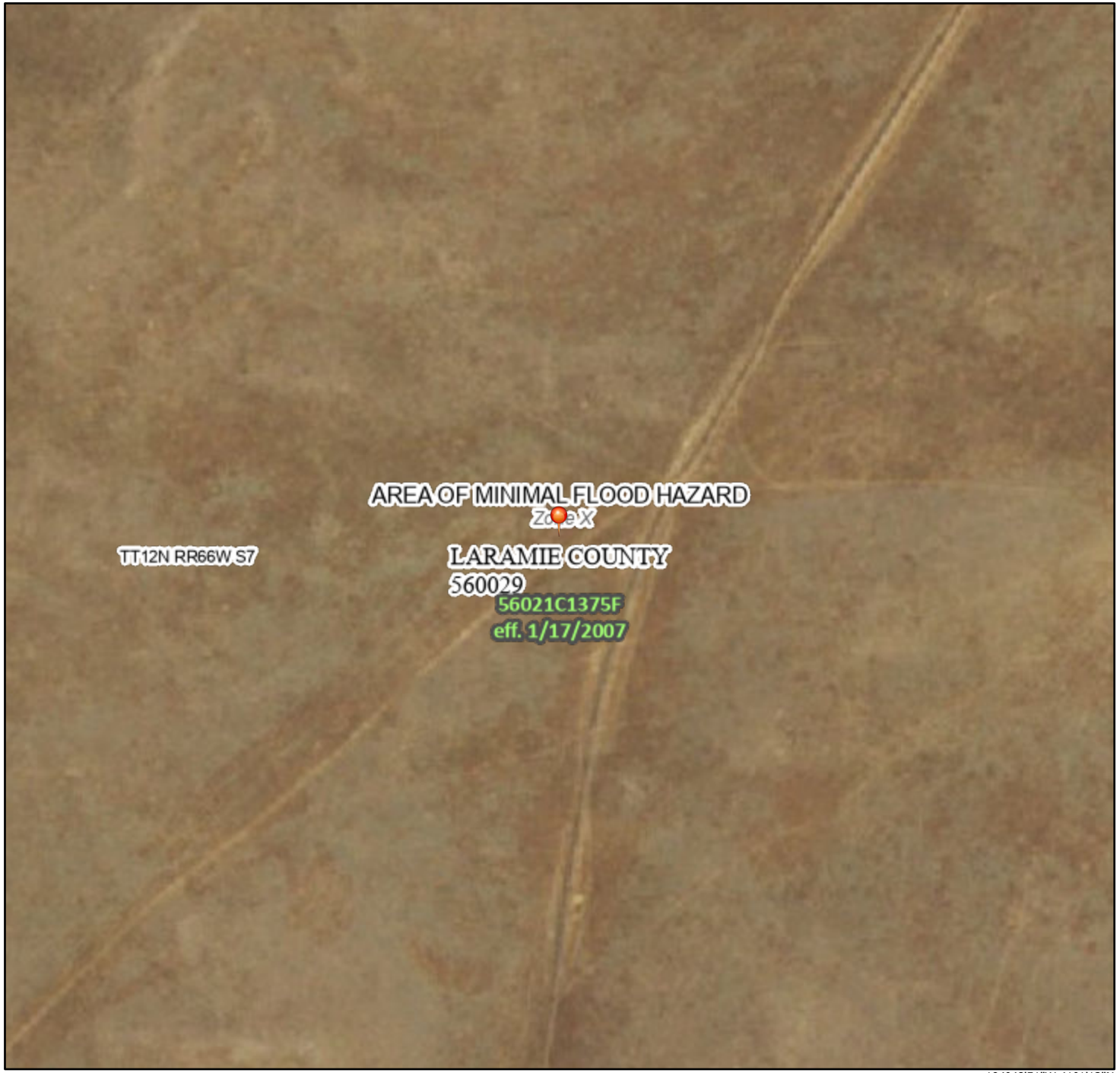
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

FEMA

104°49'29"W 41°1'39"N



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

1:6,000

104°48'51"W 41°1'12"N

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/7/2025 at 2:42 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Appendix E – Excerpts from Referenced Documents

CHEYENNE LIGHT FUEL AND POWER

SOUTH CHEYENNE SUBSTATION
SITE DRAINAGE ANALYSIS

DeWild Grant Reckert & Associates Company

Rock Rapids, Iowa

CHEYENNE LIGHT FUEL AND POWER

SITE DRAINAGE ANALYSIS
FOR
SOUTH CHEYENNE SUBSTATION

I hereby certify that this report and drainage plan for the proposed South Cheyenne Substation was prepared by me (or under my direct supervision) for the Owners thereof and that I am a duly registered Professional Engineer under the laws of the State of Wyoming.

Registered Professional Engineer (Civil)
State of Wyoming No. 12921



DGR Project No. 423303

DEWILD GRANT RECKERT & ASSOCIATES COMPANY
CONSULTING ENGINEERS
ROCK RAPIDS, IOWA
SIOUX FALLS, SOUTH DAKOTA
SIOUX CITY, IOWA

CHEYENNE LIGHT FUEL AND POWER

SITE DRAINAGE ANALYSIS
FOR
SOUTH CHEYENNE SUBSTATION

1.0 Project Description

2.0 Pre-Development Conditions

3.0 Post-Development Conditions

4.0 Porter Draw Culvert Design

5.0 Construction Storm Water Runoff

6.0 Downstream Impact

APPENDIX

- Project Plans
- Pre-Development Design Calculations
- Post-Development Design Calculations
- Culvert Design Calculations

1.0 PROJECT DESCRIPTION

1.1 PROJECT SITE INFORMATION

Project/Site Name: South Cheyenne Substation

Project Location: NW 1/4 Section 5, T12N, R66W
Laramie County, Wyoming
Lat. 41˚02'34", Long. 104˚48'32"

1.2 SITE DESCRIPTION

The proposed improvements constitute the South Cheyenne Substation near Cheyenne, Wyoming. All construction activities are to be limited to the private property/easements of Cheyenne Light, Fuel & Power.

The site improvements shall consist of the substation construction including structures. Substation construction will include access and site grading, storm sewer culvert installation, rock surfacing placement and erection of the substation components. The subsoils to be excavated will be sampled and tested during construction. All disturbed areas on the project shall be permanently seeded following finish grading.

The construction plan sheets, attached, show the type, size and depth of the proposed improvements. It is anticipated the construction schedule will be sequenced as to minimize the amount of area disturbed at one time. The topsoil stripping will be completed prior to beginning other site construction, then grading and subgrade preparation will be done. The remaining topsoil stripping shall commence as the construction sequencing requires followed by the construction of the proposed substation.

General site clean-up and permanent seeding shall conclude the construction activities on the project.

The existing site is undeveloped grass covered ranch property all generally draining to Porter Draw. The Project Plans in the Appendix show the existing ground contours (provided by Steil Surveying) as well as the proposed improvements. The Culvert Design Calculations in the Appendix illustrate the Porter Draw watershed and the USGS contours for this vicinity.

1.3 SITE SCOPE

The total area of the project site:

41.1 acres

The estimated area expected to undergo clearing, excavation or grading, including off-site materials sources, access roads, areas for support activities and staging/storage areas:

26.6 acres

2.0 PRE-DEVELOPMENT CONDITIONS

The existing undeveloped ranch property is rolling fair condition grass covered ground with with an existing WAPA overhead electrical line. Using the NRCS Curve Number method of storm water analysis, this property is classified Hydrologic condition B, with the corresponding CN- 69. The analysis rainfall data utilized below was obtained from the USGS Water Resources Investigation 87-4225 for Laramie County, Wyoming.

Duration (Minutes)	Rainfall Intensity (inches per hour)					
	(2 Year)	(5 Year)	(10 Year)	(25 Year)	(50 Year)	(100 Year)
5	3.42	4.75	5.70	6.98	8.00	9.07
10	2.64	3.66	4.38	5.40	6.12	6.90
15	2.20	3.04	3.60	4.36	4.96	5.56
30	1.34	1.96	2.42	3.06	3.56	4.12
60	0.73	1.10	1.41	1.87	2.27	2.73
120	0.41	0.63	0.83	1.16	1.46	1.84
1440	0.06	0.08	0.10	0.13	0.15	0.18

Runoff analysis was completed using TR-55 to calculate time of concentration for the existing property and reviewed for the rainfall events of 5, 10, 50 and 100-year to meet the Laramie County Land Use Regulations (adopted February 15, 2011).

Pre-Development Drainage Analysis

Storm Event Frequency (Years)	Peak Discharge (Cubic Feet/Second)
5	1.68
10	4.83
50	16.43
100	24.71

The Pre-Development Design Calculations Appendix contains the hydrographs for the above mentioned rainfall events.

3.0 POST-DEVELOPMENT CONDITIONS

The South Cheyenne Substation grading and storm sewer improvements will be completed as a single construction project (see Project Plans in the Appendix). Much of the substation pad will be completed with crushed rock surfacing making the combined substation site NRCS CN-92. In order to provide storm water detention to meet Laramie County's detention requirements of a pre-development 50 year storm to meet a developed 100 year storm, the area north of the substation pads will be installed with 12" RCP storm sewer culvert to reduce the runoff rate to those shown in the table below:

Post-Development Drainage Analysis

Storm Event Frequency (Years)	Peak Storm Flowrate (Cubic Feet/Second)	RCP Outlet Discharge (Cubic Feet/Second)
5	20.11	3.42
10	27.40	3.97
50	45.73	5.11
100	56.68	5.63

As a result, the developed 100 year discharge of 5.63 cfs is well below the undeveloped 50 year design storm of 16.43 cfs and is nearly at the 10 year level. The hydrographs for each of these conditions can be seen in the Post-Development Design Calculations Appendix for each storm event utilizing NRCS and TR-55 hydraulic methods.

The detention ponding at the 100 year storm event reaches elevation 6174.68, providing safety free board of over 3' providing additional detention in major precipitation events (Low point of access embankment = 6177.83).

4.0 PORTER DRAW CULVERT DESIGN

The access road for the South Cheyenne Substation crosses Porter Draw including a large drainage basin of 4068 acres +/- (see Culvert Design Calculations watershed plan page in the Appendix). Hydroflow calculations for the 5, 10, 50 and 100 year design storms are also included to show the culvert meets a 100 year design storm (3-5'x16' pre-cast box culverts, see Project Plans in the Appendix). The culverts are each 30' long at 0.50% slope and built to a HL-93 Design Loading. The maximum discharge in a 100 year storm event is 1576.99 cfs without overtopping of the access road. The site development of the substation pads in Section 3.0 are the only significant changes to the watershed; therefore, detention at the Porter Draw crossing is not being considered and is not required by County Land Use Guidelines.

5.0 CONSTRUCTION STORMWATER RUNOFF

The Contractor shall be responsible to control erosion off the site during construction. General Permit to Discharge Storm Water Associated with Large Construction Activity (WYPDES) is necessary for this project (26.6 acres disturbed) and will be obtained by the Owner. Contractor shall use general Best Management Practices while performing work to avoid soil erosion from the site. Contractor shall inspect erosion control devices weekly or after all precipitation of ½" or more and repair deficient areas. The Contractor shall review and follow the recommendations provided in the SWPPP in the appendix of the project specifications. Should site conditions warrant; the SWPPP shall be amended in order to maintain compliance with the permit.

6.0 DOWNSTREAM IMPACTS

The downstream impacts of the substation site will be mitigated by the installation of on-site detention to slow the storm runoff of the site (up to a 100 year design storm) to nearly the existing runoff in a 10 year design storm. Downstream impacts of Porter Draw will be negligible considering the 100 year design of the access drive culverts, as well as the outlet stabilization specified by the plans (Project Plans in the Appendix). The next downstream stormwater structure is the 10' diameter C.M.P. culvert crossing of WY Highway 85 (estimated 15' road embankment).

APPENDIX

PROJECT PLANS

Plot Date: 6/12/2012 4:58:22 PM

SEE SHEET C-011 FOR ENTRANCE DRIVE PLAN

P-1 110LF OF 12" RCP @ 2.5% W/ APRONS
P-2 85LF OF 12"RCP @ 0.40% W/APRONS
P-3 78LF OF 12"RCP @ 0.40% W/APRONS

D-1 250LF OF 4" PERFORATED DRAIN TILE
D-2 50LF OF 4" PERFORATED DRAIN TILE

SILT FENCE (TYP)

CLFP SUBSTATION

WAPA SUBSTATION

PROPOSED GATE (TYP)

PROPOSED FENCE (TYP)

CLFP EASEMENT

WAPA EASEMENT

90.00'

N0° 17' 25"E 944.55'

S0° 04' 50"W 1100.00'

S1° 11' 35"E 155.49'

N89° 53' 06"W 1310.00'

394.00'

486.00'

149.00'

24.00' (TYP)

22.00'

20.00'

20' (TYP)

30.00'

580.00'

670.00'

85.00'

57.00'

231.00'

138.00'

70.00'

R50.00' (TYP)

32+00 34+00 36+00 38+00 40+00 42+00 44+00

6175 6180 6185 6190 6195 6196 6200 6205

0' 25' 50' 100'
SCALE IN FEET

Refer to sheet C-012 for Key Notes

LEGEND - TOPOGRAPHIC SURVEY

- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING BURIED FIBER OPTIC LINE
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF WATER LINE
- PROPOSED EDGE OF ROCK
- EXISTING EASEMENT
- PROPERTY LINE, R.O.W. LINE
- DRAIN TILE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SILT FENCE/DITCH CHECKS/WATTLES
- PERMANENT TURF REINFORCEMENT MAT
- EXISTING POWER POLE, LIGHT POLE
- EXISTING GUY WIRE
- BENCHMARK, SURVEY MARKER
- GRADING DRAINAGE DIRECTION

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers
Rock Rapids, Iowa

DATE	DRAWN BY	NO.	APPROVED BY	REVISION DESCRIPTION
6-12	DLV	0	DLV	SUBSTATION CONTRUCTION

CHEYENNE LIGHT FUEL AND POWER
SOUTH CHEYENNE SUBSTATION

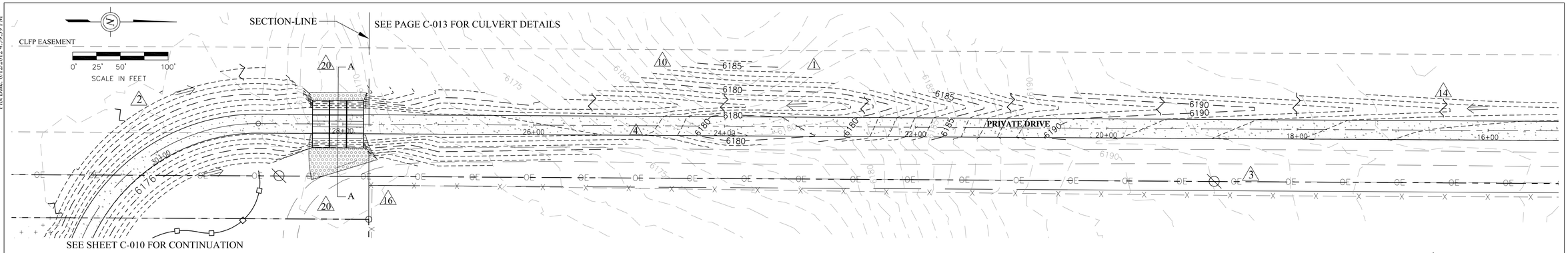
CIVIL SITE PLAN

DRAWN BY DLV DATE 4/12
APPROVED BY PDK DATE 5/12

DWG NO. SCH-C-010 REVISION NO. 0

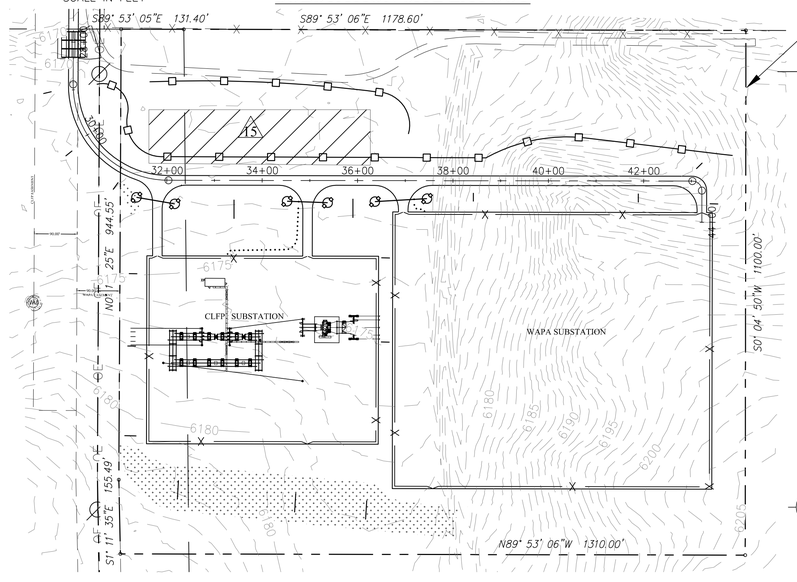
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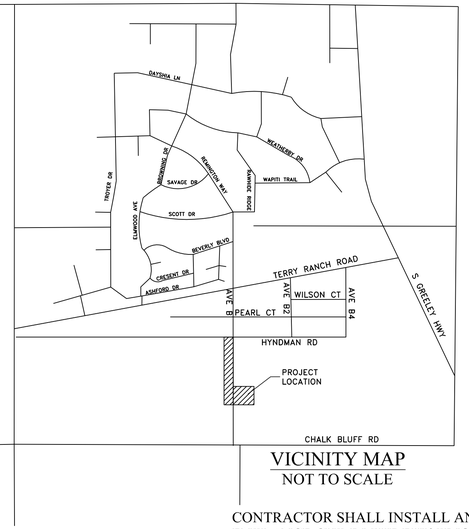


ENTRANCE DRIVE PLAN

SUBSTATION SITE LAYOUT

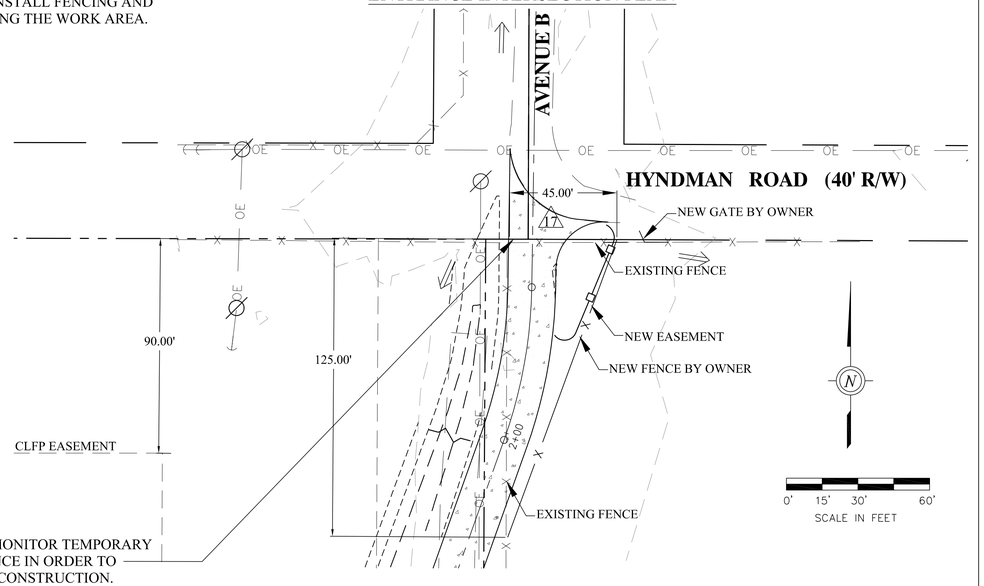


FENCING TO BE INSTALLED AT THE EAST, SOUTH AND WEST PROPERTY LINE BY THE OWNER PRIOR TO CONSTRUCTION, CONTRACTOR SHALL NOT DISTURB FENCE LINE EXCEPT AS NECESSARY TO BUILD THE ENTRANCE ROAD. CONTRACTOR SHALL REINSTALL FENCING AND TEMPORARY GATES AS NECESSARY TO PREVENT CATTLE FROM ENTERING THE WORK AREA.



VICINITY MAP
NOT TO SCALE

ENTRANCE INTERSECTION PLAN



CONTRACTOR SHALL INSTALL AND MONITOR TEMPORARY ENTRANCE CUT-IN THE EXISTING FENCE IN ORDER TO MAINTAIN FUNCTION THROUGHOUT CONSTRUCTION.

LEGEND - TOPOGRAPHIC SURVEY

- OE — EXISTING OVERHEAD ELECTRIC LINE
- FO FO — EXISTING BURIED FIBER OPTIC LINE
- X X — EXISTING FENCE
- X — PROPOSED FENCE
- EXISTING EDGE OF GRAVEL
- W W — EXISTING EDGE OF WATER LINE
- PROPOSED EDGE OF ROCK
- EXISTING EASEMENT
- PROPERTY LINE, R.O.W. LINE
- DRAIN TILE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SILT FENCE/DITCH CHECKS/WATTLES
- PERMANENT TURF REINFORCEMENT MAT
- EXISTING POWER POLE, LIGHT POLE
- EXISTING GUY WIRE
- BENCHMARK, SURVEY MARKER
- GRADING DRAINAGE DIRECTION

Refer to sheet C-012 for Key Notes

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers
Rock Rapids, Iowa

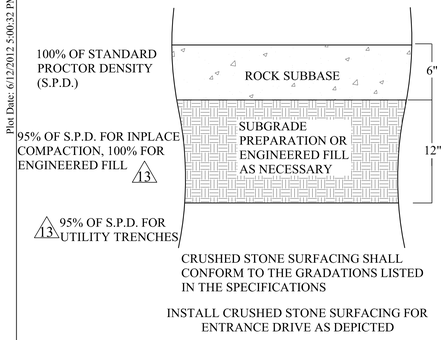
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CHEYENNE LIGHT FUEL AND POWER
SOUTH CHEYENNE SUBSTATION
CIVIL SITE PLAN

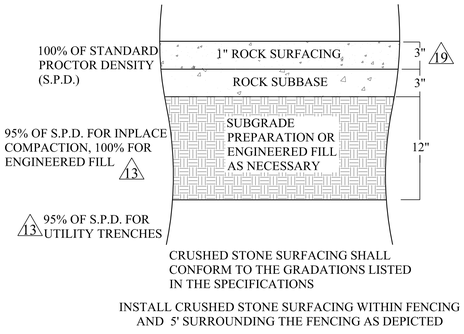
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APPROVED BY PDK DATE 5/12
DWG NO. SCH-C-011 REVISION NO. 0

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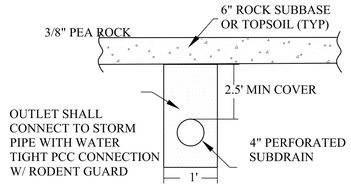
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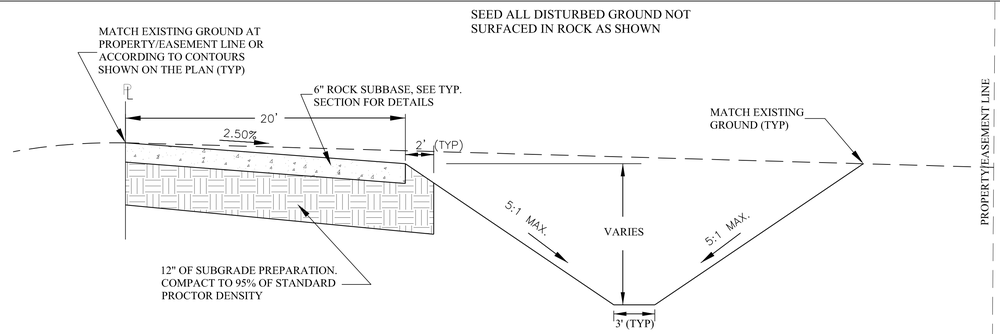
TYPICAL ROCK DRIVEWAY SURFACING SECTION
NOT TO SCALE



TYPICAL ROCK SUBSTATION SURFACING SECTION
NOT TO SCALE



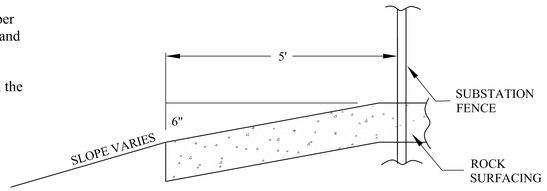
4" PERFORATED SUBDRAIN
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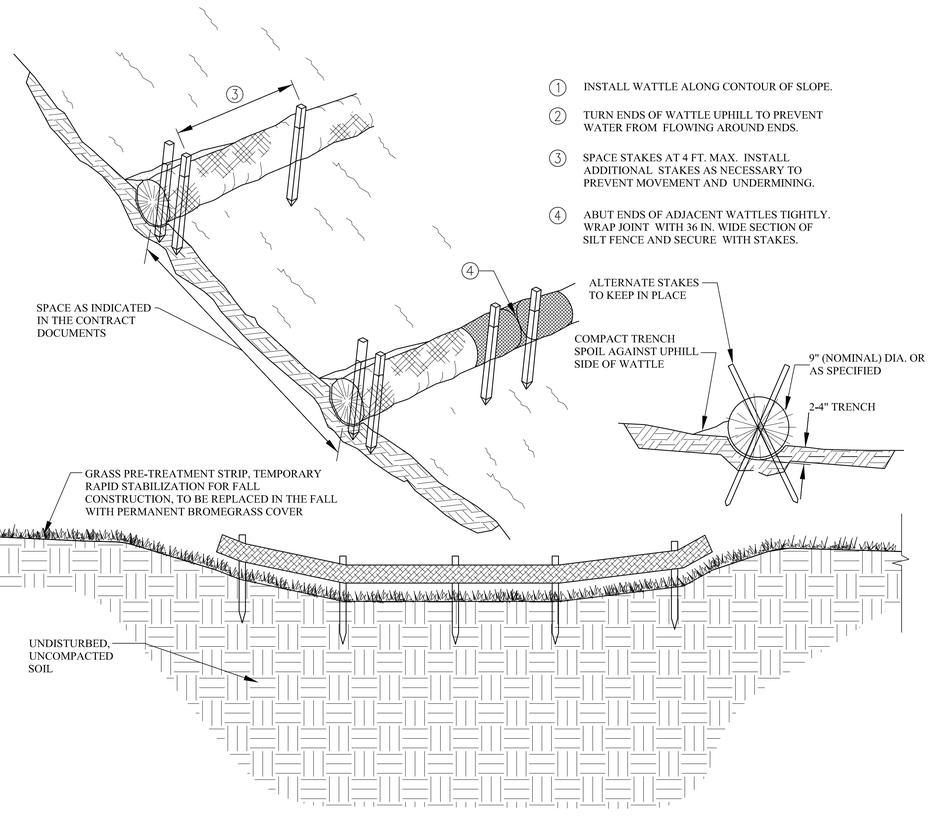
TYPICAL DRIVEWAY SECTION
NOT TO SCALE

CONSTRUCTION NOTES

1. All disturbed areas shall be prepared as shown on the details or described in the specifications.
2. Excavated material shall be utilized on site to build the slopes shown. The Contractor is responsible for excavating, hauling, and disposing of excess fill material not used in the site preparation. Excess material can be wasted on site at the direction of the Owner during construction, extra grading and seeding costs shall be incidental to the excavation bid item.
3. Utilities and other potential obstacles (underground facilities) have been shown only to the extent that they were observed at the surface or were known by Others. The Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data. The Contractor shall have full responsibility for reviewing and checking all such information and data, locating all such facilities, coordination of the work with the owners of such underground facilities during construction, and the safety and protection of all such underground facilities.
4. For rock and gravel surfacing, refer to the details and specifications for preparation and material requirements. Prior to surfacing apply 'SpraKil SK-13' as specified to prevent plant growth.
5. Provide, compact and grade engineered fill or in-place grade as necessary to meet contours shown. Proposed contours are to final top of rock/topsoil; account for 6" granular surfacing/topsoil as shown in the detail. Topsoil excavation and placement shall be incidental to the cost of the excavation bid unit.
6. Contractor shall be responsible to control erosion of the site during construction. General Permit to Discharge Storm Water Associated with Large Construction Activity (WYPDES) is necessary for this project (26.6 acres disturbed) and will be obtained by the Owner. Contractor shall use general Best Management practices while performing work to avoid soil erosion from the site. Contractor shall inspect erosion control devices weekly or after all precipitation and repair any deficient areas. The Contractor shall review and follow the recommendations provided in the SWPPP in the appendix of the specifications. Should site conditions warrant; the SWPPP shall be amended in order to maintain compliance with the permit. All costs shall be incidental to the erosion control items provided in the bid units.
7. Electrical site equipment details and substation crushed rock surfacing to be completed later by Substation Contractor.
8. Contractor will be responsible for all staking for this project. Contact the survey Engineer (Steil Surveying) for coordinate files or dimensioning to complete staking. All costs incidental to the project.
9. Contractor shall review the soils report as completed by I.M.E. All disturbed areas shall be prepared as shown on the details or described in the specifications.
10. All disturbed areas that are not surfaced shall be seeded, fertilized and mulched. Do not disturb area outside construction area shown.
11. Connect RC pipe apron to first pipe with a 1/2" stainless ready rod connection, grade 80. Also provide inlet protection for culvert ends to prevent erosion into the storm pipe. Maintenance costs shall be incidental to the bid item.
12. All site work shall be completed in accordance to the latest Wyoming DOT specifications (2010 edition).
13. For every foot of embankment material installed, the Contractor shall provide the Owner with nuclear density tests in a 50' grid per foot verifying the compaction specified. Failure to provide these test results will result in re-work necessary to provide the base and compaction test results as specified.
14. Ditch checks or wattles (~15') shall be provided every 150' in the drainage ditches on site, maintenance costs shall be included in the bid item included in the bid form
15. Utilize these areas for storage of building materials, on-site fueling and concrete washout areas, handle and contain materials as described in the SWPPP and permitted by the WYDEQ.
16. Storm water discharge location for the project site, the Contractor shall maintain and add storm water controls as necessary throughout construction to prevent soil erosion or hazardous materials from leaving the project site.
17. Install and maintain rock construction entrance to prevent offsite tracking. Rock used shall be removed during the rock surfacing portion of the work, all costs incidental to the rock surfacing bid item.
18. Install permanent turf reinforcement mat (North American Green P-550) for the area depicted.
19. Contractor shall complete work defined in the Bid Form in the specifications. Some of the items depicted in the plan may be completed by others, coordinate work with other Contractors with adjacent work.
20. Install and maintain culvert erosion control protection throughout construction by use of a series of controls including straw bales, silt fence, wattle, etc. to protect the drainage way from erosion of on-site material. All costs shall be incidental to the unit bid price.



FENCE PERIMETER GRADING
NOT TO SCALE



WATTLE INSTALLATION
NOT TO SCALE

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers
Rock Rapids, Iowa

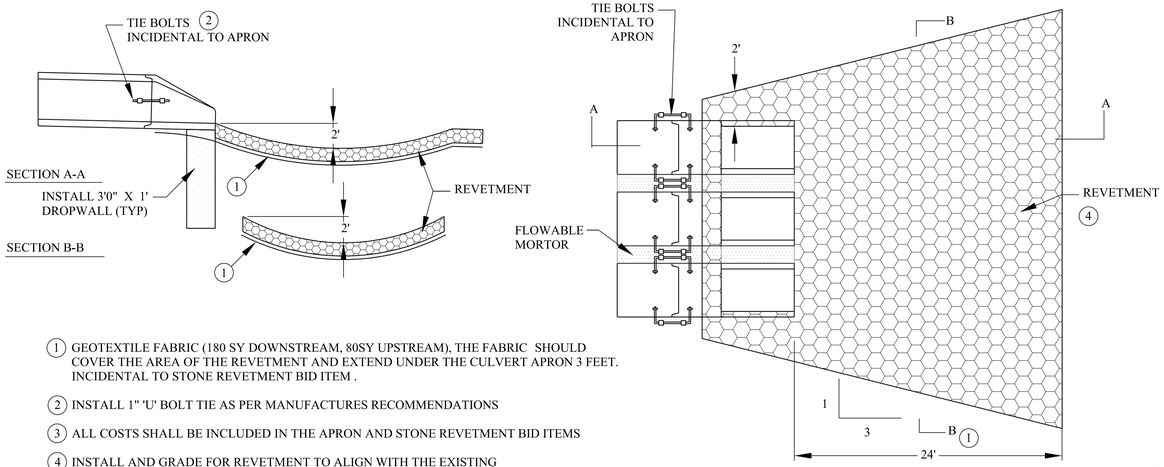
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CHEYENNE LIGHT FUEL AND POWER
SOUTH CHEYENNE SUBSTATION
CIVIL SITE DETAILS

DRAWN BY DLV DATE 4/12
APPROVED BY PDK DATE 5/12
DWG NO. SCH-C-012 REVISION NO. 0

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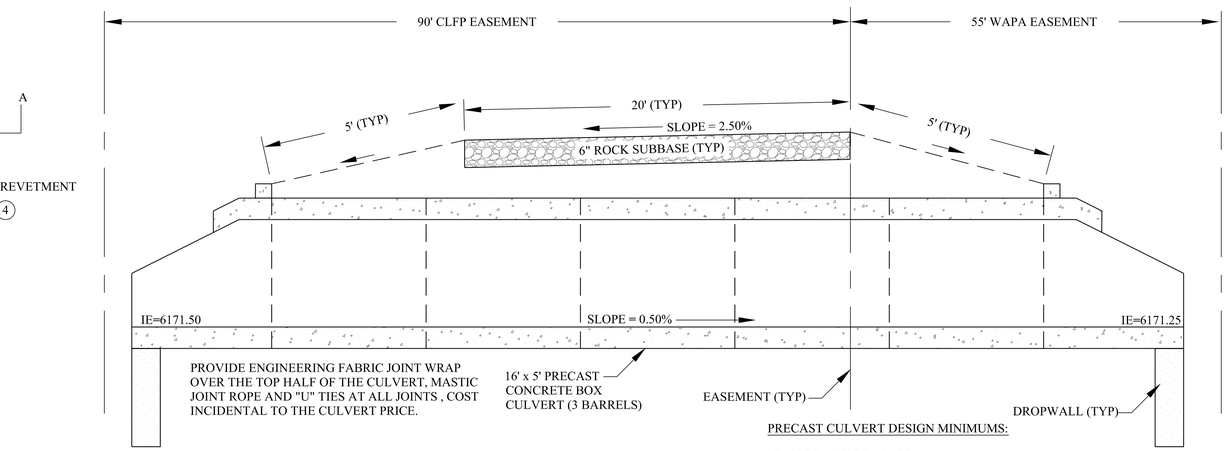
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1. GEOTEXTILE FABRIC (180 SY DOWNSTREAM, 80SY UPSTREAM), THE FABRIC SHOULD COVER THE AREA OF THE REVETMENT AND EXTEND UNDER THE CULVERT APRON 3 FEET. INCIDENTAL TO STONE REVETMENT BID ITEM .
2. INSTALL 1" 'U' BOLT TIE AS PER MANUFACTURES RECOMMENDATIONS
3. ALL COSTS SHALL BE INCLUDED IN THE APRON AND STONE REVETMENT BID ITEMS
4. INSTALL AND GRADE FOR REVETMENT TO ALIGN WITH THE EXISTING CHANNEL AS DEPICTED ON PAGE SCH-C-010.

(300 TONS) SHALL BE NATURAL STONE ACCORDING TO WYDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION. (8-30" DIAMETER) ALL ITEMS TO BE PAID FOR AT THE CONTRACT UNIT PRICE.

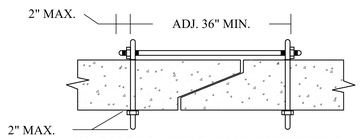
REVETMENT AT APRON
NOT TO SCALE



PRECAST CULVERT DESIGN MINIMUMS:

HL-93 DESIGN LOADING
5000 PSI CONCRETE
65000 PSI (ASTM A497) STEEL YIELD

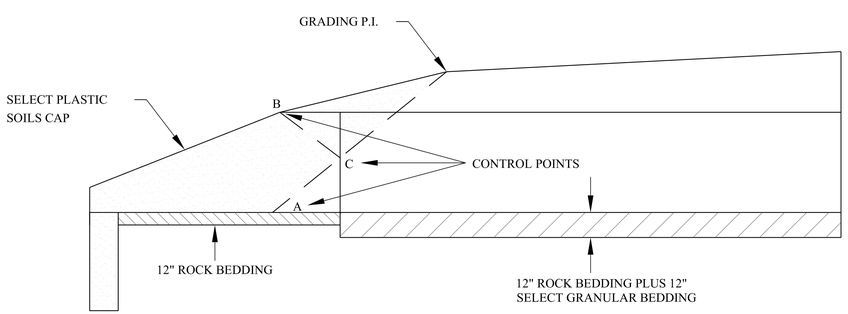
TYPICAL SECTION A-A
NOT TO SCALE



EYE BOLT & TIE BOLT ASSEMBLY INCLUDED IN PRICE BID FOR CONCRETE BOX CULVERT.

DIAMETER OF EYE BOLTS AND ADJUSTABLE TIE BOLT SHALL BE 1 INCH. TIE BOLTS, EYE BOLTS, WASHERS AND NUTS SHALL BE GALVANIZED. STEEL SHALL BE GRADE 60 OR BETTER.

TIE BOLT DETAIL
NOT TO SCALE



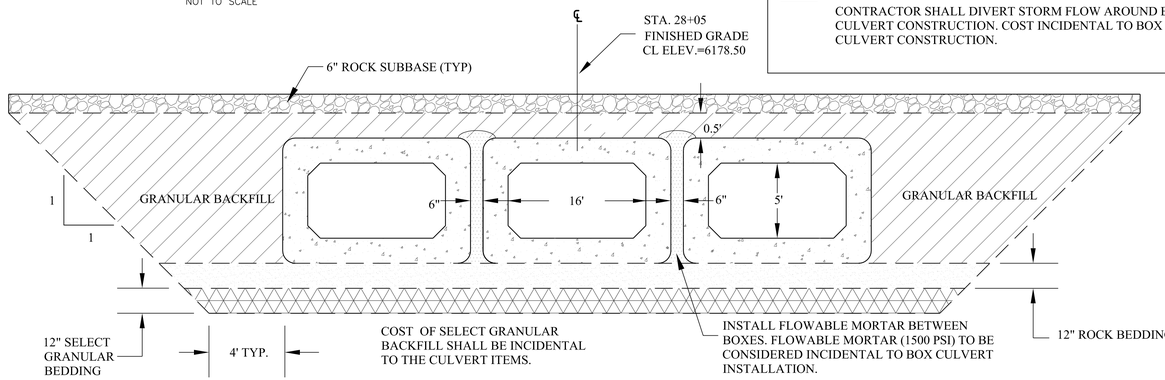
NOTES:
**DO NOT PLACE ANY GRANULAR BEDDING BEYOND THE END OF THE PIPE CULVERT BARREL SECTIONS.

THICKNESS OF PLASTIC SOIL CAP, (B-C) SHALL BE A MINIMUM OF 3 FEET. MINIMUM 50% PASSING THE 200 SIEVE & A MINIMUM 20% CLAY SIZE.

CULVERT WORK TO BE PERFORMED IN DRY CONDITIONS. ALL COST INCIDENTAL TO THE CULVERT AND EMBANKMENT ITEMS.

PLASTIC SOILS CAP TREATMENT
NOT TO SCALE

NOTE:
CONTRACTOR SHALL DIVERT STORM FLOW AROUND BOX CULVERT CONSTRUCTION. COST INCIDENTAL TO BOX CULVERT CONSTRUCTION.



SLOPE TRENCH AS REQUIRED BY FEDERAL & STATE OSHA SAFETY STANDARDS

CROSS SECTION THRU CULVERT
NOT TO SCALE

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers

Rock Rapids, Iowa

DATE	DRAWN BY	NO.	APPROVED BY	REVISION DESCRIPTION
6-12	DLV	0	DLV	SUBSTATION CONTRUCTION

CHEYENNE LIGHT FUEL AND POWER
SOUTH CHEYENNE SUBSTATION
CIVIL SITE DETAILS

DRAWN BY DLV DATE 4/12
APPROVED BY PDK DATE 5/12
DWG NO. SCH-C-013
REVISION NO. 0

P:\04\2433\03\CIVIL\DWG\2433SDETAIL2.DWG

PRE-DEVELOPMENT DESIGN CALCULATIONS

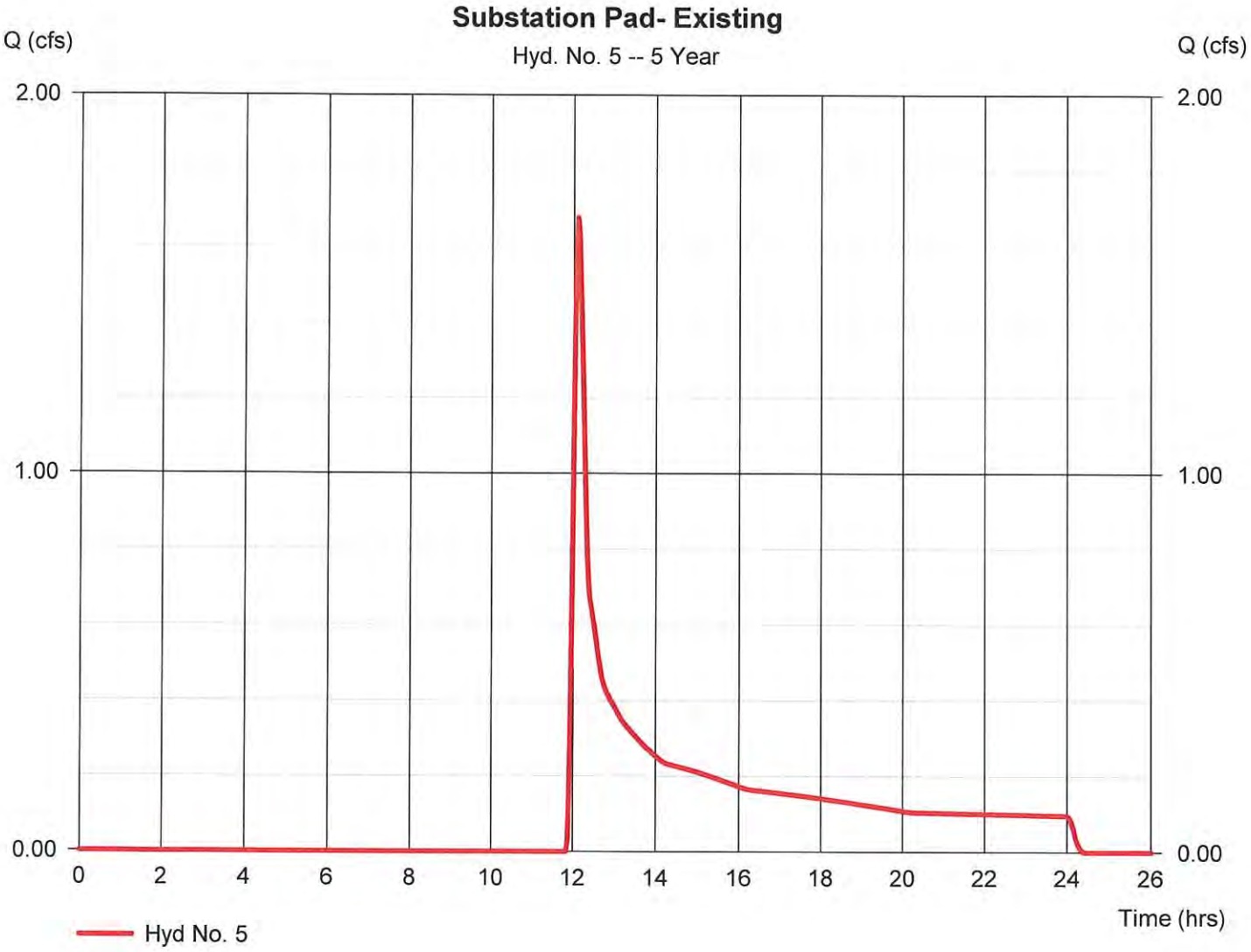
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Jul 23, 2012

Hyd. No. 5

Substation Pad- Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 1.675 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 9,188 cuft
Drainage area	= 13.720 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.90 min
Total precip.	= 1.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



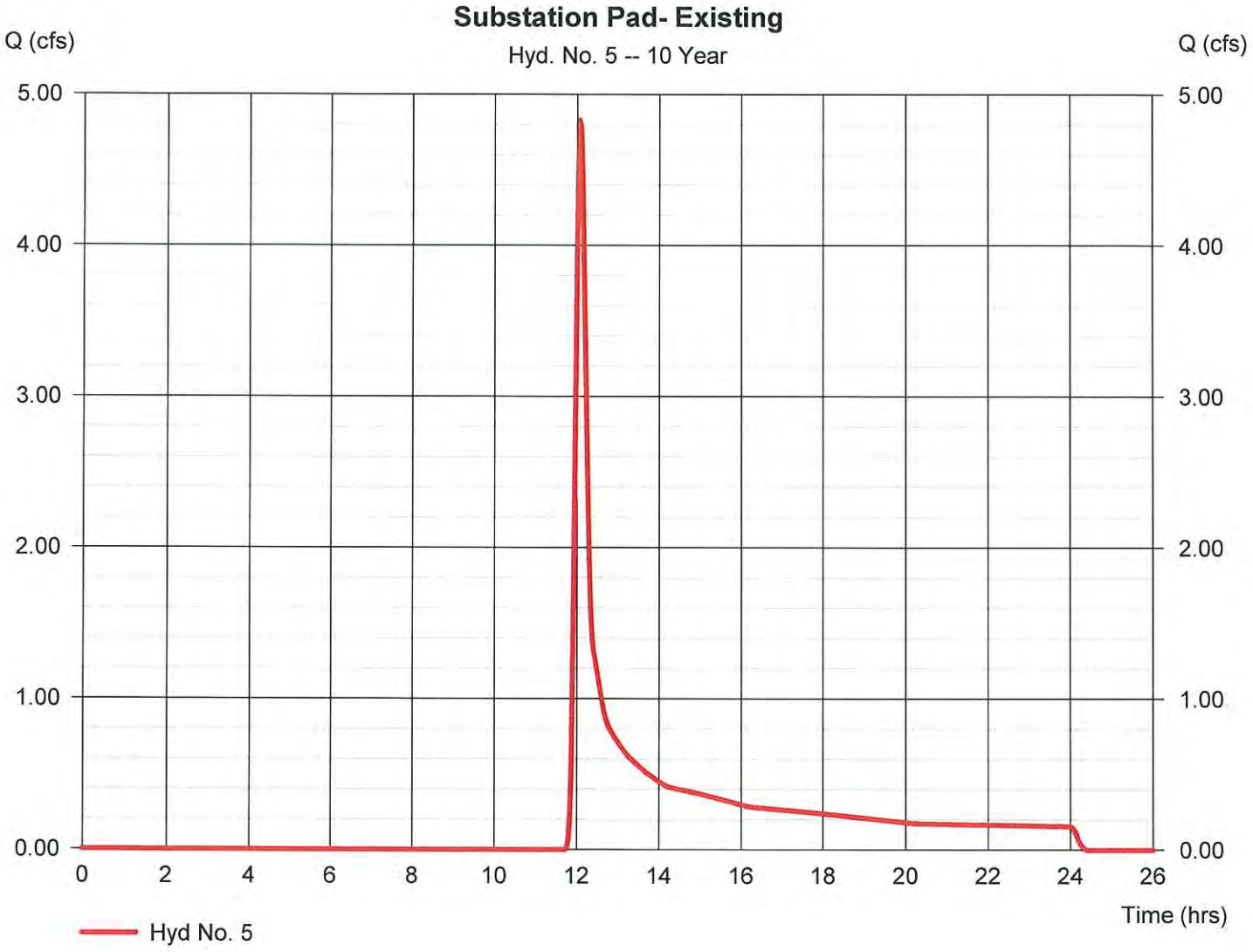
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Jul 23, 2012

Hyd. No. 5

Substation Pad- Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 4.828 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 18,262 cuft
Drainage area	= 13.720 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.90 min
Total precip.	= 2.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



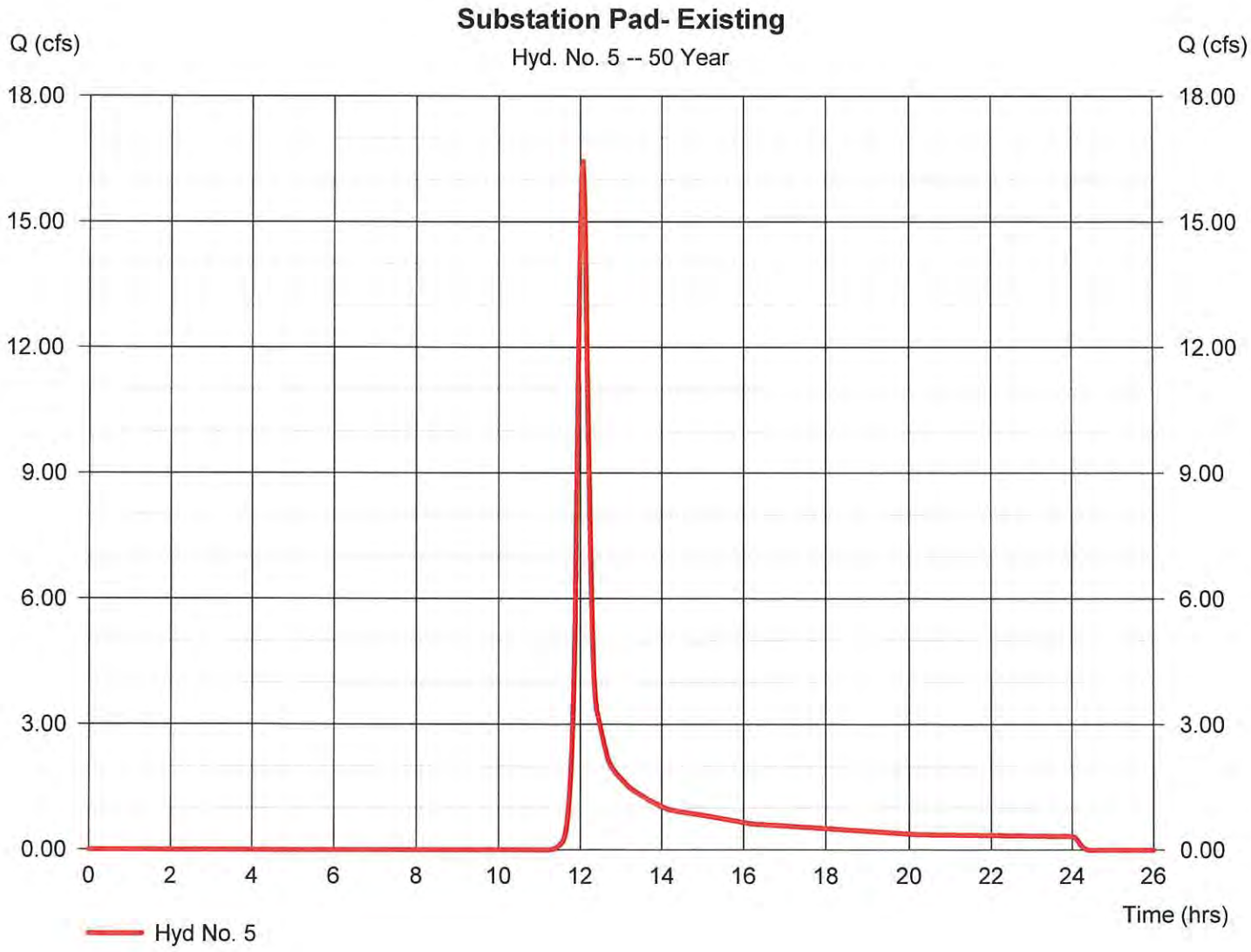
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Jul 23, 2012

Hyd. No. 5

Substation Pad- Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 16.43 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 49,258 cuft
Drainage area	= 13.720 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.90 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



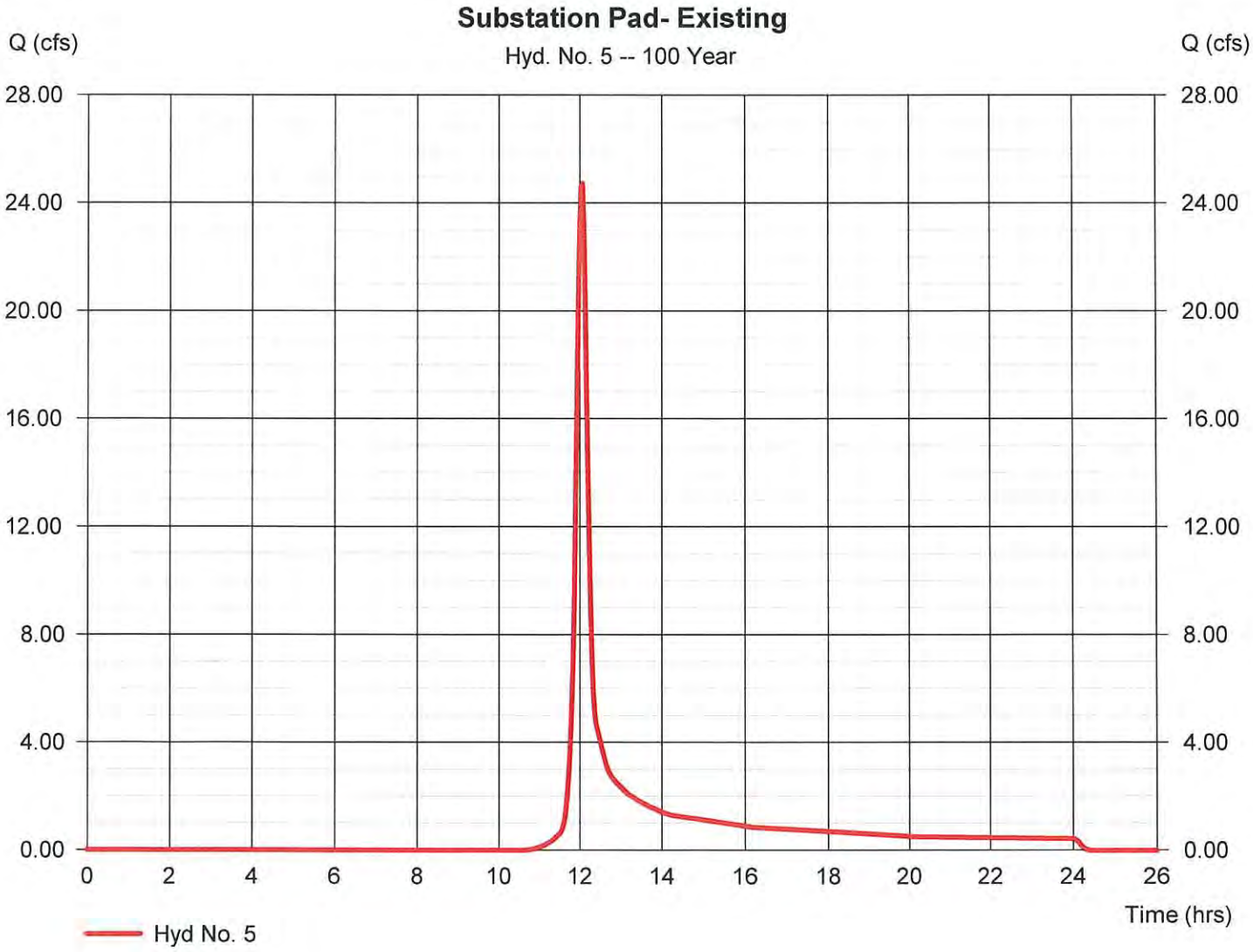
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Jul 23, 2012

Hyd. No. 5

Substation Pad- Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 24.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 71,825 cuft
Drainage area	= 13.720 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.90 min
Total precip.	= 4.32 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



POST-DEVELOPMENT DESIGN CALCULATIONS

Hydrograph Report

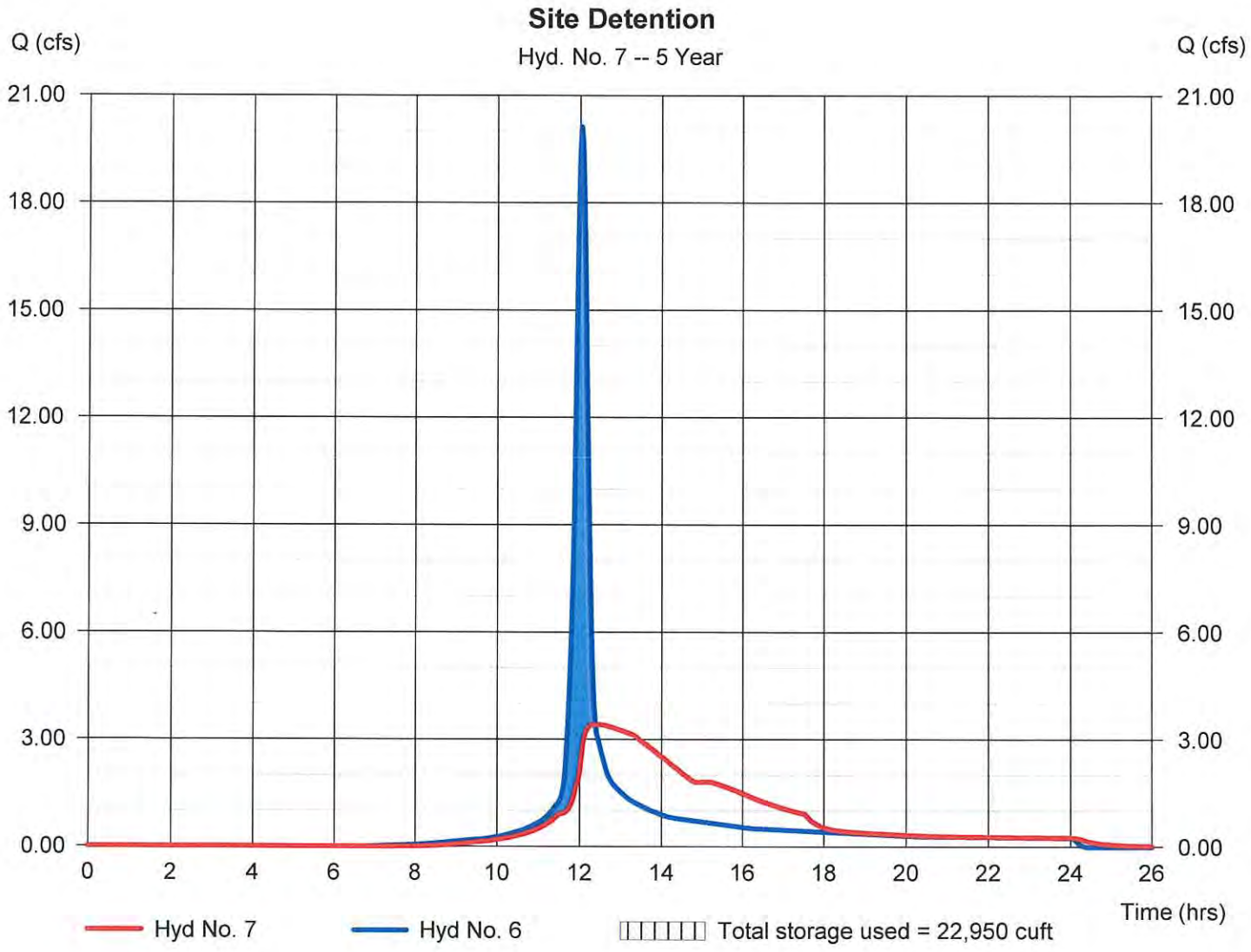
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 7

Site Detention

Hydrograph type	= Reservoir	Peak discharge	= 3.418 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 56,545 cuft
Inflow hyd. No.	= 6 - Substation Pad- Proposed	Max. Elevation	= 6173.15 ft
Reservoir name	= Site Detention	Max. Storage	= 22,950 cuft

Storage Indication method used.



Hydrograph Report

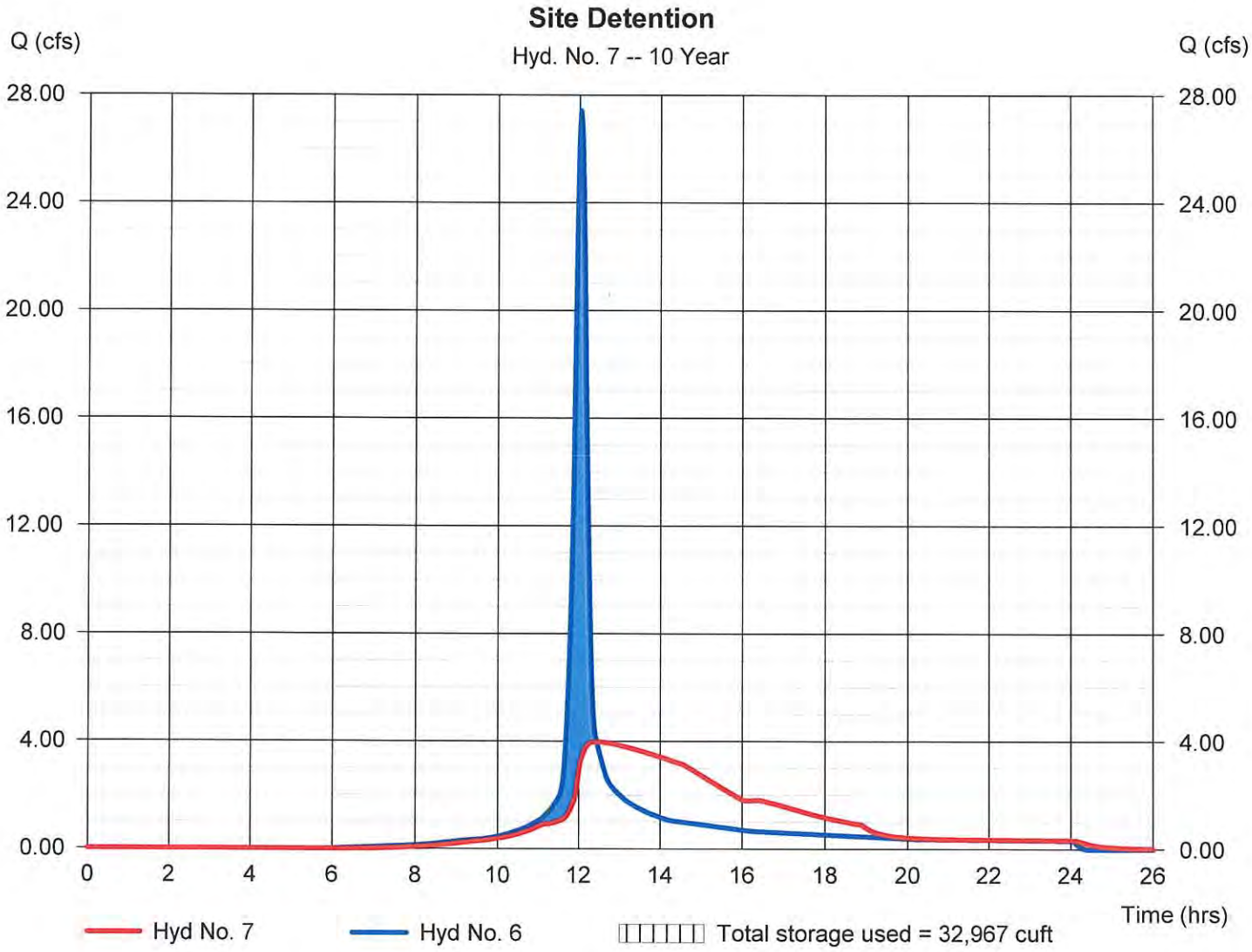
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Friday, Jul 20, 2012

Hyd. No. 7

Site Detention

Hydrograph type	= Reservoir	Peak discharge	= 3.971 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.43 hrs
Time interval	= 2 min	Hyd. volume	= 77,661 cuft
Inflow hyd. No.	= 6 - Substation Pad- Proposed	Max. Elevation	= 6173.46 ft
Reservoir name	= Site Detention	Max. Storage	= 32,967 cuft

Storage Indication method used.



Hydrograph Report

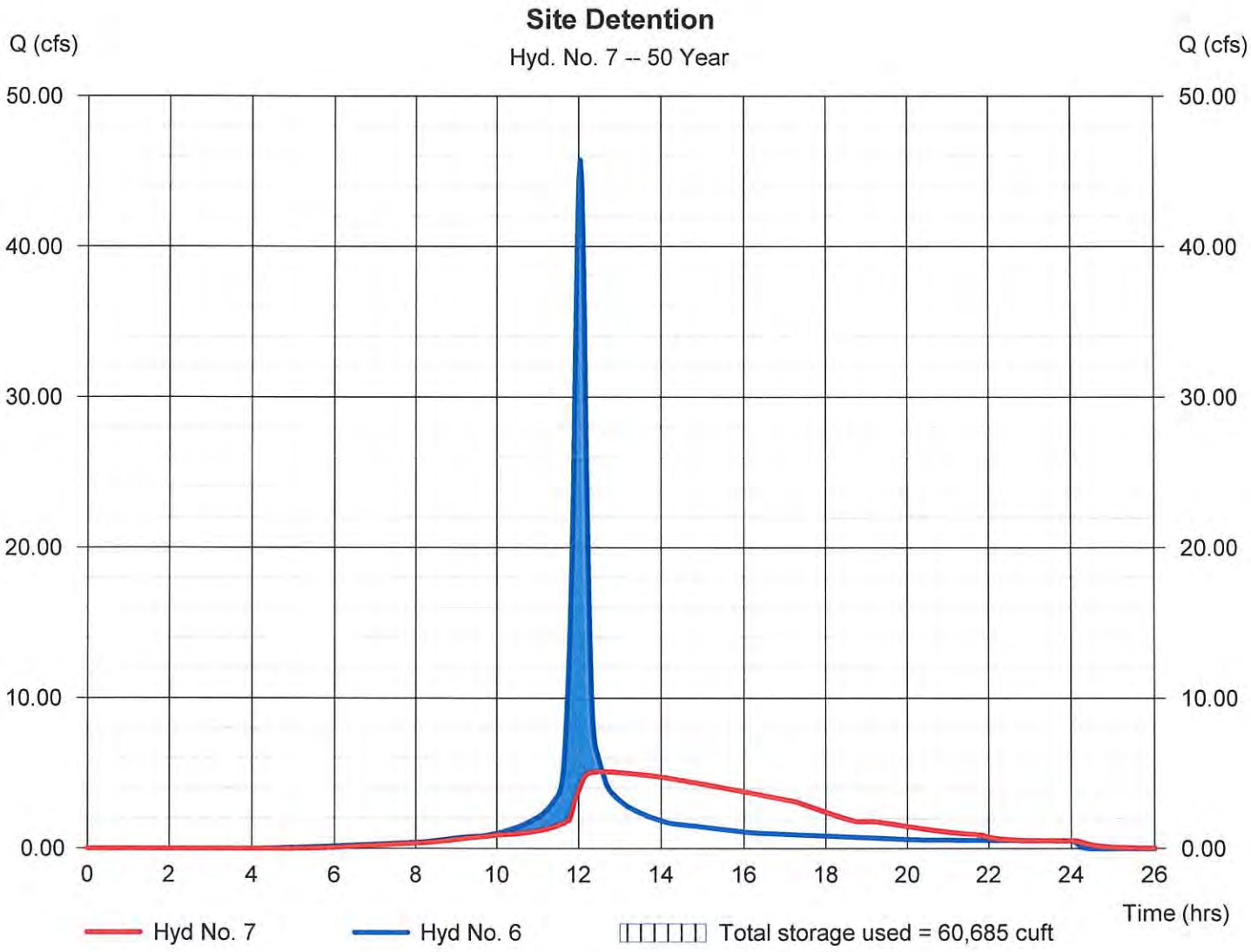
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 7

Site Detention

Hydrograph type	= Reservoir	Peak discharge	= 5.105 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.57 hrs
Time interval	= 2 min	Hyd. volume	= 132,578 cuft
Inflow hyd. No.	= 6 - Substation Pad- Proposed	Max. Elevation	= 6174.25 ft
Reservoir name	= Site Detention	Max. Storage	= 60,685 cuft

Storage Indication method used.



Hydrograph Report

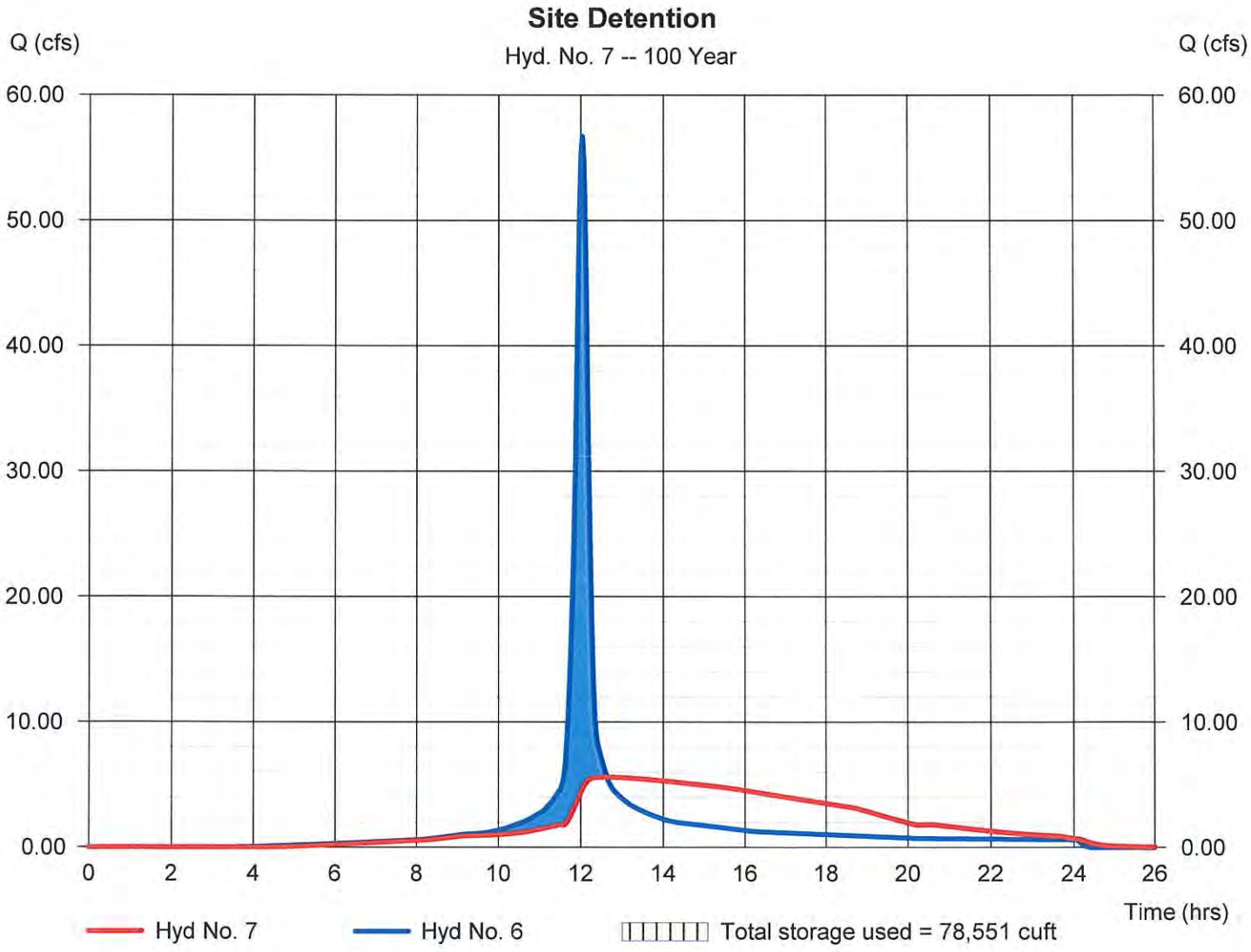
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 7

Site Detention

Hydrograph type	= Reservoir	Peak discharge	= 5.624 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.63 hrs
Time interval	= 2 min	Hyd. volume	= 166,289 cuft
Inflow hyd. No.	= 6 - Substation Pad- Proposed	Max. Elevation	= 6174.68 ft
Reservoir name	= Site Detention	Max. Storage	= 78,551 cuft

Storage Indication method used.



CULVERT DESIGN CALCULATIONS

DRAINAGE EXHIBIT
FOR
BLACK HILLS POWER

PORTIONS OF
T.12N., R.66W.;
T.13N., R.66W.;
T.12N., R.67W.;
T.13N., R.67W.;
LARAMIE COUNTY, WYOMING.

PREPARED APRIL, 2012

WATERSHED BASIN
3218 ACRES +/-

BSD ACRES

TERRY RANCH ROAD

T.13N.
T.12N.

SITE

STEIL SURVEYING SERVICES, LLC
PROFESSIONAL LAND SURVEYORS
1102 W. 18th ST. CHEYENNE, WY. 82001 (307)634-7273
756 GILCHRIST ST. WHEATLAND, WY. 82201 (307)322-9789

Hydrograph Report

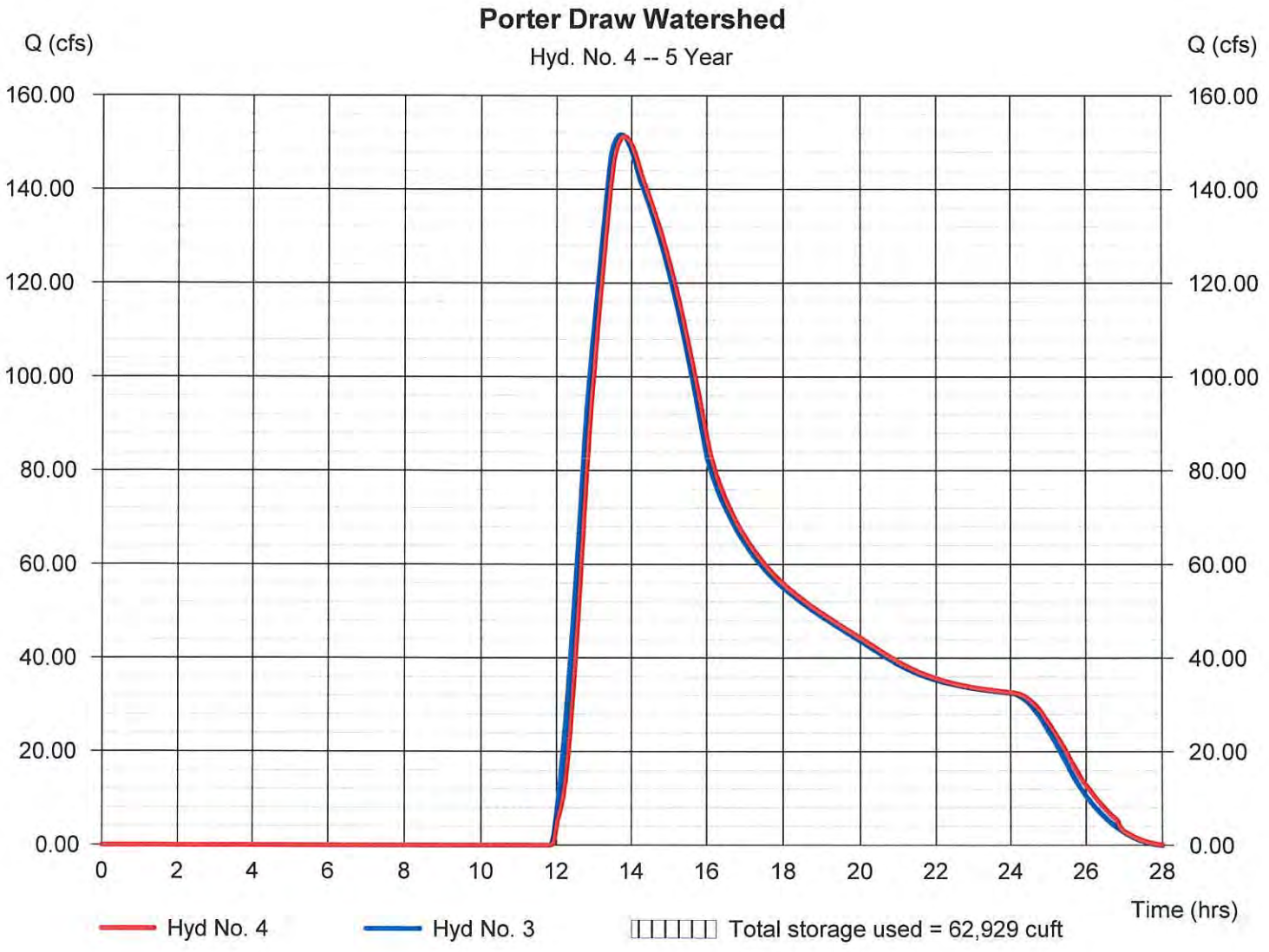
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 4

Porter Draw Watershed

Hydrograph type	= Reservoir	Peak discharge	= 151.15 cfs
Storm frequency	= 5 yrs	Time to peak	= 13.80 hrs
Time interval	= 2 min	Hyd. volume	= 3,120,853 cuft
Inflow hyd. No.	= 3 - Porter Draw Watershed	Max. Elevation	= 6172.95 ft
Reservoir name	= Porter Draw Crossing	Max. Storage	= 62,929 cuft

Storage Indication method used.



Hydrograph Report

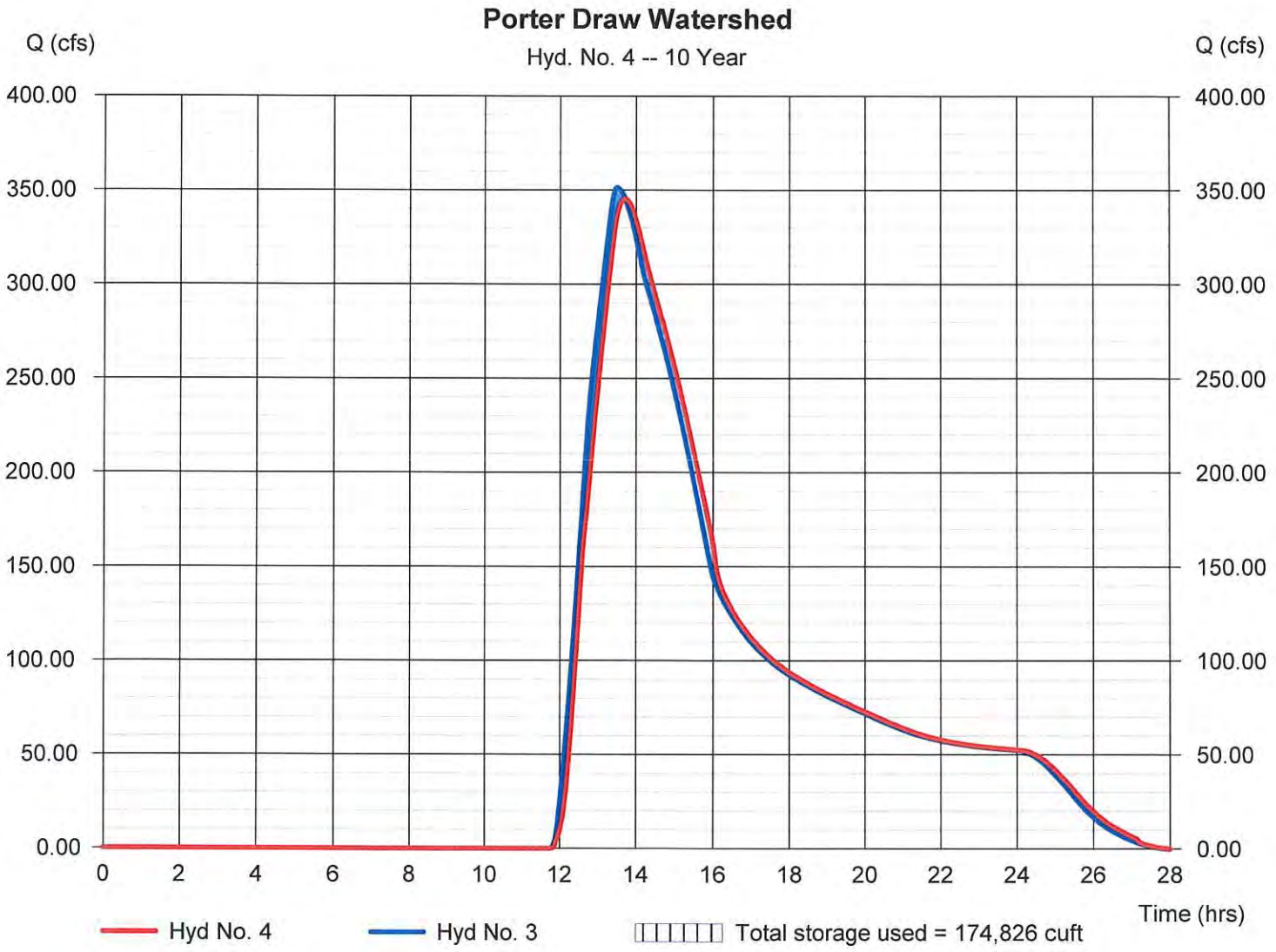
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Friday, Jul 20, 2012

Hyd. No. 4

Porter Draw Watershed

Hydrograph type	= Reservoir	Peak discharge	= 345.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.70 hrs
Time interval	= 2 min	Hyd. volume	= 6,040,552 cuft
Inflow hyd. No.	= 3 - Porter Draw Watershed	Max. Elevation	= 6173.65 ft
Reservoir name	= Porter Draw Crossing	Max. Storage	= 174,826 cuft

Storage Indication method used.



Hydrograph Report

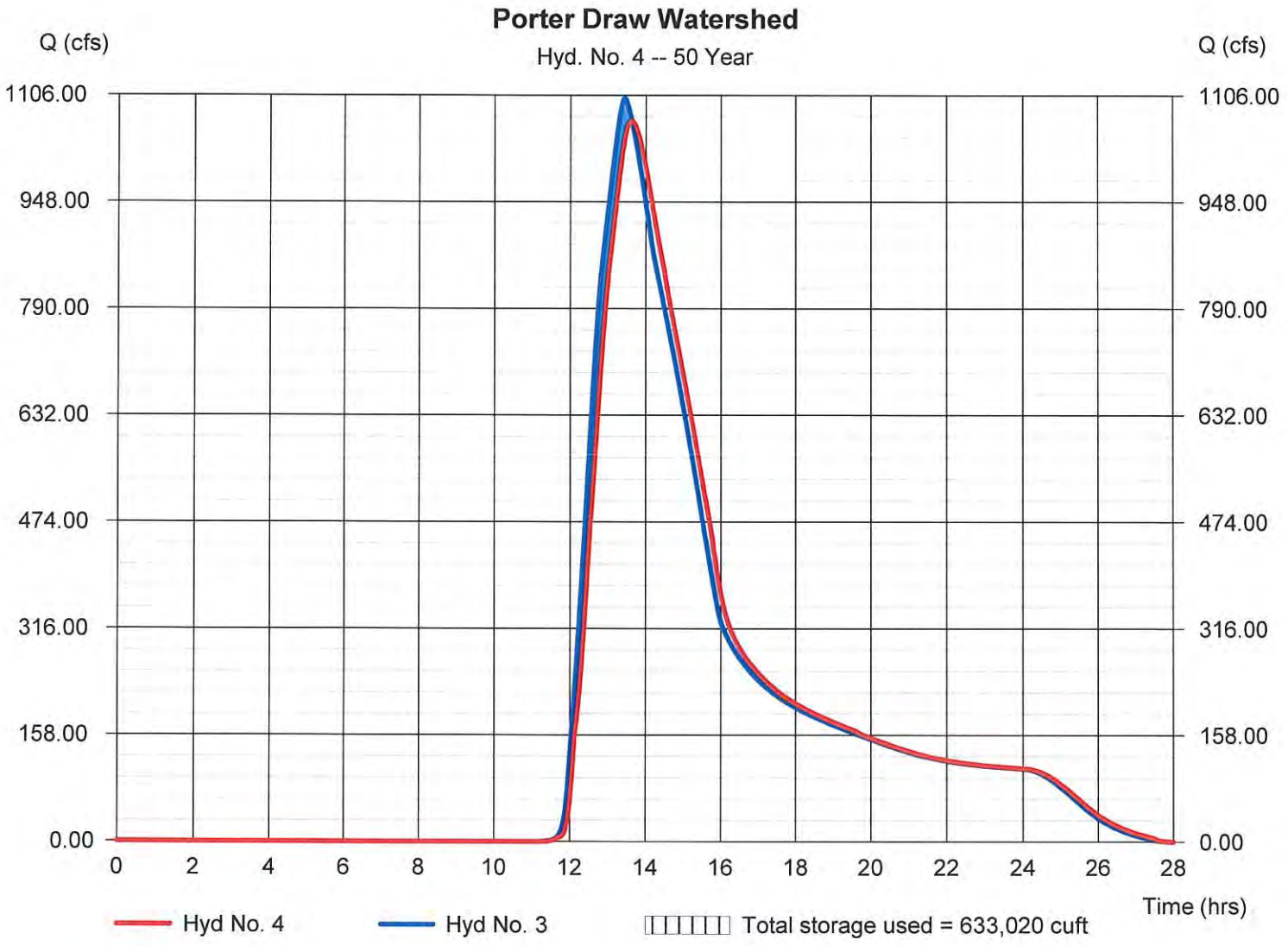
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 4

Porter Draw Watershed

Hydrograph type	= Reservoir	Peak discharge	= 1067.16 cfs
Storm frequency	= 50 yrs	Time to peak	= 13.63 hrs
Time interval	= 2 min	Hyd. volume	= 15,832,038 cuft
Inflow hyd. No.	= 3 - Porter Draw Watershed	Max. Elevation	= 6175.49 ft
Reservoir name	= Porter Draw Crossing	Max. Storage	= 633,020 cuft

Storage Indication method used.



Hydrograph Report

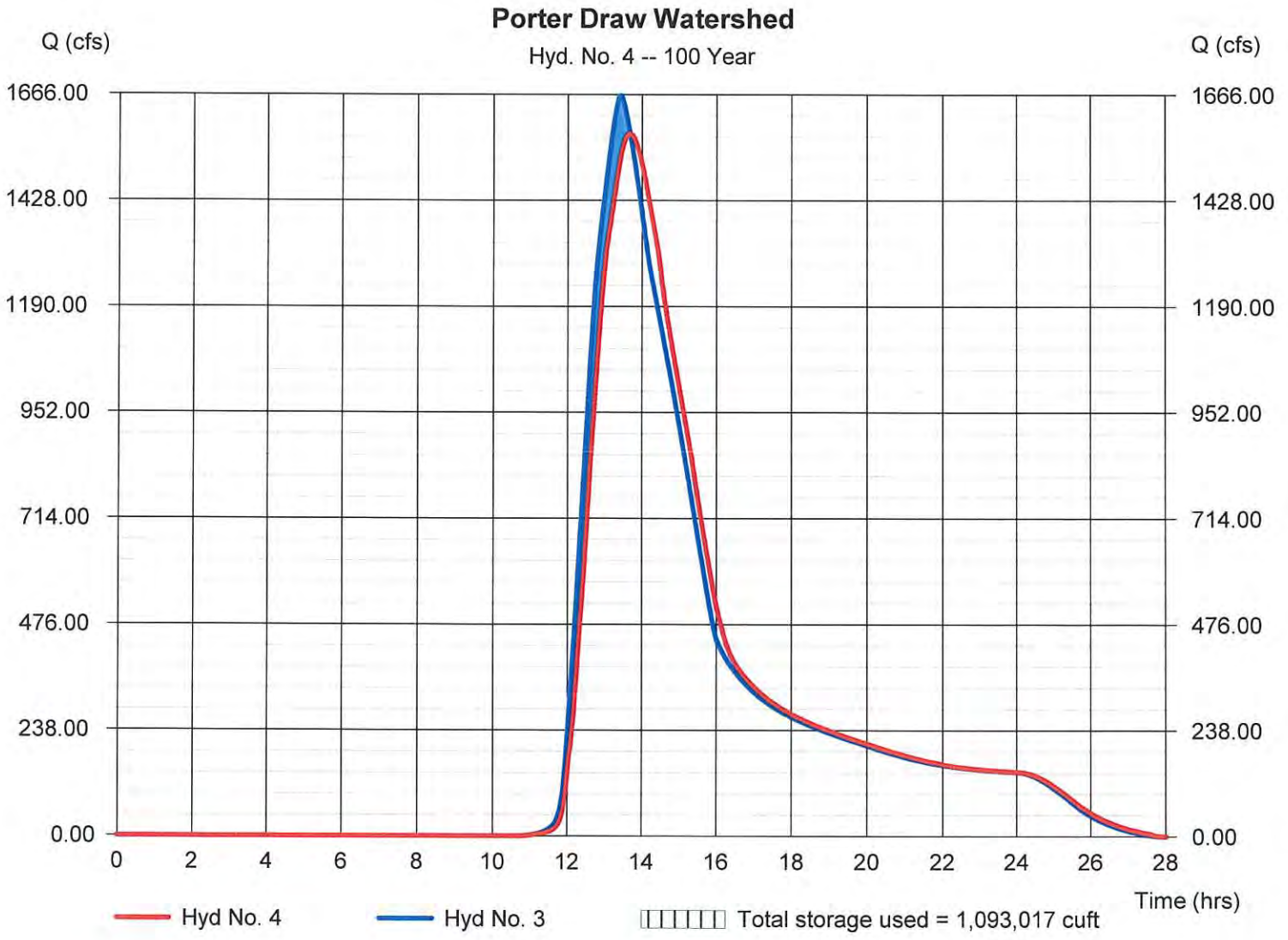
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Friday, Jul 20, 2012

Hyd. No. 4

Porter Draw Watershed

Hydrograph type	= Reservoir	Peak discharge	= 1576.99 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.67 hrs
Time interval	= 2 min	Hyd. volume	= 22,889,976 cuft
Inflow hyd. No.	= 3 - Porter Draw Watershed	Max. Elevation	= 6176.78 ft
Reservoir name	= Porter Draw Crossing	Max. Storage	= 1,093,017 cuft

Storage Indication method used.



~Draft~
TRAFFIC IMPACT STUDY

Switchgrass Industrial Park

Laramie County, Wyoming

Prepared for:

Crusoe Energy Systems, LLC & Tallgrass Energy, LLC

Kimley»Horn

T R A F F I C I M P A C T S T U D Y

Switchgrass Industrial Park

Laramie County, Wyoming

Prepared for
Crusoe Energy Systems, LLC
255 Filmore Street, Suite 300
Denver, CO 80206

&

Tallgrass Energy, LLC
370 Van Gordon Street
Lakewood, CO 80228

Prepared by
Erick W Berry, P.E, PTOE, RSP$_1$
Kimley-Horn and Associates, Inc
3325 South Timberline Road, Suite 130
Fort Colins, Colorado 80525

I certify that this Traffic Impact Study has been prepared by me or under my immediate supervision, that I have experience and training in the field of traffic and transportation engineering, and I am a registered professional engineer (P.E.) with the state of Wyoming.

Signed,

Erick W. Berry, PE, PTOE, RSP1

August 2025

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

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1.0 EXECUTIVE SUMMARY

Kimley-Horn has prepared this report to document the results of a Traffic Impact Study (TIS) for the proposed Switchgrass Industrial Park located within the southwest quadrant of the S. Greeley Highway (US-85) and Chalk Bluff Road (LCR-203) intersection, in unincorporated Laramie County, Wyoming. The proposed industrial park includes five lots, totaling approximately 1,380 acres in size. Lots 1 and 2 are proposed to house a data center, consisting of five primary buildings, each approximately 609,000 square feet in size. Lots 4 and 5 are proposed to house a natural gas power plant and fuel center power generation.

The proposed data center is expected to be operational by 2027, while the proposed power plant is expected to be operational by 2030. Therefore, analysis was conducted for a 2027 peak construction horizon, a 2030 short-term buildout horizon, as well as a 2050 long-term planning horizon. The 2050 long-term planning horizon was selected to be in line with the Cheyenne Metropolitan Planning Organization's (MPO's) Long Range Transportation Plan, Connect 2050, which is currently being developed.

The primary purpose of this traffic study is to identify project traffic generation characteristics to determine potential project traffic related impacts on the local street system and, if necessary, develop mitigation measures to address the identified traffic impacts.

The proposed industrial park features multiple internal private access roadways that utilize four distinct access points along the existing public roadways surrounding the site. These access points include one proposed full movement access along the south side of Terry Ranch Road and three proposed full movement accesses along the west side of S. Greeley Highway. The proposed access point along Terry Ranch Road is located approximately 2.25 miles west of S. Greeley Highway. The proposed north access point along S. Greeley Highway creates a new western leg of the existing 'T' intersection between S. Greeley Highway and Chalk Bluff Road. The proposed center access point along S. Greeley Highway is located approximately 1 mile south of Chalk Bluff Road. The proposed south access point along S. Greeley Highway is located approximately 1.75 miles south of the center access.

Regional access to the proposed industrial park will be provided by Interstate 25 (I-25) I-80, and S. Greeley Highway also designated as United States Highway 85 (US-85). Primary access will be provided by S. Greeley Highway, and Terry Ranch Road, also designated as Wyoming State Highway 223 (WY-223). Direct access will be provided via the four proposed access points detailed on the previous page.

The construction phase of the proposed Switchgrass Industrial Park is expected to generate approximately 14,000 daily worker trips, with 4,200 trips occurring during the morning peak hour and 5,250 trips occurring during the afternoon peak hour. It should be noted that these estimated trips do not include delivery vehicle trips for either the proposed data center or power plant, which are anticipated to occur during off-peak times. It should also be noted that these estimated trips assume each worker will generate a single vehicle trip, and no reductions in traffic volumes were applied to account for the potential of carpooling or bussing.

Additionally, the operational phase of the Switchgrass Industrial Park is expected to generate approximately 2,512 daily trips, with 308 trips occurring during the morning peak hour, and 260 trips occurring during the afternoon peak hour. It should be noted that these estimated trips do not include delivery vehicle trips for the proposed power plant, which are anticipated to occur during off-peak times.

Based on the analysis presented in this report, Kimley-Horn believes the proposed Switchgrass Industrial Park will be successfully incorporated into the existing and future roadway network. Analysis of the existing street network, the proposed project development, and expected traffic volumes resulted in the following recommendations:

2027 Peak Construction Phase Project Specific Recommendations:

- The following project specific improvements were developed based on the projected 2027 peak construction phase traffic volumes. It should be noted that these peak construction volumes are representative of a temporary condition during which the construction of the proposed data center and the construction of the proposed power plant are occurring at the same time. It is expected that construction related traffic volumes will gradually increase to the peak condition, and then gradually decrease, between the start of construction and completion of construction, which is anticipated to be by 2030. It should also be noted that these traffic volumes assume each construction worker arriving on-site will be generating a single vehicle trip and no carpooling or bussing will be utilized. Considering these assumptions, the recommendations developed based on the 2027 peak construction phase traffic volumes should be considered conservative. Furthermore, if carpooling or bussing strategies are implemented, the scale of necessary improvements may be reduced.

- With completion of the project, four distinct access points are proposed along the existing public roadways surrounding the site. These access points include one proposed full movement access along the south side of Terry Ranch Road and three proposed full movement accesses along the west side of S. Greeley Highway. The north proposed access along S. Greeley Highway is located at the existing intersection of Chalk Bluff Road (LCR-203) and S. Greeley Highway. The recommended intersection improvements based on the construction phase traffic at the four proposed access points are as follows:

    - Terry Ranch Road (WY-223) Access (#2)
        - Construct a Traffic Signal
        - Widen Terry Ranch Road to two eastbound and two westbound through lanes, east of the access
        - Widen Terry Ranch Road to two westbound through lanes that merge into one westbound through lane, west of the access
        - Construct a single channelized, free-flow, eastbound right turn lane
        - Construct the access (south leg of intersection) with two northbound left turn lanes and one north leg right turn lane

- Chalk Bluff Road (LCR-203) & S. Greeley Highway (US-85) (#4)
    - Construct a Traffic Signal
    - Widen S. Greeley Highway to three northbound and three southbound through lanes, north and south of Chalk Bluff Road
    - Construct a single northbound left turn lane
    - Construct a single channelized, free-flow, southbound right turn lane
    - Construct the access (west leg of intersection) with three eastbound left turn lanes and a single eastbound shared through/right turn lane
    - Construct a single westbound left turn lane
    - Construct a single westbound right turn lane
    - Extend existing turn lanes as necessary due to intersection widening for other improvements listed above

- S. Greeley Highway (US-85) Center Access (#5)
    - Construct a Traffic Signal
    - Widen S. Greeley Highway to two northbound and two southbound through lanes, south of center access
    - Widen S. Greeley Highway to three northbound and three southbound through lanes, north of center access
    - Construct a single northbound left turn lane
    - Construct two channelized, free-flow, southbound right turn lanes
    - Construct the access (west leg of intersection) with three eastbound left turn lanes and two eastbound right turn lanes

- S. Greeley Highway (US-85) South Access (#6)
    - Construct a Traffic Signal
    - Widen S. Greeley Highway to two northbound and two southbound through lanes, north of south access
    - Widen S. Greeley Highway to two southbound through lanes that merge into one southbound through lane, south of south access
    - Construct a single northbound left turn lane
    - Construct a single channelized, free-flow, southbound right turn lane
    - Construct the access (west leg of intersection) with two eastbound left turn lanes and one eastbound right turn lane

- The recommended intersection improvements based on the construction phase traffic at the intersection of Terry Ranch Road (WY-223) and S. Greeley Highway (US-85) are as follows:
    - Construct a Traffic Signal
    - Widen S. Greeley Highway to three northbound through lanes and three southbound through lanes, north and south of Terry Ranch Road
    - Widen Terry Ranch Road to two eastbound through lanes and two westbound through lanes, west of S. Greeley Highway
    - Construct dual northbound left turn lanes
    - Construct a single eastbound left turn lane
    - Construct a single channelized, free-flow, eastbound right turn lane, with a southbound acceleration lane
    - Extend existing turn lanes as necessary due to intersection widening for other improvements listed above

- Based on the forecasted 2027 peak construction traffic volumes, the intersection of College Drive (WY-212) and S. Greeley Highway (US-85) may experience traffic volumes that exceed the potential capacity for the intersection. The following improvements are seen as the maximum potential buildout for the intersection. However, it should be noted that even with these significant improvements, the intersection may experience failing overall levels of service.
    - Widen S. Greeley Highway to three northbound through lanes and three southbound through lanes, north and south of College Drive
    - Widen College Drive to two eastbound through lanes and two westbound through lanes, east and west of College Drive
    - Construct dual left turn lanes on all four approaches
    - Construct a single right turn lane on all four approaches

2030 Operational Phase Buildout (Short-Term) Horizon Specific Recommendations:

- The following project specific improvements were developed based on the anticipated 2030 short-term horizon traffic volumes. The recommendations do not take into consideration recommendations developed for the 2027 peak construction phase traffic volumes. If the recommended improvements developed based on the 2027 peak construction phase traffic volumes are implemented, no additional operational improvements are anticipated to be necessary as the 2027 traffic volumes are forecasted to be significantly larger than the 2030 traffic volumes, and therefore the construction phase improvements would provide excess capacity for the operational phase traffic volumes.

- With completion of the project, four distinct access points are proposed along the existing public roadways surrounding the site. These access points include one proposed full movement access along the south side of Terry Ranch Road and three proposed full movement accesses along the west side of S. Greeley Highway. The north proposed access along S. Greeley Highway is located at the existing intersection of Chalk Bluff Road (LCR-203) and S. Greeley Highway. This access is only anticipated to be utilized during construction; therefore, recommendations for improvements during the operational phase of the proposed project were not developed for this intersection. The recommended intersection improvements based on the operational phase traffic at the remaining three proposed access points are as follows:

- Terry Ranch Road (WY-223) Access (#2)
    - Operate with minor stop control, install stop sign on northbound approach
    - Construct a single eastbound right turn lane
    - Construct a single westbound left turn lane
    - Construct the access (south leg of intersection) with a single shared northbound left tun/right turn lane

- S. Greeley Highway (US-85) Center Access (#5)
    - Operate with minor stop control, install a stop sign on the eastbound approach
    - Construct a single northbound left turn lane
    - Construct a single southbound right turn lane
    - Construct the access (west leg of intersection) with a single shared eastbound left turn/right turn lane

- S. Greeley Highway (US-85) South Access (#6)
    - Operate with minor stop control, install a stop sign on the eastbound approach
    - Construct a single northbound left turn lane
    - Construct a single southbound right turn lane
    - Construct the access (west leg of intersection) with a single shared eastbound left turn/right turn lane

- Based on the forecasted 2030 traffic volumes, the intersection of College Drive (WY-212) and S. Greeley Highway (US-85) is anticipated to operate at a failing overall level of service during the afternoon peak hour, prior to the addition of project traffic. The failing overall level of service is anticipated to improve to an acceptable overall LOS D with the construction of a northbound right turn lane. However, the eastbound and westbound left turn movements are still anticipated to experience failing operations. To provide an acceptable level of service for each intersection movement, dual eastbound and westbound left turn lanes would also need to be constructed. Assuming a northbound right turn lane is constructed, this intersection is anticipated to continue to operate at an acceptable overall level of service through 2030, with the addition of operational project traffic. Therefore, no project specific improvements or modifications are expected to be necessary at this intersection based on the addition of project traffic.

2050 Planning (Long-Term) Horizon Non-Project Specific Recommendations:

- The following non-project specific improvements were developed based on the anticipated 2050 long-term horizon traffic volumes. The recommendations do not take into consideration recommendations developed for the 2027 peak construction phase traffic volumes. If the recommended improvements developed based on the 2027 peak construction phase traffic volumes are implemented.

- If the projected 2050 background traffic volumes are arrived at, the intersection of Terry Ranch Road (WY-223) and S. Greeley Highway (US-85) may experience traffic volumes that warrant the installation of a traffic signal. Along with the installation of a traffic signal, the 2050 traffic volumes may warrant two northbound and southbound through lanes, as well as a single eastbound left turn lane. Assuming these intersection improvements are implemented, the intersection may operate at an acceptable overall level of service during both peak hours, both prior to the addition of operational phase project traffic and with the addition of operational phase project traffic.

- If the projected 2050 background traffic volumes are arrived at, the intersection of College Drive (WY-212) and S. Greeley Highway (US-85) may experience a traffic demand that exceeds the potential capacity for the intersection. Considering the available right of way at the intersection an intersection configuration featuring three through lanes along S. Greeley Highway, two through lanes along College Drive, as well as dual left turn lanes and single right turn lanes on all four approaches was assumed to be the ultimate potential buildout of this intersection. Assuming these improvements are implemented, and the forecasted 2050 traffic volumes are arrived at, this intersection may still experience failing overall levels of service, both prior to and with the addition of project traffic. Therefore, in addition to the construction of additional through and turn lanes at this intersection, it is recommended that WYDOT, in partnership with Laramie County and the City of Cheyenne, including the Cheyenne MPO, explore opportunities for adjacent north/south arterials that could be used as alternative routes by drivers in the area; thereby alleviating, or at least reducing, the traffic demand at the intersection of College Drive and S. Greeley Highway.

General Recommendations:

- It is anticipated that an approved WYDOT Access Permit will be required for each of the four proposed project accesses. Based on the WYDOT Access Manual, Applications for access permits will be accepted only from an individual, partnership, corporation, qualified agent, or other body recognized by law as owning all or the major interest in the property abutting the highway right of way or proposed highway. It is recommended that upon WYDOT's approval and acceptance of this traffic impact study, access permit applications are completed and submitted to WYDOT, in accordance with the WYDOT Access Manual.

- Any onsite or offsite improvements should be incorporated into the Civil Drawings and conform to standards of the Laramie County, WYDOT, and the Manual on Uniform Traffic Control Devices (MUTCD) – 11th Edition, 2023

2.0 INTRODUCTION

Kimley-Horn has prepared this report to document the results of a Traffic Impact Study (TIS) for the proposed Switchgrass Industrial Park located within the southwest quadrant of the S. Greeley Highway (US-85) and Chalk Bluff Road (LCR-203) intersection, in unincorporated Laramie County, Wyoming. A vicinity map identifying the regional location of the site is shown in **Figure 1**. The proposed industrial park includes five lots, totaling approximately 1,380 acres in size. Lots 1 and 2 are proposed to house a data center, consisting of five primary buildings, each approximately 609,000 square feet in size. Lots 4 and 5 are proposed to house a natural gas power plant and fuel center power generation. A map of the proposed industrial park as well as a conceptual site plan for the data center are included in **Appendix A**.

The proposed data center is expected to be operational by 2027, while the proposed power plant is expected to be operational by 2030. Therefore, analysis was conducted for a 2027 peak construction horizon, a 2030 short-term buildout horizon, as well as a 2050 long-term planning horizon. The 2050 long-term planning horizon was selected to be in line with the Cheyenne Metropolitan Planning Organization's (MPO's) Long Range Transportation Plan, Connect 2050, which is currently being developed.

The primary purpose of this traffic study is to identify project traffic generation characteristics to determine potential project traffic related impacts on the local street system and, if necessary, develop mitigation measures to address the identified traffic impacts. This traffic study was scoped with Laramie County and the Wyoming Department of Transportation (WYDOT). Based on coordination with Laramie County and WYDOT, the following intersections were incorporated into this traffic study:

1. S. Greeley Highway (US-85) & College Drive (WY-212)
2. Future Site Access & Terry Ranch Road (WY-223)
3. S. Greeley Highway (US-85) & Terry Ranch Road (WY-223)
4. S. Greeley Highway (US-85) & Chalk Bluff Road (LCR-203)/Future Site Access (North Access)
5. S. Greeley Highway (US-85) & Future Site Access (Center Access)
6. S. Greeley Highway (US-85) & Future Site Access (South Access)

The proposed industrial park features multiple internal private access roadways that utilize four distinct access points along the existing public roadways surrounding the site. These access points include one proposed full movement access along the south side of Terry Ranch Road and three proposed full movement accesses along the west side of S. Greeley Highway. The proposed access point along Terry Ranch Road is located approximately 2.25 miles west of S. Greeley Highway. The proposed north access point along S. Greeley Highway creates a new western leg of the existing 'T' intersection between S. Greeley Highway and Chalk Bluff Road. The proposed center access point along S. Greeley Highway is located approximately 1 mile south of Chalk Bluff Road. The proposed south access point along S. Greeley Highway is located approximately 1.75 miles south of the center access.

Regional access to the proposed industrial park will be provided by Interstate 25 (I-25) I-80, and S. Greeley Highway also designated as United States Highway 85 (US-85). Primary access will be provided by S. Greeley Highway, and Terry Ranch Road, also designated as Wyoming State Highway 223 (WY-223). Direct access will be provided via the four proposed access points detailed above.

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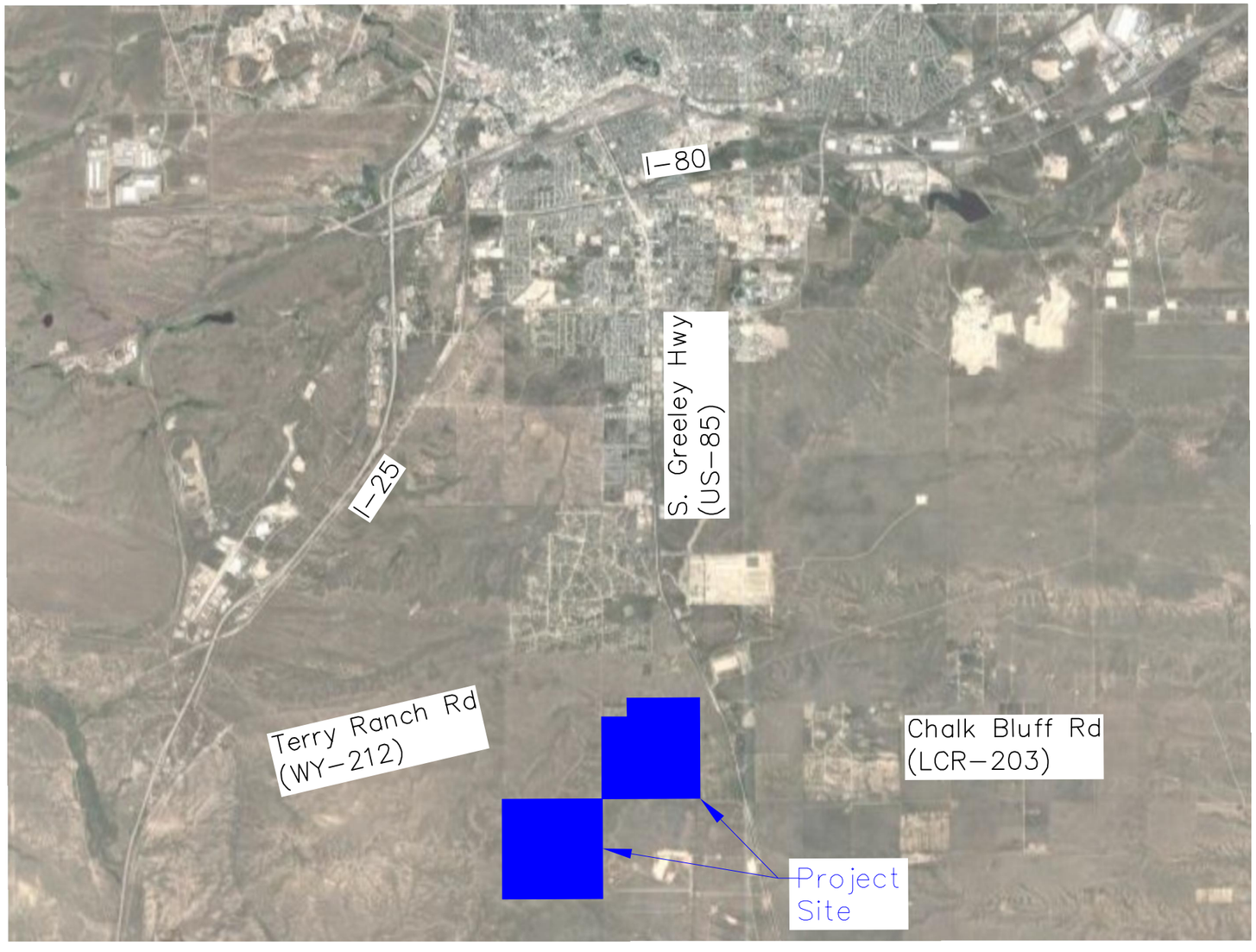


FIGURE 1
Switchgrass Industrial Park
Laramie County, Wyoming
Vicinity Map

Kimley»Horn

3.0 EXISTING AND FUTURE CONDITIONS

3.1 Existing Land Uses

The proposed industrial park is located within unincorporated Laramie County, south of the City of Cheyenne, and approximately 1 mile north of the Wyoming/Colorado state border. The proposed industrial park includes five lots, totaling approximately 1,380 acres in size. Lots 1 and 2, totaling approximately 620 acres in size, are proposed to house a data center, consisting of four primary buildings. Lots 4 and 5, totaling approximately 665 acres in size, are proposed to house a natural gas power plant and fuel center power generation.

The site is currently zoned for agricultural use; the development of the proposed power plant is anticipated to require a change in zoning classification. The area surrounding the site is primarily undeveloped land, also zoned for agricultural use. Directly east of the site is a solar energy farm. Outside of the immediate study area, the surrounding land uses are primarily agricultural, with pockets of industrial and residential uses further north of the site.

3.2 Existing Roadway Network

Within the vicinity of the study area, College Drive, also designated as Wyoming State Highway 212 (WY-212) extends east/west with one through lane in each direction. The posted speed limit along College Drive is 30 miles per hour (mph) west of S. Greeley Highway, and 40 mph east of S. Greeley Highway. The Connect 2045 Cheyenne Area Transportation Master Plan and WYDOT classify College Drive as a Principal Arterial.

Within the vicinity of the study area, Terry Ranch Road, also designated as Wyoming State Highway 223 (WY-223) extends east/west with one through lane in each direction. The posted speed limit along Terry Ranch Road, between the future Parsley Boulevard alignment, and S. Greeley Highway is 55 mph. West of the future Parsley Boulevard alignment, the posted speed limit is 65 mph. The Connect 2045 Cheyenne Area Transportation Master Plan and WYDOT classifies Terry Ranch Road as a major collector roadway.

Within the vicinity of the study area, Chalk Bluff Road, also designated as Laramie County Road 203 (LCR-203), extends east/west with one through lane in each direction. The posted speed limit along Chalk Bluff Road is 55 mph. The Connect 2045 Cheyenne Area Transportation Master Plan and WYDOT classifies Chalk Bluff Road as a major collector roadway.

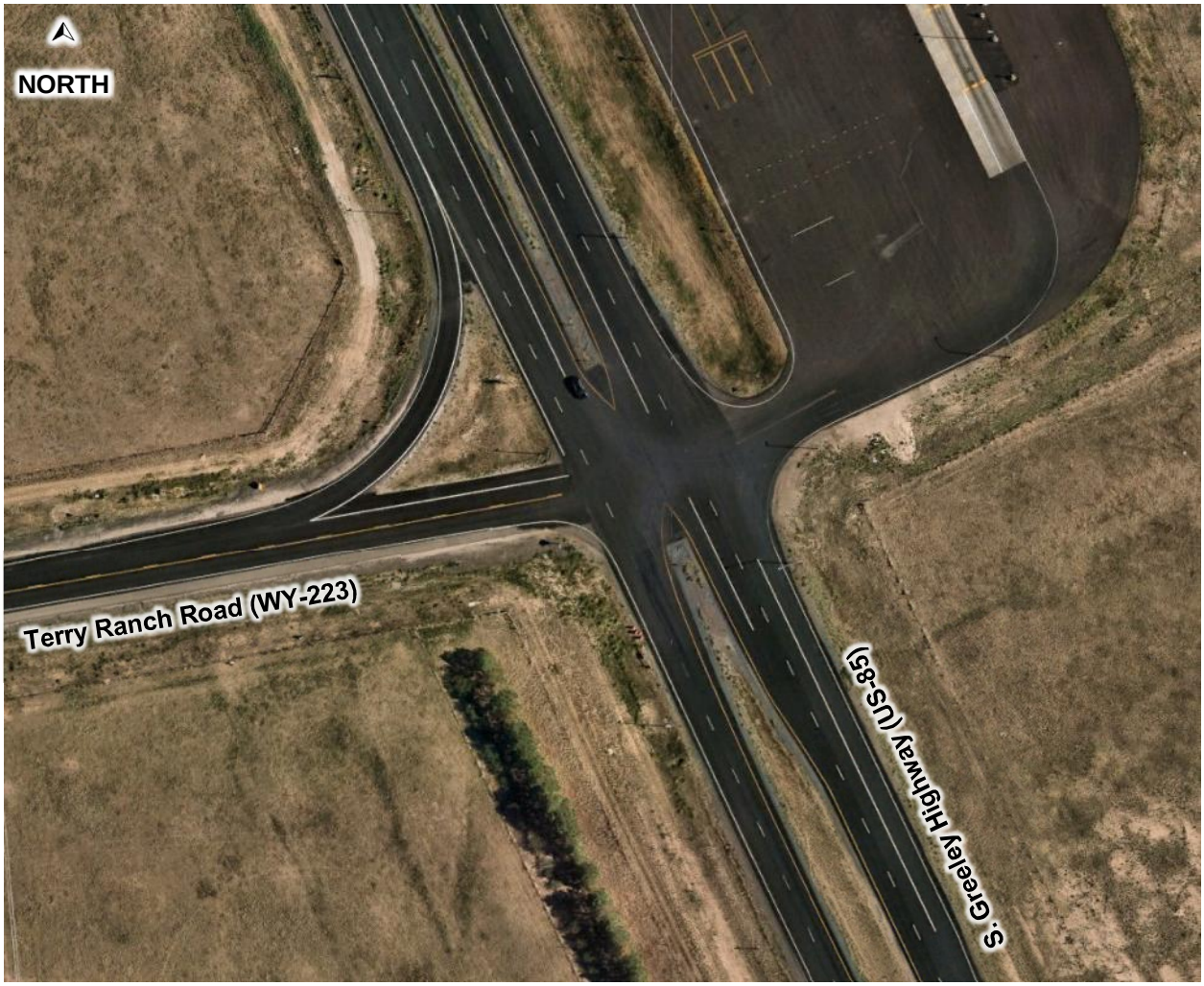
Within the vicinity of the study area, S. Greely Highway extends north/south with two through lanes in each direction north of Terry Ranch Road and one through lane in each direction south of Terry Ranch Road. The posted speed limit along S. Greeley Highway is 65 mph, south of Terry Ranch Road. The posted speed limit transitions from 65 mph to 40 mph between Terry Ranch Road and College Drive. The Connect 2045 Cheyenne Area Transportation Master Plan and WYDOT classifies S. Greeley Highway as a principal arterial roadway.

The signalized intersection of College Drive and S. Greeley Highway (#1) currently operates with protected-permissive left turn phasing on all four approaches. The eastbound and westbound approaches consist of one left turn lane, one through lane, and one right turn lane. The northbound and southbound approaches consist of one left turn lane, one exclusive through lane, and one shared through/right turn lane. An aerial photo of the existing intersection configuration, dated July 9, 2024, is included below.



College Drive (WY-212) & S. Greeley Highway (US-85) (#1)

The unsignalized intersection of Terry Ranch Road and S. Greeley Highway (#3) currently operates with stop control on the eastbound and westbound approaches. The eastbound and westbound approaches consist of a single lane for all movements. The northbound departure provides an acceleration lane for the eastbound to northbound left turn movement. The northbound and southbound approaches provide one left turn lane, two through lanes, and one right turn lane. The southbound right turn lane is channelized, with yield control as it merges with the westbound Terry Ranch Road departure lane. The eastern leg of the intersection serves as access to a WYDOT Port of Entry station. An aerial photo of the existing intersection configuration, dated July 9, 2024, is included below.



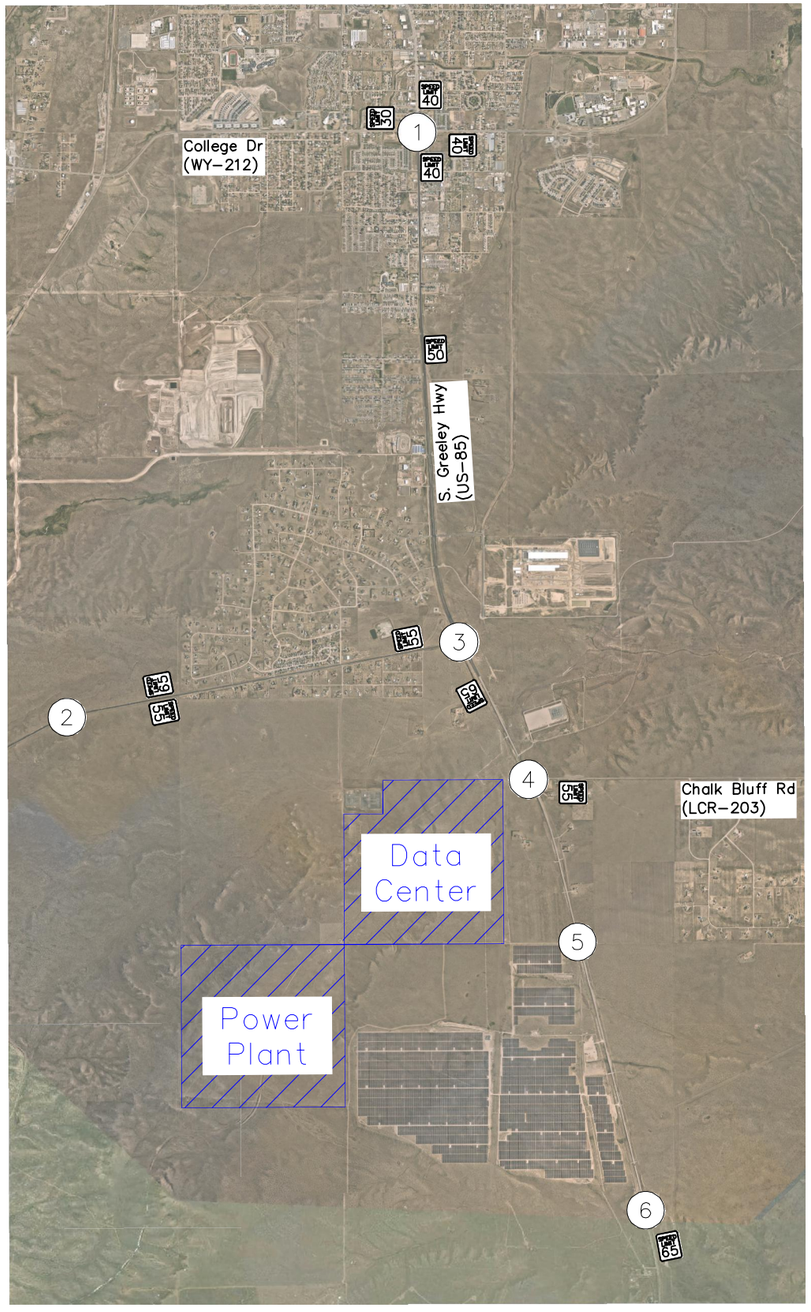
Terry Ranch Road (WY-223) & S. Greeley Highway (US-85) (#3)

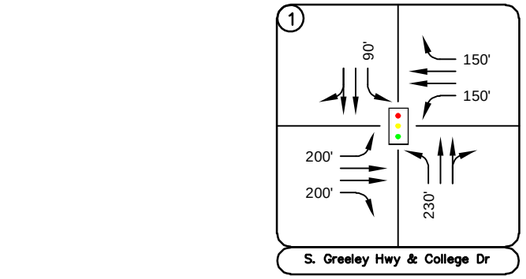
The unsignalized ‘T’-intersection of Chalk Bluff Road and S. Greeley Highway (#4) currently operates with stop control on the westbound Chalk Bluff Road approach. The westbound approach features one shared lane for the left and right turn movements. The northbound approach features one shared through/right turn lane. The southbound approach features one left turn lane and one through lane. An aerial photo of the existing intersection configuration, dated July 9, 2024, is included below.

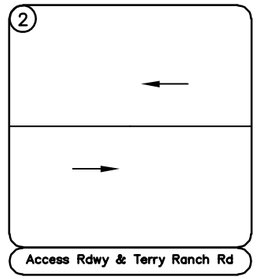


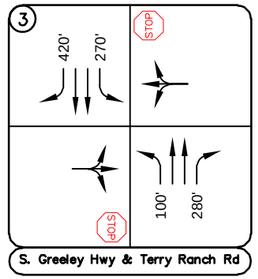
Chalk Bluff Road (LCR-203) & S. Greeley Highway (US-85) (#4)

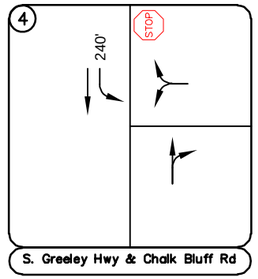
The intersection lane configuration and control for the study area intersections are shown in **Figure 2**.

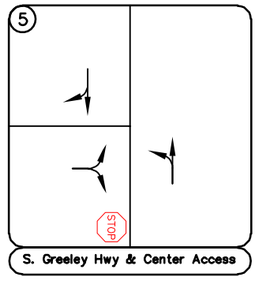


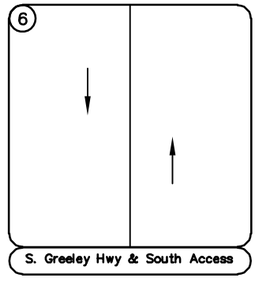


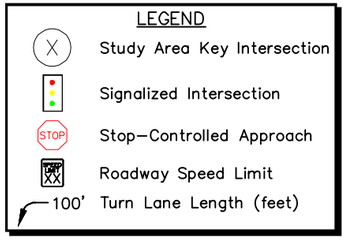












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FIGURE 2
Switchgrass Industrial Park
Laramie County, Wyoming
Existing Intersection Geometry & Control

3.3 Existing Traffic Volumes

Existing turning movement counts were collected at study intersections on a typical weekday. The typical weekday counts were collected on Thursday, July 17, 2025, during the weekday morning and afternoon peak hours. The counts were conducted during the morning and afternoon peak hours of adjacent street traffic in 15-minute intervals from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on this count date. The existing intersection traffic volumes are shown in **Figure 3** with count sheets provided in **Appendix B.**

3.4 Background Traffic Growth

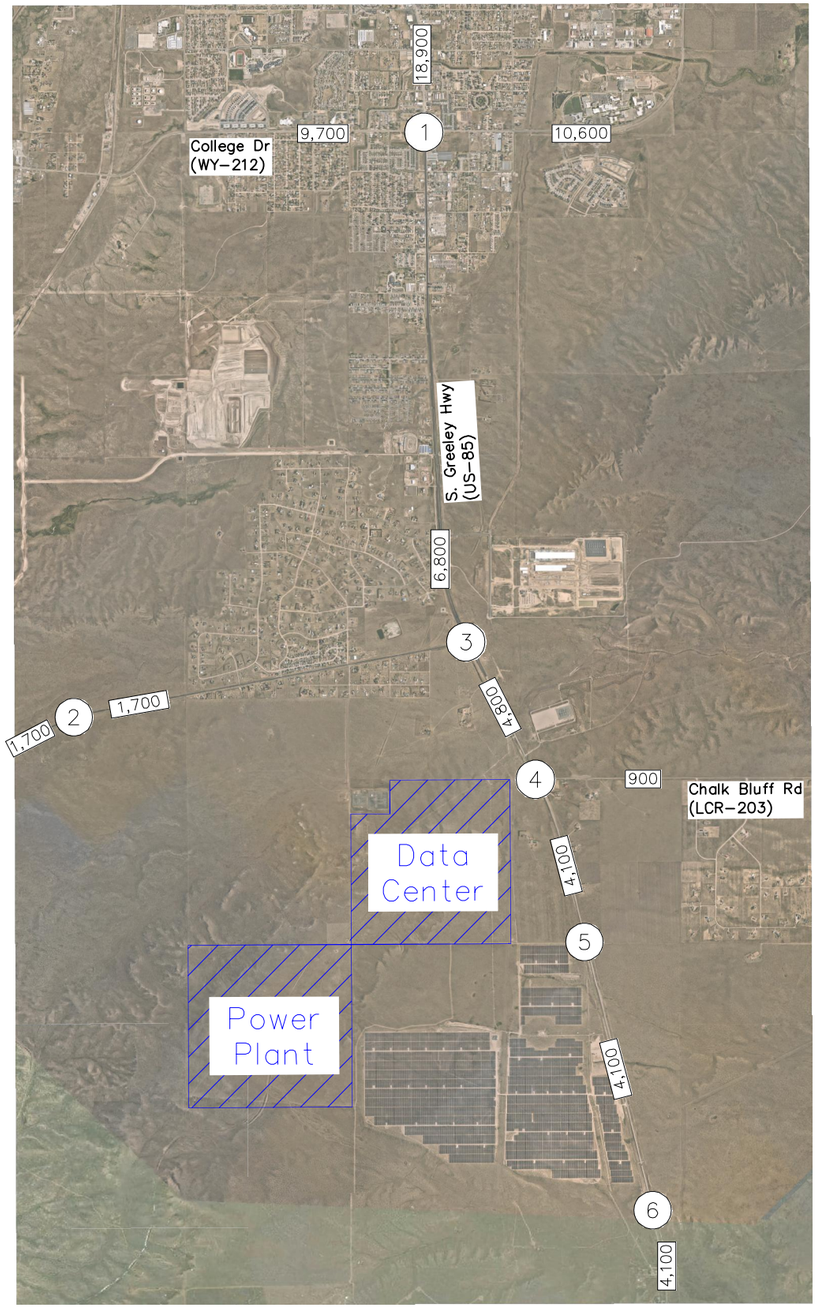
When evaluating short-term and long-term horizons, growth in traffic volumes that is not attributable to the proposed project, also referred to as background traffic, is estimated to establish expected transportation operations prior to the addition of the proposed project. The background traffic growth is typically forecasted in one of two ways, 1) by considering new traffic associated with nearby proposed developments that has been documented in a TIS, or 2) by applying annual growth rates developed by a municipality, planning organization, or department of transportation. The annual growth rates developed by these organizations typically consider expected development, regional growth, and changes in travel patterns to forecast future traffic volumes.

Based on Kimley-Horn's familiarity with the study area, construction traffic associated with the Cowboy Solar II development was considered as background traffic during the construction phase of the proposed Switchgrass Industrial Park. Applicable documents from the off-site development traffic study are included in **Appendix C**. The Connect 2045 Cheyenne Area Transportation Master Plan documents a 1.25 percent annual growth rate for the Cheyenne area. In an effort to conservatively forecast the 2027 background volumes, a 1.25 percent annual growth rate was applied to 2025 existing traffic volumes, in addition to the traffic volumes associated with the Cowboy Solar II development. Background traffic volumes for the 2027 peak construction horizon are shown in **Figure 4**.

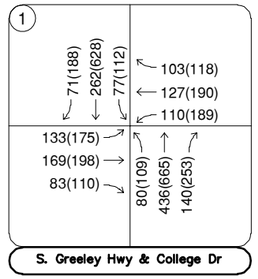
Through coordination with Laramie County and WYDOT, traffic associated with the Bison Business Park and the High Plains Business Park developments was considered as background traffic for the operational phase of the proposed Switchgrass Industrial Park. Both developments are anticipated to be constructed in phases; however, the initial phase of Bison Business Park is partially constructed therefore traffic associated with the initial phase of the Bison Business Park was assumed to be captured within the recently collected existing traffic counts. For the purposes of this study the traffic associated with the initial phase of High Plains Business Park was considered in the 2030 short-term horizon background traffic, while traffic associated with the ultimate buildout of both Bison Business Park and High Plains Business Park was considered in the 2050 long-term horizon background traffic. Applicable documents from the off-site development traffic studies are included in **Appendix C**.

When considering the 2030 background volumes, the addition of the High Plains Business park development traffic to the 2025 traffic volumes represents an average annual growth rate of approximately 0.9 percent at the study intersections. In an effort to conservatively forecast the 2030 background volumes, a 1.25 percent annual growth rate was applied to 2025 existing traffic volumes, in addition to the traffic volumes associated with the initial phase of the High Plains Business Park. Background traffic volumes for the 2030 short-term horizon are shown in **Figure 5**.

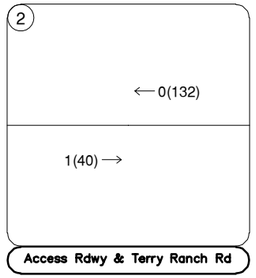
When considering the 2050 background volumes, the addition of the traffic associated with all the Bison Business Park and High Plains Business park developments to the existing 2025 traffic volumes represented an average annual growth rate of approximately 2.5 percent at the study intersections. In an effort to conservatively forecast the 2050 background volumes, a 1.25 percent annual growth rate was applied to 2025 existing traffic volumes, in addition to the traffic volumes associated with the ultimate buildout of the Bison Business Park and High Plains Business Park. Background traffic volumes for the 2050 long-term horizon are shown in **Figure 6**.

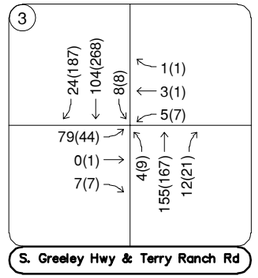


Thurs, Jul 17, 2025
7:30 to 8:30AM
(4:15 to 5:15PM)



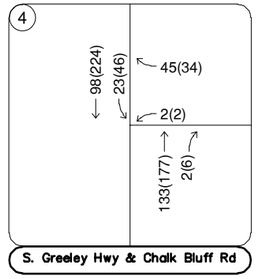
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7:00 to 8:00AM
(4:00 to 5:00PM)



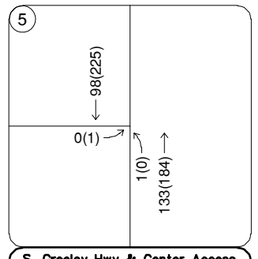


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7:30 to 8:30AM
(4:15 to 5:15PM)

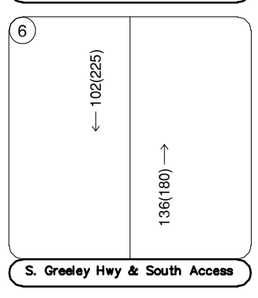
Thurs, Jul 17, 2025
7:30 to 8:30AM
(4:30 to 5:30PM)



Thurs, Jul 17, 2025
7:30 to 8:30AM
(4:30 to 5:30PM)



Thurs, Jul 17, 2025
7:30 to 8:30AM
(4:30 to 5:30PM)



LEGEND

(X) Study Area Key Intersection

XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes

XX,X00 Estimated Daily Traffic Volume

FIGURE 3
Switchgrass Industrial Park
Laramie County, Wyoming
2025 Existing Traffic Volumes

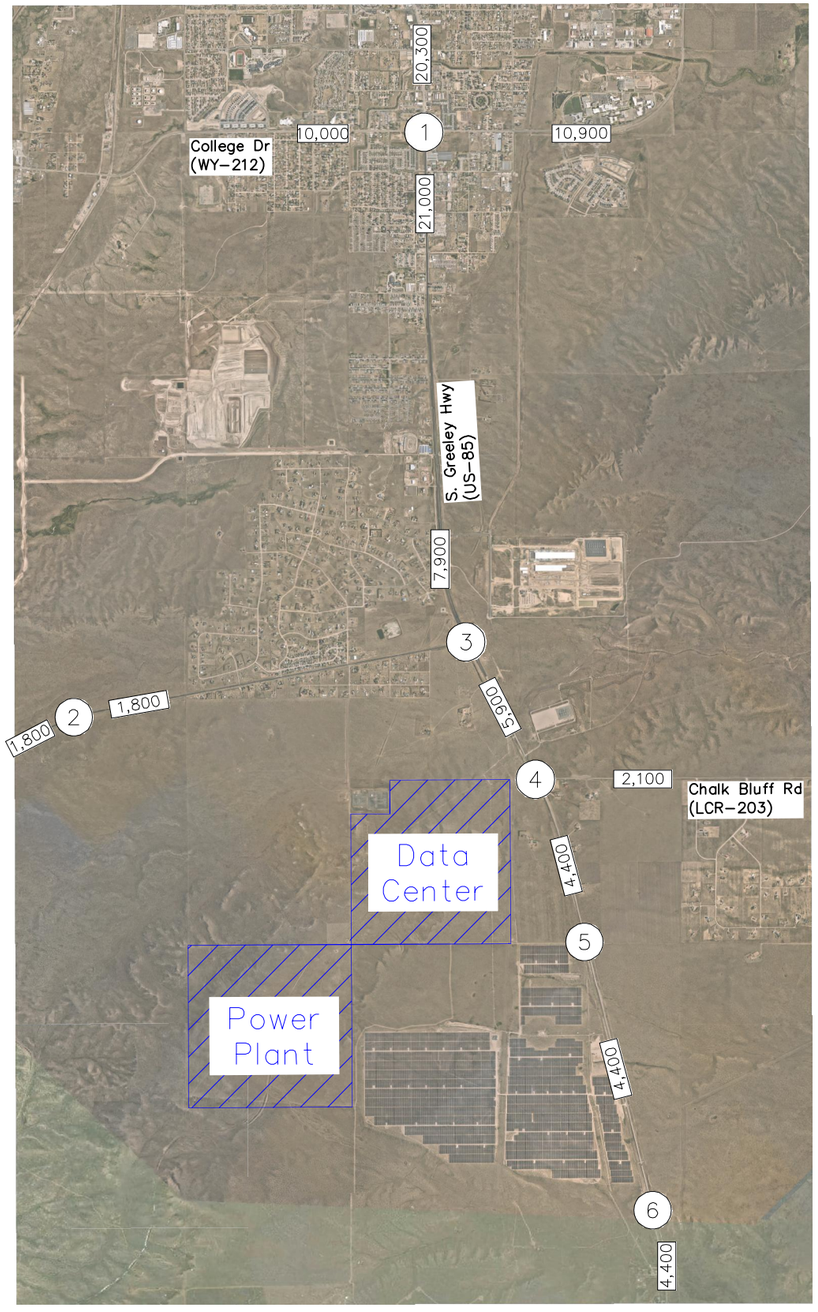
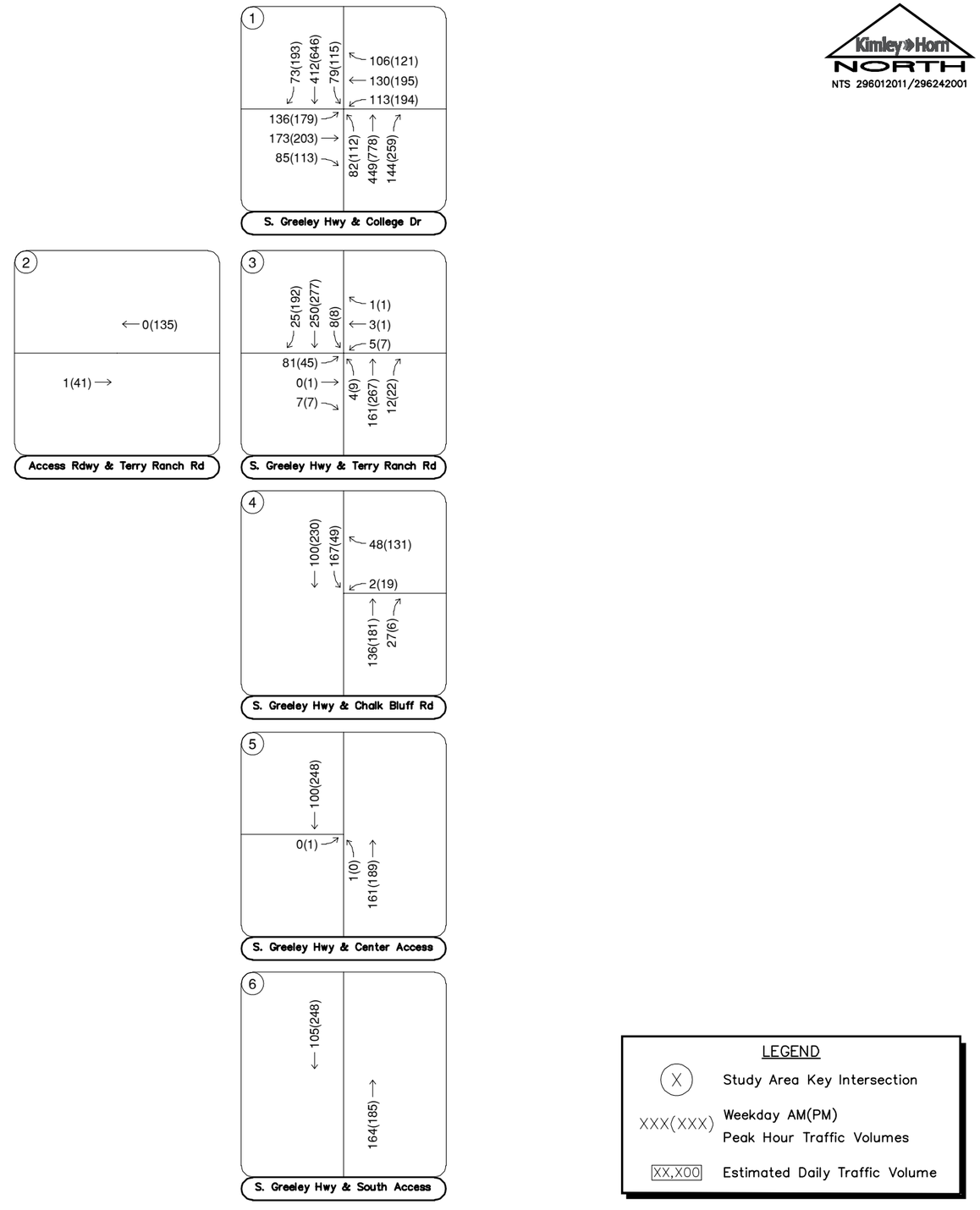


FIGURE 4
Switchgrass Industrial Park
Laramie County, Wyoming
2027 Background Traffic Volumes

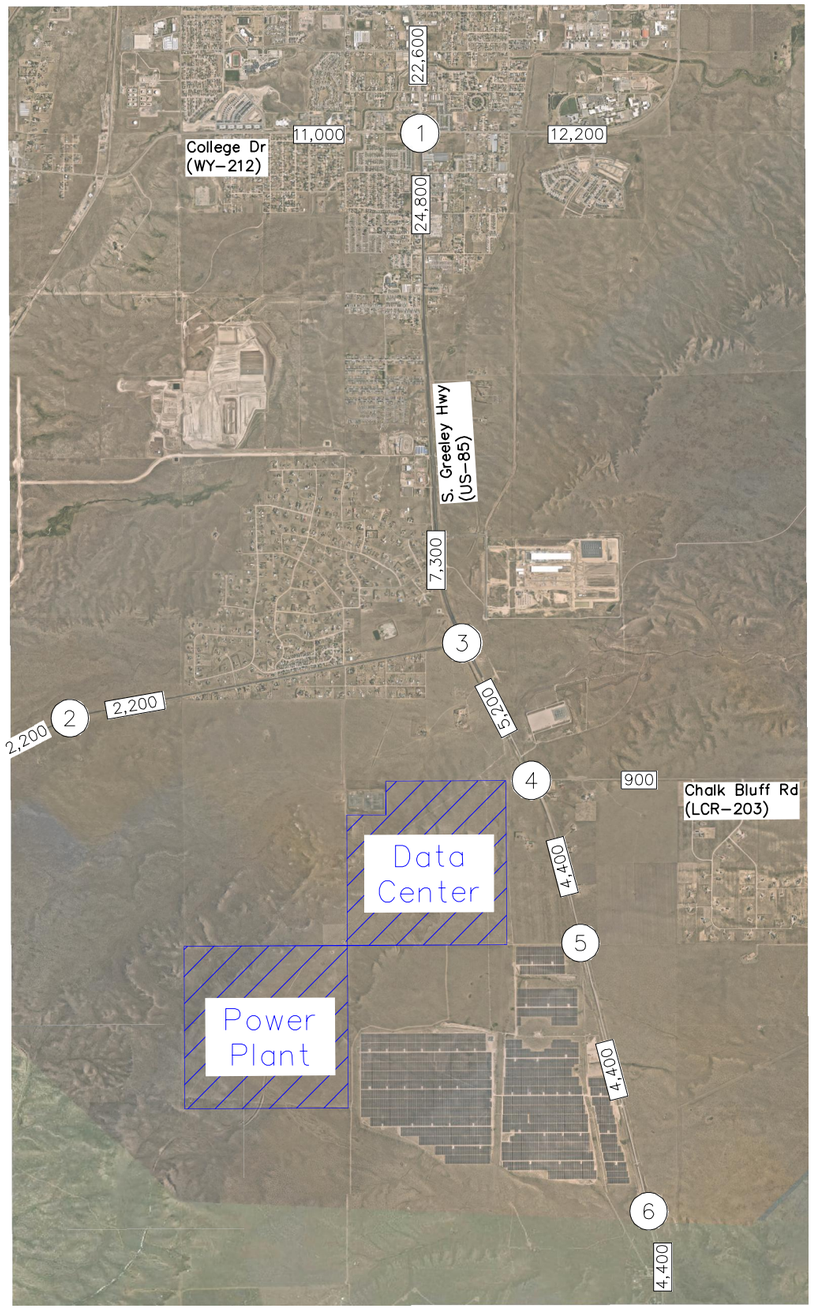


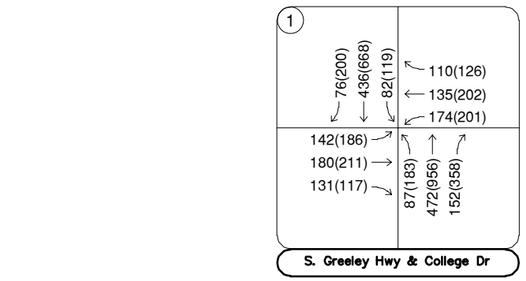
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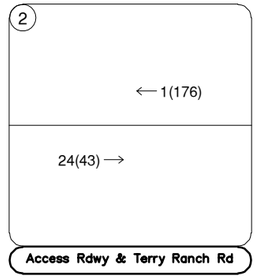
(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

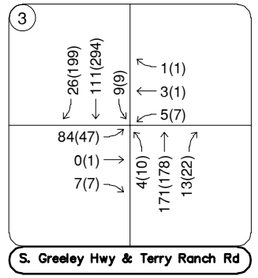
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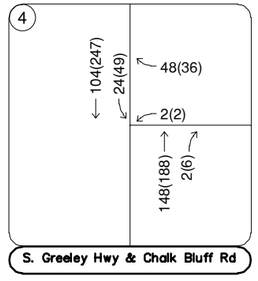
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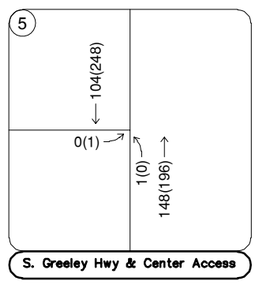


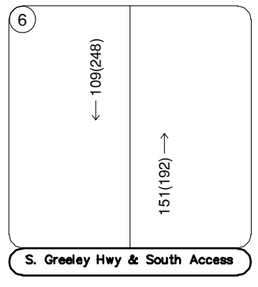












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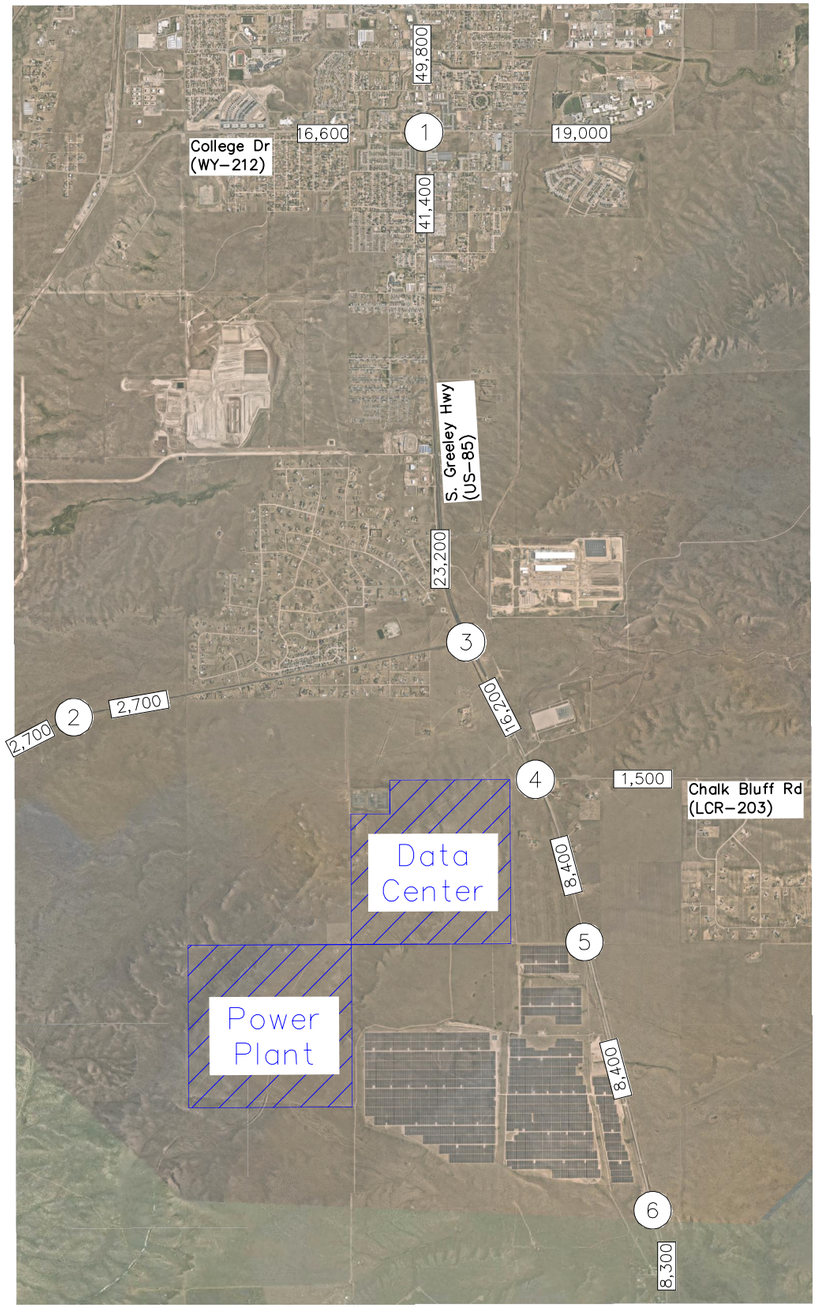
(X) Study Area Key Intersection

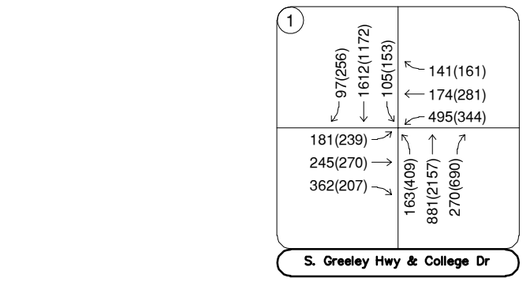
XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes

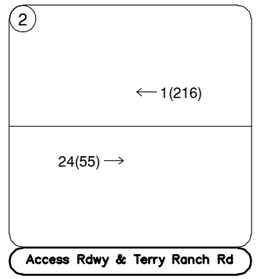
XX,X00 Estimated Daily Traffic Volume

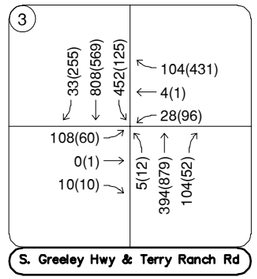
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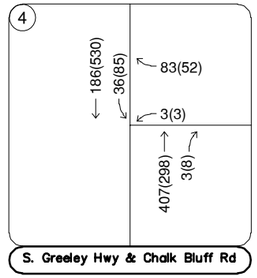
FIGURE 5
Switchgrass Industrial Park
Laramie County, Wyoming
2030 Background Traffic Volumes

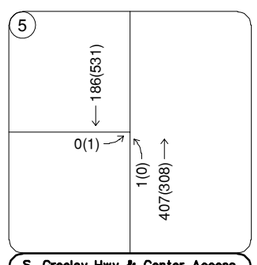


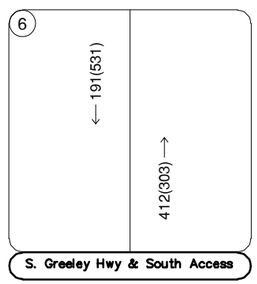












LEGEND

(X) Study Area Key Intersection

XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes

XX,X00 Estimated Daily Traffic Volume

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FIGURE 6
Switchgrass Industrial Park
Laramie County, Wyoming
2050 Background Traffic Volumes

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4.0 PROJECT TRAFFIC CHARACTERISTICS

4.1 Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. The most common practice for the trip generation process is to utilize rates and equations that are based on the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged industry source for trip generation rates and equations is the Trip Generation Manual[1] published by the Institute of Transportation Engineers (ITE). ITE has developed these trip rates and equations based on nationwide studies.

However, ITE does not include site specific data for power plants, nor does it include data specific to construction phase traffic. In order to study the effect of construction phase traffic generated by both the proposed data center and power plant, as well as operational phase traffic generated by the power plant, trip generation estimates were prepared primarily based on the input and experiences of the professionals overseeing construction and operations for the proposed data center and power plant. ITE data is available, and therefore was utilized, for trip generation estimates related to the operational phase of the data center.

Data Center Trip Generation – Construction Phase

Based on coordination with the client, construction of the data center is anticipated to occur between 2025 and 2027 and generate a peak of 5,000 construction workers visiting the site daily. The typical peak construction workday is anticipated to see workers arriving during a four-hour window between 4:00 am and 8:00 am and departing during a three and a half-hour window between 3:30 pm and 7:00 pm. In addition, the client indicated that deliveries are expected to occur during off-peak times to avoid further increasing the traffic volumes generated by workers during peak hours.

It was assumed that approximately three fifths (60%) of workers will arrive at the site during the morning peak hour of the adjacent roadways between approximately 7:30 and 8:30 am. It was also assumed that approximately three quarters (75%) of workers will depart from the site during the afternoon peak hour of the adjacent roadway between approximately 4:30 pm and 5:30 pm.

[1] Institute of Transportation Engineers, *Trip Generation Manual*, Eleventh Edition, Washington DC, 2021.

These assumptions were considered to be conservative, as the anticipated arrival and departure windows extend beyond a single peak hour.

Furthermore, it was conservatively assumed that each worker would generate a single vehicle trip, and no reductions in traffic volumes were applied to account for the potential of carpooling or bussing. Therefore, the construction worker traffic estimates may be viewed as conservative, and should carpooling or bussing options be explored, the observed traffic volumes would likely be less than estimated in this letter.

Based on these assumptions, the construction phase of the proposed data center is anticipated to generate approximately 10,000 daily worker trips with 3,000 trips occurring during the morning peak hour, and 3,750 trips occurring during the afternoon peak hour. It should be noted that these estimated trips do not include delivery vehicle trips, which are anticipated to occur during off-peak times. **Table 1** summarizes the estimated trip generation associated with the construction phase of the proposed data center.

Power Plant Trip Generation – Construction Phase

Based on coordination with the client, construction of the power plant is anticipated to occur between 2026 and 2030 and generate a peak of 2,000 construction workers visiting the site daily. The arrival and departure windows are anticipated to be consistent with the arrival and departure windows assumed for the construction phase of the data center. Similarly, deliveries were assumed to occur during off-peak times, and no reductions in traffic volumes were applied to account for the potential of carpooling or bussing.

Based on these assumptions the construction phase of the proposed power plant is anticipated to generate approximately 4,000 daily worker trips, with 1,200 trips occurring during the morning peak hour, and 1,500 trips occurring during the afternoon peak hour. **Table 1** summarizes the estimated trip generation associated with the construction phase of the proposed power plant.

Data Center Trip Generation – Operational Phase

Construction of the proposed data center is anticipated to be complete by 2027, at which point the site would transition to generating its operational phase traffic. Trip generation estimates for the operational phase of the proposed data center were prepared based on the average rates for Data Center (Land Use Code 160) documented in the ITE Trip Generation Manual. The ITE Trip Generation Manual data, and site specific data are included in **Appendix E**.

Based on ITE data, the operational phase of the proposed data center is anticipated to generate approximately 2,412 daily trips, with 268 trips occurring during the morning peak hour, and 220 trips occurring during the afternoon peak hour. **Table 1** summarizes the estimated trip generation associated with the operational phase of the proposed data center.

Power Plant Trip Generation – Operational Phase

Construction of the proposed power plant is anticipated to be complete by 2030, at which point the site would transition to generating its operational phase traffic. Trip generation estimates for the operational phase of the proposed power plant were prepared based on coordination with the client.

The client indicated that 50 employees are anticipated to be visiting the site daily, distributed across three working shifts. It was assumed that three fifths (60%) of employees will arrive at the site for the day shift, while one fifth (20%) of employees will depart from the site from a night shift, during the morning peak hour of the adjacent roadways between approximately 7:30 and 8:30 am. It was also assumed that approximately one fifth (20%) of employees will arrive at the site for an evening shift, while three fifths (60%) of employees will depart from the site from the day shift, during the afternoon peak hour of the adjacent roadway between approximately 4:30 pm and 5:30 pm.

Based on these assumptions, the operational phase of the proposed power plant is anticipated to generate approximately 100 daily employee trips, with 40 trips occurring during the morning peak hour, and 40 trips occurring during the afternoon peak hour. It should be noted that these estimated trips do not include delivery vehicle trips, which are anticipated to occur during off-peak times. **Table 1** summarizes the estimated trip generation associated with the operational phase of the proposed power plant.

Table 1 –Construction and Operational Phase Traffic Generation

Land Use & Size	Weekday Vehicles Trips						
	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Construction Phase Worker Traffic							
Data Center	10,000	3,000	-	3,000	-	3,750	3,750
Power Plant	4,000	1,200	-	1,200	-	1,500	1,500
Total Construction Worker Traffic	**14,000**	**4,200**	**-**	**4,200**	**-**	**5,250**	**5,250**
Operational Phase							
Data Center (ITE 160) 2,4350,000 Square Feet	2,412	147	121	268	66	154	220
Power Plant*	100	30	10	40	10	30	40
Total Operational Traffic	**2,512**	**177**	**131**	**308**	**76**	**184**	**260**

** The operational phase traffic for the proposed power plant only includes anticipated employee traffic*

As shown in **Table 1**, the construction phase of the proposed Switchgrass Industrial Park is expected to generate approximately 14,000 daily worker trips, with 4,200 trips occurring during the morning peak hour and 5,250 trips occurring during the afternoon peak hour. It should be noted that these estimated trips do not include delivery vehicle trips for either the proposed data center or power plant, which are anticipated to occur during off-peak times. It should also be noted that these estimated trips assume each worker will generate a single vehicle trip, and no reductions in traffic volumes were applied to account for the potential of carpooling or bussing.

Additionally, the operational phase of the Switchgrass Industrial Park is expected to generate approximately 2,512 daily trips, with 308 trips occurring during the morning peak hour, and 260 trips occurring during the afternoon peak hour. It should be noted that these estimated trips do not include delivery vehicle trips for the proposed power plant, which are anticipated to occur during off-peak times.

4.2 Trip Distribution & Traffic Assignment

The directional distribution of traffic is a means to quantify the percentage of site-generated traffic that approaches the site from a given direction and departs the site back to the original source. Distribution of site traffic on the street system was based on the area street system characteristics, existing traffic patterns, existing and anticipated surrounding demographic information, and the proposed access system for the industrial park. While the overall direction of approach percentages were assumed to be identical for the proposed data center and power plant, the specific site access distributions were assumed to be different for each site; therefore, different site access distribution assumptions were developed for the data center and power plant.

The project's traffic assignment was obtained by applying the project trip distribution to the estimated traffic generation of the development shown in **Table 1**. The traffic assignment for the proposed industrial park, under construction and operational phases are summarized in **Figures 8C** and **9C**, respectively. These traffic assignment figures combine the individual traffic assignment volumes anticipated for the proposed data center and power plant. Trip distribution assumptions and resulting traffic assignment for each site are discussed in further detail in the following sections.

Data Center Trip Distribution & Traffic Assignment

The following assumptions were made for the development of the data center trip distribution:

- The proposed center access point along S. Greeley Highway was assumed to serve as the primary ingress and egress point for both construction and operational phase traffic associated with the data center. This access point is anticipated to serve as the most direct access to the planned construction worker parking lot, anticipated to be located near the southeast corner of the site. In addition, the internal access roadway at this access point is anticipated to be the designated heavy vehicle haul route during construction.
- The proposed north access point along S. Greeley Highway is expected to serve as a secondary ingress and egress point for construction phase traffic associated with the data center. However, the access is anticipated to be transitioned to emergency access only upon the completion of construction; and therefore, it was not assumed to serve any operational phase traffic associated with the data center.

- The proposed access point along Terry Ranch Road was assumed to serve as a secondary ingress and egress point for both construction and operational phase traffic associated with the data center. The internal access roadways are expected to feature lower posted speed limits to support on-site safety goals; therefore, the majority of traffic traveling to and from the site is anticipated to utilize the access points along S. Greeley Highway, instead of this access point.
- The proposed south access point along S. Greeley Highway was not assumed to serve construction or operational phase traffic associated with the data center.

The assumed project trip distribution for the proposed data center is summarized in **Figures 7A** and **7B**. The resulting project trip assignment for the proposed data center under construction and operational phases are summarized in **Figures 8A** and **9A**, respectively.

Power Plant Trip Distribution & Traffic Assignment

The following assumptions were made for the development of the power plant trip distribution:

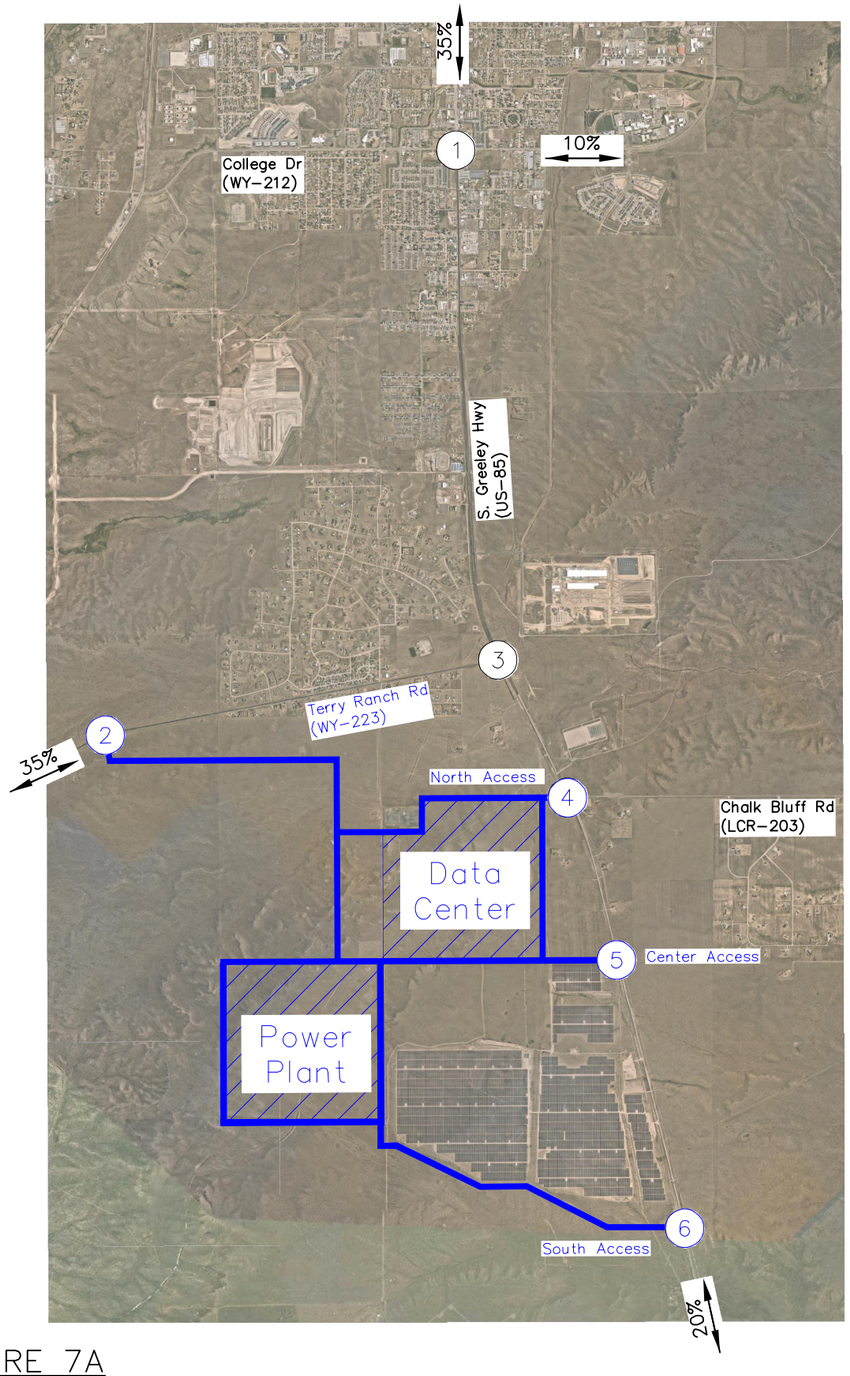
- The proposed south access point along S. Greeley Highway was assumed to serve as the primary ingress and egress point for both construction and operational phase traffic associated with the power plant. This access point is anticipated to serve as the most direct access to the planned construction worker parking lot, anticipated to be located along the southern portion of the site. In addition, the internal access roadway at this access point is anticipated to be the designated heavy vehicle haul route during construction.
- The proposed center access point along S. Greeley Highway was assumed to serve as a secondary ingress and egress point for both construction and operational phase traffic associated with the power plant.
- The proposed access point along Terry Ranch Road was assumed to serve as a secondary ingress and egress point for both construction and operational phase traffic associated with the power plant. The internal access roadways are expected to feature lower posted speed limits to support on-site safety goals; therefore, the majority of traffic traveling to and from the site is anticipated to utilize the access points along S. Greeley Highway, instead of this access point.

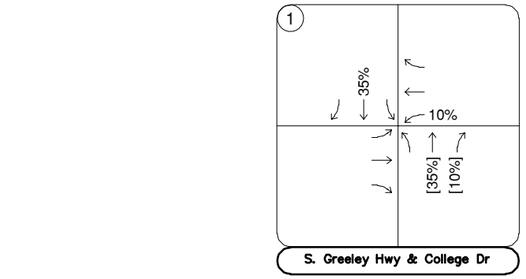
- The proposed north access point along S. Greeley Highway was not assumed to serve construction or operational phase traffic associated with the power plant.

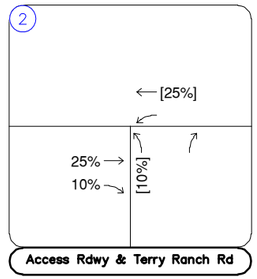
The assumed project trip distribution for the proposed power plant is summarized in **Figure 7C**. The resulting project trip assignment for the proposed data center under construction and operational phases are summarized in **Figures 8B** and **9B**, respectively.

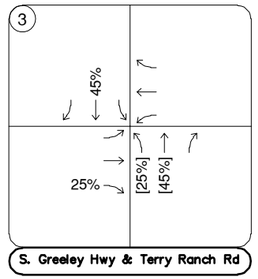
4.3 Total (Background Plus Project) Traffic

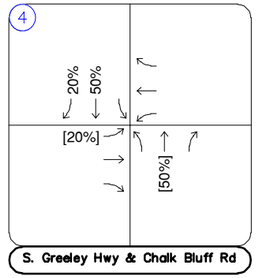
Site traffic volumes were added to the background volumes to represent estimated traffic conditions for the 2027 construction phase, 2030 short-term buildout horizon and 2050 long-term planning horizon. The total traffic volumes for 2027 are illustrated in **Figure 10**, while the total traffic volumes for 2030 and 2050 are illustrated in **Figure 11** and **Figure 12,** respectively.

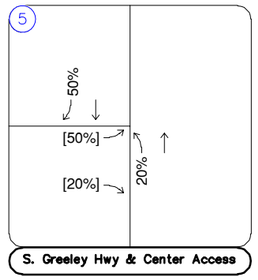


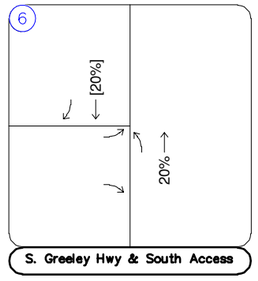












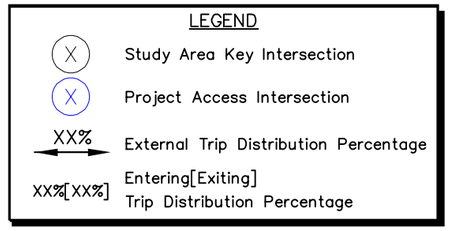
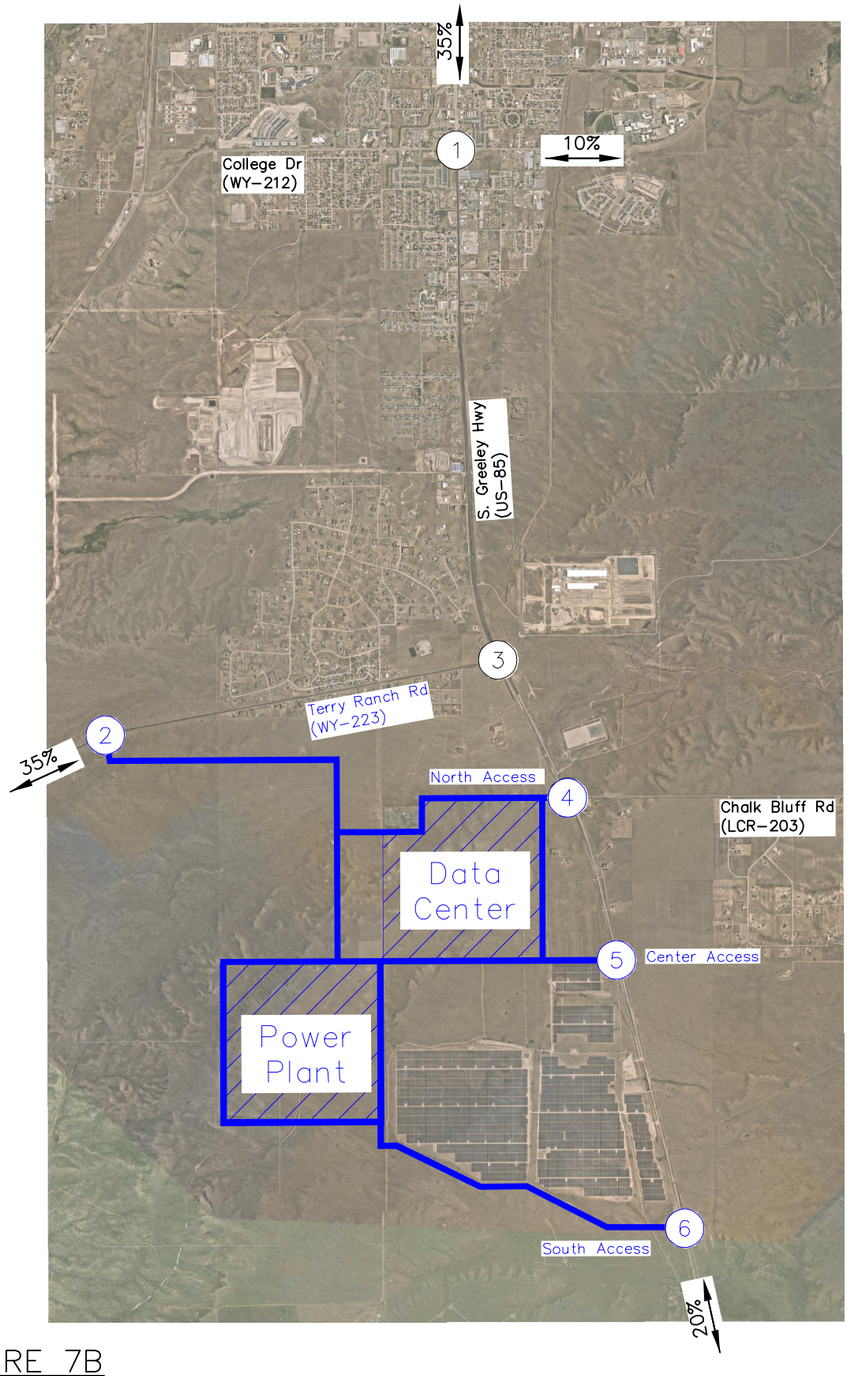
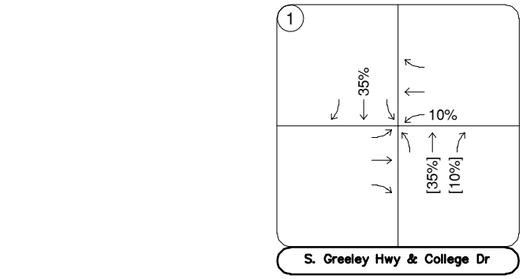
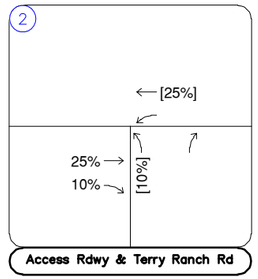
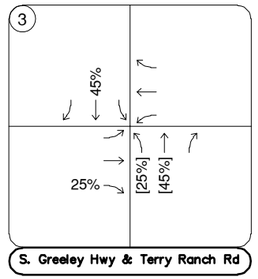


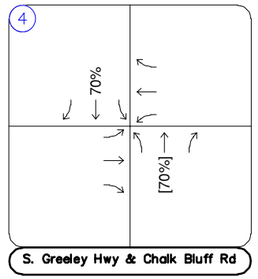
FIGURE 7A
Switchgrass Industrial Park
Laramie County, Wyoming
Data Center Construction Phase Trip Distribution

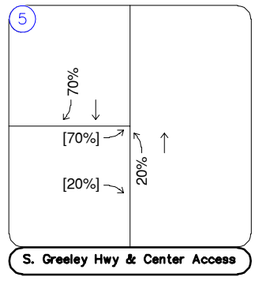


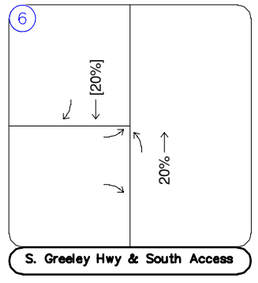












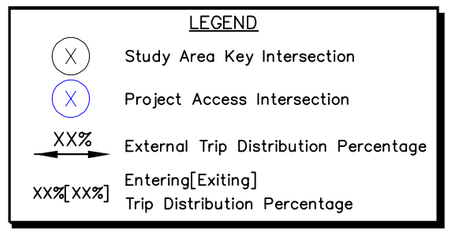
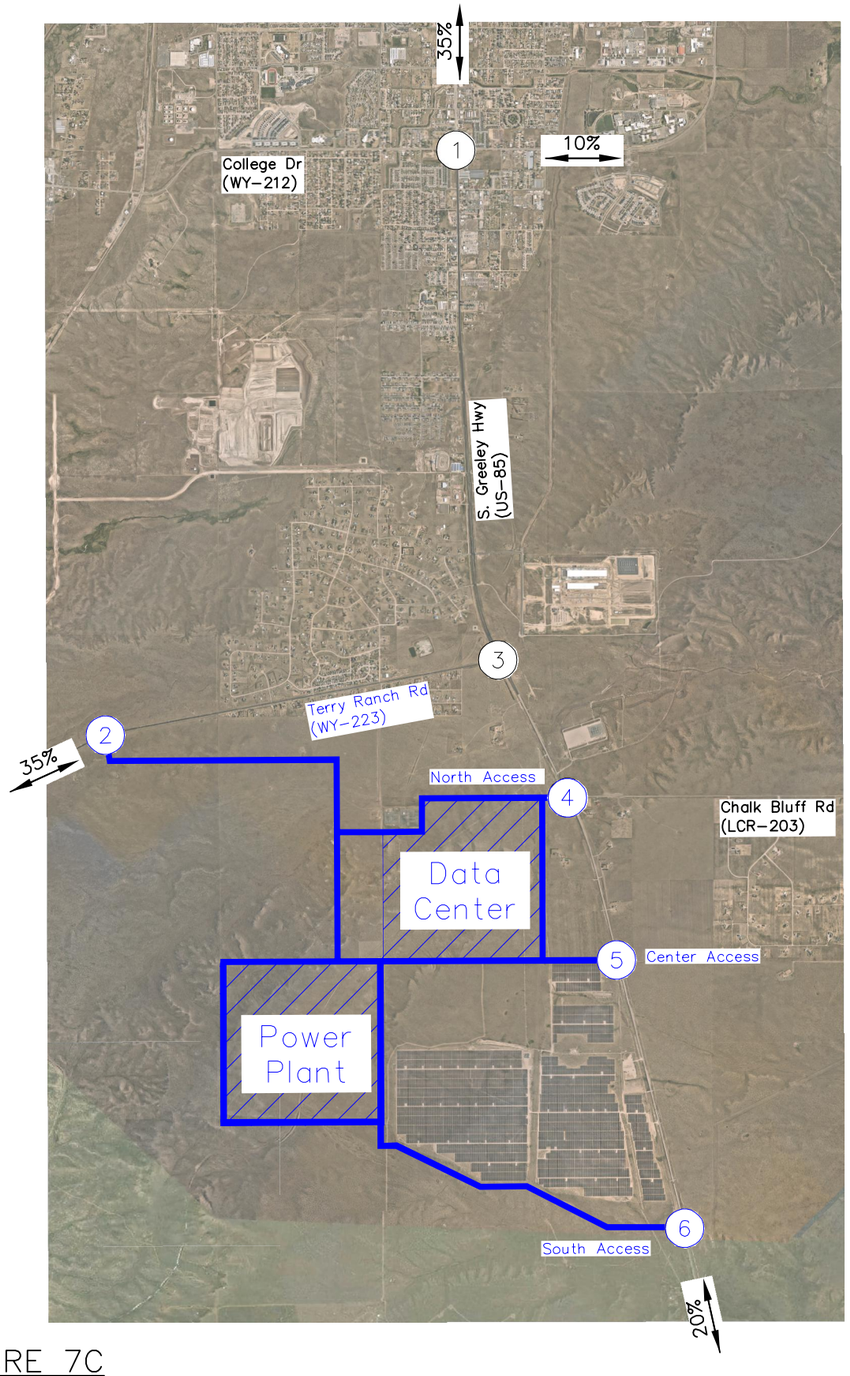
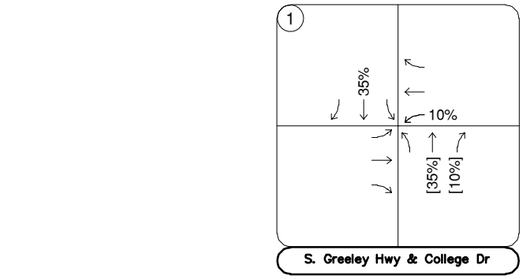
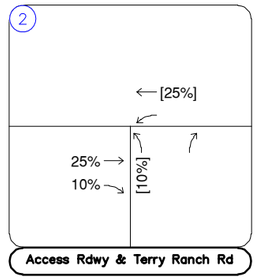
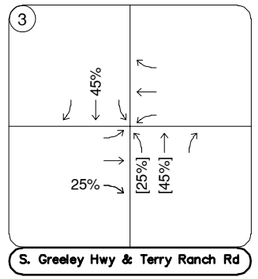


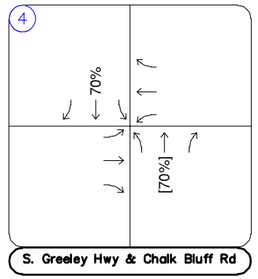
FIGURE 7B
Switchgrass Industrial Park
Laramie County, Wyoming
Data Center Operational Phase Trip Distribution

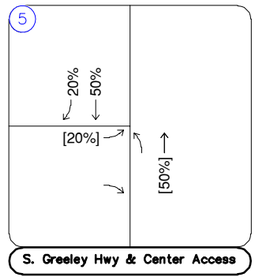


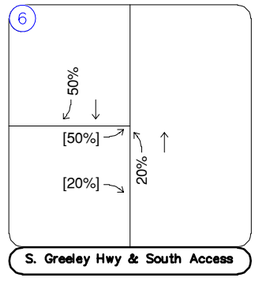


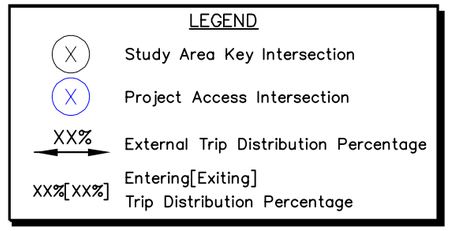








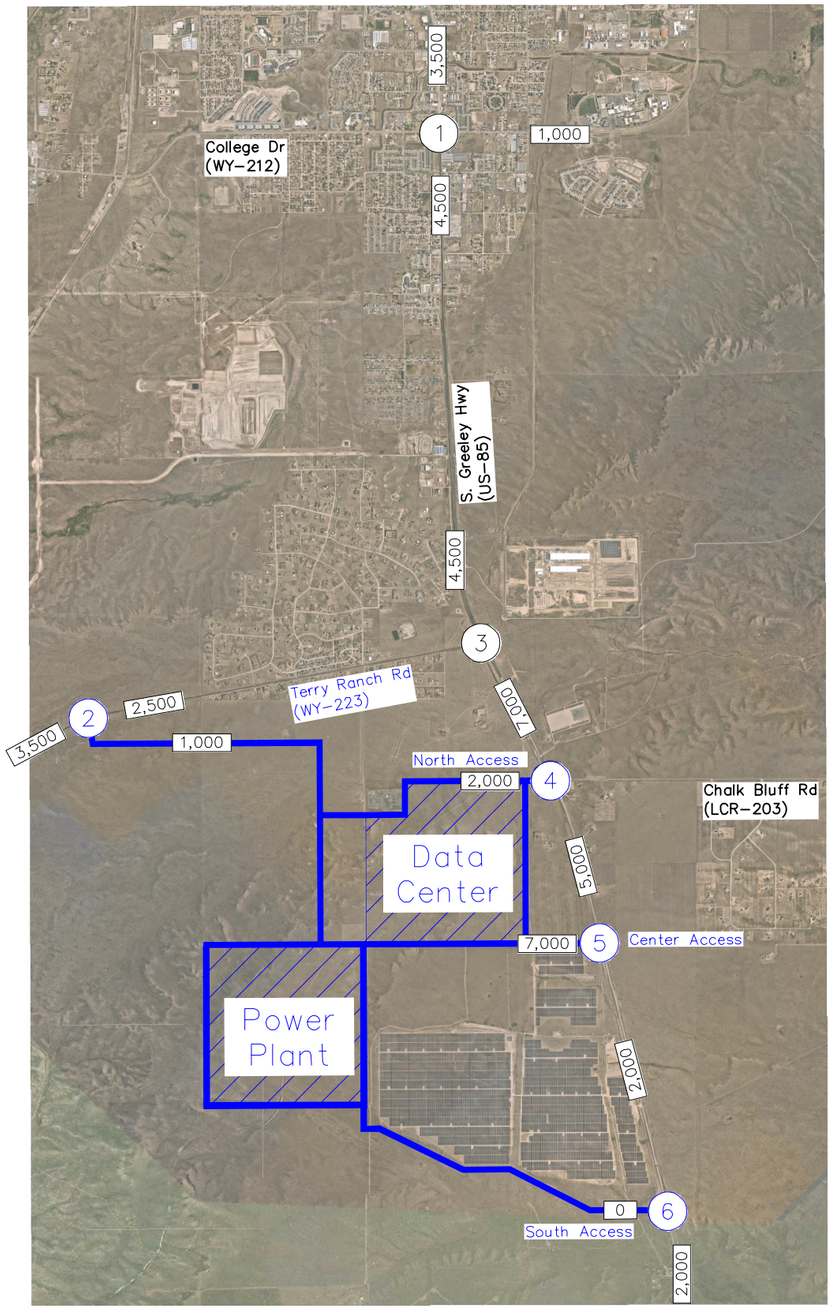


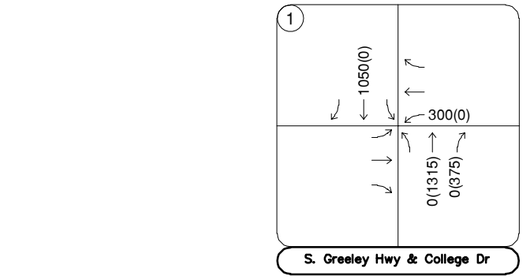


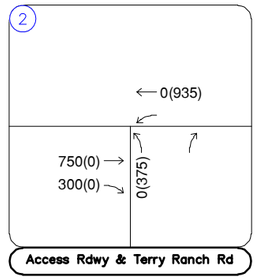
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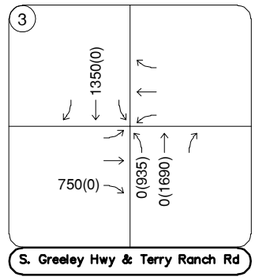
FIGURE 7C
Switchgrass Industrial Park
Laramie County, Wyoming
Power Plant Construction and Operational Phases Trip Distribution

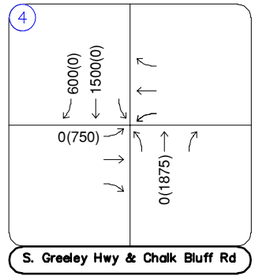
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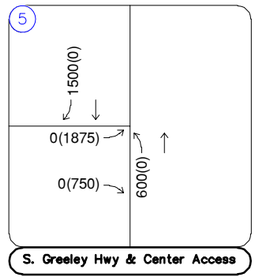


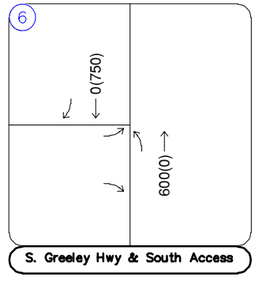












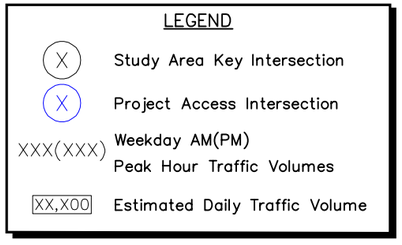


FIGURE 8A
Switchgrass Industrial Park
Laramie County, Wyoming
Data Center Construction Phase Traffic Assignment

Kimley»Horn NORTH
NTS 296012011/296242001

Kimley»Horn

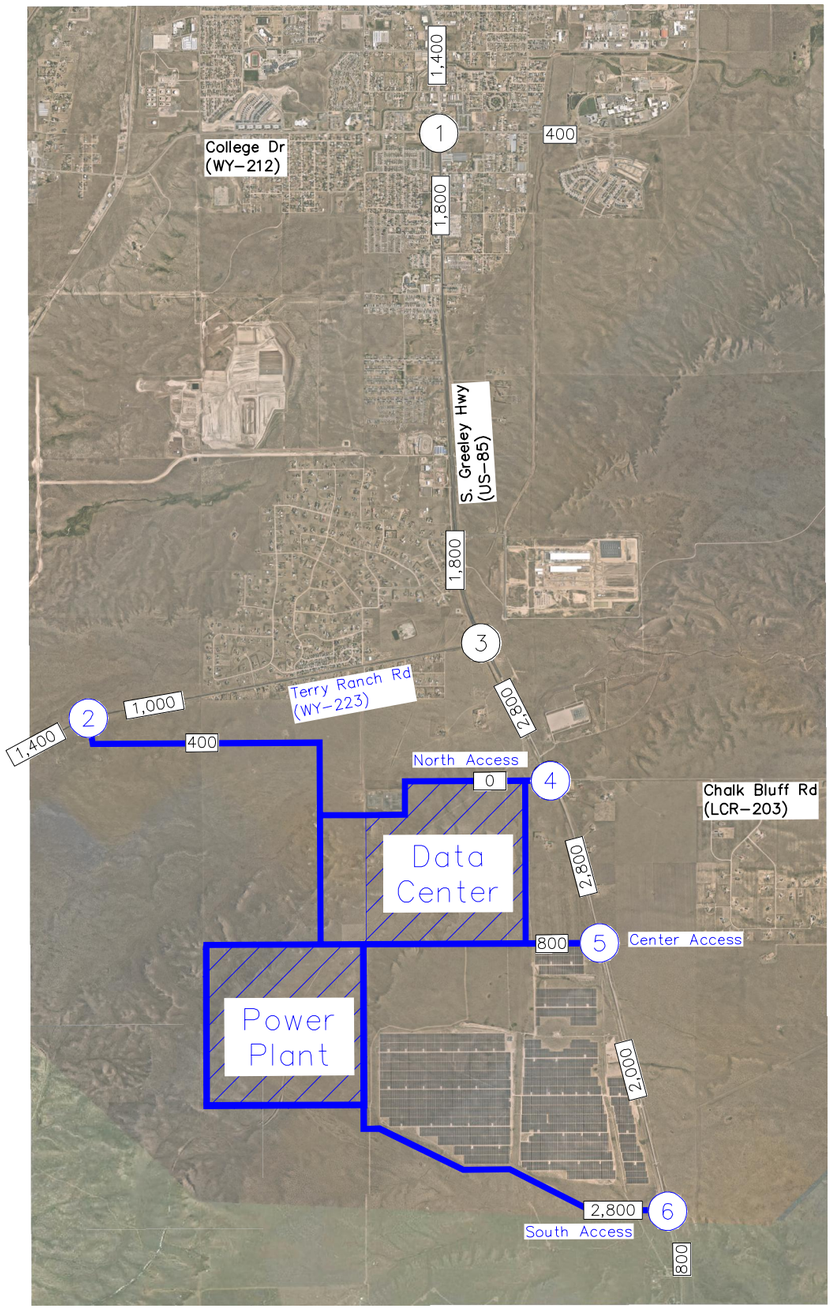
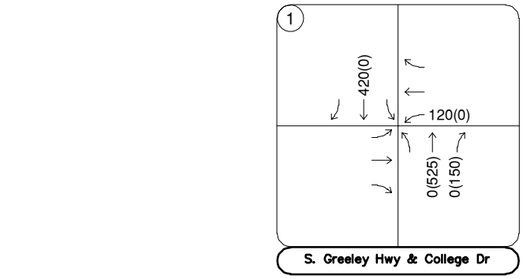
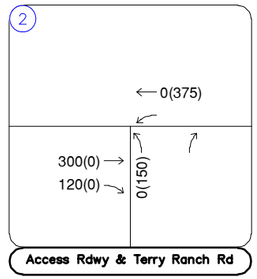
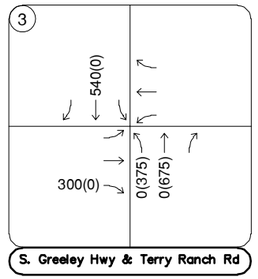
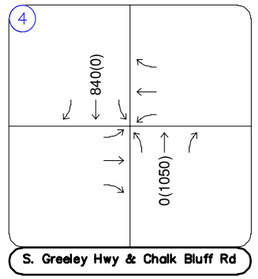


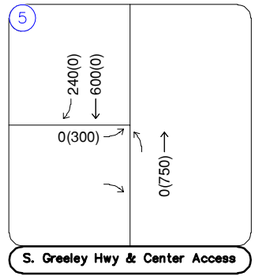
FIGURE 8B
Switchgrass Industrial Park
Laramie County, Wyoming
Power Plant Construction Phase Traffic Assignment

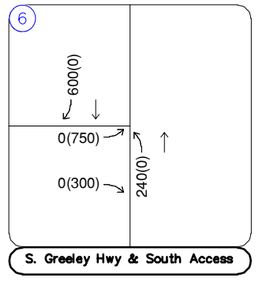












LEGEND

X	Study Area Key Intersection
X	Project Access Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,XOO	Estimated Daily Traffic Volume

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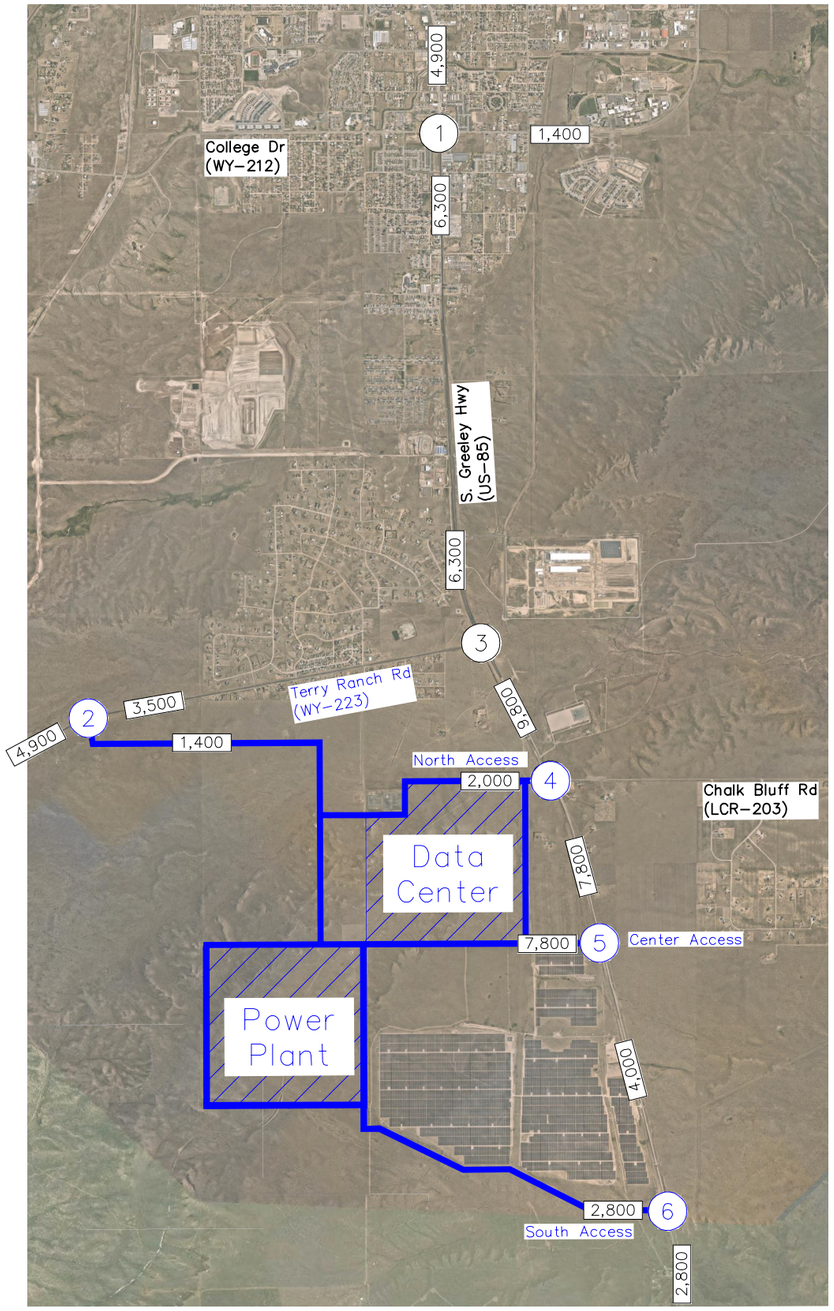
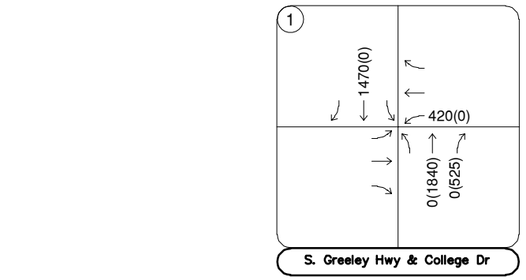
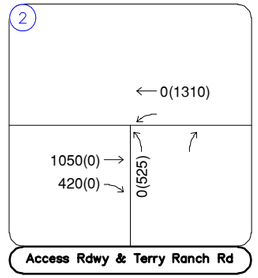
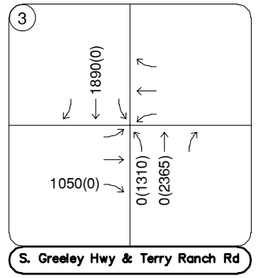
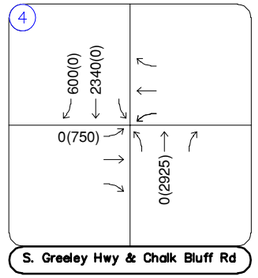


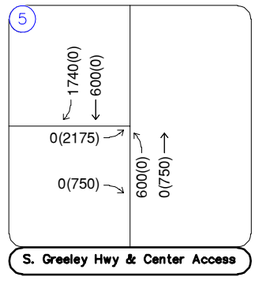
FIGURE 8C
Switchgrass Industrial Park
Laramie County, Wyoming
Total Construction Phase Traffic Assignment

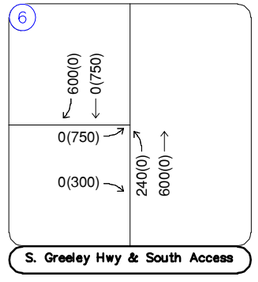










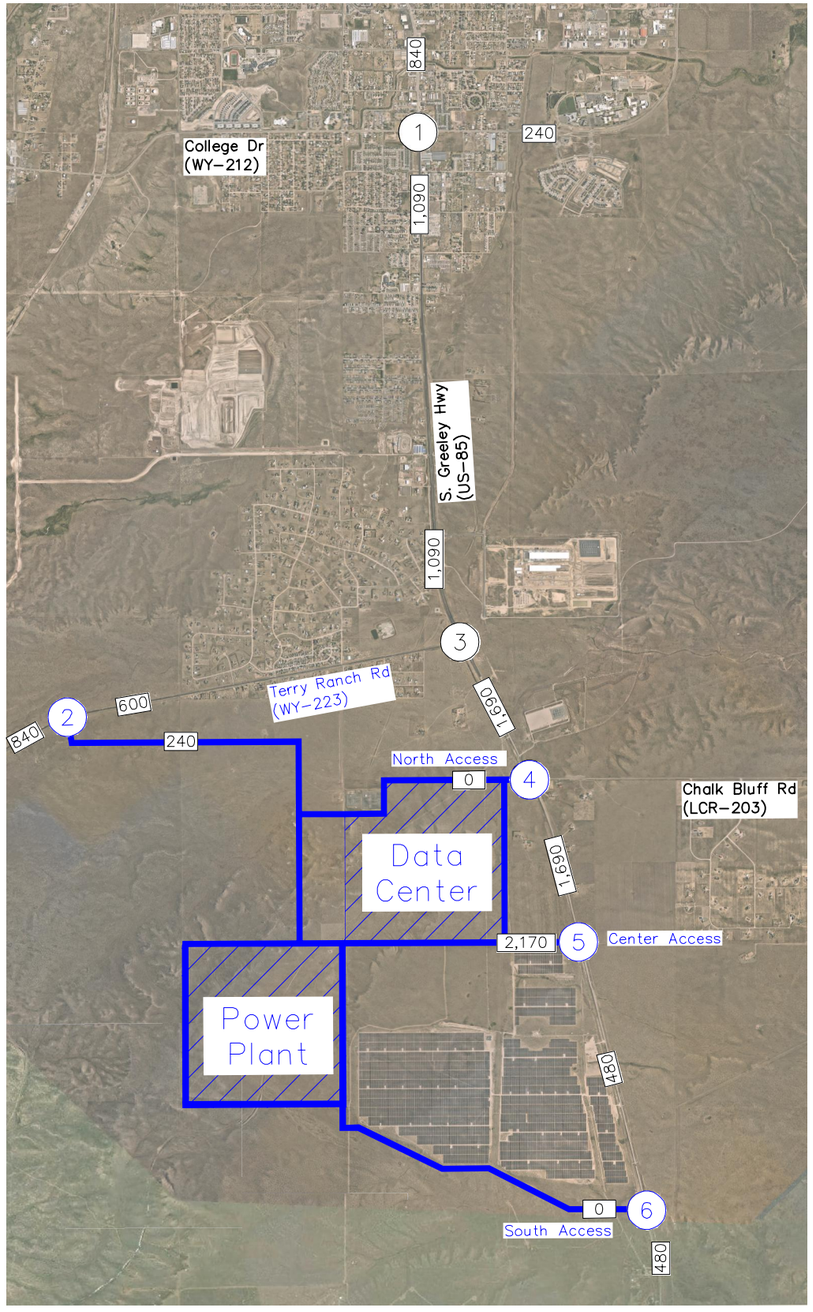


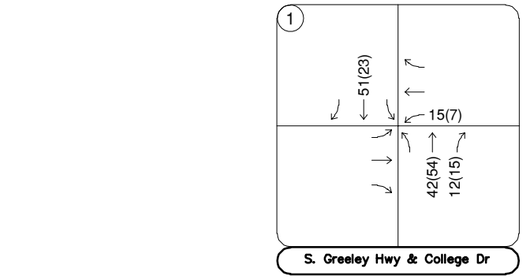
LEGEND

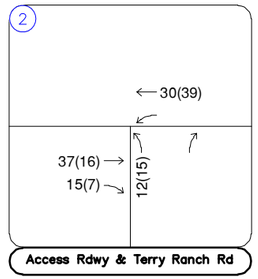
- (X) Study Area Key Intersection
- (X) Project Access Intersection
- XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes
- XX,XOO Estimated Daily Traffic Volume

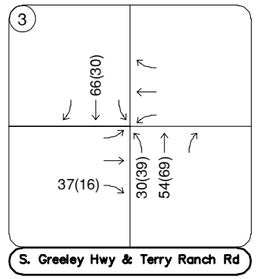
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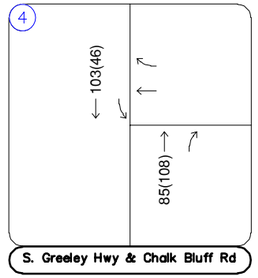
Kimley»Horn

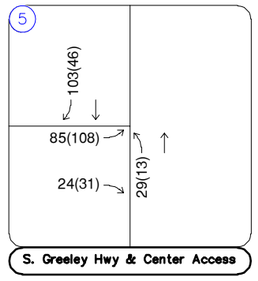


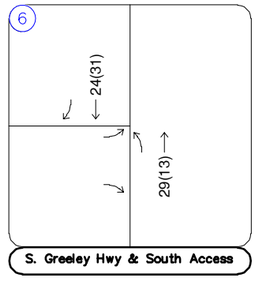












LEGEND

- (X) Study Area Key Intersection
- (X) Project Access Intersection
- XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes
- XX,XOO Estimated Daily Traffic Volume

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FIGURE 9A
Switchgrass Industrial Park
Laramie County, Wyoming
Data Center Operational Phase Traffic Assignment

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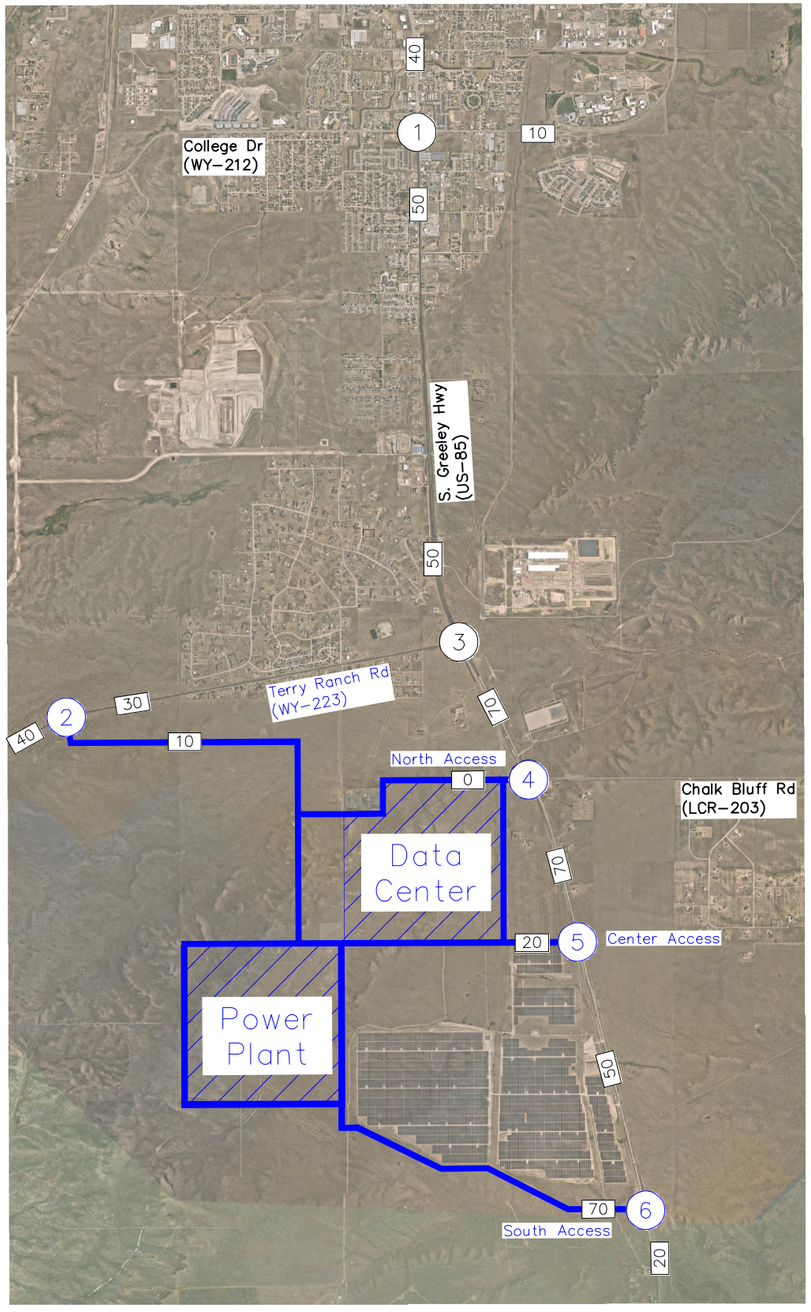
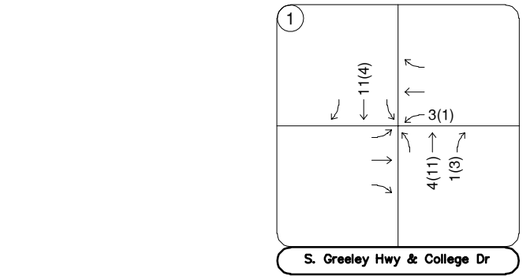
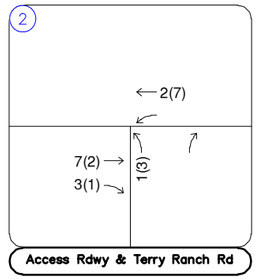
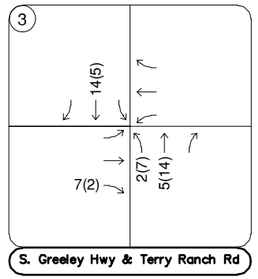
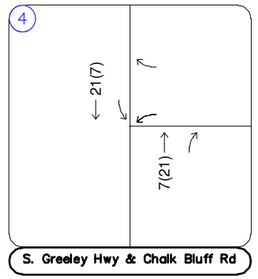


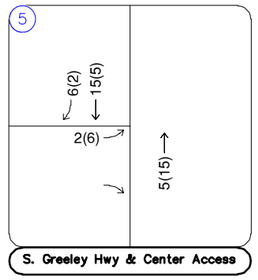
FIGURE 9B
Switchgrass Industrial Park
Laramie County, Wyoming
Power Plant Operational Phase Traffic Assignment

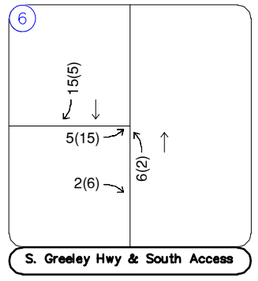










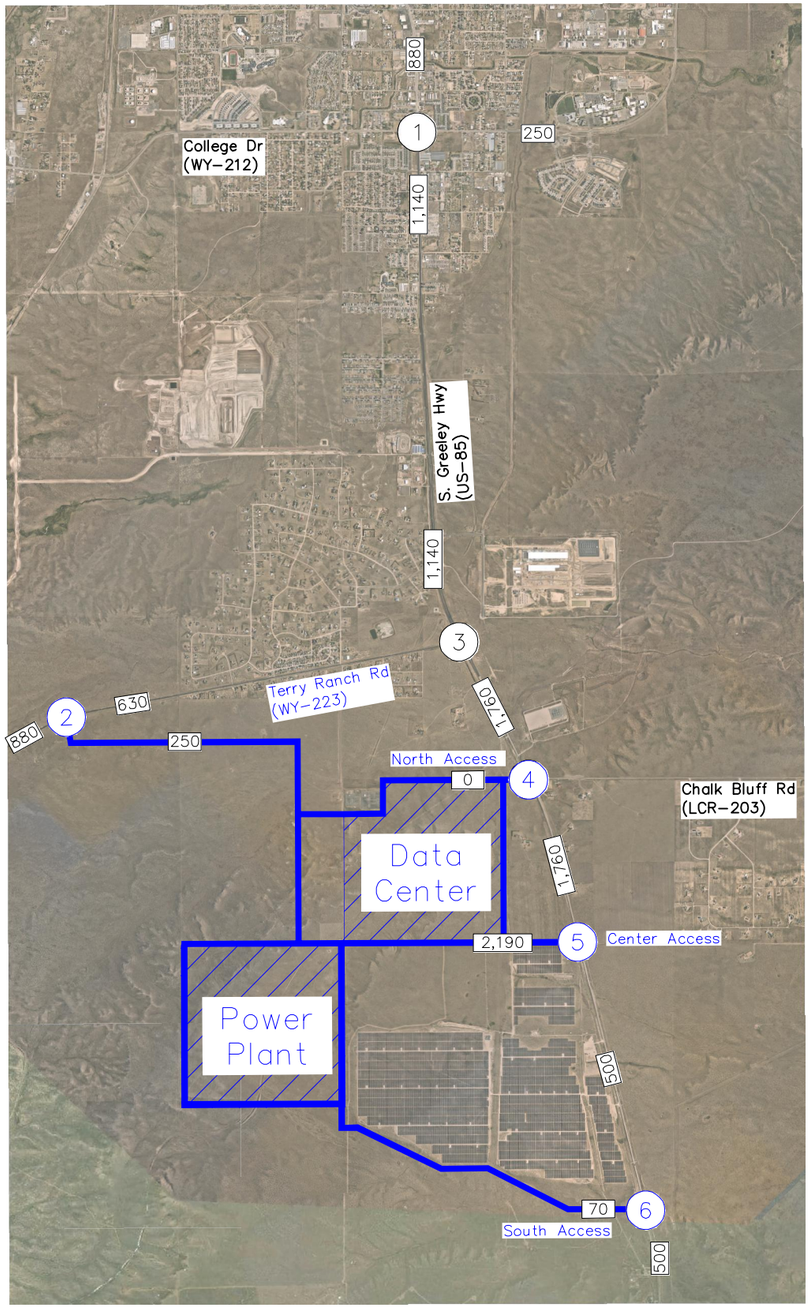


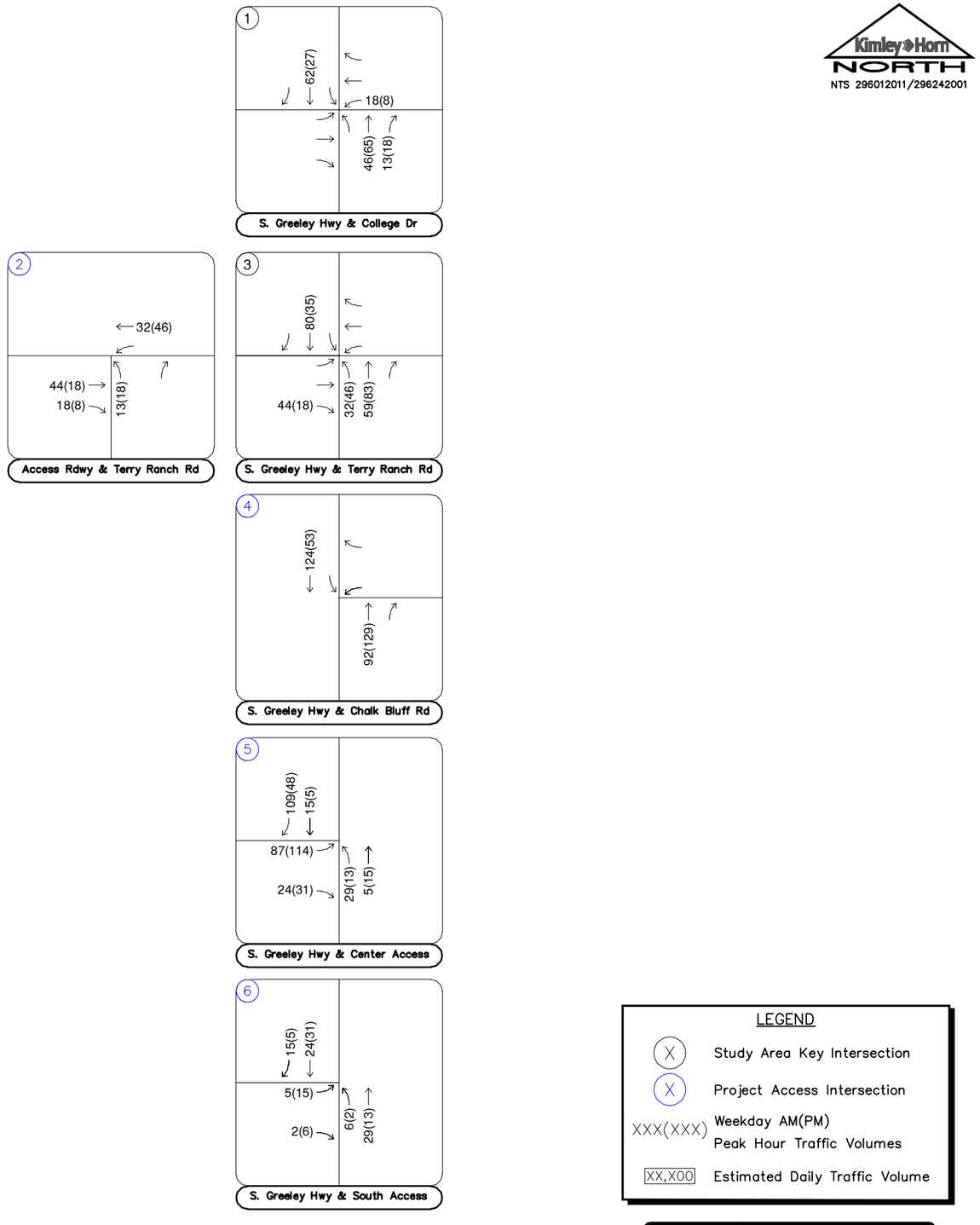
LEGEND

X	Study Area Key Intersection
X	Project Access Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,XOO	Estimated Daily Traffic Volume

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NORTH
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LEGEND

X	Study Area Key Intersection
X	Project Access Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

FIGURE 9C
Switchgrass Industrial Park
Laramie County, Wyoming
Total Operational Phase Traffic Assignment

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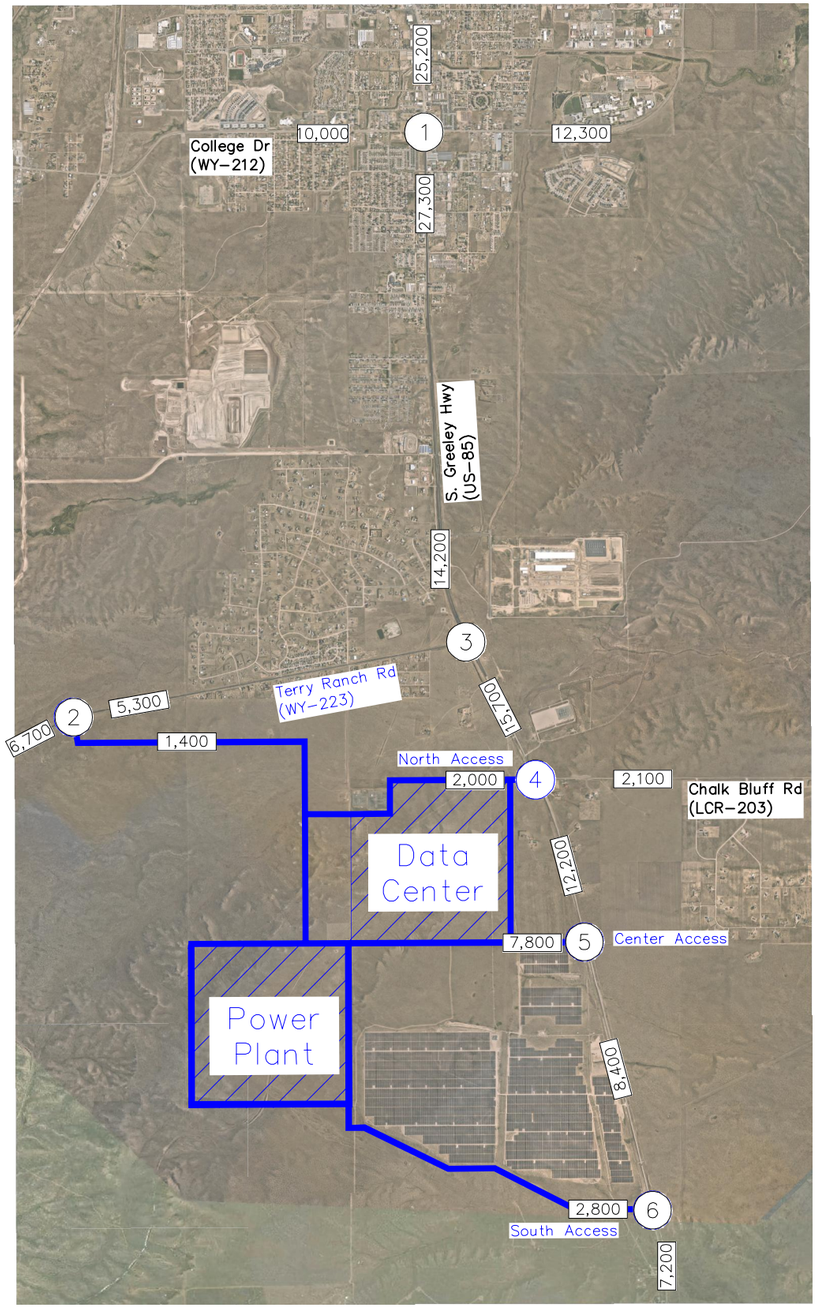
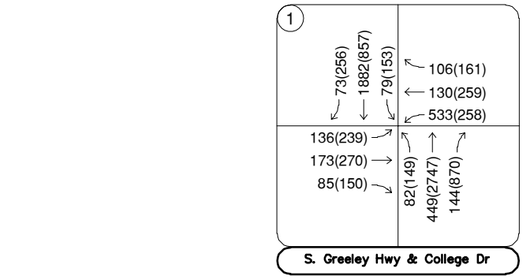
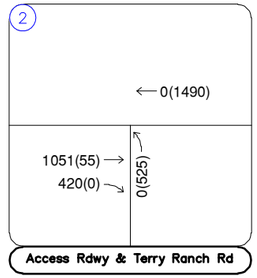
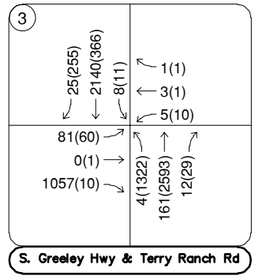
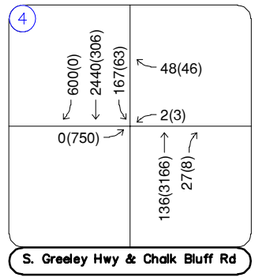


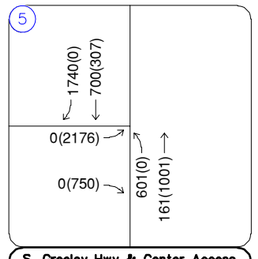
FIGURE 10
Switchgrass Industrial Park
Laramie County, Wyoming
2027 Total Traffic Volumes

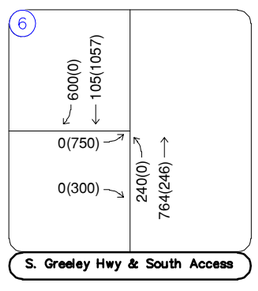












LEGEND

X	Study Area Key Intersection
X	Project Access Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

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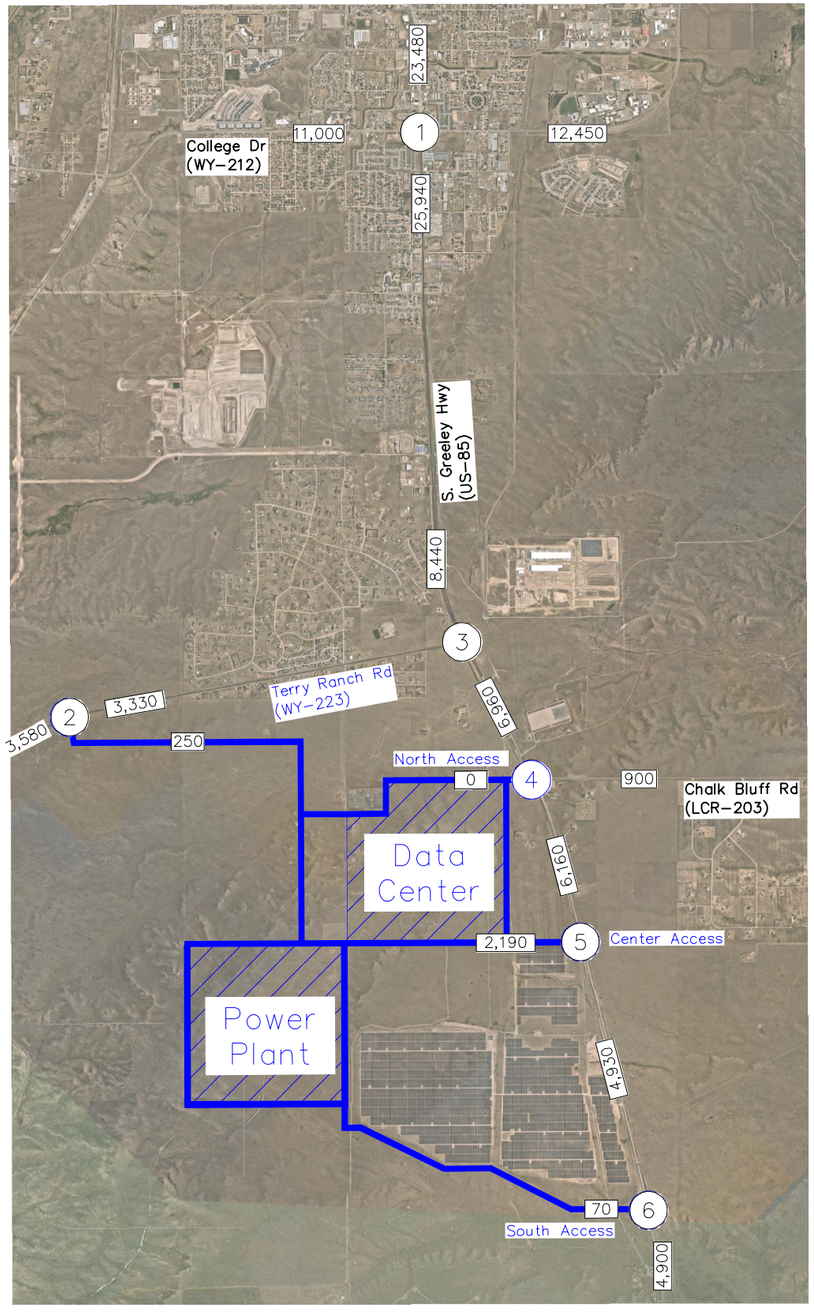
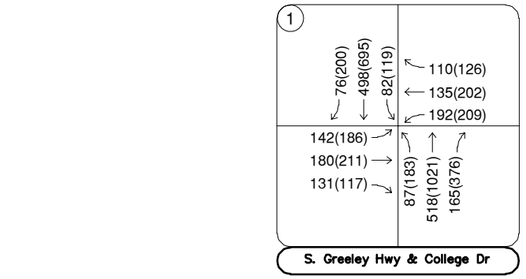
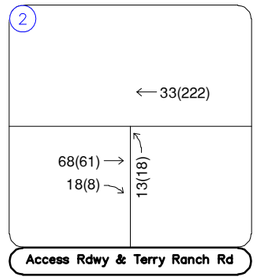
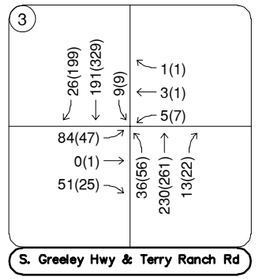
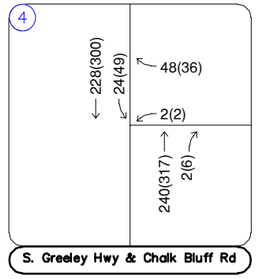


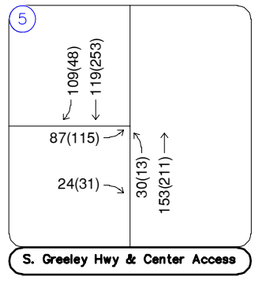
FIGURE 11
Switchgrass Industrial Park
Laramie County, Wyoming
2030 Total Traffic Volumes

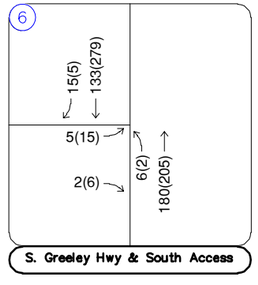












LEGEND

- (X) Study Area Key Intersection
- (X) Project Access Intersection
- XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes
- XX,X00 Estimated Daily Traffic Volume

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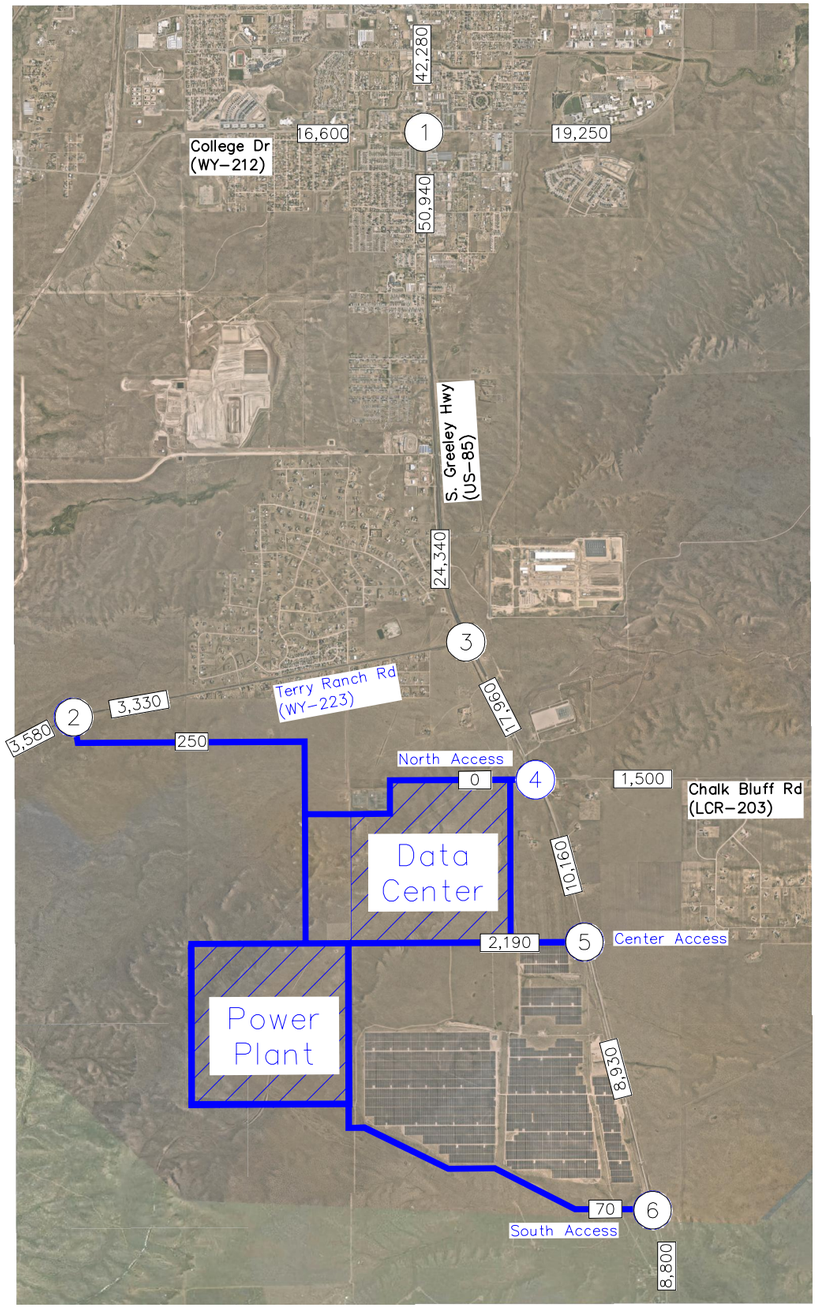
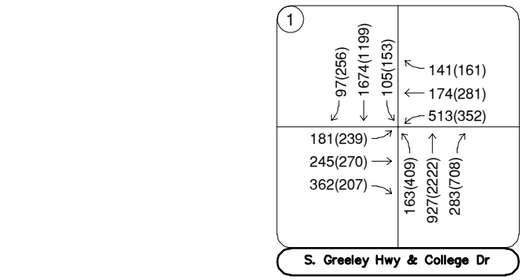
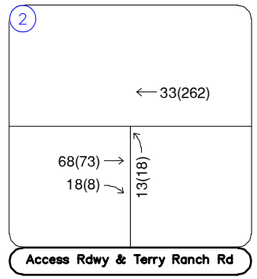
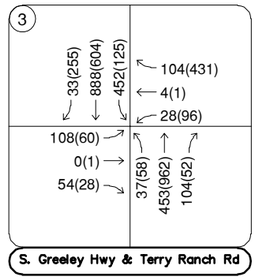
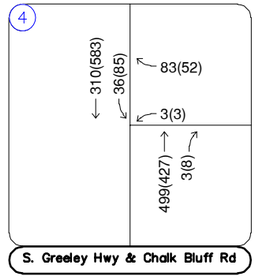


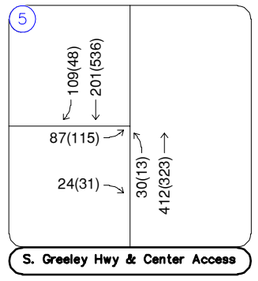
FIGURE 12
Switchgrass Industrial Park
Laramie County, Wyoming
2050 Total Traffic Volumes

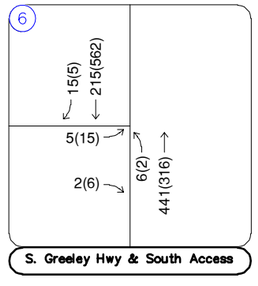












LEGEND

- (X) Study Area Key Intersection
- (X) Project Access Intersection
- XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes
- XX,XOO Estimated Daily Traffic Volume

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Kimley-Horn's analysis of traffic operations in the site vicinity was conducted to determine potential capacity deficiencies in the 2027, 2030 and 2050 development horizons at the identified study intersections. The acknowledged source for determining overall capacity is the *Highway Capacity Manual (HCM)*[2].

5.1 Analysis Methodology

Capacity analysis results are listed in terms of Level of Service (LOS). Level of service is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion). **Table 2** shows the definition of level of service for signalized and unsignalized intersections.

Table 2 – Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Definitions provided from the Highway Capacity Manual, Seventh Edition, Transportation Research Board, 2022.

Study area intersections were analyzed based on average total delay analysis for signalized and unsignalized intersections. Under the unsignalized analysis, the level of service for a two-way stop-controlled intersection is determined by the computed or measured control delay and is only defined for each minor movement. The level of service for a two-way stop-controlled intersection is not defined for the whole intersection. Level of service for signalized intersections is defined for each approach and for the overall intersection.

[2] Transportation Research Board, *Highway Capacity Manual*, Seventh Edition, Washington DC, 2022.

The 2019 Laramie County Land Use Regulations amended January 1, 2020, provides direction on the requirements for a traffic impact study submitted to the County. Section 3-5-105.d.vi. states that while LOS C is the design objective for all movements, LOS D is the minimum level of service that will be accepted. Although it is not explicitly stated in the standards, it was assumed that LOS D was not only the minimum level of service for all movements, but also the minimum level of service for overall operations.

5.2 Study Intersection Operational Analysis

Synchro traffic analysis software was used to analyze the signalized and unsignalized intersections for HCM level of service. Calculations for the operational level of service at the study intersections for the study area are provided in **Appendix E**.

The existing year analysis is based on the lane geometry and intersection control shown in **Figure 2.** While there are multiple planned improvements planned for future implementation within the study area, none of these are anticipated to be fully constructed by the time the proposed industrial park is operational; therefore, the background conditions for future horizon year analyses were also based on the existing lane geometry and intersection control. The total conditions for future horizon year analyses utilized the existing lane geometry and intersection control as a starting point, and also considered any necessary improvements identified.

Based on methodology documented in the WYDOT Traffic Studies Manual the existing peak hour factors were utilized in the intersection analyses. For intersection approaches that do not currently exist, a peak hour factor of 0.92 was utilized. Furthermore, all analyses assumed a saturation flow rate of 1,600 vehicle per hour per lane.

The signalized intersection analyses utilized an optimized cycle length with optimized phasing and splits, based on existing timing parameters. For intersections that do not currently operate under signal control, but are recommended to in the future, the analyses utilized an optimized cycle length with optimize phasing and splits, based on timing parameters developed based on ITE standard practice.

College Drive (WY-212) & S. Greeley Highway (US-85) (#1)

The signalized intersection of College Drive and S. Greeley Highway (#1) currently operates with protected-permissive left turn phasing on all four approaches. **Table 3** provides the results of the operational analysis conducted at this intersection. Under the existing conditions, this intersection operates acceptably at an overall LOS C during the morning peak hour, and an overall LOS D during the afternoon peak hour. Under the projected 2027 background traffic volumes, this intersection is anticipated to continue to operate at an acceptable overall level of service.

With the addition of peak construction traffic volumes in 2027, this intersection may experience a traffic demand that exceeds the potential capacity for the intersection. Considering the available right of way at the intersection an intersection configuration featuring three through lanes along S. Greeley Highway, two through lanes along College Drive, as well as dual left turn lanes and single right turn lanes on all four approaches was assumed to be the ultimate potential buildout of this intersection. Assuming these improvements are implemented, and the forecasted 2027 peak construction traffic volumes are arrived at, this intersection may still experience failing overall levels of service with the addition of peak construction traffic.

For comparative purposes, intersection analyses were also conducted for the operational phase of the proposed project. These analyses were conducted without consideration of the recommended improvements developed based on the 2027 peak construction phase traffic volumes.

Under the 2030 background traffic volumes, this intersection is anticipated to operate at an acceptable overall LOS C during the morning peak hour. However, this intersection is anticipated to operate at an unacceptable overall LOS E, during the afternoon peak hour. The failing overall level of service is anticipated to improve to an acceptable overall LOS D with the construction of a northbound right turn lane. However, the eastbound and westbound left turn movements are still anticipated to experience failing operations. To provide an acceptable level of service for each intersection movement, dual eastbound and westbound left turn lanes would also need to be constructed.

Assuming a northbound right turn lane is constructed, this intersection is anticipated to continue to operate at an acceptable overall level of service through 2030, with the addition of operational project traffic. Therefore, no project specific improvements or modifications are expected to be necessary at this intersection based on the 2030 short-term horizon operational analysis.

If the projected 2050 background traffic volumes are arrived at, this intersection may experience a traffic demand that exceeds the potential capacity for the intersection. Considering the available right of way at the intersection an intersection configuration featuring three through lanes along S. Greeley Highway, two through lanes along College Drive, as well as dual left turn lanes and single right turn lanes on all four approaches was assumed to be the ultimate potential buildout of this intersection. Assuming these improvements are implemented, and the forecasted 2050 background traffic volumes are arrived at, this intersection may still experience failing overall levels of service, both prior to and with the addition of project traffic.

Therefore, in addition to the potential construction of through and turn lanes at this intersection, it is recommended that WYDOT, in partnership with Laramie County and the City of Cheyenne, including the Cheyenne MPO, explore opportunities for adjacent north/south arterials that could be used as alternative routes by drivers in the area; thereby alleviating, or at least reducing, the future traffic demand at the intersection of College Drive and S. Greeley Highway.

Table 3 – College Drive (WY-212) & S. Greeley Highway (US-85) (#1) LOS Results

Intersection/ Critical Movement	2025 Existing		2027 BG		2027 Total (1)		2030 BG		2030 Total (2)		2050 BG (1)		2050 Total (1)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Overall	**C**	**D**	**C**	**D**	**E**	**F**	**C**	**E**	**C**	**D**	**E**	**E**	**E**	**F**
Eastbound App.	D	D	D	D	E	E	D	F	D	D	F	E	F	D
Eastbound Left	*C*	*E*	*C*	*E*	*E*	*F*	*C*	*F*	*C*	*E*	*D*	*F*	*E*	*E*
Eastbound Thru	*D*	*D*	*D*	*D*	*E*	*E*	*D*	*E*	*D*	*D*	*D*	*E*	*D*	*D*
Eastbound Right	*D*	*D*	*D*	*D*	*E*	*E*	*D*	*D*	*D*	*D*	*F*	*D*	*F*	*C*
Westbound App.	D	E	D	E	F	E	D	F	C	E	E	F	E	F
Westbound Left	*C*	*F*	*C*	*F*	*F*	*F*	*D*	*F*	*C*	*F*	*F*	*F*	*F*	*F*
Westbound Thru	*D*	*D*	*D*	*D*	*E*	*E*	*D*	*E*	*C*	*D*	*C*	*E*	*D*	*D*
Westbound Right	*D*	*D*	*D*	*D*	*D*	*E*	*D*	*D*	*C*	*D*	*C*	*E*	*C*	*D*
Northbound App.	B	C	B	C	B	F	B	E	B	C	C	E	C	F
Northbound Left	*A*	*B*	*B*	*B*	*E*	*E*	*B*	*B*	*B*	*C*	*E*	*E*	*E*	*D*
Northbound Thru	*B*	*C*	*B*	*C*	*B*	*F*	*B*	*F*	*B*	*C*	*C*	*F*	*C*	*F*
Northbound Right	*B*	*C*	*B*	*D*	*A*	*F*	*B*	*F*	*B*	*C*	*B*	*C*	*B*	*F*
Southbound App.	B	C	B	C	C	D	B	D	B	D	E	E	D	E
Southbound Left	*B*	*B*	*B*	*C*	*F*	*F*	*B*	*F*	*B*	*D*	*E*	*F*	*E*	*F*
Southbound Thru	*B*	*C*	*B*	*C*	*C*	*C*	*B*	*C*	*C*	*C*	*F*	*D*	*D*	*D*
Southbound Right	*B*	*C*	*B*	*C*	*A*	*B*	*B*	*C*	*C*	*C*	*B*	*C*	*B*	*C*

1 - Analysis results assume 2 EB/WB Thru Lanes, 3 NB/SB Thru Lanes, 2 LT Lanes & 1 RT Lane on all approaches

2 - Analysis results assume construction of a single NB RT Lane

Terry Ranch Road (WY-223) & S. Greeley Highway (US-85) (#3)

The unsignalized intersection of Terry Ranch Road and S. Greeley Highway (#3) currently operates with stop control on the eastbound and westbound approaches. **Table 4** provides the results of the operational analysis conducted at this intersection. Under the existing conditions, the intersection movements operate acceptably at LOS B or better during both peak hours analyzed. Under the projected 2027 background traffic volumes, this intersection movements are anticipated to continue to operate at an acceptable level of service.

With the addition of peak construction traffic volumes in 2027, this intersection may experience traffic volumes that warrant the installation of a traffic signal. Traffic signal warrant worksheets are included in **Appendix G**. Along with the installation of a traffic signal, the 2027 peak construction traffic volumes may warrant three northbound and southbound through lanes, as well as dual northbound left turn lanes, a single eastbound left turn lane, and a single, channelized free-flow eastbound right turn lane with a southbound acceleration lane. Assuming these intersection improvements are implemented, the intersection is anticipated to operate at an acceptable overall level of service during both peak hours with the addition of peak construction traffic.

For comparative purposes, intersection analyses were also conducted for the operational phase of the proposed project. These analyses improvements were conducted without consideration of the recommended improvements developed based on the 2027 peak construction phase traffic volumes.

Under the 2030 background traffic volumes, the intersection movements are anticipated to operate at an acceptable LOS B or better, during both peak hours. The intersection movements are anticipated to continue to operate at acceptable levels of service, during both peak hours in 2030, with the addition of operational phase project traffic. Therefore, no project specific improvements or modifications are expected to be necessary at this intersection based on the 2030 short-term horizon operational analysis.

If the projected 2050 background traffic volumes are arrived at, this intersection may experience traffic volumes that warrant the installation of a traffic signal. Traffic signal warrant worksheets are included in **Appendix G**. Along with the installation of a traffic signal, the 2050 traffic volumes may warrant two northbound and southbound through lanes, as well as a single eastbound left turn lane. Assuming these intersection improvements are implemented, the intersection may operate at an acceptable overall level of service during both peak hours, both prior to the addition of operational phase project traffic and with the addition of operational phase project traffic.

Table 4 – Terry Ranch Road (WY-223) & S. Greeley Highway (US-85) (#3) LOS Results

Intersection/ Critical Movement	2025 Existing (1)		2027 BG (1)		2027 Total (2)		2030 BG (1)		2030 Total (1)		2050 BG (2)		2050 Total (2)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Overall	**-**	**-**	**-**	**-**	**A**	**B**	**-**	**-**	**-**	**-**	**B**	**B**	**B**	**B**
Eastbound App.	B	B	B	B	E	E	B	B	B	C	C	C	C	C
Eastbound Left	-	-	-	-	*E*	*E*	-	-	-	-	*C*	*C*	*C*	*C*
Eastbound Thru	-	-	-	-	-	*E*	-	-	-	-	-	-	-	-
Eastbound Right	-	-	-	-	-	-	-	-	-	-	*C*	*C*	*C*	*C*
Westbound App.	B	B	B	B	E	E	B	B	B	C	C	C	C	C
Westbound Left	-	-	-	-	*E*	*E*	-	-	-	-	*C*	*C*	*C*	*C*
Westbound Thru	-	-	-	-	-	-	-	-	-	-	*C*	*C*	*C*	*C*
Westbound Right	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northbound App.	-	-	-	-	A	B	-	-	-	-	C	B	C	B
Northbound Left	*A*	*A*	*A*	*A*	*F*	*C*	*A*	*A*	*A*	*A*	*B*	*A*	*B*	*A*
Northbound Thru	-	-	-	-	*A*	*A*	-	-	-	-	*C*	*B*	*C*	*B*
Northbound Right	-	-	-	-	*A*	*A*	-	-	-	-	*B*	*A*	*C*	*A*
Southbound App.	-	-	-	-	A	D	-	-	-	-	B	A	B	B
Southbound Left	*A*	*A*	*A*	*A*	*F*	*F*	*A*	*A*	*A*	*A*	*B*	*B*	*B*	*B*
Southbound Thru	-	-	-	-	*A*	*D*	-	-	-	-	*B*	*A*	*B*	*B*
Southbound Right	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Analysis results assume minor street stop controlled intersection

2 – Analysis results assume signal controlled intersection

Chalk Bluff Road (LCR-203) & S. Greeley Highway (US-85) (#4)

The unsignalized 'T'-intersection of Chalk Bluff Road and S. Greeley Highway (#4) currently operates with stop control on the westbound Chalk Bluff Road approach. **Table 4** provides the results of the operational analysis conducted at this intersection. Under the existing conditions, the intersection movements operate acceptably at LOS A during both peak hours. Under the projected 2027 background traffic volumes, the intersection movements are anticipated to continue to operate at an acceptable overall level of service.

Upon buildout of the project, construction of a west leg of the intersection is proposed. This west leg would serve as the north S. Greeley Highway access. With the addition of peak construction traffic volumes in 2027, this intersection may experience traffic volumes that warrant the installation of a traffic signal. Traffic signal warrant worksheets are included in **Appendix G**. Along with the installation of a traffic signal, the 2027 peak construction traffic volumes may warrant three northbound through lanes and two southbound through lanes, as well as a single northbound left turn lane, three eastbound left turn lanes, and a single shared eastbound through/right turn lane. Assuming these intersection improvements are implemented, the intersection may operate at an acceptable overall LOS B during the morning peak hour. However, the intersection may experience an unacceptable overall LOS F during the afternoon peak hour. If the afternoon volumes are realized, the intersection may need a fourth northbound through lane to operate acceptably.

For comparative purposes, intersection analyses were also conducted for the operational phase of the proposed project. These analyses were conducted without consideration of the recommended improvements developed based on the 2027 peak construction phase traffic volumes.

Under the 2030 background traffic volumes, the intersection movements are anticipated to operate at an acceptable LOS B or better, during both peak hours. The intersection movements are anticipated to continue to operate at acceptable levels of service, during both peak hours in 2030, with the addition of operational phase project traffic. Therefore, no project specific improvements or modifications are expected to be necessary at this intersection based on the 2030 short-term horizon operational analysis.

Similarly, under the 2050 background traffic volumes the intersection movements are anticipated to operate at an acceptable LOS B or better, during both peak hours. The intersection movements are anticipated to continue to operate at acceptable levels of service, during both peak hours in 2050, with the addition of operational phase project traffic. Therefore, no project specific improvements or modifications are expected to be necessary at this intersection based on the 2050 long-term horizon operational analysis.

Table 5 – Chalk Bluff Road (LCR-203) & S. Greeley Highway (US-85) (#4) LOS Results

Intersection/ Critical Movement	2025 Existing (1)		2027 BG (1)		2027 Total (2)		2030 BG (1)		2030 Total (1)		2050 BG (1)		2050 Total (1)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Overall	**-**	**-**	**-**	**-**	**B**	**F**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Eastbound App.	-	-	-	-	-	F	-	-	-	-	-	-	-	-
Eastbound Left	-	-	-	-	-	*F*	-	-	-	-	-	-	-	-
Eastbound Thru	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eastbound Right	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Westbound App.	A	A	B	B	F	E	A	A	B	B	B	B	C	B
Westbound Left	-	-	-	-	*F*	*F*	-	-	-	-	-	-	-	-
Westbound Thru	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Westbound Right	-	-	-	-	*F*	*E*	-	-	-	-	-	-	-	-
Northbound App.	-	-	-	-	A	F	-	-	-	-	-	-	-	-
Northbound Left	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northbound Thru	-	-	-	-	*A*	*F*	-	-	-	-	-	-	-	-
Northbound Right	-	-	-	-	*A*	*A*	-	-	-	-	-	-	-	-
Southbound App.	-	-	-	-	A	D	-	-	-	-	-	-	-	-
Southbound Left	*A*	*A*	*A*	*A*	*E*	*F*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Southbound Thru	-	-	-	-	*A*	*A*	-	-	-	-	-	-	-	-
Southbound Right	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Analysis results assume minor street stop controlled intersection

2 – Analysis results assume signal controlled intersection

Project Accesses

With completion of the project, four distinct access points are proposed along the existing public roadways surrounding the site. These access points include one proposed full movement access along the south side of Terry Ranch Road and three proposed full movement accesses along the west side of S. Greeley Highway. The north proposed access along S. Greeley Highway is located at the existing intersection with Chalk Bluff Road and its operational performance is discussed in the previous section of this study. The recommended intersection improvements based on construction phase traffic at the remaining three proposed access points are as follows:

- Terry Ranch Road (WY-223) Access (#2)
    - Construct a Traffic Signal
        - This signal could be temporary, as it is not warranted for the operational phase traffic, but is necessary for the construction phase traffic
    - Widen Terry Ranch Road to two eastbound and two westbound through lanes, east of the access
    - Widen Terry Ranch Road to two westbound through lanes that merge into one, west of the access
    - Construct a single channelized, free-flow, eastbound right turn lane
    - Construct the access (south leg of intersection) with two northbound left turn lanes and one north leg right turn lane

- S. Greeley Highway (US-85) Center Access (#5)
    - Construct a Traffic Signal
        - This signal could be temporary, as it is not warranted for the operational phase traffic, but is necessary for the construction phase traffic
    - Widen S. Greeley Highway to two northbound and two southbound through lanes, south of the center access
    - Widen S. Greeley Highway to three northbound and three southbound through lanes, north of center access
    - Construct a single northbound left turn lane
    - Construct two channelized, free-flow, southbound right turn lanes
    - Construct the access (west leg of intersection) with three eastbound left turn lanes and two eastbound right turn lanes

- S. Greeley Highway (US-85) South Access (#6)
    - Construct a Traffic Signal
        - This signal could be temporary, as it is not warranted for the operational phase traffic, but is necessary for the construction phase traffic
    - Widen S. Greeley Highway to two northbound and two southbound through lanes, north of south access
    - Widen S. Greeley Highway to two southbound through lanes that merge into one southbound through lane, south of south access
    - Construct a single northbound left turn lane
    - Construct a single channelized, free-flow, southbound right turn lane
    - Construct the access (west leg of intersection) with two eastbound left turn lanes and one eastbound right turn lane

If the projected 2027 peak construction phase traffic volumes are realized, and the recommended improvements summarized above are implemented, the project access intersections are anticipated to operate at an overall LOS D or better during both peak hours of the construction phase. **Table 6** provides the level of service results of the operational analysis for the 2027 peak construction phase traffic volumes.

While the 2027 peak construction phase traffic volumes may warrant significant intersection improvements, the peak construction phase traffic volumes are only anticipated to be experienced temporarily, when construction operations for both sites overlap. For comparative purposes, intersection analyses were also conducted for the operational phase of the proposed project. These analyses were conducted without consideration of the recommended improvements developed based on the 2027 peak construction phase traffic volumes. The recommended intersection improvements based on the operational phase traffic at the proposed access points are as follows:

- Terry Ranch Road (WY-223) Access (#2)
    - Operate with minor stop control, install stop sign on northbound approach
    - Construct a single eastbound right turn lane
    - Construct a single westbound left turn lane
    - Construct the access (south leg of intersection) with a single shared northbound left tun/right turn lane

- S. Greeley Highway (US-85) Center Access (#5)
    - Operate with minor stop control, install a stop sign on the eastbound approach
    - Construct a single northbound left turn lane
    - Construct a single southbound right turn lane
    - Construct the access (west leg of intersection) with a single shared eastbound left turn/right turn lane

- S. Greeley Highway (US-85) South Access (#6)
    - Operate with minor stop control, install a stop sign on the eastbound approach
    - Construct a single northbound left turn lane
    - Construct a single southbound right turn lane
    - Construct the access (west leg of intersection) with a single shared eastbound left turn/right turn lane

Assuming the intersection improvements detailed above are implemented, the project access intersection movements are anticipated to operate at an acceptable LOS C or better through the 2050 long-term horizon, with the addition of operational phase project traffic. **Table 6** provides the level of service results of the operational analysis for the operational phase 2030 short-term and 2050 long-term horizon traffic volumes.

Table 6 – Project Access Level of Service Results

Intersection	2027 Construction (1)		2026 Total (2)		2050 Total (2)	
	AM	PM	AM	PM	AM	PM
Terry Ranch Rd Access (#2)						
Overall	A	C	-	-	-	-
Eastbound Through	A	A	-	-	-	-
Eastbound Right	-	-	-	-	-	-
Westbound Left	-	C	A	A	A	A
Westbound Through	-	-	-	-	-	-
Northbound Approach	-	D	A	B	A	B
S. Greeley Hwy Center Access (#5)						
Overall	C	D	-	-	-	-
Eastbound Approach	-	D	B	B	C	B
Northbound Left	D	C	A	A	A	A
Northbound Through	A	E	-	-	-	-
Southbound Through	B	C	-	-	-	-
Southbound Right	-	-	-	-	-	-
S. Greeley Hwy South Access (#6)						
Overall	A	B	-	-	-	-
Eastbound Approach	-	C	A	B	B	C
Northbound Left	A	C	A	A	A	A
Northbound Through	A	A	-	-	-	-
Southbound Through	A	B	-	-	-	-
Southbound Right	-	-	-	-	-	-

1 - Analysis results assume signal controlled intersection

2 – Analysis results assume minor street stop controlled intersection

5.1 Auxiliary Turn Lane Requirements & Turn Lane Queueing Analysis

The need for auxiliary turn lanes was determined based on the criteria defined in the WYDOT Traffic Studies Manual, dated March 2011. The recommended turn lane lengths were calculated based on the methodology defined in the AASHTO Green Book, dated 2018, 7th Edition. Based on Table 9-20 of the AASHTO Green Book, auxiliary turn lanes along facilities with a posted speed limit of 55 mph should provide 505 feet of deceleration distance, which typical include full lane width and taper. For 65 mph facilities, 700 feet of deceleration distance should be provided. In both cases, the appropriate storage length should be added to the full width turn lane length. Taper lane calculations were based on a taper rate of 15:1, and an assumed lane width of 12 feet.

A vehicle queuing analysis was conducted for the study area intersections. The queuing analysis was performed using Synchro presenting the results of the 95th percentile queue lengths. All queues are anticipated to remain within the existing or recommended turn lane lengths through 2050. Results are shown in the following **Table 7** with calculations provided within the level of service operational sheets of **Appendix E** for unsignalized intersections and **Appendix F** for signalized intersections.

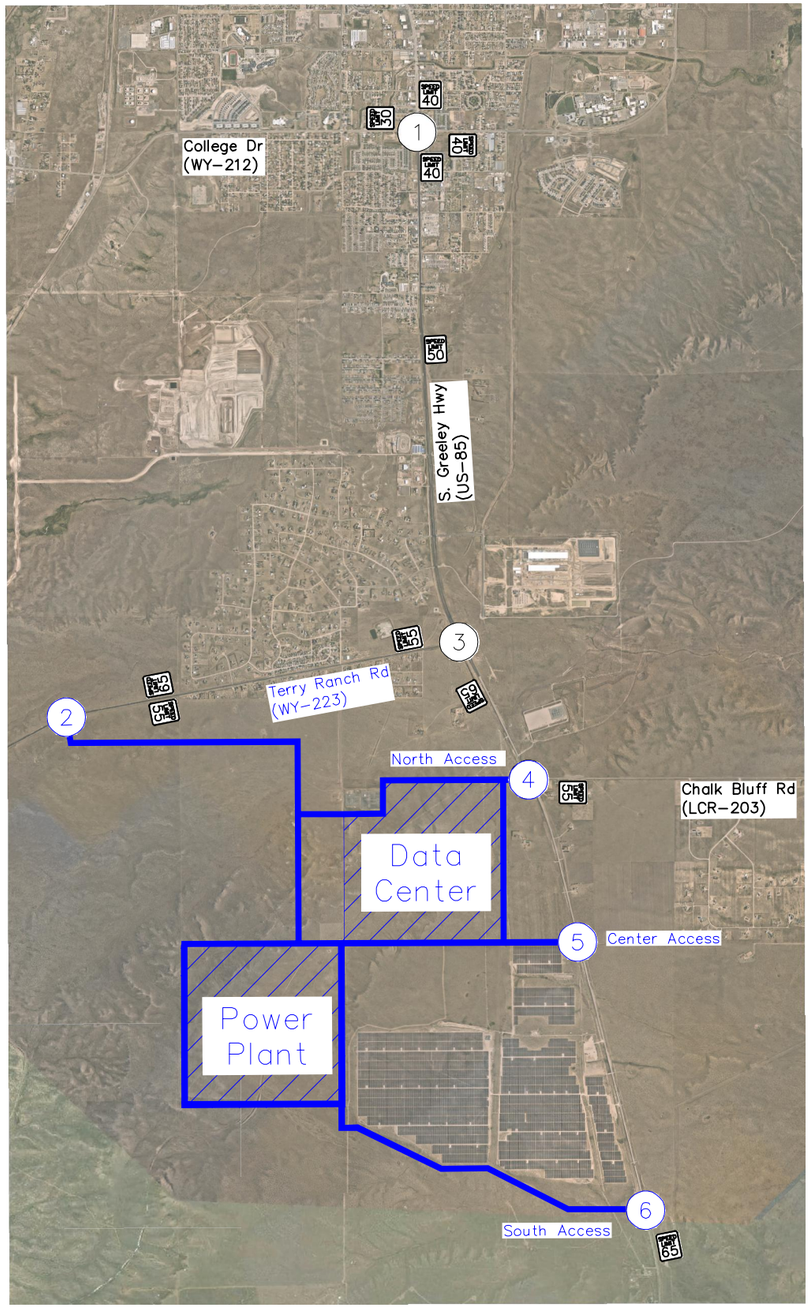
5.2 Improvement Summary

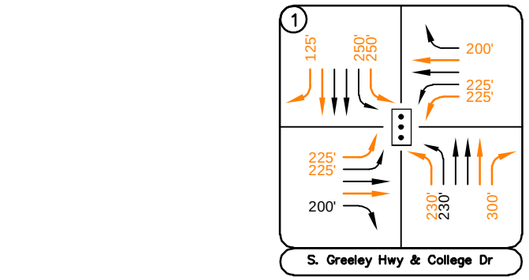
Based on the results of the intersection operational and vehicle queuing analysis, the study intersection recommended improvements and control are shown in **Figure 13** for the 2027 peak construction phase horizon. The recommended improvements for the 2030 short-term horizon and 2050 long-term horizon are shown in **Figure 14** and **Figure 15** and fi, respectively.

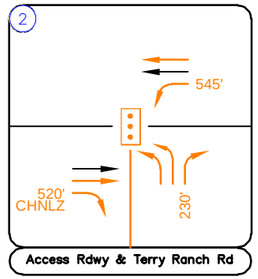
Table 7 – Turn Lane Queuing Analysis Results

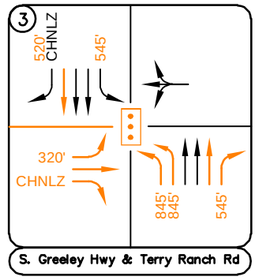
Intersection Turn Lane	Existing Turn Lane Length	2030 Calculated Queue AM/PM	2030 Recommended Length	2050 Calculated Queue AM/PM	2050 Recommended Length
College Dr & S. Greeley Hwy (#1)					
Eastbound Left	200’	97’/152’	200’	117’/57’	**200’ DL**
Eastbound Right	200’	47’/25’	200’	419’/-	**200’**
Westbound Left	150’	121’/181’	**200’**	336’/83’	**350’ DL**
Westbound Right	150’	26’/25’	150’	102’/320’	**350’**
Northbound Left	230’	59’/165’	230’	107’/25’	**230’ DL**
Northbound Right	DNE	31’/35’	**230’**	103’/25’	**230’**
Southbound Left	90’	57’/124’	**125’**	75’/62’	**125’ DL**
Southbound Right	DNE	-/-	-	23’/33’	**125’**
Terry Ranch Rd Access (#2)					
Eastbound Right	DNE	25’/25’	**545’ + 180’ T**	25’/25’	**545’ + 180’ T**
Westbound Left	DNE	25’/25’	**545’ + 180’ T**	25’/25’	**545’ + 180’ T**
Terry Ranch Rd & S. Greely Hwy (#3)					
Eastbound Left	DNE	-/-	-	95’/170’	**500’ + 180’ T**
Eastbound Right	DNE	-/-	-	-/157’	**500’ + 180’ T**
Westbound Left	DNE	-/-	-	30’/278’	**300’**
Westbound Right	DNE	-/-	-	25’/103’	**125’**
Northbound Left	100’	25’/25’	-	25’/230’	**750’ + 180’T**
Northbound Right	280’	-/-	**545’ + 180’ T**	25’/751’	**545’ + 180’ T**
Southbound Left	270’	25’/25’	-	286’/314’	**850’ + 180’ T**
Southbound Right	420’	-/-	**545’ + 180’ T**	25’/136’	**675’ + 180’ T**
Chalk Bluff Rd & S. Greeley Hwy (#4)					
Southbound Left	240’	25’/25’	**545’ + 180’ T**	25’/25’	**545’ + 180’ T**
S. Greeley Hwy Center Access (#5)					
Northbound Left	DNE	25’/25’	**545’ + 180’ T**	25’/25’	**545’ + 180’ T**
Southbound Right	DNE	25’/25’	**545’ + 180’ T**	25’/25’	**545’ + 180’ T**
S. Greeley Hwy South Access (#6)					
Northbound Left	DNE	25’/25’	**545’ + 180’ T**	25’/25’	**545’ + 180’ T**
Southbound Right	DNE	25’/25’	**545’ + 180’ T**	25’/25’	**545’ + 180’ T**

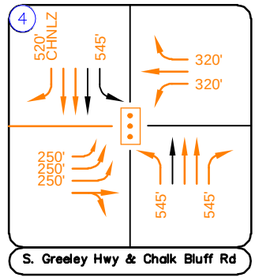
DNE = Does Not Exist; **Blue** Text = Recommended Improvement

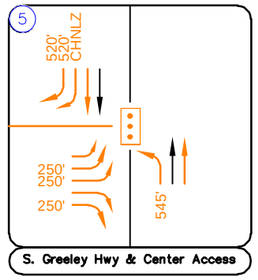


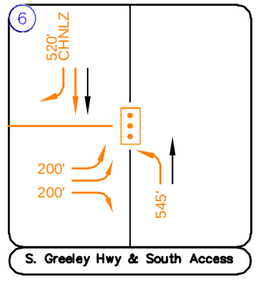


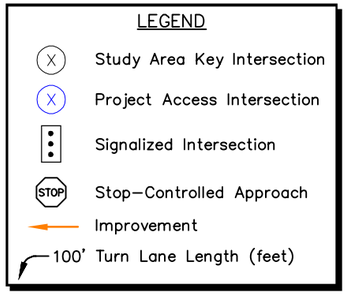








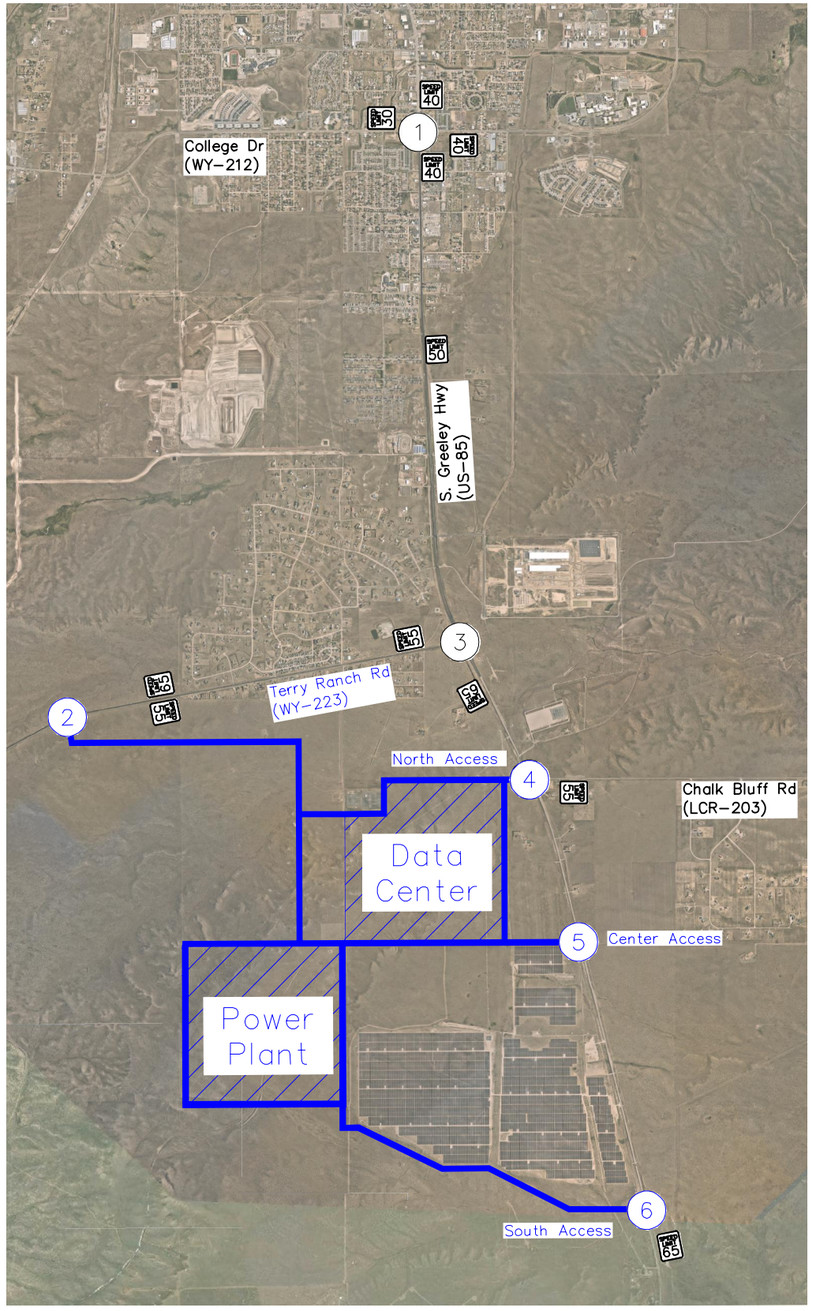


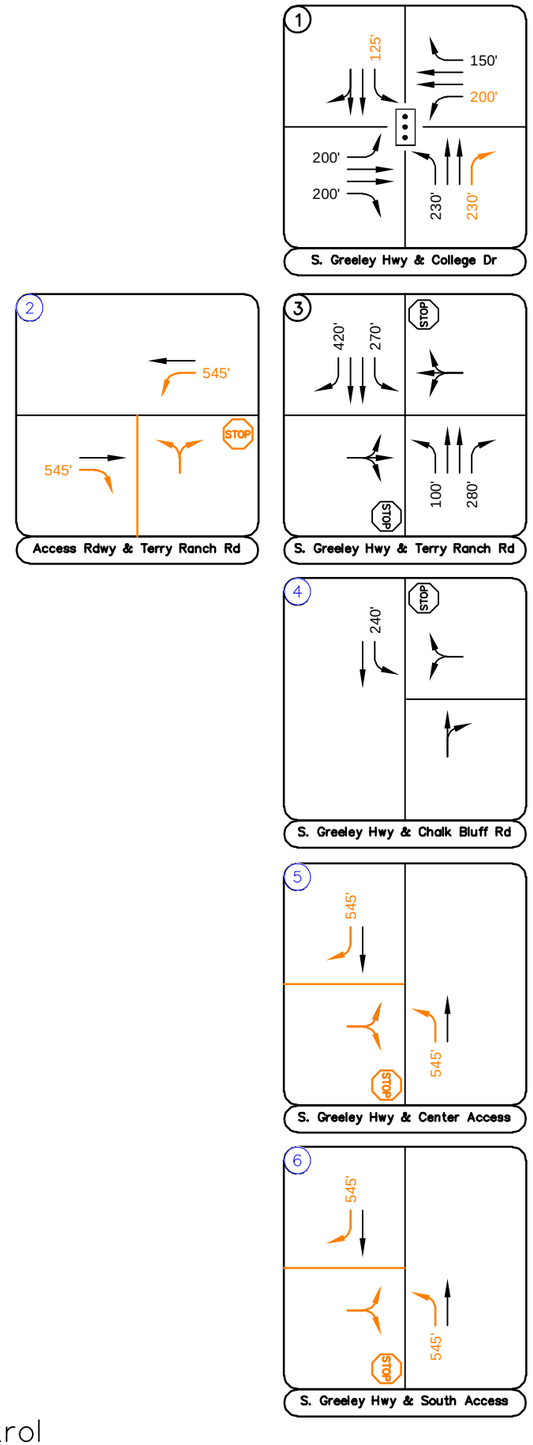


Kimley»Horn NORTH
NTS 296012011/296242001

FIGURE 13
Switchgrass Industrial Park
Laramie County, Wyoming
2027 (Construction Phase) Recommended Intersection Geometry & Control

Kimley»Horn





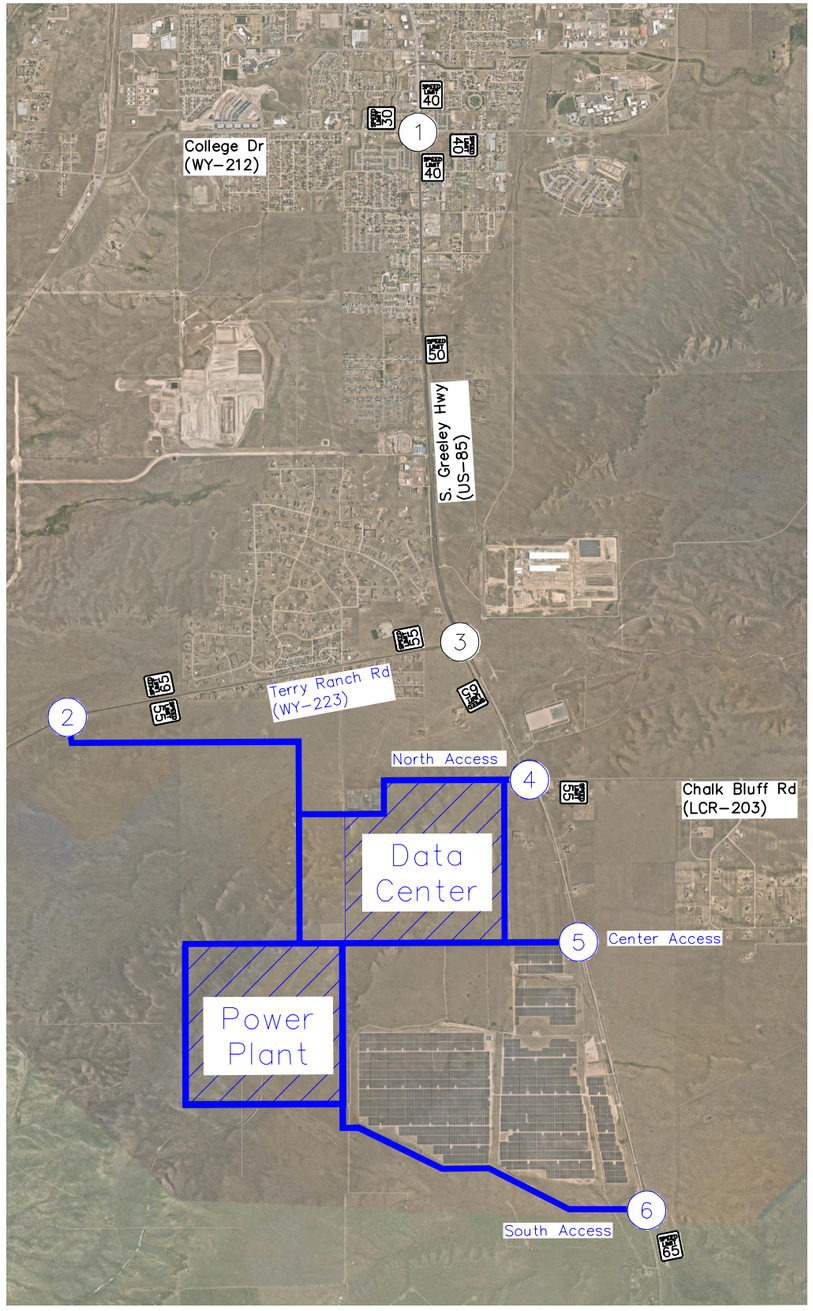
LEGEND

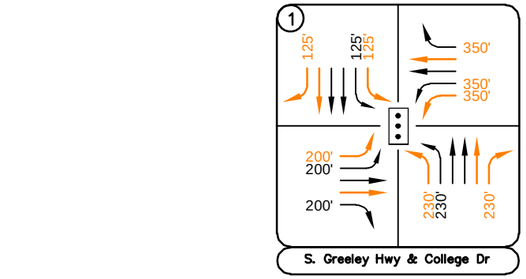
- Study Area Key Intersection
- Project Access Intersection
- Signalized Intersection
- Stop–Controlled Approach
- Improvement
- 100' Turn Lane Length (feet)

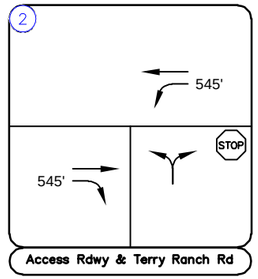
Kimley»Horn NORTH
NTS 296012011/296242001

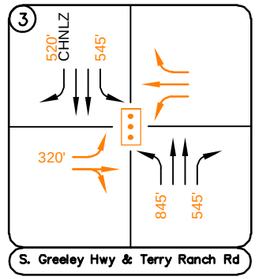
Kimley»Horn

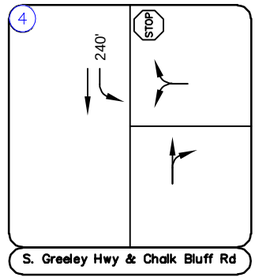
FIGURE 14
Switchgrass Industrial Park
Laramie County, Wyoming
2030 (Operational Phase) Recommended Intersection Geometry & Control

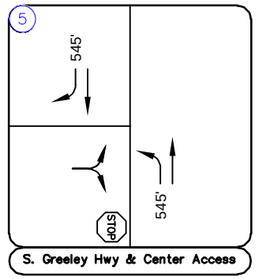


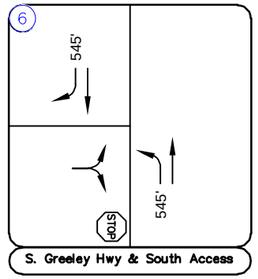


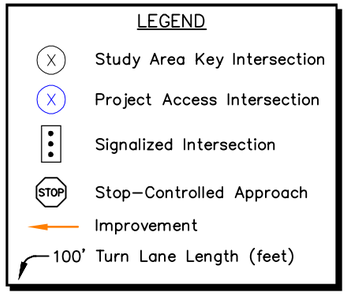












Kimley»Horn NORTH
NTS 296012011/296242001

FIGURE 15
Switchgrass Industrial Park
Laramie County, Wyoming
2050 (Operational Phase) Recommended Intersection Geometry & Control

Kimley»Horn

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis presented in this report, Kimley-Horn believes the proposed Switchgrass Industrial Park will be successfully incorporated into the existing and future roadway network. Analysis of the existing street network, the proposed project development, and expected traffic volumes resulted in the following recommendations:

2027 Peak Construction Phase Project Specific Recommendations:

- The following project specific improvements were developed based on the projected 2027 peak construction phase traffic volumes. It should be noted that these peak construction volumes are representative of a temporary condition during which the construction of the proposed data center and the construction of the proposed power plant are occurring at the same time. It is expected that construction related traffic volumes will gradually increase to the peak condition, and then gradually decrease, between the start of construction and completion of construction, which is anticipated to be by 2030. It should also be noted that these traffic volumes assume each construction worker arriving on-site will be generating a single vehicle trip and no carpooling or bussing will be utilized. Considering these assumptions, the recommendations developed based on the 2027 peak construction phase traffic volumes should be considered conservative. Furthermore, if carpooling or bussing strategies are implemented, the scale of necessary improvements may be reduced.

- With completion of the project, four distinct access points are proposed along the existing public roadways surrounding the site. These access points include one proposed full movement access along the south side of Terry Ranch Road and three proposed full movement accesses along the west side of S. Greeley Highway. The north proposed access along S. Greeley Highway is located at the existing intersection of Chalk Bluff Road (LCR-203) and S. Greeley Highway. The recommended intersection improvements based on the construction phase traffic at the four proposed access points are as follows:

- Terry Ranch Road (WY-223) Access (#2)
    - Construct a Traffic Signal
    - Widen Terry Ranch Road to two eastbound and two westbound through lanes, east of the access
    - Widen Terry Ranch Road to two westbound through lanes that merge into one westbound through lane, west of the access
    - Construct a single channelized, free-flow, eastbound right turn lane
    - Construct the access (south leg of intersection) with two northbound left turn lanes and one north leg right turn lane

- Chalk Bluff Road (LCR-203) & S. Greeley Highway (US-85) (#4)
    - Construct a Traffic Signal
    - Widen S. Greeley Highway to three northbound and three southbound through lanes, north and south of Chalk Bluff Road
    - Construct a single northbound left turn lane
    - Construct a single channelized, free-flow, southbound right turn lane
    - Construct the access (west leg of intersection) with three eastbound left turn lanes and a single eastbound shared through/right turn lane
    - Construct a single westbound left turn lane
    - Construct a single westbound right turn lane
    - Extend existing turn lanes as necessary due to intersection widening for other improvements listed above

- S. Greeley Highway (US-85) Center Access (#5)
    - Construct a Traffic Signal
    - Widen S. Greeley Highway to two northbound and two southbound through lanes, south of center access
    - Widen S. Greeley Highway to three northbound and three southbound through lanes, north of center access
    - Construct a single northbound left turn lane
    - Construct two channelized, free-flow, southbound right turn lanes
    - Construct the access (west leg of intersection) with three eastbound left turn lanes and two eastbound right turn lanes

- S. Greeley Highway (US-85) South Access (#6)
    - Construct a Traffic Signal
    - Widen S. Greeley Highway to two northbound and two southbound through lanes, north of south access
    - Widen S. Greeley Highway to two southbound through lanes that merge into one southbound through lane, south of south access
    - Construct a single northbound left turn lane
    - Construct a single channelized, free-flow, southbound right turn lane
    - Construct the access (west leg of intersection) with two eastbound left turn lanes and one eastbound right turn lane

- The recommended intersection improvements based on the construction phase traffic at the intersection of Terry Ranch Road (WY-223) and S. Greeley Highway (US-85) are as follows:
    - Construct a Traffic Signal
    - Widen S. Greeley Highway to three northbound through lanes and three southbound through lanes, north and south of Terry Ranch Road
    - Widen Terry Ranch Road to two eastbound through lanes and two westbound through lanes, west of S. Greeley Highway
    - Construct dual northbound left turn lanes
    - Construct a single eastbound left turn lane
    - Construct a single channelized, free-flow, eastbound right turn lane, with a southbound acceleration lane
    - Extend existing turn lanes as necessary due to intersection widening for other improvements listed above

- Based on the forecasted 2027 peak construction traffic volumes, the intersection of College Drive (WY-212) and S. Greeley Highway (US-85) may experience traffic volumes that exceed the potential capacity for the intersection. The following improvements are seen as the maximum potential buildout for the intersection. However, it should be noted that even with these significant improvements, the intersection may experience failing overall levels of service.
    - Widen S. Greeley Highway to three northbound through lanes and three southbound through lanes, north and south of College Drive
    - Widen College Drive to two eastbound through lanes and two westbound through lanes, east and west of College Drive
    - Construct dual left turn lanes on all four approaches
    - Construct a single right turn lane on all four approaches

2030 Operational Phase Buildout (Short-Term) Horizon Specific Recommendations:

- The following project specific improvements were developed based on the anticipated 2030 short-term horizon traffic volumes. The recommendations do not take into consideration recommendations developed for the 2027 peak construction phase traffic volumes. If the recommended improvements developed based on the 2027 peak construction phase traffic volumes are implemented, no additional operational improvements are anticipated to be necessary as the 2027 traffic volumes are forecasted to be significantly larger than the 2030 traffic volumes, and therefore the construction phase improvements would provide excess capacity for the operational phase traffic volumes.

- With completion of the project, four distinct access points are proposed along the existing public roadways surrounding the site. These access points include one proposed full movement access along the south side of Terry Ranch Road and three proposed full movement accesses along the west side of S. Greeley Highway. The north proposed access along S. Greeley Highway is located at the existing intersection of Chalk Bluff Road (LCR-203) and S. Greeley Highway. This access is only anticipated to be utilized during construction; therefore, recommendations for improvements during the operational phase of the proposed project were not developed for this intersection. The recommended intersection improvements based on the operational phase traffic at the remaining three proposed access points are as follows:

- Terry Ranch Road (WY-223) Access (#2)
    - Operate with minor stop control, install stop sign on northbound approach
    - Construct a single eastbound right turn lane
    - Construct a single westbound left turn lane
    - Construct the access (south leg of intersection) with a single shared northbound left tun/right turn lane

- S. Greeley Highway (US-85) Center Access (#5)
    - Operate with minor stop control, install a stop sign on the eastbound approach
    - Construct a single northbound left turn lane
    - Construct a single southbound right turn lane
    - Construct the access (west leg of intersection) with a single shared eastbound left turn/right turn lane

- S. Greeley Highway (US-85) South Access (#6)
    - Operate with minor stop control, install a stop sign on the eastbound approach
    - Construct a single northbound left turn lane
    - Construct a single southbound right turn lane
    - Construct the access (west leg of intersection) with a single shared eastbound left turn/right turn lane

- Based on the forecasted 2030 traffic volumes, the intersection of College Drive (WY-212) and S. Greeley Highway (US-85) is anticipated to operate at a failing overall level of service during the afternoon peak hour, prior to the addition of project traffic. The failing overall level of service is anticipated to improve to an acceptable overall LOS D with the construction of a northbound right turn lane. However, the eastbound and westbound left turn movements are still anticipated to experience failing operations. To provide an acceptable level of service for each intersection movement, dual eastbound and westbound left turn lanes would also need to be constructed. Assuming a northbound right turn lane is constructed, this intersection is anticipated to continue to operate at an acceptable overall level of service through 2030, with the addition of operational project traffic. Therefore, no project specific improvements or modifications are expected to be necessary at this intersection based on the addition of project traffic.

2050 Planning (Long-Term) Horizon Non-Project Specific Recommendations:

- The following non-project specific improvements were developed based on the anticipated 2050 long-term horizon traffic volumes. The recommendations do not take into consideration recommendations developed for the 2027 peak construction phase traffic volumes. If the recommended improvements developed based on the 2027 peak construction phase traffic volumes are implemented.

- If the projected 2050 background traffic volumes are arrived at, the intersection of Terry Ranch Road (WY-223) and S. Greeley Highway (US-85) may experience traffic volumes that warrant the installation of a traffic signal. Along with the installation of a traffic signal, the 2050 traffic volumes may warrant two northbound and southbound through lanes, as well as a single eastbound left turn lane. Assuming these intersection improvements are implemented, the intersection may operate at an acceptable overall level of service during both peak hours, both prior to the addition of operational phase project traffic and with the addition of operational phase project traffic.

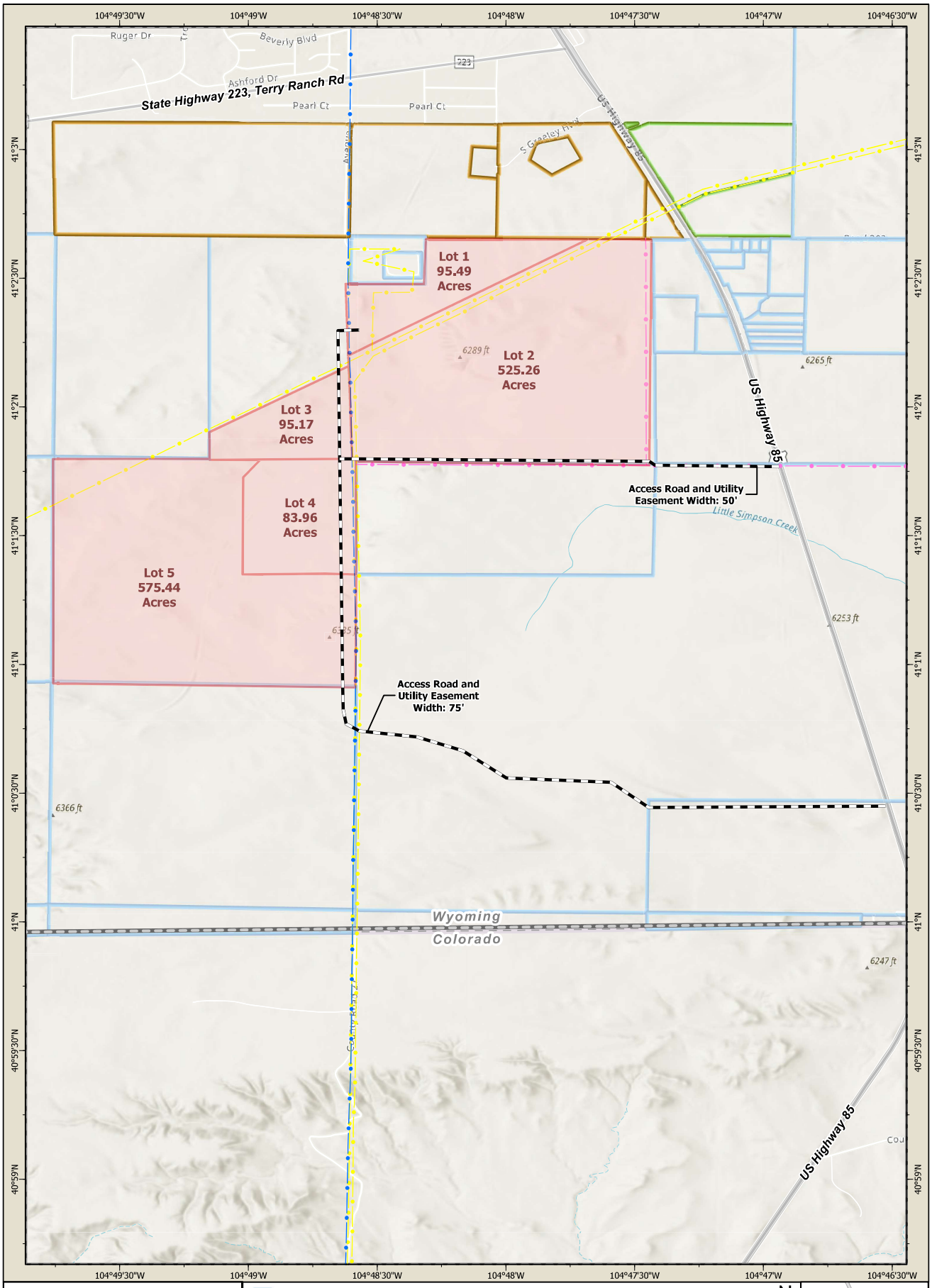
- If the projected 2050 background traffic volumes are arrived at, the intersection of College Drive (WY-212) and S. Greeley Highway (US-85) may experience a traffic demand that exceeds the potential capacity for the intersection. Considering the available right of way at the intersection an intersection configuration featuring three through lanes along S. Greeley Highway, two through lanes along College Drive, as well as dual left turn lanes and single right turn lanes on all four approaches was assumed to be the ultimate potential buildout of this intersection. Assuming these improvements are implemented, and the forecasted 2050 traffic volumes are arrived at, this intersection may still experience failing overall levels of service, both prior to and with the addition of project traffic. Therefore, in addition to the construction of additional through and turn lanes at this intersection, it is recommended that WYDOT, in partnership with Laramie County and the City of Cheyenne, including the Cheyenne MPO, explore opportunities for adjacent north/south arterials that could be used as alternative routes by drivers in the area; thereby alleviating, or at least reducing, the traffic demand at the intersection of College Drive and S. Greeley Highway.

General Recommendations:

- It is anticipated that an approved WYDOT Access Permit will be required for each of the four proposed project accesses. Based on the WYDOT Access Manual, Applications for access permits will be accepted only from an individual, partnership, corporation, qualified agent, or other body recognized by law as owning all or the major interest in the property abutting the highway right of way or proposed highway. It is recommended that upon WYDOT's approval and acceptance of this traffic impact study, access permit applications are completed and submitted to WYDOT, in accordance with the WYDOT Access Manual.

- Any onsite or offsite improvements should be incorporated into the Civil Drawings and conform to standards of the Laramie County, WYDOT, and the Manual on Uniform Traffic Control Devices (MUTCD) – 11th Edition, 2023

Appendix A: Conceptual Site Plan

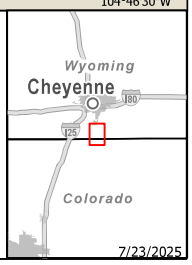


Proposed Switchgrass Industrial Park

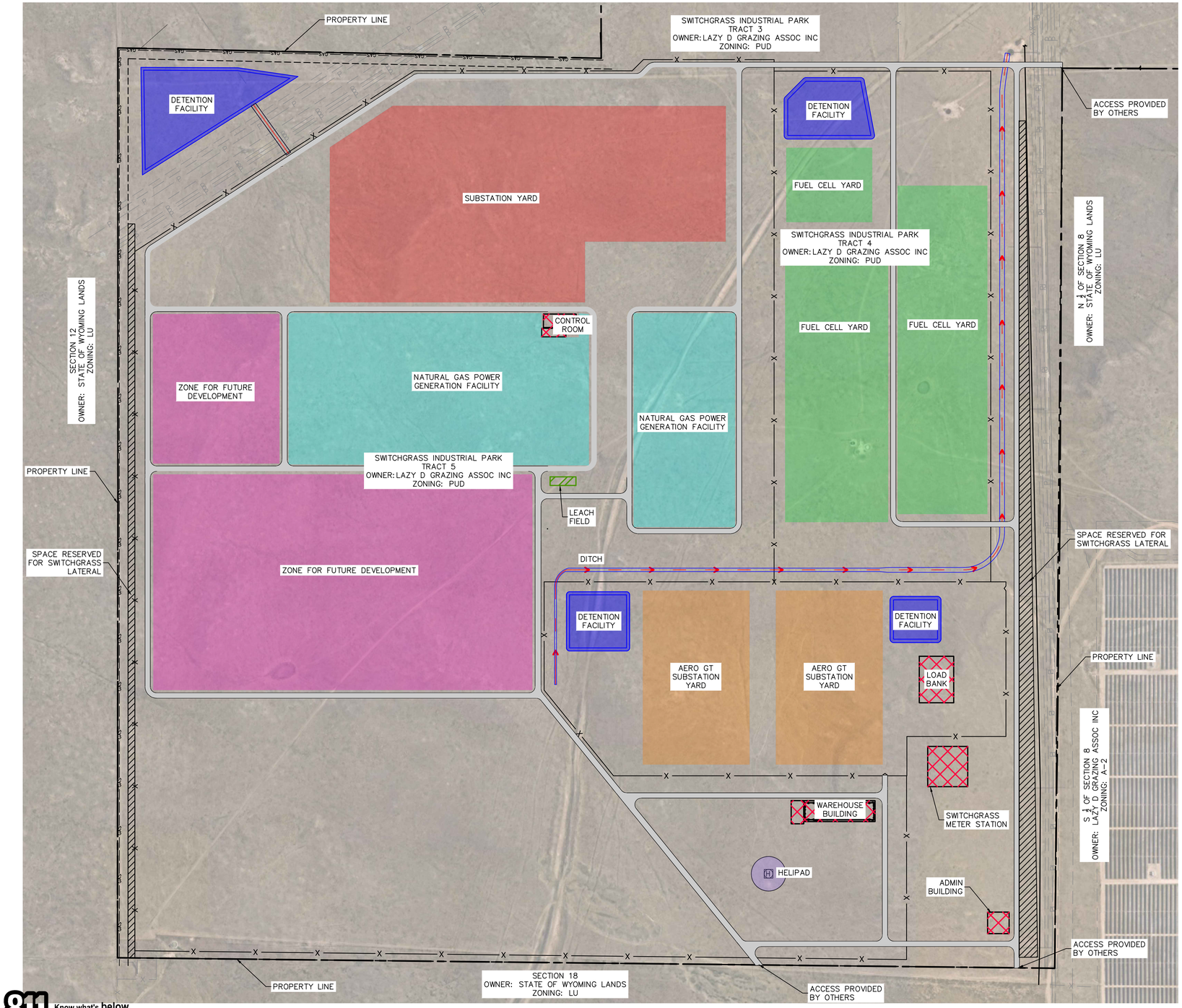
- Zone Land Use
- Annex City of Cheyenne
- Zone Ag 2
- Proposed Switchgrass Industrial Park (PUD)
- Proposed Access and Utility Road
- 230 kV Powerline
- 115/345 kV Powerline
- Proposed Powerline Easement

N

0 ¼ ½ 1 Mile



7/23/2025



LEGEND

- DETENTION FACILITY
- FUEL CELL YARD
- SUBSTATION YARD
- ZONE FOR FUTURE DEVELOPMENT
- NATURAL GAS POWER GENERATION FACILITY
- AERO GT SUBSTATION YARD
- HELIPAD
- STOCKPILE
- LEACH FIELD
- OTHER ITEMS
- PROPOSED ROAD
- DRAINAGE SWALE

NOTES

1. PER THE SWITCHGRASS INDUSTRIAL PARK PLANNED UNIT DEVELOPMENT RULES, ALL BUILDINGS SHALL BE SET BACK AT LEAST 25 FEET FROM ALL EXTERNAL PROPERTY LINES.
2. PER THE SWITCHGRASS INDUSTRIAL PARK PLANNED UNIT DEVELOPMENT RULES, THERE ARE NO HEIGHT LIMITATIONS IN THIS DISTRICT UNLESS OTHERWISE PROVIDED BY STATE OR FEDERAL LAW.

NORTH

GRAPHIC SCALE IN FEET
0 150 300 600

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

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2025 KIMLEY-HORN AND ASSOCIATES, INC.
6200 South Syracuse Way, Suite 300
Greenwood Village, Colorado 80111 (303) 228-2300

DESIGNED BY: CRM
DRAWN BY: CMS
CHECKED BY: SAL
DATE: 11/19/2025

BFC POWER AND CHEYENNE POWER HUB PROJECT
LARAMIE COUNTY, WYOMING
SITE PLAN
OVERALL SITE PLAN

NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
296242000

DRAWING NAME
OVERALL SITE PLAN.DWG

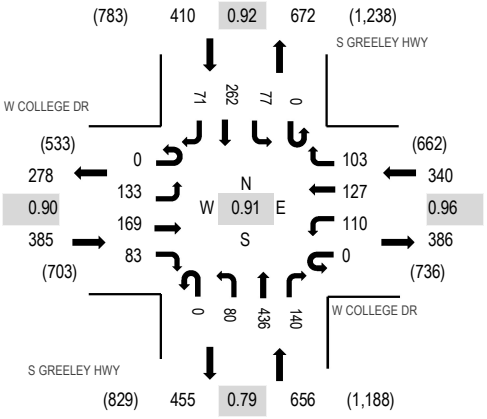
C:\ACCV\ACCDOCS\KIMLEY-HORN\296242000_LARAMIE COUNTY DATA CENTER\PROJECT FILES\CADD\PLANSHEETS\SITE PLAN\SITE PLAN - TALLGRASS

Appendix B: Intersection Count Sheets

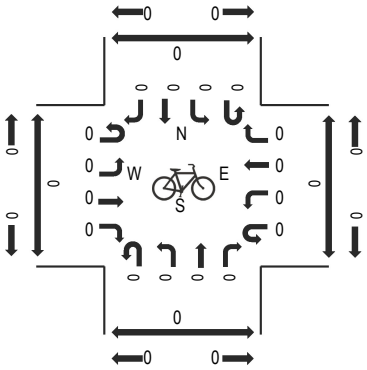
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 S GREELEY HWY & W COLLEGE DR AM
Date: Thursday, July 17, 2025
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

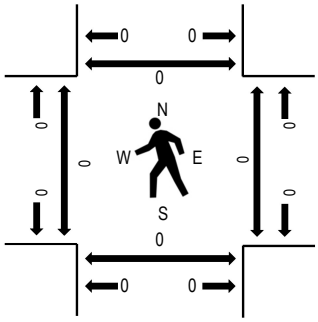
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

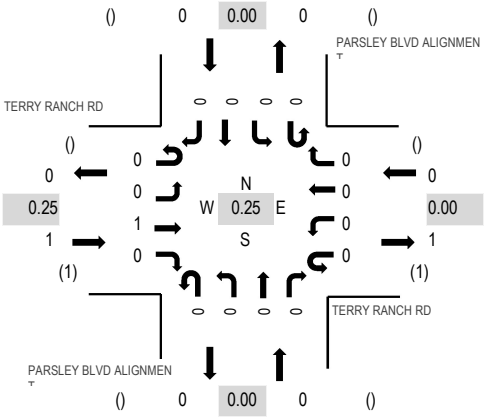
Traffic Counts - Motorized Vehicles

Interval Start Time	W COLLEGE DR Eastbound				W COLLEGE DR Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	21	34	13	0	29	24	21	0	13	74	23	0	13	60	11	336	1,666	0	0	0	0
7:15 AM	0	29	43	12	0	28	38	27	0	26	83	23	0	12	52	15	388	1,748	1	0	0	0
7:30 AM	0	39	45	23	0	25	41	29	0	21	99	39	0	14	58	19	452	1,791	0	0	0	0
7:45 AM	0	34	47	17	0	35	27	30	0	25	140	42	0	16	60	17	490	1,738	0	0	0	0
8:00 AM	0	28	39	21	0	25	34	25	0	10	93	24	0	21	78	20	418	1,670	0	0	0	0
8:15 AM	0	32	38	22	0	25	25	19	0	24	104	35	0	26	66	15	431		0	0	0	0
8:30 AM	0	27	36	20	0	19	23	28	0	22	90	33	0	29	57	15	399		0	0	0	0
8:45 AM	0	30	46	7	0	21	33	31	0	13	105	27	0	31	56	22	422		1	2	2	0
Count Total	0	240	328	135	0	207	245	210	0	154	788	246	0	162	487	134	3,336		2	2	2	0
Peak Hour	0	133	169	83	0	110	127	103	0	80	436	140	0	77	262	71	1,791		0	0	0	0

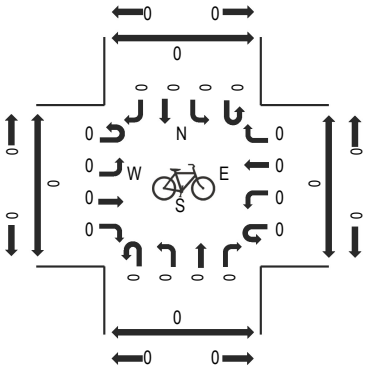
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 PARSLEY BLVD ALIGNMENT & TERRY RANCH RD AM
Date: Thursday, July 17, 2025
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

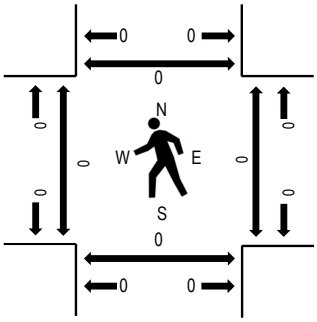
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

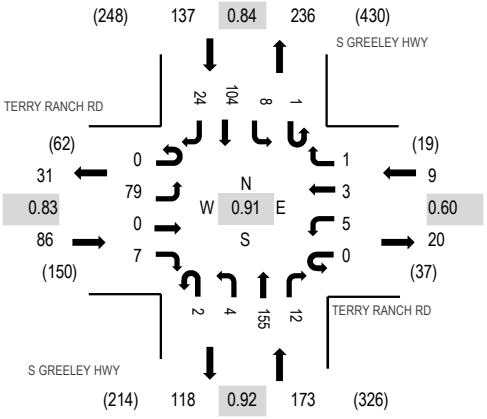
Traffic Counts - Motorized Vehicles

Interval Start Time	TERRY RANCH RD Eastbound				TERRY RANCH RD Westbound				PARSLEY BLVD ALIGNMENT Northbound				PARSLEY BLVD ALIGNMENT Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
Count Total	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0	0	0	0
Peak Hour	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0	0	0	0

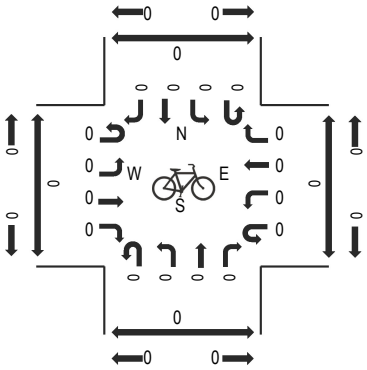
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 3 S GREELEY HWY & TERRY RANCH RD AM
Date: Thursday, July 17, 2025
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

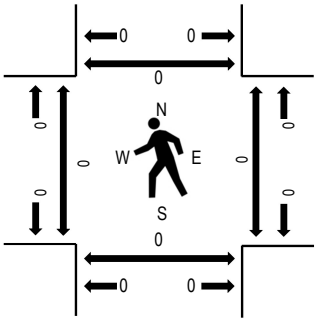
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

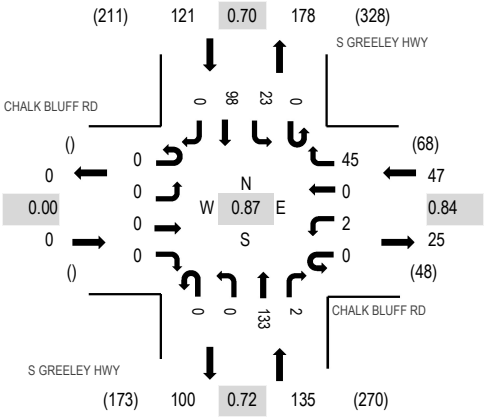
Traffic Counts - Motorized Vehicles

Interval Start Time	TERRY RANCH RD Eastbound				TERRY RANCH RD Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	17	0	2	0	2	1	0	0	2	34	2	0	6	15	6	87	366	0	0	0	0
7:15 AM	0	18	0	3	0	3	0	0	0	2	29	0	0	0	21	3	79	390	0	0	0	0
7:30 AM	0	24	0	3	0	0	0	0	0	0	47	0	0	2	22	2	100	405	0	0	0	0
7:45 AM	0	22	0	0	0	1	0	0	0	1	40	1	0	1	24	10	100	384	0	0	0	0
8:00 AM	0	18	0	2	0	2	2	1	2	2	37	3	1	3	34	4	111	377	0	0	0	0
8:15 AM	0	15	0	2	0	2	1	0	0	1	31	8	0	2	24	8	94		0	0	0	0
8:30 AM	0	13	1	1	0	3	0	0	0	2	27	2	0	2	21	7	79		0	0	0	0
8:45 AM	0	9	0	0	0	0	1	0	0	2	47	4	0	0	25	5	93		0	0	0	0
Count Total	0	136	1	13	0	13	5	1	2	12	292	20	1	16	186	45	743		0	0	0	0
Peak Hour	0	79	0	7	0	5	3	1	2	4	155	12	1	8	104	24	405		0	0	0	0

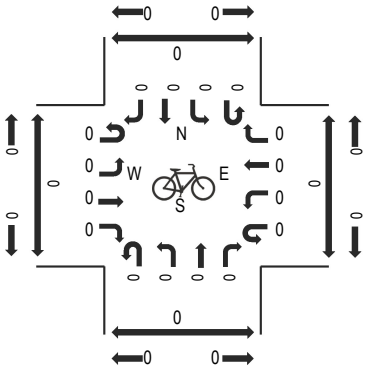
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 4 S GREELEY HWY & CHALK BLUFF RD AM
Date: Thursday, July 17, 2025
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

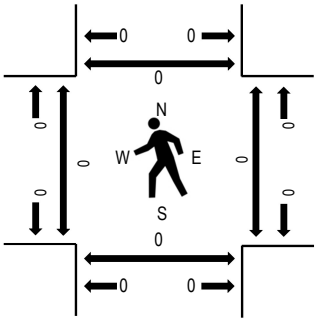
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

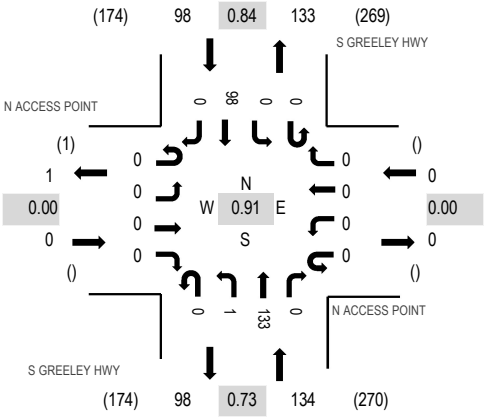
Traffic Counts - Motorized Vehicles

Interval Start Time	CHALK BLUFF RD Eastbound				CHALK BLUFF RD Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	0	0	0	1	0	6	0	0	31	0	0	2	13	0	53	262	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	4	0	0	26	0	0	7	19	0	56	296	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	12	0	0	41	0	0	6	24	0	83	303	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	14	0	0	34	0	0	2	20	0	70	279	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	9	0	0	33	2	0	11	32	0	87	287	0	0	0	0
8:15 AM	0	0	0	0	0	2	0	10	0	0	25	0	0	4	22	0	63		0	0	0	0
8:30 AM	0	0	0	0	0	1	0	5	0	0	26	4	0	5	18	0	59		0	0	0	0
8:45 AM	0	0	0	0	0	0	0	4	0	0	48	0	0	5	21	0	78		0	0	0	0
Count Total	0	0	0	0	0	4	0	64	0	0	264	6	0	42	169	0	549		0	0	0	0
Peak Hour	0	0	0	0	0	2	0	45	0	0	133	2	0	23	98	0	303		0	0	0	0

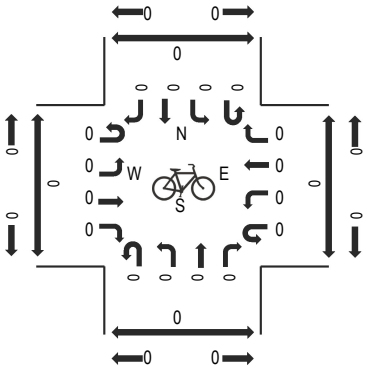
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 5 S GREELEY HWY & N ACCESS POINT AM
Date: Thursday, July 17, 2025
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

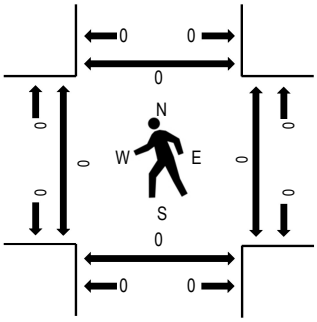
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

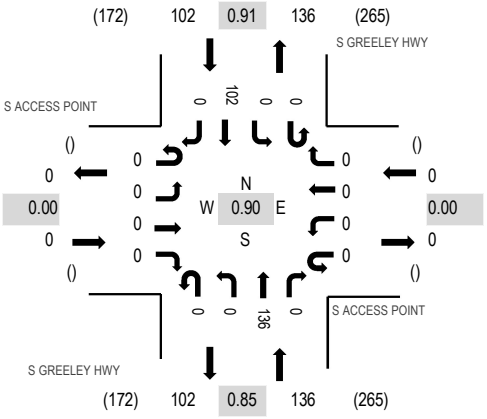
Traffic Counts - Motorized Vehicles

Interval Start Time	N ACCESS POINT Eastbound				N ACCESS POINT Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	0	0	0	0	0	0	0	0	32	0	0	0	17	0	49	215	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	28	0	0	0	20	0	48	227	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	1	40	0	0	0	23	0	64	232	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	34	0	0	0	20	0	54	216	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	32	0	0	0	29	0	61	229	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	27	0	0	0	26	0	53		0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	30	0	0	0	18	0	48		0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	46	0	0	0	21	0	67		0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	1	269	0	0	0	174	0	444		0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	1	133	0	0	0	98	0	232		0	0	0	0

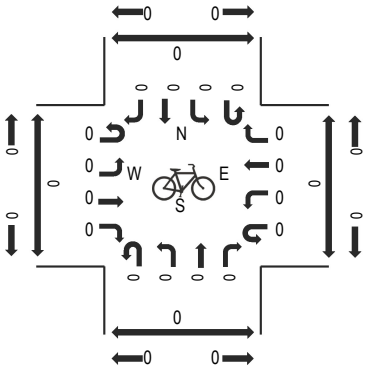
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 6 S GREELEY HWY & S ACCESS POINT AM
Date: Thursday, July 17, 2025
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

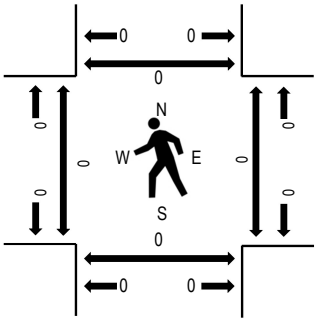
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

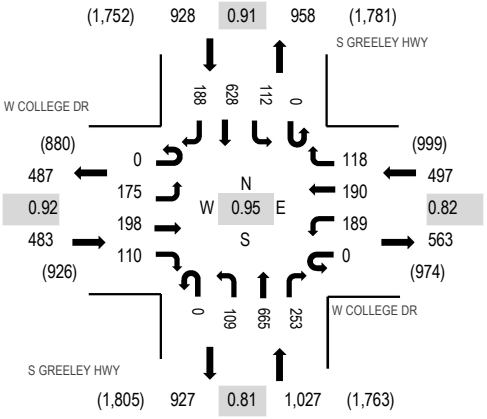
Traffic Counts - Motorized Vehicles

Interval Start Time	S ACCESS POINT Eastbound				S ACCESS POINT Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	0	0	0	0	0	0	0	0	30	0	0	0	18	0	48	212	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	27	0	0	0	15	0	42	222	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	40	0	0	0	26	0	66	238	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	35	0	0	0	21	0	56	214	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	30	0	0	0	28	0	58	225	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	31	0	0	0	27	0	58		0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	27	0	0	0	15	0	42		0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	45	0	0	0	22	0	67		0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	265	0	0	0	172	0	437		0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	136	0	0	0	102	0	238		0	0	0	0

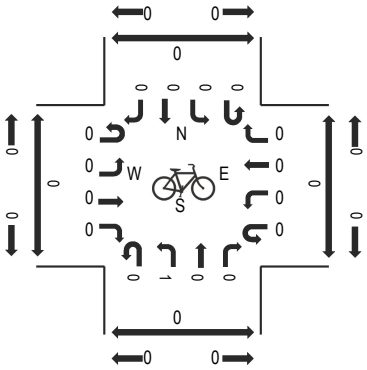
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 S GREELEY HWY & W COLLEGE DR PM
Date: Thursday, July 17, 2025
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 04:15 PM - 04:30 PM

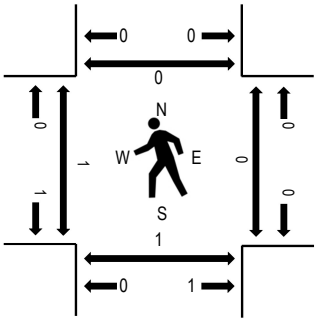
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

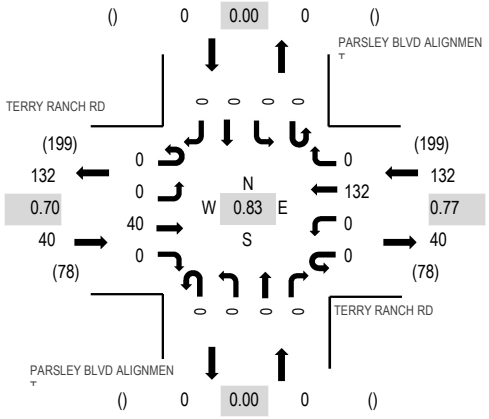
Traffic Counts - Motorized Vehicles

Interval Start Time	W COLLEGE DR Eastbound				W COLLEGE DR Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	32	36	28	0	52	52	52	0	23	133	37	0	23	136	30	634	2,876	0	0	0	0
4:15 PM	0	42	44	31	0	36	50	34	0	27	209	80	0	17	152	51	773	2,935	1	0	1	0
4:30 PM	0	43	48	13	0	49	38	29	0	22	188	82	0	25	179	45	761	2,860	0	0	0	0
4:45 PM	0	44	47	36	0	52	49	18	0	30	149	47	0	37	157	42	708	2,668	0	0	0	0
5:00 PM	0	46	59	30	0	52	53	37	0	30	119	44	0	33	140	50	693	2,564	0	0	0	0
5:15 PM	0	43	40	27	0	59	33	38	0	19	127	43	0	39	180	50	698		0	2	0	0
5:30 PM	0	47	42	34	0	38	42	26	0	16	125	28	0	19	126	26	569		0	0	0	0
5:45 PM	0	44	48	22	0	43	38	29	0	22	127	36	0	20	133	42	604		0	0	0	0
Count Total	0	341	364	221	0	381	355	263	0	189	1,177	397	0	213	1,203	336	5,440		1	2	1	0
Peak Hour	0	175	198	110	0	189	190	118	0	109	665	253	0	112	628	188	2,935		1	0	1	0

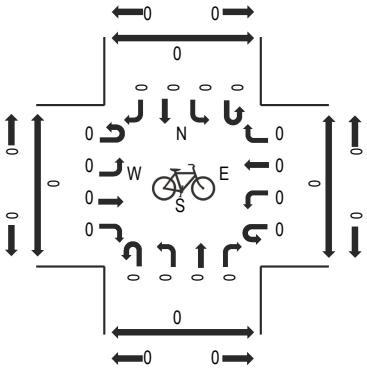
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 PARSLEY BLVD ALIGNMENT & TERRY RANCH RD PM
Date: Thursday, July 17, 2025
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:15 PM - 04:30 PM

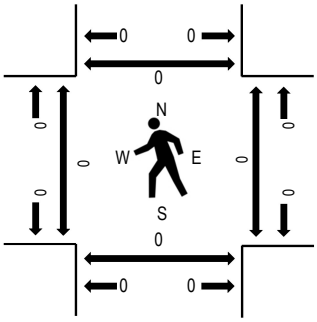
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

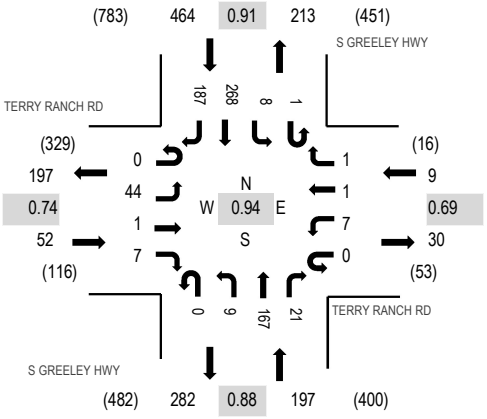
Traffic Counts - Motorized Vehicles

Interval Start Time	TERRY RANCH RD Eastbound				TERRY RANCH RD Westbound				PARSLEY BLVD ALIGNMENT Northbound				PARSLEY BLVD ALIGNMENT Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	8	0	0	0	27	0	0	0	0	0	0	0	0	0	35	172	0	0	0	0
4:15 PM	0	0	9	0	0	0	43	0	0	0	0	0	0	0	0	0	52	166	0	0	0	0
4:30 PM	0	0	15	0	0	0	34	0	0	0	0	0	0	0	0	0	49	143	0	0	0	0
4:45 PM	0	0	8	0	0	0	28	0	0	0	0	0	0	0	0	0	36	119	0	0	0	0
5:00 PM	0	0	9	0	0	0	20	0	0	0	0	0	0	0	0	0	29	105	0	0	0	0
5:15 PM	0	0	10	0	0	0	19	0	0	0	0	0	0	0	0	0	29		0	0	0	0
5:30 PM	0	0	7	0	0	0	18	0	0	0	0	0	0	0	0	0	25		0	0	0	0
5:45 PM	0	0	12	0	0	0	10	0	0	0	0	0	0	0	0	0	22		0	0	0	0
Count Total	0	0	78	0	0	0	199	0	0	0	0	0	0	0	0	0	277		0	0	0	0
Peak Hour	0	0	40	0	0	0	132	0	0	0	0	0	0	0	0	0	172		0	0	0	0

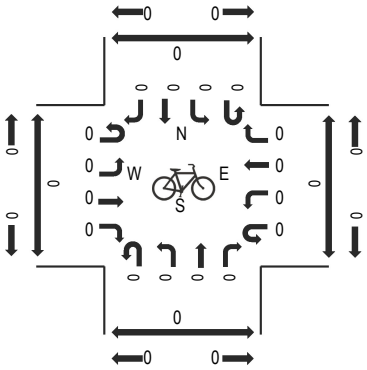
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 3 S GREELEY HWY & TERRY RANCH RD PM
Date: Thursday, July 17, 2025
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

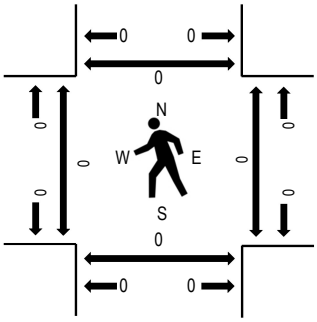
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

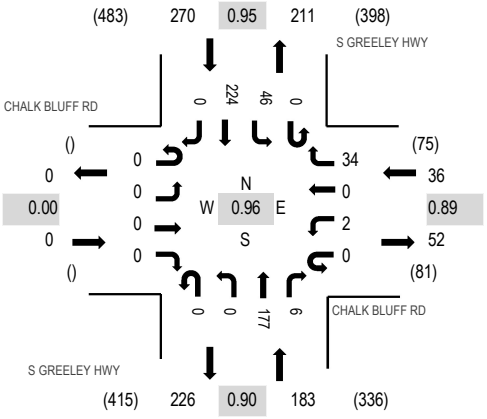
Traffic Counts - Motorized Vehicles

Interval Start Time	TERRY RANCH RD Eastbound				TERRY RANCH RD Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	12	0	2	0	3	0	1	0	2	41	5	0	5	55	38	164	721	0	0	0	0
4:15 PM	0	11	0	4	0	1	1	1	0	3	38	2	0	3	68	56	188	722	0	0	0	0
4:30 PM	0	14	1	0	0	1	0	0	0	1	49	6	0	3	67	50	192	700	0	0	0	0
4:45 PM	0	9	0	1	0	3	0	0	0	1	40	8	1	2	66	46	177	642	0	0	0	0
5:00 PM	0	10	0	2	0	2	0	0	0	4	40	5	0	0	67	35	165	594	0	0	0	0
5:15 PM	0	15	1	0	0	0	0	0	0	1	49	4	0	0	58	38	166		0	0	0	0
5:30 PM	0	12	0	1	0	0	0	0	0	5	53	2	0	1	36	24	134		0	0	0	0
5:45 PM	0	17	1	3	0	2	0	1	0	2	37	2	0	2	40	22	129		0	0	0	0
Count Total	0	100	3	13	0	12	1	3	0	19	347	34	1	16	457	309	1,315		0	0	0	0
Peak Hour	0	44	1	7	0	7	1	1	0	9	167	21	1	8	268	187	722		0	0	0	0

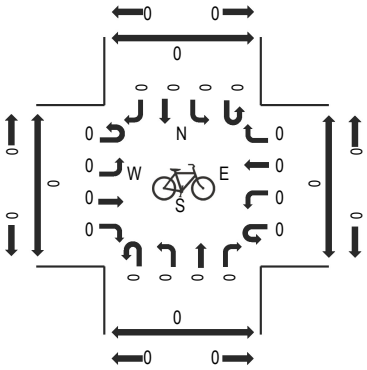
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 4 S GREELEY HWY & CHALK BLUFF RD PM
Date: Thursday, July 17, 2025
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

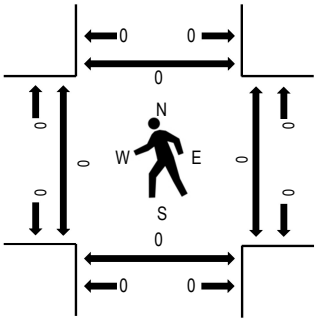
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

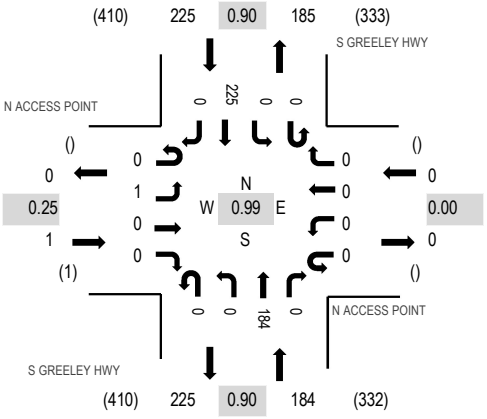
Traffic Counts - Motorized Vehicles

Interval Start Time	CHALK BLUFF RD Eastbound				CHALK BLUFF RD Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	0	0	0	0	1	0	9	0	0	40	0	0	4	57	0	111	470	0	0	0	0
4:15 PM	0	0	0	0	0	1	0	8	0	0	34	1	0	8	60	0	112	484	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	10	0	0	47	2	0	15	54	0	128	489	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	8	0	0	41	1	0	14	54	0	119	457	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	11	0	0	41	0	0	6	67	0	125	424	0	0	0	0
5:15 PM	0	0	0	0	0	1	0	5	0	0	48	3	0	11	49	0	117		0	0	0	0
5:30 PM	0	0	0	0	1	1	0	10	0	0	46	0	1	5	32	0	96		0	0	0	0
5:45 PM	0	0	0	0	0	1	0	7	0	0	32	0	0	10	36	0	86		0	0	0	0
Count Total	0	0	0	0	1	6	0	68	0	0	329	7	1	73	409	0	894		0	0	0	0
Peak Hour	0	0	0	0	0	2	0	34	0	0	177	6	0	46	224	0	489		0	0	0	0

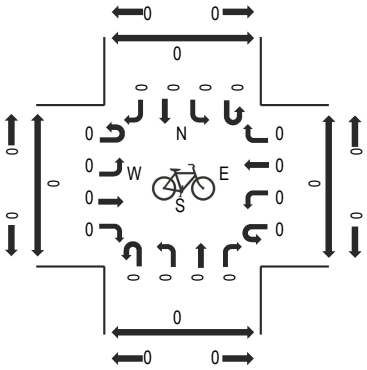
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 5 S GREELEY HWY & N ACCESS POINT PM
Date: Thursday, July 17, 2025
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

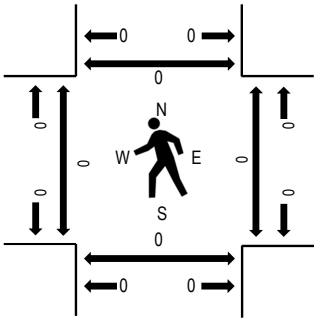
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

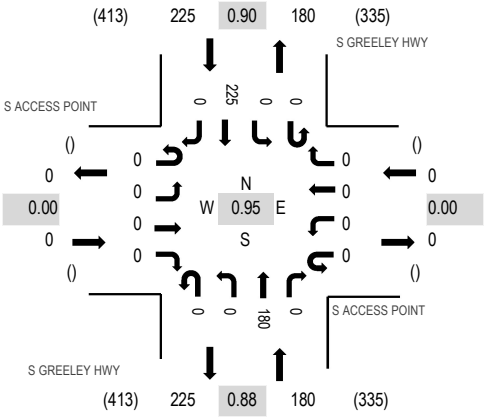
Traffic Counts - Motorized Vehicles

Interval Start Time	N ACCESS POINT Eastbound				N ACCESS POINT Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	0	0	0	0	0	0	0	0	0	38	0	0	0	58	0	96	394	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	34	0	0	0	59	0	93	402	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	51	0	0	0	51	0	102	410	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	45	0	0	0	58	0	103	381	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	0	0	38	0	0	0	65	0	104	349	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	50	0	0	0	51	0	101		0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	43	0	0	0	30	0	73		0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	33	0	0	0	38	0	71		0	0	0	0
Count Total	0	1	0	0	0	0	0	0	0	0	332	0	0	0	410	0	743		0	0	0	0
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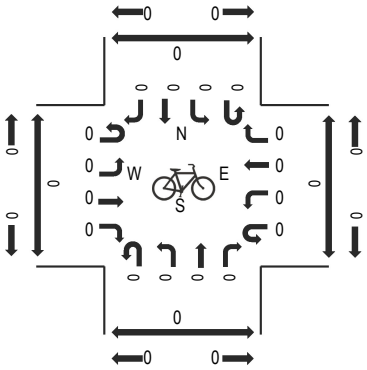
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 6 S GREELEY HWY & S ACCESS POINT PM
Date: Thursday, July 17, 2025
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

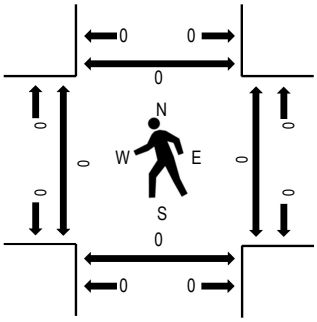
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	S ACCESS POINT Eastbound				S ACCESS POINT Westbound				S GREELEY HWY Northbound				S GREELEY HWY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	0	0	0	0	0	0	0	0	0	38	0	0	0	62	0	100	396	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	41	0	0	0	58	0	99	403	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	51	0	0	0	50	0	101	405	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	38	0	0	0	58	0	96	372	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	43	0	0	0	64	0	107	352	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	48	0	0	0	53	0	101		0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	36	0	0	0	32	0	68		0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	40	0	0	0	36	0	76		0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	335	0	0	0	413	0	748		0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	180	0	0	0	225	0	405		0	0	0	0

Appendix C: Background Traffic Study Excerpts

Traffic Impact Study

Cowboy Solar II

Laramie County, Wyoming

Prepared for:

Tri Global Energy

Kimley»Horn

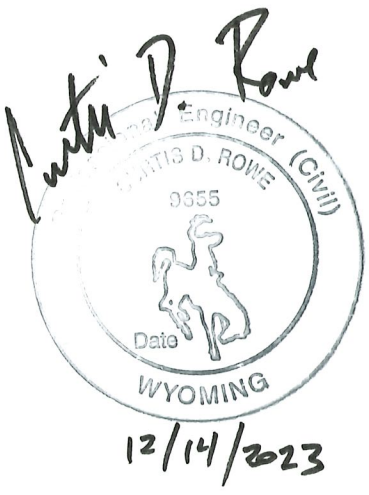
T R A F F I C I M P A C T S T U D Y

Cowboy Solar II

Laramie County, Wyoming

Prepared for
Tri Global Energy

Prepared by
Curtis D. Rowe, P.E, PTOE
Kimley-Horn and Associates, Inc.
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Suite 300
Greenwood Village, Colorado 80111
(303) 228-2300



December 2023

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4.1 Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. The number of trips generated for the Cowboy Solar II facility was estimated for the construction phase based on the anticipated construction activity as well as the operations phase based on expected site visits occurring to the facility. To study the effect of construction traffic created by the solar facility, the expected trips during the peak period of construction were used as the basis for this analysis. The peak construction traffic activity is anticipated to occur in 2027.

Construction Traffic Generation

The typical construction peak season workday will see workers arriving during a four-hour window between 6:00 am and 10:00 am and departing during a three-hour window between 1:00 pm and 4:00 pm. The standard construction hours are anticipated to be 6:30 am to 3:30 pm. The highest proportion of workers will arrive to the site between 6:00 and 7:00 am (half) and depart between 3:00 pm to 4:00 pm (one-third), although the volume will be fairly uniform during the arrival and departure hours. It is anticipated that construction of the facility will include up to 325 workers. It is important to note the truck trip generation also includes the volume adjusted for the three (3) passenger car equivalents (PCE) per truck. The following **Table 1** identifies the peak construction activity trip generation for construction of Cowboy Solar II.

Table 1 – Cowboy Solar II Traffic Generation

User	Weekday Vehicles Trips							
	Daily Round Trips	Daily Trips	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Heavy Duty Trucks (15)	15	30	3	1	4	1	2	3
Water Trucks (15)	15	30	2	0	2	0	2	2
Total Trucks	30	60	5	1	6	1	4	5
PCE Trips	*90*	*180*	*15*	*3*	*18*	*3*	*12*	*15*
Passenger Vehicles (325 construction workers)	325	650	163	1	164	1	109	110
Total Vehicles	**355**	**710**	**168**	**2**	**170**	**2**	**113**	**115**
Total PCE	***415***	***830***	***178***	***4***	***182***	***4***	***121***	***125***

As shown in the table, construction of the Cowboy Solar II facility is expected to generate approximately 710 daily trips with 170 of these trips occurring during the morning peak hour and

115 of these trips occurring during the afternoon peak hour during the peak construction activities. This volume of 710 daily trips are expected to be the highest volume generated during construction of the solar facility.

Solar Facility Operational Phase Traffic Generation

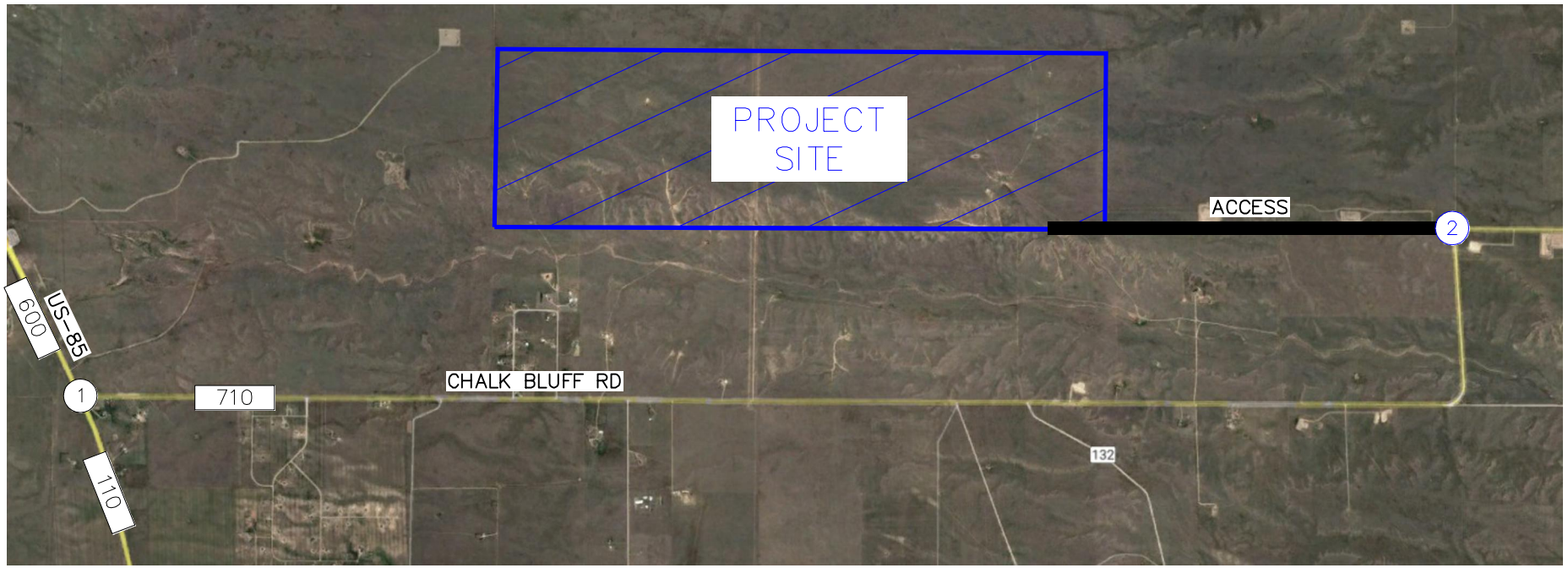
After the Cowboy Solar II facility has been constructed, the number of trips generated by the solar plant in standard operations is expected to be significantly less than during the construction period. The project will be an unmanned facility with weekly site visits by operational personnel, not exceeding 10 trips per month. On the occasional day when a site visit occurs, the daily trip generation is anticipated to be two trips with one employee entering and exiting throughout the day. Therefore, traffic impacts related to the operation of the solar plant facility are anticipated to be insignificant and not requiring roadway improvements.

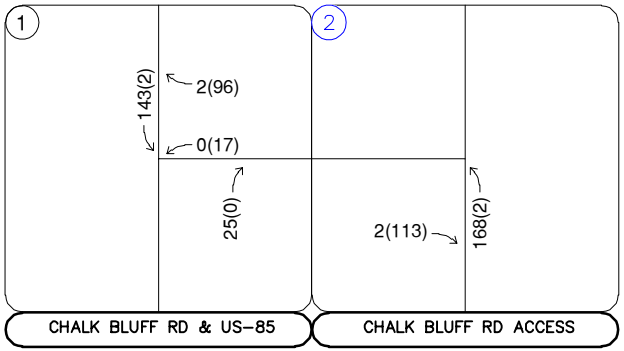
4.2 Trip Distribution

Trip distribution is based on the anticipated arrival location of employees along with the delivery route to be used for truck traffic. It is anticipated that truck traffic will utilize US-85 and Chalk Bluff Road to access the project site. Construction worker trips will be based on the arrival location from place of residence (permanent or temporary). The distribution for construction worker trips was derived based on distances to nearby cities and populations. The City of Cheyenne is located approximately 13 miles northwest of the site while the City of Greeley is located approximately 45 miles south of the site. Based on these factors, it is anticipated that 85 percent of traffic will be to and from the northwest and 15 percent of traffic will be to and from the southwest. This traffic was factored for the amount expected to arrive from US-85. The project trip distribution for the proposed development is illustrated in **Figure 5**.

4.3 Traffic Assignment

Cowboy Solar II traffic assignment was obtained by applying the project trip distribution to the estimated traffic generation of the development shown in **Table 1**. Traffic assignment is shown in **Figure 6.**

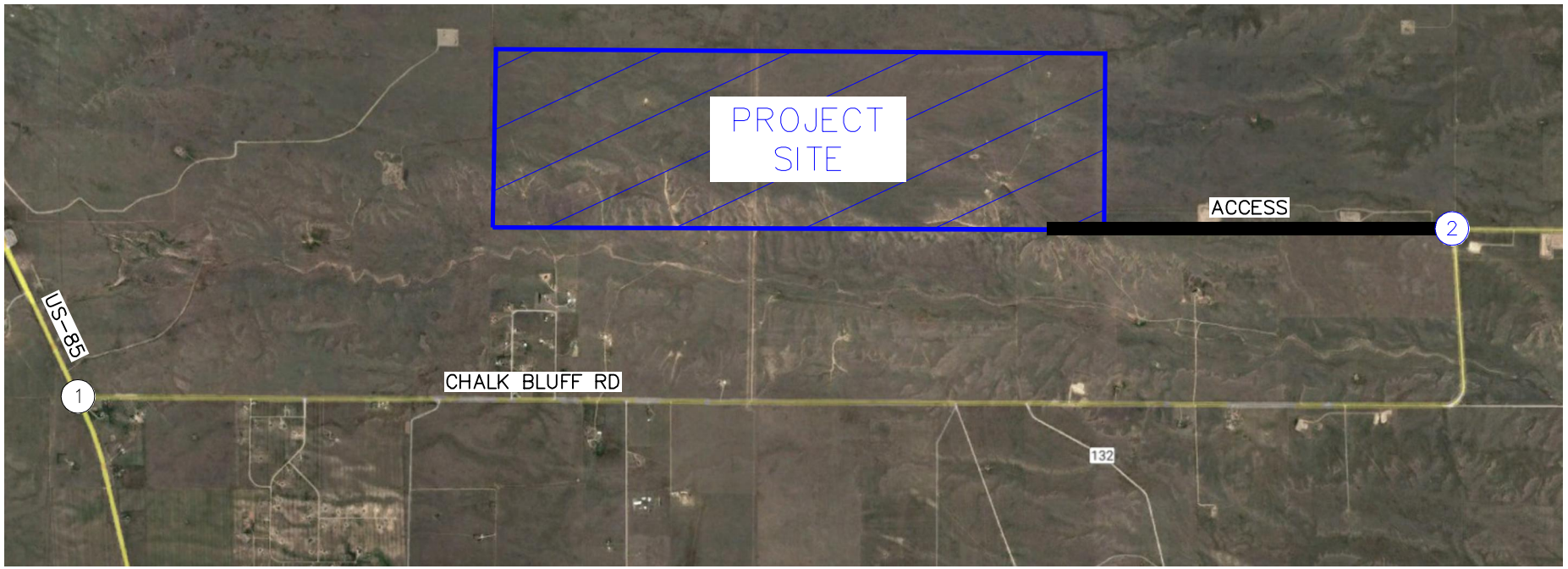


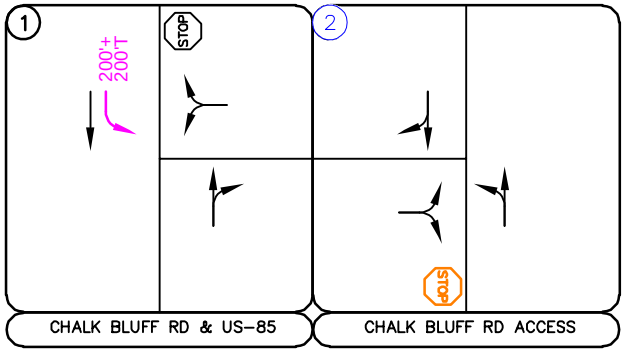


LEGEND

X	Study Area Key Intersection
X	Project Access Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

FIGURE 6
COWBOY SOLAR II
LARAMIE COUNTY, WYOMING
PROJECT TRAFFIC ASSIGNMENT (CONSTRUCTION ACTIVITY)





LEGEND

- (X) Study Area Key Intersection
- (X) Project Access Intersection
- STOP Stop Controlled Approach
- Improvement
- Improvement By Others
- 100' Turn Lane Length (feet)

FIGURE 8
COWBOY SOLAR II
LARAMIE COUNTY, WYOMING
RECOMMENDED GEOMETRY AND CONTROL

Traffic Impact Study

Bison Business Park

Laramie County, Wyoming

November 2020

Prepared for:

AVI, PC

Kimley»Horn

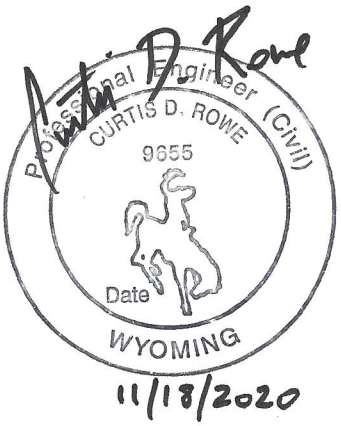
T R A F F I C I M P A C T S T U D Y

Bison Business Park

Laramie County, Wyoming

Prepared for
AVI, PC
1103 Old Town Lane
Suite 101
Cheyenne, Wyoming, 82009

Prepared by
Kimley-Horn and Associates, Inc.
4582 South Ulster Street
Suite 1500
Denver, Colorado 80237
(303) 228-2300



I certify that this Traffic Impact Study has been prepared by me or under my immediate supervision, that I have experience and training in the field of traffic and transportation engineering, and I am a registered professional engineer (P.E.) with the state of Wyoming.

Signed,

Curtis D. Rowe, P.E., PTOE

November 2020

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4.0 PROJECT TRAFFIC CHARACTERISTICS

4.1 Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged source for trip generation rates is the *Trip Generation Report*[1] published by the Institute of Transportation Engineers (ITE). ITE has established trip rates in nationwide studies of similar land uses. For this study, Kimley-Horn used the ITE Trip Generation Report regression equations that apply to Industrial Park (ITE 130) for traffic associated with the proposed Bison Business Park project.

In order to provide a conservative analysis a floor area ratio of 0.2 was used on the site area of about 615 acres, which is approximately 5,350,000 square feet, in addition to the 1,448,255 square feet on Tract 4. This equates to approximately 6,800,000 square feet of Industrial Park (130) land use.

Table 1 summarizes the estimated trip generation for Tract 4 (Phase 1) for the proposed development, which is planned to include 1,448,255 square feet of industrial park building area. As shown, the first phase of the project is expected to generate approximately 4,882 daily weekday trips with 579 of these trips occurring during the morning peak hour and 580 trips occurring during the afternoon peak hour. Full buildout will include 6,803,086 square feet of industrial park. The full buildout of the project is expected to generate approximately 22,928 daily weekday trips with 2,721 of these trips occurring during the morning peak hour and 2,722 trips occurring during the afternoon peak hour. The trip generation worksheets are included in **Appendix C**. These calculations illustrate the equations used and directional distribution of trips.

[1] Institute of Transportation Engineers, *Trip Generation: An Information Report*, Tenth Edition, Washington DC, 2017.

Table 1 – Bison Business Park Project Traffic Generation

Land Use	Quantity	Vehicles Trips						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Tract 4 - Phase I								
Industrial Park (ITE 130)	1,448,255 SF	4,882	469	110	579	122	458	580
Full Buildout								
Industrial Park (ITE 130)	6,803,086 SF	22,928	2,204	517	2,721	572	2,150	2,722

4.2 Trip Distribution

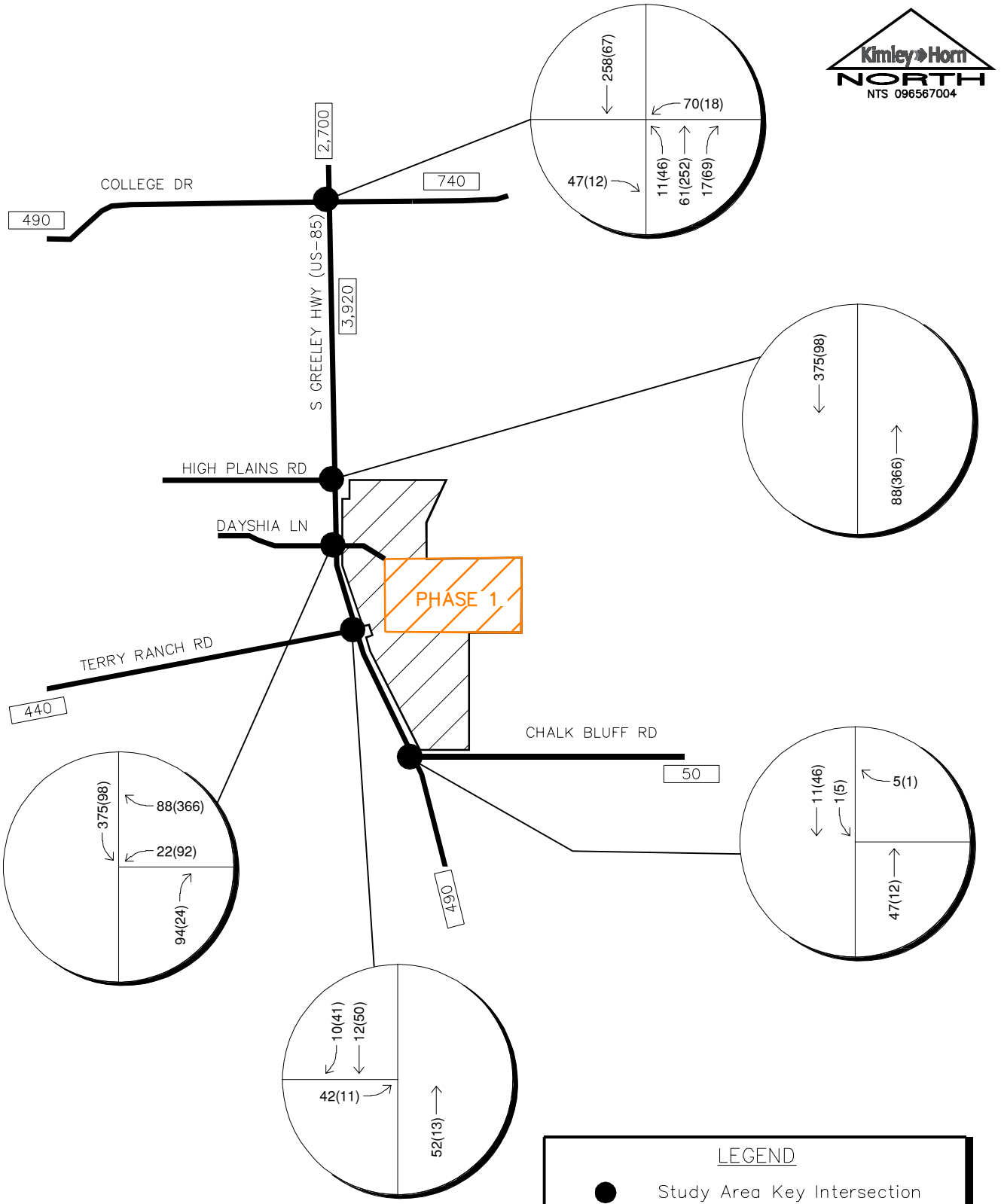
Distribution of traffic on the street system was based on the area street system characteristics, existing traffic patterns, existing and anticipated surrounding development areas and type, and the proposed access system for the project. The directional distribution of traffic is a means to quantify the percentage of site-generated traffic that approaches the site from a given direction and departs the site back to the original source. Separate distributions were prepared for the first phase and full buildout due to the additional accesses constructed with full buildout.—The first phase 2023 and full buildout 2040 trip distributions for the project are illustrated in **Figures 8** and **9**, respectively.

4.3 Traffic Assignment

Traffic assignment was obtained by applying the project trip distribution to the estimated traffic generation of the project shown in **Table 1**. Project traffic assignment for Phase 1 2023 and full buildout 2040 is shown in **Figures 10** and **11**, respectively.

4.4 Total (Background Plus Project) Traffic

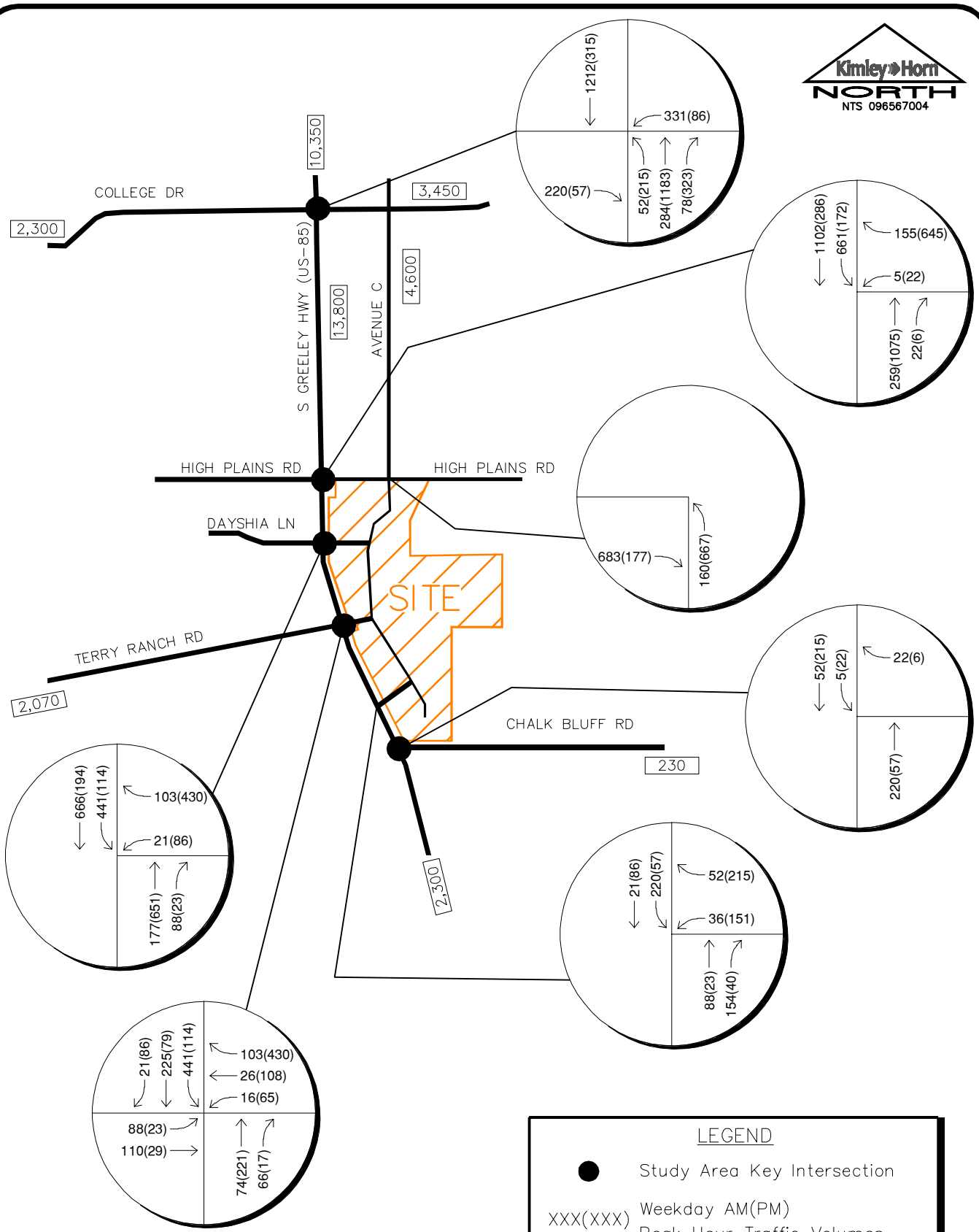
Project traffic volumes were added to the background volumes to represent estimated traffic conditions for the Phase I 2023 buildout year and the full buildout year 2040. These total traffic volumes for the site are illustrated for the 2023 and 2040 horizon years in **Figure 12** and **Figure 13,** respectively.



BISON BUSINESS PARK
LARAMIE COUNTY, WYOMING
2023 PROJECT TRAFFIC ASSIGNMENT

FIGURE 10

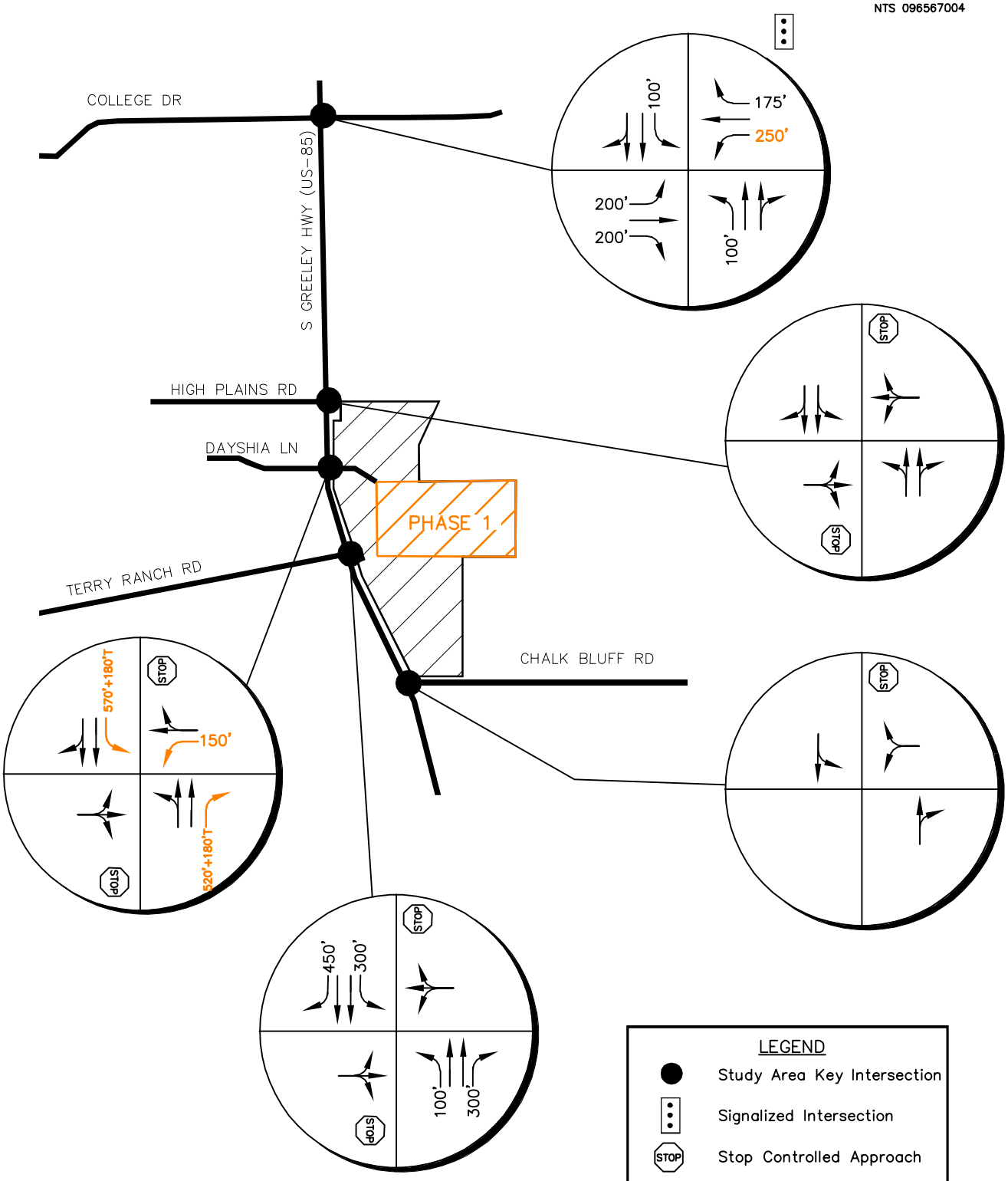
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BISON BUSINESS PARK
LARAMIE COUNTY, WYOMING
2040 PROJECT TRAFFIC ASSIGNMENT

FIGURE 11

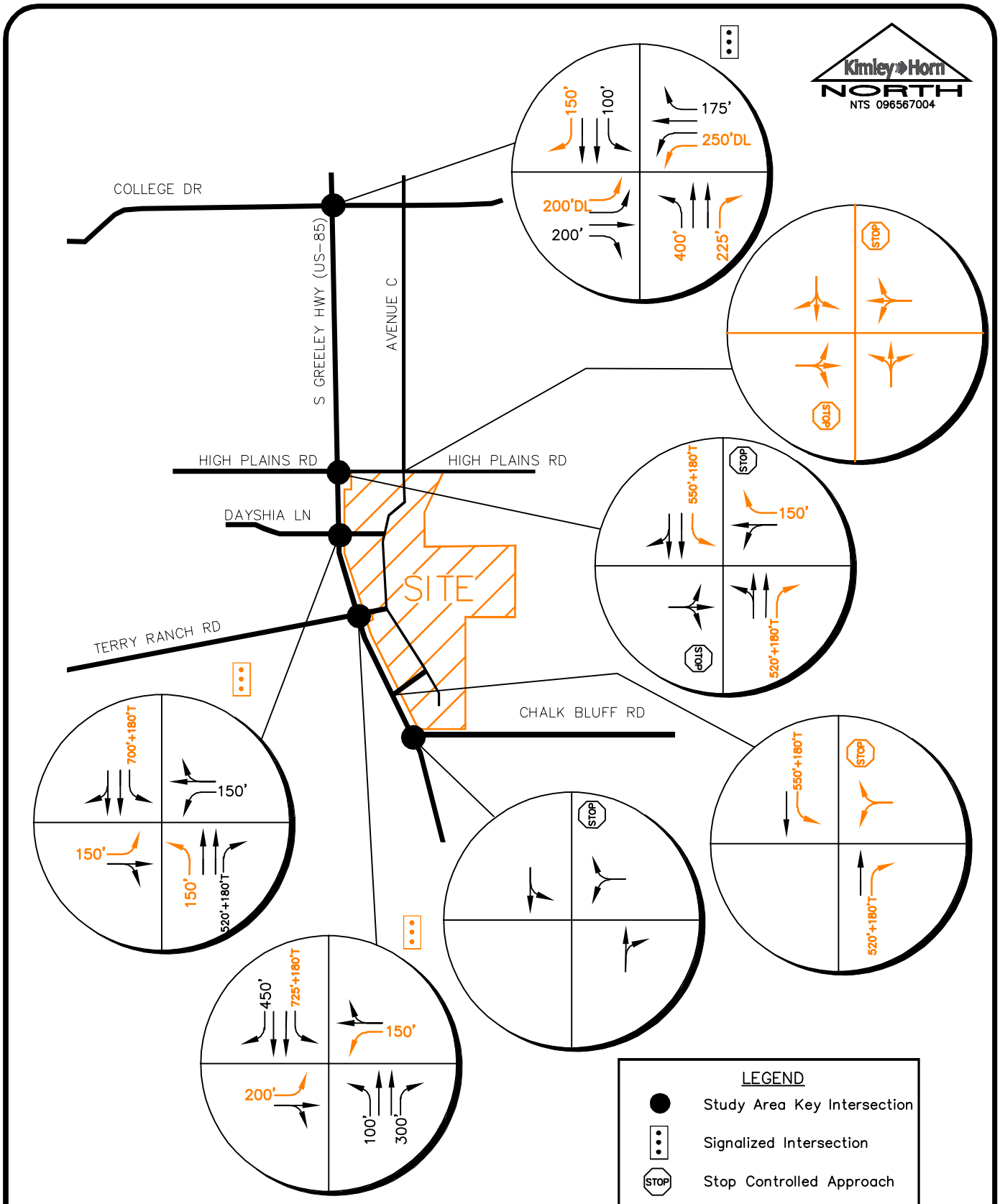
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BISON BUSINESS PARK
LARAMIE COUNTY, WYOMING
2023 RECOMMENDED LANE CONFIGURATION AND CONTROL

FIGURE 14

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BISON BUSINESS PARK
LARAMIE COUNTY, WYOMING
2040 RECOMMENDED LANE CONFIGURATION AND CONTROL

FIGURE 15

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Traffic Impact Study

Project Cosmo at High Plains Business Park

Laramie County, Wyoming

Prepared for:

AVI, PC

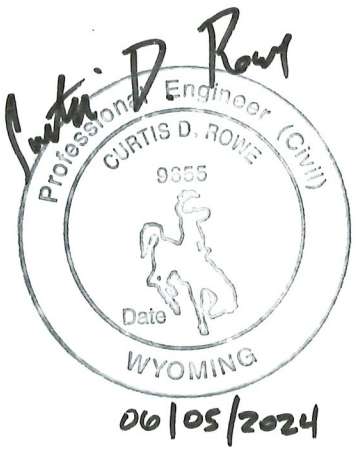
Kimley»Horn

TRAFFIC IMPACT STUDY

Project Cosmo at High Plains Business Park

Cheyenne, Wyoming

Prepared for
AVI, PC
1103 Old Town Lane
Suite 101
Cheyenne, Wyoming, 82023



Prepared by
Kimley-Horn and Associates, Inc.
6200 South Syracuse Way
Suite 300
Greenwood Village, Colorado 80111
(303) 228-2300

I certify that this Traffic Impact Study has been prepared by me or under my immediate supervision, that I have experience and training in the field of traffic and transportation engineering, and I am a registered professional engineer (P.E.) with the state of Wyoming.

Signed,

Curtis D. Rowe, P.E., PTOE

June 2024

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

4.0 PROJECT TRAFFIC CHARACTERISTICS

4.1 Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. Trip generation was developed based on user-provided information due to the specific nature of the site. For purposes of this analysis, trips were divided into two main sections, “Operations” and “Retrofit”, with subsections of personnel/employee trips and truck deliveries trips. Operations trips include staff, standard deliveries, visitors, and subcontractors, and are included for each region. Retrofit trips are assumed to be consistent through the life of the project once it is operational, and these trips are assumed to remain the same regardless of the number of regions constructed.

While retrofit trips are not anticipated to be generated immediately after project-opening, these retrofit trips were added into both the 2028 short-term and 2045 long-term horizons to conservatively estimate the trips anticipated to be generated by this development. The overall scale of the development is anticipated to encompass two (2) “regions”, as defined by the client. Operations trips are doubled when two regions are present whereas retrofit trips are not doubled per region, as retrofit trips are anticipated to serve both regions. Personnel/employee trips to and from the site are anticipated to be concentrated to specific periods of the day with all arrivals occurring during the morning period from about 5:00 AM to 9:00 AM with departures occurring from 3:00 PM to 6:00 PM. Truck delivery trips are anticipated to be fairly continuous and uniform throughout the day from approximately 6:00 AM to 4:00 PM.

Project Cosmo at High Plains Business Park, the site is expected to generate approximately 2,400 weekday daily trips, with 300 of these trips occurring during the morning peak hour and 445 of these trips occurring during the afternoon peak hour. **Table 1** summarizes the estimated trip generation for the Project Cosmo at High Plains Business Park. The trip generation information used in this study is included in **Appendix C**.

Table 1 – Project Cosmo at High Plains Business Park Traffic Generation

Type of Trip		Weekday Vehicle Trips						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Operations	Personnel	1,400	270	0	270	0	270	270
	Truck Deliveries	200	10	10	20	0	0	0
Retrofit	Personnel	700	0	0	0	0	175	175
	Truck Deliveries	100	5	5	10	0	0	0
Total Trips		**2,400**	**285**	**15**	**300**	**0**	**445**	**445**

4.2 Trip Distribution

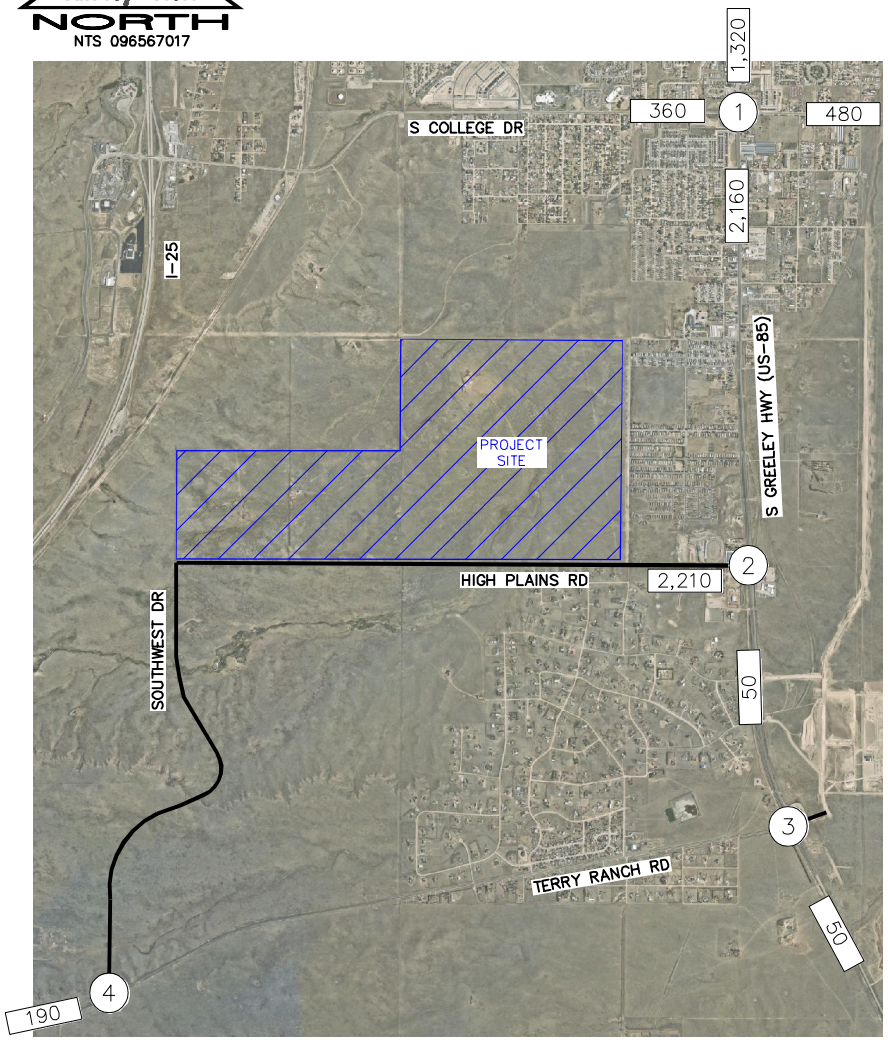
Distribution of site traffic on the street system was based on the area street system characteristics, existing traffic patterns, existing and anticipated surrounding demographic information, and the proposed access system for the project. The directional distribution of traffic is a means to quantify the percentage of site-generated traffic that approaches the site from a given direction and departs the site back to the original source. Because the roadway network is anticipated to be different between the 2028 and 2045 horizons, unique trip distributions were used for each horizon, with Division Avenue anticipated to continue through High Plains Road by 2045. The project trip distribution for the proposed development is illustrated in **Figure 7** for the 2028 horizon while **Figure 8** provides the trip distribution for the 2045 horizon.

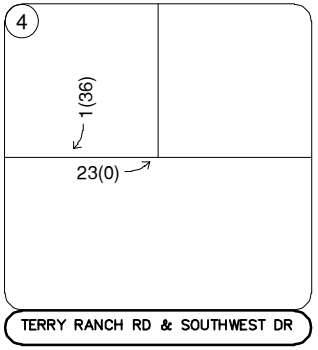
4.3 Traffic Assignment

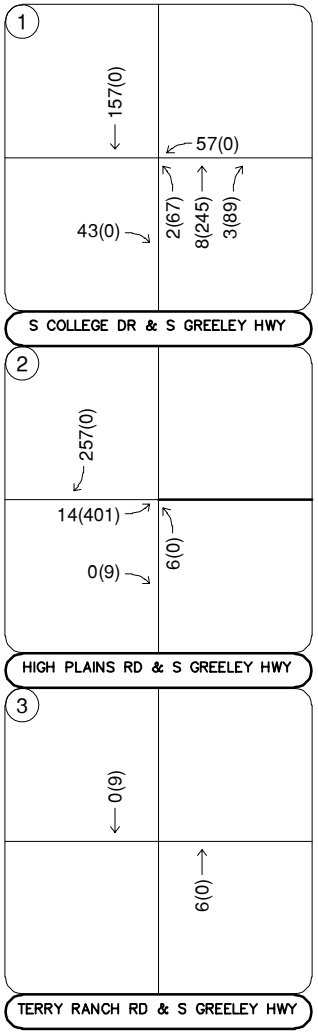
Project Cosmo at High Plains Business Park traffic assignment was obtained by applying the project trip distribution to the estimated traffic generation of the development shown in **Table 1**. Traffic assignment is shown in **Figure 9** for the 2028 horizon while **Figure 10** provides the traffic assignment in the 2045 horizon.

4.4 Total (Background Plus Project) Traffic

Site traffic volumes were added to the background volumes to represent estimated traffic conditions for the short-term 2028 buildout horizon and long-term 2045 twenty-year planning horizon. These total traffic volumes for the study area are illustrated for the 2028 and 2045 horizon years in **Figures 11** and **12**, respectively.





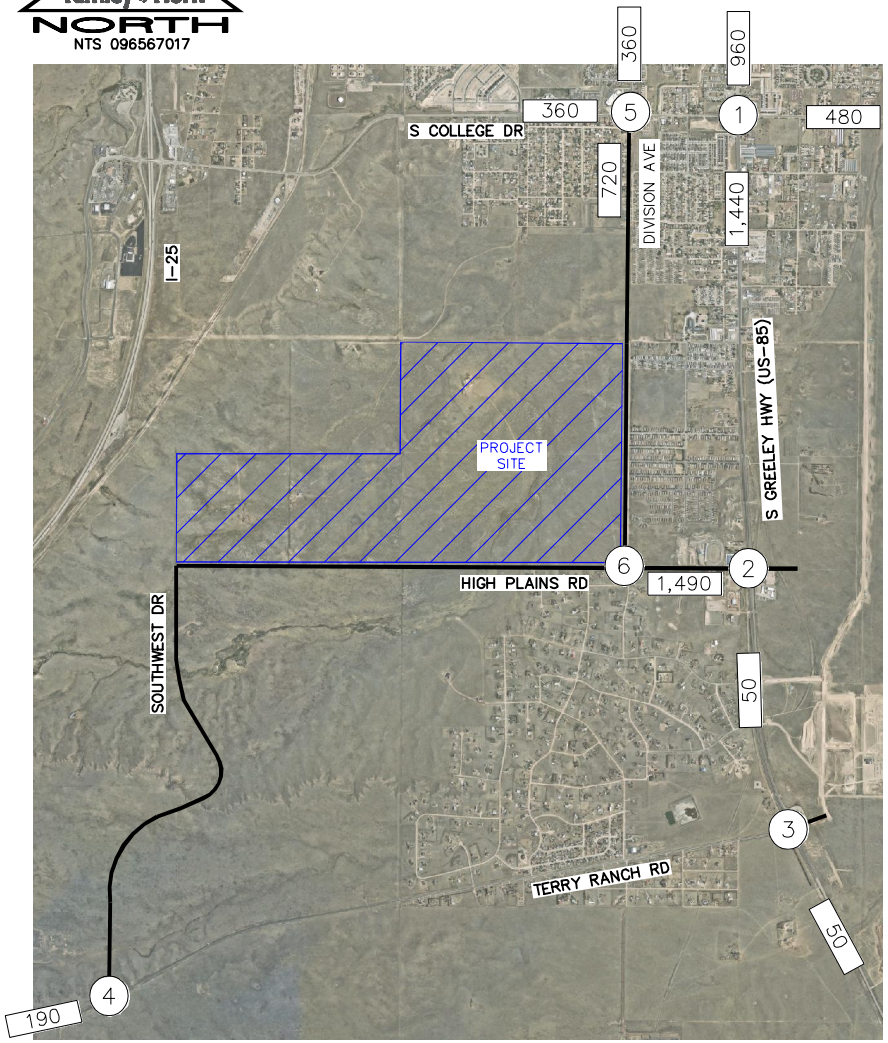


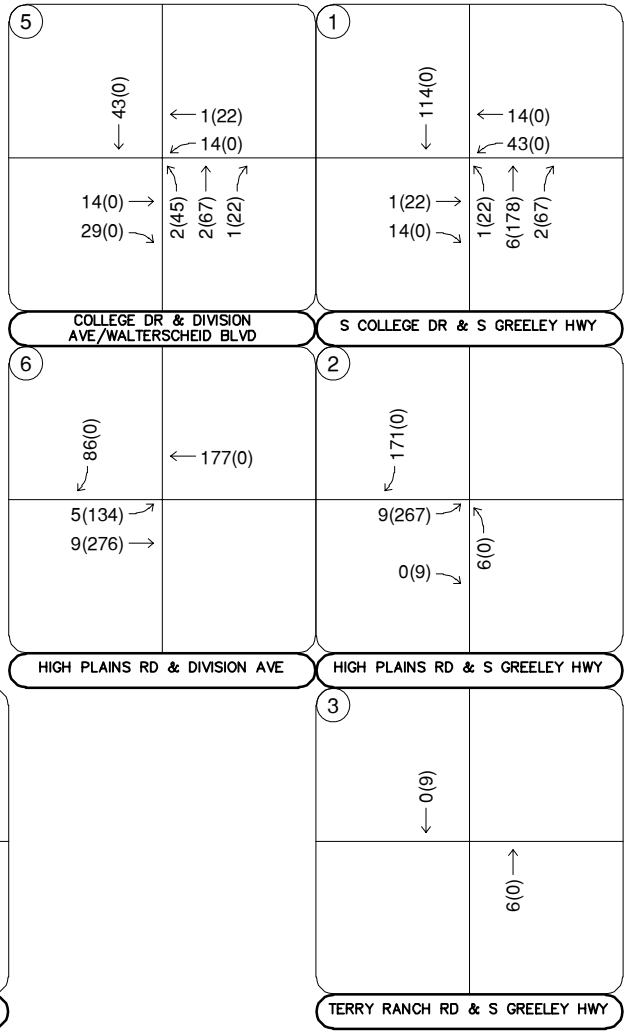
LEGEND

(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

FIGURE 9
PROJECT COSMO AT HIGH PLAINS BUSINESS PARK
CHEYENNE, WYOMING
2028 PROJECT TRAFFIC ASSIGNMENT

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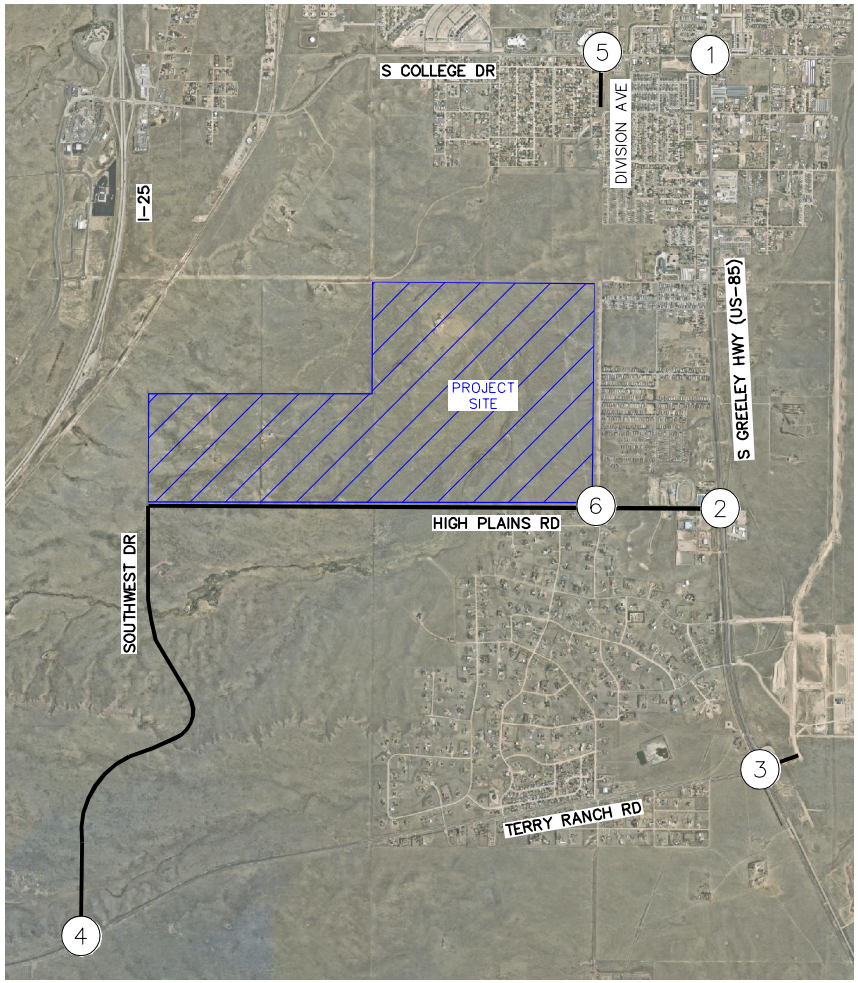


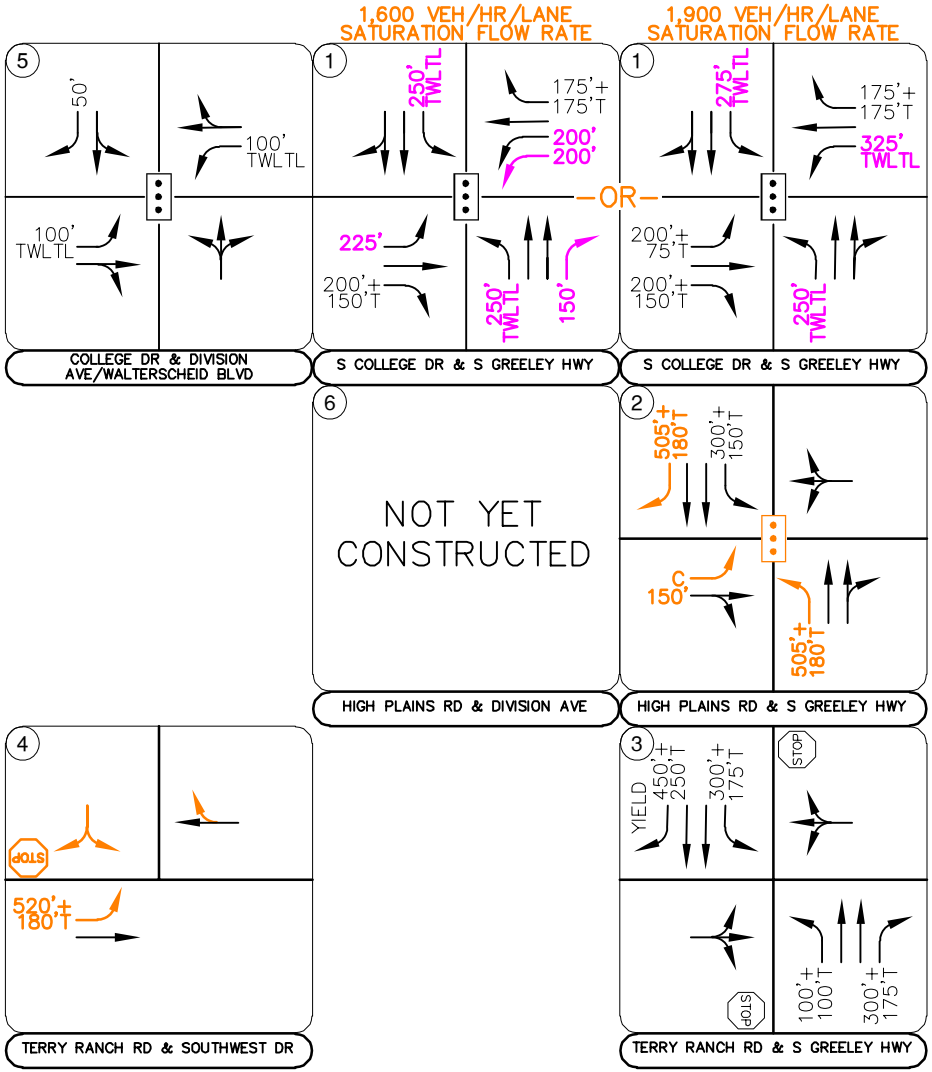
LEGEND

(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

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FIGURE 10
PROJECT COSMO AT HIGH PLAINS BUSINESS PARK
CHEYENNE, WYOMING
2045 PROJECT TRAFFIC ASSIGNMENT



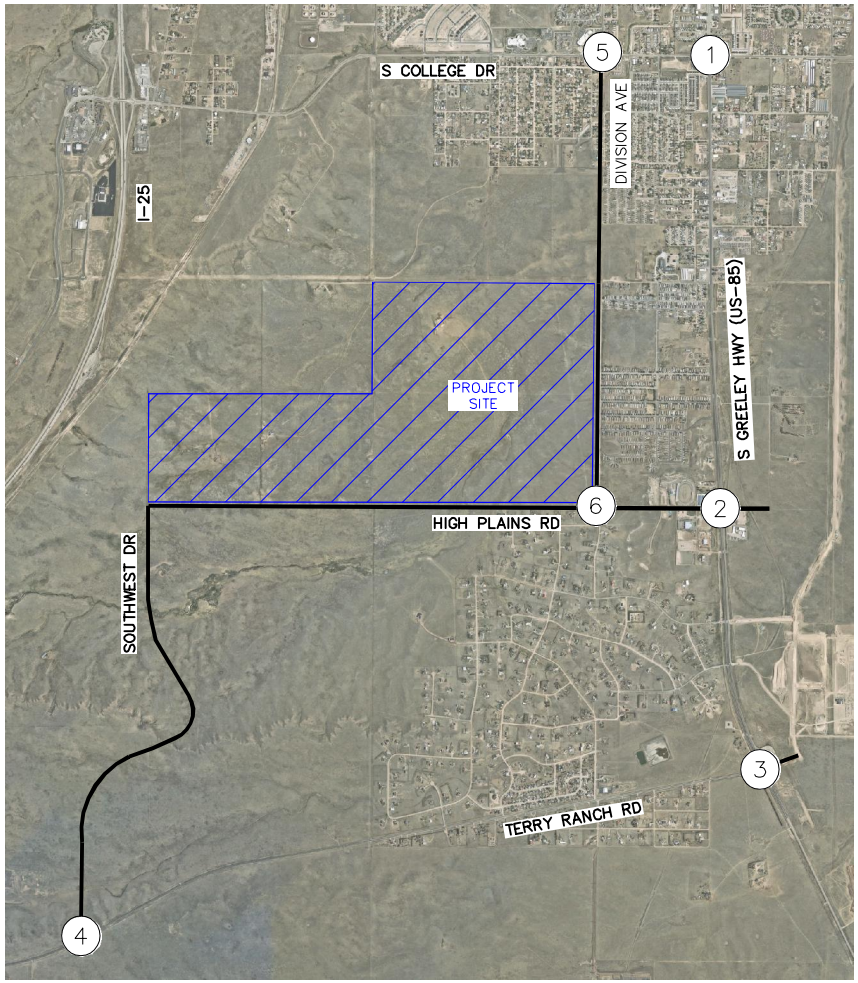


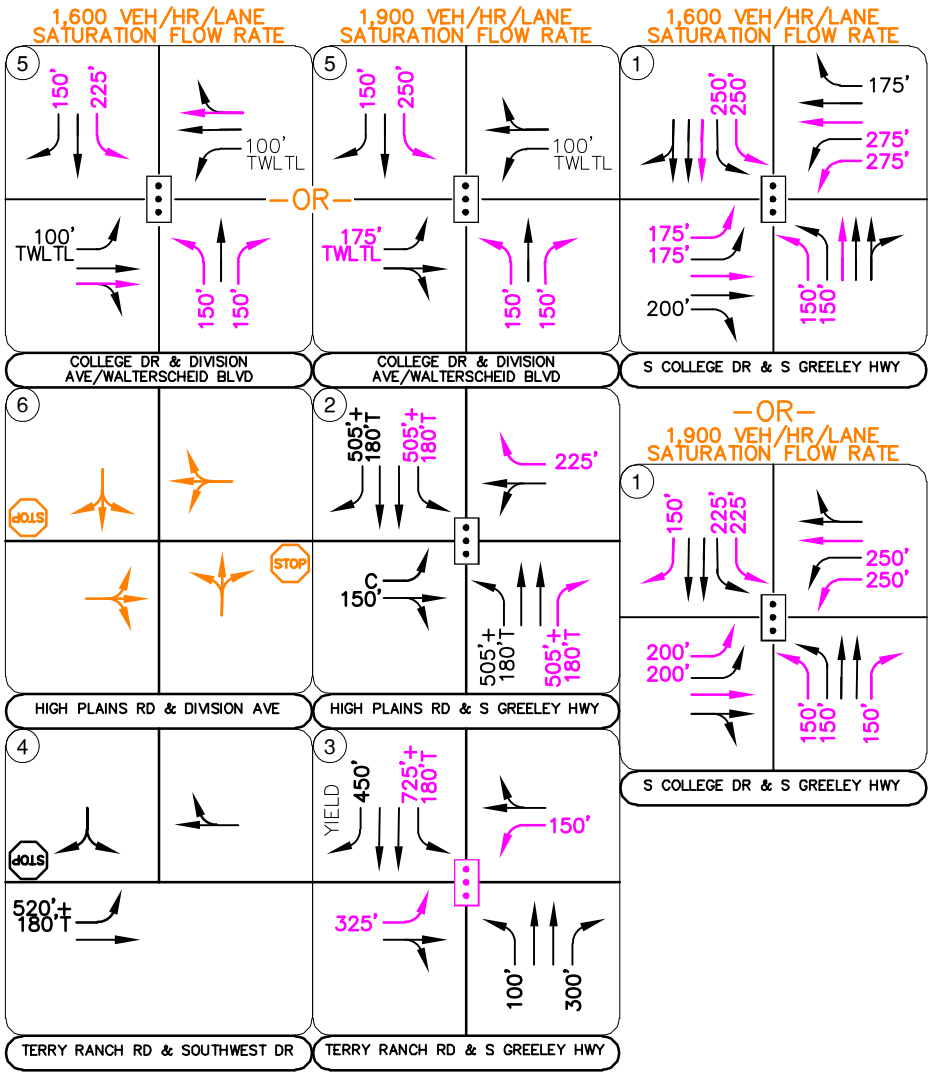
LEGEND

- Study Area Key Intersection
- Signalized Intersection
- Stop Controlled Approach
- Recommended Improvement
- Improvement by Others
- 100' Turn Lane Length (feet)
- TWLTL Two-Way Left Turn Lane

FIGURE 13

PROJECT COSMO AT HIGH PLAINS BUSINESS PARK
CHEYENNE, WYOMING
2028 RECOMMENDED GEOMETRY AND CONTROL





LEGEND

- Study Area Key Intersection
- Signalized Intersection
- Stop Controlled Approach
- Recommended Improvement
- Improvement by Others
- 100' Turn Lane Length (feet)
- TWLTL Two-Way Left Turn Lane

FIGURE 14
PROJECT COSMO AT HIGH PLAINS BUSINESS PARK
CHEYENNE, WYOMING
2045 RECOMMENDED GEOMETRY AND CONTROL

Appendix D: Trip Generation Worksheets

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Project	Laramie DC				
Subject	Trip Generation for Data Center				
Designed by	KW	*Date*	July 30, 2025	*Job No.*	296242001
Checked by		*Date*		*Sheet No.*	of

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 11th Edition, Average Rate Equations

Land Use Code - Data Center (160)

Independent Variable - 1000 Square Feet Gross Floor Feet (X)
Gross Floor Area = 2,435,000
X = 2435.0
T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (Page 189)

Average Weekday
T = 0.11 (X)
T = 0.11 * 2435

Directional Distribution: 55% ent. 45% exit.
T = 268 Average Vehicle Trip Ends
147 entering 121 exiting

147 + 121 = 268

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (Page 190)

Average Weekday
T = 0.09 (X)
T = 0.09 * 2435

Directional Distribution: 30% ent. 70% exit.
T = 220 Average Vehicle Trip Ends
66 entering 154 exiting

66 + 154 = 220

Weekday Daily (Page 188)

Average Weekday
T = 0.99 (X)
T = 0.99 * 2435

Directional Distribution: 50% entering, 50% exiting
T = 2412 Average Vehicle Trip Ends
1206 entering 1206 exiting

1206 + 1206 = 2412

Appendix E: Intersection Analysis Worksheets

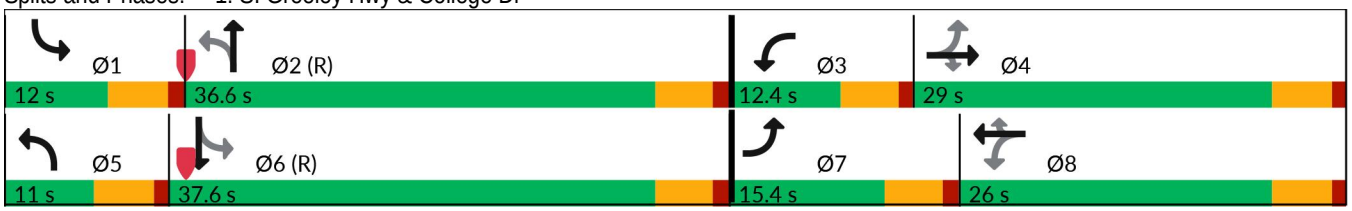
Timings
1: S. Greeley Hwy & College Dr

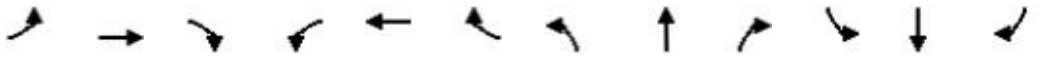
08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	133	169	83	110	127	103	80	436	77	262
Future Volume (vph)	133	169	83	110	127	103	80	436	77	262
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	15.0
Minimum Split (s)	8.9	25.9	25.9	8.9	25.9	25.9	9.0	23.0	9.0	23.0
Total Split (s)	15.4	29.0	29.0	12.4	26.0	26.0	11.0	36.6	12.0	37.6
Total Split (%)	17.1%	32.2%	32.2%	13.8%	28.9%	28.9%	12.2%	40.7%	13.3%	41.8%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	24.1	16.1	16.1	18.7	11.8	11.8	50.6	45.0	49.7	44.6
Actuated g/C Ratio	0.27	0.18	0.18	0.21	0.13	0.13	0.56	0.50	0.55	0.50
v/c Ratio	0.53	0.67	0.26	0.48	0.64	0.36	0.20	0.50	0.25	0.25
Control Delay (s/veh)	31.2	46.8	3.3	30.5	50.6	6.0	10.3	17.5	11.4	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.2	46.8	3.3	30.5	50.6	6.0	10.3	17.5	11.4	14.3
LOS	C	D	A	C	D	A	B	B	B	B
Approach Delay (s/veh)		32.0			30.6			16.6		13.8
Approach LOS		C			C			B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay (s/veh): 21.6	Intersection LOS: C
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	169	83	110	127	103	80	436	140	77	262	71
Future Volume (veh/h)	133	169	83	110	127	103	80	436	140	77	262	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	148	188	92	115	132	107	101	552	177	84	285	77
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.79	0.79	0.79	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	283	224	190	233	191	162	599	1140	364	399	1170	310
Arrive On Green	0.10	0.14	0.14	0.08	0.12	0.12	0.05	0.51	0.51	0.04	0.50	0.50
Sat Flow, veh/h	1500	1575	1335	1500	1575	1335	1500	2230	713	1500	2339	621
Grp Volume(v), veh/h	148	188	92	115	132	107	101	370	359	84	180	182
Grp Sat Flow(s),veh/h/ln	1500	1575	1335	1500	1575	1335	1500	1496	1447	1500	1496	1463
Q Serve(g_s), s	7.6	10.5	5.7	5.9	7.2	6.9	2.9	14.4	14.5	2.4	6.2	6.4
Cycle Q Clear(g_c), s	7.6	10.5	5.7	5.9	7.2	6.9	2.9	14.4	14.5	2.4	6.2	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.49	1.00		0.42
Lane Grp Cap(c), veh/h	283	224	190	233	191	162	599	765	740	399	748	732
V/C Ratio(X)	0.52	0.84	0.48	0.49	0.69	0.66	0.17	0.48	0.49	0.21	0.24	0.25
Avail Cap(c_a), veh/h	301	422	357	234	369	313	618	765	740	451	748	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	37.6	35.6	31.3	37.9	37.8	9.8	14.3	14.3	11.1	12.8	12.8
Incr Delay (d2), s/veh	0.6	3.2	0.7	0.6	1.7	1.7	0.0	2.2	2.3	0.1	0.8	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.2	1.8	2.1	2.8	2.2	0.8	4.8	4.7	0.7	2.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.8	40.8	36.3	31.9	39.6	39.5	9.9	16.5	16.6	11.2	13.6	13.7
LnGrp LOS	C	D	D	C	D	D	A	B	B	B	B	B
Approach Vol, veh/h		428			354			830			446	
Approach Delay, s/veh		36.4			37.1			15.7			13.1	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	51.0	12.4	17.7	9.9	50.0	14.3	15.8
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	7.0	31.6	7.5	24.1	6.0	32.6	10.5	21.1
Max Q Clear Time (g_c+I1), s	4.4	16.5	7.9	12.5	4.9	8.4	9.6	9.2
Green Ext Time (p_c), s	0.0	1.3	0.0	0.3	0.0	0.6	0.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.1
HCM 7th LOS	C

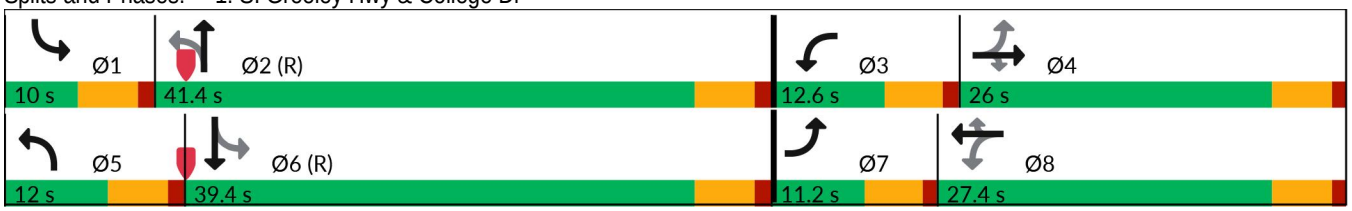
Timings
1: S. Greeley Hwy & College Dr

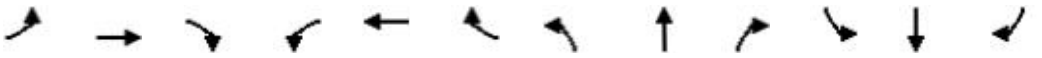
08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	175	198	110	189	190	118	109	665	112	628
Future Volume (vph)	175	198	110	189	190	118	109	665	112	628
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	15.0
Minimum Split (s)	8.9	25.9	25.9	8.9	25.9	25.9	9.0	23.0	9.0	23.0
Total Split (s)	11.2	26.0	26.0	12.6	27.4	27.4	12.0	41.4	10.0	39.4
Total Split (%)	12.4%	28.9%	28.9%	14.0%	30.4%	30.4%	13.3%	46.0%	11.1%	43.8%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	21.8	15.5	15.5	24.6	16.9	16.9	47.0	40.3	47.0	40.3
Actuated g/C Ratio	0.24	0.17	0.17	0.27	0.19	0.19	0.52	0.45	0.52	0.45
v/c Ratio	0.86	0.80	0.34	0.96	0.79	0.39	0.51	0.86	0.61	0.68
Control Delay (s/veh)	60.8	56.5	6.3	78.8	53.3	8.4	17.5	30.3	28.1	23.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	60.8	56.5	6.3	78.8	53.3	8.4	17.5	30.3	28.1	23.1
LOS	E	E	A	E	D	A	B	C	C	C
Approach Delay (s/veh)		46.6			52.3			29.0		23.7
Approach LOS		D			D			C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay (s/veh): 34.2	Intersection LOS: C
Intersection Capacity Utilization 80.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	198	110	189	190	118	109	665	253	112	628	188
Future Volume (veh/h)	175	198	110	189	190	118	109	665	253	112	628	188
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	190	215	120	230	232	144	135	821	312	123	690	207
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.81	0.81	0.81	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	217	250	212	235	275	233	326	1019	386	238	1066	320
Arrive On Green	0.07	0.16	0.16	0.09	0.17	0.17	0.07	0.48	0.48	0.06	0.47	0.47
Sat Flow, veh/h	1500	1575	1335	1500	1575	1335	1500	2122	805	1500	2269	680
Grp Volume(v), veh/h	190	215	120	230	232	144	135	579	554	123	455	442
Grp Sat Flow(s),veh/h/ln	1500	1575	1335	1500	1575	1335	1500	1496	1430	1500	1496	1453
Q Serve(g_s), s	6.3	12.0	7.5	7.7	12.8	9.0	4.1	29.5	29.6	3.8	20.9	20.9
Cycle Q Clear(g_c), s	6.3	12.0	7.5	7.7	12.8	9.0	4.1	29.5	29.6	3.8	20.9	20.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.56	1.00		0.47
Lane Grp Cap(c), veh/h	217	250	212	235	275	233	326	718	687	238	703	682
V/C Ratio(X)	0.88	0.86	0.57	0.98	0.84	0.62	0.41	0.81	0.81	0.52	0.65	0.65
Avail Cap(c_a), veh/h	217	369	313	235	394	334	344	718	687	238	703	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	36.9	35.0	34.7	36.0	34.4	13.8	19.8	19.9	17.1	18.2	18.2
Incr Delay (d2), s/veh	29.5	8.9	0.9	53.1	7.8	1.0	0.3	9.4	9.9	0.9	4.6	4.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	5.1	2.4	5.2	5.3	2.9	1.3	11.0	10.6	1.2	7.4	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	64.6	45.8	35.9	87.8	43.8	35.4	14.1	29.2	29.7	18.0	22.8	22.9
LnGrp LOS	E	D	D	F	D	D	B	C	C	B	C	C
Approach Vol, veh/h		525			606			1268			1020	
Approach Delay, s/veh		50.3			58.5			27.8			22.2	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	48.2	12.6	19.2	10.9	47.3	11.2	20.6
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	5.0	36.4	7.7	21.1	7.0	34.4	6.3	22.5
Max Q Clear Time (g_c+I1), s	5.8	31.6	9.7	14.0	6.1	22.9	8.3	14.8
Green Ext Time (p_c), s	0.0	1.4	0.0	0.3	0.0	1.6	0.0	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	35.1
HCM 7th LOS	D

Timings

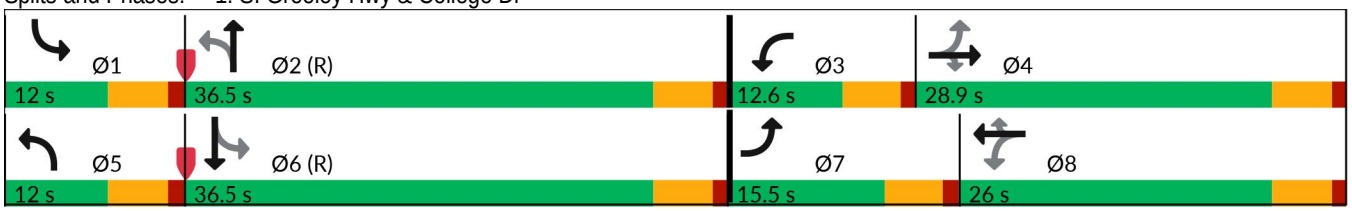
1: S. Greeley Hwy & College Dr

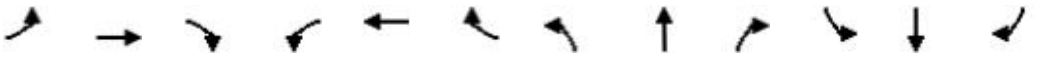
08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	136	173	85	113	130	106	82	449	79	412
Future Volume (vph)	136	173	85	113	130	106	82	449	79	412
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	15.0
Minimum Split (s)	8.9	25.9	25.9	8.9	25.9	25.9	9.0	23.0	9.0	23.0
Total Split (s)	15.5	28.9	28.9	12.6	26.0	26.0	12.0	36.5	12.0	36.5
Total Split (%)	17.2%	32.1%	32.1%	14.0%	28.9%	28.9%	13.3%	40.6%	13.3%	40.6%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	23.7	14.4	14.4	19.3	12.2	12.2	50.2	44.5	49.2	44.0
Actuated g/C Ratio	0.26	0.16	0.16	0.21	0.14	0.14	0.56	0.49	0.55	0.49
v/c Ratio	0.54	0.76	0.28	0.51	0.63	0.36	0.25	0.52	0.26	0.37
Control Delay (s/veh)	31.1	55.0	3.8	31.4	49.4	6.1	11.1	18.2	11.7	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.1	55.0	3.8	31.4	49.4	6.1	11.1	18.2	11.7	16.9
LOS	C	D	A	C	D	A	B	B	B	B
Approach Delay (s/veh)		35.7			30.4			17.3		16.2
Approach LOS		D			C			B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay (s/veh): 22.6	Intersection LOS: C
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	173	85	113	130	106	82	449	144	79	412	73
Future Volume (veh/h)	136	173	85	113	130	106	82	449	144	79	412	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	151	192	94	118	135	110	104	568	182	86	448	79
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.79	0.79	0.79	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	228	193	236	195	165	501	1128	360	386	1258	220
Arrive On Green	0.11	0.14	0.14	0.09	0.12	0.12	0.06	0.51	0.51	0.04	0.49	0.49
Sat Flow, veh/h	1500	1575	1335	1500	1575	1335	1500	2230	713	1500	2545	446
Grp Volume(v), veh/h	151	192	94	118	135	110	104	381	369	86	262	265
Grp Sat Flow(s),veh/h/ln	1500	1575	1335	1500	1575	1335	1500	1496	1447	1500	1496	1495
Q Serve(g_s), s	7.8	10.7	5.8	6.1	7.4	7.1	3.0	15.2	15.3	2.5	9.7	9.8
Cycle Q Clear(g_c), s	7.8	10.7	5.8	6.1	7.4	7.1	3.0	15.2	15.3	2.5	9.7	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.49	1.00		0.30
Lane Grp Cap(c), veh/h	286	228	193	236	195	165	501	757	732	386	740	739
V/C Ratio(X)	0.53	0.84	0.49	0.50	0.69	0.67	0.21	0.50	0.51	0.22	0.35	0.36
Avail Cap(c_a), veh/h	304	420	356	237	369	313	534	757	732	436	740	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.0	37.5	35.4	31.1	37.8	37.6	10.4	14.7	14.8	11.4	13.9	14.0
Incr Delay (d2), s/veh	0.6	3.2	0.7	0.6	1.6	1.7	0.1	2.4	2.5	0.1	1.3	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	4.2	1.9	2.1	2.8	0.1	0.9	5.1	5.0	0.8	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.6	40.7	36.1	31.7	39.4	39.4	10.5	17.1	17.2	11.5	15.3	15.3
LnGrp LOS	C	D	D	C	D	D	B	B	B	B	B	B
Approach Vol, veh/h		437			363			854			613	
Approach Delay, s/veh		36.2			36.9			16.4			14.8	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	50.5	12.6	17.9	10.0	49.5	14.4	16.0
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	7.0	31.5	7.7	24.0	7.0	31.5	10.6	21.1
Max Q Clear Time (g_c+I1), s	4.5	17.3	8.1	12.7	5.0	11.8	9.8	9.4
Green Ext Time (p_c), s	0.0	1.4	0.0	0.3	0.0	0.9	0.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.1
HCM 7th LOS	C

Timings

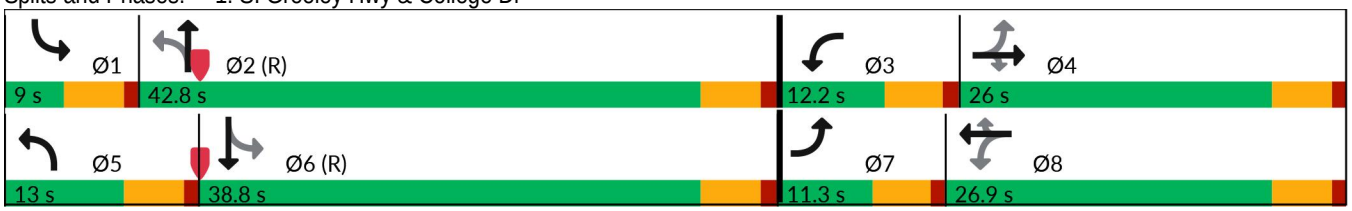
1: S. Greeley Hwy & College Dr

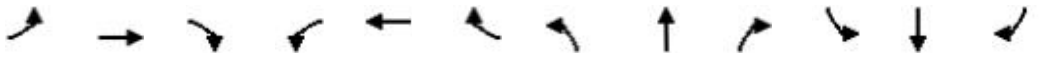
08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	179	203	113	194	195	121	112	778	115	646
Future Volume (vph)	179	203	113	194	195	121	112	778	115	646
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	15.0
Minimum Split (s)	8.9	25.9	25.9	8.9	25.9	25.9	9.0	23.0	9.0	23.0
Total Split (s)	11.3	26.0	26.0	12.2	26.9	26.9	13.0	42.8	9.0	38.8
Total Split (%)	12.6%	28.9%	28.9%	13.6%	29.9%	29.9%	14.4%	47.6%	10.0%	43.1%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	22.2	15.8	15.8	24.0	16.7	16.7	47.0	40.0	47.2	40.1
Actuated g/C Ratio	0.25	0.18	0.18	0.27	0.19	0.19	0.52	0.44	0.52	0.45
v/c Ratio	0.90	0.81	0.35	1.02	0.82	0.40	0.53	0.98	0.67	0.70
Control Delay (s/veh)	68.7	56.7	6.6	95.0	56.7	8.5	17.9	45.5	37.6	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	68.7	56.7	6.6	95.0	56.7	8.5	17.9	45.5	37.6	24.1
LOS	E	E	A	F	E	A	B	D	D	C
Approach Delay (s/veh)		49.6			59.8			42.8		25.7
Approach LOS		D			E			D		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay (s/veh): 41.8	Intersection LOS: D
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	203	113	194	195	121	112	778	259	115	646	193
Future Volume (veh/h)	179	203	113	194	195	121	112	778	259	115	646	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	195	221	123	237	238	148	138	960	320	126	710	212
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.81	0.81	0.81	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	257	218	229	272	231	318	1085	360	188	1065	318
Arrive On Green	0.07	0.16	0.16	0.08	0.17	0.17	0.07	0.49	0.49	0.04	0.47	0.47
Sat Flow, veh/h	1500	1575	1335	1500	1575	1335	1500	2208	732	1500	2271	678
Grp Volume(v), veh/h	195	221	123	237	238	148	138	649	631	126	468	454
Grp Sat Flow(s),veh/h/ln	1500	1575	1335	1500	1575	1335	1500	1496	1443	1500	1496	1453
Q Serve(g_s), s	6.4	12.3	7.6	7.3	13.2	9.3	4.2	35.0	35.6	4.0	21.7	21.7
Cycle Q Clear(g_c), s	6.4	12.3	7.6	7.3	13.2	9.3	4.2	35.0	35.6	4.0	21.7	21.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.51	1.00		0.47
Lane Grp Cap(c), veh/h	212	257	218	229	272	231	318	735	709	188	701	681
V/C Ratio(X)	0.92	0.86	0.57	1.03	0.87	0.64	0.43	0.88	0.89	0.67	0.67	0.67
Avail Cap(c_a), veh/h	212	369	313	229	385	326	351	735	709	188	701	681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	36.7	34.7	35.1	36.3	34.6	14.1	20.5	20.7	20.2	18.5	18.5
Incr Delay (d2), s/veh	39.1	9.8	0.9	68.8	11.3	1.1	0.3	14.4	15.6	7.2	5.0	5.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	5.3	2.4	6.3	5.7	3.0	1.3	13.7	13.6	1.6	7.7	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	74.2	46.5	35.6	104.0	47.6	35.7	14.4	35.0	36.3	27.4	23.4	23.6
LnGrp LOS	E	D	D	F	D	D	B	C	D	C	C	C
Approach Vol, veh/h		539			623			1418			1048	
Approach Delay, s/veh		54.0			66.2			33.6			24.0	
Approach LOS		D			E			C			C	

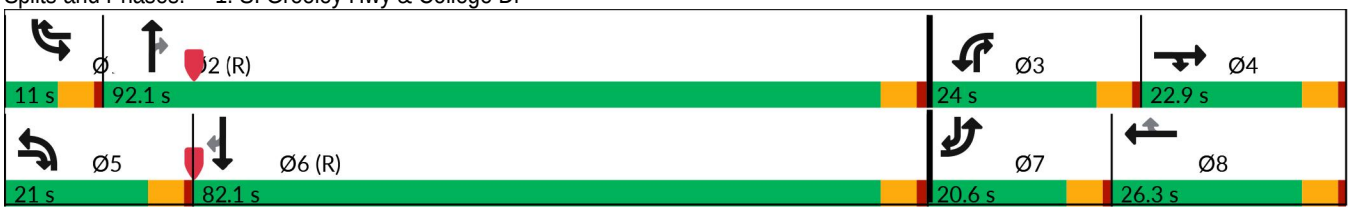
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	49.2	12.2	19.6	11.0	47.2	11.3	20.5
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	4.0	37.8	7.3	21.1	8.0	33.8	6.4	22.0
Max Q Clear Time (g_c+I1), s	6.0	37.6	9.3	14.3	6.2	23.7	8.4	15.2
Green Ext Time (p_c), s	0.0	0.1	0.0	0.3	0.0	1.6	0.0	0.3

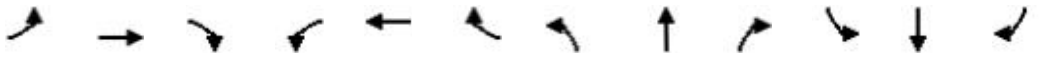
Intersection Summary	
HCM 7th Control Delay, s/veh	39.4
HCM 7th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	173	85	533	130	106	82	449	144	79	1882	73
Future Volume (vph)	136	173	85	533	130	106	82	449	144	79	1882	73
Turn Type	Prot	NA	pt+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	4 5	3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Detector Phase	7	4	4 5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	15.0	4.0	4.0	15.0	4.0
Minimum Split (s)	8.9	22.9		8.9	22.9	9.0	9.0	23.0	8.9	9.0	23.0	8.9
Total Split (s)	20.6	22.9		24.0	26.3	11.0	21.0	92.1	24.0	11.0	82.1	20.6
Total Split (%)	13.7%	15.3%		16.0%	17.5%	7.3%	14.0%	61.4%	16.0%	7.3%	54.7%	13.7%
Yellow Time (s)	3.9	3.9		3.9	3.9	4.0	4.0	4.0	3.9	4.0	4.0	3.9
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9		4.9	4.9	5.0	5.0	5.0	4.9	5.0	5.0	4.9
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	None	None	C-Max	None
Act Effct Green (s)	11.2	13.1	26.9	19.1	20.9	33.1	8.8	90.7	114.8	7.3	89.2	105.4
Actuated g/C Ratio	0.07	0.09	0.18	0.13	0.14	0.22	0.06	0.60	0.77	0.05	0.59	0.70
v/c Ratio	0.70	0.74	0.34	1.51	0.32	0.29	0.61	0.22	0.17	0.61	0.80	0.08
Control Delay (s/veh)	84.4	83.5	28.5	284.5	60.5	9.9	82.3	14.8	1.9	88.1	27.7	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	84.4	83.5	28.5	284.5	60.5	9.9	82.3	14.8	1.9	88.1	27.7	1.4
LOS	F	F	C	F	E	A	F	B	A	F	C	A
Approach Delay (s/veh)		72.0			209.0			20.3			29.1	
Approach LOS		E			F			C			C	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.51	
Intersection Signal Delay (s/veh): 65.2	Intersection LOS: E
Intersection Capacity Utilization 79.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	173	85	533	130	106	82	449	144	79	1882	73
Future Volume (veh/h)	136	173	85	533	130	106	82	449	144	79	1882	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	151	192	94	555	135	110	104	568	182	86	2046	79
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.79	0.79	0.79	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	188	243	173	371	430	245	140	2664	997	116	2628	902
Arrive On Green	0.06	0.08	0.08	0.13	0.14	0.14	0.05	0.62	0.62	0.04	0.61	0.61
Sat Flow, veh/h	2910	2993	1335	2910	2993	1335	2910	4300	1335	2910	4300	1335
Grp Volume(v), veh/h	151	192	94	555	135	110	104	568	182	86	2046	79
Grp Sat Flow(s),veh/h/ln	1455	1496	1335	1455	1496	1335	1455	1433	1335	1455	1433	1335
Q Serve(g_s), s	7.7	9.4	9.9	19.1	6.1	11.0	5.3	8.7	6.0	4.4	52.9	3.1
Cycle Q Clear(g_c), s	7.7	9.4	9.9	19.1	6.1	11.0	5.3	8.7	6.0	4.4	52.9	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	188	243	173	371	430	245	140	2664	997	116	2628	902
V/C Ratio(X)	0.80	0.79	0.54	1.50	0.31	0.45	0.74	0.21	0.18	0.74	0.78	0.09
Avail Cap(c_a), veh/h	305	359	225	371	430	245	310	2664	997	116	2628	902
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.2	67.7	61.2	65.4	57.6	54.5	70.5	12.5	5.6	71.2	21.6	8.4
Incr Delay (d2), s/veh	3.0	3.9	1.0	237.8	0.2	0.5	2.8	0.2	0.4	19.5	2.4	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	3.8	3.4	19.2	2.3	3.7	2.0	2.8	1.6	1.9	17.3	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	72.2	71.5	62.1	303.2	57.7	54.9	73.2	12.7	6.0	90.7	24.0	8.6
LnGrp LOS	E	E	E	F	E	D	E	B	A	F	C	A
Approach Vol, veh/h		437			800			854			2211	
Approach Delay, s/veh		69.7			227.7			18.6			26.0	
Approach LOS		E			F			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	97.9	24.0	17.1	12.2	96.7	14.6	26.5
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	6.0	87.1	19.1	18.0	16.0	77.1	15.7	21.4
Max Q Clear Time (g_c+I1), s	6.4	10.7	21.1	11.9	7.3	54.9	9.7	13.0
Green Ext Time (p_c), s	0.0	1.4	0.0	0.3	0.0	6.8	0.1	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	66.5
HCM 7th LOS	E

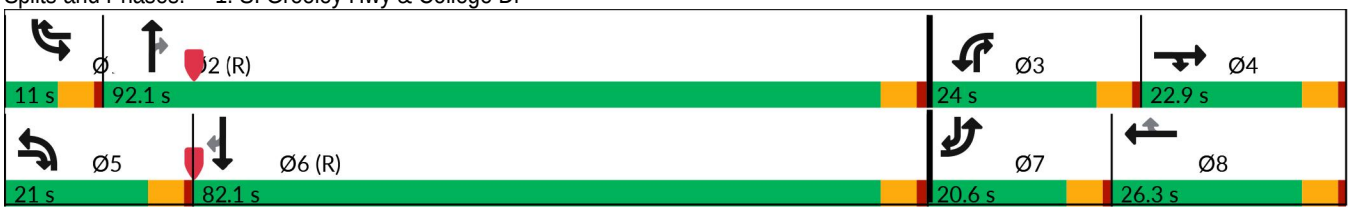
Timings
1: S. Greeley Hwy & College Dr

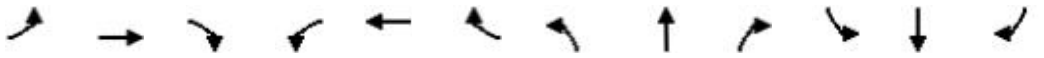
08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	270	150	258	259	161	149	2747	870	153	857	256
Future Volume (vph)	239	270	150	258	259	161	149	2747	870	153	857	256
Turn Type	Prot	NA	pt+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	4 5	3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Detector Phase	7	4	4 5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	15.0	4.0	4.0	15.0	4.0
Minimum Split (s)	8.9	22.9		8.9	22.9	9.0	9.0	23.0	8.9	9.0	23.0	8.9
Total Split (s)	20.6	22.9		24.0	26.3	11.0	21.0	92.1	24.0	11.0	82.1	20.6
Total Split (%)	13.7%	15.3%		16.0%	17.5%	7.3%	14.0%	61.4%	16.0%	7.3%	54.7%	13.7%
Yellow Time (s)	3.9	3.9		3.9	3.9	4.0	4.0	4.0	3.9	4.0	4.0	3.9
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9		4.9	4.9	5.0	5.0	5.0	4.9	5.0	5.0	4.9
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	None	None	C-Max	None
Act Effct Green (s)	15.1	16.8	34.5	19.1	20.8	32.9	12.7	87.1	111.2	7.2	81.6	101.7
Actuated g/C Ratio	0.10	0.11	0.23	0.13	0.14	0.22	0.08	0.58	0.74	0.05	0.54	0.68
v/c Ratio	0.90	0.88	0.44	0.86	0.77	0.54	0.75	1.36	1.07	1.21	0.40	0.30
Control Delay (s/veh)	97.8	92.0	25.9	85.7	75.3	34.8	77.5	196.8	68.4	198.8	21.1	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	97.8	92.0	25.9	85.7	75.3	34.8	77.5	196.8	68.4	198.8	21.1	7.8
LOS	F	F	C	F	E	C	E	F	E	F	C	A
Approach Delay (s/veh)		79.1			69.7			162.4			39.9	
Approach LOS		E			E			F			D	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.36	
Intersection Signal Delay (s/veh): 121.9	Intersection LOS: F
Intersection Capacity Utilization 102.3%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	239	270	150	258	259	161	149	2747	870	153	857	256
Future Volume (veh/h)	239	270	150	258	259	161	149	2747	870	153	857	256
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	260	293	163	315	316	196	184	3391	1074	168	942	281
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.81	0.81	0.81	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	296	371	267	350	427	244	221	2510	940	116	2355	867
Arrive On Green	0.10	0.12	0.12	0.12	0.14	0.14	0.08	0.58	0.58	0.04	0.55	0.55
Sat Flow, veh/h	2910	2993	1335	2910	2993	1335	2910	4300	1335	2910	4300	1335
Grp Volume(v), veh/h	260	293	163	315	316	196	184	3391	1074	168	942	281
Grp Sat Flow(s),veh/h/ln	1455	1496	1335	1455	1496	1335	1455	1433	1335	1455	1433	1335
Q Serve(g_s), s	13.2	14.3	16.7	16.0	15.2	21.1	9.4	87.6	87.6	6.0	19.0	14.0
Cycle Q Clear(g_c), s	13.2	14.3	16.7	16.0	15.2	21.1	9.4	87.6	87.6	6.0	19.0	14.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	296	371	267	350	427	244	221	2510	940	116	2355	867
V/C Ratio(X)	0.88	0.79	0.61	0.90	0.74	0.80	0.83	1.35	1.14	1.44	0.40	0.32
Avail Cap(c_a), veh/h	305	371	267	371	427	244	310	2510	940	116	2355	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.43	0.43	0.43	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.5	63.8	54.7	65.1	61.6	58.7	68.4	31.2	22.2	72.0	19.6	11.7
Incr Delay (d2), s/veh	22.9	10.2	3.0	22.3	6.0	16.3	4.1	159.1	70.3	241.1	0.5	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	6.0	5.8	7.0	6.1	8.2	3.6	65.1	46.9	6.1	6.3	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	89.3	74.0	57.6	87.4	67.6	75.0	72.5	190.3	92.5	313.1	20.2	12.7
LnGrp LOS	F	E	E	F	E	E	E	F	F	F	C	B
Approach Vol, veh/h		716			827			4649			1391	
Approach Delay, s/veh		75.8			76.9			163.0			54.0	
Approach LOS		E			E			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	92.6	23.0	23.5	16.4	87.2	20.1	26.3
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	6.0	87.1	19.1	18.0	16.0	77.1	15.7	21.4
Max Q Clear Time (g_c+I1), s	8.0	89.6	18.0	18.7	11.4	21.0	15.2	23.1
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	2.5	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	125.4
HCM 7th LOS	F

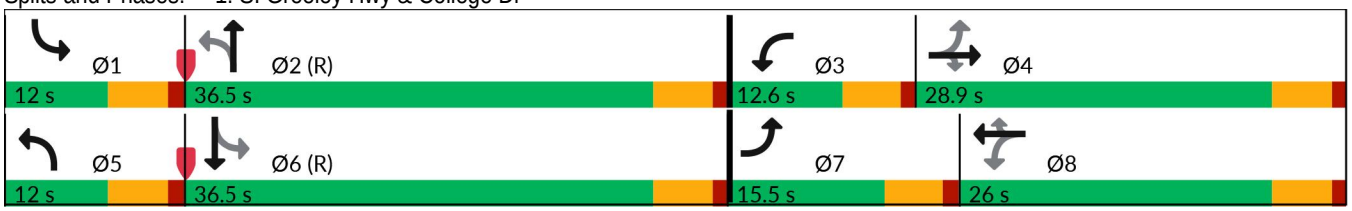
Timings
1: S. Greeley Hwy & College Dr

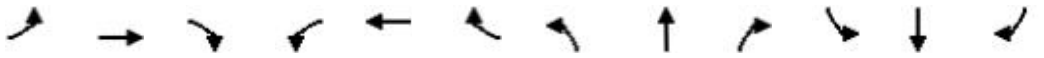
08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	142	180	131	174	135	110	87	472	82	436
Future Volume (vph)	142	180	131	174	135	110	87	472	82	436
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	15.0
Minimum Split (s)	8.9	25.9	25.9	8.9	25.9	25.9	9.0	23.0	9.0	23.0
Total Split (s)	15.5	28.9	28.9	12.6	26.0	26.0	12.0	36.5	12.0	36.5
Total Split (%)	17.2%	32.1%	32.1%	14.0%	28.9%	28.9%	13.3%	40.6%	13.3%	40.6%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	24.3	15.0	15.0	20.7	13.2	13.2	49.1	43.3	48.2	42.9
Actuated g/C Ratio	0.27	0.17	0.17	0.23	0.15	0.15	0.55	0.48	0.54	0.48
v/c Ratio	0.55	0.77	0.43	0.75	0.62	0.36	0.28	0.56	0.29	0.40
Control Delay (s/veh)	30.6	54.3	9.3	45.7	47.2	6.6	11.7	19.4	12.5	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	30.6	54.3	9.3	45.7	47.2	6.6	11.7	19.4	12.5	17.8
LOS	C	D	A	D	D	A	B	B	B	B
Approach Delay (s/veh)		33.9			35.9			18.5		17.1
Approach LOS		C			D			B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay (s/veh): 24.3	Intersection LOS: C
Intersection Capacity Utilization 65.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	180	131	174	135	110	87	472	152	82	436	76
Future Volume (veh/h)	142	180	131	174	135	110	87	472	152	82	436	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	158	200	146	181	141	115	110	597	192	89	474	83
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.79	0.79	0.79	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	290	236	200	236	198	168	481	1110	356	365	1238	216
Arrive On Green	0.11	0.15	0.15	0.09	0.13	0.13	0.06	0.50	0.50	0.05	0.49	0.49
Sat Flow, veh/h	1500	1575	1335	1500	1575	1335	1500	2228	715	1500	2548	444
Grp Volume(v), veh/h	158	200	146	181	141	115	110	401	388	89	277	280
Grp Sat Flow(s),veh/h/ln	1500	1575	1335	1500	1575	1335	1500	1496	1446	1500	1496	1495
Q Serve(g_s), s	8.1	11.1	9.4	7.7	7.7	7.4	3.2	16.5	16.6	2.7	10.5	10.6
Cycle Q Clear(g_c), s	8.1	11.1	9.4	7.7	7.7	7.4	3.2	16.5	16.6	2.7	10.5	10.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.49	1.00		0.30
Lane Grp Cap(c), veh/h	290	236	200	236	198	168	481	745	720	365	727	727
V/C Ratio(X)	0.55	0.85	0.73	0.77	0.71	0.69	0.23	0.54	0.54	0.24	0.38	0.38
Avail Cap(c_a), veh/h	301	420	356	236	369	313	510	745	720	412	727	727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.8	37.2	36.5	34.1	37.8	37.6	10.8	15.5	15.5	12.0	14.6	14.6
Incr Delay (d2), s/veh	0.9	3.2	1.9	12.9	1.8	1.9	0.1	2.8	2.9	0.1	1.5	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.4	3.0	1.6	3.0	2.4	1.0	5.6	5.5	0.8	3.5	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.7	40.4	38.4	46.9	39.6	39.5	10.9	18.3	18.4	12.1	16.1	16.2
LnGrp LOS	C	D	D	D	D	D	B	B	B	B	B	B
Approach Vol, veh/h		504			437			899			646	
Approach Delay, s/veh		36.8			42.6			17.4			15.6	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	49.8	12.6	18.4	10.3	48.7	14.8	16.2
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	7.0	31.5	7.7	24.0	7.0	31.5	10.6	21.1
Max Q Clear Time (g_c+I1), s	4.7	18.6	9.7	13.1	5.2	12.6	10.1	9.7
Green Ext Time (p_c), s	0.0	1.4	0.0	0.4	0.0	1.0	0.0	0.2

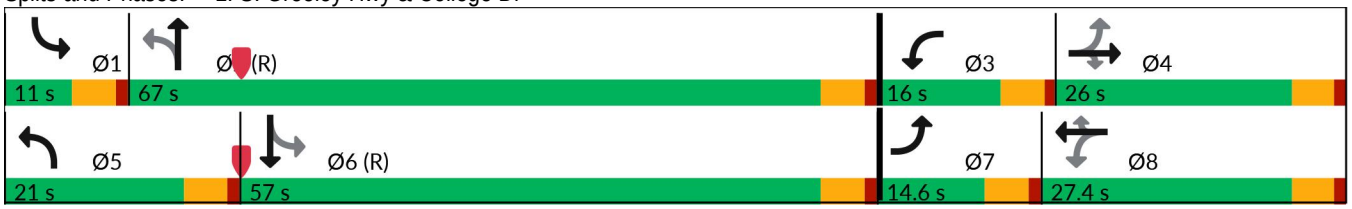
Intersection Summary	
HCM 7th Control Delay, s/veh	25.3
HCM 7th LOS	C

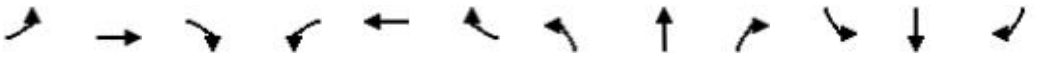
Timings
1: S. Greeley Hwy & College Dr 08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	186	211	117	201	202	126	183	956	119	668
Future Volume (vph)	186	211	117	201	202	126	183	956	119	668
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	15.0
Minimum Split (s)	8.9	25.9	25.9	8.9	25.9	25.9	9.0	23.0	9.0	23.0
Total Split (s)	14.6	26.0	26.0	16.0	27.4	27.4	21.0	67.0	11.0	57.0
Total Split (%)	12.2%	21.7%	21.7%	13.3%	22.8%	22.8%	17.5%	55.8%	9.2%	47.5%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	29.0	19.3	19.3	31.8	20.7	20.7	72.1	62.0	65.4	57.7
Actuated g/C Ratio	0.24	0.16	0.16	0.27	0.17	0.17	0.60	0.52	0.55	0.48
v/c Ratio	1.02	0.91	0.37	1.14	0.91	0.43	0.76	1.07	0.89	0.68
Control Delay (s/veh)	107.8	86.9	6.9	141.1	84.4	10.5	29.2	74.2	78.3	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	107.8	86.9	6.9	141.1	84.4	10.5	29.2	74.2	78.3	27.0
LOS	F	F	A	F	F	B	C	E	E	C
Approach Delay (s/veh)		76.3			88.3			68.7		33.2
Approach LOS		E			F			E		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay (s/veh): 63.5	Intersection LOS: E
Intersection Capacity Utilization 95.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	186	211	117	201	202	126	183	956	358	119	668	200
Future Volume (veh/h)	186	211	117	201	202	126	183	956	358	119	668	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	202	229	127	245	246	154	226	1180	442	131	734	220
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.81	0.81	0.81	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	200	253	214	217	271	230	341	1143	416	135	1119	335
Arrive On Green	0.08	0.16	0.16	0.09	0.17	0.17	0.09	0.53	0.53	0.05	0.49	0.49
Sat Flow, veh/h	1500	1575	1335	1500	1575	1335	1500	2148	782	1500	2269	680
Grp Volume(v), veh/h	202	229	127	245	246	154	226	812	810	131	484	470
Grp Sat Flow(s),veh/h/ln	1500	1575	1335	1500	1575	1335	1500	1496	1434	1500	1496	1453
Q Serve(g_s), s	9.7	17.1	10.6	11.1	18.4	13.0	8.6	63.8	63.8	5.6	29.1	29.1
Cycle Q Clear(g_c), s	9.7	17.1	10.6	11.1	18.4	13.0	8.6	63.8	63.8	5.6	29.1	29.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.55	1.00		0.47
Lane Grp Cap(c), veh/h	200	253	214	217	271	230	341	796	763	135	738	716
V/C Ratio(X)	1.01	0.91	0.59	1.13	0.91	0.67	0.66	1.02	1.06	0.97	0.66	0.66
Avail Cap(c_a), veh/h	200	277	235	217	295	250	407	796	763	135	738	716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.3	49.5	46.7	44.0	48.7	46.5	17.9	28.1	28.1	30.4	22.8	22.8
Incr Delay (d2), s/veh	66.2	28.0	1.9	100.1	27.1	4.5	1.9	37.0	50.4	67.8	4.5	4.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	8.7	3.6	7.9	9.1	4.5	2.9	29.0	30.7	4.4	10.6	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	111.4	77.4	48.6	144.1	75.8	51.0	19.8	65.1	78.5	98.2	27.3	27.4
LnGrp LOS	F	E	D	F	E	D	B	F	F	F	C	C
Approach Vol, veh/h		558			645			1848			1085	
Approach Delay, s/veh		83.2			95.8			65.4			35.9	
Approach LOS		F			F			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	68.8	16.0	24.2	15.7	64.2	14.6	25.6
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	6.0	62.0	11.1	21.1	16.0	52.0	9.7	22.5
Max Q Clear Time (g_c+I1), s	7.6	65.8	13.1	19.1	10.6	31.1	11.7	20.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.1	0.1	1.9	0.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	64.8
HCM 7th LOS	E

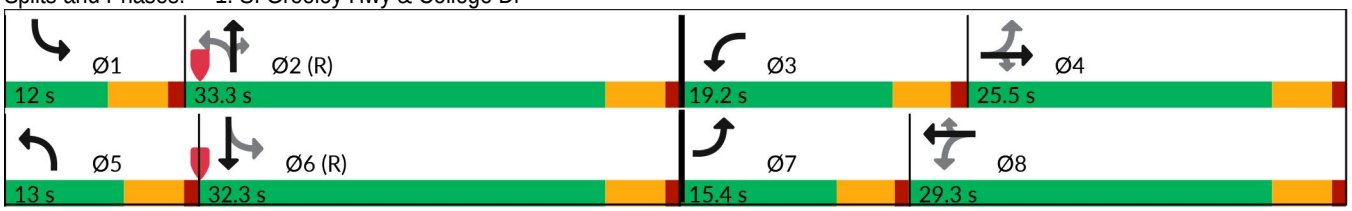
Timings
1: S. Greeley Hwy & College Dr

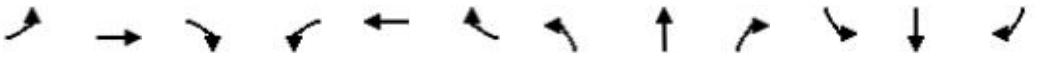
08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	142	180	131	192	135	110	87	518	165	82	498
Future Volume (vph)	142	180	131	192	135	110	87	518	165	82	498
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	7	4	4	3	8	8	5	2	2	1	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0
Minimum Split (s)	8.9	22.9	22.9	8.9	22.9	22.9	9.0	23.0	23.0	9.0	23.0
Total Split (s)	15.4	25.5	25.5	19.2	29.3	29.3	13.0	33.3	33.3	12.0	32.3
Total Split (%)	17.1%	28.3%	28.3%	21.3%	32.6%	32.6%	14.4%	37.0%	37.0%	13.3%	35.9%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	23.9	14.7	14.7	29.5	17.5	17.5	45.1	39.4	39.4	43.9	38.7
Actuated g/C Ratio	0.27	0.16	0.16	0.33	0.19	0.19	0.50	0.44	0.44	0.49	0.43
v/c Ratio	0.49	0.78	0.43	0.65	0.46	0.31	0.33	0.50	0.30	0.28	0.49
Control Delay (s/veh)	25.3	56.0	9.5	30.5	35.7	5.0	15.4	22.7	4.7	15.0	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.3	56.0	9.5	30.5	35.7	5.0	15.4	22.7	4.7	15.0	22.5
LOS	C	E	A	C	D	A	B	C	A	B	C
Approach Delay (s/veh)		32.9			25.7			18.0			21.5
Approach LOS		C			C			B			C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay (s/veh): 23.1	Intersection LOS: C
Intersection Capacity Utilization 65.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	180	131	192	135	110	87	518	165	82	498	76
Future Volume (veh/h)	142	180	131	192	135	110	87	518	165	82	498	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	158	200	146	200	141	115	110	656	209	89	541	83
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.79	0.79	0.79	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	236	200	305	274	232	401	1346	600	342	1146	175
Arrive On Green	0.11	0.15	0.15	0.13	0.17	0.17	0.06	0.45	0.45	0.05	0.44	0.44
Sat Flow, veh/h	1500	1575	1335	1500	1575	1335	1500	2993	1335	1500	2602	398
Grp Volume(v), veh/h	158	200	146	200	141	115	110	656	209	89	310	314
Grp Sat Flow(s),veh/h/ln	1500	1575	1335	1500	1575	1335	1500	1496	1335	1500	1496	1503
Q Serve(g_s), s	7.9	11.1	9.4	9.9	7.3	7.0	3.6	13.9	9.2	2.9	13.2	13.3
Cycle Q Clear(g_c), s	7.9	11.1	9.4	9.9	7.3	7.0	3.6	13.9	9.2	2.9	13.2	13.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.26
Lane Grp Cap(c), veh/h	346	236	200	305	274	232	401	1346	600	342	659	662
V/C Ratio(X)	0.46	0.85	0.73	0.66	0.51	0.50	0.27	0.49	0.35	0.26	0.47	0.47
Avail Cap(c_a), veh/h	359	361	306	345	427	362	448	1346	600	385	659	662
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.9	37.3	36.5	27.6	33.7	33.6	13.4	17.5	16.2	13.6	17.8	17.8
Incr Delay (d2), s/veh	0.4	7.0	1.9	2.5	0.6	0.6	0.1	1.3	1.6	0.1	2.4	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	4.7	3.0	3.6	2.7	2.2	1.1	4.6	2.8	0.9	4.6	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.3	44.3	38.5	30.2	34.3	34.2	13.5	18.7	17.7	13.7	20.2	20.2
LnGrp LOS	C	D	D	C	C	C	B	B	B	B	C	C
Approach Vol, veh/h		504			456			975			713	
Approach Delay, s/veh		37.6			32.4			17.9			19.4	
Approach LOS		D			C			B			B	

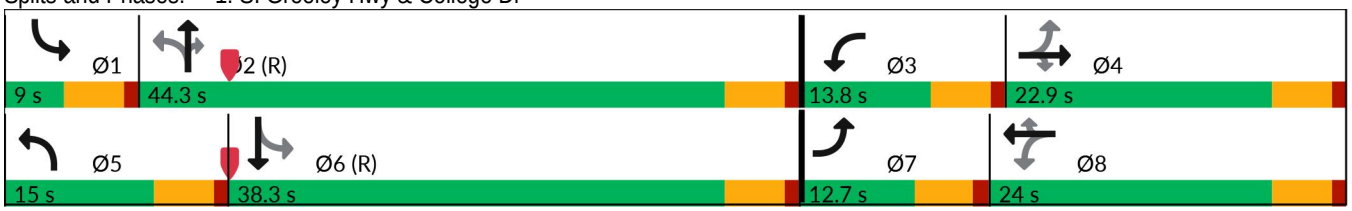
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	45.5	16.8	18.4	10.2	44.6	14.6	20.6
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	7.0	28.3	14.3	20.6	8.0	27.3	10.5	24.4
Max Q Clear Time (g_c+I1), s	4.9	15.9	11.9	13.1	5.6	15.3	9.9	9.3
Green Ext Time (p_c), s	0.0	1.4	0.0	0.3	0.0	1.0	0.0	0.3

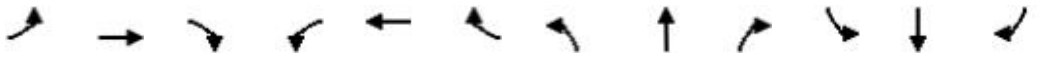
Intersection Summary	
HCM 7th Control Delay, s/veh	24.6
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	186	211	117	209	202	126	183	1021	376	119	695
Future Volume (vph)	186	211	117	209	202	126	183	1021	376	119	695
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	7	4	4	3	8	8	5	2	2	1	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0
Minimum Split (s)	8.9	22.9	22.9	8.9	22.9	22.9	9.0	23.0	23.0	9.0	23.0
Total Split (s)	12.7	22.9	22.9	13.8	24.0	24.0	15.0	44.3	44.3	9.0	38.3
Total Split (%)	14.1%	25.4%	25.4%	15.3%	26.7%	26.7%	16.7%	49.2%	49.2%	10.0%	42.6%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	23.3	15.5	15.5	25.5	16.6	16.6	50.0	39.9	39.9	41.1	35.1
Actuated g/C Ratio	0.26	0.17	0.17	0.28	0.18	0.18	0.56	0.44	0.44	0.46	0.39
v/c Ratio	0.87	0.85	0.32	1.02	0.85	0.37	0.85	0.96	0.55	0.78	0.85
Control Delay (s/veh)	60.4	63.7	2.7	92.7	62.1	4.5	45.9	41.7	4.6	50.5	33.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	60.4	63.7	2.7	92.7	62.1	4.5	45.9	41.7	4.6	50.5	33.5
LOS	E	E	A	F	E	A	D	D	A	D	C
Approach Delay (s/veh)		48.6			60.5			33.4			35.5
Approach LOS		D			E			C			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay (s/veh): 40.1	Intersection LOS: D
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	186	211	117	209	202	126	183	1021	376	119	695	200
Future Volume (veh/h)	186	211	117	209	202	126	183	1021	376	119	695	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	202	229	127	255	246	154	226	1260	464	131	764	220
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.81	0.81	0.81	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	236	262	222	254	281	238	303	1407	628	171	941	271
Arrive On Green	0.09	0.17	0.17	0.10	0.18	0.18	0.10	0.47	0.47	0.04	0.41	0.41
Sat Flow, veh/h	1500	1575	1335	1500	1575	1335	1500	2993	1335	1500	2292	660
Grp Volume(v), veh/h	202	229	127	255	246	154	226	1260	464	131	499	485
Grp Sat Flow(s),veh/h/ln	1500	1575	1335	1500	1575	1335	1500	1496	1335	1500	1496	1456
Q Serve(g_s), s	7.8	12.8	7.9	8.9	13.7	9.6	7.4	34.7	25.4	4.0	26.5	26.5
Cycle Q Clear(g_c), s	7.8	12.8	7.9	8.9	13.7	9.6	7.4	34.7	25.4	4.0	26.5	26.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	236	262	222	254	281	238	303	1407	628	171	614	598
V/C Ratio(X)	0.86	0.87	0.57	1.01	0.87	0.65	0.75	0.90	0.74	0.77	0.81	0.81
Avail Cap(c_a), veh/h	236	315	267	254	334	283	313	1407	628	171	614	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.7	36.6	34.6	33.5	36.0	34.3	18.3	21.8	19.4	24.5	23.4	23.4
Incr Delay (d2), s/veh	24.1	18.0	0.9	58.0	17.5	2.2	8.0	9.2	7.6	17.1	11.1	11.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	6.1	2.5	5.9	6.4	3.1	2.9	12.6	8.4	2.3	10.4	10.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.8	54.6	35.4	91.6	53.5	36.5	26.3	31.0	27.0	41.6	34.6	34.9
LnGrp LOS	E	D	D	F	D	D	C	C	C	D	C	C
Approach Vol, veh/h		558			655			1950			1115	
Approach Delay, s/veh		51.0			64.3			29.5			35.5	
Approach LOS		D			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	47.3	13.8	19.9	14.4	42.0	12.7	21.0
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	4.0	39.3	8.9	18.0	10.0	33.3	7.8	19.1
Max Q Clear Time (g_c+I1), s	6.0	36.7	10.9	14.8	9.4	28.5	9.8	15.7
Green Ext Time (p_c), s	0.0	1.3	0.0	0.2	0.0	1.2	0.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	39.2
HCM 7th LOS	D

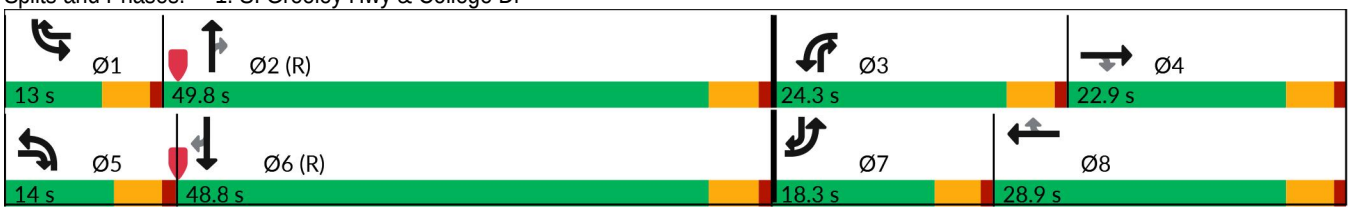
Timings
1: S. Greeley Hwy & College Dr

08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	245	362	495	174	141	163	881	270	105	1612	97
Future Volume (vph)	181	245	362	495	174	141	163	881	270	105	1612	97
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	4.0	15.0	4.0
Minimum Split (s)	8.9	22.9	9.0	8.9	22.9	9.0	9.0	23.0	8.9	9.0	23.0	8.9
Total Split (s)	18.3	22.9	14.0	24.3	28.9	13.0	14.0	49.8	24.3	13.0	48.8	18.3
Total Split (%)	16.6%	20.8%	12.7%	22.1%	26.3%	11.8%	12.7%	45.3%	22.1%	11.8%	44.4%	16.6%
Yellow Time (s)	3.9	3.9	4.0	3.9	3.9	4.0	4.0	4.0	3.9	4.0	4.0	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	5.0	4.9	4.9	5.0	5.0	5.0	4.9	5.0	5.0	4.9
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	None
Act Effct Green (s)	10.7	13.4	30.1	19.4	22.1	34.3	11.7	50.1	74.5	7.3	45.6	61.3
Actuated g/C Ratio	0.10	0.12	0.27	0.18	0.20	0.31	0.11	0.46	0.68	0.07	0.41	0.56
v/c Ratio	0.72	0.75	0.90	1.01	0.30	0.32	0.67	0.57	0.36	0.60	0.99	0.13
Control Delay (s/veh)	62.2	59.3	50.5	88.9	38.7	17.1	59.2	24.3	6.3	63.0	51.3	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	62.2	59.3	50.5	88.9	38.7	17.1	59.2	24.3	6.3	63.0	51.3	2.1
LOS	E	E	D	F	D	B	E	C	A	E	D	A
Approach Delay (s/veh)		55.9			65.6			24.9			49.4	
Approach LOS		E			E			C			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay (s/veh): 45.4	Intersection LOS: D
Intersection Capacity Utilization 92.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	245	362	495	174	141	163	881	270	105	1612	97
Future Volume (veh/h)	181	245	362	495	174	141	163	881	270	105	1612	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	201	272	402	516	181	147	206	1115	342	114	1752	105
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.79	0.79	0.79	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	251	490	328	513	759	412	238	1827	803	160	1712	647
Arrive On Green	0.09	0.16	0.16	0.18	0.25	0.25	0.08	0.42	0.42	0.06	0.40	0.40
Sat Flow, veh/h	2910	2993	1335	2910	2993	1335	2910	4300	1335	2910	4300	1335
Grp Volume(v), veh/h	201	272	402	516	181	147	206	1115	342	114	1752	105
Grp Sat Flow(s),veh/h/ln	1455	1496	1335	1455	1496	1335	1455	1433	1335	1455	1433	1335
Q Serve(g_s), s	7.5	9.2	18.0	19.4	5.3	9.4	7.7	22.1	15.1	4.2	43.8	4.8
Cycle Q Clear(g_c), s	7.5	9.2	18.0	19.4	5.3	9.4	7.7	22.1	15.1	4.2	43.8	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	251	490	328	513	759	412	238	1827	803	160	1712	647
V/C Ratio(X)	0.80	0.56	1.23	1.01	0.24	0.36	0.87	0.61	0.43	0.71	1.02	0.16
Avail Cap(c_a), veh/h	354	490	328	513	759	412	238	1827	803	212	1712	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.74	0.74	0.74	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.3	42.3	41.5	45.3	32.6	29.5	49.9	24.6	11.8	51.1	33.1	15.9
Incr Delay (d2), s/veh	5.5	0.8	126.2	41.1	0.1	0.2	20.2	1.1	1.2	4.1	27.9	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	3.4	20.0	9.7	1.9	3.0	3.4	7.3	4.3	1.6	18.7	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	54.8	43.2	167.7	86.4	32.7	29.7	70.1	25.7	13.0	55.2	61.0	16.4
LnGrp LOS	D	D	F	F	C	C	E	C	B	E	F	B
Approach Vol, veh/h		875			844			1663			1971	
Approach Delay, s/veh		103.0			65.0			28.6			58.2	
Approach LOS		F			E			C			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	51.7	24.3	22.9	14.0	48.8	14.4	32.8
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	8.0	44.8	19.4	18.0	9.0	43.8	13.4	24.0
Max Q Clear Time (g_c+I1), s	6.2	24.1	21.4	20.0	9.7	45.8	9.5	11.4
Green Ext Time (p_c), s	0.0	3.0	0.0	0.0	0.0	0.0	0.1	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	57.4
HCM 7th LOS	E

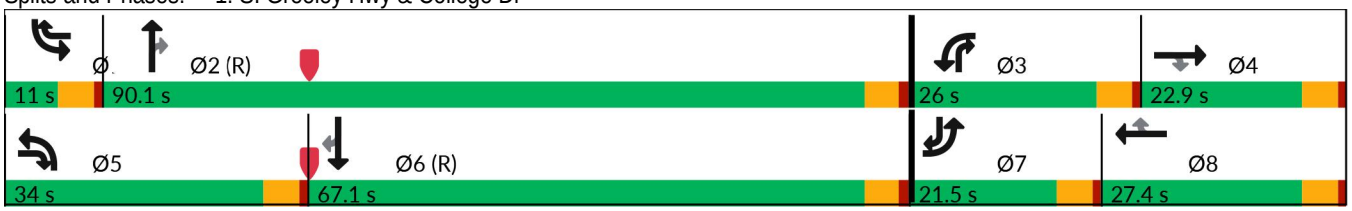
Timings
1: S. Greeley Hwy & College Dr

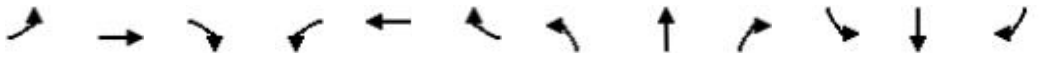
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	270	207	344	281	161	409	2157	690	153	1172	256
Future Volume (vph)	239	270	207	344	281	161	409	2157	690	153	1172	256
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	4.0	15.0	4.0
Minimum Split (s)	8.9	22.9	9.0	8.9	22.9	9.0	9.0	23.0	8.9	9.0	23.0	8.9
Total Split (s)	21.5	22.9	34.0	26.0	27.4	11.0	34.0	90.1	26.0	11.0	67.1	21.5
Total Split (%)	14.3%	15.3%	22.7%	17.3%	18.3%	7.3%	22.7%	60.1%	17.3%	7.3%	44.7%	14.3%
Yellow Time (s)	3.9	3.9	4.0	3.9	3.9	4.0	4.0	4.0	3.9	4.0	4.0	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	5.0	4.9	4.9	5.0	5.0	5.0	4.9	5.0	5.0	4.9
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	None
Act Effct Green (s)	15.5	16.8	49.5	21.1	22.4	34.5	27.8	85.1	111.2	7.2	64.5	85.0
Actuated g/C Ratio	0.10	0.11	0.33	0.14	0.15	0.23	0.19	0.57	0.74	0.05	0.43	0.57
v/c Ratio	0.88	0.88	0.48	1.03	0.77	0.53	0.94	1.10	0.85	1.21	0.70	0.35
Control Delay (s/veh)	94.1	92.0	33.7	115.1	73.8	33.5	87.1	82.3	23.0	198.8	37.8	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	94.1	92.0	33.7	115.1	73.8	33.5	87.1	82.3	23.0	198.8	37.8	13.4
LOS	F	F	C	F	E	C	F	F	C	F	D	B
Approach Delay (s/veh)		75.8			83.7			70.3			49.4	
Approach LOS		E			F			E			D	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay (s/veh): 67.8	Intersection LOS: E
Intersection Capacity Utilization 91.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	239	270	207	344	281	161	409	2157	690	153	1172	256
Future Volume (veh/h)	239	270	207	344	281	161	409	2157	690	153	1172	256
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	260	293	225	420	343	196	505	2663	852	168	1288	281
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.81	0.81	0.81	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	296	359	407	409	476	266	538	2439	945	116	1816	699
Arrive On Green	0.10	0.12	0.12	0.14	0.16	0.16	0.19	0.57	0.57	0.04	0.42	0.42
Sat Flow, veh/h	2910	2993	1335	2910	2993	1335	2910	4300	1335	2910	4300	1335
Grp Volume(v), veh/h	260	293	225	420	343	196	505	2663	852	168	1288	281
Grp Sat Flow(s),veh/h/ln	1455	1496	1335	1455	1496	1335	1455	1433	1335	1455	1433	1335
Q Serve(g_s), s	13.2	14.3	18.0	21.1	16.3	20.7	25.7	85.1	77.3	6.0	37.1	19.0
Cycle Q Clear(g_c), s	13.2	14.3	18.0	21.1	16.3	20.7	25.7	85.1	77.3	6.0	37.1	19.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	296	359	407	409	476	266	538	2439	945	116	1816	699
V/C Ratio(X)	0.88	0.82	0.55	1.03	0.72	0.74	0.94	1.09	0.90	1.44	0.71	0.40
Avail Cap(c_a), veh/h	322	359	407	409	476	266	563	2439	945	116	1816	699
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.26	0.26	0.26	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.5	64.4	43.6	64.4	59.9	56.4	60.3	32.4	17.7	72.0	35.7	21.5
Incr Delay (d2), s/veh	20.6	12.7	1.0	51.3	4.6	9.2	8.2	43.4	4.1	241.1	2.4	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	6.1	7.0	10.6	6.4	7.6	10.0	37.4	21.9	6.1	13.1	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	87.1	77.1	44.5	115.7	64.5	65.6	68.5	75.9	21.8	313.1	38.1	23.2
LnGrp LOS	F	E	D	F	E	E	E	F	C	F	D	C
Approach Vol, veh/h		778			959			4020			1737	
Approach Delay, s/veh		71.0			87.2			63.5			62.3	
Approach LOS		E			F			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	90.1	26.0	22.9	32.8	68.3	20.2	28.7
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	6.0	85.1	21.1	18.0	29.0	62.1	16.6	22.5
Max Q Clear Time (g_c+I1), s	8.0	87.1	23.1	20.0	27.7	39.1	15.2	22.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	3.6	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	67.0
HCM 7th LOS	E

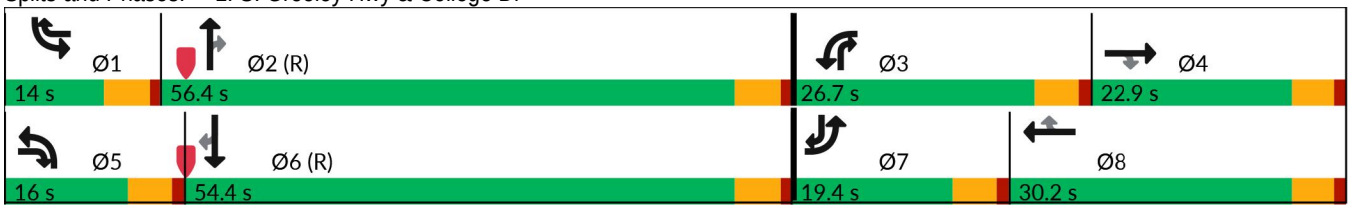
Timings
1: S. Greeley Hwy & College Dr

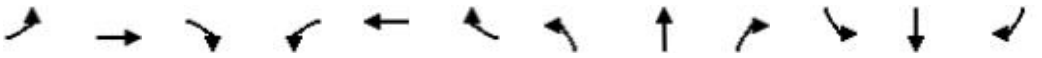
08/28/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	245	362	513	174	141	163	927	283	105	1674	97
Future Volume (vph)	181	245	362	513	174	141	163	927	283	105	1674	97
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	4.0	15.0	4.0
Minimum Split (s)	8.9	22.9	9.0	8.9	22.9	9.0	9.0	23.0	8.9	9.0	23.0	8.9
Total Split (s)	19.4	22.9	16.0	26.7	30.2	14.0	16.0	56.4	26.7	14.0	54.4	19.4
Total Split (%)	16.2%	19.1%	13.3%	22.3%	25.2%	11.7%	13.3%	47.0%	22.3%	11.7%	45.3%	16.2%
Yellow Time (s)	3.9	3.9	4.0	3.9	3.9	4.0	4.0	4.0	3.9	4.0	4.0	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	5.0	4.9	4.9	5.0	5.0	5.0	4.9	5.0	5.0	4.9
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	None
Act Effct Green (s)	11.5	14.2	32.5	21.8	24.5	37.1	13.5	56.5	83.3	7.7	50.8	67.2
Actuated g/C Ratio	0.10	0.12	0.27	0.18	0.20	0.31	0.11	0.47	0.69	0.06	0.42	0.56
v/c Ratio	0.73	0.77	0.92	1.02	0.30	0.32	0.64	0.58	0.37	0.62	1.00	0.13
Control Delay (s/veh)	68.0	66.3	57.6	92.3	41.9	19.5	60.8	25.3	6.7	68.9	57.5	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	68.0	66.3	57.6	92.3	41.9	19.5	60.8	25.3	6.7	68.9	57.5	2.5
LOS	E	E	E	F	D	B	E	C	A	E	E	A
Approach Delay (s/veh)		62.7			69.3			25.6			55.3	
Approach LOS		E			E			C			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay (s/veh): 49.3	Intersection LOS: D
Intersection Capacity Utilization 94.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	245	362	513	174	141	163	927	283	105	1674	97
Future Volume (veh/h)	181	245	362	513	174	141	163	927	283	105	1674	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	201	272	402	534	181	147	206	1173	358	114	1820	105
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.79	0.79	0.79	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	247	449	315	529	738	401	251	1932	842	157	1793	670
Arrive On Green	0.08	0.15	0.15	0.18	0.25	0.25	0.09	0.45	0.45	0.05	0.42	0.42
Sat Flow, veh/h	2910	2993	1335	2910	2993	1335	2910	4300	1335	2910	4300	1335
Grp Volume(v), veh/h	201	272	402	534	181	147	206	1173	358	114	1820	105
Grp Sat Flow(s),veh/h/ln	1455	1496	1335	1455	1496	1335	1455	1433	1335	1455	1433	1335
Q Serve(g_s), s	8.1	10.2	18.0	21.8	5.8	10.4	8.4	24.8	16.2	4.6	50.0	5.1
Cycle Q Clear(g_c), s	8.1	10.2	18.0	21.8	5.8	10.4	8.4	24.8	16.2	4.6	50.0	5.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	247	449	315	529	738	401	251	1932	842	157	1793	670
V/C Ratio(X)	0.81	0.61	1.27	1.01	0.25	0.37	0.82	0.61	0.43	0.72	1.01	0.16
Avail Cap(c_a), veh/h	352	449	315	529	738	401	267	1932	842	218	1793	670
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.0	47.7	45.8	49.1	36.2	33.0	53.9	25.0	11.2	55.9	35.0	16.1
Incr Delay (d2), s/veh	6.2	1.7	146.0	41.7	0.1	0.2	11.6	1.0	1.1	3.5	25.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	3.9	21.9	10.8	2.1	3.3	3.4	8.2	4.6	1.8	20.6	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.2	49.4	191.8	90.8	36.3	33.2	65.6	26.0	12.3	59.4	60.0	16.6
LnGrp LOS	E	D	F	F	D	C	E	C	B	E	F	B
Approach Vol, veh/h		875			862			1737			2039	
Approach Delay, s/veh		117.3			69.5			27.9			57.7	
Approach LOS		F			E			C			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	58.9	26.7	22.9	15.4	55.0	15.1	34.5
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	9.0	51.4	21.8	18.0	11.0	49.4	14.5	25.3
Max Q Clear Time (g_c+I1), s	6.6	26.8	23.8	20.0	10.4	52.0	10.1	12.4
Green Ext Time (p_c), s	0.0	3.3	0.0	0.0	0.0	0.0	0.1	0.4

Intersection Summary	
HCM 7th Control Delay, s/veh	59.6
HCM 7th LOS	E

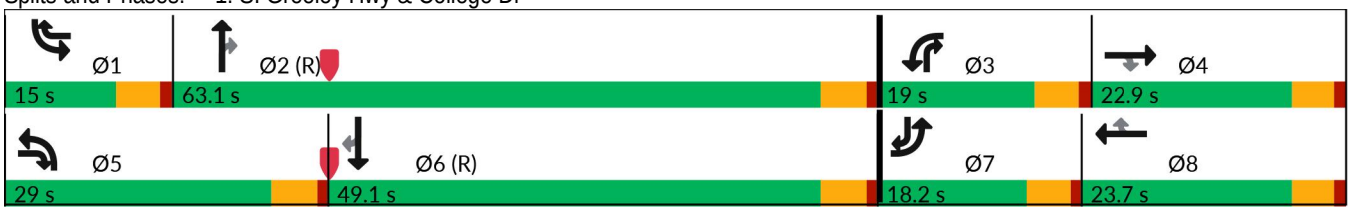
Timings
1: S. Greeley Hwy & College Dr

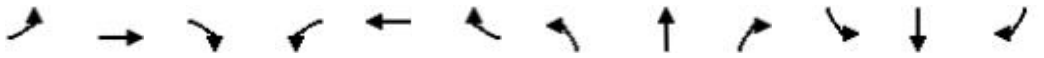
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	270	207	352	281	161	409	2222	708	153	1199	256
Future Volume (vph)	239	270	207	352	281	161	409	2222	708	153	1199	256
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	4.0	4.0	15.0	4.0
Minimum Split (s)	8.9	22.9	9.0	8.9	22.9	9.0	9.0	23.0	8.9	9.0	23.0	8.9
Total Split (s)	18.2	22.9	29.0	19.0	23.7	15.0	29.0	63.1	19.0	15.0	49.1	18.2
Total Split (%)	15.2%	19.1%	24.2%	15.8%	19.8%	12.5%	24.2%	52.6%	15.8%	12.5%	40.9%	15.2%
Yellow Time (s)	3.9	3.9	4.0	3.9	3.9	4.0	4.0	4.0	3.9	4.0	4.0	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.9	4.9	5.0	4.9	4.9	5.0	5.0	5.0	4.9	5.0	5.0	4.9
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	None
Act Effct Green (s)	12.6	15.3	43.2	14.1	16.9	34.4	23.0	58.1	77.2	12.7	47.8	65.4
Actuated g/C Ratio	0.11	0.13	0.36	0.12	0.14	0.29	0.19	0.48	0.64	0.11	0.40	0.55
v/c Ratio	0.86	0.77	0.43	1.27	0.82	0.43	0.91	1.32	0.99	1.07	0.77	0.36
Control Delay (s/veh)	78.9	64.2	22.5	183.9	66.4	18.9	69.6	177.7	47.6	143.4	36.0	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	78.9	64.2	22.5	183.9	66.4	18.9	69.6	177.7	47.6	143.4	36.0	11.2
LOS	E	E	C	F	E	B	E	F	D	F	D	B
Approach Delay (s/veh)		57.1			108.9			136.8			42.3	
Approach LOS		E			F			F			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.32	
Intersection Signal Delay (s/veh): 103.3	Intersection LOS: F
Intersection Capacity Utilization 98.3%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: S. Greeley Hwy & College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	239	270	207	352	281	161	409	2222	708	153	1199	256
Future Volume (veh/h)	239	270	207	352	281	161	409	2222	708	153	1199	256
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	260	293	225	429	343	196	505	2743	874	168	1318	281
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.81	0.81	0.81	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	305	449	451	342	487	329	547	2082	803	125	1632	646
Arrive On Green	0.10	0.15	0.15	0.12	0.16	0.16	0.19	0.48	0.48	0.08	0.38	0.38
Sat Flow, veh/h	2910	2993	1335	2910	2993	1335	2910	4300	1335	1500	4300	1335
Grp Volume(v), veh/h	260	293	225	429	343	196	505	2743	874	168	1318	281
Grp Sat Flow(s),veh/h/ln	1455	1496	1335	1455	1496	1335	1455	1433	1335	1500	1433	1335
Q Serve(g_s), s	10.5	11.1	16.1	14.1	13.0	15.6	20.5	58.1	58.1	10.0	32.9	16.5
Cycle Q Clear(g_c), s	10.5	11.1	16.1	14.1	13.0	15.6	20.5	58.1	58.1	10.0	32.9	16.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	305	449	451	342	487	329	547	2082	803	125	1632	646
V/C Ratio(X)	0.85	0.65	0.50	1.25	0.70	0.60	0.92	1.32	1.09	1.34	0.81	0.43
Avail Cap(c_a), veh/h	323	449	451	342	487	329	582	2082	803	125	1632	646
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.09	0.09	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	48.1	31.6	52.9	47.5	40.0	47.9	30.9	23.9	55.0	33.3	20.2
Incr Delay (d2), s/veh	17.5	2.7	0.3	136.4	3.9	2.1	2.5	143.2	42.1	198.6	4.4	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	4.3	5.1	11.5	5.0	5.2	7.4	46.2	29.4	10.6	11.7	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	70.3	50.7	31.9	189.3	51.4	42.0	50.4	174.2	66.0	253.6	37.7	22.3
LnGrp LOS	E	D	C	F	D	D	D	F	F	F	D	C
Approach Vol, veh/h		778			968			4122			1767	
Approach Delay, s/veh		51.8			110.6			136.1			55.8	
Approach LOS		D			F			F			E	

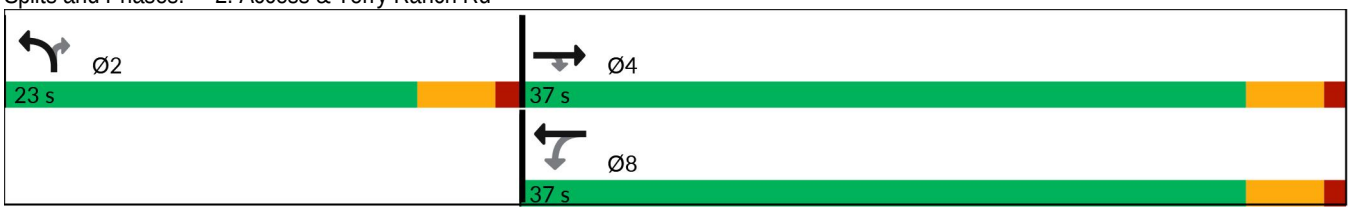
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	63.1	19.0	22.9	27.6	50.5	17.5	24.4
Change Period (Y+Rc), s	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.9
Max Green Setting (Gmax), s	10.0	58.1	14.1	18.0	24.0	44.1	13.3	18.8
Max Q Clear Time (g_c+I1), s	12.0	60.1	16.1	18.1	22.5	34.9	12.5	17.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	2.9	0.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	105.7
HCM 7th LOS	F

Lane Group	EBT	EBR	Ø2	Ø8
Lane Configurations				
Traffic Volume (vph)	1051	420		
Future Volume (vph)	1051	420		
Turn Type	NA	Perm		
Protected Phases	4		2	8
Permitted Phases		4		
Detector Phase	4	4		
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	23.0	37.0
Total Split (%)	61.7%	61.7%	38%	62%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	4.5	4.5		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	None
Act Effct Green (s)	23.1	23.1		
Actuated g/C Ratio	0.61	0.61		
v/c Ratio	0.63	0.46		
Control Delay (s/veh)	6.2	2.0		
Queue Delay	0.0	0.0		
Total Delay (s/veh)	6.2	2.0		
LOS	A	A		
Approach Delay (s/veh)	5.0			
Approach LOS	A			

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 38	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay (s/veh): 5.0	Intersection LOS: A
Intersection Capacity Utilization 38.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Access & Terry Ranch Rd





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1051	420	0	0	0	0
Future Volume (veh/h)	1051	420	0	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	1142	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2216		415	2216	17	8
Arrive On Green	0.74	0.00	0.00	0.00	0.00	0.00
Sat Flow, veh/h	3071	1335	493	3071	2910	1335
Grp Volume(v), veh/h	1142	0	0	0	0	0
Grp Sat Flow(s),veh/h/ln	1496	1335	493	1496	1455	1335
Q Serve(g_s), s	2.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.8	0.0	0.0	0.0	0.0	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2216		415	2216	17	8
V/C Ratio(X)	0.52		0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	5612		975	5612	3107	1425
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.9	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	1.1	0.0	0.0	0.0	0.0	0.0
LnGrp LOS	A					
Approach Vol, veh/h	1142			0	0	
Approach Delay, s/veh	1.1			0.0	0.0	
Approach LOS	A					

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	0.0	17.3	17.3
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	32.5	32.5
Max Q Clear Time (g_c+I1), s	0.0	4.8	0.0
Green Ext Time (p_c), s	0.0	8.1	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	1.1
HCM 7th LOS	A

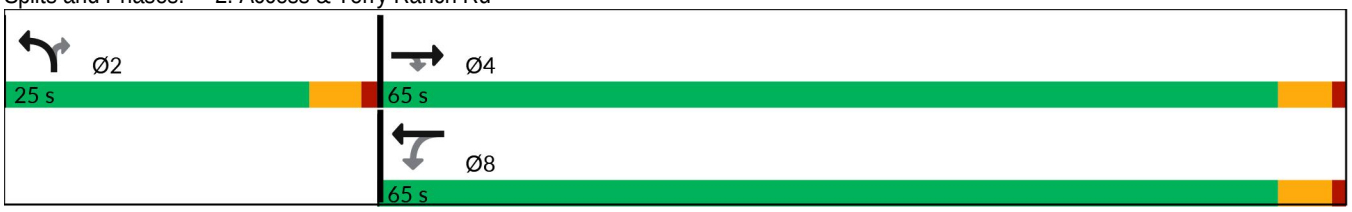
Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	55	1490	525
Future Volume (vph)	55	1490	525
Turn Type	NA	NA	Prot
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5
Total Split (s)	65.0	65.0	25.0
Total Split (%)	72.2%	72.2%	27.8%
Yellow Time (s)	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	Min
Act Effct Green (s)	59.3	59.3	19.8
Actuated g/C Ratio	0.67	0.67	0.22
v/c Ratio	0.04	0.96	0.88
Control Delay (s/veh)	5.1	28.2	50.0
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	5.1	28.2	50.0
LOS	A	C	D
Approach Delay (s/veh)	5.1	28.2	50.0
Approach LOS	A	C	D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 88.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay (s/veh): 32.3	Intersection LOS: C
Intersection Capacity Utilization 74.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Access & Terry Ranch Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	55	0	0	1490	525	0
Future Volume (veh/h)	55	0	0	1490	525	0
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	79	0	0	1935	571	0
Peak Hour Factor	0.70	0.70	0.77	0.77	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2029		82	2029	637	292
Arrive On Green	0.68	0.00	0.00	0.68	0.22	0.00
Sat Flow, veh/h	3071	1335	1320	3071	2910	1335
Grp Volume(v), veh/h	79	0	0	1935	571	0
Grp Sat Flow(s),veh/h/ln	1496	1335	1320	1496	1455	1335
Q Serve(g_s), s	0.8	0.0	0.0	51.5	16.7	0.0
Cycle Q Clear(g_c), s	0.8	0.0	0.0	51.5	16.7	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2029		82	2029	637	292
V/C Ratio(X)	0.04		0.00	0.95	0.90	0.00
Avail Cap(c_a), veh/h	2072		102	2072	683	313
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	4.7	0.0	0.0	12.8	33.1	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.8	13.9	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	13.5	7.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	4.7	0.0	0.0	23.6	47.1	0.0
LnGrp LOS	A			C	D	
Approach Vol, veh/h	79			1935	571	
Approach Delay, s/veh	4.7			23.6	47.1	
Approach LOS	A			C	D	

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	23.6	63.7	63.7
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	60.5	60.5
Max Q Clear Time (g_c+I1), s	18.7	2.8	53.5
Green Ext Time (p_c), s	0.5	0.4	5.7

Intersection Summary	
HCM 7th Control Delay, s/veh	28.2
HCM 7th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	68	18	0	33	13	0
Future Vol, veh/h	68	18	0	33	13	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	520	520	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	20	0	36	14	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	93	0	110	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1501	-	887	988
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	987	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1501	-	887	988
Mov Cap-2 Maneuver	-	-	-	-	887	-
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	987	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	9.12
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	887	-	-	1501	-
HCM Lane V/C Ratio	0.016	-	-	-	-
HCM Control Delay (s/veh)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	61	8	0	222	18	0
Future Vol, veh/h	61	8	0	222	18	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	520	520	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	77	77	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	11	0	288	20	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	99	0	375	87
Stage 1	-	-	-	-	87	-
Stage 2	-	-	-	-	288	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1494	-	626	971
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	761	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1494	-	626	971
Mov Cap-2 Maneuver	-	-	-	-	626	-
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	761	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	10.94
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	626	-	-	1494	-
HCM Lane V/C Ratio	0.031	-	-	-	-
HCM Control Delay (s/veh)	10.9	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	68	18	0	33	13	0
Future Vol, veh/h	68	18	0	33	13	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	520	520	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	20	0	36	14	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	93	0	110	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1501	-	887	988
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	987	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1501	-	887	988
Mov Cap-2 Maneuver	-	-	-	-	887	-
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	987	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	9.12
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	887	-	-	1501	-
HCM Lane V/C Ratio	0.016	-	-	-	-
HCM Control Delay (s/veh)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	73	8	0	262	18	0
Future Vol, veh/h	73	8	0	262	18	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	520	520	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	77	77	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	104	11	0	340	20	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	116	0	445	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	340	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1473	-	571	950
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	721	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1473	-	571	950
Mov Cap-2 Maneuver	-	-	-	-	571	-
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	721	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	11.53
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	571	-	-	1473	-
HCM Lane V/C Ratio	0.034	-	-	-	-
HCM Control Delay (s/veh)	11.5	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	79	0	7	5	3	1	4	155	12	8	104	24
Future Vol, veh/h	79	0	7	5	3	1	4	155	12	8	104	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	280	270	-	420
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	60	60	60	92	92	92	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	95	0	8	8	5	2	4	168	13	10	124	29

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	238	333	62	258	320	84	124	0	0	182	0	0
Stage 1	143	143	-	177	177	-	-	-	-	-	-	-
Stage 2	95	190	-	81	143	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	696	586	990	674	595	958	1461	-	-	1391	-	-
Stage 1	845	778	-	807	751	-	-	-	-	-	-	-
Stage 2	901	742	-	918	778	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	682	580	990	662	590	958	1461	-	-	1391	-	-
Mov Cap-2 Maneuver	682	580	-	662	590	-	-	-	-	-	-	-
Stage 1	840	772	-	805	749	-	-	-	-	-	-	-
Stage 2	890	740	-	904	772	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.03	10.6	0.17	0.45
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1461	-	-	700	657	1391	-	-
HCM Lane V/C Ratio	0.003	-	-	0.148	0.023	0.007	-	-
HCM Control Delay (s/veh)	7.5	-	-	11	10.6	7.6	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	1	7	7	1	1	9	167	21	8	268	187
Future Vol, veh/h	44	1	7	7	1	1	9	167	21	8	268	187
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	280	270	-	420
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	69	69	69	88	88	88	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	59	1	9	10	1	1	10	190	24	9	295	205

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	428	546	147	376	522	95	295	0	0	214	0	0
Stage 1	312	312	-	210	210	-	-	-	-	-	-	-
Stage 2	116	234	-	166	312	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	511	443	873	556	458	943	1264	-	-	1354	-	-
Stage 1	673	656	-	772	727	-	-	-	-	-	-	-
Stage 2	876	710	-	820	656	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	501	437	873	541	451	943	1264	-	-	1354	-	-
Mov Cap-2 Maneuver	501	437	-	541	451	-	-	-	-	-	-	-
Stage 1	669	652	-	766	721	-	-	-	-	-	-	-
Stage 2	866	704	-	804	652	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	12.83	11.65	0.36	0.13
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1264	-	-	530	555	1354	-	-
HCM Lane V/C Ratio	0.008	-	-	0.133	0.024	0.006	-	-
HCM Control Delay (s/veh)	7.9	-	-	12.8	11.6	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	81	0	7	5	3	1	4	161	12	8	250	25
Future Vol, veh/h	81	0	7	5	3	1	4	161	12	8	250	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	280	270	-	420
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	60	60	60	92	92	92	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	98	0	8	8	5	2	4	175	13	10	298	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	415	513	149	352	500	88	298	0	0	188	0	0
Stage 1	317	317	-	184	184	-	-	-	-	-	-	-
Stage 2	99	197	-	168	317	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	521	463	871	579	471	953	1261	-	-	1383	-	-
Stage 1	669	653	-	800	747	-	-	-	-	-	-	-
Stage 2	897	737	-	817	653	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	510	458	871	567	466	953	1261	-	-	1383	-	-
Mov Cap-2 Maneuver	510	458	-	567	466	-	-	-	-	-	-	-
Stage 1	664	649	-	798	744	-	-	-	-	-	-	-
Stage 2	886	734	-	804	649	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.54	11.7	0.18	0.22
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1261	-	-	527	552	1383	-	-
HCM Lane V/C Ratio	0.003	-	-	0.201	0.027	0.007	-	-
HCM Control Delay (s/veh)	7.9	-	-	13.5	11.7	7.6	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	1	7	7	1	1	9	267	22	8	277	192
Future Vol, veh/h	45	1	7	7	1	1	9	267	22	8	277	192
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	280	270	-	420
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	69	69	69	88	88	88	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	61	1	9	10	1	1	10	303	25	9	304	211

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	495	671	152	494	646	152	304	0	0	328	0	0
Stage 1	322	322	-	324	324	-	-	-	-	-	-	-
Stage 2	173	349	-	170	322	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	458	376	867	458	389	867	1253	-	-	1228	-	-
Stage 1	664	650	-	663	648	-	-	-	-	-	-	-
Stage 2	812	632	-	815	650	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	448	370	867	444	383	867	1253	-	-	1228	-	-
Mov Cap-2 Maneuver	448	370	-	444	383	-	-	-	-	-	-	-
Stage 1	659	645	-	657	643	-	-	-	-	-	-	-
Stage 2	802	627	-	798	645	-	-	-	-	-	-	-

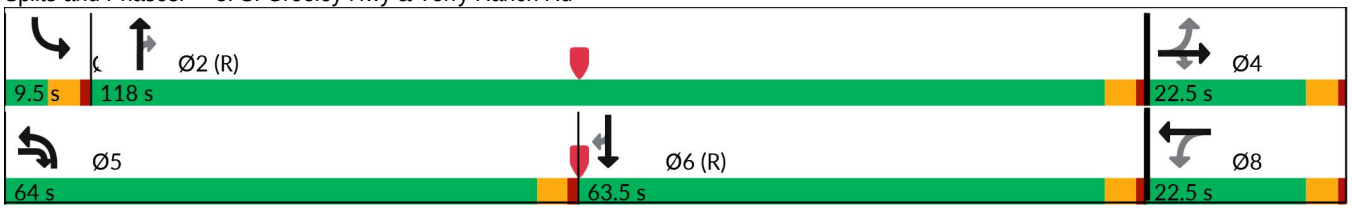
Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.88	13.03	0.24	0.13
HCM LOS	B	B		

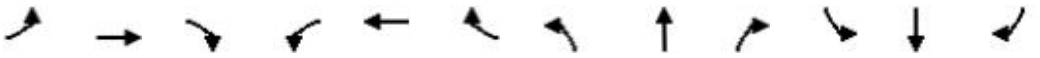
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1253	-	-	477	461	1228	-	-
HCM Lane V/C Ratio	0.008	-	-	0.15	0.028	0.007	-	-
HCM Control Delay (s/veh)	7.9	-	-	13.9	13	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	0	-	-

Lane Group	EBL	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	81	1057	5	3	4	161	12	8	2140	25
Future Volume (vph)	81	1057	5	3	4	161	12	8	2140	25
Turn Type	Perm	pm+ov	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		5		8	5	2		1	6	
Permitted Phases	4	4	8				2			6
Detector Phase	4	5	8	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	22.5	64.0	22.5	22.5	64.0	118.0	118.0	9.5	63.5	63.5
Total Split (%)	15.0%	42.7%	15.0%	15.0%	42.7%	78.7%	78.7%	6.3%	42.3%	42.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead			Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?		Yes			Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	16.0	82.0		16.0	61.5	121.2	121.2	5.2	59.0	59.0
Actuated g/C Ratio	0.11	0.55		0.11	0.41	0.81	0.81	0.03	0.39	0.39
v/c Ratio	0.79	1.74		0.10	0.00	0.05	0.01	0.20	1.51	0.05
Control Delay (s/veh)	103.3	362.9		55.0	20.0	4.8	2.8	80.1	270.6	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	103.3	362.9		55.0	20.0	4.8	2.8	80.1	270.6	2.4
LOS	F	F		D	B	A	A	F	F	A
Approach Delay (s/veh)				55.0		5.0			266.8	
Approach LOS				D		A			F	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.74	
Intersection Signal Delay (s/veh): 279.5	Intersection LOS: F
Intersection Capacity Utilization 142.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 3: S. Greeley Hwy & Terry Ranch Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	0	1057	5	3	1	4	161	12	8	2140	25
Future Volume (veh/h)	81	0	1057	5	3	1	4	161	12	8	2140	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	98	0	0	8	5	2	4	175	13	10	2548	0
Peak Hour Factor	0.83	0.83	0.83	0.60	0.60	0.60	0.92	0.92	0.92	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	128		91	49	16	15	3515	1091	17	3542	
Arrive On Green	0.08	0.00	0.00	0.08	0.08	0.08	0.01	0.82	0.82	0.01	0.82	0.00
Sat Flow, veh/h	1409	1575	1335	665	605	195	2910	4300	1335	1500	4300	1335
Grp Volume(v), veh/h	98	0	0	15	0	0	4	175	13	10	2548	0
Grp Sat Flow(s),veh/h/ln	1409	1575	1335	1466	0	0	1455	1433	1335	1500	1433	1335
Q Serve(g_s), s	8.9	0.0	0.0	0.0	0.0	0.0	0.2	1.2	0.3	1.0	38.5	0.0
Cycle Q Clear(g_c), s	10.2	0.0	0.0	1.4	0.0	0.0	0.2	1.2	0.3	1.0	38.5	0.0
Prop In Lane	1.00		1.00	0.53		0.13	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	163	128		156	0	0	15	3515	1091	17	3542	
V/C Ratio(X)	0.60	0.00		0.10	0.00	0.00	0.27	0.05	0.01	0.59	0.72	
Avail Cap(c_a), veh/h	218	189		212	0	0	1154	3515	1091	50	3542	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.25	0.25	0.00
Uniform Delay (d), s/veh	68.0	0.0	0.0	63.9	0.0	0.0	74.3	2.6	2.5	73.8	5.7	0.0
Incr Delay (d2), s/veh	2.6	0.0	0.0	0.3	0.0	0.0	9.3	0.0	0.0	7.8	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.0	0.5	0.0	0.0	0.1	0.2	0.1	0.4	7.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	70.6	0.0	0.0	64.2	0.0	0.0	83.7	2.6	2.5	81.6	6.0	0.0
LnGrp LOS	E			E			F	A	A	F	A	
Approach Vol, veh/h		98			15			192			2558	
Approach Delay, s/veh		70.6			64.2			4.3			6.3	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	127.1		16.7	5.3	128.0		16.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	113.5		18.0	59.5	59.0		18.0				
Max Q Clear Time (g_c+I1), s	3.0	3.2		12.2	2.2	40.5		3.4				
Green Ext Time (p_c), s	0.0	1.1		0.1	0.0	15.4		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	8.7	
HCM 7th LOS	A	

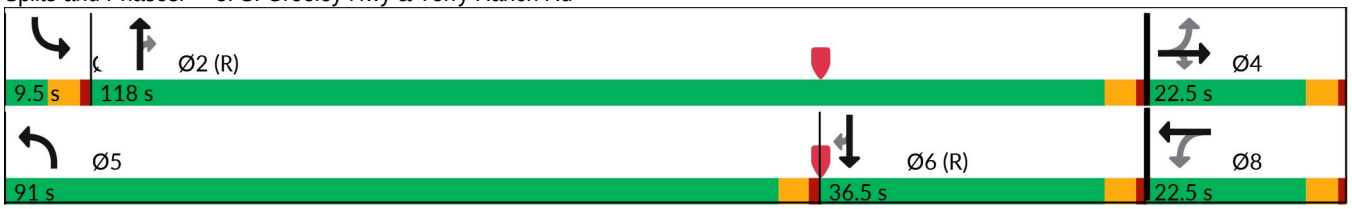
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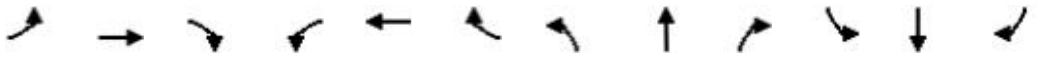
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	60	1	10	10	1	1322	2593	29	11	366	255
Future Volume (vph)	60	1	10	10	1	1322	2593	29	11	366	255
Turn Type	Perm	NA	Perm	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8	5	2		1	6	
Permitted Phases	4		4	8				2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	91.0	118.0	118.0	9.5	36.5	36.5
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%	60.7%	78.7%	78.7%	6.3%	24.3%	24.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	14.6	14.6	14.6		14.6	85.2	122.6	122.6	5.6	36.8	36.8
Actuated g/C Ratio	0.10	0.10	0.10		0.10	0.57	0.82	0.82	0.04	0.25	0.25
v/c Ratio	0.72	0.01	0.07		0.13	0.92	0.84	0.03	0.22	0.38	0.57
Control Delay (s/veh)	97.2	58.0	0.7		59.5	27.6	4.8	0.1	96.0	50.2	30.2
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	97.2	58.0	0.7		59.5	27.6	4.8	0.1	96.0	50.2	30.2
LOS	F	E	A		E	C	A	A	F	D	C
Approach Delay (s/veh)		82.7			59.5		12.4			43.0	
Approach LOS		F			E		B			D	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay (s/veh): 17.9	Intersection LOS: B
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: S. Greeley Hwy & Terry Ranch Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1	10	10	1	1	1322	2593	29	11	366	255
Future Volume (veh/h)	60	1	10	10	1	1	1322	2593	29	11	366	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	81	1	0	14	1	1	1502	2947	33	12	402	0
Peak Hour Factor	0.74	0.74	0.74	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	146	108		128	9	6	1566	3562	1106	20	1304	
Arrive On Green	0.07	0.07	0.00	0.07	0.07	0.07	0.54	0.83	0.83	0.01	0.30	0.00
Sat Flow, veh/h	1415	1575	1335	1208	127	89	2910	4300	1335	1500	4300	1335
Grp Volume(v), veh/h	81	1	0	16	0	0	1502	2947	33	12	402	0
Grp Sat Flow(s),veh/h/ln	1415	1575	1335	1424	0	0	1455	1433	1335	1500	1433	1335
Q Serve(g_s), s	6.8	0.1	0.0	1.3	0.0	0.0	73.9	56.1	0.7	1.2	10.8	0.0
Cycle Q Clear(g_c), s	8.4	0.1	0.0	1.6	0.0	0.0	73.9	56.1	0.7	1.2	10.8	0.0
Prop In Lane	1.00		1.00	0.87		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	146	108		143	0	0	1566	3562	1106	20	1304	
V/C Ratio(X)	0.56	0.01		0.11	0.00	0.00	0.96	0.83	0.03	0.61	0.31	
Avail Cap(c_a), veh/h	219	189		216	0	0	1678	3562	1106	50	1304	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	0.00	0.09	0.09	0.09	0.85	0.85	0.00
Uniform Delay (d), s/veh	68.9	65.1	0.0	65.8	0.0	0.0	33.1	7.0	2.3	73.6	40.2	0.0
Incr Delay (d2), s/veh	3.3	0.0	0.0	0.3	0.0	0.0	1.8	0.2	0.0	23.2	0.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	0.0	0.6	0.0	0.0	24.0	9.9	0.1	0.6	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	72.2	65.1	0.0	66.1	0.0	0.0	34.9	7.2	2.3	96.8	40.7	0.0
LnGrp LOS	E	E		E			C	A	A	F	D	
Approach Vol, veh/h		82			16			4482			414	
Approach Delay, s/veh		72.1			66.1			16.5			42.3	
Approach LOS		E			E			B			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	128.7		14.8	85.2	50.0		14.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	113.5		18.0	86.5	32.0		18.0				
Max Q Clear Time (g_c+I1), s	3.2	58.1		10.4	75.9	12.8		3.6				
Green Ext Time (p_c), s	0.0	43.5		0.1	4.8	2.1		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	19.7	
HCM 7th LOS	B	

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	84	0	7	5	3	1	4	171	13	9	111	26
Future Vol, veh/h	84	0	7	5	3	1	4	171	13	9	111	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	280	270	-	420
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	60	60	60	92	92	92	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	101	0	8	8	5	2	4	186	14	11	132	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	258	362	66	282	348	93	132	0	0	200	0	0
Stage 1	154	154	-	195	195	-	-	-	-	-	-	-
Stage 2	104	209	-	88	154	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	674	564	984	648	574	946	1451	-	-	1370	-	-
Stage 1	833	769	-	789	739	-	-	-	-	-	-	-
Stage 2	890	728	-	910	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	660	558	984	636	568	946	1451	-	-	1370	-	-
Mov Cap-2 Maneuver	660	558	-	636	568	-	-	-	-	-	-	-
Stage 1	827	763	-	786	736	-	-	-	-	-	-	-
Stage 2	880	726	-	895	763	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.34	10.82	0.16	0.47
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1451	-	-	677	634	1370	-	-
HCM Lane V/C Ratio	0.003	-	-	0.162	0.024	0.008	-	-
HCM Control Delay (s/veh)	7.5	-	-	11.3	10.8	7.6	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	1	7	7	1	1	10	178	22	9	294	199
Future Vol, veh/h	47	1	7	7	1	1	10	178	22	9	294	199
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	280	270	-	420
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	69	69	69	88	88	88	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	1	9	10	1	1	11	202	25	10	323	219

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	467	593	162	407	568	101	323	0	0	227	0	0
Stage 1	343	343	-	225	225	-	-	-	-	-	-	-
Stage 2	125	250	-	182	343	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	479	417	855	529	431	935	1233	-	-	1338	-	-
Stage 1	646	636	-	757	716	-	-	-	-	-	-	-
Stage 2	866	699	-	802	636	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	468	410	855	512	424	935	1233	-	-	1338	-	-
Mov Cap-2 Maneuver	468	410	-	512	424	-	-	-	-	-	-	-
Stage 1	641	631	-	750	710	-	-	-	-	-	-	-
Stage 2	855	692	-	786	631	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.54	12.01	0.38	0.14
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1233	-	-	496	527	1338	-	-
HCM Lane V/C Ratio	0.009	-	-	0.15	0.025	0.007	-	-
HCM Control Delay (s/veh)	7.9	-	-	13.5	12	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	0	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	84	0	51	5	3	1	36	230	13	9	191	26
Future Vol, veh/h	84	0	51	5	3	1	36	230	13	9	191	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	280	270	-	420
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	60	60	60	92	92	92	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	101	0	61	8	5	2	39	250	14	11	227	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	455	591	114	463	577	125	227	0	0	264	0	0
Stage 1	249	249	-	328	328	-	-	-	-	-	-	-
Stage 2	206	342	-	135	249	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	489	418	917	482	426	902	1338	-	-	1297	-	-
Stage 1	733	699	-	659	645	-	-	-	-	-	-	-
Stage 2	777	636	-	854	699	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	464	402	917	433	410	902	1338	-	-	1297	-	-
Mov Cap-2 Maneuver	464	402	-	433	410	-	-	-	-	-	-	-
Stage 1	727	694	-	639	627	-	-	-	-	-	-	-
Stage 2	747	618	-	790	694	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.8	13.27	1	0.31
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1338	-	-	571	451	1297	-	-
HCM Lane V/C Ratio	0.029	-	-	0.285	0.033	0.008	-	-
HCM Control Delay (s/veh)	7.8	-	-	13.8	13.3	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	1	25	7	1	1	56	261	22	9	329	199
Future Vol, veh/h	47	1	25	7	1	1	56	261	22	9	329	199
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	280	270	-	420
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	69	69	69	88	88	88	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	1	34	10	1	1	64	297	25	10	362	219

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	658	830	181	625	805	148	362	0	0	322	0	0
Stage 1	381	381	-	424	424	-	-	-	-	-	-	-
Stage 2	276	449	-	201	381	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	350	304	831	369	314	872	1194	-	-	1235	-	-
Stage 1	613	612	-	578	586	-	-	-	-	-	-	-
Stage 2	707	571	-	782	612	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	326	286	831	331	295	872	1194	-	-	1235	-	-
Mov Cap-2 Maneuver	326	286	-	331	295	-	-	-	-	-	-	-
Stage 1	608	607	-	548	554	-	-	-	-	-	-	-
Stage 2	666	540	-	742	607	-	-	-	-	-	-	-

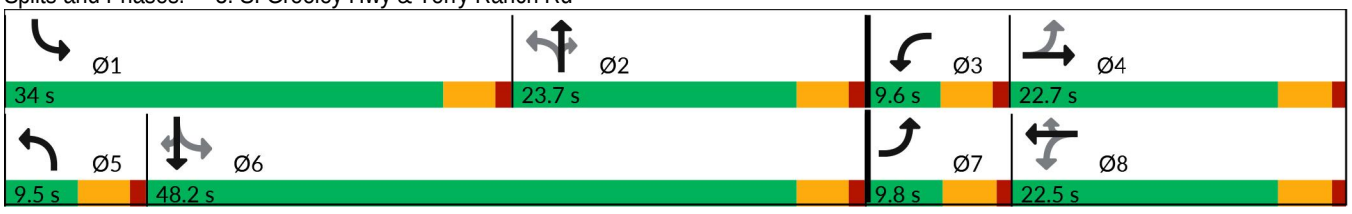
Approach	EB	WB	NB	SB
HCM Control Delay, s/v	16.5	15.67	1.35	0.13
HCM LOS	C	C		

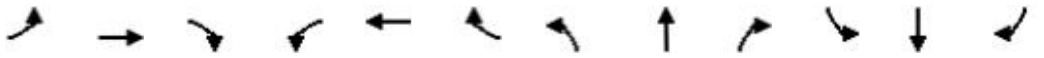
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	411	350	1235	-	-
HCM Lane V/C Ratio	0.053	-	-	0.24	0.037	0.008	-	-
HCM Control Delay (s/veh)	8.2	-	-	16.5	15.7	7.9	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.9	0.1	0	-	-

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	108	0	28	4	104	5	394	104	452	808	33
Future Volume (vph)	108	0	28	4	104	5	394	104	452	808	33
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.8	22.7	9.6	22.5	22.5	9.5	23.7	23.7	34.0	48.2	48.2
Total Split (%)	10.9%	25.2%	10.7%	25.0%	25.0%	10.6%	26.3%	26.3%	37.8%	53.6%	53.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	9.9	9.1	12.9	7.3	7.3	20.7	15.5	15.5	44.4	42.8	42.8
Actuated g/C Ratio	0.14	0.13	0.19	0.11	0.11	0.30	0.23	0.23	0.65	0.62	0.62
v/c Ratio	0.67	0.03	0.19	0.04	0.57	0.02	0.64	0.26	0.79	0.52	0.04
Control Delay (s/veh)	51.0	0.1	25.6	32.0	13.1	10.6	30.5	2.3	19.7	9.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	51.0	0.1	25.6	32.0	13.1	10.6	30.5	2.3	19.7	9.8	0.1
LOS	D	A	C	C	B	B	C	A	B	A	A
Approach Delay (s/veh)		46.7		16.3			24.5			13.0	
Approach LOS		D		B			C			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay (s/veh): 17.8	Intersection LOS: B
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: S. Greeley Hwy & Terry Ranch Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	0	10	28	4	104	5	394	104	452	808	33
Future Volume (veh/h)	108	0	10	28	4	104	5	394	104	452	808	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	130	0	12	47	7	0	5	428	113	538	962	0
Peak Hour Factor	0.83	0.83	0.83	0.60	0.60	0.60	0.92	0.92	0.92	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	352	0	144	282	91		261	614	274	662	1528	
Arrive On Green	0.10	0.00	0.11	0.05	0.06	0.00	0.01	0.21	0.21	0.31	0.51	0.00
Sat Flow, veh/h	1500	0	1335	1500	1575	1335	1500	2993	1335	1500	2993	1335
Grp Volume(v), veh/h	130	0	12	47	7	0	5	428	113	538	962	0
Grp Sat Flow(s),veh/h/ln	1500	0	1335	1500	1575	1335	1500	1496	1335	1500	1496	1335
Q Serve(g_s), s	4.4	0.0	0.4	1.6	0.2	0.0	0.1	7.3	4.0	13.7	12.7	0.0
Cycle Q Clear(g_c), s	4.4	0.0	0.4	1.6	0.2	0.0	0.1	7.3	4.0	13.7	12.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	352	0	144	282	91		261	614	274	662	1528	
V/C Ratio(X)	0.37	0.00	0.08	0.17	0.08		0.02	0.70	0.41	0.81	0.63	
Avail Cap(c_a), veh/h	352	0	443	352	517		388	1048	467	1001	2384	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.2	0.0	22.0	22.7	24.5	0.0	17.1	20.2	18.9	9.9	9.7	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.2	0.3	0.4	0.0	0.0	1.4	1.0	3.1	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.1	0.5	0.1	0.0	0.0	2.1	1.2	2.9	2.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.9	0.0	22.3	23.0	24.8	0.0	17.1	21.7	19.9	13.0	10.1	0.0
LnGrp LOS	C		C	C	C		B	C	B	B	B	
Approach Vol, veh/h		142			54			546			1500	
Approach Delay, s/veh		21.9			23.2			21.3			11.1	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.6	15.7	7.1	10.4	4.9	32.5	9.8	7.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	29.5	19.2	5.1	18.2	5.0	43.7	5.3	18.0
Max Q Clear Time (g_c+I1), s	15.7	9.3	3.6	2.4	2.1	14.7	6.4	2.2
Green Ext Time (p_c), s	1.5	2.0	0.0	0.0	0.0	6.5	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	14.6
HCM 7th LOS	B

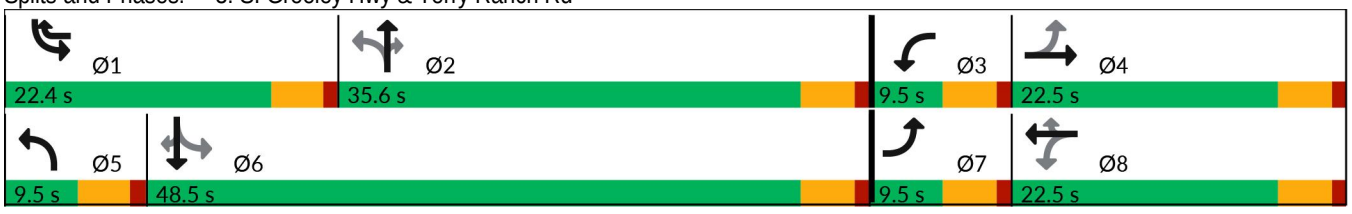
Notes

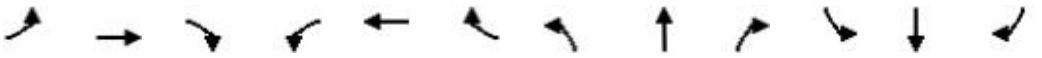
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	60	1	96	1	431	12	879	52	125	569	255
Future Volume (vph)	60	1	96	1	431	12	879	52	125	569	255
Turn Type	pm+pt	NA	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	1	5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	22.5	9.5	22.5	22.4	9.5	35.6	35.6	22.4	48.5	48.5
Total Split (%)	10.6%	25.0%	10.6%	25.0%	24.9%	10.6%	39.6%	39.6%	24.9%	53.9%	53.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	6.3	6.0	6.4	5.9	22.3	34.6	29.6	29.6	52.1	50.5	50.5
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.33	0.51	0.43	0.43	0.76	0.74	0.74
v/c Ratio	0.59	0.12	0.98	0.01	1.21	0.04	0.78	0.09	0.27	0.28	0.26
Control Delay (s/veh)	47.3	19.2	105.3	31.0	135.5	5.3	22.6	0.3	4.1	4.7	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	47.3	19.2	105.3	31.0	135.5	5.3	22.6	0.3	4.1	4.7	1.6
LOS	D	B	F	C	F	A	C	A	A	A	A
Approach Delay (s/veh)		42.9		129.9			21.1			3.8	
Approach LOS		D		F			C			A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay (s/veh): 43.7	Intersection LOS: D
Intersection Capacity Utilization 76.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: S. Greeley Hwy & Terry Ranch Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1	10	96	1	431	12	879	52	125	569	255
Future Volume (veh/h)	60	1	10	96	1	431	12	879	52	125	569	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	81	1	14	139	1	0	14	999	59	137	625	0
Peak Hour Factor	0.74	0.74	0.74	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	6	89	356	155		440	1266	565	326	1455	
Arrive On Green	0.07	0.07	0.07	0.09	0.10	0.00	0.02	0.42	0.42	0.08	0.49	0.00
Sat Flow, veh/h	1500	90	1259	1500	1575	1335	1500	2993	1335	1500	2993	1335
Grp Volume(v), veh/h	81	0	15	139	1	0	14	999	59	137	625	0
Grp Sat Flow(s),veh/h/ln	1500	0	1348	1500	1575	1335	1500	1496	1335	1500	1496	1335
Q Serve(g_s), s	2.7	0.0	0.6	4.6	0.0	0.0	0.3	15.6	1.4	2.6	7.3	0.0
Cycle Q Clear(g_c), s	2.7	0.0	0.6	4.6	0.0	0.0	0.3	15.6	1.4	2.6	7.3	0.0
Prop In Lane	1.00		0.93	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	0	96	356	155		440	1266	565	326	1455	
V/C Ratio(X)	0.24	0.00	0.16	0.39	0.01		0.03	0.79	0.10	0.42	0.43	
Avail Cap(c_a), veh/h	372	0	449	356	524		552	1721	767	701	2434	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.3	0.0	23.6	20.9	22.0	0.0	8.7	13.5	9.4	10.2	9.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.8	0.7	0.0	0.0	0.0	1.8	0.1	0.9	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	1.5	0.0	0.0	0.1	3.8	0.4	0.6	1.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.7	0.0	24.4	21.6	22.0	0.0	8.7	15.3	9.5	11.1	9.2	0.0
LnGrp LOS	C		C	C	C		A	B	A	B	A	
Approach Vol, veh/h		96			140			1072			762	
Approach Delay, s/veh		22.1			21.6			14.9			9.6	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	27.4	9.5	8.3	5.4	30.8	8.0	9.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.9	31.1	5.0	18.0	5.0	44.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.6	17.6	6.6	2.6	2.3	9.3	4.7	2.0
Green Ext Time (p_c), s	0.2	5.3	0.0	0.0	0.0	3.9	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	13.7
HCM 7th LOS	B

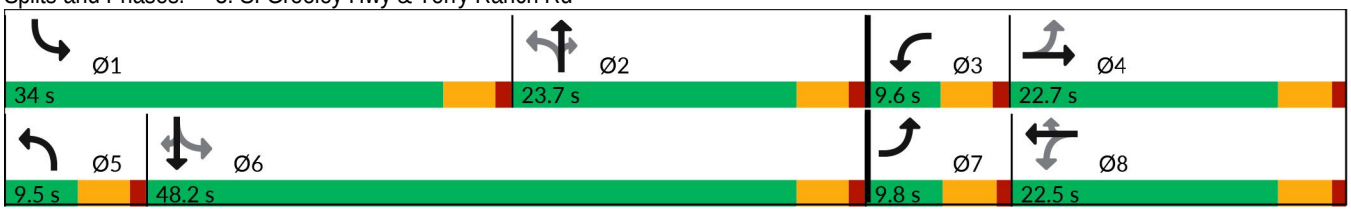
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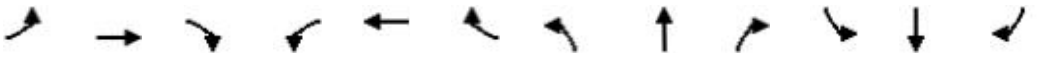
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	108	0	28	4	104	37	453	104	452	888	33
Future Volume (vph)	108	0	28	4	104	37	453	104	452	888	33
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.8	22.7	9.6	22.5	22.5	9.5	23.7	23.7	34.0	48.2	48.2
Total Split (%)	10.9%	25.2%	10.7%	25.0%	25.0%	10.6%	26.3%	26.3%	37.8%	53.6%	53.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	12.4	9.5	11.2	7.4	7.4	22.2	17.0	17.0	47.8	42.7	42.7
Actuated g/C Ratio	0.17	0.13	0.16	0.10	0.10	0.31	0.24	0.24	0.67	0.59	0.59
v/c Ratio	0.61	0.17	0.23	0.04	0.58	0.19	0.70	0.25	0.80	0.60	0.05
Control Delay (s/veh)	40.4	0.9	27.6	32.5	13.5	13.2	32.6	2.3	21.4	12.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	40.4	0.9	27.6	32.5	13.5	13.2	32.6	2.3	21.4	12.9	0.1
LOS	D	A	C	C	B	B	C	A	C	B	A
Approach Delay (s/veh)		27.3		17.0			26.1			15.4	
Approach LOS		C		B			C			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay (s/veh): 19.0	Intersection LOS: B
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: S. Greeley Hwy & Terry Ranch Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	0	54	28	4	104	37	453	104	452	888	33
Future Volume (veh/h)	108	0	54	28	4	104	37	453	104	452	888	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	130	0	65	47	7	0	40	492	113	538	1057	0
Peak Hour Factor	0.83	0.83	0.83	0.60	0.60	0.60	0.92	0.92	0.92	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	358	0	158	290	115		294	665	297	637	1454	
Arrive On Green	0.09	0.00	0.12	0.05	0.07	0.00	0.04	0.22	0.22	0.30	0.49	0.00
Sat Flow, veh/h	1500	0	1335	1500	1575	1335	1500	2993	1335	1500	2993	1335
Grp Volume(v), veh/h	130	0	65	47	7	0	40	492	113	538	1057	0
Grp Sat Flow(s),veh/h/ln	1500	0	1335	1500	1575	1335	1500	1496	1335	1500	1496	1335
Q Serve(g_s), s	4.6	0.0	2.6	1.7	0.2	0.0	1.2	8.9	4.2	14.3	16.4	0.0
Cycle Q Clear(g_c), s	4.6	0.0	2.6	1.7	0.2	0.0	1.2	8.9	4.2	14.3	16.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	358	0	158	290	115		294	665	297	637	1454	
V/C Ratio(X)	0.36	0.00	0.41	0.16	0.06		0.14	0.74	0.38	0.85	0.73	
Avail Cap(c_a), veh/h	358	0	417	353	487		362	987	440	940	2245	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.1	0.0	23.8	23.3	25.1	0.0	16.3	21.1	19.2	10.5	11.9	0.0
Incr Delay (d2), s/veh	0.6	0.0	1.7	0.3	0.2	0.0	0.2	1.6	0.8	4.8	0.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.8	0.6	0.1	0.0	0.3	2.7	1.3	3.4	3.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.8	0.0	25.5	23.6	25.3	0.0	16.5	22.7	20.0	15.2	12.6	0.0
LnGrp LOS	C		C	C	C		B	C	C	B	B	
Approach Vol, veh/h		195			54			645			1595	
Approach Delay, s/veh		23.7			23.8			21.9			13.5	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.2	17.4	7.2	11.4	6.9	32.8	9.8	8.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	29.5	19.2	5.1	18.2	5.0	43.7	5.3	18.0
Max Q Clear Time (g_c+I1), s	16.3	10.9	3.7	4.6	3.2	18.4	6.6	2.2
Green Ext Time (p_c), s	1.4	2.0	0.0	0.2	0.0	7.1	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	16.7
HCM 7th LOS	B

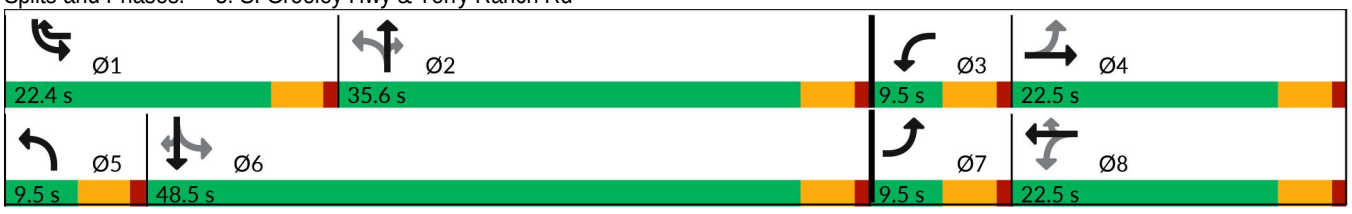
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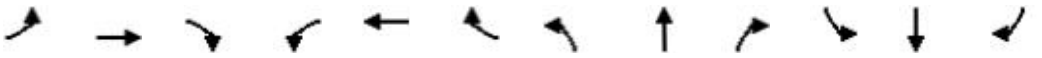
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	60	1	96	1	431	58	962	52	125	604	255
Future Volume (vph)	60	1	96	1	431	58	962	52	125	604	255
Turn Type	pm+pt	NA	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	1	5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	22.5	9.5	22.5	22.4	9.5	35.6	35.6	22.4	48.5	48.5
Total Split (%)	10.6%	25.0%	10.6%	25.0%	24.9%	10.6%	39.6%	39.6%	24.9%	53.9%	53.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	10.6	6.3	6.7	6.1	22.6	36.3	31.3	31.3	53.8	48.4	48.4
Actuated g/C Ratio	0.14	0.08	0.09	0.08	0.30	0.49	0.42	0.42	0.72	0.65	0.65
v/c Ratio	0.40	0.26	1.01	0.01	1.31	0.18	0.87	0.09	0.31	0.34	0.29
Control Delay (s/veh)	33.6	17.0	118.8	33.0	179.1	7.6	30.8	0.3	8.5	8.4	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	33.6	17.0	118.8	33.0	179.1	7.6	30.8	0.3	8.5	8.4	2.1
LOS	C	B	F	C	F	A	C	A	A	A	A
Approach Delay (s/veh)		28.2		168.0			28.1			6.8	
Approach LOS		C		F			C			A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74.4	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.31	
Intersection Signal Delay (s/veh): 54.5	Intersection LOS: D
Intersection Capacity Utilization 78.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: S. Greeley Hwy & Terry Ranch Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1	28	96	1	431	58	962	52	125	604	255
Future Volume (veh/h)	60	1	28	96	1	431	58	962	52	125	604	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	81	1	38	139	1	0	66	1093	59	137	664	0
Peak Hour Factor	0.74	0.74	0.74	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	327	3	98	322	156		453	1329	593	303	1391	
Arrive On Green	0.06	0.07	0.07	0.09	0.10	0.00	0.06	0.44	0.44	0.08	0.46	0.00
Sat Flow, veh/h	1500	34	1306	1500	1575	1335	1500	2993	1335	1500	2993	1335
Grp Volume(v), veh/h	81	0	39	139	1	0	66	1093	59	137	664	0
Grp Sat Flow(s),veh/h/ln	1500	0	1340	1500	1575	1335	1500	1496	1335	1500	1496	1335
Q Serve(g_s), s	2.8	0.0	1.6	4.9	0.0	0.0	1.3	18.2	1.5	2.7	8.7	0.0
Cycle Q Clear(g_c), s	2.8	0.0	1.6	4.9	0.0	0.0	1.3	18.2	1.5	2.7	8.7	0.0
Prop In Lane	1.00		0.97	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	327	0	100	322	156		453	1329	593	303	1391	
V/C Ratio(X)	0.25	0.00	0.39	0.43	0.01		0.15	0.82	0.10	0.45	0.48	
Avail Cap(c_a), veh/h	364	0	423	322	497		499	1632	728	658	2310	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.4	0.0	25.1	22.1	23.2	0.0	8.0	13.9	9.2	11.2	10.5	0.0
Incr Delay (d2), s/veh	0.4	0.0	2.4	0.9	0.0	0.0	0.1	2.9	0.1	1.1	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.5	1.7	0.0	0.0	0.3	4.7	0.4	0.6	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.8	0.0	27.6	23.0	23.2	0.0	8.1	16.8	9.3	12.3	10.7	0.0
LnGrp LOS	C		C	C	C		A	B	A	B	B	
Approach Vol, veh/h		120			140			1218			801	
Approach Delay, s/veh		24.3			23.0			16.0			11.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	29.8	9.5	8.8	7.7	31.0	8.1	10.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.9	31.1	5.0	18.0	5.0	44.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.7	20.2	6.9	3.6	3.3	10.7	4.8	2.0
Green Ext Time (p_c), s	0.2	5.1	0.0	0.1	0.0	4.2	0.0	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	15.1
HCM 7th LOS	B

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	45	133	2	23	98
Future Vol, veh/h	2	45	133	2	23	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	72	72	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	54	185	3	33	140

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	392	186	0	0	188	0
Stage 1	186	-	-	-	-	-
Stage 2	206	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	612	856	-	-	1387	-
Stage 1	846	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	598	856	-	-	1387	-
Mov Cap-2 Maneuver	598	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	809	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.59	0	1.46
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	841	1387	-
HCM Lane V/C Ratio	-	-	0.067	0.024	-
HCM Control Delay (s/veh)	-	-	9.6	7.7	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	34	177	6	46	224
Future Vol, veh/h	2	34	177	6	46	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	90	90	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	38	197	7	48	236

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	533	200	0	0	203	0
Stage 1	200	-	-	-	-	-
Stage 2	333	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	508	841	-	-	1368	-
Stage 1	834	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	490	841	-	-	1368	-
Mov Cap-2 Maneuver	490	-	-	-	-	-
Stage 1	834	-	-	-	-	-
Stage 2	701	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.69	0	1.32
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	809	1368	-
HCM Lane V/C Ratio	-	-	0.05	0.035	-
HCM Control Delay (s/veh)	-	-	9.7	7.7	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	48	136	27	167	100
Future Vol, veh/h	2	48	136	27	167	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	72	72	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	57	189	38	239	143

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	828	208	0	0	226	0
Stage 1	208	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	341	833	-	-	1342	-
Stage 1	827	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	280	833	-	-	1342	-
Mov Cap-2 Maneuver	280	-	-	-	-	-
Stage 1	827	-	-	-	-	-
Stage 2	441	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.05	0	5.17
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	772	1342	-
HCM Lane V/C Ratio	-	-	0.077	0.178	-
HCM Control Delay (s/veh)	-	-	10.1	8.3	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.6	-

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	131	181	6	49	230
Future Vol, veh/h	19	131	181	6	49	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	90	90	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	147	201	7	52	242

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	550	204	0	0	208	0
Stage 1	204	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	496	836	-	-	1363	-
Stage 1	830	-	-	-	-	-
Stage 2	717	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	477	836	-	-	1363	-
Mov Cap-2 Maneuver	477	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	690	-	-	-	-	-

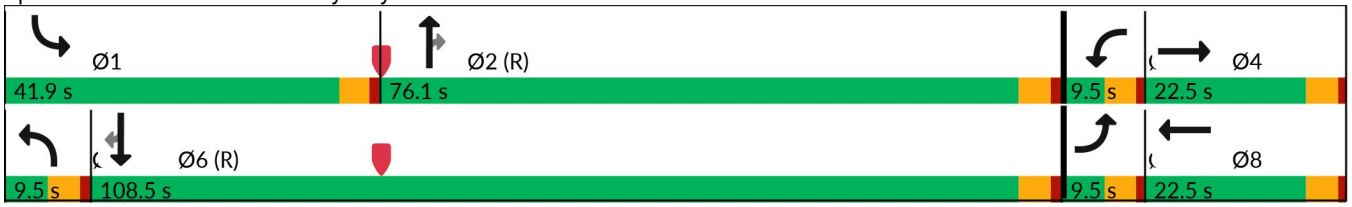
Approach	WB	NB	SB
HCM Control Delay, s/v	11.05	0	1.36
HCM LOS	B		

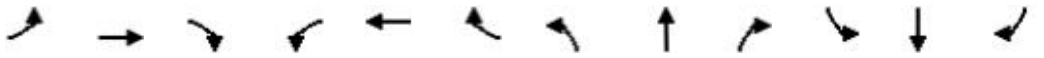
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	764	1363	-
HCM Lane V/C Ratio	-	-	0.221	0.038	-
HCM Control Delay (s/veh)	-	-	11	7.7	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT	SBR	Ø4	Ø5	Ø7
Lane Configurations										
Traffic Volume (vph)	2	0	136	27	167	2440	600			
Future Volume (vph)	2	0	136	27	167	2440	600			
Turn Type	Prot	NA	NA	Perm	Prot	NA	Perm			
Protected Phases	3	8	2		1	6		4	5	7
Permitted Phases				2			6			
Detector Phase	3	8	2	2	1	6	6			
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	9.5	22.5	22.5	22.5	9.5	9.5
Total Split (s)	9.5	22.5	76.1	76.1	41.9	108.5	108.5	22.5	9.5	9.5
Total Split (%)	6.3%	15.0%	50.7%	50.7%	27.9%	72.3%	72.3%	15%	6%	6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Lead/Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None
Act Effct Green (s)	5.1	5.5	103.8	103.8	29.2	138.4	138.4			
Actuated g/C Ratio	0.03	0.04	0.69	0.69	0.19	0.92	0.92			
v/c Ratio	0.04	0.07	0.06	0.04	0.82	0.88	0.66			
Control Delay (s/veh)	71.5	0.2	8.8	0.1	56.8	12.4	2.5			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay (s/veh)	71.5	0.2	8.8	0.1	56.8	12.4	2.5			
LOS	E	A	A	A	E	B	A			
Approach Delay (s/veh)		2.6	7.3			12.9				
Approach LOS		A	A			B				

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 41.9 (28%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay (s/veh): 12.5	Intersection LOS: B
Intersection Capacity Utilization 75.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: S. Greeley Hwy & North Access/Chalk Bluff Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	2	0	48	0	136	27	167	2440	600
Future Volume (veh/h)	0	0	0	2	0	48	0	136	27	167	2440	600
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	0	0	0	2	0	57	0	189	38	239	3486	0
Peak Hour Factor	0.92	0.92	0.92	0.84	0.84	0.84	0.72	0.72	0.72	0.70	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	30	0	4	0	69	1	2946	915	260	3820	
Arrive On Green	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.69	0.69	0.17	0.89	0.00
Sat Flow, veh/h	4230	1575	0	1500	0	1335	1500	4300	1335	1500	4300	1335
Grp Volume(v), veh/h	0	0	0	2	0	57	0	189	38	239	3486	0
Grp Sat Flow(s),veh/h/ln	1410	1575	0	1500	0	1335	1500	1433	1335	1500	1433	1335
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	6.3	0.0	2.2	1.4	23.5	71.7	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.2	0.0	6.3	0.0	2.2	1.4	23.5	71.7	0.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	3	30	0	4	0	69	1	2946	915	260	3820	
V/C Ratio(X)	0.00	0.00	0.00	0.50	0.00	0.83	0.00	0.06	0.04	0.92	0.91	
Avail Cap(c_a), veh/h	141	189	0	50	0	160	50	2946	915	374	3820	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	74.7	0.0	70.5	0.0	7.8	7.7	61.0	4.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	73.4	0.0	21.4	0.0	0.0	0.1	2.9	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.2	0.0	2.5	0.0	0.6	0.4	8.9	4.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.0	148.1	0.0	91.8	0.0	7.8	7.7	63.8	5.4	0.0
LnGrp LOS				F		F		A	A	E	A	
Approach Vol, veh/h		0			59			227			3725	
Approach Delay, s/veh		0.0			93.7			7.8			9.1	
Approach LOS					F			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.5	107.3	4.9	7.3	0.0	137.8	0.0	12.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	37.4	71.6	5.0	18.0	5.0	104.0	5.0	18.0
Max Q Clear Time (g_c+I1), s	25.5	4.2	2.2	0.0	0.0	73.7	0.0	8.3
Green Ext Time (p_c), s	0.5	1.2	0.0	0.0	0.0	28.9	0.0	0.1

Intersection Summary	
HCM 7th Control Delay, s/veh	10.3
HCM 7th LOS	B

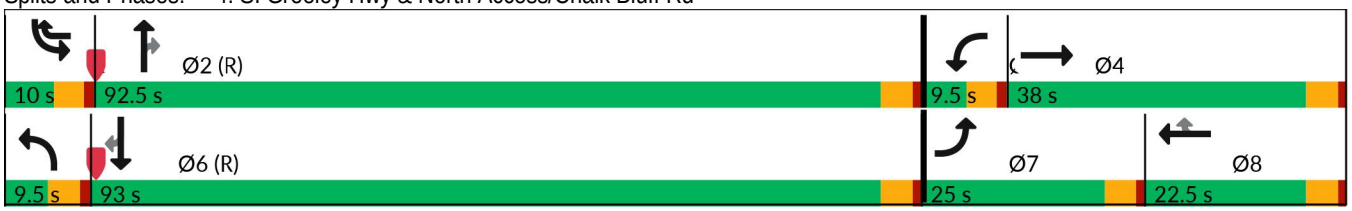
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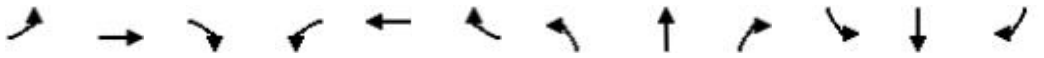
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	WBL	WBR	NBT	NBR	SBL	SBT	Ø4	Ø5	Ø8
Lane Configurations										
Traffic Volume (vph)	750	3	46	3166	8	63	306			
Future Volume (vph)	750	3	46	3166	8	63	306			
Turn Type	Prot	Prot	pm+ov	NA	Perm	Prot	NA			
Protected Phases	7	3	1	2		1	6	4	5	8
Permitted Phases			8		2					
Detector Phase	7	3	1	2	2	1	6			
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	25.0	9.5	10.0	92.5	92.5	10.0	93.0	38.0	9.5	22.5
Total Split (%)	16.7%	6.3%	6.7%	61.7%	61.7%	6.7%	62.0%	25%	6%	15%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min	None	None	None
Act Effct Green (s)	20.5	8.1	16.0	100.0	100.0	16.0	120.5			
Actuated g/C Ratio	0.14	0.05	0.11	0.67	0.67	0.11	0.80			
v/c Ratio	1.42	0.04	0.25	1.23	0.01	0.42	0.09			
Control Delay (s/veh)	243.6	63.0	7.7	131.0	0.0	73.2	0.7			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay (s/veh)	243.6	63.0	7.7	131.0	0.0	73.2	0.7			
LOS	F	E	A	F	A	E	A			
Approach Delay (s/veh)				130.6			13.0			
Approach LOS				F			B			

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 10 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.42	
Intersection Signal Delay (s/veh): 139.0	Intersection LOS: F
Intersection Capacity Utilization 105.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 4: S. Greeley Hwy & North Access/Chalk Bluff Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	750	0	0	3	0	46	0	3166	8	63	306	0
Future Volume (veh/h)	750	0	0	3	0	46	0	3166	8	63	306	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	815	0	0	3	0	52	0	3518	9	66	322	0
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	578	281	0	6	72	110	1	2842	882	55	3128	
Arrive On Green	0.14	0.00	0.00	0.00	0.00	0.05	0.00	0.66	0.66	0.04	0.73	0.00
Sat Flow, veh/h	4230	1575	0	1500	1575	1335	1500	4300	1335	1500	4300	1335
Grp Volume(v), veh/h	815	0	0	3	0	52	0	3518	9	66	322	0
Grp Sat Flow(s),veh/h/ln	1410	1575	0	1500	1575	1335	1500	1433	1335	1500	1433	1335
Q Serve(g_s), s	20.5	0.0	0.0	0.3	0.0	5.6	0.0	99.1	0.3	5.5	3.3	0.0
Cycle Q Clear(g_c), s	20.5	0.0	0.0	0.3	0.0	5.6	0.0	99.1	0.3	5.5	3.3	0.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	578	281	0	6	72	110	1	2842	882	55	3128	
V/C Ratio(X)	1.41	0.00	0.00	0.51	0.00	0.47	0.00	1.24	0.01	1.20	0.10	
Avail Cap(c_a), veh/h	578	352	0	50	189	209	50	2842	882	55	3128	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.10	0.10	0.94	0.94	0.00
Uniform Delay (d), s/veh	64.8	0.0	0.0	74.6	0.0	65.7	0.0	25.4	8.7	72.2	6.0	0.0
Incr Delay (d2), s/veh	194.5	0.0	0.0	55.2	0.0	3.1	0.0	107.4	0.0	181.5	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.8	0.0	0.0	0.2	0.0	1.9	0.0	56.6	0.1	4.8	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	259.3	0.0	0.0	129.8	0.0	68.8	0.0	132.9	8.7	253.8	6.1	0.0
LnGrp LOS	F			F		E		F	A	F	A	
Approach Vol, veh/h		815			55			3527			388	
Approach Delay, s/veh		259.3			72.2			132.5			48.2	
Approach LOS		F			E			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	103.6	5.1	31.3	0.0	113.6	25.0	11.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	88.0	5.0	33.5	5.0	88.5	20.5	18.0
Max Q Clear Time (g_c+I1), s	7.5	101.1	2.3	0.0	0.0	5.3	22.5	7.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.1

Intersection Summary	
HCM 7th Control Delay, s/veh	146.6
HCM 7th LOS	F

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	48	148	2	24	104
Future Vol, veh/h	2	48	148	2	24	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	72	72	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	57	206	3	34	149

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	424	207	0	0	208	0
Stage 1	207	-	-	-	-	-
Stage 2	217	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	587	833	-	-	1363	-
Stage 1	828	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	572	833	-	-	1363	-
Mov Cap-2 Maneuver	572	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	798	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.74	0	1.45
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	819	1363	-
HCM Lane V/C Ratio	-	-	0.073	0.025	-
HCM Control Delay (s/veh)	-	-	9.7	7.7	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	36	188	6	49	247
Future Vol, veh/h	2	36	188	6	49	247
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	90	90	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	40	209	7	52	260

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	575	212	0	0	216	0
Stage 1	212	-	-	-	-	-
Stage 2	363	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	479	828	-	-	1354	-
Stage 1	823	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	461	828	-	-	1354	-
Mov Cap-2 Maneuver	461	-	-	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	677	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.79	0	1.29
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	795	1354	-
HCM Lane V/C Ratio	-	-	0.054	0.038	-
HCM Control Delay (s/veh)	-	-	9.8	7.8	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	48	240	2	24	228
Future Vol, veh/h	2	48	240	2	24	228
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	520	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	72	72	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	57	333	3	34	326

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	729	335	0	0	336	0
Stage 1	335	-	-	-	-	-
Stage 2	394	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	390	707	-	-	1223	-
Stage 1	725	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	379	707	-	-	1223	-
Mov Cap-2 Maneuver	379	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	662	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.77	0	0.76
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	684	1223	-
HCM Lane V/C Ratio	-	-	0.087	0.028	-
HCM Control Delay (s/veh)	-	-	10.8	8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	36	317	6	49	300
Future Vol, veh/h	2	36	317	6	49	300
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	90	90	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	40	352	7	52	316

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	775	356	0	0	359	0
Stage 1	356	-	-	-	-	-
Stage 2	419	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	367	688	-	-	1200	-
Stage 1	709	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	351	688	-	-	1200	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	709	-	-	-	-	-
Stage 2	635	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.88	0	1.14
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	655	1200	-
HCM Lane V/C Ratio	-	-	0.065	0.043	-
HCM Control Delay (s/veh)	-	-	10.9	8.1	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	83	407	3	36	186
Future Vol, veh/h	3	83	407	3	36	186
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	72	72	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	99	565	4	51	266

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	936	567	0	0	569	0
Stage 1	567	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	294	523	-	-	1003	-
Stage 1	567	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	279	523	-	-	1003	-
Mov Cap-2 Maneuver	279	-	-	-	-	-
Stage 1	567	-	-	-	-	-
Stage 2	664	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.88	0	1.42
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	507	1003	-
HCM Lane V/C Ratio	-	-	0.202	0.051	-
HCM Control Delay (s/veh)	-	-	13.9	8.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.2	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	52	298	8	85	530
Future Vol, veh/h	3	52	298	8	85	530
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	90	90	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	58	331	9	89	558

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1072	336	0	0	340	0
Stage 1	336	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	244	706	-	-	1219	-
Stage 1	724	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	226	706	-	-	1219	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	724	-	-	-	-	-
Stage 2	439	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.3	0	1.13
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	633	1219	-
HCM Lane V/C Ratio	-	-	0.098	0.073	-
HCM Control Delay (s/veh)	-	-	11.3	8.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.2	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	83	499	3	36	310
Future Vol, veh/h	3	83	499	3	36	310
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	72	72	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	99	693	4	51	443

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1241	695	0	0	697	0
Stage 1	695	-	-	-	-	-
Stage 2	546	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	193	442	-	-	899	-
Stage 1	495	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	182	442	-	-	899	-
Mov Cap-2 Maneuver	182	-	-	-	-	-
Stage 1	495	-	-	-	-	-
Stage 2	547	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.27	0	0.96
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	421	899	-
HCM Lane V/C Ratio	-	-	0.243	0.057	-
HCM Control Delay (s/veh)	-	-	16.3	9.2	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.9	0.2	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	52	427	8	85	583
Future Vol, veh/h	3	52	427	8	85	583
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	240	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	90	90	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	58	474	9	89	614

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1272	479	0	0	483	0
Stage 1	479	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	185	587	-	-	1079	-
Stage 1	623	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	170	587	-	-	1079	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	409	-	-	-	-	-

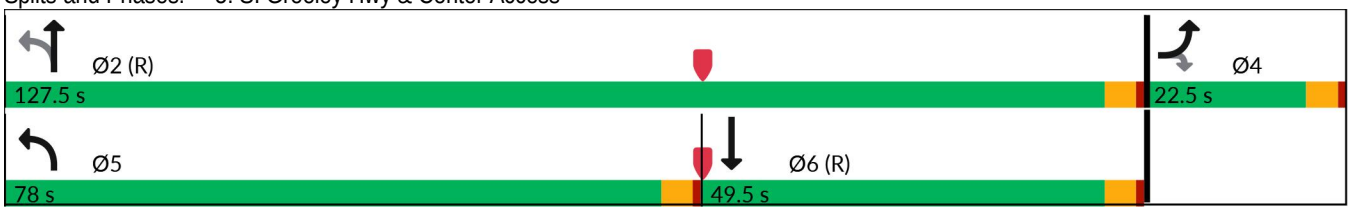
Approach	WB	NB	SB
HCM Control Delay, s/v	12.9	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	517	1079	-
HCM Lane V/C Ratio	-	-	0.119	0.083	-
HCM Control Delay (s/veh)	-	-	12.9	8.6	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.3	-

Lane Group	NBL	NBT	SBT	SBR	Ø4
Lane Configurations					
Traffic Volume (vph)	601	161	700	1740	
Future Volume (vph)	601	161	700	1740	
Turn Type	pm+pt	NA	NA	Free	
Protected Phases	5	2	6		4
Permitted Phases	2			Free	
Detector Phase	5	2	6		
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0		5.0
Minimum Split (s)	9.5	22.5	22.5		22.5
Total Split (s)	78.0	127.5	49.5		22.5
Total Split (%)	52.0%	85.0%	33.0%		15%
Yellow Time (s)	3.5	3.5	3.5		3.5
All-Red Time (s)	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5		
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Min	C-Min		None
Act Effct Green (s)	145.5	150.0	57.4	150.0	
Actuated g/C Ratio	0.97	1.00	0.38	1.00	
v/c Ratio	0.87	0.07	0.73	0.88	
Control Delay (s/veh)	30.4	0.0	42.2	5.7	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	30.4	0.0	42.2	5.7	
LOS	C	A	D	A	
Approach Delay (s/veh)		24.0	16.2		
Approach LOS		C	B		

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 78 (52%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay (s/veh): 18.3	Intersection LOS: B
Intersection Capacity Utilization 70.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: S. Greeley Hwy & Center Access





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	601	161	700	1740
Future Volume (veh/h)	0	0	601	161	700	1740
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	0	0	823	221	833	0
Peak Hour Factor	0.92	0.92	0.73	0.73	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3	2	846	2903	1826	
Arrive On Green	0.00	0.00	0.33	0.97	0.61	0.00
Sat Flow, veh/h	4230	2349	1500	3071	3071	2349
Grp Volume(v), veh/h	0	0	823	221	833	0
Grp Sat Flow(s),veh/h/ln	1410	1175	1500	1496	1496	1175
Q Serve(g_s), s	0.0	0.0	44.4	0.4	22.6	0.0
Cycle Q Clear(g_c), s	0.0	0.0	44.4	0.4	22.6	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	3	2	846	2903	1826	
V/C Ratio(X)	0.00	0.00	0.97	0.08	0.46	
Avail Cap(c_a), veh/h	508	282	1086	2903	1826	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.80	0.80	0.35	0.00
Uniform Delay (d), s/veh	0.0	0.0	23.4	0.1	15.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	16.3	0.0	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	29.7	0.0	7.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	0.0	0.0	39.7	0.1	16.1	0.0
LnGrp LOS			D	A	B	
Approach Vol, veh/h	0			1044	833	
Approach Delay, s/veh	0.0			31.3	16.1	
Approach LOS				C	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		150.0		0.0	54.0	96.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		123.0		18.0	73.5	45.0
Max Q Clear Time (g_c+I1), s		2.4		0.0	46.4	24.6
Green Ext Time (p_c), s		1.3		0.0	3.0	4.9

Intersection Summary	
HCM 7th Control Delay, s/veh	24.6
HCM 7th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	2176	750	1001	307
Future Volume (vph)	2176	750	1001	307
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	89.0	89.0	61.0	61.0
Total Split (%)	59.3%	59.3%	40.7%	40.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	84.5	84.5	56.5	56.5
Actuated g/C Ratio	0.56	0.56	0.38	0.38
v/c Ratio	1.00	0.52	0.99	0.30
Control Delay (s/veh)	50.8	6.0	70.9	29.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	50.8	6.0	70.9	29.1
LOS	D	A	E	C
Approach Delay (s/veh)	39.3		70.9	29.1
Approach LOS	D		E	C

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay (s/veh): 46.1	Intersection LOS: D
Intersection Capacity Utilization 89.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: S. Greeley Hwy & Center Access





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2176	750	0	1001	307	0
Future Volume (veh/h)	2176	750	0	1001	307	0
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	2365	815	0	1112	341	0
Peak Hour Factor	0.92	0.92	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2383	1323	48	1127	1127	
Arrive On Green	0.56	0.56	0.00	0.38	0.38	0.00
Sat Flow, veh/h	4230	2349	1039	3071	3071	2349
Grp Volume(v), veh/h	2365	815	0	1112	341	0
Grp Sat Flow(s),veh/h/ln	1410	1175	1039	1496	1496	1175
Q Serve(g_s), s	83.1	34.8	0.0	55.3	12.0	0.0
Cycle Q Clear(g_c), s	83.1	34.8	0.0	55.3	12.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	2383	1323	48	1127	1127	
V/C Ratio(X)	0.99	0.62	0.00	0.99	0.30	
Avail Cap(c_a), veh/h	2383	1323	48	1127	1127	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.64	1.00	0.00
Uniform Delay (d), s/veh	32.4	21.9	0.0	46.4	32.9	0.0
Incr Delay (d2), s/veh	16.6	0.9	0.0	18.5	0.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	31.4	9.8	0.0	22.3	4.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	49.1	22.8	0.0	64.9	33.6	0.0
LnGrp LOS	D	C		E	C	
Approach Vol, veh/h	3180			1112	341	
Approach Delay, s/veh	42.3			64.9	33.6	
Approach LOS	D			E	C	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	61.0	89.0	61.0
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	56.5	84.5	56.5
Max Q Clear Time (g_c+I1), s	57.3	85.1	14.0
Green Ext Time (p_c), s	0.0	0.0	2.0

Intersection Summary	
HCM 7th Control Delay, s/veh	47.1
HCM 7th LOS	D

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	87	24	30	153	119	109
Future Vol, veh/h	87	24	30	153	119	109
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	520	-	-	520
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	73	73	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	95	26	41	210	142	130

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	433	142	271	0	-	0
Stage 1	142	-	-	-	-	-
Stage 2	292	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	579	906	1292	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	758	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	561	906	1292	-	-	-
Mov Cap-2 Maneuver	561	-	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.33	1.29	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1292	-	611	-	-
HCM Lane V/C Ratio	0.032	-	0.197	-	-
HCM Control Delay (s/veh)	7.9	-	12.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	115	31	13	211	253	48
Future Vol, veh/h	115	31	13	211	253	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	520	-	-	520
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	34	14	234	281	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	544	281	334	0	-	0
Stage 1	281	-	-	-	-	-
Stage 2	263	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	500	758	1225	-	-	-
Stage 1	766	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	494	758	1225	-	-	-
Mov Cap-2 Maneuver	494	-	-	-	-	-
Stage 1	757	-	-	-	-	-
Stage 2	781	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.58	0.46	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1225	-	533	-	-
HCM Lane V/C Ratio	0.012	-	0.298	-	-
HCM Control Delay (s/veh)	8	-	14.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	1.2	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	87	24	30	412	201	109
Future Vol, veh/h	87	24	30	412	201	109
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	520	-	-	520
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	73	73	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	95	26	41	564	239	130

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	886	239	369	0	-	0
Stage 1	239	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	315	800	1189	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	304	800	1189	-	-	-
Mov Cap-2 Maneuver	304	-	-	-	-	-
Stage 1	773	-	-	-	-	-
Stage 2	521	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	20.52	0.55	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1189	-	351	-	-
HCM Lane V/C Ratio	0.035	-	0.343	-	-
HCM Control Delay (s/veh)	8.1	-	20.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	115	31	13	323	536	48
Future Vol, veh/h	115	31	13	323	536	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	520	-	-	520
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	34	14	359	596	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	983	596	649	0	-	0
Stage 1	596	-	-	-	-	-
Stage 2	388	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	276	504	937	-	-	-
Stage 1	551	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	271	504	937	-	-	-
Mov Cap-2 Maneuver	271	-	-	-	-	-
Stage 1	542	-	-	-	-	-
Stage 2	686	-	-	-	-	-

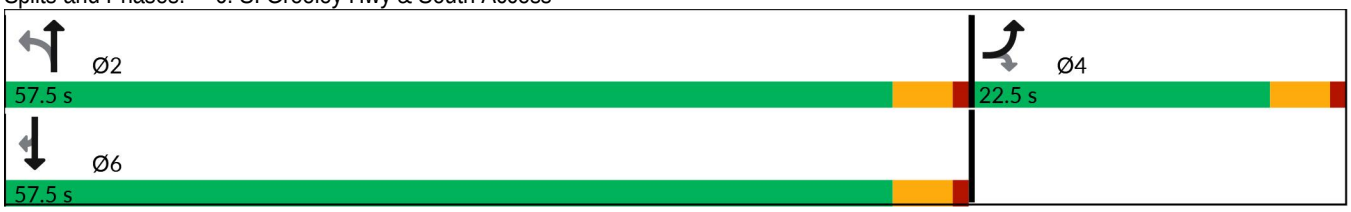
Approach	EB	NB	SB
HCM Control Delay, s/v	29.56	0.34	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	937	-	301	-	-
HCM Lane V/C Ratio	0.015	-	0.527	-	-
HCM Control Delay (s/veh)	8.9	-	29.6	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	2.9	-	-

Lane Group	NBL	NBT	SBT	SBR	Ø4
Lane Configurations					
Traffic Volume (vph)	240	764	105	600	
Future Volume (vph)	240	764	105	600	
Turn Type	Perm	NA	NA	Perm	
Protected Phases		2	6		4
Permitted Phases	2			6	
Detector Phase	2	2	6	6	
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	57.5	57.5	57.5	57.5	22.5
Total Split (%)	71.9%	71.9%	71.9%	71.9%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	None
Act Effct Green (s)	72.5	72.5	72.5	72.5	
Actuated g/C Ratio	1.00	1.00	1.00	1.00	
v/c Ratio	0.26	0.57	0.04	0.49	
Control Delay (s/veh)	0.6	1.5	0.0	1.3	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	0.6	1.5	0.0	1.3	
LOS	A	A	A	A	
Approach Delay (s/veh)		1.3	1.1		
Approach LOS		A	A		

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 72.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay (s/veh): 1.2	Intersection LOS: A
Intersection Capacity Utilization 67.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: S. Greeley Hwy & South Access





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	240	764	105	600
Future Volume (veh/h)	0	0	240	764	105	600
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	0	0	282	899	115	0
Peak Hour Factor	0.92	0.25	0.85	0.85	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	5	2	1299	1452	2758	
Arrive On Green	0.00	0.00	0.92	0.92	0.92	0.00
Sat Flow, veh/h	2910	1335	1277	1575	3071	1335
Grp Volume(v), veh/h	0	0	282	899	115	0
Grp Sat Flow(s),veh/h/ln	1455	1335	1277	1575	1496	1335
Q Serve(g_s), s	0.0	0.0	1.3	6.0	0.2	0.0
Cycle Q Clear(g_c), s	0.0	0.0	1.5	6.0	0.2	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	5	2	1299	1452	2758	
V/C Ratio(X)	0.00	0.00	0.22	0.62	0.04	
Avail Cap(c_a), veh/h	911	418	1299	1452	2758	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.4	0.2	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.4	2.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.8	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	0.0	0.0	0.6	2.4	0.2	0.0
LnGrp LOS			A	A	A	
Approach Vol, veh/h	0			1181	115	
Approach Delay, s/veh	0.0			2.0	0.2	
Approach LOS				A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		57.5		0.0		57.5
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		53.0		18.0		53.0
Max Q Clear Time (g_c+I1), s		8.0		0.0		2.2
Green Ext Time (p_c), s		8.3		0.0		0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	1.8
HCM 7th LOS	A

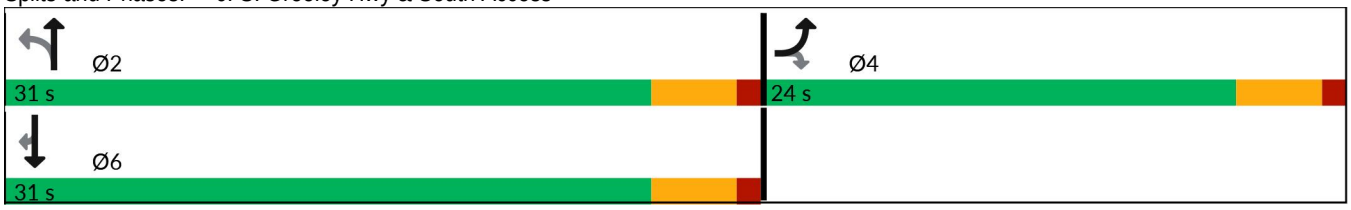
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	750	300	246	1057
Future Volume (vph)	750	300	246	1057
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	31.0	31.0
Total Split (%)	43.6%	43.6%	56.4%	56.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Max	Max
Act Effct Green (s)	18.3	18.3	26.6	26.6
Actuated g/C Ratio	0.34	0.34	0.49	0.49
v/c Ratio	0.83	0.68	0.36	0.80
Control Delay (s/veh)	25.4	21.7	10.6	17.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.4	21.7	10.6	17.5
LOS	C	C	B	B
Approach Delay (s/veh)	24.4		10.6	17.5
Approach LOS	C		B	B

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 53.9	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay (s/veh): 19.8	Intersection LOS: B
Intersection Capacity Utilization 67.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: S. Greeley Hwy & South Access





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	750	300	0	246	1057	0
Future Volume (veh/h)	750	300	0	246	1057	0
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1575	1575	1575	1575	1575
Adj Flow Rate, veh/h	815	326	0	280	1174	0
Peak Hour Factor	0.92	0.92	0.88	0.88	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	964	442	136	786	1494	
Arrive On Green	0.33	0.33	0.00	0.50	0.50	0.00
Sat Flow, veh/h	2910	1335	478	1575	3071	1335
Grp Volume(v), veh/h	815	326	0	280	1174	0
Grp Sat Flow(s),veh/h/ln	1455	1335	478	1575	1496	1335
Q Serve(g_s), s	13.8	11.5	0.0	5.7	17.2	0.0
Cycle Q Clear(g_c), s	13.8	11.5	0.0	5.7	17.2	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	964	442	136	786	1494	
V/C Ratio(X)	0.85	0.74	0.00	0.36	0.79	
Avail Cap(c_a), veh/h	1069	490	136	786	1494	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.5	15.7	0.0	8.1	10.9	0.0
Incr Delay (d2), s/veh	5.9	5.2	0.0	1.3	4.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	3.7	0.0	1.4	4.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	22.4	20.9	0.0	9.4	15.2	0.0
LnGrp LOS	C	C		A	B	
Approach Vol, veh/h	1141			280	1174	
Approach Delay, s/veh	22.0			9.4	15.2	
Approach LOS	C			A	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		31.0		22.1		31.0
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		26.5		19.5		26.5
Max Q Clear Time (g_c+I1), s		7.7		15.8		19.2
Green Ext Time (p_c), s		1.2		1.8		4.0

Intersection Summary	
HCM 7th Control Delay, s/veh	17.5
HCM 7th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	2	6	180	133	15
Future Vol, veh/h	5	2	6	180	133	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	520	-	-	520
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	25	85	85	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	8	7	212	146	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	372	146	163	0	-	0
Stage 1	146	-	-	-	-	-
Stage 2	226	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	629	901	1416	-	-	-
Stage 1	881	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	626	901	1416	-	-	-
Mov Cap-2 Maneuver	626	-	-	-	-	-
Stage 1	877	-	-	-	-	-
Stage 2	812	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.79	0.24	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1416	-	765	-	-
HCM Lane V/C Ratio	0.005	-	0.018	-	-
HCM Control Delay (s/veh)	7.6	-	9.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	6	2	205	279	5
Future Vol, veh/h	15	6	2	205	279	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	520	-	-	520
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	88	88	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	7	2	233	310	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	548	310	316	0	-	0
Stage 1	310	-	-	-	-	-
Stage 2	238	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	498	730	1245	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	497	730	1245	-	-	-
Mov Cap-2 Maneuver	497	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	802	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.87	0.08	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1245	-	547	-	-
HCM Lane V/C Ratio	0.002	-	0.042	-	-
HCM Control Delay (s/veh)	7.9	-	11.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	2	6	441	215	15
Future Vol, veh/h	5	2	6	441	215	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	520	-	-	520
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	25	85	85	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	8	7	519	236	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	769	236	253	0	-	0
Stage 1	236	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	369	803	1312	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	803	1312	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	588	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1312	-	543	-	-
HCM Lane V/C Ratio	0.005	-	0.025	-	-
HCM Control Delay (s/veh)	7.8	-	11.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	6	2	316	562	5
Future Vol, veh/h	15	6	2	316	562	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	520	-	-	520
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	88	88	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	7	2	359	624	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	988	624	630	0	-	0
Stage 1	624	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	274	485	952	-	-	-
Stage 1	534	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	273	485	952	-	-	-
Mov Cap-2 Maneuver	273	-	-	-	-	-
Stage 1	533	-	-	-	-	-
Stage 2	703	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	17.44	0.06	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	952	-	312	-	-
HCM Lane V/C Ratio	0.002	-	0.073	-	-
HCM Control Delay (s/veh)	8.8	-	17.4	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Appendix F: Intersection Queue Analysis Worksheets

Queues
1: S. Greeley Hwy & College Dr

08/28/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	158	200	146	200	141	115	110	656	209	89	624
v/c Ratio	0.49	0.78	0.43	0.65	0.46	0.31	0.33	0.50	0.30	0.28	0.49
Control Delay (s/veh)	25.3	56.0	9.5	30.5	35.7	5.0	15.4	22.7	4.7	15.0	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.3	56.0	9.5	30.5	35.7	5.0	15.4	22.7	4.7	15.0	22.5
Queue Length 50th (ft)	63	110	0	83	72	0	30	146	0	24	135
Queue Length 95th (ft)	97	172	47	121	117	26	59	196	31	57	221
Internal Link Dist (ft)		920			920			16697			920
Turn Bay Length (ft)	200		200	150		150	230		230	90	
Base Capacity (vph)	345	359	417	343	425	466	355	1303	700	334	1268
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.56	0.35	0.58	0.33	0.25	0.31	0.50	0.30	0.27	0.49

Intersection Summary



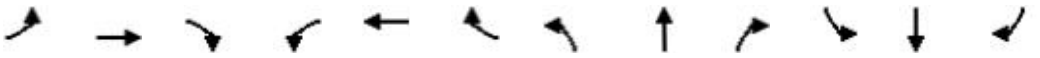
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	202	229	127	255	246	154	226	1260	464	131	984
v/c Ratio	0.87	0.85	0.32	1.02	0.85	0.37	0.85	0.96	0.55	0.78	0.85
Control Delay (s/veh)	60.4	63.7	2.7	92.7	62.1	4.5	45.9	41.7	4.6	50.5	33.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	60.4	63.7	2.7	92.7	62.1	4.5	45.9	41.7	4.6	50.5	33.5
Queue Length 50th (ft)	86	125	0	114	134	0	71	356	3	35	262
Queue Length 95th (ft)	#152	#227	7	#181	#194	12	#165	#396	35	#124	#388
Internal Link Dist (ft)		920			920			16697			920
Turn Bay Length (ft)	200		200	150		150	230		230	90	
Base Capacity (vph)	233	313	430	249	332	444	267	1319	843	168	1151
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.73	0.30	1.02	0.74	0.35	0.85	0.96	0.55	0.78	0.85

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
1: S. Greeley Hwy & College Dr

08/28/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	201	272	402	534	181	147	206	1173	358	114	1820	105
v/c Ratio	0.73	0.77	0.92	1.02	0.30	0.32	0.64	0.58	0.37	0.62	1.00	0.13
Control Delay (s/veh)	68.0	66.3	57.6	92.3	41.9	19.5	60.8	25.3	6.7	68.9	57.5	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	68.0	66.3	57.6	92.3	41.9	19.5	60.8	25.3	6.7	68.9	57.5	2.5
Queue Length 50th (ft)	79	108	229	~220	63	48	78	238	66	44	~554	0
Queue Length 95th (ft)	117	152	#419	#336	96	102	107	256	103	75	#650	23
Internal Link Dist (ft)		920			920			16697			920	
Turn Bay Length (ft)	200		200	150		150	230		230	90		90
Base Capacity (vph)	349	447	439	525	628	470	324	2017	960	218	1811	824
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.61	0.92	1.02	0.29	0.31	0.64	0.58	0.37	0.52	1.00	0.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	81	39	139	1	625	66	1093	59	137	664	280
v/c Ratio	0.40	0.26	1.01	0.01	1.31	0.18	0.87	0.09	0.31	0.34	0.29
Control Delay (s/veh)	33.6	17.0	118.8	33.0	179.1	7.6	30.8	0.3	8.5	8.4	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	33.6	17.0	118.8	33.0	179.1	7.6	30.8	0.3	8.5	8.4	2.1
Queue Length 50th (ft)	34	0	~93	0	~405	9	255	0	19	86	0
Queue Length 95th (ft)	57	20	83	4	#320	22	#395	0	62	133	33
Internal Link Dist (ft)		11807		347			4929			16697	
Turn Bay Length (ft)	320					100		280	270		420
Base Capacity (vph)	204	354	137	381	476	363	1252	665	442	1938	964
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.11	1.01	0.00	1.31	0.18	0.87	0.09	0.31	0.34	0.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
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95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



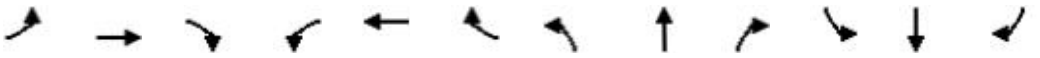
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	130	65	47	7	173	40	492	113	538	1057	39
v/c Ratio	0.61	0.17	0.23	0.04	0.58	0.19	0.70	0.25	0.80	0.60	0.05
Control Delay (s/veh)	40.4	0.9	27.6	32.5	13.5	13.2	32.6	2.3	21.4	12.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	40.4	0.9	27.6	32.5	13.5	13.2	32.6	2.3	21.4	12.9	0.1
Queue Length 50th (ft)	55	0	19	3	0	7	113	0	132	168	0
Queue Length 95th (ft)	95	0	30	10	3	18	182	9	#286	248	0
Internal Link Dist (ft)		11807		347			4929			16697	
Turn Bay Length (ft)	320					100		280	270		420
Base Capacity (vph)	212	529	201	408	482	208	828	501	743	1890	892
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.12	0.23	0.02	0.36	0.19	0.59	0.23	0.72	0.56	0.04

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
1: S. Greeley Hwy & College Dr

08/28/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	260	293	225	429	343	196	505	2743	874	168	1318	281
v/c Ratio	0.86	0.77	0.43	1.27	0.82	0.43	0.91	1.32	0.99	1.07	0.77	0.36
Control Delay (s/veh)	78.9	64.2	22.5	183.9	66.4	18.9	69.6	177.7	47.6	143.4	36.0	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	78.9	64.2	22.5	183.9	66.4	18.9	69.6	177.7	47.6	143.4	36.0	11.2
Queue Length 50th (ft)	103	115	88	~215	136	53	194	~1007	581	~156	336	72
Queue Length 95th (ft)	#170	163	157	#278	169	103	230	#925	#751	#314	402	136
Internal Link Dist (ft)		920			920			16697			920	
Turn Bay Length (ft)	200		200	150		150	230		230	90		90
Base Capacity (vph)	320	447	533	339	466	459	584	2073	885	157	1705	783
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.66	0.42	1.27	0.74	0.43	0.86	1.32	0.99	1.07	0.77	0.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Mr. Justin Arnold
Laramie County Planning & Development Department
3966 Archer Parkway
Cheyenne, WY 82009

Randy Fox
Hyndman Homesites HOA
933 Pearl Court
Cheyenne, WY 82007

Switchgrass Industrial Park
Project reference numbers:
PZ-25-00076
PZ-25-00078

December 23, 2025

Re: Public Comments from Hyndman Homesites

Dear Mr. Arnold,

Following are comments and concerns from the Hyndman Homesites HOA regarding the proposed Switchgrass Industrial Park project. Please consider these as you evaluate the project's site plan.

Background: Hyndman Homesites is the community south of Terry Ranch Road adjacent to the project. The subdivision comprises 50 homes and was formed in 1954.

For the record, no one in Hyndman wants a commercial development blocking our views of the open prairie and significantly increasing area traffic. This project is virtually in our backyards, only 1/2 mile away. One word describes the HOA's unanimous position: NIMB-Not In My Backyard.

The HOA acknowledges that the data center will provide economic, strategic and even national security benefits to the county and state. We accept the inevitability of the project and want to identify and mitigate concerns before they become problems. To that end Crusoe, Tallgrass and DPR Construction have taken the initiative to understand and address our questions and concerns. They want to be good neighbors and have been actively communicating with us about the project.

Increased traffic: This is our biggest concern. The large number of construction trucks expected in and out of the port of entry will make it difficult and dangerous to enter US-85 from Terry Ranch Road. Although US-85 will bear most of the traffic an estimated 7,000 construction workers and 1,200 data center employees will significantly increase the daily traffic on both roads. We believe a traffic light at the intersection of Terry Ranch Road and US-85 as well as turn lanes and widening the roads are needed for safety and increased traffic volume.

Water: The Wyoming State Engineer's Office is responsible for ensuring that new wells do not impact existing water usage rights. The Switchgrass project is planning to drill deep wells into the Lance Formation. Those will be far below the area's major water source, the Ogallala Aquifer in the Wild River Formation. We are concerned there is sufficient geologic data for this part of the county for assurance that wells into the Lance will not affect wells into the Ogallala above it. If data is insufficient to provide that confidence, water for a great many users could be at risk.

Excavated earth: A large amount of earth will be moved during construction. Excavated dirt should not be piled in the area between the project and our neighborhood, further degrading our view.

Visual impact: No one wants to see buildings replace our view of the open prairie. However, there are worse things to look at such as dirt piles, retention ponds or leftover building materials. We do not want those things to happen. We understand that dirt needs to be piled where it was excavated until repurposed and/or landscaped. We just don't want temporary bare piles to become permanent bare piles.

Noise abatement: Wyoming Department of Environmental Quality is responsible for ensuring the site plan complies with sound levels (dB) at specified distances. If the noise is unacceptable despite being compliant we would require sound abatement to maintain a quiet neighborhood. Since the power plant will be the largest in Wyoming we are concerned that it could become the loudest one, too.

Light pollution: Data centers are brightly illuminated at night for security. A good example is the nearby Microsoft data center. Bright lights can be disruptive to sleep unless shielded or aimed away from the neighborhood. We need lighting to be shielded or directional.

Power scalability: Power generation has been publicly described as 1.8 GW initially scalable to 10 GW. If scaling up requires additional turbines and infrastructure we are concerned about where they will be located, increased noise and emissions. We hope this is defined in the site plan.

Power plant emissions: Wyoming Department of Environmental Quality is responsible for ensuring the site plan complies with emissions regulations. Due to the size of the power plant we are concerned about noxious odors even if emissions are in compliance. Odor mitigation is concerning because it's been a problem at other data centers such as xAI in Memphis, Tennessee.

Housing for construction workers: With up to 7,000 construction workers anticipated we are concerned that a man camp for itinerant workers could be built nearby. Man camps have a reputation for increased criminal activity and are incompatible with nearby residential neighborhoods. You will recall that developers of the Meta data center were denied a zoning change request for a modest-sized man camp because of its proximity to existing neighborhoods.

Wastewater and sewage: We assume the site will not be connected to the City of Cheyenne sewer system. If an onsite waste treatment facility and evaporation ponds are planned they will need to be located far from the neighborhood. If instead a septic tank and leach field are planned there is an additional concern about infiltration and the effects on ground water.

Rainwater and flood management: We are concerned about the type, location, purpose and number of ponds planned. Retention ponds maintain a level of water year-round and can emit odors and breed mosquitoes. We understand the need for flood protection with detention ponds but specifically do not want retention ponds close to the neighborhood.

Construction dust and dirt: Construction involves earthmoving and excavating, activities that generate a lot of dust and dirt which finds a way into homes. Due to the size of this project there needs to be a way to minimize the dust.

Wildlife: The project is located inside known wildlife migration routes and sensitive habitat areas. Wyoming Game and Fish is responsible for ensuring compliance with requirements to minimize the impact on wildlife. We are concerned for our furry and feathered neighbors and are glad this is being addressed by Game & Fish.

Mr. Arnold, on behalf of Hyndman Homesites, thank you for considering our concerns about the Switchgrass Industrial Park. Please don’t hesitate to contact me if you have any questions or require further clarification.

Respectfully submitted,

Randy Fox
President, Hyndman Homesites HOA
933 Pearl Court
Cheyenne, WY 82007

Cell: 307-221-6040
Email: wyomingfox@bresnan.net

Comments pertaining to:
TALLGRASS INTEGRATED LOGISTICS SOLUTIONS, LLC AND WY DC 1, LLC

I have reservations regarding the proposed construction of the data center and the associated electrical generation facility. The Cheyenne area already hosts a substantial number of data centers.
There are concerns related to rising electricity rates for consumers, as the projected demand from new data centers may increase electricity consumption by 8% to 25% by 2030. In 2024, data centers accounted for 4% of total electricity use; this figure could reach 12% by the end of the decade. Additionally, the significant volume of natural gas required for electricity generation will likely raise natural gas prices, which may be reflected in higher utility bills for consumers.
Although I have not reviewed the site plans, several issues warrant consideration:

- What measures are in place for managing sewage generated by approximately 7,000 construction workers and 1,200 permanent employees?
- To what extent will heavy vehicles, such as semi-trucks and concrete trucks, impact local road infrastructure?
- Should there be designated green spaces separating industrial and residential zones?
- Given recent traffic increases following the Microsoft and Meta projects, what strategies will address additional congestion resulting from the Tallgrass project?
- How will plant wastewater be managed and disposed of?
- What is the anticipated sales tax revenue from this construction effort?
- Will emissions, such as water vapor plumes from the generating plant, affect the local environment or weather patterns? Furthermore, what quantities of water vapor and carbon dioxide are expected to be released into the atmosphere?
- Will issues related to noise and light pollution be considered?
- Please specify the type of fencing to be installed and indicate whether it will encompass the entire facility.
- Will the Wyoming Game and Fish guidelines be followed?

I respectfully submit these concerns for further review and consideration.
Ken and Tenny Collins
7410 Avenue B4

RESOLUTION NO. _____

A RESOLUTION TO APPROVE THE SITE PLAN FOR PROJECT JADE FOR SECTION 5, T12N, R66W, OF THE 6TH P.M., LARAMIE COUNTY, WY.

WHEREAS, Wyoming State Statutes §18-5-201 to 18-5-208; §18-5-301 to 18-5-315 authorize Laramie County, in promoting the public health, safety, morals and general welfare of the county, to regulate the use of land through zoning in unincorporated Laramie County; and

WHEREAS, the Laramie County Board of Commissioners previously adopted the Laramie County Land Use Regulations; and

WHEREAS, the proposed site plan is in conformance with the requirements of section 2-1-111 of the Laramie County Land Use Regulations; and

WHEREAS, the proposed site plan is in conformance with the requirements of section 3-1-109(f)(vi) of the Laramie County Land Use Regulations.

NOW THEREFORE BE IT RESOLVED BY THE GOVERNING BODY OF LARAMIE COUNTY, WYOMING, as follows:

The Laramie County Board of Commissioners finds that:

- **a.** This application is in conformance with section 2-4-111 governing PUD – Planned Unit Development zone district.
- **b.** This application is in conformance with section 3-1-109(f)(vi) governing General Requirements for New Site Plans.

And the Board approves the site plan for Project Jade located in Section 5, T12N, R66W, of the 6th P.M., Laramie County, WY, and adopt the findings of fact a and b of the staff report as well as the attached 'Exhibit A' – Site Plan Map, and 'Exhibit B,' the Specific Regulations for the Planned Unit Development – PUD, along with the following conditions:

1. **All agency comments will be addressed and/or corrected prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**
2. **Access and Drainage easements will be recorded with the County Clerk's Office prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**

PRESENTED, READ AND ADOPTED THIS _____ DAY OF

_____, 2025.

LARAMIE COUNTY BOARD OF COMMISSIONERS

_____
Gunnar Malm, Chairman

ATTEST:

_____
Debra K. Lee, Laramie County Clerk

Reviewed and approved as to form:

_____
Laramie County Attorney's Office

DRAFT

RESOLUTION NO. _____

A RESOLUTION TO APPROVE THE SITE PLAN FOR BFC POWER AND CHEYENNE POWER HUB FOR SECTION 7, T12N, R66W, OF THE 6TH P.M., LARAMIE COUNTY, WY.

WHEREAS, Wyoming State Statutes §18-5-201 to 18-5-208; §18-5-301 to 18-5-315 authorize Laramie County, in promoting the public health, safety, morals and general welfare of the county, to regulate the use of land through zoning in unincorporated Laramie County; and

WHEREAS, the Laramie County Board of Commissioners previously adopted the Laramie County Land Use Regulations; and

WHEREAS, the proposed site plan is in conformance with the requirements of section 2-1-111 of the Laramie County Land Use Regulations; and

WHEREAS, the proposed site plan is in conformance with the requirements of section 3-1-109(f)(vi) of the Laramie County Land Use Regulations.

NOW THEREFORE BE IT RESOLVED BY THE GOVERNING BODY OF LARAMIE COUNTY, WYOMING, as follows:

The Laramie County Board of Commissioners finds that:

- **a.** This application is in conformance with section 2-4-111 governing PUD – Planned Unit Development zone district.
- **b.** This application is in conformance with section 3-1-109(f)(vi) governing General Requirements for New Site Plans.

And the Board approves the site plan for BFC Power and Cheyenne Power Hub Project located in Section 7, T12N, R66W, of the 6th P.M., Laramie County, WY, and adopt the findings of fact a and b of the staff report as well as the attached 'Exhibit A' – Site Plan Map, and 'Exhibit B,' the Specific Regulations for the Planned Unit Development – PUD, along with the following conditions:

1. **All agency comments will be addressed and/or corrected prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**
2. **Access and Drainage easements will be recorded with the County Clerk's Office prior to the issuance of a Certificate of Review by Laramie County Planning and Development.**

PRESENTED, READ AND ADOPTED THIS _____ DAY OF

_____, 2025.

LARAMIE COUNTY BOARD OF COMMISSIONERS

_____
Gunnar Malm, Chairman

ATTEST:

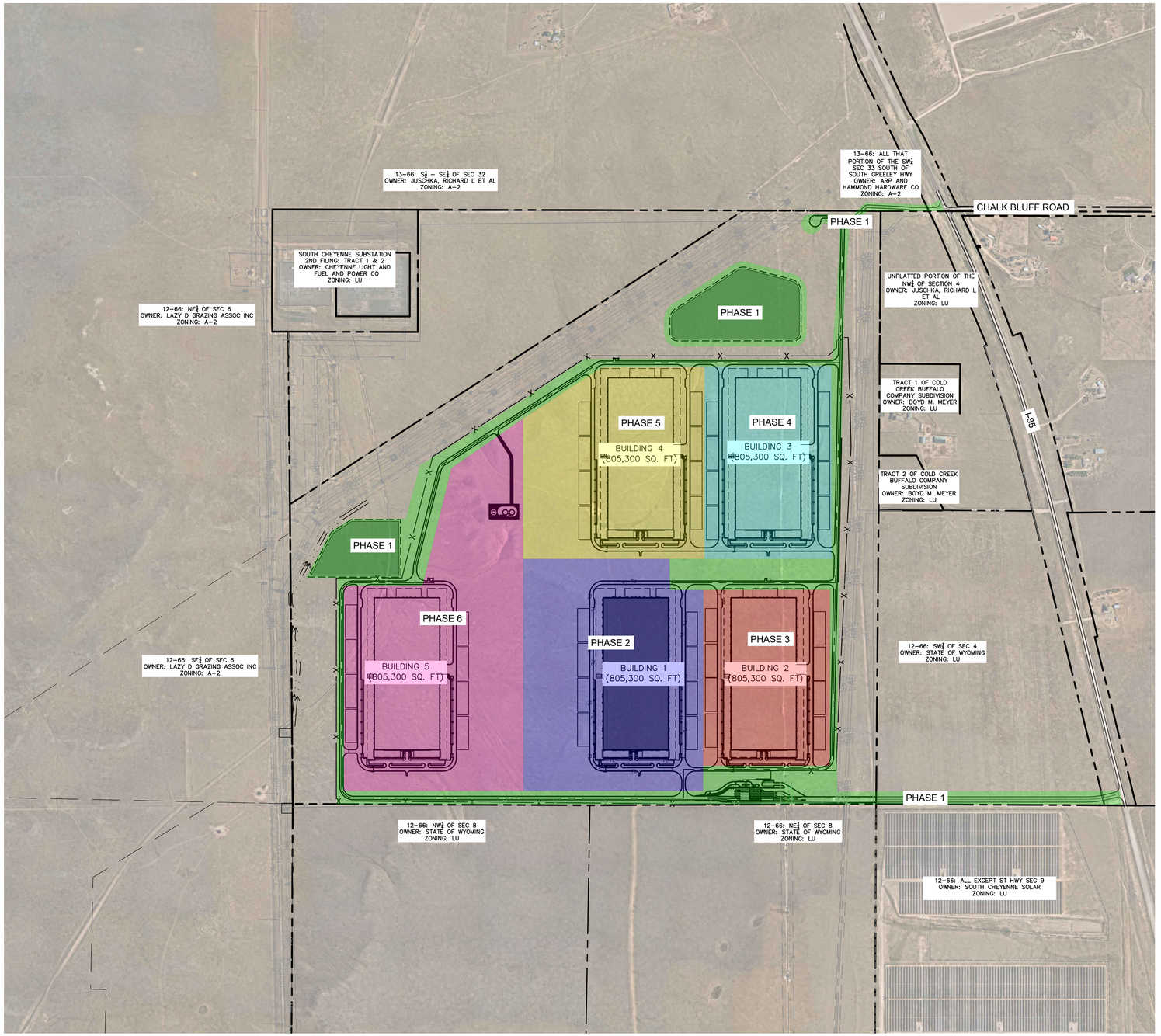
_____
Debra K. Lee, Laramie County Clerk

Reviewed and approved as to form:

_____
Laramie County Attorney's Office

DRAFT

EXHIBIT A - PROJECT JADE SITE PLAN



LEGEND

- PROPERTY LINE
- LOT LINE
- EXISTING EASEMENT LINES
- PROPOSED EASEMENT LINES
- CURB AND GUTTER
- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- PHASE 5
- PHASE 6

PHASING NOTES:

PHASE 1: ALL DEVELOPMENT WITHIN PHASE 1 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS. DEVELOPMENT SHALL INCLUDE INFRASTRUCTURE REQUIRED FOR THE FOLLOWING BUILDING PHASES. TWO DETENTION PONDS AND TRUNKLINE STORMWATER INFRASTRUCTURE FOR EACH BUILDING WILL BE BUILT IN PHASE 1 FOR STORMWATER MITIGATION THROUGHOUT THE CONSTRUCTION PROJECT.

PHASE 2: ALL DEVELOPMENT WITHIN PHASE 2 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS.

PHASE 3: ALL DEVELOPMENT WITHIN PHASE 3 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS.

PHASE 4: ALL DEVELOPMENT WITHIN PHASE 4 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS.

PHASE 5: ALL DEVELOPMENT WITHIN PHASE 5 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS.

PHASE 6: ALL DEVELOPMENT WITHIN PHASE 6 SHALL BE COMPLETED PER CIVIL, PHOTOMETRIC, LANDSCAPING AND ARCHITECTURAL PLANS.

GENERAL NOTES:

1. THE DEVELOPER SHALL CONSTRUCT ANY OFF-SITE ROADWAY OR EMERGENCY CROSSINGS IMPROVEMENTS PER LARAMIE COUNTY STANDARDS NECESSARY TO FACILITATE EMERGENCY VEHICULAR ACCESS TO THE SITE.

NORTH

GRAPHIC SCALE IN FEET
0 250 500 1000

Know what's below. Call before you dig.

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2025 KIMLEY-HORN AND ASSOCIATES, INC.
6200 South Syracuse Way, Suite 300
Greenwood Village, Colorado 80111 (303) 228-2300

DESIGNED BY: CRM
DRAWN BY: CMS
CHECKED BY: SAL
DATE: 12/19/2025

PROJECT JADE
LARAMIE COUNTY, WYOMING
SITE PLAN
PHASING PLAN

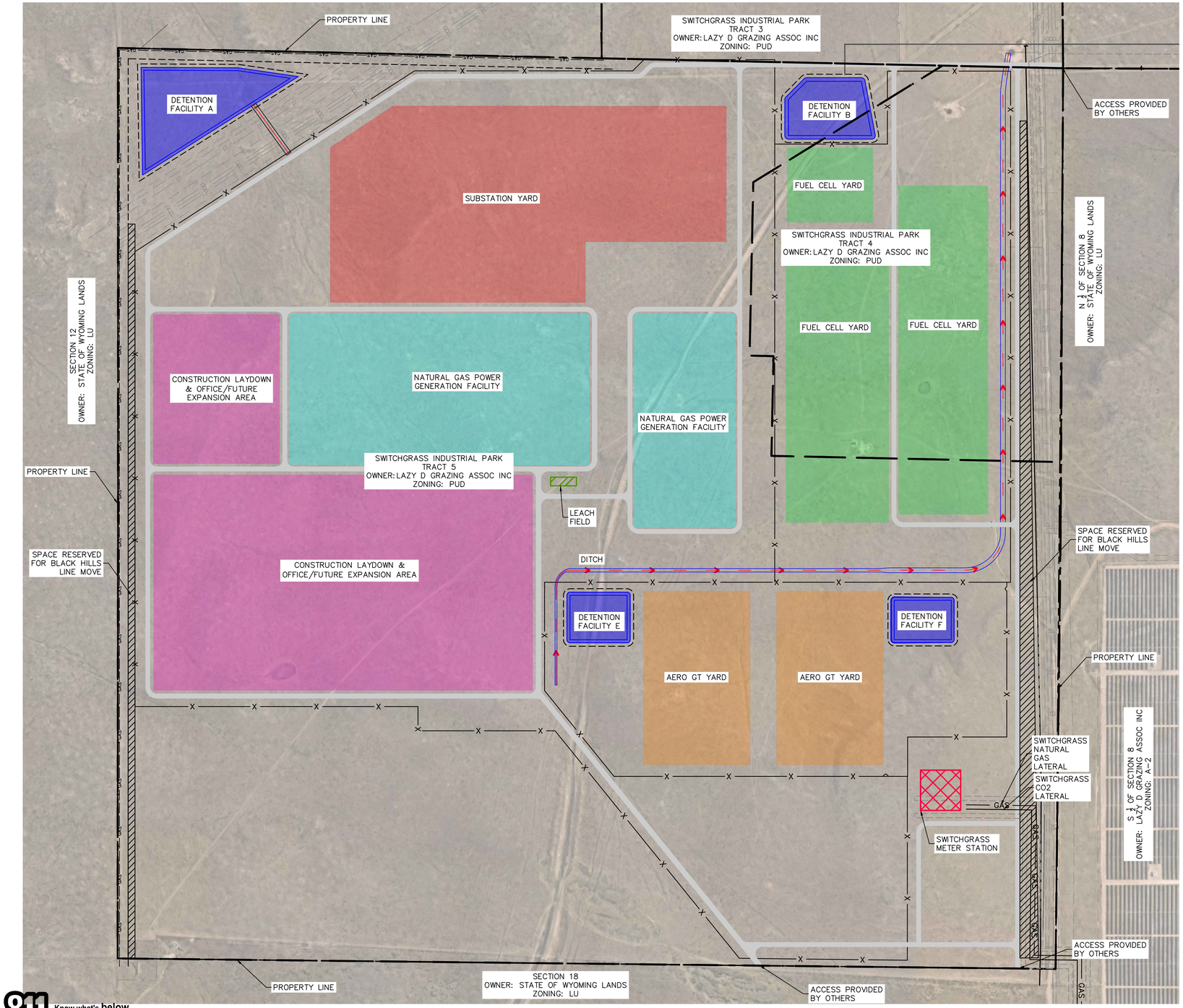
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
296242000

DRAWING NAME
296242_PHASING PLAN.DWG

C:\ACCDOCS\KIMLEY-HORN\296242000_LARAMIE COUNTY DATA CENTER\PROJECT FILES\CAD\PLANSHEETS\SITE PLAN\SITE PLAN - PARCEL 5

EXHIBIT B - BFC POWER AND CHEYENNE POWER HUB SITE PLAN



LEGEND

- DETENTION FACILITY
- FUEL CELL YARD
- SUBSTATION YARD
- CONSTRUCTION LAYDOWN & OFFICE/FUTURE EXPANSION AREA
- NATURAL GAS POWER GENERATION FACILITY
- AERO GT YARD
- METER STATION
- LEACH FIELD
- PROPOSED ROAD
- SWITCHGRASS UTILITY EASEMENT
- DRAINAGE SWALE

NOTES

1. PER THE SWITCHGRASS INDUSTRIAL PARK PLANNED UNIT DEVELOPMENT RULES, ALL BUILDINGS SHALL BE SET BACK AT LEAST 25 FEET FROM ALL EXTERNAL PROPERTY LINES.
2. PER THE SWITCHGRASS INDUSTRIAL PARK PLANNED UNIT DEVELOPMENT RULES, THERE ARE NO HEIGHT LIMITATIONS IN THIS DISTRICT UNLESS OTHERWISE PROVIDED BY STATE OR FEDERAL LAW.

NORTH

GRAPHIC SCALE IN FEET
0 150 300 600

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

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2025 KIMLEY-HORN AND ASSOCIATES, INC.
6200 South Syracuse Way, Suite 300
Greenwood Village, Colorado 80111 (303) 228-2300

DESIGNED BY: CRM
DRAWN BY: CMS
CHECKED BY: SAL
DATE: 12/19/2025

BFC POWER AND CHEYENNE POWER HUB PROJECT
LARAMIE COUNTY, WYOMING
SITE PLAN
OVERALL SITE PLAN

NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO. 296242000

DRAWING NAME
OVERALL SITE PLAN.DWG

C:\ACCA\ACCDOCS\KIMLEY-HORN\296242000_LARAMIE COUNTY DATA CENTER\PROJECT FILES\CADD\PLANSHEETS\SITE PLAN\SITE PLAN - TALLGRASS

EXHIBIT C

Docusign Envelope ID: 26FB72BC-150E-4D0A-8616-5C44201E36CF

RESOLUTION NO. **251007-20**

A RESOLUTION TO APPROVE A CHANGE IN ZONE DISTRICT FROM LU – LAND USE ZONE DISTRICT TO PUD – PLANNED UNIT DEVELOPMENT FOR A PORTION OF SECTIONS 5, 6, 7, T12N, R66W, OF THE 6TH P.M., LARAMIE COUNTY, WY.

WHEREAS, Wyoming State Statutes §18-5-201 to 18-5-208; §18-5-301 et. seq. authorize Laramie County, in promoting the public health, safety, morals and general welfare of the county, to regulate the use of land through zoning in unincorporated Laramie County; and

WHEREAS, the Laramie County Board of Commissioners previously adopted the Laramie County Land Use Regulations; and

WHEREAS, the proposed zone change is in conformance with the requirements of section 2-1-103(e)(i)(B) of the Laramie County Land Use Regulations; and

WHEREAS, the proposed zone change is in conformance with the requirements of section 2-4-111 of the Laramie County Land Use Regulations.

NOW THEREFORE BE IT RESOLVED BY THE GOVERNING BODY OF LARAMIE COUNTY, WYOMING, as follows:

The Laramie County Board of Commissioners finds that:

a. This application meets the criteria for a zone map amendment pursuant to section 2-1-103(e)(i)(B) of the Laramie County Land Use Regulations.
b. The proposed change in zone district is in conformance with the requirements of section 2-4-111 of the Laramie County Land Use Regulations.

And the Board approves a Zone Change from LU – Land Use Zone District to PUD – Planned Unit Development for a portion of Sections 5, 6, 7, T12N, R66W, of the 6th P.M., Laramie County, WY, and adopt the findings of fact a and b of the staff report as well as the attached 'Exhibit A' – Zone Change Map, and 'Exhibit B,' the Specific Regulations for the Planned Unit Development – PUD.

PRESENTED, READ AND ADOPTED THIS 7 **DAY OF**

Oct, **2025.**

LARAMIE COUNTY BOARD OF COMMISSIONERS

Signed by:
BF5EC1D80F5E740E...
Gunnar Malm, Chairman

LARAMIE COUNTY CLERK STATE OF WYOMING

ATTEST:
Signed by:
Debra K. Lee
Debra K. Lee, Laramie County Clerk

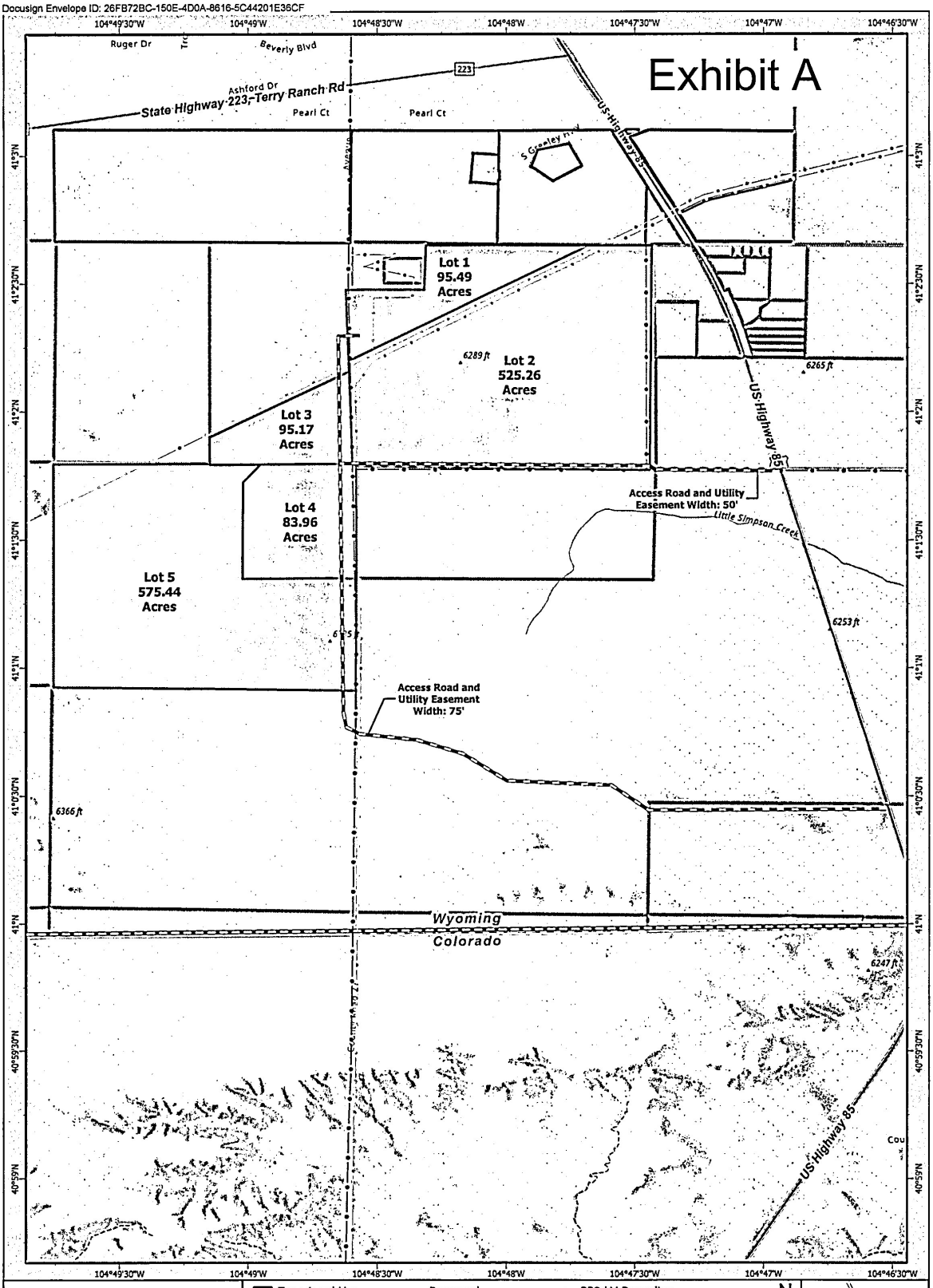
Resolution reviewed and approved as to form:

Laramie County Attorney's Office

RECP #: 901285
RECORDED 10/8/2025 AT 4:10 PM BK# 2936 PG# 4083
Debra K. Lee, CLERK OF LARAMIE COUNTY, WY PAGE 1 OF 8

COPY OF RECORD

Docusign Envelope ID: 26FB72BC-150E-4D0A-8616-5C44201E36CF



Proposed Switchgrass Industrial Park	Zone Land Use Annex City of Cheyenne Zone Ag 2	Proposed Switchgrass Industrial Park (PUD) Proposed Access and Utility Road	230 kV Powerline 115/345 kV Powerline Proposed Powerline Easement	N 0 ¼ ½ 1 Mile Wyoming Cheyenne Colorado 7/23/2025

RECP #: 901285
RECORDED 10/8/2025 AT 4:10 PM BK# 2936 PG# 4084
Debra K. Lee, CLERK OF LARAMIE COUNTY, WY PAGE 2 OF 8

Docusign Envelope ID: 26FB72BC-150E-4D0A-8616-5C44201E36CF

EXHIBIT B

RECP #: 901285
RECORDED 10/8/2025 AT 4:10 PM BK# 2936 PG# 4085
Debra K. Lee, CLERK OF LARAMIE COUNTY, WY PAGE 3 OF 8

Switchgrass Industrial Park
Planned Unit Development Rules

Purpose: The purpose of the Switchgrass Industrial Park (PUD) is to create an area for specialized commercial and industrial businesses in a rural setting with access to major transportation routes. The Proposed PUD will allow for significant data center and energy infrastructure development. The following provisions specify those sections of the 2025 Laramie County Land Use Regulations (2025 LCR) that are deleted or modified with respect to lands within the Planned Unit Development. If not specifically set forth herein, the applicable provisions of the 2025 LCR shall apply.

A. Allowable Permitted Uses
    a. The PUD district is intended for uses of very high intensity which should be buffered in order to protect the community, to ensure unimpeded operation of the uses, and to permit accessory uses which cannot readily fit into other general businesses or mixed-use areas due to the nature or intensity of operations. The following uses are permitted within this PUD:
        i. Heavy Industrial (Lots 1-5)
            1. Power generation facilities
            2. Carbon capture facilities
            3. Petroleum and hydrocarbon storage facilities
            4. Central utility (chiller water) plants
            5. Wastewater treatment facilities / evaporation ponds
            6. Any Permitted Uses in Light Industrial Lots
            7. Other uses similar in nature and intensity to those permitted in this PUD
        ii. Light Industrial (Lots 1-5)
            1. Data centers
            2. Substations and electric transmission lines
            3. Guard house
            4. Warehousing/wholesale uses
            5. Indoor storage facilities
            6. Outdoor storage facilities – not including scrap yard or junkyard
            7. Office facilities
            8. Construction laydown yards
            9. Duct bank and pipeline corridors
            10. Load banks
            11. Battery energy storage systems
            12. Communications towers

13. Other uses similar in nature and intensity to those permitted in this PUD

iii. The above mentioned Allowable Permitted Use includes accessory structures and facilities consistent with industry standards including meters, launchers, booster facilities, valves, heaters, pumps, pipeline appurtenances, and structures of any kind together with any machinery, engines, blowoff valves, compressors, electrical equipment, conduit, blowers, measurement equipment, appliances, facilities, appurtenances, meters, towers, communication lines or equipment, or any other structure as may be necessary, convenient, or desirable for operations and equipment used, useful, desirable, or convenient in connection therewith.

B. Development Standards (General). The application of 2-4-111(C) shall be modified as follows:
   a. Minimum Lot Area Size
      i. Lots within the PUD shall be no smaller than 80 acres in size unless approved pursuant to an approved subdivision application.
         1. If centralized water and sewer are present, lots may be sized as necessary to accommodate principal structure(s), accessory structure(s), outdoor display, outside storage, setbacks, required landscaping, parking, drainage, and centralized or decentralized water and sewer facilities and other pertinent standards.
         2. If centralized water and sewer are not present, the minimum lot size shall be 5 acres.
   b. Setbacks
      i. All buildings shall be set back at least 25 feet from all external property lines.
      ii. Any setback requirements between buildings, or setbacks from internal lot lines of any future subdivision, shall be waived for lots under the same owner.
      iii. Due to the unique security requirements of the data center facilities, any cross-access requirements between adjacent developments, as outlined by the LCR, shall be waived.

   c. Aesthetics
      i. To the extent practical and where it can be performed consistent with industry standards and safety requirements, building colors shall be selected to integrate with the natural environment. Earth tone colors are encouraged to easily blend with the native landscaping.
      ii. Architectural:

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Debra K. Lee, CLERK OF LARAMIE COUNTY, WY PAGE 4 OF 8

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RECORDED 10/8/2025 AT 4:10 PM BK# 2936 PG# 4087
Debra K. Lee, CLERK OF LARAMIE COUNTY, WY PAGE 5 OF 8

1. Building massing and appearance will not require recesses, extrusions, or other design features which would impede the technical design of the data center facility.
2. Consistent design of buildings, principal façade, and main entrance design is encouraged.
3. Loading or refuse areas shall be screened from views external across external property lines. Screening is not required for internally facing items.
4. Due to the unique nature of the cooling systems the data center mechanical equipment yards will not require screening.

d. Maximum Lot Coverage
    i. Lots shall not exceed 90% coverage of the property area for building, parking and outdoor storage.
e. Height Limitations
    i. There are no height limitations in this district unless otherwise provided by state or federal law.

C. Additional Development Standards:
a. Parking
    i. Applicable required ADA standards shall apply.
    ii. Access from and egress to public roadways shall meet Laramie County Public Works requirements and/or Wyoming Department of Transportation requirements where applicable.
    iii. Amount of parking to be included as required to handle the maximum number of employees during the peak employment working shift.
    iv. The project developer on each tract shall determine loading areas, safe layout and configuration, and the means of ingress and egress.
    v. Parking and loading areas shall be located with ingress and egress that minimize traffic congestion.
    vi. Parking shall be on private property and shall not be located within a public right-of-way or shared access easement serving two or more properties.
    vii. External pedestrian circulation access requirements to be waived. Pedestrian circulation may be developed within the boundaries of the site.
b. Easements and Accessory Dwelling Structures
    i. No structure shall be located within an access, drainage or defined width utility easement.
c. Site Plans
    i. A Laramie County approved Site Plan is required prior to issuance of any building permits and for any new or change of use. All site plans shall

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RECP #: 901285
RECORDED 10/8/2025 AT 4:10 PM BK# 2936 PG# 4088
Debra K. Lee, CLERK OF LARAMIE COUNTY, WY PAGE 6 OF 8

meet the requirements set forth in the then current Laramie County regulatory requirements. However, the Traffic Study, Final Drainage Report and Landscape Plans required for the site plan application may be waived or delayed in the discretion of the Laramie County Planning Director based on the independent facts of each application.

d. All buildings shall be constructed in a good and workmanlike manner and kept in proper repair and neat appearance. All construction shall be constructed with materials of high quality and which are harmonious with the rural setting.
e. Landscaping Requirements. The application of LCR 3-1-109(p) or the then current Laramie County regulations to lands within the PUD is modified as follows:
    i. As a substitute for otherwise mandated landscaping, a Native Species Landscape Plan may be used where a central water system may or may not serve the site.
        1. A Native Species Plan uses species native to the western United States with plantings that will grow and thrive in the Laramie County climate consistent with low amounts of moisture, short growing seasons, and cold winters.
    ii. Landscape plans generally
        1. Must be prepared by a Wyoming design professional
        2. May be phased to match construction phases
        3. Must be maintained by the landowner as originally approved and is subject to enforcement
        4. If property lacks adequate space for landscaping due to setback or other requirements, a written request for an exemption may be made to the Laramie County Planning and Development Office and the Planning Director may grant an administrative exemption
    iii. Alternative landscape plans may be provided if the applicant demonstrates:
        1. The plan is well integrated with surrounding land uses
        2. Meets or exceeds requirements of the LCR; or
        3. The LCR as written would not allow reasonable use of the property
    iv. The required landscape area is capped at 10% of the lot. Landscaping shall be geared towards screening external property lines.
    v. Landscaping shall not interfere with general function, safety or acceptability of any gas, electric, water, sewer, telephone, or other utility easement.
    vi. Landscaping shall not interfere with traffic visibility requirements as required by County regulations.
    vii. Buffering may be required when a more intense land use will be adjacent to a less intense land use, or zoning district.

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RECP #: 901285
RECORDED 10/8/2025 AT 4:10 PM BK# 2936 PG# 4089
Debra K. Lee, CLERK OF LARAMIE COUNTY, WY PAGE 7 OF 8

1. No storage shall be allowed within screening and buffering areas.
2. Trash collection areas and trash bins shall not be allowed within screening and buffering areas.

f. Signage
   i. All regulatory signage shall be in accordance with the current version of the Manual for Uniform Traffic Control Devices
   ii. Monument signing, wayfinding signage and landscaping throughout and/or at entrances to the industrial park are permissible
   iii. Signage and wayfinding shall be provided that is consistent with and promotes the uniqueness of the industrial park
   iv. No billboards shall be constructed upon the lands covered by this PUD

g. Roads and Traffic Requirements
   i. In conjunction with any Plat or Subdivision Permit Application proposed within the PUD and with Site Plan Review Applications as development occurs, a Transportation Impact Analysis may be required pursuant to 2025 LCR Section 5-6-103 or then current Laramie County regulations.
      1. Such document must be prepared by a qualified civil engineer licensed in Wyoming.
      2. The Director of the Laramie County Planning and Development Office may waive a traffic study based on estimated average daily trips, peak hour trips, or existing road or site conditions.
   ii. All roadways within the PUD and all roadways used for accessing the PUD area shall be constructed to Laramie County standards.

h. Drainage and Stormwater
   i. Replication of pre-development hydrologic conditions is preferred to prevent property damage and physical changes attributable to increases in run-off rate, volume, velocity, diversions, concentrations and/or unplanned ponding of stormwater.
   ii. All designs shall meet the standards set forth in the County Municipal Storm Sewer System permit and the State of Wyoming's Pollution Discharge Elimination System.
   iii. Best Management Practices to be followed in accordance with Laramie County standards to promote public health and safety.
   iv. Drainage requirements and regulations for lands to be developed which are located in and adjacent to permanent streams subject to flooding and designated as located in potential flood areas by the Federal Emergency Management Agency shall be in accordance with the Laramie County Floodplain Management Regulations.

i. Grading Permit, Erosion and Sediment Control

Docusign Envelope ID: 26FB72BC-150E-4D0A-8616-5C44201E36CF

i. A written statement of erosion and sediment management and control shall be submitted to the Laramie County Planning Department with any Site Plan Review application in accordance with then current Laramie County land use regulations for GESC.

j. Environmental Protection
   i. All lot owners shall take reasonable steps to control noxious weeds and vegetation on their lots.
   ii. Measures shall be taken to prevent erosion and protect the natural state of the lot.
   iii. Hazardous materials and chemicals shall be stored and disposed of in accordance with all applicable environmental laws and regulations.

k. Water and Sewer
   i. No sewer system is proposed at this time. Sewage disposal shall be provided by a public sanitary sewer system or a septic leach field for each lot, properly sized for the proposed uses, certified by an engineer licensed in Wyoming and shall comply with all federal, state and local regulations.
   ii. No water system is proposed at this time. Water systems shall be provided by private or public water systems or separate wells; all wells shall be properly permitted and sized for the proposed use(s) and shall comply with all applicable federal, state and local regulations.

l. Easements
   i. Easements for installation and maintenance of utilities, for drainage ditches and ponds, and for access shall be negotiated at the time such infrastructure is installed to a lot.
   ii. No structure or other material shall be placed or permitted to remain which may damage or interfere with the installation and maintenance of utilities.

RECP #: 901285
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Debra K. Lee, CLERK OF LARAMIE COUNTY, WY PAGE 8 OF 8