DOUGLAS COUNTY
COLORADO

Location and Extent
Staff Report

DATE: APRIL 24, 2024

TO: DOUGLAS COUNTY PLANNING COMMISSION

FROM: CAROLYN WASHEE-FREELAND, AICP, SENIOR PLANNER *CWF*
JEANETTE BARE, AICP, PLANNING MANAGER *JB*
STEVEN E. KOSTER, AICP, ASSISTANT DIRECTOR OF PLANNING SERVICES *SK*

SUBJECT: **5121 COUNTRY CLUB DRIVE - WAUCONDAH WASTEWATER TREATMENT FACILITY PHASE TWO PROJECT, LOCATION AND EXTENT**

PROJECT FILE: LE2024-010

OWNER:
PERRY PARK WATER AND SANITATION DISTRICT
5676 RED ROCK DRIVE
LARKSPUR, CO 80118

REPRESENTATIVE:
DIANA MILLER
PERRY PARK WATER AND SANITATION DISTRICT
5676 RED ROCK DRIVE
LARKSPUR, CO 80118

PLANNING COMMISSION HEARING: **MAY 6, 2024 @ 6:00 PM**

I. EXECUTIVE SUMMARY

Perry Park Water and Sanitation District ("PPWSD") requests approval of a Location and Extent (L&E) to construct new site improvements to the existing Waucondah Wastewater Treatment Facility ("WWTF"). The new improvements will include a new blower building, a backup generator, disinfection equipment, and other related equipment replacement to minimize disruptions and interruptions in system operations and for improved reliability of the wastewater treatment system. The WWTF is located east of the intersection of Country Club Drive and Perry Park Boulevard, west of the Town of Larkspur. PPWSD owns and operates the WWTF. PPWSD indicates that the project is necessary to bring the facility closer to today's standards and design criteria for managing wastewater.

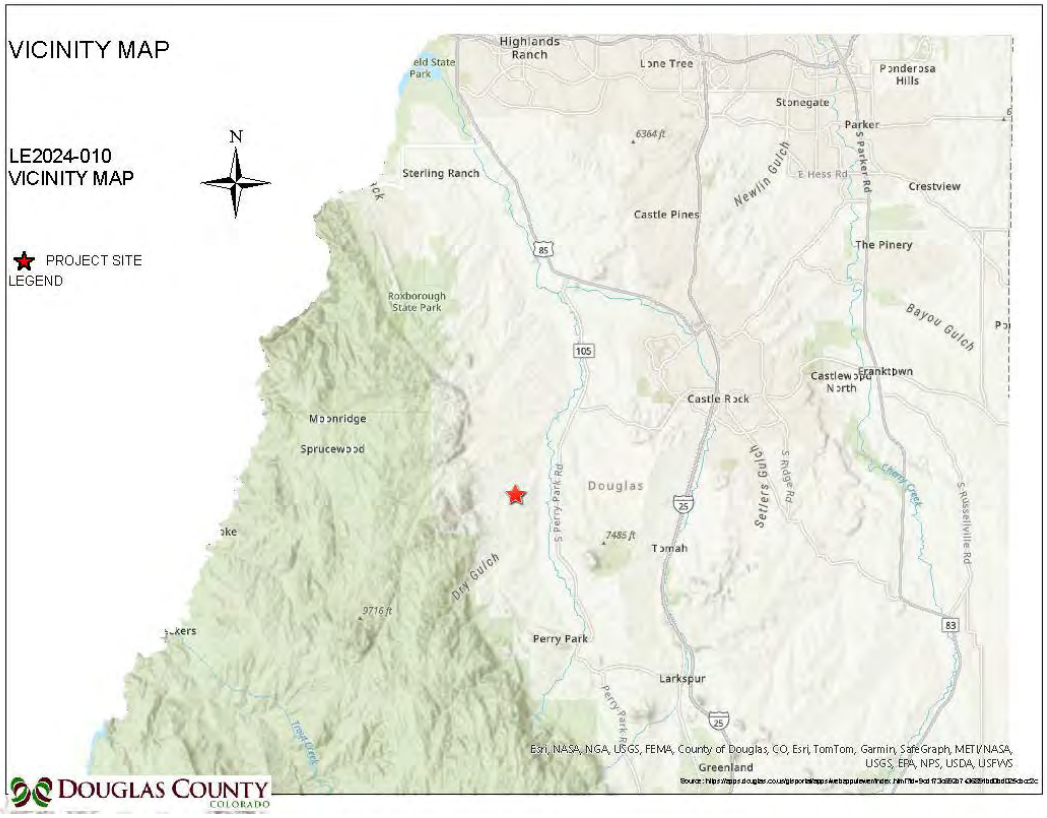
II. REQUEST

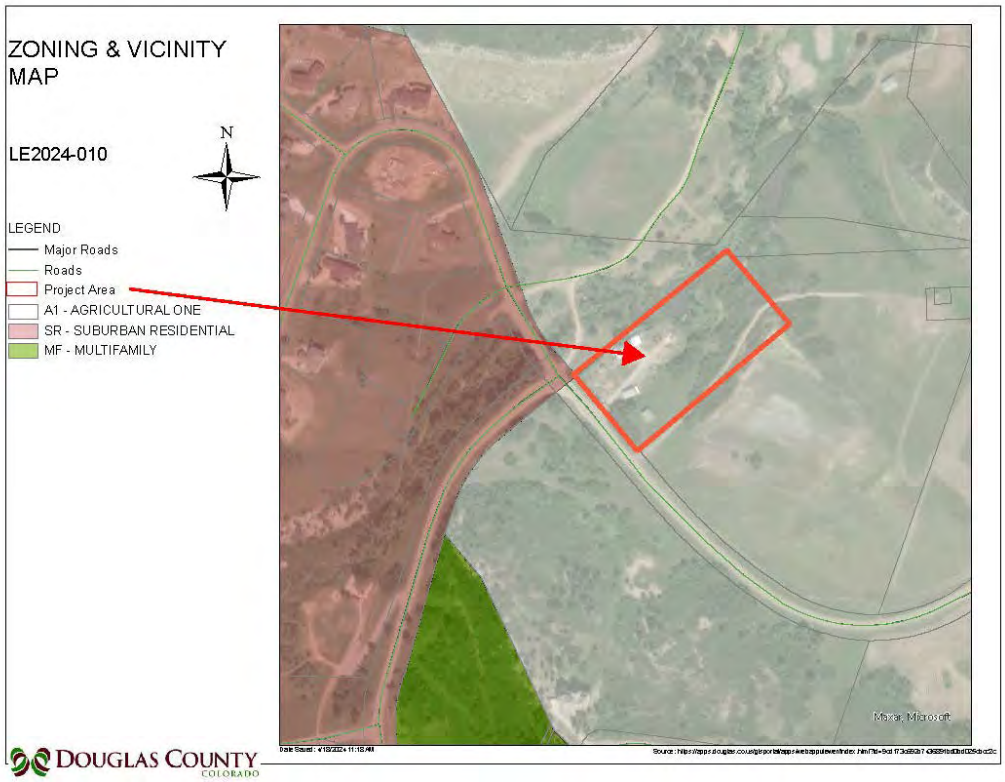
A. Request

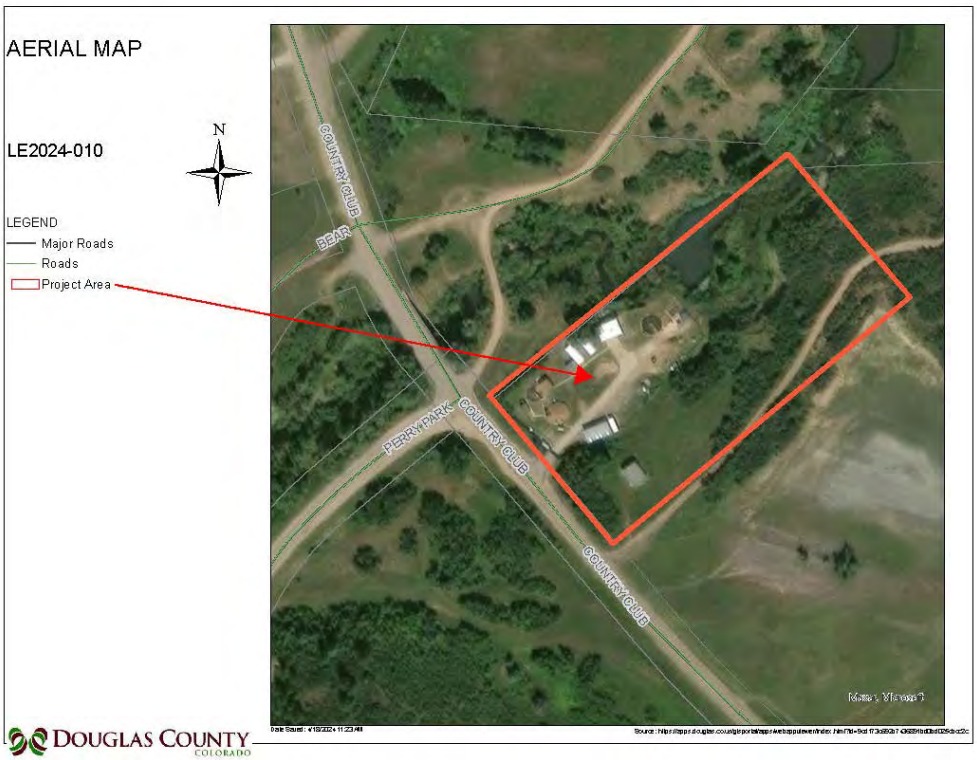
PPWSD requests approval of a L&E for the construction of a new blower building and other site improvements at the existing WWTF.

B. Location

The project site is located on a 4.13-acre parcel owned by PPWSD, located at the intersection of Country Club Drive and Perry Park Blvd. The project site is located approximately 4.5 miles west of I-25, adjacent to the Town of Larkspur. The following zoning, vicinity, and aerial maps show the location of the proposal.




ZONING & VICINITY MAP
LE2024-010
N
LEGEND
Major Roads
Roads
Project Area
A1 - AGRICULTURAL ONE
SR - SUBURBAN RESIDENTIAL
MF - MULTIFAMILY
DOUGLAS COUNTY
COLORADO


AERIAL MAP
LE2024-010
N
LEGEND
Major Roads
Roads
Project Area
COUNTRY CLUB
BEAR
PERRY PARK
COUNTRY CLUB
COUNTRY CLUB
DOUGLAS COUNTY
COLORADO

C. Project Description

The applicant is proposing to construct site improvements to existing operations at the WWTF. Improvements include a waste activated sludge pumping system that will be contained within a below-grade grey concrete vault, two partially below-grade grey concrete aerobic digester tanks to treat and stabilize process solids, a new blower building to house aeration blowers, a backup generator, and ultraviolet disinfection equipment. Additionally, minor modifications to the existing concrete channels will also be included with the L&E request. The applicant has indicated that the improvements are necessary to bring the aging facility closer to current operation standards and design criteria for the management of wastewater.

The new blower building will be 20-ft by 50-ft, and 16-ft in height. The building will be a wood framed building with metal siding and metal roofing, with a similar color scheme as other existing buildings on the site. The blower building will contain the aeration blowers to support the digestion process for the treatment facility.

Construction activities are anticipated to be completed within a one-year timeframe, starting in August 2024. Generally, construction activities will take place between 7:00 a.m. to 7:00 p.m. Monday through Friday. The applicant has indicated that noise levels and off-hour construction will be limited as much as possible. There may be some after-hour construction activities to commence at times of low flow to the facilities. It is anticipated that there will be some increase in traffic to occur during construction, with little to no effect on existing traffic patterns. The applicant has indicated that the new site improvements will not increase the overall traffic required for maintenance and operations of the WWTF.

III. CONTEXT

A. Background

PPWSD is a water and wastewater utility that has provided water and sewer services to the Perry Park community since the 1960s. The district service area encompasses approximately 8,300 acres and is comprised of Perry Park, Perry Park East, Remuda Ranch, Sage Port, and Sandstone Ranch. Additionally, the PPWSD also provides services to Meribel Village and the Plum Creek Hollow parcels, which are located outside of the general district boundaries.

PPWSD owns and operates the 4.13-acre WWTF which provides treatment service for wastewater collected in Perry Park. The WWTF was originally constructed in 1970 and the facility has been updated several times throughout the years. The applicant has indicated that the replacement of older equipment is necessary to bring the facility up to current operation standards for managing wastewater.

The project area is an unplatted, metes and bounds parcel and is zoned Agricultural One (A-1). Water treatment facilities are considered a public utility and are a use permitted by right.

B. Adjacent Land Uses and Zoning

The project site is zoned Agricultural One (A-1). The following table reflects the zone districts and land uses surrounding the project area.

	Zoning	Land Use
North	Agricultural One (A-1)	Vacant parcel owned by JSPGST LLC
South	Agricultural One (A-1)	Residential parcel
East	Agricultural One (A-1)	Vacant tract owned by PPWSD
West	Suburban Residential (SR)	Perry Park Metro District park facility

IV. PHYSICAL SITE CHARACTERISTICS

A. Site Characteristics and Constraints

The WWTF is located on a 4.13-acre parcel owned by PPWSD. The WWTF is located in the western portion of the PPWSD service area, at the base of the Rampart Range. Contour elevations range between 6,340-ft to 6,520 ft in the southeast to northwest directions towards Bear Creek. A ridge exists south of the WWTF site, with Rampart Range foothills to the west.

The WWTF site is composed of natural vegetation with moderate to steep sloping hillsides transitioning eastward into Bear Creek. WWTF is an existing facility that includes 9 buildings, an access drive from Country Club Drive, and other improvements. The site is adjacent to Bear Creek to the east. The site contains a large portion of 100-year FEMA mapped floodplain in which the majority of the WWTF facility is located. Residential development is located north and west of the project area.

The applicant has indicated that the WWTF has received complaints from the public regarding noise from the facility. A subsequent noise study was completed to address community concerns. According to the applicant, the noise study concluded that the noise levels were below the State of Colorado noise level limits with a sound level of 45 dBA from the nearest residential property. PPWSD has made further efforts to decrease noise levels from the WWTF. There have been upgrades to include inlet silencers, outlet silencers, new filter intakes, and the replacement of one of the blowers. Additionally, the applicant is proposing to implement additional improvements to reduce the noise level as much as possible including sound-attenuating blower enclosures, a better insulated building to house the equipment, and new, quieter blowers.

B. Access

Access to the WWTF site is taken directly from Country Club Drive, approximately 76-feet from the Perry Park Blvd intersection. Country Club Drive is a County-owned roadway. Public Works Engineering will require a Traffic Impact Analysis that will be submitted with the engineering and building submittals once the location and extent request has been approved.

C. Drainage and Erosion

The applicant has submitted a Phase III Drainage Report to Douglas County Engineering Services for review and acceptance. During the referral, Engineering requested more information on the potential impacts of the floodplain on the proposed site improvements.

A Grading Erosion & Sediment Control (GESC) plan and report was submitted to Douglas County Engineering Services for review and will be approved prior to permits being issued for construction activities.

D. Floodplain

The WWTF lies within the 100-year floodplain of Bear Creek. According to the applicant, FEMA issued a flood insurance study (FIS) in September 2005 with revisions made in 2021. The study found that Bear Creek was studied using approximate methods, and no floodplain elevations were available on the FEMA FIRM map system. Additional detail on the 100-year flood elevations was requested to ensure that the proposed WWTF site improvements will not be subject to flood risk or impact the floodplain. The applicant completed an analysis to better define the 100-year floodplain near the site. The applicant has indicated that the analysis has determined that the 100-year floodplain boundary does not encroach on the WWTF site. The applicant will coordinate with Public Works Engineering and FEMA to determine if other approval processes or permits are required.

V. PROVISION OF SERVICES

A. Fire Protection

The Larkspur Fire Protection District (LFPD) provides fire and emergency medical services to the site. At the writing of this staff report, LFPD has not provided a referral comment.

B. Sheriff Services

The Douglas County Sheriff's Office (DCSO) provides emergency services to the site. At the writing of this staff report, the DCSO had not provided referral agency review comments.

C. Water and Sanitation

The WWTF is owned and operated by the PPWSD.

D. Utilities

The site falls within the jurisdiction of CORE Electric Cooperative for electric, and Black Hills Energy for gas service. At the writing of this staff report, Black Hills Energy provided a no comment response to the request. Other utility providers have not commented on the request at this time.

E. Other Required Processes and Permits

The proposed project will require the following permits and approvals prior to commencement of construction:

- Public Works Engineering - Grading Erosion and Sediment Control (GESC) Plans and Permits and other applicable construction plans and permits.
- Douglas County Building Division – building permits.
- Colorado Department of Public Health and Environment (CDPHE) – site approval and other permits.
- FEMA – possible floodplain map revisions.

VI. PUBLIC NOTICE AND INPUT

Courtesy notices of an application in process were sent to abutting property owners. No responses were received from property owners at the time of the writing of this staff report.

Referral response requests were sent to referral agencies on April 15, 2024. Referral responses are due at the conclusion of the referral period on April 29, 2024, prior to the Planning Commission hearing. Engineering requested more information on the potential impacts of the floodplain on the proposed site improvements, requested that the applicant provide a traffic impact analysis, and identified the required construction documents. Agency responses received are included as an attachment to this staff report.

VII. STAFF ASSESSMENT

Staff has evaluated the application in accordance with Section 32 of the *Douglas County Zoning Resolution*. The applicant has indicated that the new site improvements will bring the WWTF facility up to current operation standards for managing wastewater.

Should the Planning Commission approve the Location and Extent request, the applicant will be required to obtain any necessary permits for completion of the proposed site improvements for the WWTF.

ATTACHMENTS **PAGE**

DOUGLAS COUNTY
COLORADO

Department of Community Development

www.douglas.co.us

Planning Services

LAND USE APPLICATION

Please fill in this application form completely. An incomplete application will not be processed.

Note: Neither the Planning Commission nor the Board of County Commissioners should be contacted regarding an open application.

OFFICE USE ONLY

PROJECT NAME: PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WWTF PHASE TWO PROJECT - LOCATION AND EXTENT

PROJECT FILE #: LE2024-010

PROJECT TYPE: Site Improvements

MARKETING NAME: Waucondah WWTF Phase Two

SITE ADDRESS: 5121 Country Club Dr., Larkspur, CO 80118

OWNER(S):

Name(s): Perry Park Water and Sanitation District

Address: 5676 Red Rock Drive, Larkspur, CO 80118

Phone: 303-681-2050

Email: dmiller_ppwsd@comcast.net

AUTHORIZED REPRESENTATIVE *(requires notarized letter of authorization if other than owner)*

Name: Diana Miller

Address: 5676 Red Rock Drive, Larkspur, CO 80118

Phone: 303-681-2050

Email: dmiller_ppwsd@comcast.net

PLANNING FEES: $325.00

ENGINEERING FEES:

TOTAL FEES:

RELATED PROJECTS: PS2023-090

LEGAL DESCRIPTION:

Subdivision Name: Metes and Bounds, Reception No. 0000051

Filing #: _____ Lot #: _____ Block #: _____ Section #: 15 Township: 9S Range: 68W

STATE PARCEL NUMBER(S): 2609-154-00-007

ZONING:

Present Zoning: A-1 Agricultural One Proposed Zoning: No Change Gross Acreage: 4.13 AC

Gross Site Density (DU per AC): N/A # of Lots or Units Proposed: N/A

SERVICE PROVIDERS:

Fire District: Larkspur Fire Protection District Metro District: N/A Gas: Black Hills

Water: Perry Park Water and Sanitation District Sewer: Perry Park Water and Sanitation District Electric: CORE Electric Cooperative

Roads: ☐ Public ☐ Private (please explain): _____

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

Diana Miller
Applicant Signature

3/21/2024
Date

Location and Extent Narrative
Perry Park Water and Sanitation District

Name of applicant:

Perry Park Water and Sanitation District

Description of the request:

This request is to cover the proposed site improvements at the Waucondah wastewater treatment facility Located in Perry Park in unincorporated Douglas County. This facility is located just off Country Club Drive near Bear Creek.

Purpose of the improvements:

The purpose of the improvements to the wastewater treatment facility is to replace the old, dated equipment and bring the facility closer to today's standards and design criteria for managing wastewater. Due to the age of the existing facilities and equipment, the aerobic digester system has experienced periodic disruptions in its operations. The operators have had to increasingly manage equipment malfunctions, component repairs, and electrical replacements. Additionally, part of the project will include additional equipment to minimize disruptions and interruptions in system operation by providing redundancy.

The major changes at the site include:

- Waste Activated Sludge – Replacement of the existing pumping system to transfer sludge from the secondary clarifier to the aerobic digesters. The pumps will be located in a below grade grey concrete vault near the secondary clarifier. The vault is approximately 10 feet long and 8 feet wide, with a depth of 15 feet. There are no architectural details associated with this below grade vault. The local control panel and access hatches will be mounted on the vault lid.
- Aerobic Digestion – Two partially below grade grey concrete aerobic digester tanks will be constructed and designed to treat and stabilize process solids. Digested solids will be transferred from each digester to one partially below grade grey concrete solids holding tank. The three tanks will be built with common well construction and the entire tankage will be 50 feet wide by 90 feet long and approximately 12 feet above ground surface. No surface treatments are planed for the bare concrete walls.
- Blower Building – The proposed blower building will house the aeration blowers. The blowers deliver process air to the digested sludge to provide aeration for treatment and mixing. This proposed building will provide a satisfactory environment for electrical, instrumentation and control gear associated with the digestion process. The building will be 20 feet wide by 50 feet long and approximately 16 feet tall. It will be a wood framed building with metal siding and metal roofing, the color scheme will generally match the metal finishes of other existing buildings.
- Backup Generator – A new emergency diesel powered backup generator will be added to the site to provide emergency power to the critical processing components. There are no architectural details associated with this backup generator.
- Ultraviolet Disinfection Equipment – The existing ultraviolet (UV) disinfection equipment will be replaced with new and updated components. Existing below grade concrete channels house the UV below the ground surface. Minor modifications to the existing concrete channels will be

required. There are no architectural details associated with this equipment replacement or the concrete channels which will remain with top of walls at ground level.

With the proposed changes, this project was required to submit and receive approval from the Colorado Department of Public Health and Environment (CDPHE). An application for an amendment to an existing site location approval and process design report were submitted to CDPHE. These submittals have been reviewed by CDPHE and were approved September 21, 2023 and January 4, 2024 respectively.

Summary of the potential impacts and proposed mitigation measures

In the pre-submittal conference, it was noted that the property site appears to be in the 100-year floodplain according to FEMA mapping. FEMA issued a flood insurance study (FIS) in September 2005, which was most recently revised in December 2021. However, Bear Creek was only studied using approximate methods, no floodplain elevations are available on the FIRM floodplain map. Therefore, additional detail on the 100-year flood elevations was requested to ensure that the new facilities will not be subject to flood risk or otherwise impact the floodplain. An analysis was completed to better define the 100-year floodplain near the site.

The basic approach using the HEC-RAS system was to create a model that gives a more detailed profile of the Bear Creek 100-year floodplain in respect to the WWTF property. The WWTF site and Bear Creek were inspected on July 11, 2023 in preparation of the HEC-RAS model. During that site visit, additional detail was gathered for the bridge crossing where Country Club Drive crosses over Bear Creek. Additional data was also collected for the is an 48-inch CMP culvert located approximately 145 feet downstream from the bridge where Bear Court crosses Bear Creek.

Since the section of Bear Creek near the WWTF has not been studied using detailed methods, there are no existing conditions in which the HEC-RAS model could be calibrated to. Instead, the model was set up using a digital elevation model from the United States Geological Survey (USGS), along with on site survey and dimensions as inputs into the HEC-RAS model. A base flow of 10 cubic feet per second (CFS) in Bear Creek was used. Data from the Waucondah Reservoir enlargement documents were utilized to determine the maximum probable spillway discharge from the Waucondah Reservoir. In the 1970's the Waucondah Reservoir was enlarged and a new spillway into Bear Creek was constructed. The Waucondah Reservoir Enlargement construction drawings (C-1273) were dated September 25, 1969. The construction drawings state that the maximum probable spillway discharge is 1,520 CFS. Finally, runoff from a delineated sub-basin was calculated using the rational method, which contributes an additional 50 CFS to Bear Creek upstream of the project site. The total flow from the Waucondah Reservoir and the delineated sub-basin was interpolated into a 1 hour Hydrograph, with a maximum flow at 20 minutes.

Bear Creek was analyzed from the Waucondah Reservoir to about 300 feet downstream of the existing WWTF site. The Bear Creek channel bank was estimated using Google Earth Pro and data from the site surveys. The HEC-RAS model was set up with cross sections placed approximately every 100 feet. Cross sections were also added upstream and downstream at the Country Club Drive bridge and the Bear Court culvert. The cross-sections were created and utilized in the HEC-RAS model. A proposed HEC-RAS model determined that the 100-year floodplain boundary does not encroach on the WWTF site.

In the pre-submittal conference, a concern around the new blower building and equipment, associated with the noise produced was mentioned. After a review of the Douglas County noise ordinance, this

property and use fall under specific exclusions from the requirement of being a public utility. In 2019 the site received complaints revolving around the noise. Following these complaints, a noise study was conducted in reference to CRS 25-12-103. The measurements concluded that the noise levels were below the State of Colorado noise level limits. Sound pressure levels were measured near noise producing plant equipment and also at one location in the direction of the nearest residences. The nearest property is approximately 450 feet northwest of the WWTF. The measurement location was approximately 235 feet northwest of the WWTF property line, so it was slightly more than halfway between. The plant noise was fairly steady and the sound level was averaged for one minute. The sound level at the measurement location was 45 dBA sound levels at the residential property will be lower than 45 dBA since it is further away and the sound level will decrease with increased distance. Even at the measurement location, the sound level is 5 dBA below the State of Colorado nighttime limit.

Although the current sound levels are below permissible limits, the Perry Park Water and Sanitation District has made efforts to further reduce noise levels. There have been upgrades to include inlet silencers, outlet silencers, new filter intakes, and the replacement of one of the blowers. However, with the new construction, we are proposing to implement additional improvements to reduce the noise level as much as possible including sound-attenuating blower enclosures, a better insulated building to house the equipment, and new quieter blowers.

To be expected, some increased traffic will occur during construction. There will be little to no effect on existing traffic patterns during construction. However, the site improvements will not increase the overall traffic required for the maintenance and operations of the facility. Additionally, Traffic patterns are not expected to be altered.

Construction will generally consist of soil excavation, new building installation, new process tank installation, existing building demolition, new process equipment, new process piping, miscellaneous equipment replacement, backup generator installation, electrical upgrades, and yard piping. Construction is anticipated to commence in August of 2024 as weather permits and is expected to last approximately one year. The anticipated construction period is dependent on weather and material procurement. Construction work hours are anticipated to align with Douglas County's maximal permissible noise limit during the weekday hours of 7:00 AM to the next 7 PM. However, there may be construction activities that are required to be performed at times of low flow to the facility, which generally occur after those hours mentioned above. Sound levels and off-hour construction will be limited as much as possible.

Compliance with the Comprehensive Master Plan

This Location and Extent submittal is in conformance with the Douglas County Storm Drainage Design and Technical Criteria Manual, as well as the Douglas County Comprehensive Master Plan. The Perry Park Water and Sanitation District was formed to manage the water and sanitary sewer infrastructure that serves the Perry Park Development and the surrounding area. The WWTF has historically met the requirements of its discharge permit, but several components of the WWTF have inadequate capacity. Most unit processes require certain upgrades due to age, condition, and operational capability and the facility lacks redundancy, which increases the risk of a major violation in the event of adverse conditions such as equipment failures. The intent of the project it to address these concerns and provide the District better capabilities to meet water quality requirements. The proposed WWTF improvements will be contained within the existing Waucondah WWTF site; therefore limiting impacts to private property and natural lands outside the property

We trust the information provided in this submittal document is sufficient for the proposed site improvements. If you should have any questions or desire additional information, please contact our office at your convenience.

Community Impact Report and Traffic Narrative
Perry Park Water and Sanitation District

Name of applicant:

Perry Park Water and Sanitation District

Summary of the potential impacts and proposed mitigation measures

In the pre-submittal conference, it was noted that the property site appears to be in the 100-year floodplain according to FEMA mapping. FEMA issued a flood insurance study (FIS) in September 2005, which was most recently revised in December 2021. However, Bear Creek was only studied using approximate methods, no floodplain elevations are available on the FIRM floodplain map. Therefore, additional detail on the 100-year flood elevations was requested to ensure that the new facilities will not be subject to flood risk or otherwise impact the floodplain. An analysis was completed to better define the 100-year floodplain near the site.

The basic approach using the HEC-RAS system was to create a model that gives a more detailed profile of the Bear Creek 100-year floodplain in respect to the WWTF property. The WWTF site and Bear Creek were inspected on July 11, 2023 in preparation of the HEC-RAS model. During that site visit, additional detail was gathered for the bridge crossing where Country Club Drive crosses over Bear Creek. Additional data was also collected for the is an 48-inch CMP culvert located approximately 145 feet downstream from the bridge where Bear Court crosses Bear Creek.

Since the section of Bear Creek near the WWTF has not been studied using detailed methods, there are no existing conditions in which the HEC-RAS model could be calibrated to. Instead, the model was set up using a digital elevation model from the United States Geological Survey (USGS), along with on site survey and dimensions as inputs into the HEC-RAS model. A base flow of 10 cubic feet per second (CFS) in Bear Creek was used. Data from the Waucondah Reservoir enlargement documents were utilized to determine the maximum probable spillway discharge from the Waucondah Reservoir. In the 1970's the Waucondah Reservoir was enlarged and a new spillway into Bear Creek was constructed. The Waucondah Reservoir Enlargement construction drawings (C-1273) were dated September 25, 1969. The construction drawings state that the maximum probable spillway discharge is 1,520 CFS. Finally, runoff from a delineated sub-basin was calculated using the rational method, which contributes an additional 50 CFS to Bear Creek upstream of the project site. The total flow from the Waucondah Reservoir and the delineated sub-basin was interpolated into a 1 hour Hydrograph, with a maximum flow at 20 minutes.

Bear Creek was analyzed from the Waucondah Reservoir to about 300 feet downstream of the existing WWTF site. The Bear Creek channel bank was estimated using Google Earth Pro and data from the site surveys. The HEC-RAS model was set up with cross sections placed approximately every 100 feet. Cross sections were also added upstream and downstream at the Country Club Drive bridge and the Bear Court culvert. The cross-sections were created and utilized in the HEC-RAS model. A proposed HEC-RAS model determined that the 100-year floodplain boundary does not encroach on the WWTF site.

In the pre-submittal conference, a concern around the new blower building and equipment, associated with the noise produced was mentioned. After a review of the Douglas County noise ordinance, this

property and use fall under specific exclusions from the requirement of being a public utility. In 2019 the site received complaints revolving around the noise. Following these complaints, a noise study was conducted in reference to CRS 25-12-103. The measurements concluded that the noise levels were below the State of Colorado noise level limits. Sound pressure levels were measured near noise producing plant equipment and also at one location in the direction of the nearest residences. The nearest property is approximately 450 feet northwest of the WWTF. The measurement location was approximately 235 feet northwest of the WWTF property line, so it was slightly more than halfway between. The plant noise was fairly steady and the sound level was averaged for one minute. The sound level at the measurement location was 45 dBA sound levels at the residential property will be lower than 45 dBA since it is further away and the sound level will decrease with increased distance. Even at the measurement location, the sound level is 5 dBA below the State of Colorado nighttime limit.

Although the current sound levels are below permissible limits, the Perry Park Water and Sanitation District has made efforts to further reduce noise levels. There have been upgrades to include inlet silencers, outlet silencers, new filter intakes, and the replacement of one of the blowers. However, with the new construction, we are proposing to implement additional improvements to reduce the noise level as much as possible including sound-attenuating blower enclosures, a better insulated building to house the equipment, and new quieter blowers.

Traffic impacts

To be expected, some increased traffic will occur during construction. There will be little to no effect on existing traffic patterns during construction. However, the site improvements will not increase the overall traffic required for the maintenance and operations of the facility. Additionally, Traffic patterns are not expected to be altered.

Construction will generally consist of soil excavation, new building installation, new process tank installation, existing building demolition, new process equipment, new process piping, miscellaneous equipment replacement, backup generator installation, electrical upgrades, and yard piping. Construction is anticipated to commence in August of 2024 as weather permits and is expected to last approximately one year. The anticipated construction period is dependent on weather and material procurement. Construction work hours are anticipated to align with Douglas County's maximal permissible noise limit during the weekday hours of 7:00 AM to the next 7 PM. However, there may be construction activities that are required to be performed at times of low flow to the facility, which generally occur after those hours mentioned above. Sound levels and off-hour construction will be limited as much as possible.

VICINITY MAP

LE2024-010
VICINITY MAP

N

PROJECT SITE
LEGEND

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent

Source: https://apps.douglas.co.us/gisportal/apps/webappviewer/index.html?id=9cd173c692b7436891bd0bd025cbcc2c

ZONING & VICINITY MAP

LE2024-010

N

LEGEND

- Major Roads
- Roads
- Project Area
- A1 - AGRICULTURAL ONE
- SR - SUBURBAN RESIDENTIAL
- MF - MULTIFAMILY

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent

Date Saved: 4/18/2024 11:18 AM

Source: https://apps.douglas.co.us/gisportal/apps/webappviewer/index.html?id=9cd173c692b7436891bd0bd025cbcc2c

AERIAL MAP

LE2024-010

N

LEGEND

- Major Roads
- Roads
- Project Area

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent

Date Saved: 4/18/2024 11:23 AM

Source: https://apps.douglas.co.us/gisportal/apps/webappviewer/index.html?id=9cd173c692b7436891bd0bd025cbcc2c

Project Name: Perry Park Water and Sanitation District, Waucondah Wastewater Treatment Facility – Phase II Project – Location and Extent
Project File #: LE2024-010
Initial Referral: Date Sent: 04/15/2024 **Date Due:** 04/29/2024

Agency	Rec'd	Agency Response	Response Resolution
Addressing Analyst	04/15/2024	The existing address for the Waucondah Waste Water Facility is 5121 COUNTRY CLUB DRIVE. The proposed address for the planned new blower building with electrical room is 5119 COUNTRY CLUB DRIVE. Proposed addresses are not to be used for any purpose other than for plan review until after this project is approved. Proposed addresses are subject to changes as necessary for 911 dispatch and life safety purposes. Addresses are recorded by Douglas County following all necessary approvals. Contact DCAddressing@douglas.co.us or 303.660.7411 with questions	No action necessary
Assessor		Awaiting referral response	
AT&T		Awaiting referral response	
Black Hills Energy	04/15/2024	No Comment	No action necessary
Building Services	04/18/2024	Permit(s) required. Please visit Douglas County's website for requirements and contact 303-660-7494 if you have any questions.	No action necessary
CDPHE – Water Quality Control Division	04/15/2024	Summary comments: CDPHE provided referral comments regarding the permitting process with the State for asbestos removal, air emissions permitting, odor permits, air quality requirements for land development, and demolition and redevelopment permitting requirements. Additional comments addressed hazardous and solid waste rules and	Comments forwarded to applicant to address directly with referral agency

Project Name: Perry Park Water and Sanitation District, Waucondah Wastewater Treatment Facility – Phase II Project – Location and Extent

Project File #: LE2024-010

Initial Referral: Date Sent: 04/15/2024 **Date Due:** 04/29/2024

Agency	Rec'd	Agency Response	Response Resolution
		regulations, water quality, and clean water requirements.	
CenturyLink	04/17/2024	We have received your request for an Encroachment and have set up a Lumen project accordingly. Your project number is P861615 and it should be referenced in all emails sent in for review. Please do not reply to this email. Your project owner is Varina Hoopes and they can be reached by email at varina.hoopes@lumen.com with any questions that you may have regarding this project. Requests are addressed in the order received; Lumen will endeavor to respond within 30 days. Kelley Franklin | Faulk & Foster Project Coordinator Kelley.Franklin@lumen.com Kelley.Franklin@FaulkandFoster.com Direct 318.807.2619| Fax 318.807.2705 Faulk & Foster| www.faulkandfoster.com	Comments forwarded to applicant to address directly with referral agency
Comcast		Awaiting referral response	
CORE Electric Cooperative		Awaiting referral response	
Douglas County Health Department	04/19/2024	Summary: Wastewater - Provided there is no interruption to sanitary sewer service, DCHD has no objection to the improvements to the wastewater facility. Air Quality – Building Demolition: DCHD provided information regarding environmental hazards, lead paint removal, and noise limitations.	Comments forwarded to applicant to address directly with referral agency
Douglas County: Douglas County Parks and Trails		Awaiting referral response	
Douglas County: Open Space and Natural Resources		Awaiting referral response	

Project Name: Perry Park Water and Sanitation District, Waucondah Wastewater Treatment Facility – Phase II Project – Location and Extent

Project File #: LE2024-010

Initial Referral: Date Sent: 04/15/2024 **Date Due:** 04/29/2024

Agency	Rec'd	Agency Response	Response Resolution
Douglas County: Wildfire Mitigation		Awaiting referral response	
Drainage: Mile High Flood District		Awaiting referral response	
Engineering Services	04/22/2024	Summary: Engineering made comments to the project narrative in regard to the floodplain. Engineering also requested a traffic impact analysis, construction documents, and made various redlines/comments to the drainage study, GESC Plan, and required a Storm Drainage Operation & Maintenance Manual. Engineering provided information on the required permits.	Comments forwarded to applicant to address directly with Public Works Engineering
Federal: FEMA Region VIII Federal Insurance & Mitigation Division	04/22/2024	I do not have an account to access these documents. However, FEMA cannot approve a site location as requested. If you have not done so already, please send this request to the floodplain administrator in Douglas County. My records indicate that this is Janet Herman (engineering@douglas.co.us). You could also contact Doug Mahan with the state of Colorado. Doug Mahan (doug.mahan@state.co.us) Laura Stahnke, PE Senior Floodplain Specialist | Mitigation Division | Region 8 Mobile: (720) 327-9703 Laura.Stahnke@fema.dhs.gov Federal Emergency Management Agency fema.gov	Applicant to follow up with Public Works Engineering in response to referral comments.
Federal: US Army Corp of Engineers		Awaiting referral response	
Federal: USDOI Fish & Wildlife Service		Awaiting referral response	

Project Name: Perry Park Water and Sanitation District, Waucondah Wastewater Treatment Facility – Phase II Project – Location and Extent

Project File #: LE2024-010

Initial Referral: Date Sent: 04/15/2024 **Date Due:** 04/29/2024

Agency	Rec'd	Agency Response	Response Resolution
Fire Districts: Larkspur FD		Awaiting referral response	
Forests: Pike National Forest-US Forest Service		Awaiting referral response	
Homeowners' Association: Echo Hills Townhouses Association		Awaiting referral response	
Homeowners' Association: Perry Park ACC		Awaiting referral response	
Homeowners' Association: Perry Park East HOA		Awaiting referral response	
Homeowners' Association: Retreat in Perry Park		Awaiting referral response	
Office of Emergency Management	04/15/2024	OEM has no concerns with this project.	No action necessary
Sheriff's Office		Awaiting referral response	
Sheriff's Office E911		Awaiting referral response	
Water and Sanitation Districts: Perry Park Water & Sanitation District		Awaiting referral response	
Wildlife: Colorado Parks and Wildlife (Northcentral DC - Dist 541)		Awaiting referral response	
Xcel Energy-Right of Way & Permits	04/15/2024	Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the Perry Park Water and Sanitation District - Waucondah WWTF Phase Two Location and Extent Request and currently has no apparent conflict. As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 for utility locates prior to construction. Violeta Ciocanu (Chokanu) Right of Way and Permits Public Service Company of Colorado dba Xcel Energy Office: 303-285-6612 – Email: violeta.ciocanu@xcelenergy.com	No action necessary

DOUGLAS COUNTY
HEALTH DEPARTMENT COLORADO

April 19, 2024

Carolyn Washee-Freelend
100 Third St.
Castle Rock, CO 80104

RE: LE2024-010

Dear Ms. Washee-Freelend

Thank you for the opportunity to review and comment on the application for a Location & Extent for the property located at 5121 Country Club Drive. Douglas County Health Department (DCHD) staff have reviewed the application for compliance with pertinent environmental and public health regulations. After reviewing the application, DCHD has the following comments.

Wastewater
Provided there is no interruption to sanitary sewer service, DCHD has no objection to the improvements to the wastewater facility.

Air Quality - Building Demolition
The application indicates that existing structures on the site will be demolished.

The Colorado Department of Public Health and Environment Air Pollution Control Division (APCD) regulates air emissions. State air quality regulations require that precautions be taken prior to demolition of buildings to evaluate the presence of asbestos fibers that may present a health risk. If asbestos is present, actions must be taken to prevent their release into the environment. The applicant shall contact the APCD at (303) 692-3100 for more information. Additional information is available at https://cdphe.colorado.gov/indoor-air-quality/asbestos.

Buildings constructed prior to 1978 may contain lead paint. Environmental Protection Agency's (EPA) 2008 Lead-Based Paint Renovation, Repair and Painting (RRP) Rule (as amended in 2010 and 2011), aims to protect the public from lead-based paint hazards associated with renovation, repair and painting activities. These activities can create hazardous lead dust when surfaces with lead paint, even from many decades ago, are disturbed. More information can be found here https://www.epa.gov/lead/lead-renovation-repair-and-painting-program-rules and https://www.epa.gov/lead. The applicant may contact, and the Environmental Protection Agency EPA at 1-800-424-5323 for more information.

Noise
Regular exposure to elevated sound levels can have a negative impact on both physical and mental health by increasing the risk of stress, hearing impairment, hypertension, ischemic heart disease, and sleep disturbance. *A noise analysis has been conducted to evaluate this potential impact on the proposed use and determined noise levels to be below State regulatory limits.*

DOUGLAS COUNTY
HEALTH DEPARTMENT COLORADO

Please contact me at 720-907-4888 or bfreyer@douglas.co.us if you have any questions about our comments.

Sincerely,

Brent Freyer
Environmental Health Specialist II
Douglas County Health Department

COLORADO
Department of Public Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

Carolyn Washee-Freeland, AICP
Senior Planner
Douglas County Planning Services
100 Third Street
Castle Rock, CO 80104

VIA EMAIL

RE: Douglas County eReferral (LE2024-010) Is Ready For Review

Dear Carolyn Washee-Freeland,

The Colorado Department of Public Health and Environment's Air Pollution Control Division (APCD or Division) received a request for conformity review request concerning the proposed Perry Park Water and Sanitation District project as described in your correspondence dated April 15, 2024. The Division has reviewed the project letter and respectfully offers the following comments. Please note that the following Air Quality Control Commission (AQCC) regulations may not be inclusive of the regulations the proposed project will be subject to. It is the responsibility of the involved parties to determine what regulations they are subject to and follow them accordingly.

APEN and Regulation No. 3

We note that projects similar to this proposal have included the use of engines and/or generators. In Colorado, most businesses that are or will be emitting air pollutants above certain levels are required to report those emissions to the Division by completing an Air Pollutant Emissions Notice (APEN). This is a two in one form for reporting air emissions and to obtain an air permit, if a permit will be required. While only businesses that exceed the AQCC reporting thresholds are required to report their emissions, all businesses - regardless of emission amount - must always comply with the Colorado AQCC regulations, found here https://cdphe.colorado.gov/aqcc-regulations. APEN and permit reporting thresholds are provided at https://cdphe.colorado.gov/apens-and-air-permits/apen-and-permit-threshold-table.
A permit may not be required if it meets the following criteria:[1]

- Is a stationary internal combustion engine that is an emergency power generator that operates no more than 250 hrs/year; or
- Is a stationary internal combustion engine with uncontrolled actual emissions less than 5 tons per year for each individual criteria pollutant emitted; or

[1] APEN or Permit Exemptions, CDPHE, https://cdphe.colorado.gov/apens-and-air-permits/common-apen-or-air-permit-exemptions

- Is a stationary internal combustion engine with manufacturer's site-rated horsepower of less than 50

For additional information on exemptions and permitting requirements, please visit https://cdphe.colorado.gov/apens-and-air-permits/common-apen-or-air-permit-exemptions.

VOC and Hazardous Air Pollutants (HAPS) Analysis for Small Wastewater Projects

An Air Pollutant Emissions Notice (APEN) for VOC and HAPS may be required depending on the existing and new throughput of your facility. Municipal wastewater projects may use the following chart to estimate VOC and HAPs emissions in order to determine if they are required to submit an APEN under Regulation Number 3.

Pollutant	Emission Factor Lb/MM gallon	Reporting Threshold
VOC	3.49414	1 ton/year OR 2 ton/year
Hexamine	0.41207	250 lbs/year
Perchloroethylene	0.00890	
Benzene	0.22873	
Toluene	0.00267	
Total Xylene	0.00267	
Ammonia	19.0000	

Odor

All businesses in Colorado are subject to AQCC Regulation Number 2 (Odor Emission) and a permit may be required for the installation of odor control equipment. Please refer to AQCC Number 2 for guidance on odor suppression actions. You may also view the complete regulatory language at https://cdphe.colorado.gov/aqcc-regulations.

Land Development

We also note that projects similar to this proposal often involve land development. Under Colorado air quality regulations, land development refers to all land clearing activities, including but not limited to land preparation such as excavating or grading, for residential, commercial or industrial development. Land development activities release fugitive dust, a pollutant regulation by the Division. Small land development activities are not subject to the same reporting and permitting requirements as large land activities. Specifically, land development activities that are less than 25 contiguous acres and less than 6 months in duration do not need to report air emissions to the Division. It is important to note that even if a permit is not required, fugitive dust control measures including the Land Development APEN Form APCD-223 must be followed at the site. Fugitive dust control techniques commonly included in the plan are included in the table below.

Control Options for Unpaved Roadways	
Watering	Use of chemical stabilizer
Paving	Controlling vehicle speed
Graveling	
Control Options for Mud and Dirt Carry-Out Onto Paved Surfaces	
Gravel entry ways	Washing vehicle wheels
Covering the load	Not overfilling trucks
Control Options for Disturbed Areas	
Watering	Application of a chemical stabilizer
Revegetation	Controlling vehicle speed

Compaction	Furrowing the soil
Wind Breaks	Minimizing the areas of disturbance
	Synthetic or Natural Cover for Slopes

Please refer to the website https://cdphe.colorado.gov/apens-and-air-permits for information on land use APENs and permit forms. Click on "Land Development" to access the land development specific APEN form. Please contact KC Houlden, Construction Permits Unit Supervisor, at 303-692-4092, kenneth.houlden@state.co.us if you have any specific questions about APENs and permit forms.

Demolition and Redevelopment

In Colorado there are regulations regarding the appropriate removal and handling of asbestos and lead-based paint as part of a demolition, renovation, or remodeling project. These regulations are presented AQCC Number 8 (asbestos) and Number 19 (lead-based paint) https://cdphe.colorado.gov/aqcc-regulations.

These regulations may require the use of, or inspection by, companies or individuals that are certified to inspect or remove these hazards prior to renovation or demolition. The Division must also be notified prior to beginning any asbestos abatement or demolition activities. For additional guidance on these regulations and lists of certified companies and individuals, please visit www.colorado.gov/cdphe/asbestos and www.colorado.gov/cdphe/lead for lead-based paint. An asbestos renovation and demolition fact sheet, inspection flowchart, and brochure are attached to my email response for your review. If you have any questions about Colorado's asbestos and lead-based paint regulations or are unsure whether you are subject to them please call the Indoor Environment Program at cdphe.asbestos@state.co.us or 303-692-3100.

If you have any other questions or need additional information, please use the contact info listed above, or e-mail or call me directly. Thank you for contacting the Air Pollution Control Division about your project.

Sincerely,
Brendan Cicione
Air Quality and Transportation Planner
General SIP Unit
Air Pollution Control Division
Colorado Department of Public Health and Environment
303-691-4104 // brendan.cicione@state.co.us

ASBESTOS - RENOVATION AND DEMOLITION

Are you Remodeling, Renovating or Demolishing?

You may be subject to State and Federal Regulations requiring an inspection for asbestos.
Avoid penalties and delays: If you are impacting greater than the trigger levels of suspect asbestos-containing materials ("ACM") – you must have your project inspected for ACM by a Colorado-certified asbestos building inspector before commencing work.

It is Dangerous and Illegal to Improperly Disturb ACM!

Asbestos can be found in these and many other common building materials: Ceiling textures, vinyl floor coverings and mastic, boiler and pipe insulation, heating and cooling duct insulation, ceiling tile, roofing products, clapboard shingles, etc. These materials may be regulated - a certified asbestos building inspector can determine which materials contain asbestos and which are regulated.

For ALL Renovation Projects:

- Buildings of ***any*** age may contain ACM; even those newly built may have ACM.
- **Inspection:** If the structures/components to be disturbed exceed the trigger levels, they ***must be inspected for asbestos*** by a Colorado-certified asbestos building inspector, unless the building was built after October 12, 1988, **AND** the architect or engineer who built it signs and submits documentation showing that no ACM was specified or used in the construction of the building – then no inspection is needed. Asbestos Consulting Firms and asbestos building inspectors can be found in the yellow pages of most telephone books under the heading "Asbestos Consulting and Testing" or go to our web site for a current list: www.colorado.gov/cdphe/asbestos.
- If the amount of ACM to be disturbed exceeds the following trigger levels, then an asbestos abatement contractor must remove the material:
    - **Single-Family Residential Dwellings ("SFRD")** - the trigger levels are: 50 linear feet on pipes; 32 square feet on other surfaces; or the volume equivalent of a 55-gallon drum.
    - **Public and Commercial Buildings** (other than SFRDs) - the trigger levels are: 260 linear feet on pipes; 160 square feet on other surfaces; or the volume equivalent of a 55-gallon drum.
- Under many circumstances, a Colorado-certified General Abatement Contractor (GAC) must remove ACM that is regulated or may become regulated before it is disturbed by renovation or demolition activities. GACs can be found in the yellow pages of most telephone books under the heading, "Asbestos Abatement" or go to our web site for a current list.
- **Notification:** A written application to CDPHE for a notice/permit may be required, along with payment of a fee and a **ten (10) working-day notification period (emergencies may be excluded)** before the removal (abatement) of regulated asbestos-containing materials. **ALL** ACM waste must be disposed of at an approved asbestos waste disposal site – regardless of the quantity or the necessity for a notice/permit.

Demolitions, Destructive Salvage, House Moving

If you demolish, perform destructive salvage, perform de-construction, burn, destroy, dismantle, dynamite, implode, knock down, level, pull down, pulverize, raze, tear down, wreck all of a structure or structural components, or you move a house, you may be subject to State and Federal regulations **even when there is NO asbestos in the facility. Demolition means:** the wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility.

For ALL Demolition Projects:

- **Inspection:** the building or area of the building to be demolished ***must be inspected for asbestos*** by a Colorado-certified asbestos inspector. Asbestos Consulting Firms and asbestos building inspectors can be found in the yellow pages of most telephone books under the heading "Asbestos Consulting and Testing" or go to our web site for a current list:
- **Asbestos Removal** (if necessary) may have to be performed by a Colorado-certified GAC. Removal, in accordance with Regulation No. 8, Part B, is required if the amount of asbestos-containing material that is friable or will become friable during demolition exceeds the trigger levels.
- **A Demolition Notification Application Form** must be submitted to the CDPHE, **even if no asbestos was found during the inspection,** along with payment of a notification fee and a **ten (10) working-day notification period** that is required before the demolition can commence.

During Demolition:

- Recycling of materials, such as concrete or wood, that are bonded or contaminated with asbestos-containing material (ACM), such as floor tile or mastic, is NOT permitted.
- Demolition of a building that has non-friable asbestos-containing vinyl asbestos tile (VAT) or tar-impregnated roofing materials remaining must be completed without causing the asbestos-containing materials to become friable. Concrete floors covered with floor tile shall be removed in large sections if possible. Operations such as crushing, pneumatic jacking, etc. of materials containing asbestos are not permitted.
- When imploding or burning a structure, ALL asbestos-containing material, regardless of type or quantity, **MUST** be removed prior to demolition.

For More Information or Forms, please contact:

Asbestos Compliance Assistance Group
Phone: (303) 692-3100
Fax: (303) 782-0278
Toll Free: 1-800-886-7689
Web page: http://www.colorado.gov/cdphe/asbestos
Email address: cdphe.asbestos@state.co.us

Have your project inspected by a Colorado-certified asbestos building inspector before you begin renovation or demolition activities

Violation of asbestos regulations can result in monetary penalties and project delays.

Colorado Department of Public Health & Environment

Air Pollution Control Division
Indoor Environment Program

4300 Cherry Creek Drive South,
Denver, Colorado, 80246

303-692-3100
303-782-0278, fax

cdphe.asbestos@state.co.us

www.colorado.gov/cdphe/asbestos

Colorado law requires asbestos testing prior to renovation or Demolition!

COLORADO
Department of Public Health & Environment

www.colorado.gov/cdphe/asbestos

What is asbestos?

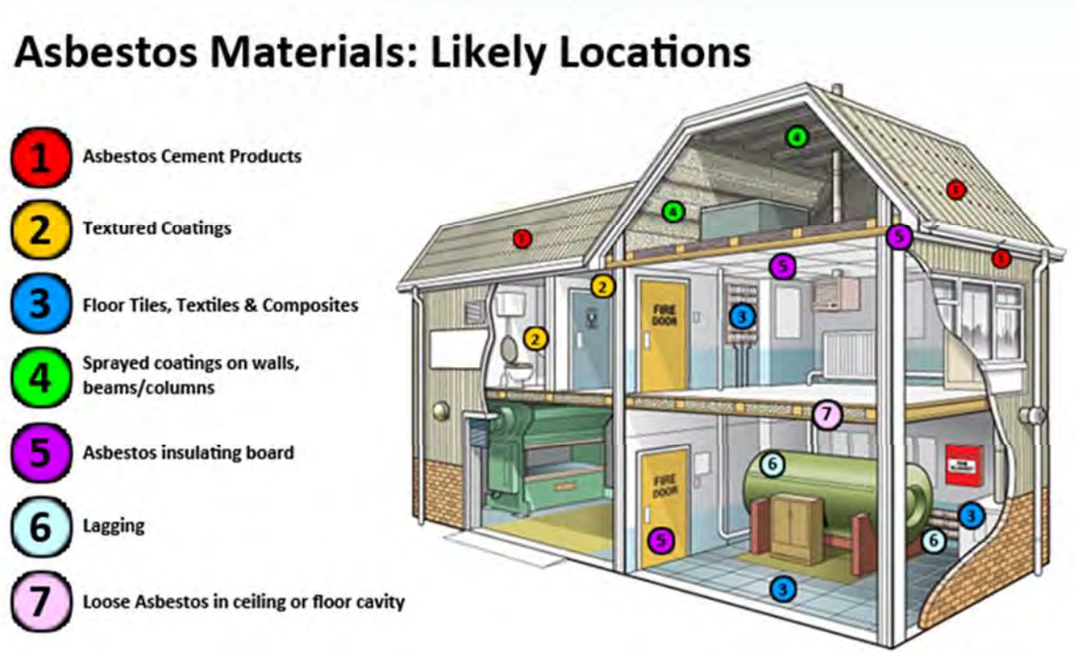
- Asbestos is a naturally occurring mineral fiber mined for its useful properties.
- Asbestos is a known carcinogen and can cause respiratory disease.
- There is a common misconception that asbestos use was completely banned in the United States.
- It is currently legal to manufacture certain asbestos containing materials (ACMs) and some ACMs are still being imported today.
- Asbestos fibers have been added to many different building materials regardless of the date of construction.

How to get your building tested:

- Building materials require asbestos testing or must be assumed to be asbestos containing.
- Testing must be done by a Colorado certified Asbestos Building Inspector who can be found through: www.colorado.gov/cdphe/asbestos-consulting-firms
- Contact CDPHE to determine if testing is required. In most cases, testing will be required.

Some places asbestos containing materials can be found:

1. Cement like products such as shingles and siding.
2. Walls/ceilings (drywall, plaster, etc.), skim coating, texturing, joint compounds and acoustical texturing “popcorn ceiling”.
3. Floor tiles, sheet vinyl, linoleum and their associated adhesives.
4. Sprayed on fireproofing seen on structural beams and decking.
5. Ceiling tiles, fire doors and soffits.
6. Insulation on pipes and boilers, including pipe/duct wrap.
7. Blown in insulation such as vermiculite.



Is an Asbestos Inspection Required?

COLORADO
Department of Public Health & Environment

Renovation

SFRD Single Family Residential Dwelling or a **P&C** Public & Commercial structure?

SFRD

Are you impacting greater than the trigger levels of building materials?

(**32ft², 50 linear feet or the volume equivalent of a 55-gallon drum**)

Yes

P&C

Are you impacting greater than the trigger levels of building materials?

(**160ft², 260 linear feet or the volume equivalent of a 55-gallon drum**)

Yes

No

An asbestos inspection is not required although recommended.

Inform all contractors of asbestos containing materials (ACMs).

Obtain local permits if required.
Follow all other regulations (e.g. OSHA).

An asbestos inspection is required by a certified asbestos building inspector or materials need to be assumed to be an ACM.

Is there confirmed/assumed ACM present greater than the trigger levels?

YES

A state certified General Abatement Contractor may be required to do the work. ***

NO

No further action required by CDPHE. Inform all contractors of ACM. Obtain local permits if required. Follow all other regulations (e.g. OSHA).

Demolition

Asbestos inspection & state demolition permit required. Asbestos inspection must be conducted by a certified asbestos building inspector.

Definitions and Links:

Renovation – Altering in any way one or more components in or on a facility. Operations in which load-supporting structural members are wrecked or removed are demolitions Examples of renovation work include to replacement or repair of mechanical ventilation systems, pipes, ceilings, walls, flooring (including floor tiles) and insulating materials. Renovation may also include the construction of additions or the modification of existing components where tie-ins, joints or other intersection may occur.

Demolition – The wrecking or removal of any load-supporting structural member of a facility together with any handling of debris related to the demolition, the intentional burning of any facility, or moving a facility from a permanent foundation.

Asbestos Consulting Firms & Asbestos Building Inspectors can be found at: https://www.colorado.gov/cdphe/asbestos-consulting-firms

Demolition notification application forms can be found under the forms tab at: https://www.colorado.gov/cdphe/asbestos

*** Some ACMs may only require notification or may be exempt from the regulation. Homeowners who do not intend to rent, sell or demolish their primary residence may have additional options. Please contact CDPHE for further details.

4300 Cherry Creek Drive South, Denver CO, 80246 | 303-692-3100 | Fax: 303-782-0278 | www.colorado.gov/cdphe/asbestos | cdphe.asbestos@state.co.us

COLORADO
Department of Public Health & Environment

Thank you for contacting the Colorado Department of Public Health and Environment (CDPHE). Please note that the following requirements and recommendations apply to many but not all projects referred by local governments. Also, they are not intended to be an exhaustive list and it is ultimately the responsibility of the applicant to comply with all applicable rules and regulations. CDPHE's failure to respond to a referral should not be construed as a favorable response.

Hazardous and Solid Waste

The applicant must comply with all applicable hazardous and solid waste rules and regulations.

Hazardous waste regulations are available here:
https://www.colorado.gov/pacific/cdphe/hwregs.

Solid waste regulations are available here:
https://www.colorado.gov/pacific/cdphe/swregs.

Applicable requirements may include, but are not limited to, properly characterizing all wastes generated from this project and ensuring they are properly managed and disposed of in accordance with Colorado's solid and hazardous waste regulations.

If this proposed project processes, reclaims, sorts, or recycles recyclable materials generated from industrial operations (including, but not limited to construction and demolition debris and other recyclable materials), then it must register as an industrial recycling facility in accordance with Section 8 of the Colorado Solid Waste Regulations. The industrial recycling registration form is available here:
https://www.colorado.gov/pacific/cdphe/sw-recycling-forms-apps.

If you have any questions regarding hazardous and/or solid waste, please contact CDPHE's Hazardous Materials and Waste Management Division (HMWMD) by emailing comments.hmwmd@state.co.us or calling 303-692-3320.

Water Quality

The applicant must comply with all applicable water quality rules and regulations.
The Water Quality Control Division (WQCD) administers regulatory programs that are generally designed to help protect both Colorado's natural water bodies (the clean water program) and built drinking water systems. Applicants must comply with all applicable water quality rules and regulations relating to both clean water and drinking water. All water quality regulations are available here:
https://cdphe.colorado.gov/water-quality-control-commission-regulations.

Clean Water Requirements

Stormwater

Applicable clean water requirements may include, but are not limited to, obtaining a stormwater discharge permit if construction activities disturb one acre or more of land or if they are part of a larger common plan of development that will disturb one or more acres of land. In determining the area of construction disturbance, WQCD looks at the entire plan, including disturbances associated with utilities, pipelines or roads constructed to serve the facility.

Please use the Colorado Environmental Online Services (CEOS) to apply for new construction stormwater discharge permits, modify or terminate existing permits and change permit contacts.

For CEOS support please see the following WQCD website:
https://cdphe.colorado.gov/cor400000-stormwater-discharge
or contact:
Email: cdphe_ceos_support@state.co.us or cdphe_wqcd_permits@state.co.us
CEOS Phone: 303-691-7919
Permits Phone: 303-692-3517

Domestic Wastewater

Some projects with wastewater collection may have domestic wastewater treatment works (i.e., treatment plant, interceptor sewer, or lift station) with a design capacity to receive greater than 2,000 gallons per day (gpd) and are subject to state-wide site location, design, and permitting requirements implemented by the Water Quality Control Division. State review and approval of the site location application and design is required by the Colorado Water Quality Control Act (Act), Section 25-8-702, C.R.S. which states in part that:

> *"No person shall commence the construction of any domestic wastewater treatment works or the enlargement of the capacity of an existing domestic wastewater treatment works, unless the site location and the design for the construction or expansion have been approved by the division."*

State review may also be necessary for projects with multiple on-site wastewater treatment systems (OWTS) on a single property, unless the OWTS meet the requirements of division's "Site Application Policy 6: Multiple On-Site Wastewater Treatment Systems" (Policy 6).

If applicable, the project would need to meet all applicable regulatory requirements including, but not limited to, site location and design review, discharge permitting, having a certified operator; and routine monitoring and reporting. For questions regarding domestic wastewater regulation applicability or other assistance and resources, visit these websites:
https://cdphe.colorado.gov/design
https://cdphe.colorado.gov/clean-water-permitting-sectors

Drinking Water Requirements

The definition of a public water system is self-implementing. It is the responsibility of all water systems in Colorado to assess whether their system is a public water system and to comply with the regulations accordingly. There is not a notification process whereby a system only becomes a public water system if the Department notifies that system. A system becomes subject to regulation as a public water system at the point the system begins operating a system meeting the definition of a public water system under Regulation 11.

Some projects may also need to address drinking water regulations if the proposed project meets the definition of a "Public Water System" per the Colorado Primary Drinking Water Regulations (Regulation 11):

> *A Public Water System means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least 25 individuals daily at least 60 days per year. A public water system is either a community water system or a non-community water system. Such term does not include any special irrigation district. Such term includes:*
>
> > *(a) Any collection, treatment, storage, and distribution facilities under control of the supplier of such system and used primarily in connection with such system.*
> >
> > *(b) Any collection or pretreatment storage facilities not under such control, which are used primarily in connection with such system.*

If applicable, the project would need to meet all applicable requirements of Regulation 11 including, but not limited to, design review and approval; technical, managerial and financial review and approval; having a certified operator; and routine monitoring and reporting. If it is determined that your facility meets the definition of a public water system please submit a drinking water inventory update form to the department. For questions regarding drinking water regulation applicability or other assistance and resources, visit these websites:

https://cdphe.colorado.gov/drinking-water
https://cdphe.colorado.gov/dwtrain

If you have any other questions regarding either clean or drinking water quality, please contact CDPHE's WQCD by emailing cdphe.commentswqcd@state.co.us or calling 303-692-3500.

Air Quality

The applicant must comply with all relevant state and federal air quality rules and regulations. Air quality regulations are available here: https://www.colorado.gov/pacific/cdphe/aqcc-regs.

Air Pollutant Emissions Notices (APENs) and Permits

Applicable requirements may include, but are not limited to, reporting emissions to the Air Pollution Control Division (APCD) by completing an APEN. An APEN is a two in one form for reporting air emissions and obtaining an air permit, if a permit will be required. While only businesses that exceed the Air Quality Control Commission (AQCC) reporting thresholds are required to report their emissions, all businesses - regardless of emission amount - must always comply with applicable AQCC regulations.

In general, an APEN is required when uncontrolled actual emissions for an emission point or group of emission points exceed the following defined emission thresholds:

Table 1 APEN Thresholds		
Pollutant Category	**UNCONTROLLED ACTUAL EMISSIONS**	
	Attainment Area	**Non-attainment Area**
Criteria Pollutant	**2 tons per year**	**1 ton per year**
Lead	**100 pounds per year**	**100 pounds per year**
Non-Criteria Pollutant	**250 pounds per year**	**250 pounds per year**

Uncontrolled actual emissions do not take into account any pollution control equipment that may exist. A map of the Denver Metropolitan Ozone Non-attainment area can be found on the following website: http://www.colorado.gov/airquality/ss_map_wm.aspx.

In addition to these reporting thresholds, a Land Development APEN (Form APCD-223) may be required for land development. Under Colorado air quality regulations, land development refers to all land clearing activities, including but not limited to land preparation such as excavating or grading, for residential, commercial or industrial development. Land development activities release fugitive dust, a pollutant regulation by APCD. Small land development activities are not subject to the same reporting and permitting requirements as large land activities. Specifically, land development activities that are less than 25 contiguous acres and less than 6 months in duration do not need to report air emissions to APCD.

It is important to note that even if a permit is not required, fugitive dust control measures included the Land Development APEN Form APCD-223 must be followed at the site. Fugitive dust control techniques commonly included in the plan are included in the table below.

Control Options for Unpaved Roadways	
Watering	Use of chemical stabilizer
Paving	Controlling vehicle speed
Graveling	
Control Options for Mud and Dirt Carry-Out Onto Paved Surfaces	
Gravel entry ways	Washing vehicle wheels
Covering the load	Not overfilling trucks
Control Options for Disturbed Areas	

Watering	Application of a chemical stabilizer
Revegetation	Controlling vehicle speed
Compaction	Furrowing the soil
Wind Breaks	Minimizing the areas of disturbance
	Synthetic or Natural Cover for Slopes

Additional information on APENs and air permits can be found on the following website: https://www.colorado.gov/pacific/cdphe/air/do-you-need-an-apen. This site explains the process to obtain APENs and air quality permits, as well as information on calculating emissions, exemptions, and additional requirements. You may also view AQCC Regulation Number 3 at https://www.colorado.gov/pacific/cdphe/aqcc-regs for the complete regulatory language.

If you have any questions regarding Colorado's APEN or air permitting requirements or are unsure whether your business operations emit air pollutants, please call the Small Business Assistance Program (SBAP) at 303- 692-3175 or 303-692-3148.

Asbestos and Lead-Based Paint

In Colorado there are regulations regarding the appropriate removal and handling of asbestos and lead-based paint as part of a demolition, renovation, or remodeling project. These regulations are presented in AQCC Number 8 (asbestos) and Number 19 (lead-based paint) which can be found on the following website: https://www.colorado.gov/cdphe/aqcc-regs.

These regulations may require the use of, or inspection by, companies or individuals that are certified to inspect or remove these hazards **prior to renovation or demolition**. APCD must also be notified of abatement or demolition activities prior to beginning any work in the case of asbestos. For additional guidance on these regulations and lists of certified companies and individuals please visit the following website for asbestos: https://www.colorado.gov/cdphe/categories/services-and-information/environment/asbestos and the following website for lead-based paint: https://www.colorado.gov/pacific/cdphe/categories/services-and-information/lead.

If you have any questions about Colorado's asbestos and lead-based paint regulations or are unsure whether you are subject to them please call the Indoor Environment Program at 303-692-3100.

If you have more general questions about air quality, please contact CDPHE's APCD by emailing cdphe.commentsapcd@state.co.us or calling 303-692-3100.

Environmental Justice and Health Equity

CDPHE is dedicated to promoting and protecting the health and environment for all Coloradans. As part of those efforts, we strive to achieve health equity and environmental justice.

ENVIRONMENTAL JUSTICE is the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income. Environmental justice recognizes that all people have a right to breathe clean air, drink clean water, participate freely in decisions that affect their environment, live free of dangerous levels of toxic pollution, experience equal protection of environmental policies, and share the benefits of a prosperous and vibrant pollution-free economy.

HEALTH EQUITY is when all people, regardless of who they are or what they believe, have the opportunity to attain their full health potential. Achieving health equity requires valuing all people equally with focused and ongoing efforts to address inequalities.

The Environmental Justice Act (HB21-1266) builds upon these efforts by declaring a statewide policy to advance environmental justice, defining disproportionately impacted communities, and creating an Environmental Justice Action Task Force, Environmental Justice Ombudsperson, and Environmental Justice Advisory Board. The Environmental Justice Act also directs the Air Quality Control Commission to promulgate certain rules to reduce emissions in disproportionately impacted communities, and to revise its approach to permitting actions in disproportionately impacted communities. The Environmental Justice Act further requires the Air Quality Control Commission to conduct enhanced outreach in disproportionately impacted communities for rulemakings and contested permitting actions.

The Environmental Justice Act's definition of disproportionately impacted communities includes low-income communities, communities of color, and housing cost-burdened communities, as well as communities that experience cumulative impacts and with a history of environmental racism. CDPHE's Climate Equity Data Viewer can be used to identify census block groups that meet those three criteria.

CDPHE notes that certain projects have potential to impact communities of color and low-income communities that are already disproportionately impacted by cumulative impacts across environmental media and challenges outside the environmental context. It is our strong recommendation that your organization consider the potential for disproportionate environmental and health impacts on specific communities within the project scope and take action to avoid, mitigate, and minimize those impacts.

To ensure the meaningful involvement of disproportionately impacted communities, we recommend that you interface directly with the communities in the project area to better understand community perspectives on the project to receive feedback on how it may impact them during development and construction as well as after completion. This feedback should be taken into account wherever possible, and reflected in changes made to the project plan to implement the feedback.

Additionally, to ensure the fair treatment of disproportionately impacted communities, we recommend that you consider substantive measures to avoid, minimize, and mitigate impacts to disproportionately impacted communities. This may include considering alternative facility siting locations, using best management practices to reduce impacts to air, water, soil, noise, light, or odor, or offsetting impacts by reducing impacts from other nearby facilities as appropriate.

We have included some general resources for your reference.

Resources:
CDPHE Environmental Justice Website
CDPHE's Health Equity Resources
CDPHE's "Sweet" Tools to Advance Equity
EPA's Environmental Justice and NEPA Resources

Right of Way & Permits

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

April 16, 2024

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

Attn: Carolyn Washee-Freeland

Re: Perry Park Water and Sanitation District - Waucondah WWTF Phase Two Location and Extent Request
Case # LE2024-010

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the **Perry Park Water and Sanitation District - Waucondah WWTF Phase Two Location and Extent Request** and currently has **no apparent conflict**.

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

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

REFERRAL RESPONSE REQUEST – LOCATION AND EXTENT

Date sent: **April 15, 2024** Comments due by: **April 29, 2023**

Project Name:	*Waucondah Water Wastewater Treatment Facility Site Improvements, Perry Park Water and Sanitation District - Location and Extent*
Project File #:	**LE2024-010**
Project Summary:	Perry Park Water and Sanitation District requests approval of a Location and Extent for site improvements at the existing Waucondah Water Wastewater Treatment Facility, located at 5121 Country Club Drive, Larkspur, CO SPN: 2609-154-00-007.The project site is located at the intersection of Perry Park Blvd and Country Club Drive.

Information on the identified development proposal located in Douglas County is enclosed. Please review and comment in the space provided.

☐	No Comment		
☐	Please be advised of the following concerns:		
☒	See letter attached for detail.		
Agency:	**Douglas County Public Works**	**Phone #:**	**303-660-7490**
Your Name:	**Ken Murphy, P.E.**	**Your Signature:**	Ken Murphy
(please print)		**Date:**	**22 APR 2024**

A public hearing on this request will be held before the Douglas County Planning Commission on Monday, **May 6, 2024, at 6:00 pm; located at 100 Third Street, Castle Rock, CO 80104 in the Commissioner's Hearing Room.**

Sincerely,

Carolyn Washee-Freeland

Carolyn Washee-Freeland, AICP
Senior Planner
303-660-7460
cfreeland@douglas.co.us
Enclosure

April 29, 2024 DV2024-186

Diana Miller
Perry Park Water and Sanitation District
5676 Red Rock Drive
Larkspur, CO 80118

RE: Waucondah Wastewater Treatment Facility (WWTF) – Phase 2 Location and Extent
Rev1 PWE Comments

Ms. Miller,

Douglas County Public Works Engineering has reviewed your submittal. Our comments are below.

TECHNICAL DOCUMENTATION

Project Narrative and Planning Exhibit
- Please address comments in the redlined narrative.

Traffic Impact Analysis
- A TIA was not provided for review.

Drainage Study
- Please address comments in the redlined drainage study.

Construction Documents (CDs)
- CDs were not provided for review.

Grading Erosion and Sediment Control (GESC) Report and Plan
- Please address comments on the attached redlined GESC report and plans.

Storm Drainage Operation & Maintenance (O & M) Manual
- Permanent stormwater and water quality facilities will require a site-specific O & M Manual.
- The manual will provide future owner-operators with a basis for regular inspection and maintenance.
- Manual templates are at: https://www.douglas.co.us/public-works/development-review/
- Edit the template to make it relevant to the site and the stormwater improvements.

ADMINISTRATIVE DOCUMENTATION

Documents described below are required for final approvals and/or to start construction.

Improvements Agreement (IA)
- An IA is not required for projects approved through the L+E process.

Temporary Construction Easement (TCE)
- A recorded TCE is required only if work bill be performed on private land outside the project boundary.
- A TCE is an agreement between the project owner and the owner of land outside the project boundary.

- The project owner is responsible to execute and record the agreement; and to provide Douglas County Public Works with copies of the recorded easements.
- County can provide a template easement upon request.

Secondary Drainage Easement

- This easement is required for stormwater detention facilities constructed with the project.
- When the facility design is complete, prepare legal exhibits granting access to, around, and into each pond from the nearest public right-of-way.
- Easements must be accepted by the Board of County Commissioners in a regular land use hearing and approval generally requires 1 to 3 weeks.

GESC Permit

- Please have the selected grading contractor submit the following to Carol LeMaire:
    - GESC report with signed owner and engineer certification statements
    - Signed and stamped GESC plans
    - A completed GESC permit application
- Include the project DV number (found at the top of this letter) on the submittal.
- Below are some contacts for approval of the GESC Permit:
- Contact Carol LeMaire at CLemaire@douglas.co.us to submit the permit application and pay permit fees
- Contact Janet Peterson at JLPeterson@Douglas.co.us to provide GESC security

Right-of-Way / Construction Permit

- Contact the Permits and Inspections Division to apply for a ROW/Construction permit or other required permits
- https://www.douglas.co.us/public-works/permits/

POST-CONSTRUCTION DOCUMENTATION

Please see requirements below to obtain a certificate of occupancy (CO).

As-Built Plans

- Following construction, provide the County with a set of as-built plans documenting information critical to the function of roadway and drainage improvements based on a post-construction survey
- Where as-built information differs from record copy plans, strike-through the record copy information and annotate as-built information in red font, linework, or hatching, as applicable.
- Have the engineer-of-record sign and stamp the as-builts and provide County with a copy.

Certification of Stormwater Detention and Water Quality Facilities

- Following construction, provide the County with a letter from the engineer of record certifying the stormwater improvements are constructed per the design and will function as intended.
    - Include as-built drawings for each facility based on a post-construction survey.
    - Include re-analysis demonstrating facility performance based on the as-built geometry.
    - Include tables documenting key design criteria (e.g. pond and spillway capacities, freeboard) to demonstrate the as-built pond meets or exceeds minimum criteria.

DOUGLAS COUNTY PUBLIC WORKS DEVELOPMENT RESOURCES

Many resources including criteria manuals, agreement forms, warranty and maintenance applications, templates for O & M manuals and other items are available at the web page below:

- https://www.douglas.co.us/public-works/development-review/

Please let me know if you have any questions regarding the items above.

Respectfully,

Kenneth M Murphy, P.E.
Senior Development Review Engineer
kmurphy@douglas.co.us

cc: DV File

LOCATION AND EXTENT NARRATIVE

for

WAUCONDAH WWTF IMPROVEMENTS PHASE 2

Prepared for the:

PERRY PARK WATER AND SANITATION DISTRICT

GMS, Inc.
Consulting Engineers

PERRY PARK WATER AND SANITATION DISTRICT

LOCATION AND EXTENT SUBMITTAL – WAUCONDAH WWTF IMPROVEMENTS PHASE 2

Location and Extent Narrative
Perry Park Water and Sanitation District

Name of applicant:

Perry Park Water and Sanitation District

Description of the request:

This request is to cover the proposed site improvements at the Waucondah wastewater treatment facility Located in Perry Park in unincorporated Douglas County. This facility is located just off Country Club Drive near Bear Creek.

Purpose of the improvements:

The purpose of the improvements to the wastewater treatment facility is to replace the old, dated equipment and bring the facility closer to today's standards and design criteria for managing wastewater. Due to the age of the existing facilities and equipment, the aerobic digester system has experienced periodic disruptions in its operations. The operators have had to increasingly manage equipment malfunctions, component repairs, and electrical replacements. Additionally, part of the project will include additional equipment to minimize disruptions and interruptions in system operation by providing redundancy.

The major changes at the site include:

- Waste Activated Sludge – Replacement of the existing pumping system to transfer sludge from the secondary clarifier to the aerobic digesters. The pumps will be located in a below grade grey concrete vault near the secondary clarifier. The vault is approximately 10 feet long and 8 feet wide, with a depth of 15 feet. There are no architectural details associated with this below grade vault. The local control panel and access hatches will be mounted on the vault lid.
- Aerobic Digestion – Two partially below grade grey concrete aerobic digester tanks will be constructed and designed to treat and stabilize process solids. Digested solids will be transferred from each digester to one partially below grade grey concrete solids holding tank. The three tanks will be built with common well construction and the entire tankage will be 50 feet wide by 90 feet long and approximately 12 feet above ground surface. No surface treatments are planed for the bare concrete walls.
- Blower Building – The proposed blower building will house the aeration blowers. The blowers deliver process air to the digested sludge to provide aeration for treatment and mixing. This proposed building will provide a satisfactory environment for electrical, instrumentation and control gear associated with the digestion process. The building will be 20 feet wide by 50 feet long and approximately 16 feet tall. It will be a wood framed building with metal siding and metal roofing, the color scheme will generally match the metal finishes of other existing buildings.
- Backup Generator – A new emergency diesel powered backup generator will be added to the site to provide emergency power to the critical processing components. There are no architectural details associated with this backup generator.
- Ultraviolet Disinfection Equipment – The existing ultraviolet (UV) disinfection equipment will be replaced with new and updated components. Existing below grade concrete channels house the UV below the ground surface. Minor modifications to the existing concrete channels will be

This level of detail regarding determination of base flood elevations is not appropriate for the project narrative. Please move this to the drainage report. The project narrative should simply explain that:
1. The FEMA map showed approximate floodplain
2. The floodplain was refined through an engineering study.
3. No grading and improvements are planned to be within the refined floodplain.

required. There are no architectural details associated with this equipment replacement or the concrete channels which will remain with top of walls at ground level.

With the proposed changes, this project was required to submit and receive approval from the Colorado Department of Public Health and Environment (CDPHE). An application for an amendment to an existing site location approval and process design report were submitted to CDPHE. These submittals have been reviewed by CDPHE and were approved September 21, 2023 and January 4, 2024 respectively.

Summary of the potential impacts and proposed mitigation measures

In the pre-submittal conference, it was noted that the property site appears to be in the 100-year floodplain according to FEMA mapping. FEMA issued a flood insurance study (FIS) in September 2005, which was most recently revised in December 2021. However, Bear Creek was only studied using approximate methods, no floodplain elevations are available on the FIRM floodplain map. Therefore, additional detail on the 100-year flood elevations was requested to ensure that the new facilities will not be subject to flood risk or otherwise impact the floodplain. An analysis was completed to better define the 100-year floodplain near the site.

The basic approach using the HEC-RAS system was to create a model that gives a more detailed profile of the Bear Creek 100-year floodplain in respect to the WWTF property. The WWTF site and Bear Creek were inspected on July 11, 2023 in preparation of the HEC-RAS model. During that site visit, additional detail was gathered for the bridge crossing where Country Club Drive crosses over Bear Creek. Additional data was also collected for the is an 48-inch CMP culvert located approximately 145 feet downstream from the bridge where Bear Court crosses Bear Creek.

Since the section of Bear Creek near the WWTF has not been studied using detailed methods, there are no existing conditions in which the HEC-RAS model could be calibrated to. Instead, the model was set up using a digital elevation model from the United States Geological Survey (USGS), along with on site survey and dimensions as inputs into the HEC-RAS model. A base flow of 10 cubic feet per second (CFS) in Bear Creek was used. Data from the Waucondah Reservoir enlargement documents were utilized to determine the maximum probable spillway discharge from the Waucondah Reservoir. In the 1970's the Waucondah Reservoir was enlarged and a new spillway into Bear Creek was constructed. The Waucondah Reservoir Enlargement construction drawings (C-1273) were dated September 25, 1969. The construction drawings state that the maximum probable spillway discharge is 1,520 CFS. Finally, runoff from a delineated sub-basin was calculated using the rational method, which contributes an additional 50 CFS to Bear Creek upstream of the project site. The total flow from the Waucondah Reservoir and the delineated sub-basin was interpolated into a 1 hour Hydrograph, with a maximum flow at 20 minutes.

Bear Creek was analyzed from the Waucondah Reservoir to about 300 feet downstream of the existing WWTF site. The Bear Creek channel bank was estimated using Google Earth Pro and data from the site surveys. The HEC-RAS model was set up with cross sections placed approximately every 100 feet. Cross sections were also added upstream and downstream at the Country Club Drive bridge and the Bear Court culvert. The cross-sections were created and utilized in the HEC-RAS model. A proposed HEC-RAS model determined that the 100-year floodplain boundary does not encroach on the WWTF site.

In the pre-submittal conference, a concern around the new blower building and equipment, associated with the noise produced was mentioned. After a review of the Douglas County noise ordinance, this

Regarding traffic concerns, please address temporary impacts during construction and long-term impacts following construction.

Explain that a temporary traffic control plan will be included, if required, for construction traffic.

Describe long-term impacts with estimates of average daily trips to the site and estimates of average peak AM and peak PM trips. Please keep in mind that a "trip" is a vehicle coming to or leaving from the site, i.e. a visit by one employee is considered two trips, one coming and one leaving.

property and use fall under specific exclusions from the requirement of being a public utility. In 2019 the site received complaints revolving around the noise. Following these complaints, a noise study was conducted in reference to CRS 25-12-103. The measurements concluded that the noise levels were below the State of Colorado noise level limits. Sound pressure levels were measured near noise producing plant equipment and also at one location in the direction of the nearest residences. The nearest property is approximately 450 feet northwest of the WWTF. The measurement location was approximately 235 feet northwest of the WWTF property line, so it was slightly more than halfway between. The plant noise was fairly steady and the sound level was averaged for one minute. The sound level at the measurement location was 45 dBA sound levels at the residential property will be lower than 45 dBA since it is further away and the sound level will decrease with increased distance. Even at the measurement location, the sound level is 5 dBA below the State of Colorado nighttime limit.

Although the current sound levels are below permissible limits, the Perry Park Water and Sanitation District has made efforts to further reduce noise levels. There have been upgrades to include inlet silencers, outlet silencers, new filter intakes, and the replacement of one of the blowers. However, with the new construction, we are proposing to implement additional improvements to reduce the noise level as much as possible including sound-attenuating blower enclosures, a better insulated building to house the equipment, and new quieter blowers.

To be expected, some increased traffic will occur during construction. There will be little to no effect on existing traffic patterns during construction. However, the site improvements will not increase the overall traffic required for the maintenance and operations of the facility. Additionally, Traffic patterns are not expected to be altered.

Construction will generally consist of soil excavation, new building installation, new process tank installation, existing building demolition, new process equipment, new process piping, miscellaneous equipment replacement, backup generator installation, electrical upgrades, and yard piping. Construction is anticipated to commence in August of 2024 as weather permits and is expected to last approximately one year. The anticipated construction period is dependent on weather and material procurement. Construction work hours are anticipated to align with Douglas County's maximal permissible noise limit during the weekday hours of 7:00 AM to the next 7 PM. However, there may be construction activities that are required to be performed at times of low flow to the facility, which generally occur after those hours mentioned above. Sound levels and off-hour construction will be limited as much as possible.

Compliance with the Comprehensive Master Plan

This Location and Extent submittal is in conformance with the Douglas County Storm Drainage Design and Technical Criteria Manual, as well as the Douglas County Comprehensive Master Plan. The Perry Park Water and Sanitation District was formed to manage the water and sanitary sewer infrastructure that serves the Perry Park Development and the surrounding area. The WWTF has historically met the requirements of its discharge permit, but several components of the WWTF have inadequate capacity. Most unit processes require certain upgrades due to age, condition, and operational capability and the facility lacks redundancy, which increases the risk of a major violation in the event of adverse conditions such as equipment failures. The intent of the project it to address these concerns and provide the District better capabilities to meet water quality requirements. The proposed WWTF improvements will be contained within the existing Waucondah WWTF site; therefore limiting impacts to private property and natural lands outside the property

We trust the information provided in this submittal document is sufficient for the proposed site improvements. If you should have any questions or desire additional information, please contact our office at your convenience.

Community Impact Report and Traffic Narrative
Perry Park Water and Sanitation District

Name of applicant:

Perry Park Water and Sanitation District

Provide a summary of expected impacts per the Phase III report.

Summary of the potential impacts and proposed mitigation measures

In the pre-submittal conference, it was noted that the property site appears to be in the 100-year floodplain according to FEMA mapping. Therefore, sufficient detail on the flood elevations needs to be provided to ensure that the new facilities will not be subject to flood risk or otherwise impact the floodplain. Please see the attached drainage report as part of the L&E submittal document to review any potential impacts to the floodplain.

In the pre-submittal conference, a concern around the new blower building and equipment, associated with the noise produced was mentioned. After a review of the Douglas County noise ordinance, this property and use fall under specific exclusions from the requirement of being a public utility. In 2019 the site received complaints revolving around the noise. Following these complaints, a noise study was conducted in reference to CRS 25-12-103. The measurements concluded that the noise levels were below the State of Colorado noise level limits. Although the current noise levels are below permissible limits the Perry Park Water and Sanitation District has made efforts to further reduce noise levels. There have been upgrades to include inlet silencers, outlet silencers, new filter intakes, and the replacement of one of the blowers. However, with the new construction, we are proposing to implement additional improvements to reduce the noise level as much as possible including sound-attenuating blower enclosures, a better insulated building to house the equipment, and new quieter blowers.

Traffic impacts

To be expected some increased traffic will occur during construction. There will be little to no effect on existing traffic patterns during construction. However, the site improvements will not increase the overall traffic required for the maintenance and operations of the facility. Additionally, Traffic patterns are not expected to be altered.

Construction will generally consist of soil excavation, new building installation, new process tank installation, existing building demolition, new process equipment, new process piping, miscellaneous equipment replacement, backup generator installation, electrical upgrades, and yard piping. Construction is anticipated to commence in 2024 as weather permits and is expected to last approximately one year. The anticipated construction period is dependent on weather and material procurement. Construction work hours will mostly align with Douglas County's maximal permissible noise limit during the hours of 7:00 AM to the next 7 PM. However, there may be construction activities that are required to be performed at times of low flow to the facility, which generally occur after those hours mentioned above. Noise levels and off-hour construction will be limited as much as possible.

PHASE III DRAINAGE REPORT
FOR
THE PERRY PARK WATER AND SANITATION DISTRICT

PROJECT NO. 2021-068.600

MARCH 2024

OWNER:

PERRY PARK WATER AND SANITATION DISTRICT
5676 WEST RED ROCK DRIVE
LARKSPUR, CO 80118

PREPARED BY:

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER STREET, SUITE 300
COLORADO SPRINGS, COLORADO 80903

TELEPHONE: (719) 475-2935
TELEFAX: (719) 475-2938

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

Remove the geotechnical report from the Phase III drainage report as it is not relevant to drainage.

Please include detailed drainage maps showing existing and proposed drainage per the Douglas County Drainage Manual Section 4.4.6.(II).

This report and plan for the Phase III drainage design of the Waucondah Wastewater Treatment Facility (WWTF) Improvements – Phase 2 was prepared by me (or under my direct supervision) in accordance with the provisions of Douglas County Design and Technical Criteria for the owners thereof. I understand that Douglas County does not and will not assume liability of drainage facilities designed by others.

By: Samuel L. Wood, PE
Licensed Professional Engineer for and on behalf of GMS, Inc.
State of Colorado
No. 60152

Perry Park Water and Sanitation District hereby certifies that the drainage facilities for the Waucondah Wastewater Treatment Facility (WWTF) Improvements – Phase 2 shall be constructed according to the design presented in this report. I understand that Douglas County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that Douglas County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of the Waucondah Wastewater Treatment Facility (WWTF) Improvements – Phase 2, guarantee that final drainage design review will absolve Perry Park Water and Sanitation District and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Perry Park Water and Sanitation District
Name of Developer

Authorized Signature

SECTION I

INTRODUCTION

A. PURPOSE AND SCOPE

This drainage report has been prepared for the Perry Park Water and Sanitation District's (PPWSD) wastewater treatment facility (WWTF) improvements. The purpose of this report is to present the findings of a floodplain impact evaluation at the WWTF site.

B. BACKGROUND

An evaluation of the existing Waucondah WWTF, dated February 2021, was completed by TST Infrastructure, LLC in order to determine the current and future capabilities of the facility. At that time, several community complaints had been lodged with PPWSD concerning noise, odor, and the aesthetics of the WWTF; so the PPWSD determined that a complete evaluation of the WWTF was needed. The plant has historically met the requirements of its discharge permit, but several components of the WWTF have inadequate capacity. Most unit processes require certain upgrades due to age, condition, and operational capability and the facility lacks redundancy, which increases the risk of a major violation in the event of adverse conditions such as equipment failures.

The recommended phase II WWTF improvements consist of new process tanks and equipment, demolition of the existing digester complex, new yard piping and structures, a new blower building, installation of instrumentation and controls, installation of UV disinfection system, and installation of new generator and electrical. The proposed WWTF improvements will be contained within the existing Waucondah WWTF site southeast of the intersection of Perry Park Boulevard and County Club Drive.

The Federal Emergency Management Agency (FEMA) issued a flood insurance study (FIS) in January 1996, in which portions of Bear Creek was studied using approximate methods. According to the flood insurance rate map (FIRM), the Waucondah WWTF lies within the 100-year floodplain of Bear Creek.

Wasn't a more detailed study carried out for this project to map the floodplain? Please reference these studies here.

There seems to be a lot of discussion of the service area in this report. The report should be focussed onthe area to be improved through as defined by the L+E and the service area is completely irrelevant. Please revise the report to focus on the WWTF project area.

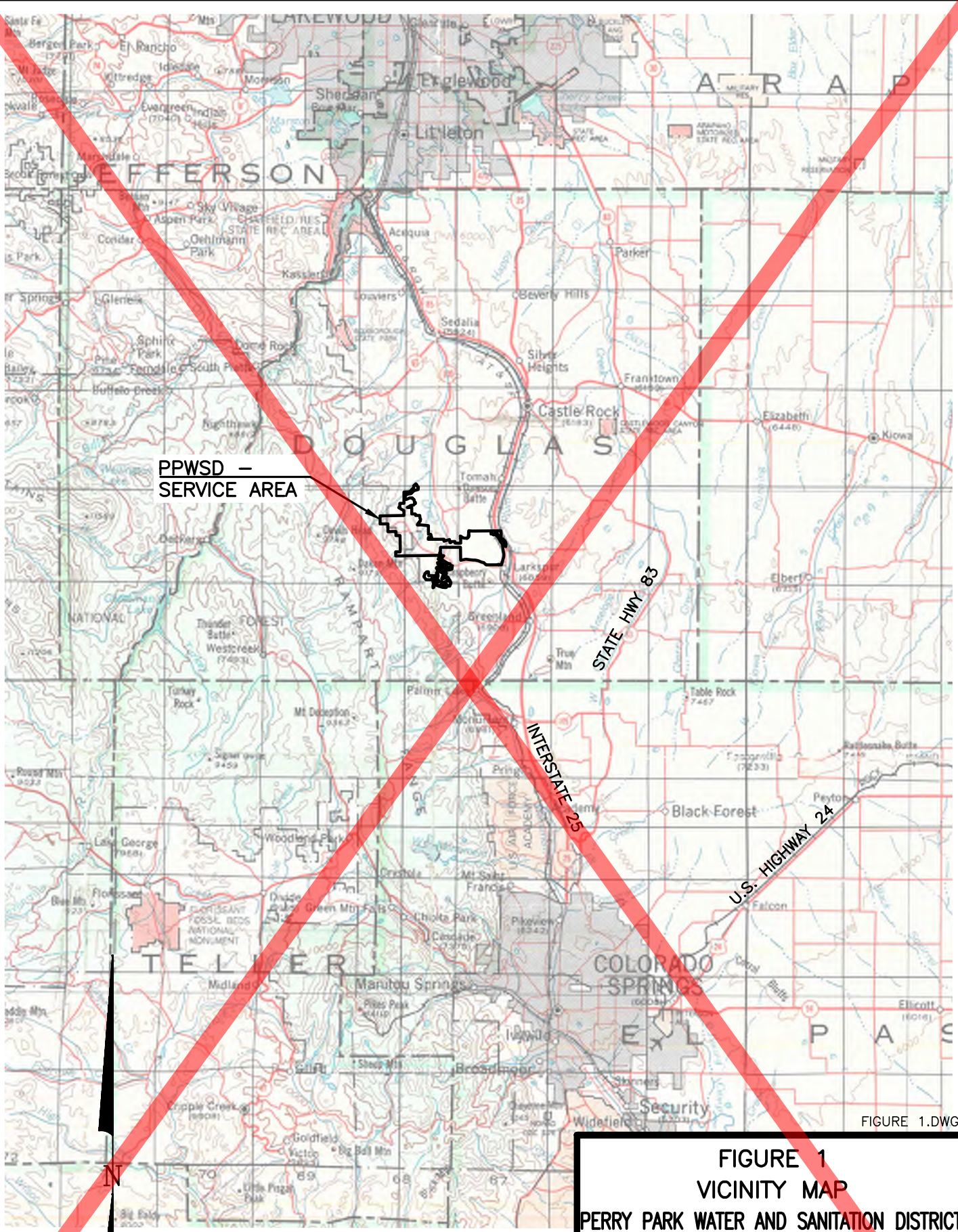
SECTION II
GENERAL LOCATION AND DESCRIPTION

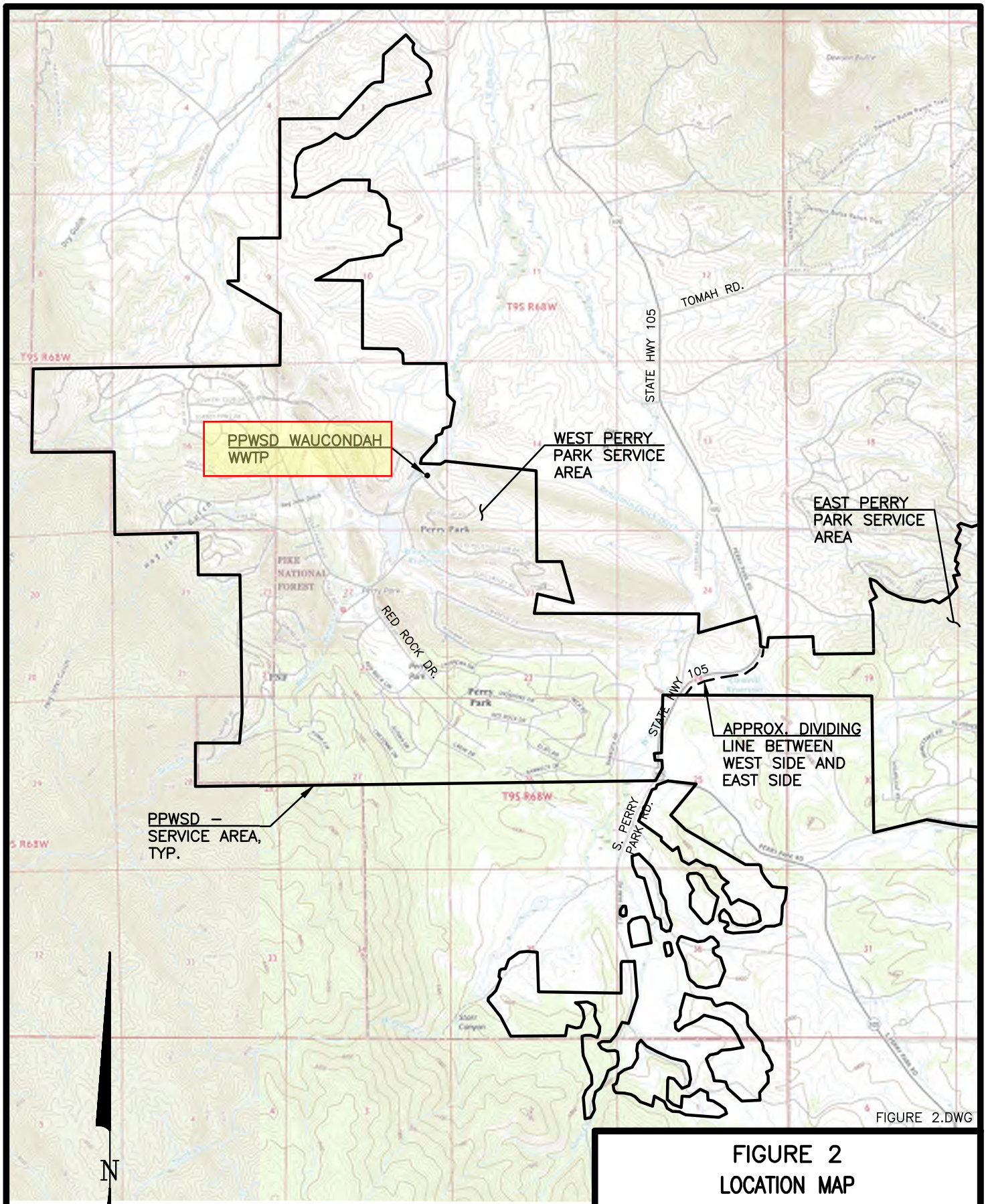
A. SITE LOCATION

The Waucondah Wastewater Treatment Facility (WWTF) is one of two WWTFs for the Perry Park Water and Sanitation District (PPWSD). Perry Park is an unincorporated community in Douglas County, Colorado. The service area for PPWSD is located northwest of the Town of Larkspur and south of the Town of Castle Rock. The community is located within Sections 19, 20, 21, 22, 27, 28, 29, 30, 33, 34, Township 9 South, Range 67 West and Sections 2, 3, 9, 10, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, Township 9 South, Range 68 West of the 6th Principal Meridian. Water and wastewater services for the community are provided by PPWSD.

The District's total service area is generally split into an east side, known as East Perry Park, and a west side, known as West Perry Park. The Waucondah WWTF is located in the West Perry Park service area. Therefore, it receives wastewater flow from West Perry Park only, no wastewater from East Perry Park. The West Perry Park service area is located approximately 8 miles southwest of the City of Castle Rock and 3 miles northwest of the Town of Larkspur. The general location of the Waucondah WWTF's service area is shown with respect to neighboring communities in Figure 1. Figure 1 has been taken from the U.S. Geological Survey's mapping of the State of Colorado which is compiled at a scale of 1:500,000 (1-inch equals approximately 8 miles).

The PPWSD service area is roughly bordered to the east by Interstate 25 and to the west by the Rampart Range, and bisected north-south by State Highway 105 (South Perry Park Road). This drainage report will be concentrating on the Waucondah WWTF which generally encompasses the west side service area boundary. Generalized limits of the planning area are shown in Figure 2. Figure 2 also depicts the general street configurations within the east side area, as well as topography, drainage, railroad, and irrigation canals and ditches. Figure 2 has been taken from a U.S. Geological Survey quadrangle. The scale of Figure 2 is approximately 1-inch equals 3,000 feet. The figure has been annotated to show West Perry Park. West Perry Park is also referred to as the Waucondah WWTF service area in this report. East Perry Park, the area served by Sageport WWTF, is not discussed in this report.





G:\Perry Park WSD\2021-068\625\Figure 2.dwg, 8.5x11, 3/19/2024 4:44:44 PM, slw, DWG To PDF.pc3, 1:1

B. DESCRIPTION OF PROPERTY

1. Waucondah WWTF Property Description

The existing Waucondah WWTF is located on a 4.13 acre rectangular property on the southeast corner of Country Club Drive and Bear Court in Perry Park, Colorado. The property is adjacent to Bear Creek and contains approximately 9 buildings that aid in the treatment of the District's wastewater. The WWTF property is located east of Perry Park's suburban residential area and is surrounded by unincorporated property. The proposed improvements will not change the property's current land use as the property is already being used for wastewater treatment.

2. Physiography, Topography, and Vegetation

Douglas County falls within the physiographic province of the Front Range. As such the western edge of the District's service area is bordered by the base of the Rampart Range portion of the Front Range mountains. Figure 2 shows the general topography in and around West Perry Park. Elevations within West Perry Park range from a high of approximately 7,200 feet to a low of approximately 6,300 feet. The Waucondah WWTF is located just east of Bear Creek on Country Club Drive, at approximately 6,340 feet in elevation. In general, the topography within the service area falls from the south to the north. PPWSD's Waucondah WWTF is located on the northeast side of the service area as shown in Figure 2. The topography within the WWTF property falls from the southeast to northwest towards Bear Creek. No prominent topographic features exist within the Waucondah WWTF property, but there is a ridge just south of the WWTF site and the foothills of rampart range are located to the west.

A majority of the land surrounding the Waucondah WWTF's service area, and the land immediately surrounding the WWTF itself, is forested. Land north of the WWTF gives way to shrubland and pastureland. There are no delineated wetlands on the WWTF property. The only delineated wetlands in the area are associated with Bear Creek. Native vegetation in the area consists of a variety of short and mid-tall grasses including Blue Gamma, Galleta, Alkali Sacaton, Buffalo Grass, Salt Grass, and Sand Dropseed.

3. Soils

The US Department of Agriculture through the Natural Resources Conservation Service (NRCS) has compiled detailed soil information for Douglas County. This data is available on the NRCS' web soil survey website. Soil type information within and surrounding the Waucondah WWTF is relevant as it relates to the constructability of wastewater facilities within the area and the soil's ability to transmit surface water.

The following soils have been identified in the NRCS mapping of the Waucondah WWTF area as shown on the following Figures 3A, 3B and 3C. General information is presented in terms of the characteristics of these different soil classifications. None of the identified soils are classified as prime farmland. The extent at which the soil map was created (to show only locations around the Waucondah WWTF relevant to the scope of this report) resulted in a scale greater than what is recommended for this location by the NRCS. As such, the locations of soil group borders displayed in the soil map are approximate.

Soil Group RaE – Razor clay, 3 to 25% Slopes

This is the predominant soil group within the Waucondah WWTF property, found mainly in the southeast part of the existing Waucondah WWTF property and extending east of the property. This soil group consists of clay; bedrock can be found between 20 to 40 inches deep. These soils are well drained with a high runoff class. These soils are classified as hydrologic soil group "D". Depths to water table are generally greater than 80 inches.

Soil Group Se – Rock land-Lonetree complex, 10 to 100% Slopes

This soil group is prevalent west of the existing Waucondah WWTF property and generally follows the alignment of Bear Creek. This soil group consists of coarse sand overlying loamy sands. These soils have a high runoff class and are classified as hydrologic soil group "D". Depths to water table are generally 0 to 24 inches since these soils are typically found in flood plains and drainageways.

The majority of the improvements are in HSG D. However the analyses assumed HSG B. This is unconservative. Please revise.

G:\Perry Park WSD\2021-068\625\Figure 3A.dwg, 8.5x11, 3/19/2024 4:51:24 PM, slw, DWG To PDF.pc3

Please show the site outline in this map.

104° 59' 3" W

N

Map Scale: 1:2,500 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

FIGURE 3A
SOILS MAP
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

Soil Map—Castle Rock Area, Colorado
(PPWSD)

MAP LEGEND

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

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

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

Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Castle Rock Area, Colorado
Survey Area Data: Version 15, Sep 1, 2022

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

Date(s) aerial images were photographed: Jul 1, 2020—Jul 2, 2020

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.

FI 3B.DWG

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

FIGURE 3B
SOILS MAP LEGEND
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ka	Kassler gravelly sandy loam	0.2	0.9%
RaE	Razor clay, 3 to 25 percent slopes	9.7	39.2%
Se	Sandy wet alluvial land	8.8	35.7%
Sv	Stony steep land	2.0	8.0%
TcE	Tinytown-Cheesman complex, 5 to 30 percent slopes	4.0	16.2%
Totals for Area of Interest		**24.6**	**100.0%**

FIGURE 3C.DWG

FIGURE 3C
SOIL MAP UNIT LEGEND
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903
MARCH 2024

Soil Group TcE – Tinytown-Cheesman, 5 to 30% Slopes

This soil group is prevalent in a small section northeast of the existing Waucondah WWTF property. This soil group consists of gravelly sandy loam. These soils are well drained with a low runoff class. These soils are classified as hydrologic soil group "A". Depths to water table are generally greater than 80 inches.

4. Major and Minor Drainageways

Again, the service area is irrelevant. Please revise to focus on the WWTF property.

The majority of the District's service area drains towards the Waucondah Reservoir. There are several minor drainage ways scattered along the foothills of Rampart Range that feed the Waucondah Reservoir. The Waucondah Reservoir spillway controls flow from the reservoir into Bear Creek. Bear Creek is the major drainageway in the area and flows northeast, passing adjacent to the northwest part of the existing WWTF property. Approximately, 835 feet downstream of the Waucondah Reservoir spillway, there is a ditch that splits from Bear Creek and continues north/northwest of the Creek. This irrigation ditch is Pleasant Park Ditch and is located 350 feet northwest of the existing WWTF site.

5. Floodplain

The 2005 Flood Insurance Rate Map (FIRM) for the area, produced by Federal Emergency Management Agency (FEMA), is shown on the following Figure 4. The current Water Quality Control Division (WQCD) design criteria for wastewater treatment works, WPC-DR-1, requires that structures and equipment are accessible, able to discharge, and protected from physical damage during the 100-year flood. The map shows that the Waucondah WWTF is located within the 100-year floodplain associated with Bear Creek.

FEMA issued a flood insurance study (FIS) in September 2005, which was most recently revised in December 2021. However, Bear Creek was only studied using approximate methods. Therefore, no floodplain elevations are available on the FIRM floodplain map.

Please discuss in this section how the floodplain was mapped for this project.

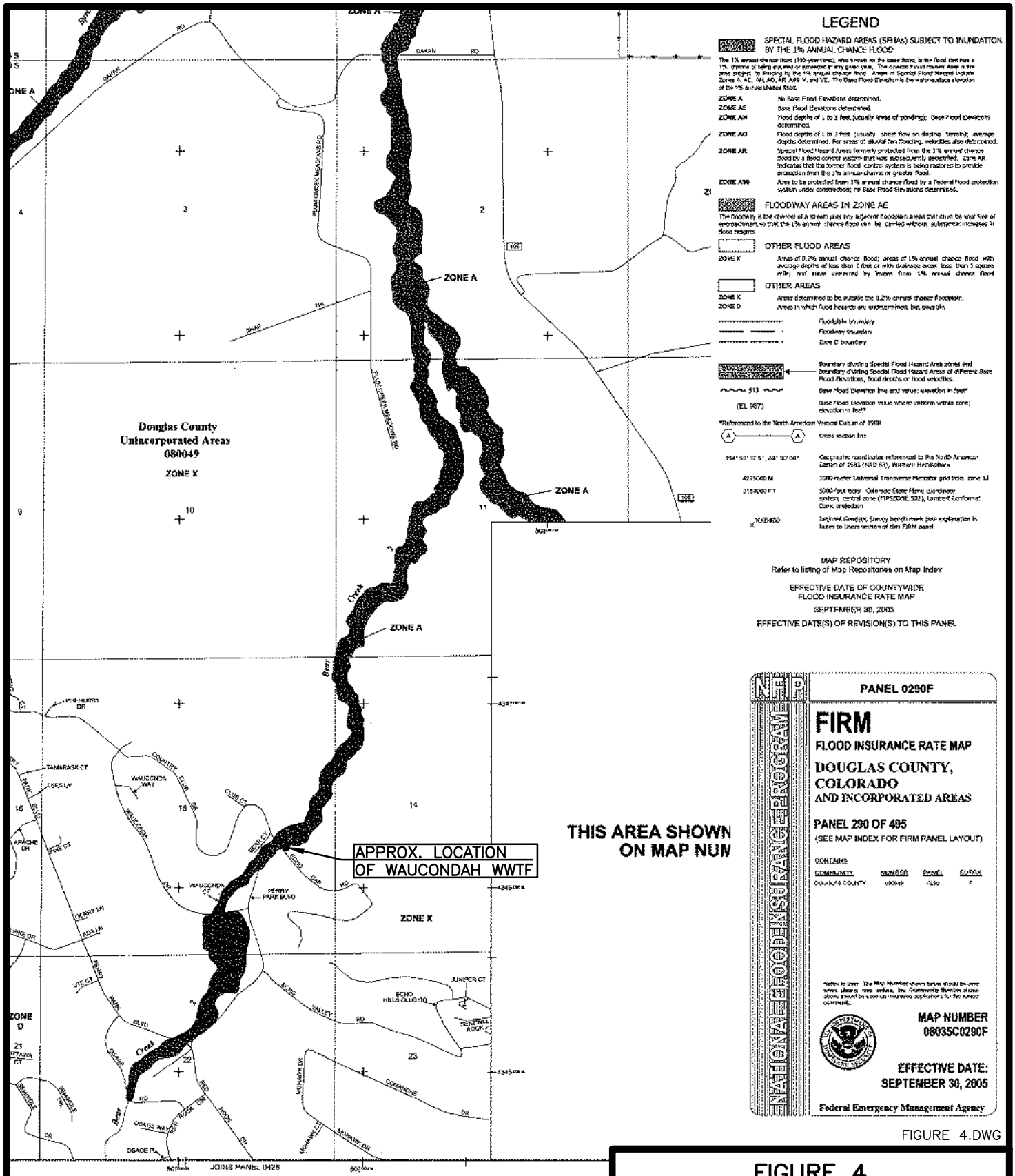


FIGURE 4.DWG

FIGURE 4
FEMA FLOODPLAIN MAP
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

6. Precipitation and Temperature

Climate data has been obtained from the National Weather Service, the Climatic Atlas of the United States prepared by the Department of Commerce and information from the Colorado Climate Center located at Colorado State University. The climate of Perry Park can generally be classified as continental, warm and semi-arid and is characterized by low humidity, and a wide range in daily and annual temperatures. Perry Park experiences a fair amount of precipitation throughout the year and the area is also subject to rapid changes in weather during any season.

The climate station nearest to Perry Park that collects comprehensive monthly data for the past fifteen years is located in Castle Rock, CO. This station (NOAA Station 51401) is approximately 10.7 miles north of the Waucondah WWTF service area. Historical precipitation and temperature data were gathered from this climate station. These data sets were assumed to be representative of climatic conditions in the Perry Park area. The lowest monthly average temperature occurs in January and is approximately 17.8°F. The highest monthly average temperature occurs in July and is 86.5°F. Most precipitation occurs in the late summer months of August and September. The average annual rainfall in Perry Park is approximately 17 inches per year. Annual precipitation for the last ten years has been below average except in 2014, 2015, and 2017.

SECTION III

DRAINAGE BASINS AND SUB-BASINS

A. MAJOR DRAINAGE BASINS

The Waucondah WWTF is located at the southeast corner of the intersection of Country Club Drive and Perry Park Boulevard. The WWTF is located directly adjacent to Bear Creek. Bear Creek drains in a south to north direction, originating from the Rampart Range, southwest of the WWTF. Bear Creek and several other drainage ways within the community contribute to the Waucondah Reservoir. The Waucondah Reservoir has a spillway on the north end that allows drainage from the reservoir back into Bear Creek, which then continues north past the WWTF.

Bear Creek, north of the Waucondah Reservoir is the area of concern because it runs adjacent to the WWTF site and the WWTF site may be located within Bear Creek's floodplain. In a 1996 FEMA FIS, portions of Bear Creek were studied using approximate methods. From the 1996 FIS, FEMA developed FIRM mapping of the Perry Park community and according to the FIRM map, the WWTF site is within the 100-year floodplain. There are no other drainage studies or flood hazard mapping of this area.

Sub-basin 1 contains the area within and surrounding the Perry Park community that contributes stormwater to the Waucondah Reservoir, the WWTF site, and Bear Creek. The drainage basin was delineated using USGS contour mapping and contains approximately 9,085 acres. Sub-basin 1 extends east from the WWTF into the mountainous, residential area of the PPWSD service area. The basin also extends southwest into the Rampart Range to include the headwaters of Bear Creek. Sub-basin 1 is bounded on the north end by the Waucondah WWTF because all stormwater north of the WWTF would not affect the site. The major drainage basin is shown on the following Figure 5.

In general, this basin drains from the southwest to the northeast and ultimately drains to the Waucondah Reservoir. This sub-basin consists mostly of vegetated mountainous area with slopes over 15%. The portion of sub-basin 1 that is located within the Perry Park community

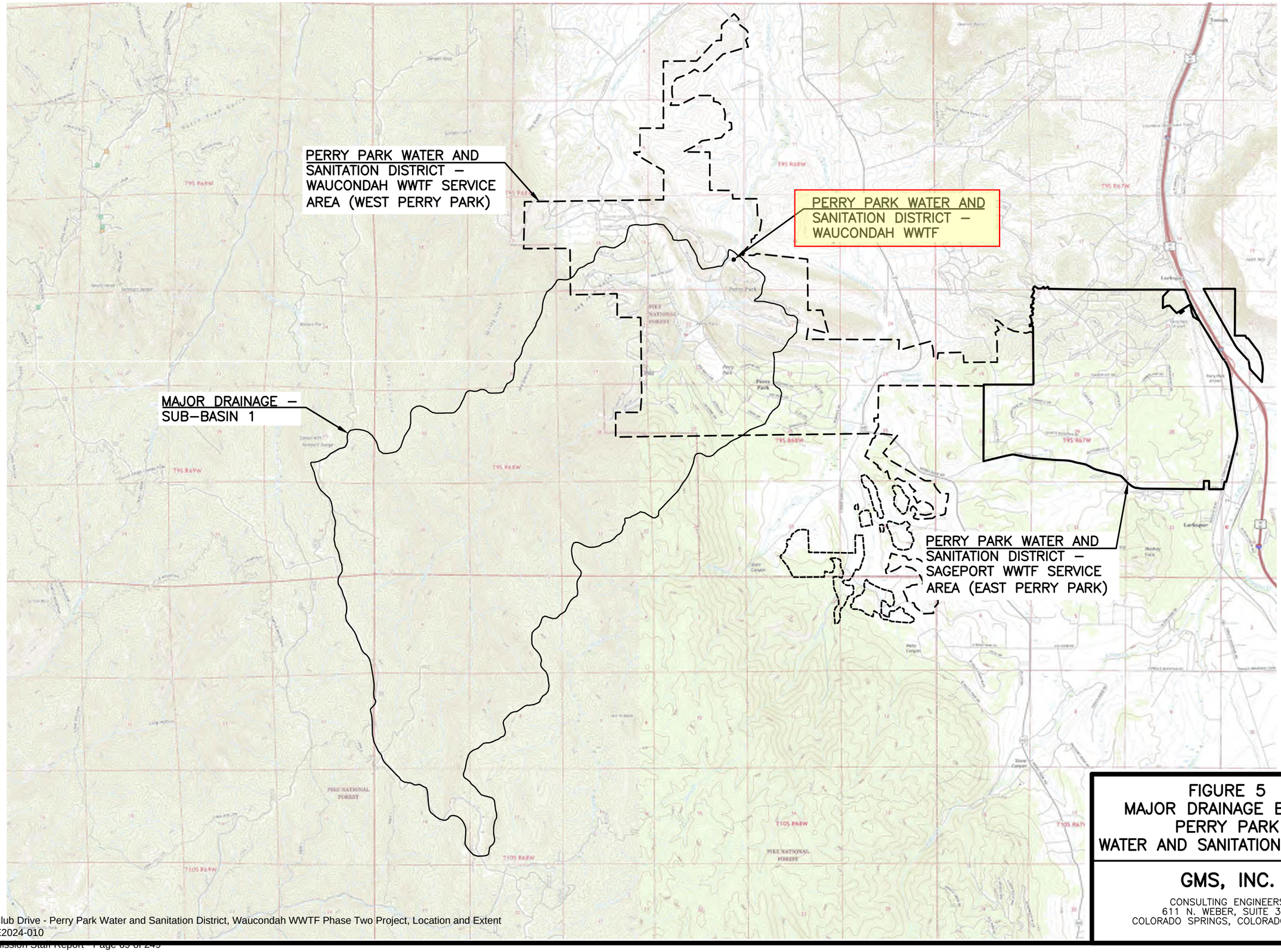


FIGURE 5.DWG

FIGURE 5
MAJOR DRAINAGE BASINS
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: LE2024-010

consists of suburban residential land use. The remaining area of sub-basin 1 consists of Pike National Forest property. Further development will be limited to the Perry Park community and will not affect the Waucondah WWTF site.

B. MINOR DRAINAGE BASINS

As discussed previously, Waucondah Reservoir drains into Bear Creek, which continues north, adjacent to the WWTF. In the 1970's, a new spillway from the Waucondah Reservoir into Bear Creek was constructed. This dam restricts the flow from the Waucondah Reservoir into Bear Creek with a maximum probable spillway discharge of 1,520 cubic feet per second (CFS). Because of this dam, only a limited amount of stormwater that directly contributes to the Waucondah Reservoir will spill into Bear Creek, impacting the Creek's floodplain. Therefore, the major drainage basin shown on Figure 5 was separated even further into a single sub-basin that directly contributes stormwater to Bear Creek and the WWTF.

An unnamed channel splits off from Bear Creek approximately 900 feet downstream of the Waucondah Reservoir. This channel is located west of Bear Creek for approximately 1.5 miles and is assumed to capture all contributing stormwater west of the channel. Based on this assumption, the west side of sub-basin 2 is bounded by this unnamed channel. The rest of the sub-basin's extents were determined using USGS contour mapping. The south end of the sub-basin is bounded at Waucondah Drive and the north end of the sub-basin is bounded by the north end of the WWTF site. Finally, the sub-basin extends east from Bear Creek beyond County Club Drive and Echo Gap Road. This sub-basin contains approximately 112.4 acres and drains to Bear Creek. This minor drainage basin is shown on the following figure 6. A 48-inch diameter corrugated metal pipe (CMP) culvert is located within Bear Creek where Bear Creek intersects with Bear Court.

In general, this basin drains from the southeast to the northwest towards Bear Creek. This sub-basin consists mostly of vegetated undeveloped area with slopes over 15%. Sub-basin 2 is almost entirely contained within the Perry Park community and consists mostly of suburban residential land use. Most of this residential area is undeveloped. The sub-basin was assigned a conservative runoff coefficient of 0.2. Further development within the sub-basin will be limited due to the area's existing surface profile and will not directly affect runoff on the WWTF site.

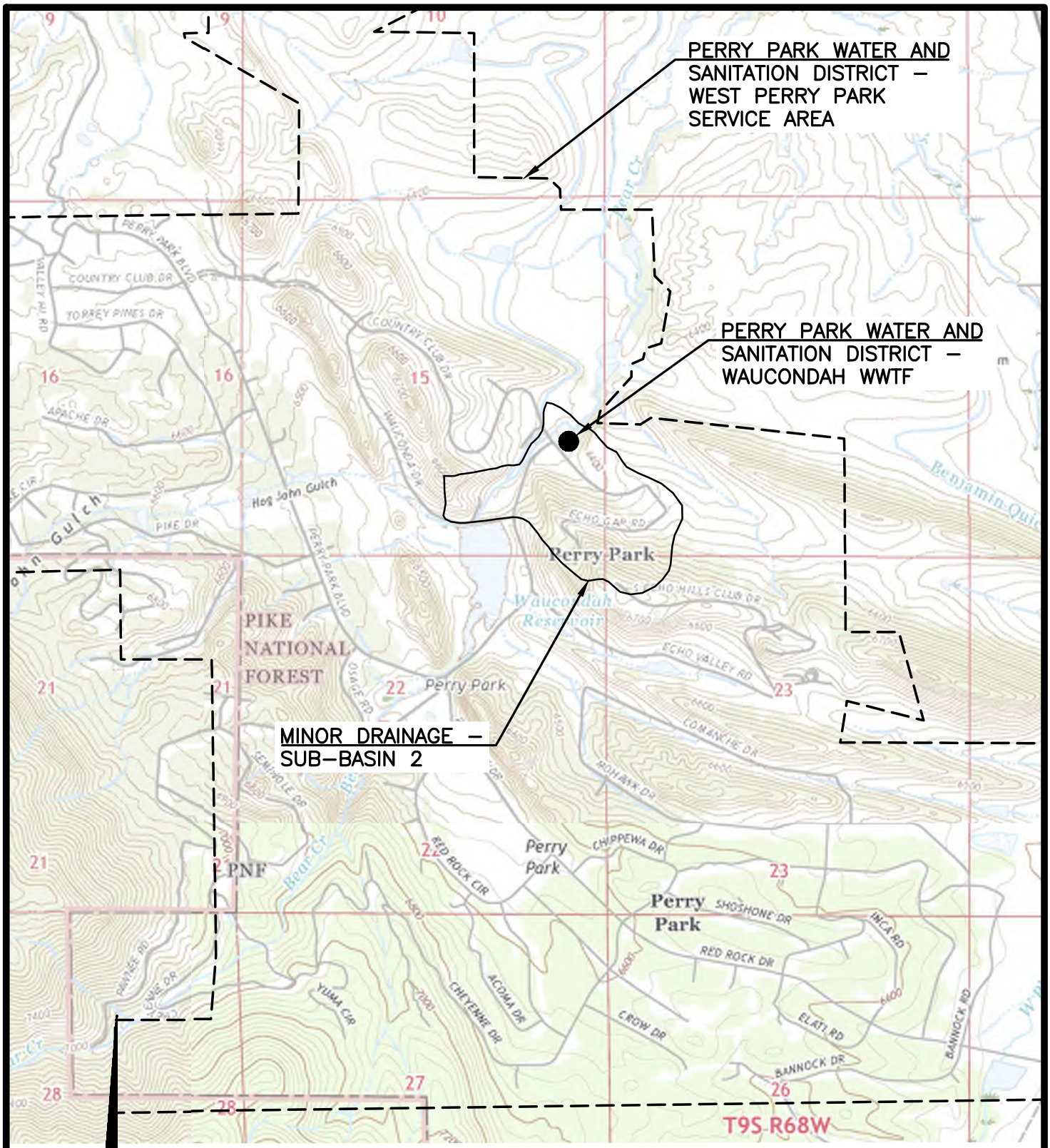


FIGURE 6.DWG

FIGURE 6
MINOR DRAINAGE BASINS
PERRY PARK
WATER AND SANITATION DISTRICT

SCALE: 1" = 3,000'

SOURCE: LARKSPUR, GREENLAND, DAWSON BUTTE AND CASTLE ROCK SOUTH USGS QUAD MAPS

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

G:\Perry Park WSD\2021-068\625\Figure 6.dwg, 8.5x11, 3/19/2024 5:03:23 PM, slw, DWG To PDF.pc3, 1:1

SECTION IV

DRAINAGE DESIGN CRITERIA

A. REGULATIONS

A floodplain evaluation of Bear Creek was performed using the U.S. Army Corps of Engineers HEC-RAS River Analysis System, version 6.1.0. (HEC-RAS). This is the most commonly used tool for open channel hydraulic modeling and is a recognized methodology by the Mile High Flood District (MHFD) and Douglas County. Precipitation data was added to the HEC-RAS model by using the rational method. This is also a recognized method of calculating stormwater runoff.

Douglas County requires a minimum of 2-ft of freeboard between the 100-year base flood elevation and the lowest finished floor elevation of all structures. Where possible the required freeboard should be contained within the floodplain tract and/or easement. No deviation in criteria is requested from the Douglas County Storm Drainage Design and Technical Criteria Manual, the Urban Storm Drainage Criteria Manual (USDCM), or the Water Quality Control Division (WQCD) wastewater design criteria.

B. DRAINAGE STUDIES, OUTFALL SYSTEM PLANS, SITE CONSTRAINTS

There are no previous drainage studies that influence the drainage design of the Waucondah WWTF.

C. HYDROLOGY

The hydrologic methodology that was utilized in evaluating stormwater runoff was the rational method. The basin's stormwater runoff was evaluated for a 100-year storm event for the purpose of the floodplain model. This evaluation was done in accordance with the current Douglas County Storm Drainage Design and Technical Criteria Manual. In order to evaluate and establish the impact of stormwater for a 100-year storm event, total precipitation depths for this storm duration was determined for the overall area. The intensity of a 100-year storm event was determined to be 4 inches per hour.

A runoff coefficient was established for the sub-basin that drains to Bear Creek upstream of the WWTF. This component of the hydrologic model has been developed utilizing the existing land uses and the land surface conditions. The sub-basin was assigned a conservative runoff coefficient of 0.2.

Since all the basins are less than 160 acres, the rational method is used to calculate runoff from all the on-site basins. The rational formula is as follows:

Q=CIA

Where,
Q = Runoff in cubic feet/sec
C = Composite Runoff Coefficient for 100-year storm
I = Intensity of rainfall at calculated time of concentration
A = Area of basin in acres

See the peak runoff calculations for the existing and proposed condition in Appendices C and D.

Detention storage was not reviewed as the disturbed area will be less than 1.0 acre and will be treated by downslope perimeter BMPS per Section 3.10 of the Douglas County Grading, Erosion, and Sediment Control Manual.

Please only describe permanent detention and water quality facilities and control measures in this report.

Temporary measures should be discussed in the GESC Report.

D. HYDRAULICS

The basic approach using the HEC-RAS system was to create a model that gives a more detailed profile of the Bear Creek 100-year floodplain in respect to the WWTF property. The WWTF site and Bear Creek were inspected on July 11, 2023 in preparation of the HEC-RAS model. During that site visit it was discovered that there is a bridge crossing where Country Club Drive crosses over Bear Creek. Additionally, there is an 48-inch CMP culvert located approximately 145 feet downstream from the bridge where Bear Court crosses Bear Creek.

This "hydraulics" section is meant to discuss conveyance of runoff from the site following the hydrology.

Please move this discussion of the floodplain mapping to the section titled Floodplain in Section II of this report.

Alternatively, and preferably, make the floodplain delineation its own stand-alone memo report with related figures (Wacondah dam documents, HEC-RAS cross-sections, plan views, etc.) and simply refer to that appendix as needed within this report.

Since the section of Bear Creek near the WWTF has not been studied using detailed methods, there are no existing conditions in which the HEC-RAS model could be calibrated to. Instead, the model was set up using a digital elevation model from the United States Geological Survey (USGS), along with some on site survey and dimensions as inputs into the HEC-RAS model. A base flow of 10 cubic feet per second (CFS) in Bear Creek was used. Data from the Waucondah Reservoir enlargement documents were utilized to determine the maximum probable spillway discharge from the Waucondah Reservoir. In the 1970's the Waucondah Reservoir was enlarged and a new spillway into Bear Creek was constructed. The Waucondah Reservoir Enlargement construction drawings (C-1273) dated September 25, 1969 were provided in Appendix A. See sheet number 2 in Appendix A of the construction drawings, it's stated that the maximum probable spillway discharge is 1,520 CFS. Finally, runoff from a delineated sub-basin was calculated using the rational method, as described above, which contributes an additional 50 CFS. The total flow from the Waucondah Reservoir and the delineated sub-basin was interpolated into a 1 hour Hydrograph, with a maximum flow at 20 minutes.

Bear Creek was analyzed from the Waucondah Reservoir to about 300 feet downstream of the existing WWTF. The Bear Creek channel bank was estimated using Google Earth Pro and pictures from the site visit in July. The HEC-RAS model was set up with cross sections placed approximately every 100 feet. Cross sections were also added upstream and downstream at the bridge (Sta. 8+00 and Sta. 7+50) and the culvert (Sta. 6+56.61 and Sta. 6+09.03). The following Figure 7 shows the cross-sections created and utilized in the HEC-RAS model. A proposed HEC-RAS model was not created since it was determined that the 100-year floodplain boundary did not encroach on the WWTF site.

E. WATER QUALITY ENHANCEMENT

Please only describe permanent detention and water quality facilities and control measures in this report. Temporary measures should be discussed in the GESC Report.

Best Management Practices (BMPs) will be utilized throughout the project to minimize the impact to Bear Creek. During the construction process, silt fences will be utilized around the border of the project area. As the runoff from the disturbed area will be less than 1.0 acres, sediment control logs will be utilized near the downstream perimeter between the proposed improvements and the creek. Additionally, existing vegetation will also act a buffer between the project site and Bear Creek. After construction has been completed, the site will be re-seeded with a native grass seed and mulched.

G:\Perry Park WSD\2021-068\625\Figure 7.dwg, 8.5x11, 3/19/2024 5:00:04 PM, slw, DWG To PDF.pc3

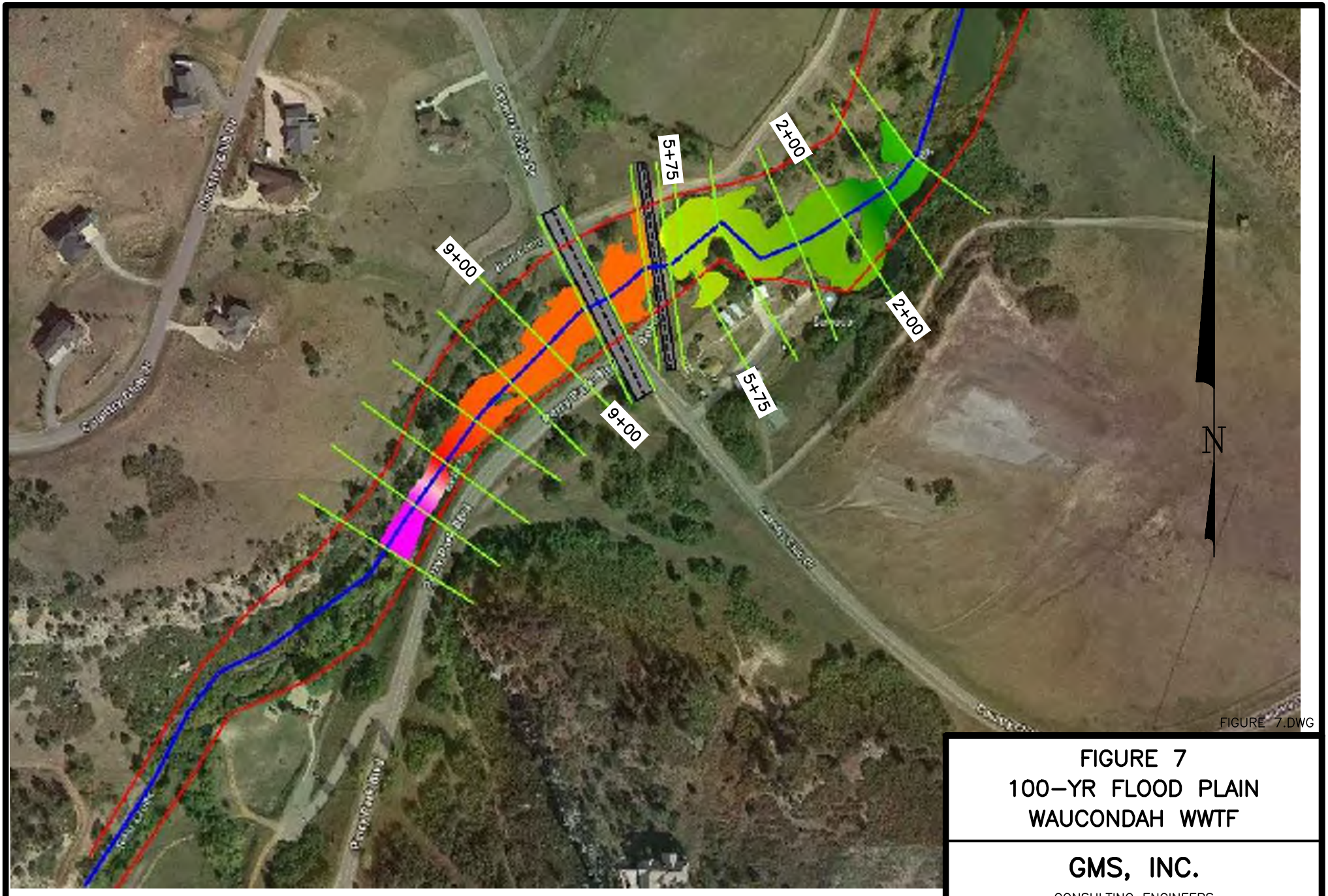


FIGURE 7
100–YR FLOOD PLAIN
WAUCONDAH WWTF

SCALE: NTS

SOURCE: HEC-RAS

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

611 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: LE2024-010

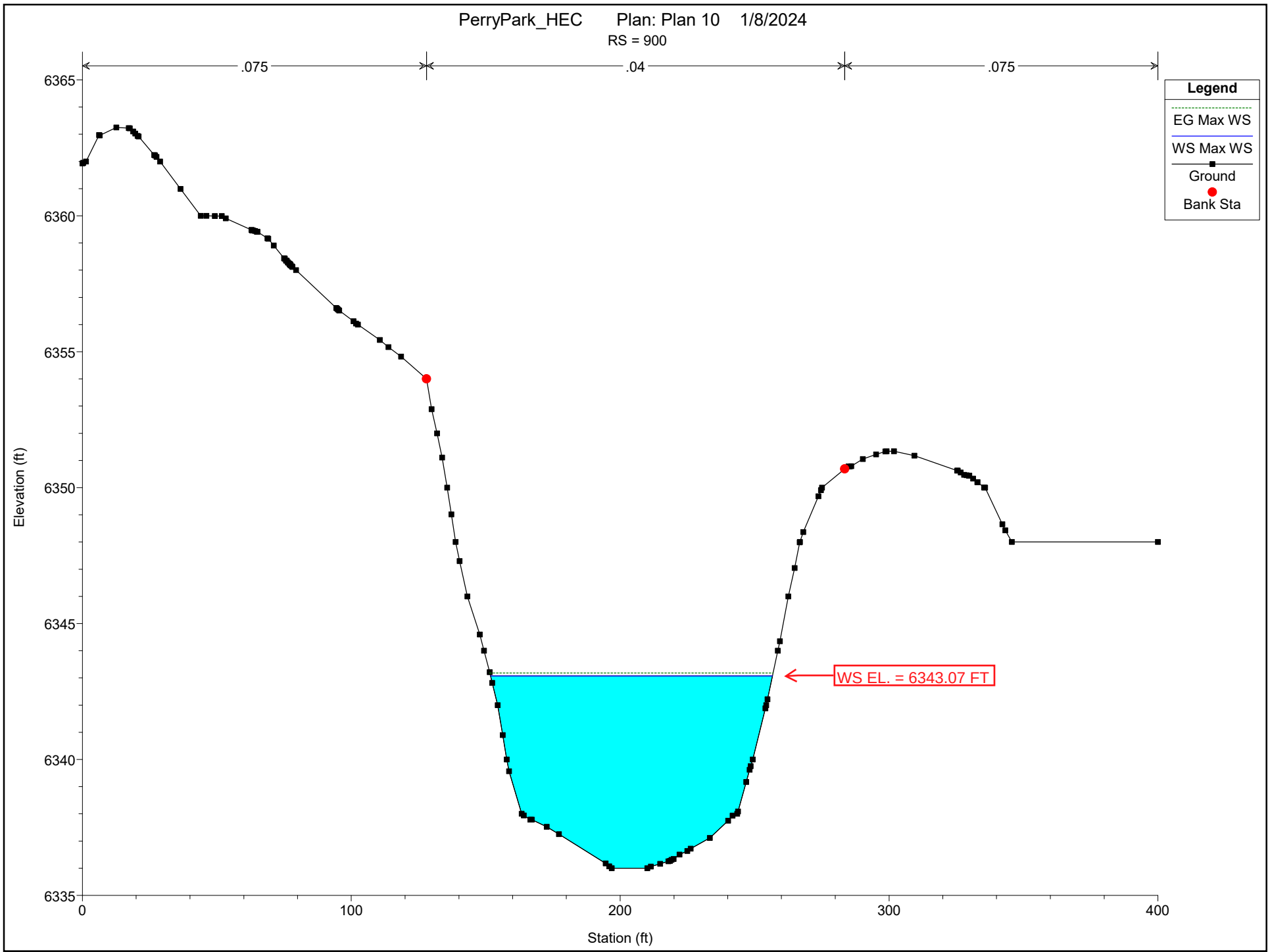


FIGURE 7-1

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: LE2024-010

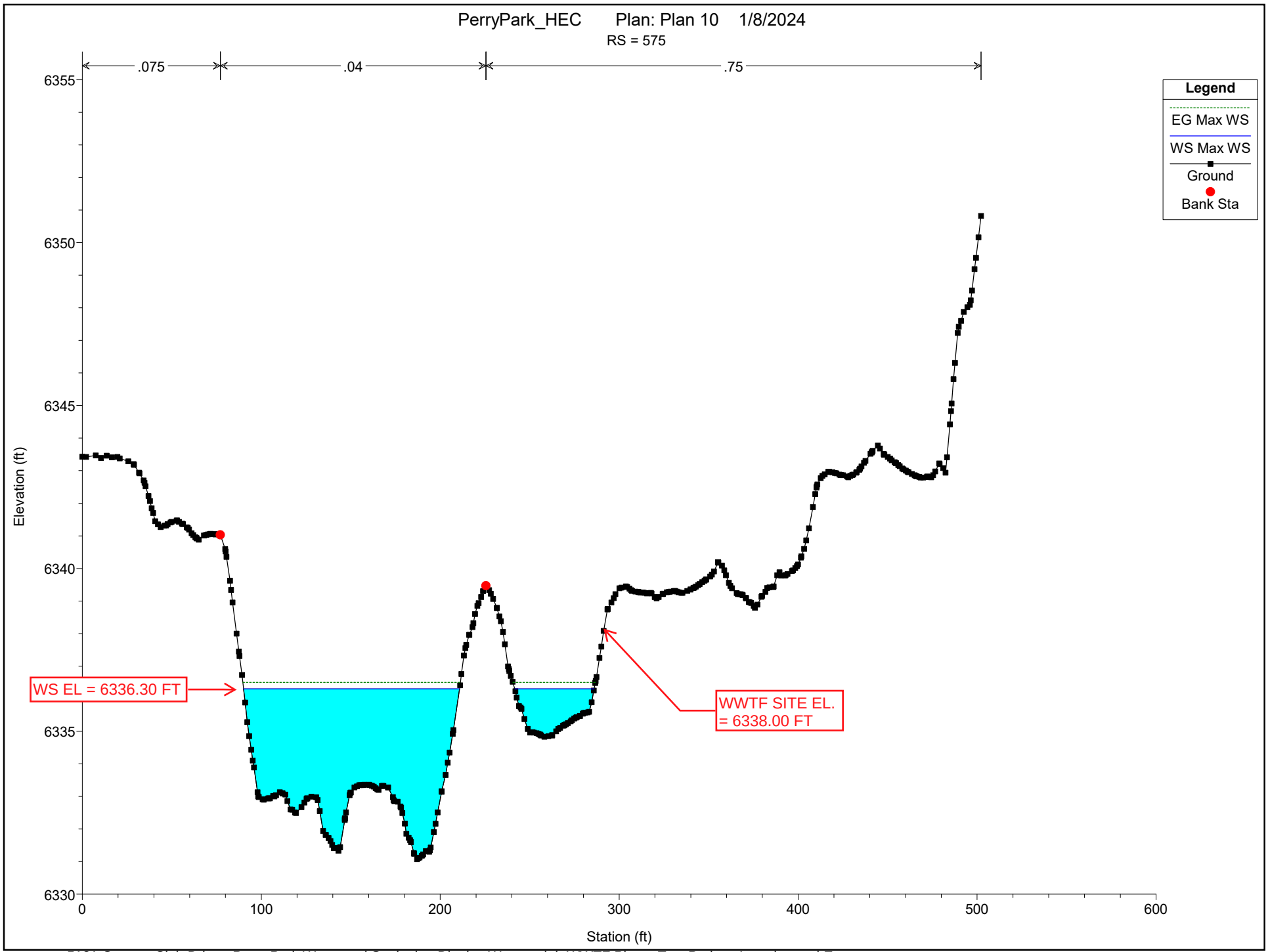


FIGURE 7.2

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: LE2024-010
Planning Commission Staff Report - Page 77 of 249

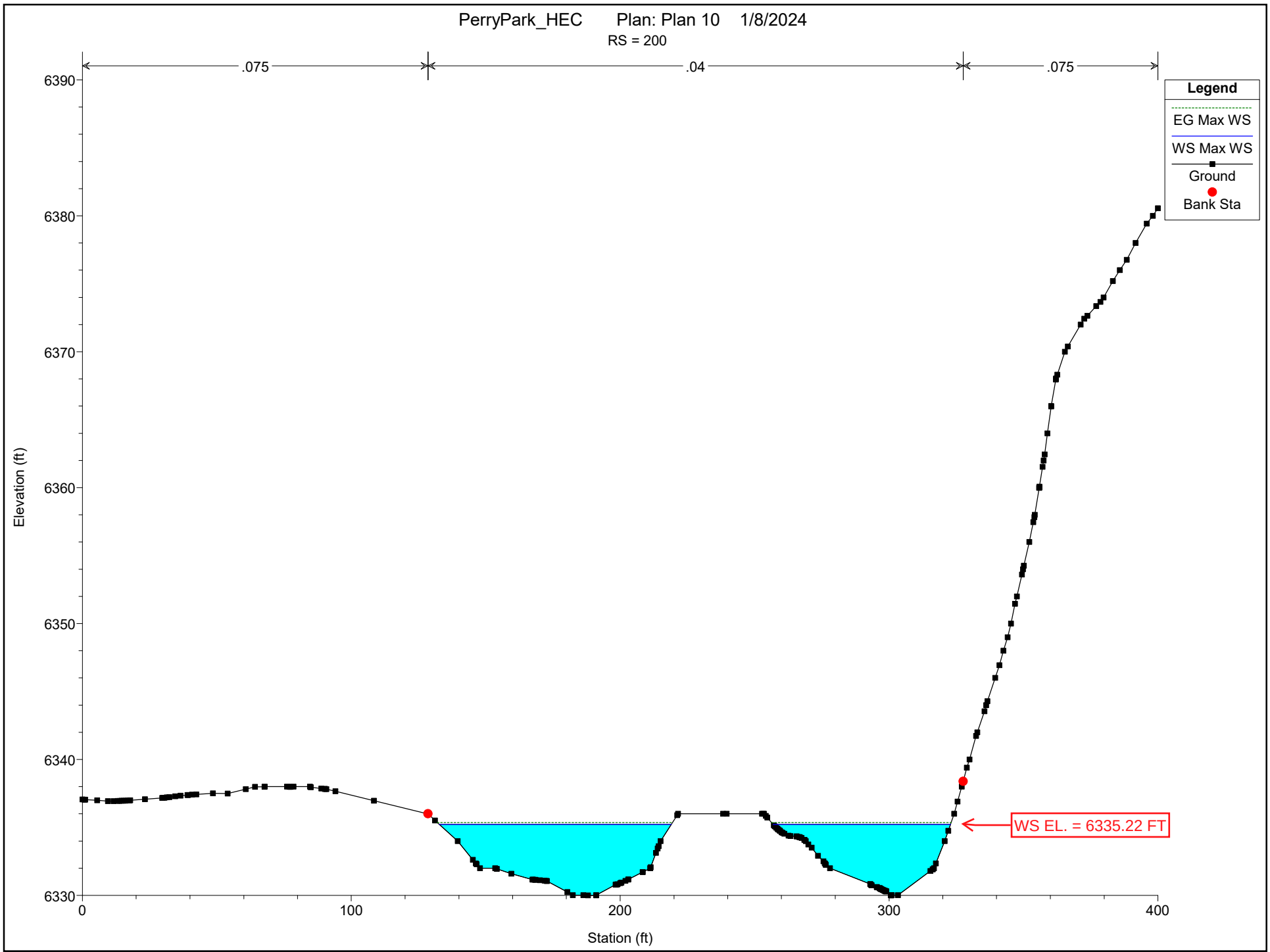


FIGURE 7-3

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent

The project will need to add permanent detention and water quality facilities to bring the site up to current County criteria.

Please review Chapters 13 and 14 of the Douglas County Drainage Manual for detention and water quality requirements: https://www.douglas.co.us/water/stormwater/storm-drainage-design-and-technical-criteria-manual/

See following sheet for one potential solution.

SECTION V

STORMWATER MANAGEMENT FACILITY DESIGN

A. STORMWATER CONVEYANCE FACILITIES

Runoff on the Waucondah WWTF site currently sheet flows in an west to east direction towards Bear Creek. There are no stormwater structures located on the WWTF site. Bear Creek has a culvert where Bear Court crosses over the Creek. When the construction of the new WWTF structures is completed, the ground will be restored and graded to allow the stormwater to continue to sheet flow from the east side of the property towards bear Creek on the west side. No new stormwater structures will be added to the site as a result of the WWTF improvements.

B. STORMWATER STORAGE FACILI

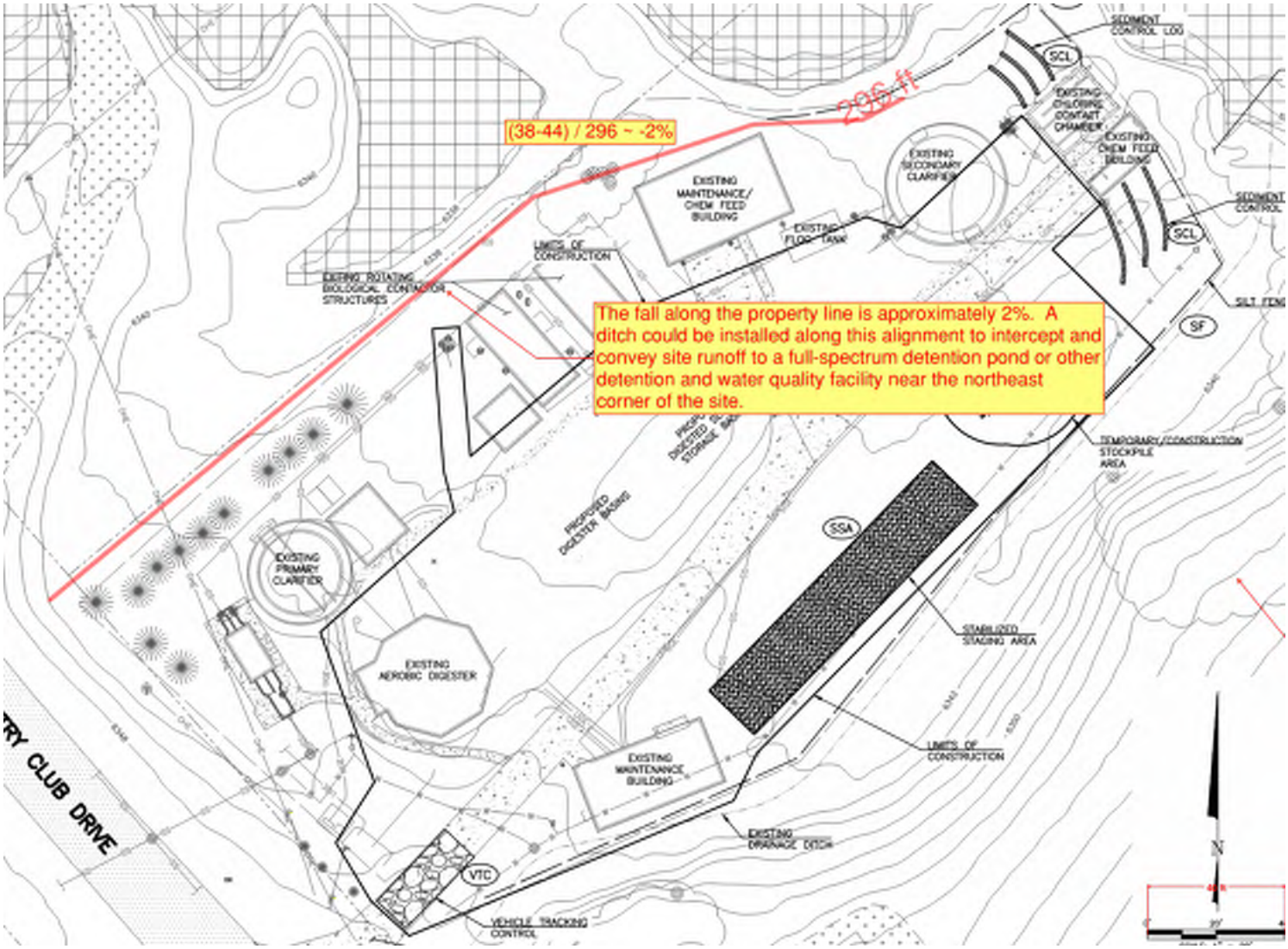
Per Douglas County criteria, detention is required for all development. Within the Chatfield Basin, water quality treatment is required for land disturbance of more than 1 acre which includes all buildings, roads, grading, etc. on the entire site.

The limit of construction area will be less than 1.0 acres and therefore no new stormwater storage facilities will be added to the existing WWTF site. Runoff from the disturbed areas will be treated by down slope perimeter BMPs.

This section should address permanent water quality features, not BMPs for water quality during construction. Please revise accordingly.

C. WATER QUALITY ENHANCEMENT BEST MANAGEMENT PRACTICES

Stormwater runoff on the site will sheet flow from the east side of the WWTF site towards Bear Creek on the west side of the site. The estimated disturbance area for the proposed improvements at the Waucondah WWTF site is approximately 0.63 acres. Runoff from the construction site will be treated using downslope perimeter BMPs. BMPs will be installed in 3 phases based on the construction progress. The phases consist of initial, interim, and final. In the initial phase, Sediment Control Log (SCL) and Silt Fences (SF) will be installed along the perimeter of the construction site. Additionally, Vehicle Tracking Control (VTC) will be placed at all entrances and/or exits to the construction site and a Stabilized Staging Area (SSA) will be utilized to reduce the likelihood that vehicles most frequently visiting the site will come into contact with mud.


(38-44) / 296 ~ -2%
296 ft
The fall along the property line is approximately 2%. A ditch could be installed along this alignment to intercept and convey site runoff to a full-spectrum detention pond or other detention and water quality facility near the northeast corner of the site.
EXISTING MAINTENANCE/ CHEM FEED BUILDING
EXISTING SECONDARY CLARIFIER
EXISTING CHLORINE CONTACT CHAMBER
EXISTING CHEM FEED BUILDING
EXISTING FLOW TANK
LIMITS OF CONSTRUCTION
EXISTING ROTATING BIOLOGICAL CONTACTOR STRUCTURES
PROPOSED DIGESTER BASINS
EXISTING PRIMARY CLARIFIER
EXISTING AEROBIC DIGESTER
EXISTING MAINTENANCE BUILDING
EXISTING DRAINAGE DITCH
VEHICLE TRACKING CONTROL
TEMPORARY CONSTRUCTION STOCKPILE AREA
STABILIZED STAGING AREA
SEDIMENT CONTROL LOG
SILT FENCE
SCL
SF
SSA
VTC
RY CLUB DRIVE
N

Please only describe permanent detention and water quality facilities and control measures in this report. Temporary measures should be discussed in the GESC Report.

The interim BMP will consist of a Concrete Washout Area (CWA) in order to isolate concrete truck washout operations. This interim BMP will be utilized in addition to the initial phase BMPs. The final phase BMPs will consist of Seeding and Mulching (SM). All disturbed areas will be restored using drill seeding with native grasses and crimping in straw mulch to provide immediate protection to the newly seeded areas. All silt fences and sediment control logs will remain in place until the final erosion control measures have sufficiently stabilized the disturbed areas. Once the final erosion control measures are stabilized, vegetation will act as a natural filter for any stormwater runoff.

Per previous comment, please move this information to a separate memo letter documenting delineation of a refined floodplain.

This section should only state no floodplain modifications are planned or described planned floodplain modifications.

D. FLOODPLAIN MODIFICATION

In a 1996 FEMA FIS, portions of Bear Creek were studied using approximate methods. According to the FIRM mapping of Bear Creek and the Perry Park community, the WWTF site is within the 100-year floodplain. Using HEC-RAS, a model of Bear Creek was developed and analyzed in order to determine the 100-year floodplain elevations.

The HEC-RAS model was created using the spillway data from the Waucondah Reservoir Enlargement plans. Once the hydrology data for the delineated sub-basin was implemented, the model was completed. The HEC-RAS model determined that the 100-year flood elevation near the WWTF site is 6336.30 and the elevation of the WWTF property is 6338.00. The original plan was to use this set up as the existing site conditions and then add in the new WWTF structures to see how they affected the 100-year floodplain, but based on the findings from the HEC-RAS model, the Bear Creek floodplain does not encroach on the WWTF property. The results of the HEC-RAS model are shown below on Table 1 and represented on Figure 8.

The way this is written, it implies the entire property is at this exact elevation. Is this the minimum elevation of the property? Please elaborate.

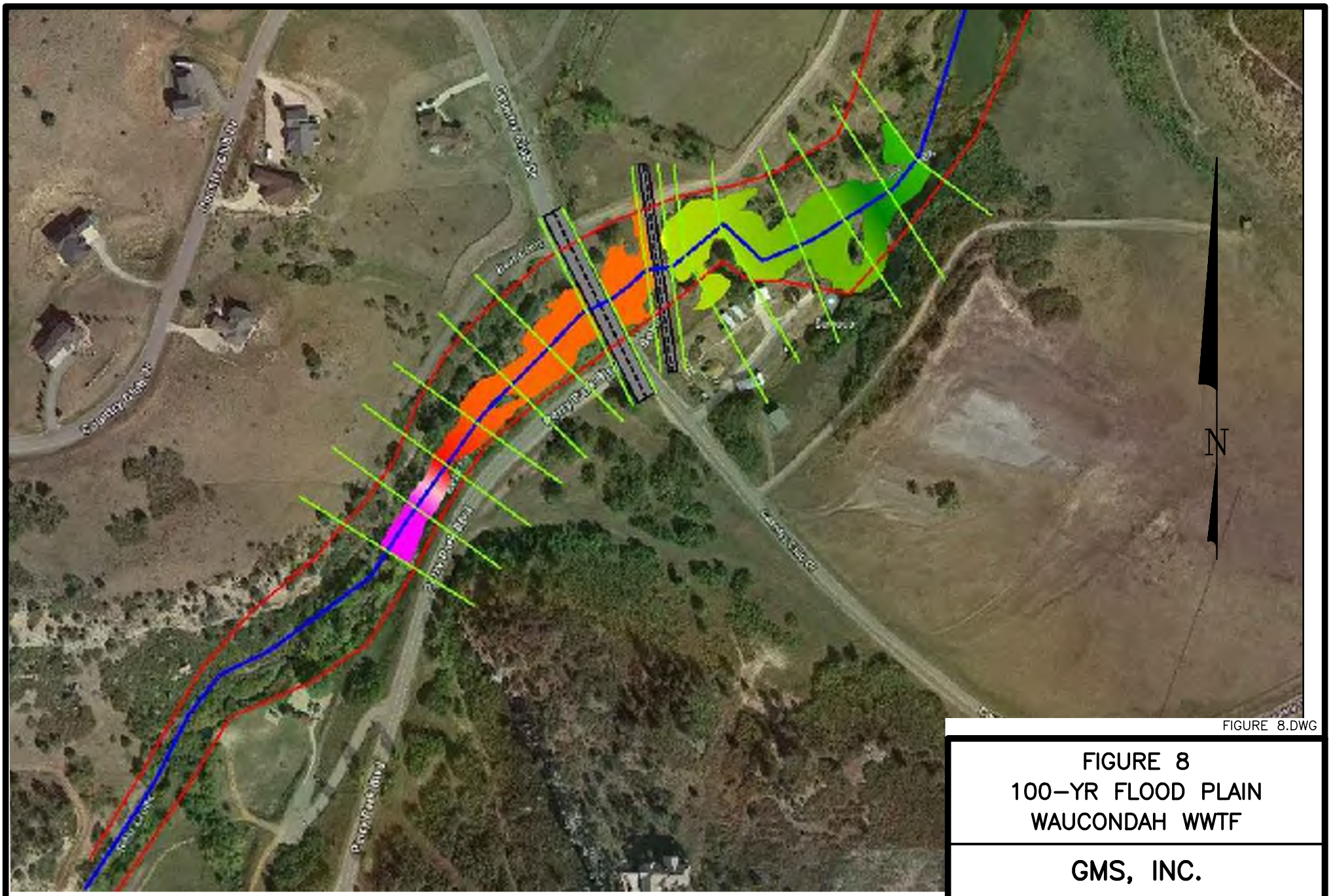


FIGURE 8.DWG

FIGURE 8
100–YR FLOOD PLAIN
WAUCONDAH WWTF

SCALE: NTS

SOURCE: HEC-RAS

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

TABLE 1

PERRY PARK WATER AND SANITATION DISTRICT

HEC-RAS MODEL RESULTS

Cross-Section Name	Cross-Section Station	Stream Bed Elevation	100-yr Flood Elevation	WWTF Site Elevation
Upstream of WWTF	9+00	6336.00	6343.07	6338.00
Center of WWTF	5+75	6332.00	6336.30	6338.00
Downstream of WWTF	2+00	6330.00	6335.22	6338.00

Since the 100-year floodplain does not encroach the WWTF property, the floodplain will not be modified by the improvements to the WWTF.

This section is meant for permitting requirements related to flood hazards and drainage, and construction e.g. Corps of Engineers permitting, Floodplain Development Permits, GESC, DC Construction Permit, etc. Please delete any information not related to required permits for flood hazards, drainage or construction.

E. ADDITIONAL PERMITTING RE

The U.S. Fish and Wildlife Service National Wetlands Inventory Mapping was reviewed to determine the types and locations of wetlands within the planning area. The mapping indicates that the only delineated wetlands identified within the vicinity of the Waucondah WWTF are associated with Bear Creek. The Bear Creek wetlands are classified as Riverine, unknown perennial and permanently flooded, and freshwater forested/shrub wetland. There are no delineated wetlands within the project planning area; therefore, a section 404 nationwide permit will not be required.

Most of the undeveloped land that surrounds the Waucondah WWTF site is forested, which may offer habitat for many species of wildlife. Using the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consulting (IPaC) database, threatened and endangered species that may inhabit the planning area were identified. There are several threatened and endangered species may be present within the planning area. These species include two mammals (Gray Wolf and Preble's Meadow Jumping Mouse), three birds (Mexican Spotted Owl, Piping Plover, and Whooping Crane), two fishes (Greenback Cutthroat Trout and Pallid Sturgeon), one insect (Monarch Butterfly), and two flowering plants (Ute Ladies'-tresses and Western Prairie Fringed Orchid). There is a final critical habitat for

the Preble's Meadow Jumping Mouse (PMJM) that is located along Bear Creek and adjacent to the WWTF site. The final critical habitat for the PMJM and its relationship to the WWTF is shown on the following figure 9. The existing fence of the WWTF was constructed so that the PMJM critical habitat would not be disturbed. All of the WWTF improvements will be contained within the existing WWTF; therefore, the PMJM critical habitat will not be disturbed by the WWTF improvements.

A review of the State and National Register of Historic Places for the Perry Park area and Douglas County was completed. There are no historic properties listed in in Perry Park, Colorado. The closest historic site is Ben Quick Ranch and Fort and the John Kinner House, both of which are located on the same property along Highway 105 in Larkspur. The project is located 1.5 miles west of these historic structures; therefore, the project site is not within the vicinity of either of these historic structures. There will be no impact to any historic places.

Based on the information, it is likely that no permits will be required by the USACE, USFWS, or SHPO for the construction of the Waucondah WWTF improvements. A Douglas County Grading, Erosion, and Sediment Control (GESC) permit will need to be obtained for this project.

The 100-yr rainfall intensity must be taken from the Drainage Manual or from NOAA Atlas 14. Please delete this reference to hydrologic information from the dam documents.

F. GENERAL

The Construction Documents from the Waucondah Reservoir enlargement project in Appendix A were used to establish maximum probable discharge from the spillway. These documents also provided the 100-year return period rainfall intensity of 4 inches per hour.

Figures 1 and 2 were provided to show the location of the project as well as its surrounding area. The soils map figures are intended to show the types of soil in and around the project site. Additionally, the Geotechnical Report for the project site is located in Appendix B.

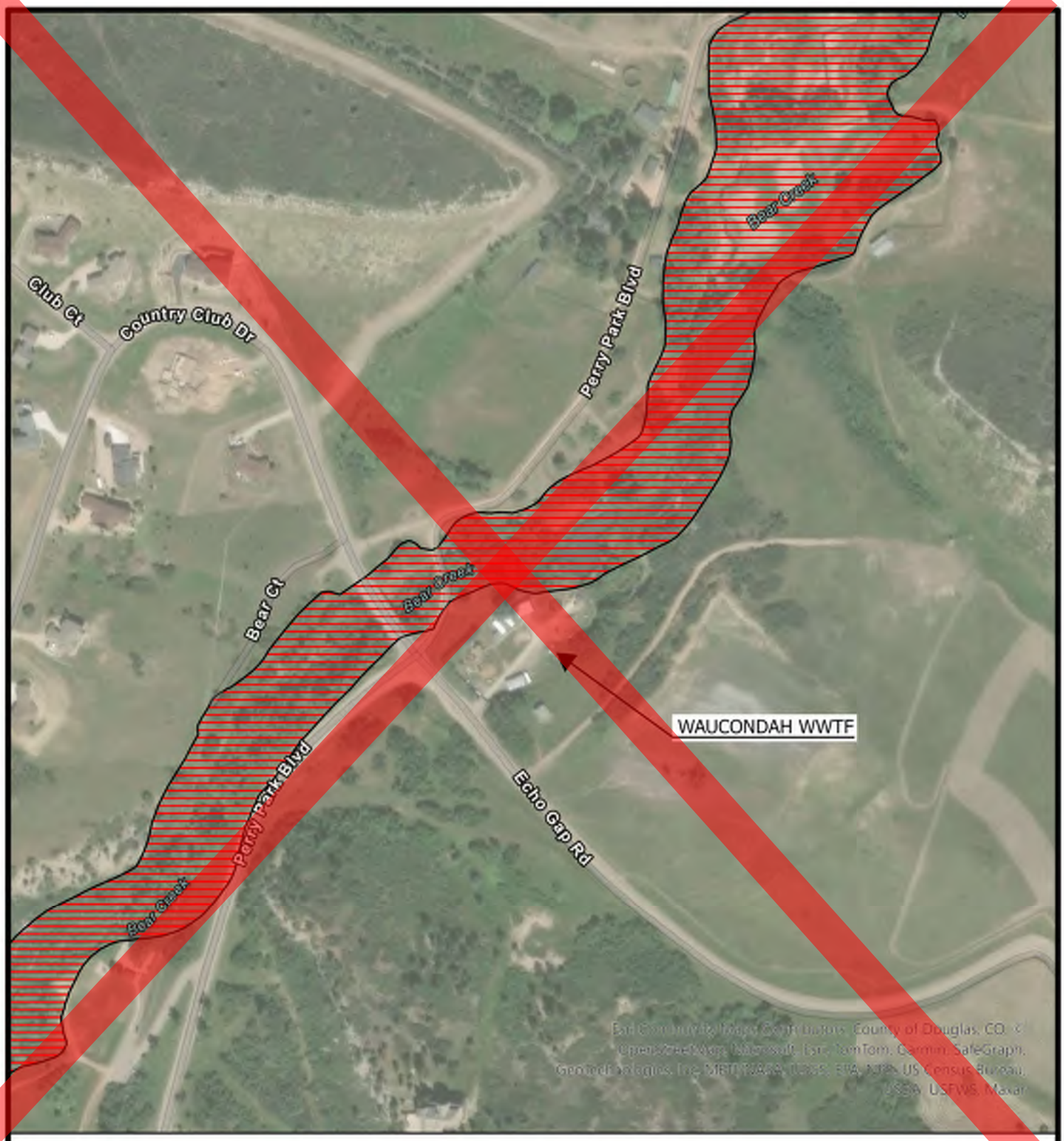
The only relevant soils are those **at** the project site.

Figures 5 and 6 show the upstream and downstream major and minor drainage basins associated with the project site.

Figure 4 illustrates the FEMA flood plain mapping. However, Figures 7 and 8 were produced with HEC-RAS to "further define" the 100-year floodplain. This effort was

completed to demonstrate that the project site is located outside of the flood plain boundary.

This Drainage Report along with the Grading, Erosion and Sediment Control (GESC) Report will be applied to help facilitate and manage the stormwater for the project site.



Path: M:\ArcGIS_LIB\Environmental\EA Maps\EA Maps.aprx

N

PMJM CRITICAL HABITAT

SCALE: 1" = 300'

FIGURE 9
PMJM CRITICAL HABITAT
PPWSD

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

SECTION VI

CONCLUSIONS

A. COMPLIANCE WITH STANDARDS

The HEC-RAS model of Bear Creek's 100-year floodplain determined that the Creek's floodplain does not reach the Waucondah WWTF site. The current WQCD design criteria for wastewater treatment works, WPC-DR-1, requires that structures and equipment are accessible, able to discharge, and protected from physical damage during the 100-year flood. Additionally, Douglas County requires a minimum of 2-ft of freeboard between the 100-year base flood elevation and the lowest finished floor elevation of all structures. The HEC-RAS model determined that the 100-year flood elevation near the WWTF site is 6336.30 and the WWTF site elevation is 6338.00. Since the 100-year floodplain does not reach the WWTF site, and the site elevation is approximately 2 feet above the 100-year floodplain, the construction of the new structures on the site will comply with Douglas County standards and WQCD design criteria.

B. VARIANCES

No variances from design criteria are requested at this time.

C. DRAINAGE CONCEPT

All on site stormwater flow paths will be restored after construction is completed. The improvements associated with this project are not anticipated to have downstream impacts or adverse impacts to any wetlands or floodplains. As the disturbed area will be less than 1.0 acre, runoff will be treated by downslope perimeter BMPs.

Please only describe permanent detention and water quality facilities and control measures in this report. Temporary measures should be discussed in the GESC Report.

APPENDIX A – STORM INTENSITY DATA

SPILLWAY DETAILS
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY

DOUGLAS COUNTY — COLORADO

DRAWN BY: M.L.W.	CK'D BY: F.M.F.	DATE: 12-69	REVISED

AMERICAN CONSULTING ENGINEERS INC.
5475 LEETSDALE DRIVE DENVER, COLORADO 80222

JOB NO. 71-17
SHEET NO. 4

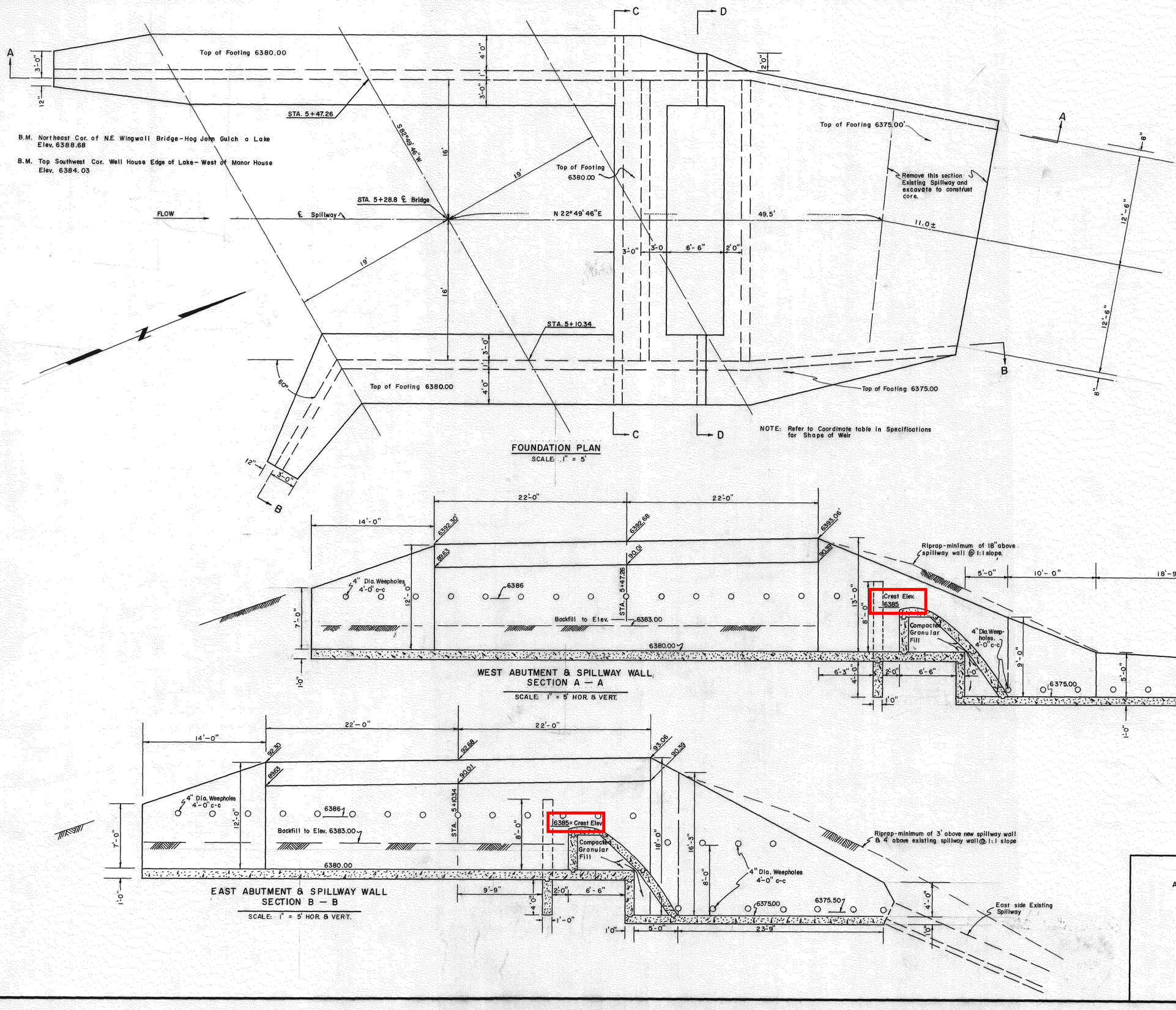
Colorado Western Development Co., a Colorado Corporation, whose post office address is P.O. Box 38 Larkspur, Colorado, does hereby accept and approve these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT dam.

Colorado Western Development Co.
By Lee E. Stubblefield
Lee E. Stubblefield - President

I hereby certify that these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT were prepared for the Owners.

Cecil D. Broyles
Cecil D. Broyles - P.E. & L.S. No. 2690

IRRIGATION DIVISION NO. 1 WATER DISTRICT NO. 8



Approved on the 2nd day of Feb. 1970
State Engineer
By: Deputy

C-1273

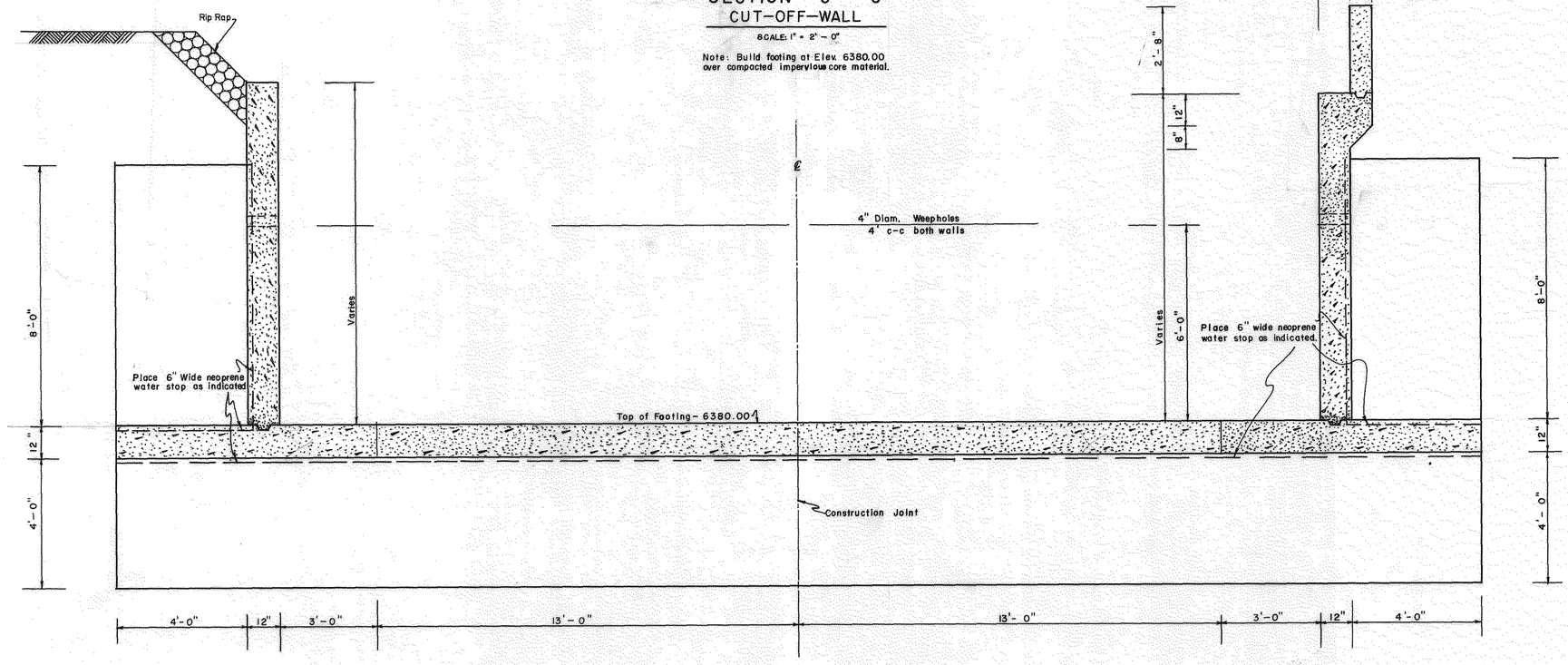
B.M Northeast Cor. of N.E. Wing wall Bridge— Hog John Gulch —@ Lake Elev. 6388.68

B.M. Top Southwest Cor. -well house Edge of Lake—West of Manor House Elev. 6384.03

SECTION C — C
CUT-OFF-WALL

SCALE: 1" = 2'-0"

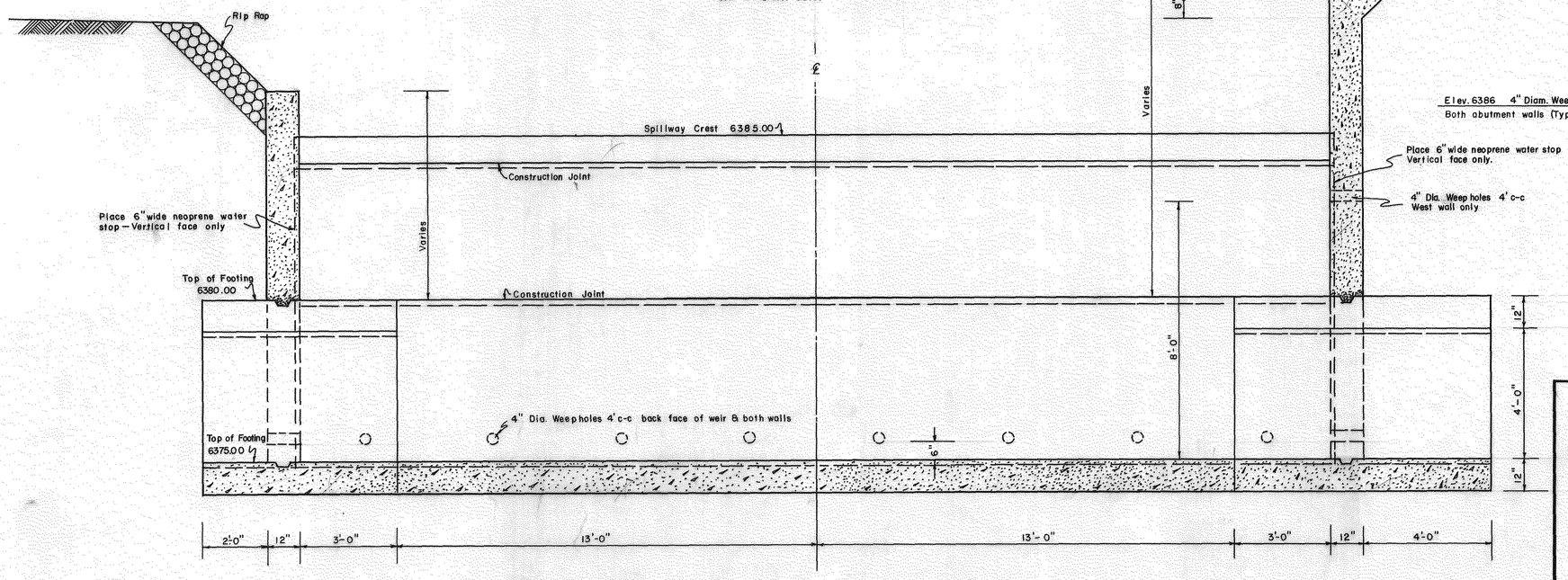
Note: Build footing at Elev. 6380.00 over compacted impervious core material.



SECTION D — D
STEP FOOTING

SCALE: 1" = 2'-0"

Note: Build footing at Elev. 6375.00 over 6" Gravel base.



IRRIGATION DIVISION NO. 1 WATER DISTRICT NO. 8

SPILLWAY SECTIONS
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY

DOUGLAS COUNTY COLORADO

DRAWN BY: M.L.W.	CK'D BY: F.M.F.	DATE: 12-69	REVISED

AMERICAN CONSULTING ENGINEERS INC.

5475 LEETSDALE DRIVE DENVER, COLORADO 80222

JOB NO 71—17

SHEET NO. 5

Colorado Western Development Co., a Colorado Corporation, whose post office address is P.O. Box 38 Larkspur, Colorado, does hereby accept and approve these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT dam.

Colorado Western Development Co.
By: Lee E. Stubblefield
Lee E. Stubblefield — President

I hereby certify that these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT were prepared for the Owners.

Cecil D. Broyles
Cecil D. Broyles P.E. & L.S. No. 2690

Approved on the 2nd day of January 1970

State Engineer

By: _____
Deputy

C-1273

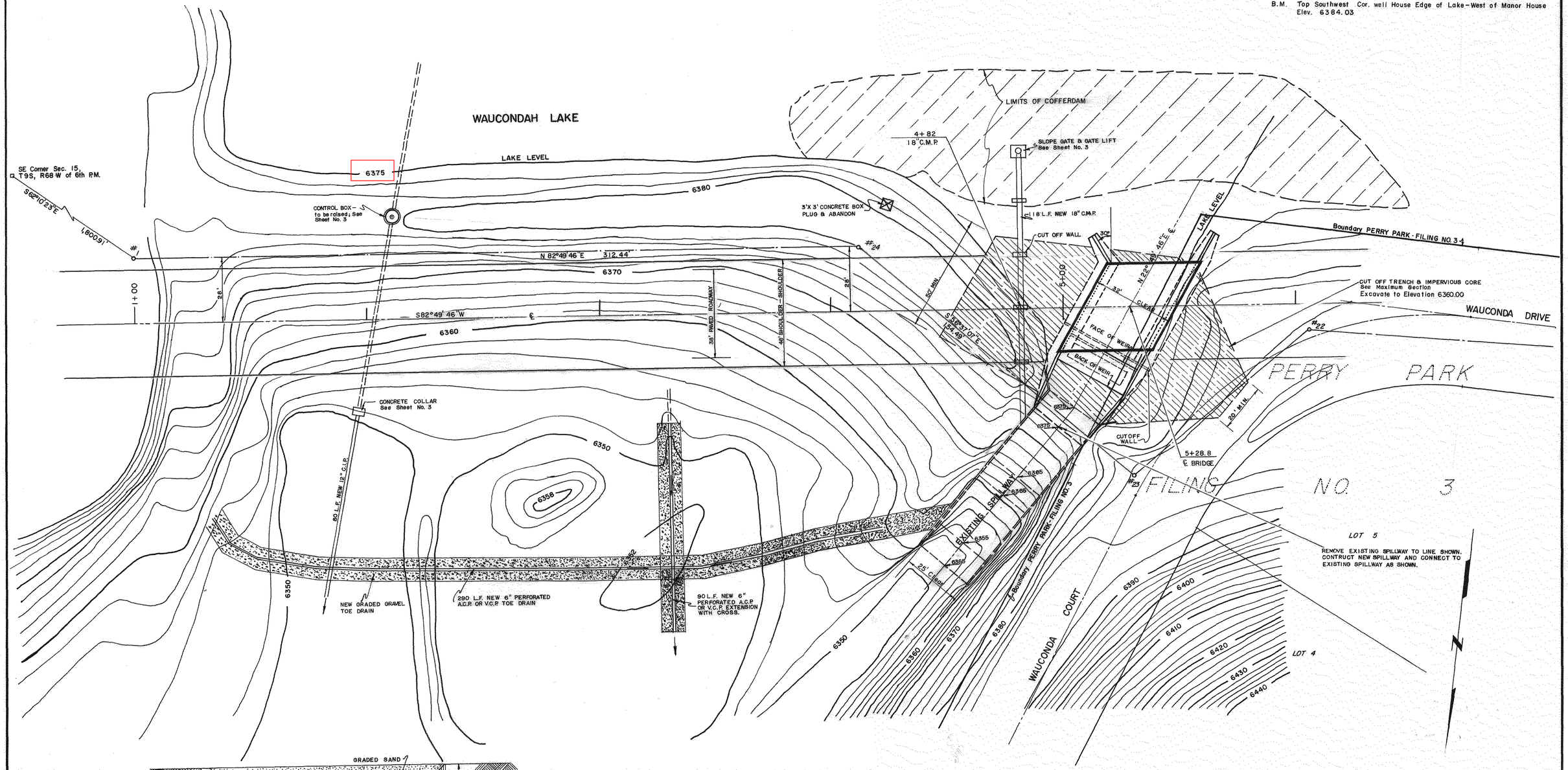
PLAN — DAM & SPILLWAY

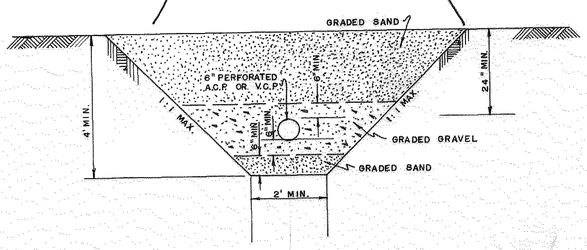
SCALE: 1" = 20'

NOTE:
Lower Lake level to Elevation 6365.00' over a minimum of 4 weeks period of time; construct Cofferdam to crest elevation of 6375.00. Excavate area ahead of existing spillway to Elevation shown in Maximum Section and in Plan below. Extend Core into impervious material in existing dam and into rock at abutment on West side. Remove to a minimum of 4 Ft. of penetration into rock or existing core of dam. Replace with impervious material maximum side slope 1:1.

B.M. Northeast Cor. of N.E. Wing wall Bridge — Hog John Gulch @ Lake Elev. 6388.68

B.M. Top Southwest Cor. well House Edge of Lake — West of Manor House Elev. 6384.03





TYPICAL SECTION
EXTENSION & TOE DRAIN

IRRIGATION DIVISION NO. 1 WATER DISTRICT NO. 8

PLAN — DAM & SPILLWAY
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY
DOUGLAS COUNTY COLORADO

DRAWN BY: M. L.W.	CK'D BY: F.M.F.	DATE: 10-30-69	REVISED:
AMERICAN CONSULTING ENGINEERS INC.			12-16-69
			JOB NO. 71-17
5475 LEETSDALE DRIVE	DENVER, COLORADO 80222		SHEET NO. 1

Colorado Western Development Co. a Colorado Corporation, Owner, whose post office address is P.O. Box 38 Larkspur, Colorado, does hereby accept and approve these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT dam.

Colorado Western Development Co.
by Lee E. Stubblefield
Lee E. Stubblefield — President

I hereby certify that these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT were prepared for the Owners thereof.

Cecil D. Broyles
Cecil D. Broyles P.E. & L.S. No. 2890

Approved on the 2nd day of March, 1970

E. J. Hoover
State Engineer

By: _____
Deputy

C-1273

103773

C-1273 1/2/70

B.M. Top Southwest Cor. well house
Edge of Lake – West of Manor House
Elev. 6384.03

B.M. Northeast Cor. of N.E. Wing wall Bridge – Hog John Gulch @ lake
Elev. 6388.68

6410 6400 6390 6380 6370 6360 6350

℄ 40' Roadway (80 R.O.W.)

6388.00' 86.60' 94.80' 93.64' 88.04' 94.55' 94.55' 88.04' 92.68'

Vert. P.I. 6394.60' Vert. P.I. 6392.68' Vert. P.I. 6394.68' Vert. P.I. 6392.68'

50' V.C. 50' V.C. 50' V.C.

3.64 % + 1.33% — 1.33 %

BORROW AREA LEVEL 50'V.C.

PROPOSED CREST

STA. 5+29 ℄ Bridge

LEVEL

PROPOSED SPILLWAY APPROACH CHANNEL

DOWNSTREAM FACE OF DAM

Scale: 1"=20' Horz. 1" = 10' Vert.

T.H. # 2 EXISTING CREST T.H. # 1 T.H. #1A H.W.L. ELEV. 6385.00'

Existing Spillway

18" Outlet Conduit

Existing 10" C.I.P.

New 6" perforated Drain See Sheet 1

New 6" perforated Drain See Sheet 1

EXISTING GRADE (Toe of Slope)

FILL
SAND – SILTY TO CLAYEY, DRY TO WET, MOSTLY VERY SOFT.

SAND
WELL GRADED, MEDIUM DENSE TO DENSE, CLEAN TO SILTY AND CLAYEY, WET

CLAY
VERY SANDY TO SAND, CLAYEY, EXTREMELY STIFF, WET, GREY

CLAYSTONE BEDROCK
MEDIUM HARD, BLUE

1+00 2+00 3+00 4+00 5+00 6+00

GATE LIFT

"H" Dimension
Eye Bolt
Gate Lift Armco HB 24
Oil Filler
Anchor Bolts
Stem & Sleeve 46'
Vent Line
ELEV. 6390.00'
2'(Min.)

SECTION

"H" Dimension
Stem & Sleeve 46'
Oil Seal
Slope Gate 18" Armco 50-100
Anchor Bolts
Elev. 6373.0'
Thimble
1 1/2" Galv. Pipe Vent Line
1:1 (Min.)
Shop Fabricate to this joint
4 Bar
(Min)
42" MIN.

SLOPE GATE DETAILS

4" 4" 4" 4"
4 Bar – 16" cc Both ways
2' 2' 2'

PLAN

NOTE
BED VENT LINE & GATE LIFT STEM WITH RIPRAP. MARK GAGE ROD WITH METAL DIE IN FEET AND TENTHS OF FEET ON VENT LINE. PAINT NUMBERS ON VENT LINE SO THEY ARE CLEARLY VISIBLE. SEE SPECIFICATIONS

6395 6385 6375 6365 6355

OPERATING WHEEL
CONTROL BOX
H.W.L. 6385.00'
GATE LIFT VENT LINE
18" RIPRAP
SLOPE GATE L.W.L. 6373.00 6375 6370
PLACE CUTOFF WALL EVERY 25' ALONG 18"C.M.P. AS SHOWN
EXISTING C.I. DRAIN
RAISE CONTROL BOX AS SHOWN – SEE SPECIFICATIONS
BACK FACE EXISTING DAM
STA. 4+50 to STA. 5+75 Excavate to 6360.00 for cut-off trench. See Sheet 1.
IMPERVIOUS CORE
COHESIONLESS MATERIAL (FREE DRAINING)
SEE PLAN & SPILLWAY SECTION
NEW 18"Ø C.M.P. @ 2 %
TOP OF GRAVEL @ ELEV. 6365
CONC. COLLAR
NEW 12"Ø C.I. PIPE
1.5' GRAVEL BLANKET DRAIN
6" PEREORATED CLAY OR ASBESTOS-CEMENT DRAIN EXTEND EXISTING DRAIN TO TOE OF SLOPE
TOE DRAIN WITH 6" PERFORATED CLAY OR ASBESTOS-CEMENT PIPE- SEE SHEET 2
TOE DRAIN
SLOPE TO DAYLIGHT
46' 4' 19' 19' 4'
0.02 ft./ft.
CREST 6395.06'
2 1 1:1 Max.
7.5' 14.5' 30' 23'
10'

MAXIMUM CROSS SECTION

SCALE: 1"= 10'-0" HOR. & VERT

DISCHARGE CURVE

GUAGE ROD DEPTH IN FEET: 0 2 4 6 8 10 12
CAPACITY IN C.F.S.: 4 8 12 16 20 24 28 32

18" DIAMETER OUTLET CONDUIT

EXCAVATE TO SPRING LINE OF C.M.P. AS SHOWN, COMPACT OVER C.M.P. AFTER CUTOFF WALLS HAVE BEEN POURED. SEE SPECIFICATIONS.

1:1 MAX. 1:1 MAX.
NEW 18" C.M.P.
8-#8 @ 5'-0" BOTH WAYS EACH CUT OFF WALL
LIMITS OF CUT OFF WALL
6" 12" 2' 6" 12" 6"
5'-6"

EXCAVATION FOR 18" C.M.P. IN EXISTING DAM SECTION

Scale: 1" = 2'-0"

IRRIGATION DIVISION NO. 1 WATER DISTRICT NO. 8

PROFILE & MAXIMUM SECTION
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY
DOUGLAS COUNTY COLORADO

DRAWN BY: M. L.W.	CK'D BY: C. D. B.	DATE '9-25-69	REVISED 1-2-70 12-16-69
AMERICAN CONSULTING ENGINEERS INC. 388-5729 5475 LEETSDALE DR. DENVER, COLORADO 80222			JOB NO. 71-17 SHEET NO. 3

Colorado Western Development Co., a Colorado Corporation, Owner, whose post office address is P.O. Box 38, Larkspur, Colorado, does hereby accept and approve these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT dam.

Colorado Western Development Co.
by: Lee E. Stubblefield
Lee E. Stubblefield – Pres.

I hereby certify that these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT were prepared by me for the Owners thereof.

Cecil D. Broyles P.E. & L.S. No. 2690

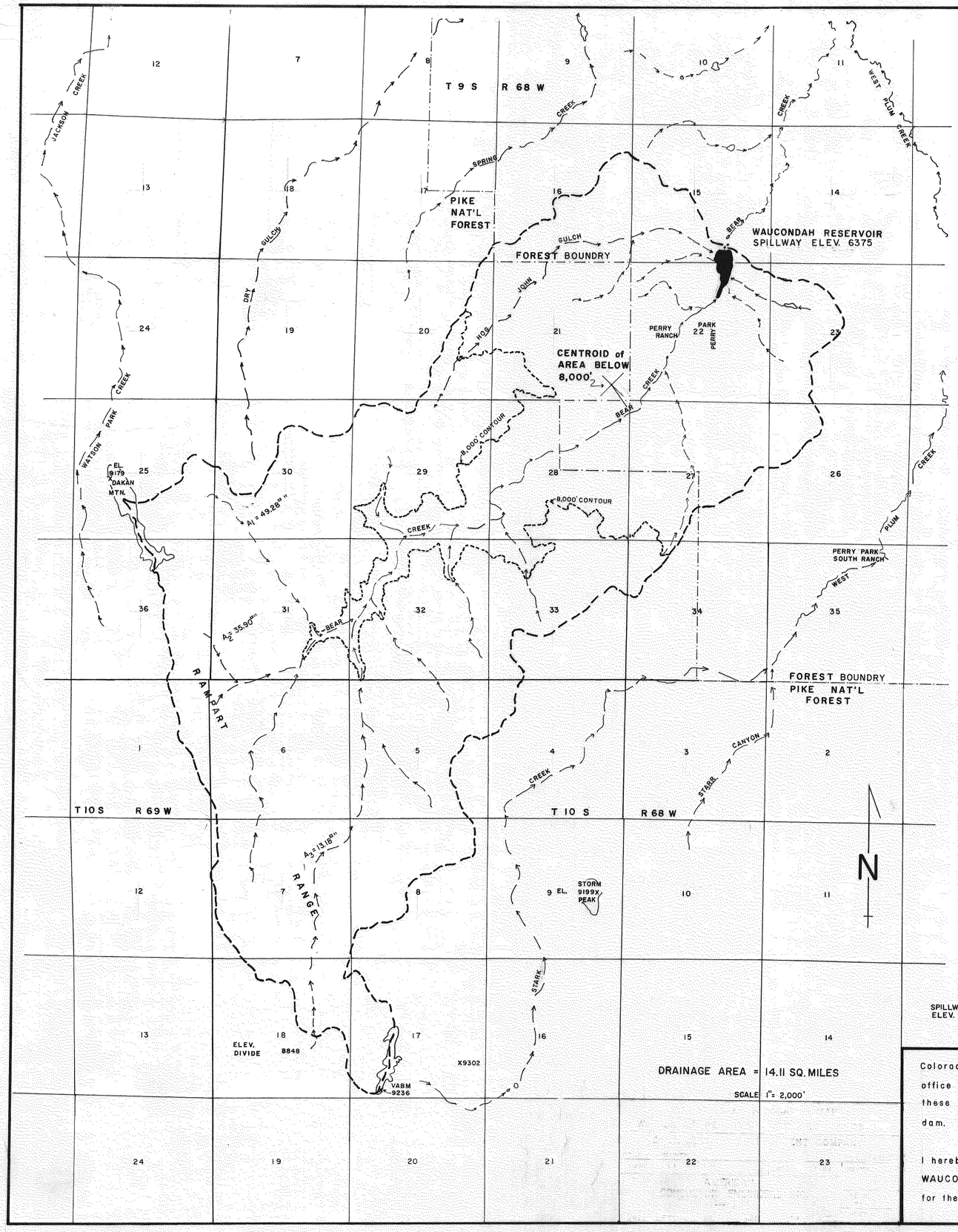
CECIL D. BROYLES 2690 REGISTERED PROFESSIONAL ENGINEER & LAND SURVEYOR COLORADO

Approved on the 2nd day of Jan. 1970.

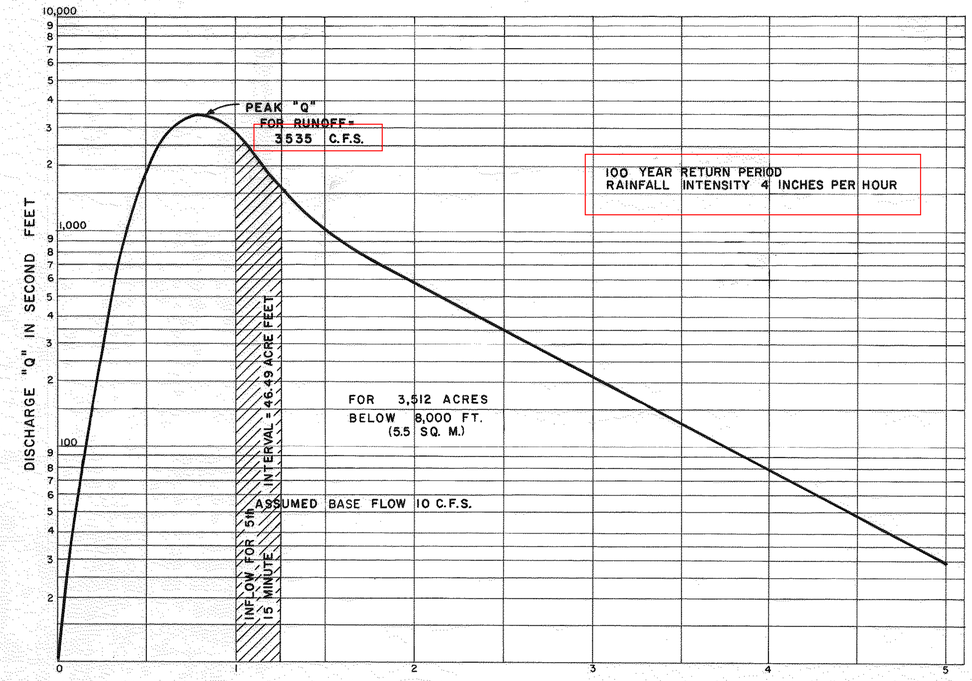
State Engineer

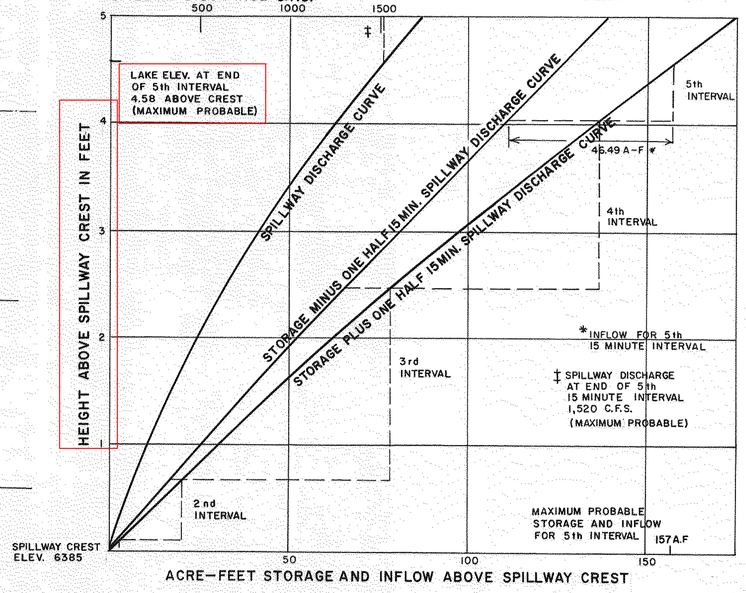
By: Deputy

C-1273



UNITGRAPH OR FLOOD HYDROGRAPH
FOR WAUCONDAH RESERVOIR ON BEAR CREEK DRAINAGE BASIN





IRRIGATION DIVISION NO. 1 WATER DISTRICT NO. 8

DRAINAGE AREA & LOCATION MAP
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY
DOUGLAS COUNTY ○ COLORADO

DRAWN BY: J.J.	CK'D BY: C. D. B.	DATE: 9-25-69	REVISED

AMERICAN CONSULTING ENGINEERS INC.
5475 LEETSDALE DR. DENVER, COLORADO 80222

JOB NO. 71-17
SHEET NO. 2

Colorado Western Development Co., a Colorado Corporation, Owner, whose post office address is P.O. Box 38 Larkspur, Colorado, does hereby accept and approve these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT dam.

Colorado Western Development Co.
by Lee E. Stubblefield
Lee E. Stubblefield - Pres.

I hereby certify that these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT were prepared by me for the Owners thereof.

Cecil D. Broyles P.E. & L.S. No. 2690

Approved on the 2nd day of January, 1970

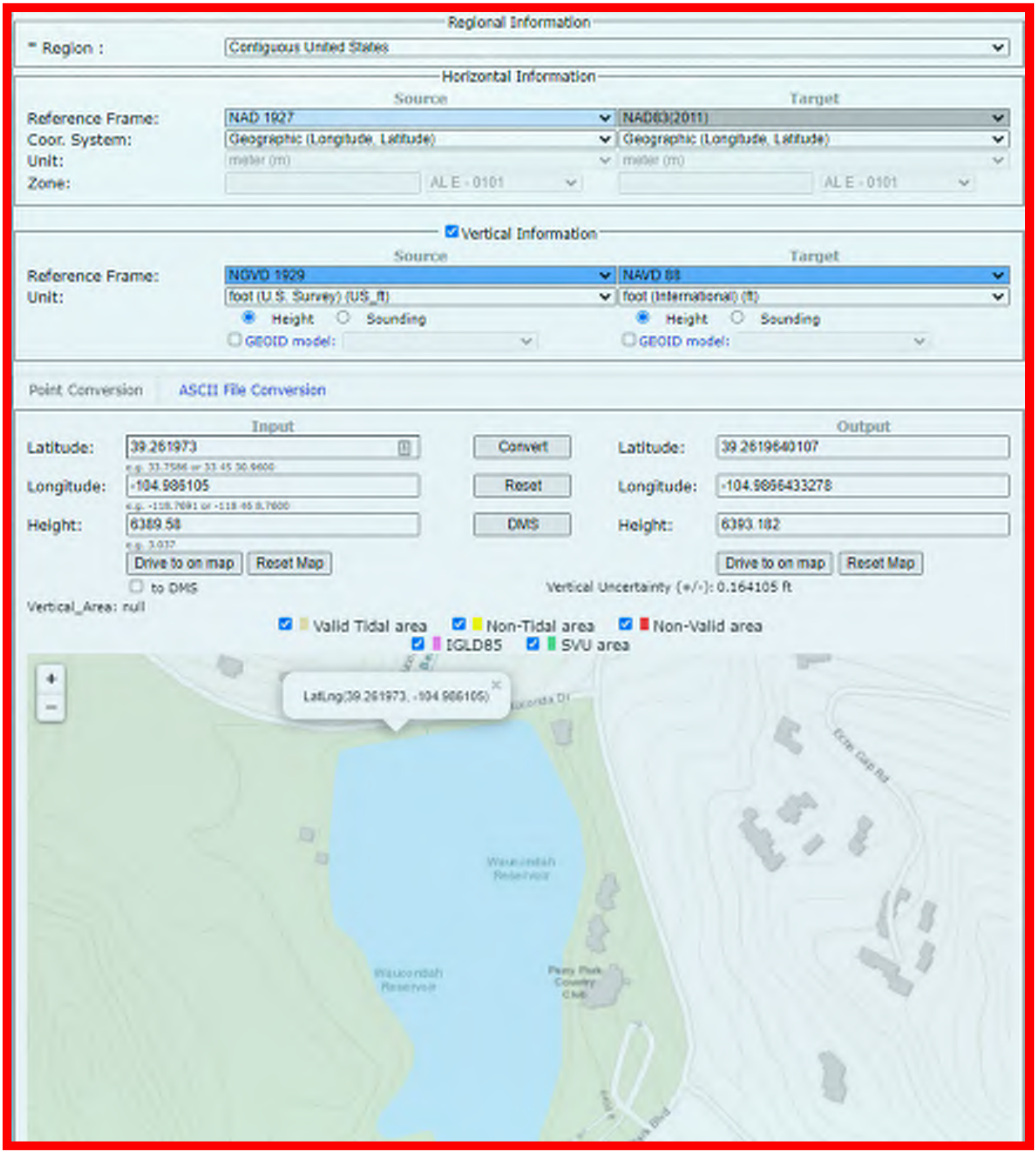
State Engineer

BY: _____
Deputy

C-1273

10-7-69

SOURCE: https://vdatum.noaa.gov/vdatumweb/vdatumweb?a=164400120220201



Please remove the geotechnical report from the Phase III drainage report as it is not relevant.

APPENDIX B – GEOTECHNICAL REPORT

APPENDIX C – EXISTING DRAINAGE BASIN CALCULATIONS

Please provide the source for the 1-hour point rainfall depths or use Zone 1 depths per Table 6-1 of the Douglas County Drainage Manual.

TABLE 6-1
1-HOUR POINT RAINFALL VALUES FOR DOUGLAS COUNTY (INCHES)

	2- YR	5-YR	10-YR	50-YR	100-YR
ZONE 1	1.06	1.43	1.66	2.26	2.60
ZONE 2	0.98	1.32	1.53	2.07	2.34
ZONE 3	0.72	1.05	1.26	1.78	2.05

Calculation of Peak Runoff using Rational Method

Designer: Samuel Wood
Company: GMS Inc.
Date: 3/20/2024
Project: Perry Park WSD
Location: Waucondah

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

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

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

Computed $t_c = t_i + t_t$

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

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

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

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

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.81	1.07	1.31	1.66	1.95	2.26	3.06
	a	b	c				
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786				

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

$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Existing	1.29	B	20.15	0.13	0.15	0.22	0.38	0.44	0.52	0.61	300.00			0.029	20.91	224.00	6342.12	6338.57	0.016	10	1.26	2.97	23.87	25.08	23.87	1.44	1.91	2.34	2.97	3.49	4.04	5.47	0.24	0.37	0.66	1.44	1.98	2.71	4.30

See comment in report text regarding HSG used for design. Please revise.

APPENDIX D – PROPOSED DRAINAGE CALCULATIONS

Please provide the source for the 1-hour point rainfall depths or use Zone 1 depths per Table 6-1 of the Douglas County Drainage Manual.

Calculation of Peak Runoff using Rational Method

Designer: Samuel Wood
Company: GMS Inc.
Date: 3/20/2024
Project: Perry Park WSD
Location: Waucondah

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

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

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

Computed $t_c = t_i + t_t$

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

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

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

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

1-hour rainfall depth, P1 (in) =	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
	0.81	1.07	1.31	1.66	1.95	2.26	3.06
Rainfall Intensity Equation Coefficients =	a	b	c	$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$			
	28.50	10.00	0.786				

$Q(cfs) = CIA$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Proposed	1.29	B	48.70	0.36	0.39	0.45	0.55	0.60	0.65	0.71	300.00			0.029	15.59	224.00	6342.12	6338.57	0.016	10	1.26	2.97	18.55	19.60	18.55	1.65	2.19	2.68	3.39	3.99	4.62	6.26	0.76	1.11	1.56	2.43	3.09	3.89	5.77

See comment in report text regarding HSG used for design. Please revise.

GRADING, EROSION AND SEDIMENT CONTROL REPORT

for

WAUCONDAH WWTF IMPROVEMENTS PHASE 2

Prepared for the:

PERRY PARK WATER AND SANITATION DISTRICT

GMS, Inc.
Consulting Engineers

GRADING, EROSION AND SEDIMENT CONTROL (GESC) REPORT
FOR
THE PERRY PARK WATER AND SANITATION DISTRICT

PROJECT NO. 2021-068.600

MARCH 2024

OWNER:

PERRY PARK WATER AND SANITATION DISTRICT
DIANA MILLER
5676 WEST RED ROCK DRIVE
LARKSPUR, CO 80118

PREPARED BY:

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER STREET, SUITE 300
COLORADO SPRINGS, COLORADO 80903

TELEPHONE: (719) 475-2935
TELEFAX: (719) 475-2938

This grading, erosion and sediment control report and plan for the Waucondah Wastewater Treatment Facility (WWTF) Improvements – Phase 2 was prepared by me (or under my supervision) for the owners thereof in accordance with the provisions of Douglas County's Grading, Erosion, and Sediment Control Manual, and the Urban Drainage and Flood Control District Criteria and approved variances and exceptions thereto. I understand that it is the policy of Douglas County that the County does not and will not assume liability for GESC facilities designed by others.

By: Samuel L. Wood, PE
Licensed Professional Engineer for and on behalf of GMS, Inc.
State of Colorado
No. 60152

As Owner/Developer of the land identified in this report, I agree to proceed, implement, and comply with all of the requirements and recommendations outlined herein. I understand that additional grading, erosion and sediment control measures may be required of the Permittees, due to unforeseen erosion problems or if the submitted plan does not function as intended. The requirements of this plan shall run with the land and be the obligation of the Permittees until such time as the plan is properly completed, modified, or voided.

Diana Miller

Perry Park Water and Sanitation District
Authorized Signature

Please delete information which is not relevant to grading, drainage, erosion and sediment control.

Project description:

An evaluation of the existing Waucondah Wastewater Treatment Facility (WWTF), dated February 2021, was completed by TST Infrastructure, LLC in order to determine the current and future capabilities of the facility. At that time, several community complaints have been lodged with PPWSD concerning noise, odor, and the aesthetics of the WWTF; so the PPWSD determined that a complete evaluation of the WWTF was needed. The plant has historically met the requirements of its discharge permit, but several components of the WWTF have inadequate capacity. Most unit processes is require certain upgrades due to age, condition, and operational capability and the facility lacks redundancy, which increases the risk of major violation in the event of adverse conditions such as equipment failures.

The recommended phase II WWTF improvements consist of new process tanks and equipment, demolition of the existing digester complex, new yard piping and structures, a new blower building, installation of the instrumentation and controls, installation of UV disinfection system, and installation of new generator and electrical. The proposed WWTF improvements will be contained within the existing Waucondah WWTF site southeast of the intersection of Perry Park Boulevard and Country Club Drive. The WWTF site is located at latitude 39°15'55.33" N and longitude 104°58' 52.75" W.

Existing site conditions:

Waucondah WWTF Property Description:

Discussions of the overall service area are irrelevant to this GESC report.

Please delete and only discuss the area where construction will occur.

The existing Waucondah WWTF is located on a 4.13 acre rectangular property on the southeast corner of Country Club Drive and Bear Court in Perry Park, Colorado. See the figure in Appendix A. The property is adjacent to Bear Creek and contains approximately 9 buildings that aid in the treatment of the District's wastewater. The WWTF property is located east of Perry Park's suburban residential area and is surrounded by unincorporated property. The proposed improvements will not change the property's land use.

Physiography, Topography, and Vegetation

Douglas County falls within the physiographic province of the Front Range. As such the western edge of the District's service area is bordered by the base of the Rampart Range portion of the Front Range mountains. Figure 2 shows the general topography in and around West Perry Park. Elevations within West Perry Park range from a high of approximately 7,200 feet to a low of approximately 6,300 feet. The Waucondah WWTF is located just east of Bear Creek on Country Club Drive, at approximately 6,340 feet in elevation. In general, the topography within the service area falls from the south to the north. PPWSD's Waucondah WWTF is located on the northeast side of the service area as shown in Figure 2. The topography within the WWTF property falls from the southeast to northwest towards Bear Creek.

A majority of the land surrounding the Waucondah WWTF's service area, and the land immediately surrounding the WWTF itself, is forested. Land north of the WWTF gives way to shrubland and pastureland. There are no delineated wetlands on the WWTF property. The only delineated wetlands in the area are associated with Bear Creek. Native vegetation in the area consists of a variety of short and mid-tall grasses including Blue Gamma, Galleta, Alkali Sacaton, Buffalo Grass, Salt Grass, and Sand Dropseed.

Adjacent areas:

The WWTF is located to the northeast of the Waucondah reservoir and alongside Bear Creek. This facility services the PPWSD Waucondah Service residential area. It is located southeast of the intersection of Country Club Drive and Perry Park Boulevard.

Soils: The US Department of Agriculture through the Natural Resources Conservation Service (NRCS) has compiled detailed soil information for Douglas County. This data is available on the NRCS' web soil survey website. Soil type information within and surrounding the Waucondah WWTF is relevant as it relates to the constructability of wastewater facilities within the area and the soil's ability to transmit surface water.

The following soils have been identified in the NRCS mapping of the Waucondah WWTF area as shown on the figures in Appendix B. General information is presented in terms of the characteristics of these different soil classifications. None of the identified soils are classified as prime farmland. The extent at which the soil map was created (to show only locations around the Waucondah WWTF relevant to the scope of this report) resulted in a scale greater than what is recommended for this location by the NRCS. As such, the locations of soil group borders displayed in the soil map are approximate.

Soil Group RaE – Razor clay, 3 to 25% Slopes

This is the predominant soil group within the Waucondah WWTF property, found mainly in the southeast part of the existing Waucondah WWTF property and extending east of the property. This soil group consists of clay; bedrock can be found between 20 to 40 inches deep. These soils are well drained with a high runoff class. These soils are classified as hydrologic soil group "D". Depths to water table are generally greater than 80 inches.

Soil Group Se – Rock land-Lonetree complex, 10 to 100% Slopes

This soil group is prevalent west of the existing Waucondah WWTF property and generally follows the alignment of Bear Creek. This soil group consists of coarse sand overlying loamy sands. These soils have a high runoff class and are classified as hydrologic soil group "D". Depths to water table are generally 0 to 24 inches since these soils are typically found in flood plains and drainage ways.

Soil Group TcE – Tinytown-Cheesman, 5 to 30% Slopes

This soil group is prevalent in a small section northeast of the existing Waucondah WWTF property. This soil group consists of gravelly sandy loam. These soils are well drained with a low runoff class. These soils are classified as hydrologic soil group "A". Depths to water table are generally greater than 80 inches.

Areas and volumes:

The property is approximately 4.13 acres. The site consists of approximately 1.06 acres of which full buildout will be achieved by future phases. The interim phase two project will consist of demolition, utility installation, proposed blower building, digester basins, and landscaping construction. The project site is located in the agricultural – one zone of Douglas County and is exempt. The phase two project estimated disturbance area is approximately 0.63 acres.

Please note that unbalanced earthwork requires a variance and net cut requires verification of a permitted site to receive the spoils and handle spoils per County criteria. For purposes of this report, please describe these requirements here and, if a receiving site has not yet been identified, indicate the contractor will need to fulfill these requirements at the time the permit application is submitted.

The estimated cut volume of earthwork is 450 cubic yards (CY) and the estimated fill volume is 300 CY, which indicates that this is a nearly balanced site.

Erosion and sediment control measures:

Note that the following section is based on Douglas County's Grading, Erosion, and Settlement Control (GESC) Manual (Reference 1). This project will include three phases; initial, interim, and final. Control measures will vary by phase and have specific GESC activities associated with it. Each phase will be discussed below to include control measures and the steps needed for controlling erosion and sediment.

Initial:

The following Best Management Practices (BMPs) shall be installed prior to any land-disturbing activities occurring. The initial controls are to be installed at the upset of construction and remain in place and maintained throughout the project.

Sediment Control Logs (SCL): Cylindrical bundle of wood, coconut, compost, excelsior, or straw fiber designed to form a semi-porous filter, able to withstand overtopping. The log shall be staked into the ground in order to promote sediment deposition on its upstream side and reduce flow velocities to prevent sediment from escaping downstream.

Silt Fences (SF): Silt fences a temporary sediment barrier constructed of woven fabric stretched across supporting posts. The bottom edge of the fabric is placed in an anchor trench that is backed filled with compacted soil. It is used to keep silt created during construction from escaping downstream.

Vehicle Tracking Control (VTC): The VTC shall be placed at all entrances and/or exits to the construction site. A VTC shall consist of 3 to 6-inch crushed rock pad 12 inches thick. An alternative reusable rockless construction entrance may be considered. The VTC is intended to eliminate as much mud as possible from the tires of vehicles prior to exiting the site.

Stabilized Staging Area (SSA): A layer of aggregate or rock is to be spread in the areas used for construction trailer(s), parking, storage, unloading, and loading, this reduces the likelihood that vehicles most frequently entering and exiting the site will come into contact with mud.

Interim:

The interim BMPs will be in addition to the initial phase BMPs. The following controls will be used to control erosion and sediment. They shall be based on proposed grades and drainage features and are installed after initial site grading. Note that silt fences, vehicle tracking control, stabilized staging area, and sediment control logs are also used in the interim phase but are installed in the initial phase. Information on those BMPs is listed in the Initial section above.

Concrete Washout Area (CWA): Consists of a shallow excavation with a perimeter berm to isolate concrete truck washout operations.

Final:

The final BMPs shall be installed following construction activities. The following BMPs will be used to control erosion and sediment. They shall be based on proposed grades, drainage features and any other disturbed land area. Note that silt fences and sediment control logs will remain in place until the final erosion control measures have sufficiently stabilized the disturbed areas.

Seeding and Mulching (SM): Consists of drill seeding disturbed areas with native grasses and crimping in straw mulch to provide immediate protection against rain and wind erosion and, as the grass cover becomes established, to provide long-term stabilization of exposed soils.

Timing/phasing schedule:

It is anticipated that construction activities will begin in the second quarter of 2024. As noted above, BMP installation is divided into three phases. Additionally, the initial BMP's are to be installed prior to any land-disturbing activities occurring.

The actual construction schedule and sequencing of activities are subject to change based on actual field conditions, material procurement, and unforeseen variables. Therefore, it is estimated that construction activities and the final BMPs to be established by the second quarter of 2025.

Permanent stabilization:

The final phase of the erosion and sediment control measures is to install seeding and mulching. This will be utilized to stabilize the site.

Stormwater management considerations:

The WWTF site lies within the Bear Creek basin. The site is bounded by Bear Creek to the north and east; to the south by an existing grass-lined diversion ditch and to the west by Country Club Drive Road. Therefore, the volume of stormwater runoff is very limited. The runoff will be directed to maintain the historic drainage patterns from the site. The historic drainage pattern drains runoff from the northwest to the southeast. The previously mentioned BMPs will be utilized to limit stormwater runoff during construction. Additionally, runoff continues through a vegetation buffer from the site prior to entering Bear Creek.

Maintenance:

The contractor will be responsible for maintaining all temporary BMPs to ensure proper performance. Section 5.7 of the Douglas County Grading, Erosion and Sediment Control Manual lists the frequency with which inspections are required. BMPs should be inspected after significant rainfall and events for damage and be repaired as necessary.

Cost Estimate:

An opinion of probable cost is attached as Appendix D. This will be used to establish the contractor's required financial security for erosion control measures and required maintenance.

County Statement:

“This Grading, Erosion and Sediment Control plan has been placed in the Douglas County file for this project and appears to fulfill the applicable Douglas County Grading, Erosion and Sediment Control criteria. Additional Grading, Erosion and Sediment Control measures may be required of the Owner or his/her agents, due to unforeseen erosion problems or if the submitted plan does not function as intended. The requirements of this plan shall run with the land and be the obligation of the land owner, or his/her designated representative(s) until such time as the plan is properly completed, modified or voided.”

REFERENCES

1. Douglas County Grading, Erosion and Sediment Control (GESC) Manual, Amended January 2017.

2. Urban Storm Drainage Criteria Manuals Volumes 1-3, Urban Drainage and Flood Control District, January 2016.

Appendix A Vicinity Map

Appendix B Soil Map

Appendix C Floodplain Map

Appendix D Landscape Plan

Appendix E Engineer's Opinion of Probable Cost

Appendix F GESC drawing and report checklist

Appendix G L&E Submittal and GESC Drawings

APPENDIX A – VICINITY MAP

REMUDA RANCH EXEMPTION

LEGAL DESCRIPTION

TR E1/2 SE1/4 15-9-68 4.13 AM/L 209-364

Bear Creek 2

Creek

1 MILE RADIUS

WAUCONDAH WWTF

WAUCONDA LAKES

ECHO HILLS TOWNHOUSES

KESLING

ECHO VILLAGE

PREO PERRY PARK COMMON

RETREAT IN PERRY PARK

INTEREST COMMUNITY

KARABATSOS EXEMPTION

INCA RIDGE

INDIAN HEAD

BIG

16 15 14 22 23 21

N

0' 500' 1,000'

SCALE: 1" = 500'

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION

FIGURE 1
VICINITY MAP
PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WASTEWATER TREATMENT FACILITY

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER STREET, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC	PROJECT NO.	2021-068.600
DESIGNED	SLW	GMS FILE NO.	
CHECKED	SLW		
DATE	MARCH 2024		

SHEET

OF

G:\Perry Park\WSD\2021-068\600\Loc and Extent Exhibit.dwg, FIGURE 1, 3/18/2024 4:06:12 PM, dtw, DWG To PDF.pc3, 1:1

APPENDIX B – SOILS MAP

G:\Perry Park WSD\2021-068\625\Figure 3A.dwg, 8.5x11, 3/19/2024 4:51:24 PM, slw, DWG To PDF.pc3

Please outline the project limits of construction in this map.

104° 59' 3" W

Map Scale: 1:2,500 if printed on A landscape (11" x 8.5") sheet.

N

0 35 70 140 210 Meters

0 100 200 400 600 Feet

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

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

FIGURE 3A
SOILS MAP
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

Soil Map—Castle Rock Area, Colorado
(PPWSD)

MAP LEGEND

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

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

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

Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Castle Rock Area, Colorado
Survey Area Data: Version 15, Sep 1, 2022

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

Date(s) aerial images were photographed: Jul 1, 2020—Jul 2, 2020

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.

FI 3B.DWG

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

FIGURE 3B
SOILS MAP LEGEND
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ka	Kassler gravelly sandy loam	0.2	0.9%
RaE	Razor clay, 3 to 25 percent slopes	9.7	39.2%
Se	Sandy wet alluvial land	8.8	35.7%
Sv	Stony steep land	2.0	8.0%
TcE	Tinytown-Cheesman complex, 5 to 30 percent slopes	4.0	16.2%
Totals for Area of Interest		**24.6**	**100.0%**

FIGURE 3C.DWG

FIGURE 3C
SOIL MAP UNIT LEGEND
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

APPENDIX C – FLOODPLAIN MAP

LEGEND OF LINES AND SYMBOLS

- WOOD FENCE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- SANITARY SEWER LINE
- SLUDGE WATER RETURN
- OVERHEAD ELECTRIC LINE
- UNDERGROUND ELECTRIC LINE
- SECONDARY SLUDGE LINE
- WASTE ACTIVATED SLUDGE LINE
- PRIMARY SLUDGE LINE
- DIGESTED DECANT DISCHARGE
- PROCESS AIR PIPING
- WATER LINE
- CONTOUR LINE WITH ELEVATION LABEL
- DITCH FLOWLINE
- FIRE HYDRANT
- WATER VALVE BOX
- UTILITY POLE
- UTILITY POLE w/ LIGHT
- BUILDING
- CONCRETE FLATWORK
- ASPHALT SURFACING
- GRAVEL ROADWAY/DRIVEWAY
- DIRT ROAD
- SANITARY SEWER MANHOLE
- SANITARY SEWER CLEAN-OUT

BEAR CREEK

EXISTING CULVERT

EXISTING BRIDGE

EXISTING 36' DIAMETER SECONDARY CLARIFIER
BLDG HT. = N/A
TOP OF WALL EL. = 6338.1

EXISTING 15'x34' MAINTENANCE/
CHEM FEED BUILDING
STRU. HT. = 13.2'
F.F. EL. = 6339.6

EXISTING 10'x18' FLOC. TANK
TANK HT. = N/A
TOP OF TANK EL. = 6340.0

EXISTING 17'x22' CHLORINE
CONTACT CHAMBER
WALL HT. = N/A
TOP OF WALL EL. = 6339.0

EXISTING 14'x24' CHEM FEED BUILDING
BLDG HT. = 8.6'
F.F. EL. = 6338.4

EXISTING 15'x34' ROTATING
BIOLOGICAL CONTACTOR STRUCTURE
STRU. HT. = 7.5'
F.F. EL. = 6339.1

EXISTING 15'x34' ROTATING
BIOLOGICAL CONTACTOR STRUCTURE
STRU. HT. = 7.5'
F.F. EL. = 6339.0

EXISTING 14'x15' BLOWER BUILDING
BLDG HT. = 8.9'
F.F. EL. = 6339.3

EXISTING 17'x19' PUMP BUILDING
BLDG HT. = 14.25'
F.F. EL. = 6340.5

EXISTING 31' DIAMETER
PRIMARY CLARIFIER
BLDG HT. = N/A
TOP OF WALL EL. = 6340.9

PROPOSED 20'x50' BLOWER
BUILDING WITH ELECTRIC ROOM
BLDG HT. = 16.0'
F.F. EL. = 6340.50

PROPOSED
ELECTRIC ROOM

EXISTING ASPHALT
ROADWAYS

EXISTING 9'x16'
HEADWORKS BUILDING
BLDG HT. = 10.4'
F.F. EL. = 6343.7

PROPOSED 50'x90' DIGESTER BASINS
BLDG HT. = N/A
TOP OF WALL EL. = 6352.00

EXISTING 36' DIAMETER AEROBIC
DIGESTER STRU. HT. = 18.0'
TOP OF WALL EL. = 6341.1

EXISTING
DRAINAGE DITCH

EXISTING 20'x40'
MAINTENANCE BUILDING
BLDG HT. = 10.4'
F.F. EL. = 6343.7

EXISTING CONCRETE DRIVE
AT FACILITY GATED ACCESS

PERRY PARK BOULEVARD

COUNTRY CLUB DRIVE

LEGAL DESCRIPTION

100 YEAR FLOODPLAIN
MAXIMUM WATER
SURFACE

N

0' 20' 40'
SCALE: 1" = 20'

SCALE VERIFICATION
BAR IS ONE INCH
ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET
ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION

FIGURE 2
FLOODPLAIN PLAN
PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WASTEWATER TREATMENT FACILITY

GMS, INC.
CONSULTING ENGINEERS
611 WEST 10TH STREET
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC	PROJECT NO.	2021-068.600		
DESIGNED	SLW				
CHECKED	SLW				
DATE	MARCH 2024	GMS FILE NO.			

SHEET

OF

APPENDIX D – LANDSCAPE PLAN

LEGEND OF LINES AND SYMBOLS

- WOOD FENCE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- 6360 — CONTOUR LINE WITH ELEVATION LABEL
- DITCH FLOWLINE
- BUILDING
- CONCRETE FLATWORK
- ASPHALT SURFACING
- GRAVEL ROADWAY/DRIVEWAY
- DIRT ROAD

PERRY PARK BOULEVARD

COUNTRY CLUB DRIVE

BEAR CREEK

EXISTING WOOD PICKET PRIVACY FENCE | EXISTING CHAIN LINK PERIMETER FENCE

EXISTING TREES, RECENTLY PLANTED – TYP.

EXISTING WOOD PRIVACY FENCE, RECENTLY INSTALLED – TYP.

EXISTING HEADWORKS SCREEN

EXISTING PRIMARY CLARIFIER

EXISTING PUMP BLDG

EXISTING BLOWER BLDG

EXISTING RBC NO. 1

EXISTING RBC NO. 2

EXISTING MAINTENANCE/ CHEM FEED BUILDING

EXISTING FLOC TANK

EXISTING AEROBIC DIGESTER (TO BE DEMOLISHED)

PROPOSED DIGESTER NO. 1

PROPOSED DIGESTER NO. 2

PROPOSED DIGESTED SLUDGE BASIN

PROPOSED WAS PUMP & VAULT

EXISTING SECONDARY CLARIFIER

EXISTING CHLORINE CONTACT CHAMBER

EXISTING CHEM FEED BLDG

PROPOSED BLOWER BUILDING

FUTURE SECONDARY CLARIFIER

EXISTING OFFICE

EXISTING DRAINAGE DITCH – TYP.

EXISTING WOOD PICKET PRIVACY FENCE | EXISTING CHAIN LINK PERIMETER FENCE

6332 6336 6338 6340 6342 6348 6350 6360

0' 20' 40'
SCALE: 1" = 20'

NOTE:

1. ALL DISTURBED AREA TO BE RESEEDED WITH A NATIVE GRASSES SEED MIX.

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION

FIGURE 3
LANDSCAPE PLAN
PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WASTEWATER TREATMENT FACILITY

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC	
DESIGNED	SLW	
CHECKED	SLW	
DATE	MARCH 2024	
PROJECT NO.	2021-068.600	
GMS FILE NO.		

SHEET

OF

APPENDIX E – ENGINEER'S OPINION OF PROBABLE COST

Please update if / when the GESC plans are revised.

Douglas County GESC Permit

Cost Opinion Spreadsheet

Mar-04

BMP No.	BMP	ID	Unit	Installation Unit Cost	Quantity	Cost
1	Check Dam	CD	LF	$ 24.00		$ -
2	Compost Blanket	CB	SF	$0.36		$ -
3	Compost Filter Berm	CFB	LF	$ 2.00		$ -
4	Concrete Washout Area	CWA	EA	$ 100.00	1	$ 100 - 00
5	Construction Fence	CF	LF	$ 2.00		$ -
6	Construction Markers	CM	LF	$ 0.20		$ -
7	Dewatering	DW	EA	$ 600.00		$ -
8	Diversion Ditch	DD	LF	$ 1.60		$ -
9	Erosion Control Blanket	ECB	SY	$ 5.00		$ -
10	Inlet Protection	IP	LF	$ 20.00		$ -
11	Reinforced Check Dam	RCD	LF	$ 36.00		$ -
12	Reinforced Rock Berm	RRB	LF	$ 9.00		$ -
13	RRB for Culvert Protection	RRC	LF	$ 9.00		$ -
14	Sediment Basin	SB	AC	$ 1,100.00		$ -
15	Sediment Control Log	SCL	LF	$ 2.00	200	$ 400 - 00
16	Sediment Trap	ST	EA	$ 600.00		$ -
17	Seeding and Mulching	SM	AC	$ 2,500.00	1	$ 2,500 - 00
18	Silt Fence	SF	LF	$ 2.00	500	$ 1,000 - 00
19	Stabilized Staging Area	SSA	SY	$ 2.00	500	$ 1,000 - 00
20	Surface Roughening	SR	AC	$ 600.00		$ -
21	Temporary Slope Drain	TSD	LF	$ 30.00		$ -
22	Temporary Stream Crossing	TSC	EA	$1,000.00		$ -
23	Terracing	TER		$ -		$ -
24	Vehicle Tracking Control	VTC	EA	$1,000.00	2	$ 2,000 - 00
25	VTC with Wheel Wash	WW		$ -		$ -
26	Temporary Batch Plant Restoration		AC	$5,000.00		$ -
	TOTAL					$ 7,000 - 00

APPENDIX F – GESC DRAWING AND REPORT CHECKLIST

DOUGLAS COUNTY
COLORADO

Community Planning and Sustainable Development
Engineering Division

Project Name: _____
DV#: _____
Date Submitted: _____

DRAWINGS AND REPORT CHECKLIST FOR STANDARD GESC PERMITS

A. DRAWINGS

I. COVER SHEET

Design Engineer			County Engineer			
Yes	No	N/A	Yes	No	N/A	
X						1. Project name.
X						2. Project address (If applicable).
X						3. Owner address.
X						4. Design firm's name and address.
X						5. Plan sheet index.
X						6. Designer Engineer Signature Block.
X						7. The following note: THE ***GRADING, EROSION, AND SEDIMENT CONTROL PLAN*** INCLUDED HEREIN HAS BEEN PLACED IN THE DOUGLAS COUNTY FILE FOR THIS PROJECT AND APPEARS TO FULFILL APPLICABLE DOUGLAS COUNTY GRADING, EROSION AND SEDIMENT CONTROL CRITERIA, AS AMENDED. ADDITIONAL GRADING, EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED OF THE PERMITTEE(S) DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED GESC PLAN DOES NOT FUNCTION AS INTENDED. THE REQUIREMENTS OF THIS GESC PLAN SHALL RUN WITH THE LAND AND BE THE OBLIGATION OF THE PERMITTEE(S), UNTIL SUCH TIME AS THE GESC PLAN IS PROPERLY COMPLETED, MODIFIED OR VOIDED.

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
X					
X					

8. GESC Drawing Designer Engineer's signature block with name, date, and Professional Engineer registration number. Signature block shall include the following note:

   THE ***GRADING, EROSION AND SEDIMENT CONTROL PLAN*** INCLUDED HEREIN HAS BEEN PREPARED UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE REQUIREMENTS OF THE GRADING, EROSION AND SEDIMENT CONTROL (GESC) CRITERIA MANUAL OF DOUGLAS COUNTY, AS AMENDED.

9. County acceptance block.
10. General location Map at a scale of 1 inch to 1,000 feet to 8,000 feet indicating:
    - General vicinity of the site location.
    - Major roadway names.
    - North arrow and scale.

II. GESC DRAWING INDEX SHEET

For projects that require multiple plan-view sheets to adequately show the project area (based on the specified scale ranges), a single plan-view sheet shall be provided at a scale appropriate to show the entire site on 1 sheet. Areas of coverage of the multiple blow-up sheets are to be indicated as rectangles on the index sheet.

III. INITIAL GESC DRAWING

This Drawing shall provide grading, erosion and sediment controls for the initial clearing, grubbing and grading of a project. At a minimum, it shall contain:

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
		X			
X					
X					
X					

1. Property lines.
2. Existing and proposed easements.
3. Existing topography at 1 or 2 foot contour intervals, extending a minimum of 100 feet beyond the property line.
4. Location of any existing structures or hydrologic features within mapping limits.
5. USGS Benchmark used for project.

Design Engineer			County Engineer			
Yes	No	N/A	Yes	No	N/A	
X						6. Limits of Construction encompassing all areas of work, access points, storage and staging areas, borrow areas, stockpiles, and utility tie-in locations in on-site and off-site locations. Stream corridors and other resource areas to be preserved and all other areas outside the Limits of Construction shall be lightly shaded to clearly show area not to be disturbed.
X						7. Location of stockpiles, including topsoil, imported aggregates, and excess material.
X						8. Location of storage and staging areas for equipment, fuel, lubricant, chemical (and other materials) and waste storage.
		X				9. Location of borrow or disposal areas.
		X				10. Location of temporary roads.
X						11. Location, map symbol, and letter callouts of all initial erosion and sediment control BMPs.
X						12. Information to be specified for each BMP, such as type and dimensions, as called for in the GESC Standard Notes and Details.
X						13. The following note: SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP NAMES AND SYMBOLS.
X						14. Douglas County acceptance block.
X						15. Other information as may be reasonably required by Douglas County.
X						16. Design Engineer sign off block.

IV. INTERIM GESC DRAWING

The Interim GESC Drawing shall show all the information included on the Initial GESC Drawing, as noted below

Design Engineer			County Engineer			
Yes	No	N/A	Yes	No	N/A	
X						1. Existing topography at 1 or 2 foot contour intervals extending a minimum of 100 feet beyond the property line, as shown on the Initial GESC Drawing. **These contours shall be screened.**

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
X					
X					
X					
X					
X					

2. Location of all existing erosion and sediment control measures on site, as shown on the **Initial** GESC Drawing Sheet. **These control measures shall be screened. Dimension information for initial stage BMPs shall not be shown.**
3. Items 1, 2, and 4 through 10 from the Initial GESC Drawing (see Section 3.18.3).
In addition, the Interim GESC Drawing shall include the following:
4. Proposed topography at 1 or 2 foot contour intervals, showing elevations, dimensions, locations, and slope of all proposed grading.
5. Outlines of cut and fill areas.
6. Location of all interim erosion and sediment controls, designed in conjunction with the proposed site topography, but also considering the controls designed in the initial GESC Drawing.
7. Locations of all buildings, drainage features and facilities, paved areas, retaining walls, curbing, water quality facilities, or other permanent features to be constructed in connection with, or as a part of, the proposed work, per approved plat, SIP or other improvement plan.

Project Name: _____
DV#: _____
Date Submitted: _____

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
X					
X					
X					

8. The following notes:
   - SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP NAMES AND SYMBOLS.
   - SHADED BMPS WERE INSTALLED IN INITIAL STAGE AND SHALL BE LEFT IN PLACE IN INTERIM STAGE UNLESS OTHERWISE NOTED.
   - ALL INTERIM EROSION AND SEDIMENT CONTROL BMPS INCLUDING DRILL SEEDING AND CRIMP MULCHING OF DISTURBED AREAS, MUST BE INSTALLED, INSPECTED, AND APPROVED BY THE COUNTY PRIOR TO THE ISSUANCE OF A RIGHT-OF-WAY USE AND CONSTRUCTION PERMIT FOR THE PURPOSE OF PAVING OR INSTALLATION OF CURB AND GUTTER.
   - SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITY FACILITIES, CULVERTS, STORM DRAINS, AND OUTLET PROTECTION.
9. Summary of cut and fill volumes showing how earthwork balances on site.
10. Douglas County Acceptance Block.
11. Design Engineer sign off block.

V. FINAL GESC DRAWING

This Drawing shows controls for final completion of the site. At a minimum, this Drawing shall contain the indicated information.

The Final GESC Drawing shall include all information shown on the Initial and Interim Drawings, as noted below:

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
X					
X					
X					
X					
X					
X					
X					
X					

1. Existing topography in areas of proposed contours need not be shown.
2. Existing Initial and Interim BMPs shall be shown, (**Screened**). Dimension information shall not be shown.
   In addition, the following information shall be shown:
3. Directional flow arrows on all drainage features.
4. Any Initial or Interim BMPs that are to be removed and any resulting disturbed area to be stabilized.
5. Location of all Final erosion and sediment control BMPs, permanent landscaping, and measures necessary to minimize the movement of sediment off site until permanent vegetation can be established.
6. Show limits of buildings, pavement, sod, and permanent landscaping (define types) per accepted plat, SIP, or other improvement plan.
7. Show Seeding and Mulching (SM) everywhere except buildings, pavement areas, and permanent landscaping areas.
8. Show other BMPs considered by the Design Engineer to be appropriate.
9. Show the following BMPs to be removed at the end of construction:
   - Indicate Dewatering (DW) to be removed.
   - Indicate Temporary Stream Crossings (TSC) to be removed.
   - Indicate Stabilized Staging Area (SSA) to be removed.
   - Indicate Vehicle Tracking Control (VTC) to be removed.
   - Indicate Construction Fence (CF) to be removed.

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
X					
X					

10. Include the following notes:
    - SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP NAMES AND SYMBOLS.
    - SHADED BMPs WERE INSTALLED IN INITIAL OR INTERIM GESC DRAWING AND, UNLESS OTHERWISE INDICATED, SHALL BE LEFT IN PLACE UNTIL REVEGETATION ESTABLISHMENT IS APPROVED BY THE COUNTY.
    - SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, CULVERTS, STORM DRAINS AND OUTLET PROTECTION.
11. Douglas County Acceptance Block.
12. Design Engineer sign off block.

B. REPORT

VI. GESC DRAWING AND REPORT CHECKLIST

A copy of this GESC Drawing and Report Checklist must be completely filled out, signed by the Design Engineer, and submitted with the GESC Plan.

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
X					

1. Name, address, and telephone number of the applicants – The name, address, and telephone number of the Professional Engineer preparing (or supervising the preparation of) the GESC Plan shall also be included, if different from the Applicants.
2. Project description – A brief description of the nature and purpose of the land-disturbing activity, the total area of the site, the area of disturbance involved, and project location including township, range, section, and quarter-section, or the latitude and longitude, of the approximate center of the project.

Project Name: _____
DV#: _____
Date Submitted: _____

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
X					
X					
X					
X					
X					
X					
X					

3. Existing site conditions – A description of existing topography, vegetation, and drainage; a description of any wetlands on the site; and any other unique features of the property.
4. Adjacent areas – A description of neighboring areas such as streams, lakes, residential areas, roads, etc., which might be affected by the land disturbance.
5. Soils – A brief description of the soils on the site including information on soil type and names, mapping unit, erodibility, permeability, hydrologic soil group, depth, texture, and soil structure (this information may be obtained from the soil report for the site, for the adjacent sites if acceptable by the County, or the applicable Soil Survey prepared by the Natural Resources Conservation Service).
6. Areas and volumes – An estimate of the quantity (in cubic yards) of excavation and fill involved (indicating a balance on site), and the surface area (in acres) of the proposed disturbance.
7. Erosion and sediment control measures – A description of the methods presented in the *GESC Manual* that will be used to control erosion and sediment on the site.
8. Timing/Phasing schedule – A schedule indicating the anticipated starting and completion time periods of the site grading and/or construction sequence, including the installation and removal of erosion and sediment control BMPs. Indicate the anticipated starting and completion time periods of individual project phases.
9. Permanent stabilization – A brief description, including applicable specifications, of how the site will be stabilized after construction is completed.
10. Stormwater management considerations – Explain how stormwater runoff from and through the site will be handled during construction.

Project Name: _____
DV#: _____
Date Submitted: _____

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					
X					
		X			
		X			
X					

11. Maintenance – Any special maintenance requirements over and above what is identified in the GESC Standard Notes and Details.
12. Opinion of Probable Cost for installation and maintenance of controls – An Opinion of Probable Costs for erosion and sediment control, including anticipated maintenance during the construction phase, shall be submitted with the GESC Drawing. This will be reviewed by County staff and used as a basis for fiscal security. A copy of a spreadsheet to be used for preparing the Opinion of Probable Costs for erosion and sediment control is included in Appendix I of the *GESC Manual*. An electronic copy of the Spreadsheet is available form the Douglas County Engineering Division. Unit costs used to develop probable erosion and sediment control costs shall be shown in the spreadsheet.
13. Calculations – Any calculations made for the design of such items as Sediment Basins or Erosion Control Blanket selection.
14. Other information of data – As may be reasonably required by Douglas County.
15. The following note: – "THIS *GRADING, EROSION AND SEDIMENT CONTROL PLAN* HAS BEEN PLACED IN THE DOUGLAS COUNTY FILE FOR THIS PROJECT AND APPEARS TO FULFILL THE APPLICABLE DOUGLAS COUNTY *GRADING, EROSION AND SEDIMENT CONTROL* CRITERIA. ADDITIONAL GRADING, EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED OF THE OWNER OR HIS/HER AGENTS, DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT FUNCTION AS INTENDED. THE REQUIREMENTS OF THIS PLAN SHALL RUN WITH THE LAND AND BE THE OBLIGATION OF THE LAND OWNER, OR HIS/HER DESIGNATED REPRESENTATIVE(S) UNTIL SUCH TIME AS THE PLAN IS PROPERLY COMPLETED, MODIFIED OR VOIDED."

Design Engineer			County Engineer		
Yes	No	N/A	Yes	No	N/A
X					

16. Signature Page – For Permittees acknowledging the review and acceptance of responsibility, and a statement by the Professional Engineer acknowledging responsibility for the preparation of the GESC Plan.

APPENDIX G – L & E SUBMITTAL AND GESC DRAWINGS

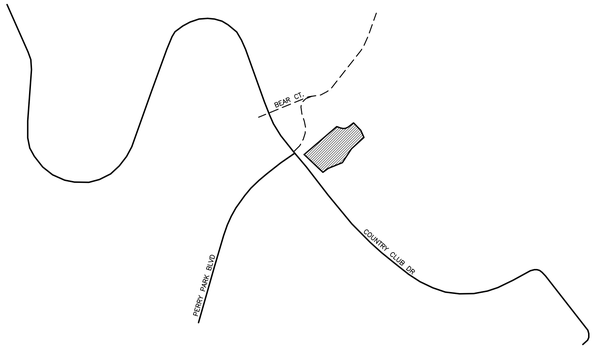
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS - PHASE 2

FOR

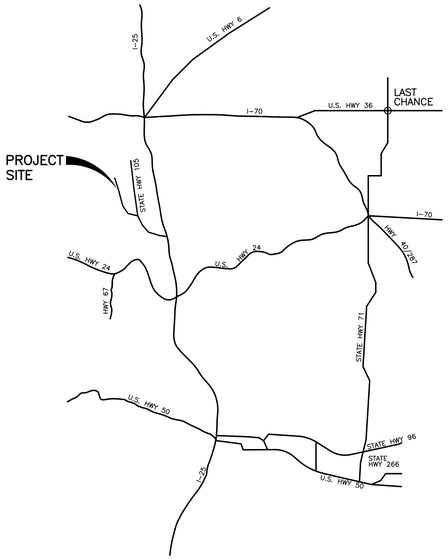
PERRY PARK WATER & SANITATION DISTRICT

LOCATION AND EXTENT SUBMITTAL

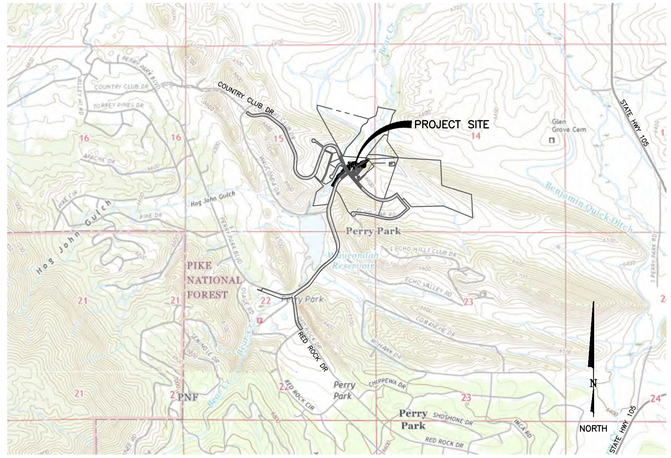
MARCH 2024



LOCATION MAP
NO SCALE



VICINITY MAP
NO SCALE



SITE MAP
SCALE: 1" = 2,000'

THE GRADING, EROSION, AND SEDIMENT CONTROL PLAN INCLUDED HEREIN HAS BEEN PLACED IN THE DOUGLAS COUNTY FILE FOR THIS PROJECT AND APPEARS TO FULFILL APPLICABLE DOUGLAS COUNTY GRADING, EROSION AND SEDIMENT CONTROL CRITERIA, AS AMENDED. ADDITIONAL GRADING, EROSION AND SEDIMENT MEASURE MAY BE REQUIRED OF THE PERMITTEE(S) DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED GESC PLAN DOES NOT FUNCTION AS INTENDED. THE REQUIREMENTS OF THIS GESC PLAN SHALL RUN WITH THE LAND AND BE THE OBLIGATION OF THE PERMITTEE(S), UNTIL SUCH TIME AS THE GESC PLAN IS PROPERLY COMPLETED, MODIFIED OR VOIDED.

Perry Park Water & Sanitation District

GMS, INC.
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

_____
ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

_____
DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

PROJECT ADDRESS:
5121 COUNTRY CLUB DR.
LARKSPUR, CO 80118

OWNER ADDRESS:
PERRY PARK WATER AND SANITATION DISTRICT
5676 RED ROCK DR.
LARKSPUR, CO 80118

DRAWING INDEX

BY: _____ DATE: _____
SAMUEL L. WOOD, PE 060152
GMS, INC.
CONSULTING ENGINEERS

NOTE: THE GRADING, EROSION AND SEDIMENT CONTROL PLAN INCLUDED HEREIN HAS BEEN PREPARED UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE REQUIREMENTS OF THE GRADING, EROSION AND SEDIMENT CONTROL (GESC) CRITERIA MANUAL OF DOUGLAS COUNTY, AS AMENDED.

BY: _____ DATE: _____
PERRY PARK WATER & SANITATION DISTRICT

SHEET 1 OF 11
GMS FILE No. .

PLOT CONFIGURATION: GMS-STANDARD(NO SCREEN)
CAD FILENAME: G:\PERRY PARK WSD\2021-068\600\GESC COVER.DWG

G:\Perry Park WSD\2021-068\600\GESC COVER.dwg, LOCATION AND EXTENT SUBMITTAL COVER, 3/29/2024 8:39:35 AM, dw, AutoCAD PDF (General Documentation).pc3, 1:1

STANDARD NOTES

1. THE DOUGLAS COUNTY ENGINEERING DIRECTOR SIGNATURE AFFIXED TO THIS DOCUMENT INDICATES THE ENGINEERING DIVISION HAS REVIEWED THE DOCUMENT AND FOUND IT IN GENERAL CONFORMANCE WITH THE DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS AND THE DOUGLAS COUNTY SUBDIVISION RESOLUTION OR ACCEPTED VARIANCES TO THOSE REGULATIONS. THE DOUGLAS COUNTY ENGINEERING DIRECTOR, THROUGH ACCEPTANCE OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY, OTHER THAN STATED ABOVE, FOR THE COMPLETENESS AND/OR ACCURACY OF THESE DOCUMENTS. THE OWNER AND ENGINEER UNDERSTAND THAT THE RESPONSIBILITY FOR THE ENGINEERING ADEQUACY OF THE FACILITIES DEPICTED IN THIS DOCUMENT LIES SOLELY WITH THE PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF COLORADO WHOSE STAMP AND SIGNATURE IS AFFIXED TO THIS DOCUMENT.

2. ALL CONSTRUCTION SHALL CONFORM TO DOUGLAS COUNTY STANDARDS. ANY CONSTRUCTION NOT SPECIFICALLY ADDRESSED BY THESE PLANS AND SPECIFICATIONS WILL BE BUILT IN COMPLIANCE WITH THE LATEST EDITION OF THE MOST STRINGENT OF THE FOLLOWING:

   - THE DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS
   - THE COLORADO DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
   - THE COLORADO DEPARTMENT OF TRANSPORTATION M STANDARDS

3. ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE DOUGLAS COUNTY ENGINEERING DIVISION AS APPLICABLE. THE COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO ITS STANDARDS AND SPECIFICATIONS.

4. THE CONTRACTOR SHALL NOTIFY THE DOUGLAS COUNTY ENGINEERING INSPECTION DIVISION, 303-660-7487, A MINIMUM OF 24-HOURS AND A MAXIMUM OF 72-HOURS PRIOR TO STARTING CONSTRUCTION. CONTRACTOR SHALL NOTIFY DOUGLAS COUNTY ENGINEERING INSPECTION WHEN WORKING OUTSIDE OF THE PUBLIC RIGHT-OF-WAY ON ANY FACILITY THAT WILL BE CONVEYED TO THE COUNTY, URBAN DRAINAGE & FLOOD CONTROL DISTRICT, OR OTHER SPECIAL DISTRICT FOR MAINTENANCE (STORM SEWER, ENERGY DISSIPATERS, DETENTION OUTLET STRUCTURES, OR OTHER DRAINAGE INFRASTRUCTURES). FAILURE TO NOTIFY THE ENGINEERING INSPECTION DIVISION TO ALLOW THEM TO INSPECT THE CONSTRUCTION MAY RESULT IN NON-ACCEPTANCE OF THE FACILITY/INFRASTRUCTURE BY THE COUNTY AND/OR URBAN DRAINAGE.

5. CONSTRUCTION WILL NOT BEGIN UNTIL ALL APPLICABLE PERMITS HAVE BEEN ISSUED. IF A DOUGLAS COUNTY ENGINEERING INSPECTOR IS NOT AVAILABLE AFTER PROPER NOTICE OF CONSTRUCTION ACTIVITY HAS BEEN PROVIDED, THE PERMITTEE MAY COMMENCE WORK IN THE INSPECTOR'S ABSENCE. HOWEVER, DOUGLAS COUNTY RESERVES THE RIGHT NOT TO ACCEPT THE IMPROVEMENT IF SUBSEQUENT TESTING REVEALS AN IMPROPER INSTALLATION.

6. THE LOCATION OF THE EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION. FOR INFORMATION CONTACT: COLORADO 811, AT 1-800-922-1987 (WWW.COLORADO811.ORG).

7. THE CONTRACTOR SHALL HAVE ONE (1) COPY OF THE PLANS SIGNED BY THE DOUGLAS COUNTY ENGINEERING DIRECTOR, ONE (1) COPY OF THE ROADWAY DESIGN AND CONSTRUCTION STANDARDS, AS AMENDED, AND ALL APPLICABLE PERMITS AT THE JOB SITE AT ALL TIMES.

8. ALL PROPOSED STREET CUTS TO EXISTING PAVEMENTS FOR UTILITIES, STORM SEWER OR FOR OTHER PURPOSES ARE LISTED ON REFERENCED BELOW:

EXAMPLES: WATER TIE-IN	SHEET 3
STORM SEWER CONNECTION	SHEET 6

9. A TRAFFIC CONTROL PLAN, IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, SHALL BE SUBMITTED TO DOUGLAS COUNTY FOR ACCEPTANCE WITH THE RIGHT-OF-WAY USE AND CONSTRUCTION PERMIT APPLICATION. A RIGHT-OF-WAY USE AND CONSTRUCTION PERMIT WILL NOT BE ISSUED WITHOUT AN ACCEPTED TRAFFIC CONTROL PLAN FOR TRAFFIC CONTROL DURING CONSTRUCTION.

10. THE CONSTRUCTION PLANS SHALL BE CONSIDERED VALID FOR THREE (3) YEARS FROM THE DATE OF COUNTY ACCEPTANCE, AFTER WHICH TIME THESE PLANS SHALL BE VOID AND WILL BE SUBJECT TO RE-REVIEW AND RE-ACCEPTANCE BY DOUGLAS COUNTY.

11. DOUGLAS COUNTY STANDARD DETAILS SHALL NOT BE MODIFIED. ANY NON-STANDARD DETAILS WILL BE CLEARLY IDENTIFIED AS SUCH.

12. PAVING, INCLUDING CONSTRUCTION OF CURB AND GUTTER (WHEN USED), SHALL NOT START UNTIL A PAVEMENT DESIGN REPORT AND SUBGRADE COMPACTION TESTS ARE ACCEPTED BY THE ENGINEERING INSPECTION DIVISION FOR ALL PUBLIC AND PRIVATE ROADS.

13. STANDARD DOUGLAS COUNTY HANDICAP RAMPS ARE TO BE CONSTRUCTED AT ALL CURB RETURNS AND AT MID-BLOCK LOCATIONS OPPOSITE OF ONE OF THE CURB RETURNS OF ALL "T" INTERSECTIONS AS IDENTIFIED ON THESE PLANS.

14. ALL STATIONING IS BASED ON CENTERLINE OF ROADWAYS UNLESS OTHERWISE NOTED.

15. ALL ELEVATIONS ARE ON UNITED STATES COAST AND GEODETIC SURVEY (USC&GS) (NAVD-88) DATUM WITH DATE. THE RANGE POINT OR MONUMENTS SHALL BE SHOWN ON CONSTRUCTION DRAWINGS.

16. ALL STORM SEWER IMPROVEMENTS (PUBLIC AND PRIVATE) INCLUDING, BUT NOT LIMITED TO, INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, RIPRAP, DETENTION BASINS, FOREBAYS, MICROPOOLS, AND WATER QUALITY FACILITIES REQUIRE PERMITTING AND INSPECTIONS. PLEASE CONTACT THE DOUGLAS COUNTY ENGINEERING INSPECTIONS DIVISION AT 303-660-7487 FOR PERMITTING REQUIREMENTS AND INSPECTIONS SCHEDULING.

17. TWO (2) MANHOLE ACCESS POINTS ARE REQUIRED ON ALL TYPE "R" CURB INLETS GREATER THAN OR EQUAL TO TEN (10) FEET IN LENGTH.

18. EPOXY COATED REBAR IS REQUIRED ON ALL DRAINAGE STRUCTURES.

19. DOUGLAS COUNTY REQUIRES CLASS D CONCRETE FOR ALL DRAINAGE STRUCTURES.

20. ALL RCP STORM SEWERS MUST USE ASTM C443 WATERTIGHT GASKETS PER THE CURRENT DOUGLAS COUNTY AND URBAN DRAINAGE DESIGN CRITERIA.

21. ALL RCP SHALL BE CLASS III STORM SEWER PIPE UNLESS OTHERWISE SPECIFIED.

22. JOINT RESTRAINS ARE REQUIRED FOR A MINIMUM OF THE LAST TWO PIPE JOINTS AND FLARED END SECTION OF AN RCP OUTFALL.

23. PRECAST INLETS AND MANHOLE BASES ARE NOT ALLOWED.

24. TOE WALLS ARE REQUIRED ON FLARED END SECTIONS AT THE OUTLET END OF CULVERTS AND STORM SEWER OUTFALLS.

25. FILTER FABRIC IS REQUIRED UNDER ALL RIPRAP PADS.

26. THE PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF COLORADO, SIGNING THESE PLANS IS RESPONSIBLE FOR ENSURING THAT THE DETAILS INCLUDED ARE COMPATIBLE WITH THE STANDARD DOUGLAS COUNTY DETAILS CONTAINED IN THE LATEST VERSIONS OF THE CRITERIA MANUALS. THIS INCLUDES, BUT IS NOT LIMITED TO:

   - DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS
   - DOUGLAS COUNTY STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA
   - DOUGLAS COUNTY GRADING, EROSION AND SEDIMENT CONTROL CRITERIA
   - CDOT M & S STANDARDS
   - MUTCD
   - URBAN STORM DRAINAGE CRITERIA MANUAL VOLUMES 1, 2 & 3

27. A TEMPORARY CONSTRUCTION ACCESS PERMIT FROM DOUGLAS COUNTY MAY BE REQUIRED FOR ANY PROJECT.

G:\Perry Park WSD\2021-068\600\DOUGLAS COUNTY STANDARD NOTES.dwg, DOUGLAS COUNTY STANDARD NOTES - 24x36, 3/29/2024 8:39:43 AM, dw, AutoCAD PDF (General Documentation).pc3, 1:1

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

Perry Park Water & Sanitation District

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION

DOUGLAS COUNTY STANDARD NOTES

WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2

PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

SHEET 2 OF 11

LEGEND

AIR	AIR PIPING
DDD	DIGESTER DECANT DISCHARGE PIPING
G	GAS PIPING
NPW	NON-POTABLE WATER PIPING
OHE	OVERHEAD ELECTRIC LINE
P.S.P	PRIMARY SLUDGE PIPING
SS	SANITARY SEWER PIPING
SW	STORMWATER PIPING
UGE	UNDERGROUND ELECTRIC LINE
W	POTABLE WATER PIPING
WAS	WASTE ACTIVATED SLUDGE PIPING
	CHAIN LINK FENCE
	NEW PIPING LARGER THAN 10"
	NEW PIPING SMALLER THAN 12"
	EXISTING PIPING LARGER THAN 10"
	EXISTING PIPING SMALLER THAN 12"
	EXISTING GATE VALVE
	EXISTING PLUG VALVE
	CONCRETE PLUG
	NEW GATE VALVE
	NEW FIRE HYDRANT
	NEW YARD HYDRANT
	EXISTING YARD HYDRANT
	EXISTING FIRE HYDRANT
	EXISTING MANHOLE
	PROPOSED MANHOLE
	EXISTING ELECTRIC HAND HOLE
	NEW ELECTRIC HAND HOLE
GM	EXISTING GAS METER
	NEW GAS METER
	NEW ELECTRIC POWER POLE

EXISTING CHAIN LINK PERIMETER FENCE. DO NOT DISTURB – TYP.

EXISTING 8" D.I.P. RBC BYPASS (TO REMAIN)

EXISTING 8" D.I.P. RBC INFLUENT (TO REMAIN)

EXISTING SPLITTER STRUCTURE (TO REMAIN)

CONNECT NEW DECANT PIPING TO EXISTING DECANT PIPING. DO NOT DISTURB EXISTING STRUCTURE PENETRATION.

EXISTING 8" D.I.P. PRIMARY CLARIFIER EFFLUENT TO RBC's (TO REMAIN)

EXISTING 8" D.I.P. PRIMARY CLARIFIER BYPASS (TO REMAIN)

EXISTING 8" D.I.P. PRIMARY CLARIFIER INFLUENT (TO REMAIN)

INSTALL TEMPORARY EXTENSION OF W.A.S. PIPE TO EXISTING AIR LIFT MANHOLE. PIPE TO BE ABANDONED ONCE NEW DIGESTER AND SLUDGE STO. TANKS ARE IN OPERATION – TYP.

EXISTING MAINTENANCE/ CHEM FEED BUILDING (TO REMAIN)

EXISTING FLOC TANK (TO REMAIN)

EXISTING SECONDARY CLARIFIER (TO REMAIN)

EXISTING CHEM FEED BUILDING (TO REMAIN)

EXISTING RBC NO.2 (TO REMAIN)

EXISTING RBC NO.1 (TO REMAIN)

EXISTING BLOWER BUILDING (TO REMAIN)

EXISTING PRIMARY SLUDGE PUMP BUILDING (TO REMAIN)

EXISTING PRIMARY CLARIFIER (TO REMAIN)

EXISTING HEADWORKS SCREEN (TO REMAIN)

EXISTING AEROBIC DIGESTER (TO BE DEMOLISHED)

EXISTING OFFICE BUILDING (TO REMAIN)

PROPOSED W.A.S. PUMP VAULT

CONNECT NEW WAS PIPING TO EXISTING WAS PIPING. DO NOT DISTURB EXISTING STRUCTURE PENETRATION.

PROPOSED SLUDGE STORAGE BASIN

PROPOSED DIGESTER NO. 2

PROPOSED DIGESTER NO. 1

NEW BLOWER BUILDING

NEW ELECTRIC ROOM

EXISTING ENTRANCE GATE TO REMAIN

COUNTRY CLUB DR

EXISTING CHAIN LINK PERIMETER FENCE. DO NOT DISTURB – TYP.

NOTES:

1. REFER TO DETAILED SITE PLANS FOR PIPING CONNECTIONS AT BUILDINGS AND OTHER STRUCTURES.
2. REFER TO DRAWING G-27 FOR NATURAL GAS PIPING PLAN.
3. REFER TO DRAWING E-1 FOR MASTER SITE ELECTRICAL PLAN.
4. REFER TO DRAWING G-8 FOR MASTER SITE DEMOLITION PLAN, FOR EXISTING PIPING TO BE DEMOLISHED OR ABANDONED IN PLACE.
5. DISCOVERY EXCAVATION IS REQUIRED IN THIS AREA TO CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND PIPING. PERFORM DISCOVERY EXCAVATION PRIOR TO FINALIZING MANHOLE SUBMITTAL FOR THIS LOCATION.

N

0' 10' 20'
SCALE: 1" = 10'

PIPING SCHEDULE

(101)	SERVICE	U/S STRUCTURE	D/S STRUCTURE	SHEET REF.	PIPE DIA.	PIPE MATERIAL	NORMAL OPERATING PRESSURE (PSI)	MAX. OPERATING PRESSURE (PSI)	TEST PRESSURE (PSI)
101	WAS	W.A.S. PUMP VAULT	DIGESTER BASINS	1/G-19	4"	CE LINED D.I.P.	15	50	75
102	PS	PS PUMP BLDG	DIGESTER BASINS	1/G-19	4"	D.I.P.	15	50	75
103	DEC	DIGESTERS/SLG STO.	SLG STO. BASINS	1/G-20	6"	SDR35 PVC	GRAVITY	GRAVITY	5
104	AIR	BLOWER BLDG	DIGESTERS/SLG STORAGE	1/G-21	6"	UNLINED D.I.P.	7	10	15

PRELIMINARY COPY

DRAWING ISSUED FOR WATER QUALITY CONTROL DIVISION REVIEW WITH THE PROCESS DESIGN REPORT.

DECEMBER 8, 2023

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

MASTER UTILITY PLAN

WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2

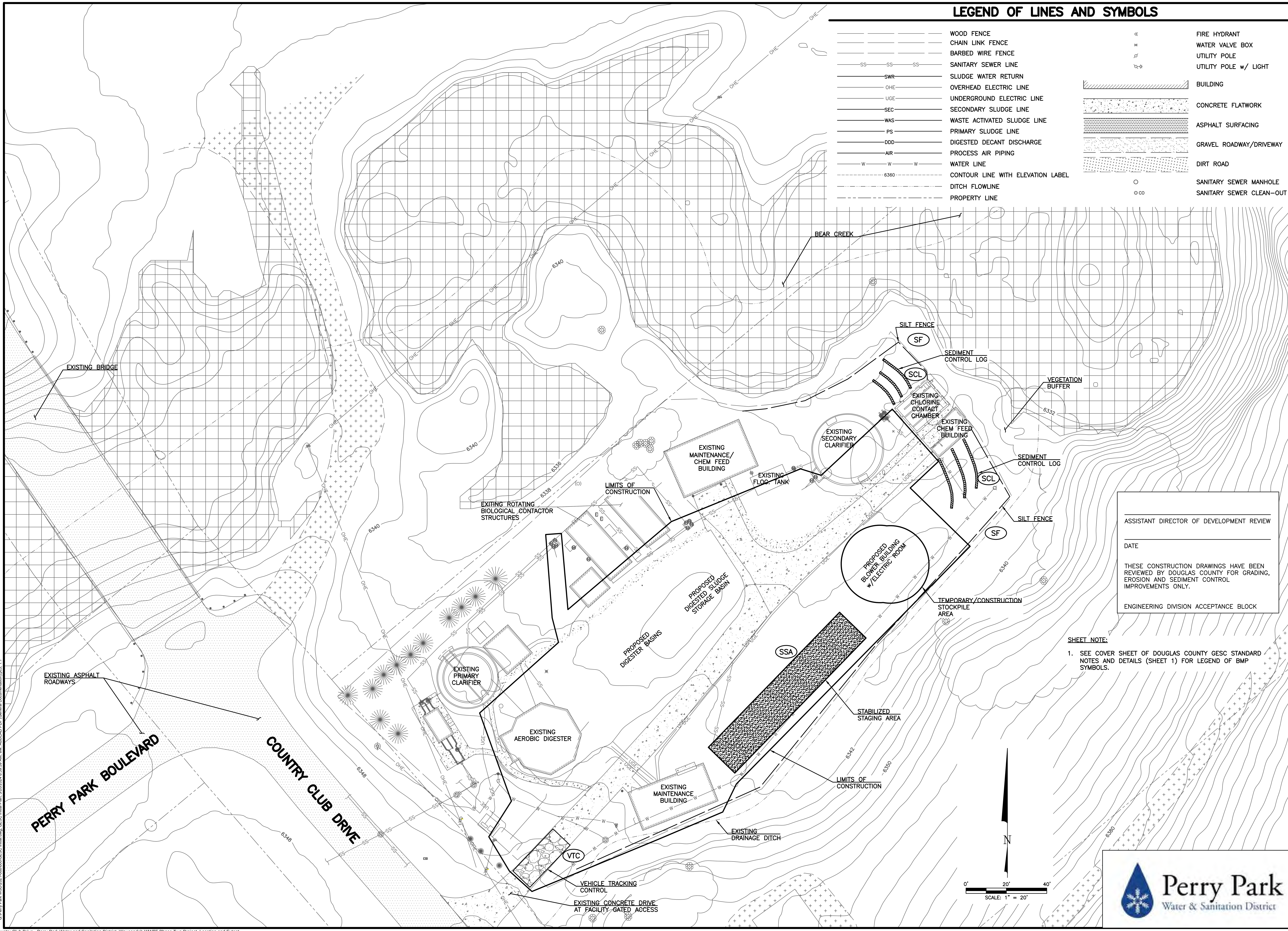
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
614 INNER CANYON LOOP
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

Perry Park Water & Sanitation District

SHEET 3 OF 11



LEGEND OF LINES AND SYMBOLS

WOOD FENCE
CHAIN LINK FENCE
BARBED WIRE FENCE
SS — SANITARY SEWER LINE
SWR — SLUDGE WATER RETURN
OHE — OVERHEAD ELECTRIC LINE
UGE — UNDERGROUND ELECTRIC LINE
SEC — SECONDARY SLUDGE LINE
WAS — WASTE ACTIVATED SLUDGE LINE
PS — PRIMARY SLUDGE LINE
DDD — DIGESTED DECANT DISCHARGE
AIR — PROCESS AIR PIPING
W — WATER LINE
6360 — CONTOUR LINE WITH ELEVATION LABEL
DITCH FLOWLINE
PROPERTY LINE
FIRE HYDRANT
WATER VALVE BOX
UTILITY POLE
UTILITY POLE w/ LIGHT
BUILDING
CONCRETE FLATWORK
ASPHALT SURFACING
GRAVEL ROADWAY/DRIVEWAY
DIRT ROAD
SANITARY SEWER MANHOLE
SANITARY SEWER CLEAN-OUT

SHEET NOTE:

1. SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP SYMBOLS.

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

GESC INITIAL PLAN
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

Perry Park
Water & Sanitation District

SHEET 4 OF 11

G:\Perry Park WSD\2021-068\600\GESC Initial.dwg, GESC Initial Plan, 3/20/2024 8:59:59 AM, slw, AutoCAD PDF (General Documentation).pc3, 1:1

LEGEND OF LINES AND SYMBOLS

- WOOD FENCE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- SS — SANITARY SEWER LINE
- SWR — SLUDGE WATER RETURN
- OHE — OVERHEAD ELECTRIC LINE
- UGE — UNDERGROUND ELECTRIC LINE
- SEC — SECONDARY SLUDGE LINE
- WAS — WASTE ACTIVATED SLUDGE LINE
- PS — PRIMARY SLUDGE LINE
- DDD — DIGESTED DECANT DISCHARGE
- AIR — PROCESS AIR PIPING
- W — WATER LINE
- 6360 — CONTOUR LINE WITH ELEVATION LABEL
- DITCH FLOWLINE
- PROPERTY LINE

- FIRE HYDRANT
- WATER VALVE BOX
- UTILITY POLE
- UTILITY POLE w/ LIGHT
- BUILDING
- CONCRETE FLATWORK
- ASPHALT SURFACING
- GRAVEL ROADWAY/DRIVEWAY
- DIRT ROAD
- SANITARY SEWER MANHOLE
- CO — SANITARY SEWER CLEAN–OUT

BEAR CREEK

EXISTING BRIDGE

SILT FENCE (SF)

SEDIMENT CONTROL LOG (SCL)

VEGETATION BUFFER

EXISTING CHLORINE CONTACT CHAMBER

EXISTING CHEM FEED BUILDING

EXISTING SECONDARY CLARIFIER

EXISTING MAINTENANCE/ CHEM FEED BUILDING

EXISTING FLOC. TANK

LIMITS OF CONSTRUCTION

EXITING ROTATING BIOLOGICAL CONTACTOR STRUCTURES

PROPOSED BLOWER BUILDING W/ELECTRIC ROOM

PROPOSED DIGESTED SLUDGE STORAGE BASIN

PROPOSED DIGESTER BASINS

CUT VOLUME = 400 CY
FILL VOLUME = 350 CY

TEMPORARY/CONSTRUCTION STOCKPILE AREA

SSA

EXISTING PRIMARY CLARIFIER

EXISTING AEROBIC DIGESTER

STABILIZED STAGING AREA

EXISTING MAINTENANCE BUILDING

CWA

EXISTING DRAINAGE DITCH

CONCRETE WASHOUT AREA

VTC

VEHICLE TRACKING CONTROL

EXISTING CONCRETE DRIVE AT FACILITY GATED ACCESS

EXISTING ASPHALT ROADWAYS

PERRY PARK BOULEVARD

COUNTRY CLUB DRIVE

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SHEET NOTE:

1. SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP SYMBOLS.
2. SHADED BMPS WERE INSTALLED IN INITIAL STAGE AND SHALL BE LEFT IN PLACE IN INTERIM STAGE UNLESS OTHERWISE NOTED.
3. ALL INTERIM EROSION AND SEDIMENT CONTROL BMPS INCLUDING DRILL SEEDING AND CRIMP MULCHING OF DISTURBED AREAS, MUST BE INSTALLED, INSPECTED, AND APPROVED BY THE COUNTY PRIOR TO THE ISSUANCE OF A RIGHT–OF–WAY USE AND CONSTRUCTION PERMIT FOR THE PURPOSE OF PAVING OR INSTALLATION OF CURB AND GUTTER.
4. SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITY FACILITIES, CULVERTS, STORM DRAINS, AND OUTLET PROTECTION.

N

0' 20' 40'
SCALE: 1" = 20'

Perry Park Water & Sanitation District

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

GESC INTERIM PLAN
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021–068.600
GMS FILE NO.	3788

SHEET 5 OF 11

G:\Perry Park WSD\2021-068\800\GESC Interim.dwg, GESC Interim Plan, 3/20/2024 9:07:04 AM, slw, AutoCAD PDF (General Documentation).pc3, 1:1

LEGEND OF LINES AND SYMBOLS

- WOOD FENCE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- SANITARY SEWER LINE
- SLUDGE WATER RETURN
- OVERHEAD ELECTRIC LINE
- UNDERGROUND ELECTRIC LINE
- SECONDARY SLUDGE LINE
- WASTE ACTIVATED SLUDGE LINE
- PRIMARY SLUDGE LINE
- DIGESTED DECANT DISCHARGE
- PROCESS AIR PIPING
- WATER LINE
- CONTOUR LINE WITH ELEVATION LABEL
- DITCH FLOWLINE
- PROPERTY LINE
- FIRE HYDRANT
- WATER VALVE BOX
- UTILITY POLE
- UTILITY POLE w/ LIGHT
- BUILDING
- CONCRETE FLATWORK
- ASPHALT SURFACING
- GRAVEL ROADWAY/DRIVEWAY
- DIRT ROAD
- SANITARY SEWER MANHOLE
- SANITARY SEWER CLEAN-OUT

BEAR CREEK
EXISTING BRIDGE
VEGETATION BUFFER
EXISTING CHLORINE CONTACT CHAMBER
EXISTING CHEM FEED BUILDING
SEEDING AND MULCHING
EXISTING SECONDARY CLARIFIER
EXISTING MAINTENANCE/ CHEM FEED BUILDING
EXISTING FLOC. TANK
LIMITS OF CONSTRUCTION
EXITING ROTATING BIOLOGICAL CONTACTOR STRUCTURES
PROPOSED DIGESTED SLUDGE STORAGE BASIN
PROPOSED DIGESTER BASINS
PROPOSED BLOWER BUILDING W/ELECTRIC ROOM
SEEDING AND MULCHING
EXISTING PRIMARY CLARIFIER
EXISTING ASPHALT ROADWAYS
EXISTING AEROBIC DIGESTER
EXISTING MAINTENANCE BUILDING
LIMITS OF CONSTRUCTION
EXISTING DRAINAGE DITCH
CONCRETE WASHOUT TO BE REMOVED AFTER CONSTRUCTION
VEHICLE TRACKING CONTROL TO BE REMOVED AFTER CONSTRUCTION
EXISTING CONCRETE DRIVE AT FACILITY GATED ACCESS
PERRY PARK BOULEVARD
COUNTRY CLUB DRIVE

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SHEET NOTE:

1. SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP SYMBOLS.
2. SHADED BMPS WERE INSTALLED IN INITIAL OR INTERIM GESC DRAWING AND , UNLESS OTHERWISE INDICATED, SHALL BE LEFT IN PLACE UNTIL REVEGETATION ESTABLISHMENT IS APPROVED BY THE COUNTY.
3. SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, CULVERTS, STORM DRAINS AND OUTLET PROTECTION.

N

0' 20' 40'
SCALE: 1" = 20'

Perry Park Water & Sanitation District

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

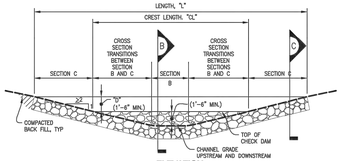
GESC FINAL PLAN
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

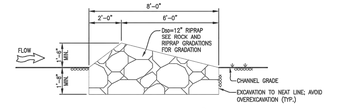
GMS, INC.
CONSULTING ENGINEERS
617 MAIN STREET
COLORADO SPRINGS, COLORADO 80903

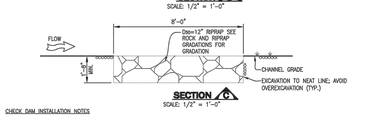
DRAWN	SKC	PROJECT NO.	2021-068.600
DESIGNED	SLW	GMS FILE NO.	3788
CHECKED	SLW		
DATE	MARCH 2024		

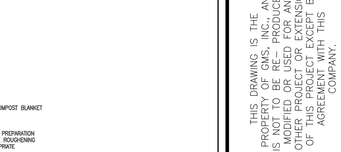
SHEET 6 OF 11

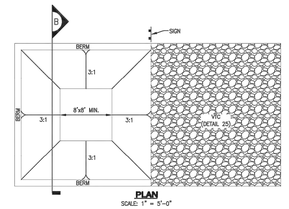
G:\Perry Park WSD\2021-068\600\GESC\Final\dwg_GESC Final Plan_7/20/2024 9:00:14 AM_dlw_AutoCAD PDF (General Documentation).pc3, 1:1

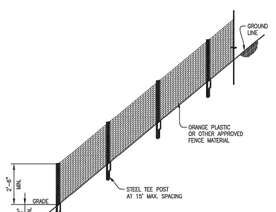


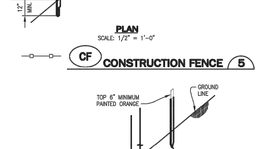












GRADING, EROSION, AND SEDIMENT CONTROL (GESC) GENERAL NOTES

1. THE DOUGLAS COUNTY ENGINEER'S SIGNATURE AFFIXED TO THIS DOCUMENT INDICATES THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING HAS REVIEWED THE DOCUMENT AND FOUND IT IN GENERAL COMPLIANCE WITH THE DOUGLAS COUNTY GRADING, EROSION AND SEDIMENT CONTROL (GESC) CRITERIA MANUAL. THE DOUGLAS COUNTY DIRECTOR OF ENGINEERING SERVICES, THROUGH ACCEPTANCE OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY (OTHER THAN AS STATED ABOVE) FOR THE COMPLETENESS AND/OR ACCURACY OF THESE DOCUMENTS.
2. THE ADEQUACY OF THIS GESC PLAN LIES WITH THE ORIGINAL DESIGN ENGINEER.
3. THE GESC PLAN SHALL BE CONSIDERED VALID FOR THREE (3) YEARS FROM THE DATE OF ACCEPTANCE BY DOUGLAS COUNTY, AFTER WHICH TIME THE PLAN SHALL BE VOID AND WILL BE SUBJECT TO RE-REVIEW AND RE-ACCEPTANCE BY DOUGLAS COUNTY.
4. ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING. DOUGLAS COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO THE GESC MANUAL, GESC PLAN OR GESC PERMIT.
5. THE PLACEMENT OF EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs) SHALL BE IN ACCORDANCE WITH THE DOUGLAS COUNTY ACCEPTED GESC PLAN AND THE DOUGLAS COUNTY GESC MANUAL, AS AMENDED.
6. ANY VARIATION IN MATERIAL, TYPE OR LOCATION OF EROSION AND SEDIMENT CONTROL BMPs FROM THE DOUGLAS COUNTY ACCEPTED GESC PLAN WILL REQUIRE APPROVAL FROM AN ACCOUNTABLE REPRESENTATIVE OF THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING.
7. AFTER THE GESC PLAN HAS BEEN ACCEPTED, THE GESC PERMIT APPLIED FOR, FEES AND FISCAL SECURITY SUBMITTED TO THE COUNTY, AND THE GESC FIELD MANUAL OBTAINED AND REVIEWED, THE CONTRACTOR MAY INSTALL THE INITIAL-STAGE EROSION AND SEDIMENT CONTROL BMPs INDICATED ON THE ACCEPTED GESC PLAN.
8. THE FIRST BMP TO BE INSTALLED ON THE SITE SHALL BE CONSTRUCTION FENCE, MARKERS, OR OTHER APPROVED MEANS OF DEFINING THE LIMITS OF CONSTRUCTION, INCLUDING CONSTRUCTION LIMITS ADJACENT TO STREAM CORRIDORS AND OTHER AREAS TO BE PRESERVED.
9. AFTER INSTALLATION OF THE INITIAL-STAGE EROSION AND SEDIMENT CONTROL BMPs, THE PERMITTEE SHALL CALL THE DOUGLAS COUNTY ENGINEERING PERMITS STAFF AT 303-660-7487 TO SCHEDULE A PRECONSTRUCTION MEETING AT THE PROJECT SITE. THE REQUEST SHALL BE MADE A MINIMUM OF THREE BUSINESS DAYS PRIOR TO THE REQUESTED MEETING TIME. NO CONSTRUCTION ACTIVITIES SHALL BE PLANNED WITHIN 24 HOURS AFTER THE PRECONSTRUCTION MEETING.
10. THE OWNER OR OWNER'S REPRESENTATIVE, THE GESC MANAGER, THE GENERAL CONTRACTOR, AND THE GRADING SUBCONTRACTOR, IF DIFFERENT FROM THE GENERAL CONTRACTOR, MUST ATTEND THE PRECONSTRUCTION MEETING. IF ANY OF THE REQUIRED PARTICIPANTS FAIL TO ATTEND THE PRECONSTRUCTION MEETING, OR IF THE GESC FIELD MANUAL IS NOT ON SITE, OR IF THE INSTALLATION OF THE INITIAL BMPs ARE NOT APPROVED BY THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR, THE APPLICANT WILL HAVE TO PAY A REINSPECTION FEE, ADDRESS ANY PROBLEMS WITH BMP INSTALLATION, AND CALL TO RESCHEDULE THE MEETING, WITH A CORRESPONDING DELAY IN THE START OF CONSTRUCTION. DOUGLAS COUNTY STRONGLY ENCOURAGES THE APPLICANT TO HAVE THE ENGINEER OF RECORD AT THE PRECONSTRUCTION MEETING.
11. CONSTRUCTION SHALL NOT BEGIN UNTIL THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR APPROVES THE INSTALLATION OF THE INITIAL BMPs AND THE APPROVED GESC PERMIT IS PICKED UP FROM THE COUNTY AND IS IN-HAND ON THE SITE. THE COMPLETED PERMIT WILL BE AVAILABLE WITHIN 24-HOURS AFTER THE INSTALLATION OF THE INITIAL BMPs ARE APPROVED.
12. THE GESC MANAGER SHALL STRICTLY ADHERE TO THE DOUGLAS COUNTY-APPROVED LIMITS OF CONSTRUCTION AT ALL TIMES. THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING MUST APPROVE ANY CHANGES TO THE LIMITS OF CONSTRUCTION AND, AT THE DISCRETION OF THE ENGINEERING DIVISION, ADDITIONAL EROSION/SEDIMENT CONTROLS MAY BE REQUIRED IN ANY ADDITIONAL AREAS OF CONSTRUCTION.
13. THE MAXIMUM AREA OF CONSTRUCTION SHALL BE LIMITED TO 40 ACRES (70 ACRES IF APPROVED FOR SOIL MITIGATION OPERATIONS) TO REDUCE THE AMOUNT OF LAND DISTURBED AT ANY ONE TIME. LARGER SITES SHALL BE DIVIDED INTO PHASES THAT ARE EACH 40 (OR 70) ACRES OR LESS IN SIZE. THESE PROJECTS SHALL CONDUCT GRADING ACTIVITIES IN ACCORDANCE WITH THE ACCEPTED GESC PLAN. BMP INSTALLATION AND APPROVAL BY DOUGLAS COUNTY AT THE START AND COMPLETION OF EACH PHASE SHALL BE CONDUCTED IN ACCORDANCE WITH THE PROCEDURES OUTLINED IN THE GESC MANUAL AND/OR GESC FIELD MANUAL.
14. PRIOR TO ANY CONSTRUCTION ACTIVITY, THE PERMITTEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES. FOR INFORMATION, CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) AT 811, 1-800-922-1987, OR WWW.COLORADO811.ORG.
15. NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHEREVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATIONS.
16. THE GESC PERMIT SHALL BE VALID FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ISSUANCE.
17. A COPY OF THE GESC PERMIT, ACCEPTED GESC PLANS AND THE GESC FIELD MANUAL SHALL BE ON SITE AT ALL TIMES.
18. THE GESC MANAGER SHALL BE RESPONSIBLE FOR ENSURING THAT THE SITE REMAINS IN COMPLIANCE WITH THE GESC PERMIT AND SHALL BE THE PERMITTEE'S CONTACT PERSON WITH THE COUNTY FOR ALL MATTERS PERTAINING TO THE GESC PERMIT. THE GESC MANAGER SHALL BE PRESENT AT THE SITE THE MAJORITY OF THE TIME AND SHALL BE AVAILABLE THROUGH A 24-HOUR CONTACT NUMBER. IN THE EVENT THAT THE CONTRACTOR'S GESC MANAGER IS NOT ON SITE AND CANNOT BE REACHED DURING A VIOLATION, THE ALTERNATE GESC MANAGER SHALL BE CONTACTED. IF NEITHER THE GESC MANAGER NOR ALTERNATE GESC MANAGER CAN BE CONTACTED DURING ANY VIOLATION, A STOP WORK ORDER MAY BE ISSUED.
19. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE THROUGH THE DOUGLAS COUNTY-APPROVED ACCESS POINT. A VEHICLE TRACKING CONTROL PAD IS REQUIRED AT ALL ACCESS POINTS ON THE SITE. ADDITIONAL STABILIZED CONSTRUCTION ENTRANCES MAY BE ADDED WITH AUTHORIZATION FROM THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING.
20. THE GESC MANAGER IS RESPONSIBLE FOR CLEANUP OF SEDIMENT OR CONSTRUCTION DEBRIS TRACKED ONTO ADJACENT PAVED AREAS. PAVED AREAS INCLUDING STREETS ARE TO BE KEPT CLEAN THROUGHOUT BUILD-OUT AND SHALL BE CLEANED, WITH A STREET SWEEPER OR SIMILAR DEVICE, AT FIRST NOTICE OF ACCIDENTAL TRACKING OR AT THE DISCRETION OF THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR. STREET WASHING IS NOT ALLOWED. DOUGLAS COUNTY RESERVES THE RIGHT TO REQUIRE ADDITIONAL MEASURES TO ENSURE AREA STREETS ARE KEPT FREE OF SEDIMENT AND/OR CONSTRUCTION DEBRIS.
21. APPROVED EROSION AND SEDIMENT CONTROL BMPs SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THIS PROJECT. AT A MINIMUM, THE GESC MANAGER SHALL INSPECT ALL BMPs IN ACCORDANCE WITH THE ACCEPTED GESC PLAN AND GESC MANUAL. LEVEL III VIOLATIONS SHALL BE CORRECTED IMMEDIATELY AFTER THE PERMITTEE(S) NOTICE THE VIOLATION(S) OR ARE NOTIFIED OF THE VIOLATION(S). GENERALLY DOUGLAS COUNTY WILL REINSPECT FOR COMPLIANCE WITHIN 48 HOURS OF NOTIFICATION OF LEVEL III VIOLATIONS. LEVEL II VIOLATIONS SHALL BE CORRECTED IMMEDIATELY, OR AS DIRECTED BY A DOUGLAS COUNTY EROSION CONTROL INSPECTOR. ACCUMULATED SEDIMENT AND CONSTRUCTION DEBRIS SHALL BE REMOVED AND PROPERLY DISPOSED.
22. STRAW BALES ARE NOT A DOUGLAS COUNTY ACCEPTED SEDIMENT CONTROL BMP.
23. TOPSOIL SHALL BE STRIPPED AND STOCKPILED IN THE LOCATION SHOWN ON THE ACCEPTED GESC PLAN. THE GESC MANAGER SHALL SCHEDULE AN INSPECTION WITH THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR AS SOON AS TOPSOIL STRIPPING IS COMPLETED. FAILURE TO SCHEDULE SUCH INSPECTION OR FAILURE TO STOCKPILE TOPSOIL SHALL RESULT IN ISSUANCE OF A STOP WORK ORDER. THE STOP WORK ORDER SHALL REMAIN IN PLACE UNTIL TOPSOIL IS STOCKPILED ON SITE OR APPROPRIATE SOIL AMENDMENTS ARE STOCKPILED ON SITE.
24. THE ACCEPTED GESC PLAN MAY REQUIRE CHANGES OR ALTERATIONS AFTER APPROVAL TO MEET CHANGING SITE OR PROJECT CONDITIONS OR TO ADDRESS INEFFICIENCIES IN DESIGN OR INSTALLATION. THE GESC MANAGER SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER AND DOUGLAS COUNTY PUBLIC WORKS ENGINEERING FOR ANY PROPOSED CHANGES.
25. LINING OF TEMPORARY SWALES AND DITCHES SHALL BE IN ACCORDANCE WITH THE GESC CRITERIA MANUAL.
26. NO PERMANENT EARTH SLOPES GREATER THAN 3:1 SHALL BE ALLOWED.
27. ANY SETTLEMENT OR SOIL ACCUMULATIONS BEYOND THE LIMITS OF CONSTRUCTION DUE TO GRADING OR EROSION SHALL BE REPAIRED IMMEDIATELY BY THE GESC MANAGER. THE GESC MANAGER SHALL BE HELD RESPONSIBLE FOR OBTAINING ACCESS RIGHTS TO ADJACENT PROPERTY, IF NEEDED, AND REMEDIATING ANY ADVERSE IMPACTS TO ADJACENT WATERWAYS, WETLANDS, PROPERTIES, ETC. RESULTING FROM WORK DONE AS PART OF THIS PROJECT.
28. A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
29. SOILS THAT WILL BE STOCKPILED FOR MORE THAN THIRTY (30) DAYS SHALL BE SEEDED AND MULCHED WITHIN FOURTEEN (14) DAYS OF STOCKPILE CONSTRUCTION. NO STOCKPILES SHALL BE PLACED WITHIN ONE HUNDRED (100) FEET OF A DRAINAGE WAY UNLESS APPROVED BY THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING.
30. ALL CHEMICAL OR HAZARDOUS MATERIAL SPILLS WHICH MAY ENTER WATERS OF THE STATE OF COLORADO, WHICH INCLUDE BUT ARE NOT LIMITED TO, SURFACE WATER, GROUND WATER AND DRY GULLIES OR STORM SEWER LEADING TO SURFACE WATER, SHALL BE IMMEDIATELY REPORTED TO THE CDPHE PER CRS 25-8-601, AND DOUGLAS COUNTY. RELEASES OF PETROLEUM PRODUCTS AND CERTAIN HAZARDOUS SUBSTANCES LISTED UNDER THE FEDERAL CLEAN WATER ACT (40 CFR PART 116) MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER AS WELL AS THE CDPHE. CONTACT INFORMATION FOR CDPHE, DOUGLAS COUNTY AND THE NATIONAL RESPONSE CENTER CAN BE FOUND IN APPENDIX A OF THE GESC MANUAL, AS AMENDED. SPILLS THAT POSE AN IMMEDIATE RISK TO HUMAN LIFE SHALL BE REPORTED TO 911. FAILURE TO REPORT AND CLEAN UP ANY SPILL MAY RESULT IN ISSUANCE OF A STOP WORK ORDER.
31. ALL WORK ON SITE SHALL STAY A MINIMUM OF ONE HUNDRED (100) FEET AWAY FROM ANY DRAINAGEWAY, WETLAND, ETC. UNLESS OTHERWISE NOTED ON AN ACCEPTED DOUGLAS COUNTY GESC PLAN.
32. ALL PROJECTS SHALL BALANCE EARTHWORK QUANTITIES ON SITE. IN THE EVENT A VARIANCE IS GRANTED BY THE COUNTY DIRECTOR OF ENGINEERING SERVICES TO ALLOW IMPORT OR EXPORT OF MATERIAL, THE PERMITTEE SHALL HAVE A GESC PERMIT IN HAND FOR THE IMPORT OR EXPORT SITE PRIOR TO ANY TRANSPORTING OF EARTHEN MATERIAL. THE GESC MANAGER SHALL NOTIFY THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR OF THE LOCATION AND PERMIT NUMBERS OF BOTH THE EXPORTING AND IMPORTING SITES PRIOR TO ANY IMPORT/ EXPORT OPERATIONS.
33. THE USE OF REBAR, STEEL STAKES OR STEEL FENCE POSTS FOR STAKING OR SUPPORT OF ANY EROSION OR SEDIMENT CONTROL BMP IS PROHIBITED (EXCEPT STEEL TEE-POSTS FOR USE IN SUPPORTING CONSTRUCTION FENCE).
34. THE CLEANING OF CONCRETE DELIVERY TRUCK CHUTES IS RESTRICTED TO APPROVED CONCRETE WASH OUT LOCATIONS ON THE JOB SITE. THE DISCHARGE OF WATER CONTAINING WASTE CONCRETE TO THE STORM SEWER SYSTEM IS PROHIBITED. ALL CONCRETE WASTE SHALL BE PROPERLY CLEANED UP AND DISPOSED AT AN APPROPRIATE LOCATION.
35. ALL DEWATERING ON SITE SHALL BE COORDINATED WITH A DOUGLAS COUNTY EROSION CONTROL INSPECTOR AND BE FREE OF SEDIMENT IN ACCORDANCE WITH THE GESC MANUAL.
36. ALL PERMANENT INSTALLATIONS OF PIPES FOR STORM SEWERS, SLOPE DRAINS, AND CULVERTS, TOGETHER WITH RIPRAP APRONS OR OTHER INLET AND OUTLET PROTECTION, REQUIRE INSPECTION BY DOUGLAS COUNTY PUBLIC WORKS ENGINEERING (SEPARATE FROM GESC INSPECTIONS).
37. ALL DISTURBED AREAS SHALL BE DRILL SEEDED AND CRIMP MULCHED IN ACCORDANCE WITH THE GESC CRITERIA MANUAL WITHIN THIRTY (30) DAYS OF INITIAL EXPOSURE OR WITHIN FOURTEEN (14) DAYS OF SUBSTANTIAL COMPLETION (AS DEFINED BY DOUGLAS COUNTY) OF AN AREA, WHICHEVER IS LESS. THIS MAY REQUIRE MULTIPLE MOBILIZATIONS FOR SEEDING AND MULCHING.
38. ALL SLOPES STEEPER THEN 4:1 REQUIRE EROSION CONTROL BLANKETING.
39. HYDRAULIC SEEDING AND HYDRAULIC MULCHING ARE NOT AN ACCEPTABLE METHOD OF SEEDING OR MULCHING IN DOUGLAS COUNTY.
40. NO CURB AND GUTTER PERMITS SHALL BE ISSUED UNTIL ALL DISTURBED AREAS ARE DRILL SEEDED AND CRIMP MULCHED.
41. NO PAVING PERMITS SHALL BE ISSUED UNTIL ALL INTERIM INLET PROTECTION IS INSTALLED AND APPROVED BY THE EROSION CONTROL INSPECTOR.
42. A GESC INSPECTION SHALL BE CONDUCTED FOR CERTIFICATE OR TEMPORARY CERTIFICATE OF OCCUPANCY OR INITIAL ACCEPTANCE.
43. GESC MANAGER SHALL PROVIDE AND MAINTAIN PORTABLE TOILETS AND TRASH DUMPSTERS FOR THE PROJECT.

BMP LEGEND

DETAIL NO.	SHEET NO.		BMP LEGEND
1	①	CD	CHECK DAM
2	①	CB	COMPOST BLANKET
3	①	CFB	COMPOST FILTER BERM
4	①	CWA	CONCRETE WASHOUT AREA
5	①	CF	CONSTRUCTION FENCE
6	①	CM	CONSTRUCTION MARKER
7	①	CS	CURB SOCK
8	①	DW	DEWATERING
9	①	DD	DIVERSION DITCH
10	②	ECB	EROSION CONTROL BLANKET
11	②	IP	INLET PROTECTION
12	②	RCD	REINFORCED CHECK DAM
13	②	RRB	REINFORCED ROCK BERM
14	②	RRC	RRB FOR CULVERT PROTECTION
15	②	SB	SEDIMENT BASIN
16	③	SCL	SEDIMENT CONTROL LOG
17	③	ST	SEDIMENT TRAP
18	③	SM	SEEDING AND MULCHING
19	③	SF	SILT FENCE
20	③	SSA	STABILIZED STAGING AREA
21	③	SR	SURFACE ROUGHENING
22	③	TSD	TEMPORARY SLOPE DRAIN
23	③	TSC	TEMPORARY STREAM CROSSING
24	③	TER	TERRACING
25	③	VTC	VEHICLE TRACKING CONTROL
26	③	WW	VTC WITH WHEEL WASH
	①		ROCK AND RIPRAP GRADATIONS
		LOC	LIMITS OF CONSTRUCTION

CHECK DAM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF CHECK DAMS.
   - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
   - LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
2. CHECK DAMS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND-DISTURBING ACTIVITIES.
3. RIPRAP UTILIZED FOR CHECK DAMS SHALL HAVE A D_{50} MEDIAN STONE SIZE OF 12".
4. RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'-8".
5. THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1'-6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR CHECK DAMS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CHECK DAM IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
3. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND VEGETATED COVER IS APPROVED BY THE COUNTY.
4. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. ANY DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

CD CHECK DAM 1

COMPOST BLANKET AND COMPOST FILTER BERM

SCALE: 1" = 5'-0"

COMPOST BLANKET NOTES:

1. SEE PLAN VIEW FOR AREA OF COMPOST BLANKET.
2. MAY BE USED IN PLACE OF STRAW MULCH OR EROSION CONTROL BLANKET IN AREAS WHERE ACCESS IS DIFFICULT DUE TO LANDSCAPING OR OTHER OBJECTS OR IN AREAS WHERE A SMOOTH TURF GRASS FINISH IS DESIRED.
3. SHALL ONLY BE UTILIZED IN AREAS WHERE SHEET FLOW CONDITIONS PREVAIL; SHALL BE PROHIBITED IN AREAS OF POSSIBLE CONCENTRATED FLOW.
4. SOIL PREPARATION SHALL BE COMPLETE PER THE SPECIFICATIONS OUTLINED IN THESE CRITERIA PRIOR TO APPLICATION.
5. WHEN TURF GRASS FINISH IS NOT DESIRED, SURFACE ROUGHENING ON SLOPES SHALL TAKE PLACE PRIOR TO APPLICATION.
6. SHALL BE EVENLY APPLIED AT A DEPTH OF 2 INCH.
7. MAYBE APPLIED UTILIZING PNEUMATIC BLOWER, OR BY HAND.
8. SEEDING SHALL BE DRILLED PRIOR TO THE APPLICATION OF COMPOST OR SEED MAY BE COMBINED AND BLOWN WITH THE PNEUMATIC BLOWER.
9. COMPOST FILTER BERM SHALL BE UTILIZED ON SLOPES WITH A MAXIMUM SPACING OF 15 FEET PER THE REQUIREMENTS FOUND IN THE COMPOST FILTER BERM SECTION.
10. THE RECOMMENDED INSPECTION FREQUENCY IS WEEKLY, DURING AND AFTER ANY STORM EVENT.
11. COMPOST USED IN THE APPLICATION OF THE COMPOST BLANKET SHALL BE A CLASS I COMPOST AS DEFINED BY THE FOLLOWING PHYSICAL, CHEMICAL, AND BIOLOGICAL PARAMETERS:

PARAMETERS	CLASS I COMPOST FOR COMPOST BLANKET
MINIMUM STABILITY INDICATOR	STABLE TO VERY STABLE
SOLUBLE SALTS	MAXIMUM 5mmhos/cm
PH	6.0 – 8.0
AG INDEX	> 10
MATURITY INDICATOR EXPRESSED AS PERCENTAGE OF GERMINATION/VIGOR	80+/80+
MATURITY INDICATOR EXPRESSED AS AMMONIA N/ NITRATE N RATIO	< 4
MATURITY INDICATOR EXPRESSED AS CARBON TO NITROGEN RATIO	20:1
TESTED FOR CLOPYRALID	YES/NEGATIVE RESULT
MOISTURE CONTENT	30–60 %
ORGANIC MATTER CONTENT	25–45 % OF DRY WEIGHT
PARTICLE SIZE DISTRIBUTION	3" (75mm) 100% PASSING 1" (25mm) 95% TO 100% PASSING 3/4" (19mm) 85% TO 90% PASSING 3/8" (9.5mm) 50% TO 60% PASSING #4 20 TO 35% PASSING
PRIMARY, SECONDARY NUTRIENTS; TRACE ELEMENT	MUST BE REPORTED
TESTING AND TEST REPORT SUBMITTAL REQUIREMENTS	STA + CLOPYRALID
ORGANIC MATTER PER CUBIC YARD	MUST REPORT
CHEMICAL CONTAMINANTS	MEET OR EXCEED US EPA CLASS A STANDARD, 40 CFR 503.1 TABLES 1 & 3 LEVELS
MINIMUM MANUFACTURING/PRODUCTION REQUIREMENT	FULLY PERMITTED UNDER COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
RISK FACTOR RELATING TO PLANT GERMINATION AND HEALTH	LOW

NOTE: CLOPYRALID IS THE COMMON NAME OF A HERBICIDE THAT KILLS BROAD-LEAVED WEEDS SUCH AS DANDELIONS, CLOVER AND THISTLE.

CB COMPOST BLANKET 2

COMPOST FILTER BERM NOTES:

1. SEE PLAN VIEW FOR LENGTH OF COMPOST FILTER BERM.
2. SHALL BE APPLIED TO ALL SLOPES RECEIVING A COMPOST BLANKET AT 15' INCREMENTS.
3. FILTER BERMS SHALL RUN PARALLEL TO THE CONTOUR.
4. FILTER BERMS SHALL BE A MINIMUM OF 1' H x 2' W.
5. FILTER BERMS SHALL BE APPLIED UTILIZING PNEUMATIC BLOWER, OR BY HAND.
6. SHALL ONLY BE UTILIZED IN AREAS WHERE SHEET FLOW CONDITIONS PREVAIL; SHALL BE PROHIBITED IN AREAS OF POSSIBLE CONCENTRATED FLOW.
7. SOIL PREPARATION SHALL BE COMPLETE PER THE SPECIFICATIONS OUTLINED IN THESE CRITERIA PRIOR TO APPLICATION.
8. WHEN TURF GRASS FINISH IS NOT DESIRED, SURFACE ROUGHENING ON SLOPES SHALL TAKE PLACE PRIOR TO APPLICATION.
9. SEEDING SHALL BE DRILLED BEFORE THE APPLICATION OF COMPOST OR SEED MAY BE COMBINED AND BLOWN WITH THE PNEUMATIC BLOWER.
10. THE RECOMMENDED INSPECTION FREQUENCY IS WEEKLY, DURING AND AFTER ANY STORM EVENT.
11. COMPOST USED IN THE APPLICATION OF THE COMPOST BLANKET SHALL BE A CLASS I COMPOST AS DEFINED BY THE FOLLOWING PHYSICAL, CHEMICAL, AND BIOLOGICAL PARAMETERS:

PARAMETERS	CLASS I COMPOST FOR COMPOST FILTER BERM
MINIMUM STABILITY INDICATOR	STABLE TO VERY STABLE
SOLUBLE SALTS	MAXIMUM 5mmhos/cm
PH	6.0 – 8.0
AG INDEX	> 10
MATURITY INDICATOR EXPRESSED AS PERCENTAGE OF GERMINATION/VIGOR	80+/80+
MATURITY INDICATOR EXPRESSED AS AMMONIA N/ NITRATE N RATIO	< 4
MATURITY INDICATOR EXPRESSED AS CARBON TO NITROGEN RATIO	20:1
TESTED FOR CLOPYRALID	YES/NEGATIVE RESULT
MOISTURE CONTENT	30–60 %
ORGANIC MATTER CONTENT	25–45 % OF DRY WEIGHT
PARTICLE SIZE DISTRIBUTION	3" (75mm) 100% PASSING 1" (25mm) 95% TO 100% PASSING 3/4" (19mm) 85% TO 90% PASSING 3/8" (9.5mm) 50% TO 60% PASSING #4 20 TO 35% PASSING
PRIMARY, SECONDARY NUTRIENTS; TRACE ELEMENT	MUST BE REPORTED
TESTING AND TEST REPORT SUBMITTAL REQUIREMENTS	STA + CLOPYRALID
ORGANIC MATTER PER CUBIC YARD	MUST REPORT
CHEMICAL CONTAMINANTS	MEET OR EXCEED US EPA CLASS A STANDARD, 40 CFR 503.1 TABLES 1 & 3 LEVELS
MINIMUM MANUFACTURING/PRODUCTION REQUIREMENT	FULLY PERMITTED UNDER COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
RISK FACTOR RELATING TO PLANT GERMINATION AND HEALTH	LOW

NOTE: IF A BIOSOLID COMPOST IS TO BE UTILIZED IT SHALL BE PRODUCED BY A FACILITY IN POSSESSION OF A VALID NOTICE OF AUTHORIZATION (NOA) FOR THE UNRESTRICTED USE AND DISTRIBUTION BY THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT. THE NOA SHALL BE PROVIDED UPON REQUEST TO DOUGLAS COUNTY.

NOTE: A LAB TEST DETAILING THE CHEMICAL, PHYSICAL, AND BIOLOGICAL PARAMETERS SHALL BE PROVIDED UPON REQUEST BY DOUGLAS COUNTY.

CFB COMPOST FILTER BERM 3

CONCRETE WASHOUT AREA INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF CONCRETE WASHOUT AREA.
2. THE CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
3. VEHICLE TRACKING CONTROL (DETAIL 25) IS REQUIRED AT THE ACCESS POINT.
4. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
5. EXCAVATED MATERIAL SHALL BE UTILIZED IN PERIMETER BERM CONSTRUCTION.
6. DURABLE PORTABLE CONCRETE WASHOUT BASINS OR TUBS MAY BE USED WITH THE APPROVAL OF THE EROSION CONTROL INSPECTOR.

CONCRETE WASHOUT AREA MAINTENANCE NOTES

1. THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
2. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT AN APPROVED WASTE SITE.
3. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.
4. RECOMMENDED INSPECTION FREQUENCY IS WEEKLY, DURING AND AFTER ANY STORM EVENT.

CWA CONCRETE WASHOUT AREA 4

CF CONSTRUCTION FENCE 5

CM CONSTRUCTION MARKERS 6

CONSTRUCTION FENCE INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - TYPE OF CONSTRUCTION LIMIT INDICATOR (FENCE OR MARKERS).
   - LOCATION AND LENGTH OF FENCE OR LINE OF MARKERS.
2. CONSTRUCTION FENCE OR MARKERS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO OTHER BMPS AND ANY LAND-DISTURBING ACTIVITIES.
3. STEEL TEE POSTS SHALL BE UTILIZED FOR SUPPORT OF CONSTRUCTION FENCE. MAXIMUM SPACING FOR TEE POSTS SHALL BE 15'.

CONSTRUCTION FENCE MAINTENANCE NOTES

1. ANY DAMAGED FENCE OR MARKERS SHALL BE REPAIRED ON A DAILY BASIS.
2. FENCE OR MARKERS SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF ANY DISTURBED AREA EXISTS AFTER FENCE REMOVAL, IT SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

MAXIMUM SPACING ALONG STREET GRADE

STREET SLOPE	CURB SOCK SPACING (FT.)
0.5%	100
1.0%	100
2.0%	75
3.0%	50
4.0%	50
5.0%	50
6.0%	25
7.0%	25
8.0%	25

CURB SOCK INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATION OF CURB SOCK.
2. CURB SOCKS INDICATED ON THE GESC PLAN SHALL BE INSTALLED PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.
3. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH THE GRADATION SHOWN ON SHEET 1 (1 ½").
4. WIRE MESH SHALL BE FABRICATED OF 20 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48 INCHES.
5. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND 2-INCH CENTERS ON THE ENDS.
6. TUBULAR MARKERS SHALL MEET REQUIREMENTS OF MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED.
7. THE TOP OF THE CURB SOCK SHALL BE ½" TO 1" BELOW TOP OF CURB.
8. CURB SOCK SHALL BE CONSTRUCTED IN ONE PIECE.

CURB SOCK MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR CURB SOCKS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF CURB SOCK SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF THE CURB SOCK IS WITHIN 2 ½" OF THE CREST.
3. CURB SOCKS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED, UNLESS THE COUNTY APPROVES EARLIER REMOVAL OF CURB SOCKS IN STREETS.

CS CURB SOCK 7

DEWATERING INSTALLATION NOTES

1. THE PERMITTEE(S) SHALL SCHEDULE AN ONSITE INSPECTION WITH THE EROSION CONTROL INSPECTOR PRIOR TO ANY SITE DEWATERING OPERATIONS BEGIN.
2. THE GESC MANAGER SHALL OBTAIN A CONSTRUCTION DEWATERING PERMIT (DEWATERING PERMIT) FROM THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) PRIOR TO ANY DEWATERING OPERATIONS THAT REQUIRE A DEWATERING PERMIT.
3. AT A MINIMUM, THE DEWATERING BMPs SHALL CONSIST OF THE FOLLOWING:
   PRE-FILTER ON THE SUCTION END OF THE PUMP/HOSE.
   FILTER BMP PRIOR TO FINAL DISCHARGE, AND
   ENERGY DISSIPATING BMP AT THE DISCHARGE END OF THE HOSE/PUMP.
4. THE TYPE AND PLACEMENT OF DEWATERING CONTROLS SHALL BE COORDINATED WITH, AND APPROVED BY, THE EROSION CONTROL INSPECTOR PRIOR TO THE DISCHARGE OF ANY WATER.

DEWATERING MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY IS HOURLY FOR DEWATERING SYSTEMS AND PERFORM ANY NECESSARY REPAIRS OR MAINTENANCE.
2. TEMPORARY SETTLING BASINS SHALL BE REMOVED WHEN NO LONGER NEEDED FOR DEWATERING OPERATIONS. ANY DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

DW DEWATERING 8

DIVERSION DITCH INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF DIVERSION DITCH.
   - TYPE OF DITCH (UNLINED, ECB LINED, PLASTIC LINED OR RIPRAP LINED).
   - LENGTH OF EACH TYPE OF DITCH.
   - DEPTH, "D", AND WIDTH, "W" DIMENSIONS.
   - FOR ECB LINED DITCH, EROSION CONTROL BLANKET TYPE (SEE DETAIL 10).
   - FOR RIPRAP LINED DITCH, SIZE OF RIPRAP, "D50".
2. SEE DRAINAGE PLANS FOR DETAILS OF ANY PERMANENT CONVEYANCE FACILITIES OR DIVERSION DITCHES EXCEEDING A 2-YEAR FLOW RATE OF 10 CFS.
3. DIVERSION DITCHES INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
4. FOR ECB LINED DITCHES, INSTALLATION OF EROSION CONTROL BLANKET SHALL CONFORM TO THE REQUIREMENTS OF DETAIL 10.
5. IN LOCATIONS WHERE CONSTRUCTION TRAFFIC MUST CROSS A DIVERSION DITCH, THE PERMITTEES SHALL INSTALL A TEMPORARY CULVERT WITH A MINIMUM DIAMETER OF 12-INCHES.

DIVERSION DITCH MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR DIVERSION DITCHES IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. DIVERSION DITCHES ARE TO REMAIN IN PLACE UNTIL THE END OF CONSTRUCTION, OR, IF APPROVED BY THE COUNTY, LEFT IN PLACE.
3. IF DIVERSION DITCHES ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

DD DIVERSION DITCH 9

TABLE 1. RIPRAP GRADATIONS

RIPRAP TYPE	D50 MEDIAN STONE SIZE (INCHES)	% OF MATERIAL SMALLER THAN TYPICAL STONE	TYPICAL STONE EQUIVALENT DIAMETER (INCHES)	TYPICAL STONE WEIGHT (POUNDS)
VL	6	70 – 100 50 – 70 35 – 50 2 – 10	12 9 6 2	85 35 10 0.4
L	9	70 – 100 50 – 70 35 – 50 2 – 10	15 12 9 3	160 85 35 1.3
M	12	70 – 100 50 – 70 35 – 50 2 – 10	21 18 12 4	440 275 85 3
H	18	100 50 – 70 35 – 50 2 – 10	30 24 18 6	1280 650 275 10
VH	24	100 50 – 70 35 – 50 2 – 10	42 33 24 9	3500 1700 650 35

TABLE 2. RIPRAP BEDDING

SIEVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
	CLASS A
3"	100
1 1/2"	20 – 90
NO. 4	0 – 20
NO. 200	0 – 3

MATCHES SPECIFICATIONS FOR CDOT CLASS A FILTER MATERIAL AND UDFCD TYPE 1 BEDDING. ALL ROCK SHALL BE FRACTURED FACE, ALL SIDES.

TABLE 3. 1 1/2" CRUSHED ROCK

SIEVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
	NO. 4
2"	100
1 1/2"	90 – 100
1"	20 – 55
3/4"	0 – 15
3/8"	0 – 5

MATCHES SPECIFICATIONS FOR NO. 4 COARSE AGGREGATE FOR CONCRETE PER AASHTO M43. ALL ROCK SHALL BE FRACTURED FACE, ALL SIDES.

ROCK AND RIPRAP GRADATIONS

Sheet Revisions

1	DOUGLAS COUNTY REISSUE	1/17

NOTE: SCALES SHOWN ARE FOR 24"x36" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

DOUGLAS COUNTY
COLORADO

GESC

GRADING, EROSION, AND SEDIMENT CONTROL

GESC PLAN STANDARD NOTES AND DETAILS

SHEET 1 OF 3

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

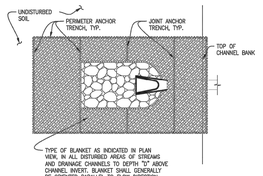
GESC STANDARD DETAILS I
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

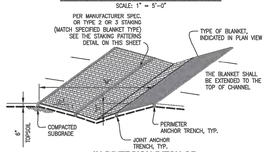
GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

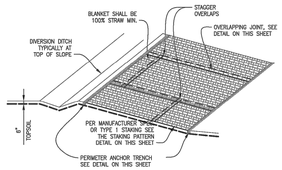
DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

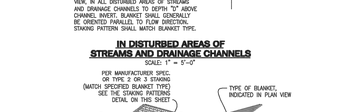
SHEET 7 OF 11

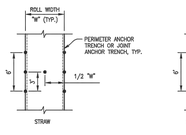
G:\Perry Park WSD\2021-068\600\GRADING AND DRAINAGE I.dwg, GESC STANDARD DETAILS I - 24x36, 3/20/2024 9:00:24 AM, slw, AutoCAD PDF (General Documentation).pc3, 1:1

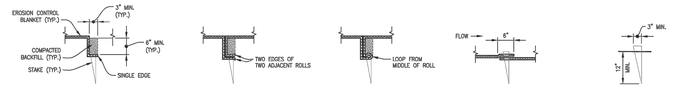


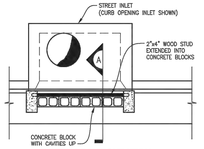


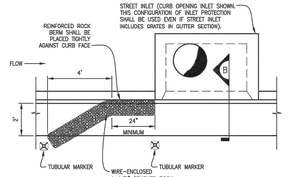


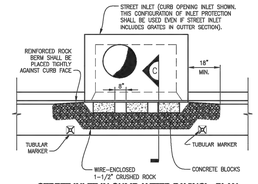


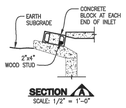


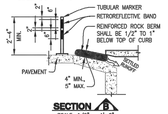


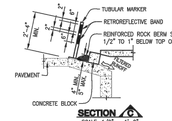


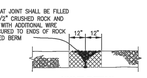


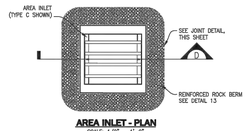


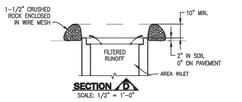


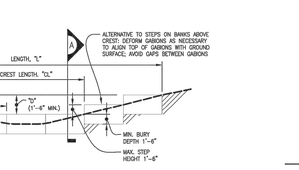


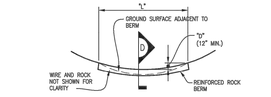


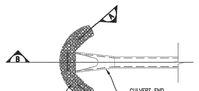


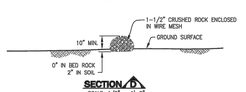


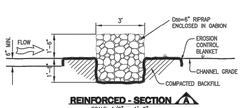


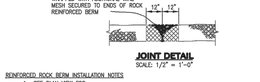


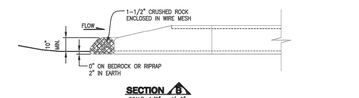


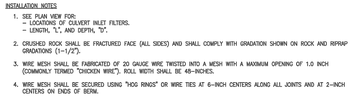


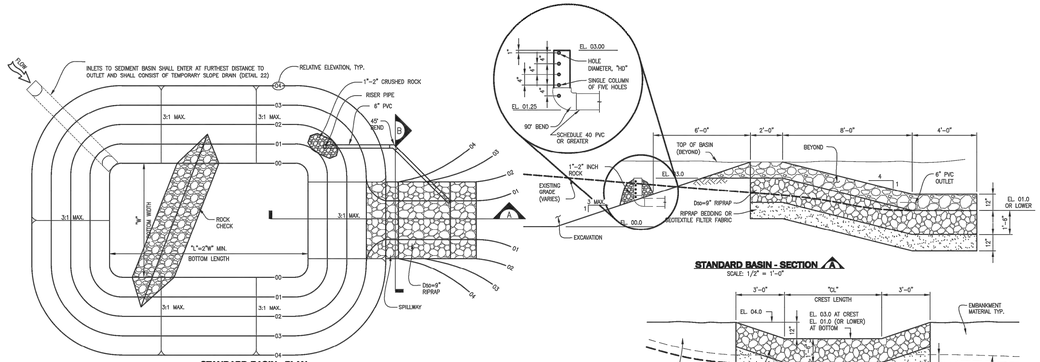


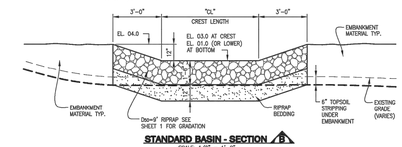












IN DISTURBED AREAS OF STREAMS AND DRAINAGE CHANNELS
SCALE: 1" = 5'-0"

IN DIVERSION DITCH OR SMALL DITCH DRAINAGEWAY
SCALE: 1" = 5'-0"

OUTSIDE OF STREAMS AND DRAINAGE CHANNELS
SCALE: 1" = 5'-0"

STAKING PATTERNS
SCALE: 1" = 5'-0"
SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. IF NO MANUFACTURER'S SPECIFICATION IS AVAILABLE USE THE ACCEPTABLE STAKING PATTERN (AS SHOWN ABOVE).

PERIMETER ANCHOR TRENCH
SCALE: 1" = 1'-0"

JOINT ANCHOR TRENCH
SCALE: 1" = 1'-0"

INTERMEDIATE ANCHOR TRENCH
SCALE: 1" = 5'-0"

OVERLAPPING JOINT
SCALE: 1" = 1'-0"

WOOD STAKE DETAIL
SCALE: 1" = 1'-0"
MINIMUM THICKNESS 1/2"

EROSION CONTROL BLANKET INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF PERIMETER OF EROSION CONTROL BLANKET.
   - TYPE OF BLANKET (STRAW, STRAW-COCONUT, COCONUT, OR EXCELSIOR).
   - AREA "A" IN SQUARE YARDS OF EACH TYPE OF BLANKET.
2. ALL EROSION CONTROL BLANKETS AND NETTING SHALL BE MADE OF 100% NATURAL AND BIODEGRADABLE MATERIAL; NO PLASTIC OR OTHER SYNTHETIC MATERIAL, EVEN IF PHOTO DEGRADABLE, SHALL BE ALLOWED.
3. IN AREAS WHERE EROSION CONTROL BLANKET IS SHOWN ON THE PLANS, THE PERMITTEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING BELOW THE BLANKET IN ACCORDANCE WITH THE REQUIREMENTS OF DETAIL 12, SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO BLANKET INSTALLATION AND THE BLANKET SHALL BE IN FULL CONTACT WITH SUBGRADE, NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
4. PERIMETER ANCHOR TRENCH SHALL BE USED AT OUTSIDE PERIMETER OF ALL BLANKET AREAS.
5. JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL BLANKET INSTALLATIONS IN A DRAINAGEWAY EXCEPT STRAW, WHICH MAY USE AN OVERLAPPING JOINT.
6. INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF THE ROLL LENGTH FOR COCONUT AND EXCELSIOR BLANKETS.
7. THE OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER FOR BLANKETS ON SLOPES.
8. MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKET SHALL CONFORM TO TABLE 7.1.

EROSION CONTROL BLANKET INSTALLATION NOTES – CONTINUED

9. ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKET SHALL BE RESEEDED AND MULCHED IN ACCORDANCE WITH DETAIL 18.
10. SEE DRAINAGE DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION MEASURES THAT MAY EXCEED THE DESIGN CONDITIONS ASSOCIATED WITH THE DETAILS ABOVE.
11. METAL STAKES OR STAPLES MAY BE USED FOR EROSION CONTROL BLANKET INSTALLATIONS OUTSIDE OF DRAINAGE CHANNELS.

TABLE 7.1 – EROSION CONTROL BLANKET TYPE

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	NETTING MIN.
STRAW*	–	100%	–	DOUBLE/NATURAL
STRAW-COCONUT	30% MIN.	70% MAX.	–	DOUBLE/NATURAL
COCONUT	100%	–	–	DOUBLE/NATURAL
EXCELSIOR	–	–	100%	DOUBLE/NATURAL

* FOR OUTSIDE OF STREAMS AND DRAINAGE CHANNELS

EROSION CONTROL BLANKET MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR EROSION CONTROL BLANKETS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. EROSION CONTROL BLANKET IS TO BE LEFT IN PLACE UNLESS REQUESTED TO BE REMOVED BY THE COUNTY.
3. ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE RE-INSTALLED. ANY SUBGRADE AREAS BELOW THE BLANKET THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED AND MULCHED AND THE EROSION CONTROL BLANKET REINSTALLED.

▨ ECB EROSION CONTROL BLANKET 10

INTERIM CONFIGURATION (BEFORE PAVING) STREET INLET - PLAN
SCALE: 1/2" = 1'-0"

STREET INLET ON CONTINUOUS GRADE (AFTER PAVING) - PLAN
SCALE: 1/2" = 1'-0"

STREET INLET IN SUMP (AFTER PAVING) - PLAN
SCALE: 1/2" = 1'-0"

JOINT DETAIL
SCALE: 1/2" = 1'-0"

SECTION A
SCALE: 1/2" = 1'-0"

SECTION B
SCALE: 1/2" = 1'-0"

SECTION C
SCALE: 1/2" = 1'-0"

AREA INLET - PLAN
SCALE: 1/2" = 1'-0"

SECTION D
SCALE: 1/2" = 1'-0"

INLET PROTECTION INSTALLATION NOTES

1. INTERIM CONFIGURATION OF INLET PROTECTION IN STREETS SHALL BE INSTALLED WITHIN 48-HOURS OF POURING INLET. INLET PROTECTION (AFTER PAVEMENT) SHALL BE INSTALLED WITHIN 48 HOURS AFTER PAVING IS PLACED.
2. INLET PROTECTION AT AREA INLETS SHALL BE INSTALLED WITHIN 48-HOURS OF POURING INLET.
3. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON ROCK AND RIPRAP GRADATIONS (1-1/2").
4. WIRE MESH SHALL BE FABRICATED OF 20 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
5. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
6. REINFORCED ROCK BERM SHALL BE CONSTRUCTED IN ONE PIECE OR SHALL BE CONSTRUCTED USING JOINT DETAIL.
7. TUBULAR MARKERS SHALL MEET REQUIREMENTS OF MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED.
8. THE TOP OF REINFORCED ROCK BERM SHALL BE 1/2"-1" BELOW TOP OF CURB.

INLET PROTECTION MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR INLET PROTECTION IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY. MORE FREQUENT INSPECTIONS AND REPAIRS MAY BE REQUIRED DURING WINTER CONDITIONS DUE TO FREEZE/THAW PROBLEMS.
2. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF ROCK BERM IS WITHIN 2-1/2 INCHES OF THE CREST.
3. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED, UNLESS THE COUNTY APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.
4. WHEN INLET PROTECTION AT AREA INLETS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

IP INLET PROTECTION 11

REINFORCED - ELEVATION
SCALE: 1" = 5'-0"

BLOW UP OF TWISTED WIRE GABION
SCALE: NTS

REINFORCED - SECTION A
SCALE: 1/2" = 1'-0"

REINFORCED CHECK DAM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF CHECK DAMS.
   - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
   - LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
2. CHECK DAMS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND-DISTURBING ACTIVITIES.
3. REINFORCED CHECK DAMS, GABIONS SHALL HAVE GALVANIZED TWISTED WIRE NETTING WITH A MAXIMUM OPENING DIMENSION OF 4-1/2" AND A MINIMUM WIRE THICKNESS OF 0.10". WIRE "HOG RINGS" AT 4" SPACING OR OTHER APPROVED MEANS SHALL BE USED AT ALL GABION SEAMS AND TO SECURE THE GABION TO THE ADJACENT GABION.
4. THE CHECK DAM SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'-6".
5. EROSION BLANKET SHALL BE PLACED IN THE REINFORCED CHECK DAM TRENCH EXTENDING A MINIMUM OF 1'-6" ON BOTH THE UPSTREAM AND DOWNSTREAM SIDES OF THE REINFORCED CHECK DAM.

REINFORCED CHECK DAM MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR CHECK DAMS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CHECK DAM IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
3. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY.
4. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACK FILL. ANY DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

RCD REINFORCED CHECK DAM 12

ELEVATION
SCALE: 1" = 5'-0"

SECTION A
SCALE: 1/2" = 1'-0"

JOINT DETAIL
SCALE: 1/2" = 1'-0"

REINFORCED ROCK BERM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF REINFORCED ROCK BERMS.
   - LENGTH, "L", AND DEPTH, "D" DIMENSIONS.
2. REINFORCED ROCK BERM SECTION APPLIES TO CULVERT INLET FILTER AND INLET PROTECTION.
3. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON ROCK AND RIPRAP GRADATIONS (1-1/2").
4. WIRE MESH SHALL BE FABRICATED OF 20 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
5. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
6. FOR CONCENTRATED FLOW AREAS THE ENDS OF THE REINFORCED ROCK BERM SHALL BE 12" HIGHER THAN THE CENTER OF THE BERM.

REINFORCED ROCK BERM MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR REINFORCED ROCK BERM IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF REINFORCED ROCK BERM SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF FILTER IS WITHIN 5 INCHES OF THE CREST.
3. REINFORCED ROCK BERMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED.
4. WHEN REINFORCED ROCK BERMS ARE REMOVED, ANY DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

RRB REINFORCED ROCK BERM 13

PLAN
SCALE: 1" = 5'-0"

SECTION A
SCALE: 1" = 5'-0"

JOINT DETAIL
SCALE: 1/2" = 1'-0"

SECTION B
SCALE: 1/2" = 1'-0"

INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF CULVERT INLET FILTERS.
   - LENGTH, "L", AND DEPTH, "D".
2. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON ROCK AND RIPRAP GRADATIONS (1-1/2").
3. WIRE MESH SHALL BE FABRICATED OF 20 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
4. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
5. THE ENDS OF THE REINFORCED ROCK BERM SHALL BE 12" HIGHER THAN THE CENTER OF THE BERM.

MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR RRB FOR CULVERT PROTECTION IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF RRB FOR CULVERT PROTECTION SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF FILTER IS 1/2 THE HEIGHT OF THE REINFORCED ROCK BERM.
3. RRB FOR CULVERT PROTECTION ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY.
4. WHEN RRB FOR CULVERT PROTECTION ARE REMOVED, ANY DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

RRC RRB FOR CULVERT PROTECTION 14

STANDARD BASIN - PLAN
SCALE: 1" = 5'-0"

STANDARD BASIN - SECTION A
SCALE: 1/2" = 1'-0"

STANDARD BASIN - SECTION B
SCALE: 1/2" = 1'-0"

SEDIMENT BASIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF SEDIMENT BASIN.
   - TYPE OF BASIN (STANDARD BASIN OR NON-STANDARD BASIN).
   - FOR STANDARD BASIN, CREST LENGTH, "CL", BOTTOM WIDTH, "W", AND HOLE DIAMETER, "HD".
   - FOR NON-STANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT, "H", NUMBER OF COLUMNS, "N", HOLE DIAMETER, "HD", AND PIPE DIAMETER "D".
2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.
3. SEDIMENT BASINS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY OTHER LAND-DISTURBING ACTIVITY.
4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY WITHIN 2 PERCENTAGE POINTS OF OPTIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
6. PIPE SCH 40 OR GREATER SHALL BE USED.
7. THE DETAILS SHOWN ON THIS SHEET PERTAIN TO STANDARD SEDIMENT BASIN(S) IDENTIFIED ON THE GESC PLAN VIEW DRAWINGS USED FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SEDIMENT BASIN IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED IN SEDIMENT BASIN SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS 1.0 FOOT.
3. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY.
4. IF SEDIMENT BASINS ARE REMOVED, THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

SIZING INFORMATION FOR STANDARD SEDIMENT BASIN

Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	16	2.0	7/16
2	22	4.0	5/8
3	27	6.0	3/4
4	31	8.0	7/8
5	35	10.0	1.0
6	38	12.0	1 1/8
7	41	14.0	1 1/4
8	44	16.0	1 1/4
9	47	18.0	1 3/8
10	49	20.0	1 3/8
11	52	22.0	1 1/2
12	54	24.0	1 1/2
13	56	26.0	1 5/8
14	59	28.0	1 5/8
15	61	30.0	1 5/8

SB SEDIMENT BASIN 15

Sheet Revisions

1	DOUGLAS COUNTY REISSUE	1/17

NOTE: SCALES SHOWN ARE FOR 24"x36" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

DOUGLAS COUNTY
COLORADO

GESC
GRADING, EROSION, AND SEDIMENT CONTROL

GESC PLAN
STANDARD NOTES
AND DETAILS

SHEET
2 OF 3

SCALE VERIFICATION
BAR IS ONE INCH
ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET
ADJUST SCALES ACCORDINGLY

THIS DRAWING IS THE PROPERTY OF GMS, INC., AND IS NOT TO BE RE- PRODUCED, MODIFIED OR USED FOR ANY OTHER PROJECT OR EXTENSION OF THIS PROJECT EXCEPT BY AGREEMENT WITH THIS COMPANY.

REVISIONS

NO.	DATE	DESCRIPTION
1		

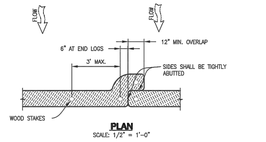
GESC STANDARD DETAILS II
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

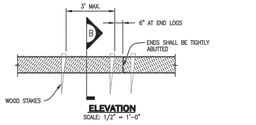
GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

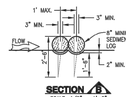
DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

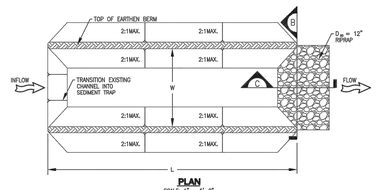
SHEET
8
OF
11

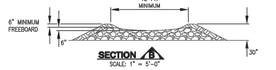
G:\Perry Park WSD\2021-068\600\GRADING AND DRAINAGE II.dwg, GESC STANDARD DETAILS II - 24x36, 3/20/2024 9:00:34 AM, slw, AutoCAD PDF (General Documentation).pc3, 1:1

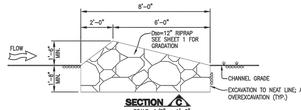


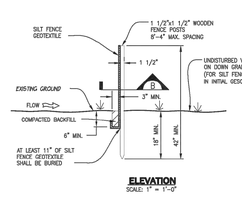


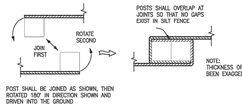


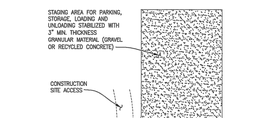


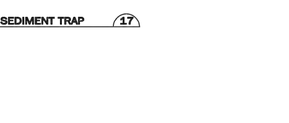


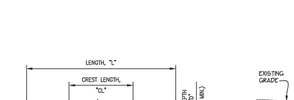


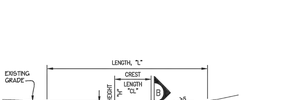


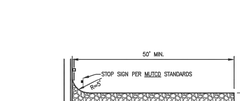


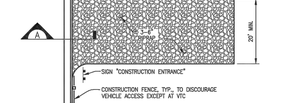


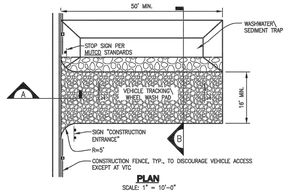












SEDIMENT CONTROL LOG INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION AND LENGTH OF SEDIMENT CONTROL LOG.
2. SEDIMENT CONTROL LOGS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND–DISTURBING ACTIVITIES.
3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR, OR COCONUT FIBER.
4. NOT FOR USE IN CONCENTRATED FLOW AREAS.
5. THE SEDIMENT CONTROL LOG SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 2".

SEDIMENT CONTROL LOG MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SEDIMENT CONTROL LOGS IS DAILY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOGS SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN ½ THE HEIGHT OF THE CREST OF LOG.
3. SEDIMENT CONTROL LOG SHALL REMAIN IN PLACE UNTIL THE VEGETATIVE COVER IS APPROVED BY THE EROSION CONTROL INSPECTOR. IF ANY DISTURBED AREA EXISTS AFTER REMOVAL, IT SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

SCL SEDIMENT CONTROL LOG 16

SEDIMENT TRAP INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION, LENGTH AND WIDTH OF SEDIMENT TRAP.
2. SEDIMENT TRAPS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND–DISTURBING ACTIVITIES.
3. SEDIMENT TRAP BERM SHALL BE CONSTRUCTED FROM MATERIAL FROM EXCAVATION. THE BERM SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
4. RIPRAP OUTLET SHALL BE CONSTRUCTED WITH D_{50} =12" RIPRAP WITH A MINIMUM OVERFLOW OF 6".
5. THE TOP OF THE EARTHEN BERM SHALL BE A MINIMUM OF 6" HIGHER THAN THE TOP OF THE RIPRAP OUTLET STRUCTURE.
6. THE ENDS OF THE RIPRAP OUTLET STRUCTURE SHALL BE MINIMUM OF 6" HIGHER THAN THE CENTER OF THE OUTLET STRUCTURE.

SEDIMENT TRAP MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SEDIMENT TRAPS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF RIPRAP SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN ½ THE HEIGHT OF THE RIPRAP OUTLET STRUCTURE.
3. SEDIMENT TRAPS SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVERAGE IS APPROVED BY THE COUNTY.
4. WHEN SEDIMENT TRAPS ARE REMOVED THE DISTURBED AREA SHALL BE DRILLED SEEDED AND CRIMP MULCHED OR STABILIZED IN A MANNER APPROVED BY THE COUNTY.

ST SEDIMENT TRAP 17

SEEDING AND MULCHING INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - AREA OF SEEDING AND MULCHING.
   - TYPE OF SEED MIX (PERMANENT, TEMPORARY, OR LOW–GROWTH).
2. ALL BRANDS FURNISHED SHALL BE FREE FROM SUCH NOXIOUS SEEDS AS RUSSIAN OR CANADIAN THISTLE, COARSE FESCUE, EUROPEAN BINDWEED, JOHNSON GRASS, KNAP WEED AND LEAFY SPURGE.
3. THE SEEDER SHALL FURNISH TO THE CONTRACTOR A SIGNED STATEMENT CERTIFYING THAT THE SEED FURNISHED IS FROM A LOT THAT HAS BEEN TESTED BY A RECOGNIZED LABORATORY. SEED WHICH HAS BECOME WET, MOLDY, OR OTHERWISE DAMAGED IN TRANSIT OR IN STORAGE WILL NOT BE ACCEPTABLE. SEED TICKETS SHALL BE PROVIDED TO DOUGLAS COUNTY UPON REQUEST.
4. DRILL SEEDING MIX SHALL CONFORM TO THE TABLE ON THE RIGHT:
5. IF THE SEED AVAILABLE ON THE MARKET DOES NOT MEET THE MINIMUM PURITY AND GERMINATION PERCENTAGES SPECIFIED, THE SUBCONTRACTOR MUST COMPENSATE FOR A LESSER PERCENTAGE OF PURITY OR GERMINATION BY FURNISHING SUFFICIENT ADDITIONAL SEED TO EQUAL THE SPECIFIED PRODUCT. THE TAGS FROM THE SEED MIXES MUST BE SUPPLIED TO THE CONTRACTOR AND FORWARDED TO THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR.
6. THE FORMULA USED FOR DETERMINING THE QUANTITY OF PURE LIVE SEED (PLS) SHALL BE (POUNDS OF SEED) X (PURITY) X (GERMINATION) = POUNDS OF PURE LIVE SEED (PLS).
7. PERMANENT SEED MIX SHALL BE USED UNLESS OTHERWISE APPROVED BY THE COUNTY.
8. ALL AREAS TO BE SEEDED AND MULCHED SHALL HAVE NATIVE TOPSOIL OR APPROVED SOIL AMENDMENTS SPREAD TO A DEPTH OF AT LEAST 6 INCHES (LOOSE DEPTH). HAUL ROADS AND OTHER COMPACTED AREAS SHALL BE LOOSENED TO A DEPTH OF 6 INCHES PRIOR TO SPREADING TOPSOIL.
9. SOIL IS TO BE THOROUGHLY LOOSENED (TILLED) TO A DEPTH OF AT LEAST 6 INCHES PRIOR TO SEEDING. THE TOP 6 INCHES OF THE SEED BED SHALL BE FREE OF ROCKS GREATER THAN 4 INCHES AND SOIL CLODS GREATER THAN 2 INCHES. SEEDING OVER ANY COMPACTED AREAS THAT HAVEN'T BEEN THOROUGHLY LOOSENED SHALL BE REJECTED.
10. SEED IS TO BE APPLIED USING A MECHANICAL DRILL TO A DEPTH NOT LESS THAN 1/4 INCH AND NOT MORE THAN 3/4 INCH. ROW SPACING SHALL BE NO MORE THAN 6 INCHES. MATERIAL USED FOR MULCH SHALL CONSIST OF LONG–STEMMED STRAW. AT LEAST 50 PERCENT OF THE MULCH, BY WEIGHT, SHALL BE 10 INCHES OR MORE IN LENGTH. MULCH SHALL BE APPLIED AND MECHANICALLY ANCHORED TO A DEPTH OF AT LEAST 2 INCHES. MULCH SHALL BE APPLIED AT A RATE OF 4000 LB. OF STRAW PER ACRE.
11. IF THE PERMITTEE DEMONSTRATES TO THE COUNTY THAT IT IS NOT POSSIBLE TO DRILL SEED, SEED IS TO BE UNIFORMLY BROADCAST AT TWO TIMES THE DRILLED RATE, THEN LIGHTLY HARROWED TO PROVIDE A SEED DEPTH OF APPROXIMATELY 1/4 INCH, THEN ROLLED TO COMPACT, THEN MULCHED AS SPECIFIED ABOVE.
12. SEEDING AND MULCHING SHALL BE COMPLETED WITHIN 30 DAYS OF INITIAL EXPOSURE OR 14 DAYS AFTER GRADING IS SUBSTANTIALLY COMPLETE IN A GIVEN AREA (AS DEFINED BY THE COUNTY). THIS MAY REQUIRE MULTIPLE MOBILIZATIONS FOR SEEDING AND MULCHING.
13. MULCH SHALL BE APPLIED WITHIN 24–HOURS OF SEEDING.
14. TACKIFIER SHOULD BE UTILIZED TO HELP PREVENT STRAW DISPLACEMENT.

SEEDING AND MULCHING MAINTENANCE NOTES

1. SEEDED AND MULCHED AREAS SHALL BE INSPECTED FOR REQUIRED COVERAGE MONTHLY FOR A PERIOD OF TWO YEARS FOLLOWING INITIAL SEEDING. REPAIRS AND RE–SEEDING AND MULCHING SHALL BE UNDERTAKEN AFTER THE FIRST GROWING SEASON FOR ANY AREAS FAILING TO MEET THE REQUIRED COVERAGE.
2. REQUIRED COVERAGE FOR STANDARD, OPEN SPACE AND LOW GROWTH SEED MIXES SHALL BE DEFINED AS FOLLOWS:
   1. THREE (3) PLANTS PER SQUARE FOOT WITH A MINIMUM HEIGHT OF 3 INCHES. THE 3 PLANTS PER SQUARE FOOT SHALL BE OF THE VARIETY AND SPECIES FOUND IN THE DOUGLAS COUNTY–APPROVED MIX.
   2. NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO–FEET BY TWO–FEET OR EQUIVALENT).
   3. FREE OF ERODED AREAS.
   4. FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC MANUAL.
3. REQUIRED COVERAGE FOR TURF GRASS AREAS SHALL BE DEFINED AS FOLLOWS:
   1. AT LEAST 80% VEGETATIVE COVER OF GRASS SPECIES PLANTED.
   2. NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO–FEET BY TWO–FEET OR EQUIVALENT).
   3. FREE OF ERODED AREAS.
   4. FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC MANUAL.
4. RILL AND GULLY EROSION SHALL BE FILLED WITH TOPSOIL PRIOR TO RESEEDING. THE RESEEDING METHOD SHALL BE APPROVED BY THE COUNTY.

DOUGLAS COUNTY PERMANENT DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
BIG BLUESTEM	KAW	PNWS	10	1.1
YELLOW INDIANGRASS	CHEYENNE	PNWS	10	1
SWITCHGRASS	BLACKWELL	PNWS	10	0.4
SIDEOATS GRAMA	VAUGHN	PNWB	10	0.9
WESTERN WHEATGRASS	ARRIBA	PNCS	10	1.6
BLUE GRAMA	HACHITA	PNWB	10	0.3
THICKSPIKE WHEATGRASS	CRITANA	PNCS	10	1
PRAIRIE SANDREED	GOSHEN	PNWS	10	0.7
GREEN NEEDLEGRASS	LODORM	PNCB	10	1
SLENDER WHEATGRASS	PRYOR	PNCB	5	0.6
STREAMBANK WHEATGRASS	SODAR	PNCS	5	0.6
			TOTAL	9.2

DOUGLAS COUNTY TEMPORARY DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
SMOOTH BROMEGRASS	LINCOLN	PICS	30	3.9
INTERMEDIATE WHEATGRASS	OAHE	PICS	30	4.5
PUBESCENT WHEATGRASS	LUNA	PICS	30	4.2
ANNUAL RYEGRASS	N/A	AICB	10	0.8
			TOTAL	13.4

DOUGLAS COUNTY LOW–GROWTH DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
BUFFALOGRASS	TEXOKA	PNWS	20	3.2
BLUE GRAMA	HACHITA	PNWB	20	0.6
WESTERN WHEATGRASS	ARRIBA	PNCS	20	3.2
SIDEOATS GRAMA	VAUGHN	PNWB	20	1.8
THICKSPIKE WHEATGRASS	CRITANA	PNCS	10	1
STREAMBANK WHEATGRASS	SODAR	PNCS	10	1.2
			TOTAL	11.0

NOTES:
P=PERENNIAL
A=ANNUAL
N=NATIVE
I=INTRODUCED
W=WARM SEASON
C=COOL SEASON
S=SOD FORMER
B=BUNCHGRASS

SM SEEDING AND MULCHING 18

SILT FENCE INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION AND LENGTH OF FENCE.
2. ANCHOR TRENCH SHALL BE EXCAVATED WITH TRENCHER, OR WITH SILT FENCE INSTALLATION MACHINE; NO ROAD GRADERS, BACKHOES, ETC. SHALL BE USED. TRENCH SHALL BE COMPACTED BY HAND, WITH "JUMPING JACK", OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
3. SILT FENCE GEOTEXTILE SHALL MEET THE FOLLOWING REQUIREMENTS:
   - 6–TO 12–GALLONS PER MINUTE PER SQUARE FOOT FLOW CAPACITY.
   - 90 LB. TENSILE STRENGTH PER ASTM D4622.
   - UV DESIGN AT 500 HRS MIN. 70% STRENGTH RETAINED PER ASTM D4355.
4. SILT FENCE INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND–DISTURBING ACTIVITIES.

SILT FENCE MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SILT FENCE IS DAILY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF SILT FENCE SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT REACHES A DEPTH OF 6–INCHES.
3. SILT FENCE SHALL BE REMOVED WHEN THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY. IF ANY DISTURBED AREA EXISTS AFTER REMOVAL, IT SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

SF SILT FENCE 19

STABILIZED STAGING AREA INSTALLATION NOTES

1. SEE PLAN VIEW FOR GENERAL LOCATION OF STAGING AREA. CONTRACTOR MAY MODIFY LOCATION AND SIZE OF STABILIZED STAGING AREA WITH COUNTY APPROVAL.
2. STABILIZED STAGING AREA SHALL BE LARGE ENOUGH TO FULLY CONTAIN PARKING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
3. IF REQUIRED BY THE COUNTY, SITE ACCESS ROADS SHALL BE STABILIZED IN THE SAME MANNER AS THE STAGING AREA.
4. STAGING AREA SHALL BE STABILIZED PRIOR TO ANY OTHER OPERATIONS ON THE SITE.
5. THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM OF 3" OF GRANULAR MATERIAL (GRAVEL OR RECYCLED CONCRETE).

STABILIZED STAGING AREA MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR THE STABILIZED STAGING AREA IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. GESC MANAGER SHALL PROVIDE ADDITIONAL THICKNESS OF GRANULAR MATERIAL IF ANY RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.
3. STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
4. ANY ACCUMULATED DIRT OR MUD SHALL BE REMOVED FROM THE SURFACE OF THE STABILIZED STAGING AREA.
5. THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE COUNTY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED.

SSA STABILIZED STAGING AREA 20

SURFACE ROUGHENING INSTALLATION NOTES

1. SURFACE ROUGHENING SHALL BE PROVIDED ON ALL FINISHED GRADES (SLOPES AND "FLAT" AREAS) WITHIN 2 DAYS OF COMPLETION OF FINISHED GRADE (FOR AREAS NOT RECEIVING TOPSOIL) OR WITHIN 2 DAYS OF TOPSOIL PLACEMENT.
2. AREAS WHERE BUILDING FOUNDATIONS, PAVEMENT, OR SOD IS TO BE PLACED WITHIN 7–DAYS OF FINISHED GRADING DO NOT NEED TO BE SURFACE ROUGHENED.
3. DISTURBED SURFACES SHALL BE ROUGHENED USING RIPPING OR TILLING EQUIPMENT ON THE CONTOUR OR TRACKING UP AND DOWN A SLOPE USING EQUIPMENT TREADS.

SURFACE ROUGHENING MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SURFACE ROUGHENING IS WEEKLY, DURING AND AFTER ANY STORM EVENT, AND MAKE REPAIRS.
2. VEHICLES AND EQUIPMENT SHALL GENERALLY BE CONFINED TO ACCESS DRIVES AND SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SURFACE ROUGHENED.
3. IN NON–TURF GRASS FINISHED AREAS, SEEDING AND MULCHING SHALL TAKE PLACE DIRECTLY OVER SURFACE ROUGHENED AREAS WITHOUT FIRST SMOOTHING OUT THE SURFACE.
4. IN AREAS NOT SEEDED AND MULCHED AFTER SURFACE ROUGHENING, SURFACES SHALL BE RE–ROUGHENED AS NECESSARY TO MAINTAIN GROOVE DEPTH AND SMOOTH OVER ANY RILL EROSION.

SR SURFACE ROUGHENING 21

SLOPE DRAIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION AND LENGTH OF SLOPE DRAIN.
   - PIPE DIAMETER, "D", AND RIPRAP SIZE, "D_{50}".
2. SLOPE DRAIN DIMENSIONS SHALL BE CONSIDERED MINIMUM DIMENSIONS; CONTRACTOR MAY ELECT TO INSTALL LARGER FACILITIES. ANY DAMAGE TO SLOPE OR SLOPE DRAIN DURING RUNOFF EVENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
3. SLOPE DRAINS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY UPSTREAM LAND–DISTURBING ACTIVITIES.
4. FOR TEMPORARY SLOPE DRAINS, PIPE MAY BE INSTALLED ON TOP OF SLOPE; HOWEVER, 12" MIN. COVER AT TOP OF SLOPE SHALL BE PROVIDED.
5. A RIPRAP PAD SHALL BE PLACED AT THE OUTFALL OF THE SLOPE DRAIN.

SLOPE DRAIN MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SLOPE DRAINS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. TEMPORARY SLOPE DRAINS ARE TO REMAIN IN PLACE UNTIL NO LONGER NEEDED, BUT SHALL BE REMOVED PRIOR TO THE END OF CONSTRUCTION. WHEN SLOPE DRAINS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

TSD TEMPORARY SLOPE DRAIN 22

TEMPORARY STREAM CROSSING INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF TEMPORARY STREAM CROSSING.
   - STREAM CROSSING TYPE (FORD OR CULVERT).
   - FOR FORD CROSSING: LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
   - FOR CULVERT CROSSING : LENGTH, "L", CREST LENGTH, "CL", CROSSING HEIGHT, "H", DEPTH, "D", CULVERT DIAMETER, "CD", AND NUMBER, TYPE AND CLASS OR GAUGE OF CULVERTS.
2. TEMPORARY STREAM CROSSING DIMENSIONS, D50, AND NUMBER OF CULVERTS INDICATED (FOR CULVERT CROSSING) SHALL BE CONSIDERED MINIMUM DIMENSIONS; ENGINEER MAY ELECT TO INSTALL LARGER FACILITIES. ANY DAMAGE TO STREAM CROSSING OR EXISTING STREAM CHANNEL DURING BASEFLOW OR FLOOD EVENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
3. SEE ROCK AND RIPRAP GRADATIONS FOR RIPRAP AND 1–1/2" CRUSHED ROCK GRADATIONS.
4. FOR A TEMPORARY STREAM CROSSING THAT WILL CARRY LOADS, THE TEMPORARY STREAM CROSSING MUST BE DESIGNED BY THE DESIGN ENGINEER.

TEMPORARY STREAM CROSSING MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR TEMPORARY STREAM CROSSINGS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF TEMPORARY STREAM CROSSINGS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CROSSING IS WITHIN 6–INCHES OF THE CREST (FORD CROSSING) OR GREATER THAN AN AVERAGE DEPTH OF 12–INCHES (CULVERT CROSSING).
3. TEMPORARY STREAM CROSSINGS ARE TO REMAIN IN PLACE UNTIL NO LONGER NEEDED, BUT SHALL BE REMOVED PRIOR TO THE END OF CONSTRUCTION.
4. WHEN TEMPORARY STREAM CROSSINGS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

TSC TEMPORARY STREAM CROSSING 23

TERRACING INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - WIDTH, "W", AND SLOPE, "Z".
2. TERRACING IS NOT REQUIRED FOR SLOPES OF 4 TO 1 OR FLATTER.
3. EARTH (VEGETATED) SLOPES STEEPER THAN 3 TO 1 ARE NOT ALLOWED ON THE SITE.

TERRACING MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR TERRACING IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. ANY RILL EROSION OCCURRING ON SLOPES SHALL BE REPAIRED AND RESEEDED AND MULCHED IN ACCORDANCE WITH DETAIL 18.

TER TERRACING 24

VEHICLE TRACKING CONTROL INSTALLATION NOTES

1. VEHICLE TRACKING CONTROL PADS SHALL BE INSTALLED AT EVERY ACCESS POINT TO SITE.
2. VEHICLE TRACKING CONTROL PADS SHALL CONSIST OF HARD, DENSE, DURABLE STONE, ANGULAR IN SHAPE AND RESISTANT TO WEATHERING. ROUNDED STONE OR BOULDERS WILL NOT BE ACCEPTABLE. THE STONES SHALL BE 3" WITH A MAXIMUM SIZE OF 6". THE STONE SHALL HAVE A SPECIFIC GRAVITY OF AT LEAST 2.6. CONTROL OF GRADATION WILL BE BY VISUAL INSPECTIONS.
3. ANY CRACKED OR DAMAGED CURB AND GUTTER AND SIDEWALK SHALL BE REPLACED BY PERMITTEE.
4. A DOUGLAS COUNTY TEMPORARY CONSTRUCTION ACCESS PERMIT IS REQUIRED FOR EACH POINT ONTO DOUGLAS COUNTY R.O.W.
5. A STOP SIGN INSTALLED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED, SHALL BE INSTALLED FOR EXITING TRAFFIC AT THE VTC.

VEHICLE TRACKING CONTROL MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR VEHICLE TRACKING CONTROL IS DAILY. GRAVEL SURFACE SHALL BE CLEAN AND LOOSE ENOUGH TO RUT SLIGHTLY UNDER WHEEL LOADS AND CAUSE LOOSE GRAVEL TO DISLODGE MUD FROM TIRES. WHEN GRAVEL BECOMES COMPACTED OR FILLED WITH SEDIMENT SO THAT THE EFFECTIVENESS OF THE PAD IS DIMINISHED, CONTRACTOR SHALL RIP, TURN OVER, OR OTHERWISE LOOSEN GRAVEL, PLACE ADDITIONAL NEW GRAVEL, OR REPLACE WITH NEW GRAVEL AS NECESSARY TO RESTORE EFFECTIVENESS.
2. VEHICLE TRACKING CONTROL SHALL BE REMOVED AT THE END OF CONSTRUCTION, THE GRAVEL MATERIAL REMOVED OR, IF APPROVED BY THE COUNTY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED.

VTC VEHICLE TRACKING CONTROL 25

VEHICLE TRACKING CONTROL WITH WHEEL WASH INSTALLATION NOTES

1. ALTHOUGH NOT NORMALLY USED, THE COUNTY RESERVES THE RIGHT TO REQUIRE VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITIES AT SITES WHERE TRACKING ONTO PAVED AREAS BECOMES A SIGNIFICANT PROBLEM.
2. IF VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITIES ARE REQUIRED, ALL WHEELS ON EVERY VEHICLE LEAVING THE SITE SHALL BE CLEANED OF MUD USING A PRESSURE–WASHER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A WATER SOURCE.
3. VEHICLE TRACKING CONTROL PADS SHALL CONSIST OF HARD, DENSE, DURABLE STONE, ANGULAR IN SHAPE AND RESISTANT TO WEATHERING. ROUNDED STONE OR BOULDERS WILL NOT BE ACCEPTABLE. THE STONES SHALL BE 3" WITH A MAXIMUM SIZE OF 6". THE STONE SHALL HAVE A SPECIFIC GRAVITY OF AT LEAST 2.6. CONTROL OF GRADATION WILL BE BY VISUAL INSPECTIONS.
4. ANY CRACKED OR DAMAGED CURB AND GUTTER AND SIDEWALK SHALL BE REPLACED BY CONTRACTOR.
5. A STOP SIGN INSTALLED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED, SHALL BE INSTALLED FOR EXITING TRAFFIC AT THE VTC.

VEHICLE TRACKING CONTROL WITH WHEEL WASH MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITIES IS DAILY. ACCUMULATED SEDIMENTS SHALL BE REMOVED FROM PAD SURFACE.
2. ACCUMULATED SEDIMENT IN THE WASHWATER/SEDIMENT TRAP SHALL BE REMOVED WHEN THE SEDIMENT DEPTH REACHES AN AVERAGE OF 12–INCHES.
3. VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITY SHALL BE REMOVED AT THE END OF CONSTRUCTION, THE RIPRAP MATERIAL REMOVED OR, IF APPROVED BY THE COUNTY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED.

WW VTC WITH WHEEL WASH 26

Sheet Revisions

1	DOUGLAS COUNTY REISSUE	1/17

NOTE: SCALES SHOWN ARE FOR 24"x36" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

DOUGLAS COUNTY
COLORADO

GESC GRADING, EROSION, AND SEDIMENT CONTROL

GESC PLAN STANDARD NOTES AND DETAILS

SHEET 3 OF 3

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

THIS DRAWING IS THE PROPERTY OF GMS, INC. AND IS NOT TO BE RE-PRODUCED, MODIFIED OR USED FOR ANY OTHER PROJECT OR EXTENSION OF THIS PROJECT EXCEPT BY AGREEMENT WITH THIS COMPANY.

REVISIONS

NO.	DATE	DESCRIPTION
1		

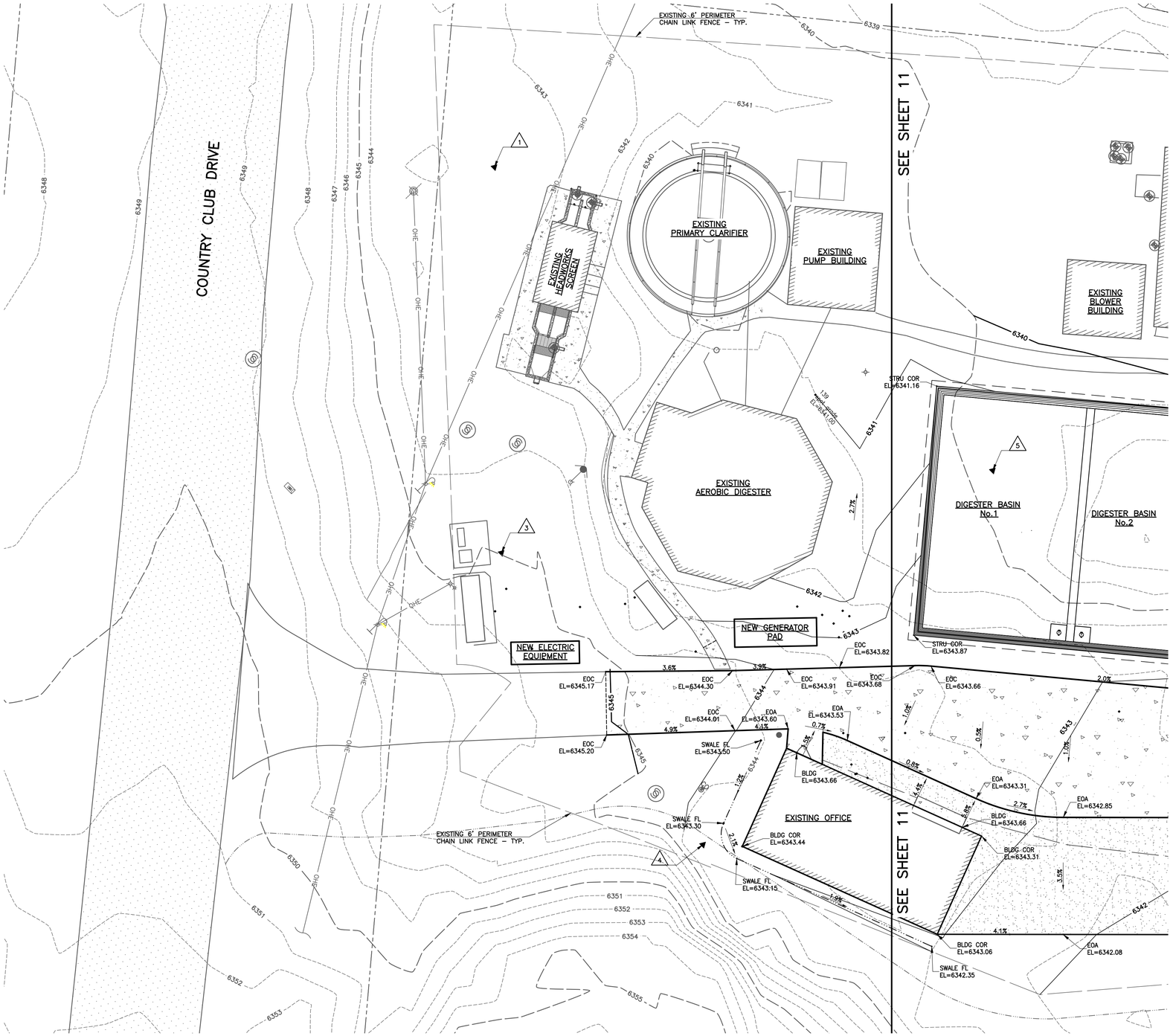
GESC STANDARD DETAILS III
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021–068.600
GMS FILE NO.	3788

SHEET 9 OF 11

G:\Perry Park WSD\2021\068600\GRADING AND DRAINAGE III.dwg, GESC STANDARD DETAILS III - 24x36, 3/20/2024 9:00:44 AM, slw, AutoCAD PDF (General Documentation).pc3, 1:1



1/10 SITE GRADING PLAN
SCALE: 1" = 10'

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

Perry Park Water & Sanitation District

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

SITE GRADING AND DRAINAGE I
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

SHEET 10 OF 11

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

SEE SHEET 10

SEE SHEET 10

EXISTING PRIMARY CLARIFIER (TO REMAIN)

EXISTING RBC NO. 1

EXISTING RBC NO. 2

EXISTING BLOWER BUILDING

EXISTING MAINTENANCE/CHEM FEED BUILDING

EXISTING AEROBIC DIGESTER (TO BE DEMOLISHED)

PROPOSED DIGESTER NO. 1
TOC EL. = 6336.00

PROPOSED DIGESTER NO. 2
TOC EL. = 6336.00

PROPOSED DIGESTED SLUDGE BASIN
TOC EL. = 6336.00

EXISTING FLOC TANK

EXISTING SECONDARY CLARIFIER

PROPOSED PUMP VAULT

PROPOSED UV DISINFECTION SYSTEM IMPROVEMENTS

EXISTING CHEM FEED BUILDING

PROPOSED BLOWER BUILDING
TOC EL. = 6340.50

ELECTRIC ROOM

EXISTING OFFICE

FIXED BOLLARD, SET EDGE EVEN WITH OPENING – TYP. OF 2

EXISTING 6' PERIMETER CHAIN LINK FENCE – TYP.

STRU COR EL=6341.16
BLDG COR EL=6339.90
EOC EL=6339.57
EOC EL=6339.59
EOC EL=6339.49
EOC EL=6339.53
EOC EL=6339.61
EOC EL=6339.96
EL-INT EL=6339.80
EOC EL=6339.55
EOC EL=6339.12
EOC EL=6339.30
EOC EL=6337.87
STRU COR EL=6340.05
STRU COR EL=6340.05
STRU COR EL=6340.05
STRU COR EL=6340.05
STRU COR EL=6343.87
STRU COR EL=6344.49
STRU COR EL=6340.99
STRU COR EL=6342.33
EOC EL=6343.82
EOC EL=6344.30
EOC EL=6343.91
EOC EL=6343.68
EOC EL=6343.66
EOC EL=6342.33
EOC EL=6344.01
EOA EL=6343.60
EOA EL=6343.53
EOA EL=6343.31
EOA EL=6342.85
EOA EL=6342.01
EOA EL=6341.36
BLDG EL=6343.66
BLDG COR EL=6343.31
CG-FL EL=6340.71
CG FL EL=6340.46
SWALE FL EL=6343.15
BLDG COR EL=6343.06
EOA EL=6342.08
EOA EL=6341.55
SWALE FL EL=6342.35
FS EL=6340.53
FS EL=6340.24
FL-INT EL=6340.75
EOC EL=6340.39
CG FL EL=6340.47
EOC EL=6340.16
EOC EL=6338.24
EOC EL=6338.32
EOC EL=6340.47
BLDG COR EL=6340.30
BLDG COR EL=6340.35
EOC EL=6340.16

1/11 SITE GRADING PLAN
SCALE: 1" = 10'

SITE GRADING AND DRAINAGE II
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
6162 LEHMAN DRIVE, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

Perry Park Water & Sanitation District

SHEET 11 OF 11

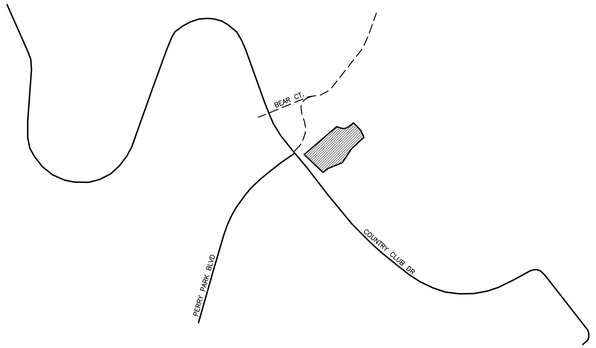
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS - PHASE 2

FOR

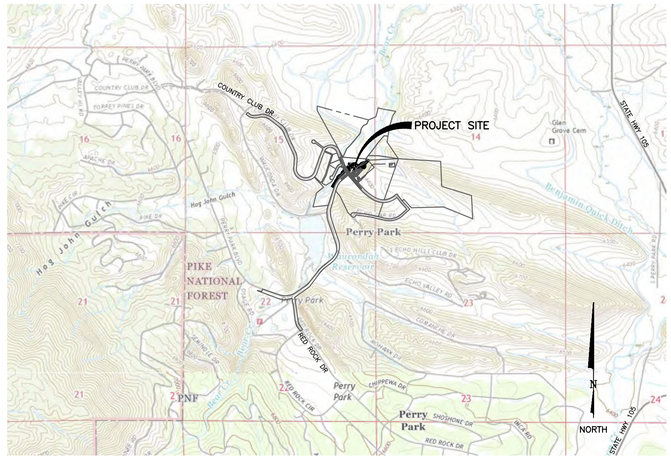
PERRY PARK WATER & SANITATION DISTRICT

LOCATION AND EXTENT SUBMITTAL

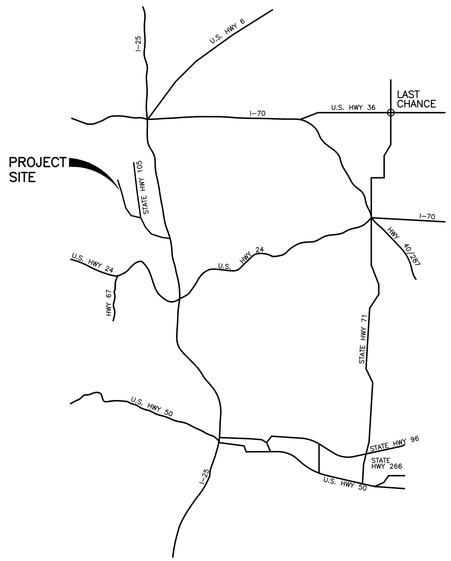
MARCH 2024



LOCATION MAP
NO SCALE



SITE MAP
SCALE: 1" = 2,000'



VICINITY MAP
NO SCALE

THE GRADING, EROSION, AND SEDIMENT CONTROL PLAN INCLUDED HEREIN HAS BEEN PLACED IN THE DOUGLAS COUNTY FILE FOR THIS PROJECT AND APPEARS TO FULFILL APPLICABLE DOUGLAS COUNTY GRADING, EROSION AND SEDIMENT CONTROL CRITERIA, AS AMENDED. ADDITIONAL GRADING, EROSION AND SEDIMENT MEASURE MAY BE REQUIRED OF THE PERMITTEE(S) DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED GESC PLAN DOES NOT FUNCTION AS INTENDED. THE REQUIREMENTS OF THIS GESC PLAN SHALL RUN WITH THE LAND AND BE THE OBLIGATION OF THE PERMITTEE(S), UNTIL SUCH TIME AS THE GESC PLAN IS PROPERLY COMPLETED, MODIFIED OR VOIDED.

Perry Park Water & Sanitation District

GMS, INC.
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

_____
ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

_____
DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

PROJECT ADDRESS:
5121 COUNTRY CLUB DR.
LARKSPUR, CO 80118

OWNER ADDRESS:
PERRY PARK WATER AND SANITATION DISTRICT
5676 RED ROCK DR.
LARKSPUR, CO 80118

DRAWING INDEX

BY: _____ DATE: _____
SAMUEL L. WOOD, PE 060152
GMS, INC.
CONSULTING ENGINEERS

NOTE: THE GRADING, EROSION AND SEDIMENT CONTROL PLAN INCLUDED HEREIN HAS BEEN PREPARED UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE REQUIREMENTS OF THE GRADING, EROSION AND SEDIMENT CONTROL (GESC) CRITERIA MANUAL OF DOUGLAS COUNTY, AS AMENDED.

BY: _____ DATE: _____
PERRY PARK WATER & SANITATION DISTRICT

GMS FILE No. .
PLOT CONFIGURATION: GMS-STANDARD(NO SCREEN).
CAD FILENAME: G:\PERRY PARK WSD\2021-068\600\GESC COVER.DWG

G:\Perry Park WSD\2021-068\600\GESC COVER.dwg, LOCATION AND EXTENT SUBMITTAL COVER, 2/20/2024 8:39:35 AM, dlw, AutoCAD PDF (General Documentation).pc3, 1:1

STANDARD NOTES

1. THE DOUGLAS COUNTY ENGINEERING DIRECTOR SIGNATURE AFFIXED TO THIS DOCUMENT INDICATES THE ENGINEERING DIVISION HAS REVIEWED THE DOCUMENT AND FOUND IT IN GENERAL CONFORMANCE WITH THE DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS AND THE DOUGLAS COUNTY SUBDIVISION RESOLUTION OR ACCEPTED VARIANCES TO THOSE REGULATIONS. THE DOUGLAS COUNTY ENGINEERING DIRECTOR, THROUGH ACCEPTANCE OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY, OTHER THAN STATED ABOVE, FOR THE COMPLETENESS AND/OR ACCURACY OF THESE DOCUMENTS. THE OWNER AND ENGINEER UNDERSTAND THAT THE RESPONSIBILITY FOR THE ENGINEERING ADEQUACY OF THE FACILITIES DEPICTED IN THIS DOCUMENT LIES SOLELY WITH THE PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF COLORADO WHOSE STAMP AND SIGNATURE IS AFFIXED TO THIS DOCUMENT.

2. ALL CONSTRUCTION SHALL CONFORM TO DOUGLAS COUNTY STANDARDS. ANY CONSTRUCTION NOT SPECIFICALLY ADDRESSED BY THESE PLANS AND SPECIFICATIONS WILL BE BUILT IN COMPLIANCE WITH THE LATEST EDITION OF THE MOST STRINGENT OF THE FOLLOWING:

   - THE DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS
   - THE COLORADO DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
   - THE COLORADO DEPARTMENT OF TRANSPORTATION M STANDARDS

3. ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE DOUGLAS COUNTY ENGINEERING DIVISION AS APPLICABLE. THE COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO ITS STANDARDS AND SPECIFICATIONS.

4. THE CONTRACTOR SHALL NOTIFY THE DOUGLAS COUNTY ENGINEERING INSPECTION DIVISION, 303-660-7487, A MINIMUM OF 24-HOURS AND A MAXIMUM OF 72-HOURS PRIOR TO STARTING CONSTRUCTION. CONTRACTOR SHALL NOTIFY DOUGLAS COUNTY ENGINEERING INSPECTION WHEN WORKING OUTSIDE OF THE PUBLIC RIGHT-OF-WAY ON ANY FACILITY THAT WILL BE CONVEYED TO THE COUNTY, URBAN DRAINAGE & FLOOD CONTROL DISTRICT, OR OTHER SPECIAL DISTRICT FOR MAINTENANCE (STORM SEWER, ENERGY DISSIPATERS, DETENTION OUTLET STRUCTURES, OR OTHER DRAINAGE INFRASTRUCTURES). FAILURE TO NOTIFY THE ENGINEERING INSPECTION DIVISION TO ALLOW THEM TO INSPECT THE CONSTRUCTION MAY RESULT IN NON-ACCEPTANCE OF THE FACILITY/INFRASTRUCTURE BY THE COUNTY AND/OR URBAN DRAINAGE.

5. CONSTRUCTION WILL NOT BEGIN UNTIL ALL APPLICABLE PERMITS HAVE BEEN ISSUED. IF A DOUGLAS COUNTY ENGINEERING INSPECTOR IS NOT AVAILABLE AFTER PROPER NOTICE OF CONSTRUCTION ACTIVITY HAS BEEN PROVIDED, THE PERMITTEE MAY COMMENCE WORK IN THE INSPECTOR'S ABSENCE. HOWEVER, DOUGLAS COUNTY RESERVES THE RIGHT NOT TO ACCEPT THE IMPROVEMENT IF SUBSEQUENT TESTING REVEALS AN IMPROPER INSTALLATION.

6. THE LOCATION OF THE EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION. FOR INFORMATION CONTACT: COLORADO 811, AT 1-800-922-1987 (WWW.COLORADO811.ORG).

7. THE CONTRACTOR SHALL HAVE ONE (1) COPY OF THE PLANS SIGNED BY THE DOUGLAS COUNTY ENGINEERING DIRECTOR, ONE (1) COPY OF THE ROADWAY DESIGN AND CONSTRUCTION STANDARDS, AS AMENDED, AND ALL APPLICABLE PERMITS AT THE JOB SITE AT ALL TIMES.

8. ALL PROPOSED STREET CUTS TO EXISTING PAVEMENTS FOR UTILITIES, STORM SEWER OR FOR OTHER PURPOSES ARE LISTED ON REFERENCED BELOW:

EXAMPLES: WATER TIE-IN	SHEET 3
STORM SEWER CONNECTION	SHEET 6

9. A TRAFFIC CONTROL PLAN, IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, SHALL BE SUBMITTED TO DOUGLAS COUNTY FOR ACCEPTANCE WITH THE RIGHT-OF-WAY USE AND CONSTRUCTION PERMIT APPLICATION. A RIGHT-OF-WAY USE AND CONSTRUCTION PERMIT WILL NOT BE ISSUED WITHOUT AN ACCEPTED TRAFFIC CONTROL PLAN FOR TRAFFIC CONTROL DURING CONSTRUCTION.

10. THE CONSTRUCTION PLANS SHALL BE CONSIDERED VALID FOR THREE (3) YEARS FROM THE DATE OF COUNTY ACCEPTANCE, AFTER WHICH TIME THESE PLANS SHALL BE VOID AND WILL BE SUBJECT TO RE-REVIEW AND RE-ACCEPTANCE BY DOUGLAS COUNTY.

11. DOUGLAS COUNTY STANDARD DETAILS SHALL NOT BE MODIFIED. ANY NON-STANDARD DETAILS WILL BE CLEARLY IDENTIFIED AS SUCH.

12. PAVING, INCLUDING CONSTRUCTION OF CURB AND GUTTER (WHEN USED), SHALL NOT START UNTIL A PAVEMENT DESIGN REPORT AND SUBGRADE COMPACTION TESTS ARE ACCEPTED BY THE ENGINEERING INSPECTION DIVISION FOR ALL PUBLIC AND PRIVATE ROADS.

13. STANDARD DOUGLAS COUNTY HANDICAP RAMPS ARE TO BE CONSTRUCTED AT ALL CURB RETURNS AND AT MID-BLOCK LOCATIONS OPPOSITE OF ONE OF THE CURB RETURNS OF ALL "T" INTERSECTIONS AS IDENTIFIED ON THESE PLANS.

14. ALL STATIONING IS BASED ON CENTERLINE OF ROADWAYS UNLESS OTHERWISE NOTED.

15. ALL ELEVATIONS ARE ON UNITED STATES COAST AND GEODETIC SURVEY (USC&GS) (NAVD-88) DATUM WITH DATE. THE RANGE POINT OR MONUMENTS SHALL BE SHOWN ON CONSTRUCTION DRAWINGS.

16. ALL STORM SEWER IMPROVEMENTS (PUBLIC AND PRIVATE) INCLUDING, BUT NOT LIMITED TO, INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, RIPRAP, DETENTION BASINS, FOREBAYS, MICROPOOLS, AND WATER QUALITY FACILITIES REQUIRE PERMITTING AND INSPECTIONS. PLEASE CONTACT THE DOUGLAS COUNTY ENGINEERING INSPECTIONS DIVISION AT 303-660-7487 FOR PERMITTING REQUIREMENTS AND INSPECTIONS SCHEDULING.

17. TWO (2) MANHOLE ACCESS POINTS ARE REQUIRED ON ALL TYPE "R" CURB INLETS GREATER THAN OR EQUAL TO TEN (10) FEET IN LENGTH.

18. EPOXY COATED REBAR IS REQUIRED ON ALL DRAINAGE STRUCTURES.

19. DOUGLAS COUNTY REQUIRES CLASS D CONCRETE FOR ALL DRAINAGE STRUCTURES.

20. ALL RCP STORM SEWERS MUST USE ASTM C443 WATERTIGHT GASKETS PER THE CURRENT DOUGLAS COUNTY AND URBAN DRAINAGE DESIGN CRITERIA.

21. ALL RCP SHALL BE CLASS III STORM SEWER PIPE UNLESS OTHERWISE SPECIFIED.

22. JOINT RESTRAINS ARE REQUIRED FOR A MINIMUM OF THE LAST TWO PIPE JOINTS AND FLARED END SECTION OF AN RCP OUTFALL.

23. PRECAST INLETS AND MANHOLE BASES ARE NOT ALLOWED.

24. TOE WALLS ARE REQUIRED ON FLARED END SECTIONS AT THE OUTLET END OF CULVERTS AND STORM SEWER OUTFALLS.

25. FILTER FABRIC IS REQUIRED UNDER ALL RIPRAP PADS.

26. THE PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF COLORADO, SIGNING THESE PLANS IS RESPONSIBLE FOR ENSURING THAT THE DETAILS INCLUDED ARE COMPATIBLE WITH THE STANDARD DOUGLAS COUNTY DETAILS CONTAINED IN THE LATEST VERSIONS OF THE CRITERIA MANUALS. THIS INCLUDES, BUT IS NOT LIMITED TO:

   - DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS
   - DOUGLAS COUNTY STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA
   - DOUGLAS COUNTY GRADING, EROSION AND SEDIMENT CONTROL CRITERIA
   - CDOT M & S STANDARDS
   - MUTCD
   - URBAN STORM DRAINAGE CRITERIA MANUAL VOLUMES 1, 2 & 3

27. A TEMPORARY CONSTRUCTION ACCESS PERMIT FROM DOUGLAS COUNTY MAY BE REQUIRED FOR ANY PROJECT.

G:\Perry Park WSD\2021-068\600\DOUGLAS COUNTY STANDARD NOTES.dwg, DOUGLAS COUNTY STANDARD NOTES - 24x36, 3/29/2024 8:39:43 AM, dw, AutoCAD PDF (General Documentation).pc3, 1:1

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

Perry Park Water & Sanitation District

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION

DOUGLAS COUNTY STANDARD NOTES

WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2

PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

SHEET 2 OF 11

LEGEND

AIR	AIR PIPING
DDD	DIGESTER DECANT DISCHARGE PIPING
G	GAS PIPING
NPW	NON-POTABLE WATER PIPING
OHE	OVERHEAD ELECTRIC LINE
P.S.P	PRIMARY SLUDGE PIPING
SS	SANITARY SEWER PIPING
SW	STORMWATER PIPING
UGE	UNDERGROUND ELECTRIC LINE
W	POTABLE WATER PIPING
WAS	WASTE ACTIVATED SLUDGE PIPING
	CHAIN LINK FENCE
	NEW PIPING LARGER THAN 10"
	NEW PIPING SMALLER THAN 12"
	EXISTING PIPING LARGER THAN 10"
	EXISTING PIPING SMALLER THAN 12"
	EXISTING GATE VALVE
	EXISTING PLUG VALVE
	CONCRETE PLUG
	NEW GATE VALVE
	NEW FIRE HYDRANT
	NEW YARD HYDRANT
	EXISTING YARD HYDRANT
	EXISTING FIRE HYDRANT
	EXISTING MANHOLE
	PROPOSED MANHOLE
	EXISTING ELECTRIC HAND HOLE
	NEW ELECTRIC HAND HOLE
GM	EXISTING GAS METER
	NEW GAS METER
	NEW ELECTRIC POWER POLE

EXISTING CHAIN LINK PERIMETER FENCE. DO NOT DISTURB – TYP.

EXISTING 8" D.I.P. RBC BYPASS (TO REMAIN)

EXISTING 8" D.I.P. RBC INFLUENT (TO REMAIN)

EXISTING SPLITTER STRUCTURE (TO REMAIN)

CONNECT NEW DECANT PIPING TO EXISTING DECANT PIPING. DO NOT DISTURB EXISTING STRUCTURE PENETRATION.

EXISTING 8" D.I.P. PRIMARY CLARIFIER EFFLUENT TO RBC's (TO REMAIN)

EXISTING 8" D.I.P. PRIMARY CLARIFIER BYPASS (TO REMAIN)

EXISTING 8" D.I.P. PRIMARY CLARIFIER INFLUENT (TO REMAIN)

INSTALL TEMPORARY EXTENSION OF W.A.S. PIPE TO EXISTING AIR LIFT MANHOLE. PIPE TO BE ABANDONED ONCE NEW DIGESTER AND SLUDGE STO. TANKS ARE IN OPERATION – TYP.

EXISTING MAINTENANCE/ CHEM FEED BUILDING (TO REMAIN)

EXISTING FLOC TANK (TO REMAIN)

EXISTING SECONDARY CLARIFIER (TO REMAIN)

EXISTING CHEM FEED BUILDING (TO REMAIN)

EXISTING RBC NO.2 (TO REMAIN)

EXISTING RBC NO.1 (TO REMAIN)

EXISTING BLOWER BUILDING (TO REMAIN)

EXISTING PRIMARY SLUDGE PUMP BUILDING (TO REMAIN)

EXISTING PRIMARY CLARIFIER (TO REMAIN)

EXISTING HEADWORKS SCREEN (TO REMAIN)

EXISTING AEROBIC DIGESTER (TO BE DEMOLISHED)

PROPOSED W.A.S. PUMP VAULT

CONNECT NEW WAS PIPING TO EXISTING WAS PIPING. DO NOT DISTURB EXISTING STRUCTURE PENETRATION.

PROPOSED SLUDGE STORAGE BASIN

PROPOSED DIGESTER NO. 2

PROPOSED DIGESTER NO. 1

NEW BLOWER BUILDING

NEW ELECTRIC ROOM

EXISTING OFFICE BUILDING (TO REMAIN)

EXISTING CHAIN LINK PERIMETER FENCE. DO NOT DISTURB – TYP.

EXISTING ENTRANCE GATE TO REMAIN

COUNTRY CLUB DR

NOTES:

1. REFER TO DETAILED SITE PLANS FOR PIPING CONNECTIONS AT BUILDINGS AND OTHER STRUCTURES.
2. REFER TO DRAWING G-27 FOR NATURAL GAS PIPING PLAN.
3. REFER TO DRAWING E-1 FOR MASTER SITE ELECTRICAL PLAN.
4. REFER TO DRAWING G-8 FOR MASTER SITE DEMOLITION PLAN, FOR EXISTING PIPING TO BE DEMOLISHED OR ABANDONED IN PLACE.
5. DISCOVERY EXCAVATION IS REQUIRED IN THIS AREA TO CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND PIPING. PERFORM DISCOVERY EXCAVATION PRIOR TO FINALIZING MANHOLE SUBMITTAL FOR THIS LOCATION.

N

0' 10' 20'

SCALE: 1" = 10'

PIPING SCHEDULE

(101)	SERVICE	U/S STRUCTURE	D/S STRUCTURE	SHEET REF.	PIPE DIA.	PIPE MATERIAL	NORMAL OPERATING PRESSURE (PSI)	MAX. OPERATING PRESSURE (PSI)	TEST PRESSURE (PSI)
101	WAS	W.A.S. PUMP VAULT	DIGESTER BASINS	1/G-19	4"	CE LINED D.I.P.	15	50	75
102	PS	PS PUMP BLDG	DIGESTER BASINS	1/G-19	4"	D.I.P.	15	50	75
103	DEC	DIGESTERS/SLG STO.	SLG STO. BASINS	1/G-20	6"	SDR35 PVC	GRAVITY	GRAVITY	5
104	AIR	BLOWER BLDG	DIGESTERS/SLG STORAGE	1/G-21	6"	UNLINED D.I.P.	7	10	15

PRELIMINARY COPY

DRAWING ISSUED FOR WATER QUALITY CONTROL DIVISION REVIEW WITH THE PROCESS DESIGN REPORT.

DECEMBER 8, 2023

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

MASTER UTILITY PLAN

WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2

PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
614 INNER CANYON ROAD, SUITE 250
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC	DATE	MARCH 2024
DESIGNED	SLW	PROJECT NO.	2021-068.600
CHECKED	SLW	GMS FILE NO.	3788

Perry Park Water & Sanitation District

SHEET 3 OF 11

LEGEND OF LINES AND SYMBOLS

- WOOD FENCE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- SS — SANITARY SEWER LINE
- SWR — SLUDGE WATER RETURN
- OHE — OVERHEAD ELECTRIC LINE
- UGE — UNDERGROUND ELECTRIC LINE
- SEC — SECONDARY SLUDGE LINE
- WAS — WASTE ACTIVATED SLUDGE LINE
- PS — PRIMARY SLUDGE LINE
- DDD — DIGESTED DECANT DISCHARGE
- AIR — PROCESS AIR PIPING
- W — WATER LINE
- 6360 — CONTOUR LINE WITH ELEVATION LABEL
- DITCH FLOWLINE
- PROPERTY LINE
- FIRE HYDRANT
- WATER VALVE BOX
- UTILITY POLE
- UTILITY POLE w/ LIGHT
- BUILDING
- CONCRETE FLATWORK
- ASPHALT SURFACING
- GRAVEL ROADWAY/DRIVEWAY

Please revise the scope of the GESC drawings to focus on the LOC, i.e. similar to the utility plan on the previous sheet.

Please see Section 3.17 of the Douglas County GESC manual and include required dimensions for each BMP shown in each sheet.

BEAR CREEK

EXISTING BRIDGE

SILT FENCE

SF

SEDIMENT CONTROL LOG

SCL

VEGETATION BUFFER

EXISTING CHLORINE CONTACT CHAMBER

EXISTING CHEM FEED BUILDING

EXISTING SECONDARY CLARIFIER

296 ft

(38-44) / 296 ~ -2%

EXISTING MAINTENANCE/ CHEM FEED BUILDING

EXISTING FLOC. TANK

LIMITS OF CONSTRUCTION

EXITING ROTATING BIOLOGICAL CONTACTOR STRUCTURES

The fall along the property line is approximately 2%. A ditch could be installed along this alignment to intercept and convey site runoff to a full-spectrum detention pond or other detention and water quality facility near the northeast corner of the site.

PROPOSED DIGESTED SLUDGE STORAGE BASIN

TEMPORARY/CONSTRUCTION STOCKPILE AREA

PROPOSED DIGESTER BASINS

EXISTING PRIMARY CLARIFIER

EXISTING AEROBIC DIGESTER

SSA

STABILIZED STAGING AREA

EXISTING MAINTENANCE BUILDING

LIMITS OF CONSTRUCTION

EXISTING DRAINAGE DITCH

VTC

VEHICLE TRACKING CONTROL

EXISTING CONCRETE DRIVE AT FACILITY GATED ACCESS

EXISTING ASPHALT ROADWAYS

PERRY PARK BOULEVARD

COUNTRY CLUB DRIVE

6340 6338 6342 6350 6348 6332 6380

Please show flow arrows and contours or spot shots throughout the plan to demonstrate how runoff from all disturbed areas will convey to the BMPs.

N

40 ft

0' 20' 40'

SCALE: 1" = 20'

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SHEET NOTE:

1. SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP SYMBOLS.

Perry Park Water & Sanitation District

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

GESC INITIAL PLAN

WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2

PERRY PARK WATER & SANITATION DISTRICT

GMS, INC. CIVIL ENGINEERS 1000 TOWN CENTER DRIVE, SUITE 230 LAFAYETTE, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

SHEET 4 OF 11

G:\Perry Park WSD\2021.068\600\GESC\Initial.dwg, GESC Initial Plan, 3/25/2024 8:39:53 AM, dev, AutoCAD PDF (General Documentation).pc3, 1:1

LEGEND OF LINES AND SYMBOLS

- WOOD FENCE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- SS — SANITARY SEWER LINE
- SWR — SLUDGE WATER RETURN
- OHE — OVERHEAD ELECTRIC LINE
- UGE — UNDERGROUND ELECTRIC LINE
- SEC — SECONDARY SLUDGE LINE
- WAS — WASTE ACTIVATED SLUDGE LINE
- PS — PRIMARY SLUDGE LINE
- DDD — DIGESTED DECANT DISCHARGE
- AIR — PROCESS AIR PIPING
- W — WATER LINE
- 6360 — CONTOUR LINE WITH ELEVATION LABEL
- DITCH FLOWLINE
- PROPERTY LINE

- FIRE HYDRANT
- WATER VALVE BOX
- UTILITY POLE
- UTILITY POLE w/ LIGHT
- BUILDING
- CONCRETE FLATWORK
- ASPHALT SURFACING
- GRAVEL ROADWAY/DRIVEWAY
- DIRT ROAD
- SANITARY SEWER MANHOLE
- CO — SANITARY SEWER CLEAN–OUT

BEAR CREEK
EXISTING BRIDGE
EXISTING ASPHALT ROADWAYS
PERRY PARK BOULEVARD
COUNTRY CLUB DRIVE
SILT FENCE (SF)
SEDIMENT CONTROL LOG (SCL)
VEGETATION BUFFER
EXISTING CHLORINE CONTACT CHAMBER
EXISTING CHEM FEED BUILDING
EXISTING SECONDARY CLARIFIER
EXISTING MAINTENANCE/ CHEM FEED BUILDING
EXISTING FLOC. TANK
LIMITS OF CONSTRUCTION
EXITING ROTATING BIOLOGICAL CONTACTOR STRUCTURES
PROPOSED DIGESTED SLUDGE STORAGE BASIN
PROPOSED DIGESTER BASINS
PROPOSED BLOWER BUILDING W/ELECTRIC ROOM
CUT VOLUME = 400 CY
FILL VOLUME = 350 CY
TEMPORARY/CONSTRUCTION STOCKPILE AREA
STABILIZED STAGING AREA
EXISTING PRIMARY CLARIFIER
EXISTING AEROBIC DIGESTER
EXISTING MAINTENANCE BUILDING
EXISTING DRAINAGE DITCH
CONCRETE WASHOUT AREA (CWA)
VEHICLE TRACKING CONTROL (VTC)
EXISTING CONCRETE DRIVE AT FACILITY GATED ACCESS
Please screen back elements installed in a previous stage.

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SHEET NOTE:

1. SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP SYMBOLS.
2. SHADED BMPS WERE INSTALLED IN INITIAL STAGE AND SHALL BE LEFT IN PLACE IN INTERIM STAGE UNLESS OTHERWISE NOTED.
3. ALL INTERIM EROSION AND SEDIMENT CONTROL BMPS INCLUDING DRILL SEEDING AND CRIMP MULCHING OF DISTURBED AREAS, MUST BE INSTALLED, INSPECTED, AND APPROVED BY THE COUNTY PRIOR TO THE ISSUANCE OF A RIGHT–OF–WAY USE AND CONSTRUCTION PERMIT FOR THE PURPOSE OF PAVING OR INSTALLATION OF CURB AND GUTTER.
4. SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITY FACILITIES, CULVERTS, STORM DRAINS, AND OUTLET PROTECTION.

N

0' 20' 40'
SCALE: 1" = 20'

Perry Park Water & Sanitation District

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

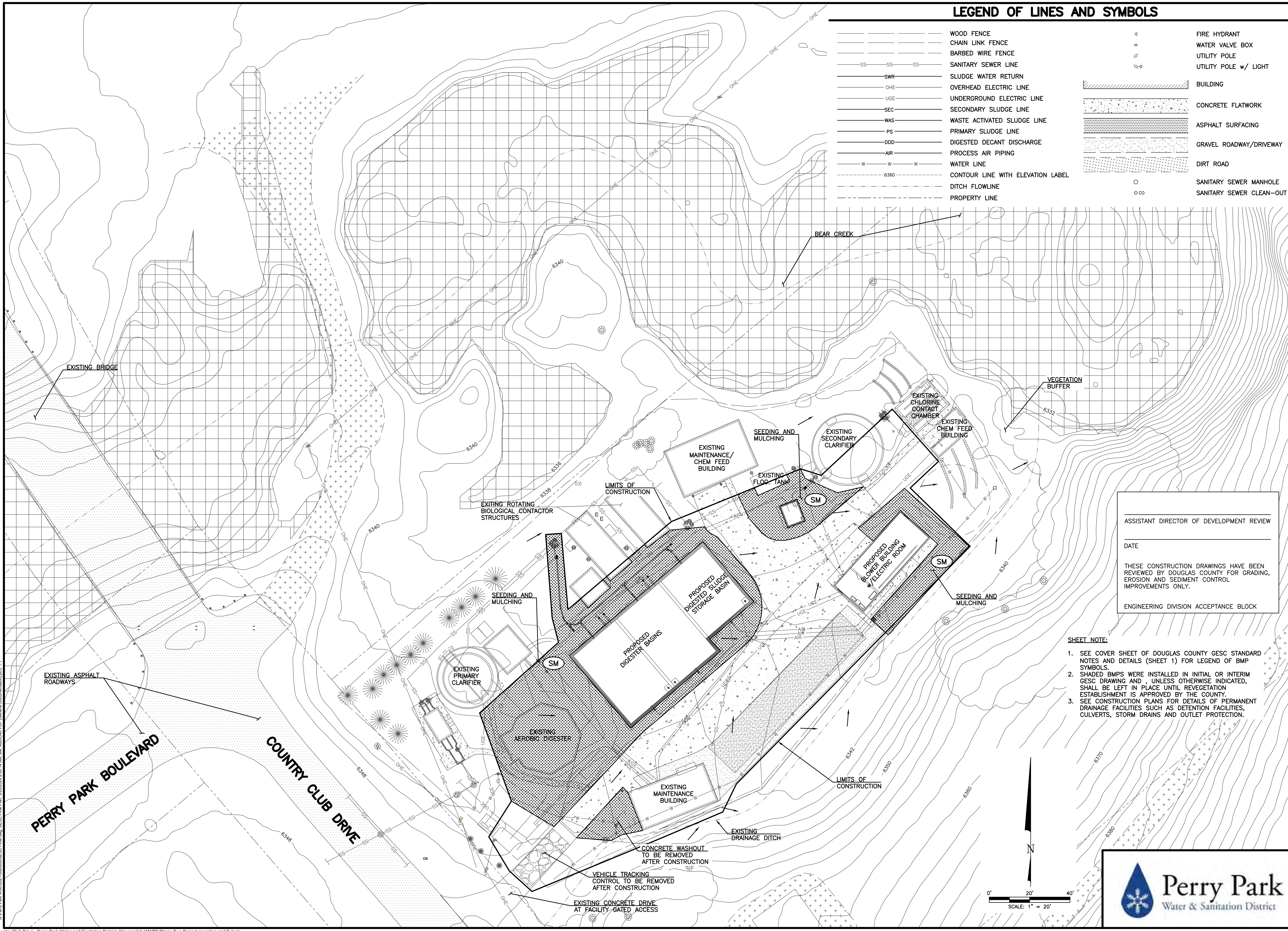
GESC INTERIM PLAN
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021–068.600
GMS FILE NO.	3788

SHEET 5 OF 11

G:\Perry Park WSD\2021-068\800\GESC Interim.dwg, GESC Interim Plan, 3/20/2024 9:07:04 AM, dtw, AutoCAD PDF (General Documentation).pc3, 1:1



LEGEND OF LINES AND SYMBOLS
WOOD FENCE
CHAIN LINK FENCE
BARBED WIRE FENCE
SANITARY SEWER LINE
SLUDGE WATER RETURN
OVERHEAD ELECTRIC LINE
UNDERGROUND ELECTRIC LINE
SECONDARY SLUDGE LINE
WASTE ACTIVATED SLUDGE LINE
PRIMARY SLUDGE LINE
DIGESTED DECANT DISCHARGE
PROCESS AIR PIPING
WATER LINE
CONTOUR LINE WITH ELEVATION LABEL
DITCH FLOWLINE
PROPERTY LINE
FIRE HYDRANT
WATER VALVE BOX
UTILITY POLE
UTILITY POLE w/ LIGHT
BUILDING
CONCRETE FLATWORK
ASPHALT SURFACING
GRAVEL ROADWAY/DRIVEWAY
DIRT ROAD
SANITARY SEWER MANHOLE
SANITARY SEWER CLEAN-OUT
BEAR CREEK
EXISTING BRIDGE
VEGETATION BUFFER
EXISTING CHLORINE CONTACT CHAMBER
EXISTING CHEM FEED BUILDING
SEEDING AND MULCHING
EXISTING SECONDARY CLARIFIER
EXISTING MAINTENANCE/ CHEM FEED BUILDING
EXISTING FLOC. TANK
LIMITS OF CONSTRUCTION
EXITING ROTATING BIOLOGICAL CONTACTOR STRUCTURES
SM
PROPOSED BLOWER BUILDING w/ELECTRIC ROOM
PROPOSED DIGESTED SLUDGE STORAGE BASIN
PROPOSED DIGESTER BASINS
EXISTING PRIMARY CLARIFIER
EXISTING AEROBIC DIGESTER
EXISTING ASPHALT ROADWAYS
PERRY PARK BOULEVARD
COUNTRY CLUB DRIVE
EXISTING MAINTENANCE BUILDING
EXISTING DRAINAGE DITCH
CONCRETE WASHOUT TO BE REMOVED AFTER CONSTRUCTION
VEHICLE TRACKING CONTROL TO BE REMOVED AFTER CONSTRUCTION
EXISTING CONCRETE DRIVE AT FACILITY GATED ACCESS
6340
6338
6336
6332
6342
6348
6350
6360
6370
6380
N
0' 20' 40'
SCALE: 1" = 20'

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

SHEET NOTE:

1. SEE COVER SHEET OF DOUGLAS COUNTY GESC STANDARD NOTES AND DETAILS (SHEET 1) FOR LEGEND OF BMP SYMBOLS.
2. SHADED BMPS WERE INSTALLED IN INITIAL OR INTERIM GESC DRAWING AND , UNLESS OTHERWISE INDICATED, SHALL BE LEFT IN PLACE UNTIL REVEGETATION ESTABLISHMENT IS APPROVED BY THE COUNTY.
3. SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, CULVERTS, STORM DRAINS AND OUTLET PROTECTION.

Perry Park
Water & Sanitation District

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

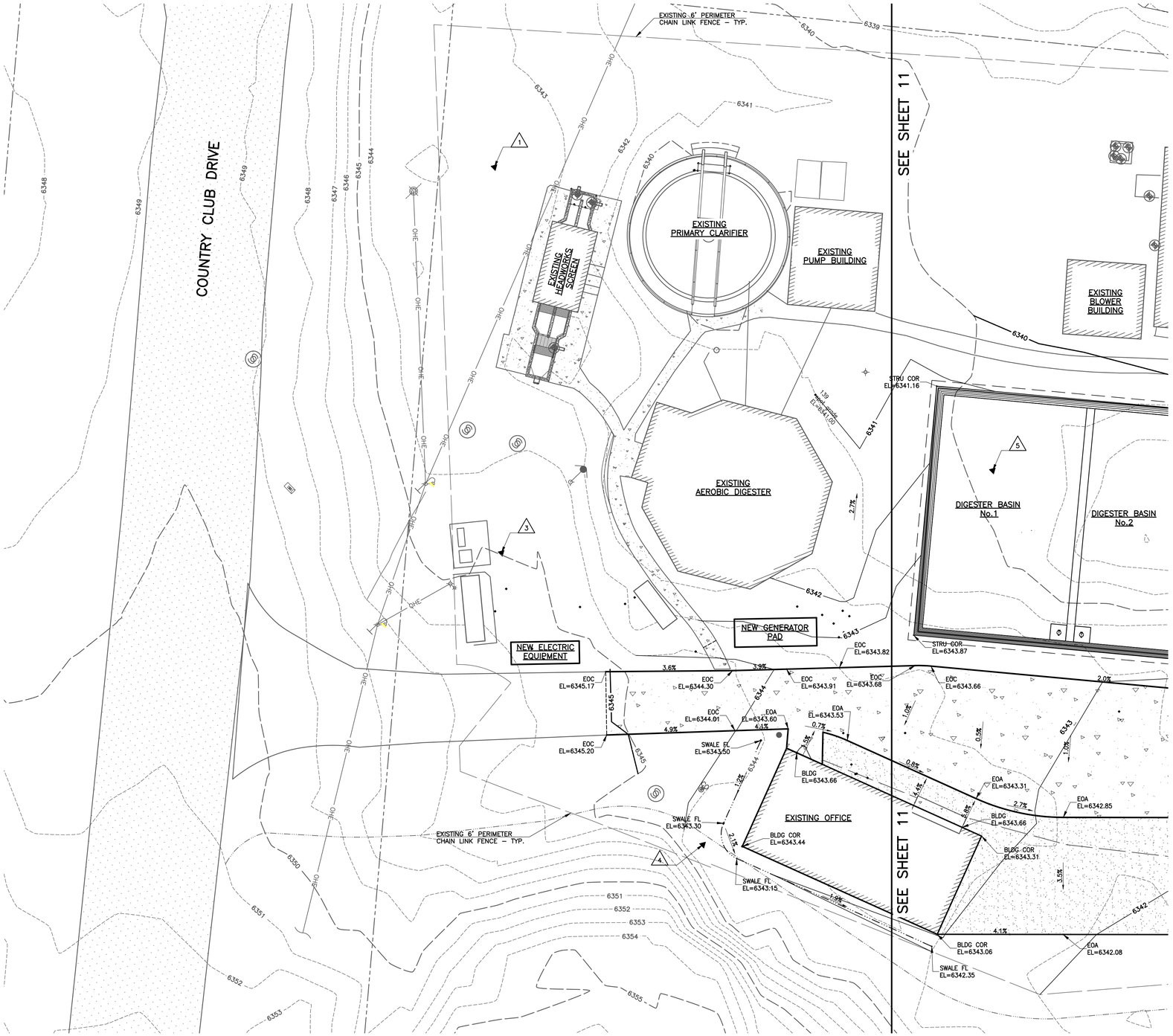
GESC FINAL PLAN
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS - PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

SHEET 6 OF 11

Please include drainage plans in the drainage report.



1/10 SITE GRADING PLAN
SCALE: 1" = 10'

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

Perry Park Water & Sanitation District

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

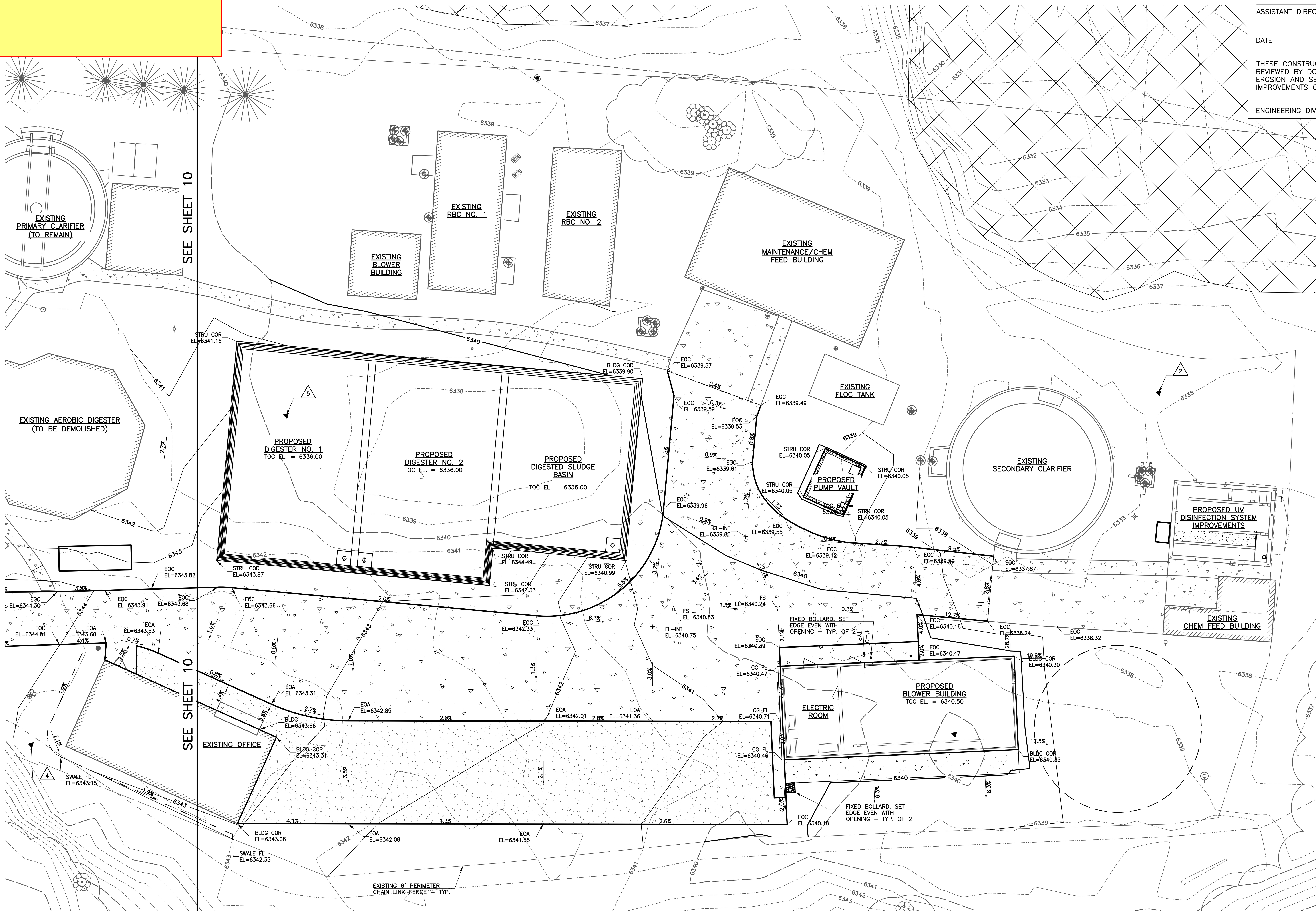
SITE GRADING AND DRAINAGE I
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

SHEET 10 OF 11

Please include drainage plans in the drainage report.



1/11 SITE GRADING PLAN
SCALE: 1" = 10'

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

ASSISTANT DIRECTOR OF DEVELOPMENT REVIEW

DATE

THESE CONSTRUCTION DRAWINGS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR GRADING, EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK

REVISIONS

NO.	DATE	DESCRIPTION
1		

SITE GRADING AND DRAINAGE II
WAUCONDAH WASTEWATER TREATMENT FACILITY IMPROVEMENTS – PHASE 2
PERRY PARK WATER & SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	SLW
CHECKED	SLW
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	3788

Perry Park Water & Sanitation District

SHEET 11 OF 11

G:\Perry Park WSD\2021-068\600\Site Grading and Drainage II.dwg, Site Grading and Drainage II, 3/20/2024 9:01:05 AM, slw, AutoCAD PDF (General Documentation).pc3, 1:1

APPENDIX H – PERMITS

The drainage report indicates the floodplain will not be modified by this project. If no work is planned in the floodplain, the FDP is not needed. If work in the floodplain is planned, please revise the drainage report to reflect this condition.

DOUGLAS COUNTY DEPARTMENT OF PUBLIC WORKS ENGINEERING
100 Third Street, Castle Rock, CO 80104
(303) 660-7490

FLOODPLAIN DEVELOPMENT PERMIT FORM

DATE:	PARCEL #: 2609-154-00-007	PERMIT#:
OWNER NAME: Perry Park Water and Sanitation District	CONTRACTOR NAME:	
ADDRESS: 5121 Country Club Dr.	ADDRESS	
Larkspur, CO 80118		
PHONE #: 303-681-2050	PHONE #:	
PROJECT LOCATION/DIRECTIONS: 5121 Country Club Dr., Larkspur, CO 80118		

PROJECT INFORMATION

PROJECT TYPE	PROJECT ACTIVITY	
☐ Single Family Residential	☐ New Construction	☐ Channelization
☐ Multi-Family Residential	☐ Substantial Improvement (>50%)	☐ Fill
☐ Manufactured (Mobile) Home	■ Improvement (<50%)	☐ Bridge/Culvert
☐ Non-Residential	☐ Rehabilitation	☐ Levee
☐ Other/Explanation		

FLOOD HAZARD DATA

Watercourse Name: Bear Creek	
The project is proposed in the	☐ Floodway ■ Floodway Fringe
Base (100-year) Flood Elevation(s) at Project Site: 6336.15 feet a.m.s.l	
Elevation required for Lowest Floor: 6338.1 feet amsl	
Elevation required for Floodproofing: 6336.5 feet amsl	
Source Document/Report/Maps: Flood Plain, Drainage Report	

PROPOSAL REVIEW CHECKLIST

X	Site development plans depict the floodway and base flood elevations.
X	Engineering data is provided for map and floodway revisions.
X	Floodway certification and data document no increase in flood heights.
X	Subdivision proposals minimize flood damage and protect utilities.
X	Lowest floor elevations are above the base (100-year) flood level.
N/A	Manufactured (mobile) homes are elevated and adequately anchored.
X	Non-residential floodproofing designs meet NFIP water-tight standards.
	Other

ENGINEERING DIVISION PROJECT FILE REFERENCE

	Project Reference File Number:
	CLOMR/LOMR File Number:

PERMIT ACTION

	PERMIT APPROVED – The information submitted for the proposed project was reviewed and is in compliance with approved flood plain management standards.
	PERMIT DENIED – The proposed project does not meet approved flood plain management standards (explanation is attached).
	VARIANCE GRANTED – A variance was granted from the base (100-year) flood elevations established by FEMA consistent with variance requirements of NFIP regulations Part 60.6 (variance action documentation is attached).

COMMENTS

_____

_____

_____

_____

_____

_____

Floodplain Administrator's Signature:

_____ _____

Signature Date

DEVELOPMENT DOCUMENTATION

	MAP REVISION DATA – Certified documentation by a registered professional engineer of as-built conditions for flood plain alternations were received and submitted to FEMA for a flood insurance map revision.
	FILL CERTIFICATE – A community official certified the elevation, compaction, slope and slope protection for all fill placed in the flood plain consistent with NFIP regulations Part 65.5 for flood insurance map revisions.
	ELEVATION CERTIFICATE – Certified as-build elevation of the building's ☐ lowest floor; ☐ floodproofing level. An Elevations Certificate (Part II) completed by a registered professional engineer or land surveyor certifying this elevation is on file.
	CERTIFICATE OF OCCUPANCY OR COMPLIANCE ISSUED (date) _____

NOTE: ***Approval of this Floodplain Development Permit Application by Douglas County does not obviate your need to comply with the requirements of Sections 7 and 9 of the Endangered Species Act of 1973, 16 U.S.C. 1531, et seq., or Section 404 of the Clean Water Act, as amended, or with any other applicable federal, state, or local laws or regulations.***

Douglas County Department of Public Works Engineering
RIGHT-OF-WAY US AND/OR CONSTRUCTION PERMIT APPLICATION:

This application does not apply to this project. All construction or installation will occur on privately owned property. No construction or installation will occur in the Douglas County public rights-of-way.

Please have the selected contractor submit the ROW/Use/Construction permit directly to the Douglas County Permits and Inspections Division.

DOUGLAS COUNTY
COLORADO

File # _____
Permit # _____
❑ New ❑ Renew ❑ Addition
Permit Duration:
❑ 60 Day ❑ 120 Day ❑ 180 Day
❑ 240 Day ❑ 300 Day ❑ 360 Day

Department of Public Works Engineering
RIGHT-OF-WAY USE AND/OR CONSTRUCTION PERMIT APPLICATION

DATE:	**PERMITTEE** (Company Name):
PERMITTEE TELEPHONE: (❑Cell / ❑Office)	**ADDRESS**:
OWNER NAME AND COMPANY FOR WHOM WORK DONE:	**CITY/STATE/ZIP**
OWNER EMAIL:	**RESPONSIBLE CONSTRUCTION SUPERVISOR EMAIL:**
OWNER TELEPHONE (❑Cell / ❑Office)	**PERMITTEE'S RESPONSIBLE CONSTRUCTION SUPERVISOR NAME**:
SUBDIVISION:	**FILING #**:
CONSTRUCTION ADDRESS/LOCATION:	

CONSTRUCTION

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
BASE FEE (Check all utilities that apply) ❑STO ❑SAN ❑WAT ❑PHO ❑FO ❑Trench Drain ❑TV ❑GAS ❑ELEC ❑Conduit	$60.00 each utility	1❑ 2❑ 3❑ 4❑ 5❑ 6❑ 7❑ 8❑ 9❑ 10❑	
Pipe/Cable 0.5" – 8"	$.19 LF		
Pipe/Cable 8.25" – 16"	$.27 LF		
Pipe/Cable 16.25" – 24"	$.44 LF		
Pipe/Cable 25" – 42"	$.77 LF		
Pipe/Cable 43" and larger	$.97 LF		

STREET CUT

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
Paved Road	$5.00 sf		
Gravel	$2.00 sf		
GESC Compliance (Applicable to any street cut or disturbance >36 lin. ft.)	$130.00 each		
❑ Boring ❑Jacking ❑Tunneling	$75.00 each		

STREET/ROAD CONSTRUCTION

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
BASE FEE ❑Subgrade ❑Base Course ❑Surface (Check all that apply)	$85.00 each	1❑ 2❑ 3❑ ❑ Other KM	
Subgrade per square yard	$.11 sy		
Base Course per square yard	$.11 sy		
Surface per square yard	$.11 sy		

CROSS-PANS

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
First Cross Pan	$55.00 each		
Additional Cross Pans	$28.00 each		

SIDEWALK/CURB&GUTTER/HANDICAP RAMP

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
BASE FEE	$55.00 each	1❑ 2❑ 3❑	
Curb &gutter w/o sidewalk	$.10 LF		
Sidewalk w/ integral curb & gutter	$.11 LF		
Sidewalk w/o curb & gutter	$.10 LF		
Sidewalk Chase Drain **(No base fee required)**	$45.00 each		
Handicap Ramp **(No base fee required)**	$45.00 each		

VALLEY PAN OR TRICKLE CHANNEL (For Detention Ponds or drainage ways)

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
BASE FEE	$53.00 each	1❑ 2❑	
Valley Pan	$.11 LF		
Concrete Trickle Channel	$.17 LF		

D.C. ROADWAY MANUAL. SEC. 10.1.1. Requirements for ROW Permits MINIMUM CHARGE SHALL BE $200.00

SEE "GENERAL PROVISIONS" FOR ADDITIONAL NOTES AND INFORMATION

NOTE: Each approved project construction plan set requires separate permits.

- ☐ **No open holes left in ROW overnight**
- ☐ **No frost/snow in backfill**
- ☐ **No stockpiling in ROW**
- ☐ **No road surface cuts**
- ☐ **Reseed all disturbed areas.**
- ☐ **Use proper erosion control methods and materials**
- ☐ **Compaction reports required every 8" in depth and every 250' longitudinal**
- ☐ **CLSM required on all road surface cuts.**
- ☐ **Traffic control as per MUTCD**
- ☐ **Traffic control in place M-F; 8am-3:30 pm ONLY**
- ☐ **Pre-con required before starting construction.**
- ☐ **ALL work must be schedule with Douglas County permits at least 24hrs prior to starting work.**
- ☐ **Failure to cancel the County inspection may result in a rescheduling fee of $50.00.**
- ☐ **Renewals Require Application**

NO REFUNDS

COLORADO 811

Colorado 811 must be notified prior to excavation!!!

Continues on next page

PIPE CULVERT or PRECAST BOX

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
BASE FEE	$60.00 each		
36" or smaller	Base Only		
>36"	$.90 LF		

CAST-IN-PLACE Storm Sewer Vaults/ Inlets or Junction Boxes

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
6' or smaller	$75.00 each		
6' or larger	$150.00 each		

LANDSCAPE/RETAINING WALLS

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
BASE FEE	$60.00 each	1❑ 2❑ 3❑	
Landscape Plus Square Yards	$.10 sy		
Retaining Walls >4 ft in height	$.11 face sq. ft		
Porous Landscape/Sand Filters per basin	$ 50.00 per basin		
> 10 sq yds	+ $ .09 sq yd		

RIP-RAP EROSION PROTECTION

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
BASE FEE	$60.00 each	1❑ 2❑ 3❑ 4❑ 5❑ 6❑	
Rip-Rap Plus Cubic Yard	$.20 cy		
Rip-Rap Plus Tonnage	$.15 ton		
Fore bay	$.09 sq yd		
Micro Pool	$50.00 each		
Vehicle Tracking Control Pad	$50.00 each		
VTC w/Wheel wash	$75.00 each		

MISCELLANEOUS

DESCRIPTION	FEE	QUANTITY	SUB-TOTAL
❑Utility Handhole ❑Pull Box ❑Pot Holes	$37.00 each		
Manhole (❑San ❑Storm)	$53.00 each		
Bridge/Cast-in-place Box Culvert	$500.00 ea.		
Traffic Signal (per location)	$500.00 ea.		
Base Fee (Per project)	$50.00 each		
Traffic Sign (Regulatory)	$12.50 each		
Traffic Control Only or Pot Hole for Pavement Design	Minimum Permit Fee		
Permit Duration Exceeding 60 Days	$200 Each 60 Day Period		
Road/Street Striping Only	Minimum Fee		
Warranty Work/Repairs			
1st 60-day permit	No cost		
Subsequent permits after 60 days	Minimum permit fee + item cost		
Minimum permit fee	$200.00		
Reinstatement fee (After Stop Work Order)	$600.00		

A COPY OF THE FINAL PERMIT AND APPROVED CONSTRUCTION PLANS MUST BE ON THE JOB SITE AT ALL TIMES.

Page 1 Sub-Total $_____
Page 2 Sub-Total $_____
No permit Fee (3x)$_____

TOTAL DUE: $_____

NOTES and COMMENTS:

APPROVAL FOR PERMITTEE

During the date(s) and time(s) this Permit is in force, Permittee takes full responsibility for all accidents, injuries, damages or loss of property, including personal and Douglas County property. Permittee agrees to indemnify and hold harmless Douglas County and its officers, agents and employees from any and all claims, costs, expenses and attorneys' fees resulting from use of the facilities. Permittee hereby releases, waives, discharges and covenants not to sue Douglas County, its officers, agents and employees on account of injury to person or property caused by the negligence of Douglas County; provided, however, that Permittee shall not indemnify Douglas County and its Officials, Agents and Employees from damages resulting from the negligence of the County's Commissioners, Officials, Directors, Agents and Employees. This indemnification is intended to comply with CRS 13-50.5-102(8), as amended from time to time.

In accepting this permit, the undersigned verifies that they are the permittee herein; that they have read and understand all of the following provisions; and that by virtue of their signature are bound by and agrees to comply with all provisions of this permit, with the current Douglas County Road Design and Construction Standards, state requirements regulating construction and with the M.U.T.C.D.

_____ _____
Permittee's Name (Please Print) Permittee's Signature

_____ _____
Company Name Date

Douglas County Government
Department of Public Works Engineering

FILE#: _____
PERMIT#: _____
AMOUNT: No Cost

Low Impact Grading, Erosion and Sediment Control (GESC) Permit Application

Each question must be fully and accurately answered. No action can be taken on this application until all questions have been answered. PLEASE PRINT, except for signature.

PROPERTY OWNER	CONTRACTOR
NAME: Perry Park Water and Sanitation District	COMPANY NAME:
ADDRESS: 5121 Country Club Drive	ADDRESS:
CONTACT NAME: Diana Miller	CONTACT NAME:
PHONE: 303-681-2050	PHONE:
EMAIL: Dmiller_ppwsd@comcast.net	EMAIL:
DISTURBED ACRES (including grading/excavation/fill): 0.63	IMPORT 0 C.Y. EXPORT 0 C.Y.
DIMENSIONS OF PROPOSED EARTHWORK: (i.e., height, width, length) n/a/n/a	IMPORT/EXPORT VARIANCE? ☐Yes ■No COPY ATTACHED? ☐Yes ■ No
PROJECT ADDRESS: 5121 Country Club Drive	
SUBDIVISION/PROJECT LOCATION AND/OR NAME:	
PROJECT DESCRIPTION (use additional sheets if necessary): The recommended phase II WWTF improvements consist of new process tanks and equipment, demolition of the existing digester complex, new yard piping and structures, a new blower building, installtion of instrumentation and controls, installation of UV disfection system, and installation of new generator and electrical. The proposed WWTF improvements will be contained within the existing Waucondah WWTF site.	
☐ Renewal	☐ Transfer

By signing below, both applicants hereby apply for a Douglas County Low Impact GESC Permit for the aforementioned property and certify as follows:

1. To the best of my/our knowledge, the information provided herein is correct;
2. A GESC Plan for the disturbed area on this site was prepared and submitted in accordance with the GESC Manual, as amended:

The Low Impact GESC Permit is granted with the explicit understanding that it is the Permittees' responsibility to:

1. Obtain all property access and use easements necessary for the project.
2. Allow Douglas County unrestricted access to the site to conduct regular site inspections;
3. Comply with all requirements of the GESC Manual, accepted GESC plan, and GESC Permit;
4. Immediately cease land-disturbing activities upon receipt of a written Stop Work Order from an authorized representative of Douglas County. A Stop Work Order shall be issued and this Permit is suspended if the Permittees are not in compliance with the GESC Permit, GESC Plan and/or GESC Manual, or the Permittees fail to take corrective action within the time specified on the written notification of such non-compliance;
5. Understand that in addition to other remedies, a violation of this GESC Permit shall constitute a violation of the Stormwater Ordinance No. O-013-001 and Section 31 of the Douglas County Zoning Resolution;
6. Understand any approval obtained from Douglas County does not obviate your need to comply with the requirements of the State of Colorado Department of Public Health and Environment, Colorado Discharge Permit System, General Permit, and Sections 7 and 9 of the Endangered Species Act of 1973, 16 U.S.C. 1531, et seq., as amended, or with any other applicable federal, state or local laws or regulations.
7. During the date(s) and time(s) this Permit is in force, Permittee takes full responsibility for all accidents, injuries, damages or loss of property, including personal and Douglas County property. Permittee agrees to indemnify and hold harmless Douglas County and its officers, agents and employees from any and all claims, costs, expenses and attorneys' fees resulting from use of the facilities. Permittee hereby releases, waives, discharges and covenants not to sue Douglas County, its officers, agents and employees on account of injury to person or property caused by the negligence of Douglas County; provided, however, that Permittee shall not indemnify Douglas County and its Officials, Agents and Employees from damages resulting from the negligence of the County's Commissioners, Officials, Directors, Agents and Employees. This indemnification is intended to comply with CRS 13-50.5-102(8), as amended from time to time.

I certify I am legally authorized to sign on behalf of and bind the above listed entity(s).

Property Owner: Diana Miller Date: 3/27/2024 Contractor: _____ Date: _____
Print Name: Diana Miller Title: District Manager Print Name: _____ Title: _____

Rev 10/2022

WaveEngineering
Acoustics, Noise & Vibration

October 2, 2019

Ms. Diana Miller
District Manager
Perry Park Water and Sanitation District
5676 Red Rock Dr.
Larkspur, Colorado 80118

Re: Wauconda WWTP Sound Level Measurements
Wave #2099

Dear Diana,

I visited the Wauconda Wastewater Treatment Plant (WWTP) at 5121 Country Club Drive in Larkspur with you on July 18, 2019. I was on site from approximately 9:00 a.m. until 10:00 a.m.

I understand that you have received complaints about noise from the plant from nearby residents. While on site, I observed the existing conditions and measured noise levels near the plant equipment and in the direction of nearby homes. The measurements showed that the noise levels are currently below the State of Colorado noise level limits for residences. This letter summarizes my test procedures and results.

Applicable Noise Statutes

To the best of my knowledge, neither Perry Park nor Douglas County have noise ordinances or statutes that apply to the plant.

The **State of Colorado Revised Statute CRS 25-12-103**, Paragraph (1) states

"…Sound levels of noise radiating from a property line at a distance of twenty-five feet or more therefrom in excess of the dB(A) established for the following time periods and zones shall constitute prima facie evidence that such noise is a public nuisance."

1100 W. Littleton Blvd. #420
Littleton, CO 80120
720-446-WAVE (9283)
www.WaveEngineering.US

The maximum permissible noise levels are:

Residential	55 dBA daytime	50 dBA nighttime
Commercial	60 dBA daytime	55 dBA nighttime
Light Industrial	70 dBA daytime	65 dBA nighttime
Industrial	80 dBA daytime	75 dBA nighttime

Daytime is from 7:00 a.m. to the next 7:00 p.m. Nighttime is from 7:00 p.m. to the next 7:00 a.m. While I was on site during daytime hours, I will use the nighttime limit for comparison purposes since the plant noise is steady and the plant runs continuously day and night.

Test Equipment

The following test equipment was used.

Larson Davis Model 831 sound level meter S/N 0002878, Type 1 per ANSI S1.4
PCB preamp PRM831, S/N 023893
PCB ½″ microphone Model 377B02, S/N 130873
Larson Davis CAL200 acoustic calibrator, S/N 2905

A windscreen was placed on the microphone. The system calibration was checked before and after the measurements.

Test Procedures & Results

Sound pressure levels were measured near noise producing plant equipment and also at one location in the direction of the nearest residences. I did not measure noise levels at the residential properties, but I measured in their direction, where shown on Figure 1 below.

The nearest residential property is approximately 450′ northwest of the WWTP.
The measurement location is approximately 235′ northwest of the WWTP property line, so it is slightly more than halfway between the two.

1100 W. Littleton Blvd. #420
Littleton, CO 80120
720-446-WAVE (9283)
www.WaveEngineering.US

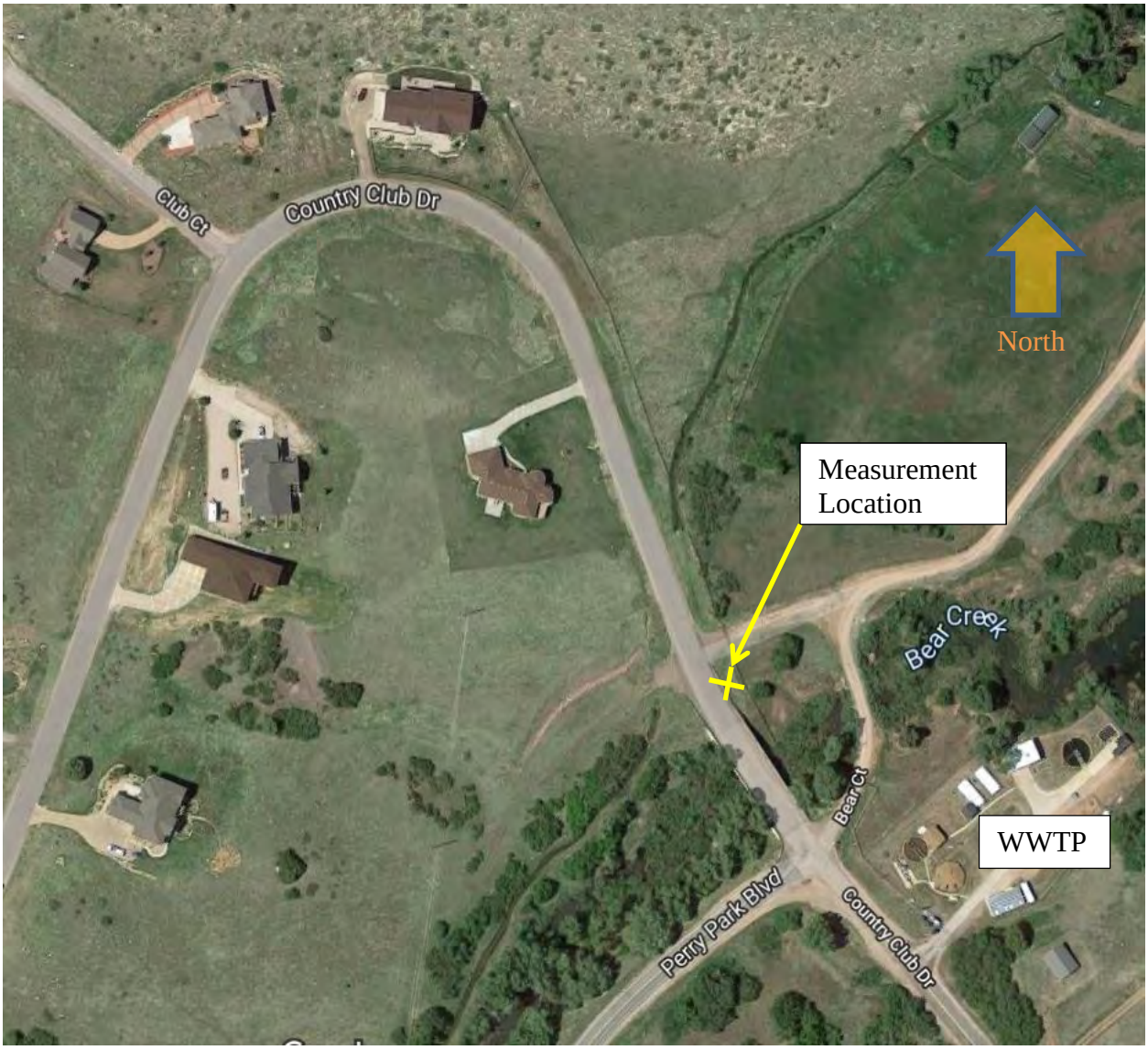


Figure 1: Aerial Photo of WWTP and Nearest Homes

The sound pressure level at the location shown in Figure 1 was 45 dBA. The plant noise is fairly steady and the sound level was averaged for one minute. The sound level at the residential property will be lower than 45 dBA since it is further away and the sound level will decrease with increased distance. Even at the measurement location shown, the sound level is 5 dBA below the State of Colorado *nighttime* limit.

1100 W. Littleton Blvd. #420
Littleton, CO 80120
720-446-WAVE (9283)
www.WaveEngineering.US

I also measured noise levels near plant equipment. The two Digester Blowers and the RBC Blower were identified as the most significant noise producers on site. The blowers were housed inside buildings.

The A-weighted decibel levels near equipment are shown in Table 1. These sound levels represent 20 to 40 second averages. Again, the equipment noise is fairly steady.

These sound levels are not used to determine compliance with the acceptable limits, but are for your information only. We have octave band and one-third octave band data as well if needed.

Table 1: Measured Sound Levels Near Equipment

Measurement Location	dBA
5′ from Digester Blower #1 intake	81
5′ from Digester Blower intakes, between #1 & #2 intakes	80
3′ Inside open door of Digester Blower Building	86
3′ outside open door of Digester Blower Building	77
5′ in front of closed RBC Blower Building door	63
3′ outside of south RBC Building roof eave	74
3′ outside of north RBC Building roof eave	76
1′ from RBC Blower intake	74
Average inside RBC Building	90

Please feel free to contact me if you have questions or would like to discuss this report.

Sincerely,

Jeff Kwolkoski, P.E., INCE Bd. Cert.
President

1100 W. Littleton Blvd. #420
Littleton, CO 80120
720-446-WAVE (9283)
www.WaveEngineering.US

PHASE III DRAINAGE REPORT
FOR
THE PERRY PARK WATER AND SANITATION DISTRICT

PROJECT NO. 2021-068.600

MARCH 2024

OWNER:

PERRY PARK WATER AND SANITATION DISTRICT
5676 WEST RED ROCK DRIVE
LARKSPUR, CO 80118

PREPARED BY:

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER STREET, SUITE 300
COLORADO SPRINGS, COLORADO 80903

TELEPHONE: (719) 475-2935
TELEFAX: (719) 475-2938

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

This report and plan for the Phase III drainage design of the Waucondah Wastewater Treatment Facility (WWTF) Improvements – Phase 2 was prepared by me (or under my direct supervision) in accordance with the provisions of Douglas County Design and Technical Criteria for the owners thereof. I understand that Douglas County does not and will not assume liability of drainage facilities designed by others.

By: Samuel L. Wood, PE
Licensed Professional Engineer for and on behalf of GMS, Inc.
State of Colorado
No. 60152

Perry Park Water and Sanitation District hereby certifies that the drainage facilities for the Waucondah Wastewater Treatment Facility (WWTF) Improvements – Phase 2 shall be constructed according to the design presented in this report. I understand that Douglas County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that Douglas County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of the Waucondah Wastewater Treatment Facility (WWTF) Improvements – Phase 2, guarantee that final drainage design review will absolve Perry Park Water and Sanitation District and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Perry Park Water and Sanitation District
Name of Developer

Authorized Signature

SECTION I
INTRODUCTION

A. PURPOSE AND SCOPE

This drainage report has been prepared for the Perry Park Water and Sanitation District's (PPWSD) wastewater treatment facility (WWTF) improvements. The purpose of this report is to present the findings of a floodplain impact evaluation at the WWTF site.

B. BACKGROUND

An evaluation of the existing Waucondah WWTF, dated February 2021, was completed by TST Infrastructure, LLC in order to determine the current and future capabilities of the facility. At that time, several community complaints had been lodged with PPWSD concerning noise, odor, and the aesthetics of the WWTF; so the PPWSD determined that a complete evaluation of the WWTF was needed. The plant has historically met the requirements of its discharge permit, but several components of the WWTF have inadequate capacity. Most unit processes require certain upgrades due to age, condition, and operational capability and the facility lacks redundancy, which increases the risk of a major violation in the event of adverse conditions such as equipment failures.

The recommended phase II WWTF improvements consist of new process tanks and equipment, demolition of the existing digester complex, new yard piping and structures, a new blower building, installation of instrumentation and controls, installation of UV disinfection system, and installation of new generator and electrical. The proposed WWTF improvements will be contained within the existing Waucondah WWTF site southeast of the intersection of Perry Park Boulevard and County Club Drive.

The Federal Emergency Management Agency (FEMA) issued a flood insurance study (FIS) in January 1996, in which portions of Bear Creek was studied using approximate methods. According to the flood insurance rate map (FIRM), the Waucondah WWTF lies within the 100-year floodplain of Bear Creek.

SECTION II

GENERAL LOCATION AND DESCRIPTION

A. SITE LOCATION

The Waucondah Wastewater Treatment Facility (WWTF) is one of two WWTFs for the Perry Park Water and Sanitation District (PPWSD). Perry Park is an unincorporated community in Douglas County, Colorado. The service area for PPWSD is located northwest of the Town of Larkspur and south of the Town of Castle Rock. The community is located within Sections 19, 20, 21, 22, 27, 28, 29, 30, 33, 34, Township 9 South, Range 67 West and Sections 2, 3, 9, 10, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, Township 9 South, Range 68 West of the 6th Principal Meridian. Water and wastewater services for the community are provided by PPWSD.

The District's total service area is generally split into an east side, known as East Perry Park, and a west side, known as West Perry Park. The Waucondah WWTF is located in the West Perry Park service area. Therefore, it receives wastewater flow from West Perry Park only, no wastewater from East Perry Park. The West Perry Park service area is located approximately 8 miles southwest of the City of Castle Rock and 3 miles northwest of the Town of Larkspur. The general location of the Waucondah WWTF's service area is shown with respect to neighboring communities in Figure 1. Figure 1 has been taken from the U.S. Geological Survey's mapping of the State of Colorado which is compiled at a scale of 1:500,000 (1-inch equals approximately 8 miles).

The PPWSD service area is roughly bordered to the east by Interstate 25 and to the west by the Rampart Range, and bisected north-south by State Highway 105 (South Perry Park Road). This drainage report will be concentrating on the Waucondah WWTF which generally encompasses the west side service area boundary. Generalized limits of the planning area are shown in Figure 2. Figure 2 also depicts the general street configurations within the east side area, as well as topography, drainage, railroad, and irrigation canals and ditches. Figure 2 has been taken from a U.S. Geological Survey quadrangle. The scale of Figure 2 is approximately 1-inch equals 3,000 feet. The figure has been annotated to show West Perry Park. West Perry Park is also referred to as the Waucondah WWTF service area in this report. East Perry Park, the area served by Sageport WWTF, is not discussed in this report.

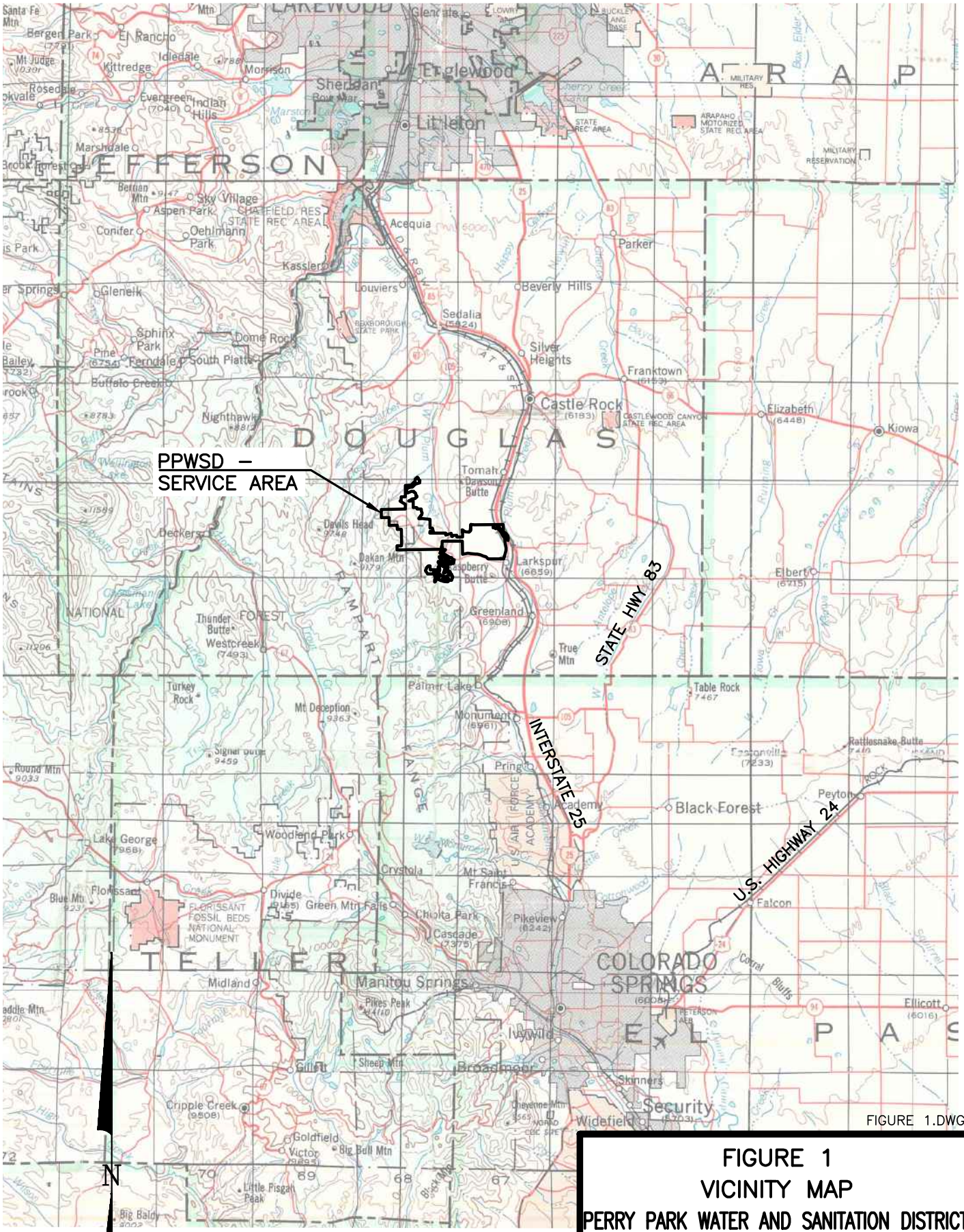


FIGURE 1.DWG

FIGURE 1
VICINITY MAP
PERRY PARK WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

SOURCE: USGS MAP OF COLORADO

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: TE2024-010

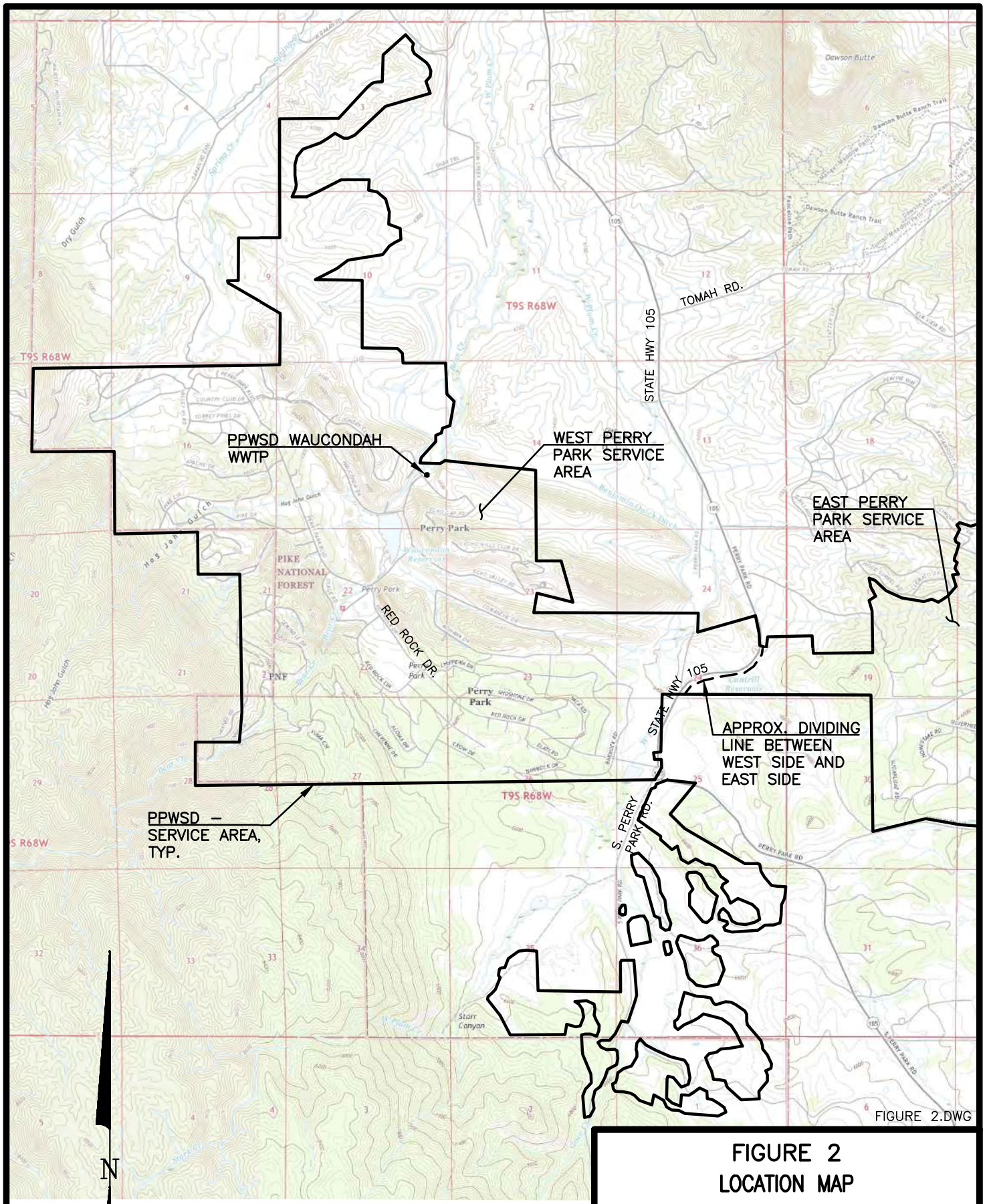


FIGURE 2
LOCATION MAP
PERRY PARK WATER AND SANITATION DISTRICT

SCALE: 1" = 4,000'

SOURCE: LARKSPUR, DAWSON BUTTE, DEVILS HEAD AND DAKAN MOUNTAIN USGS QUAD MAPS

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

G:\Perry Park WSD\2021-068\625\Figure 2.dwg, 8.5x11, 3/19/2024 4:44:44 PM, slw, DWG To PDF.pc3, 1:1

B. DESCRIPTION OF PROPERTY

1. Waucondah WWTF Property Description

The existing Waucondah WWTF is located on a 4.13 acre rectangular property on the southeast corner of Country Club Drive and Bear Court in Perry Park, Colorado. The property is adjacent to Bear Creek and contains approximately 9 buildings that aid in the treatment of the District's wastewater. The WWTF property is located east of Perry Park's suburban residential area and is surrounded by unincorporated property. The proposed improvements will not change the property's current land use as the property is already being used for wastewater treatment.

2. Physiography, Topography, and Vegetation

Douglas County falls within the physiographic province of the Front Range. As such the western edge of the District's service area is bordered by the base of the Rampart Range portion of the Front Range mountains. Figure 2 shows the general topography in and around West Perry Park. Elevations within West Perry Park range from a high of approximately 7,200 feet to a low of approximately 6,300 feet. The Waucondah WWTF is located just east of Bear Creek on Country Club Drive, at approximately 6,340 feet in elevation. In general, the topography within the service area falls from the south to the north. PPWSD's Waucondah WWTF is located on the northeast side of the service area as shown in Figure 2. The topography within the WWTF property falls from the southeast to northwest towards Bear Creek. No prominent topographic features exist within the Waucondah WWTF property, but there is a ridge just south of the WWTF site and the foothills of rampart range are located to the west.

A majority of the land surrounding the Waucondah WWTF's service area, and the land immediately surrounding the WWTF itself, is forested. Land north of the WWTF gives way to shrubland and pastureland. There are no delineated wetlands on the WWTF property. The only delineated wetlands in the area are associated with Bear Creek. Native vegetation in the area consists of a variety of short and mid-tall grasses including Blue Gamma, Galleta, Alkali Sacaton, Buffalo Grass, Salt Grass, and Sand Dropseed.

3. Soils

The US Department of Agriculture through the Natural Resources Conservation Service (NRCS) has compiled detailed soil information for Douglas County. This data is available on the NRCS' web soil survey website. Soil type information within and surrounding the Waucondah WWTF is relevant as it relates to the constructability of wastewater facilities within the area and the soil's ability to transmit surface water.

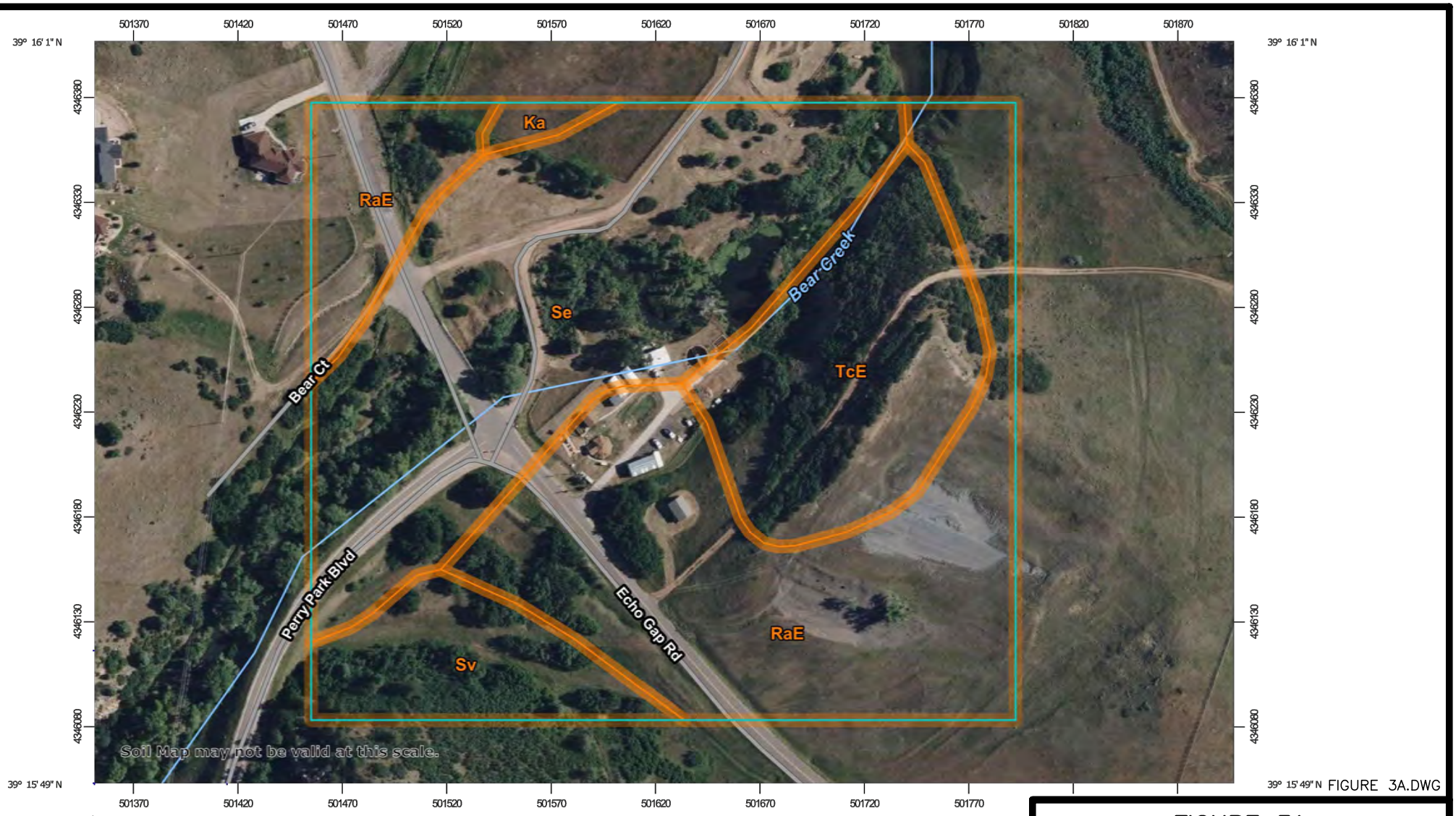
The following soils have been identified in the NRCS mapping of the Waucondah WWTF area as shown on the following Figures 3A, 3B and 3C. General information is presented in terms of the characteristics of these different soil classifications. None of the identified soils are classified as prime farmland. The extent at which the soil map was created (to show only locations around the Waucondah WWTF relevant to the scope of this report) resulted in a scale greater than what is recommended for this location by the NRCS. As such, the locations of soil group borders displayed in the soil map are approximate.

Soil Group RaE – Razor clay, 3 to 25% Slopes

This is the predominant soil group within the Waucondah WWTF property, found mainly in the southeast part of the existing Waucondah WWTF property and extending east of the property. This soil group consists of clay; bedrock can be found between 20 to 40 inches deep. These soils are well drained with a high runoff class. These soils are classified as hydrologic soil group "D". Depths to water table are generally greater than 80 inches.

Soil Group Se – Rock land-Lonetree complex, 10 to 100% Slopes

This soil group is prevalent west of the existing Waucondah WWTF property and generally follows the alignment of Bear Creek. This soil group consists of coarse sand overlying loamy sands. These soils have a high runoff class and are classified as hydrologic soil group "D". Depths to water table are generally 0 to 24 inches since these soils are typically found in flood plains and drainageways.



104° 59' 3" W

N

Map Scale: 1:2,500 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

FIGURE 3A.DWG

FIGURE 3A
SOILS MAP
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

Soil Map—Castle Rock Area, Colorado
(PPWSD)

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Castle Rock Area, Colorado
Survey Area Data: Version 15, Sep 1, 2022

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

Date(s) aerial images were photographed: Jul 1, 2020—Jul 2, 2020

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.

FIGURE 3B.DWG

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

FIGURE 3B
SOILS MAP LEGEND
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ka	Kassler gravelly sandy loam	0.2	0.9%
RaE	Razor clay, 3 to 25 percent slopes	9.7	39.2%
Se	Sandy wet alluvial land	8.8	35.7%
Sv	Stony steep land	2.0	8.0%
TcE	Tinytown-Cheesman complex, 5 to 30 percent slopes	4.0	16.2%
Totals for Area of Interest		**24.6**	**100.0%**

FIGURE 3C.DWG

FIGURE 3C
SOIL MAP UNIT LEGEND
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903
MARCH 2024

Soil Group TcE – Tinytown-Cheesman, 5 to 30% Slopes

This soil group is prevalent in a small section northeast of the existing Waucondah WWTF property. This soil group consists of gravelly sandy loam. These soils are well drained with a low runoff class. These soils are classified as hydrologic soil group "A". Depths to water table are generally greater than 80 inches.

4. Major and Minor Drainageways

The majority of the District's service area drains towards the Waucondah Reservoir. There are several minor drainage ways scattered along the foothills of Rampart Range that feed the Waucondah Reservoir. The Waucondah Reservoir spillway controls flow from the reservoir into Bear Creek. Bear Creek is the major drainageway in the area and flows northeast, passing adjacent to the northwest part of the existing WWTF property. Approximately, 835 feet downstream of the Waucondah Reservoir spillway, there is a ditch that splits from Bear Creek and continues north/northwest of the Creek. This irrigation ditch is Pleasant Park Ditch and is located 350 feet northwest of the existing WWTF site.

5. Floodplain

The 2005 Flood Insurance Rate Map (FIRM) for the area, produced by Federal Emergency Management Agency (FEMA), is shown on the following Figure 4. The current Water Quality Control Division (WQCD) design criteria for wastewater treatment works, WPC-DR-1, requires that structures and equipment are accessible, able to discharge, and protected from physical damage during the 100-year flood. The map shows that the Waucondah WWTF is located within the 100-year floodplain associated with Bear Creek.

FEMA issued a flood insurance study (FIS) in September 2005, which was most recently revised in December 2021. However, Bear Creek was only studied using approximate methods. Therefore, no floodplain elevations are available on the FIRM floodplain map.

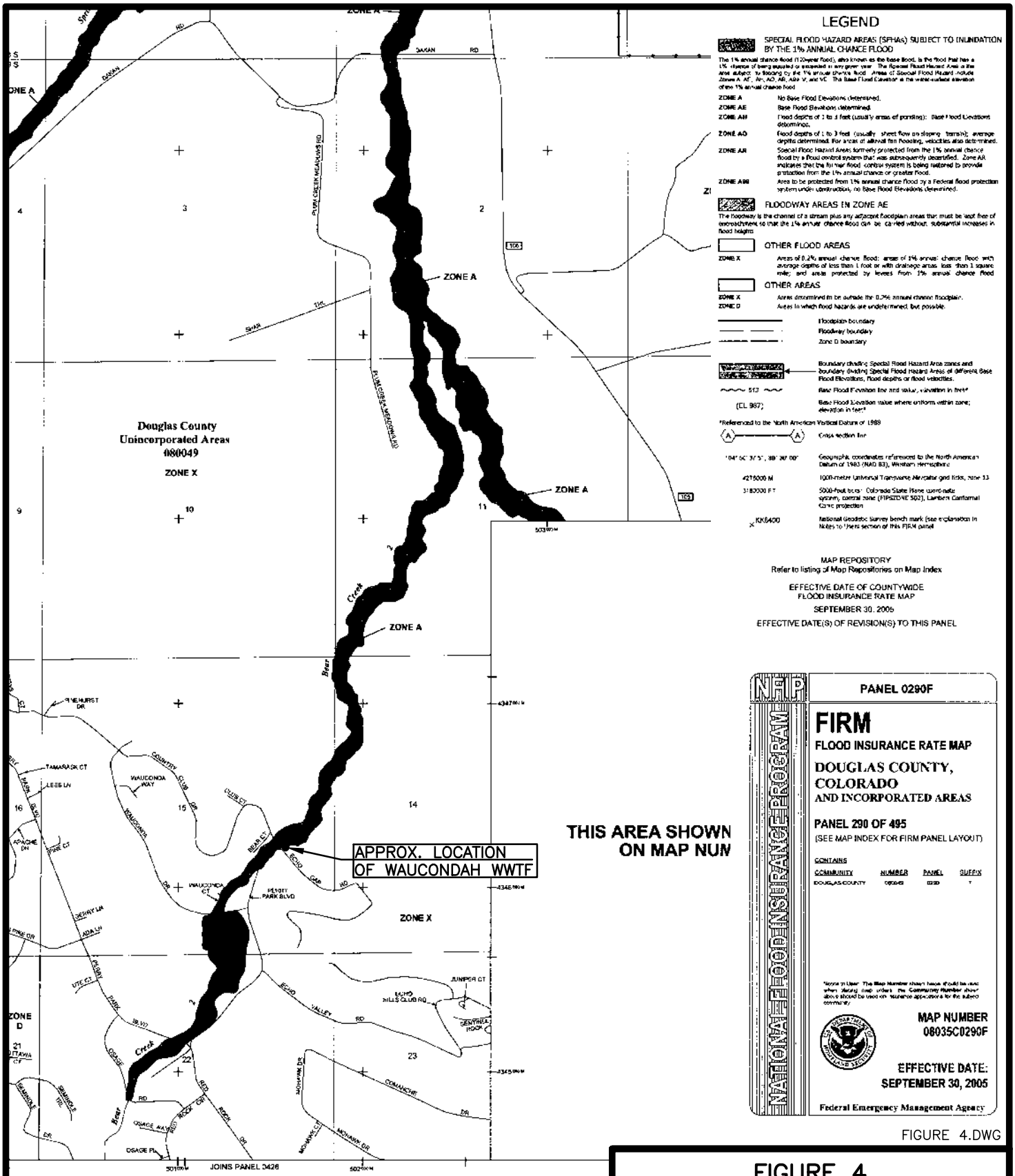


FIGURE 4.DWG

FIGURE 4
FEMA FLOODPLAIN MAP
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

6. Precipitation and Temperature

Climate data has been obtained from the National Weather Service, the Climatic Atlas of the United States prepared by the Department of Commerce and information from the Colorado Climate Center located at Colorado State University. The climate of Perry Park can generally be classified as continental, warm and semi-arid and is characterized by low humidity, and a wide range in daily and annual temperatures. Perry Park experiences a fair amount of precipitation throughout the year and the area is also subject to rapid changes in weather during any season.

The climate station nearest to Perry Park that collects comprehensive monthly data for the past fifteen years is located in Castle Rock, CO. This station (NOAA Station 51401) is approximately 10.7 miles north of the Waucondah WWTF service area. Historical precipitation and temperature data were gathered from this climate station. These data sets were assumed to be representative of climatic conditions in the Perry Park area. The lowest monthly average temperature occurs in January and is approximately 17.8°F. The highest monthly average temperature occurs in July and is 86.5°F. Most precipitation occurs in the late summer months of August and September. The average annual rainfall in Perry Park is approximately 17 inches per year. Annual precipitation for the last ten years has been below average except in 2014, 2015, and 2017.

SECTION III

DRAINAGE BASINS AND SUB-BASINS

A. MAJOR DRAINAGE BASINS

The Waucondah WWTF is located at the southeast corner of the intersection of Country Club Drive and Perry Park Boulevard. The WWTF is located directly adjacent to Bear Creek. Bear Creek drains in a south to north direction, originating from the Rampart Range, southwest of the WWTF. Bear Creek and several other drainage ways within the community contribute to the Waucondah Reservoir. The Waucondah Reservoir has a spillway on the north end that allows drainage from the reservoir back into Bear Creek, which then continues north past the WWTF.

Bear Creek, north of the Waucondah Reservoir is the area of concern because it runs adjacent to the WWTF site and the WWTF site may be located within Bear Creek's floodplain. In a 1996 FEMA FIS, portions of Bear Creek were studied using approximate methods. From the 1996 FIS, FEMA developed FIRM mapping of the Perry Park community and according to the FIRM map, the WWTF site is within the 100-year floodplain. There are no other drainage studies or flood hazard mapping of this area.

Sub-basin 1 contains the area within and surrounding the Perry Park community that contributes stormwater to the Waucondah Reservoir, the WWTF site, and Bear Creek. The drainage basin was delineated using USGS contour mapping and contains approximately 9,085 acres. Sub-basin 1 extends east from the WWTF into the mountainous, residential area of the PPWSD service area. The basin also extends southwest into the Rampart Range to include the headwaters of Bear Creek. Sub-basin 1 is bounded on the north end by the Waucondah WWTF because all stormwater north of the WWTF would not affect the site. The major drainage basin is shown on the following Figure 5.

In general, this basin drains from the southwest to the northeast and ultimately drains to the Waucondah Reservoir. This sub-basin consists mostly of vegetated mountainous area with slopes over 15%. The portion of sub-basin 1 that is located within the Perry Park community

PERRY PARK WATER AND SANITATION DISTRICT – WAUCONDAH WWTF SERVICE AREA (WEST PERRY PARK)

PERRY PARK WATER AND SANITATION DISTRICT – WAUCONDAH WWTF

MAJOR DRAINAGE – SUB–BASIN 1

PERRY PARK WATER AND SANITATION DISTRICT – SAGEPORT WWTF SERVICE AREA (EAST PERRY PARK)

FIGURE 5.DWG

FIGURE 5
MAJOR DRAINAGE BASINS
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: LE2024-010

consists of suburban residential land use. The remaining area of sub-basin 1 consists of Pike National Forest property. Further development will be limited to the Perry Park community and will not affect the Waucondah WWTF site.

B. MINOR DRAINAGE BASINS

As discussed previously, Waucondah Reservoir drains into Bear Creek, which continues north, adjacent to the WWTF. In the 1970's, a new spillway from the Waucondah Reservoir into Bear Creek was constructed. This dam restricts the flow from the Waucondah Reservoir into Bear Creek with a maximum probable spillway discharge of 1,520 cubic feet per second (CFS). Because of this dam, only a limited amount of stormwater that directly contributes to the Waucondah Reservoir will spill into Bear Creek, impacting the Creek's floodplain. Therefore, the major drainage basin shown on Figure 5 was separated even further into a single sub-basin that directly contributes stormwater to Bear Creek and the WWTF.

An unnamed channel splits off from Bear Creek approximately 900 feet downstream of the Waucondah Reservoir. This channel is located west of Bear Creek for approximately 1.5 miles and is assumed to capture all contributing stormwater west of the channel. Based on this assumption, the west side of sub-basin 2 is bounded by this unnamed channel. The rest of the sub-basin's extents were determined using USGS contour mapping. The south end of the sub-basin is bounded at Waucondah Drive and the north end of the sub-basin is bounded by the north end of the WWTF site. Finally, the sub-basin extends east from Bear Creek beyond County Club Drive and Echo Gap Road. This sub-basin contains approximately 112.4 acres and drains to Bear Creek. This minor drainage basin is shown on the following figure 6. A 48-inch diameter corrugated metal pipe (CMP) culvert is located within Bear Creek where Bear Creek intersects with Bear Court.

In general, this basin drains from the southeast to the northwest towards Bear Creek. This sub-basin consists mostly of vegetated undeveloped area with slopes over 15%. Sub-basin 2 is almost entirely contained within the Perry Park community and consists mostly of suburban residential land use. Most of this residential area is undeveloped. The sub-basin was assigned a conservative runoff coefficient of 0.2. Further development within the sub-basin will be limited due to the area's existing surface profile and will not directly affect runoff on the WWTF site.

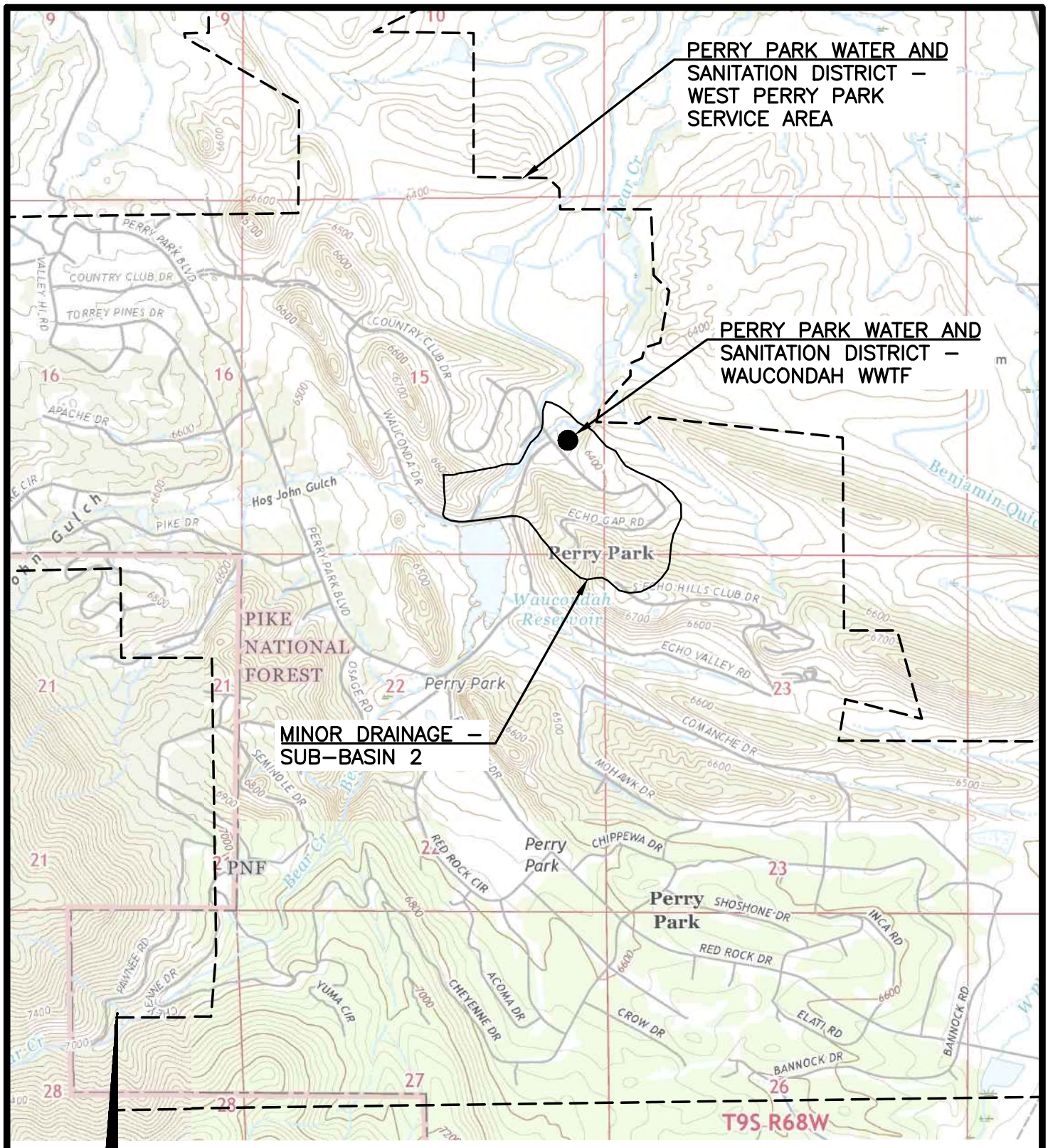


FIGURE 6.DWG

SCALE: 1" = 3,000'

SOURCE: LARKSPUR, GREENLAND, DAWSON BUTTE AND CASTLE ROCK SOUTH USGS QUAD MAPS

FIGURE 6
MINOR DRAINAGE BASINS
PERRY PARK
WATER AND SANITATION DISTRICT

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

SECTION IV

DRAINAGE DESIGN CRITERIA

A. REGULATIONS

A floodplain evaluation of Bear Creek was performed using the U.S. Army Corps of Engineers HEC-RAS River Analysis System, version 6.1.0. (HEC-RAS). This is the most commonly used tool for open channel hydraulic modeling and is a recognized methodology by the Mile High Flood District (MHFD) and Douglas County. Precipitation data was added to the HEC-RAS model by using the rational method. This is also a recognized method of calculating stormwater runoff.

Douglas County requires a minimum of 2-ft of freeboard between the 100-year base flood elevation and the lowest finished floor elevation of all structures. Where possible the required freeboard should be contained within the floodplain tract and/or easement. No deviation in criteria is requested from the Douglas County Storm Drainage Design and Technical Criteria Manual, the Urban Storm Drainage Criteria Manual (USDCM), or the Water Quality Control Division (WQCD) wastewater design criteria.

B. DRAINAGE STUDIES, OUTFALL SYSTEM PLANS, SITE CONSTRAINTS

There are no previous drainage studies that influence the drainage design of the Waucondah WWTF.

C. HYDROLOGY

The hydrologic methodology that was utilized in evaluating stormwater runoff was the rational method. The basin's stormwater runoff was evaluated for a 100-year storm event for the purpose of the floodplain model. This evaluation was done in accordance with the current Douglas County Storm Drainage Design and Technical Criteria Manual. In order to evaluate and establish the impact of stormwater for a 100-year storm event, total precipitation depths for this storm duration was determined for the overall area. The intensity of a 100-year storm event was determined to be 4 inches per hour.

A runoff coefficient was established for the sub-basin that drains to Bear Creek upstream of the WWTF. This component of the hydrologic model has been developed utilizing the existing land uses and the land surface conditions. The sub-basin was assigned a conservative runoff coefficient of 0.2.

Since all the basins are less than 160 acres, the rational method is used to calculate runoff from all the on-site basins. The rational formula is as follows:

Q=CIA

Where,
Q = Runoff in cubic feet/sec
C = Composite Runoff Coefficient for 100-year storm
I = Intensity of rainfall at calculated time of concentration
A = Area of basin in acres

See the peak runoff calculations for the existing and proposed condition in Appendices C and D.

Detention storage was not reviewed as the disturbed area will be less than 1.0 acre and will be treated by downslope perimeter BMPS per Section 3.10 of the Douglas County Grading, Erosion, and Sediment Control Manual.

D. HYDRAULICS

The basic approach using the HEC-RAS system was to create a model that gives a more detailed profile of the Bear Creek 100-year floodplain in respect to the WWTF property. The WWTF site and Bear Creek were inspected on July 11, 2023 in preparation of the HEC-RAS model. During that site visit it was discovered that there is a bridge crossing where Country Club Drive crosses over Bear Creek. Additionally, there is an 48-inch CMP culvert located approximately 145 feet downstream from the bridge where Bear Court crosses Bear Creek.

Since the section of Bear Creek near the WWTF has not been studied using detailed methods, there are no existing conditions in which the HEC-RAS model could be calibrated to. Instead, the model was set up using a digital elevation model from the United States Geological Survey (USGS), along with some on site survey and dimensions as inputs into the HEC-RAS model. A base flow of 10 cubic feet per second (CFS) in Bear Creek was used. Data from the Waucondah Reservoir enlargement documents were utilized to determine the maximum probable spillway discharge from the Waucondah Reservoir. In the 1970's the Waucondah Reservoir was enlarged and a new spillway into Bear Creek was constructed. The Waucondah Reservoir Enlargement construction drawings (C-1273) dated September 25, 1969 were provided in Appendix A. See sheet number 2 in Appendix A of the construction drawings, it's stated that the maximum probable spillway discharge is 1,520 CFS. Finally, runoff from a delineated sub-basin was calculated using the rational method, as described above, which contributes an additional 50 CFS. The total flow from the Waucondah Reservoir and the delineated sub-basin was interpolated into a 1 hour Hydrograph, with a maximum flow at 20 minutes.

Bear Creek was analyzed from the Waucondah Reservoir to about 300 feet downstream of the existing WWTF. The Bear Creek channel bank was estimated using Google Earth Pro and pictures from the site visit in July. The HEC-RAS model was set up with cross sections placed approximately every 100 feet. Cross sections were also added upstream and downstream at the bridge (Sta. 8+00 and Sta. 7+50) and the culvert (Sta. 6+56.61 and Sta. 6+09.03). The following Figure 7 shows the cross-sections created and utilized in the HEC-RAS model. A proposed HEC-RAS model was not created since it was determined that the 100-year floodplain boundary did not encroach on the WWTF site.

E. WATER QUALITY ENHANCEMENT

Best Management Practices (BMPs) will be utilized throughout the project to minimize the impact to Bear Creek. During the construction process, silt fences will be utilized around the border of the project area. As the runoff from the disturbed area will be less than 1.0 acres, sediment control logs will be utilized near the downstream perimeter between the proposed improvements and the creek. Additionally, existing vegetation will also act a buffer between the project site and Bear Creek. After construction has been completed, the site will be re-seeded with a native grass seed and mulched.

G:\Perry Park WSD\2021-068\625\Figure 7.dwg, 8.5x11, 3/19/2024 5:00:04 PM, slw, DWG To PDF.pc3

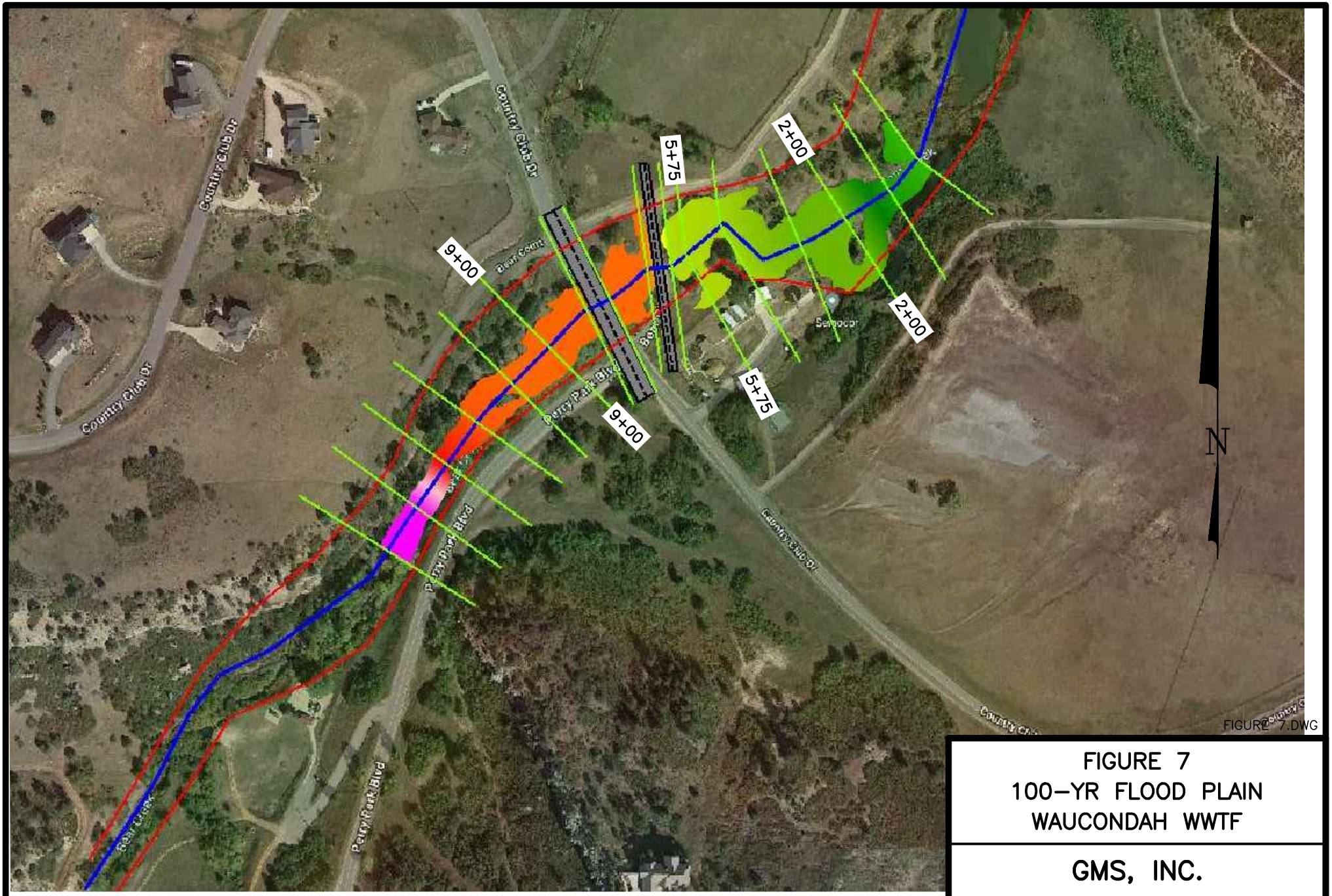


FIGURE 7
100–YR FLOOD PLAIN
WAUCONDAH WWTF

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

SCALE: NTS

SOURCE: HEC-RAS

611 N. Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: LE2024-010

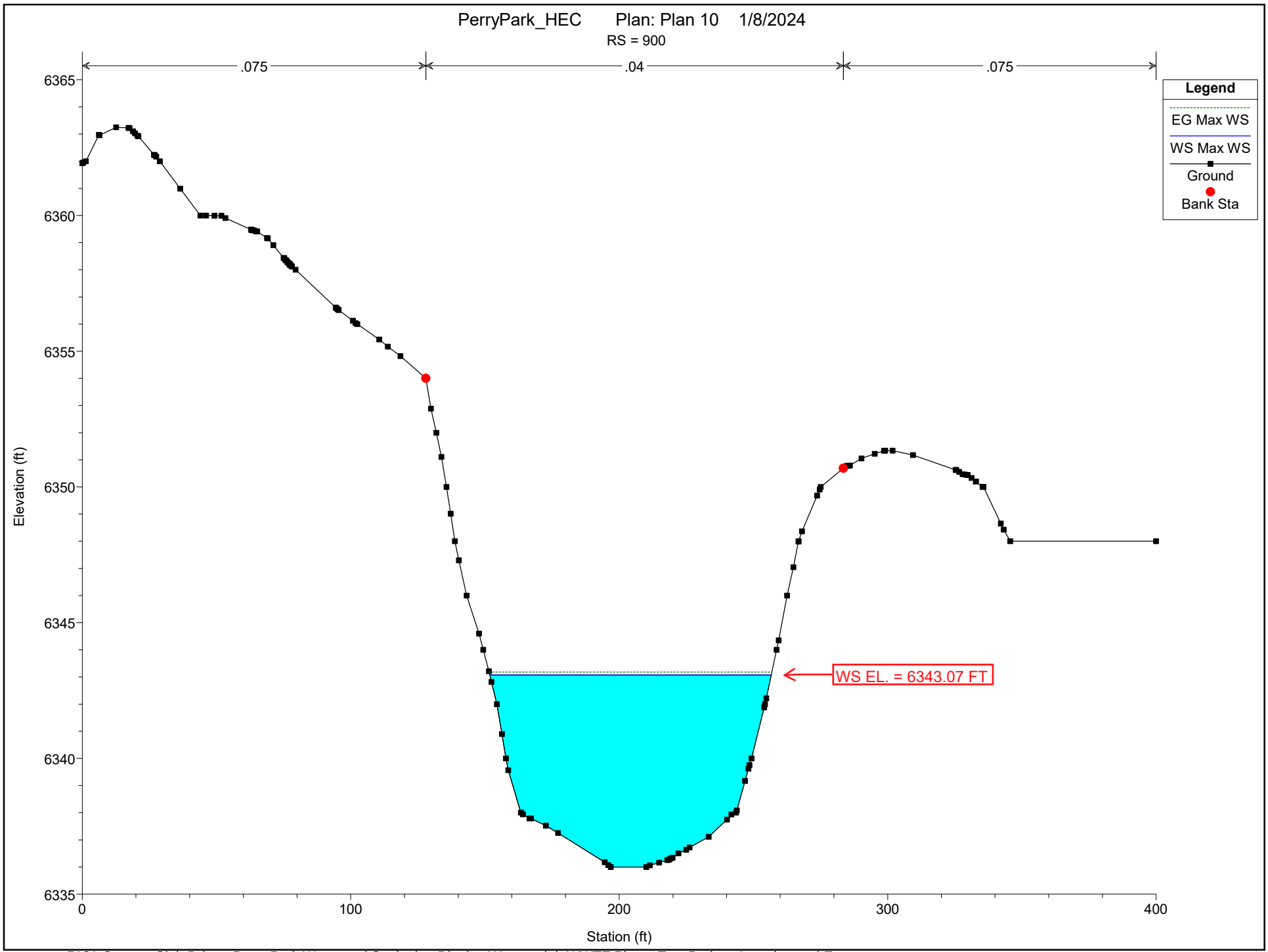


FIGURE 7.1

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent

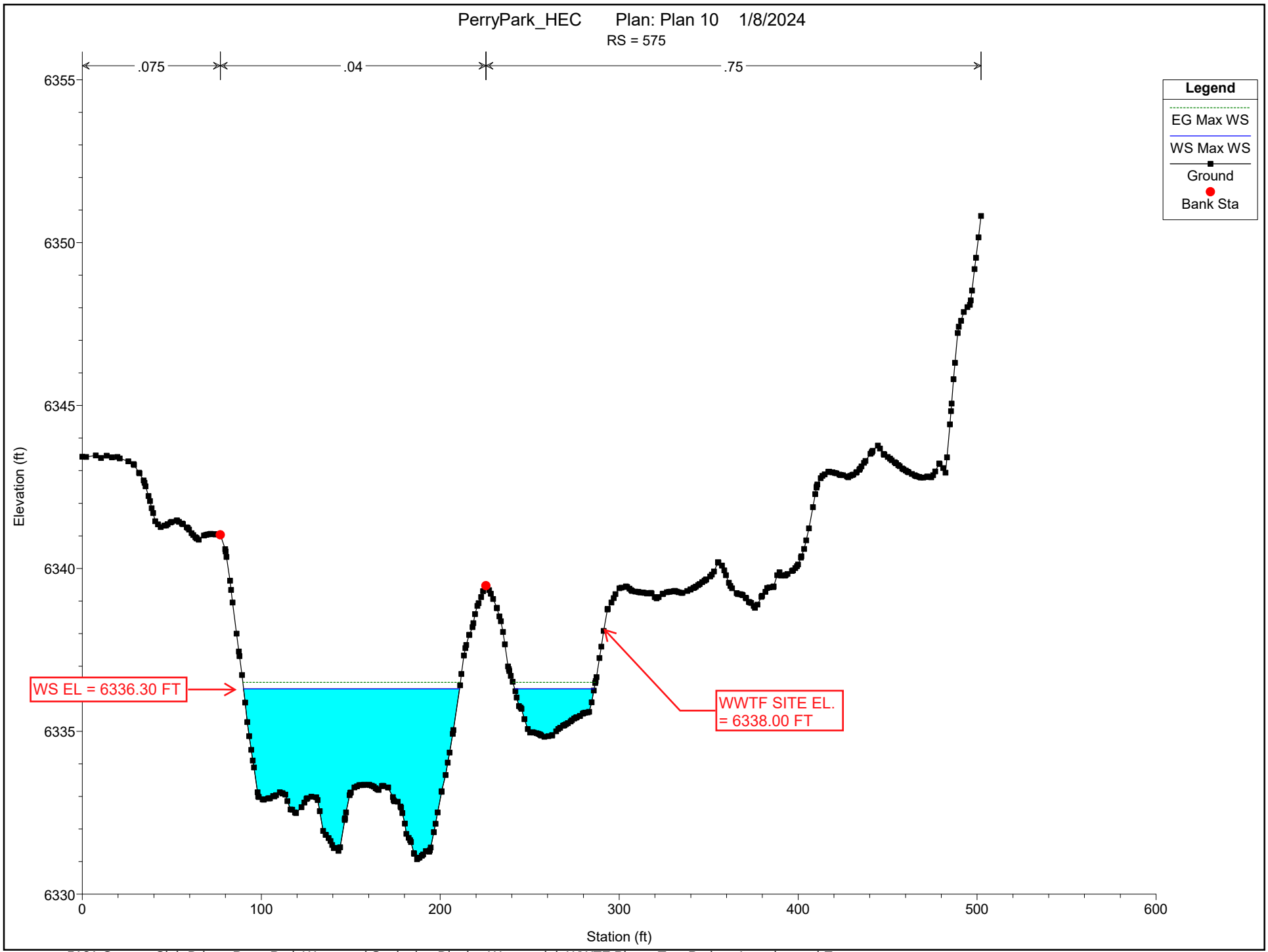


FIGURE 7.2

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: LE2024-010

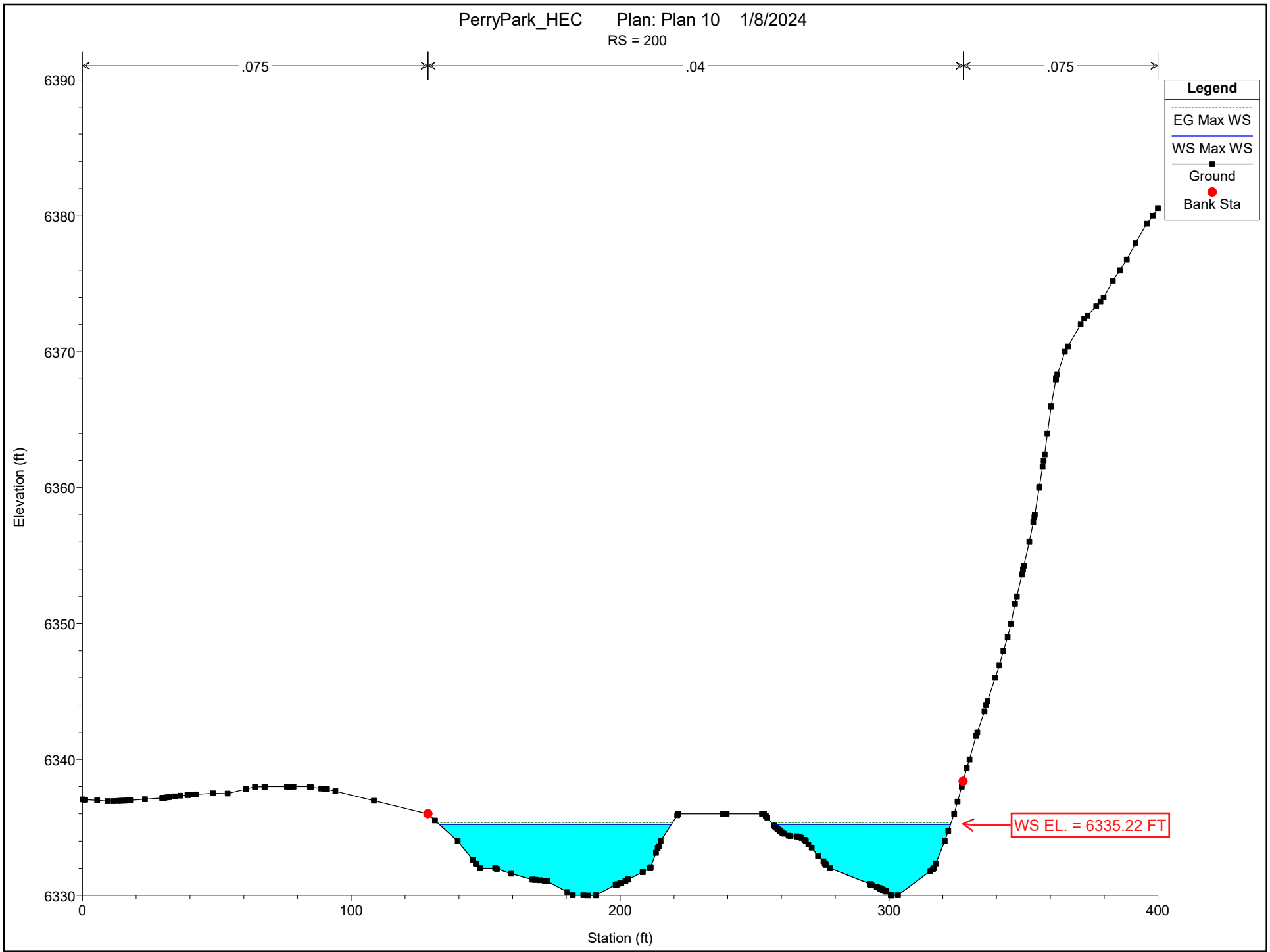


FIGURE 7-3

5121 Country Club Drive - Perry Park Water and Sanitation District, Waucondah WWTF Phase Two Project, Location and Extent
Project File: LE2024-010

SECTION V

STORMWATER MANAGEMENT FACILITY DESIGN

A. STORMWATER CONVEYANCE FACILITIES

Runoff on the Waucondah WWTF site currently sheet flows in an west to east direction towards Bear Creek. There are no stormwater structures located on the WWTF site. Bear Creek has a culvert where Bear Court crosses over the Creek. When the construction of the new WWTF structures is completed, the ground will be restored and graded to allow the stormwater to continue to sheet flow from the east side of the property towards bear Creek on the west side. No new stormwater structures will be added to the site as a result of the WWTF improvements.

B. STORMWATER STORAGE FACILITIES

The limit of construction area will be less than 1.0 acres and therefore no new stormwater storage facilities will be added to the existing WWTF site. Runoff from the disturbed areas will be treated by down slope perimeter BMPs.

C. WATER QUALITY ENHANCEMENT BEST MANAGEMENT PRACTICES

Stormwater runoff on the site will sheet flow from the east side of the WWTF site towards Bear Creek on the west side of the site. The estimated disturbance area for the proposed improvements at the Waucondah WWTF site is approximately 0.63 acres. Runoff from the construction site will be treated using downslope perimeter BMPs. BMPs will be installed in 3 phases based on the construction progress. The phases consist of initial, interim, and final. In the initial phase, Sediment Control Log (SCL) and Silt Fences (SF) will be installed along the perimeter of the construction site. Additionally, Vehicle Tracking Control (VTC) will be placed at all entrances and/or exits to the construction site and a Stabilized Staging Area (SSA) will be utilized to reduce the likelihood that vehicles most frequently visiting the site will come into contact with mud.

The interim BMP will consist of a Concrete Washout Area (CWA) in order to isolate concrete truck washout operations. This interim BMP will be utilized in addition to the initial phase BMPs. The final phase BMPs will consist of Seeding and Mulching (SM). All disturbed areas will be restored using drill seeding with native grasses and crimping in straw mulch to provide immediate protection to the newly seeded areas. All silt fences and sediment control logs will remain in place until the final erosion control measures have sufficiently stabilized the disturbed areas. Once the final erosion control measures are stabilized, vegetation will act as a natural filter for any stormwater runoff.

D. FLOODPLAIN MODIFICATION

In a 1996 FEMA FIS, portions of Bear Creek were studied using approximate methods. According to the FIRM mapping of Bear Creek and the Perry Park community, the WWTF site is within the 100-year floodplain. Using HEC-RAS, a model of Bear Creek was developed and analyzed in order to determine the 100-year floodplain elevations.

The HEC-RAS model was created using the spillway data from the Waucondah Reservoir Enlargement plans. Once the hydrology data for the delineated sub-basin was implemented, the model was completed. The HEC-RAS model determined that the 100-year flood elevation near the WWTF site is 6336.30 and the elevation of the WWTF property is 6338.00. The original plan was to use this set up as the existing site conditions and then add in the new WWTF structures to see how they affected the 100-year floodplain, but based on the findings from the HEC-RAS model, the Bear Creek floodplain does not encroach on the WWTF property. The results of the HEC-RAS model are shown below on Table 1 and represented on Figure 8.

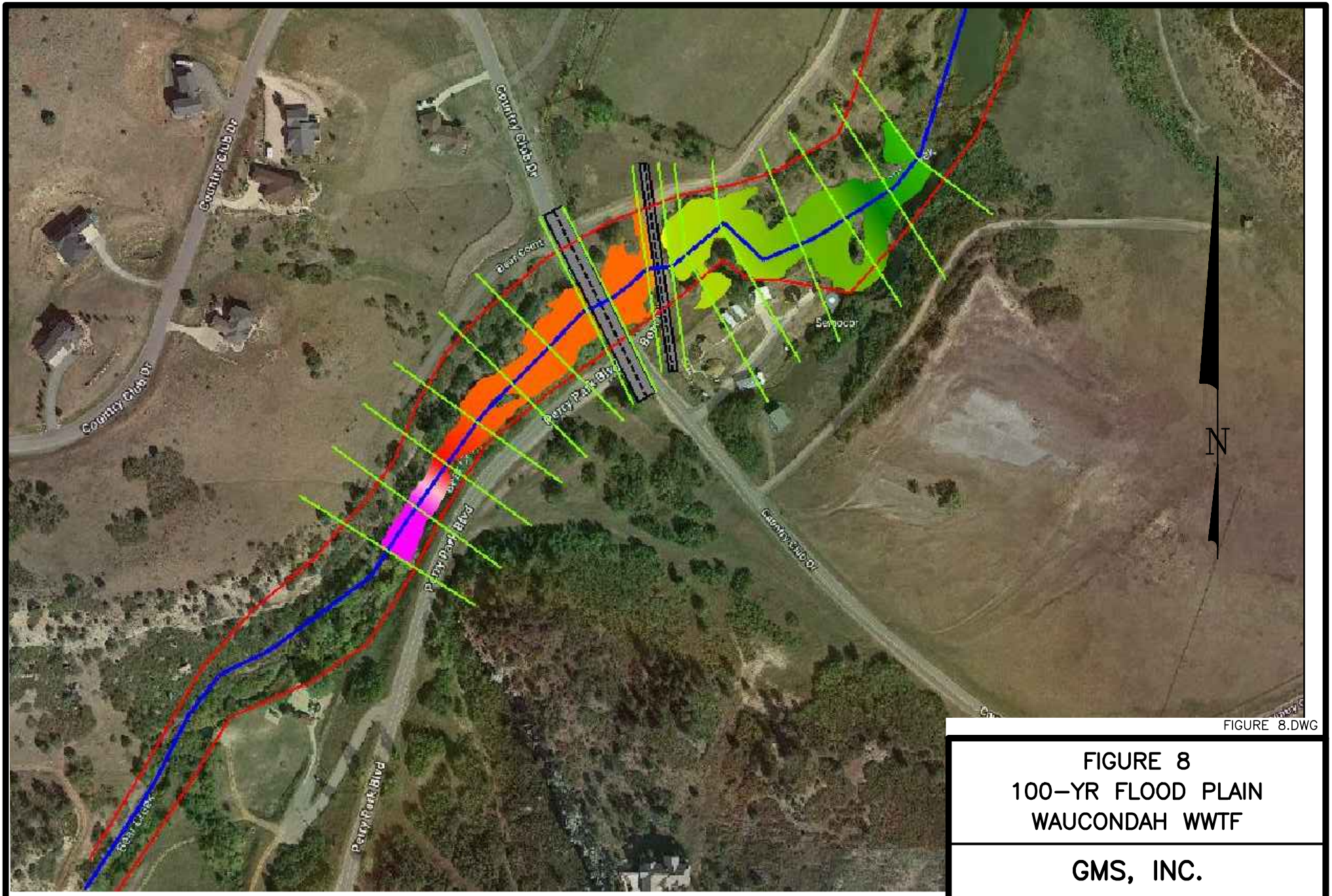


FIGURE 8.DWG

FIGURE 8
100–YR FLOOD PLAIN
WAUCONDAH WWTF

SCALE: NTS

SOURCE: HEC-RAS

GMS, INC.

CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

TABLE 1

PERRY PARK WATER AND SANITATION DISTRICT

HEC-RAS MODEL RESULTS

Cross-Section Name	Cross-Section Station	Stream Bed Elevation	100-yr Flood Elevation	WWTF Site Elevation
Upstream of WWTF	9+00	6336.00	6343.07	6338.00
Center of WWTF	5+75	6332.00	6336.30	6338.00
Downstream of WWTF	2+00	6330.00	6335.22	6338.00

Since the 100-year floodplain does not encroach the WWTF property, the floodplain will not be modified by the improvements to the WWTF.

E. ADDITIONAL PERMITTING REQUIREMENTS

The U.S. Fish and Wildlife Service National Wetlands Inventory Mapping was reviewed to determine the types and locations of wetlands within the planning area. The mapping indicates that the only delineated wetlands identified within the vicinity of the Waucondah WWTF are associated with Bear Creek. The Bear Creek wetlands are classified as Riverine, unknown perennial and permanently flooded, and freshwater forested/shrub wetland. There are no delineated wetlands within the project planning area; therefore, a section 404 nationwide permit will not be required.

Most of the undeveloped land that surrounds the Waucondah WWTF site is forested, which may offer habitat for many species of wildlife. Using the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consulting (IPaC) database, threatened and endangered species that may inhabit the planning area were identified. There are several threatened and endangered species may be present within the planning area. These species include two mammals (Gray Wolf and Preble's Meadow Jumping Mouse), three birds (Mexican Spotted Owl, Piping Plover, and Whooping Crane), two fishes (Greenback Cutthroat Trout and Pallid Sturgeon), one insect (Monarch Butterfly), and two flowering plants (Ute Ladies'-tresses and Western Prairie Fringed Orchid). There is a final critical habitat for

the Preble's Meadow Jumping Mouse (PMJM) that is located along Bear Creek and adjacent to the WWTF site. The final critical habitat for the PMJM and its relationship to the WWTF is shown on the following figure 9. The existing fence of the WWTF was constructed so that the PMJM critical habitat would not be disturbed. All of the WWTF improvements will be contained within the existing WWTF; therefore, the PMJM critical habitat will not be disturbed by the WWTF improvements.

A review of the State and National Register of Historic Places for the Perry Park area and Douglas County was completed. There are no historic properties listed in in Perry Park, Colorado. The closest historic site is Ben Quick Ranch and Fort and the John Kinner House, both of which are located on the same property along Highway 105 in Larkspur. The project is located 1.5 miles west of these historic structures; therefore, the project site is not within the vicinity of either of these historic structures. There will be no impact to any historic places.

Based on the information, it is likely that no permits will be required by the USACE, USFWS, or SHPO for the construction of the Waucondah WWTF improvements. A Douglas County Grading, Erosion, and Sediment Control (GESC) permit will need to be obtained for this project.

F. GENERAL

The Construction Documents from the Waucondah Reservoir enlargement project in Appendix A were used to establish maximum probable discharge from the spillway. These documents also provided the 100-year return period rainfall intensity of 4 inches per hour.

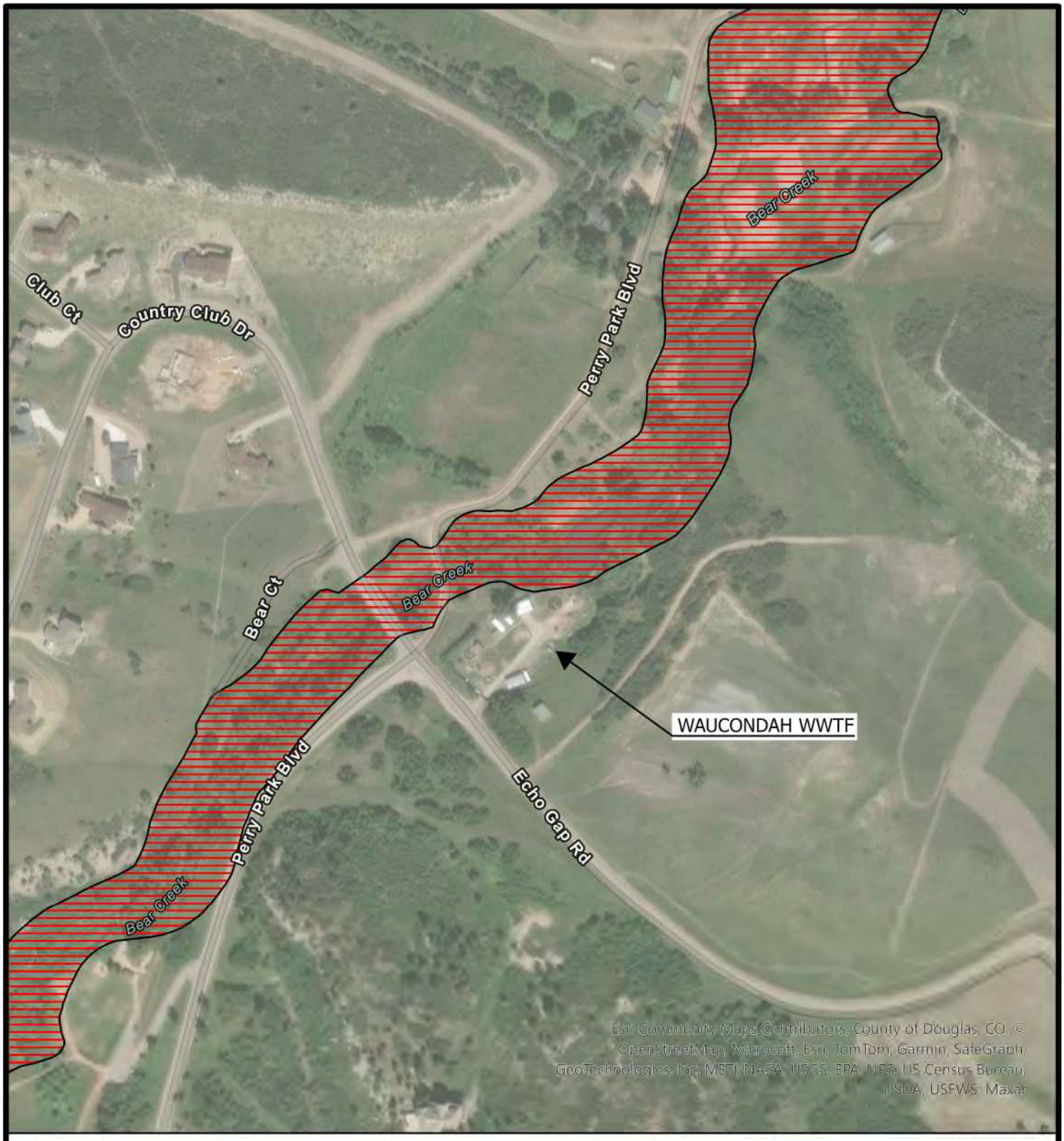
Figures 1 and 2 were provided to show the location of the project as well as its surrounding area. The soils map figures are intended to show the types of soil in and around the project site. Additionally, the Geotechnical Report for the project site is located in Appendix B.

Figures 5 and 6 show the upstream and downstream major and minor drainage basins associated with the project site.

Figure 4 illustrates the FEMA flood plain mapping. However, Figures 7 and 8 were produced with HEC-RAS to "further define" the 100-year floodplain. This effort was

completed to demonstrate that the project site is located outside of the flood plain boundary.

This Drainage Report along with the Grading, Erosion and Sediment Control (GESC) Report will be applied to help facilitate and manage the stormwater for the project site.



Path: M:\ArcGIS_LIB\Environmental\EA Maps\EA Maps.aprx

N

PMJM CRITICAL HABITAT

SCALE: 1" = 300'

FIGURE 9
PMJM CRITICAL HABITAT
PPWSD

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

MARCH 2024

SECTION VI
CONCLUSIONS

A. COMPLIANCE WITH STANDARDS

The HEC-RAS model of Bear Creek's 100-year floodplain determined that the Creek's floodplain does not reach the Waucondah WWTF site. The current WQCD design criteria for wastewater treatment works, WPC-DR-1, requires that structures and equipment are accessible, able to discharge, and protected from physical damage during the 100-year flood. Additionally, Douglas County requires a minimum of 2-ft of freeboard between the 100-year base flood elevation and the lowest finished floor elevation of all structures. The HEC-RAS model determined that the 100-year flood elevation near the WWTF site is 6336.30 and the WWTF site elevation is 6338.00. Since the 100-year floodplain does not reach the WWTF site, and the site elevation is approximately 2 feet above the 100-year floodplain, the construction of the new structures on the site will comply with Douglas County standards and WQCD design criteria.

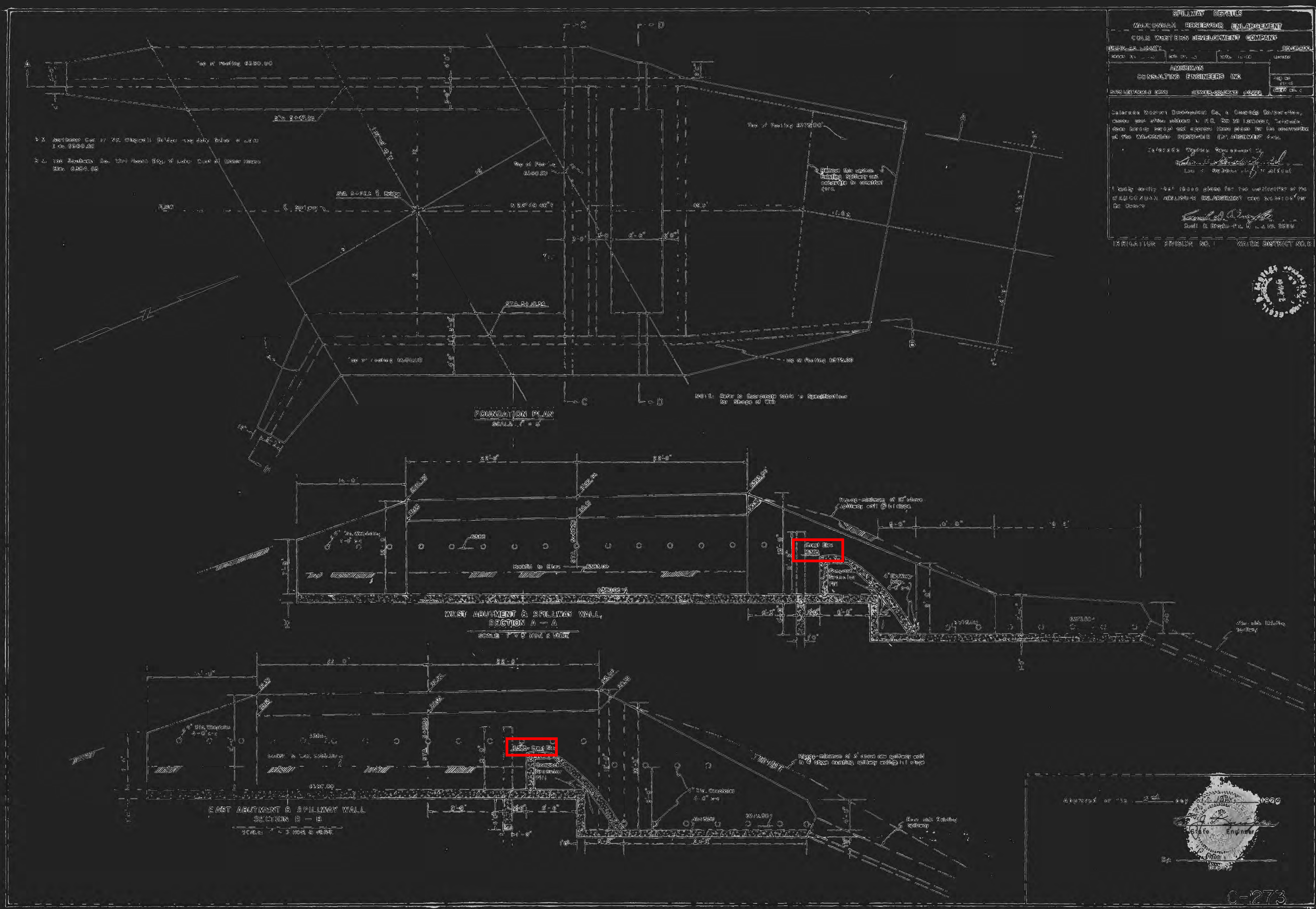
B. VARIANCES

No variances from design criteria are requested at this time.

C. DRAINAGE CONCEPT

All on site stormwater flow paths will be restored after construction is completed. The improvements associated with this project are not anticipated to have downstream impacts or adverse impacts to any wetlands or floodplains. As the disturbed area will be less than 1.0 acre, runoff will be treated by downslope perimeter BMPs.

APPENDIX A – STORM INTENSITY DATA



SPILLWAY DETAILS
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY
DOUGLAS COUNTY
COLORADO
AMERICAN CONSULTING ENGINEERS INC.
5475 LEETSDALE DRIVE
DENVER, COLORADO 80222
SHEET NO. 4
Colorado Western Development Co., a Colorado Corporation, whose post office address is P.O. Box 38 Larkspur, Colorado, does hereby accept and approve these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT dam.
Colorado Western Development Co.
By
I hereby certify that these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT were prepared for the Owners
Cecil D. Broyles-P.E. & L.S. No. 2690
IRRIGATION DIVISION NO. 1
WATER DISTRICT NO. 8
FOUNDATION PLAN
WEST ABUTMENT & SPILLWAY WALL, SECTION A — A
EAST ABUTMENT & SPILLWAY WALL SECTION B — B
Crest Elev.
State Engineer
C-1273
BEST COPY

SECTION C -- C
CUT-OFF-WALL

SCALE: 1" = 2'-0"

Note: Build footing at Elev. 8378.00 over competent impervious material.

Rip Rap

Place 3" min. Weepholes 4'-0" c.c. both walls

Varies

Place 3" min. aggregate water stop - Vertical face only

Top of Footing 8368.00

Place 6" min. aggregate water stop as indicated

Varies

Construction Joint

SECTION D -- D
STEP FOOTING

SCALE: 1" = 2'-0"

Note: Build footing at Elev. 8378.00 over a dense base.

Rip Rap

Spillway Crest 8388.00

Construction Joint

Place 3" min. aggregate water stop - Vertical face only

Top of Footing 8388.00

Construction Joint

3" Min. Weepholes 4'-0" c.c. both faces of wall & both walls

Top of Footing 8376.00

Place 3" min. Weepholes 4'-0" c.c. (Typ.)

Place 3" min. aggregate water stop - Vertical face only

4" Min. Weepholes 4'-0" c.c. West face only

Elev. 8378.00 at NW corner of Spillway Wall. Typ.

Elev. 8388.00 at NW corner of Spillway Wall. Typ.

INITIAL DIVISION NO. 1 WATER DISTRICT NO. 6

SPILLWAY SECTIONS

WAUCONDAH RESERVOIR ENLARGEMENT

COLO. WESTERN DEVELOPMENT COMPANY

COLORADO SPRINGS, COLORADO

DRAWN BY: C.T.S.	DATE OF PLAT:	DATE: 10-70	DRAWING

AMERICAN CONSULTING ENGINEERS INC.

JOB NO.	
SHEET	OF SHEETS

SCALE: AS SHOWN DENVER, COLORADO 80202

Colorado Western Development Co., a Colorado corporation, whose mail office address is P.O. Box 88, Denver, Colorado 80201 hereby accepts these plans of the construction of the WAUCONDAH RESERVOIR ENLARGEMENT for ownership.

Colorado Western Development Co.

By: [signature]

Title: Vice President

I hereby certify that these plans are the ones referred to in the WAUCONDAH RESERVOIR ENLARGEMENT were prepared for the owners.

Carl D. Zoyes P.E. & L.S. 2882

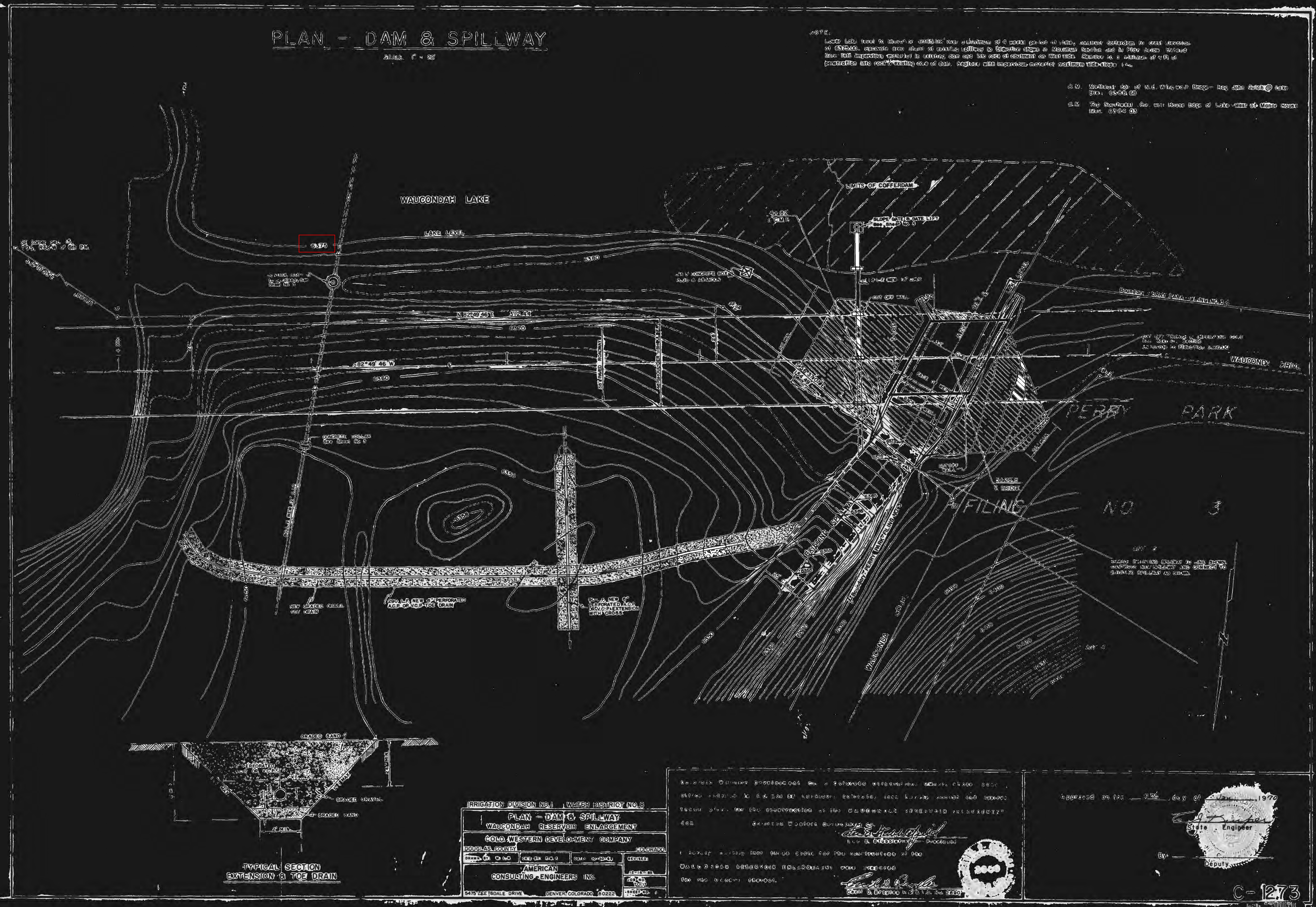
Approved on the 2nd day of [illegible]

[illegible] Engineer

By: [illegible]

Secretary

C-273


PLAN - DAM & SPILLWAY
NOTE:
Lower Lake level to Elevation 6365.00 over a minimum of 4 weeks period of time, construct Cofferdam to crest elevation of 6375.00. Excavate area ahead of existing spillway to Elevation shown in Maximum Section and in Plan below. Extend Core into impervious material in existing dam and into rock at abutment on West side. Remove to a minimum of 4 Ft of penetration into rock or existing core of dam. Replace with impervious material maximum side slope
B. M. Northeast Cor. of N.E. Wingwall Bridge - Hog John Gulch @ Lake Elev. 6368.68
B. M. Top Southwest Cor. well House Edge of Lake - West of Manor House Elev. 6384.03
WAUCONDAH LAKE
LAKE LEVEL
LIMITS OF COFFERDAM
PERRY PARK
FILING NO 3
WAUCONDA DRIVE
CONCRETE COLLAR See Sheet No 3
NEW GRADED GRAVEL TOE DRAIN
TYPICAL SECTION EXTENSION & TOE DRAIN
GRADED SAND
GRADED GRAVEL
IRRIGATION DIVISION NO. 1 WATER DISTRICT NO. 8
PLAN - DAM & SPILLWAY
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY
DOUGLAS COUNTY COLORADO
AMERICAN CONSULTING ENGINEERS INC.
5475 LEETSDALE DRIVE DENVER, COLORADO 80222
Approved on the 2nd day of Jan, 1970
State Engineer
By
Deputy
C-1273

B.M. Top Southwest Cor. well house
Edge of Lake – West of Manor House
Elev. 6384.03

B.M. Northeast Cor. of N.E. Wing wall Bridge – Hog John Gulch @ lake
Elev. 6388.68

6410 6400 6390 6380 6370 6360 6350

℄ 40' Roadway (80' R.O.W.)

6395.00' 94.60' LEVEL 94.60' BORROW AREA

Vert. P.I. 6394.60'

50' V.C.

3.84 %

93.84'

Vert. P.I. 6392.68'

93.01'

50' V.C.

+ 1.33%

94.38'

Vert. P.I. 6394.68'

94.38' PROPOSED CREST

– 1.33 %

50' V.C.

93.01'

Vert. P.I. 6392.68'

92.68'

STA. 5+29 ℄ Bridge

92.68' LEVEL

PROPOSED SPILLWAY APPROACH CHANNEL

DOWNSTREAM FACE OF DAM

Scale: 1"=20' Horz. 1" = 10' Vert.

T.H. # 2

EXISTING CREST

T.H. #1

H.W.L. ELEV. 6385.00'

T.H. #1A

Existing Spillway

18" Outlet Conduit

FILL
SAND – SILTY TO CLAYEY, DRY TO WET, MOSTLY VERY SOFT.

Existing 10" C.I.P.

New 6" perforated Drain See Sheet 1

New 6" perforated Drain See Sheet 1

EXISTING GRADE (Toe of Slope)

SAND
WELL GRADED, MEDIUM DENSE TO DENSE, CLEAN TO SILTY AND CLAYEY, WET

1+00 2+00 3+00 4+00 5+00 6+00

CLAY
VERY SANDY TO SAND, CLAYEY, EXTREMELY STIFF, WET, GREY

CLAYSTONE BEDROCK
MEDIUM HARD, BLUE

GATE LIFT

"H" Dimension
Eye Bolt
Gate Lift Armco HB 24
Oil Filler
Anchor Bolts
Stem & Sleeve 46'
Vent Line
ELEV. 6390.00'
2'(Min.)

SECTION

"H" Dimension
Stem & Sleeve 46'
Oil Seal
Slope Gate 18" Armco SO-10C
Anchor Bolts
Elev. 6373.0'
Thimble
1 1/2" Galv. Pipe Vent Line
4 Bar
Shop Fabricate to this joint
42" MIN.

PLAN

4 Bar – 16" cc Both ways

SLOPE GATE DETAILS

NOTE
BED VENT LINE & GATE LIFT STEM WITH RIPRAP. MARK GAGE ROD WITH METAL DIE IN FEET AND TENTHS OF FEET ON VENT LINE. PAINT NUMBERS ON VENT LINE SO THEY ARE CLEARLY VISIBLE. SEE SPECIFICATIONS

6395 6385 6375 6365 6355

OPERATING WHEEL
CONTROL BOX
H.W.L. 6385.00'
GATE LIFT VENT LINE
18" RIPRAP
SLOPE GATE L.W.L. 6373.00'
6375
6370
PLACE CUTOFF WALL EVERY 23' ALONG 18" C.M.P. AS SHOWN
EXISTING C.I. DRAIN
RAISE CONTROL BOX AS SHOWN – SEE SPECIFICATIONS
BACK FACE EXISTING DAM
STA. 4+50 to STA. 5+75 Excavate to 6360.00 for cut-off trench. See Sheet 1.
NEW 18"ø C.M.P. @ 2.0%
TOP OF GRAVEL @ ELEV. 6365
CONC. COLLAR
NEW 12"ø C.I. PIPE
1.5' GRAVEL BLANKET DRAIN
6" PERFORATED CLAY OR ASBESTOS-CEMENT DRAIN EXTEND EXISTING DRAIN TO TOE OF SLOPE
IMPERVIOUS CORE
COHESIONLESS MATERIAL (FREE DRAINING)
SEE PLAN & SPILLWAY SECTION
TOE DRAIN WITH 6" PERFORATED CLAY OR ASBESTOS-CEMENT PIPE – SEE SHEET 2
TOE DRAIN
SLOPE TO DAYLIGHT

4.6' 4' 19' 19' 4'
0.02 ft./ft.
2½
2
1
1:1 MAX.
8' 10'
7.5' 14.5' 3.0' 2.3'

CREST 6395.06'

MAXIMUM CROSS SECTION

SCALE: 1"=10'-0" HOR. & VERT

EXCAVATE TO SPRING LINE OF C.M.P. AS SHOWN, COMPACT OVER C.M.P. AFTER CUTOFF WALLS HAVE BEEN POURED. SEE SPECIFICATIONS.

1:1 MAX. 1:1 MAX.
NEW 18" C.M.P.
8 #4 Ø-5'-0" BOTH WAYS EACH CUT OFF WALL
LIMITS OF CUT OFF WALL
6" 12" 2' 6" 12" 6"
4'
5'-6"

EXCAVATION FOR 18" C.M.P. IN EXISTING DAM SECTION

Scale: 1" = 2'-0"

DISCHARGE CURVE

GUAGE ROD DEPTH IN FEET: 0 2 4 6 8 10 12
CAPACITY IN C.F.S.: 4 8 12 16 20 24 28 32

18" DIAMETER OUTLET CONDUIT

IRRIGATION DIVISION NO. 1 WATER DISTRICT NO. 8

PROFILE & MAXIMUM SECTION
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY
DOUGLAS COUNTY COLORADO

DRAWN BY: M. L.W.	CK'D BY: C. D. B.	DATE 9-25-69	REVISED 1-2-70 12-16-69

AMERICAN CONSULTING ENGINEERS INC.
388-5729
5475 LEETSDALE DR. DENVER, COLORADO 80222

JOB NO. 71-17
SHEET NO. 3

Colorado Western Development Co., a Colorado Corporation, Owner, whose post office address is P.O. Box 38, Larkspur, Colorado, does hereby accept and approve these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT dam.

Colorado Western Development Co.
by: Lee E. Stubblefield
Lee E. Stubblefield – Pres.

I hereby certify that these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT were prepared by me for the Owners thereof.

Cecil D. Broyles
Cecil D. Broyles P.E. & L.S. No. 2690

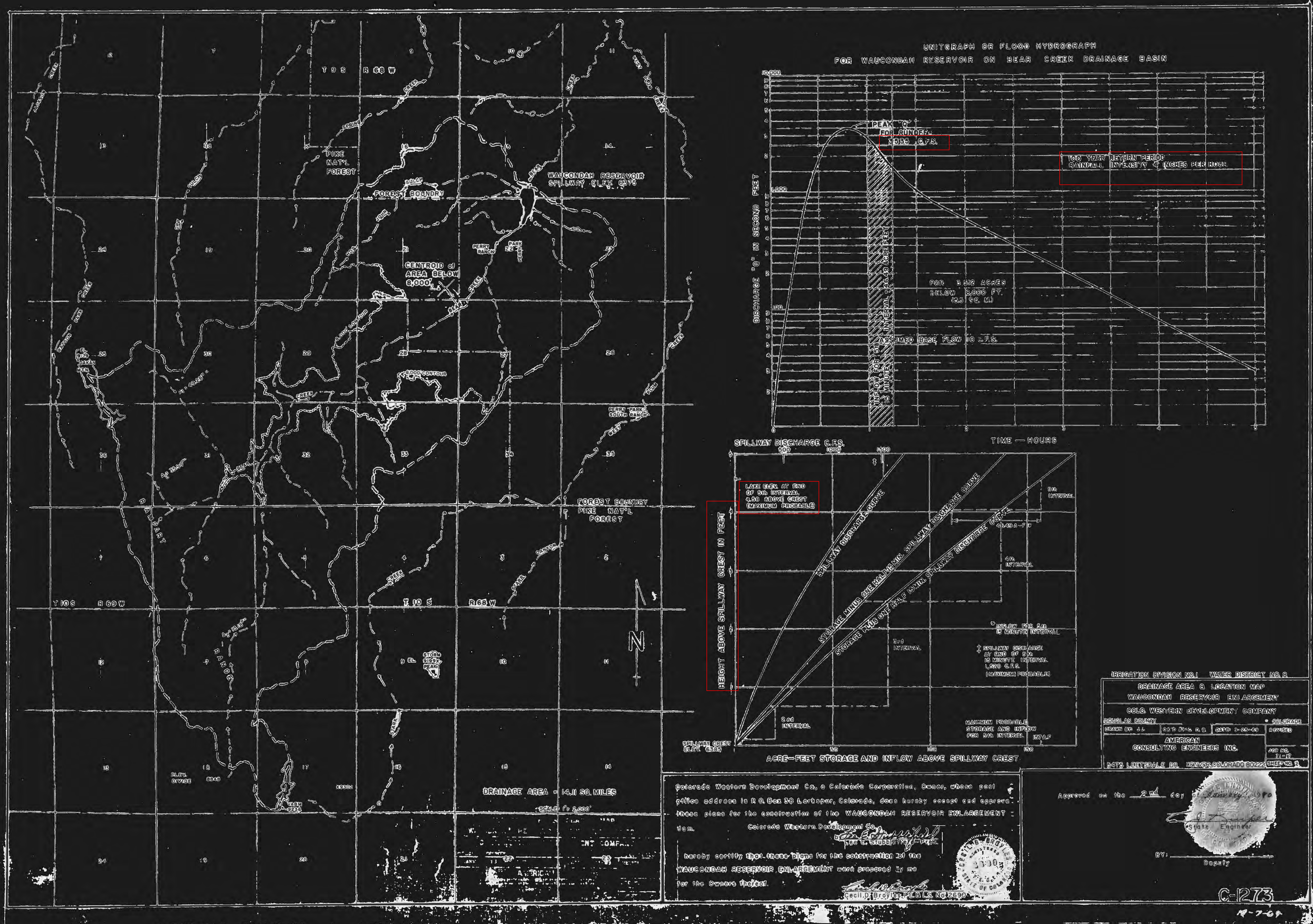
CECIL D. BROYLES REGISTERED 3000 STATE OF COLORADO

Approved on the 2nd day of January, 1970.

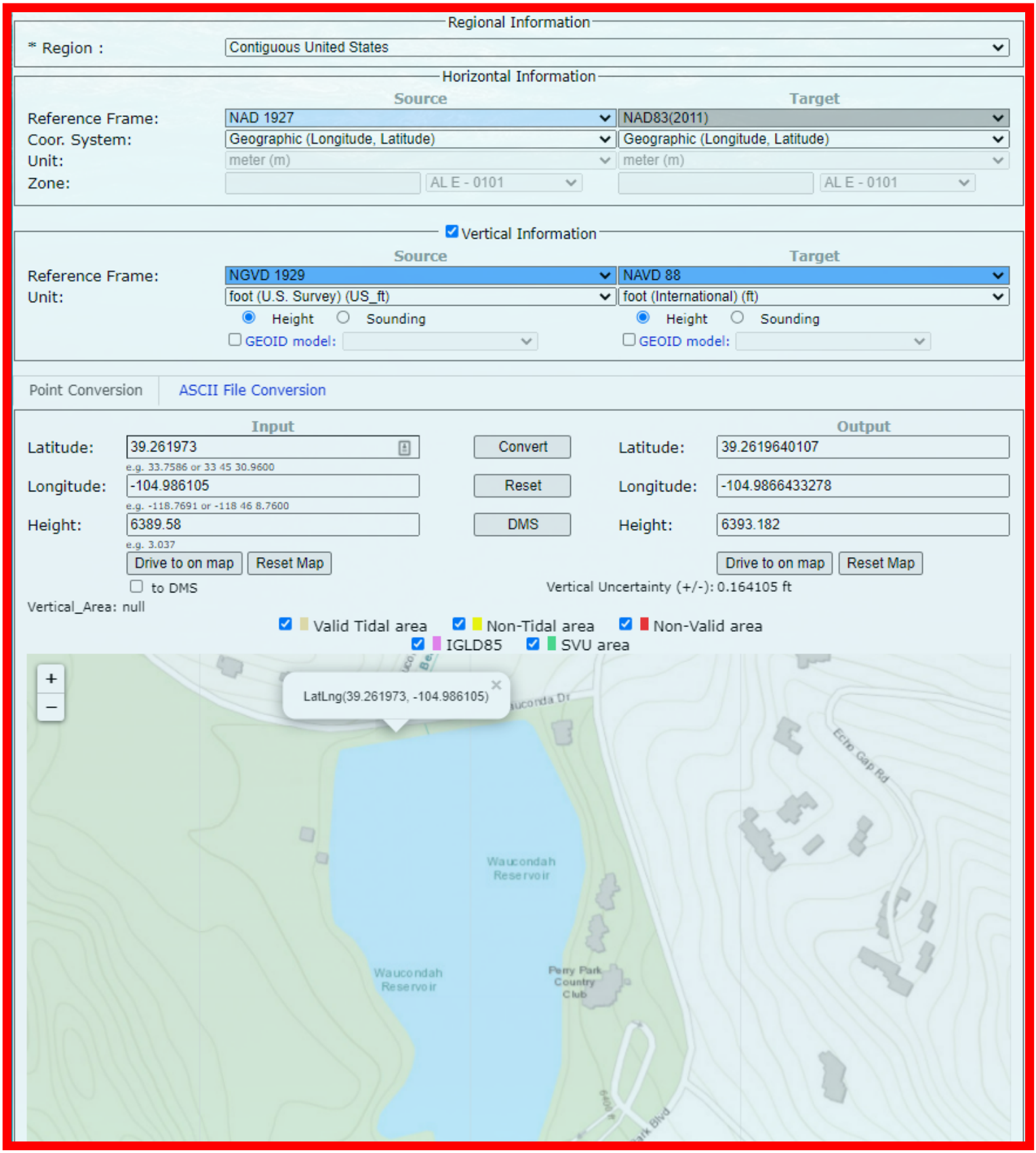
State Engineer

By: _____
Deputy

C-1273


T 9 S R 68 W
PIKE NAT'L FOREST
FOREST BOUNDRY
WAUCONDAH RESERVOIR SPILLWAY ELEV. 6375
PERRY RANCH
CENTROID of AREA BELOW 8,000'
8000' CONTOUR
PERRY PARK SOUTH RANCH
FOREST BOUNDRY PIKE NAT'L FOREST
RAMPART RANGE
T 10 S R 69 W
T 10 S R 68 W
N
DRAINAGE AREA - 14.11 SQ. MILES
SCALE: 1" = 2,000'
UNITGRAPH OR FLOOD HYDROGRAPH
FOR WAUCONDAH RESERVOIR ON BEAR CREEK DRAINAGE BASIN
PEAK "Q" FOR RUNOFF 3935 C.F.S.
100 YEAR RETURN PERIOD RAINFALL INTENSITY 4 INCHES PER HOUR
FOR 3132 ACRES BELOW 8,000 FT. (4.9 SQ. MI.)
ASSUMED BASE FLOW 10 C.F.S.
DISCHARGE "Q" IN SECOND FEET
TIME — HOURS
SPILLWAY DISCHARGE C.F.S.
LAKE ELEV. AT END OF 5th INTERVAL 4.58 ABOVE CREST (MAXIMUM PROBABLE)
SPILLWAY DISCHARGE CURVE
STORAGE MINUS ONE HALF 15 MIN. SPILLWAY DISCHARGE CURVE
STORAGE PLUS ONE HALF 15 MIN. SPILLWAY DISCHARGE CURVE
HEIGHT ABOVE SPILLWAY CREST IN FEET
2nd INTERVAL
3rd INTERVAL
4th INTERVAL
5th INTERVAL
INFLOW FOR 5th 15 MINUTE INTERVAL
SPILLWAY DISCHARGE AT END OF 5th 15 MINUTE INTERVAL (MAXIMUM PROBABLE)
MAXIMUM PROBABLE STORAGE AND INFLOW FOR 5th INTERVAL
157 A.F
SPILLWAY CREST ELEV. 6385
50
100
150
ACRE-FEET STORAGE AND INFLOW ABOVE SPILLWAY CREST
IRRIGATION DIVISION NO. 1 WATER DISTRICT NO. 8
DRAINAGE AREA & LOCATION MAP
WAUCONDAH RESERVOIR ENLARGEMENT
COLO. WESTERN DEVELOPMENT COMPANY
DOUGLAS COUNTY • COLORADO
DRAWN BY: J.J. CK'D BY: C. D. B. DATE: 9-25-69 REVISED
AMERICAN CONSULTING ENGINEERS INC.
5475 LEETSDALE DR. DENVER, COLORADO 80222
JOB NO. 71-17
SHEET NO. 2
Colorado Western Development Co., a Colorado Corporation, Owner, whose post office address is P. O. Box 38 Larkspur, Colorado, does hereby accept and approve these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT dam.
Colorado Western Development Co.
by Lee E. Stubblefield - Pres.
I hereby certify that these plans for the construction of the WAUCONDAH RESERVOIR ENLARGEMENT were prepared by me for the Owners thereof.
Cecil D. Broyles P.E. & L.S. No. 2690
Approved on the 2nd day of January, 1970
State Engineer
BY: Deputy
C-1273
12-7-69

SOURCE: https://vdatum.noaa.gov/vdatumweb/vdatumweb?a=164400120220201



APPENDIX B – GEOTECHNICAL REPORT

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

SUBSURFACE SOIL INVESTIGATION
PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WWTF IMPROVEMENTS, PHASE 2
AEROBIC DIGESTION FACILITIES
5121 COUNTRY CLUB DRIVE
LARKSPUR, COLORADO 80118

Prepared for

GMS, Inc.
611 North Weber Street, Suite 300
Colorado Springs, Colorado 80903

Attn: Mark Morton

November 28, 2022

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Stuart Wood
Geologist

COLORADO REGISTERED
JOSEPH COLLIN GOODE JR.
11-29-2022
23725
PROFESSIONAL ENGINEER

Reviewed by:

Joseph C. Goode, Jr., P.E.
President

SW/rs

Encl.

Entech Job No. 222009
AAprojects/2022/222009 ssi

Table of Contents

SUBSURFACE SOIL INVESTIGATION
PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WWTF IMPROVEMENTS, PHASE 2
AEROBIC DIGESTION FACILITIES
5121 COUNTRY CLUB DRIVE
LARKSPUR, COLORADO 80118

1.0 INTRODUCTION

GMS, Inc. is planning construction of new aerobic digestion facilities and associated site improvements. The site is located at 5121 Country Club Drive east of the intersection with Perry Park Boulevard in Larkspur, Colorado. The Vicinity Map is presented in Figure 1. The Site Plan/Test Boring Location Map is presented in Figure 2.

This report describes the subsurface conditions encountered in test borings drilled for the new aerobic digestion and sludge storage tanks; aeration blower building, a secondary sludge pump vault, a generator pad, and an alternate tank location. The report provides recommendations for foundation design and construction. The subsurface investigation for the proposed structures included drilling borings at locations within or near the footprints of the five proposed structures, collecting samples of soil from the borings, performing laboratory tests on selected samples and conducting a geotechnical evaluation of the investigation findings. All drilling and subsurface investigation activities were performed by Entech Engineering, Inc. (Entech). The contents of this report, including the geotechnical evaluation and recommendations, are subject to the limitations and assumptions presented in Section 6.0.

2.0 PROJECT AND SITE DESCRIPTION

The project will consist of constructing new aerobic digestion and sludge storage tanks, a new aeration blower building, a primary and secondary sludge pump vault, a generator pad and associated site improvements. The proposed tank slabs are expected to have a finished elevation of 4 feet below existing ground surface, the slab for the blower building is expected to have a finished elevation of 1 foot above existing ground surface, and the pump vaults will have a depth of 14 feet below ground surface. No specific load data was available at the time of this report preparation other than the dimensions of the buildings. The ground surface topography in the vicinity of the proposed structures is generally level with a gradual slope to the west. The vegetation consisted mainly of grass and weeds with surrounding brush and deciduous trees.

3.0 SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

Subsurface conditions within the area of the proposed structures were explored by drilling seven test borings at the approximate locations shown on Figure 2. The structure associated with each test boring is indicated in the Test Boring Logs (Appendix A). The test borings were drilled to depths of 20 to 45 feet below ground surface (bgs). The drilling was performed using a truck-mounted, continuous flight auger-drilling rig supplied and operated by Entech. Boring logs descriptive of the subsurface conditions encountered during drilling are presented in Appendix A. Observations for groundwater presence were made in each of the open boreholes at the conclusion of drilling to estimate the elevation of the groundwater table in the planned building area. The results of the groundwater observation are included on the boring logs.

Soil samples were obtained with respect to depth in the borings utilizing the Standard Penetration Test (ASTM D-1586) using 2-inch O.D. split-barrel and California samplers. Results of the Standard Penetration Testing (SPT) are included on the boring logs in terms of N-values expressed in blows per foot (bpf). Soil samples recovered from the borings were visually classified in the field and described on the boring logs. The field classifications were later verified utilizing of laboratory testing and grouped by type in

terms of engineering properties. The soil types (by number) are included on the boring logs.

Water content testing (ASTM D-2216) was performed on most samples recovered from the borings and the results are shown on the boring logs. Grain-Size Analysis (ASTM D-422) and Atterberg Limits testing (ASTM D-4318) were performed on selected samples to assist in classifying the materials encountered in the borings. Volume change testing was performed on selected samples using the FHA Swell Test and the Swell/Consolidation Test (ASTM D-4546) in order to evaluate potential expansion/compression characteristics of the soil. Sulfate tests were performed to evaluate the soil's corrosive characteristics. The laboratory testing results are summarized in Table 1 and are presented in Appendix B.

4.0 SUBSURFACE CONDITIONS

Two soil types were encountered in the borings drilled for the proposed structures: Type 1: silty to clayey to clean sand (SM, SC, GP) and Type 2: very sandy clay (CL). The soils were classified using the results of the laboratory testing and the Unified Soil Classification System (USCS). Observation for groundwater were made approximate 1 week after completion of drilling.

4.1 Soil

Soil Type 1 classified as silty to clayey to clean sand (SM, SC, GP). The sand was encountered in six of the test borings at the surface and extended to depths of 9 feet or to the termination of test borings (20 feet). Standard Penetration Testing on the sand resulted in SPT N-values of 1 to greater than 50 bpf, which indicates very loose to very dense states. Moisture content and grain size analysis indicate approximately 2 to 26 percent water content and approximately 5 to 27 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing resulted in liquid limits of no-value to 42 percent and plastic indexes of non-plastic to 22 percent. Swell/Consolidation Testing on a sample of clayey sand from Test Boring No. 1 at a depth of 2 to 3 feet resulted in a volume change of 0.3 percent, which indicates a low expansion potential.

Sulfate testing resulted in less than 0.01 to 0.06 percent soluble sulfate by weight, indicating the sand exhibits a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 2 classified as a very sandy clay (CL). The clay was encountered in Test Borings No. 6 and 7 at a depth of approximately 9 feet bgs for Test Boring No. 6 and extended to termination of boring at 20 feet bgs. Test Boring No. 7 encountered clay at the ground surface and extended full depth of boring to 45 feet. Standard Penetration Testing conducted on the clay resulted in SPT N-values of 11 to 35 bpf, which indicates firm to stiff consistencies. Moisture content and grain size analysis showed approximately 10 to 26 percent water contents and approximately 52 to 58 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing resulted in liquid limit of 43 to 65 percent, and plastic indexes of 28 to 36 percent. FHA Swell Testing resulted in an expansion pressure of 2060 psf, indicating the clay exhibits moderate to high swell potential. Swell/Consolidation Testing on the clay resulted in a volume change of a 0.4 percent, which indicates a low expansion potential. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, indicating the clay exhibits a negligible potential for below grade concrete degradation due to sulfate attack.

Additional descriptions and engineering properties of the soil encountered during drilling are included on the boring logs and on Table 1. It should be understood that the soil descriptions reported on the boring logs likely vary between boring locations and sampling depth. Similarly, the lines of stratigraphic separation shown on the boring logs represent approximate boundaries between soil types and the actual transitions between soil types is likely more gradual or variable.

4.2 Groundwater

Groundwater was encountered in all of the borings at depths of 7.5 to 26.5 feet bgs. Groundwater will likely affect the construction of the shallow foundations proposed for the site. Unstable conditions will likely be encountered if excavations approach the water table. Interceptor drains, subsurface drains, and soil stabilization techniques (shot rock/geofabric) may be required. It should be noted that groundwater levels may

fluctuate due to seasonal variations, changes in land runoff, and future development of nearby areas.

5.0 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

The following discussion is based on the subsurface conditions encountered in the seven borings drilled for the Waucondah WWTF Improvements in Larkspur, Colorado. If subsurface conditions different from those described herein are encountered during construction of the structure or if the project elements change from those described, Entech Engineering, Inc. should be notified so that the evaluation and recommendations presented below can be reviewed and revised if necessary.

It is anticipated that the structures will be supported by shallow concrete spread footing/pad foundations bearing on medium dense native sands, recompacted loose sands or structural fill where overexcavation/stabilization is required. Foundations should have a minimum 30-inch frost protection. Subsurface conditions in the planned structure locations consist of silty to slightly silty sand and sandy clay. SPT N-values measured in the sand indicated variable conditions ranging from very loose to medium dense states at anticipated foundation grade. The very loose conditions were primarily encountered at or below water levels. The anticipated foundation/footing grades in each structure are indicated on the boring logs. The soils were encountered at dry to saturated conditions. Moderately expansive clay was encountered in Test Boring Nos. 6 and 7 at 9 feet and over the boring depth, respectively. The clay soils encountered in Test Boring No. 7 will require moisture conditioning and/or mixing with granular soils, if used as structural fill below buildings. It is anticipated the clay and loose sand soils, if encountered, will require mitigation to support the planned structures. Conditions encountered in each structure location are summarized in the following table.

Test Boring	Structure	Foundation Grade	Groundwater	Soil Conditions
1	Generator	at grade	10 feet	Medium dense clayey sand
2	Primary Sludge Lift	10-12 feet	9 feet	Loose saturated silty sand, stabilization will be required
3	Alternate Tank Location	6-8 feet	7.5 feet	Medium dense clay to silty sand, unstable soils at groundwater table, stabilization will likely be required
4	Secondary Sludge Lift	10-12 feet	10 feet	Loose saturated soils, stabilization will likely be required.
5	Blower Building	at grade	8 feet	Medium dense clayey to silty sand, scarify & compact subgrade
6	Proposed Digester	5 feet	9 feet	Loose silty sand, scarify & compact subgrade
7	Borrow Area	—	26.5 feet	Clayey sand to sandy clay, clays moderately expansive

5.1 Footing Subgrade Improvement

The soils at foundation grade range from loose to medium dense states. Very loose to loose sands encountered in foundation excavations will require removal and recompaction below the foundation members. The depths of removal should be determined at each structure. In areas where foundations approach water levels, stabilization with shot rock or geogrid along with interceptor drains or capillary break drains may be required. Very sandy clay was encountered in Test Boring No. 6 at 9 feet bgs. Clay soils at or near foundation grade should be penetrated or overexcavated.

The final depth of overexcavation should be determined during the excavation observation. The overexcavation width should extend a minimum 3 feet beyond the footing perimeter to assist in distributing footing stresses. The subgrade of the overexcavated area should be scarified, moisture conditioned and compacted, to at to at least 95 percent of the soil's maximum dry density as determined by the Modified Proctor Test ASTM D-1557 at a moisture content within about 2 percent of optimum. Subsequent fill placed in the overexcavation should be compacted as above. Onsite granular soils, as approved by Entech may be used as structural fill.

Provided the soils encountered in the footing excavations are consistent with the in-place conditions observed in the borings and the above recommended mitigation is implemented, a maximum allowable bearing capacity of 2,000 pounds per square foot (psf) is recommended for the footing design. Higher bearing capacities can be achieved with deeper soil stabilization. These higher volumes should be evaluated for each structure. Fill placed in the overexcavation should be free of organic materials, debris and stone sizes greater than 3 inches in diameter. Fill placed below footings should be compacted to at least 95 percent of the soil's ASTM D-1557 maximum dry density and be placed in horizontal lifts not exceeding 6 inches in thickness after compaction. Frequent density tests should be performed at 12-inch intervals and at proposed footing subgrade elevations. Exterior footings should be embedded a minimum of 30 inches below the adjacent exterior site grade in order to provide frost protection.

It is recommended that an Entech Engineer observe the foundation excavation and evaluate if the exposed native and filled subgrade(s) are consistent with those described in this report. The Entech Engineer should also provide recommendations for foundation drainage should conditions warrant.

5.2 On-Grade Floor Slabs

On-grade slabs for the planned structures should be supported as discussed above. On-site granular soils, as approved by Entech may be used as structural fill. Structural fill should be compacted to a minimum of 95 percent of its Maximum Modified Proctor Dry Density Test (ASTM D-1557). The fill should be moisture conditioned to ±2 percent of

the optimum moisture content as determined to aid in compaction. All soil beneath the slab should be free of organics, debris and stone sized larger than 3 inches in diameter.

Grade supported floor slabs should be separated from other building structural components and utility penetrations to allow for possible future vertical movement unless they are designed as part of the foundation system. In the case of isolated slabs that are not designed as part of the foundation interior, partition walls should be constructed in such a manner so as not to transfer slab movement into the overlying floor(s) and/or roof members, should slab movement occur. Control joints in grade-supported slabs are recommended at 10 to 15-foot perpendicular spacing to control cracking. If slab movement cannot be tolerated a structural floor system should be used. **Slabs for below grade tanks/digesters must be designed for the potential buoyant uplift forces when the structures are empty.**

5.3 Drainage

Positive surface drainage is recommended around the perimeter of the planned structures to minimize infiltration of surface water into the supporting foundation soils. A minimum ground surface slope of 5 percent in the first 10 feet as measured from the exterior foundation wall(s) is recommended for unpaved areas. For paved areas and other impervious surfaces, a minimum slope of 2 percent is adequate.

To further help minimize infiltration of water into the foundation zone, vegetative plantings placed close to foundation walls should be limited to those species having low watering requirements and irrigated grass should not be located within 5 feet of the foundation. Similarly, sprinklers are not recommended to discharge water within 5 feet of foundations. Irrigation near foundations should be limited to the minimum amount necessary to maintain vegetation. Application of more water than necessary can increase the potential for slab and foundation movement.

5.4 Concrete

Sulfate solubility testing was conducted on three samples recovered from the test borings to evaluate the potential for sulfate attack on concrete placed below surface grade. The test results indicated less than 0.01 to 0.06 percent soluble sulfate (by weight). The test results indicate the sulfate component of the in-place soils presents a negligible exposure threat to concrete placed below the site grade. Type II cement is recommended for manufacture of any concrete that will come into contact with the existing site soil and bedrock and/or imported fill. To further avoid concrete degradation, it is recommended that during construction, concrete not be placed on frozen or wet ground. Care should be taken to prevent accumulation or ponding of water in foundation excavations prior to placement of concrete. If standing water is present in a foundation excavation, it should be removed by ditching to sumps and pumping the water away from the foundation area prior to concrete placement. If concrete is placed during periods of cold temperatures, the concrete must be kept from freezing. This may require covering the concrete with insulated blankets and adding heat to prohibit freezing.

5.5 Foundation and Floor Slab Backfill

All backfill within the foundation area and below floor slabs should be compacted to a minimum of 95 percent of the soil's maximum dry density as determined by the Modified Proctor Test ASTM D-1557. Backfill should be placed in horizontal lifts such that each finished lift has a compacted thickness of six-inches or less. Backfill should be placed at water contents conducive to achieving adequate compaction, usually within $\pm$2% of the optimum water content as determined by ASTM D-1557. Mechanical methods can be used for placement and compaction of backfill; however, heavy equipment should be kept at distance from foundation walls and below slab infrastructure to avoid over stressing. No water flooding techniques of any type should be used for compaction or placement of backfill material. An Entech Engineer should approve any imported fill planned to be used within the foundation area prior to delivery to the site.

5.6 Utility Trench Backfill

Backfill placed in utility trenches should be compacted to a minimum of 95 percent of the fills' maximum dry density as determined by the Modified Proctor Test ASTM D-1557. Backfill should be placed in horizontal lifts having a compacted thickness of six-inches or less and at a moisture content conducive to adequate compaction, usually ±2 percent of the ASTM D-1557 optimum water content. Mechanical methods should be used for backfill placement; however, heavy equipment should be kept at a distance from foundation walls. No water flooding techniques of any type should be used for compaction or placement of utility backfill. The on-site soils are suitable for use as utility trench backfill.

Trench backfill placement should be performed in accordance with City of Security specifications. All excavation and excavation shoring/bracing should be performed in accordance with OSHA guidelines.

5.7 General Backfill

Areas to receive backfill outside the foundation limits should have all topsoil, organic material, and debris removed. Fill must be properly benched into slopes or cuts in order to be adequately compacted. The fill receiving surface should be scarified and moisture conditioned to within ±2% of its' optimum moisture content and compacted to a minimum of 95 percent of the ASTM D-1557 maximum dry density. Fill material should be free of vegetation and other unsuitable material and should not contain rocks or fragments greater than 6-inches. Topsoil and strippings should be separated from all backfill and structural fill sources on the site. Backfill placement and compaction beneath and around foundations, in utility trenches, beneath roadways and/or other structural features associated with the project should be observed and tested by an Entech Engineer during construction. The on-site sand soils are suitable for use as general backfill outside the foundation areas.

5.8 Excavation Stability

Excavation sidewalls must be properly sloped, benched and/or otherwise supported in order to maintain stable conditions. All excavation openings and work completed therein shall conform to OSHA Standards as put forward in CFR 29, Part 1926.650-652, (Subpart P).

5.9 Winter Construction

In the event construction of the planned foundations occurs during winter, foundations and subgrades should be protected from freezing conditions. Concrete should not be placed on frozen soil and once concrete has been placed, it should not be allowed to freeze. Similarly, once exposed, the foundation subgrade should not be allowed to freeze. During site grading and subgrade preparation, care should be taken to avoid burial of snow, ice or frozen material within the planned construction area.

5.10 Construction Observations

It is recommended that an Entech Engineer observe and document the following activities during construction of the building foundation system and concrete slab.

- Excavated subgrades.
- Compaction of overexcavated foundation areas.
- Placement/compaction of fill for the foundation components and floor slab.
- Placement/compaction of utility bedding and trench backfill.

6.0 CLOSURE

The subsurface investigation, geotechnical evaluation and recommendations presented in this report are intended for use by GMS, Inc. with application to the Wauconda Wastewater Treatment Facilities, Aerobic Digestion Facilities and associated site improvements. In conducting the subsurface investigation, laboratory testing, engineering evaluation and reporting, Entech Engineering, Inc. endeavored to work in accordance with generally accepted professional geotechnical and geologic practices and principles consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession currently practicing in same locality and under similar conditions. No other warranty, expressed or implied is made. During final design and/or construction, if conditions are encountered which appear different from those described in this report, Entech Engineering, Inc. requests that it be notified so that the evaluation and recommendations presented herein can be reviewed and modified as appropriate.

If there are any questions regarding the information provided in this report or if Entech Engineering, Inc. can be of further assistance, please do not hesitate to contact us.

TABLE

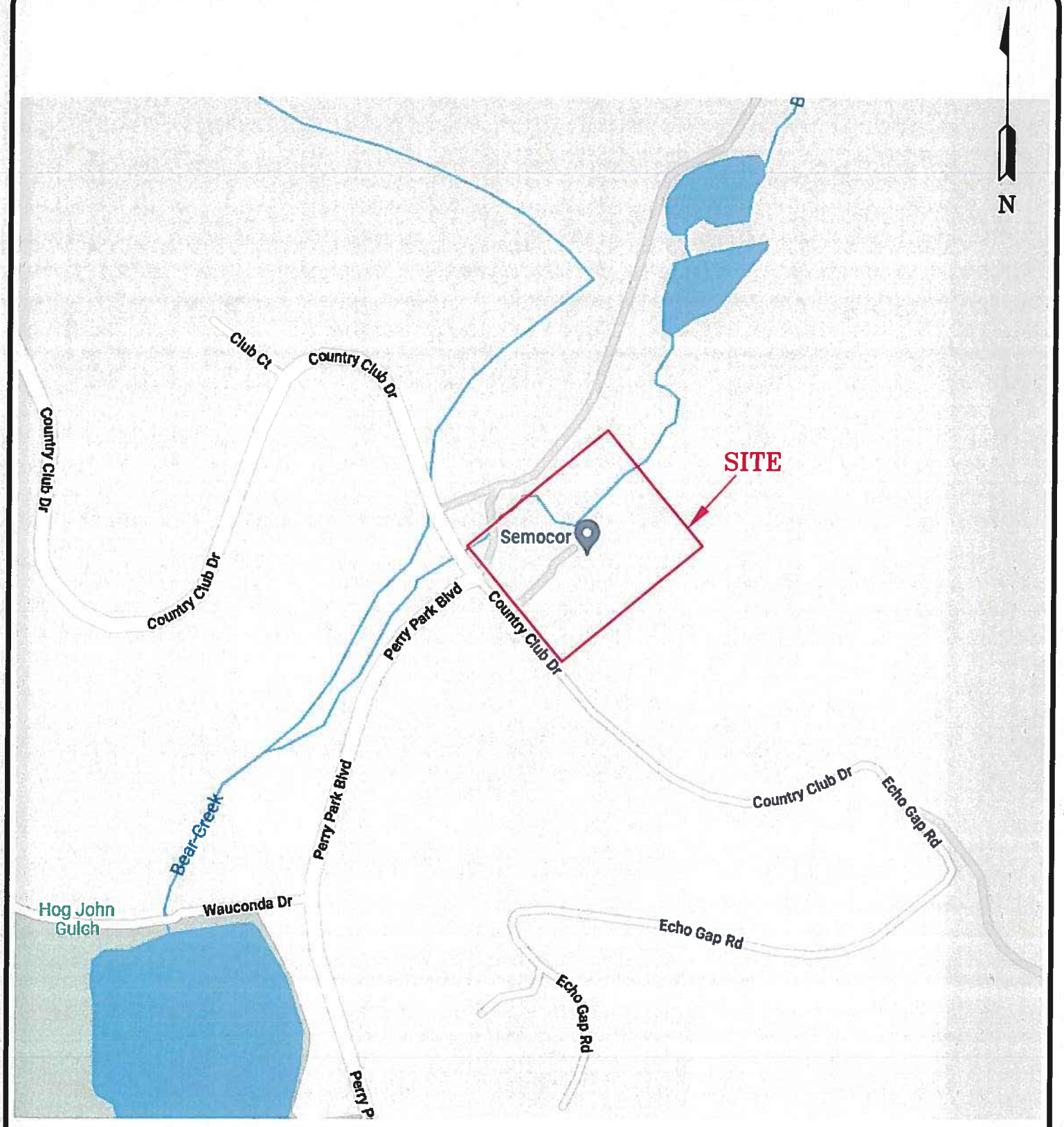
TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT GMS, INC.
PROJECT PERRY PARK SANITATION
JOB NO. 222009

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3	12.0	116.6	21.5	42	22	0.03		0.3	SC	SAND, CLAYEY
1	3	20			4.6						GP	SAND
1	4	15			13.4	NV	NP	<0.01			SM	SAND, SILTY
1	5	5			26.6			0.06			SM	SAND, SILTY
1	2	10			14.3						SM	SAND, SILTY
2	6	10			57.8				2060		CL	CLAY, VERY SANDY
2	7	2-3			58.8	65	36				CH	CLAY, VERY SANDY
2	7	10			68.1	63	40				CH	CLAY, VERY SANDY
2	7	30	20.7	107.5	52.4	43	28	<0.01		0.4	CL	CLAY, VERY SANDY

FIGURES



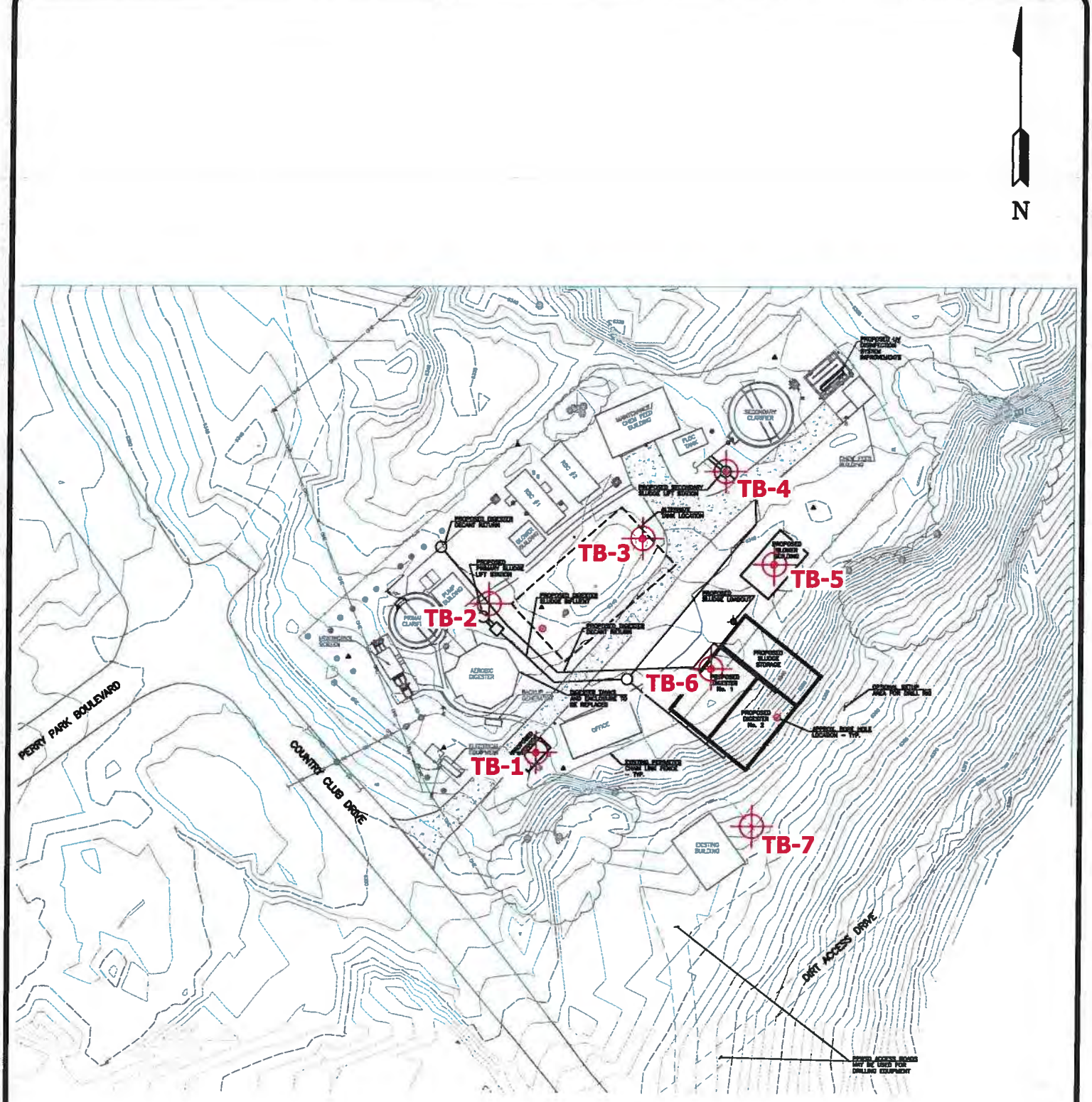
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
WAUCONDAH WASTEWATER FACILITY DISTRICT
LARKSPUR, COLORADO
FOR: GMS, Inc.

DRAWN:	DATE:	CHECKED:	DATE:
JAC	10/26/22	DPS	10-27-22

JOB NO.: 222009

FIG NO.: 1



TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

TEST BORING LOCATION MAP
WAUCONDAH WASTEWATER FACILITY DISTRICT
LARKSPUR, CO
FOR: GMS, Inc.

DRAWN:	DATE:	CHECKED:	DATE:
JAC	10/26/22	DPS	10-27-22

JOB NO.: 222009

FIG NO.: 2

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 10/14/2022
Job # 222009

REMARKS

GENERATOR
@ GRADE

WATER @ 10', 10/20/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			16	17.3	1	SAND, CLAYEY, FINE GRAINED, DARK BROWN, MEDIUM DENSE, VERY MOIST
5			12	5.0	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO VERY DENSE, DRY TO MOIST
10			20	2.3	1	
15			50	8.5	1	
20			14	18.4	1	SAND, CLAYEY, FINE GRAINED, RED BROWN, MEDIUM DENSE, MOIST

TEST BORING NO. 2
DATE DRILLED 10/14/2022
CLIENT GMS, INC.
LOCATION PERRY PARK SANITATION

REMARKS

SLUDGE LIFT

WATER @ 9',
10/20/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			17	15.6	1	SAND, SILTY, CLAYEY LENSES, FINE TO COARSE GRAINED, DARK BROWN, TAN, MEDIUM DENSE TO VERY LOOSE, MOIST
5			19	4.5	1	
10			4	12.3	1	FOUNDATION GRADE, 10-12'
15			1	10.6	1	
20			21	6.5	1	

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:

JOB NO.: 222009
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 10/14/2022
Job # 222009

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
ALT TANK WATER @ 7.5', 10/9/22						
SAND, SILTY TO CLEAN, FINE TO COARSE GRAINED, DARK BROWN TO TAN, MEDIUM DENSE, MOIST				23	6.9	1
	5			18	8.0	1
FOUNDATION GRADE, 6-8'						
	10			15	6.2	1
	15			*	5.8	1
* - BULK SAMPLE TAKEN	20			*	4.3	1

TEST BORING NO. 4
DATE DRILLED 10/14/2022
CLIENT GMS, INC.
LOCATION PERRY PARK SANITATION

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SECONDARY SLUDGE LIFT WATER @ 10', 10/20/22						
SAND, SILTY, FINE TO COARSE GRAINED, DARK BROWN TO TAN, LOOSE TO MEDIUM DENSE, MOIST				7	6.2	1
	5			4	15.9	1
FOUNDATION GRADE, 10-12'	10			5	25.9	1
	15			17	18.9	1
* - BULK SAMPLE TAKEN	20			*	23.7	1

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:

JOB NO.: 222009
FIG NO.: A- 2

TEST BORING NO. 5
DATE DRILLED 10/14/2022
Job # 222009

REMARKS

BLOWER BUILDING
@GRADE

WATER @ 8', 10/20/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			16	14.6	1
			15	1.9	1
5					
			3	24.2	1
10					
			50/7"	9.4	1
15					
			*	18.1	1
20					

2" ROAD BASE, SAND, CLAYEY, FINE GRAINED, DARK BROWN, MEDIUM DENSE, MOIST

SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO VERY DENSE, MOIST

* - BULK SAMPLE TAKEN

TEST BORING NO. 6
DATE DRILLED 10/14/2022
CLIENT GMS, INC.
LOCATION PERRY PARK SANITATION

REMARKS

PROPOSED DIGESTER

WATER @ 9', 10/20/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			22	6.2	1
5			8	15.9	1
10			13	25.9	2
15			15	18.9	2
20			11	23.7	2

SAND, SILTY, CLAYEY LENSES, FINE TO COARSE GRAINED, DARK BROWN TO TAN, MEDIUM DENSE TO LOOSE, MOIST

FOUNDATION GRADE, 5-6'

CLAY, VERY SANDY, FIRM TO STIFF, MOIST

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:

JOB NO.: 222009
FIG NO.: A- 3

TEST BORING NO. 7
DATE DRILLED 10/14/2022
Job # 222009

REMARKS

BORROW AREA

WATER @ 26.5', 10/20/22

CLAY, VERY SANDY, BROWN, VERY STIFF TO FIRM, MOIST

Depth (ft)	Symbol	Samples	Blows / ft.	Water %	Soil Type
			35	12.4	2
5			28	10.1	2
10			18	16.7	2
15			13	20.3	2
20			13	17.6	2
25			20	15.7	2
30			19	20.1	2
35			33	17.6	2
40					
45			35	12.8	2

TEST BORING NO.
DATE DRILLED
CLIENT GMS, INC.
LOCATION PERRY PARK SANITATION

REMARKS

Depth (ft)	Symbol	Samples	Blows / ft.	Water %	Soil Type
5					
10					
15					
20					

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

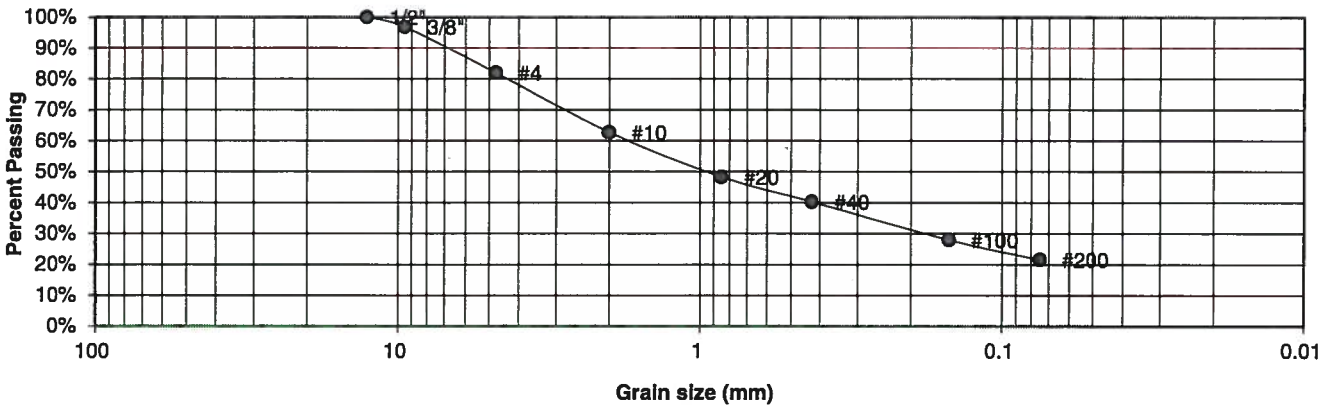
DRAWN:	DATE:	CHECKED:	DATE:

JOB NO.: 222009
FIG NO.: A- 4

APPENDIX B: Laboratory Testing Results

UNIFIED CLASSIFICATION	SC	CLIENT	GMS, INC.
SOIL TYPE #	1	PROJECT	PERRY PARK SANITATION
TEST BORING #	1	JOB NO.	222009
DEPTH (FT)	2-3	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.8%
4	81.9%
10	62.7%
20	48.2%
40	40.3%
100	28.0%
200	21.5%

Atterberg Limits	
Plastic Limit	20
Liquid Limit	42
Plastic Index	22

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

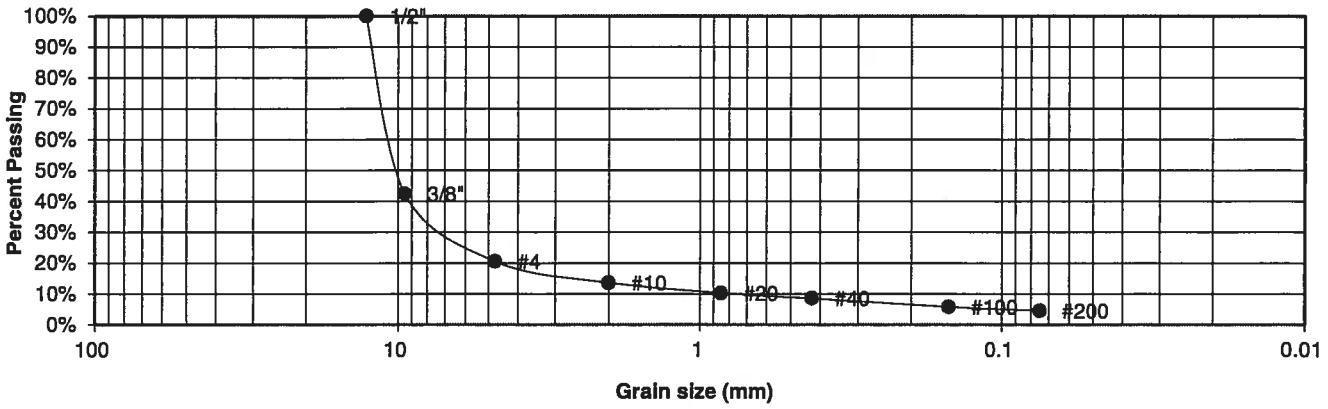
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SW	10-25-22

JOB NO.: 222009
FIG NO.: B-1

UNIFIED CLASSIFICATION	GP	CLIENT	GMS, INC.
SOIL TYPE #	1	PROJECT	PERRY PARK SANITATION
TEST BORING #	3	JOB NO.	222009
DEPTH (FT)	20	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	42.4%
4	20.5%
10	13.6%
20	10.3%
40	8.6%
100	5.8%
200	4.6%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

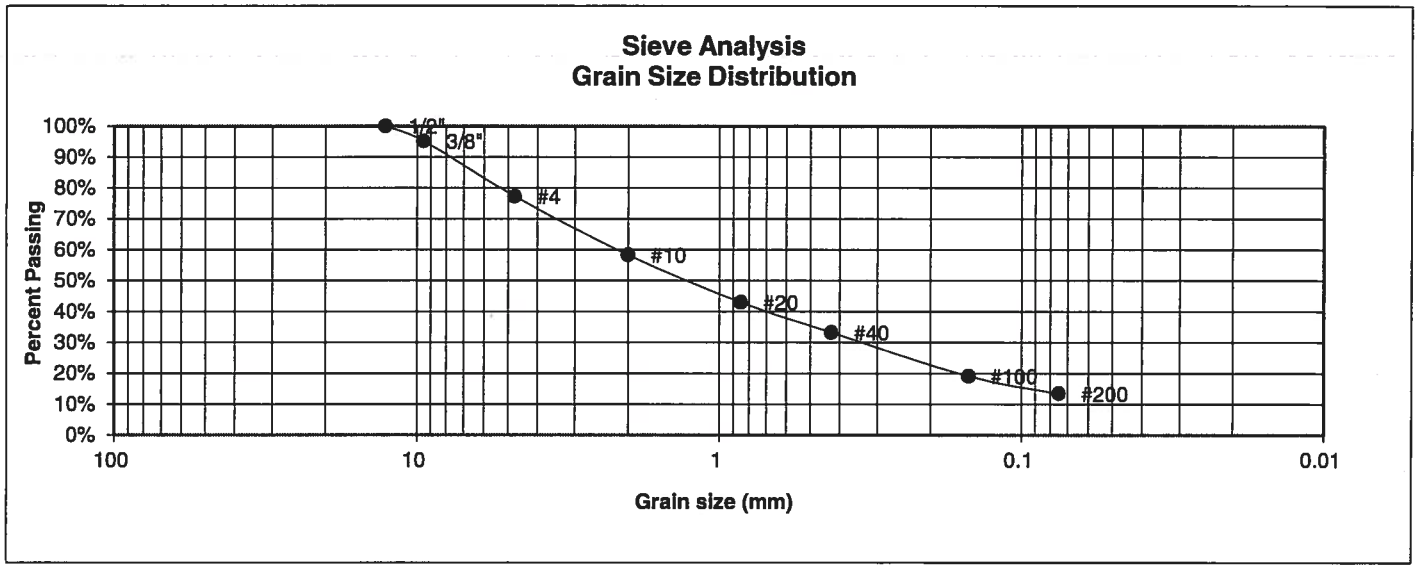
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SW	10-26-22

JOB NO.: 222009
FIG NO.: B-2

UNIFIED CLASSIFICATION	SM	CLIENT	GMS, INC.
SOIL TYPE #	1	PROJECT	PERRY PARK SANITATION
TEST BORING #	4	JOB NO.	222009
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.2%
4	77.3%
10	58.3%
20	42.9%
40	33.2%
100	19.1%
200	13.4%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

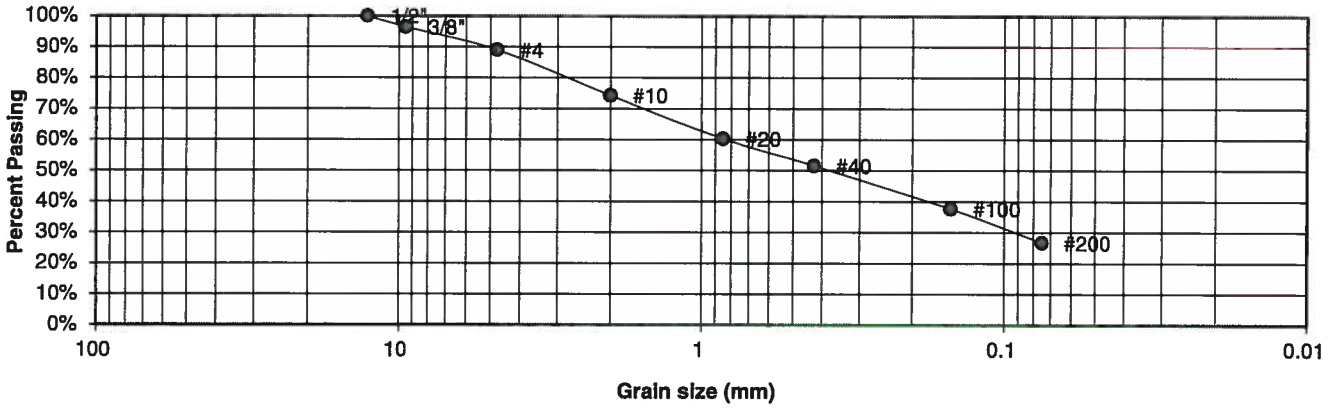
DRAWN:	DATE:	CHECKED:	DATE:
		BU	10-26-22

JOB NO.: 222009

FIG NO.: B-3

UNIFIED CLASSIFICATION	SM	CLIENT	GMS, INC.
SOIL TYPE #	1	PROJECT	PERRY PARK SANITATION
TEST BORING #	5	JOB NO.	222009
DEPTH (FT)	5	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.4%
4	89.0%
10	74.2%
20	60.3%
40	51.6%
100	37.6%
200	26.6%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

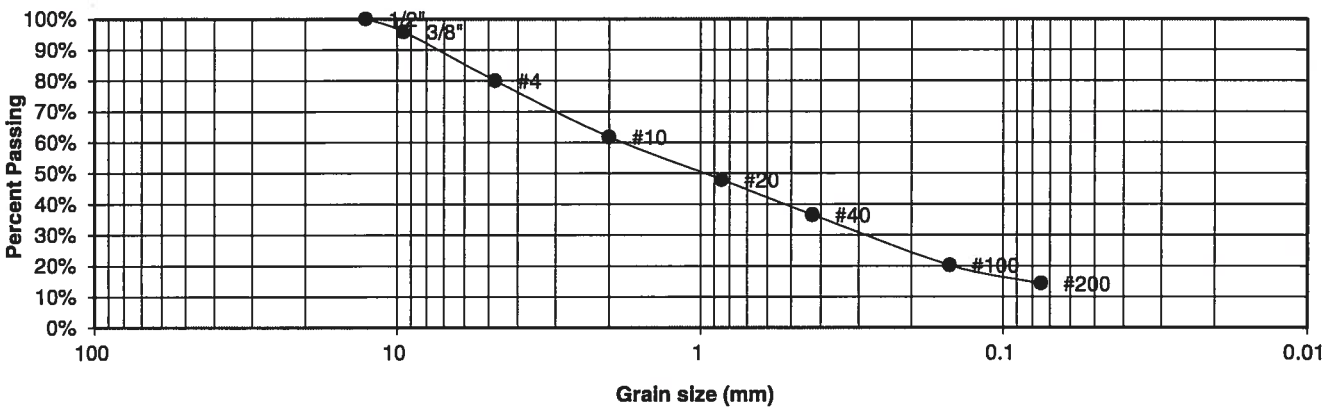
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SLW	10-26-22

JOB NO.: 222009
FIG NO.: B-4

UNIFIED CLASSIFICATION	SM	CLIENT	GMS, INC.
SOIL TYPE #	1	PROJECT	PERRY PARK SANITATION
TEST BORING #	2	JOB NO.	222009
DEPTH (FT)	10	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.9%
4	80.0%
10	61.8%
20	48.0%
40	36.5%
100	20.2%
200	14.3%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

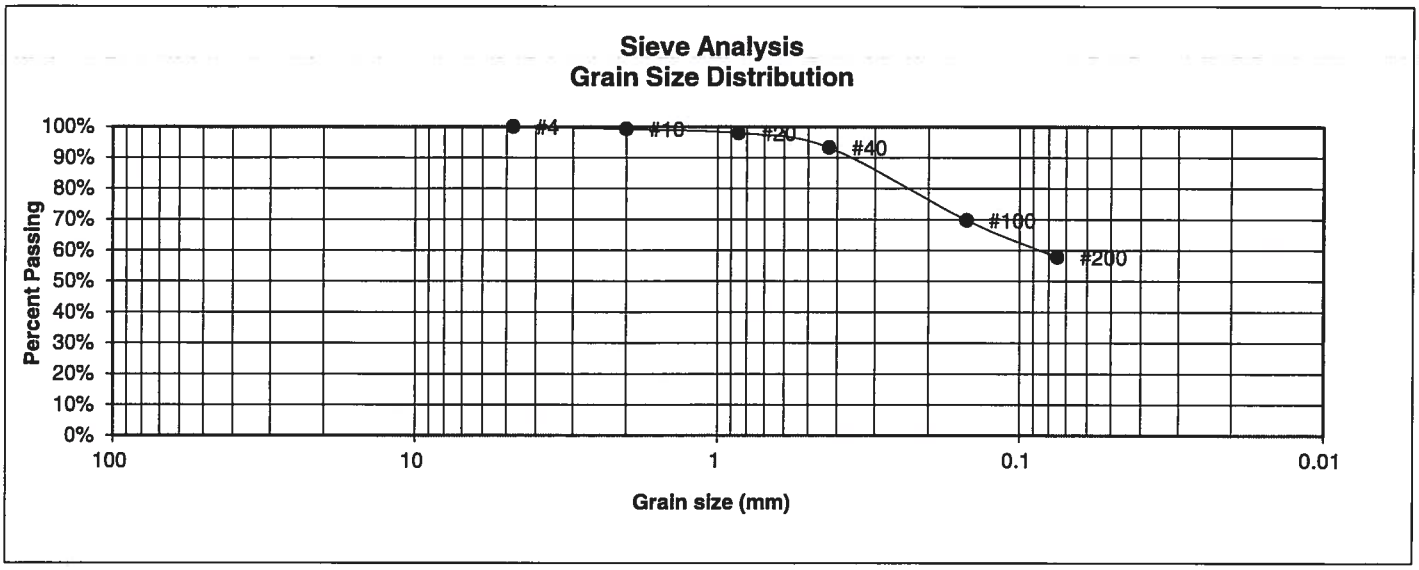
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		JW	10-26-22

JOB NO.: 222009
FIG NO.: B-5

UNIFIED CLASSIFICATION	CL	CLIENT	GMS, INC.
SOIL TYPE #	2	PROJECT	PERRY PARK SANITATION
TEST BORING #	6	JOB NO.	222009
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.3%
20	97.9%
40	93.3%
100	69.7%
200	57.8%

Atterberg Limits	
Plastic Limit	
Liquid Limit	
Plastic Index	
Swell	
Moisture at start	13.1%
Moisture at finish	19.2%
Moisture increase	6.1%
Initial dry density (pcf)	99
Swell (psf)	2060

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

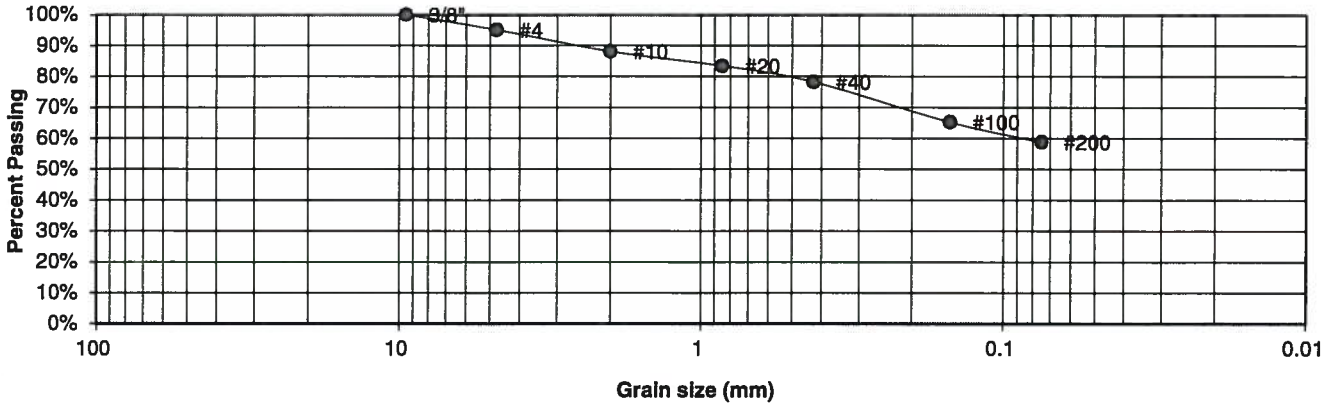
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SW	10-25-22

JOB NO.: 222009
FIG NO.: B-6

UNIFIED CLASSIFICATION	CH	CLIENT	GMS, INC.
SOIL TYPE #	2	PROJECT	PERRY PARK SANITATION
TEST BORING #	7	JOB NO.	222009
DEPTH (FT)	2-3	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.1%
10	88.0%
20	83.4%
40	78.2%
100	65.2%
200	58.8%

Atterberg Limits	
Plastic Limit	29
Liquid Limit	65
Plastic Index	36

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

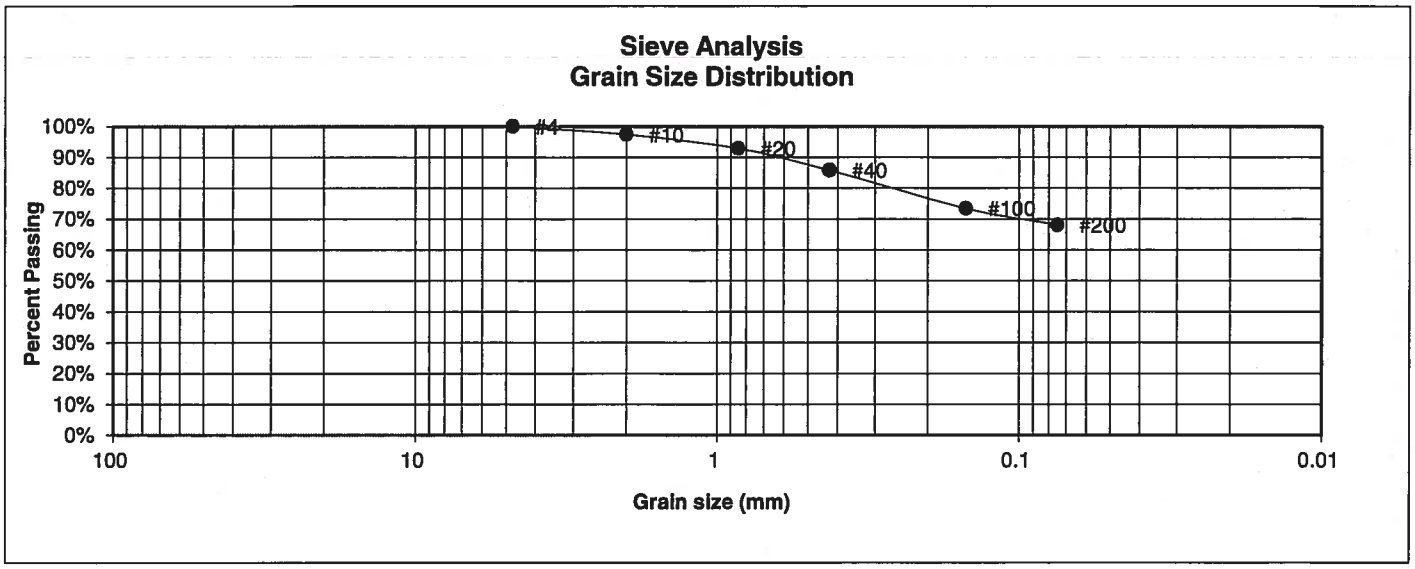
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SW	10-25-22

JOB NO.: 222009

FIG NO.: B-7

UNIFIED CLASSIFICATION	CH	CLIENT	GMS, INC.
SOIL TYPE #	2	PROJECT	PERRY PARK SANITATION
TEST BORING #	7	JOB NO.	222009
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	97.4%
20	92.9%
40	85.8%
100	73.4%
200	68.1%

Atterberg Limits	
Plastic Limit	23
Liquid Limit	63
Plastic Index	40

Swell	
Moisture at start	10.1%
Moisture at finish	26.0%
Moisture increase	15.9%
Initial dry density (pcf)	93
Swell (psf)	1180

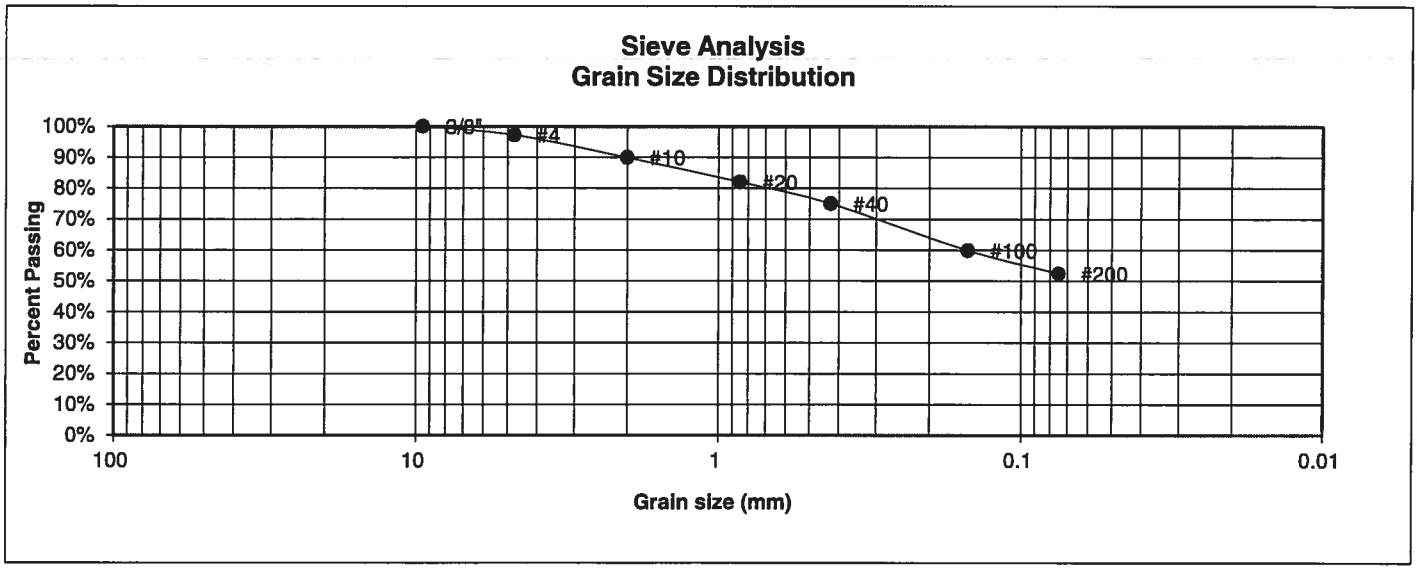
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SJ	1/29/24

JOB NO.: 222009
FIG NO.: B 8

UNIFIED CLASSIFICATION	CL	CLIENT	GMS, INC.
SOIL TYPE #	2	PROJECT	PERRY PARK SANITATION
TEST BORING #	7	JOB NO.	222009
DEPTH (FT)	30	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.2%
10	89.9%
20	82.0%
40	75.0%
100	59.9%
200	52.4%

Atterberg Limits	
Plastic Limit	15
Liquid Limit	43
Plastic Index	28

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		BW	10-26-22

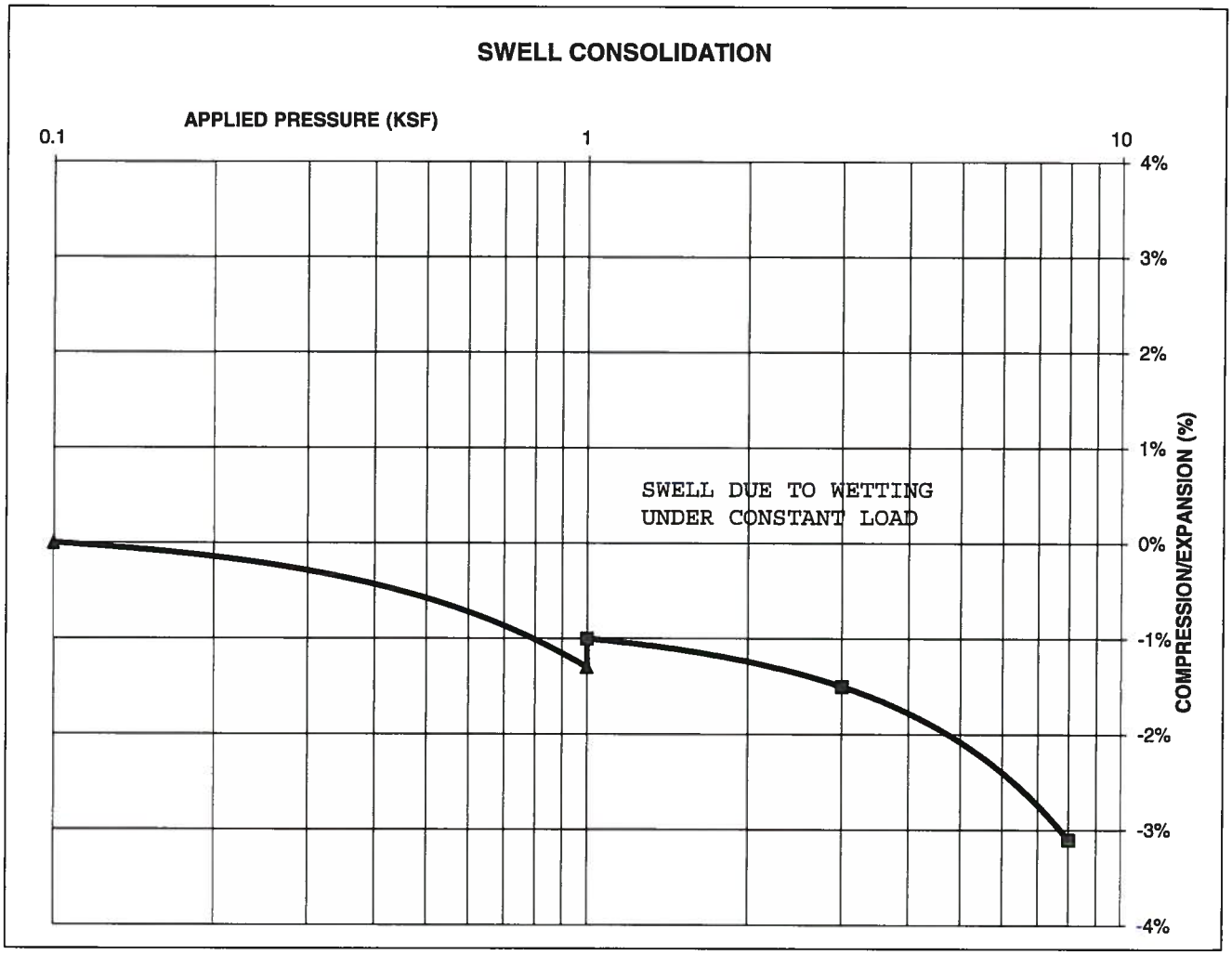
JOB NO.: 222009

FIG NO.: B-9

CONSOLIDATION TEST RESULTS

TEST BORING #	1	DEPTH(ft)	2-3
DESCRIPTION	SC	SOIL TYPE	1
NATURAL UNIT DRY WEIGHT (PCF)			117
NATURAL MOISTURE CONTENT			12.0%
SWELL/CONSOLIDATION (%)			0.3%

JOB NO. 222009
CLIENT GMS, INC.
PROJECT PERRY PARK SANITATION



ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

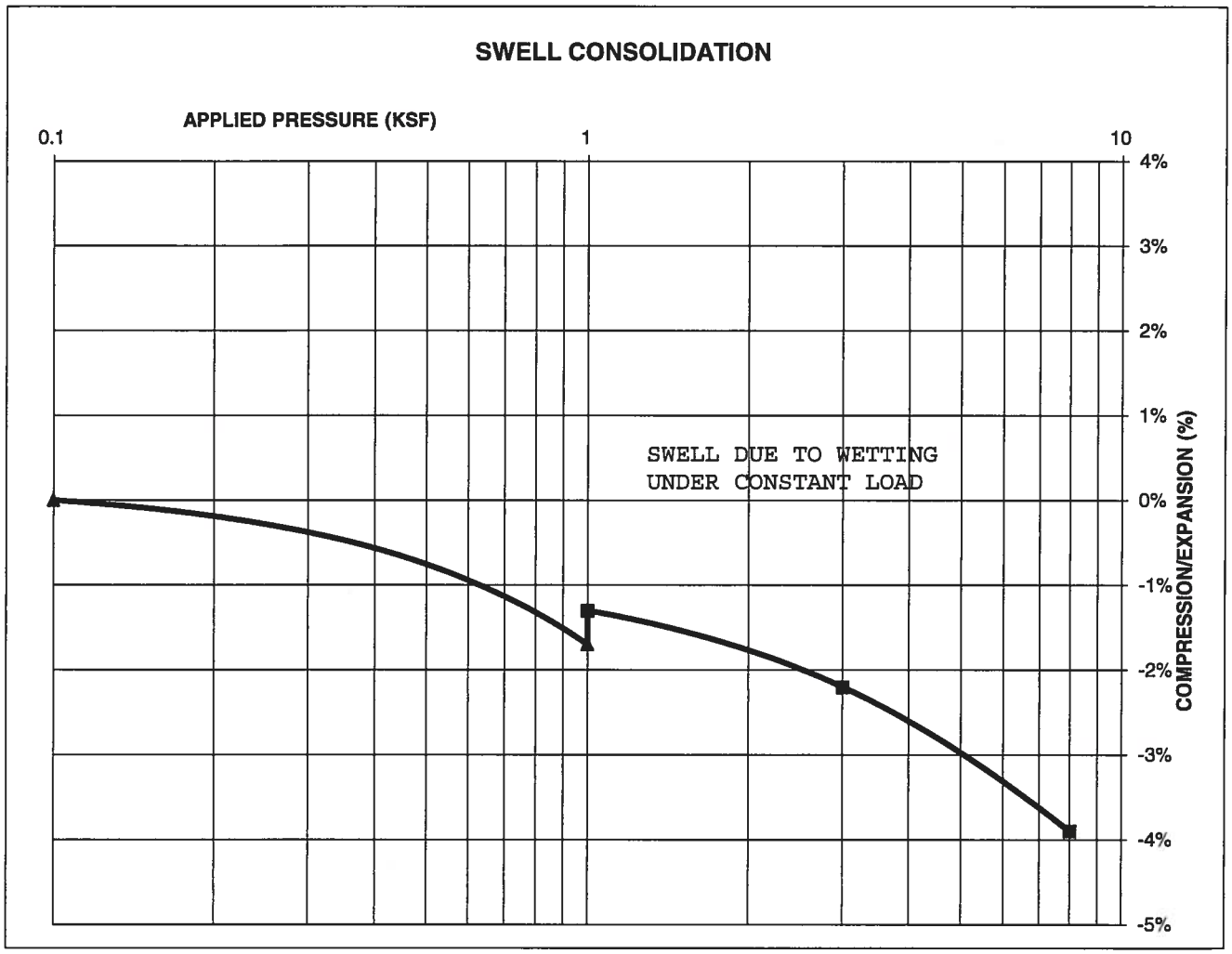
DRAWN:	DATE:	CHECKED:	DATE:
		SJE	10-25-202

JOB NO.: 222009
FIG NO.: B-10

CONSOLIDATION TEST RESULTS

TEST BORING #	7	DEPTH(ft)	30
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			107
NATURAL MOISTURE CONTENT			20.7%
SWELL/CONSOLIDATION (%)			0.4%

JOB NO. 222009
CLIENT GMS, INC.
PROJECT PERRY PARK SANITATION



ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		JW	10-23-24

JOB NO.: 222009
FIG NO.: B-11

CLIENT	GMS, INC.	JOB NO.	222009
PROJECT	PERRY PARK SANITATION	DATE	10/20/2022
LOCATION	PERRY PARK SANITATION	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-1	2-3	1	SC	0.03
TB-4	15	1	SM	<0.01
TB-5	5	1	SM	0.06
TB-7	30	2	CL	<0.01

QC BLANK PASS

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST SULFATE RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SW	10-27-22

JOB NO.: 222009
FIG NO.: B-12

APPENDIX C – EXISTING DRAINAGE BASIN CALCULATIONS

Calculation of Peak Runoff using Rational Method

Designer: Samuel Wood
Company: GMS Inc.
Date: 3/20/2024
Project: Perry Park WSD
Location: Waucondah

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

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

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

Computed $t_c = t_i + t_t$

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

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

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

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

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.81	1.07	1.31	1.66	1.95	2.26	3.06
	a	b	c				
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786				

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

$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Existing	1.29	B	20.15	0.13	0.15	0.22	0.38	0.44	0.52	0.61	300.00			0.029	20.91	224.00	6342.12	6338.57	0.016	10	1.26	2.97	23.87	25.08	23.87	1.44	1.91	2.34	2.97	3.49	4.04	5.47	0.24	0.37	0.66	1.44	1.98	2.71	4.30

APPENDIX D – PROPOSED DRAINAGE CALCULATIONS

Calculation of Peak Runoff using Rational Method

Designer: Samuel Wood
Company: GMS Inc.
Date: 3/20/2024
Project: Perry Park WSD
Location: Waucondah

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

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

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

Computed $t_c = t_i + t_t$

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

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

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

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

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.81	1.07	1.31	1.66	1.95	2.26	3.06
	a	b	c				
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786				

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

$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Proposed	1.29	B	48.70	0.36	0.39	0.45	0.55	0.60	0.65	0.71	300.00			0.029	15.59	224.00	6342.12	6338.57	0.016	10	1.26	2.97	18.55	19.60	18.55	1.65	2.19	2.68	3.39	3.99	4.62	6.26	0.76	1.11	1.56	2.43	3.09	3.89	5.77

LEGAL DESCRIPTION

TR E1/2 SE1/4 15-9-68 4.13 AM/L 209-364
PARCEL NO. : 2609-154-00-007
5121 COUNTRY CLUB DRIVE
LARKSPUR, CO 80118

BROOKS RANCH
PLUM CREEK MEADOWS
JIMRICK RANCH
DAWSO
LIFE ESTATE
TOMAH RD
REMUDA RANCH EXEMPTION
Spring Creek
Gulch
Bear Creek 2
West Plum Creek
1 MILE RADIUS
WAUCONDAH WWTF
WAUCONDA LAKES
ECHO HILLS TOWNHOUSES
ECHO
KESLING
ECHO VILLAGE
PREO PERRY PARK
COMMON INTEREST COMMUNITY
RETREAT IN PERRY PARK
KARABATSOS EXEMPTION
INCA RIDGE
COUNTY ROAD NO 105
INDIAN HEAD
BIG "D"
PERRY PARK
PERRY PARK GATEWAY
SMIT EXEMPTION
MERIBEL VILLAGE
TAY
AT B
EXE
BEA

N
0' 1,000' 2,000'
SCALE: 1" = 1,000'

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DESCRIPTION	DATE

VICINITY MAP

PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WWTF PHASE TWO LOCATION AND EXTENT REQUEST LE2024-010

GMS, INC.
CONSULTING ENGINEERS
617 NORTH WEBER STREET
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC		
DESIGNED	SLW		
CHECKED	SLW		
DATE	MARCH 2024	PROJECT NO.	2021-068.600
		GMS FILE NO.	

SHEET 1 OF 4

G:\Perry Park W&S\2021-068\600\Loc and Extent Exhibit.dwg, FIGURE 1, 4/17/2024 2:48:31 PM, kle, DWG To PDF.pc3, 1:1

LEGAL DESCRIPTION

TR E1/2 SE1/4 15-9-68 4.13 AM/L 209-364
PARCEL NO. : 2609-154-00-007
5121 COUNTRY CLUB DRIVE
LARKSPUR, CO 80118

LEGEND OF LINES AND SYMBOLS

- WOOD FENCE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- 6360 — CONTOUR LINE WITH ELEVATION LABEL
- DITCH FLOWLINE
- BUILDING
- CONCRETE FLATWORK
- ASPHALT SURFACING
- GRAVEL ROADWAY/DRIVEWAY
- DIRT ROAD

SETBACKS

STREET = 25'
SIDE = 25'
REAR = 25'

PERRY PARK BOULEVARD

COUNTRY CLUB DRIVE

100-YEAR FLOODPLAIN

BEAR CREEK

EXISTING WOOD PICKET PRIVACY FENCE

EXISTING CHAIN LINK PERIMETER FENCE

EXISTING TREES, RECENTLY PLANTED – TYP.

PROPERTY BOUNDARY – TYP.

EXISTING WOOD PRIVACY FENCE, RECENTLY INSTALLED – TYP.

EXISTING 31' DIAMETER PRIMARY CLARIFIER BLDG HT. = N/A TOP OF WALL EL. = 6340.9

EXISTING 15'x34' ROTATING BIOLOGICAL CONTACTOR STRUCTURE STRU. HT. = 7.5' F.F. EL. = 6339.1

EXISTING 15'x34' ROTATING BIOLOGICAL CONTACTOR STRUCTURE STRU. HT. = 7.5' F.F. EL. = 6339.0

EXISTING 15'x34' MAINTENANCE/ CHEM FEED BUILDING STRU. HT. = 13.2' F.F. EL. = 6339.6

EXISTING 9'x16' HEADWORKS BUILDING BLDG HT. = 10.4' F.F. EL. = 6343.7

EXISTING 17'x19' PUMP BUILDING BLDG HT. = 14.25' F.F. EL. = 6340.5

EXISTING 14'x15' BLOWER BUILDING BLDG HT. = 8.9' F.F. EL. = 6339.3

EXISTING AEROBIC DIGESTER (TO BE DEMOLISHED)

EXISTING 36' DIAMETER AEROBIC DIGESTER STRU. HT. = 18.0' TOP OF WALL EL. = 6341.1

EXISTING WATER SOURCE

PROPOSED DIGESTER NO. 1

PROPOSED DIGESTER NO. 2

PROPOSED DIGESTED SLUDGE BASIN

EXISTING 10'x18' FLOC. TANK TANK HT. = N/A TOP OF TANK EL. = 6340.0

PROPOSED WAS PUMP VAULT

EXISTING 36' DIAMETER SECONDARY CLARIFIER BLDG HT. = N/A TOP OF WALL EL. = 6338.1

EXISTING 17'x22' CHLORINE CONTACT CHAMBER (NEW UV SYSTEM) WALL HT. = N/A TOP OF WALL EL. = 6339.0

PROPOSED 50'x90' DIGESTER BASINS BLDG HT. = N/A TOP OF WALL EL. = 6352.00

EXISTING ENTRANCE TO REMAIN

PROPOSED CONCRETE REPLACED DRIVEWAYS

PROPOSED EMERGENCY GENERATOR

FUTURE SECONDARY CLARIFIER

EXISTING 14'x24' CHEM FEED BUILDING BLDG HT. = 8.6' F.F. EL. = 6338.4

EXISTING WOOD PICKET PRIVACY FENCE

EXISTING CHAIN LINK PERIMETER FENCE

EXISTING 20'x40' MAINTENANCE BUILDING BLDG HT. = 10.4' F.F. EL. = 6343.7

EXISTING DRAINAGE DITCH – TYP.

PROPOSED 20'x50' BLOWER BUILDING WITH ELECTRIC ROOM BLDG HT. = 16.0' F.F. EL. = 6340.50

ROAD TO TANK = 125'-3"

SOUTH PROPERTY LINE TO TANK = 96'-4"

EAST FENCE TO TANK = 59'-7"

WEST PROPERTY LINE TO TANK = 66'-5"

NORTH FENCE TO TANK = 139'-0"

NORTH FENCE TO TANK = 2'-10"

WEST PROPERTY LINE TO TANK = 75'-2"

WEST PROPERTY LINE TO BUILDING = 116'-6"

NORTH FENCE TO BUILDING = 47'-5"

SOUTH PROPERTY LINE TO BUILDING = 217'-8"

0' 20' 40'
SCALE: 1" = 20'

NOTE:

1. ALL DISTURBED AREA TO BE RESEEDED WITH A NATIVE GRASSES SEED MIX.

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

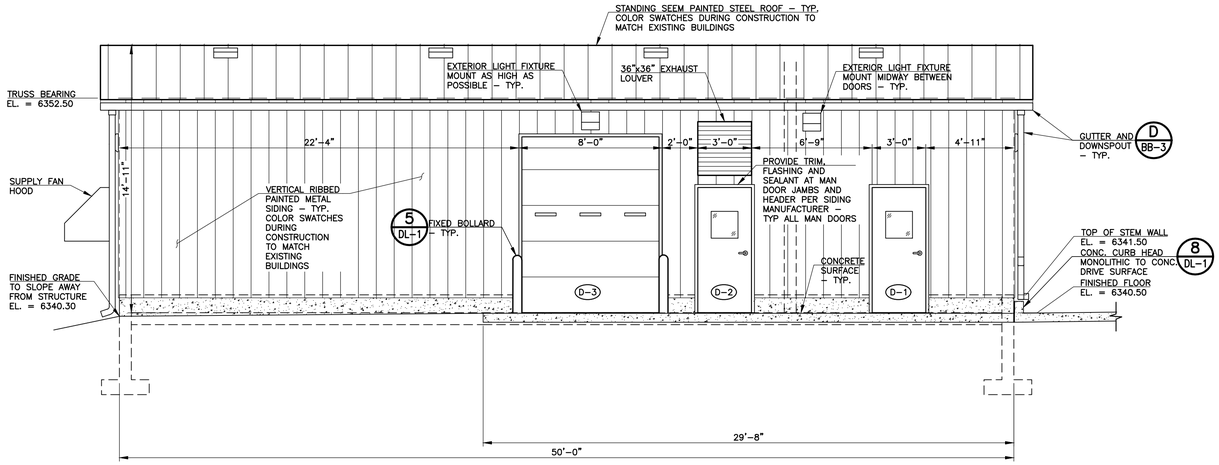
LANDSCAPE PLAN

PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WWTF PHASE TWO LOCATION AND EXTENT REQUEST LE2024-010

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC	
DESIGNED	SLW	
CHECKED	SLW	
DATE	MARCH 2024	
PROJECT NO.	2021-068.600	
GMS FILE NO.		

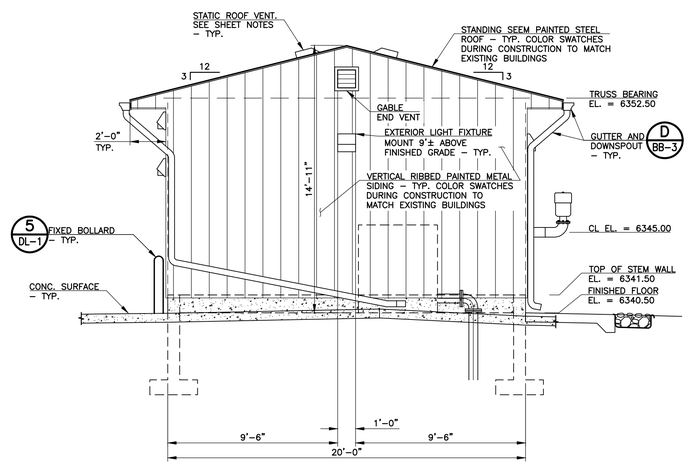
SHEET 2 OF 4



A 70 NORTH ELEVATION

0' 4' 8'

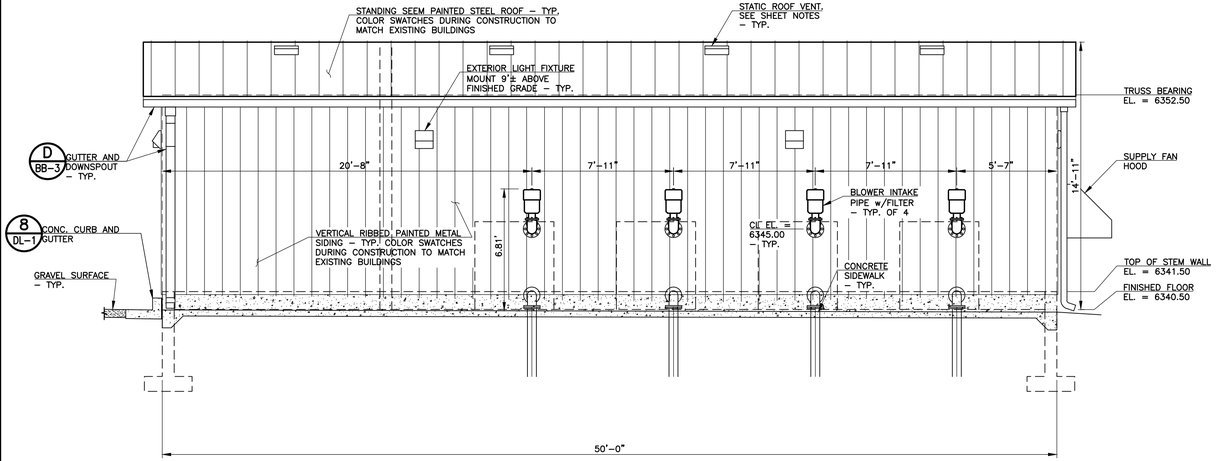
SCALE: 1/4" = 1'-0"



B 70 WEST ELEVATION

0' 4' 8'

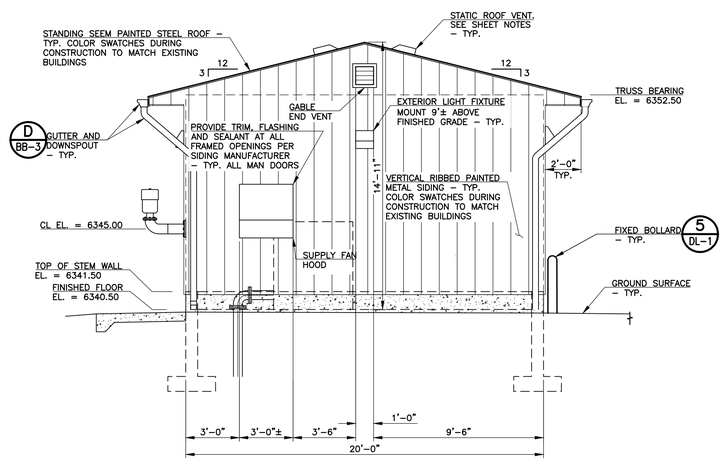
SCALE: 1/4" = 1'-0"



C 70 SOUTH ELEVATION

0' 4' 8'

SCALE: 1/4" = 1'-0"



D 70 EAST ELEVATION

0' 4' 8'

SCALE: 1/4" = 1'-0"

SHEET NOTES:

1. REFER TO MECHANICAL DRAWINGS FOR PENETRATION REQUIREMENTS ON DUCTWORK, LOUVERS, ETC. VERIFY WALL PENETRATION SIZES AND DIMENSIONAL LOCATIONS WITH MECHANICAL EQUIPMENT REQUIREMENTS. PROVIDE TRIM, FLASHING AND SEALANT AROUND ALL PENETRATIONS.
2. REFER TO ARCHITECTURAL DETAILS FOR DOOR LITE REQUIREMENTS.
3. EACH STATIC ROOF VENT SHALL PROVIDE A MINIMUM FREE AREA FOR VENTILATION OF 1.0 SQUARE FEET.
4. STATIC ROOF VENTS SHALL BE INSTALLED AT EQUAL SPACING ALONG SOUTH SIDE OF BUILDING. ALL VENTS SHALL BE INSTALLED NEAR THE TOP OF ROOF SLOPE FOR MAXIMUM VENTILATION ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
5. FURNISH AND INSTALL THE QUANTITY OF STATIC ROOF VENTS REQUIRED TO PROVIDE A TOTAL MINIMUM FREE AREA FOR VENTILATION OF 4.0 SQUARE FEET.
6. VERIFY ALL WALL OPENING DIMENSIONS WITH EQUIPMENT SUPPLIER AND ADJUST AS NECESSARY TO ACCOMMODATE EQUIPMENT FURNISHED.

Perry Park Water & Sanitation District

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION
1		

BLOWER BUILDING
ARCHITECTURAL ELEVATIONS
PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WWTF PHASE TWO LOCATION AND EXTENT
REQUEST LE 2024-010

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC
DESIGNED	MAM
CHECKED	MAM
DATE	MARCH 2024
PROJECT NO.	2021-068.600
GMS FILE NO.	

SHEET 4 OF

LEGEND OF LINES AND SYMBOLS

- WOOD FENCE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- SANITARY SEWER LINE
- SLUDGE WATER RETURN
- OVERHEAD ELECTRIC LINE
- UNDERGROUND ELECTRIC LINE
- SECONDARY SLUDGE LINE
- WASTE ACTIVATED SLUDGE LINE
- PRIMARY SLUDGE LINE
- DIGESTED DECANT DISCHARGE
- PROCESS AIR PIPING
- WATER LINE
- CONTOUR LINE WITH ELEVATION LABEL
- DITCH FLOWLINE
- FIRE HYDRANT
- WATER VALVE BOX
- UTILITY POLE
- UTILITY POLE w/ LIGHT
- BUILDING
- CONCRETE FLATWORK
- ASPHALT SURFACING
- GRAVEL ROADWAY/DRIVEWAY
- DIRT ROAD
- SANITARY SEWER MANHOLE
- SANITARY SEWER CLEAN–OUT

100 YEAR FLOODPLAIN
MAXIMUM WATER
SURFACE

BEAR CREEK

EXISTING CULVERT

EXISTING BRIDGE

EXISTING 36' DIAMETER SECONDARY CLARIFIER
BLDG HT. = N/A
TOP OF WALL EL. = 6338.1

EXISTING 15'x34' MAINTENANCE/
CHEM FEED BUILDING
STRU. HT. = 13.2'
F.F. EL. = 6339.6

EXISTING 10'x18' FLOC. TANK
TANK HT. = N/A
TOP OF TANK EL. = 6340.0

EXISTING 17'x22' CHLORINE
CONTACT CHAMBER
WALL HT. = N/A
TOP OF WALL EL. = 6339.0

EXISTING 14'x24' CHEM FEED BUILDING
BLDG HT. = 8.6'
F.F. EL. = 6338.4

WEST PROPERTY LINE TO BUILDING = 116'-8"

NORTH FENCE TO TANK = 139'-0"

EXISTING 15'x34' ROTATING
BIOLOGICAL CONTACTOR STRUCTURE
STRU. HT. = 7.5'
F.F. EL. = 6339.1

EXISTING 15'x34' ROTATING
BIOLOGICAL CONTACTOR STRUCTURE
STRU. HT. = 7.5'
F.F. EL. = 6339.0

EXISTING 14'x15' BLOWER BUILDING
BLDG HT. = 8.9'
F.F. EL. = 6339.3

EXISTING 17'x19' PUMP BUILDING
BLDG HT. = 14.25'
F.F. EL. = 6340.5

WEST PROPERTY LINE TO TANK = 88'-5"

EXISTING 31' DIAMETER
PRIMARY CLARIFIER
BLDG HT. = N/A
TOP OF WALL EL. = 6340.9

NORTH FENCE TO BUILDING = 47'-5"

PROPOSED 20'x50' BLOWER
BUILDING WITH ELECTRIC ROOM
BLDG HT. = 16.0'
F.F. EL. = 6340.50

EAST FENCE TO BUILDING = 16'-8"

PROPOSED
ELECTRIC ROOM

EAST FENCE TO TANK = 98'-1"

EXISTING ASPHALT
ROADWAYS

EXISTING 9'x16'
HEADWORKS BUILDING
BLDG HT. = 10.4'
F.F. EL. = 6343.7

PROPOSED 50'x90' DIGESTER BASINS
BLDG HT. = N/A
TOP OF WALL EL. = 6352.00

EXISTING 36' DIAMETER AEROBIC
DIGESTER STRU. HT. = 18.0'
TOP OF WALL EL. = 6341.1

ROAD TO TANK = 125'-3"

SOUTH PROPERTY LINE TO TANK = 96'-4"

SOUTH PROPERTY LINE TO BUILDING = 217'-8"

EXISTING
DRAINAGE DITCH

EXISTING 20'x40'
MAINTENANCE BUILDING
BLDG HT. = 10.4'
SOIL EL. = 6343.7

EXISTING CONCRETE DRIVE
AT FACILITY GATED ACCESS

PERRY PARK BOULEVARD

COUNTRY CLUB DRIVE

N

0' 20' 40'
SCALE: 1" = 20'

SCALE VERIFICATION
BAR IS ONE INCH
ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET
ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DATE	DESCRIPTION

FLOODPLAIN PLAN

PERRY PARK WATER AND SANITATION DISTRICT
WAUCONDAH WWTF PHASE TWO LOCATION AND EXTENT REQUEST LE2024-010

GMS, INC.
CONSULTING ENGINEERS
617 MAIN STREET
COLORADO SPRINGS, COLORADO 80903

DRAWN	SKC		
DESIGNED	SLW		
CHECKED	SLW		
DATE	MARCH 2024	PROJECT NO.	2021-068.600
		GMS FILE NO.	

SHEET
4
OF
4

G:\Perry Park WSD\2021-068\600\cad and Extent Exhibit.dwg, FIGURE 2, 4/17/2024 10:47:45 AM, ske, DWG To PDF.pc3, 1:1