

**Construction Activities Stormwater Management Plan (SWMP)
Grading, Erosion and Stormwater Quality Control Plan
Sand Creek Drainageway
Sterling Ranch Road and Briargate Parkway Bridge Design
Homestead at Sterling Ranch Filing No. 2
Branding Iron at Sterling Ranch Filing No. 2
El Paso County, Colorado
38.959800°N, -104.673787°W**

Owner/Developer:

Sterling Ranch Metropolitan District
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Colorado Springs, Colorado 80903
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Prepared by:



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Kiowa Project No. 19032

May 20, 2020

Qualified Stormwater Manager: _____

Contractor: _____

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STATE STORMWATER DISCHARGE PERMIT REQUIREMENTS

At least ten days prior to the anticipated start of construction activities (i.e. the initial disturbance of soils associated with clearing, grading, excavation activities, installation of structural Best Management Practices, or other activities), for projects that will disturb one (1.0) acre or more, the owner or operator of the construction activity must submit an application as provided by the Colorado Department of Public Health and Environment, Water Quality Control Division (Division). This form may be reproduced and is also available from the Division's web site. Applications received by the Division are processed and a permit certification and other relevant materials will be sent to the attention of the legally responsible person. The application contains certification of completion of a storm water management plan (SWMP). Do not include a copy of the Stormwater Management Plan, unless requested by the Division.

For information or application materials contact:

Colorado Department of Public Health and Environment
Water Quality Control Division
WQCD-P-B2
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

<https://www.colorado.gov/pacific/cdphe/wq-construction-general-permits>

Electronic Application – CDPHE website:

<https://www.colorado.gov/pacific/cdphe/WQ%20permits%20construction%20electronic%20application>

I. STORMWATER MANAGEMENT PLAN OBJECTIVES

The objective of the Stormwater Management Plan (SWMP) is “to identify possible pollutant sources that may contribute pollutants to stormwater and identify Best Management Practices (BMPs) that, when implemented, will reduce or eliminate any possible water quality impacts. The SWMP must be completed and implemented at the time the project breaks ground and revised as construction proceeds, to accurately reflect the conditions and practices at the site (CDPHE *Stormwater Management Plan Preparation Guidance*)”. A general schedule or phasing of BMPs will be determined by construction schedule and ground disturbances necessitating required erosion control methods/BMPs. The SWMP shall be implemented until expiration or inactivation of permit coverage. Evaluations of and modifications to this plan may be necessary during the length of the construction project until the site is finally stabilized.

SWMP Plan Availability: A copy of the Stormwater Discharge Permit from the State of Colorado, SWMP Report, SWMP Site Map, SWMP Notes and Details; and inspection reports shall be kept on site by the Qualified Stormwater Manager at all times, as to be available for use by the operator/Qualified Stormwater Manager and to be available for inspection by federal, state and local agencies. If an office location is not available at the site, the SWMP must be managed so that it is available at the site when construction activities are occurring (for example: by keeping the SWMP in the superintendent’s vehicle). The permittee shall retain copies of the SWMP and all reports required by the Permit and records of all data used to complete the Permit application for three (3) years minimum after expiration or inactivation of permit coverage, unless the community requires a longer period.

This SWMP should be viewed as a “living document” that is continuously being reviewed and modified as a part of the overall process of evaluating and managing stormwater quality issues at the site. The Qualified Stormwater Manager shall amend the SWMP when there is a change in design, construction, operation or maintenance of the site which would require the implementation of new or revised BMPs or if the SWMP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activity or when BMPs are no longer necessary and are removed. If the Qualified Stormwater Manager feels that modifications to the BMPs shown on the SWMP are necessary to provide for a more effective plan, the Qualified Stormwater Manager should contact the County Inspector to obtain acceptance of the proposed modifications prior to installing the BMPs. The process will include: 1) Evaluate pollutant sources, 2) Select BMPs, 3) Document BMPs, 4) Implement BMPs. Minor field modifications to the BMPs may be approved by the County inspector. All other requested major modifications shall be in writing and submitted to the County for approval.

SWMP revisions must be made prior to changes in the site conditions, except for “Responsive SWMP Changes” as follows:

- SWMP revision must be made immediately after changes are made in the field to address BMP installation and/or implementation issues; or
- SWMP revisions must be made as soon as practicable, but in no case more than 72 hours, after change(s) in BMP installation and/or implementation occur at the site that require development of materials to modify the SWMP
 - ◊ A notation must be included in the SWMP prior to the site change(s) that includes the time and date of the change(s) in the field, and identification of the BMP(s) removed or added and the location(s) of the BMP(s). Modifications to the SWMP shall be submitted to the County within seven days.

An El Paso County Erosion and Stormwater Quality Control Permit (ESQCP) is required along with a Colorado Discharge Permit System (CDPS), Stormwater Discharge Associated with Construction Activities Permit from the Colorado Department of Public Health and Environment for this project. The general conditions associated with the permits must be followed through the duration of the land disturbing activities at the site. For additional details or more specific information on the CDPS permit, consult the CDPS General Permit No. COR-030000. County ESQCP: Signoff and acceptance of both the Grading Plan and the Erosion Control Plan, or a combined plan, by the County constitute and an ESQCP authorizing the approved land disturbance and implementation of the approved erosion and stormwater quality control measures are required.

A. State Permit Applicant

The State Permit applicant (also referred to as the Permittee) must be a legal entity that meets the definition of the owner and/or operator of the construction site, in order for this application to legally cover the activities occurring at the site. The applicant must have day-to-day supervision and control over activities at the site and implementation of the SWMP. Although it is acceptable for the applicant to meet this requirement through the actions of a contractor, as discussed in the examples below, the applicant remains liable for violations resulting from the actions of their contractor and/or subcontractors. Examples of acceptable applicants include:

Owner or Developer - An owner or developer who is operating as the site manager or otherwise has supervision and control over the site, either directly or through a contract with an entity such as those listed below.

General Contractor or Subcontractor - A contractor with contractual responsibility and operational control (including SWMP implementation) to address the impacts construction activities may have on stormwater quality.

Other Designated Agents/Contractors - Other agents, such as a consultant acting as construction manager under contract with the owner or developer, with contractual responsibility and operational control (including SWMP implementation) to address the impacts construction activities may have on stormwater quality.

Refer to the CDPHE, *Stormwater Management Plan Preparation Guidance* for additional information.

The Permittee shall be legally responsible for compliance with the State Permit.

B. SWMP Terms

Best Management Practices (BMPs): BMPs encompass a wide range of erosion and sediment control practices, both structural and non-structural in nature, that are intended to reduce or eliminate any possible water quality impacts from stormwater leaving a construction site. The individual BMPs appropriate for a particular construction site are largely dependent of the types of potential pollutant sources present, the nature of the construction activity, and specific-site conditions.

Nonstructural BMPs, such as preserving natural vegetation, preventive maintenance and spill response procedures, schedules of activities, prohibition of specific practices, education, and other management practices are mainly operational or managerial techniques.

Structural BMPs include treatment processes and practices ranging from diversion structures and silt fences, to retention ponds and inlet protection.

Construction Start Date: This is the day when ground disturbing activities are expected to begin, including grubbing, stockpiling, excavating, demolition, and grading activities.

Disturbance Area Determination: Aside from clearing, grading and excavation activities, disturbed areas also include areas receiving overburden (e.g., stockpiles), demolition areas, and areas with heavy equipment/vehicle traffic and storage that disturb existing vegetative cover.

Final Stabilization Date: In terms of permit coverage, this is when the site is finally stabilized. This means that all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels (refer to Final Stabilization Section). Permit coverage must be maintained until the site has reached Final Stabilization. Even if only one part of the project is being done, the estimated final stabilization date must be for the overall project. If permit coverage is still required once your part is completed, the permit certification may be transferred or reassigned to a new responsible entity(s).

SWMP Drawings: Also known as the SWMP Site Map.

C. Contractor Required Items

The Contractor shall include and/or provide the following items prior to beginning land disturbing activities:

- Add the Qualified Stormwater Manager and Alternate with phone numbers to this plan.
- Construction Dates – Verify the construction dates indicated in this report. Update as necessary to reflect the planned schedule.
- Material Handling and Spill Prevention procedures – See Section IV-4.
- Application - Insert Application for CDPS Stormwater Discharge Associated with Construction Activities Permit into Appendix.
- Permit - Insert Permit for CDPS Stormwater Discharge Associated with Construction Activities into Appendix.
- Location of SWMP and Records: The most current version of the SWMP. Construction activities discharge permit, inspection reports and other related files shall be onsite by the Contractor during the period of construction.
- Calculate preconstruction percentage of cover for the existing vegetation and document using photographs.

II. SITE DESCRIPTION

A. Nature of the Construction Activity

The proposed activities will include drainageway improvements along the Sand Creek and bridge crossing of Sand Creek at Sterling Ranch Road and at Briargate Parkway. Included in the project is the stabilization of the existing floodplain along Sand Creek. Stabilization measures include spoil riprap low flow channel, soil riprap and grass-lined overbank channel that will range in width from 20 to 50-feet, 19 grouted sloping boulder necessary to achieve stable longitudinal design slopes that range from 0.2 to 0.8 of 0.5 percent and a multi-use

trail. Drainageway and bridge geometry have been designed to be able to convey the 100-year discharge. The bottom width of the low-flow channel will be 25-feet. All soil/riprap will be un-grouted and will be revegetated. Channel stabilization work will be preceded by the installation of initial construction stormwater BMPs, clear and grubbing, topsoil, temporary and permanent seeding and temporary and permanent mulching.

i. Site Location

The site is located within the Sterling Ranch development. Drainageway improvements will begin at the south property line of Sterling Ranch and extend north to the north property line covering approximately 8,800 lineal feet. The site is located within the portions of Sections 27 and 33 Township 12 South, Range 65 West of the 6th Principal Meridian, in El Paso County, Colorado. The location of the site is shown on the Vicinity Map (Figure 1).

ii. Adjacent Areas

The site is bounded to the west by the Branding Iron at Sterling Ranch Filing 2 and Homestead at Sterling Ranch Filing 2, on the south by the Rancheros Filing No, 1 subdivision, and on the east and north by undeveloped land owned by the developer(s) of Sterling Ranch.

B. Sequence of Major Activities

The major construction activities associated with this project are shown in the table below along with an approximate timing of the sequence. In general, the Qualified Stormwater Manager and the Contractor will identify the precise schedule to be used during the term of this project and modify this schedule as needed. Minimal clearing and grubbing may be necessary to install the initial erosion control features. Access to the construction site will be accomplished via the rough graded road section for Sterling Ranch Road and Briargate Boulevard. Accordingly, vehicle tracking will be established at any paved roadway where construction traffic could be anticipated.

Approximate Sequence of Major Construction Activities:

Mobilization and installation of initial BMPs	January 2021
Clearing and grubbing, channel earthwork	January-February 2021
Grading	February –April 2021
Drainageway Construction; bank linings and drop structures	April- July 2021
Bridge construction	June-September 2021
Maintenance trail and fine grading	September- October 2021
Site Revegetation	October 2021
End Construction (refer to <i>Final Stabilization...</i> section)	March 2022

The temporary erosion control measures can be removed when Final Stabilization has occurred. Refer to the Final Stabilization section for a description of the requirements.

C. Estimate of Area and Volume Disturbed

The total site area associated with the channel construction is 47.3 acres of which approximately 22.1 acres will be subject to disturbance. The estimated area of disturbance corresponds to that necessary to perform grading and proposed improvements for Sand Creek. Locations of disturbed areas are as shown on the SWMP Site Maps included in Appendix D. All other areas are planned to remain undisturbed.

Earthwork operations will involve be roughly 25,000 cubic yards of Cut-to-Fill. Fill will be placed within the limits of construction. The earthwork quantity is approximate.

D. Soil Data

Soils within the area of disturbance are classified to be within Hydrologic Soils Group B as shown in the El Paso County Soils Survey. Specifically, the site includes Pring sandy loam. These consist mainly of deep well drained soil clay loams with a moderate to high hazard of erosion. Hydrologic Soil Group B soils have a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission and a moderate erosion hazard. Discharges of these soils into the receiving waterways could cause localized areas of sediment deposition. Deposition of excessive amounts of sediment could in turn cause a decrease in the hydraulic capacity of the drainageway.

Pre-construction 100-year runoff coefficient for the site is 0.25 and the post-construction runoff coefficient will be roughly 0.25.

E. Existing Vegetation and Ground Cover

The existing site is undeveloped, and the vegetative cover is in fair condition with non-native and native grasses and herb. The channel banks are lined with trees, most notably Russian olive and Siberian elms. The existing ground slopes on the overbanks are moderate and range from 1 to 6 percent. Slopes along the channel are moderate to extreme, nearly vertical at some locations.

During the design phase an estimate of 65 percent ground cover was made using aerial photographs for the segment of Sand Creek subject to the construction. The low percent cover results from the sand bed channel of the drainageway. It is recommended that the contractor take pictures of the existing vegetation cover at various locations within the area proposed for disturbance prior to construction to document the preconstruction vegetative cover percentage. Contractor shall provide calculations of vegetative cover that they feel will be necessary to make the Final Stabilization comparison (refer to Final Stabilization section for additional information). The contractor will be responsible for providing the documentation to make this comparison to the County and the State of Colorado, Water Quality Control Division.

F. Potential Pollution Sources

The potential pollution sources for the site that may have an impact to stormwater include the following items. During the initial phase of the work, the Qualified Stormwater Manager should identify the locations of the potential pollutant sources on the SWMP site map and routinely update them as the work progresses.

1. Ground disturbing activities and grading - Sediment
2. Off-site vehicle tracking - Sediment
3. Vehicle maintenance or fueling – Fuel, oil, chemicals
4. Storage of demolition and disposal items – Sediment, asphalt, concrete
5. Soil, aggregate and sand stockpiling - Sediment
6. Storage of fertilizers, materials or chemicals - Chemicals
7. Haul routes – Sediment, fuel, oil
8. Landscaping – Fertilizers, sediment, over-watering, pesticides
9. Portolet – Chemicals, human waste

G. Non-stormwater Discharges

In the existing condition there are no known non-stormwater discharges from the project site, such as springs and landscape irrigation return flows. During construction, the following non-stormwater discharges from the project site could occur.

1. Construction dewatering – is not anticipated, but in the case groundwater is encountered, a CDPHE construction dewatering permit will be required prior to performing the dewatering activities. A dewatering bag or other approved BMP shall be used during dewatering.
2. Release of concrete washout water – Not anticipated.
3. Runoff from water used for dust control – Not anticipated. The contractor should limit the amount of water used for dust control to an amount less than would result in runoff. Perimeter control BMPs are planned to filter water that may cause runoff.

If any other non-stormwater discharges from the site become apparent during the term of construction, the occurrence and mitigation shall be addressed by the Qualified Stormwater Manager.

H. Receiving Waters

In the existing condition, the site drains by the East Fork Jimmy Camp Creek flowing from the northeast in a southeasterly manner to join the mainstem of Jimmy Camp Creek a short distance downstream.

Immediate Receiving water(s): Sand Creek

Ultimate Receiving Water(s): Fountain Creek

Sand Creek is a major drainageway that crosses through the northwest portion of the site from north to south. The subject property is located within a Zone AE FEMA regulated floodplain based on Flood Insurance Rate Map 08041C0957G, dated December 7, 2018. The planned improvements to Sand Creek will modify the existing floodplain. A Conditional Letter of Map Revision (CLOMR) has been submitted to FEMA for the major drainageway and bridge construction. The FIRM panel for the project area is contained in the Appendix. The 100-year floodplain will be contained within the proposed channel section and will not extend into the proposed lots.

III. SWMP SITE MAP CONTENTS

The SWMP Site Map and SWMP Drawings are considered a part of this plan. It identifies the following:

1. Construction site boundaries;
2. All areas of ground disturbance;
3. Areas of cut and fill;
4. Areas used for storage of building materials, equipment, soil, or waste;
5. Locations of all structural BMPs;
6. Locations of non-structural BMPs where applicable;
7. Locations of springs, streams, wetlands, detention basins, irrigation canals, roadside ditches and other surface waters.

The Qualified Stormwater Manager will be required to regularly update SWMP Site Maps contained in Appendix D so that current conditions at the site can be reflected at all times.

IV. STORMWATER MANAGEMENT CONTROLS

A. Qualified Stormwater Manager

The Permittee shall designate the Qualified Stormwater Manager. The Qualified Stormwater Manager is typically the Contractor or his/her designated representative and is responsible for developing, implementing, maintaining and revising the SWMP. The Qualified Stormwater Manager is the contact person with the County and State for all matters pertaining to the SWMP. The Qualified Stormwater Manager is the person responsible for the SWMP accuracy, completeness and implementation. Therefore the Qualified Stormwater Manager should be a person with authority to adequately manage and direct day to day stormwater quality management activities at the site. The Qualified Stormwater Manager shall have the authority to act on behalf of the Permittee(s) to ensure the site remains in compliance with the CDPS Stormwater Discharge Associated with Construction Activities Permit and the County's ESQCP. An Alternate Qualified Stormwater Manager who is able to serve in the same capacity as the Qualified Stormwater Manager shall also be selected.

The Qualified Stormwater Manager shall be present at the project site a majority of the time and (along with the Alternate Qualified Stormwater Manager) shall provide the County with a 24-hour emergency contact number.

If the Qualified Stormwater Manager or Alternate changes for any reason, it shall be noted/redlined on this Plan. The County shall be notified in writing of any change.

Qualified Stormwater Manager: _____

Phone: _____

Alternate Qualified Stormwater Manager: _____

Phone: _____

B. Identification of Potential Pollutant Sources:

At a minimum, the following sources and activities shall be evaluated for the potential to contribute pollutants to stormwater discharges and identified in the SWMP if found to have such potential. The sources of any potential pollutants must be controlled through BMP selection and implementation. Each pollutant source recognized through this process as having the potential to contribute pollutants to stormwater, must be identified in the SWMP along with the specific stormwater management control (BMPs) that will be implemented to adequately control the source. (Note: the actual evaluation of the potential pollutant sources does NOT need to be included in the SWMP – just the resultant pollutant sources and their associated BMPs.). The Qualified Stormwater Manager shall determine the need for and locations of each of the following potential pollutant sources during the course of the construction project.

Could it Contribute?	Potential Pollutant Source	BMP Implemented to Control Source
Yes	All disturbed and stored soils	Sediment control logs, inlet protection, seed and mulch
Yes	Vehicle tracking of sediments	VTC is offsite from construction limits
No	Management of contaminated soils	
Yes	Loading and unloading operations	Stabilized staging area, materials storage area, vehicle tracking control, silt fence
Yes	Outdoor storage activities (building materials, fertilizers, chemicals, etc.)	Stabilized staging area, materials storage area, perimeter silt fence
Yes	Vehicle and equipment maintenance and fueling	Stabilized staging area, materials storage area, perimeter silt fence
Not expected	Significant dust or particulate generating processes	Control by sprinkling with water and other appropriate means.
Yes	Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc	Use as recommended by manufacturer and in areas specified, inlet protection
Yes	On-site waste management practices (waste piles, liquid wastes, dumpsters, etc)	Stabilized staging area, silt fence, inlet protection, sediment basin, non-structural BMPs. Daily cleanup of staging and stockpile area to be conducted.
No	Concrete truck/equipment washing, including the concrete truck chute and associated fixtures and equipment	Cast-in-place concrete is not anticipated to complete the part of the work
No	Dedicated asphalt and concrete batch plants	There are no concrete or asphalt batch plant required for this project
Yes	Non-industrial waste sources such as worker trash and portable toilets	Stabilized staging area, construction fence, non-structural BMPs. Daily cleanup of staging and stockpile area to be conducted
Yes	Other areas or procedures where potential spills can occur	Construction fence

Two concrete washout stations are proposed on GEC Plans & FAE. Update text

The Air Pollution Control Division of the Colorado Department of Public Health and Environment (CDPHE) has passed air quality regulations consistent with Federal legislation. Regulation No. 3 requires submittal of an Air Pollutant Emission Notice (APEN) for sources of fugitive dust from construction sites, as well as other sources. Regulation No. 1 defines particulate emission control regulations for haul roads and roadways. Additional controls, such as road watering, may be necessary to fully comply with these regulations at a construction site. The Contractor should contact CDPHE about APENs and other air quality requirements.

C. Best Management Practices (BMPs) for Pollution Prevention

1. A list of the Structural BMPs for erosion and sediment control implemented on the site to minimize erosion and sediment are as follows. Refer to the SWMP Drawings for Installation and Maintenance requirements for each structural BMP and refer to the SWMP drawings for the location of the BMPs.
 - a) Sediment control logs (SCL): A temporary sediment barrier constructed of straw wattles placed continuously behind the back of the boulder low flow linings.
 - b) Stabilized Staging Area (SSA): Consists of stripping topsoil and spreading a layer of granular material in the area to be used for a trailer, parking, storage, unloading and loading. Silt fence will be installed as a perimeter control around stored construction materials (riprap), topsoil, and temporary soil stockpiles.
 - c) Concrete Washout Area (CWA): An approved portable concrete washout system, or a shallow excavation with a small perimeter berm to isolate concrete truck washout operations.
 - d) Erosion Control Blanket (ECB): Slopes equal to greater than the steepness indicated on the plans shall be protected with an erosion control blanket.
 - e) Vehicle Tracking Control (VTC): Consists of a rock pad that is intended to help strip mud from tires prior to vehicles leaving the construction site. Installed at all entrance/exit points to the site. The number of access points shall be minimized.
 - f) Inlet protection (IP): Installed at appropriate inlets
 - g) Construction fencing: This will consist of plastic construction fencing at the limits of disturbance.

Minimal clearing and grubbing may be necessary prior to installing the initial erosion control features.

No clearing, grading, excavation, filling or other land disturbing activities shall be permitted until signoff and acceptance of the Grading Plan and Erosion Control Plan (or the combined plan) is received from the County.

Once signoff and acceptance is received, the approved erosion and sediment control measures must be installed before land-disturbing activities are initiated so that no adverse effect of site alteration will impact surrounding property.

2. Non-structural practices for erosion and sediment control to be used to minimize erosion and sediment transport are:
 - a) Seeding and Mulching (SM): Temporary seeding and mulching will be used to stabilize disturbed areas that will be inactive for an extended time. Permanent seeding should be used to stabilize areas at final grade that will not otherwise be stabilized.
 - b) Hydro-mulching (MU): Temporary hydro-mulching will be used to stabilize disturbed areas that will be inactive for an extended time. Permanent seeding should be used to stabilize areas at final grade that will not otherwise be stabilized.

3. Phased BMP Implementation:

The Qualified Stormwater Manager shall update the BMP Implementation if necessary to meet and/or address the Contractor's schedule. The SWMP shall be updated as necessary to reflect the BMPs installed.

a) Installation of Initial BMPs

Prior to any construction activities, erosion control facilities shall be installed. Minimal demolition, clearing and grubbing may be necessary prior to installing the initial erosion control features. Stabilization of demolished asphalt and cleared or grubbed areas to be completed the same day if possible. The "initial" BMPs include, but may not be limited to, construction fencing, silt fence (perimeter control at stockpile area(s), stabilized staging area, and material storage area. Designated areas for construction trailer (if used), trash container, portolets, vehicle and equipment parking and material storage. If these areas are not indicated on the plan, the contractor must "red line" the plan with the locations. Provide a confined area for maintenance and fueling of equipment from which runoff will be contained and filtered. BMP / Erosion Control facility waste shall be disposed of properly.

b) Clearing, grubbing and site clearing

The measures included in the previous sequence shall be maintained and continue. The removal debris and dead vegetation shall be disposed of properly. If a soil stockpile area is needed, the area shall be protected in accordance with the DCM and the stockpile area shall be redlined onto the plan. Existing vegetation to remain shall be protected. Wind erosion shall be controlled on the site by sprinkling and other appropriate means.

c) Site Grading and Drainageway Construction

The measures included in the previous sequence shall be maintained and continue. The earthwork will occur within the 100-year floodplain of the drainageway when the stabilization measures are installed. It is the intent to minimize the disturbance of the native vegetation by limiting access points and haul roads within the drainageway. The contractor shall not leave any equipment in the bottom of the creek in times when precipitation is expected or when the contractor is not on site. Sediment control logs shall be placed along the low flow channel that forms the low flow channel. Dewatering is not anticipated for the work within and adjacent to the drainageway. Construction details related to dewatering should be prepared and included with a CDPHE construction dewatering permit application. A CDPHE construction dewatering permit is required prior to performing the dewatering activities. Excess and removed asphalt and concrete shall be disposed of properly. Materials associated with drainageway construction shall be stored in the areas delineated on the SWMP site plan. If an area is not delineated on the plan, the contractor shall "red line" the plan to show the location. Material waste from drainageway construction shall be disposed of properly. Solvents, paints and chemicals shall be stored and disposed properly.

d) Landscaping

The measures included in the previous sequence shall be maintained and continue, unless the work requiring the measure is completed. Seeding and mulching shall be installed. Avoid excess watering and placing of fertilizers and chemicals.

e) Final Stabilization

The necessary erosion control measures included in the previous sequence shall continue until Final Stabilization is reached. Refer to Final Stabilization section for requirements.

The Qualified Stormwater Manager shall amend the SWMP if necessary and as required, refer to Section I.

4. Materials handling and spill prevention:

The Qualified Stormwater Manager will inspect daily to ensure proper use and disposal of materials on-site including building materials, paints, solvents, fertilizers, chemicals, waste materials and equipment maintenance or fueling procedures. All materials stored on-site will be stored in a neat and orderly manner in the original containers with the original manufacturer's label and where possible under a roof or other enclosure to prevent contact with stormwater. Chemicals should be stored within berms or other secondary containment devices to prevent leaks and spills from contacting stormwater runoff. Before disposing of the container all of a product will be used up whenever possible and manufacturer's recommendations for proper disposal will be followed according to state and local regulations.

Material and equipment necessary for spill cleanup will be kept in the material storage area on-site. Manufacturer's recommendations for spill cleanup will be posted and site personnel will be made aware of the procedures along with the location of the information and cleanup supplies.

The contractor shall have spill prevention and response procedures that include the following:

- a) Notification procedures to be used in the event of an accident. At the very least, the Qualified Stormwater Manager should be notified. Depending on the nature of the spill and the material involved, the Colorado Department of Public Health and Environment (24-hour spill reporting line - 877-518-5608), downstream water users or other agencies may also need to be notified.
- b) Instructions for clean-up procedures and identification of spill kit location(s).
- c) Provisions for absorbents to be made available for use in fuel areas and for containers to be available for used absorbents.
- d) Procedures for properly washing out concrete truck chutes and other equipment in a manner and location so that the materials and wash water cannot discharge from the site and never into a storm drain system or stream.

5. Dedicated concrete or asphalt batch plants:

No dedicated concrete or asphalt batch plants will be used.

6. Waste management and disposal:

All construction site waste both liquid and solid must be contained in approved waste containers and disposed of off-site according to state and local regulations. Portable sanitary facilities shall be provided at the site throughout the construction phase and must comply with state and local sanitary or septic system.

7. Groundwater and stormwater dewatering:

Groundwater dewatering is not anticipated for the work within channel. During groundwater or stormwater dewatering, locations and practices to be implemented to control stormwater pollution from excavations, etc. must be noted on the SWMP. A separate CDPHE construction discharge (dewatering) permit will be required for groundwater dewatering and shall be obtained by the Qualified Stormwater Manager. Construction dewatering water cannot be discharged to surface water or to storm sewer systems without separate permit coverage. The discharge of Construction Dewatering water to the ground, under specific conditions, may be allowed by the Stormwater Construction Permit when appropriate BMPs are implemented. Refer to USDCM Volume III (UDFCD) for County acceptable means of dewatering.

V. FINAL STABILIZATION AND LONG-TERM STORMWATER MANAGEMENT

“Final stabilization is reached when all ground surface disturbing activities at the site have been completed and uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, or equivalent permanent, physical erosion reduction methods have been employed.” When vegetation is used to achieve final stabilization, the 70% vegetation requirement applies to a uniform plant density, which means that all areas of the site that rely on a vegetative cover to achieve stabilization must be uniformly vegetated. The contractor will be responsible for providing the documentation to make this comparison to the County and the State of Colorado, Water Quality Control Division. The stormwater permit allows the permittee to use alternatives to vegetation to achieve final stabilization. All alternatives to vegetation must meet specific criteria to be considered equivalent to vegetation, specifically: Stabilization must be permanent, all disturbed areas must be stabilized, and alternatives must follow good practices, refer to CDPHE Memo, dated March 5, 2013 (see References).

Temporary seeding for the project site shall include drilled seeding and mulching and hydro-mulching. For the application methods, soil preparation and seeding and mulching and hydro-mulching requirements, refer to SWMP Drawings. All slopes steeper than four-to-one (4:1) must be covered with an erosion control blanket meeting the County requirements.

Management of storm water after completion of construction will be accomplished by utilizing the practices listed below.

- Upon completion of construction, the site shall be inspected to ensure that all equipment, waste materials and debris have been removed.
- The site will be inspected to make certain that all graded surfaces have been paved, landscaped or seeded with an appropriate ground cover.
- All silt fence, inlet protection, sediment logs, rock socks, etc. and all other control practices and measures that are to remain after completion of construction will be inspected to ensure their proper functioning.
- The contractor shall remove erosion control measures that are not required to remain.

After all construction activities are completed on the site, but final stabilization has not been achieved, the contractor shall make a thorough inspection of the stormwater management system at least once every month.

The contractor shall be responsible for maintaining the BMPs and stormwater controls in good working order and shall also be responsible for the costs incurred until such time as final stabilization is reached. Once final stabilization has been achieved the contractor shall be responsible for removal of the erosion control measures.

Should any of the erosion control facilities (BMPs) become in disrepair prior to the establishment of the native or natural erosion control measures, the Contractor is responsible for the cost of such maintenance. The Contractor is also responsible for the clean-up of offsite areas affected by any sediment that may leave the site. Control of erosion from areas disturbed by drainageway, utility or building construction will be the responsibility of the respective contractor. All erosion control measures shown on the plan shall be installed and maintained in accordance with Best Management Practices.

Inactivation of permit coverage: Coverage under the Stormwater Construction Permit may be inactivated by the permittee when the site has attained final stabilization, all temporary erosion and sediment control measures have been removed, and all components of the SWMP are complete.

VI. RECOMMENDED INSPECTION AND MAINTENANCE PROCEDURES

A. Minimum Inspection Schedule

1. Frequency. Contractor should inspect and document Construction BMP's at the following times and intervals.
 - a) After installation of any Construction BMP;
 - b) At least once every 14 days, but a more frequent inspection schedule may be necessary to ensure that BMPs continue to operate as needed to comply with the permit.
 - c) Within 24 hours after a precipitation or snowmelt event that produces runoff or causes surface erosion.
2. Consult State Permit No. COR-030000 for alternate inspection requirements at temporarily idle sites, at completed sites, or for winter conditions.
3. Refer to the Standard Details for the maintenance procedures associated with each BMP.
4. Inspection Procedures. The inspection must include observation of:
 - a) The construction site perimeter and discharge points (including discharges into a storm sewer system);
 - b) All disturbed areas;
 - c) Areas used for material/waste storage that are exposed to precipitation
 - d) Other areas determined to have a significant potential for stormwater pollution, such as demolition areas or concrete washout locations, or locations where vehicles enter or leave the site;
 - e) Erosion and sediment control measures identified in the SWMP; and any other structural BMPs that may require maintenance, such as secondary containment around fuel tanks, or the condition of spill response kits.

The inspection must determine if there is evidence of, or the potential for, pollutants entering the drainage system. BMPs should be reviewed to determine if they still meet the design and operational criteria in the SWMP, and if they continue to adequately control pollutants at the site. Any BMPs not operating in accordance with the SWMP must be addressed as soon as possible, immediately in most cases, to minimize the discharge of pollutants, and the SWMP must be updated as described.

5. Record Keeping and Documenting Inspections: Keeping accurate and complete records serves several functions. First, keeping records of spills, leaks, inspections, etc. is a requirement of the State Stormwater Construction Permit; therefore, enforcement action, including fines, could result if records are not adequate. Second, by keeping accurate and detailed records, you will have documentation of events which could prove invaluable should complications arise concerning the permit, lawsuits, etc.
6. Inspection Checklist/Report. The Permittee must document inspection results and maintain a record of the results for a period of 3 years following expiration or inactivation of permit coverage. These records must be made available to CDPHE, the County or EPA upon request. The Qualified Stormwater Manager should record the inspection results on a site-specific standardized inspection report or County Inspection Checklist to be maintained and kept on the construction site. An example template for the inspection report format is included in the Appendix. The Qualified Stormwater Manager should develop a site-specific inspection report that itemizes the selected Construction BMP's for their site. At a minimum the following information from each inspection should be recorded on the site-specific report:
 - a) Date of inspection;
 - b) Name and title of inspector;
 - c) Location(s) of discharges of sediment or other pollutants from the site;
 - d) Location(s) of BMPs that need to be maintained;
 - e) Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
 - f) Location(s) where additional BMPs are needed that were not in place at the time of inspection;
 - g) Deviations from the minimum inspection schedule as provided in the permit;
 - h) Descriptions of corrective actions for any item above, date(s) of corrective actions taken, and measures taken to prevent future violations, including requisite changes to the SWMP, as necessary and
 - i) After adequate corrective action(s) has been taken, or where a report does not identify any incidents requiring corrective actions, the report shall contain a signed statement indicating the site is in compliance with the permit to the best of the signer's knowledge and belief.
7. Inspection Checklists/Reports to County: Inspection Checklists/Reports to County: Completed Inspection Checklists will be submitted electronically to the assigned County Engineering inspector within 5 business days of the inspection. The inspections checklists must also be kept on-site. In the location designated. The Qualified Stormwater Manager will be responsible for signing the inspection forms.

B. BMP Operation and Maintenance.

The Qualified Stormwater Manager is responsible for operation and maintenance of construction BMPs. The Qualified Stormwater Manager will inspect the site per inspection and monitoring protocol outlined above and will make any necessary repairs to construction BMPs immediately after a defect or other need for repair is discovered. The project site and

the adjacent streets impacted by the construction shall be kept neat, clean and free of debris. The erosion control measures and facilities will be maintained in good working order until final stabilization. Any items that are not functioning properly or are inadequate will be promptly repaired or upgraded. Records of inspections must be kept and be available for review by the State of Colorado Water Quality Control Division or the County.

VII. REFERENCES

- 1) CDPS General Permit: Stormwater Discharges Associated with Construction Activity Permit No. COR-030000, Colorado Department of Public Health and Environment, dated July 1, 2007. Administratively continued effective July 1, 2012.
- 2) CDPHE, Stormwater Discharges Associated with Construction Activity, Stormwater Management Plan Preparation Guidance, prepared by CDPHE, dated April 2011.
- 3) CDPHE Memorandum, Final Stabilization requirements for stormwater construction permit termination, Alternatives to the 70% plant density re-vegetation requirement, prepared by CDPHE, dated March 5, 2013.
- 4) El Paso County Drainage Criteria Manual (Volumes 1 and 2) and Engineering Criteria Manual, current editions.
- 5) Volume 3, Urban Storm Drainage Criteria Manual, by Urban Drainage and Flood Control District, current edition.
- 6) Soil Survey of El Paso County Area, Colorado, prepared by United States Department of Agriculture Soil Conservation Service.
- (7) Flood Insurance Rate Map, Map Number 08041C0757G, by Federal Emergency Management Administration, dated December 7, 2018.

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APPENDIX

Figure 1 - Vicinity Map

Figure 2 – FIRM Panels 533G and 535G

APPENDIX A

**Permittee Provided: Application for CDPS Stormwater Discharge Associated with Construction Activities Permit

APPENDIX B

**Permittee Provided: CDPS Stormwater Discharge Associated with Construction Activities Permit

APPENDIX C

Example – Exhibit A: Erosion and Sediment Control Field Inspection Report

Example – Exhibit B: Corrective Action Report

APPENDIX D

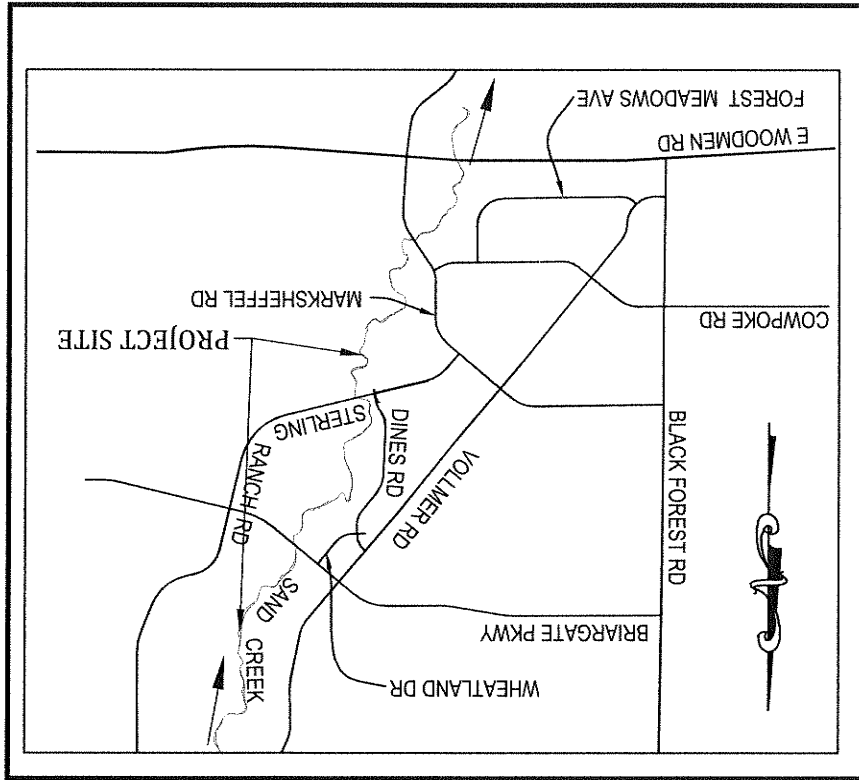
SWMP Plans

APPENDIX

Figure 1 - Vicinity Map

Figure 2 – FIRM Panels 533G and 535G

FIGURE 1
VICINITY MAP
SCALE: N.T.S.





Legend

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

SPECIAL FLOOD HAZARD AREAS

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

OTHER AREAS OF FLOOD HAZARD

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

OTHER AREAS

- NO SCREEN
- Area of Minimal Flood Hazard *Zone E*
- Effective LOWRS
- Area of Undetermined Flood Hazard *Zone G*

GENERAL STRUCTURES

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

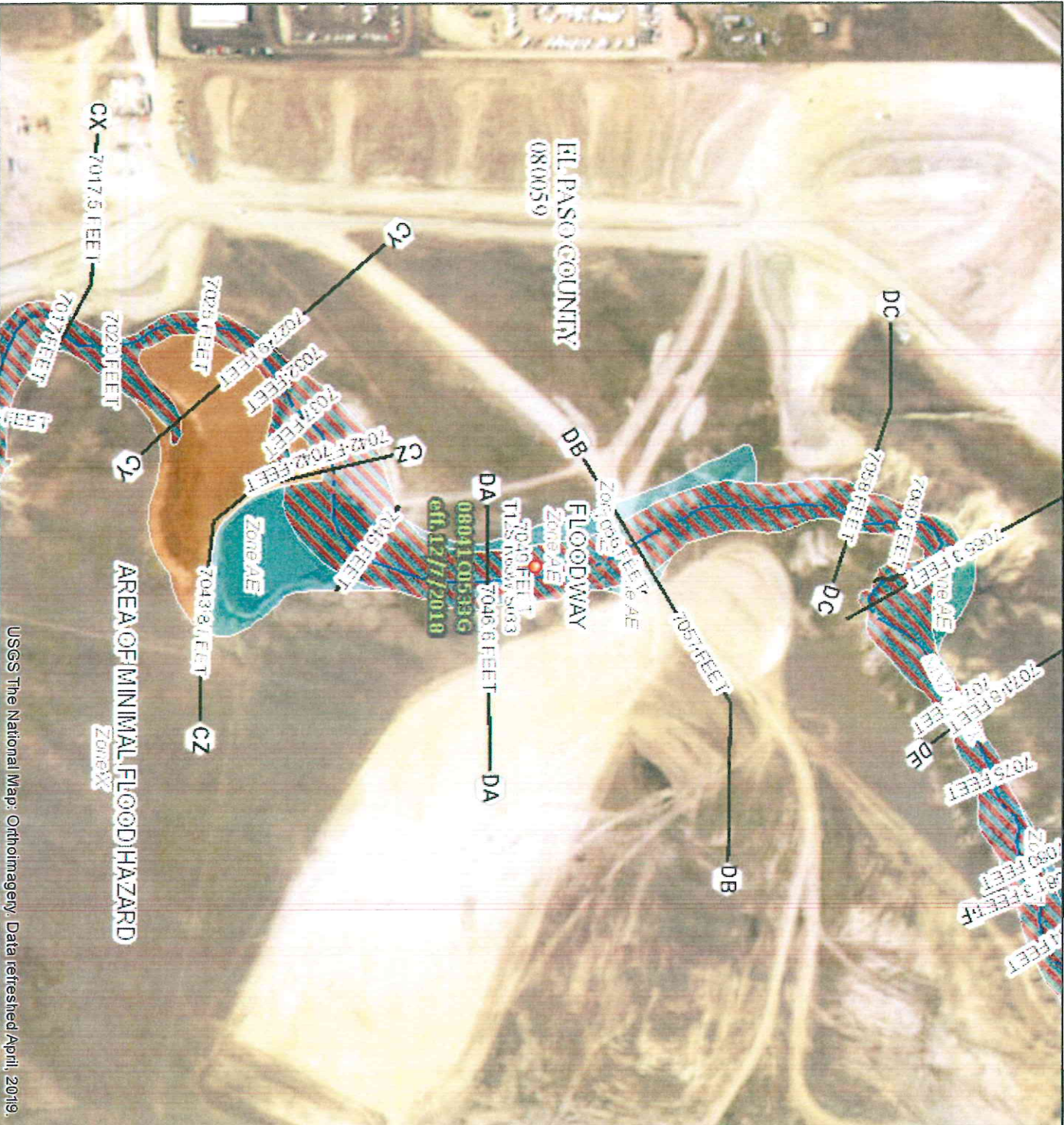
OTHER FEATURES

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

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

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



USGS The National Map: Orthoimagery, Data refreshed April, 2019. 38°57'26.71\"/>

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/5/2020 at 1:40:17 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

National Flood Hazard Layer FIRMette



8°58'18.40"N



104°39'46.83"W

USGS The National Map: Orthoimagery. Data refreshed April, 2019. 38°57'50.43"N



Legend

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

SPECIAL FLOOD HAZARD AREAS

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

OTHER AREAS OF FLOOD HAZARD

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

OTHER AREAS

- Area of Minimal Flood Hazard
- Effective LOMRS
- Area of Undetermined Flood Hazard

GENERAL STRUCTURES

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

OTHER FEATURES

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

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

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

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

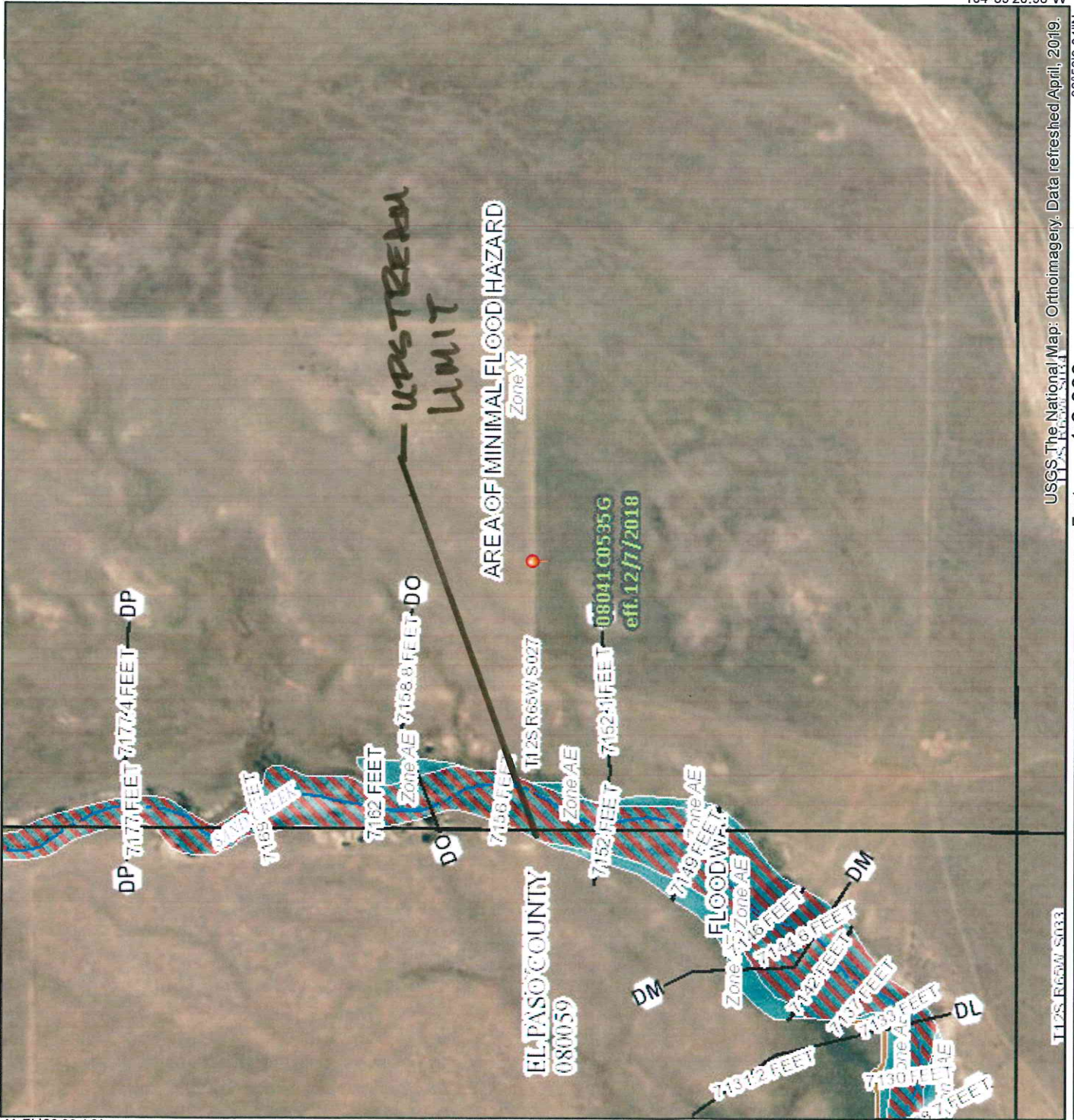
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National Flood Hazard Layer FIRMette



38°58'37.02"N



USGS The National Map: Orthoimagery. Data refreshed April, 2019.

38°58'39.04"N

Feet 1:6,000



Legend

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

- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE) Zone A, V, A99
 - With BFE or Depth Zone AE, AO, AH, VE, AR
 - Regulatory Floodway
- OTHER AREAS OF FLOOD HAZARD**
 - 0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee. See Notes. Zone X
 - Area with Flood Risk due to Levee Zone D
- OTHER AREAS**
 - Area of Minimal Flood Hazard Zone X
 - Effective LOMRS
 - Area of Undetermined Flood Hazard Zone X
- GENERAL STRUCTURES**
 - Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall
- OTHER FEATURES**
 - Cross Sections with 1% Annual Chance Water Surface Elevation
 - 20.2
 - 17.5
 - Coastal Transect
 - Base Flood Elevation Line (BFE)
 - Limit of Study
 - Jurisdiction Boundary
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature
- MAP PANELS**
 - Digital Data Available
 - No Digital Data Available
 - Unmapped



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

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

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APPENDIX A
****Permittee Provided: Application for CDPS Stormwater Discharge Associated
with Construction Activities Permit**

APPENDIX B

****Permittee Provided: CDPS Stormwater Discharge Associated with Construction Activities Permit**

APPENDIX C

Example – Exhibit A: Erosion and Sediment Control Field Inspection Report
Example – Exhibit B: Corrective Action Report

**Exhibit A
Erosion and Sediment Control Field Inspection Report**

Project Name:	Date of Inspection:
Project Address/Location:	Time of Inspection:
Contractor:	Name of Inspector:

Reason for Inspection:

BMP for Erosion Control	Practice Used		Maintenance or Sediment Removal Required		Explain Required Action
	Yes	No	Yes	No	
Check Dams					
Concrete Washout Area					
Construction Fence					
Diversion Ditch/Swales/Berms					
Erosion Control Blankets					
Inlet Protection					
Reinforced Rock Berms					
Reinforced Rock Berms - Culvert					
Sediment Basin					
Sediment Control Log					
Seed & Mulch (Temp. or Permanent)					
Silt Fence					
Sodding					
Stabilized Staging Area					
Straw Bale Barrier					
Surface Roughening					
Vehicle Tracking Control Pad					

Contractor's Comments:

Inspector's Comments:

I certify this Erosion and Sediment Control Field Inspection Report is complete and accurate, to my knowledge and belief.

Inspector Signature and Date:	Reviewed By:
-------------------------------	--------------

**Exhibit B
Corrective Action Report**

Site: _____

Inspector: _____

Date: _____

.....
Erosion Control Measure/Facility Requiring Attention:

Recommended Corrective Action:

Scheduled Completion Date: _____ Date Completed: _____

.....
Erosion Control Measure/Facility Requiring Attention:

Recommended Corrective Action:

Scheduled Completion Date: _____ Date Completed: _____

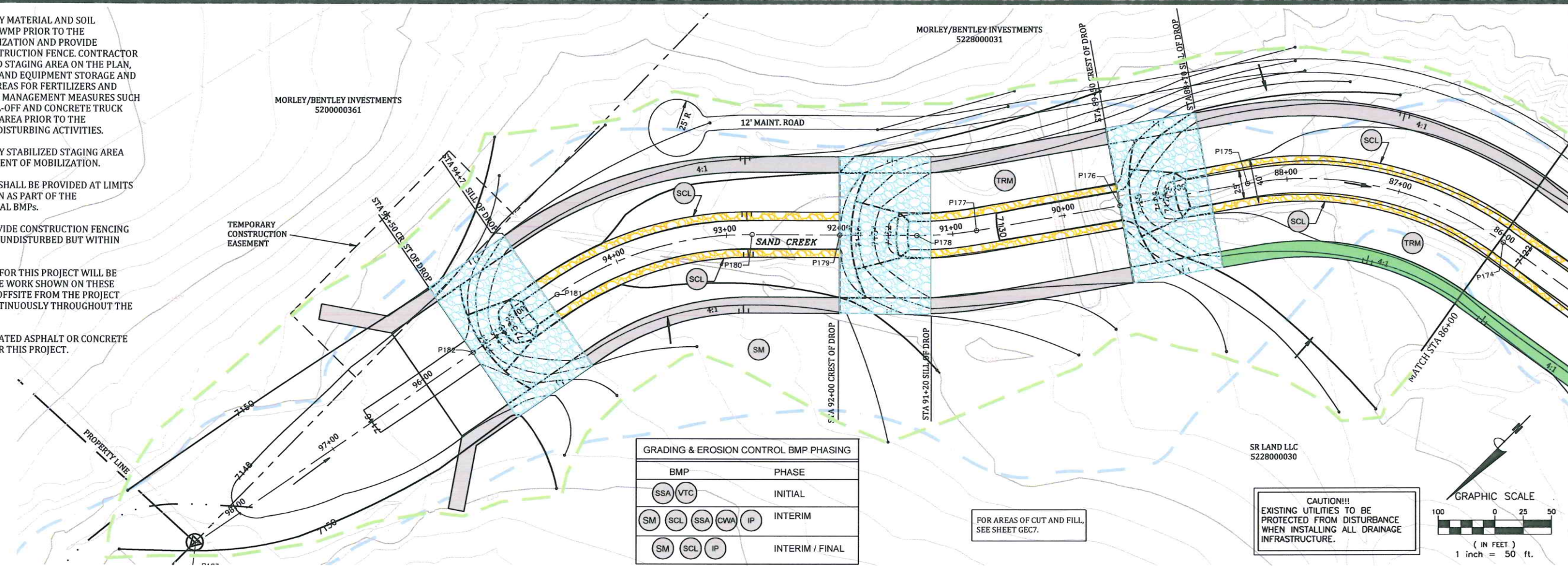
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Erosion Control Measure/Facility Requiring Attention:

Recommended Corrective Action:

Scheduled Completion Date: _____ Date Completed: _____

APPENDIX D
SWMP Plans

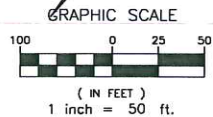
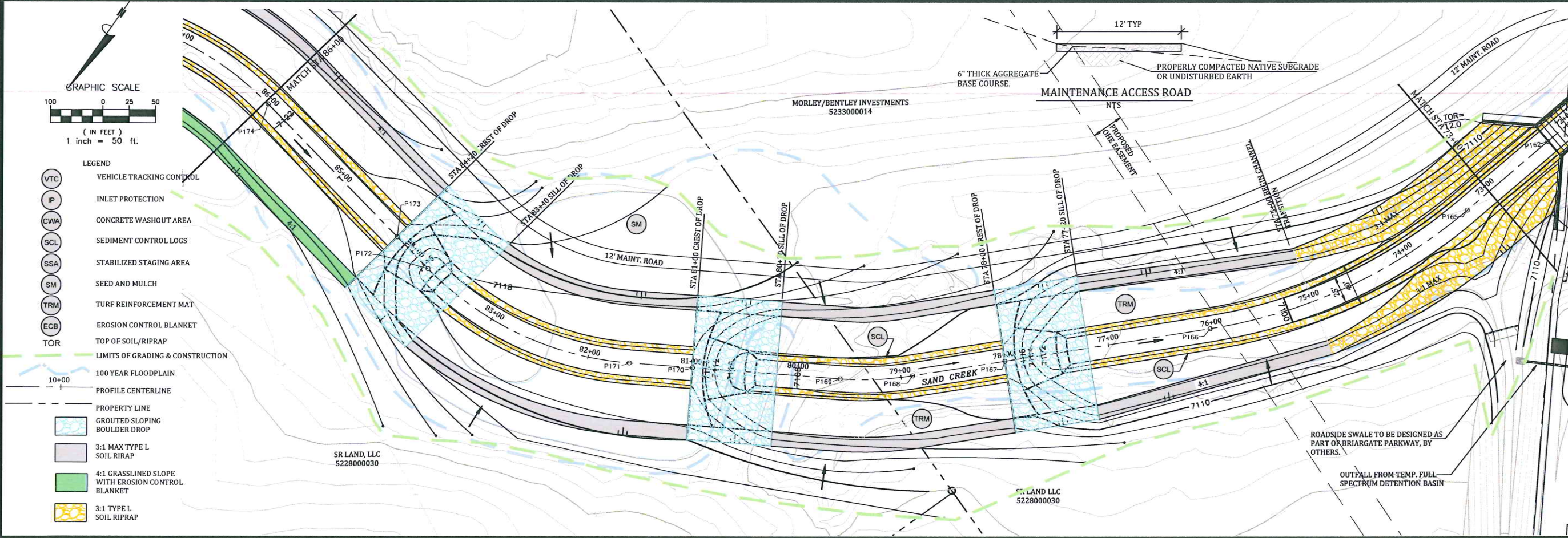
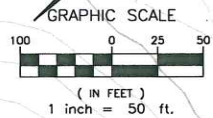
- NOTES:
1. CONTRACTOR TO IDENTIFY MATERIAL AND SOIL STOCKPILES AREA ON THE SWMP PRIOR TO THE COMMENCEMENT OF MOBILIZATION AND PROVIDE PERIMETER CONTROL CONSTRUCTION FENCE. CONTRACTOR SHALL IDENTIFY STABILIZED STAGING AREA ON THE PLAN, THE LOCATION OF VEHICLE AND EQUIPMENT STORAGE AND MAINTENANCE, STORAGE AREAS FOR FERTILIZERS AND PESTICIDES, ON SITE WASTE MANAGEMENT MEASURES SUCH AS PORTOLETS, TRASH ROLL-OFF AND CONCRETE TRUCK AND EQUIPMENT WASHING AREA PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITIES.
 2. CONTRACTOR TO IDENTIFY STABILIZED STAGING AREA PRIOR TO THE COMMENCEMENT OF MOBILIZATION.
 3. CONSTRUCTION FENCING SHALL BE PROVIDED AT LIMITS OF GRADING/CONSTRUCTION AS PART OF THE INSTALLATION OF THE INITIAL BMPs.
 4. CONTRACTOR SHALL PROVIDE CONSTRUCTION FENCING AROUND AREAS TO REMAIN UNDISTURBED BUT WITHIN LIMITS OF GRADING.
 5. VEHICLE TRACKING BMPs FOR THIS PROJECT WILL BE LOCATED OFFSITE FROM THE WORK SHOWN ON THESE PLANS. VEHICLE TRACKING OFFSITE FROM THE PROJECT SHALL BE MAINTAINED CONTINUOUSLY THROUGHOUT THE PERIOD OF CONSTRUCTION.
 6. THERE WILL BE NO DEDICATED ASPHALT OR CONCRETE BATCH PLANS REQUIRED FOR THIS PROJECT.



GRADING & EROSION CONTROL BMP PHASING	
BMP	PHASE
(SSA) (VTC)	INITIAL
(SM) (SCL) (SSA) (CWA) (IP)	INTERIM
(SM) (SCL) (IP)	INTERIM / FINAL

FOR AREAS OF CUT AND FILL, SEE SHEET GEC7.

CAUTION!!!
EXISTING UTILITIES TO BE PROTECTED FROM DISTURBANCE WHEN INSTALLING ALL DRAINAGE INFRASTRUCTURE.



- LEGEND
- (VTC) VEHICLE TRACKING CONTROL
 - (IP) INLET PROTECTION
 - (CWA) CONCRETE WASHOUT AREA
 - (SCL) SEDIMENT CONTROL LOGS
 - (SSA) STABILIZED STAGING AREA
 - (SM) SEED AND MULCH
 - (TRM) TURF REINFORCEMENT MAT
 - (ECB) EROSION CONTROL BLANKET
 - (TOR) TOP OF SOIL/RIPRAP
 - LIMITS OF GRADING & CONSTRUCTION
 - 10+00 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - PROPERTY LINE
 - (Blue hatched) GROUTED SLOPING BOULDER DROP
 - (Pink hatched) 3:1 MAX TYPE L SOIL RIPRAP
 - (Green hatched) 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
 - (Yellow hatched) 3:1 TYPE L SOIL RIPRAP

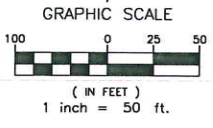
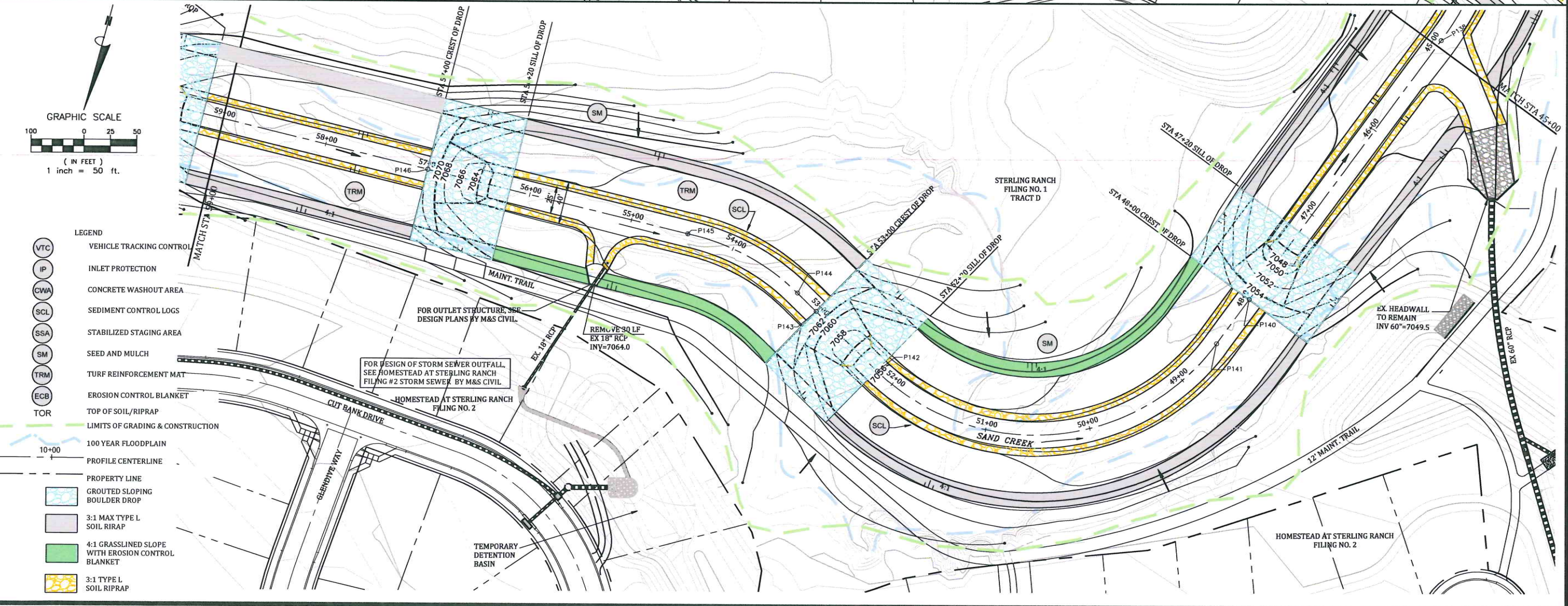
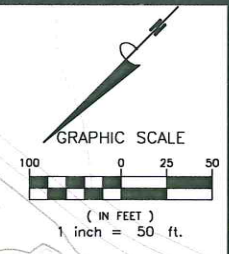
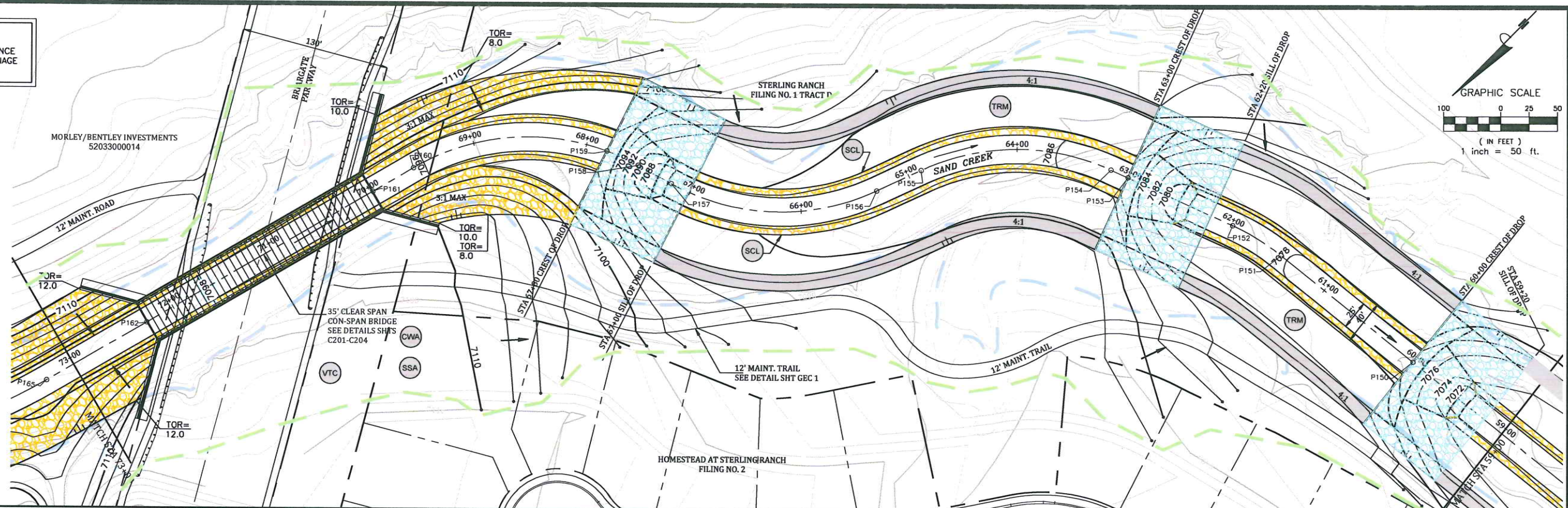
SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
 STERLING RANCH DEVELOPMENT
 STA 97+00 TO STA 73+00
 EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	5/20/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

GEC1

Kiowa
 Engineering Corporation
 1604 South 21st Street
 Colorado Springs, Colorado 80904
 (719) 630-7342

CAUTION!!!
EXISTING UTILITIES TO BE
PROTECTED FROM DISTURBANCE
WHEN INSTALLING ALL DRAINAGE
INFRASTRUCTURE.



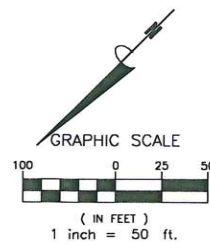
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 - (ECB) EROSION CONTROL BLANKET
 - TOR TOP OF SOIL/RIPRAP
 - LIMITS OF GRADING & CONSTRUCTION
 - 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - PROPERTY LINE
 - GROUTED SLOPING BOULDER DROP
 - 3:1 MAX TYPE L SOIL RIPRAP
 - 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
 - 3:1 TYPE L SOIL RIPRAP

Kiowa
Engineering Corporation
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

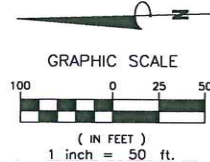
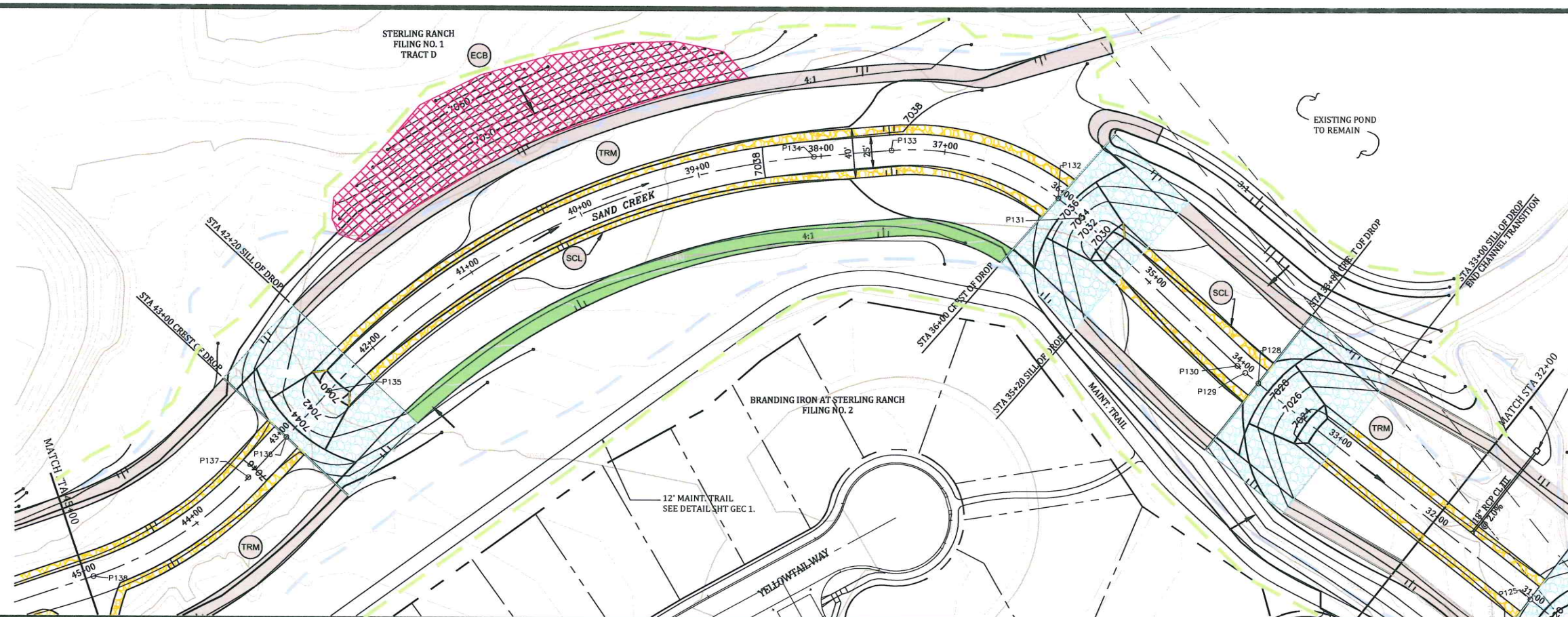
**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
STA 73+00 TO STA 45+00
EL PASO COUNTY, COLORADO**

Project No.:	19032
Date:	5/20/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

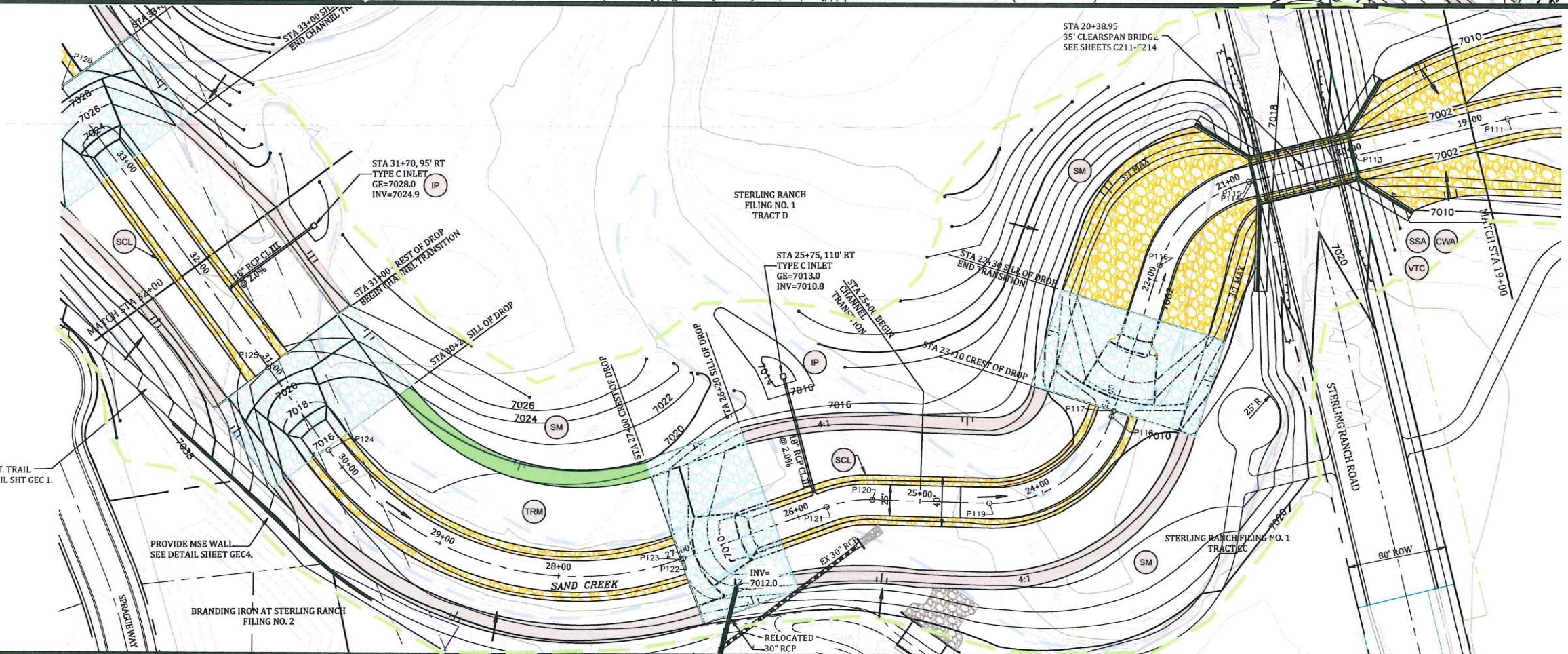
GEC2



CAUTION!!!
EXISTING UTILITIES TO BE
PROTECTED FROM DISTURBANCE
WHEN INSTALLING ALL DRAINAGE
INFRASTRUCTURE.



- LEGEND
- VEHICLE TRACKING CONTROL
 - INLET PROTECTION
 - CONCRETE WASHOUT AREA
 - SEDIMENT CONTROL LOGS
 - STABILIZED STAGING AREA
 - SEED AND MULCH
 - TURF REINFORCEMENT MAT
 - EROSION CONTROL BLANKET
 - TOP OF SOIL/RIPRAP
 - LIMITS OF GRADING & CONSTRUCTION
 - 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - PROPERTY LINE
 - GROUTED SLOPING BOULDER DROP
 - 3:1 MAX TYPE L SOIL RIPRAP
 - 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
 - 3:1 TYPE L SOIL RIPRAP



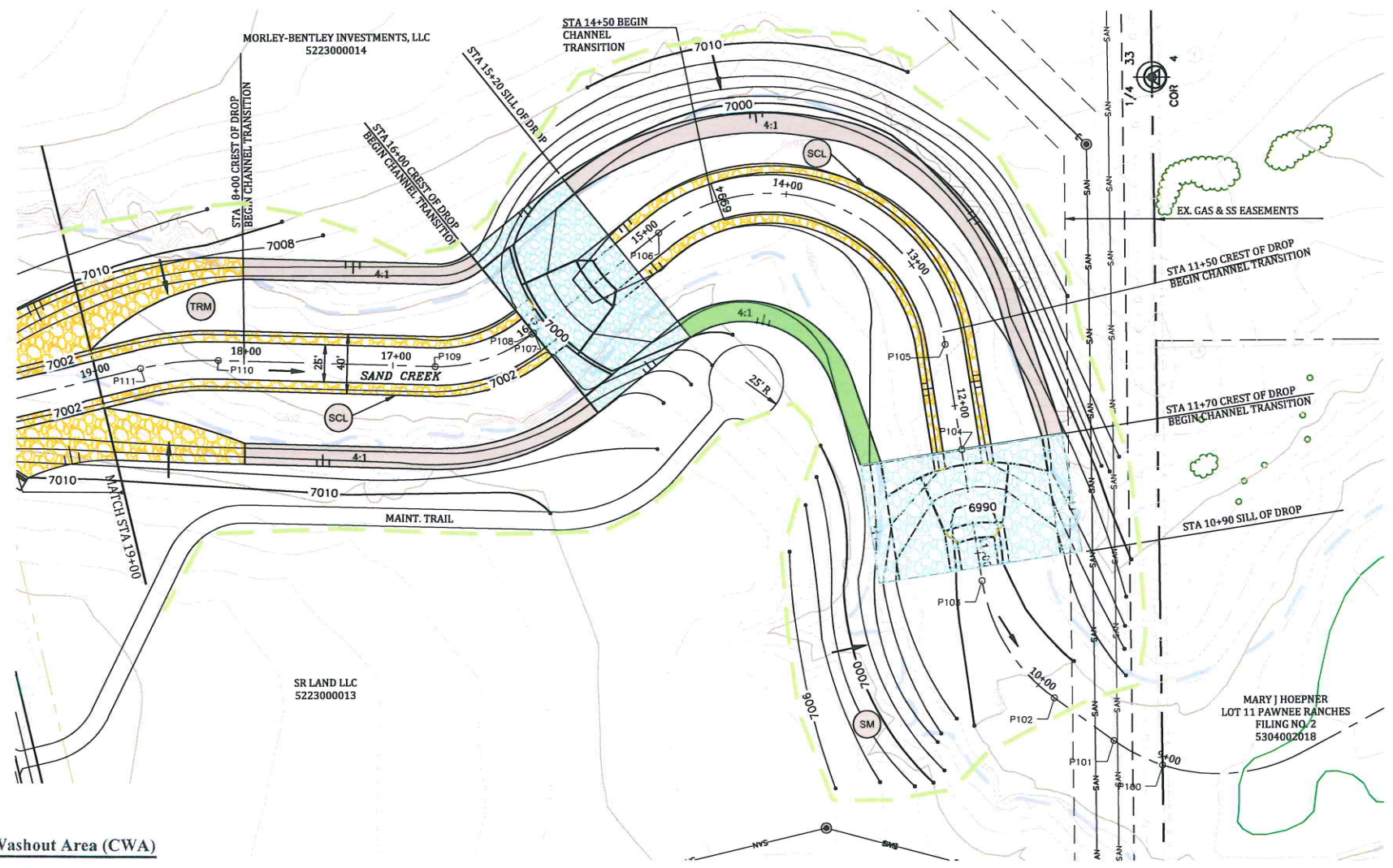
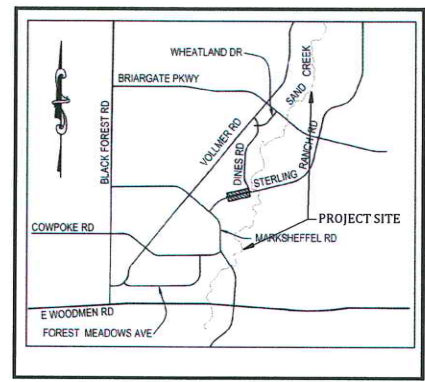
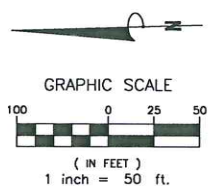
**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
STA 45+00 TO STA 19+00
EL PASO COUNTY, COLORADO**

Project No.:	19032
Date:	5/20/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

GEC3

- LEGEND**
- (VTC) VEHICLE TRACKING CONTROL
 - (IP) INLET PROTECTION
 - (CWA) CONCRETE WASHOUT AREA
 - (SCL) SEDIMENT CONTROL LOGS
 - (SSA) STABILIZED STAGING AREA
 - (SM) SEED AND MULCH
 - (TRM) TURF REINFORCEMENT MAT
 - (ECB) EROSION CONTROL BLANKET
 - (TOR) TOP OF SOIL/RIPRAP
- LIMITS OF GRADING & CONSTRUCTION
- 100 YEAR FLOODPLAIN
- PROFILE CENTERLINE
- PROPERTY LINE
- GROUTED SLOPING BOULDER DROP
- 3:1 MAX TYPE L SOIL RIPRAP
- 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
- 3:1 TYPE L SOIL RIPRAP

CAUTION!!!
EXISTING UTILITIES TO BE PROTECTED FROM DISTURBANCE WHEN INSTALLING ALL DRAINAGE INFRASTRUCTURE.

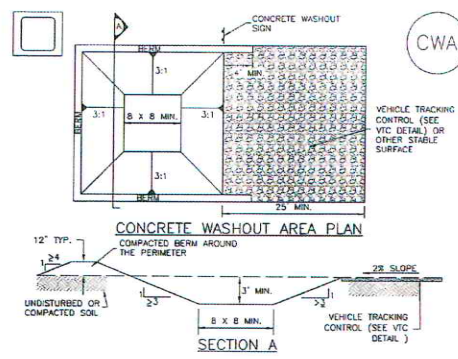


Concrete Washout Area (CWA) MM-1

MM-1

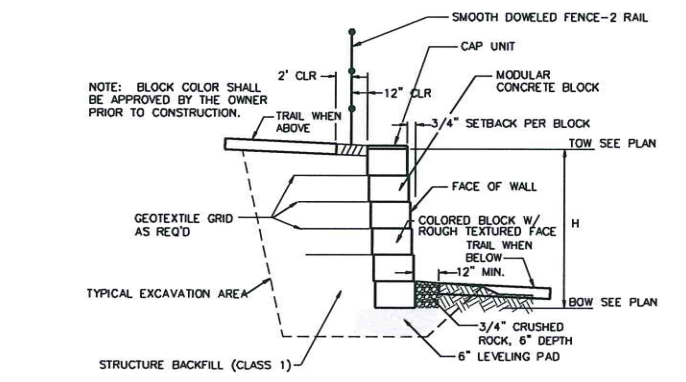
MM-1

Concrete Washout Area (CWA) MM-1



- CWA-1. CONCRETE WASHOUT AREA**
- CWA INSTALLATION NOTES**
1. SEE PLAN VIEW FOR:
 - CWA INSTALLATION LOCATION.
 2. DO NOT LOCATE AN UNLINED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1,000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (1/8 MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES OR A LINED ABOVE-GROUND STORAGE ARE SHOULD BE USED.
 3. THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
 4. CWA SHALL INCLUDE A FLAT SUBSURFACE PIT THAT IS AT LEAST 8" BY 8" SLOPES LEADING OUT OF THE SUBSURFACE PIT SHALL BE 3:1 OR FLATTER. THE PIT SHALL BE AT LEAST 3' DEEP.
 5. BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 1'.
 6. VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
 7. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP TRUCKS.
 8. USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

- CWA MAINTENANCE NOTES**
1. INSPECT BMPs EACH WEEKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 4. THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASTE. CONCRETE MATERIALS, ACCUMULATED IN PIT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2'.
 5. CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PIT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.
 6. THE CWA SHALL REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT IS PLACED.
 7. WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEED AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.
- (DETAIL ADAPTED FROM DOMINGUEZ COUNTY, COLORADO AND THE CITY OF PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD.)
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.



- CONCRETE BLOCK FACING MSE WALL CROSS SECTION**
- NOTE: BLOCK COLOR SHALL BE APPROVED BY THE OWNER PRIOR TO CONSTRUCTION.
- NOTES:
1. SHOP DRAWINGS DEPICTING THE DESIGN OF BLOCK WALL SHALL BE SUBMITTED TO ENGINEER PRIOR TO CONSTRUCTION PER THE PROJECT SPECIFICATIONS. DESIGN SHALL BE COMPLETED UNDER THE DIRECT SUPERVISION OF A PROPERLY REGISTERED PROFESSIONAL ENGINEER WITH THE STATE OF COLORADO. FINAL CONSTRUCTION DRAWINGS SHALL BEAR HIS/HER SEAL AND SIGNATURE.
 2. BUILDING PERMIT FOR THE INSTALLATION OF THE MSE WALL MAY BE REQUIRED THROUGH THE PIKES PEAK REGIONAL BUILDING DEPARTMENT.

PROJECT SPECIFIC GRADING AND EROSION CONTROL NOTES

1. All earthwork required of this construction shall be completed in accordance with all applicable sections of the Project Specifications and Soil Investigation Report (Geotechnical Report).
2. Rubbish including timber, concrete rubble, trees, brush, and asphalt shall not be backfilled adjacent to any of the structures or be in the placement of any unclassified fill. The Contractor shall be responsible for the removal and hauling of such materials to a suitable spoil area. Costs associated with the removal of such materials shall be paid for as documented in the Project Specifications.
3. Excess excavation shall become the property of the Contractor and shall be disposed of at the Contractor's expense. The cost of haulage and spoiling of excess excavated materials shall be paid for as documented in the Project Specifications.
4. Water shall be used as a dust palliative as required and shall be included in the cost for earthwork item(s). No separate payment will be made for dust control associated with the site construction.
5. The road grades shall be cleared of vegetation and the topsoil stockpiled for later use.
6. All grading shall be in conformance with the Geotechnical Report for the area.
7. Placement of fill for roadway embankments shall be completed in conformance with the Geotechnical Report.
8. Grading contours shown on this plan are to final grade.
9. Compaction under filled areas, including roadway and detention basin embankments, shall be 95 percent of the maximum Standard Proctor Density (ASTM D698) at two (2) percent of optimum moisture content.
10. No rubble or debris shall be placed in the backfill under any of the proposed buildings, streets, curb & gutter, sidewalk and drainage structures or within five (5) feet of a building footprint. Properly graded rubble may be used in some locations as specified and verified by the Geotechnical Engineer.
11. Contractor is responsible for reviewing the site prior to bidding to verify site conditions.
12. Contractor is responsible for providing erosion control measures as approved by the El Paso County PCD Engineering Division and as may be required by the El Paso County Inspector.
13. All slopes equal to or greater than 3:1 shall require anchored soil retention blanket (SRB), Geocorr 700 or equal.
14. The Developer is responsible for maintaining erosion control measures until a mature stage of vegetation is established.
15. All soils used for fill must be approved by a representative of the Geotechnical Engineer.
16. All natural ground to receive fill must be properly scarified, watered and compacted prior to placing fill.
17. The Contractor is solely responsible for the design, maintenance and operation of any required dewatering system. The Contractor shall perform such independent investigation as he deems necessary to satisfy himself as to the subsurface groundwater conditions and unstable soil conditions to be encountered throughout the construction. Contractor shall coordinate the dewatering system with El Paso County when associated with public facilities.
18. No fill shall be placed, spread or rolled while it is frozen, thawing or during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until a representative of the Geotechnical Engineer indicates that the moisture content and density of the previously placed fill are as specified. Fill surfaces may be scarified and recompacted after rainfall if necessary, to obtain proper moisture density relation.
19. Additional erosion control structures and/or grading may be required at the time of construction.
20. Sediment removal for erosion control facilities shall be performed continuously for proper function.
21. Base mapping was provided by MS Civil Engineers The date of the last survey update was 2019.
22. Proposed Construction Schedule:
 - Begin Construction: pending
 - End Construction: pending
 - Total Site Area = 60 Acres
23. Area to be disturbed = 47.3 Acres (est.).
 - Existing 100-year runoff coefficient = 0.25
 - Proposed 100-year runoff coefficient = 0.25
 - Existing Hydrologic Soil Groups: HSG A & B
 - Site is currently undeveloped and covered with native grasses on mild to moderate to steep slopes (1%-4%).
24. Site is located in the Sand Creek Drainage Basin.

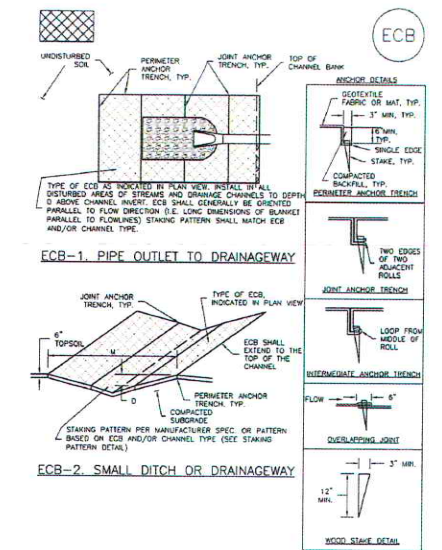
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 1604 South 21st Street
 Colorado Springs, Colorado 80904
 (719) 550-7546

SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
 STA 19+00 TO STA 9+00
 EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	5/20/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

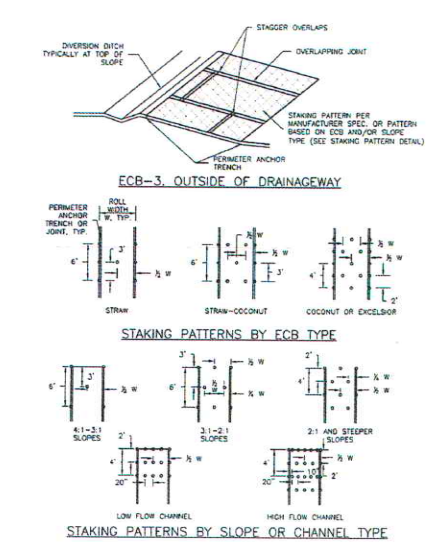
GEC4

EC-6 Rolled Erosion Control Products (RECP)



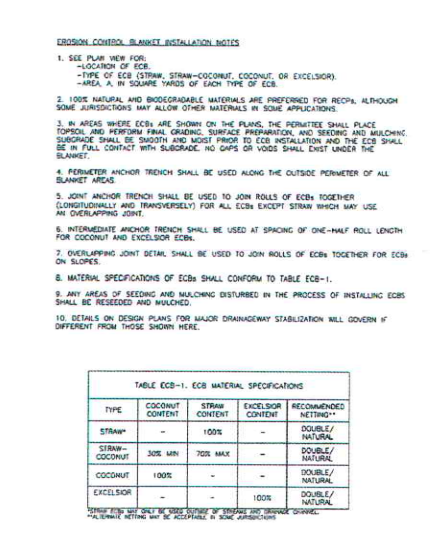
RECP-6 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

EC-6 Rolled Erosion Control Products (RECP)



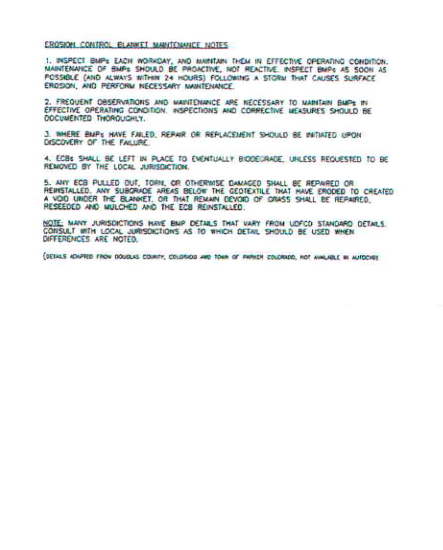
RECP-7 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

EC-6 Rolled Erosion Control Products (RECP)



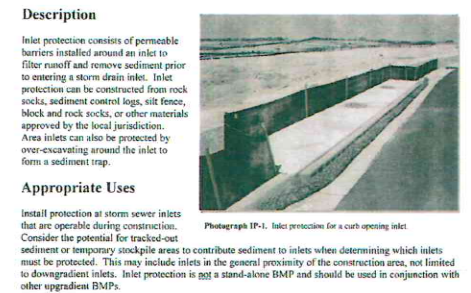
RECP-8 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

EC-6 Rolled Erosion Control Products (RECP)



RECP-9 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

IP-6 Inlet Protection (IP)



Design and Installation

To function effectively, inlet protection measures must be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs must also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding.

Inlet Protection (various forms)

Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

IP-1. Block and Rock Sock Inlet Protection for Sump or On-grade Inlets

IP-2. Curb (Rock) Socks Upstream of Inlet Protection, On-grade Inlets

August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 IP-1

SC-6 Inlet Protection (IP)

- IP-3. Rock Sock Inlet Protection for Sump/Area Inlet
 - IP-4. Silt Fence Inlet Protection for Sump/Area Inlet
 - IP-5. Over-excavation Inlet Protection
 - IP-6. Straw Bale Inlet Protection for Sump/Area Inlet
 - CIP-1. Culvert Inlet Protection
- Proprietary inlet protection devices should be installed in accordance with manufacturer specifications. More information is provided below on selecting inlet protection for sump and on-grade locations.

Inlets Located in a Sump

When applying inlet protection in sump conditions, it is important that the inlet continue to function during larger runoff events. For curb inlets, the maximum height of the protective barrier should be lower than the top of the curb opening to allow overflow into the inlet during larger storms without excessive localized flooding. If the inlet protection height is greater than the curb elevation, particularly if the filter becomes clogged with sediment, runoff will not enter the inlet and may bypass it, possibly causing localized flooding, public safety issues, and downstream erosion and damage from bypassed flows.

Area inlets located in a sump setting can be protected through the use of silt fence, concrete block and rock socks (on paved surfaces), sediment control logs/straw wattles embedded in the adjacent soil and stacked around the area inlet (on pervious surfaces), over-excavation around the inlet, and proprietary products providing equivalent functions.

Inlets Located on a Slope

For curb and gutter inlets on paved sloping streets, block and rock sock inlet protection is recommended in conjunction with curb socks in the gutter leading to the inlet. For inlets located along unpaved roads, also see the Check Dam Fact Sheet.

Maintenance and Removal

Inspect inlet protection frequently. Inspection and maintenance guidance includes:

- Inspect for tears that can result in sediment directly entering the inlet, as well as result in the contents of the BMP (e.g., gravel) washing into the inlet.
- Check for improper installation resulting in untreated flows bypassing the BMP and directly entering the inlet or bypassing to an unprotected downstream inlet. For example, silt fence that has not been properly tensioned around the inlet can result in flows under the silt fence and directly into the inlet.
- Look for displaced BMPs that are no longer protecting the inlet. Displacement may occur following larger storm events that wash away or reposition the inlet protection. Traffic or equipment may also crush or displace the BMP.
- Monitor sediment accumulation upgradient of the inlet protection.

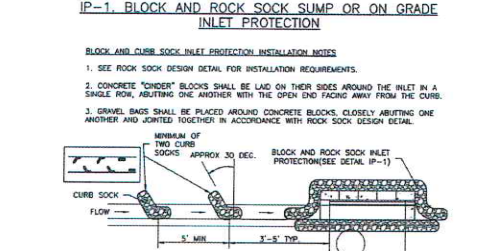
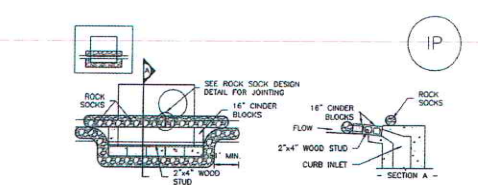
IP-2 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 August 2013

IP-6 Inlet Protection (IP)

- Remove sediment accumulation from the area upstream of the inlet protection, as needed to maintain BMP effectiveness, typically when it reaches no more than half the storage capacity of the inlet protection. For silt fence, remove sediment when it accumulates to a depth of no more than 6 inches. Remove sediment accumulation from the area upstream of the inlet protection as needed to maintain the functionality of the BMP.
 - Proprietary inlet protection devices should be inspected and maintained in accordance with manufacturer specifications. If proprietary inlet insert devices are used, sediment should be removed in a timely manner to prevent devices from breaking and spilling sediment into the storm drain.
- Inlet protection must be removed and properly disposed of when the drainage area for the inlet has reached final stabilization.

IP-3 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 August 2013

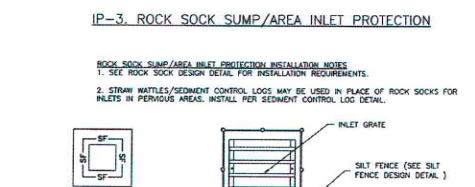
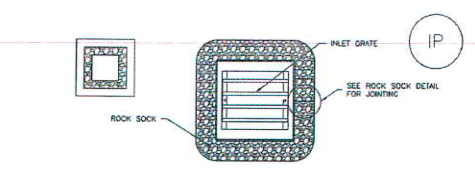
SC-6 Inlet Protection (IP)



- BLOCK AND CURB SOCK INLET PROTECTION INSTALLATION NOTES**
- SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - CONCRETE "CINDER" BLOCKS SHALL BE LAID ON THEIR SIDES AROUND THE INLET IN A SINGLE ROW, ABUTTING ONE ANCHOR WITH THE OPEN END FACING AWAY FROM THE CURB.
 - GRAVEL BAGS SHALL BE PLACED AROUND CONCRETE BLOCKS, CLOSELY ABUTTING ONE ANOTHER AND JOINED TOGETHER IN ACCORDANCE WITH ROCK SOCK DESIGN DETAIL.
- CURB ROCK SOCK INLET PROTECTION INSTALLATION NOTES**
- SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - PLACEMENT OF THE SOCK SHALL BE APPROXIMATELY 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.
 - SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED A MINIMUM OF 5 FEET APART.
 - AT LEAST TWO CURB SOCKS IN SERIES ARE REQUIRED UPSTREAM OF ON-GRADE INLETS.

IP-4 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 August 2013

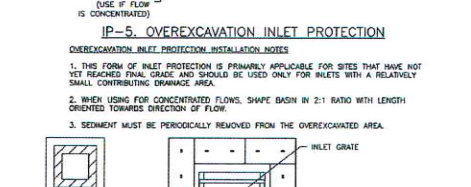
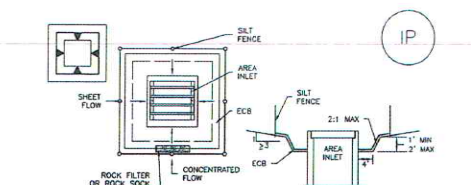
IP-3 Inlet Protection (IP)



- ROCK SOCK SUMP/AREA INLET PROTECTION INSTALLATION NOTES**
- SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - STRAW MATTES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF ROCK SOCKS FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.
- SILT FENCE INLET PROTECTION INSTALLATION NOTES**
- SEE SILT FENCE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - POSTS SHALL BE PLACED AT EACH CORNER OF THE INLET AND AROUND THE EDGES AT A MAXIMUM SPACING OF 3 FEET.
 - STRAW MATTES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF SILT FENCE FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.

IP-5 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 August 2013

SC-6 Inlet Protection (IP)



- OVEREXCAVATION INLET PROTECTION INSTALLATION NOTES**
- THIS FORM OF INLET PROTECTION IS PRIMARILY APPLICABLE FOR SITES THAT HAVE NOT YET REACHED FINAL GRADE AND SHOULD BE USED ONLY FOR INLETS WITH A RELATIVELY SMALL CONTRIBUTING DRAINAGE AREA.
 - WHEN USING FOR CONCENTRATED FLOWS, SHAPE BASIN IN 2:1 RATIO WITH LENGTH ORIENTED TOWARDS DIRECTION OF FLOW.
 - SEDIMENT MUST BE PERIODICALLY REMOVED FROM THE OVEREXCAVATED AREA.
- STRAW BALE BARRIER INLET PROTECTION INSTALLATION NOTES**
- SEE STRAW BALE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - BALES SHALL BE PLACED IN A SINGLE ROW AROUND THE INLET WITH ENDS OF BALES TIGHTLY ABUTTING ONE ANOTHER.

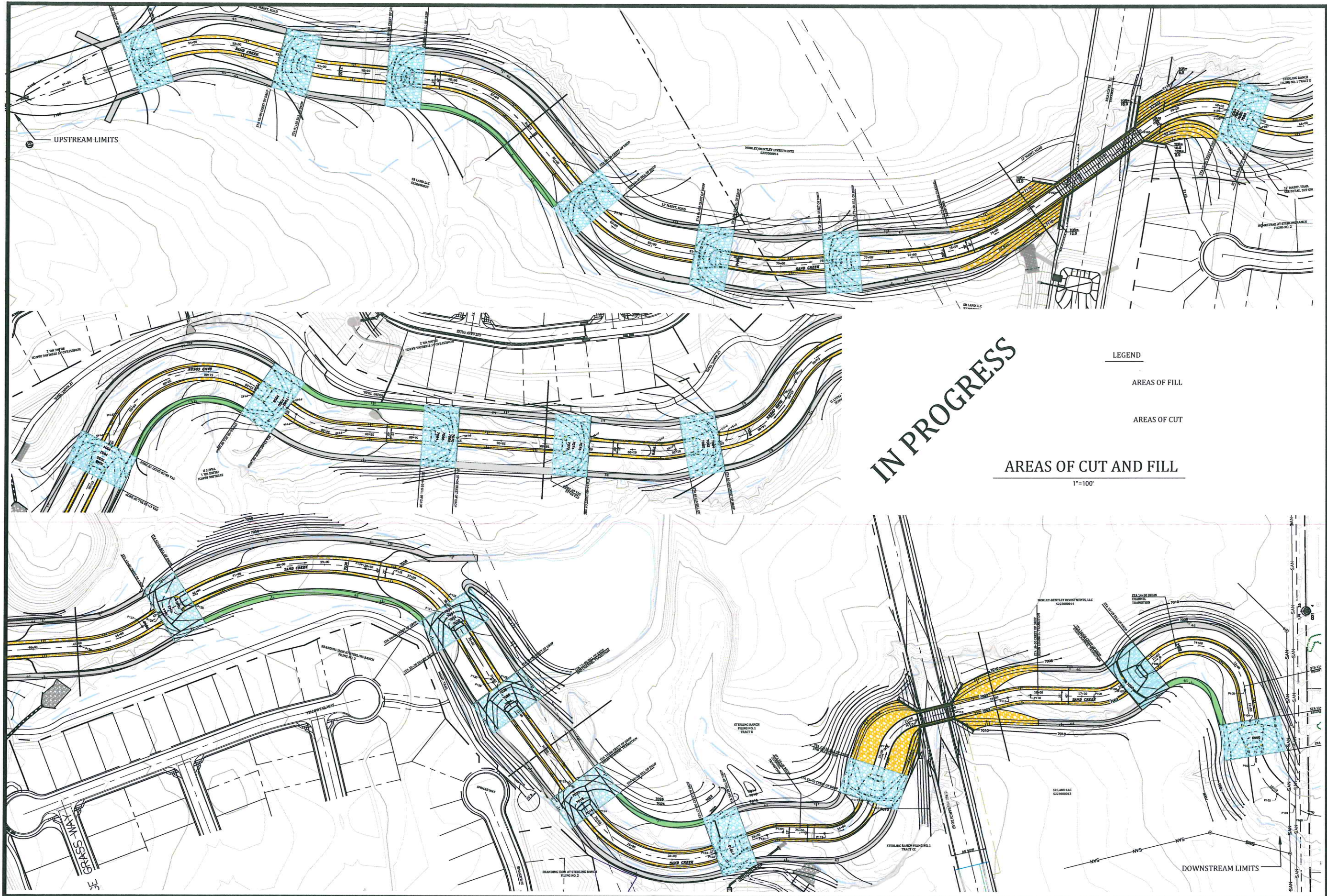
IP-6 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 August 2013

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SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
EROSION CONTROL DETAILS
 EL PASO COUNTY, COLORADO

Project No.: 19032
 Date: 5/20/2020
 Design: RNW
 Drawn: EAK
 Check: RNW
 Revisions:

GEC6



IN PROGRESS

LEGEND
 AREAS OF FILL
 AREAS OF CUT
 AREAS OF CUT AND FILL
 1"=100'

**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
 STERLING RANCH ROAD BRIDGE DESIGN PLANS
 STERLING RANCH DEVELOPMENT
 AREAS OF CUT AND FILL
 EL PASO COUNTY, COLORADO**

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