

**STORMWATER MANAGEMENT REPORT  
FOR  
URBAN COLLECTION AT PALMER VILLAGE**

**Prepared For:  
Richmond American Homes  
4350 S. Monaco Street  
Denver, Colorado 80237**

**May 4, 2021  
Project No. 25149.01**

**Prepared By:  
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**Qualified Stormwater Manager:  
Name: Eric Kubley  
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Address: 4350 S. Monaco Street  
Denver, CO 80237**

**Contractor:  
Name: TBD  
Company: TBD  
Address: TBD**

**PCD File No.:  
SF-20-028**

**Engineer's Certification**

This Grading, Erosion, and Sediment Control Report was prepared under my direction and supervision, and is correct to the best of my knowledge and belief. If such work is performed in accordance with the Grading and Erosion Control Plan, the work will not become a hazard to life and limb, endanger property, or adversely affect the safety, use, or stability of a public way, drainage channel, or other property.

---

Glenn Ellis, Colorado P.E. 38861  
For and On Behalf of JR Engineering, LLC

Date

**Developer's/Owner's Certification**

The owner will comply with the requirements of this Grading, Erosion, and Sediment Control Report including temporary BMP inspection requirements and final stabilization requirements. I acknowledge the responsibility to determine whether the construction activities outlined in this report require Colorado Discharge Permit System (CDPS) permitting for Stormwater discharges associated with Construction Activity.

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Name of Owner/Developer

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Authorized Signature

Date

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## **Introduction – Urban Collection at Palmer Village**

This document is the “Storm Water Management Plan for Urban Collection at Palmer Village.” It has been prepared to meet the regulatory requirements of El Paso County, the Colorado Department of Health - Water Quality Control Division, and to satisfy the provisions set forth by the Colorado Water Quality Control Act and Federal Water Pollution Control Act.

## **Project Description**

The Urban Collection at Palmer Village site is in El Paso County and is a proposed private residential development for multi-family homes. The project includes grading, utility installation, drainage, asphalt roadways, concrete sidewalks and curb & gutter, and multiple housing structures. The total disturbance area created by the project is approximately 10.83 acres.

## **Site Description**

A 100-unit residential development is proposed within the Palmer Village subdivision (totaling 10.83 acres) (hereby referred to as the “site”) per the corresponding approved Final Plat. The two tracts (M and N) along Constitution Avenue, east to Marksheffel Road will not be developed at this time. They are referenced in this plan only in the context of being included in the plat of the proposed development. Any development of these two tracts shall require separate grading and erosion control plans, and separate storm water management plans. The Site is undeveloped other than a sanitary sewer easement that follows the eastern border adjacent to Tract M.

## **Existing Site Conditions**

The existing site is undeveloped and is covered by sparse native grasses, vegetation, some shrubs and trees, determined by an aerial inspection. The existing site, in general, slopes to the east at slopes ranging from 1% to 3%.

## **Receiving Waters**

The site lies within the Sand Creek Drainage Basin based on the “Sand Creek Drainage Basin Planning Study” completed by Kiowa Engineering Corporation in January 1993. The Sand Creek Drainage Basin covers approximately 54 square miles and is divided into five major sub-basins: Sand Creek Mainstem, East Fork Sand Creek, and Central Tributary to East Fork, West Fork,

and East Fork Sub tributary. The site is within the East Fork Sand Creek sub-basin, as shown in Appendix A. The Sand Creek Basin discharges into Fountain Creek approximately 1.5 miles upstream of Academy Boulevard Bridge over Fountain Creek.

### **Adjacent Areas**

The Site is located in the northeast quarter of Section 5, Township 14 South, Range 65 West of the Sixth Principal Meridian in the County of El Paso, State of Colorado. The Site is located immediately south of Constitution Avenue on the west and east side of Hannah Ridge Drive, extending to the east to Marksheffel Road. The site is bounded by Constitution Avenue to the north, Marksheffel Road to the east, Jessica Heights Filing No. 1 to the south, and the Cherokee Park Townhomes to the west. Refer to the vicinity map in Appendix A.

### **Soils**

The proposed development site is comprised of variable sloping grasslands that generally slope east at approximately 3% on the east side of Hannah Ridge Drive. On the west side of Hannah Ridge Drive the land slopes at about 1% to the east, draining into the curb and gutter in Hannah Ridge Drive.

Soil characteristics are comprised of Blakeland loamy sand. NRCS rates this soil designation as Hydrologic Group A. Group A soils exhibit a high infiltration rate when thoroughly wet and consist chiefly of deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a high rate of water transmission and a low runoff potential. Eroded soil may adversely impact downstream drainage ways. BMPs will be installed and maintained to mitigate impacts due to soil erosion. Refer to the soil survey mapping in Appendix B.

### **Stream Crossings**

There are no stream crossings through the site.

### **Description of Potential Pollutants**

Proposed construction activities are not anticipated to generate any non-stormwater discharge.

- Concrete washout shall be placed on the site.
- Dewatering is not expected for the site.

### **Soil Borings/Tests and Groundwater**

Currently no soil boring tests or groundwater tests have been made for this project.

### **Areas and Volume Statement**

Urban Collection at Palmer Village site consists of 10.83 acres. The entire site will be disturbed with the proposed improvements. The construction will require approximately 23,000 cubic yards of fill, 16,600 cubic yards of cut, and a net fill volume of 6,400 cubic yards.

- Site Map - Refer to the attached maps for locations of BMPs and BMP Details including installation, maintenance, and inspection requirements.

## **Stormwater Management Controls**

### **SWMP Administrator**

The SWMP Administrator also known as Qualified Storm Water Manager will be Eric Kubley (722-977-3862) with Richmond American Homes. The SWMP Administrator shall be the individual(s), position, or title who is responsible for developing, implementing, maintaining, and updating the SWMP. The administrator will sufficiently qualified for the required duties per El Paso County Engineering Criteria Manual Appendix I.5. The activities and responsibilities of the administrator shall address all aspects of the facility's SWMP.

### **Erosion and Sediment Control**

This project does not rely on control measures owned or operated by another entity. Erosion and sediment control measures that will be used during the project are as follows:

## Structural Practices

### Silt Fence

Purpose:

- To act as a barrier to interrupt runoff to allow sediment to settle out during construction operations.
- Used to filter shallow sheet flow.

Typical Applications:

- Perimeter control on lots or tracts
- Perimeter control around dirt stockpiles
- Utilized as a temporary feature.

### Inlet Protection

Purpose:

- Intercept and filter sediment laden runoff and prevent it from entering storm sewer systems.

Typical Applications:

- For any type of storm drain inlet in streets, paved areas, or landscaped areas.
- Utilized as a temporary feature.

### Outlet Protection

Purpose:

- To prevent scour at conveyance outlets by reducing the speed concentrated flows

Typical Applications:

- For any type of storm water conveyance outlet structures
- Utilized as a temporary feature.

### Swale

Purpose:

- An earthen channel that conveys runoff.

Typical Applications:

- Along a construction perimeter to keep runoff on site

- At the top of a slope to direct runoff downstream
- Used as a temporary or permanent feature

### Straw Bale Barrier (Check Dam)

Purpose:

- To act as a barrier to interrupt runoff to allow sediment to settle out during construction operations.

Typical Applications:

- Used in swales to prevent erosive velocities from developing

### Erosion Control Blanket

Purpose:

- To protect soil from impact of precipitation and overland flow, and retain moisture for vegetation establishment.

Typical Applications:

- Can be installed on seeded areas for temporary use or can be utilized for permanent use on landscape areas.

### Sediment Basin

Purpose:

- To detain runoff long enough for sediment to settle out.

Typical Applications:

- Installed where a permanent detention basin is planned.
- In areas with more than one acre of disturbance
- Utilized as a temporary feature

### Vehicle Tracking Control

Purpose:

- To reduce the amount of sediment leaving an area via vehicle's tires

Typical Applications:

- Long-term stockpiles (30days+)

- Construction access points
- On-site trailer parking/access

### Stabilized Staging Area

Purpose:

- Designated onsite construction area for trailers, onsite construction parking, and material storage area.

Typical Applications:

- Material Storage
- Onsite Construction parking
- Temporary construction trailer parking

### Non-Structural Practices

#### Temporary/Permanent Seeding

Purpose:

- To provide stabilization of disturbed soil

Typical Applications:

- Any disturbed areas
- Stockpiles
- Slopes

#### Mulching

Purpose:

- Apply to disturbed soils to reduce erosion by protecting bare soil from rainfall impact, increase infiltration, and reduce runoff.

Typical Applications:

- Use in conjunction with temporary or permanent seeding.
- Use as a means of temporary stabilization for areas that cannot be reseeded due to seasonal constraints
- Slopes

### *Potential Pollutant Sources*

Potential pollution sources include; debris, emissions from construction vehicles, possible refueling incidents and accidental materials or chemical spills. Specific pollution components and their solutions are listed below:

- All exposed and stored soils – All exposed soils will be seeded and mulched upon completion of construction within the vicinity. Silt fence will be utilized to contain sediment deposited by runoff until seeding can take. Silt fence or a similar barrier should be installed as needed around long-term stockpiles (30 days+). Stockpiles that exceed 8 to 10 feet in height may require additional erosion protection by way of an additional row of silt. Vehicle Tracking Control should be installed at access points to minimize sediment deposition from vehicles exiting the site.
- Vehicle tracking of sediments – If sediment is tracked onto the street, a reasonable attempt shall be made to clean up sediment and mud deposits as soon as possible. A street sweeper may be used as necessary. Vehicle Tracking Control shall be installed at all vehicular access points to the site.
- Vehicle Tracking Control - The contractor will be responsible for placement of vehicle tracking control measures at the locations of site entrances. Vehicle tracking control measures include, but are not limited to: minimizing site access; street sweeping or scraping; tracking pads; graveled parking areas; wash racks; and contractor education. As well, if sediment is tracked onto the street, a reasonable attempt will be made to clean up any large deposits as soon as possible and if necessary, a street sweeper may be used.
- Management of contaminated soils – Appropriate measures will be taken to cleanup the cause of the contaminated soil. All contaminated soils must be disposed of offsite in an appropriate manner.
- Loading and unloading operations – Should a spill occur during a loading or unloading operation it shall be cleaned up immediately and the on-site personnel shall be contacted.

- Outdoor storage activities – Materials with potential to contaminate stormwater runoff will be stored so as to prevent/minimize exposure of toxic materials. Storage areas containing toxic materials shall be designated accordingly. Onsite areas used for material storage that are exposed to the elements, namely precipitation, shall be inspected for evidence of, or the potential for, pollutants entering the drainage system.
- Vehicle, equipment maintenance, and fueling – All designated fueling and maintenance areas shall be located a minimum of 100 feet from any drainage course whenever possible. If the fueling area is located on a pervious surface, the area shall be covered with a non-pervious lining so as to prevent soil contamination by way of infiltration. Any spillage shall be cleaned up immediately.
- Significant dust or particulate generating processes – Dust-reducing measures will be taken during construction until appropriate seeding and mulching can be placed. A water truck capable of misting soils susceptible to wind dispersion may be used.
- Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc. – Oil, grease, coolants, etc. that leak onto the soil or impervious surface should be cleaned up as soon as possible and on-site personnel notified.
- On-site waste management practices (waste piles, liquid wastes, dumpsters, etc.) – Dumpsters will be utilized as needed to remove trash from the site. Any waste material found on-site or generated by construction activities will be disposed of in a manner that prevents polluting of storm water discharges. In the event that waste is to be stored on-site, it shall be in an area located a minimum of 100 feet from any drainage course whenever possible. Whenever waste is in a porous container, it shall be in an area enclosed by a 12-inch high compacted earthen ridge (or equal measure). If the enclosed waste area is located on porous soil, the area shall be covered with a non-porous lining to prevent soil contamination. Whenever precipitation is predicted, the waste shall be covered with a non-porous cover, anchored on all sides to prevent its removal by wind, in order to prevent precipitation from leaching out potential pollutants from the waste.

- Non-industrial waste sources such as worker trash and portable toilets – All portable toilets should be kept a minimum of 50 feet from state waters and 10 feet from storm water inlets. They will be secured at all four corners to prevent overturning and cleaned on a weekly basis. They will be inspected daily for spills.
- Landscaping Materials – Materials may be stored temporarily in the street until work is completed. If top-soil, mulch, or similar material is to be kept in the street or gutter overnight, containment measures should be taken to minimize any pollution discharge potential.
- Other areas or procedures where potential spills can occur – No other areas have been identified at this time.

#### **Other Potential Pollution**

Exact location of the following potential pollution sources will be determined and documented during construction.

- Concrete washout - The contractor will be responsible for placement of concrete washout area. They will be placed such that concrete washout activities do not result in the discharge of materials, or contribute pollutants to stormwater runoff.
- Batch Plant - A dedicated asphalt or concrete batch plant is not planned to be utilized. If plans change and at such time a batch plant is used it will be the responsibility of the contractor to update the SWMP report and plans in addition to receiving/obtaining all necessary permits.
- Concrete truck/equipment washing, including the concrete truck chute and associated fixtures and equipment – concrete truck/equipment washing will take place in a designated concrete wash-out area. Said area shall be placed a minimum of 100' from any drainage/water sources and shall serve to contain wash water generated by equipment

washing. Remnants of concrete and cement that are left behind at the concrete washout area(s) shall be transported and disposed of offsite.

### **Material Handling, and Spill Prevention and Response**

There will be a designated individual on-site who will receive training on what to do when a hazardous spill occurs. There will be a small spill kit on-site containing clean-up supplies, emergency contact information, and report(s) to document occurrences.

Spills must be cleaned up as soon as possible and contaminated soil/materials must be properly disposed of off-site.

### **Timing Schedule**

Development of the project site will follow standard construction sequencing characteristic of site construction. There will be no phasing for this project site. The anticipated start date is late spring 2021. The anticipated date of completion and final stabilization is fall 2021. Sequencing of development will commence in the following manner:

1. Installation of initial temporary erosion control measures as noted on the plans. Implementation of BMPs shall precede initial construction operations. The time schedule may vary depending on plan approvals and weather. The initial BMP's for this project shall include silt fencing as shown on the plans, vehicle tracking control at the staging entrance, a stabilized staging area, a concrete washout area, and installation of inlet protection around existing inlets that are subject to debris or sediment deposition.
2. Site clearing and grading will occur within the project limits.
3. Subgrade preparation and compaction for hardscaped areas.
4. Installation of underground utilities and connections to main lines.
5. Installation of concrete and asphalt pavement, along with curb and gutter, and following is structure development.
6. Install signs and permanent striping.
7. Installation of site landscaping and removal of temporary erosion controls and final site cleanup should not occur until site vegetation is fully restored. Once full site stabilization

has been achieved, all temporary BMP's should be removed and final site cleaning performed.

### **Permanent Stabilization**

Seeding and mulching will be utilized to replace vegetation in areas where existing ground cover was disturbed. Seeding and mulching shall be per El Paso County requirements (See Engineering Criteria Manual, Chapter 3.4). Final Stabilization will be completed once construction activities have ceased and 70% of the vegetative cover for the site has been re-instated, as compared to pre-disturbance levels, or once equivalent permanent erosion control measures have been implemented (pavement, concrete, etc.).

### **Owner Inspection & Maintenance of Construction BMP'S**

All necessary BMPs will be installed and maintained until the completion of the project. Long term stormwater management may begin once final stabilization of the site has been implemented.

Inspections of erosion & sediment control measures will occur every 14 days and within 24 hours of any precipitation or snowmelt 'event' that incurs runoff. The operator shall keep a record of inspections. Uncontrolled release of mud, muddy water, or measurable quantities of sediment found off the site shall be recorded with a brief explanation as to the measures taken to prevent future releases as well as any measure taken to clean up the sediment that has left the site. Any items in need of correction must occur as soon as possible to ensure continuous implementation of BMPs. Based on the results of the inspection and the description of potential pollutant sources, pollution prevention and control measures shall be revised and modified as appropriate as soon as practicable after such inspection. The SWMP Administrator must sign the inspection log.

All temporary and permanent erosion and sediment control facilities shall be maintained and repaired as needed to assure continued performance of their intended function. Silt fences will require periodic replacement. Sediment traps and sediment basins shall be cleaned when accumulated sediments equal approximately one-half of trap storage capacity. Both sediment

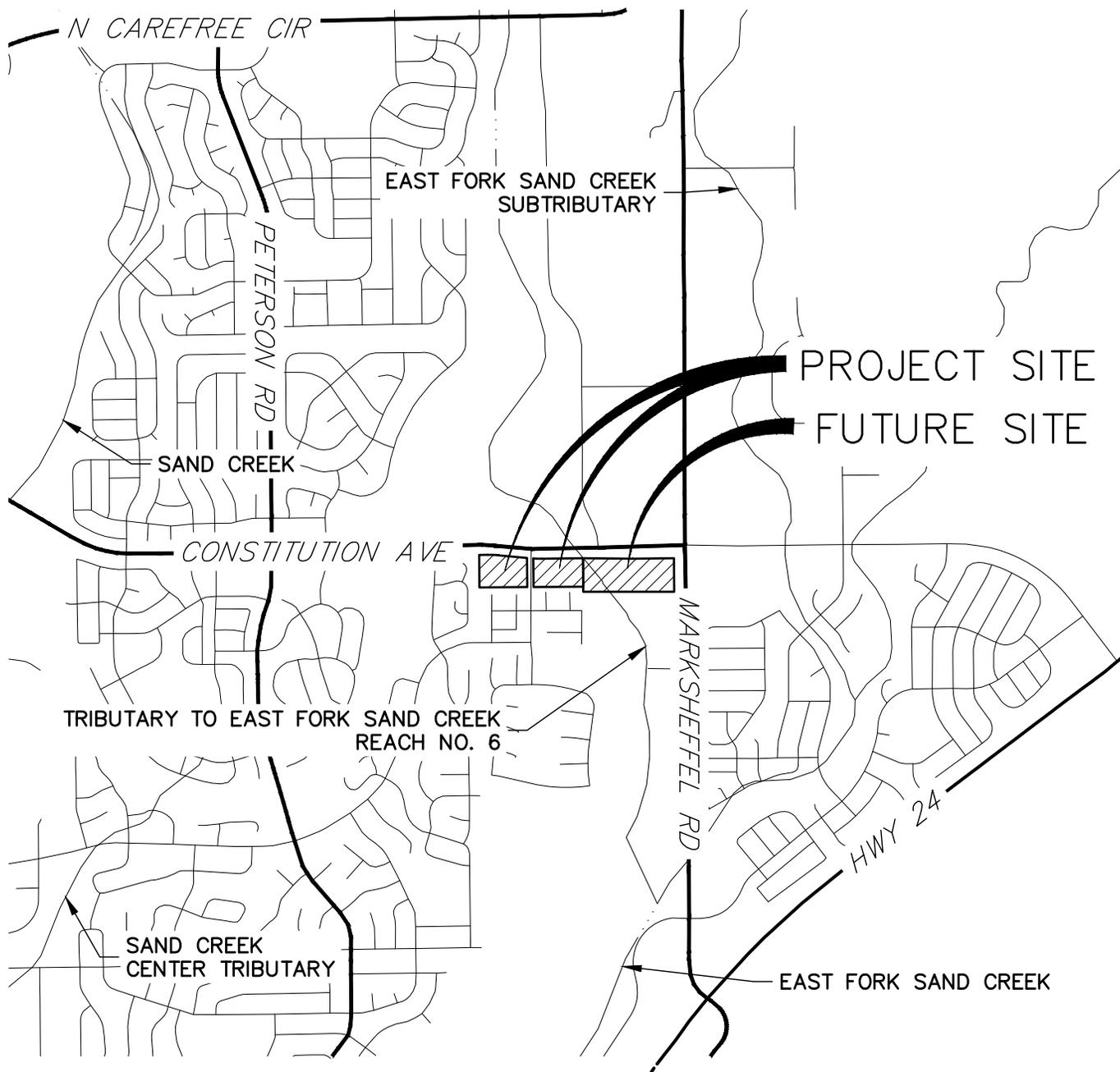
basins will be converted to permanent detention and water quality ponds. Contractor shall remove sediment and debris that has been collected in basin depression to ensure that the basin meets the design grades of the permanent detention and water quality pond. The storm lines shall also be cleaned and free of sediment once the site becomes stabilized. Also, refer to the attached GESCs for additional installation, inspection, and maintenance requirements.

This report is a living document and is to be continuously reviewed and modified as part of the overall process of evaluating and managing stormwater quality issues on the site. The SWMP Administrator 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 the storm water discharges associated with construction activity or when BMPs are no longer necessary and are removed.

## **APPENDIX A – VICINITY MAP**

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ORIGINAL SCALE: 1" = 2000'

APPENDIX A: VICINITY MAP  
 URBAN COLLECTION AT  
 PALMER VILLAGE  
 JOB NO. 25149.01  
 06/01/2020  
 SHEET 1 OF 1



**J-R ENGINEERING**

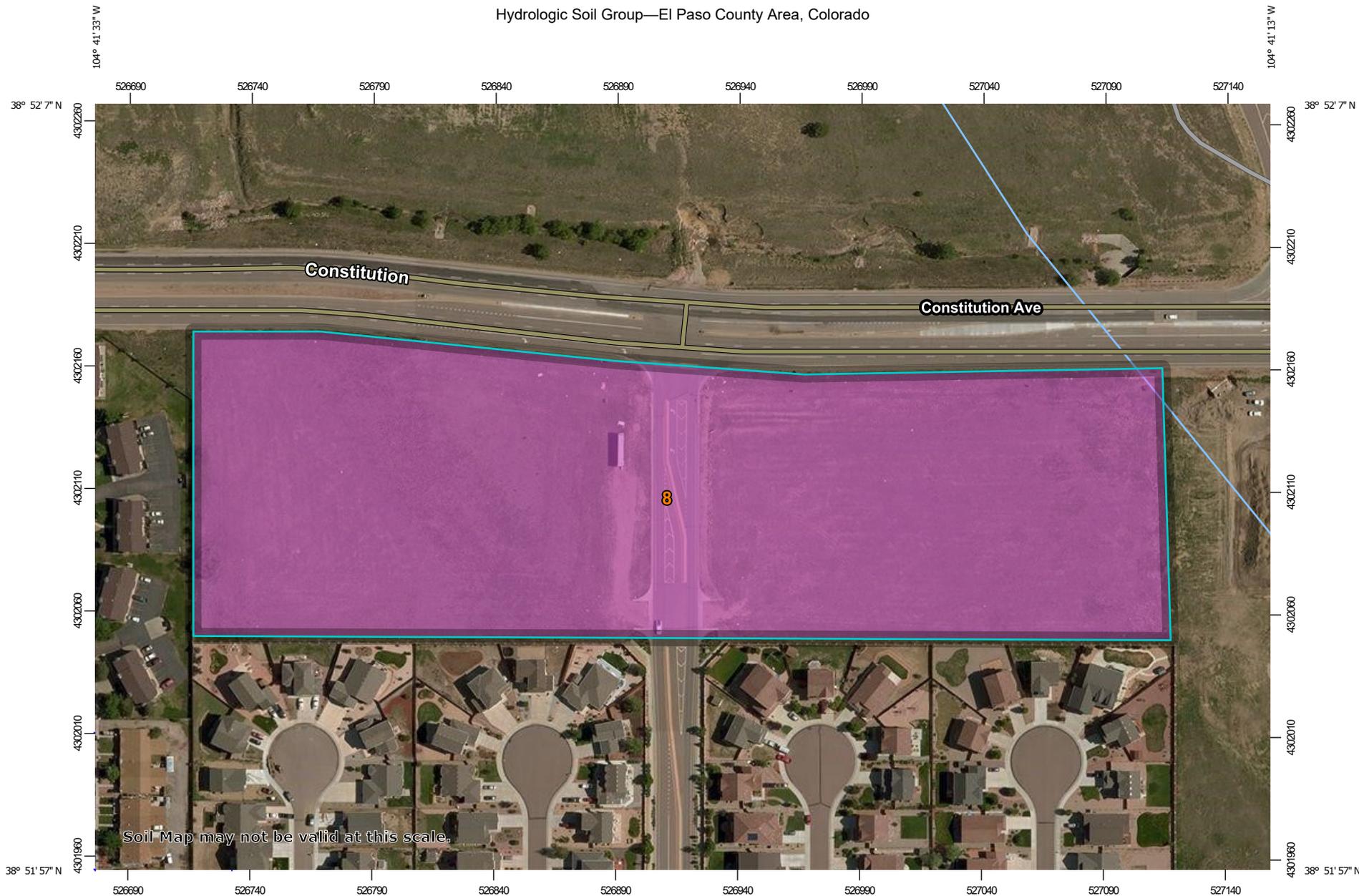
A Westrian Company

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 Fort Collins 970-491-9888 • www.jrengineering.com

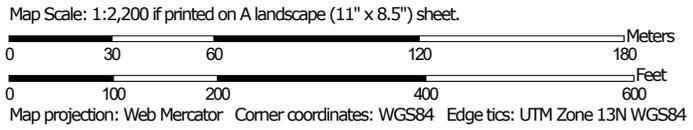
## **APPENDIX B – SOILS MAPS**

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Hydrologic Soil Group—El Paso County Area, Colorado



Soil Map may not be valid at this scale.



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

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

#### Soil Rating Lines

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

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado  
 Survey Area Data: Version 17, Sep 13, 2019

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

Date(s) aerial images were photographed: Apr 15, 2011—Jun 17, 2014

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

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	11.3	100.0%
<b>Totals for Area of Interest</b>			<b>11.3</b>	<b>100.0%</b>

### Description

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

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

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

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

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

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

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

### Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

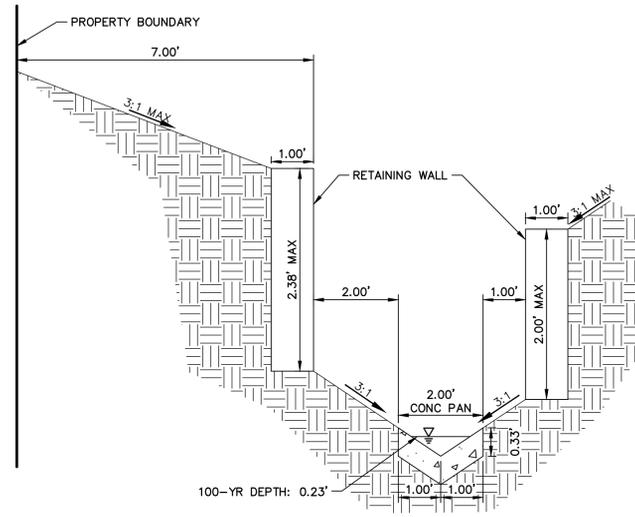
*Tie-break Rule:* Higher

## **APPENDIX C – GRADING EROSION CONTROL PLANS AND DETAILS**

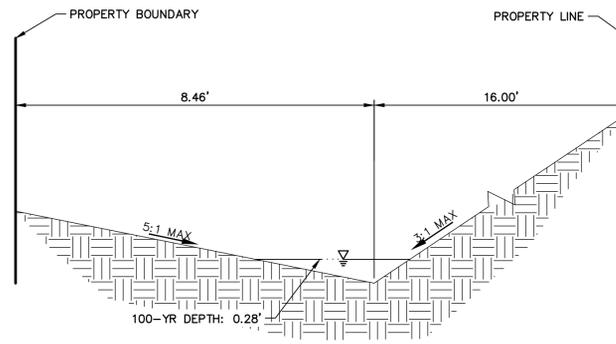
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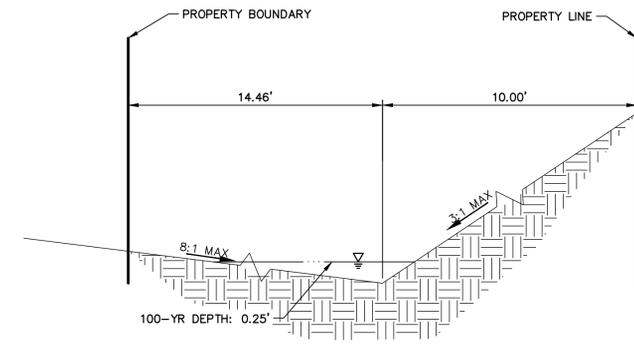




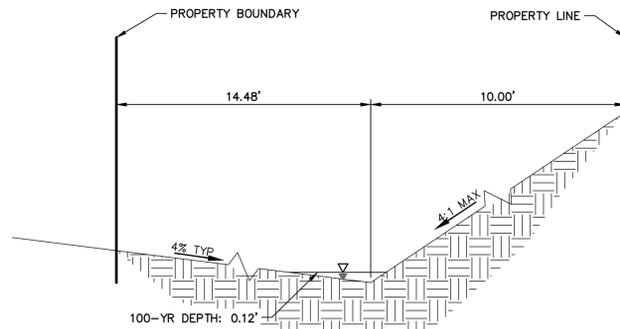
**A SWALE A-A SECTION**  
SCALE: 1"=2' (HOR), 1"=1' (VERT)



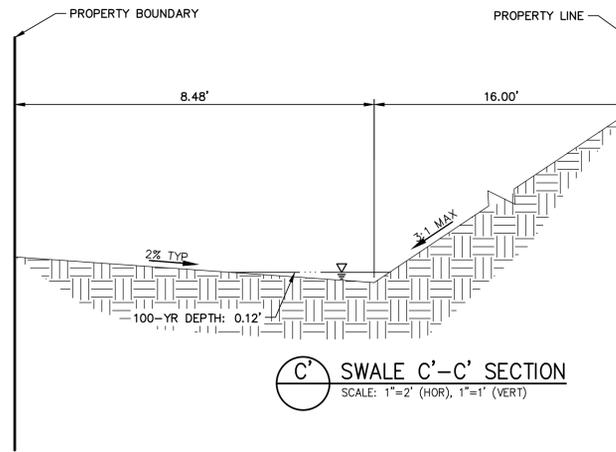
**B SWALE B-B SECTION**  
SCALE: 1"=2' (HOR), 1"=1' (VERT)



**B' SWALE B'-B' SECTION**  
SCALE: 1"=2' (HOR), 1"=1' (VERT)



**C SWALE C-C SECTION**  
SCALE: 1"=2' (HOR), 1"=1' (VERT)



**C' SWALE C'-C' SECTION**  
SCALE: 1"=2' (HOR), 1"=1' (VERT)

**SWALE SECTION NOTES**

1. ALL SWALE SECTIONS ARE FACING UPSTREAM (WEST).
2. SEE LANDSCAPE PLANS BY OTHERS FOR PROPOSED SURFACE MATERIAL.

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR  
**MDC HOLDINGS**  
RICHMOND AMERICAN HOMES  
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DENVER, CO 80237  
ATTN: JASON FOCK  
720-977-3827

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BY	DATE	No.	REVISION

H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
1" = 2'	1" = 1'	01/26/21	RPD	RPD	

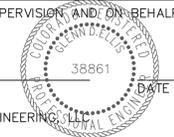
URBAN COLLECTION AT  
PALMER VILLAGE  
SWALE CROSS SECTIONS  
GEC PLANS

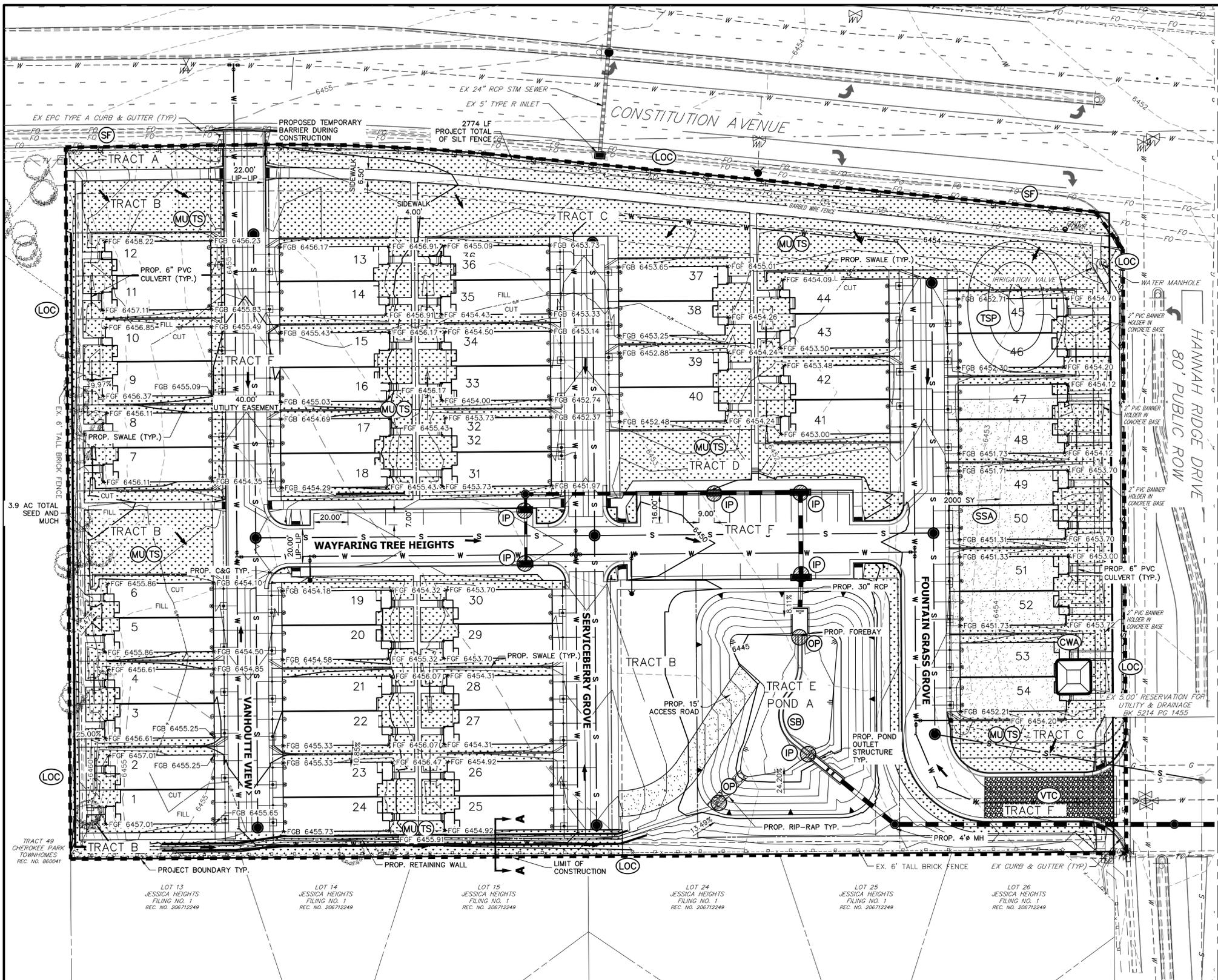


**ENGINEER'S STATEMENT**

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

GLENN D. ELLIS, P.E.  
COLORADO P.E. 38861  
FOR AND ON BEHALF OF JR ENGINEERING, L.L.C.





**LEGEND**

- CHECK DAM (STRAW BALE)
- CONSTRUCTION FENCE
- CONCRETE WASHOUT AREA
- INLET PROTECTION
- LIMITS OF CONSTRUCTION/DISTURBANCE
- OUTLET PROTECTION
- TEMPORARY SEEDING & MULCHING
- SEDIMENT BASIN
- SILT FENCE
- STABILIZED STAGING AREA
- TEMPORARY STOCK PILE
- TEMPORARY SWALE
- VEHICLE TRACKING CONTROL
- EROSION CONTROL BLANKET
- STORMWATER FLOW DIRECTION

**GRADING, EROSION AND STORMWATER QUALITY CONTROL PLAN NOTES**

1. SEE SHEETS 3-5 FOR LIMITS OF SEED AND MULCH AREAS. TOTAL AMOUNT TO RECEIVE TEMPORARY SEED & MULCH IS 10.83 AC.
2. ALL ROADWAY & DRIVE AREAS WILL BE ASPHALT.
3. SEE STORM SEWER & POND IMPROVEMENT PLANS FOR DETAILED DESIGN OF PROPOSED IMPROVEMENTS.
4. FGF = FINISHED GRADE @ FRONT OF BUILDING
5. FGR = FINISHED GRADE @ REAR OF BUILDING
6. THERE WILL BE NO PHASING FOR THIS PROJECT
7. THE EXISTING VEGETATION CONSISTS OF NATIVE GRASSES, AND A FEW SHRUBS AND TREES.

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR  
**MDC HOLDINGS**  
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 DENVER, CO 80237  
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H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	REVISION	
						No.	DATE
1"=30'	1"=3'	01/26/21	MCS	MCS			

URBAN COLLECTION AT  
 PALMER VILLAGE  
 EROSION CONTROL PLAN  
 GEC PLAN

SHEET 4 OF 10  
 JOB NO. 25149.01

THE LOCATIONS OF EXISTING ABOVE GROUND AND UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL ABOVE GROUND AND UNDERGROUND UTILITIES.

ORIGINAL SCALE: 1" = 30'



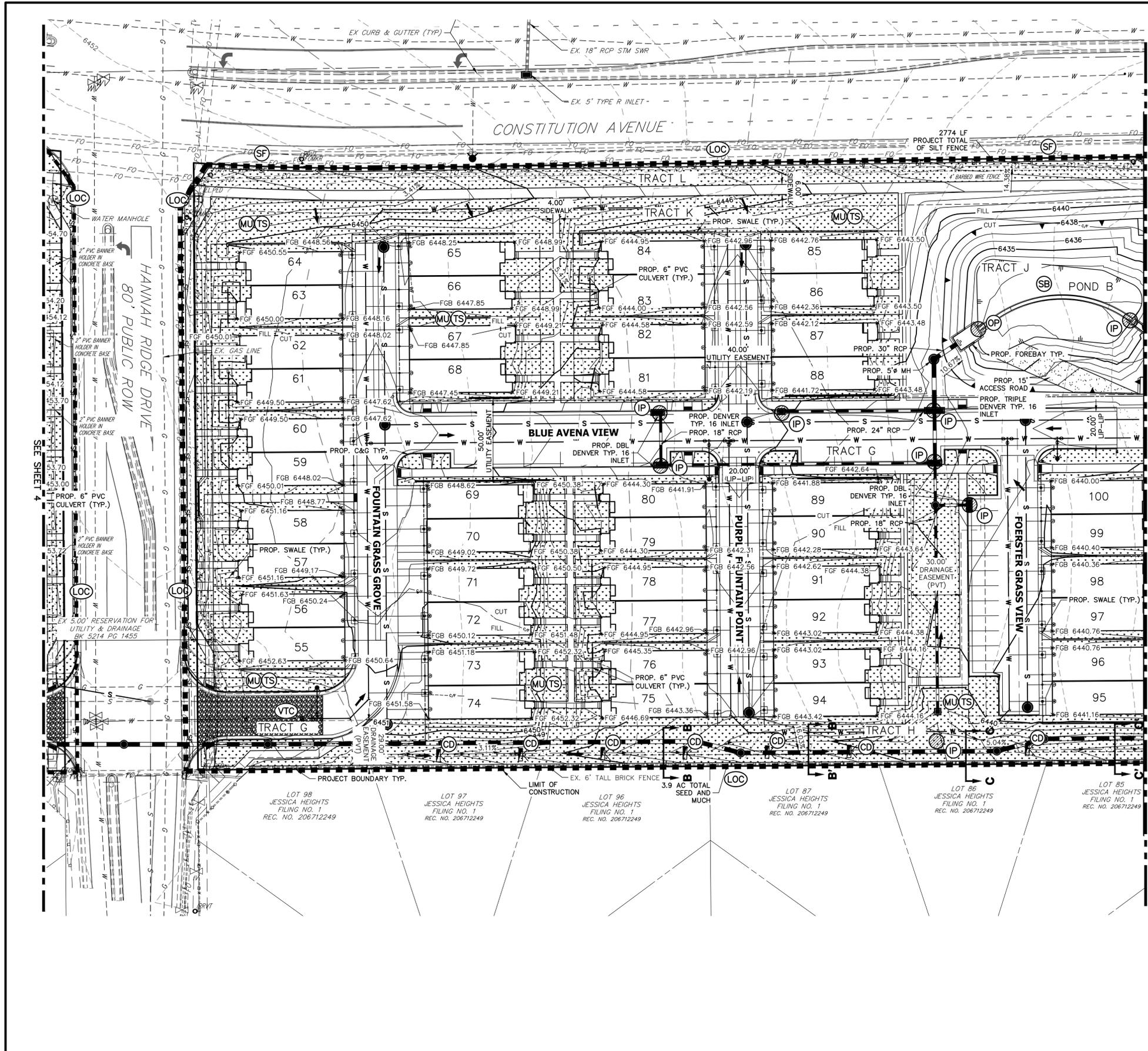
Know what's below.  
 Call before you dig.

**ENGINEER'S STATEMENT**

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

GLENN D. ELLIS, P.E.  
 COLORADO P.E. 38861  
 FOR AND ON BEHALF OF JR ENGINEERING, L.L.C.

38861  
 DATE



**LEGEND**

CHECK DAM (STRAW BALE)	CD	
CONSTRUCTION FENCE	CF	
CONCRETE WASHOUT AREA	CWA	
INLET PROTECTION	IP	
LIMITS OF CONSTRUCTION/DISTURBANCE	LOC	
OUTLET PROTECTION	OP	
TEMPORARY SEEDING & MULCHING	TS/MU	
SEDIMENT BASIN	SB	
SILT FENCE	SF	
STABILIZED STAGING AREA	SSA	
TEMPORARY STOCK PILE	TSP	
TEMPORARY SWALE	TSW	
VEHICLE TRACKING CONTROL	VTC	
EROSION CONTROL BLANKET	ECB	
STORMWATER FLOW DIRECTION		

**GRADING, EROSION AND STORMWATER QUALITY CONTROL PLAN NOTES**

- SEE SHEETS 3-5 FOR LIMITS OF SEED AND MULCH AREAS. TOTAL AMOUNT TO RECEIVE TEMPORARY SEED & MULCH IS 10.83 AC.
- ALL ROADWAY & DRIVE AREAS WILL BE ASPHALT.
- SEE STORM SEWER & POND IMPROVEMENT PLANS FOR DETAILED DESIGN OF PROPOSED IMPROVEMENTS.
- FGF= FINISHED GRADE @ FRONT OF BUILDING
- FRG= FINISHED GRADE @ REAR OF BUILDING
- THERE WILL BE NO PHASING FOR THIS PROJECT
- THE EXISTING VEGETATION CONSISTS OF NATIVE GRASSES, AND A FEW SHRUBS AND TREES.

THE LOCATIONS OF EXISTING ABOVE GROUND AND UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL ABOVE GROUND AND UNDERGROUND UTILITIES.

ORIGINAL SCALE: 1" = 30'  
  
**Know what's below. Call before you dig.**

**ENGINEER'S STATEMENT**  
 PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

GLENN D. ELLIS, P.E.  
 COLORADO P.E. 38861  
 FOR AND ON BEHALF OF JR ENGINEERING, L.L.C.

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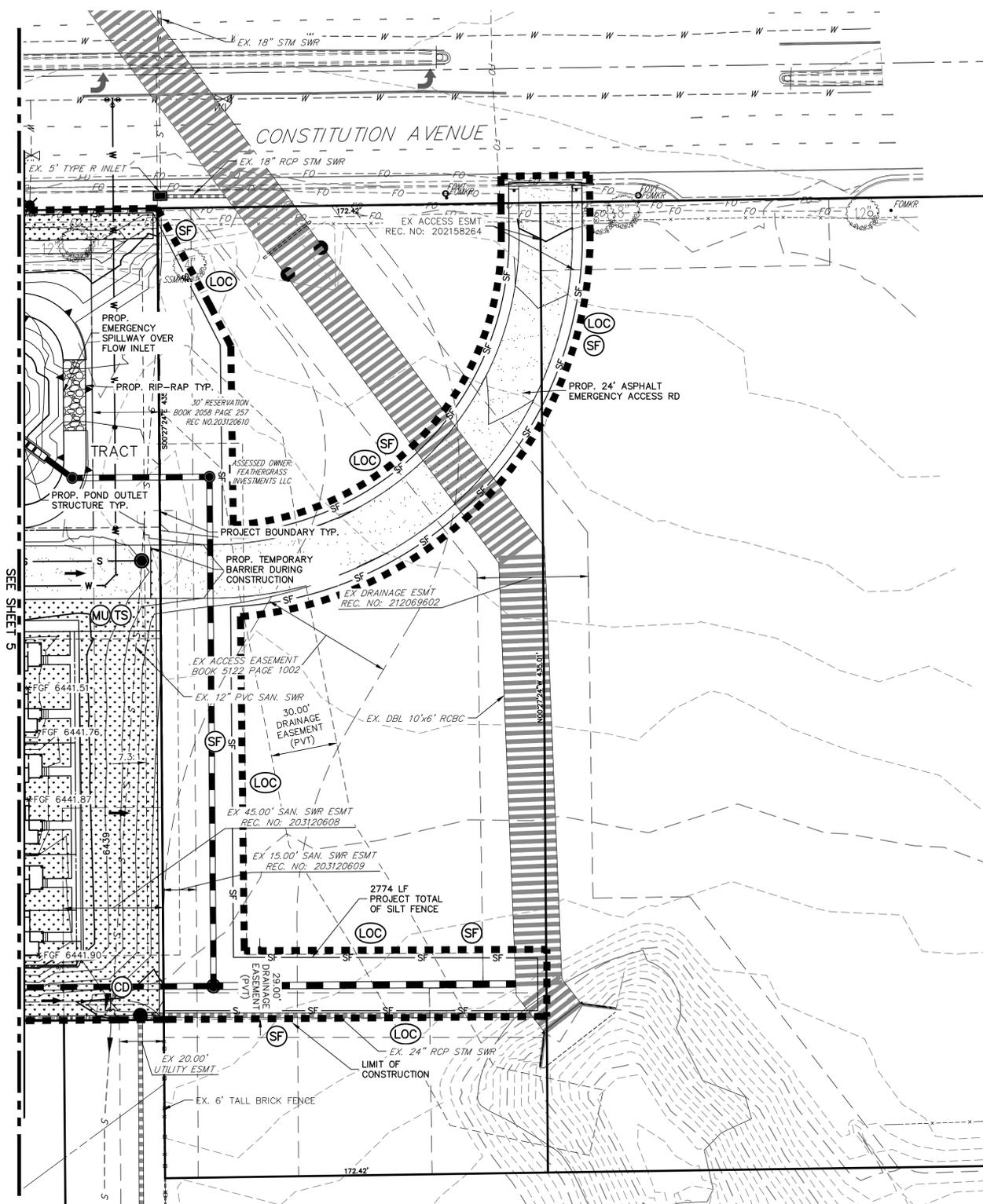
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BY	DATE
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V-SCALE	1"=3'
DATE	01/26/21
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CHECKED BY	

URBAN COLLECTION AT PALMER VILLAGE  
 EROSION CONTROL PLAN  
 GEC PLAN

SHEET 5 OF 10  
 JOB NO. 25149.01



**LEGEND**

CHECK DAM (STRAW BALE)	CD	
CONSTRUCTION FENCE	CF	
CONCRETE WASHOUT AREA	CWA	
INLET PROTECTION	IP	
LIMITS OF CONSTRUCTION/DISTURBANCE	LOC	
OUTLET PROTECTION	OP	
TEMPORARY SEEDING & MULCHING	TS/MU	
SEDIMENT BASIN	SB	
SILT FENCE	SF	
STABILIZED STAGING AREA	SSA	
TEMPORARY STOCK PILE	TSP	
TEMPORARY SWALE	TSW	
VEHICLE TRACKING CONTROL	VTC	
EROSION CONTROL BLANKET	ECB	
STORMWATER FLOW DIRECTION		

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ORIGINAL SCALE: 1" = 30'

**ENGINEER'S STATEMENT**  
 PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

GLENN D. ELLIS, P.E.  
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 FOR AND ON BEHALF OF JR ENGINEERING

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BY	DATE	No.	REVISION

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 V-SCALE 1"=3'  
 DATE 01/26/21  
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 CHECKED BY

**URBAN COLLECTION AT PALMER VILLAGE**  
**EROSION CONTROL PLAN**  
**GEC PLAN**

SHEET 6 OF 10  
 JOB NO. 25149.01





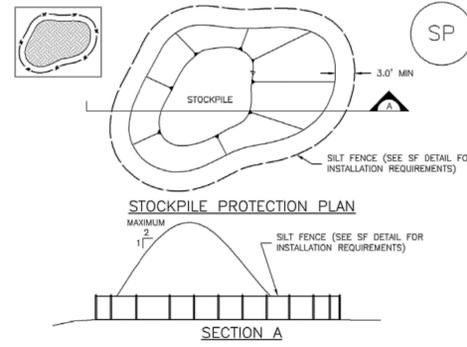
**MM-1 Concrete Washout Area (CWA)**

**CWA MAINTENANCE NOTES**

1. INSPECT BMPs EACH WORKDAY, 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 PITS 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 DOUGLAS 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.

CWA-4 Urban Drainage and Flood Control District November 2010  
Urban Storm Drainage Criteria Manual Volume 3

**MM-2 Stockpile Management (SP)**



**SP-1. STOCKPILE PROTECTION**

- STOCKPILE PROTECTION INSTALLATION NOTES**
1. SEE PLAN VIEW FOR:  
-LOCATION OF STOCKPILES.  
-TYPE OF STOCKPILE PROTECTION.
  2. INSTALL PERIMETER CONTROLS IN ACCORDANCE WITH THEIR RESPECTIVE DESIGN DETAILS. SILT FENCE IS SHOWN IN THE STOCKPILE PROTECTION DETAILS; HOWEVER, OTHER TYPES OF PERIMETER CONTROLS INCLUDING SEDIMENT CONTROL LOGS OR ROCK SOCKS MAY BE SUITABLE IN SOME CIRCUMSTANCES. CONSIDERATIONS FOR DETERMINING THE APPROPRIATE TYPE OF PERIMETER CONTROL FOR A STOCKPILE INCLUDE WHETHER THE STOCKPILE IS LOCATED ON A PERVIOUS OR IMPERVIOUS SURFACE, THE RELATIVE HEIGHTS OF THE PERIMETER CONTROL AND STOCKPILE, THE ABILITY OF THE PERIMETER CONTROL TO CONTAIN THE STOCKPILE WITHOUT FAILING IN THE EVENT THAT MATERIAL FROM THE STOCKPILE SHIFTS OR SLUMPS AGAINST THE PERIMETER, AND OTHER FACTORS.
  3. STABILIZE THE STOCKPILE SURFACE WITH SURFACE ROUGHENING, TEMPORARY SEEDING AND MULCHING. EROSION CONTROL BLANKETS OR SOIL BINDERS SOILS STOCKPILED FOR AN EXTENDED PERIOD (TYPICALLY FOR MORE THAN 60 DAYS) SHOULD BE SEEDED AND MULCHED WITH A TEMPORARY GRASS COVER ONCE THE STOCKPILE IS PLACED (TYPICALLY WITHIN 14 DAYS). USE OF MULCH ONLY OR A SOIL BINDER IS ACCEPTABLE IF THE STOCKPILE WILL BE IN PLACE FOR A MORE LIMITED TIME PERIOD (TYPICALLY 30-60 DAYS).
  4. FOR TEMPORARY STOCKPILES ON THE INTERIOR PORTION OF A CONSTRUCTION SITE, WHERE OTHER DOWNGRADIENT CONTROLS, INCLUDING PERIMETER CONTROL, ARE IN PLACE, STOCKPILE PERIMETER CONTROLS MAY NOT BE REQUIRED.

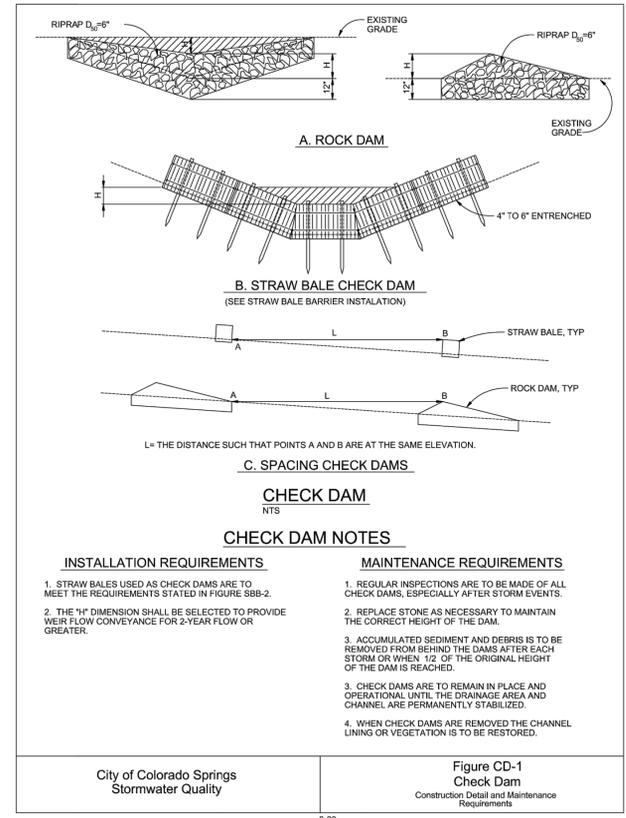
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**MM-2 Stockpile Management (SM)**

**STOCKPILE PROTECTION MAINTENANCE NOTES**

1. INSPECT BMPs EACH WORKDAY, 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. IF PERIMETER PROTECTION MUST BE MOVED TO ACCESS SOIL STOCKPILE, REPLACE PERIMETER CONTROLS BY THE END OF THE WORKDAY.
  5. STOCKPILE PERIMETER CONTROLS CAN BE REMOVED ONCE ALL THE MATERIAL FROM THE STOCKPILE HAS BEEN USED.
- (DETAILS ADAPTED FROM 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.

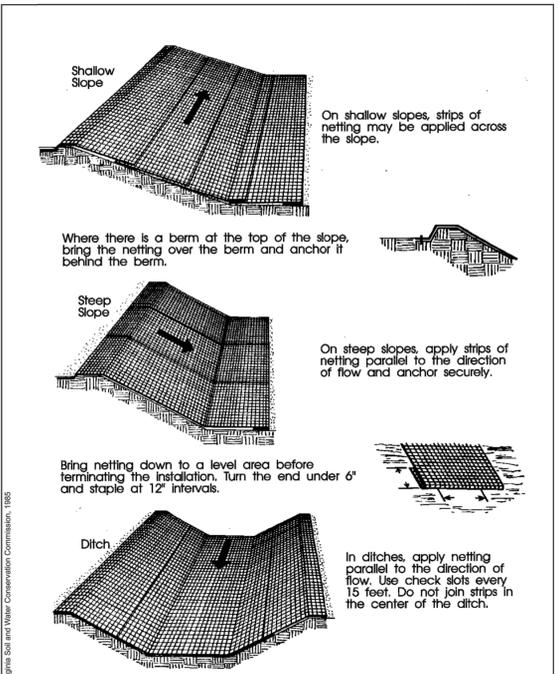
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**CHECK DAM NOTES**

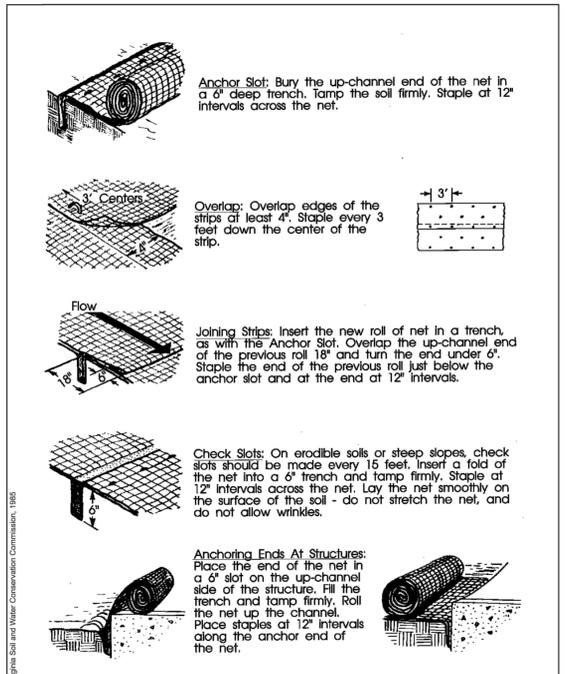
- INSTALLATION REQUIREMENTS**
1. STRAW BALES USED AS CHECK DAMS ARE TO BE MADE OF ALL CHECK DAMS, ESPECIALLY AFTER STORM EVENTS.
  2. THE 1" DIMENSION SHALL BE SELECTED TO PROVIDE WEIR FLOW CONVEYANCE FOR 2-YEAR FLOW OR GREATER.
- MAINTENANCE REQUIREMENTS**
1. REGULAR INSPECTIONS ARE TO BE MADE OF ALL CHECK DAMS, ESPECIALLY AFTER STORM EVENTS.
  2. REPLACE STONE AS NECESSARY TO MAINTAIN THE CORRECT HEIGHT OF THE DAM.
  3. ACCUMULATED SEDIMENT AND DEBRIS IS TO BE REMOVED FROM BEHIND THE DAMS AFTER EACH STORM OR WHEN 1/2 OF THE ORIGINAL HEIGHT OF THE DAM IS REACHED.
  4. CHECK DAMS ARE TO REMAIN IN PLACE AND OPERATIONAL UNTIL THE DRAINAGE AREA AND CHANNEL ARE PERMANENTLY STABILIZED.
  4. WHEN CHECK DAMS ARE REMOVED THE CHANNEL LINING OR VEGETATION IS TO BE RESTORED.

City of Colorado Springs Stormwater Quality Figure CD-1 Check Dam Construction Detail and Maintenance Requirements 3-20



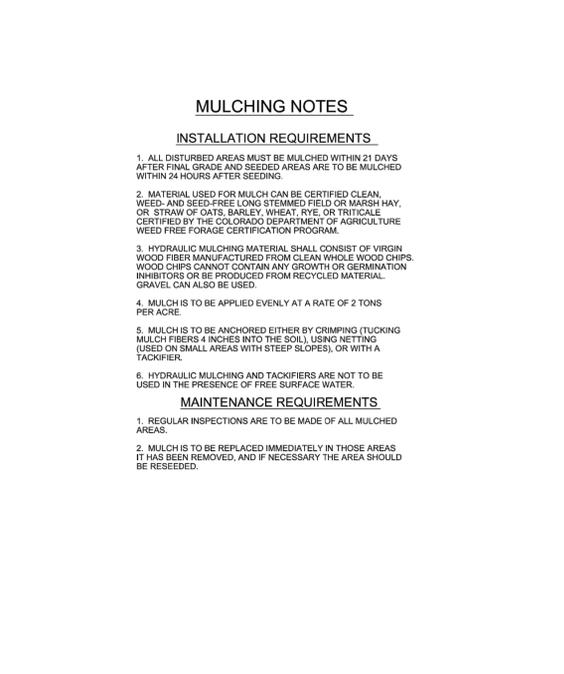
**Figure ECB-1 Erosion Control Blanket Application Examples**

City of Colorado Springs Storm Water Quality Figure ECB-1 Erosion Control Blanket Application Examples 3-22



**Figure ECB-2 Erosion Control Blanket Installation Requirements**

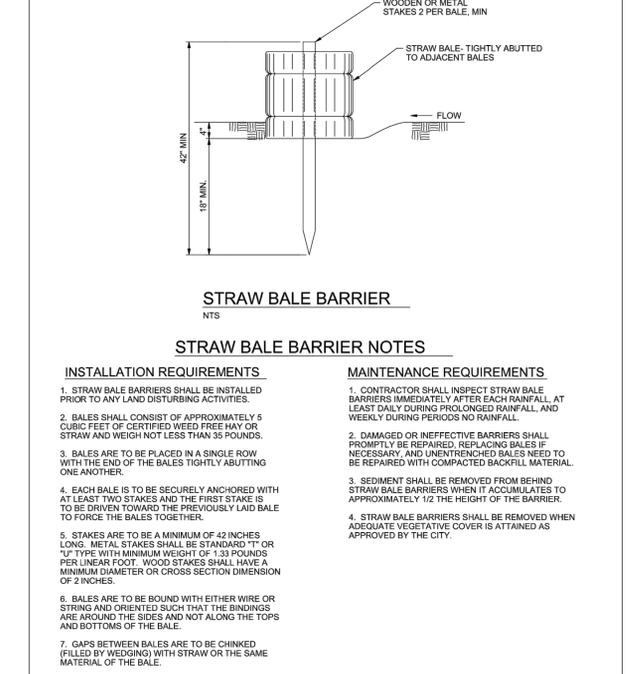
City of Colorado Springs Storm Water Quality Figure ECB-2 Erosion Control Blanket Installation Requirements 3-23



**MULCHING NOTES**

- INSTALLATION REQUIREMENTS**
1. ALL DISTURBED AREAS MUST BE MULCHED WITHIN 21 DAYS AFTER FINAL GRADE AND SEEDING AREAS ARE TO BE MULCHED WITHIN 24 HOURS AFTER SEEDING.
  2. MATERIAL USED FOR MULCH CAN BE CERTIFIED CLEAN, WEED- AND SEED-FREE LONG STEMMED FIELD OR MARSH HAY, OR STRAW OF OATS, BARLEY, WHEAT, RYE, OR TRITICALE. CERTIFIED BY THE COLORADO DEPARTMENT OF AGRICULTURE WEED FREE FORAGE CERTIFICATION PROGRAM.
  3. HYDRAULIC MULCHING MATERIAL SHALL CONSIST OF VIRGIN WOOD FIBER MANUFACTURED FROM CLEAN WHOLE WOOD CHIPS. WOOD CHIPS CANNOT CONTAIN ANY GROWTH OR GERMINATION INHIBITORS OR BE PRODUCED FROM RECYCLED MATERIAL. GRAVEL CAN ALSO BE USED.
  4. MULCH IS TO BE APPLIED EVENLY AT A RATE OF 2 TONS PER ACRE.
  5. MULCH IS TO BE ANCHORED EITHER BY CRIMPING (TUCKING MULCH FIBERS 4 INCHES INTO THE SOIL), USING NETTING (USED ON SMALL AREAS WITH STEEP SLOPES), OR WITH A TACKIFIER.
  6. HYDRAULIC MULCHING AND TACKIFIERS ARE NOT TO BE USED IN THE PRESENCE OF FREE SURFACE WATER.
- MAINTENANCE REQUIREMENTS**
1. REGULAR INSPECTIONS ARE TO BE MADE OF ALL MULCHED AREAS.
  2. MULCH IS TO BE REPLACED IMMEDIATELY IN THOSE AREAS IT HAS BEEN REMOVED, AND IF NECESSARY THE AREA SHOULD BE RESEEDED.

City of Colorado Springs Stormwater Quality Figure MU-1 Mulching Construction Detail and Maintenance Requirements 3-30



**STRAW BALE BARRIER**

- INSTALLATION REQUIREMENTS**
1. CONTRACTOR SHALL INSPECT STRAW BALE BARRIERS IMMEDIATELY AFTER EACH RAINFALL AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS NO RAINFALL.
  2. DAMAGED OR INEFFECTIVE BARRIERS SHALL PROMPTLY BE REPAIRED, REPLACING BALES IF NECESSARY, AND UNENTRENCHED BALES NEED TO BE REPAIRED WITH COMPACTED BACKFILL MATERIAL ONE ANOTHER.
  3. SEDIMENT SHALL BE REMOVED FROM BEHIND STRAW BALE BARRIERS WHEN IT ACCUMULATES TO APPROXIMATELY 1/2 THE HEIGHT OF THE BARRIER.
  4. STRAW BALE BARRIERS SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED AS APPROVED BY THE CITY.
- MAINTENANCE REQUIREMENTS**
1. STRAW BALE BARRIERS SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
  2. BALES SHALL CONSIST OF APPROXIMATELY 5 CUBIC FEET OF CERTIFIED WEED FREE HAY OR STRAW AND WEIGH NOT LESS THAN 35 POUNDS.
  3. BALES ARE TO BE PLACED IN A SINGLE ROW WITH THE END OF THE BALES TIGHTLY ABUTTING ONE ANOTHER.
  4. EACH BALE IS TO BE SECURELY ANCHORED WITH AT LEAST TWO STAKES AND THE FIRST STAKE IS TO BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER.
  5. STAKES ARE TO BE A MINIMUM OF 42 INCHES LONG. METAL STAKES SHALL BE STANDARD "T" OR "U" TYPE WITH MINIMUM WEIGHT OF 1.33 POUNDS PER LINEAR FOOT. WOOD STAKES SHALL HAVE A MINIMUM DIAMETER OR CROSS SECTION DIMENSION OF 2 INCHES.
  6. BALES ARE TO BE BOUND WITH EITHER WIRE OR STRING AND ORIENTED SUCH THAT THE BINDINGS ARE AROUND THE SIDES AND NOT ALONG THE TOPS AND BOTTOMS OF THE BALE.
  7. GAPS BETWEEN BALES ARE TO BE CHINKED (FILLED BY WEDGING) WITH STRAW OR THE SAME MATERIAL OF THE BALE.
  8. END BALES ARE TO EXTEND UPSLOPE SO THE TRAPPED RUNOFF CANNOT FLOW AROUND THE ENDS OF THE BARRIER.

City of Colorado Springs Stormwater Quality Figure SBB-2 Straw Bale Barrier Construction Detail and Maintenance Requirements 3-42



**ENGINEER'S STATEMENT**  
STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

GLENN D. ELLIS, P.E.  
COLORADO P.E. 38861  
FOR AND ON BEHALF OF JR ENGINEERING

38861 DATE

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No.	REVISION	BY	DATE	H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY

URBAN COLLECTION AT PALMER VILLAGE  
DETAILS  
GEC PLANS

SHEET 9 OF 10  
JOB NO. 25149.01

RECOMMENDED ANNUAL GRASSES				
SPECIES (COMMON NAME)	GROWTH SEASON	SEEDING DATE	POUNDS OF PURE LIVE SEED (PLS) (PLS/ACRE)	PLANTING DEPTH (INCHES)
1. OATS	COOL	MARCH 16 - APRIL 30	35-50	1-2
2. SPRING WHEAT	COOL	MARCH 16 - APRIL 30	25-35	1-2
3. SPRING BARLEY	COOL	MARCH 16 - APRIL 30	25-35	1-2
4. ANNUAL RYEGRASS	COOL	MARCH 16 - JUNE 30	10-15	1/2
5. MILLET	WARM	MAY 16 - JULY 15	3-15	1/2-3/4
6. SUDANGRASS	WARM	MAY 16 - JULY 15	5-10	1/2-3/4
7. SORGHUM	WARM	MAY 16 - JULY 15	5-10	1/2-3/4
8. WINTER WHEAT	COOL	SEPTEMBER 1 - 30	20-35	1-2
9. WINTER BARLEY	COOL	SEPTEMBER 1 - 30	20-35	1-2
10. WINTER RYE	COOL	SEPTEMBER 1 - 30	20-35	1-2
11. TRITICALE	COOL	SEPTEMBER 1 - 30	25-40	1-2

THIS TABLE WAS TAKEN FROM UDFCD FOR RECOMMENDED ANNUAL GRASSES FOR THE DENVER METROPOLITAN AREA. THIS TABLE MAY BE USED UNLESS A SITE-SPECIFIC SEED MIX IS REQUESTED AND APPROVED.

TABLE TS-1

TEMPORARY SEEDING NOTES

INSTALLATION REQUIREMENTS

- DISTURBED AREAS ARE TO BE SEEDDED WITHIN 21 DAYS AFTER CONSTRUCTION ACTIVITY OR GRADING ENDS IF SEASON ALLOWS.
- IF NECESSARY, SOIL IS TO BE CONDITIONED FOR PLANT GROWTH BY APPLYING TOPSOIL, FERTILIZER, OR LIME.
- SOIL IS TO BE TILLED IMMEDIATELY PRIOR TO APPLYING SEEDS. COMPACT SOILS ESPECIALLY NEED TO BE LOOSENEED.
- SEEDBED DEPTH IS TO BE 4 INCHES FOR SLOPES FLATTER THAN 2:1, AND 1 INCH FOR SLOPES STEEPER THAN 2:1.
- ANNUAL GRASSES LISTED IN TABLE TS-1 ARE TO BE USED FOR TEMPORARY SEEDING. SEED MIXES ARE NOT TO CONTAIN ANY NOXIOUS WEED SEEDS INCLUDING RUSSIAN OR CANADIAN THISTLE, KNAWEED, PURPLE LOOSESTRIPE, EUROPEAN BINDWEED, JOHNSON GRASS, AND LEAFY SPURGE.
- TABLE TS-1 ALSO PROVIDES REQUIREMENTS FOR SEEDING RATES, SEEDING DATES, AND PLANTING DEPTHS FOR THE APPROVED TYPES OF ANNUAL GRASSES.
- SEEDING IS TO BE APPLIED USING MECHANICAL TYPE DRILLS EXCEPT WHERE SLOPES ARE STEEP OR ACCESS IS LIMITED THEN HYDRAULIC SEEDING MAY BE USED.
- ALL SEEDDED AREAS ARE TO BE MULCHED (SEE FACTSHEET ON MULCHING).
- IF HYDRAULIC SEEDING IS USED THEN HYDRAULIC MULCHING SHALL BE DONE SEPARATELY TO AVOID SEEDS BECOMING ENCAPSULATED IN THE MULCH.

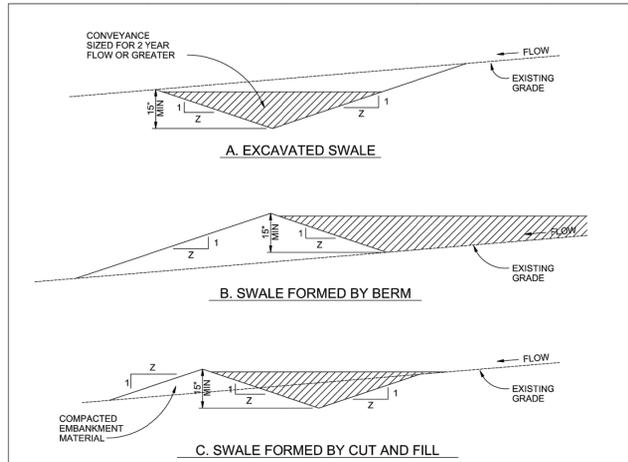
MAINTENANCE REQUIREMENTS

- REGULAR INSPECTIONS ARE TO BE MADE OF ALL SEEDDED AREAS TO ENSURE GROWTH.
- AREAS WHERE GROWTH IS NOT OCCURRING QUICKLY OR THE MULCH HAS BEEN REMOVED SHALL BE RE-SEEDDED AS SOON AS POSSIBLE AND RE-MULCHED IF NEEDED.
- SEEDDED AREAS ARE NOT TO BE DRIVEN OVER WITH CONSTRUCTION EQUIPMENT OR VEHICLES.

City of Colorado Springs  
Stormwater Quality

Figure TS-1  
Temporary Seeding  
Construction Detail and Maintenance  
Requirements

3-47



TEMPORARY SWALE

TEMPORARY SWALE NOTES

INSTALLATION REQUIREMENTS

- TEMPORARY SWALES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
- THE AREA UNDER WHICH THE EMBANKMENT IS TO BE INSTALLED SHALL BE CLEARED, GRUBBED, AND STRIPPED OF ALL VEGETATION AND ROOT MAT.
- EMBANKMENT MATERIAL SHALL CONSIST OF SOIL WITH A MINIMUM OF 15% PASSING A #200 SIEVE. EXCAVATED SOIL CAN BE USED IF IT MEETS THIS REQUIREMENT.
- EMBANKMENT IS TO BE COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT ACCORDING TO ASTM D 698.
- SWALES WITH SLOPE > 2% SHALL BE LINED, SEE FIGURE TSW-3.
- SWALES ARE TO DRAIN INTO A SEDIMENT BASIN OR OTHER STABILIZED OUTLET.
- Z SHALL BE 3 OR GREATER.

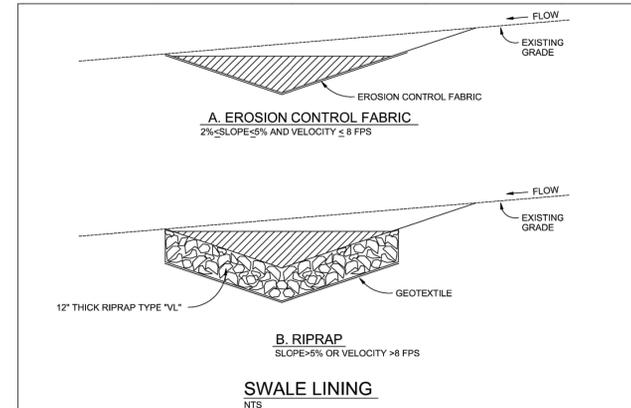
MAINTENANCE REQUIREMENTS

- CONTRACTOR SHALL INSPECT SWALES AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS OF NO RAINFALL.
- SWALES SHALL BE ROUTINELY CLEARED OF ANY DEBRIS OR ACCUMULATION OF SEDIMENT.
- ERODED SLOPES OR DAMAGED LININGS SHALL IMMEDIATELY BE REPAIRED.
- TEMPORARY SWALES SHALL REMAIN OPERATIONAL AND PROPERLY MAINTAINED UNTIL THE SITE AREA IS PERMANENTLY STABILIZED WITH ADEQUATE VEGETATIVE COVER AND/OR OTHER PERMANENT STRUCTURE AS APPROVED BY THE CITY.

City of Colorado Springs  
Stormwater Quality

Figure TSW-2  
Temporary Swale  
Construction Detail and Maintenance  
Requirements

3-50



SWALE LINING NOTES

INSTALLATION REQUIREMENTS

- REFER TO THE EROSION CONTROL BLANKETS FACTSHEET FOR PROPER INSTALLATION OF EROSION CONTROL FABRIC LINING.
- SWALES WITH EASILY ERODIBLE SOILS AND SLOPES LESS THAN 2%, SHALL BE LINED WITH EROSION CONTROL FABRIC.
- VELOCITIES FOR EROSION CONTROL FABRICS SHALL NOT EXCEED 8 FPS. SWALES WITH VELOCITIES GREATER THAN 8 FPS SHALL BE LINED WITH RIP RAP.

MAINTENANCE REQUIREMENTS

- CONTRACTOR SHALL INSPECT SWALE LININGS AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL AND WEEKLY DURING PERIODS OF NO RAINFALL.
- DAMAGED LININGS SHALL IMMEDIATELY BE REPAIRED.
- REFER TO THE EROSION CONTROL BLANKETS FACTSHEET FOR PROPER MAINTENANCE.
- DISPLACED RIPRAP OR COARSE AGGREGATE IS TO BE REPLACED AS SOON AS POSSIBLE.
- SWALE LININGS ARE TO REMAIN IN PLACE AND BE PROPERLY MAINTAINED UNTIL THE TEMPORARY SWALE IS REMOVED.

City of Colorado Springs  
Stormwater Quality

Figure TSW-3  
Swale Linings  
Construction Detail and Maintenance  
Requirements

3-51

Temporary Outlet Protection (TOP) EC-8

Description

Outlet protection helps to reduce erosion immediately downstream of a pipe, culvert, slope drain, rundown or other conveyance with concentrated, high-velocity flows. Typical outlet protection consists of riprap or rock aprons at the conveyance outlet.



Photograph TOP-1. Riprap outlet protection.

Appropriate Uses

Outlet protection should be used when a conveyance discharges onto a disturbed area where there is potential for accelerated erosion due to concentrated flow. Outlet protection should be provided where the velocity at the culvert outlet exceeds the maximum permissible velocity of the material in the receiving channel.

Note: This Fact Sheet and detail are for temporary outlet protection, outlets that are intended to be used for less than 2 years. For permanent, long-term outlet protection, see the Major Drainage chapter of Volume 1.

Design and Installation

Design outlet protection to handle runoff from the largest drainage area that may be contributing runoff during construction (the drainage area may change as a result of grading). Key in rock, around the entire perimeter of the apron, to a minimum depth of 6 inches for stability. Extend riprap to the height of the culvert or the normal flow depth of the downstream channel, whichever is less. Additional erosion control measures such as vegetative lining, turf reinforcement mat and/or other channel lining methods may be required downstream of the outlet protection if the channel is susceptible to erosion. See Design Detail OP-1 for additional information.

Maintenance and Removal

Inspect apron for damage and displaced rocks. If rocks are missing or significantly displaced, repair or replace as necessary. If rocks are continuously missing or displaced, consider increasing the size of the riprap or deeper keying of the perimeter.

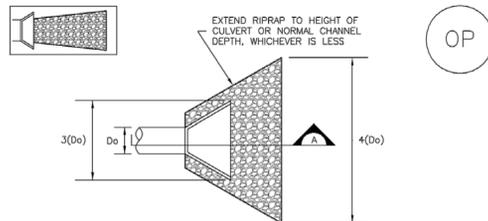
Remove sediment accumulated at the outlet before the outlet protection becomes buried and ineffective. When sediment accumulation is noted, check that upgradient BMPs, including inlet protection, are in effective operating condition.

Outlet protection may be removed once the pipe is no longer draining an upstream area, or once the downstream area has been sufficiently stabilized. If the drainage pipe is permanent, outlet protection can be left in place; however, permanent outlet protection should be designed and constructed in accordance with the requirements of the Major Drainage chapter of Volume 2.

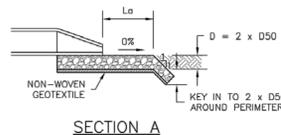
Outlet Protection	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No

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Temporary Outlet Protection (TOP) EC-8



TEMPORARY OUTLET PROTECTION PLAN



SECTION A

TABLE OP-1. TEMPORARY OUTLET PROTECTION SIZING TABLE			
PIPE DIAMETER, Dp (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5	5	4
	5	10	6
	10	10	6
12	5	10	4
	10	13	6
	20	16	9
18	30	23	12
	40	26	16
	50	16	9
24	40	26	12
	50	26	12
	60	30	16

OP-1. TEMPORARY OUTLET PROTECTION

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Urban Storm Drainage Criteria Manual Volume 3

Temporary Outlet Protection (TOP) EC-8

TEMPORARY OUTLET PROTECTION INSTALLATION NOTES

- SEE PLAN VIEW FOR LOCATION OF OUTLET PROTECTION. DIMENSIONS OF OUTLET PROTECTION.
- DETAIL IS INTENDED FOR PIPES WITH SLOPE < 10%. ADDITIONAL EVALUATION OF RIPRAP SIZING AND OUTLET PROTECTION DIMENSIONS REQUIRED FOR STEEPER SLOPES.
- TEMPORARY OUTLET PROTECTION INFORMATION IS FOR OUTLETS INTENDED TO BE UTILIZED LESS THAN 2 YEARS.

TEMPORARY OUTLET PROTECTION INSPECTION AND MAINTENANCE NOTES

- INSPECT BMPs EACH WORKDAY, 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.
- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

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.

(DETAILS ADAPTED FROM AURORA, COLORADO AND PREVIOUS VERSION OF VOLUME 3, NOT AVAILABLE IN AUTOCAD)

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Urban Storm Drainage Criteria Manual Volume 3



Know what's below.  
Call before you dig.

ENGINEER'S STATEMENT

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT



GLENN D. ELLIS, P.E.  
COLORADO P.E. 38861  
FOR AND ON BEHALF OF JR ENGINEERING

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE FOR THE PROJECTS DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR  
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Fort Collins 970-491-9888 • www.jrengineering.com

BY	DATE	REVISION	No.	N/A	N/A	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
						01/26/21	MCS	MCS	

URBAN COLLECTION AT  
PALMER VILLAGE  
DETAILS  
GEC PLANS

SHEET 10 OF 10  
JOB NO. 25149.01