

El Paso County  
STORMWATER MANAGEMENT PLAN

**Short Stop Restaurant**  
Part of Lot 1, Powers Centre Filing No. 3  
Section 6, Township 14 South, Range 65 West of the 6<sup>th</sup> P.M.  
5819 Palmer Park Boulevard

October 2, 2017

Revised  
November 15, 2018

Revised  
December 20, 2018

prepared for

Short Stop Restaurant

Oliver E. Watts, Consulting Engineer, Inc.  
Colorado Springs, Colorado

**OLIVER E. WATTS, PE-LS**

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**Celebrating over 39 years in business**

December 20, 2018

El Paso County D.O.T.  
2880 International Circle  
suite 110  
Colorado Springs, CO 80910

ATTN: Daniel Torres

SUBJECT: Stormwater Management Plan  
Short Stop Restaurant

Transmitted herewith for your review and approval is the SWMP for the Short Stop Restaurant, located at 5819 Palmer Park Boulevard. It has been revised per the County review comments / letter dated 11-15-18 and 12-18-18.

Please contact our office if we may provide any further information.

Oliver E. Watts, Consulting Engineer, Inc.

BY: \_\_\_\_\_  
Erik S. Watts, Authorized Representative  
Erosion Control Supervisor

The developer / owner has read and will comply with all of the requirements specified in this stormwater management report.

By: \_\_\_\_\_  
Ted Vong  
Short Stop Restaurant  
485 N Circle Drive  
Colorado Springs, CO 80909

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## 1. SITE DESCRIPTION:

The Short Stop Restaurant Site is located on the east side of Powers Boulevard just south of the Palmer Park, in the 'old K-Mart Shopping Center'. 5819 Palmer Park Boulevard: Section 6, Township 14 South, Range 65 West of the 6<sup>th</sup> P.M., in El Paso County. It is a portion of Lot 1, Powers Centre Filing No. 3. The overall Site totals 5.5 acres. Grading is also to occur on 0.067 acres of the existing, paved, parking lot.

**a) Construction activity description:** Construction activity will include; overlot grading, curb/gutter installation, utility installation and building construction. The erosion control pond will be installed in the southwest portion of the site, during said overlot grading, to mitigate any runoff associated with overlot grading construction activities. The site will be landscaped once all construction has been completed.

**b) Sequence / time line of activities:** The site will be graded in compliance with El Paso County Code. Grading for the site is scheduled to be completed by December 2018. Total site disturbance will be 0.067 acres / 2951 square feet.

**c) Site area:** Lot 1 is 5.55 acres total. The portion of the site that is to experience grading is approximately 0.067 acres. The Site is not vegetated; it is an existing paved parking.

**d) Runoff:** Overall runoff from the Site will remain at historic levels. Attached is the "Description of Runoff" section from the sites drainage letter:

*This Site was previously platted as Powers Center Filing no. 3. At that time a drainage report was submitted and approved by El Paso County, Colorado. The portion of the parking lot to be occupied by the restaurant is totally asphalt paved at this time. The construction of the drive in could arguably have less impervious cover than that of the existing parking, although for the sake of computations the impervious ratio is assumed to be 80% in keeping with the existing zoning. The entire lot area associated with the construction occupies 0.469 acre on an approximate slope of four percent. The runoff from the entire area is computed to be 2.0 cfs / 3.6 cfs, not including potential inflows from the north.*

*A sand filter basin is proposed to mitigate the placement of the restaurant, as required by County regulations. Based on the 2951 square foot footprint of the total disturbed area, the required storage is 90 cubic feet. The basin will be placed in an existing parking island in the southwest corner of the site, and is proposed to be constructed of vertical masonry walls with the sand filter floor of 62 square feet, as shown in the enclosed computations. A curb outlet will route the runoff into the basin.*

This parcel is not within the limits of a designated flood plain or flood hazard area, as identified on FEMA Panel No.'s 08041C0751 G 08041C0752 G, both dated December 7, 2018, a copy of which is enclosed for reference. The portions to be graded, are outside the flood plain, as shown on the drainage plan.

Review 2: Unresolved  
Review 3: Revise the text so that it matches what is indicated on the drainage report.

The method used for all computations is that specified in the City-County Drainage Criteria Manual, using the rational method for areas of the size of the site and the SCS method for the review of the major basin involved. All computations are enclosed for reference and review.

The local USDA/SCS office has mapped the soils in the area. A soils map interpretation sheet is enclosed for reference. All soils in this area are of hydrologic group "B", Blendon. It has moderate to high erosion hazards with both water and wind and is listed as having high potential for successful reseeding, especially with 'native' grasses. Potential erosion impacts would affect the parking lot and sediment pond. Silt fencing and/or hay bales will serve to mitigate this hazard.

**e) Existing vegetation:** As stated previously; Item 1, C "Site Area," the site is current a paved parking lot: The area is to be developed as listed in this report implemented.

**f) Potential pollution sources:** None are known to exist.

**g) Non stormwater discharge:** No springs are known to exist. Any additional discharge is confined to the surface and runoff routed to the aforementioned detention pond. As such, water flowing in Sand Creek will not be affected by this project.

**h) Receiving water(s), size, type and description of outfall(s):** Sand Creek and ultimately Fountain Creek is the receiving water for stormwater discharge from this Site. Outfalls are shown on the enclosed drainage plan.

## **2. SITE MAP:**

Enclosed are a vicinity map and drainage plan for review. Details for the BMP's are listed in the rear of this report.

## **3. BMPs FOR STORMWATER POLLUTION PREVENTION:**

### **a) Erosion and sediment controls:**

**1) Structural practices:** Erosion will be contained through the use of silt fencing, and hay bale check dams.

**2) Non-Structural practices:** Permanent stabilization practices will be implemented on this Site through landscaping. See the approved landscape plan for details.

**b) Materials handling and Spills Prevention:** There are no plans to have any On-Site batch plant(s).

Vehicle refueling will take place away from areas containing or conveying water in accordance with State approved practices. Should a fuel or fluid spill occur, the contractor will County and State guidelines concerning spills such as; berming the area around the spill and remove all contaminated soil in an approved container and disposing of said containing at a County / State approved facility / Site.

**4. FINAL STABILIZATION AND LONG TERM STORMWATER MANAGEMENT:**

As stated earlier, copies of the drainage plan is submitted for your review. This Plan should adequately address this section. Our office will have inspectors monitoring the Site during construction to insure compliance with applicable State and El Paso County Code(s). The Permittee will contact your office upon final stabilization, once the silt fencing and/or hay bales have been removed and the vegetation in the landscaped parking medians is established.

**5. OTHER CONTROLS:**

Please review the enclosed Grading Plan. It details said controls. Waste disposal will be in accordance with El Paso County standards. The existing parking lot will serve as a rock mat to remove any soil from vehicles before entering Palmer Park Boulevard.

**6. INSPECTION AND MAINTENANCE:**

The owner, the architect, John Nelson, as well as this office will monitor the day to day Site activities during the construction. A copy of this report will be kept in the vehicle of said inspector. Inspections will occur and reports will be filled out every 14 days, and/or after a precipitation event as required, to ensure adequate operation and design of selected BMP's. Copies of said inspection reports will be kept in the site trailer and at this office. Silt fencing and/or hay bales will need to be replaced and/or repaired as need be. The sediment basin / pond will need to be inspection to insure the inlet and outlet structures have not been clogged or been damaged / collapsed. All liter and debris should be removed form the pond and disposed off of the site (i.e. in a trash bag, trash can, dumpster).

**7. SWMP REVISION PROCEDURES:**

This SWMP should be revised as necessary to address changing site conditions and BMP needs. The need for revision could include the following: Stabilization, continued overlot grading, removal of one of more BMP as items are completed, the weather and precipitation could affect and cause a needed revision in the SWMP. This office will revise accordingly.

**8. FINAL STABILIZATION:**

**Re-seed mixture**

The area is current a paved parking area. No reseedling will be done.

# National Flood Hazard Layer FIRMette



38°51'27.52"N



USGS The National Map: Orthoimagery, Data refreshed October, 2017. 38°50'59.51"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, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes, Zone X
- Area with Flood Risk due to Levee Zone D

**OTHER AREAS**

- Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone I

**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.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/18/2018 at 4:19:30 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 modernized areas cannot be used for regulatory purposes.

104°42'48.98"W





## Design Procedure Form: Sand Filter (SF)

UD-BMP (Version 3.06, November 2016)

Sheet 1 of 2

3/4

**Designer:** O.E. Watts  
**Company:** OEW Cons. Engr. Inc  
**Date:** September 27, 2018 November 24, 2018 December 19, 2018  
**Project:** 5819 Palmer Park  
**Location:** \_\_\_\_\_

<p><b>1. Basin Storage Volume</b></p> <p>A) Effective Imperviousness of Tributary Area, <math>I_a</math> (100% if all paved and roofed areas upstream of sand filter)</p> <p>B) Tributary Area's Imperviousness Ratio (<math>i = I_a/100</math>)</p> <p>C) Water Quality Capture Volume (WQCV) Based on 12-hour Drain Time <math>WQCV = 0.8 * (0.91 * i^2 - 1.19 * i + 0.78 * i)</math></p> <p>D) Contributing Watershed Area (including sand filter area)</p> <p>E) Water Quality Capture Volume (WQCV) Design Volume <math>V_{WQCV} = WQCV / 12 * Area</math></p> <p>F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm</p> <p>G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume</p> <p>H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)</p>	<p><math>I_a =</math> <u>80.0</u> %</p> <p><math>i =</math> <u>0.800</u></p> <p>WQCV = <u>0.26</u> watershed inches</p> <p>Area = <u>3,998</u> sq ft</p> <p><math>V_{WQCV} =</math> <u>88</u> cu ft</p> <p><math>d_6 =</math> <u>0.60</u> in</p> <p><math>V_{WQCV\ OTHER} =</math> <u>122</u> cu ft</p> <p><math>V_{WQCV\ USER} =</math> _____ cu ft</p>
<p><b>2. Basin Geometry</b></p> <p>A) WQCV Depth</p> <p>B) Sand Filter Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred). Use "0" if sand filter has vertical walls.</p> <p>C) Minimum Filter Area (Flat Surface Area)</p> <p>D) Actual Filter Area</p> <p>E) Volume Provided</p>	<p><math>D_{WQCV} =</math> <u>2.0</u> ft</p> <p><math>Z =</math> <u>0.00</u> ft / ft</p> <p><math>A_{Min} =</math> <u>40</u> sq ft</p> <p><math>A_{Actual} =</math> <u>62</u> sq ft</p> <p><math>V_T =</math> <u>124</u> cu ft</p>
<p><b>3. Filter Material</b></p>	<p>Choose One _____</p> <p><input checked="" type="radio"/> 18" CDOT Class B or C Filter Material</p> <p><input type="radio"/> Other (Explain): _____</p>
<p><b>4. Underdrain System</b></p> <p>A) Are underdrains provided?</p> <p>B) Underdrain system orifice diameter for 12 hour drain time</p> <p style="margin-left: 20px;">i) Distance From Lowest Elevation of the Storage Volume to the Center of the Orifice</p> <p style="margin-left: 20px;">ii) Volume to Drain in 12 Hours</p> <p style="margin-left: 20px;">iii) Orifice Diameter, 3/8" Minimum</p>	<p>Choose One _____</p> <p><input type="radio"/> YES</p> <p><input checked="" type="radio"/> NO</p> <p><math>y =</math> <u>N/A</u> ft</p> <p><math>Vol_{12} =</math> <u>N/A</u> cu ft</p> <p><math>D_o =</math> <u>N/A</u> in</p>

Design Procedure Form: Sand Filter (SF)

Sheet 2 of 2

4/4

Designer: O.E. Watts  
Company: OEW Cons. Engr. Inc  
Date: September 27, 2018 November 24, 2018 December 19, 2018  
Project: 5819 Palmer Park  
Location: \_\_\_\_\_

5. Impermeable Geomembrane Liner and Geotextile Separator Fabric

A) Is an impermeable liner provided due to proximity of structures or groundwater contamination?

Choose One

YES  NO

6-7. Inlet / Outlet Works

A) Describe the type of energy dissipation at inlet points and means of conveying flows in excess of the WQCV through the outlet

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Notes:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Table 6-6. Runoff Coefficients for Rational Method**  
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
<b>Business</b>													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
<b>Residential</b>													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
<b>Industrial</b>													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
<b>Parks and Cemeteries</b>													
Parks	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
<b>Undeveloped Areas</b>													
Historic Flow Analysis-- Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.06	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
<b>Streets</b>													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
<b>Drive and Walks</b>													
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

### 3.2 Time of Concentration

One of the basic assumptions underlying the Rational Method is that runoff is a function of the average rainfall rate during the time required for water to flow from the hydraulically most remote part of the drainage area under consideration to the design point. However, in practice, the time of concentration can be an empirical value that results in reasonable and acceptable peak flow calculations.

For urban areas, the time of concentration ( $t_c$ ) consists of an initial time or overland flow time ( $t_i$ ) plus the travel time ( $t_t$ ) in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time ( $t_i$ ) plus the time of travel in a concentrated form, such as a swale or drainageway. The travel portion ( $t_t$ ) of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or drainageway. Initial time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. The time of concentration is represented by Equation 6-7 for both urban and non-urban areas.

$$t_c = t_i + t_r \quad (\text{Eq. 6-7})$$

Where:

$t_c$  = time of concentration (min)

$t_i$  = overland (initial) flow time (min)

$t_r$  = travel time in the ditch, channel, gutter, storm sewer, etc. (min)

### 3.2.1 Overland (Initial) Flow Time

The overland flow time,  $t_i$ , may be calculated using Equation 6-8.

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \quad (\text{Eq. 6-8})$$

Where:

$t_i$  = overland (initial) flow time (min)

$C_5$  = runoff coefficient for 5-year frequency (see Table 6-6)

$L$  = length of overland flow (300 ft maximum for non-urban land uses, 100 ft maximum for urban land uses)

$S$  = average basin slope (ft/ft)

Note that in some urban watersheds, the overland flow time may be very small because flows quickly concentrate and channelize.

### 3.2.2 Travel Time

For catchments with overland and channelized flow, the time of concentration needs to be considered in combination with the travel time,  $t_b$ , which is calculated using the hydraulic properties of the swale, ditch, or channel. For preliminary work, the overland travel time,  $t_i$ , can be estimated with the help of Figure 6-25 or Equation 6-9 (Guo 1999).

$$V = C_v S_w^{0.5} \quad (\text{Eq. 6-9})$$

Where:

$V$  = velocity (ft/s)

$C_v$  = conveyance coefficient (from Table 6-7)

$S_w$  = watercourse slope (ft/ft)

Table 6-7. Conveyance Coefficient,  $C_v$ 

Type of Land Surface	$C_v$
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

\*For buried riprap, select  $C_v$  value based on type of vegetative cover.

The travel time is calculated by dividing the flow distance (in feet) by the velocity calculated using Equation 6-9 and converting units to minutes.

The time of concentration ( $t_c$ ) is then the sum of the overland flow time ( $t_o$ ) and the travel time ( $t_r$ ) per Equation 6-7.

### 3.2.3 First Design Point Time of Concentration in Urban Catchments

Using this procedure, the time of concentration at the first design point (typically the first inlet in the system) in an urbanized catchment should not exceed the time of concentration calculated using Equation 6-10. The first design point is defined as the point where runoff first enters the storm sewer system.

$$t_c = \frac{L}{180} + 10 \quad (\text{Eq. 6-10})$$

Where:

$t_c$  = maximum time of concentration at the first design point in an urban watershed (min)

$L$  = waterway length (ft)

Equation 6-10 was developed using the rainfall-runoff data collected in the Denver region and, in essence, represents regional “calibration” of the Rational Method. Normally, Equation 6-10 will result in a lesser time of concentration at the first design point and will govern in an urbanized watershed. For subsequent design points, the time of concentration is calculated by accumulating the travel times in downstream drainageway reaches.

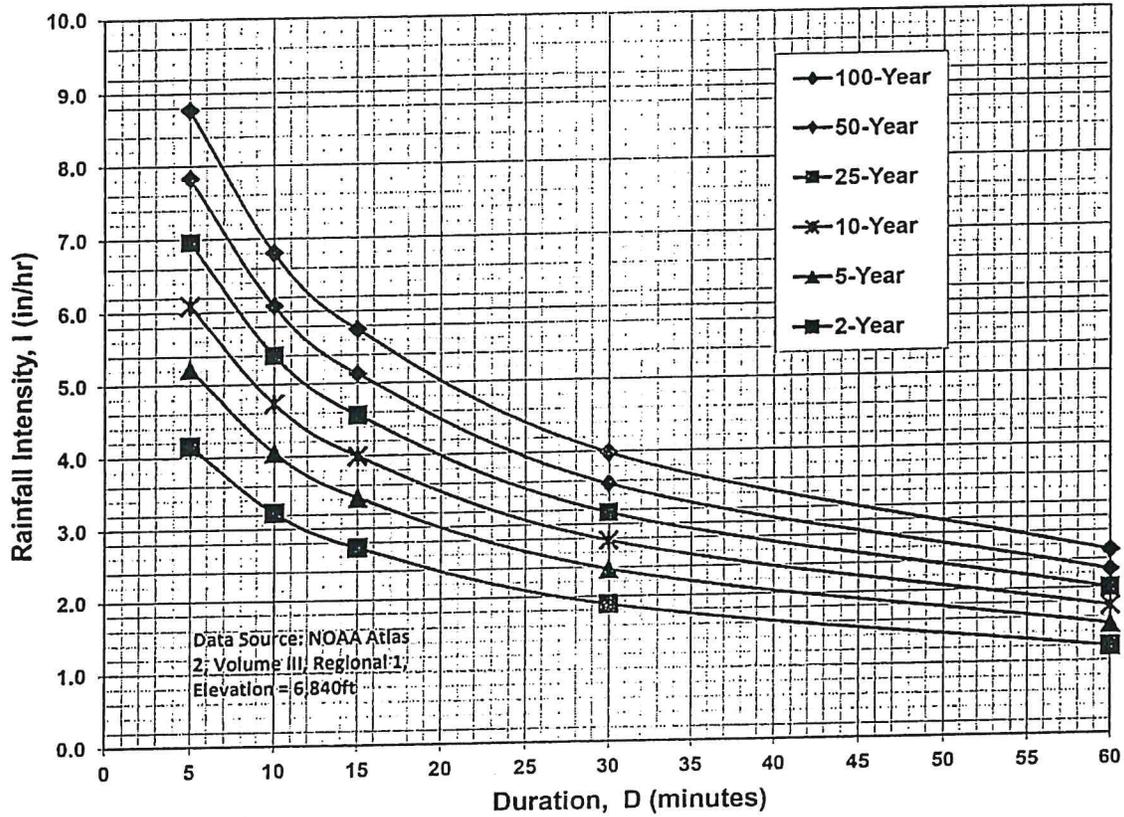
### 3.2.4 Minimum Time of Concentration

If the calculations result in a  $t_c$  of less than 10 minutes for undeveloped conditions, it is recommended that a minimum value of 10 minutes be used. The minimum  $t_c$  for urbanized areas is 5 minutes.

### 3.2.5 Post-Development Time of Concentration

As Equation 6-8 indicates, the time of concentration is a function of the 5-year runoff coefficient for a drainage basin. Typically, higher levels of imperviousness (higher 5-year runoff coefficients) correspond to shorter times of concentration, and lower levels of imperviousness correspond to longer times of

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



**IDF Equations**

$$I_{100} = -2.52 \ln(D) + 12.735$$

$$I_{50} = -2.25 \ln(D) + 11.375$$

$$I_{25} = -2.00 \ln(D) + 10.111$$

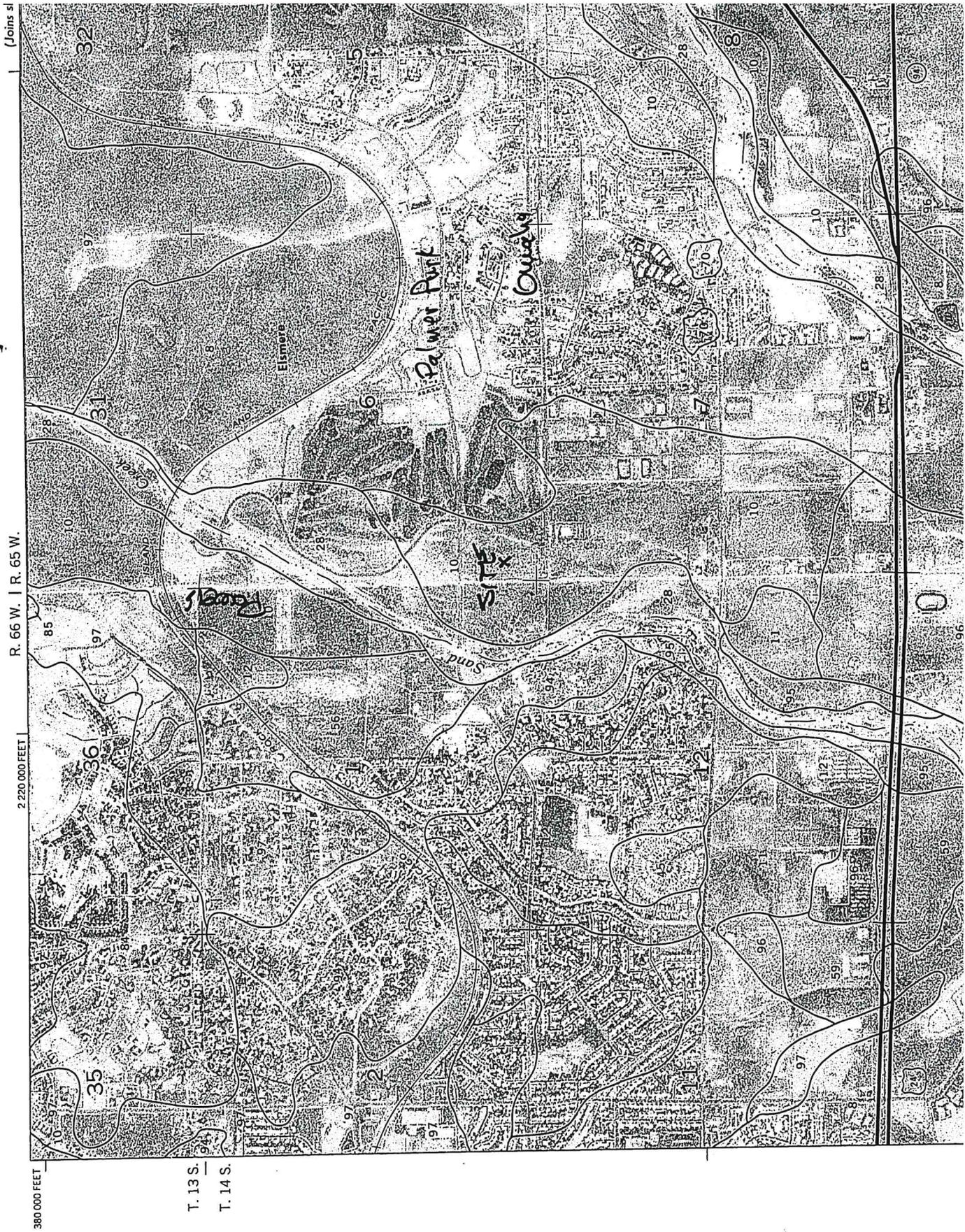
$$I_{10} = -1.75 \ln(D) + 8.847$$

$$I_5 = -1.50 \ln(D) + 7.583$$

$$I_2 = -1.19 \ln(D) + 6.035$$

Note: Values calculated by equations may not precisely duplicate values read from figure.

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE



OLIVER E. WATTS  
CONSULTING ENGINEER, INC.  
COLORADO SPRINGS

6819 PALMER PARK BLVD  
SCS SOILS MAP  
1"=2000'

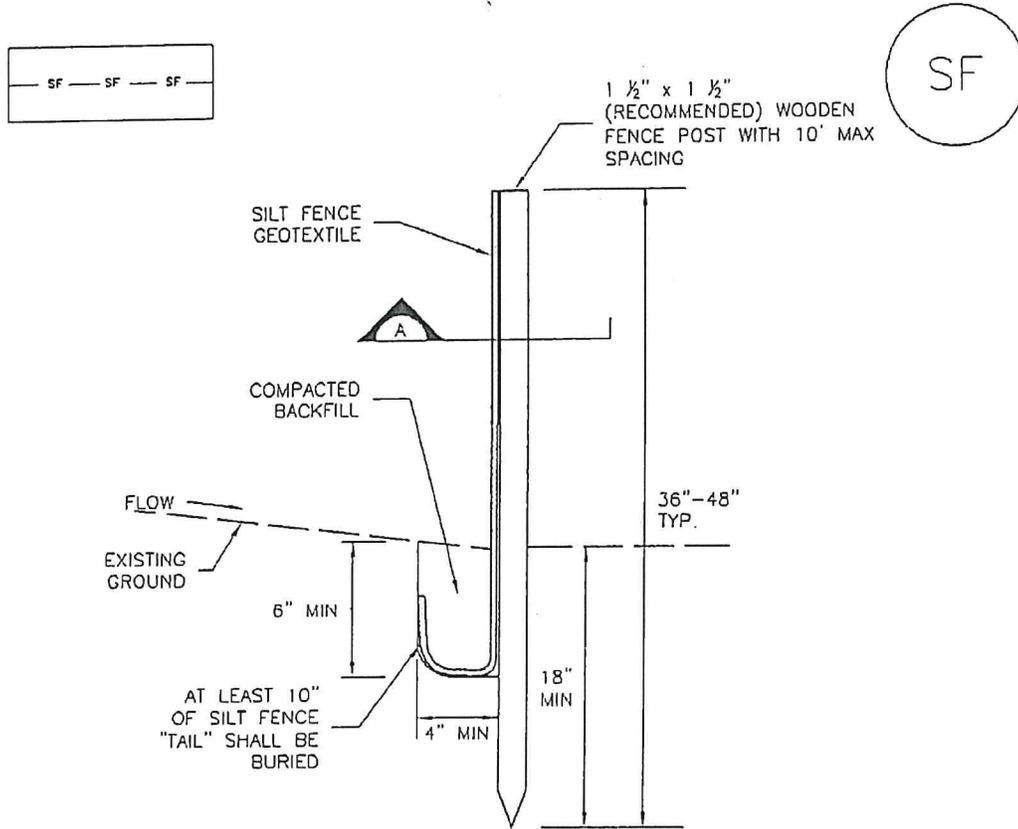
EL PASO COUNTY AREA, COLORADO

TABLE 16.--SOIL AND WATER FEATURES

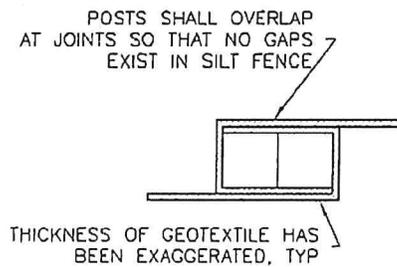
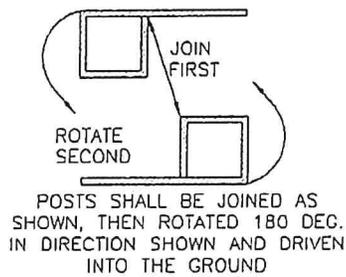
[Absence of an entry indicates the feature is not a concern. See "flooding" in Glossary for definition of terms as "rare," "brief," and "very brief." The symbol > means greater than]

Soil name and map symbol	Hydro-logic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Hardness	
Alamosa: 1-----	C	Frequent-----	Brief-----	May-Jun	>60	---	High.
Ascalon: 2, 3-----	B	None-----	---	---	>60	---	Moderate:
Badland: 4-----	D	---	---	---	---	---	---
Bijou: 5, 6, 7-----	B	None-----	---	---	>60	---	Low.
Blakeland: 8-----	A	None-----	---	---	>60	---	Low.
19: Blakeland part-	A	None-----	---	---	>60	---	Low.
Fluvaquentic Haplaquolls part-----	D	Common-----	Very brief----	Mar-Aug	>60	---	High.
Blendon: 10-----	B	None-----	---	---	>60	---	Moderate.
Bresser: 11, 12, 13-----	B	None-----	---	---	>60	---	Low.
Brussett: 14, 15-----	B	None-----	---	---	>60	---	Moderate.
Chaseville: 16, 17-----	A	None-----	---	---	>60	---	Low.
118: Chaseville part	A	None-----	---	---	>60	---	Low.
Midway part---	D	None-----	---	---	10-20	Rippable	Moderate.
Columbine: 19-----	A	None to rare	---	---	>60	---	Low.
Connerton: 120: Connerton part-	B	None-----	---	---	>60	---	High.
Rock outcrop part-----	D	---	---	---	---	---	---
Cruckton: 21-----	B	None-----	---	---	>60	---	Moderate.
Cushman: 22, 23-----	C	None-----	---	---	20-40	Rippable	Moderate.
124: Cushman part---	C	None-----	---	---	20-40	Rippable	Moderate.
Kutch part---	C	None-----	---	---	20-40	Rippable	Moderate.
Elbeth: 25, 26-----	B	None-----	---	---	>60	---	Moderate.
127: Elbeth part---	B	None-----	---	---	>60	---	Moderate.

See footnote at end of table.



SILT FENCE



SECTION A

SF-1. SILT FENCE

SILT FENCE INSTALLATION NOTES

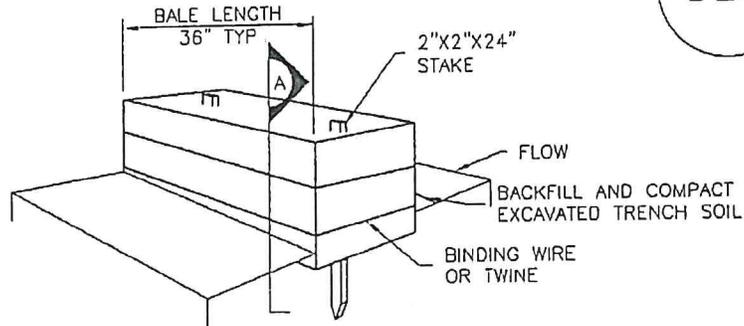
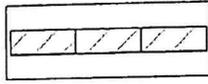
1. SILT FENCE MUST BE PLACED AWAY FROM THE TOE OF THE SLOPE TO ALLOW FOR WATER PONDING. SILT FENCE AT THE TOE OF A SLOPE SHOULD BE INSTALLED IN A FLAT LOCATION AT LEAST SEVERAL FEET (2-5 FT) FROM THE TOE OF THE SLOPE TO ALLOW ROOM FOR PONDING AND DEPOSITION.
2. A UNIFORM 6" X 4" ANCHOR TRENCH SHALL BE EXCAVATED USING TRENCHER OR SILT FENCE INSTALLATION DEVICE. NO ROAD GRADERS, BACKHOES, OR SIMILAR EQUIPMENT SHALL BE USED.
3. COMPACT ANCHOR TRENCH BY HAND WITH A "JUMPING JACK" OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
4. SILT FENCE SHALL BE PULLED TIGHT AS IT IS ANCHORED TO THE STAKES. THERE SHOULD BE NO NOTICEABLE SAG BETWEEN STAKES AFTER IT HAS BEEN ANCHORED TO THE STAKES.
5. SILT FENCE FABRIC SHALL BE ANCHORED TO THE STAKES USING 1" HEAVY DUTY STAPLES OR NAILS WITH 1" HEADS. STAPLES AND NAILS SHOULD BE PLACED 3" ALONG THE FABRIC DOWN THE STAKE.
6. AT THE END OF A RUN OF SILT FENCE ALONG A CONTOUR, THE SILT FENCE SHOULD BE TURNED PERPENDICULAR TO THE CONTOUR TO CREATE A "J-HOOK." THE "J-HOOK" EXTENDING PERPENDICULAR TO THE CONTOUR SHOULD BE OF SUFFICIENT LENGTH TO KEEP RUNOFF FROM FLOWING AROUND THE END OF THE SILT FENCE (TYPICALLY 10' - 20').
7. SILT FENCE SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

SILT FENCE MAINTENANCE NOTES

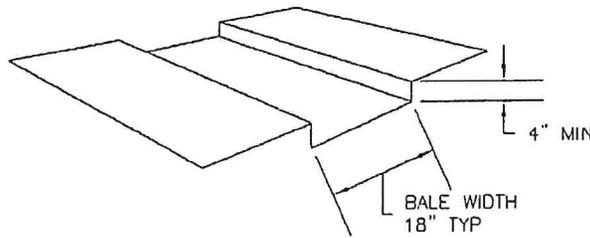
1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS 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. SEDIMENT ACCUMULATED UPSTREAM OF THE SILT FENCE SHALL BE REMOVED AS NEEDED TO MAINTAIN THE FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY 6".
5. REPAIR OR REPLACE SILT FENCE WHEN THERE ARE SIGNS OF WEAR, SUCH AS SAGGING, TEARING, OR COLLAPSE.
6. SILT FENCE IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION, OR IS REPLACED BY AN EQUIVALENT PERIMETER SEDIMENT CONTROL BMP.
7. WHEN SILT FENCE IS REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, NOT AVAILABLE IN AUTOCAD)

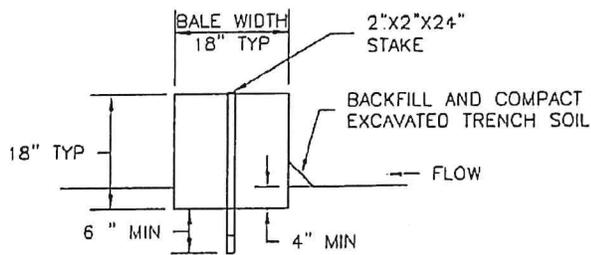
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.



STRAW BALE



TRENCH FOR STRAW BALE



SECTION A

SBB-1. STRAW BALE

## STRAW BALE INSTALLATION NOTES

1. SEE PLAN VIEW FOR:  
-LOCATION(S) OF STRAW BALES.
2. STRAW BALES SHALL CONSIST OF CERTIFIED WEED FREE STRAW OR HAY. LOCAL JURISDICTIONS MAY REQUIRE PROOF THAT BALES ARE WEED FREE.
3. STRAW BALES SHALL CONSIST OF APPROXIMATELY 5 CUBIC FEET OF STRAW OR HAY AND WEIGH NOT LESS THAN 35 POUNDS.
4. WHEN STRAW BALES ARE USED IN SERIES AS A BARRIER, THE END OF EACH BALE SHALL BE TIGHTLY ABUTTING ONE ANOTHER.
5. STRAW BALE DIMENSIONS SHALL BE APPROXIMATELY 36"X18"X18".
6. A UNIFORM ANCHOR TRENCH SHALL BE EXCAVATED TO A DEPTH OF 4". STRAW BALES SHALL BE PLACED SO THAT BINDING TWINE IS ENCOMPASSING THE VERTICAL SIDES OF THE BALE(S). ALL EXCAVATED SOIL SHALL BE PLACED ON THE UPHILL SIDE OF THE STRAW BALE(S) AND COMPACTED.

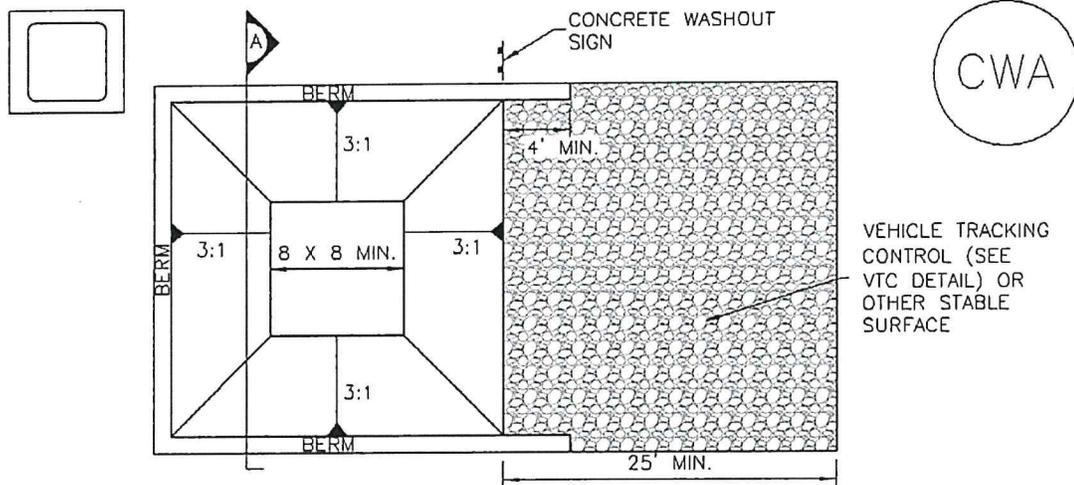
7. TWO (2) WOODEN STAKES SHALL BE USED TO HOLD EACH BALE IN PLACE. WOODEN STAKES SHALL BE 2"X2"X24". WOODEN STAKES SHALL BE DRIVEN 6" INTO THE GROUND.

## STRAW BALE MAINTENANCE NOTES

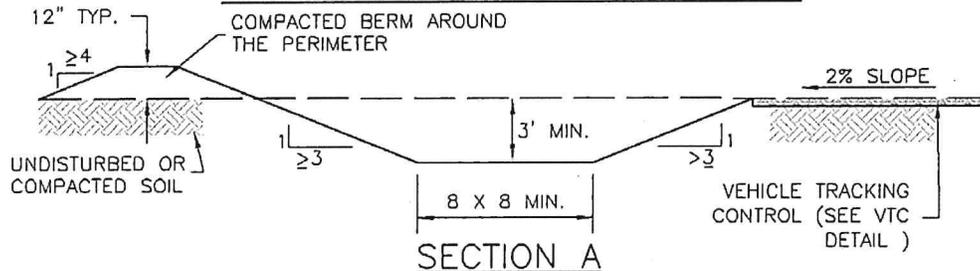
1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS 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. STRAW BALES SHALL BE REPLACED IF THEY BECOME HEAVILY SOILED, ROTTEN, OR DAMAGED BEYOND REPAIR.
5. SEDIMENT ACCUMULATED UPSTREAM OF STRAW BALE BARRIER SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BMP. TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY  $\frac{1}{4}$  OF THE HEIGHT OF THE STRAW BALE BARRIER.
6. STRAW BALES ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
7. WHEN STRAW BALES ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAILS ADAPTED FROM TOWN 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 WASHOUT AREA PLAN**



## 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 INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (16 MIL 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 RIGS.
8. USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

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 PIT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2'.

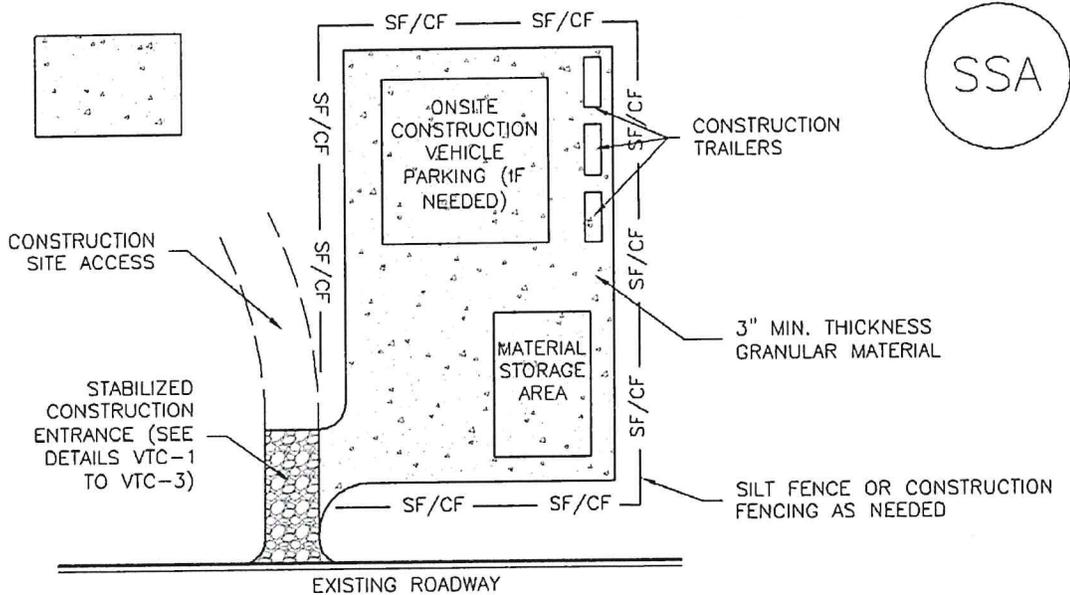
5. CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PIT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.

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 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.



**SSA-1. STABILIZED STAGING AREA**

STABILIZED STAGING AREA INSTALLATION NOTES

1. SEE PLAN VIEW FOR
  - LOCATION OF STAGING AREA(S).
  - CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.
2. STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
3. STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
4. THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL.
5. UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.
6. ADDITIONAL PERIMETER BMPs MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

STABILIZED STAGING AREA 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. ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.

STABILIZED STAGING AREA MAINTENANCE NOTES

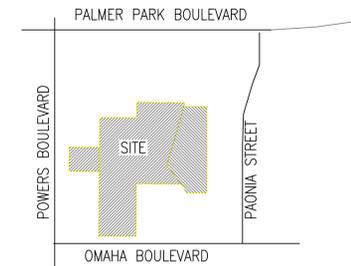
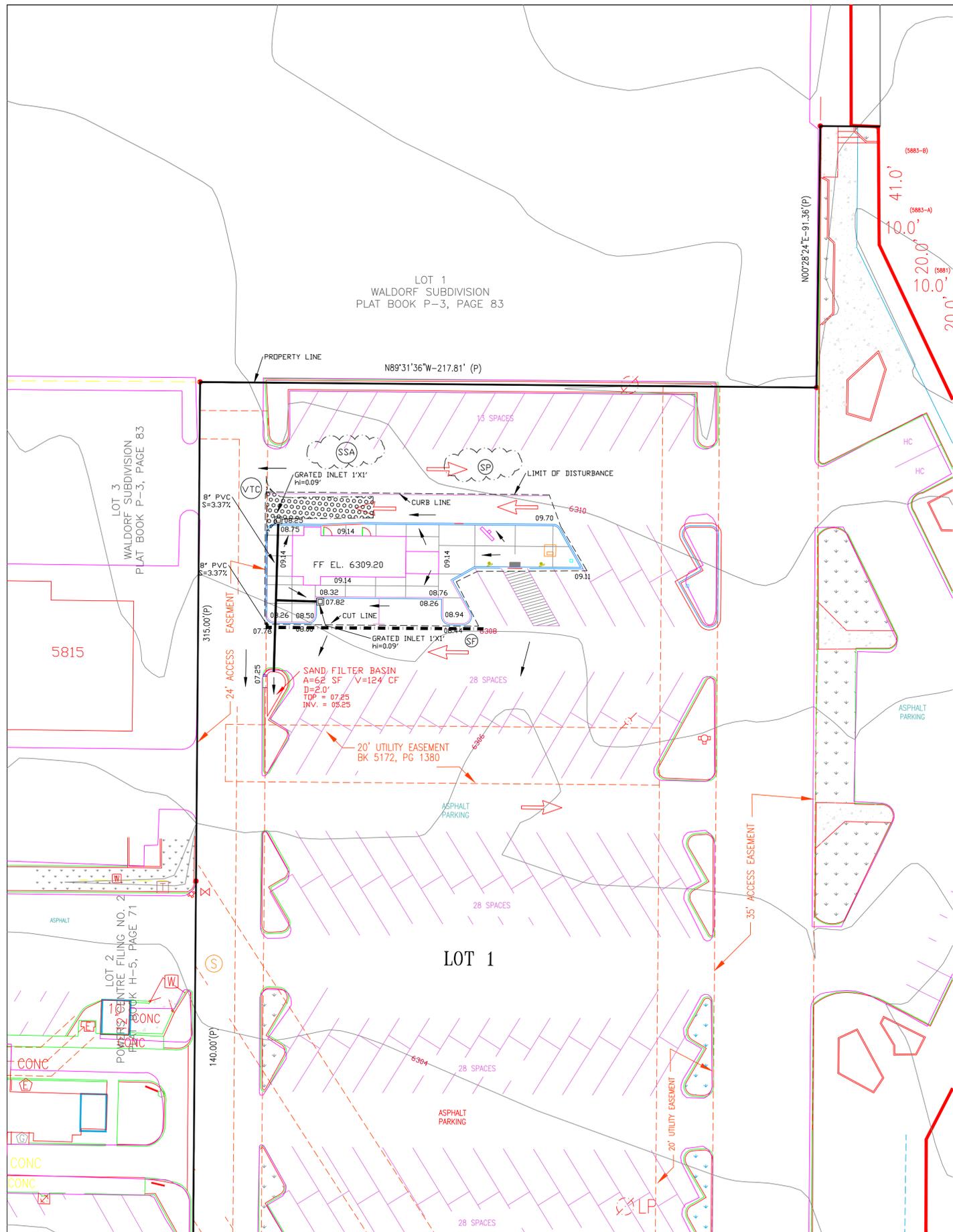
5. STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING/LOADING OPERATIONS.

6. THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE LOCAL JURISDICTION, USED ON SITE, AND THE AREA COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.

NOTE: MANY MUNICIPALITIES PROHIBIT THE USE OF RECYCLED CONCRETE AS GRANULAR MATERIAL FOR STABILIZED STAGING AREAS DUE TO DIFFICULTIES WITH RE-ESTABLISHMENT OF VEGETATION IN AREAS WHERE RECYCLED CONCRETE WAS PLACED.

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.

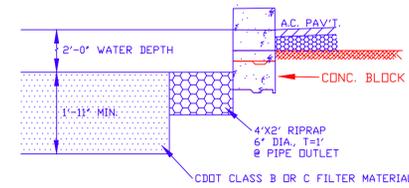
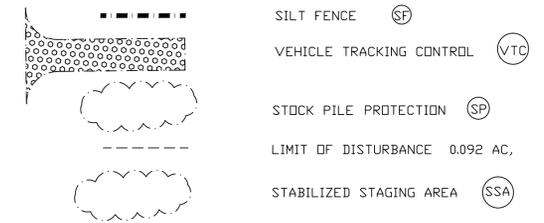
(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)



VICINITY MAP  
N.T.S.



Scale 1" = 20'



SAND FILTER SECTION

1/2" = 1'-0"

**Engineer's Statement:**  
 This Grading and Erosion Control Plan was prepared under my direction and supervision and is correct to the best of my knowledge and belief. Said Plan has been prepared according to the criteria established by the County for Grading and Erosion Control Plans. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this plan.

Name \_\_\_\_\_ Date \_\_\_\_\_

**Owner's Statement:**

The Owner will comply with the requirements of the Grading and Erosion Control Plan.

Name \_\_\_\_\_ Date \_\_\_\_\_

**El Paso County:**

County plan review is provided only for general conformance with County Design Criteria. The County is not responsible for the accuracy and adequacy of the design, dimensions, and/or elevations which shall be confirmed at the job site. The County through the approval of this document assumes no responsibility for completeness and/or accuracy of this document.

Filed in accordance with the requirements of the El Paso County Land Development Code, Drainage Criteria Manual, Volumes 1 and 2, and Engineering Criteria Manual as amended.

In accordance with ECM Section 112, these construction documents will be valid for construction for a period of 2 years from the date signed by the El Paso County Engineer. If construction has not started within those 2 years, the plans will need to be resubmitted for approval, including payment of review fees at the Planning and Community Development Directors discretion.

Jennifer Irvine, P.E. \_\_\_\_\_ Date \_\_\_\_\_  
 County Engineer / ECM Administrator

DRAWN BY: O.E. WATTS DATE: 11-23-18 DWG. NO.: 18-5237-03 TOPOGRAPHY: BIT LIT FMS BASE PLAN BY: JOHN NELSON	APPROVED BY: _____ PROJ. NO.: _____ DWG.: _____	REVISIONS _____ _____ _____	OLIVER E. WATTS CONSULTING ENGINEER COLORADO SPRINGS	PROJECT 5819 PALMER PARK BLVD. LOT 1, POWERS CENTER FIL. NO. 3 EL PASO COUNTY	SHEET NO. 1 OF 1	<b>GRADING AND EROSION CONTROL PLAN</b>
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Standard Notes for El Paso County Grading and Erosion Control Plans

- Construction may not commence until a Construction Permit is obtained from Planning and Community Development (PCD) and a preconstruction conference is held with PCD Inspections.
- Stormwater discharges from construction sites shall not cause or threaten to cause pollution, contamination, or degradation of State Waters. All work and earth disturbance shall be done in a manner that minimizes pollution of any on-site or off site waters, including wetlands.
- Notwithstanding anything depicted in these plans in words or graphic representation, all design and construction related to roads, storm drainage and erosion control shall conform to the standards and requirements of the most recent version of the relevant adopted El Paso County standards, including the Land Development Code, the Engineering Criteria Manual, the Drainage Criteria Manual, and the Drainage Criteria Manual Volume 2. Any deviations from regulations and standards must be requested, and approved, in writing.
- A separate Stormwater Management Plan (SWMP) for this project shall be completed and an Erosion and Stormwater Quality Control Permit (ESQCP) issued prior to commencing construction. During construction the SWMP is the responsibility of the designated Stormwater Manager, shall be located on site at all times and shall be kept up to date with work progress and changes in the field.
- Once the ESQCP has been issued, the contractor may install the initial stage erosion and sediment control BMPs as indicated on the GEC. A preconstruction meeting between the contractor, engineer, and El Paso County will be held prior to any construction. It is the responsibility of the applicant to coordinate the meeting time and place with County PCD Inspections staff.
- Soil erosion control measures for all slopes, channels, ditches, or any disturbed land area shall be completed within 21 calendar days after final grading, or final earth disturbance, has been completed. Disturbed areas and stockpiles which are not at final grade but will remain dormant for longer than 30 days shall also be mulched within 21 days after interim grading. An area that is going to remain in an interim state for more than 60 days shall also be seeded. All temporary soil erosion control measures and BMPs shall be maintained until permanent soil erosion control measures are implemented and established.
- Temporary soil erosion control facilities shall be removed and earth disturbance areas graded and stabilized with permanent soil erosion control measures pursuant to standards and specification prescribed in the DCM Volume II and the Engineering Criteria Manual (ECM) appendix I.
- All persons engaged in earth disturbance shall implement and maintain acceptable soil erosion and sediment control measures including BMPs in conformance with the erosion control technical standards of the Drainage Criteria Manual (DCM) Volume II and in accordance with the Stormwater Management Plan (SWMP).
- All temporary erosion control facilities including BMPs and all permanent facilities intended to control erosion of any earth disturbance operations shall be installed as defined in the approved plans, the SWMP and the DCM Volume II and maintained throughout the duration of the earth disturbance operation.
- Any earth disturbance shall be conducted in such a manner so as to effectively reduce accelerated soil erosion and resulting sedimentation. All disturbances shall be designed, constructed, and completed so that the exposed area of any disturbed land shall be limited to the shortest practical period of time.
- Any temporary or permanent facility designed and constructed for the conveyance of stormwater around, through, or from the earth disturbance area shall be designed to limit the discharge to a non-erosive velocity.
- Concrete wash water shall be contained and disposed of in accordance with the SWMP. No wash water shall be discharged to or allowed to runoff to State Waters, including any surface or subsurface storm drainage system or facilities.
- Erosion control blanketing shall be used on slopes steeper than 3:1.
- Building, construction, excavation, or other waste materials shall not be temporarily placed or stored in the street, alley, or other public way, unless in accordance with an approved Traffic Control Plan. BMP's may be required by El Paso County Engineering if deemed necessary, based on specific conditions and circumstances.
- Vehicle tracking of soils and construction debris off-site shall be minimized. Materials tracked offsite shall be cleaned up and properly disposed of immediately.

- Contractor shall be responsible for the removal of all wastes from the construction site for disposal in accordance with local and State regulatory requirements. No construction debris, tree slash, building material wastes or unused building materials shall be buried, dumped, or discharged at the site.
- The owner, site developer, contractor, and/or their authorized agents shall be responsible for the removal of all construction debris, dirt, trash, rock, sediment, and sand that may accumulate in the storm sewer or other drainage conveyance system and stormwater apertures as a result of site development.
- The quantity of materials stored on the project site shall be limited, as much as practical, to that quantity required to perform the work in an orderly sequence. All materials stored on-site shall be stored in a neat, orderly manner, in their original containers, with original manufacturer's labels.
- No chemicals are to be used by the contractor, which have the potential to be released in stormwater unless permission for the use of a specific chemical is granted in writing by the ECM Administrator. In granting the use of such chemicals, special conditions and monitoring may be required.
- Bulk storage structures for petroleum products and other chemicals shall have adequate protection so as to contain all spills and prevent any spilled material from entering State Waters, including any surface or subsurface storm drainage system or facilities.
- No person shall cause the impediment of stormwater flow in the flow line of the curb and gutter or in the ditch line.
- Individuals shall comply with the "Colorado Water Quality Control Act" (Title 25, Article 8, CRS), and the "Clean Water Act" (33 USC 1344), in addition to the requirements included in the DCM Volume II and the ECM Appendix I. All appropriate permits must be obtained by the contractor prior to construction (NPDES, Floodplain, 404, Fugitive dust, etc.). In the event of conflicts between these requirements and laws, rules, or regulations of other Federal, State, or County agencies, the more restrictive laws, rules, or regulations shall apply.
- All construction traffic must enter/exit the site at approved construction access points.
- Prior to actual construction the permittee shall verify the location of existing utilities.
- A water source shall be available on site during earthwork operations and utilized as required to minimize dust from earthwork equipment and wind.
- The soils report for this site has been prepared by \_\_\_\_\_ and shall be considered a part of these plans.
- At least ten days prior to the anticipated start of construction, for projects that will disturb 1 acre or more, the owner or operator of construction activity shall submit a permit application for stormwater discharge to the Colorado Department of Public Health and Environment, Water Quality Division. The application contains certification of completion of a stormwater management plan (SWMP), of which this grading and erosion control plan may be a part. For information or application materials contact:

Colorado Department of Public Health and Environment  
 Water Quality Control Division  
 WQCD - Permits  
 4300 Cherry Creek Drive South  
 Denver, CO 80246-1530  
 Attn: Permits Unit

DRAWN BY: D.E. WATTS	APPROVED BY:	REVISIONS
DATE: 12-19-18	PRJ. NO.:	
DWG. NO.: 18-5237-04	DWG.:	

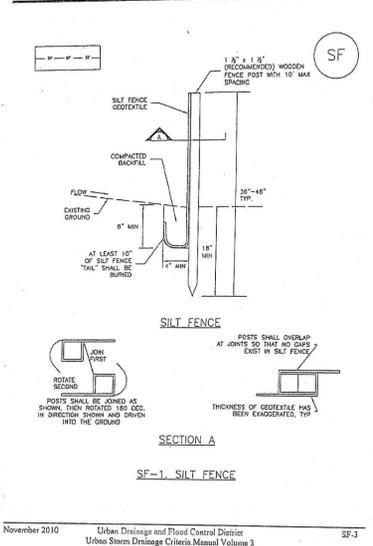
OLIVER E. WATTS  
 CONSULTING ENGINEER  
 COLORADO SPRINGS

PROJECT  
 5819 PALMER PARK BLVD.  
 LOT 1, POWERS CENTER FIL. NO. 3  
 EL PASO COUNTY

SHT. NAME  
**EROSION CONTROL DETAILS**

SHT. NO.  
 2  
 OF  
 2

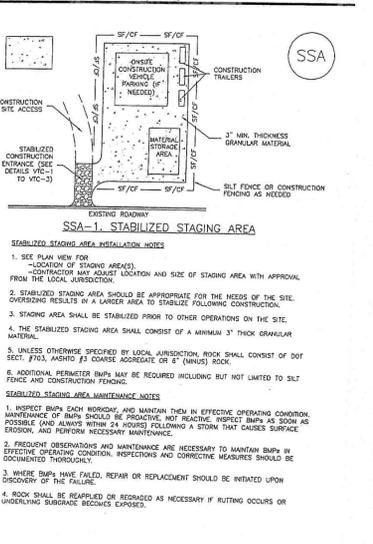
Silt Fence (SF) SC-1



- SILT FENCE INSTALLATION NOTES**
- SILT FENCE MUST BE PLACED AWAY FROM THE TOE OF THE SLOPE TO ALLOW ROOM FOR WATER PONDING. SILT FENCE AT THE TOE OF A SLOPE SHOULD BE INSTALLED IN A PALE LOCATION PONDING AND DEPOSITION.
  - A UNIFORM 6" X 4" ANCHOR TRENCH SHALL BE EXCAVATED USING TRENCHER OR SILT FENCE INSTALLATION DEVICE. NO ROAD GRADERS, BACKHOES OR SIMILAR EQUIPMENT SHALL BE USED.
  - COMPACT ANCHOR TRENCH BY HAND WITH A TAMMING JACKET OR BY WHEEL ROLLING TRENCH BY HAND.
  - SILT FENCE SHALL BE PULLED TIGHT AS IT IS ANCHORED TO THE STAKES. THERE SHOULD BE NO HORIZONTAL SAG BETWEEN STAKES AFTER IT HAS BEEN ANCHORED TO THE STAKES.
  - SILT FENCE FABRIC SHALL BE ANCHORED TO THE STAKES USING 1" HEAVY DUTY STAPLES OR NAILS WITH 1" LEGS. STAPLES AND NAILS SHOULD BE PLACED 3" ALONG THE FABRIC.
  - AT THE END OF A RUN OF SILT FENCE ALONG A CONTOUR, THE SILT FENCE SHOULD BE TURNED PERPENDICULAR TO THE CONTOUR TO CREATE A "J-HOOK". THE "J-HOOK" EXTENDING PERPENDICULAR TO THE CONTOUR SHOULD BE OF SUFFICIENT LENGTH TO KEEP RUNOFF FROM FLOWING AROUND THE END OF THE SILT FENCE (TYPICALLY 10' - 20').
  - SILT FENCE SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
- SILT FENCE MAINTENANCE NOTES**
- INSPECT BUPS EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BUPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BUPS 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 BUPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
  - WHERE BUPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
  - SEDIMENT ACCUMULATED UPSTREAM OF THE SILT FENCE SHALL BE REMOVED AS NEEDED TO MAINTAIN THE FUNCTIONALITY OF THE BUP. TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENT IS APPROXIMATELY 4".
  - REPAIR OR REPLACE SILT FENCE WHEN THERE ARE SIGNS OF WEAR, SUCH AS SAGGING, TEARING, OR COLLAPSE.
  - SILT FENCE IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION, OR IS REPLACED BY AN EQUIVALENT PERMANENT SEDIMENT CONTROL BUP.
  - WHEN SILT FENCE IS REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDS, AND MULCH OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.
- NOTES: MANY JURISDICTIONS HAVE BUP DETAILS THAT VARY FROM IFCO'S STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

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Stabilized Staging Area (SSA) SM-6



**STABILIZED STAGING AREA INSTALLATION NOTES**

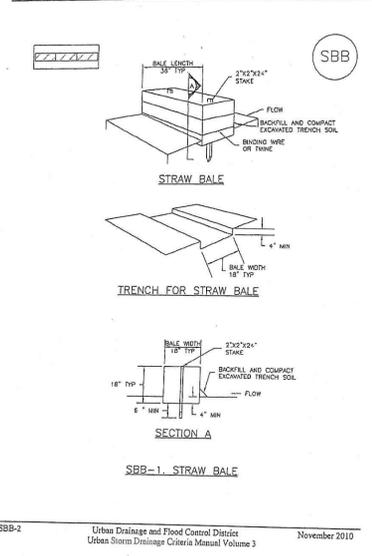
- SEE PLAN VIEW FOR LOCATION OF STAGING AREA(S).
- STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
- STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
- THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL.
- UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. 7703, AASHTO #3 COARSE AGGREGATE OR 4" (MINUS) ROCK.
- ADDITIONAL PERIMETER BUPS MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

**STABILIZED STAGING AREA MAINTENANCE NOTES**

- INSPECT BUPS EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BUPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BUPS 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 BUPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BUPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
- ROCK SHALL BE REAPPLIED OR REGRANDED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.

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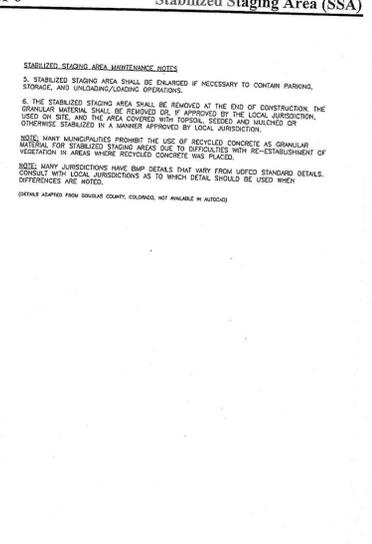
Straw Bale Barrier (SBB) SC-3



- STRAW BALE INSTALLATION NOTES**
- SEE PLAN VIEW FOR "LOCATION(S)" OF STRAW BALES.
  - STRAW BALES SHALL COVER TOP OF EXPOSED EARTH OR CONCRETE. STRAW BALE SHALL BE PLACED ON A 12" WIDE TRENCH OR PALE LOCATION PONDING AND DEPOSITION.
  - STRAW BALES SHALL BE USED IN SERIES AS A BARRIER. THE END OF EACH BALE SHALL BE TIGHTLY BUTTED TO ONE ANCHOR.
  - STRAW BALE DIMENSIONS SHALL BE APPROXIMATELY 20"x16"x18".
  - A UNIFORM ANCHOR TRENCH SHALL BE EXCAVATED TO A DEPTH OF 4". STRAW BALES SHALL BE PLACED SO THAT BUNDLING TRENCHES IS ENCOURAGED. THE VERTICAL SIDES OF THE BUNDLES, ALL EXCAVATED SOIL SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRAW BALES AND COMPACTED.
  - TWO (2) WOODEN STAKES SHALL BE USED TO HOLD BALE IN PLACE. WOODEN STAKES SHALL BE 2"x2"x24". WOODEN STAKES SHALL BE GIVEN 6" INTO THE GROUND.
- STRAW BALE MAINTENANCE NOTES**
- INSPECT BUPS EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BUPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BUPS 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 BUPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
  - WHERE BUPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
  - STRAW BALES SHALL BE REPLACED IF THEY BECOME HEAVILY SOILED, ROTTEN, OR DAMAGED BEYOND REPAIR.
  - SEDIMENT ACCUMULATED UPSTREAM OF STRAW BALE BARRIER SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BUP. TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENT IS APPROXIMATELY 4" OF THE HEIGHT OF THE STRAW BALE BARRIER.
  - STRAW BALES ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
  - WHEN STRAW BALES ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDS, AND MULCH OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.
- NOTES: MANY JURISDICTIONS HAVE BUP DETAILS THAT VARY FROM IFCO'S STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

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Stabilized Staging Area (SSA) SM-6



**STABILIZED STAGING AREA INSTALLATION NOTES**

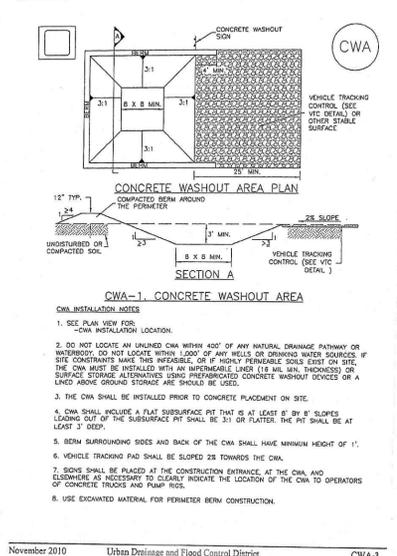
- SEE PLAN VIEW FOR LOCATION OF STAGING AREA(S).
- STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
- STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
- THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL.
- UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. 7703, AASHTO #3 COARSE AGGREGATE OR 4" (MINUS) ROCK.
- ADDITIONAL PERIMETER BUPS MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

**STABILIZED STAGING AREA MAINTENANCE NOTES**

- INSPECT BUPS EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BUPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BUPS 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 BUPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BUPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
- ROCK SHALL BE REAPPLIED OR REGRANDED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.

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Concrete Washout Area (CWA) MM-1



- CWA-1. CONCRETE WASHOUT AREA**
- CWA INSTALLATION NOTES**
- SEE PLAN VIEW FOR "CWA" INSTALLATION LOCATION.
  - DO NOT LOCATE AN UNGRADED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONDITIONS MAKE THIS UNFEASIBLE, OR IF HIGHLY FERTILIZABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (12 MIL GAL THICKNESS) OR SURFACE COVERING AS SPECIFIED USING PREPARED CONCRETE WASHOUT DEVICES OR LINED ABOVE GROUND STORAGE ARE SHOULD BE USED.
  - THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
  - CWA SHALL INCLUDE A FLAT SUBSURFACE PFT THAT IS AT LEAST 6" OR 8" SLOPES LEADING OUT OF THE SUBSURFACE PFT SHALL BE 3:1 OR GREATER. THE PFT SHALL BE AT LEAST 3' DEEP.
  - BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 12".
  - VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
  - SOILS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE AT THE CWA, AND ELEVATIONS AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP TRUCKS.
  - USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.
- CWA MAINTENANCE NOTES**
- INSPECT BUPS EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BUPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BUPS 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 BUPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
  - WHERE BUPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
  - THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASHOUT. CONCRETE MATERIAL ACCUMULATED IN PFT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2".
  - CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PFT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.
  - WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEEDS AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION. (DETAIL ADAPTED FROM SOUTHERN COUNTY, COLORADO AND THE CITY OF DENVER, COLORADO, NOT AVAILABLE IN IFCO'S).
- NOTE: MANY JURISDICTIONS HAVE CWA DETAILS THAT VARY FROM IFCO'S STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

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

Concrete Washout Area (CWA) MM-1



**CWA-1. CONCRETE WASHOUT AREA**

**CWA INSTALLATION NOTES**

- SEE PLAN VIEW FOR "CWA" INSTALLATION LOCATION.
- DO NOT LOCATE AN UNGRADED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONDITIONS MAKE THIS UNFEASIBLE, OR IF HIGHLY FERTILIZABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (12 MIL GAL THICKNESS) OR SURFACE COVERING AS SPECIFIED USING PREPARED CONCRETE WASHOUT DEVICES OR LINED ABOVE GROUND STORAGE ARE SHOULD BE USED.
- THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
- CWA SHALL INCLUDE A FLAT SUBSURFACE PFT THAT IS AT LEAST 6" OR 8" SLOPES LEADING OUT OF THE SUBSURFACE PFT SHALL BE 3:1 OR GREATER. THE PFT SHALL BE AT LEAST 3' DEEP.
- BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 12".
- VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
- SOILS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE AT THE CWA, AND ELEVATIONS AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP TRUCKS.
- USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

**CWA MAINTENANCE NOTES**

- INSPECT BUPS EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BUPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BUPS 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 BUPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BUPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
- THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASHOUT. CONCRETE MATERIAL ACCUMULATED IN PFT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2".
- CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PFT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.
- WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEEDS AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION. (DETAIL ADAPTED FROM SOUTHERN COUNTY, COLORADO AND THE CITY OF DENVER, COLORADO, NOT AVAILABLE IN IFCO'S).

NOTE: MANY JURISDICTIONS HAVE CWA DETAILS THAT VARY FROM IFCO'S STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

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# Markup Summary

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Daniel Torres (1)

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**Subject:** Cloud+  
**Page Label:** 4  
**Lock:** Unlocked  
**Author:** Daniel Torres  
**Date:** 1/14/2019 11:00:50 AM  
**Color:** ■

Review 2: Unresolved  
Review 3: Revise the text so that it matches what is indicated on the drainage report.