El Paso County
STORMWATER MANAGEMENT PLAN

Lot 11 Rolling Thunder Business Park

Part of the NE ¼, Sec. 11, T. 13 S., R. 65 W., 6th P.M.

April 6, 2021

prepared for
Rukus Investments

Qualified Stormwater Manager
Name: Erik S. Watts
Company: Oliver E. Watts Consulting Engineer Inc
Address: 614 Elkton Drive Colorado Springs, CO 80907

Contractor
Name: _____
Company: _____
Address: _____

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

OLIVER E. WATTS, PE-LS
OLIVER E. WATTS, CONSULTING ENGINEER, INC.
CIVIL ENGINEERING AND SURVEYING
614 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907
(719) 593-0173
fax (719) 265-9660
olliewatts@aol.com
Celebrating over 42 years in business

April 6, 2021

El Paso County D.O.T.
3275 Akers Drive
Colorado Springs, CO 80922

ATTN: Permits Unit

SUBJECT: Stormwater Management Plan
Lot 11 Rolling Thunder Business Park

Transmitted herewith for your review and approval is the SWMP for the Lot 11 Rolling Thunder Business Park.

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: _____
Rukus Investments LLC
Jeff Wesson
2041 Meadowbrook Parkway
Colorado Springs, CO 80951-4732

Table of Contents

1. SITE DESCRIPTION:

Lot 11 Rolling Thunder Business Park is located at 10659 Maltese Point, on the south side of Woodmen Road, just east of Falcon Meadows Boulevard in the Northeast Quarter of Section 11, Township 13 South, Range 65 West of the 6th P.M., in El Paso County. The overall Site totals 2.000 acres. Grading is also to occur on 1.639 acres of the lot.
Lat: 38° 56' 21.68378 " N **Long:** 104° 37' 48.56319 " W

a) Construction activity description: Construction activity for the site will include; overlot grading, and construction of two commercial buildings; one on each lot and parking lot. The site will be landscaped / reseeded once all construction has been completed.

b) Sequence / time line of activities: The site will be overlot graded per the enclosed grading plan. All site grading is to be in compliance with El Paso County Code. Grading for the site is scheduled to be completed by spring 2022. Total site landscaping / reseeding should be completed and acceptable ground cover / vegetation established by late September 2022.

c) Site area: The site is 2.000 acres total. It is part of the larger, 15.747 acre Rolling Thunder Business Park subdivision. The portion of the site that is to experience grading is approximately 1.639 acres. The Site is vegetated with grasses, and some scrub brush, where not covered by piles of dirt: Approximately 35% of the site has some form of vegetation on it. Said vegetation, is outside of / off of Maltese Point, and Rolling Thunder Way. The site is to be graded so as to comply with the Grading and Erosion Control Plans, which accompany the submittal.

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

…this Site was previously platted as Lot 11 in the Rolling Thunder Business Park in 2008. At that time a drainage report was submitted and approved by El Paso County, Colorado. This lot has been zoned for industrial or commercial uses since that time, and runoff was computed on that basis. The lot was rough graded and an erosion control pond, known as the "Fire House Pond" was constructed as shown on the enclosed existing conditions drainage plan, occupying approximately 3000 square feet to a depth of four feet. The historic runoff for the original ground range land condition is computed to be 0.3 cfs / 2.4 cfs) 5-year / 100- year runoffs). The outfall to the pond is a private 8 foot grated inlet and 24" RCP running westerly to a manhole, where a 30" RCP from the Lot 10 pond combines and runs south in a 36" RCP across Rolling Thunder Way.
Water quality storage exists on the "Southwest Pond" in lot 10, westerly of this lot, as shown on the drainage plan, and in the "Tank Pond" east of this site. These ponds are shown on the drainage plan for the Rolling Thunder Business Park enclosed in the backup material of this report. Therefore, a water quality pond is required for the development of this lot.
B: Proposed Conditions:
Those portions of the lot within the paved portions of Fire House View and Maltese Point will not be modified. The remainder of the lot (1.664 acre) will be developed as shown on the enclosed drainage plan, and runoff will be directed by the grading shown to a private water quality pond in the Southeast corner. The landscaped areas shown on the plan total 18,830 square feet, or 26.0% of Basin A. An impervious percentage of 75% was used for computation purposes.
A minor (private) storm sewer is provided along the north sides of the two main buildings to provide

adequate drainage capacity and prevent winter ice problems. The existing pond has been relocated to allow for optimum use of the lot. A sand filter basin is proposed which requires a total bottom area of 699 square feet at a depth of two feet with 3:1 side slopes as shown on the enclosed SFB computation form. A pond bottom area of 741.3 square feet is provided as shown on the drainage plan, and the total pond storage is 2205 cubic feet. The total runoff from the lot will be 2.8 cfs / 5.8 CFS. A 6-foot curb outlet will discharge the 100 year runoff into the pond, a standard grated inlet at the two foot level will capture the 100-year runoff and a 12" HDPE will be routed to the existing grated inlet, which will end up being in the parking lot and will be capped. The existing RCP storm sewers described above are mote than adequate to convey the 100-year runoff as shown in the enclosed computations.

This parcel is not within the limits of a designated flood plain or flood hazard area, as identified on FEMA Panel No. 08041C0752 G, dated December 7, 2018, a copy of which is enclosed for reference.

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 "A", Blakeland Series. It has slow surface water runoff, but high eroadability and moderate blowing (wind) hazard, and is listed as having high potential for successful reseeding, especially with 'native' grasses. Potential erosion impacts would affect Maltese Point. Runoff would be carried down the slopes and into the street. Erosion control measures; silt fencing, and reseeding will serve to mitigate this hazard. See page 2, Erosion Control Plan for details.

e) <u>Existing vegetation:</u> As stated previously; Item 1, C "Site Area," vegetation consists of grasses, and some scrub brush. Approximately 35% of the site has some form of vegetation on it. This was determined, per visual inspection at the time of the site topographic survey dated 9-24-20. Per the enclosed Grading and Erosion Control Plans: The area is to be graded as shown and erosion control measures, as shown, and listed in said Plans implemented.

f) <u>Potential pollution sources:</u>
Potential pollution sources which shall be evaluated for potential to contribute to stormwater discharge for the subject site may include the following: disturbed and stored soils, vehicle tracking of sediments, management of contaminated soils, loading and unloading operations, outdoor storage of materials (building material, chemicals, etc.), vehicle and equipment maintenance and fueling, significant dust or particulate generating processes, routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils. etc., on-site waste management practices (waste piles, liquid wastes, dumpsters), concrete truck / equipment washing, including the truck chute and associated fixtures, non-industrial waste sources (worker trash and portable toilet) and other areas or procedures where potential spills can occur. The locations of these areas that affect the site are shown on the enclosed plans.

TABLE 1: POTENTIAL POLLUTION SOURCES

Potential Pollution Sources	Possible Site Contributions of Pollutants to Stormwater Discharges
All disturbed and stored soils	Stockpiles of fill from the excavations, topsoil stockpiles. Imported borrow stockpile.
Vehicle tracking of sediments	See the enclosed drawings for vehicle entrance and exit.
Management of contaminated soils	No contaminated soils are expected to be encountered.
Loading and unloading operations	Loading and unloading of building materials, etc.
Outdoor storage activities (building material, fertilizers, chemicals, etc.)	Building materials and equipment storage areas (no fertilizers, petroleum or chemical products will be stored on-site).
Vehicle and equipment maintenance and fueling	Fueling will occur on-site using mobile equipment (will not be stored on-site). Equipment maintenance will occur off-site.
Significant dust or particulate-generating processes	Vehicle tracking, soil removed from excavation, stockpiles.
Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc.	All equipment maintenance will occur off-site. No fertilizers, pesticides, detergents, and/or solvents will be used or stored on-site.
On-site waste management practices (waste piles, liquid wastes, dumpsters, etc.)	All waste will be removed from site as soon as possible.
Concrete truck/equipment washing, including the concrete truck chute and associated fixtures and equipment	Washout as shown or relocated by contractor.
Dedicated asphalt and concrete batch plants	No dedicated asphalt and concrete batch plants are on-site.
Non-industrial waste sources such as worker trash and portable toilets	Worker trash will be removed from the site as soon as possible. Portable toilets will be provided.
Other areas or procedures where potential spills can occur	Petroleum releases from equipment are possible.

BMP's for Pollutant Prevention:
The following are common practices to mitigate potential pollutants:

- Wind erosion shall be controlled by sprinkling site roadways and/or temporary stabilizing stockpiles. Each dump truck hauling materials to or from the site shall be required to cover its bed with a tarpaulin.
- Sanitary facilities shall be placed a minimum of 10' from any curb and 50' from any inlet. If not feasible for the site, a secondary containment shall be implemented.
- Equipment fueling and maintenances services – a designated fueling area will be established to contain any spill resulting from fueling, maintenance or repair of equipment. Contractors shall be responsible for containment, cleanup and disposal of any leak or spill and any associated costs of said cleanup / disposal.
- Chemical products shall be protected from precipitation, free from ground contact, and stored properly to prevent damage from equipment, vehicles or workers.
- Material stockpiles (soils, soil amendments, debris/trash piles) – All construction trash and debris will be deposited in the site dumpster(s).
- Sediment and mitigation of sediment – Sweeping operations will take place as necessary to maintain roadways / parking areas. The perimeter of the site will be evaluated for any potential impact resulting from trucking operations or sediment mitigation from the site.

BMP devices will be placed to protect storm system inlets should any roadway / parking area tracking or sediment mitigation occur.

- Snow removal and/or stockpiling will be considered prior to placement at the site. Snow stockpiles should be kept away from any stormwater conveyance system(s) to include; inlets, ponds, outfall locations, roadway surfaces, etc.

g) Non stormwater discharge: No springs are known to exist. Any additional discharge is confined to the surface and runoff routed to the subdivision detention pond.

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 grading plan. NOTE: There are no streams cross this project.

2. SITE MAP:
Enclosed are a vicinity map and grading and erosion control plans for review. Details for the BMP's are shown of the plans.

3. BMPs FOR STORMWATER POLLUTION PREVENTION:

a) Erosion and sediment controls:

1) Structural practices: As indicated on the enclosed Grading and Erosion Control Plans, erosion will be contained through the use of said silt fencing. See Plans for locations and details on silt fencing. The portion of the lot that has experienced grading will be landscaped or reseeded per County Code (see DCM Volume II for details).

2) Non-Structural practices: Permanent stabilization practices will be implemented on this Site through landscaping and reseeding. Said landscaping/seeding activities will occur when all grading / construction for the site is finished. See the enclosed Grading and Erosion Control Plans for details.

b) Materials handling and Spills Prevention: There are no plans to have any On-Site batch plant(s). Equipment fueling and maintenances services – a designated fueling area will be established to contain any spill resulting from fueling, maintenance or repair of equipment. Contractors shall be responsible for containment, cleanup and disposal of any leak or spill and any associated costs of said cleanup / disposal. Vehicle refueling will take place away from areas containing or conveying water, or near the existing road, 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 Grading and Erosion Control Plans are submitted for your review. These Plans 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 vegetation /

ground cover reaches 70% of pre-disturbance levels. See re-seed section, page 7, for suggested final stabilization seed mix, for areas outside the landscaping. The temporary BMP's will be removed upon receiving permission from El Paso County.

5. OTHER CONTROLS:
Please review the enclosed Grading and Erosion Control Plan. It details said controls. Waste disposal will be in accordance with El Paso County standards. A rock mat (VTC) will be installed where shown on the grading plan to remove any soil from vehicles before entering Maltese Point.

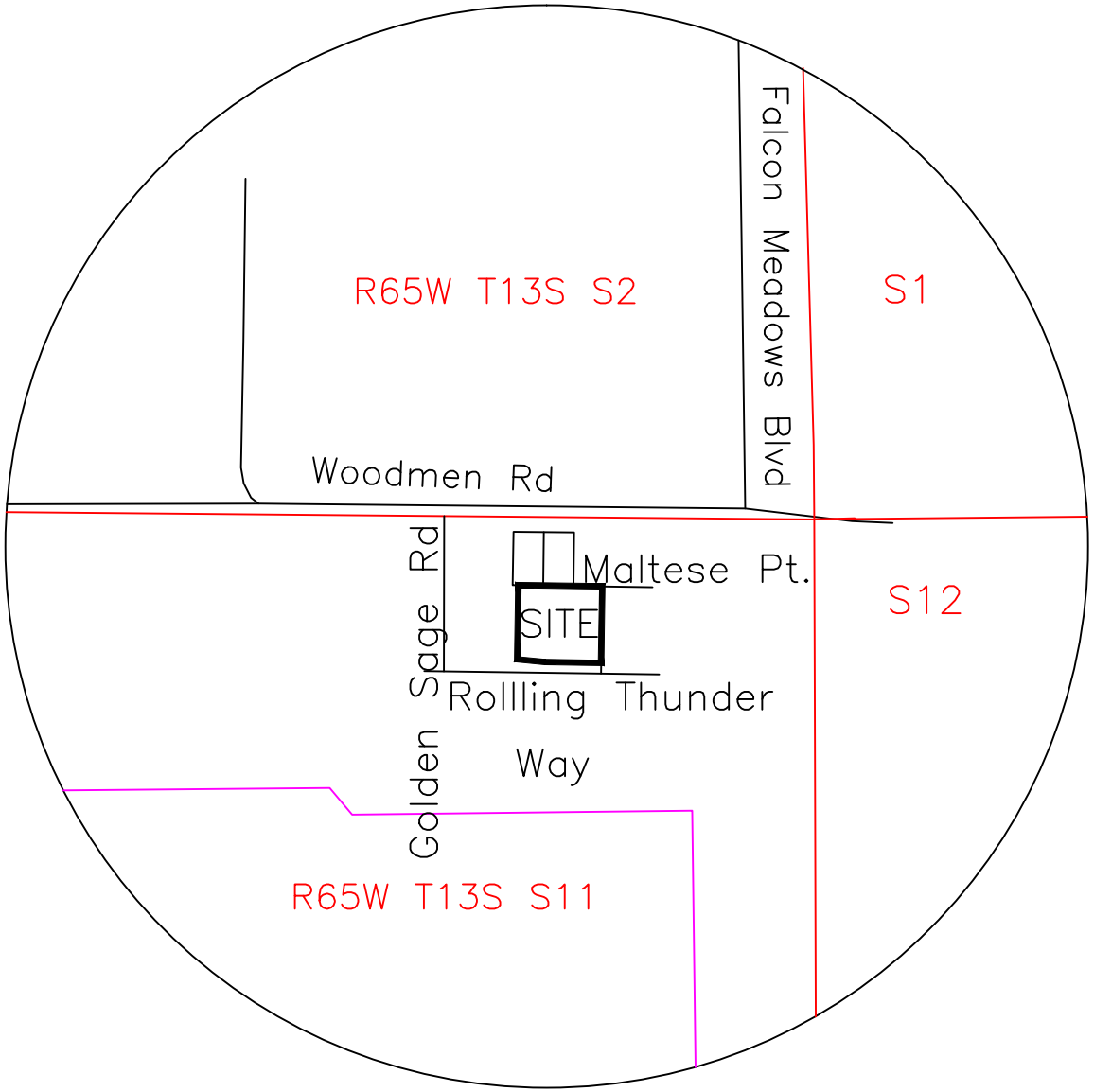
6. INSPECTION AND MAINTENANCE:
The Qualified Stormwater Manager will monitor the day to day Site activities during construction. A copy of this report will be kept in the vehicle of said inspector.
Inspections will occur and reports will be filled out and signed by the Qualified Stormwater Manager every 14 days, and/or after a precipitation event as required, to ensure adequate operation and design of selected BMP's. Signed copies of said inspection reports will be kept by the permit holder and at this office. Silt fencing will need to be replaced and/or repaired as need be. All litter and debris should be removed from the lot 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 the various phases of grading, construction, and changing site conditions and BMP needs.
The need for revision could include the following: 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. The Qualified Stormwater Manager will revise accordingly.

8. FINAL STABILIZATION:
Re-seed mixture
All disturbed areas shall be re-graded and, those areas not covered by landscaping could be reseeded with the following native grass mixture for sandy soils:

GRASS	VARIETY	AMOUNT IN PLS LBS PER ACRE
Sideoats Grama	El Reno	3.0 Lbs
Western Wheatgrass	Barton	2.5 Lbs
Slender Wheat Grass	Native	2.0 Lbs
Little Bluestem	Pastura	2.0 Lbs
Sand Dropseed	Native	0.5 Lbs
Switch Grass	Nebraska 28	3.0 Lbs
Weeping Love Grass	Morpha	1.0 Lbs

9. EROSION CONTROL MEASURES OWNER / OPERATED BY ANOTHER ENTITY:
This project does NOT rely on control measures owned or operated by another entity.



VICINITY MAP

Not to Scale

MAJOR BASIN	SUB BASIN	AREA		BASIN		T_c MIN	I in./hr.		SOIL GRP	DEV. TYPE	C		FLOW 5-ry qp -CFS-	FLOW 100-yr qp -CFS-	RETURN PERIOD -years-	
		PLANIM READ	ACRES	LENGTH -FT.-	HEIGHT -FT.-											
EXISTING	A	COGO	1.664	300	4	29	2.4	1.1	B	R/L	0.08	0.35	0.3	2.4	5	100
DEVELOPED	A	COGO	1.664	300	3	17.1			B	75%	0.554	0.675				
				+130		+2.0										
						19.1	3.0	5.1					2.8	5.8	5	100

HYDROLOGICAL COMPUTATION – BASIC DATA
PROJ: FOLLLING THUNDER BUSINESS PARK F 1B BY:O.E. WATTS
RATIONAL METHOD DATE: 4/2/21 2/23/21

OLIVER E. WATTS, CONSULTING ENGINEER, INC.
614 ELKTON DRIVE COLORADO SPRINGS, CO 80907

STREET AND STORM SEWER CALCULATIONS

STREET	LOCATION	DISTANCE -ft.-	ELEVATION & SLOPE	TOTAL RUNOFF -cfs- 5-yr./100-yr	STREET FLOW / CAPACITY -cfs- 5-yr./100-yr	PIPE FLOW -cfs-	TYPE PIPE, CATCH BASIN & SLOPE %
PARKING	OUTFALL		77.0	2.8/5.8	5.8		6' CURB OUTLET d=0.46'
		6	3:1				
	POIND		75.0				
	GRATE		TOP=77.0 INV=75.5		5.8	5.8	FB GRATE h=0.4' ok
		33.27	6.64%			5.8	18" HDPE
	EXIST. O/L		73.29				hi=0.16V2=0.17' < 0.4

Design Procedure Form: Sand Filter (SF)

UD-BMP (Version 3.07, March 2018)

Sheet 1 of 2

3/4

Designer: DE Watts
Company:
Date: February 18, 2021
Project: Old Pond
Location: 10755 Melfese

1. Basin Storage Volume	
A) Effective Imperviousness of Tributary Area, I_a (100% if all paved and roofed areas upstream of sand filter)	I_a = 75.0 %
B) Tributary Area's Imperviousness Ratio (i = I_a/100)	i = 0.750
C) Water Quality Capture Volume (WQCV) Based on 12-hour Drain Time WQCV= 0.8 * (0.91* i^3 - 1.19 * i^2 + 0.78 * i)	WQCV = 0.24 watershed inches
D) Contributing Watershed Area (including sand filter area)	Area = 74,585 sq ft
E) Water Quality Capture Volume (WQCV) Design Volume V_{WQCV} = WQCV / 12 * Area	V_{WQCV} = cu ft
F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm	d_6 = 3.00 in
G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume	$V_{WQCV\ OTHER}$ = 10,391 cu ft
H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)	$V_{WQCV\ USER}$ = cu ft
2. Basin Geometry	
A) WQCV Depth	D_{WQCV} = 2.0 ft
B) Sand Filter Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred). Use "0" if sand filter has vertical walls.	Z = 3.00 ft / ft **DIFFICULT TO MAINTAIN, INCREASE WHERE POSSIBLE**
C) Minimum Filter Area (Flat Surface Area)	A_{Min} = 699 sq ft
D) Actual Filter Area	A_{Actual} = sq ft
E) Volume Provided	V_T = cu ft
3. Filter Material	Choose One: ○ 18" CDOT Class B or C Filter Material ○ Other (Explain):
4. Underdrain System	
A) Are underdrains provided?	Choose One: ○ YES ○ NO
B) Underdrain system orifice diameter for 12 hour drain time	
i) Distance From Lowest Elevation of the Storage Volume to the Center of the Orifice	y = ft
ii) Volume to Drain in 12 Hours	Vol_{12} = cu ft
iii) Orifice Diameter, 3/8" Minimum	D_O = in

Design Procedure Form: Sand Filter (SF)

9/1

Designer:
Company:
Date: February 18, 2021
Project: PLD Pond
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 O YES O NO
6. 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:

National Flood Hazard Layer FIRMette

FEMA

Legend

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

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

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

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

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

OTHER FEATURES
- 20.2 / 17.5 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

N

The pin displayed on the map is an approximate point selected by the user and does not represe 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 1/22/2020 at 12:00:29 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

OLIVER E. WATTS
CONSULTING ENGINEER, INC.
COLORADO SPRINGS

ROLLING THUNDER BUSINESS PARK
FILING NO. 1B
SOILS MAP
1"=2000'

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	Hydrologic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Hardness	
					In		
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.
[1]9: 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.
[1]18: Chaseville part	A	None	---	---	>60	---	Low.
Midway part	D	None	---	---	10-20	Rippable	Moderate.
Columbine: 19	A	None to rare	---	---	>60	---	Low.
Connerton: [1]20: 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.
[1]24: Cushman part	C	None	---	---	20-40	Rippable	Moderate.
Kutch part	C	None	---	---	20-40	Rippable	Moderate.
Elbeth: 25, 26	B	None	---	---	>60	---	Moderate.
[1]27: Elbeth part	B	None	---	---	>60	---	Moderate.

See footnote at end of table.

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
Business													
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
Residential													
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
Industrial													
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
Parks and Cemeteries	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
Undeveloped Areas													
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	0.08	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
Streets													
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
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.

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

Where:

t_c = time of concentration (min)

t_i = overland (initial) flow time (min)

t_t = 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_t, which is calculated using the hydraulic properties of the swale, ditch, or channel. For preliminary work, the overland travel time, t_t, 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_i) and the travel time (t_t) 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.

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

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.

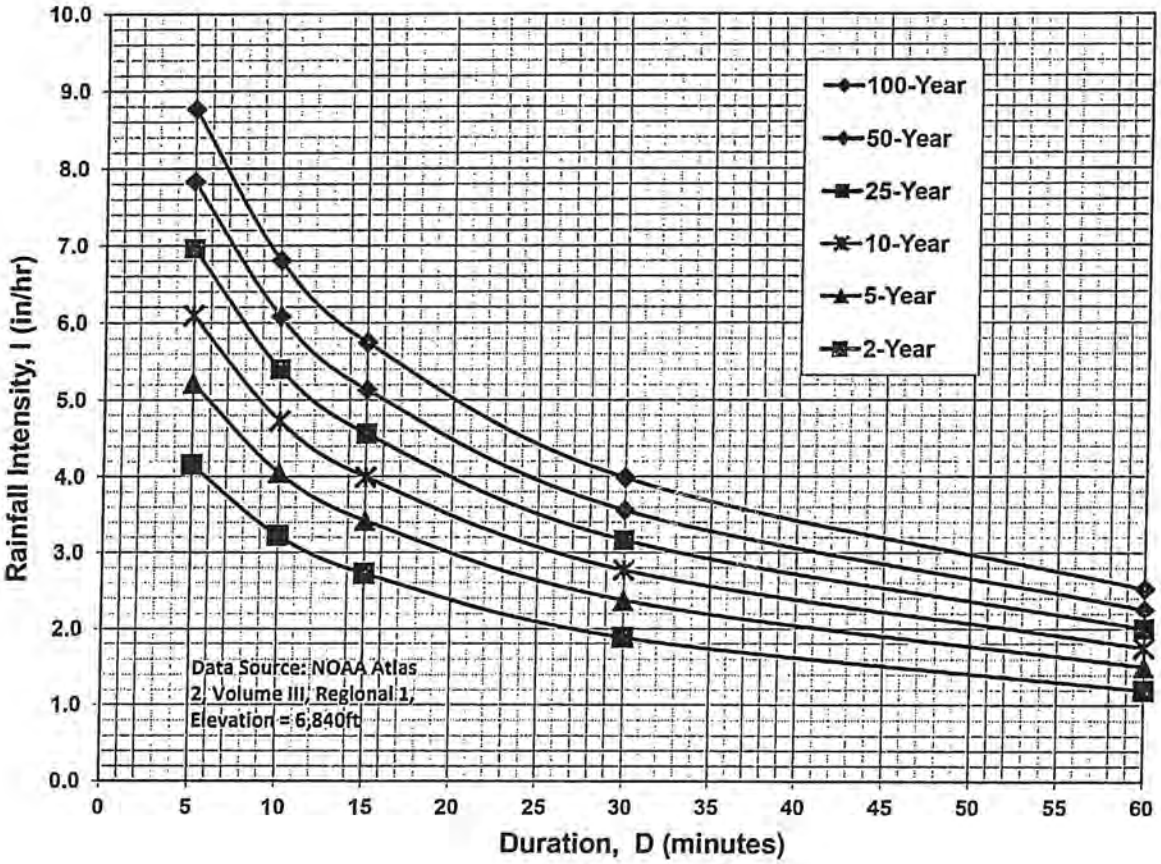
3.2.4 Minimum Time of Concentration

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

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

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

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

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

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

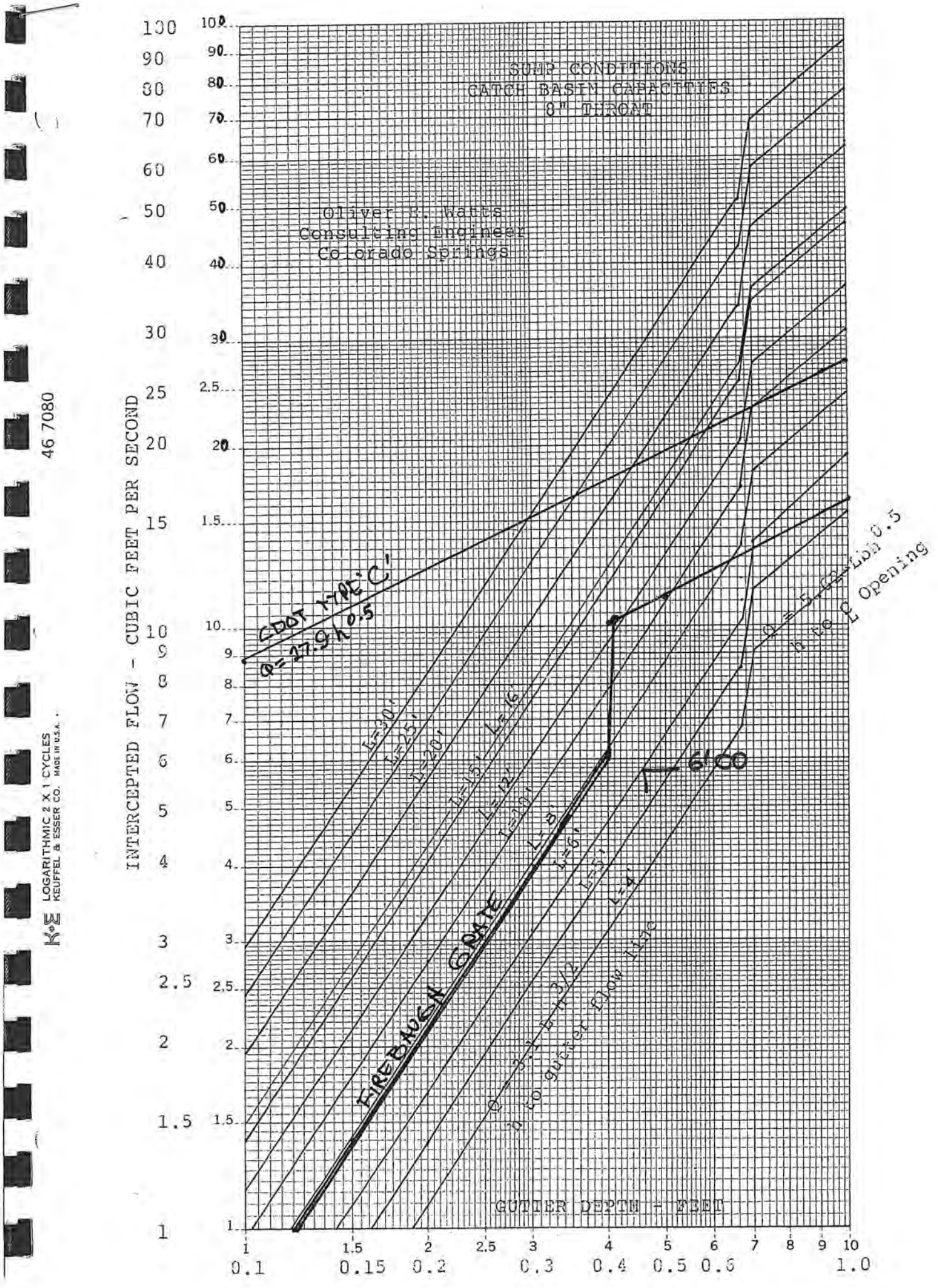
$I_2 = -1.19 \ln(D) + 6.035$

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

$$Q=\frac{0.463}{n} D^{8/3} S^{\frac{1}{2}} \qquad Q=KS^{\frac{1}{2}}$$

DIAMETER -IN.-	AREA -FT2-	D 8/3 -FT-	K			
			N=0.010	N=0.013	N=0.024	N=0.026
2	0.02182	0.008413	0.3895	---	---	---
4	0.08727	0.053420	2.4733	---	---	---
6	0.19630	0.157500	7.2922	5.609	---	---
8	0.34910	0.339200	15.7050	12.081	---	---
10	0.54540	0.615000	28.4745	21.903	---	---
12	0.78540	1.000000	46.3000	35.615	---	---
15	1.22720	1.813100	83.9465	64.574	---	---
18	1.76710	2.948300	136.5100	105.000	56.88	52.50
21	2.40530	4.447400	205.9100	158.400	85.80	79.20
24	3.14160	6.349600	293.9900	226.140	122.49	113.07
27	3.97610	8.692700	402.4700	309.590	167.70	154.79
30	4.90870	11.512600	533.0300	410.030	222.10	205.02
33	5.93960	14.844100	---	528.680	---	---
36	7.06860	18.720800	866.7700	666.700	361.20	333.30
39	8.29580	23.175100	---	825.400	---	---
42	9.62110	28.238900	---	1005.000	544.80	502.50
48	12.56640	40.317500	---	1436.000	777.80	718.00
54	15.90430	55.195000	---	1966.000	1065.00	983.00
60	19.63500	73.100400	---	2604.000	1410.00	1302.00
66	23.75830	94.254200	---	3357.000	1818.00	1678.00
72	28.27430	118.869400	---	4234.000	2293.00	2117.00
78	33.18310	147.152900	---	5241.000	2839.00	2620.00
84	38.48450	179.306000	---	6386.000	3459.00	3193.00
90	44.17860	215.524500	---	7676.000	4158.00	3838.00
96	50.26550	256.000000	---	9118.000	4939.00	4559.00
108	63.61730	350.466600	---	12480.000	6761.00	6140.00
120	78.53980	464.158900	---	16530.000	8954.00	8265.00

Oliver E. Watts
Consulting Engine
Colorado Springs

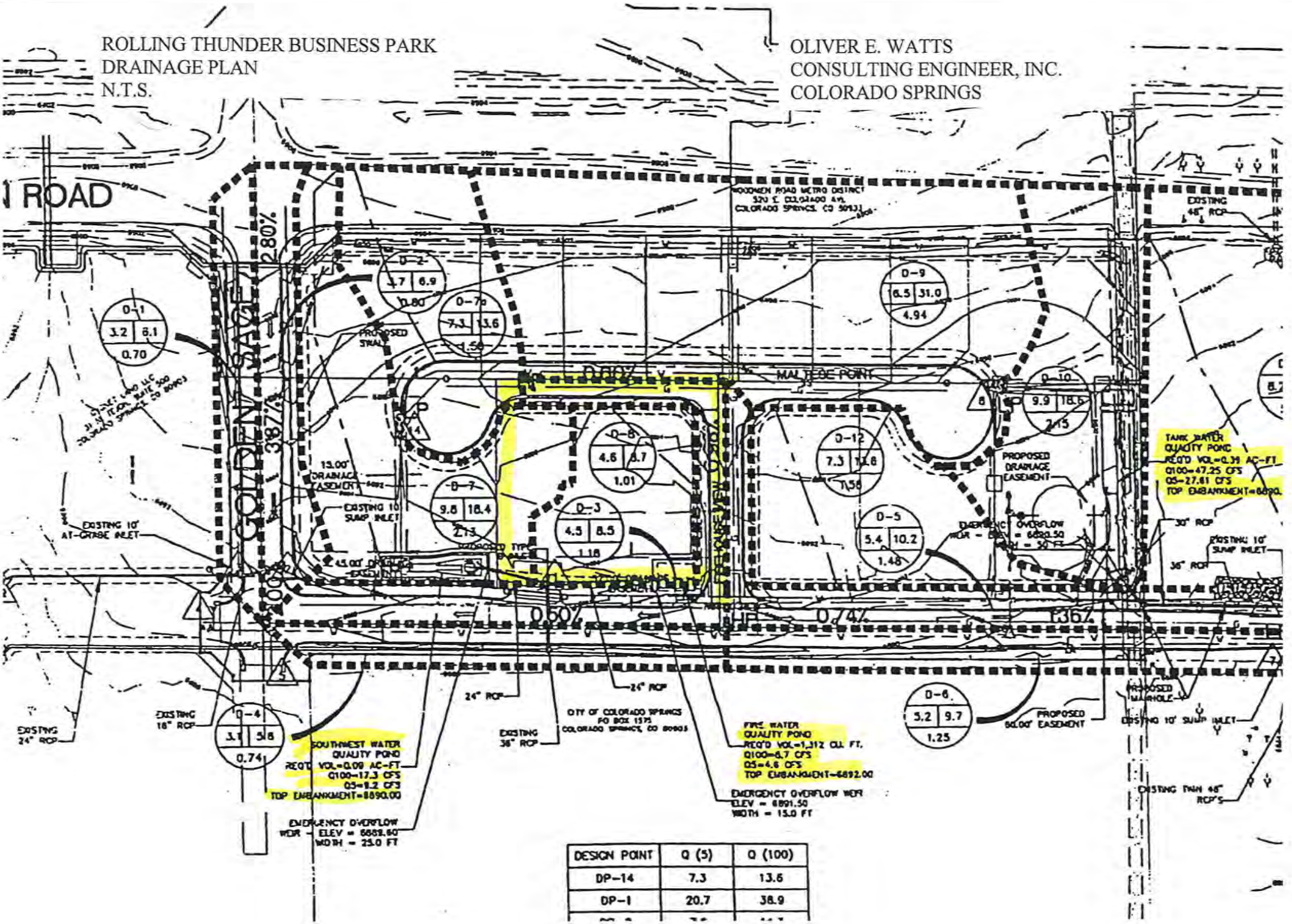


46 7080

LOGARITHMIC 2 X 1 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

ROLLING THUNDER BUSINESS PARK
DRAINAGE PLAN
N.T.S.

OLIVER E. WATTS
CONSULTING ENGINEER, INC.
COLORADO SPRINGS



DESIGN POINT	Q (5)	Q (100)
DP-14	7.3	13.6
DP-1	20.7	38.9

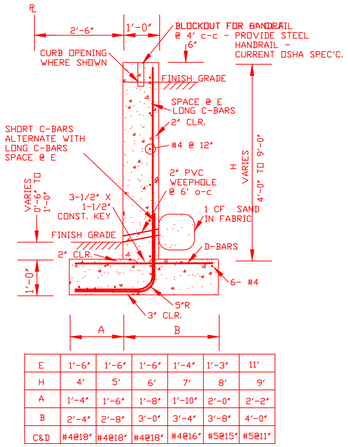
ROLLING THUNDER BUSINESS PARK - FDR - DEVELOPED CONDITIONS
(RATIONAL METHOD Q=CIA)

BASIN	TOTAL FLOWS						AREA	WEIGHTED		OVERLAND				CHANNEL				Tc	INTENSITY			COMMENTS
	Q2	Q5	Q100		CA(equiv.)		TOTAL	C5	C100	C5	Length	Slope	Tco	Length	Slope	Velocity	Tcc	TOTAL	I2	I5	I100	
	(c.f.s.)	(c.f.s.)	(c.f.s.)	2 YR	5 YR	100 YR	(Ac)				(ft)	(ft)	(min)	(ft)	(%)	(fps)	(min)	(min)	(in/hr)	(in/hr)	(in/hr)	
D-1	2.3	3.2	6.1	0.6	0.63	0.67	0.70	0.90	0.95	0.90	5	2.0%	0.7	500	3.5%	3.7	2.2	5.0	3.7	5.1	9.1	
D-2	2.7	3.7	6.9	0.7	0.72	0.76	0.80	0.90	0.95	0.90	5	2.0%	0.7	500	3.5%	3.7	2.2	5.0	3.7	5.1	9.1	
D-3	3.3	4.5	8.5	1.1	1.06	1.12	1.18	0.90	0.95	0.90	40	2.0%	1.9	715	0.7%	1.7	7.1	9.0	3.1	4.3	7.6	
D-4	2.2	3.1	5.8	0.7	0.67	0.71	0.74	0.90	0.95	0.90	5	2.0%	0.7	560	0.5%	1.4	6.6	7.3	3.3	4.6	8.2	
D-5	3.9	5.4	10.2	1.3	1.33	1.41	1.48	0.90	0.95	0.90	40	2.0%	1.9	1,000	1.0%	2.0	8.3	10.2	3.0	4.1	7.2	
D-6	3.8	5.2	9.7	1.1	1.12	1.19	1.25	0.90	0.95	0.90	5	2.0%	0.7	775	1.0%	2.0	6.5	7.1	3.4	4.6	8.2	
D-7	7.1	9.8	18.4	1.9	1.92	2.02	2.13	0.90	0.95	0.90	40	2.0%	1.9	515	3.1%	3.5	2.4	5.0	3.7	5.1	9.1	
D-7a	5.3	7.3	13.6	1.4	1.42	1.50	1.58	0.90	0.95	0.90	40	2.0%	1.9	285	4.3%	4.1	1.2	5.0	3.7	5.1	9.1	
D-8	3.4	4.6	8.7	0.9	0.91	0.96	1.01	0.90	0.95	0.90	5	2.0%	0.7	245	1.2%	2.2	1.8	5.0	3.7	5.1	9.1	
D-9	12.0	16.5	31.0	4.4	4.45	4.69	4.94	0.90	0.95	0.90	300	2.0%	5.2	715	0.6%	1.5	7.7	12.8	2.7	3.7	6.6	
D-10	7.2	9.9	18.6	1.9	1.94	2.04	2.15	0.90	0.95	0.90	60	2.0%	2.3	300	2.0%	2.8	1.8	5.0	3.7	5.1	9.1	
D-11	5.9	8.2	19.4	1.6	1.60	2.13	5.33	0.30	0.40	0.90	60	2.0%	2.3	500	2.8%	3.3	2.5	5.0	3.7	5.1	9.1	
D-12	5.3	7.3	13.6	1.4	1.42	1.50	1.58	0.90	0.95	0.90	10	2.0%	0.9	250	1.6%	2.5	1.6	5.0	3.7	5.1	9.1	
Offsite	68.8	94.7	194.5	32.5	32.50	37.50	50.00	0.65	0.75	0.35	100	2.0%	11.2	1,500	1.5%	2.4	10.2	21.4	2.1	2.9	5.2	
Formula:		C*I*A	C*I*A		Q/I	Q/I							*1			*2	*3	Tco+Tcc	*4	*5	*6	
							86.95									20			1.09	1.5	2.67	

1* Tco = 1.87*(1.1-C5)*(L^0.5)*((S*100)^-0.33) (DCM page 5-11)
2* Vc = 20*S^0.5 (USDCM RO-4)
3* Tcc = 1/V*L/60
4* I2 = (26.65*1.09)/(10+Tc)^0.76 (City Letter of 1/7/2003)
5* I5 = (26.65*1.50)/(10+Tc)^0.76 (City Letter of 1/7/2003)
6* I100 =(26.65*2.67)/(10+Tc)^0.76 (City Letter of 1/7/2003)

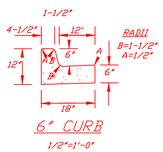
ROLLLING THUNDER BUSINESS PARK
ROLLLING THUNDER BUSINESS PARK FILING NO. 1A
MALTESE POINT
(PRIVATE)
ROLLING THUNDER WAY
FIRE HOUSE VIEW
(PRIVATE)
ROLLLING THUNDER BUSINESS PARK
TBM 6880.15
TBM 6880.33
TBM 6876.06
TBM 6877.27
N 89°10'31" W 224.00'
S 00°49'29" W 274.00'
N 00°49'29" E 282.53'
S 89°10'28" E 207.64'
S 84°24'39" E 144.50'
S 89°10'28" E 310.00'
S 89°10'28" E 198.50'
S 00°49'32" W 216.93'
S 45°49'32" W 75.80'
10,800 S.F. CORE & SHELL BUILDING
11
87,148 SF
FF EL. 6881.64
10,800 S.F. CORE & SHELL BUILDING
FF EL. 6880.06
LIMIT OF DISTURBANCE
LIMIT OF CUT
LIMIT OF FILL
STD COUNTY DRIVEWAY SEE DWG NO. SD_2-23 & SD_2-26
D/W TO BE BARRICADED WHILE UNDER CONSTRUCTION UNTIL PAVED
49' INGRESS/EGRESS & UTILITY EASEMENT
STD. D/W APRON
GRATED INLET TOP = 80.74 INV. 79.24
88.00 LF 12" PVC S=1.00%
GRATED INLET TOP 80.74 INV. 79.24 INV 12"PVC 78.36
45.29LF 12"PVC S=1.00%
GRATED INLET TOP 79.46 INV. 77.96
GRATED INLET TOP 79.46 INV. 77.96 INV. 12" PVC 77.08
106.98 LF 12" PVC S=1.20 %
78.35LF 12" PVC S=2.00%
79.76 LF 12" PVC S=1.00%
RETAINING WALL
GRATED OUTLET TOP EL. 6575.2
45' DRAINAGE EASEMENT
52' DRAINAGE EASEMENT
25' BUILDING SETBACK
STORM SEWER MANHOLE TOP=77.15 RAISE RIM TO GRADE
2' CURB OPENING
6' CURB OUTLET
SEAL COVER ON GRATED OUTLET
A=741 SF 699 SF REQ'D V=2205 CF
33.27 LF 18"HDPE S=6.64%
GRATED OUTLET TOP 77.00 INV. 75.50
CONC. C&G
CONC. S/W
CONC. D/W
A.C. PAV'T.
R.O.W. VARIES
Scale 1" = 20'
Contour Interval: 1'
WGS 84 ORHTOMETRIC HEIGHTS
TBM'S SHOWN ON MANHOLE RIMS
LEGEND:
SEWER MANHOLE
STORM SEWER MANHOLE
WATER VALVE
FIRE HYDRANT
FIBEROPTIC VAULT
ELECTRICAL VAULT
PUBLIC UTILITY - PER VISIBLE EVIDENCE
CONCRETE EXISTING (MALTESE ONLY)
CONCRETE NEW (ON-SITE ONLY)
VICINITY MAP
1"=1000'
R65W T13S S2
S1
S12
R65W T13S S11
Woodmen Rd
Maltese Pt.
SITE
Rollling Thunder Way
Golden Sage Rd
Falcon Meadows Blvd
EROSION CONTROL LEGEND:
SILT FENCE (INTERIM)
VEHICLE TRACKING CONTROL (INTERIM)
STOCK PILE PROTECTION (INTERIM)
LIMIT OF DISTURBANCE 1.640 AC. (INTERIM)
STABILIZED STAGING AREA (INITIAL)
CONCRETE WASHOUT (INTERIM)
DIRECTION OF RUNOFF (FINAL)
PROPERTY BOUNDARY LINE
S 89°10'28" E 207.64'
CONTOUR LEGEND:
ORIGINAL CONTOURS
FINISH CONTOURS

DRAWN BY: O.E. WATTS DATE: 4-2-21 DWG. NO.: 20-5509-06 SURVEYED BY: OEW, ESW, 6-26-19,9-24-20	APPROVED BY: PROJ. NO. DWG.	REVISIONS 3-16-21 REVISED BUILDINGS OEW	OLIVER E. WATTS CONSULTING ENGINEER COLORADO SPRINGS	PROJECT 10659 MALTESE POINT LOT 11, ROLLLING THUNDER BUSINESS PARK EL PASO COUNTY	SHT. NAME GRADING AND EROSION CONTROL PLAN	SHT. NO. 1 OF 2

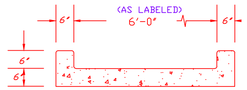


E	1'-6"	1'-6"	1'-6"	1'-4"	1'-3"	11"
H	4'	5'	6'	7'	8'	9'
A	1'-4"	1'-6"	1'-8"	1'-10"	2'-0"	2'-2"
B	2'-4"	2'-8"	3'-0"	3'-4"	3'-8"	4'-0"
C&D	#4@18"	#4@18"	#4@18"	#4@16"	#5@15"	#5@11"

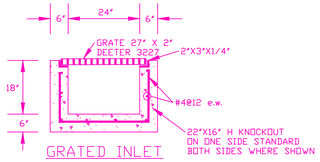
RETAINING WALL DETAIL
1/2"=1'-0"



6" CURB
1/2"=1'-0"



CURB OPENING
1/2" = 1'-0"



GRATED INLET
1/2"=1'-0"

INLETS SHALL CONFORM TO FIREBAUGH PRECAST CO. STD. INLET OR EQUAL

Engineer's Statement (for standalone GEC Plan):
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.

_____
Engineer of Record Signature Date
Oliver E. Watts, COLO PELS#9853
Oliver E Watts Consulting Engineer, inc.
614 Elkton Drive Colorado Springs, CO 80907
719-593-0173
olliewatts@aol.com

Engineer's Statement (for GEC Plan within Construction Drawing set):
These detailed plans and specifications were prepared under my direction and supervision. Said plans and specifications have been prepared according to the criteria established by the County for detailed roadway, drainage, grading and erosion control plans and specifications, and said plans and specifications are in conformity with applicable master drainage plans and master transportation plans. Said plans and specifications meet the purposes for which the particular roadway and drainage facilities are designed and are correct to the best of my knowledge and belief. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparation of these detailed plans and specifications.

_____
Engineer of Record Signature Date
Oliver E. Watts, COLO PELS#9853
Oliver E Watts Consulting Engineer, inc.
614 Elkton Drive Colorado Springs, CO 80907
719-593-0173
olliewatts@aol.com

Owner's Statement (for standalone GEC Plan):
I, the owner/developer have read and will comply with the requirements of the Grading and Erosion Control Plan.

_____
Owner Signature Date

Owner's Statement (for GEC Plan within Construction Drawing set):
I, the owner/developer have read and will comply with the requirements of the grading and erosion control plan and all of the requirements specified in these detailed plans and specifications.

_____
Owner Signature Date

El Paso County (standalone GEC Plan):
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 1.12, 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 Director's discretion.

_____
County Engineer/ECM Administrator Date

STANDARD NOTES FOR EL PASO COUNTY GRADING AND EROSION CONTROL PLANS

1. 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.
2. 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.
3. A separate Stormwater Management Plan (SMWP) for this project shall be completed and an Erosion and Stormwater Quality Control Permit (ESQCP) issued prior to commencing construction. Management of the SWMP during construction is the responsibility of the designated Qualified Stormwater Manager or Certified Erosion Control Inspector. The SWMP shall be located on site at all times during construction and shall be kept up to date with work progress and changes in the field.
4. Once the ESQCP is approved and a 'Notice to Proceed' has been issued, the contractor may install the initial stage erosion and sediment control measures as indicated on the approved 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 staff.
5. Control measures must be installed prior to commencement of activities that could contribute pollutants to stormwater. control measures for all slopes, channels, ditches, and disturbed land areas shall be installed immediately upon completion of the disturbance.
6. All temporary sediment and erosion control measures shall be maintained and remain in effective operating condition until permanent soil erosion control measures are implemented and final stabilization is established. All persons engaged in land disturbance activities shall assess the adequacy of control measures at the site and identify if changes to those control measures are needed to ensure the continued effective performance of the control measures. All changes to temporary sediment and erosion control measures must be incorporated into the Stormwater Management Plan.
7. Temporary stabilization shall be implemented on disturbed areas and stockpiles where ground disturbing construction activity has permanently ceased or temporarily ceased for longer than 14 days.
8. Final stabilization must be implemented at all applicable construction sites. Final stabilization is achieved when all ground disturbing activities are complete and all disturbed areas either have a uniform vegetative cover with individual plant density of 70 percent of pre-disturbance levels established or equivalent permanent alternative stabilization method is implemented. All temporary sediment and erosion control measures shall be removed upon final stabilization and before permit closure.
9. All permanent stormwater management facilities shall be installed as designed in the approved plans. Any proposed changes that effect the design or function of permanent stormwater management structures must be approved by the ECM Administrator prior to implementation.
10. Earth disturbances shall be conducted in such a manner so as to effectively minimize 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. Pre-existing vegetation shall be protected and maintained within 50 horizontal feet of waters of the state unless shown to be infeasible and specifically requested and approved.
11. Compaction of soil must be prevented in areas designated for infiltration control measures or where final stabilization will be achieved by vegetative cover. Areas designated for infiltration control measures shall also be protected from sedimentation during construction until final stabilization is achieved. If compaction prevention is not feasible due to site constraints, all areas designated for infiltration and vegetation control measures must be loosened prior to installation of the control measure(s).
12. Any temporary or permanent facility designed and constructed for the conveyance of stormwater around, through, or from the earth disturbance area shall be a stabilized conveyance designed to minimize erosion and the discharge of sediment off site.
13. Concrete wash water shall be contained and disposed of in accordance with the SWMP. No wash water shall be discharged to or allowed to enter State Waters, including any surface or subsurface storm drainage system or facilities. Concrete washouts shall not be located in an area where shallow groundwater may be present, or within 50 feet of a surface water body, creek or stream.
14. During dewatering operations of uncontaminated ground water may be discharged on site, but shall not leave the site in the form of surface runoff unless an approved State dewatering permit is in place.
15. Erosion control blanketing or other protective covering shall be used on slopes steeper than 3:1.
16. 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.
17. 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. Control measures may be required by El Paso County Engineering if deemed necessary, based on specific conditions and circumstances.
18. Tracking of soils and construction debris off-site shall be minimized. Materials tracked off-site shall be cleaned up and properly disposed of immediately.
19. The owner/developer shall be responsible for the removal of all construction debris, dirt, trash, rock, sediment, soil, and sand that may accumulate in roads, storm drains and other drainage conveyance systems and stormwater appurtenances as a result of site development.
20. 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.
21. No chemical(s) having the potential to be released in stormwater are to be stored or used onsite unless permission for the use of such chemical(s) is granted in writing by the ECM Administrator. In granting approval for the use of such chemical(s), special conditions and monitoring may be required.
22. Bulk storage of allowed petroleum products or other allowed liquid chemicals in excess of 55 gallons shall require adequate secondary containment protection to contain all spills onsite and to prevent any spilled materials from entering State Waters, any surface or subsurface storm drainage system or other facilities.
23. No person shall cause the impediment of stormwater flow in the curb and gutter or ditch except with approved sediment control measures.
24. Owner/developer and their agents shall comply with the 'Colorado Water Quality Control Act' (Title 25, Article 8, CRS), and the 'Clean Water Actnd shall' (33 USC 1344), in addition to the requirements of the Land Development Code, DCM Volume II and the ECM Appendix I. All appropriate permits must be obtained by the contractor prior to construction (1041, NPDES, Floodplain, 404, fugitive dust, etc.). In the event of conflicts between these requirements and other laws, rules, or regulations of other Federal, State, local, or County agencies, the most restrictive laws, rules, or regulations shall apply.
25. All construction traffic must enter/exit the site only at approved construction access points.
26. Prior to construction the Permittee shall verify the location of existing utilities.
27. A water source shall be available on site during earthwork operations and shall be utilized as required to minimize dust from earthwork equipment and wind.
28. The soils report for this site has been prepared by _____ and shall be considered a part of these plans.
29. At least ten (10) days prior to the anticipated start of construction, for projects that will disturb one (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

Engineer of Record:
The Grading and Erosion Control Plan was prepared under my direction and supervision and is complete and 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.

_____
Engineer of Record Signature Date
Oliver E. Watts, COLO PELS#9853
Oliver E Watts Consulting Engineer, inc.
614 Elkton Drive Colorado Springs, CO 80907
719-593-0173
olliewatts@aol.com

Review Engineer:
The Grading and Erosion Control Plan was reviewed and found to meet the checklist requirements except where otherwise noted or allowed by an approved deviation request.

_____
Review Engineer Date

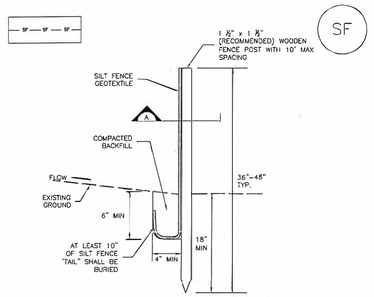
DRAWN BY: O.E. WATTS	APPROVED BY:	REVISIONS 3-16-21 REVISED BUILDINGS OEW	OLIVER E. WATTS CONSULTING ENGINEER COLORADO SPRINGS
DATE: 4-2-21	PROJ. NO.		
DWG. NO.: 20-5509-07	DWG.		
SURVEYED BY: OEW, ESW, 6-26-19,9-24-20			

PROJECT: 10659 MALTESE POINT
LOT 11, ROLLING THUNDER BUSINESS PARK
EL PASO COUNTY

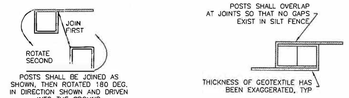
SHT. NAME: GRADING AND EROSION CONTROL PLAN

SHT. NO. 2 OF 2

Silt Fence (SF) SC-1



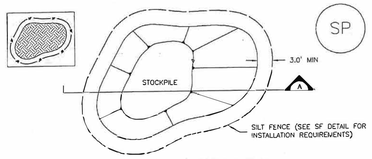
SILT FENCE



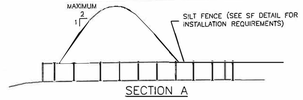
SECTION A

SF-1. SILT FENCE

Stockpile Management (SP) MM-2



STOCKPILE PROTECTION PLAN



SECTION A

SP-1. STOCKPILE PROTECTION

STOCKPILE PROTECTION INSTALLATION NOTES

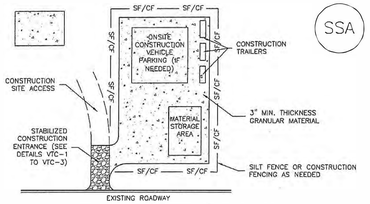
1. SEE PLAN VIEW FOR:
   -LOCATION OF STOCKPILES.
   -TYPE OF STOCKPILE PROTECTION.

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.

Stabilized Staging Area (SSA) SM-6



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.

SEEDING & MULCHING

ALL SOIL TESTING, SOILS AMENDMENT AND FERTILIZER DOCUMENTATION, AND SEED LOAD AND BAG TICKETS MUST BE ADDED TO THE CSWMP.

SOIL PREPARATION

1. IN AREAS TO BE SEEDED, THE UPPER 6 INCHES OF THE SOIL MUST NOT BE HEAVILY COMPACTED, AND SHOULD BE IN FRIABLE CONDITION. LESS THAN 85% STANDARD PROCTOR DENSITY IS ACCEPTABLE. AREAS OF COMPACTION OR GENERAL CONSTRUCTION ACTIVITY MUST BE SCARIFIED TO A DEPTH OF 6 TO 12 INCHES PRIOR TO SPREADING TOPSOIL TO BREAK UP COMPACTED LAYERS AND PROVIDE A BLENDING ZONE BETWEEN DIFFERENT SOIL LAYERS.
2. AREAS TO BE PLANTED SHALL HAVE AT LEAST 4 INCHES OF TOPSOIL SUITABLE TO SUPPORT PLANT GROWTH.
3. THE CITY RECOMMENDS THAT EXISTING AND/OR IMPORTED TOPSOIL BE TESTED TO IDENTIFY SOIL DEFICIENCIES AND ANY SOIL AMENDMENTS NECESSARY TO ADDRESS THESE DEFICIENCIES. SOIL AMENDMENTS AND/OR FERTILIZERS SHOULD BE ADDED TO CORRECT TOPSOIL DEFICIENCIES BASED ON SOIL TESTING RESULTS.
4. TOPSOIL SHALL BE PROTECTED DURING THE CONSTRUCTION PERIOD TO RETAIN ITS STRUCTURE AVOID COMPACTION, AND TO PREVENT EROSION AND CONTAMINATION. STRIPPED TOPSOIL MUST BE STORED IN AN AREA AWAY FROM MACHINERY AND CONSTRUCTION OPERATIONS, AND CARE MUST BE TAKEN TO PROTECT THE TOPSOIL AS A VALUABLE COMMODITY. TOPSOIL MUST NOT BE STRIPPED DURING UNDESIRABLE WORKING CONDITIONS (E.G. DURING WET WEATHER OR WHEN SOILS ARE SATURATED). TOPSOIL SHALL NOT BE STORED IN SWALES OR IN AREAS WITH POOR DRAINAGE.

SEEDING

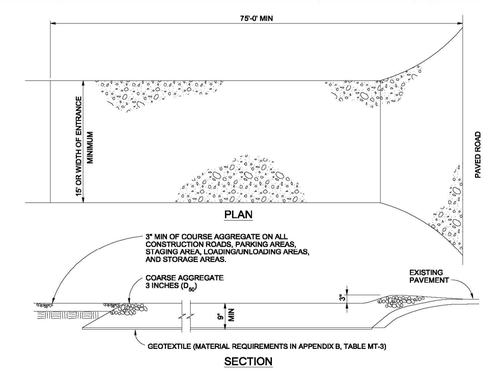
1. ALLOWABLE SEED MIXES ARE INCLUDED IN THE CITY OF COLORADO SPRINGS STORMWATER CONSTRUCTION MANUAL. ALTERNATIVE SEED MIXES ARE ACCEPTABLE IF INCLUDED IN AN APPROVED LANDSCAPING PLAN.
2. SEED SHOULD BE DRILL-SEEDED WHENEVER POSSIBLE
   - SEED DEPTH MUST BE ¼ TO ½ INCHES WHEN DRILL-SEEDING IS USED
3. BROADCAST SEEDING OR HYDRO-SEEDING WITH TACKIFIER MAY BE SUBSTITUTED ON SLOPES STEEPER THAN 3:1 OR ON OTHER AREAS NOT PRACTICAL TO DRILL SEED.
   - SEEDING RATES MUST BE DOUBLED FOR BROADCAST SEEDING OR INCREASED BY 50% IF USING A BRILLION DRILL OR HYDRO-SEEDING
   - BROADCAST SEEDING MUST BE LIGHTLY HAND-RAKED INTO THE SOIL

MULCHING

1. MULCHING SHOULD BE COMPLETED AS SOON AS PRACTICABLE AFTER SEEDING, HOWEVER PLANTED AREAS MUST BE MULCHED NO LATER THAN 14 DAYS AFTER PLANTING.
2. MULCHING REQUIREMENTS INCLUDE:
   - HAY OR STRAW MULCH
     - ONLY CERTIFIED WEED-FREE AND CERTIFIED SEED-FREE MULCH MAY BE USED. MULCH MUST BE APPLIED AT 2 TONS/ACRE AND ADEQUATELY SECURED BY CRIMPING AND/OR TACKIFIER.
     - CRIMPING MUST NOT BE USED ON SLOPES GREATER THAN 3:1 AND MULCH FIBERS MUST BE TUCKED INTO THE SOIL TO A DEPTH OF 3 TO 4 INCHES.
     - TACKIFIER MUST BE USED IN PLACE OF CRIMPING ON SLOPES STEEPER THAN 3:1.
   - HYDRAULIC MULCHING
     - HYDRAULIC MULCHING IS AN OPTION ON STEEP SLOPES OR WHERE ACCESS IS LIMITED.
     - IF HYDRO-SEEDING IS USED, MULCHING MUST BE APPLIED AS A SEPARATE, SECOND OPERATION.
     - WOOD CELLULOSE FIBERS MIXED WITH WATER MUST BE APPLIED AT A RATE OF 2,000 TO 2,500 POUNDS/ACRE, AND TACKIFIER MUST BE APPLIED AT A RATE OF 100 POUNDS/ACRE.
   - EROSION CONTROL BLANKET
     - EROSION CONTROL BLANKET MAY BE USED IN PLACE OF TRADITIONAL MULCHING METHODS.

SM

STORMWATER ENTERPRISE	SEEDING & MULCHING	
	APPROVED: SHEET MANAGER	
	ISSUED: 10/1/19	REVISED: 6/19/2020
		DRAWING NO.: 800-SM



SECTION

VEHICLE TRACKING

NTS

VEHICLE TRACKING NOTES

INSTALLATION REQUIREMENTS

1. ALL ENTRANCES TO THE CONSTRUCTION SITE ARE TO BE STABILIZED PRIOR TO CONSTRUCTION BEGINNING.
2. CONSTRUCTION ENTRANCES ARE TO BE BUILT WITH AN APRON TO ALLOW FOR TURNING TRAFFIC, BUT SHOULD NOT BE BUILT OVER EXISTING PAVEMENT EXCEPT FOR A SLIGHT OVERLAP.
3. AREAS TO BE STABILIZED ARE TO BE PROPERLY GRADED AND COMPACTED PRIOR TO LAYING DOWN GEOTEXTILE AND STONE.
4. CONSTRUCTION ROADS, PARKING AREAS, LOADING/UNLOADING ZONES, STORAGE AREAS, AND STAGING AREAS ARE TO BE STABILIZED.
5. CONSTRUCTION ROADS ARE TO BE BUILT TO CONFORM TO SITE GRADES, BUT SHOULD NOT HAVE SIDE SLOPES OR ROAD GRADES THAT ARE EXCESSIVELY STEEP.

MAINTENANCE REQUIREMENTS

1. REGULAR INSPECTIONS ARE TO BE MADE OF ALL STABILIZED AREAS, ESPECIALLY AFTER STORM EVENTS.
2. STONES ARE TO BE REAPPLIED PERIODICALLY AND WHEN REPAIR IS NECESSARY.
3. SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED DAILY BY SHOVELING OR SWEEPING. SEDIMENT IS NOT TO BE WASHED DOWN STORM SEWER DRAINS.
4. STORM SEWER INLET PROTECTION IS TO BE IN PLACE, INSPECTED, AND CLEANED IF NECESSARY.
5. OTHER ASSOCIATED SEDIMENT CONTROL MEASURES ARE TO BE INSPECTED TO ENSURE GOOD WORKING CONDITION.

City of Colorado Springs Stormwater Quality

Figure VT-2
Vehicle Tracking
Application Examples

SC-1 Silt Fence (SF)

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.

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.

STOCKPILE PROTECTION MAINTENANCE NOTES

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.

SM-6 Stabilized Staging Area (SSA)

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)

Prepared by the Office of:
Oliver E. Watts, Consulting Engineer, Inc.
614 Elkton Drive, Colorado Springs, CO 80907
719-593-0173
olliewatts@aol.com
Celebrating over 39 years in business

DRAWN BY: O.E. WATTS	APPROVED BY:	REVISIONS	OLIVER E. WATTS CONSULTING ENGINEER COLORADO SPRINGS
DATE: 12-14-18	PROJ. NO.		
DWG. NO.: 19-5348	DWG.		

PROJECT

SHT. NAME: EROSION CONTROL DETAILS

SHT. NO.: OF