#### TOWN OF ERIE - GRADING NOTES

- 1. ALL CONSTRUCTION ACTIVITIES THAT DISTURBS ONE OR MORE ACRES OF LAND, AS WELL AS ACTIVITIES THAT DISTURB LESS THAN ONE ACRES OF LAND, BUT IS PARE OF A LARGER COMMON ACTIVITIES THAT DISTURBED LESS THAN A COLORADO STORMWATER DISAMAGE ON CONSTRUCTION SITES. OWNERS OR CONTRACTORS MUST OBTAIN A COLORADO STORMWATER DISCHARGE FERMIT FOR CONSTRUCTION ACTIVITIES FROM THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (OPHE) AND A GRADNIC AND STORMWATER OUALITY FERMIT FROM THE TOWN OF ERIE. CONTRACTOR SHALL:

  1.1. MANITAIN A COPY OF THE STORMWATER WANAGEMENT PLAN (SWEP) ONISTE AT ALL TIMES OR PROVIDE AN UPDATED DIGITAL COPY WITHIN THIS BUSINESS DAYS UPON REQUEST. THE STORM WATER WANAGEMENT PLAN OF SER OF MUST SEE MANITAINED AND MADE AVAILABLE TO TOWN OF ERR INSECTIONS UPON
- NESTALL AND MAINTAIN EROSION, SEDIMENT, AND MATERIALS MANAGEMENT CONTROL MEASURE AS SPECIFIED IN THE SWMP.

- 2. INSTALL AND MANTAIN EROSION, SEDIMENT, AND MATERIALS MANAGEMENT CONTROL MEASURE AS SECRETED IN THE SAMP.

  INSPECT ALL CONTROL MEASURES AT LEAST EVERY SEVEN (7) DAYS OR EVER FOURTEEN (14) DAYS AND WITHIN THEETY FOUR (24) HOURS AFTER ANY PRECIPITATION OR SNOWMELT (14) DAYS AND WITHIN THEETY FOUR (25) HOURS AFTER ANY PRECIPITATION OR SNOWMELT COPIES OF THESE REPORTS SHALL BE PROVIDED TO THE TOWN OF ERIE ENDMERSHOR STAFF.

  BASED ON INSPECTION AND MAINTENANCE RECORDS OF CONTROL MEASURES WITH THE SWAMP.

  BASED ON INSPECTION PERFORMED BY THE PERMIT HOLDER OR BY TOWN PERSONNELL, WITHOUT AND ANY OF THE PERMIT ALL MODIFICATIONS SHALL BE COMPLETED AS SOON AS PRACTICABLE AFTER THE REFERENCED INSPECTION, AND SHALL BE COMPLETED AS SOON AS PRACTICABLE AFTER THE REFERENCED INSPECTION, AND SHALL BE COMPLETED AS SOON AS PRACTICABLE AFTER THE REFERENCED INSPECTION, AND SHALL BE COMPLETED AS SOON AS PRACTICABLE AFTER THE REFERENCED INSPECTION, AND SHALL BE COMPLETED AS SOON AS PRACTICABLE AFTER THE REFERENCED INSPECTION, AND SHALL BE COMPLETED AS SOON AS PRACTICABLE AFTER THE REFERENCED INSPECTION, AND SHALL BE SUPPORTED AS SOON AS PRACTICABLE AFTER THE REFERENCED INSPECTION, AND SHALL BE SUPPORTED AND ASSOCIATED WITH CONTINUE OF THE SWAMP PROVES TO BE INSPECTION FOR IT THE SWAMP PROVES TO BE INSPECTION FOR IT THE SWAMP PROVES TO BE INSPECTION OF THE PROVINCE OF CONTROLLING INSTALLATION AND MAINTENANCE OF CONTROL MASSIESS SHALL BE SUPPORTED ON THE TEST AT OF EACH CONSTRUCTION AND ANATON AND MAINTENANCE OF CONTROL MASSIESS SHALL BE SUPPORTED TO THE START OF EACH CONSTRUCTION PRIASE.

- CONSTRUCTION PHASE.

  APPROPRIATE STABILIZED CONSTRUCTION ENTRANCES WITH VEHICLE TRACKING CONTROLS INSTALLED SHALL BE UTULIZED AT ALL THESE TO REDUCE THE TRACKOUT OF SEDIMENT. IF NON-STRUCTIONAL VEHICLE TRACKING CONTROLS ARE UTULIZED, CLEANUP OF TRACKOUT MUST OCCUR AT THE END OF EVERY BUSINESS DAY WITH CONSTRUCTION ACTIVITY
- OCCURRING.

  OCCURRING. (SECONATION, EMBANIMENT, AND COMPACTION) SHALL CONFORM TO THE ACCURRING (SECONATION, EMBANIMENT, AND COMPACTION) SHALL FURTHER BE IN COMPGNAMACE WITH THE TOWN OF EME "STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC IMPROVEMENTS," LATEST EDITION.

  ALL GRADING AND FILLING OPERATIONS SHALL BE OBSERVED, INSPECTED AND TESTED BY A UCRNESS OBJECT SHALL BEST AND SECONATION OF SHALL BE OBSERVED, INSPECTED AND TESTED BY A UCRNESS OBJECT SHALL BEST AND SHALL BEST AND SHALL BEST OBSERVED.
- ENGINEERING TATON SHALL BE RETAINED AND PROTECTED INVEREVER POSSIBLE EXPOSURE OF SOLID TO RESOLID THE RESOLUTION OF THE UNLESS DESIGNATED FOR REMOVAL AND SHALL BE LIABLE FOR SUCH DAMAGE AT HIS/HER
- EXPENSE.

  TOPSOIL SHALL BE STOCKPILED TO THE EXTENT PRACTICABLE ON THE SITE FOR USE ON AREAS TO BE RE-VEGETATED. ANY AND ALL STOCKPILES SHALL BE LOCATED AND PROTECTED FROM RECOSIVE LELEMANS. IF MATERIALS ARE STORED OFFSITE, A WRITTEN USE AGREEMENT BETWEEN THE PERMITTEE AND THE OWNER/PERMITOR OF ANY CONTROL MEASURES BEING UTILIZED OUTSIDE OF THE PERMITTEE ARMS THE MADE AVAILABLE TO TOWN PERSONNEL UPON
- REQUEST.

  6. TEMPORARY VEGETATION/STABILIZATION SHALL BE INSTALLED ON ALL DISTURBED AREAS WHERE PERMANENT SURFACE IMPROVEMENTS ARE NOT SCHEDULED FOR IMMEDIATE INSTALLATION BUT PLIMANENT SUPE ALE IMPROVISEENTS ARE NOT SCHEDULED FOR MIGHE INSTALLABLE INSTALLABLE IN A CAPITAL OF THE AND A CONTROL OF THE ACCOUNT OF THE
- 7. AT ALL TIMES, A WATER TRUCK SHALL BE ON-SITE AND THE PROPERTY SHALL BE MANTANED AND/OR WATER TO TO REVENT WIND-CAUSE DESIGN. LEAF MAPICA SAUACEM FROFERTY. BY DISCUSSION OF THE PROPERTY AND PROPERTY OF THE PROPERTY OF THE OWNER/OFF WATER OF THE PROPERTY OF THE OWNER/OFF WATER OFF THE OWNER OWNER OFF THE OWNER OWNE

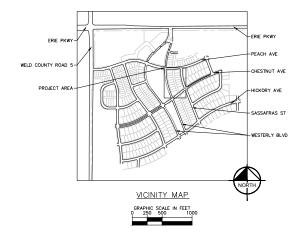
- 10. DEPTH OF MOSTURE-DENSITY CONTROL SHALL BE FULL DEFINED IN ALL EMBARMMENT AND JO. (5) INCHES SON THE BASE OF CUTS AND FILLS.

  11. ENSURE PROTECTION. STORM PIPES SHALL BE GRADED TOO RAIN AND SHALL SUFFICIENT ENGINE PROTECTION. STORM PIPES SHALL BE SHALL BE SHALL BE SHALL SUFFICIENT SHALL SUFFICIENT SHALL SHAL
- 12.1. INITIAL INSPECTION WHEN THE FEMORITEE IS READY TO BEGIN WORK, BUT NOT LESS THAN TWO (2) DAYS BEFORE ANY GRADING OR GRUBBING IS STATED.

  12.2. A FITER THE NATURAL GROUND OR BEDROCK IS EXPOSED AND PREPARED TO RECEIVE FILL, BUT BEFORE FILL IS PLACED.

  12.3. EXCAVATION INSPECTION AFTER THE EXCAVATION IS STARTED BUT BEFORE THE VERTICAL.
- DEPTH OF EXCAVATION EXCEEDS TEN (10) FEET.

  12.4. FILL INSPECTION AFTER THE FILL PLACEMENT IS STARTED, BUT BEFORE THE FILL EXCEEDS



SHEET	INDEX	
1 COVER SHEET		
2 INITIAL PLAN		
3	INTERIM / FINAL PLAN	
4-8 DETAILS		

#### GESC PLAN SIGNATURES

#### OWNER'S STATEMENT

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH THE REQUIREMENTS OF THE GRADING AND EROSION CONTROL PLAN.

OWNER SIGNATURE DATE

#### 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 BELLEF. SAID PLAN PLAN BEST OF THE CONTROL OF THE CO

KEVIN KOFFORD, PE - KIMLEY-HORN AND ASSOCIATES, INC.

DATE

NOT FOR CONSTRUCTION Kimin Minn

PROJECT NO.

SHEET

Know what's below. Call before you dig.

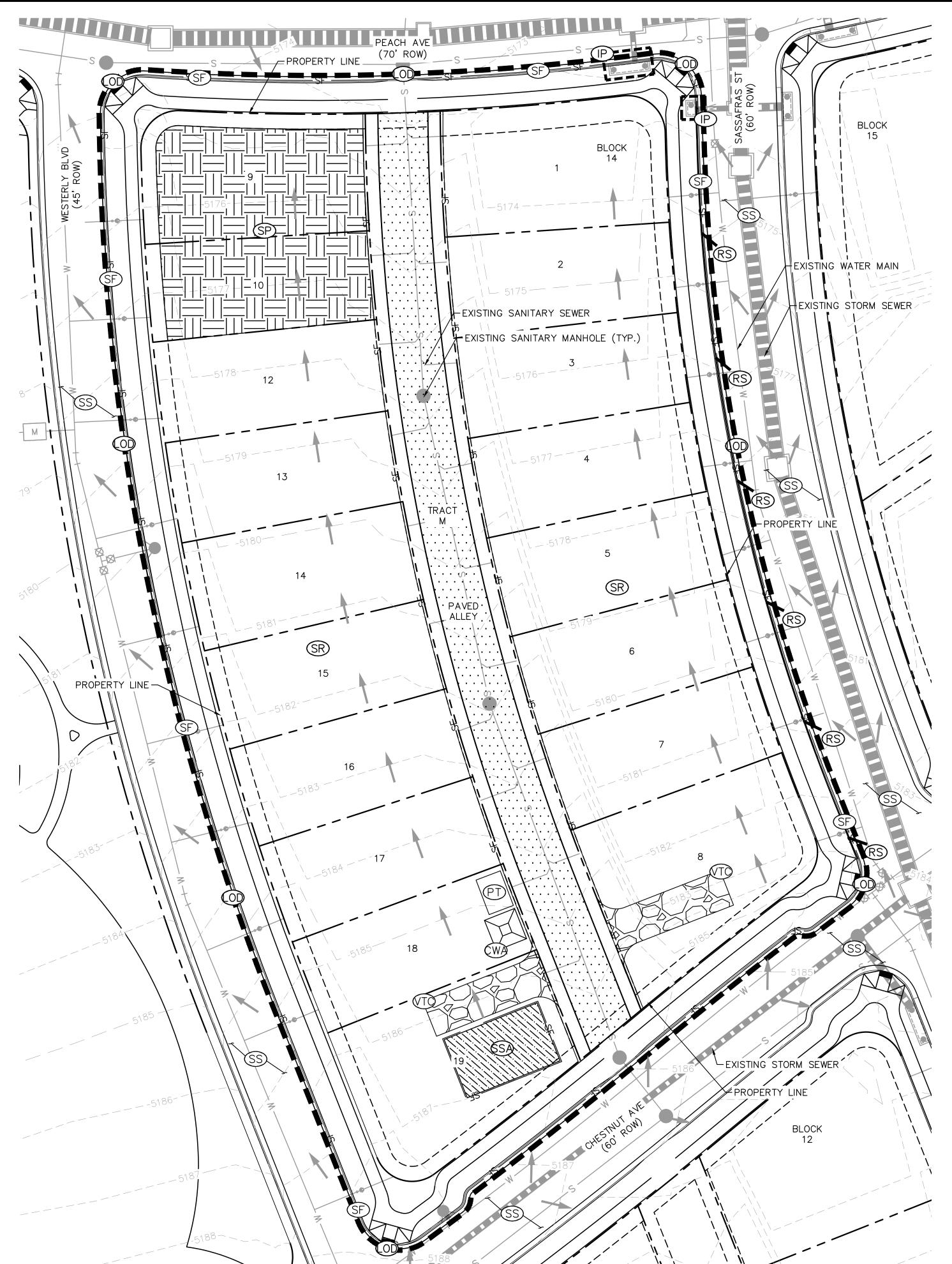
- 1. THE INTENT OF THIS PLAN IS TO IDENTIFY THE EROSION CONTROL PRACTICES RECOMMENDED. THE CONTRACTOR SHALL REFERENCE ADDITIONAL CONSTRUCTION PLANS OF EXISTING AND PROPOSED IMPROVEMENTS.
- 2. ADJACENT STREETS SHALL BE KEPT CLEAN AND FREE OF SEDIMENT AND/OR DEBRIS AS NEEDED.
- 3. TEMPORARY STABILIZATION (TS) SHALL BE IMPLEMENTED WITHIN THE DISTURBED PORTIONS OF THE PROJECT SITE NO LATER THAN 14 DAYS FOLLOWING THE CEASE OF CONSTRUCTION ACTIVITIES WITHIN THE DISTURBED AREAS.
- 4. PERMANENT STABILIZATION (PS) MAY BE USED WITHIN AREAS OF TEMPORARY STABILIZATION (TS) AT THE CONTRACTOR'S DISCRETION. STABILIZATION SHALL BE APPLIED IN ACCORDANCE WITH APPLICABLE TEMPORARY STABILIZATION SEQUENCING REQUIREMENTS.
- 5. CONTRACTOR SHALL UTILIZE ROLLED EROSION CONTROL PRODUCTS (STRAW-SINGLE NET EROSION CONTROL BLANKETS AND OPEN WEAVE TEXTILES) ON ALL SLOPES 3H:1V OR GREATER TO ACHIEVE REQUIRED STABILIZATION. CONTRACTOR SHALL MAINTAIN ACCEPTABLE EROSION CONTROL
- IDENTIFIED HEREIN. BEST MANAGEMENT PRACTICES AND STABILIZATION SHALL BE COMPLETED AS IDENTIFIED HEREIN IN ACCORDANCE WITHIN OWNER REQUIREMENTS.

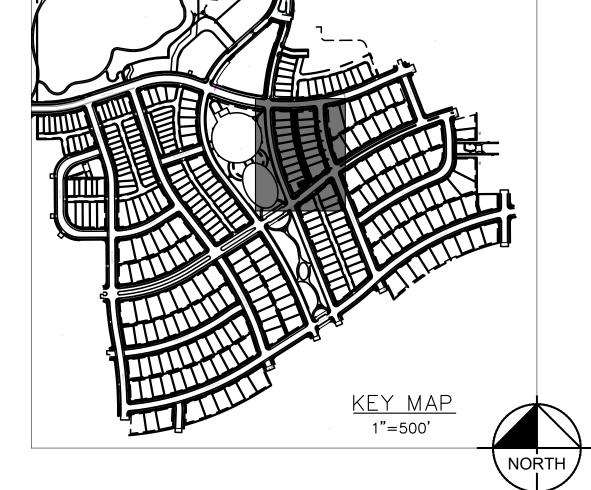
PRACTICES WITHIN THE ANTICIPATED LIMITS OF CONSTRUCTION

- 7. SILT FENCE TO BE INSTALLED PRIOR TO COMMENCEMENT OF ONSITE GRADING AND CONSTRUCTION ACTIVITIES. SILT FENCE MAY BE SUBSTITUTED WITH BLACK FABRIC WATTLE.
- 8. SILT FENCE TO BE REPLACED WITH BLACK FABRIC WATTLE AS LOT SPECIFIC FOUNDATION BACKFILL AND COMPACTION IS COMPLETED.
- DEMOLITION, REMOVAL, OVEREXCAVATION AND SOIL TREATMENT SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER RECOMMENDATIONS AS NOTED IN THE APPROVED PROJECT GEOTECHNICAL REPORT.
- 10. NO ASPHALT OR CONCRETE BATCH PLANTS SHALL BE USED FOR THIS PROJECT.
- 11. CHECK DAMS TO BE PLACED IN TEMPORARY AND PERMANENT DRAINAGE SWALES AND ROADSIDE DITCHES AND TO BE SPACED AS DEEMED NECESSARY. RIRPRAP IN CHECK DAMS TO BE SUBSTITUTED WITH SCL.
- 12. \*SURFACE ROUGHENING SURFACE ROUGHENING TO BE IMPLEMENTED AS NEEDED AND DETERMINED BY INSPECTOR.

LIMITS OF DISTURBANCE

ONSITE IMPROVEMENTS  $= \pm 2.31$  ACRES OFFSITE IMPROVEMENTS  $= \pm 0.00$  ACRES TOTAL  $= \pm 2.31$  ACRES





<u>LEGEND</u>

UTILITY EASEMENT -----

\_\_\_\_ XXXX \_\_\_ \_\_ MAJOR ELEVATION CONTOUR

PROPERTY LINE

0

eV

DESIGNED BY: KRK

DRAWN BY: RES CHECKED BY: KRK DATE: 01/18/22

0

FILING

WESTERLY

PRELIMINARY FOR REVIEW ONLY NOT FOR CONSTRUCTION

Kimley » Horn Kimley-Horn and Associates, Inc.

PROJECT NO. XXXXXXXX

SHEET

SUBDIVISION F BLOCK 13 GESC PLANS

MINOR ELEVATION CONTOUR ---- XXXX ----

SANITARY SEWER PIPE

STORM WATER UTILITY PIPE

MANHOLE

WATER PIPE

FIRE HYDRANT

LIMITS OF DISTURBANCE SILT FENCE

DRAINAGE DITCH

BLACK FABRIC WATTLE

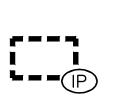
FINAL STABILIZATION

STABILIZED STAGING AREA SOIL STOCK PILING

VEHICLE TRACKING (MUD MAT)

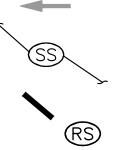
PORTABLE TOILET

CONCRETE WASHOUT (ECOPAN)



INLET PROTECTION

FLOW ARROW



SR

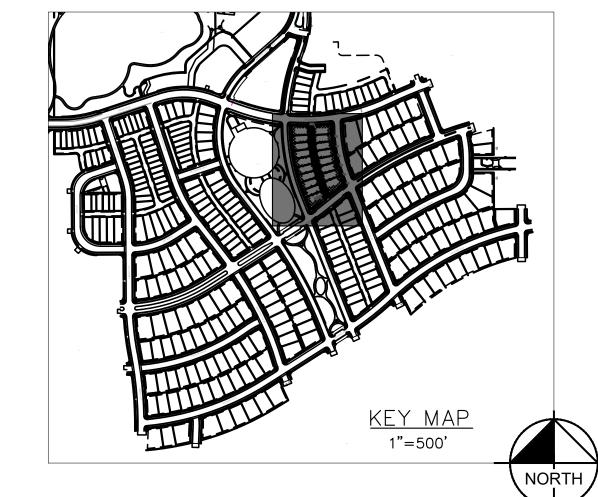
STREET SWEEPING



\*SURFACE ROUGHENING



Know what's **below.**Call before you dig.



<u>LEGEND</u>

\_\_\_\_\_ W \_\_\_\_

—(SF)— SF ———

UTILITY EASEMENT -----

---- XXXX --- ---MAJOR ELEVATION CONTOUR

PROPERTY LINE

---- XXXX ----MINOR ELEVATION CONTOUR

WATER PIPE

SANITARY SEWER PIPE

MANHOLE

SILT FENCE

STORM WATER UTILITY PIPE 

FIRE HYDRANT

LIMITS OF DISTURBANCE

DRAINAGE DITCH

BLACK FABRIC WATTLE

FINAL STABILIZATION

STABILIZED STAGING AREA

PORTABLE TOILET

CONCRETE WASHOUT (ECOPAN)

INLET PROTECTION

FLOW ARROW

ROCK SOCKS

Know what's **below.**Call before you dig.

DESIGNED BY: KRK DRAWN BY: RES CHECKED BY: KRK

DATE: 01/18/22

SUBDIVISION I BLOCK 13 GESC PLANS INTERIM / FINAL

Ŋ

SOIL STOCK PILING

VEHICLE TRACKING (MUD MAT)

STREET SWEEPING

\*SURFACE ROUGHENING

FOR REVIEW ONLY NOT FOR CONSTRUCTION Kimley » Horn Kimley-Horn and Associates, Inc.

PRELIMINARY

PROJECT NO. XXXXXXXX

SHEET

**SC-6** 



**Appropriate Uses** 

Install protection at storm sewer inlets that are operable during construction. Consider the potential for tracked-out

sediment or temporary stockpile areas to contribute sediment to inlets when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is <u>not</u> a stand-alone BMP and should be used in conjunction with other upgradient BMPs.

#### **Design and Installation**

To function effectively, inlet protection measures must be installed to ensure that flows do not bypass the

Several inlet protection designs are provided in the Design Details. Additionally, a variety of proprietary products are available for inlet protection that may be approved for use by local governments. If proprietary products are used, design details and installation procedures from the manufacturer must be followed. Regardless of the type of inlet protection selected, inlet protection is most effective when combined with other BMPs such as curb socks and check dams. Inlet protection is often the last barrier

Design details with notes are provided for these forms of in	nlet
protection:	

IP-1	Block an	nd Rock S	Sock Inlet	Protection:	for Sump	or On	-grade
TD 0	G 1 (D	1) 0 1		07.1.7			

IP-2. Curb (F Inlets

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Photograph IP-1. Inlet protection for a curb opening inlet.

No Yes No

Inlet Protection (various forms)

inlet protection and enter the storm drain without treatment. However, designs must also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding. When selecting the type of inlet protection, consider factors such as type of inlet (e.g., curb or area, sump or on-grade conditions), traffic, anticipated flows, ability to secure the BMP properly, safety and other site-specific conditions. For example, block and rock socks will be better suited to a curb and gutter along a roadway, as opposed to silt fence or sediment control logs, which cannot be properly secured in a curb and gutter setting, but are effective area inlet protection measures.

before runoff enters the storm sewer or receiving water.

Design details with notes are provided for these forms of inlet protection:	
IP-1. Block and Rock Sock Inlet Protection for Sump or On-gr.	a

	Functions	
and Rock Sock Inlet Protection for Sump or On-grade	Erosion Control	
	Sediment Control	
Rock) Socks Upstream of Inlet Protection, On-grade	Site/Material Management	

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#### IP-3. Rock Sock Inlet Protection for Sump/Area Inlet

IP-4. Silt Fence Inlet Protection for Sump/Area Inlet

IP-5. Over-excavation Inlet Protection

IP-6. Straw Bale Inlet Protection for Sump/Area Inlet

CIP-1. Culvert Inlet Protection

Propriety inlet protection devices should be installed in accordance with manufacturer specifications.

More information is provided below on selecting inlet protection for sump and on-grade locations.

#### Inlets Located in a Sump

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

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

#### **Inlets Located on a Slope**

**SC-6** 

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

#### Maintenance and Removal

Inspect inlet protection frequently. Inspection and maintenance guidance includes:

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

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 Remove sediment accumulation from the area upstream of the inlet protection, as needed to maintain BMP effectiveness, typically when it reaches no more than half the storage capacity of the inlet protection. For silt fence, remove sediment when it accumulates to a depth of no more than 6 inches. Remove sediment accumulation from the area upstream of the inlet protection as needed to maintain the functionality of the BMP.

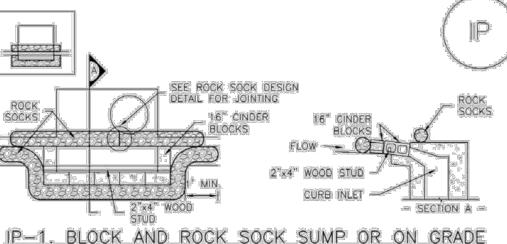
 Propriety inlet protection devices should be inspected and maintained in accordance with manufacturer specifications. If proprietary inlet insert devices are used, sediment should be removed in a timely manner to prevent devices from breaking and spilling sediment into the storm drain.

Inlet protection must be removed and properly disposed of when the drainage area for the inlet has reached final stabilization.

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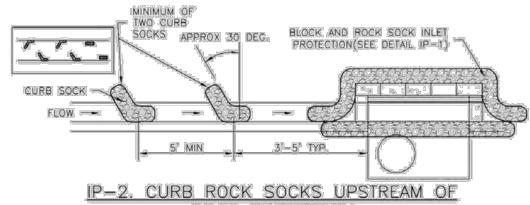


BLOCK AND CURB SOCK INLET PROTECTION INSTALLATION NOTES

1. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS

INLET PROTECTION

3. GRAVEL BAGS SHALL BE PLACED AROUND CONCRETE BLOCKS, CLOSELY ABUTTING ONE ANOTHER AND JOINTED TOGETHER IN ACCORDANCE WITH ROCK SOCK DESIGN DETAIL.



INLET PROTECTION

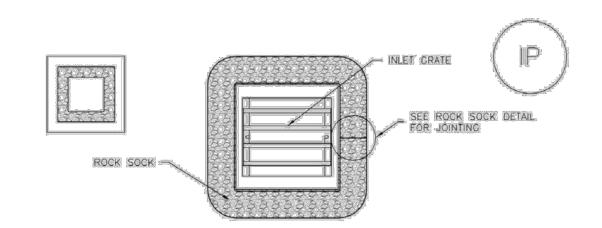
- CURB ROCK SOCK INLET PROTECTION INSTALLATION NOTES 1. SEE ROCK SOCK DESIGN DETAIL INSTALLATION REQUIREMENTS.
- 2. PLACEMENT OF THE SOCK SHALL BE APPROXIMATELY 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.
- 3. SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED A MINIMUM OF 5 FEET APART.
- 4. AT LEAST TWO CURB SOCKS IN SERIES ARE REQUIRED UPSTREAM OF ON-GRADE INLETS.

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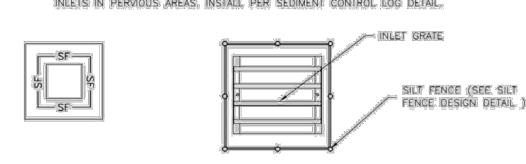




## IP-3. ROCK SOCK SUMP/AREA INLET PROTECTION

ROCK SOCK SUMP/AREA INLET PROTECTION INSTALLATION NOTES:

1. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS. 2. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF ROCK SOCKS FOR INLETS IN PERVIOUS AREAS, INSTALL PER SEDIMENT CONTROL LOG DETAIL.



IP-4. SILT FENCE FOR SUMP INLET PROTECTION

## SILIL FENCE INLET PROTECTION INSTALLATION NOTES

1. SEE SILT FENCE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.

2. POSTS SHALL BE PLACED AT EACH CORNER OF THE INLET AND AROUND THE EDGES AT A MAXIMUM SPACING OF 3 FEET.

3. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF SILT FENCE FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.

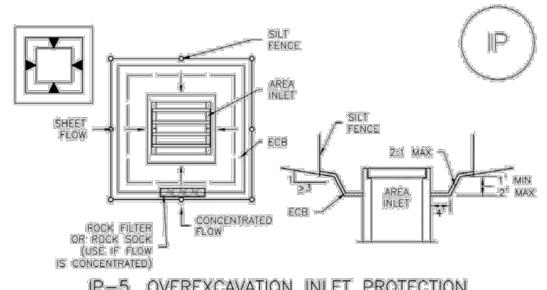
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Urban Drainage and Flood Control District

IP-5 IP-6

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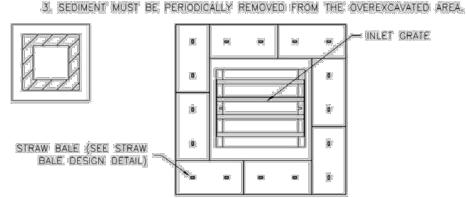
# **Inlet Protection (IP)**



IP-5. OVEREXCAVATION INLET PROTECTION OVEREXCAVATION INLET PROTECTION INSTALLATION INOTES

I., THIS FORM OF INLET PROTECTION IS PRIMARILY APPLICABLE FOR SITES THAT HAVE NOT YET REACHED FINAL GRADE, AND SHOULD BE USED ONLY FOR INLETS WITH A RELATIVELY SMALL CONTRIBUTING DRAINAGE AREA.

2), WHEN USING FOR CONCENTRATED FLOWS, SHAPE BASIN IN 2:1 RATIO WITH LENGTH ORIENTED TOWARDS DIRECTION OF FLOW.



## IP-6. STRAW BALE FOR SUMP INLET PROTECTION

STRAW BALE BARRIER INUIT PROTECTION INSTALLATION NOTES 1. SEE STRAW BALE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS:

2. BALES SHALL BE PLACED IN A SINGLE ROW AROUND THE INLET WITH ENDS OF BALES TIGHTLY ABUTTING ONE ANOTHER.

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# **Inlet Protection (IP)**

FLOW --

CULVERT INLET PROTECTION

\_\_CULVERT END SECTION

- ROCK SOCK

PLAN [10" MIN.

CULVERT INLET PROTECTION INSTAULATION NOTES

SEE PLAN VIEW FOR

 LOCATION OF CULVERT INLET PROTECTION.

CULVERY INLES PROTECTION MAINTENANCE NOTES

EROSION, AND PERFORM NECESSARY MAINTENANCE.

SEDIMENT DEPTH IS & THE HEIGHT OF THE ROCK SOCK.

(DETAILS ADAPTED FROM AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

August 2013

**SC-6** 

D (12" MIN.) 7

BACKFILL UPSTREAM

SECTION A

KEY IN ROCK SOCK OF ON BEDROCK, PAVEMENT OR RIPRAP

KEY IN ROCK SOCK 2" ON EARTH

SECTION B

CIP-1. CULVERT INLET PROTECTION

2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL.

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

FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPS; IN EFFECTIVE OPERATING CONDITION, INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON

4 SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE

5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

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 INOTED.

Urban Drainage and Flood Control District

Urban Storm Drainage Criteria Manual Volume 3

IP-3

**Inlet Protection (IP)** 

GENERAL INLET PROTECTION INSTALLATION NOTES 1. SEE PLAN VIEW FOR:
--LOCATION OF INLET PROTECTION.
--TYPE OF INLET PROTECTION (IP.1, IP.2, IP.3, IP.4, IP.5, IP.6)

**SC-6** 

2. INLET PROTECTION SHALL BE INSTALLED PROMPTLY AFTER: INLET CONSTRUCTION OR PAVING IS COMPLETE (TYPICALLY WITHIN 48 HOURS). IF A RAINFALL/RUNOFF EVENT IS FORECAST,

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

INUST\_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

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPS IN EFFECTIVE OPERATING CONDITION INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE 3. WHERE BMPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED AS NECESSARY TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN STORAGE VOLUME REACHES 50% OF CAPACITY, A DEPTH OF 6" WHEN SILT FENCE IS USED, OR K OF THE HEIGHT FOR

5. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED; UNLESS THE LOCAL JURISDICTION APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.

6. WHEN INLET PROTECTION AT AREA INLETS IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED, OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION. (DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

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

NOTE: THE DETAILS INCLUDED WITH THIS FACT SHEET SHOW COMMONLY USED, CONVENTIONAL METHODS OF INLET PROTECTION IN THE DENVER METROPOLITAN AREA. THERE ARE MANY PROPRIETARY INCET PROTECTION METHODS ON THE MARKET, UDFCD NEITHER ENDORSES NOR DISCOURAGES USE OF PROPRIETARY INLET PROTECTION; HOWEVER, IN THE EVENT PROPRIETARY METHODS ARE USED, THE APPROPRIATE DETAIL FROM THE MANUFACTURER MUST BE INCLUDED IN THE SWAP AND THE BMP MUST BE INSTALLED AND MAINTAINED AS SHOWN IN THE MANUFACTURER'S DETAILS.

NOTE: SOME MUNICIPALITIES DISCOURAGE OR PROHIBIT THE USE OF STRAW BALES FOR INLET PROTECTION, CHECK WITH LOCAL JURISDICTION TO DETERMINE IF STRAW BALE INLET PROTECTION IS ACCEPTABLE.

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August 2013

August 2013

August 2013

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IP-7

**MM-2** 

#### Description

Stockpile management includes measures to minimize erosion and sediment transport from soil stockpiles.

#### **Appropriate Uses**

Stockpile management should be used when soils or other erodible materials are stored at the construction site. Special attention should be given to stockpiles in close proximity to natural or manmade storm systems.



Photograph SP-1. A topsoil stockpile that has been partially revegetated and is protected by silt fence perimeter control.

Locate stockpiles away from all drainage system components including storm sewer inlets. Where practical, choose stockpile locations that that will remain undisturbed for the longest period of time as the

phases of construction progress. Place sediment control BMPs around the perimeter of the stockpile, such as sediment control logs, rock socks, silt fence, straw bales and sand bags. See Detail SP-1 for guidance on proper establishment of perimeter controls around a stockpile. For stockpiles in active use, provide a stabilized designated access point on the upgradient side of the stockpile. 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). Timeframes for stabilization of stockpiles noted in this fact sheet are "typical" guidelines. Check permit requirements for specific federal, state, and/or local requirements that

Stockpiles should not be placed in streets or paved areas unless no other practical alternative exists. See the Stabilized Staging Area Fact Sheet for guidance when staging in roadways is unavoidable due to space or right-of-way constraints. For paved areas, rock socks must be used for perimeter control and all inlets with the potential to receive sediment from the stockpile (even from vehicle tracking) must be protected.

#### Maintenance and Removal

Inspect perimeter controls and inlet protection in accordance with their respective BMP Fact Sheets. Where seeding, mulch and/or soil binders are used, reseeding or reapplication of soil binder may be necessary.

When temporary removal of a perimeter BMP is necessary to access a stockpile, ensure BMPs are reinstalled in accordance with their respective design detail section.

Stockpile Management	
Functions	
Erosion Control	Yes
Sediment Control	Yes
Site/Material Management	Yes

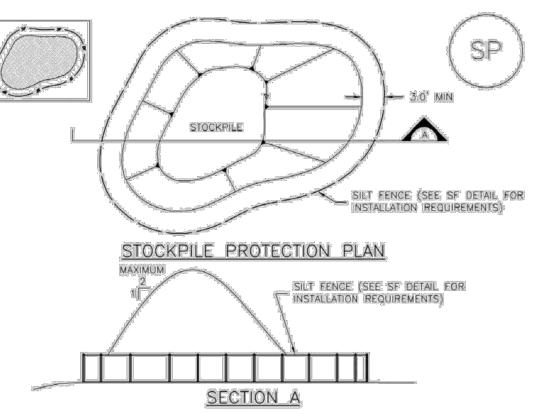
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# **Stockpile Management (SP)**

**MM-2** 



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 ISTOCKPILE 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 MULCHI 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.

MATERIALS\_STAGING\_IN\_ROADWAY\_MAINTENANGE\_NOTES

I. 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.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION, INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. INSPECT PVC PIPE ALONG CURB LINE FOR CLOGGING AND DEBRIS. REMOVE OBSTRUCTIONS

5. CLEAN MATERIAL FROM PAVED SURFACES BY SWEEPING OR VACUUMING. NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS, CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN

DIFFERENCES ARE NOTED. (DETAILS ADAPTED FROM AURORA, COLORADO)

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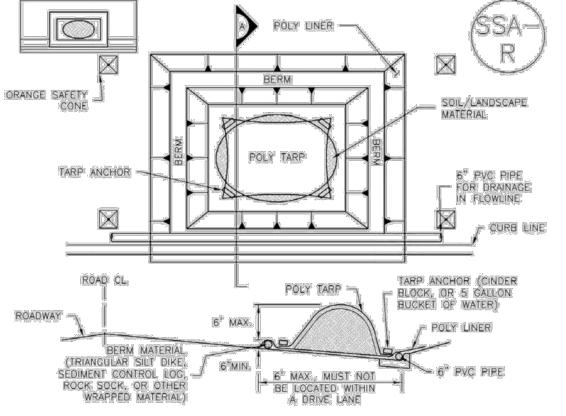
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# **MM-2**

**Stockpile Management (SM)** 

When the stockpile is no longer needed, properly dispose of excess materials and revegetate or otherwise stabilize the ground surface where the stockpile was located.

# **Stockpile Management (SP)**



SP-2. MATERIALS STAGING IN ROADWAY

MATERIALS\_STAGING\_IN\_ROADWAYS\_INSTALUATION\_NOTES

1. SEE PLAN VIEW FOR LOCATION OF MATERIAL STAGING AREA(S) CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL. FROM THE LOCAL JURISDICTION.

2. FEATURE MUST BE INSTALLED PRIOR TO EXCAVATION, EARTHWORK OR DELIVERY OF MATERIALS MUST BE STATIONED ON THE POLY LINER, ANY INCIDENTAL, MATERIALS

DEPOSITED ON PAVED SECTION OR ALONG CURB LINE MUST BE CLEANED UP PROMPTLY. 4, POLY UNER AND TARP COVER SHOULD BE OF SIGNIFICANT THICKNESS TO PREVENT DAMAGE OR LOSS OF INTEGRITY

5. SAND BAGS MAY BE SUBSTITUTED TO ANCHOR THE COVER TARP OR PROVIDE BERMING UNDER THE BASE LINER.

6. FEATURE IS NOT INTENDED FOR USE WITH WET MATERIAL THAT WILL BE DRAINING AND/OR SPREADING OUT ON THE POLY LINER OR FOR DEMOLITION MATERIALS.

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7. THIS FEATURE CAN BE USED FOR:

"UTILITY REPAIRS,"

"WHEN OTHER STAGING LOCATIONS AND OPTIONS ARE LIMITED."

"OTHER LIMITED APPLICATION AND SHORT DURATION STAGING,"

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#### STOCKPILE\_PROTECTION\_MAINTENANCE\_NOTES

T. 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.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION, INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE

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. 15. STOCKPILE PERIMETER CONTROLS: CAN BE REMOVED ONCE, ALL THE MATERIAL FROM THE STOCKPILE HAS BEEN USED.

(DETAILS ADAPTED FROM PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD) NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

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# **Street Sweeping and Vacuuming (SS)**

**SM-7** 

# **Description**

SP-5

Street sweeping and vacuuming remove sediment that has been tracked onto roadways to reduce sediment transport into storm drain systems or a surface waterway.

## **Appropriate Uses**

Use this practice at construction sites where vehicles may track sediment offsite onto paved roadways.

## **Design and Installation**

Photograph SS-1. A street sweeper removes sediment and potential pollutants along the curb line at a construction site. Photo courtesy of Street sweeping or vacuuming should be

conducted when there is noticeable sediment accumulation on roadways adjacent to the construction site. Typically, this will be concentrated at the entrance/exit to the construction site. Well-maintained stabilized construction entrances, vehicle tracking controls and tire wash facilities can help reduce the necessary frequency of street sweeping and vacuuming.

On smaller construction sites, street sweeping can be conducted manually using a shovel and broom. Never wash accumulated sediment on roadways into storm drains.

## **Maintenance and Removal**

- Inspect paved roads around the perimeter of the construction site on a daily basis and more frequently, as needed. Remove accumulated sediment, as needed.
- Following street sweeping, check inlet protection that may have been displaced during street
- Inspect area to be swept for materials that may be hazardous prior to beginning sweeping operations.

Street Sweeping/ Vacuu	ming
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	Yes

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SS-1

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SP-3

SP-2 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

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SILT FENCE

**Concrete Washout Area (CWA)** 

**Description** 

Concrete waste management involves designating and properly managing a specific area of the construction site as a concrete washout area. A concrete washout area can be created using one of several approaches designed to receive wash water from washing of tools and concrete mixer chutes, liquid concrete waste from dump trucks, mobile batch mixers, or pump trucks. Three basic approaches are available: excavation of a pit in the ground, use of an above ground storage area, or use of prefabricated haulaway concrete washout containers. Surface discharges of concrete washout



water from construction sites are prohibited. Photograph CWA-1. Example of concrete washout area. Note gravel tracking pad for access and sign.

## Appropriate Uses

Concrete washout areas must be designated on all sites that will generate concrete wash water or liquid concrete waste from onsite concrete mixing or concrete delivery.

Because pH is a pollutant of concern for washout activities, when unlined pits are used for concrete washout, the soil must have adequate buffering capacity to result in protection of state groundwater standards; otherwise, a liner/containment must be used. The following management practices are recommended to prevent an impact from unlined pits to groundwater:

- The use of the washout site should be temporary (less than 1 year), and
- The washout site should be not be located in an area where shallow groundwater may be present, such as near natural drainages, springs, or wetlands.

# **Design and Installation**

Concrete washout activities must be conducted in a manner that does not contribute pollutants to surface waters or stormwater runoff. Concrete washout areas may be lined or unlined excavated pits in the ground, commercially manufactured prefabricated washout containers, or aboveground holding areas constructed of berms, sandbags or straw bales with a plastic liner.

Although unlined washout areas may be used, lined pits may be required to protect groundwater under

Contain Conditions.	ſ
Do not locate an unlined washout area within 400 feet	ŀ
of any natural drainage pathway or waterbody or	
within 1,000 feet of any wells or drinking water	-
<b>sources.</b> Even for lined concrete washouts, it is	
advisable to locate the facility away from waterbodies	
and drainage paths. If site constraints make these	

Concrete Washout Area	
Functions	
Erosion Control	No
Sediment Control	No
Site/Material Management	Yes

CWA-1

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Silt Fence (SF)

#### **Maintenance and Removal**

SC-1

SF-3

**MM-1** 

Inspection of silt fence includes observing the material for tears or holes and checking for slumping fence and undercut areas bypassing flows. Repair of silt fence typically involves replacing the damaged section with a new section. Sediment accumulated behind silt fence should be removed, as needed to maintain BMP effectiveness, typically before it reaches a depth of 6 inches.

Silt fence may be removed when the upstream area has reached final stabilization.



Photograph SF-2. When silt fence is not installed along the contour, a "J-hook" installation may be appropriate to ensure that the BMP does not create concentrated flow parallel to the silt fence. Photo courtesy of Tom

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# **MM-1**

# **Concrete Washout Area (CWA)**

setbacks infeasible or if highly permeable soils exist in the area, then the pit must be installed with an impermeable liner (16 mil minimum thickness) or surface storage alternatives using prefabricated concrete washout devices or a lined aboveground storage area should be used.

Design details with notes are provided in Detail CWA-1 for pits and CWA-2 for aboveground storage areas. Pre-fabricated concrete washout container information can be obtained from vendors.

## **Maintenance and Removal**

A key consideration for concrete washout areas is to ensure that adequate signage is in place identifying the location of the washout area. Part of inspecting and maintaining washout areas is ensuring that adequate signage is provided and in good repair and that the washout area is being used, as opposed to washout in non-designated areas of the site.

Remove concrete waste in the washout area, as needed to maintain BMP function (typically when filled to about two-thirds of its capacity). Collect concrete waste and deliver offsite to a designated disposal location.

Upon termination of use of the washout site, accumulated solid waste, including concrete waste and any contaminated soils, must be removed from the site to prevent on-site disposal of solid waste. If the wash water is allowed to evaporate and the concrete hardens, it may be recycled.





Photograph CWA-3. Earthen concrete washout. Photo courtesy of CDOT.

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Silt Fence (SF)

#### **Description**

A silt fence is a woven geotextile fabric attached to wooden posts and trenched into the ground. It is designed as a sediment barrier to intercept sheet flow runoff from disturbed areas.

# **Appropriate Uses**

- A silt fence can be used where runoff is conveyed from a disturbed area as sheet flow. Silt fence is not designed to receive concentrated flow or to be used as a filter fabric. Typical uses include:
- Down slope of a disturbed area to accept sheet flow.
- Along the perimeter of a receiving water such as a stream, pond or wetland.
- At the perimeter of a construction site.

#### **Design and Installation**

Silt fence should be installed along the contour of slopes so that it intercepts sheet flow. The maximum recommended tributary drainage area per 100 lineal feet of silt fence, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to silt fence installed along the contour. Silt fence installed for other uses, such as perimeter control, should be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the silt fence.

See Detail SF-1 for proper silt fence installation, which involves proper trenching, staking, securing the fabric to the stakes, and backfilling the silt fence. Properly installed silt fence should not be easily pulled out by hand and there should be no gaps between the ground and the fabric.

Silt fence must meet the minimum allowable strength requirements, depth of installation requirement, and other specifications in the design details. Improper installation

of silt fence is a common reason for silt fence failure; however, when properly installed and used for the appropriate purposes, can be highly effective.

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

SF-1

**MM-1** 

CWA-3

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Photograph SF-1. Silt fence creates a sediment barrier, forcing

sheet flow runoff to evaporate or infiltrate.

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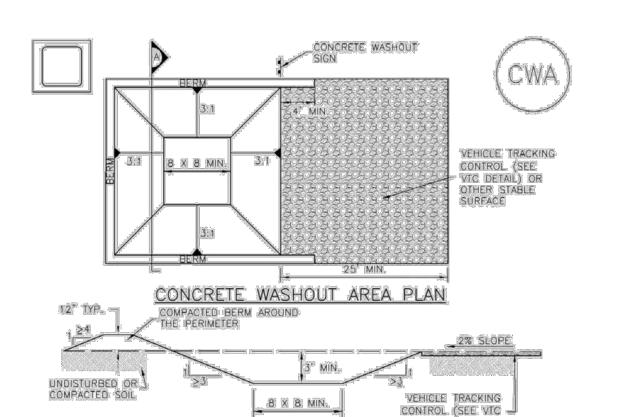
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SC-1

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# **Concrete Washout Area (CWA)**



CWA-1. CONCRETE WASHOUT AREA CWA\_INSTALLATION NOTES

i. 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.

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.

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SC-1 Silt Fence (SF)

#### SILT\_FENCE\_INSTALLATION\_NOTES

I. 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

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.

COMPACT ANCHOR TRENCH BY HAND WITH A "JUMPING JACK" OR BY WHEEL ROLLING

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. . SILT FENCE FABRIC SHALL BE ANCHORED TO THE STAKES USING 1" HEAVY DUTY STAPLES OR NAILS WITH I" HEADS, STAPLES AND NAILS SHOULD BE PLACED 3" ALONG THE FABRIC

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 FENGE 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) FOULDWING 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

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.
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# Concrete Washout (ECOPAN Style)

BMP Description*	A concrete washout is designed to capture waste water and waste products resulting from the cleaning of concrete and masonry equipment.
	nom the treating of controls and masonly equipment.
Function	Concrete washouts are used to contain concrete and liquids from chutes of concret mixers and hoppers that are rinsed out after delivery. The washout consolidates solid and allows for containment and evaporation of liquids for easier disposal and prevent runoff into storm sewers or waters on the site.
Installation	Concrete washout shall be installed or provided prior to any construction activities the include the handling of materials containing cement (e.g. concrete, masonry, etc.). concrete washout may not be necessary if all wash-out operations are performed of site. Ecopan are all steel slope sided boxes delivered to the site and placed at convict locations  Concrete washouts should not be sited within 50 feet of storm drains, opeditched/swales, or water bodies. They should be sized to accommodate the anticipate concrete use on the site.
	concrete use on the site.
Phasing	Concrete washouts shall be used during all phases of construction where concrete similar products will be used.
Implementation	Concrete washout areas shall be implemented on all sites where concrete or simil products are used.
BMP Location	Concrete washout is located on ar adjacent to active lots as needed. See SWMP MA
(List all concrete washout areas used on site)	for exact location if needed on site.
site)	
Inspections	A concrete wash-out should be inspected to make sure appropriate access control tracking and containment is in place.
Maintenance	Maintenance would include the removal of hardened material or excess liquicleaning or replacing the tracking material and general structural integrity of the installation. Concrete washouts should be cleaned of excess water and solids when the capacity of the washout reaches no more than 50%.

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Appropriate Uses

Vehicle tracking controls provide

stabilized construction site access where vehicles exit the site onto paved public

roads. An effective vehicle tracking

control helps remove sediment (mud or

dirt) from vehicles, reducing tracking onto

Description

the paved surface.

Implement a stabilized construction entrance or vehicle tracking control where frequent heavy vehicle traffic exits the construction site onto a paved roadway. An effective vehicle tracking control is

Photograph VTC-1. A vehicle tracking control pad constructed with properly sized rock reduces off-site sediment tracking.

- particularly important during the following conditions:
- Wet weather periods when mud is easily tracked off site.
- During dry weather periods where dust is a concern.
- When poorly drained, clayey soils are present on site.

Although wheel washes are not required in designs of vehicle tracking controls, they may be needed at particularly muddy sites.

#### Design and Installation

Construct the vehicle tracking control on a level surface. Where feasible, grade the tracking control towards the construction site to reduce off-site runoff. Place signage, as needed, to direct construction vehicles to the designated exit through the vehicle tracking control. There are several different types of stabilized construction entrances including:

VTC-1. Aggregate Vehicle Tracking Control. This is a coarse-aggregate surfaced pad underlain by a geotextile. This is the most common vehicle tracking control, and when properly maintained can be effective at removing sediment from vehicle tires.

VTC-2. Vehicle Tracking Control with Construction Mat or Turf Reinforcement Mat. This type of control may be appropriate for site access at very small construction sites with low traffic volume over vegetated areas. Although this application does not typically remove sediment from vehicles, it helps protect existing vegetation and provides a stabilized entrance.

Vehicle Tracking Control		
Functions		
Erosion Control	Moderate	
Sediment Control	Yes	
Site/Material Management	Yes	

VTC-1

**EC-10** 

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# CONSTRUCTION MATS, WOVEN OR TRM VTC-3. VEHICLE TRACKING CONTROL W/ CONSTRUCTION MAT OR TURF REINFORCEMENT MAT (TRM) Urban Drainage and Flood Control District VTC-5 November 2010 Urban Storm Drainage Criteria Manual Volume 3 You created this PDF from an application that is not licensed to print to novaPDF printer (<a href="http://www.novapdf.com">http://www.novapdf.com</a>)

# Earth Dikes and Drainage Swales (ED/DS)

## **Description**

Earth dikes and drainage swales are temporary storm conveyance channels constructed either to divert runoff around slopes or to convey runoff to additional sediment control BMPs prior to discharge of runoff from a site. Drainage swales may be lined or unlined, but if an unlined swale is used, it must be well compacted and capable of resisting erosive velocities.

## **Appropriate Uses**

Earth dikes and drainage swales are typically used to control the flow path of runoff at a construction site by diverting runoff around areas prone to erosion, such as steep slopes. Earth dikes and drainage swales may also be constructed as temporary conveyance features. This will direct runoff to additional sediment control treatment BMPs, such as sediment traps or



Photograph ED/DS-1. Example of an earth dike used to divert flows at a construction site. Photo courtesy of CDOT.

## **Design and Installation**

When earth dikes are used to divert water for slope protection, the earth dike typically consists of a horizontal ridge of soil placed perpendicular to the slope and angled slightly to provide drainage along the contour. The dike is used in conjunction with a swale or a small channel upslope of the berm to convey the diverted water. Temporary diversion dikes can be constructed by excavation of a V-shaped trench or ditch and placement of the fill on the downslope side of the cut. There are two types of placement for temporary slope diversion dikes:

- A dike located at the top of a slope to divert upland runoff away from the disturbed area and convey it in a temporary or permanent channel.
- A diversion dike located at the base or mid-slope of a disturbed area to intercept runoff and reduce the effective slope length.

Depending on the project, either an earth dike or drainage swale may be more appropriate. If there is a need for cut on the project, then an excavated drainage swale may be better suited. When the project is primarily fill, then a conveyance constructed using a berm may be the

better option. All dikes or swales receiving runoff from a disturbed area should direct stormwater to a sediment control BMP such as a sediment trap or basin.

<b>Earth Dikes and Drainage Swales</b>	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No

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ED/DS-1

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Earth Dikes and Drainage Swales (ED/DS)

# Unlined dikes or swales should only be used for intercepting sheet flow runoff and are not intended

for diversion of concentrated flows.

Details with notes are provided for several design variations, including:

- ED-1. Unlined Earth Dike formed by Berm DS-1. Unlined Excavated Swale
- DS-2. Unlined Swale Formed by Cut and Fill
- DS-3. ECB-lined Swale
- DS-4. Synthetic-lined Swale
- DS-5. Riprap-lined Swale

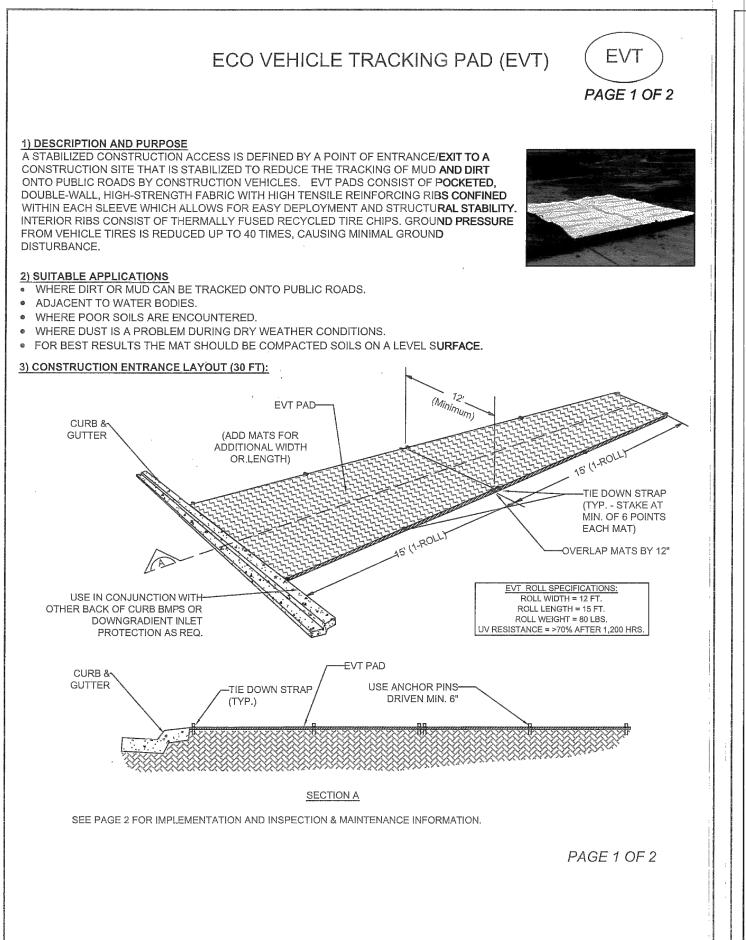
ED/DS-2

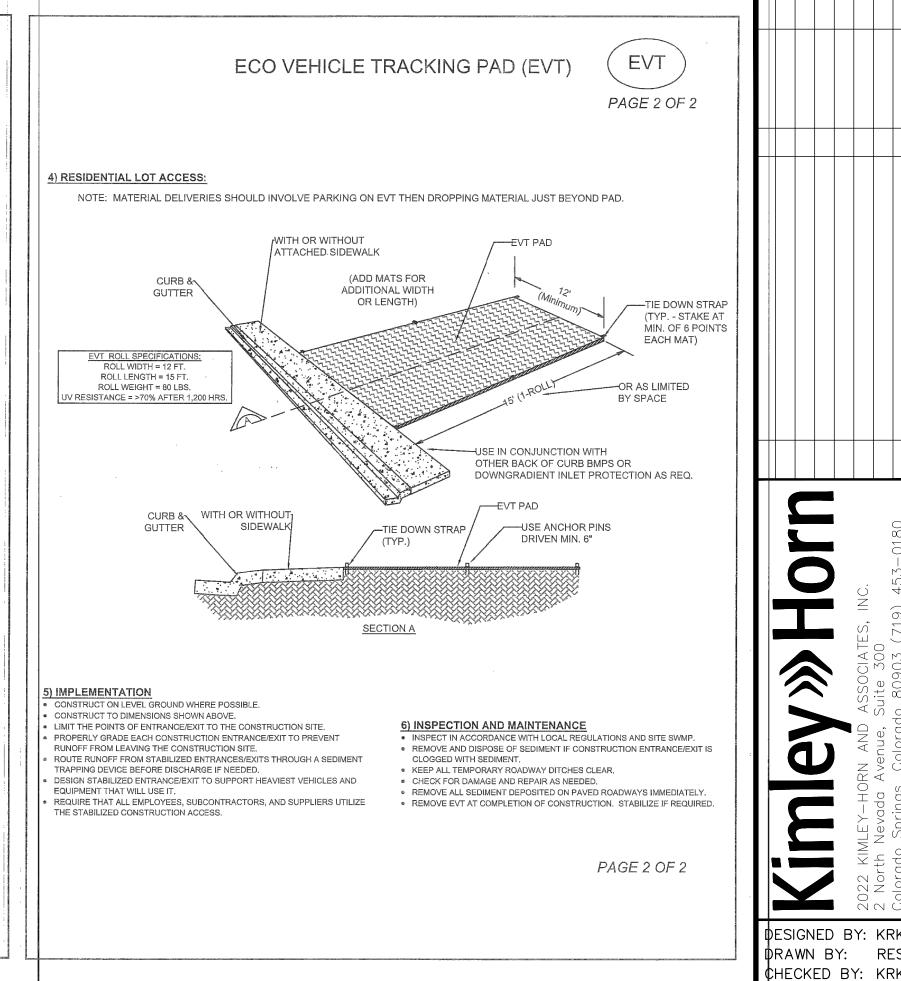
The details also include guidance on permissible velocities for cohesive channels if unlined approaches will be used.

## **Maintenance and Removal**

Inspect earth dikes for stability, compaction, and signs of erosion and repair. Inspect side slopes for erosion and damage to erosion control fabric. Stabilize slopes and repair fabric as necessary. If there is reoccurring extensive damage, consider installing rock check dams or lining the channel with riprap.

If drainage swales are not permanent, remove dikes and fill channels when the upstream area is stabilized. Stabilize the fill or disturbed area immediately following removal by revegetation or other permanent stabilization method approved by the local jurisdiction.

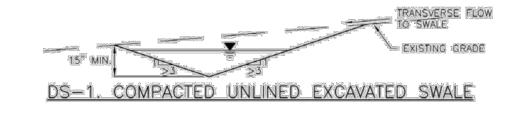




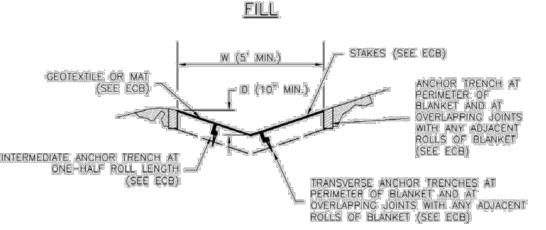


ED=1. COMPACTED UNLINED EARTH DIKE FORMED BY BERM

Earth Dikes and Drainage Swales (ED/DS)







DS-3. ECB LINED SWALE (CUT AND FILL OR BERM)

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EARTH\_DIKE\_AND\_DRAINAGE\_SWALE\_MAINTENANCE\_NOTES.

I. 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

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. SWALES SHALL REMAIN IN PLACE UNTIL THE END OF CONSTRUCTION; IF APPROVED BY LOCAL JURISDICTION, SWALES MAY BE LEFT IN PLACE.

(DETAIL ADAPTED FROM DOUGLAS: COUNTY: COLORADO AND THE CITY OF COLORADO: SPRINGS), COLORADO; NOT AVAILABLE IN

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.

ED/DS-5

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SEDIMENT CONTROL LOC INSTAULATION NOTES

SEDIMENTE CONTROLL LOC MAINTENANCE NOTES

EROSION, AND PERFORM NECESSARY MAINTENANCE.

AND CITY OF AURORA, COLORADO, NOT AVAILABLE (IN AUTOCAD)

1. SEE PLAN VIEW FOR LOCATION AND LENGTH OF SEDIMENT CONTROL LOGS.

2. SEDIMENT CONTROL LOGS THAT ACT AS A PERIMETER CONTROL SHALL BE INSTALLED PRIOR TO ANY UPGRADIENT LAND-DISTURBING ACTIVITIES.

3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSION OR COCONUT FIBER, AND SHALL BE FREE OF ANY NOXIOUS WEED SEEDS OR DEFECTS INCLUDING RIPS, HOLES AND OBVIOUS WEAR.

4. SEDIMENT CONTROL LOGS MAY BE USED AS SMALL CHECK DAMS IN DITCHES AND SWALES HOWEVER, THEY SHOULD NOT BE USED IN PERENNIAL STREAMS OR HIGH VELOCITY DRAINAGE

5. IT IS RECOMMENDED THAT SEDIMENT CONTROL LOGS BE TRENCHED INTO THE GROUND TO

A DEPTH OF APPROXIMATELY & OF THE DIAMETER OF THE LOC. IF TRENCHING TO THIS DEPTH IS NOT FEASIBLE AND/OR DESIRABLE (SHORT TERM INSTALLATION WITH DESIRE NOT TO

DAMAGE LANDSCAPE) A LESSER TRENCHING DEPTH MAY BE ACCEPTABLE WITH MORE ROBUST

6. THE UPHILL SIDE OF THE SEDIMENT CONTROL LOG SHALL BE BACKFILLED WITH SOIL THAT. IS FREE OF ROCKS AND DEBRIS. THE SOIL SHALL BE TIGHTLY COMPACTED INTO THE SHAPE OF A RIGHT TRIANGLE USING A SHOVEL OR WEIGHTED LAWN ROLLER.

7. FOLLOW MANUFACTURERS' GUIDANCE FOR STAKING. IF MANUFACTURERS' INSTRUCTIONS

DO NOT SPECIFY SPACING, STAKES SHALL BE PLACED ON 4° CENTERS AND EMBEDDED A. MINIMUM OF 6° INTO THE GROUND, 3° OF THE STAKE SHALL PROTRUDE FROM THE TOP OF

I 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

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.

SEDIMENTS IS APPROXIMATELY & OF THE HEIGHT OF THE SEDIMENT CONTROL LOG.

4. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOG SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED

5: SEDIMENT CONTROL, LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION; IF DISTURBED AREAS EXIST AFTER REMOVAL, THEY SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL

(DETAILS ADAPTED FROM TOWN OF PARKER: COLORADO: JEFFERSON COUNTY COLORADO: DOUGLAS COUNTY, COLORADO,

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

THE LOG. STAKES THAT ARE BROKEN PRIOR TO INSTALLATION SHALL BE REPLACED.

Improper installation can lead to poor performance. Be sure that sediment control logs are properly trenched, anchored and tightly jointed.

#### Maintenance and Removal

SC-2

Be aware that sediment control logs will eventually degrade. Remove accumulated sediment before the depth is one-half the height of the sediment log and repair damage to the sediment log, typically by replacing the damaged section.

Once the upstream area is stabilized, remove and properly dispose of the logs. Areas disturbed beneath the logs may need to be seeded and mulched. Sediment control logs that are biodegradable may occasionally be left in place (e.g., when logs are used in conjunction with erosion control blankets as permanent slope breaks). However, removal of sediment control logs after final stabilization is typically recommended when used in perimeter control, inlet protection and check dam applications.

**Description** 

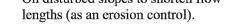
A sediment control log is a linear roll made of natural materials such as straw, coconut fiber, or other fibrous material trenched into the ground and held with a wooden stake. Sediment control logs are also often referred to as "straw wattles." They are used as a sediment barrier to intercept sheet flow runoff from disturbed areas.

# **Appropriate Uses**

Sediment control logs can be used in the following applications to trap

- As perimeter control for stockpiles and the site.
- As part of inlet protection designs.
- As check dams in small drainage ditches. (Sediment control logs are not intended for use in channels with high flow velocities.)
- On disturbed slopes to shorten flow





• As part of multi-layered perimeter control along a receiving water such as a stream, pond or wetland.

perimeter control at the corner of a construction site.

#### Sediment control logs work well in combination with other layers of erosion and sediment controls.

#### **Design and Installation**

Sediment control logs should be installed along the contour to avoid concentrating flows. The maximum allowable tributary drainage area per 100 lineal feet of sediment control log, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to sediment control logs installed along the contour. When installed for other uses, such as perimeter control, it should be installed in a way that will not

produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the BMP.

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

SCL-1

SC-2

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SCL-5 November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3

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AT PERIMETER OF CONSTRUCTION SITE

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**Sediment Control Log (SCL)** 

**Sediment Control Log (SCL)** 

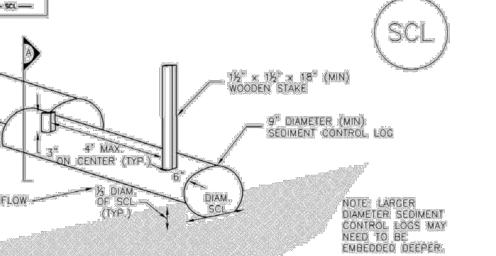
\_ CENTER STAKE IN CONTROL LOG

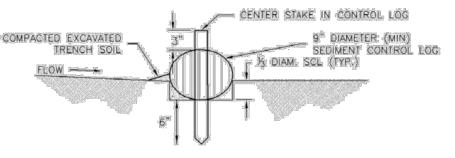
PLACE CONTROL LOG AGAINST SIDEWALK

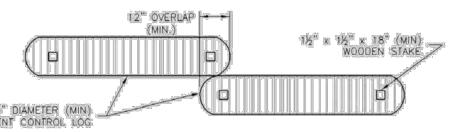
STAKING AT 4 MAX: ON CENTER (TYP.)

SEDIMENT CONTROL LOC 13 DIAM. SCL (TYP.) FLOW ----

SCL-2







SEDIMENT CONTROL LOG JOINTS

SCL-3

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SCL-4. SEDIMENT CONTROL LOGS TO CONTROL

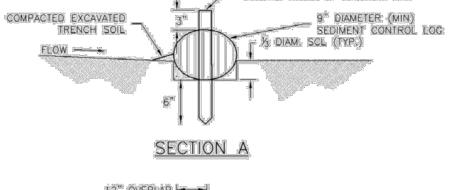
SLOPE LENGTH

TREE LAWN

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SEDIMENT CONTROL LOG



SCL-1. SEDIMENT CONTROL LOG

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SCL-4

- CENTER STAKE IN CONTROL LOG 9" DIAMETER (MIN) SEDIMENT CONTROL LOG PLACE LOG AGAINST BACK OF CURB 光 DIAM, SCL (TYP.) SCL-2. SEDIMENT CONTROL LOG AT BACK OF CURB TREE LAWN (TYPICAL) SCL-3. SEDIMENT CONTROL LOG AT SIDEWALK WITH

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DESIGNED BY: KRK

DRAWN BY: RES CHECKED BY: KRK

DATE: 01/18/22

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PROJECT NO. XXXXXXXX

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SC-2

SC-2