Stormwater Management Facility Operation and Maintenance (O&M) Manual

for:

Homestead at Sterling Ranch Filing No. 2

Located at:

Homestead at Sterling Ranch Filing No. 2: Bounded by Wheatland Drive, Briargate Parkway, Dines Boulevard and Sand Creek

Prepared for:

SR Land, LLC 20 Boulder Crescent, Suite 201 Colorado Springs, CO 80903 Jim Morley (719) 471-1742

Prepared by:

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SF-19-004

Reference: **This manual is adapted from Town of Parker, Colorado,** STORMWATER PERMANENT BEST MANAGEMENT PRACTICES (PBMP) LONG-TERM OPERATION AND MAINTENANCE MANUAL, October 2004

> Stormwater Management Facility Operation and Maintenance (O&M) Manual Comment on sheet 55.

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Stormwater Management Facility Operation and Maintenance (O&M) Manual

I. Compliance with Stormwater Facility Maintenance Requirements

All property owners are responsible for ensuring that stormwater facilities installed on their property are properly maintained and that they function as designed. In some cases, this maintenance responsibility may be assigned to others through special agreements. The maintenance responsibility for a stormwater facility may be designated on the subdivision plat, the site development plan, and/or within a maintenance agreement for the property. Property owners should be aware of their responsibilities regarding stormwater facility maintenance. Maintenance agreement(s) associated with this property are provided in Appendix A.

In some cases, the El Paso County (EPC) may agree to provide the required inspection and maintenance for some or all private stormwater facilities. In these cases, an EPC maintenance agreement will be included in Appendix A for those facilities that are agreed to be included in the EPC routine maintenance program.

II. Inspection & Maintenance – Annual Reporting

Requirements for the inspection and maintenance of stormwater facilities, as well as reporting requirements are included in this Stormwater Management Facility Operation and Maintenance (O&M) Manual.

Verification that the Stormwater facilities have been properly inspected and maintained; submittal of the required Inspection and Maintenance Forms and Inspector qualifications shall be provided to EPC on an annual basis. The annual reporting form shall be provided to EPC prior to May 31st of each year.

Copies of the Inspection and Maintenance forms for each of the stormwater facilities are located in Appendix D and E. A standard annual reporting form is provided in Appendix F. Each form shall be reviewed and submitted by the property owner or property manager to EPC.

Property owners are not required to provide Inspection and Maintenance Reports for stormwater facilities that have been agreed to be maintained by EPC. These reports will be generated through EPC's inspection & maintenance program.

III. Preventative Measures to Reduce Maintenance Costs

The most effective way to maintain your water quality facility is to prevent the pollutants from entering the facility in the first place. Common pollutants include sediment, trash & debris, chemicals, dog wastes, runoff from stored materials, illicit discharges into the storm drainage system and many others. A thoughtful maintenance program will include measures to address these

potential contaminants, and will save money and time in the long run. Key points to consider in your maintenance program include:

- Educate property owners/residents to be aware of how their actions affect water quality, and how they can help reduce maintenance costs.
- Keep properties, streets and gutters, and parking lots free of trash, debris, and lawn clippings.
- Ensure the proper disposal of hazardous wastes and chemicals.
- Plan lawn care to minimize the use of chemicals and pesticides.
- Sweep paved surfaces and put the sweepings back on the lawn.
- Be aware of automobiles leaking fluids. Use absorbents such as cat litter to soak up drippings dispose of properly.
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean out the upstream components of the storm drainage system, including inlets, storm sewers and outfalls.
- Do not store materials outdoors (including landscaping materials) unless properly protected from runoff.

IV. Access and Easements

All stormwater management facilities located on the site have both a designated access location as well as a maintenance easement. Refer to the Stormwater Facilities Map located in Appendix G for access and easement locations.

V. Safety

Keep safety considerations at the forefront of inspection procedures at all times. Likely hazards should be anticipated and avoided. Never enter a confined space (outlet structure, manhole, etc) without proper training or equipment. A confined space should never be entered without at least one additional person present.

If a toxic or flammable substance is discovered, leave the immediate area and contact the local Sheriff at 911.

Potentially dangerous (e.g., fuel, chemicals, hazardous materials) substances found in the areas must be referred to the local Sheriff's Office immediately for response by the Hazardous Materials Unit. The emergency contact number is 911.

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified within the pond that is greater than 48" in height, make the appropriate note/comment on the maintenance inspection form.

If any hazard is found within the facility area that poses an immediate threat to public safety, contact the local Sheriff's Office immediately.

VI. Field Inspection Equipment

It is imperative that the appropriate equipment is taken to the field with the inspector(s). This is to ensure the safety of the inspector and allow the inspections to be performed as efficiently as possible. Below is a list of the equipment that may be necessary to perform the inspections of all Stormwater Management Facilities:

- Protective clothing and boots.
- Safety equipment (vest, hard hat, confined space entry equipment).
- Communication equipment.
- Operation and Maintenance Manual for the site including stormwater management facility location maps.
- Clipboard.
- Stormwater Facility Maintenance Inspection Forms (See Appendix D).
- Manhole Lid Remover
- Shovel.

Some of the items identified above need not be carried by the inspector (manhole lid remover, shovel, and confined space entry equipment). However, this equipment should be available in the vehicle driven to the site.

VII. Inspecting Stormwater Management Facilities

The quality of stormwater entering the waters of the state relies heavily on the proper operation and maintenance of permanent best management practices. Stormwater management facilities must be periodically inspected to ensure that they function as designed. The inspection will determine the appropriate maintenance that is required for the facility.

A. Inspection Procedures

All stormwater management facilities are required to be inspected by a qualified individual at a minimum of once per year. Inspections should follow the inspection guidance found in the SOP for the specific type of facility. (Appendix C of this manual).

B. Inspection Report

The person(s) conducting the inspection activities shall complete the appropriate inspection report for the specific facility. Inspection reports are located in Appendix D.

The following information explains how to fill out the Inspection Forms:

General Information

This section identifies the facility location, person conducting the inspection, the date and time the facility was inspected, and approximate days since the last rainfall. Property classification is identified as single-family residential, multi-family residential, commercial, or other.

The reason for the inspection is also identified on the form depending on the nature of the inspection. All facilities should be inspected on an annual basis at a minimum. In addition, all facilities should be inspected after a significant precipitation event to ensure the facility is draining appropriately and to identify any damage that occurred as a result of the increased runoff.

Inspection Scoring

For each inspection item, a score must be given to identify the urgency of required maintenance. The scoring is as follows:

- 0 = No deficiencies identified.
- Monitor Although maintenance may not be required at this time, a potential problem exists that will most likely need to be addressed in the future. This can include items like minor erosion, concrete cracks/spalling, or minor sediment accumulation. This item should be revisited at the next inspection.
- 2 = Routine Maintenance Required Some inspection items can be addressed through the routine maintenance program (See SOP in appendix A). This can include items like vegetation management or debris/trash removal.
- 3 = Immediate Repair Necessary This item needs immediate attention because failure is imminent or has already occurred. This could include items such as structural failure of a feature (outlet works, forebay, etc), significant erosion, or significant sediment accumulation. This score should be given to an item that can significantly affect the function of the facility.
- N/A This is checked by an item that may not exist in a facility. Not all facilities have all of the features identified on the form (forebay, micro-pool, etc.).

Inspection Summary/Additional Comments

Additional explanations to inspection items, and observations about the facility not covered by the form, are recorded in this section.

Overall Facility Rating

An overall rating must be given for each facility inspected. The overall facility rating should correspond with the highest score (0, 1, 2, 3) given to any feature on the inspection form.

C. Verification of Inspection and Form Submittal

The Stormwater Management Facility Inspection Form provides a record of inspection of the facility. Inspection Forms for each facility type are provided in Appendix D. Verification of the inspection of the stormwater facilities, the facility inspection form(s), and Inspector Qualifications shall be provided to EPC on an annual basis. The verification and the inspection form(s) shall be reviewed and submitted by the property owner or property manager.

Refer to Section II of this Manual regarding the annual reporting of inspections.

VIII. Maintaining Stormwater Management Facilities

Stormwater management facilities must be properly maintained to ensure that they operate correctly and provide the water quality treatment for which they were designed. Routine maintenance performed on a frequently scheduled basis, can help avoid more costly rehabilitative maintenance that results when facilities are not adequately maintained.

A. Maintenance Categories

Stormwater management facility maintenance programs are separated into three broad categories of work. These categories are based largely on the Urban Drainage and Flood Control District's Maintenance Program for regional drainage facilities. The categories are separated based upon the magnitude and type of the maintenance activities performed. A description of each category follows:

Routine Work

The majority of this work consists of scheduled mowings and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash racks. It also includes activities such as weed control, mosquito treatment, and algae treatment. These activities normally will be performed numerous times during the year. These items can be completed without any prior

correspondence with EPC; however, completed inspection and maintenance forms shall be submitted to EPC for each inspection and maintenance activity.

Restoration Work

This work consists of a variety of isolated or small-scale maintenance and work needed to address operational problems. Most of this work can be completed by a small crew, with minor tools, and small equipment. These items require prior correspondence with EPC and require that completed maintenance forms be submitted to EPC for each maintenance activity.

Rehabilitation Work

This work consists of large-scale maintenance and major improvements needed to address failures within the stormwater management facilities. This work requires consultation with EPC and may require an engineering design with construction plans to be prepared for review and approval. This work may also require more specialized maintenance equipment, surveying, construction permits or assistance through private contractors and consultants. These items require prior correspondence with EPC and require that completed maintenance forms be submitted to EPC for each maintenance activity.

B. <u>Maintenance Personnel</u>

Maintenance personnel must be qualified to properly maintain stormwater management facilities. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

C. Maintenance Forms

The Stormwater Management Facility Maintenance Form provides a record of maintenance activities. Maintenance Forms for each facility type are provided in Appendix E. Maintenance Forms shall be completed by the contractor completing the required maintenance items. The form shall then be reviewed by the property owner or an authorized agent of the property owner and submitted on an annual basis to the Southeast Metro Stormwater Authority.

Refer to Section II of this Manual regarding the annual reporting of inspections and maintenance activities performed.

APPENDIX A

PRIVATE DETENTION BASIN / STORMWATER QUALITY BEST MANAGEMENT PRACTICE MAINTENANCE AGREEMENT AND EASEMENT

This PRIVATE DETENTION BASIN / STORMWATER QUALITY BEST MANAGEMENT PRACTICE MAINTENANCE AGREEMENT AND EASEMENT (Agreement) is made by and between EL PASO COUNTY by and through THE BOARD OF COUNTY COMMISSIONERS OF EL PASO COUNTY, COLORADO (Board or County) and SR Land, LLC ("Owner or Developer") and STERLING RANCH METROPOLITAN DISTRICT NO. 1 ("District"), a quasi-municipal corporation and political subdivision of the State of Colorado. The above may occasionally be referred to herein singularly as "Party" and collectively as "Parties."

Recitals

A. WHEREAS, the District provides various municipal services to certain real property in El Paso County, Colorado referred to as Sterling Ranch; and

B. WHEREAS, Developer is the owner of certain real estate in El Paso County, Colorado, which Property is legally described in <u>Exhibit A</u> attached hereto and incorporated herein by this reference; and

C. WHEREAS, Developer desires to plat and develop on the Property a subdivision to be known as Homestead at Sterling Ranch Filing No. 2; and

D. WHEREAS, the development of this Property will substantially increase the volume of water runoff and will decrease the quality of the stormwater runoff from the Property, and, therefore, it is in the best interest of public health, safety and welfare for the County to condition approval of this subdivision on Developer's promise to construct adequate drainage, water runoff control facilities, and stormwater quality structural Best Management Practices ("BMPs") for the subdivision; and

E. WHEREAS, Chapter 8, Section 8.4.5 of the El Paso County <u>Land Development Code</u>, as periodically amended, promulgated pursuant to Section 30-28-133(1), Colorado Revised Statutes (C.R.S.), requires the County to condition approval of all subdivisions on a developer's promise to so construct adequate drainage, water runoff control facilities, and BMPs in subdivisions; and

F. WHEREAS, the <u>Drainage Criteria Manual, Volume 2</u>, as amended by Appendix I of the El Paso County <u>Engineering Criteria Manual (ECM)</u>, as each may be periodically amended, promulgated pursuant to the County's Colorado Discharge Permit System General Permit (MS4 Permit) as required by Phase II of the National Pollutant Discharge Elimination System (NPDES), which MS4 Permit requires that the County take measures to protect the quality of stormwater from sediment and other contaminants, requires subdividers, developers, landowners, and owners of facilities located in the County's rights-of-way or easements to provide adequate permanent stormwater quality BMPs with new development or significant redevelopment; and

G. WHEREAS, Section 2.9 of the El Paso County <u>Drainage Criteria Manual</u> provides for a developer's promise to maintain a subdivision's drainage facilities in the event the County does not assume such responsibility; and

H. WHEREAS, developers in El Paso County have historically chosen water runoff detention basins as a means to provide adequate drainage and water runoff control in subdivisions, which basins, while effective, are less expensive for developers to construct than other methods of providing drainage and water runoff control; and

I. WHEREAS, Developer desires to construct for the subdivision two detention basin/stormwater quality BMP(s) ("detention basin/BMP(s)") as the means for providing adequate drainage and stormwater runoff control and to meet requirements of the County's MS4 Permit, and to provide for operating, cleaning, maintaining and repairing such detention basin/BMP(s); and

J. WHEREAS, Developer desires to construct the detention basin/BMP(s) on property that is or will be platted as Homestead Sterling Ranch Filing No. 2, Lots 24-27 and Tract B, and as set forth on Exhibit B attached hereto; and

K. WHEREAS, Developer and the District shall be charged with the duty of constructing the detention basin/BMP(s) and the District shall be charged with the duties of operating, maintaining and repairing the detention basin/BMP(s) on the Property described in <u>Exhibit B</u>; and

L. WHEREAS, it is the County's experience that subdivision developers and property owners historically have not properly cleaned and otherwise not properly maintained and repaired these detention basins/BMPs, and that these detention basins/BMPs, when not so properly cleaned, maintained, and repaired, threaten the public health, safety and welfare; and

M. WHEREAS, the County, in order to protect the public health, safety and welfare, has historically expended valuable and limited public resources to so properly clean, maintain, and repair these detention basins/BMPs when developers and property owners have failed in their responsibilities, and therefore, the County desires the means to recover its costs incurred in the event the burden falls on the County to so clean, maintain and repair the detention basin/BMP(s) serving this Subdivision due to the Developer's or the District's failure to meet its obligations to do the same; and

N. WHEREAS, the County conditions approval of this Subdivision on the Developer's promise to so construct the detention basin/BMP(s), and further conditions approval on the District's promise to reimburse the County in the event the burden falls upon the County to so clean, maintain and/or repair the detention basin/BMP(s) serving this Subdivision; and

O. WHEREAS, the County could condition subdivision approval on the Developer's promise to construct a different and more expensive drainage, water runoff control system and BMPs than those proposed herein, which more expensive system would not create the possibility of the burden of cleaning, maintenance and repair expenses falling on the County; however, the County is willing to forego such right upon the performance of Developer's and the District's promises contained herein; and

P. WHEREAS, the County, in order to secure performance of the promises contained herein, conditions approval of this Subdivision upon the Developer's grant herein of a perpetual

Easement over a portion of the Property for the purpose of allowing the County to periodically access, inspect, and, when so necessary, to clean, maintain and/or repair the detention basin/BMP(s); and

Q. WHEREAS, Pursuant to Colorado Constitution, Article XIV, Section 18(2) and Section 29-1-203, Colorado Revised Statutes, governmental entities may cooperate and contract with each other to provide any function, services, or facilities lawfully authorized to each.

Agreement

NOW, THEREFORE, in consideration of the mutual Promises contained herein, the sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. <u>Incorporation of Recitals</u>: The Parties incorporate the Recitals above into this Agreement.

2. <u>Covenants Running with the Land</u>: Developer and the District agree that this entire Agreement and the performance thereof shall become a covenant running with the land, which land is legally described in <u>Exhibit A</u> attached hereto, and that this entire Agreement and the performance thereof shall be binding upon themselves, their respective successors and assigns.

3. <u>Construction</u>: Developer or the District shall construct on that portion of the Property described in <u>Exhibit B</u> attached hereto and incorporated herein by this reference, a detention basin/BMP(s). Developer or the District shall not commence construction of the detention basin/BMP(s) until the El Paso County Development Services Department (DSD) has approved in writing the plans and specifications for the detention basin/BMP(s) and this Agreement has been signed by all Parties and returned to the DSD. Developer or the District shall complete construction of the detention basin/BMP(s) in substantial compliance with the County-approved plans and specifications for the detention basin/BMP(s). Failure to meet these requirements shall be a material breach of this Agreement, and shall entitle the County to pursue any remedies available to it at law or in equity to enforce the same. Construction of the detention basin/BMP(s) shall be substantially completed within one (1) year (defined as 365 days), which one year period will commence to run on the date the approved plat of this Subdivision is recorded in the records of the El Paso County Clerk and Recorder. Rough grading of the detention basin/BMP(s) must be completed and inspected by the El Paso County Development Services Department prior to commencing road construction.

In the event construction is not substantially completed within the one (1) year period, then the County may exercise its discretion to complete the project, and shall have the right to seek reimbursement from the Developer or the District and their respective successors and assigns, for its actual costs and expenses incurred in the process of completing construction. The term actual costs and expenses shall be liberally construed in favor of the County, and shall include, but shall not be limited to, labor costs, tool and equipment costs, supply costs, and engineering and design costs, regardless of whether the County uses its own personnel, tools, equipment and supplies, etc. to correct the matter. In the event the County initiates any litigation or engages the services of legal counsel in order to enforce the Provisions arising herein, the County shall be entitled to its damages and costs, including reasonable attorney fees, regardless of whether the County contracts with outside legal counsel or utilizes in-house legal counsel for the same.

4. <u>Maintenance</u>: The District agrees for itself and its successors and assigns, that it will regularly and routinely inspect, clean and maintain the detention basin/BMP(s), and otherwise keep the same in good repair, all at its own cost and expense. No trees or shrubs that will impair the structural integrity of the detention basin/BMP(s) shall be planted or allowed to grow on the detention basin/BMP(s).

5. <u>Creation of Easement</u>: Developer hereby grants the County and the District a nonexclusive perpetual easement upon and across that portion of the Property described in <u>Exhibit B</u>. The purpose of the easement is to allow the County and the District to access, inspect, clean, repair and maintain the detention basin/BMP(s); however, the creation of the easement does not expressly or implicitly impose on the County a duty to so inspect, clean, repair or maintain the detention basin/BMP(s).

6. <u>County's Rights and Obligations</u>: Any time the County determines, in the sole exercise of its discretion, that the detention basin/BMP(s) is not properly cleaned, maintained and/or otherwise kept in good repair, the County shall give reasonable notice to the Developer, the District and their respective successors and assigns, that the detention basin/BMP(s) needs to be cleaned, maintained and/or otherwise repaired. The notice shall provide a reasonable time to correct the problem(s). Should the responsible parties fail to correct the specified problem(s), the County may enter upon the Property to so correct the specified problem(s). Notice shall be effective to the above by the County's deposit of the same into the regular United States mail, postage pre-paid. Notwithstanding the foregoing, this Agreement does not expressly or implicitly impose on the County a duty to so inspect, clean, repair or maintain the detention basin/BMP(s).

7. <u>Reimbursement of County's Costs / Covenant Running With the Land</u>: The Developer and the District agree and covenant, for themselves, their respective successors and assigns, that they will reimburse the County for its costs and expenses incurred in the process of completing construction of, cleaning, maintaining, and/or repairing the detention basin/BMP(s) pursuant to the provisions of this Agreement.

The term "actual costs and expenses" shall be liberally construed in favor of the County, and shall include, but shall not be limited to, labor costs, tools and equipment costs, supply costs, and engineering and design costs, regardless of whether the County uses its own personnel, tools, equipment and supplies, etc. to correct the matter. In the event the County initiates any litigation or engages the services of legal counsel in order to enforce the provisions arising herein, the County shall be entitled to its damages and costs, including reasonable attorney's fees, regardless of whether the County contracts with outside legal counsel or utilizes in-house legal counsel for the same.

8. <u>Contingencies of Subdivision Approval</u>: Developer's and the Metro District's execution of this Agreement is a condition of subdivision approval. Additional conditions of this Agreement include, but are not limited to, the following:

a. Conveyance of Lots 24-27 and Tract B, Homestead at Sterling Ranch Filing No. 2, from Developer to the District (which will include a reservation of easement in favor of the County for purposes of accessing, inspecting, cleaning, maintaining, and repairing the detention basin/BMP(s)), and recording of the Deed for the same; and

b. A copy of the Covenants of the Subdivision, if applicable, establishing that the District is obligated to inspect, clean, maintain, and repair the detention basin/BMP(s).

The County shall have the right, in the sole exercise of its discretion, to approve or disapprove any documentation submitted to it under the conditions of this Paragraph, including but not limited to, any separate agreement or amendment, if applicable, identifying any specific maintenance responsibilities not addressed herein. The County's rejection of any documentation submitted hereunder shall mean that the appropriate condition of this Agreement has not been fulfilled.

9. <u>Agreement Monitored by El Paso County Development Services Department and/or El Paso County Department of Transportation</u>: Any and all actions and decisions to be made hereunder by the County shall be made by the Director of the El Paso County Development Services Department and/or the Director of the El Paso County Department of Transportation. Accordingly, any and all documents, submissions, plan approvals, inspections, etc. shall be submitted to and shall be made by the Director of the Development Services Department and/or the Director of the El Paso County Department of Transportation.

10. <u>Indemnification and Hold Harmless</u>: To the extent authorized by law, Developer and the District agree, for themselves, their respective successors and assigns, that they will indemnify, defend, and hold the County harmless from any and all loss, costs, damage, injury, liability, claim, lien, demand, action and causes of action whatsoever, whether at law or in equity, arising from or related to their respective intentional or negligent acts, errors or omissions or that of their agents, officers, servants, employees, invitees and licensees in the construction, operation, inspection, cleaning (including analyzing and disposing of any solid or hazardous wastes as defined by State and/or Federal environmental laws and regulations), maintenance, and repair of the detention basin/BMP(s), and such obligation arising under this Paragraph shall be joint and several. Nothing in this Paragraph shall be deemed to waive or otherwise limit the defense available to the County pursuant to the Colorado Governmental Immunity Act, Sections 24-10-101, *et seq.* C.R.S., or as otherwise provided by law.

11. <u>Severability</u>: In the event any Court of competent jurisdiction declares any part of this Agreement to be unenforceable, such declaration shall not affect the enforceability of the remaining parts of this Agreement.

12. <u>Third Parties:</u> This Agreement does not and shall not be deemed to confer upon or grant to any third party any right to claim damages or to bring any lawsuit, action or other proceeding against either the County, the Developer, the District, or their respective successors and assigns, because of any breach hereof or because of any terms, covenants, agreements or conditions contained herein.

13. <u>Solid Waste or Hazardous Materials</u>: Should any refuse from the detention basin/BMP(s) be suspected or identified as solid waste or petroleum products, hazardous substances or hazardous materials (collectively referred to herein as "hazardous materials"), the Developer and the District shall take all necessary and proper steps to characterize the solid waste or hazardous materials and properly dispose of it in accordance with applicable State and/or Federal environmental laws and regulations, including, but not limited to, the following: Solid Wastes Disposal Sites and Facilities Acts, §§ 30-20-100.5 – 30-20-119, C.R.S., Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities, 6 C.C.R. 1007-2, *et seq.*, Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992k, and Federal Solid Waste Regulations 40 CFR Ch. I. The County shall not be responsible or liable for identifying, characterizing, cleaning up, or disposing of such solid waste or hazardous materials. Notwithstanding

the previous sentence, should any refuse cleaned up and disposed of by the County be determined to be solid waste or hazardous materials, the Developer and the District, but not the County, shall be responsible and liable as the owner, generator, and/or transporter of said solid waste or hazardous materials.

14. <u>Applicable Law and Venue</u>: The laws, rules, and regulations of the State of Colorado and El Paso County shall be applicable in the enforcement, interpretation, and execution of this Agreement, except that Federal law may be applicable regarding solid waste or hazardous materials. Venue shall be in the El Paso County District Court.

15. Limitation on <u>Developer's Obligation and Liability</u>: The obligation and liability of the Developer hereunder shall only continue until such time as the Final Plat as described in Paragraph Three (3) of the Recitals set forth above is recorded and the Developer or District completes the construction of the detention basin/BMP(s) and the Developer has transferred all applicable maintenance and operation responsibilities to the District. By execution of this agreement, the District agrees to accept all responsibilities and to perform all duties assigned to it, including those of the Developer, as specified herein, upon transfer of Lots 24-27 and Tract B from Developer to the District.

IN WITNESS WHEREOF, the Parties affix their signatures below.

Executed this _____ day of _____, 20__, by:

SR LAND, LLC

By:

James Morley, Its Manager

The foregoing instrument was acknowledged before me this _____ day of _____, 2016, by James Morley, Manager, SR Land, LLC.

Witness my hand and official seal.

My commission expires:

Notary Public

Executed this _____ day of _____, 2016, by:

STERLING RANCH METROPOLITAN DISTRICT NO. 1

By:		
By:James Morley, President		
A		
Attest:		
By:		
Secretary		
The foregoing instrument was ack	knowledged before me this	day of 2016.
2016, by James Morley, President, STER	RLING RANCH METROPOL	ITAN DISTRICT No. 1
Witness my hand and official seal.		
My commission expires:		_
	Notary Public	
Executed this day of	, 2016, by:	
BOARD OF COUNTY COMMISSION	NERS	
OF EL PASO COUNTY, COLORADO		
By:		
, Chain	r	
Attest:		
County Clerk and Recorder		
The foregoing instrument was ack	knowledged before me this	day of
2016, by, Chair of Colorado, as Attested to by	the Board of County Commis	ssioners of El Paso County,
Colorado, as Attested to by	, County Clerk and	a Kecorder.

Witness my hand and official seal.

My commission expires: _____

Notary Public

Approved as to Content and Form:

Assistant County Attorney

EL PASO COUNTY DEVELOPMENT SERVICES DEPARTMENT

By: _____

Craig Dossey, Executive Director



20 Boulder Crescent, STE 110 Colorado Springs, CO 80903 Mail to: PO Box 1360 Colorado Springs, CO 80901 719.955.5485

POND 1 – HOMESTEAD AT STERLING RANCH FILING NO. 2 MAINTENANCE AGREEMENT EXHIBIT "A"

M&S Job No. 09-007 FEBRUARY 22, 2019

A PARCEL OF LAND LOCATED IN A PORTION OF THE SOUTHWEST QUARTER (SW 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 33, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH PRINCIPAL MERIDIAN, EL PASO COUNTY, COLORADO;

BASIS OF BEARINGS: THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW1/4) OF SECTION 34, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH PRINCIPLE MERIDIAN, THE SECTION CORNER COMMON TO SECTIONS 33, 34, 3, AND 4 BEING MONUMENTED WITH A 2-1/2" ALUMINUM CAP STAMPED "LS 11624" AND AT THE QUARTER CORNER COMMON TO SECTIONS 34 AND 3 WITH A 2-1/2" ALUMINUM CAP STAMPED "LS 11624", SAID LINE BEARS N89°14'14" E, A DISTANCE OF 2,722.56 FEET.

COMMENCING AT SAID SOUTHWEST CORNER OF SAID SOUTHWEST QUARTER (SW1/4) OF SAID SECTION 34; THENCE N31°01"13" W, A DISTANCE OF 4121.66 FEET TO A POINT A POINT ON THE WESTERLY LINE OF TRACT D AS SHOWN ON THE PLAT OF "STERLING RANCH FILING NO. 1" UNDER RECEPTION NUMBER 218714151 OF THE RECORDS OF EL PASO COUNTY, COLORADO, AND THE POINT OF BEGINNING OF THE PARCEL HEREIN DESCRIBED;

THENCE ALONG SAID WESTERLY LINES OF TRACT D THE FOLLOWING THREE (3) COURSES):

- 1) THENCE S69°43'31"W A DISTANCE OF 88.65 FEET;
- 2) THENCE S81°55'47"W A DISTANCE OF 111.14 FEET;
- 3) THENCE N71°56'55"W, A DISTANCE OF 75.60 FEET TO THE NORTHEAST CORNER OF TRACT F OF AFORESAID "STERLING RANCH FILING NO. 1";

THENCE ALONG THE NORTHERLY LINES OF SAID TRACT F THE FOLLOWING THREE (3) COURSES):

- 1) THENCE N71°56'55"W, A DISTANCE OF 80.38 FEET;
- 2) THENCE N54°41'05"W, A DISTANCE OF 37.80 FEET;
- 3) THENCE N31°24'46"W, A DISTANCE OF 36.61 FEET;

THENCE N35°18'43"E A DISTANCE OF 131.72 FEET;

THENCE 268.18 FEET ON THE ARC OF A NON-TANGENT CURVE TO THE LEFT, SAID CURVE HAVE A RADIUS OF 225.00 FEET, A CENTRAL ANGLE OF 68°17'28" (THE CHORD OF WHICH BEARS S76°07'45"E A DISTANCE OF 252.58 FEET) TO A POINT OF TANGENT;

THENCE N69°43'31"E A DISTANCE OF 30.37 FEET;

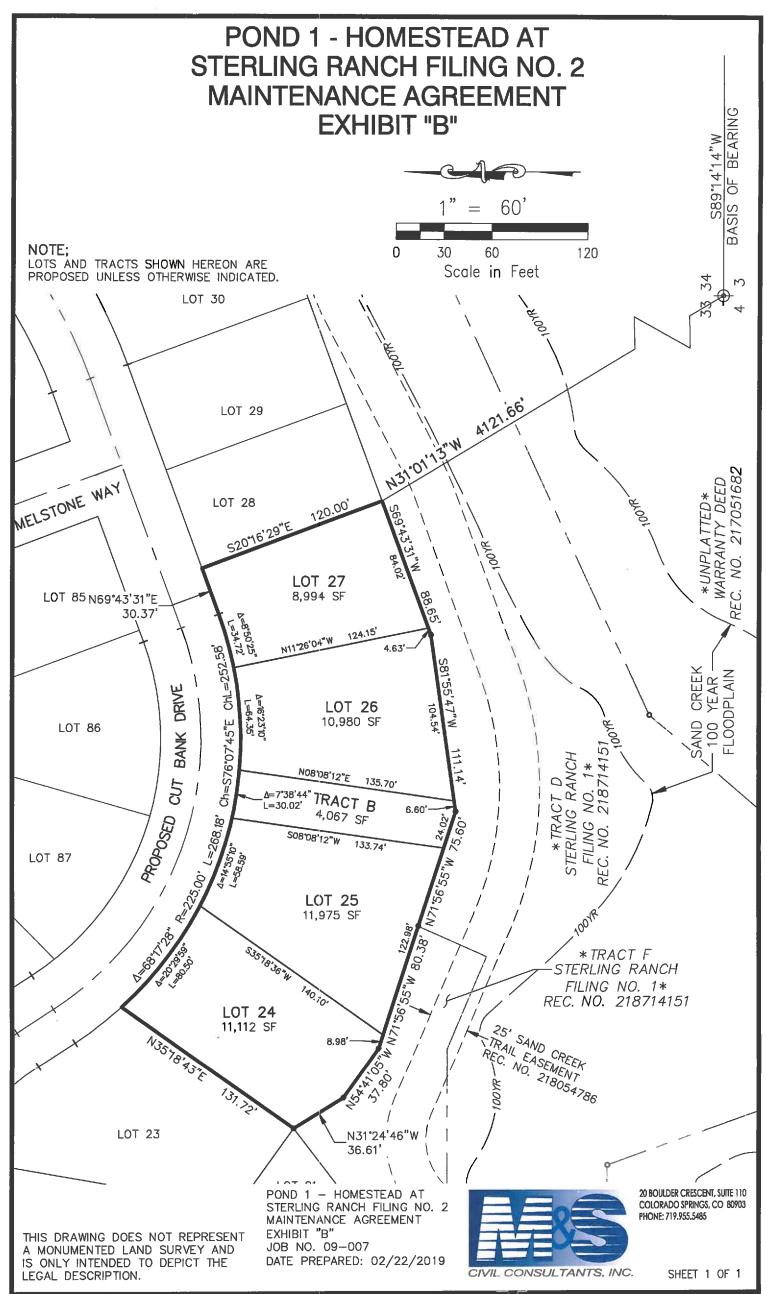
THENCE \$20°16'29"E A DISTANCE OF 120.00 FEET TO THE POINT OF BEGINNING;

CONTAINING A CALCULATED AREA OF 47,128 SQUARE FEET (1.082 ACRES) MORE OR LESS.

PREPARED BY:

VERNON P. TAYLOR, COLORADO PLS NO. 25966 FOR AND ON BEHALF OF M&S CIVIL CONSULTANTS, INC 20 BOULDER CRESCENT, SUITE 110 COLORADO SPRINGS, CO 80903

DATE



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APPENDIX B

Appendix B

General Location and Description of Stormwater Management Facilities

A. General Site Description

Homestead at Sterling Ranch Filing No. 2 is located in the SE ¼ of the NW ¼, the SW ¼ of the NE ¼, and the NW ¼ of the NE ¼ of Section 33, Township 12 South, Range 65 West of the 6th Principal Meridian, and the NE ¼ of the SW ¼ of Section 33, Township 12 South, Range 65 West of the 6th Principal Meridian within unincorporated El Paso County, Colorado. The site is bound on the south by an existing detention pond, to the north by Briargate Parkway and to the east by Sand Creek. Existing Dines Boulevard runs along the western site boundary. An existing residential development, Homestead at Sterling Ranch Filing No. 1, bounds the site to the west and a future commercial parcel bounds the site to the northwest. Sterling Ranch lies within the Sand Creek Drainage Basin. Flows from this site are tributary to Sand Creek.

Homestead at Sterling Ranch Filing No. 2 consists of 29.658 acres and is presently undeveloped. Vegetation is sparse, consisting of native grasses. Existing site terrain generally slopes from north to southwest at grade rates that vary between 2% and 6%.

B. General Stormwater Management Description

All stormwater is conveyed via curb and gutter and conventional reinforced concrete pipe (RCP) storm sewer to a temporary Full Spectrum Detention Facility. Interim Pond 1 functions as a water quality facility for runoff produced from onsite tributary Basins to Interim Pond 1.

C. Stormwater Facilities Site Plan

Inspection or maintenance personnel may utilize the Stormwater Facilities Map located in Appendix G for locating the Interim Pond 1 within this development.

D. On-Site Stormwater Management Facilities

Volume Reduction Facilities

Roof drains will be directed to side yard swales to aid in minimizing direct connection of impervious surfaces.

Storage Facilities (Detention)

Interim Pond 1, the water quality facility is designed to treat 0.247 ac-ft of water quality storage (WQCV), 0.701 ac-feet of excess urban runoff volume (EURV) and 1.283 ac-ft of 100-year storage. An emergency spillway, riprap stilling basin and trickle channel, outlet structure, and maintenance access road has been designed for Interim Pond 1. The pond is temporary in nature and designed to provide water quality during the interim period before ultimate channel improvements to Sand Creek have been completed.

Water Quality Facilities

Interim Pond 1, the water quality facility is designed to treat 0.247 ac-ft of water quality storage (WQCV). Source Control Best Management Practices

The O&M manual does not include any nonstructural BMPs.

APPENDIX C

Standard Operation Procedures for Inspection and Maintenance

Extended Detention Basins (EDBs)

November 2007

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EDB-1 BACKGROUND

Extended Detention Basins (EDBs) are one of the most common types of Stormwater Management Facilities utilized within the Front Range of Colorado. An EDB is a sedimentation basin designed to "extend" the runoff detention time, but to drain completely dry sometime after stormwater runoff ends. The EDB's drain time for the water quality portion of the facility is typically 40 hours. The basins are considered to be "dry" because the majority of the basin is designed not to have a significant permanent pool of water remaining between runoff events.

EDBs are an adaptation of a detention basin used for flood control, with the primary difference is the addition of forebays, micropools and a slow release outlet design. Forebays are shallow concrete "pans" located at the inflow point to the basin and are provided to facilitate sediment removal within a contained area prior to releasing into the pond. These forebays collect and briefly hold stormwater runoff resulting in a process called sedimentation, dropping sediment out of the stormwater. The stormwater is then routed from the forebay into the concrete trickle channel and upper basin, the large grassy portion of the basin. The EDB uses a much smaller outlet that extends the emptying time of the more frequently occurring runoff events to facilitate pollutant removal. An EDB should have a small micropool just upstream of the outlet. This micropool is designed to hold a small amount of water to keep sediment and floatables from blocking the outlet orifices.

EDB-2 INSPECTING EXTENDED DETENTION BASINS (EDBs)

EDB-2.1 Access and Easements

Inspection or maintenance personnel may utilize the stormwater facility map located in Appendix G containing the location(s) of the access points and maintenance easements of the EDB(s) within this development.

EDB-2.2 Stormwater Management Facilities Locations

Inspection or maintenance personnel may utilize the stormwater facility map located in Appendix G containing the location(s) of the EDB(s) within this development.

EDB-2.3 Extended Detention Basin (EDB) Features

EDBs have a number of features that are designed to serve a particular function. Many times the proper function of one feature depends on another. For example, if a forebay is not properly maintained, it could negatively affect the performance of a feature downstream (trickle channel, micropool, etc.). Therefore, it is critical that each feature of the EDB is properly inspected and maintained to ensure that the overall facility functions as it was intended. Below is a list and description of the most common features within an EDB and the corresponding maintenance inspection items that can be anticipated:

EDB Features	Sediment Removal	Mowing/ Weed control	Trash & Debris Removal	Erosion	Overgrown Vegetation Removal	Standing Water (mosquito/ algae control)	Structure Repair
Inflow Points (outfalls)	Х		Х				Х
Forebay	Х		Х				Х
Low-flow channel	Х		Х	Х	Х		Х
Bottom Stage	Х	Х	Х	Х	Х	Х	
Micropool	Х		Х		Х	Х	Х
Outlet Works	Х		Х				Х
Emergency Spillway			Х	Х	Х		Х
Upper Stage			Х	Х			
Embankment		Х		Х	Х		

Table EDB-1Typical Inspection & Maintenance Requirements Matrix

EDB-2.3.1 Inflow Points

Inflow Points or Outfalls into EDBs are the point source of the stormwater discharge into the facility. An inflow point is commonly a storm sewer pipe with a flared end section that discharges into the EDB. In some instances, an inflow point could be a drainage channel or ditch that flows into the facility.

An energy dissipater (riprap or hard armor protection) is typically immediately downstream of the discharge point into the EDB to protect from erosion. In some cases, the storm sewer outfall can have a toewall or cut-off wall immediately below the structure to prevent undercutting of the outfall from erosion.

The typical maintenance items that are found with inflow points are as follows:

a. Riprap Displaced – Many times, because the repeated impact/force of water, the riprap can shift and settle. If any portion of the riprap apron appears to have settled, soil is present between the riprap, or the riprap has shifted, maintenance may be required to ensure future erosion is prevented.

b. Erosion Present/Outfall Undercut – In some situations, the energy dissipater may not have been sized, constructed, or maintained appropriately and erosion has occurred. Any erosion within the vicinity of the inflow point will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.

c. Sediment Accumulation – Because of the turbulence in the water created by the energy dissipater, sediment often deposits immediately downstream of the inflow point. To prevent a loss in hydraulic performance of the upstream infrastructure, sediment that accumulates in this area must be removed in a timely manner.

d. Structural Damage – Structural damage can occur at anytime during the life of the facility. Typically, for an inflow, the structural damage occurs to the pipe flared end section (concrete or steel). Structural damage can lead to additional operating problems with the facility, including loss of hydraulic performance.

e. Woody Growth/Weeds Present – Undesirable vegetation can grow in and around the inflow area to an EDB that can significantly affect the performance of the drainage facilities discharging into the facility. This type of vegetation includes trees (typically cottonwoods) and dense areas of shrubs (willows). If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, resulting in blockage of the discharge. Also, tree roots can cause damage to the structural components of the inflow. Routine maintenance is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree). In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.

EDB-2.3.2 Forebay

A forebay is a solid surface (pad), typically constructed of concrete, immediately downstream of the inflow point. The forebay is designed to capture larger particles and trash to prevent them from entering the main portion of the EDB. The solid surface is designed to facilitate mechanical sediment removal (skid steer). The forebay typically includes a small diameter discharge pipe or v-notch weir on the downstream end and designed to drain the forebay in a specified period of time to promote sedimentation. The forebays vary in size and depth depending on the design and site constraints.

The typical maintenance items that are found with forebays are as follows:

a. Sediment/Debris Accumulation – Because this feature of the EDB is designed to provide the initial sedimentation, debris and sediment frequently accumulate in this area. If the sediment and debris is not removed from the forebay on a regular basis, it can significantly affect the function of other features within the EDB. Routine sediment removal from the forebay can **significantly** reduce the need for dredging of the main portion of the EDB using specialized equipment (long reach excavators). Routine removal of sediment from the forebay can **substantially** decrease the long-term sediment removal costs of an EDB.

b. Concrete Cracking/Failing – The forebay is primarily constructed of concrete, which cracks, spalls, and settles. Damage to the forebay can result in deceased performance and impact maintenance efforts.

c. Drain Pipe/Weir Clogged – Many times the drainpipe or weir can be clogged with debris, and prevent the forebay from draining properly. If standing water is present in the forebay (and there is not a base flow), the forebay is most likely not draining properly. This can result in a decrease in performance and create potential nuisances with stagnant water (mosquitoes).

d. Weir/Drain Pipe Damaged – Routine maintenance activities, vandalism, or age may cause the weir or drain pipe in the forebay to become damaged. Weirs are typically constructed of concrete, which cracks and spalls. The drainpipe is typically smaller in diameter and constructed with plastic, which can fracture.

EDB-2.3.3 Trickle Channel (Low-Flow)

The trickle channel conveys stormwater from the forebay to the micropool of the EDB. The trickle channel is typically made of concrete. However, grass lined (riprap sides protected) is also common and can provide for an additional means of water quality within the EDB. The trickle channel is typically 6-9 inches in depth and can vary in width.

The typical maintenance items that are found with trickle channels are as follows:

a. Sediment/Debris Accumulation – Trickle channels are typically designed with a relatively flat slope that can promote sedimentation and the collection of debris. Also, if a trickle channel is grass lined it can accumulate sediment and debris at a much quicker rate. Routine removal of accumulated sediment and debris is essential in preventing

flows from circumventing the trickle channel and affecting the dry storage portion of the pond.

b. Concrete/Riprap Damage – Concrete can crack, spall, and settle and must be repaired to ensure proper function of the trickle channel. Riprap can also shift over time and must be replaced/repaired as necessary.

c. Woody Growth/Weeds Present – Because of the constant moisture in the area surrounding the trickle channel, woody growth (cottonwoods/willows) can become a problem. Trees and dense shrub type vegetation can affect the capacity of the trickle channel and can allow flows to circumvent the feature.

d. Erosion Outside of Channel – In larger precipitation events, the trickle channel capacity will likely be exceeded. This can result in erosion immediately adjacent to the trickle channel and must be repaired to prevent further damage to the structural components of the EDB.

EDB-2.3.4 Bottom Stage

The bottom stage is at least 1.0 to 2.0 feet deeper than the upper stage and is located in front of the outlet works structure. The bottom stage is designed to store the smaller runoff events, assists in keeping the majority of the basin bottom dry resulting in easier maintenance operations, and enhances the facilities pollutant removal capabilities. This area of the EDB may develop wetland vegetation.

The typical maintenance items that are found with the bottom stage are as follows:

a. Sediment/Debris Accumulation – The micro-pool can frequently accumulate sediment and debris. This material must be removed to maintain pond volume and proper function of the outlet structure.

b. Woody Growth/Weeds Present - Because of the constant moisture in the soil surrounding the micro-pool, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate outside of the micro-pool, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree). *c. Bank Erosion* – The micro-pool is usually a couple feet deeper than the other areas of the ponds. Erosion can be caused by water dropping into the micro-pool if adequate protection/armor is not present. Erosion in this area must be mitigated to prevent sediment transport and other EDB feature damage.

d. Mosquitoes/Algae Treatment – Nuisance created by stagnant water can result from improper maintenance/treatment of the micro-pool. Mosquito larvae can be laid by adult mosquitoes within the permanent pool. Also, aquatic vegetation that grows in shallow pools of water can decompose causing foul odors. Chemical/mechanical treatment of the micro-pool may be necessary to reduce these impacts to adjacent homeowners.

e. Petroleum/Chemical Sheen – Many indicators of illicit discharges into the storm sewer systems will be present in the micro-pool area of the EDB. These indicators can include sheens, odors, discolored soil, and dead vegetation. If it is suspected that an illicit discharge has occurred, contact the supervisor immediately. Proper removal/mitigation of contaminated soils and water in the EDB is necessary to minimize any environmental impacts downstream.

EDB-2.3.5 Micro-pool

The micro-pool is a concrete or grouted boulder walled structure directly in front of the outlet works. At a minimum, the micropool is 2.5 feet deep and is designed to hold water. The micro-pool is critical in the proper function of the EDB; it allows suspended sediment to be deposited at the bottom of the micro-pool and prevents these sediments from being deposited in front of the outlet works causing clogging of the outlet structure, which results in marshy areas within the top and bottom stages.

The typical maintenance items that are found with micro-pools are as follows:

a. Sediment/Debris Accumulation – The micro-pool can frequently accumulate sediment and debris. This material must be removed to maintain pond volume and proper function of the outlet structure.

b. Woody Growth/Weeds Present - Because of the constant moisture in the soil surrounding the micro-pool, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate outside of the micro-pool, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree).

c. Mosquitoes/Algae Treatment – Nuisance created by stagnant water can result from improper maintenance/treatment of the micro-pool. Mosquito larvae can be laid by adult mosquitoes within the permanent pool. Also, aquatic vegetation that grows in shallow pools of water can decompose causing foul odors. Chemical/mechanical treatment of the micro-pool may be necessary to reduce these impacts to adjacent homeowners.

d. Petroleum/Chemical Sheen – Many indicators of illicit discharges into the storm sewer systems will be present in the micro-pool area of the EDB. These indicators can include sheens, odors, discolored soil, and dead vegetation. If it is suspected that an illicit discharge has occurred, contact the supervisor immediately. Proper removal/mitigation of contaminated soils and water in the EDB is necessary to minimize any environmental impacts downstream.

EDB-2.3.6 Outlet Works

The outlet works is the feature that drains the EDB in specified quantities and periods of time. The outlet works is typically constructed of reinforced concrete into the embankment of the EDB. The concrete structure typically has steel orifice plates anchored/embedded into it to control stormwater release rates. The larger openings (flood control) on the outlet structure typically have trash racks over them to prevent clogging. The water quality orifice plate (smaller diameter holes) will typically have a well screen covering it to prevent smaller materials from clogging it. The outlet structure is the single most important feature in the EDB operation. Proper inspection and maintenance of the outlet works is essential in ensuring the long-term operation of the EDB.

The typical maintenance items that are found with the outlet works are as follows:

a. Trash Rack/Well Screen Clogged – Floatable material that enters the EDB will most likely make its way to the outlet structure. This material is trapped against the trash racks and well screens on the outlet structure (which is why they are there). This material must be removed on a routine basis to ensure the outlet structure drains in the specified design period.

b. Structural Damage - The outlet structure is primarily constructed of concrete, which can crack, spall, and settle. The steel trash racks and well screens are also susceptible to damage.

c. Orifice Plate Missing/Not Secure – Many times residents, property owners, or maintenance personnel will remove or loosen orifice plates if they believe the pond is not draining properly. Any modification to the orifice plate(s) will significantly affect the designed discharge rates for water quality and/or flood control. Modification of the orifice plates is not allowed without approval from EPC.

d. Manhole Access – Access to the outlet structure is necessary to properly inspect and maintain the facility. If access is difficult or not available to inspect the structure, chances are it will be difficult to maintain as well.

e. Woody Growth/Weeds Present - Because of the constant moisture in the soil surrounding the outlet works, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate around the outlet works, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree).

EDB-2.3.7 Emergency Spillway

An emergency spillway is typical of all EDBs and designed to serve as the overflow in the event the volume of the pond is exceeded. The emergency spillway is typically armored with riprap (or other hard armor) and is sometimes buried with soil. The emergency spillway is typically a weir (notch) in the pond embankment. Proper function of the emergency spillway is essential to ensure flooding does not affect adjacent properties.

The typical maintenance items that are found with emergency spillways are as follows:

a. Riprap Displaced – As mentioned before, the emergency spillway is typically armored with riprap to provide erosion protection. Over the life of an EDB, the riprap may shift or dislodge due to flow.

b. Erosion Present – Although the spillway is typically armored, stormwater flowing through the spillway can cause erosion damage.

Erosion must be repaired to ensure the integrity of the basin embankment, and proper function of the spillway.

c. Woody Growth/Weeds Present – Management of woody vegetation is essential in the proper long-term function of the spillway. Larger trees or dense shrubs can capture larger debris entering the EDB and reduce the capacity of the spillway.

d. Obstruction Debris – The spillway must be cleared of any obstruction (man made or natural) to ensure the proper design capacity.

EDB-2.3.8 Upper Stage (Dry Storage)

The upper stage of the EDB provides the majority of the water quality flood detention volume. This area of the EDB is higher than the micropool and typically stays dry, except during storm events. The upper stage is the largest feature/area of the basin. Sometimes, the upper stage can be utilized for park space and other uses in larger EDBs. With proper maintenance of the micro-pool and forebay(s), the upper stage should not experience much sedimentation; however, bottom elevations should be monitored to ensure adequate volume.

The typical maintenance items that are found with upper stages are as follows:

a. Vegetation Sparse – The upper basin is the most visible part of the EDB, and therefore aesthetics is important. Adequate and properly maintained vegetation can greatly increase the overall appearance and acceptance of the EDB by the public. In addition, vegetation can reduce the potential for erosion and subsequent sediment transport to the other areas of the pond.

b. Woody Growth/Undesirable Vegetation – Although some trees and woody vegetation may be acceptable in the upper basin, some thinning of cottonwoods and willows may be necessary. Remember, the basin will have to be dredged to ensure volume, and large trees and shrubs will be difficult to protect during that operation.

c. Standing Water/Boggy Areas – Standing water or boggy areas in the upper stage is typically a sign that some other feature in the pond is not functioning properly. Routine maintenance (mowing, trash removal, etc) can be extremely difficult for the upper stage if the ground is saturated. If this inspection item is checked, make sure you have identified the root cause of the problem.

d. Sediment Accumulation – Although other features within the EDB are designed to capture sediment, the upper storage area will collect sediment over time. Excessive amounts of sedimentation will result in a loss of storage volume. It may be more difficult to determine if this area has accumulated sediment without conducting a field survey.

Below is a list of indicators:

- 1. Ground adjacent to the trickle channel appears to be several inches higher than concrete/riprap
- 2. Standing water or boggy areas in upper stage
- 3. Uneven grades or mounds
- 4. Micro-pool or Forebay has excessive amounts of sediment

e. Erosion (banks and bottom) – The bottom grades of the dry storage are typically flat enough that erosion should not occur. However, inadequate vegetative cover may result in erosion of the upper stage. Erosion that occurs in the upper stage can result in increased dredging/maintenance of the micro-pool.

f. Trash/Debris – Trash and debris can accumulate in the upper area after large events, or from illegal dumping. Over time, this material can accumulate and clog the EDB outlet works.

g. Maintenance Access – Most EDBs typically have a gravel/concrete maintenance access path to either the upper stage or forebay. This access path should be inspected to ensure the surface is still drivable. Some of the smaller EDBs may not have maintenance access paths; however, the inspector should verify that access is available from adjacent properties.

EDB-2.3.9 Miscellaneous

There are a variety of inspection/maintenance issues that may not be attributed to a single feature within the EDB. This category on the inspection form is for maintenance items that are commonly found in the EDB, but may not be attributed to an individual feature.

a. Encroachment in Easement Area – Private lots/property can sometimes be located very close to the EDBs, even though they are required to be located in tracts with drainage easements. Property owners may place landscaping, trash, fencing, or other items within the easement area that may affect maintenance or the operation of the facility. *b. Graffiti/Vandalism* – Damage to the EDB infrastructure can be caused by vandals. If criminal mischief is evident, the inspector should forward this information to the local Sheriff's Office.

c. Public Hazards – Public hazards include items such as vertical drops of greater than 4-feet, containers of unknown/suspicious substances, exposed metal/jagged concrete on structures. **If any hazard is found within the facility area that poses an immediate threat to public safety, contact the local Sheriff at 911 immediately!**

d. Burrowing Animals/Pests – Prairie dogs and other burrowing rodents may cause damage to the EDB features and negatively affect the vegetation within the EDB.

e. Other – Any miscellaneous inspection/maintenance items not contained on the form should be entered here.

EDB-2.4 Inspection Forms

EDB Inspection forms are located in Appendix D. Inspection forms shall be completed by the person(s) conducting the inspection activities. Each form shall be reviewed and submitted by the property owner or property manager to the El Paso County per the requirements of the Operations and Maintenance Manual. These inspection forms shall be kept indefinitely and made available to the El Paso County upon request.

EDB-3 MAINTAINING EXTENDED DETENTION BASINS (EDBS)

EDB-3.1 Maintenance Personnel

Maintenance personnel must be qualified to properly maintain EDBs. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

EDB-3.2 Equipment

It is imperative that the appropriate equipment and tools are taken to the field with the operations crew. The types of equipment/tools will vary depending on the task at hand. Below is a list of tools, equipment, and material(s) that may be necessary to perform maintenance on an EDB:

- 1.) Loppers/Tree Trimming Tools
- 2.) Mowing Tractors
- 3.) Trimmers (extra string)

- 4.) Shovels
- 5.) Rakes
- 6.) All Surface Vehicle (ASVs)
- 7.) Skid Steer
- 8.) Back Hoe
- 9.) Track Hoe/Long Reach Excavator
- 10.) Dump Truck
- 11.) Jet-Vac Machine
- 12.) Engineers Level (laser)
- 13.) Riprap (Minimum Type M)
- 14.) Filter Fabric
- 15.) Erosion Control Blanket(s)
- 16.) Seed Mix (Native Foothills)
- 17.) Illicit Discharge Cleanup Kits
- 18.) Trash Bags
- 19.) Tools (wrenches, screw drivers, hammers, etc)
- 20.) Chain Saw
- 21.) Confined Space Entry Equipment
- 22.) Approved Stormwater Facility Operation and Maintenance Manual

Some of the items identified above may not be needed for every maintenance operation. However, this equipment should be available to the maintenance operations crews should the need arise.

EDB-3.3 Safety

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified within the EDB that is greater than 48" in height, make the appropriate note/comment on the maintenance inspection form.

EDB-3.4 Maintenance Forms

The EDB Maintenance Form provides a record of each maintenance operation performed by maintenance contractors. The EBD Maintenance Form shall be filled out in the field after the completion of the maintenance operation. Each form shall be reviewed and submitted by the property owner or property manager to the El Paso County per the requirements of the Operations and Maintenance Manual. The EDB Maintenance form is located in Appendix E.

EDB-3.5 Maintenance Categories and Activities

A typical EDB Maintenance Program will consist of three broad categories of work. Within each category of work, a variety of maintenance activities can be performed on an EDB. A maintenance activity can be specific to each feature within the EDB, or general to the overall facility. This section of the SOP explains each of the categories and briefly describes the typical maintenance activities for an EDB.

A variety of maintenance activities are typical of EDBs. The maintenance activities range in magnitude from routine trash pickup to the reconstruction of drainage infrastructure. Below is a description of each maintenance activity, the objectives, and frequency of actions:

EDB-3.6 Routine Maintenance Activities

The majority of this work consists of regularly scheduled mowing and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash racks. It also includes activities such as includes weed control, mosquito treatment, and algae treatment. These activities normally will be performed numerous times during the year. These items can be completed without any prior correspondence with the El Paso County; however, completed inspection and maintenance forms shall be submitted to the EPC for each inspection and maintenance activity.

The Maintenance Activities are summarized below, and further described in the following sections.

TABLE – EDB-2

Summary of Routine Maintenance Activities

MAINTENANCE ACTIVITY	MINIMUM FREQUENCY	LOOK FOR:	MAINTENANCE ACTION
Mowing	Twice annually	Excessive grass height/aesthetics	Mow grass to a height of 4" to 6"
Trash/Debris Removal	Twice annually	Trash & debris in EDB	Remove and dispose of trash and debris
Outlet Works Cleaning	As needed - after significant rain events – twice annually min.	Clogged outlet structure; ponding water	Remove and dispose of debris/trash/sediment to allow outlet to function properly
Weed control	Minimum twice annually	Noxious weeds; Unwanted vegetation	Treat w/ herbicide or hand pull; Consult the local weed specialist
Mosquito Treatment	As needed	Standing water/mosquito habitat	Treat w/ EPA approved chemicals
Algae Treatment	As needed	Standing water/ Algal growth/green color	Treat w/ EPA approved chemicals

EDB-3.6.1 Mowing

Occasional mowing is necessary to limit unwanted vegetation and to improve the overall appearance of the EDB. Native vegetation should be mowed to a height of 4-to-6 inches tall. Grass clippings should be collected and disposed of properly.

Frequency – Routine - Minimum of twice annually or depending on aesthetics.

EDB-3.6.2 Trash/Debris Removal

Trash and debris must be removed from the entire EDB area to minimize outlet clogging and to improve aesthetics. This activity must be performed prior to mowing operations.

Frequency – Routine – Prior to mowing operations and minimum of twice annually.

EDB-3.6.3 Outlet Works Cleaning

Debris and other materials can clog the outlet work's well screen, orifice plate(s) and trash rack. This activity must be performed anytime other maintenance activities are conducted to ensure proper operation.

Frequency - Routine – After significant rainfall event or concurrently with other maintenance activities.

EDB-3.6.4 Weed Control

Noxious weeds and other unwanted vegetation must be treated as needed throughout the EDB. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with the local Weed Inspector is highly recommended prior to the use of herbicide.

Frequency – Routine – As needed based on inspections.

EDB-3.6.5 Mosquito/Algae Treatment

Treatment of permanent pools is necessary to control mosquitoes and undesirable aquatic vegetation that can create nuisances. Only EPA approved chemicals/materials can be used in areas that are warranted.

Frequency – As needed.

EDB- 3.7 Minor Maintenance Activities

This work consists of a variety of isolated or small-scale maintenance or operational problems. Most of this work can be completed by a small crew, tools, and small equipment. These items require prior correspondence with EPC and require completed inspection and maintenance forms to be submitted to EPC for each inspection and maintenance activity.

Table – EDB-3Summary of Minor Maintenance Activities

MAINTENANCE ACTIVITY	MINIMUM FREQUENCY	LOOK FOR:	MAINTENANCE ACTION
Sediment Removal	As needed; typically every 1 –2 years	Sediment build-up; decrease in pond volume	Remove and dispose of sediment
Erosion Repair	As needed, based upon inspection	Rills/gullies forming on side slopes, trickle channel, other areas	Repair eroded areas Revegetate; address source of erosion
Vegetation Removal/Tree	As needed,	Large trees/wood	Remove vegetation;
Thinning	based upon inspection	vegetation in lower chamber of pond	restore grade and surface
Drain Cleaning/Jet Vac	As needed, based upon inspection	Sediment build-up /non draining system	Clean drains; Jet Vac if needed

EDB-3.7.1 Sediment Removal

Sediment removal is necessary to maintain the original design volume of the EDB and to ensure proper function of the infrastructure. Regular sediment removal (minor) from the forebay, inflow(s), and trickle channel can significantly reduce the frequency of major sediment removal activities (dredging) in the upper and lower stages. The minor sediment removal activities can typically be addressed with shovels and smaller equipment. Major sediment removal activities will require larger and more specialized equipment. The major sediment activities will also require surveying with an engineer's level, and consultation with EPC Engineering Staff to ensure design volumes/grades are achieved.

Stormwater sediments removed from EDBs do not meet the criteria of "hazardous waste". However, these sediments are contaminated with a wide array of organic and inorganic pollutants and handling must be done with care. Sediments from permanent pools must be carefully removed to minimize turbidity, further sedimentation, or other adverse water quality impacts. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a landfill for proper disposal. Prompt and thorough cleanup is important should a spill occur during transportation.

Frequency – Nonroutine – As necessary based upon inspections. Sediment removal in the forebay and trickle channel may be necessary as frequently as every 1-2 years.

EDB-3.7.2 Erosion Repair

The repair of eroded areas is necessary to ensure the proper function of the EDB, minimize sediment transport, and to reduce potential impacts to other features. Erosion can vary in magnitude from minor repairs to trickle channels, energy dissipaters, and rilling to major gullies in the embankments and spillways. The repair of eroded areas may require the use of excavators, earthmoving equipment, riprap, concrete, erosion control blankets, and turf reinforcement mats. Major erosion repair to the pond embankments, spillways, and adjacent to structures will require consultation with EPC engineering staff.

Frequency – Nonroutine – As necessary based upon inspections.

EDB-3.7.3 Vegetation Removal/Tree Thinning

Dense stands of woody vegetation (willows, shrubs, etc) or trees can create maintenance problems for the infrastructure within an EDB. Tree roots can damage structures and invade pipes/channels thereby blocking flows. Also, trees growing in the upper and lower stages of the EDB will most likely have to be removed when sediment/dredging operations occur. A small tree is easier to remove than a large tree, therefore, regular removal/thinning is imperative. All trees and woody vegetation that is growing in the bottom of the EDB or near structures (inflows, trickle channels, outlet works, emergency spillways, etc) should be removed. Any trees or woody vegetation in the EDB should be limited to the upper portions of the pond banks.

Frequency – Nonroutine – As necessary based upon inspections.

EDB-3.7.4 Clearing Drains/Jet-Vac

An EDB contains many structures, openings, and pipes that can be frequently clogged with debris. These blockages can result in a decrease of hydraulic capacity and create standing water in areas outside of the micro-pool. Many times the blockage to this infrastructure can be difficult to access and/or clean. Specialized equipment (jet-vac machines) may be necessary to clear debris from these difficult areas.

Frequency – Nonroutine – As necessary based upon inspections.

EDB-3.8 Major Maintenance Activities

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. All of this work requires

consultation with EPC to ensure the proper maintenance is performed. This work requires that the engineering staff review the original design and construction drawings to access the situation and assign the necessary maintenance. A **public improvements permit shall be required for all major maintenance activities.** This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants.

MAINTENANCE ACTIVITY	MINIMUM FREQUENCY	LOOK FOR:	MAINTENANCE ACTION
Major Sediment Removal	As needed – based upon scheduled inspections	Large quantities of sediment; reduced pond capacity	Remove and dispose of sediment. Repair vegetation as needed
Major Erosion Repair	As needed – based upon scheduled inspections	Severe erosion including gullies, excessive soil displacement, areas of settlement, holes	Repair erosion – find cause of problem and address to avoid future erosion
Structural Repair	As needed – based upon scheduled inspections	Deterioration and/or damage to structural components – broken concrete, damaged pipes, outlet works	Structural repair to restore the structure to its original design

Table – EDB-4 Summary of Maior Maintenance Activities

EDB-3.8.1 Major Sediment Removal

Major sediment removal consists of removal of large quantities of sediment or removal of sediment from vegetated areas. Care shall be given when removing large quantities of sediment and sediment deposited in vegetated areas. Large quantities of sediment need to be carefully removed, transported and disposed of. Vegetated areas need special care to ensure design volumes and grades are preserved.

Frequency – Nonroutine – Repair as needed based upon inspections.

EDB-3.8.2 Major Erosion Repair

Major erosion repair consist of filling and revegetating areas of severe erosion. Determining the cause of the erosion as well as correcting the condition that caused the erosion should also be part of the erosion repair. Care should be given to ensure design grades and volumes are preserved.

Frequency – Nonroutine – Repair as needed based upon inspections.

EDB-3.8.3 <u>Structural Repair</u>

An EDB includes a variety of structures that can deteriorate or be damaged during the course of routine maintenance. These structures are constructed of steel and concrete that can degrade or be damaged and may need to be repaired or re-constructed from time to time. These structures include items like outlet works, trickle channels, forebays, inflows and other features. In-house operations staff can perform some of the minor structural repairs. Major repairs to structures may require input from a structural engineer and specialized contractors. Consultation with EPC Engineering Staff should take place prior to all structural repairs.

Frequency – Nonroutine – Repair as needed based upon inspections.

Reference: This manual is adapted from Town of Parker, Colorado, STORMWATER PERMANENT BEST MANAGEMENT PRACTICES (PBMP) LONG-TERM OPERATION AND MAINTENANCE MANUAL, October 2004 APPENDIX D

EXTENDED DETENTION BASIN (EDB) **INSPECTION FORM** Date: _____ Subdivision/Business Name:_____ Inspector: Subdivision/Business Address: Weather: Date of Last Rainfall: Amount: Inches Property Classification: Residential Multi Family Commercial Other: (Circle One) Reason for Inspection: Routine Complaint After Significant Rainfall Event (Circle One) INSPECTION SCORING - For each facility inspection item, insert one of the following scores: 0 = No deficiencies identified 2 = Routine maintenance required 1 = Monitor (potential for future problem) 3 =Immediate repair necessary N/A = Not applicable **FEATURES** 1.) Inflow Points 2.) Forebay Sediment/Debris Accumulation Riprap Displaced Erosion Present/Outfall Undercut Concrete Cracking/Failing Sediment Accumulation Drain Pipe/Wier Clogged (not draining) ____Structural Damage (pipe, end-section, etc.) ____Wier/Drain Pipe Damage Woody Growth/Weeds Present 3.) Trickle Channel (Low-flow) 4.) Bottom Stage (Micro-Pool) Sediment/Debris Accumulation _Sediment/Debris Accumulation Concrete/Riprap Damage Woody Growth/Weeds Present Woody Growth/Weeds Present Bank Erosion Erosion Outside Channel Mosquitoes/Algae Treatment Petroleum/Chemical Sheen 5.) Outlet Works 6.) Emergency Spillway Trash Rack/Well Screen Clogged _Riprap Displaced Structural Damage (concrete, steel, subgrade) **Erosion Present** Woody Growth/Weeds Present Orifice Plate(s) Missing/Not Secure Manhole Access (cover, steps, etc.) Obstruction/Debris ____Woody Growth/Weeds Present 7.) Upper Stage (Dry Storage) 8.) Miscellaneous Encroachment in Easement Area Vegetation Sparse Woody Growth/Undesirable Vegetation Graffiti/Vandalism Standing Water/Boggy Areas **Public Hazards** Sediment Accumulation Burrowing Animals/Pests Erosion (banks and bottom) Other Trash/Debris Maintenance Access Inspection Summary / Additional Comments: OVERALL FACILITY RATING (Circle One) 0 = No Deficiencies Identified 2 = Routine Maintenance Required 1 = Monitor (potential for future problem exists) 3 = Immediate Repair Necessary

This inspection form shall be kept indefinitely and made available to the El Paso County upon request.

APPENDIX E

	MAINTENA	NCE FORM	
ubdivision/Business Name: Ibdivision/Business Address:			
Maintenance Category: Circle All That Apply)	Routine	Restoration	Rehabilitation
MAINTENANCE ACTI	VITIES PERFORMED		
ROUTINE WORK MOWING TRASH/DEBRIS OUTLET WORK WEED CONTRO MOSQUITO TR ALGAE TREATION	KS CLEANING (TRASH RAG OL (HERBICIDE APPLICAT EATMENT	CK/WELL SCREEN) ION)	
RESTORATION WOR	<u>K F</u>	REHABILITATION	<u>WORK</u>
INFL EROSION REP, INFL INFL TRIC VEGETATION F INFL INFL INFL INFL BOT BOT REVEGETATIO JET-VAC/CLEA	REBAY CKLE CHANNEL LOW AIR LOW POINT CKLE CHANNEL REMOVAL/TREE THINNING LOW(S) CKLE CHANNEL PER STAGE TOM STAGE TOM STAGE N RING DRAINS REBAY CLET WORKS	UP EROSION REP, OL UP BC SP STRUCTURAL INF OL FO TR	OTTOM STAGE OPER STAGE AIR JTLET WORKS OPER STAGE OTTOM STAGE ILLWAY
ESTIMATED TOTAL MANH	IOURS:		
EQUIPMENT/MATERIAL U	ISED:		
COMMENTS/ADDITIONAL	INFO:		

APPENDIX F

Annual Inspection and Maintenance Reporting Form for Stormwater Facilities

(This form to be submitted to EPC prior to May 31 of each year)

Date: _____

To: El Paso County Department of Public Works Attn: Stormwater Facility Operations and Maintenance Program 2880 International Circle, Suite 7437 South Fairplay Street Colorado Springs, CO 80922

Re: Certification of Inspection and Maintenance; Submittal of forms

Property/Subdivision Name:

Prop	berty	Address:		
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Contact Name:

I verify that the required stormwater facility inspections and required maintenance have been completed in accordance with the <u>Stormwater Facilities Maintenance Agreement</u> and the <u>Operations and Maintenance Manual</u> associated with the above referenced property.

The required Stormwater Facility Inspection and Maintenance forms are hereby provided.

Name of Party Responsible for Inspection & Maintenance

Property Owner

Authorized Signature

Signature

APPENDIX G

OPERATION AND MAINTENANCE SITE PLANS EXTENDED DETENTION BASIN (EDB) CHECKLIST FOR REQUIRED ITEMS

PLAN AND PROFILE SHEET

Plan view shall include:

Location and labels for all major features of EDB (inflow structure(s), forebay, micropool, trickle channel, access road, outlet work(s), spillway, maintenance access ramps, embankment, etc.)

Contours

Other utilities in vicinity of EDB

Cross-reference to EDB Operation and Maintenance Details sheet

Linework for right-of-way lines, lot lines, easements, and tracts

Hatch indicating permanent water elevation in micropool.

Profile view shall include:

Location and labels for all major features of EDB (inflow structure(s), forebay, micropool, trickle channel, access road, outlet work(s), spillway, maintenance access ramps, embankment, etc.)

Invert elevations at major features of EDB (inflow structure(s), forebay, micropool, outlet work(s))

Permanent pool elevation of micropool

Water quality water surface elevation

Water surface elevation of all applicable storm events

Label for upper and bottom stages for EDB

DETAIL SHEET

Detail sheet shall include:

Volume provided by the EDB forebay and micropool, including the WQCV

WQCV drain time

Seed mix

Total mow area including approximate mow boundaries on each side of EDB

Duplicate the following tables from the "Standard Operation Procedure for Extended Detention Basin Inspection and Maintenance" document:

- Inspection and Maintenance Requirements at Specific EDB Features
- o Summary of Routine Maintenance Activities for an EDB
- o Summary of Minor Maintenance Activities for an EDB
- o Summary of Major Maintenance Activities for an EDB

Water quality outlet works detail

Water quality plate detail

Maintenance access road detail

Trickle channel typical section

Forebay edge detail (or cross section) which includes maximum allowed sediment depth in forebay

Forebay release structure detail

Spillway detail(s), including cutoff wall

OPERATION AND MAINTENANCE SITE PLANS STORMWATER FACILITIES MAP CHECKLIST FOR REQUIRED ITEMS

Stormwater facilities map shall include:

Labels for all streets (includes linework for edge of street and street name)

Linework for right-of-way lines, lot lines, and tracts

Linework and labels for all major drainageways

Label roadways, developments, etc adjacent to project site

Labels for all BMPs being constructed on project site including a summary table when multiple BMPs are present

Legend for identifying features/line types on drawing (optional)

HOMESTEAD AT STERLING RANCH FILING COUNTY OF EL PASO, STATE OF COLORADO FINAL GRADING/EROSION CONTROL PL

STANDARD CONSTRUCTION NOTES:

- 1. ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD LOCATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO SPRINGS.
- 3. CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SWMP), THE SOILS AND GEOTECHNICAL REPORT AND THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIME INCLUDING THE FOLLOWING: 3.1 EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
- 3.2 CITY OF COLORADO SPRINGS/FL PASO COUNTY ENGINEERING CRITERA MANUAL VOLUMES 1 AND 2. 3.3 COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARDS SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION. 3.4 CDOT M&S STANDARDS.
- 4. IT IS THE DESIGN ENGINEERS RESPONSIBILITY TO ACCURACY SHOW EXISTING CONDITION BOTH ONSITE AND OFFSITE ON THE CONSTRUCTION PLANS. ANY MODIFICATION NECESSARY DUE TO CONFLICT OMISSIONS OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPERS RESPONSIBILITY TO RECTIFY.
- 5. ONCE THE ESQCP HAS BEEN ISSUED. THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL BMPS AS INDICATED ON THE GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY DSD INSPECTIONS STAFF.
- 6. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES AND TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORM WATER QUALITY CONTROL PERMIT (ESQCP), US ARMY CORPS OF ENGINEER ISSUED 401 AND/OR 404 PERMITS AND COUNTY AND STATE FUGITIVE DUST PERMITS.
- 7. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE CONSTRUCTION SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
- 8. ANY TEMPORARY SIGNAGE AND STRIPING SHALL COMPLY WITH EL PASO COUNTY DOW AND MUTCD CRITERIA.
- 9. CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRE BY EL PASO COUNTY DOT INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
- 10. THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFFSITE DISTURBANCE GRADING, OR CONSTRUCTION.

GRADING AND EROSION CONTROL NOTES:

- STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFF SITE WATERS, INCLUDING WETLANDS.
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS TO 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. DURING CONSTRUCTION THE SWMP IS THE RESPONSIBILITY OF THE DESIGNATED STORNWATER MANAGER, SHALL BE LOCATED ON SITE AT ALL TIMES AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.
- 4. ONCE THE ESQCP HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL BMPS AS INDICATED ON THE GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY DSD INSPECTIONS STAFF
- 5. SOIL EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN 21 CALENDAR DAYS AFTER FINAL GRADING, OR FINAL EARTH DISTURBANCE, HAS BEEN COMPLETED. DISTURBED AREAS AND STOCKPILES WHICH ARE NOT AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 30 DAYS SHALL ALSO BE MULCHED WITHIN 21 DAYS AFTER INTERIM GRADING. AN AREA THAT IS GOING TO REMAIN IN AN INTERIM STATE FOR MORE THAN 60 DAYS SHALL ALSO BE SEEDED. ALL TEMPORARY SOIL EROSION CONTROL MEASURES AND BMPS SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND ESTABLISHED.
- TEMPORARY SOIL EROSION CONTROL FACILITIES SHALL BE REMOVED AND EARTH DISTURBANCE AREAS GRADED AND STABILIZED WITH PERMANENT SOIL EROSION CONTROL MEASURES PURSUANT TO STANDARDS AND SPECIFICATION PRESCRIBED IN THE DCM VOLUME II AND THE ENGINEERING CRITERIA MANUAL (ECM) APPENDIX I.
- ALL PERSONS ENGAGED IN EARTH DISTURBANCE SHALL IMPLEMENT AND MAINTAIN ACCEPTABLE SOIL EROSION AND SEDIMENT CONTROL MEASURES INCLUDING BMPS IN CONFORMANCE WITH THE EROSION CONTROL TECHNICAL STANDARDS OF THE DRAINAGE CRITERIA MANUAL (DCM) VOLUME II AND IN ACCORDANCE WITH THE STORMWATER MANAGEMENT PLAN (SWMP).
- 8. ALL TEMPORARY EROSION CONTROL FACILITIES INCLUDING BMPS AND ALL PERMANENT FACILITIES INTENDED TO CONTROL EROSION OF ANY EARTH DISTURBANCE OPERATIONS, SHALL BE INSTALLED AS DEFINED IN THE APPROVED PLANS, THE SWMP AND THE DCM VOLUME II AND MAINTAINED THROUGHOUT THE DURATION OF THE EARTH DISTURBANCE OPERATION.
- 9. ANY EARTH DISTURBANCE SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY REDUCE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME.
- 10. ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE DESIGNED TO LIMIT THE DISCHARGE TO A NON-EROSIVE VELOCITY.
- 11. CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGED TO OR ALLOWED TO RUNOFF TO STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. 12. EROSION CONTROL BLANKETING IS TO BE USED ON SLOPES STEEPER THAN 3:1.
- 13. BUILDING, CONSTRUCTION, EXCAVATION, OR OTHER WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. BMP'S MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
- 14. VEHICLE TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED. MATERIALS TRACKED OFF-SITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
- 15. 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.
- 16. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, AND SAND THAT MAY ACCUMULATE IN THE STORM SEWER OR OTHER DRAINAGE CONVEYANCE SYSTEM AND STORMWATER APPURTENANCES AS A RESULT OF SITE DEVELOPMENT.
- 17. 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.
- 18. NO CHEMICALS ARE TO BE USED BY THE CONTRACTOR, WHICH HAVE THE POTENTIAL TO BE RELEASED IN STORMWATER UNLESS PERMISSION FOR THE USE OF SPECIFIC CHEMICAL IS GRANTED IN WRITING BY THE ECM ADMINISTRATOR. IN GRANTING THE USE OF SUCH CHEMICALS, SPECIAL CONDITIONS AND MONITORING MAY BE REQUIRED.
- 19. BULK STORAGE STRUCTURES FOR PETROLEUM PRODUCTS AND OTHER CHEMICALS SHALL HAVE ADEQUATE PROTECTION SO AS TO CONTAIN ALL SPILLS AND PREVENT ANY SPILLED MATERIAL FROM ENTERING STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES.
- 20. NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE FLOW LINE OF THE CURB AND GUTTER OR IN THE DITCHLINE.
- 21. INDIVIDUALS SHALL COMPLY WITH THE "COLORADO WATER QUALITY CONTROL ACT" (TITLE 25, ARTICLE 8, CRS), AND THE "CLEAN WATER ACT" (33 USC 1344), IN ADDITION TO THE REQUIREMENTS INCLUDED IN THE DCM VOLUME II AND THE ECM APPENDIX I. ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (NPDES, FLOODPLAIN, 404, FUGITIVE DUST, ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, STATE, OR COUNTY AGENCIES, THE MORE RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
- 22. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
- 23. PRIOR TO ACTUAL CONSTRUCTION, THE PERMITEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES.
- 24. A WATER SOURCE SHALL BE AVAILABLE ON-SITE DURING EARTHWORK OPERATIONS AND UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
- 25. THE SOILS REPORT FOR THIS SITE HAS BEEN PREPARED BY CTL THOMPSON, INC. AND SHALL BE CONSIDERED A PART OF THESE PLANS.
- 26. AT LEAST TEN DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB 1 ACRE OR MORE, THE OWNER OR OPERATOR OF CONTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIROMENT, 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

27. NO PORTION OF THIS PROPERTY IS LOCATED WITHIN A DESIGNATED FEMA FLOODPLAIN IN ACCORDANCE WITH FLOOD INSURANCE RATE MAPS (FIRM) 08041C0535F, EFFECTIVE DATE MARCH 17, 1997.

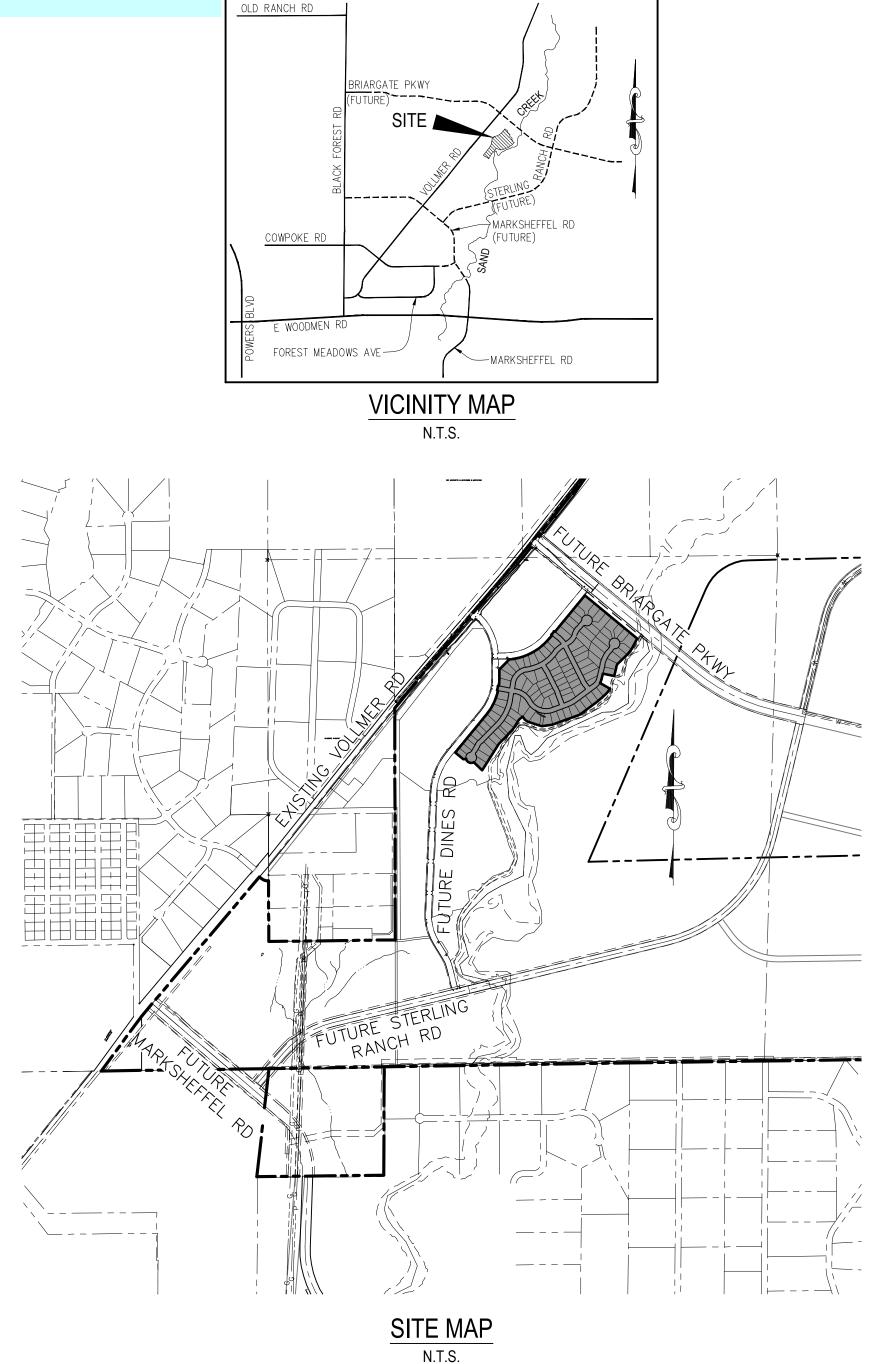
submittal

ADDITIONAL NOTES

UPDATED BY THE CONTRACTOR.

FEBRUARY 2019 SF-19-004





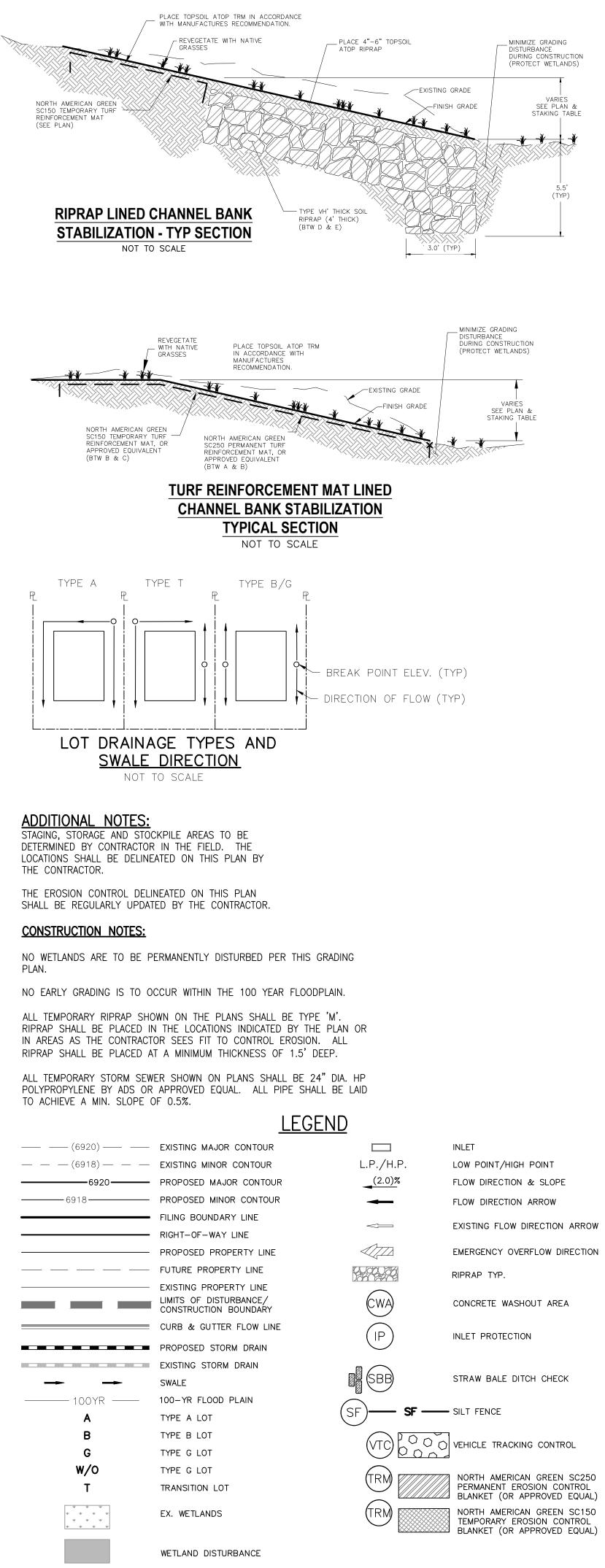
<u>BENCHMARKS</u>

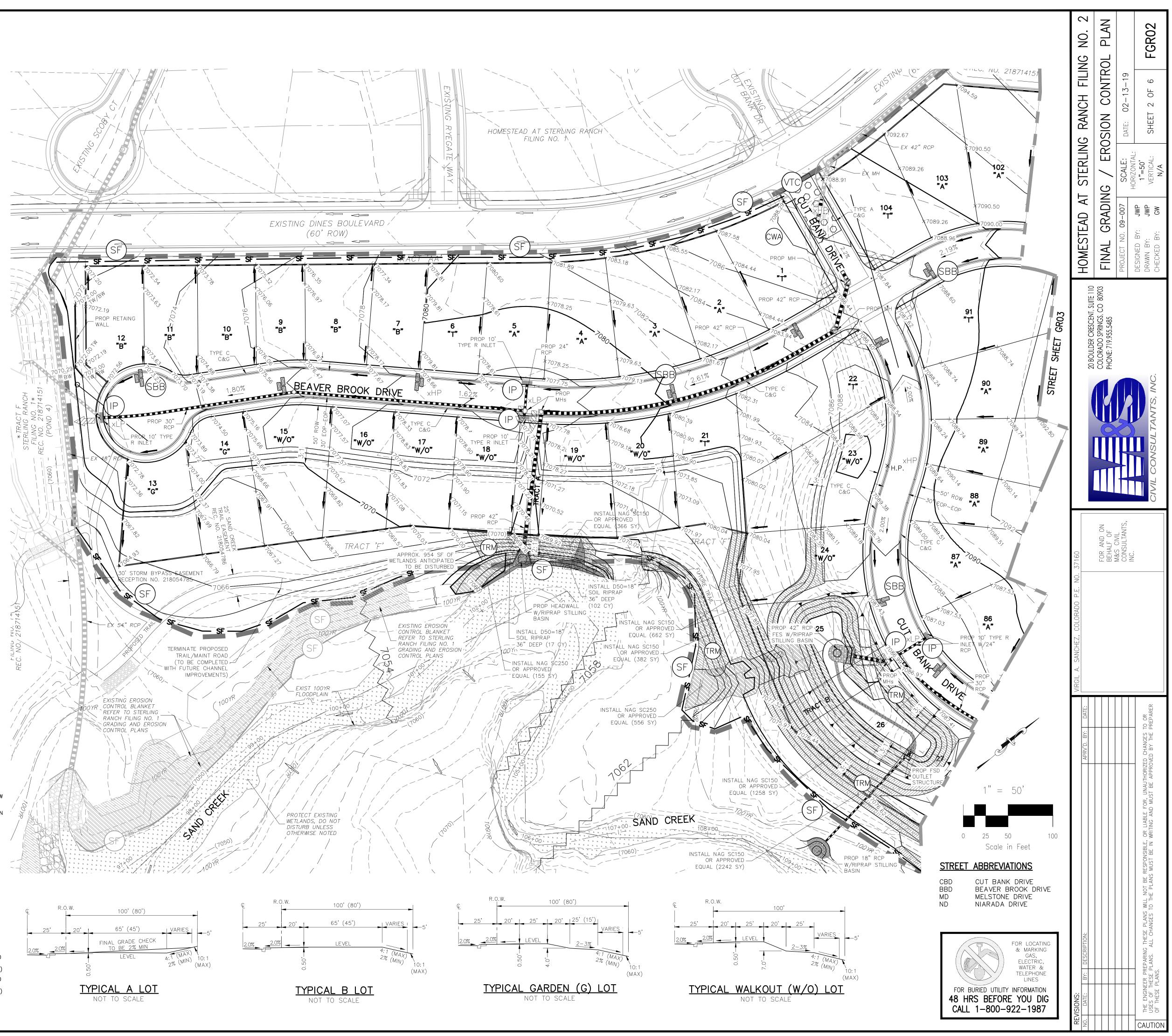
- 1. THE TOP OF AN ALUMINUM SURVEYORS CAP, STAMPED "9853", AT THE SOUTHEAST BOUNDARY CORNER OF BARBARICK SUBDIVISION NORTHING = 411416.273EASTING = 235167.071
- ELEVATION = 7023.42
- 2. THE TOP OF A RED PLASTIC SURVEYORS CAP, ILLEGIBLE, AT THE NORTHWEST BOUNDARY CORNER OF PAWNEE RANCHEROS SUBDIVISION NORTHING = 410095.404EASTING = 235052.131ELEVATION = 7000.40
- 3. THE TOP OF A RED PLASTIC SURVEYORS CAP. STAMPED "38141", AT THE SOUTHWEST BOUNDARY CORNER OF BARBARICK SUBDISION NORTHING = 411399.962EASTING = 233849.817ELEVATION = 7030.82

STAGING AREA TO BE DETERMINED BY CONTRACTOR IN THE FIELD. THE LOCATIONS SHALL BE DELINEATED ON THIS PLAN BY THE CONTRACTOR. THE EROSION CONTROL DELINEATED ON THIS PLAN SHALL BE REGULARLY

S NO. 2 ANS			RANCH FILINGNO.2ONCONTROLPLANGrading & Erosion Control Plans/FGR01.dwgFE:02-13-19HEET1OFFET1OF			
AGENCIES OWNER/DEVELOPER:	SR LAND, LLC 20 BOULDER CRESCENT, SUITE 201 COLORADO SPRINGS, CO 80901 JIM MORLEY (719) 471–1742					
CIVIL ENGINEER:	M & S CIVIL CONSULTANTS, INC. 20 BOULDER CRESCENT, SUITE 110 COLORADO SPRINGS, CO 80903 VIRGIL A. SANCHEZ P.E. (719) 955-	-5485	AT AT AT			
COUNTY ENGINEERING:	EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT 2880 INTERNATIONAL CIRCLE, SUITE COLORADO SPRINGS, CO 80910		HOMESTEAD FINAL GRA PROJECT NO. 09-0 DESIGNED BY: JW DRAWN BY: JW CHECKED BY: G			
TRAFFIC ENGINEERING:	JEFF RICE, P.E. (719) 520–6300 EL PASO COUNTY DEPARTMENT OF F 3275 AKERS DRIVE COLORADO SPRINGS, CO 80922					
WATER RESOURCES:	JENNIFER IRVINE, P.E. (719) 520–6 STERLING RANCH METRO DISTRICT EN JDS–HYDRO CONSULTANTS 545 E. PIKES PEAK AVE., SUITE 300 COLORADO SPRINGS, CO 80903	NGINEERS	20 BOULDER CRESCENT, SUITE 110 COLORADO SPRINGS, CO 80903 PHONE: 719.955.5485			
FIRE DISTRICT:	JOHN MCGINN (719) 668–8769 BLACK FOREST FIRE PROTECTION DIS 11445 TEACHOUT ROAD COLORADO SPRINGS, CO 80908 CHIEF BRYAN JACK (719) 495–4300		20 BOUL COLORY PHONE:			
GAS DEPARTMENT:	COLORADO SPRINGS UTILITIES 7710 DURANT DR. COLORADO SPRINGS, CO 80947 TIM WENDT (719) 668–3556)	TANTS, I			
ELECTRIC DEPARTMENT:	MOUNTAIN VIEW ELECTRIC 11140 E. WOODMEN ROAD FALCON, CO 80831 (719) 495–2283					
COMMUNICATIONS:	QWEST COMMUNICATIONS (U.N.C.C. LOCATORS) (800) 922–198 AT&T (LOCATORS) (719) 635–3674	87	CIVIL C			
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VIRGIL A. SANCHEZ, COL FOR AND ON BEHALF OF	DRADO P.E. NO. 37160 M&S CIVIL CONSULTANTS, INC.	DATE	Z, COLORADO			
	MENT: EVELOPER HAS READ AND WILL COMPLY WITH UCTION PLANS AND THE ACCOMPANYING DRAIN		VIRGIL A. SANCHE			
JIM MORLEY SR LAND, LLC 20 BOULDER CRESCENT, SUI COLORADO SPRINGS, CO 809 (719) 471–1742	TE 201	DATE	APRV'D. BY: DATE: ED CHANGES TO OR			
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CALL 1-800-922-1987







ALL TEMPORARY STORM SEWER SHOWN ON PLANS SHALL BE 24" DIA. HP POLYPROPYLENE BY ADS OR APPROVED EQUAL. ALL PIPE SHALL BE LAID TO ACHIEVE A MIN. SLOPE OF 0.5%.

EC-2 Temporary and Permanent Seeding (TS/PS)

soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Seed Mix for Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period (typically 30 days or more), plant an annual grass appropriate for the time of planting and mulch the planted areas. Annual grasses suitable for the Denver metropolitan area are listed in Table TS/PS-1. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Seed Mix for Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in Table TS/PS-2 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment.

If desired for wildlife habitat or landscape diversity, shrubs such as rubber rabbitbrush (Chrysothamnus nauseosus), fourwing saltbush (Atriplex canescens) and skunkbrush sumac (Rhus trilobata) could be added to the upland seedmixes at 0.25, 0.5 and 1 pound PLS/acre, respectively. In riparian zones, planting root stock of such species as American plum (Prunus americana), woods rose (Rosa woodsii), plains cottonwood (Populus sargentii), and willow (Populus spp.) may be considered. On non-topsoiled upland sites, a legume such as Ladak alfalfa at 1 pound PLS/acre can be included as a source of nitrogen for perennial grasses.

> Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3

Temporary and Permanent Seeding (TS/PS) EC-2

June 2012

June 2012

Table TS/PS-3. Seeding Dates for Annual and Perennial Grasses

	(Numbers in	l Grasses table reference able TS/PS-1)	Perennial Grasses		
Seeding Dates	Warm	Cool	Warm	Cool	
January 1–March 15			✓	√	
March 16–April 30	4	1,2,3	✓	√	
May 1–May 15	4		~		
May 16–June 30	4,5,6,7				
July 1–July 15	5,6,7				
July 16–August 31					
September 1–September 30		8,9,10,11			
October 1–December 31			✓	✓	

Mulch

TS/PS-2

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

TS/PS-6

EROSION CONTROL CRITERIA:

EROSION CONTROL MEASURES SHALL BE IMPLEMENTED IN A MANNER THAT WILL PROTECT PROPERTIES AND PUBLIC FACILITIES FROM THE ADVERSE EFFECTS OF EROSION AND SEDIMENTATION AS A RESULT OF CONSTRUCTION AND EARTHWORK ACTIVITIES WITHIN THE PROJECT SITE.

Urban Drainage and Flood Control District

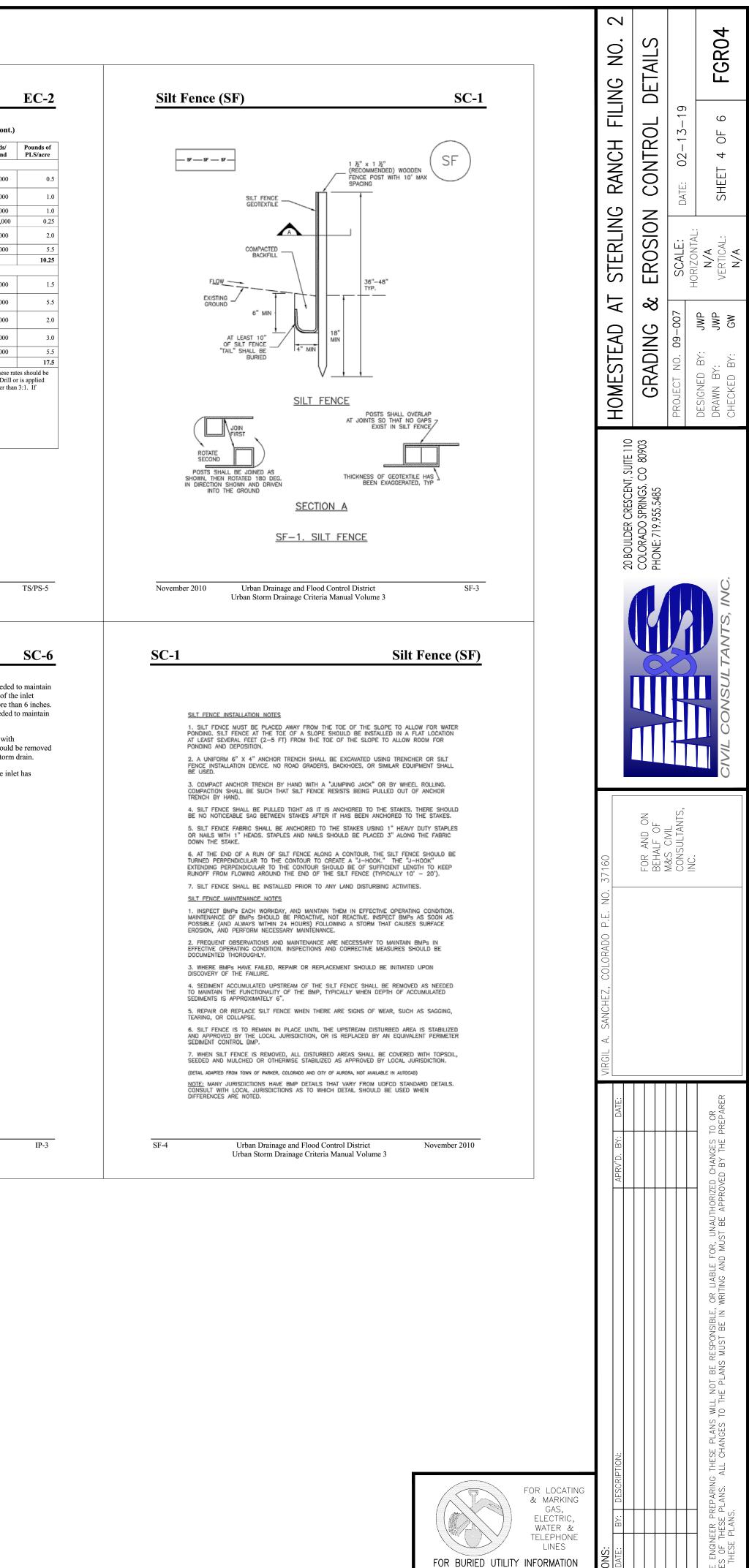
Urban Storm Drainage Criteria Manual Volume 3

- 1. PRIOR TO START OF GRADING OPERATIONS, LOCATE AND SET THE SEDIMENT BERM AND VEHICLE TRACKING CONTROL AS SHOWN ON THE EROSION CONTROL PLAN.
- 2. THE SEDIMENT BERM SHALL BE KEPT IN PLACE AND MAINTAINED UNTIL EROSION AND SEDIMENTATION POTENTIAL IS MITIGATED. REMOVAL OF SILT AND SEDIMENT COLLECTED BY THE SEDIMENT BERM IS REQUIRED ONCE IT REACHES HALF THE HEIGHT OF THE SEDIMENT BERM.
- 3. EROSION CONTROL DEVICES SHOULD BE CHECKED AFTER EVERY STORM OR NOT MORE THAN EVERY 14 DAYS. REPAIRS OR REPLACEMENT SHOULD BE MADE AS NECESSARY TO MAINTAIN PROPER PROTECTION.

SOIL EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN TWENTY-ONE (21) CALENDAR DAYS AFTER FINAL GRADING, OR FINAL EARTH DISTURBANCE HAS BEEN COMPLETED. DISTURBED AREAS AND STOCKPILES WHICH ARE NOT AT THE FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 30 DAYS SHALL ALSO BE MULCHED WITHIN 21 DAYS AFTER INTERIM GRADING. AN AREA THAT IS GOING TO REMAIN IN AN INTERIM STATE FOR MORE THAN 60 DAYS SHALL ALSO BE SEEDED. ALL TEMPORARY SOIL EROSION CONTROL MEASURES AND BMP'S SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED.

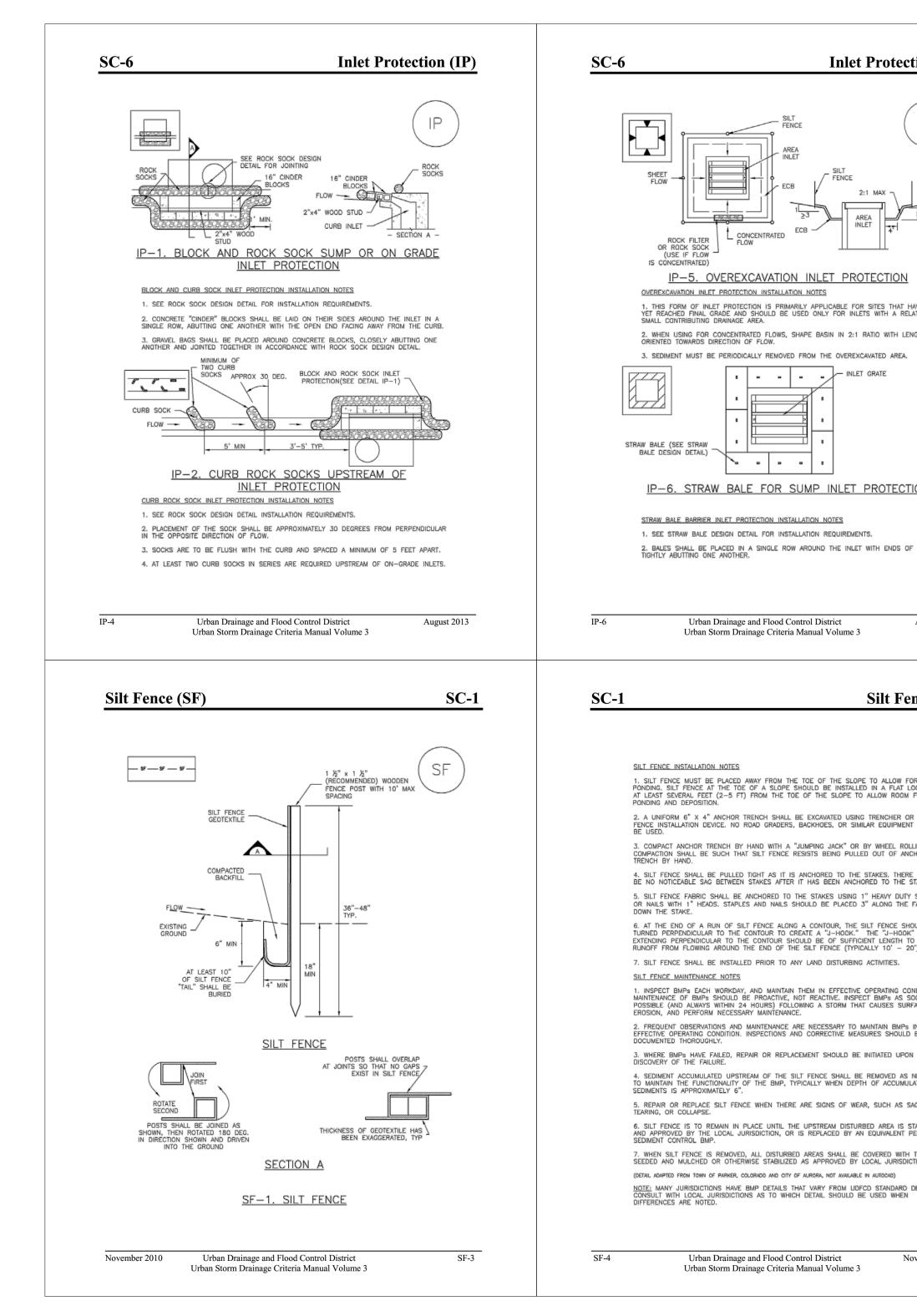
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g from April	hest success pro hrough early Magated, seeding n	ay and in th	e fall after	he first of Sep	tember unt			S-2. Minimum Drill Seed	Growth	Growth	Grasses Seeds/	Pounds of		Common	Botanical	Growth	erennial Gra	sses (cont.) Seeds/
seeding date							Common ^a Name Alakali Soil Seed Mix	Name	Season ^b	Form	Pound	PLS/acre	San	Name ndy Soil Seed Mix	Name	Season ^b	Form	Pound
le TS/PS-1.	Minimum Drill	Seeding Ra	ates for Va	rious Tempor	ary Annu	al Grasses	Alkali sacaton	Sporobolus airoides	Cool	Bunch	1,750,000	0.25	Blue	ie grama	Bouteloua gracilis	Warm	Sod-forming bunchgrass	825,000
S	ecies ^a	Growth		nds of Live Seed	Planting Depth		Basin wildrye Sodar streambank wheatgrass	Elymus cinereus Agropyron riparium 'Sodar'	Cool Cool	Bunch Sod	165,000 170,000	2.5 2.5	Can	mper little bluestem	Schizachyrium scoparium 'Camper'	Warm	Bunch	240,000
(Comr 1. Oats	ion name)	Season ^b Cool		S)/acre[°] 5 - 50	(inches) 1 - 2		Jose tall wheatgrass Arriba western wheatgrass	Agropyron elongatum 'Jose' Agropyron smithii 'Arriba'	Cool Cool	Bunch Sod	79,000 110,000	7.0 5.5		nirie sandreed	Calamovilfa longifolia Sporobolus cryptandrus	Warm Cool	Open sod Bunch	274,000 5,298,000
2. Spring	wheat	Cool	25	5 - 35	1 - 2		Total Fertile Loamy Soil Seed Mix					17.75	Vau	ughn sideoats grama	Bouteloua curtipendula 'Vaughn'	Warm	Sod	191,000
 Spring Annua 		Cool Cool	_	5 - 35) - 15	1 - 2		Ephriam crested wheatgrass	Agropyron cristatum 'Ephriam'	Cool	Sod	175,000	2.0	Arri	riba western wheatgrass Total	Agropyron smithii 'Arriba'	Cool	Sod	110,000
5. Millet		Warm		- 15	¹ / ₂ - ³ / ₄		Dural hard fescue	Festuca ovina 'duriuscula' Bromus inermis leyss	Cool	Bunch	565,000	1.0		avy Clay, Rocky Foothill Seed	Mix Agropyron cristatum			
6. Sudan 7. Sorgh	-	Warm Warm		-10	$\frac{1}{2} - \frac{3}{4}$ $\frac{1}{2} - \frac{3}{4}$		Lincoln smooth brome Sodar streambank wheatgrass	'Lincoln' Agropyron riparium 'Sodar'	Cool	Sod	130,000	3.0	-	hriam crested wheatgrass ^d	'Ephriam' Agropyron intermedium	Cool	Sod	175,000
8. Winte		Cool		0-35	1 - 2		Arriba western wheatgrass	Agropyron smithii 'Arriba'	Cool	Sod	110,000	7.0		he Intermediate wheatgrass	'Oahe' Bouteloua curtipendula	Cool	Sod	115,000
9. Winte 10. Winte	-	Cool Cool		0–35 0–35	1 - 2 1 - 2		Total High Water Table Soil Seed Mix					15.5		ughn sideoats grama ^e	'Vaughn' Bromus inermis leyss	Warm Cool	Sod	191,000 130,000
11. Tritica ^a Successfi	le I seeding of ann	Cool		5-40	1 - 2		Meadow foxtail Redtop	Alopecurus pratensis Agrostis alba	Cool Warm	Sod Open sod	900,000 5,000,000	0.5		riba western wheatgrass	'Lincoln' Agropyron smithii 'Arriba'	Cool	Sod	110,000
usually p	oduce enough de water erosion fo	ead-plant re	sidue to pro	vide protectio	n from		Reed canarygrass	Phalaris arundinacea Bromus inermis leyss	Cool	Sod	68,000	0.5			and rates are based on drill seeding	r followed by	crimped straw m	ilch. These rat
is not dist	urbed or mowed	closer than	8 inches.			21	Lincoln smooth brome	<i>'Lincoln' Panicum virgatum</i>	Cool	Sod	130,000	3.0	d	doubled if seed is broadcast and through hydraulic seeding. Hydr	should be increased by 50 percent raulic seeding may be substituted	t if the seedin for drilling or	g is done using a l ily where slopes a	Brillion Drill o
steeper th	seeding may be an 3:1 or where	access limit	ations exist	When hydra	ulic		Pathfinder switchgrass	'Pathfinder' Agropyron elongatum	Warm	Sod	389,000	5.5		hydraulic seeding is used, hydrau See Table TS/PS-3 for seeding d	ulic mulching should be done as a lates.	separate ope	ation.	
operation	used, hydraulic when practical,						Alkar tall wheatgrass Total	'Alkar'	Cool	Bunch	79,000	5.5 10.75		e ,	ition turf seed rates should be dou e used on slopes steeper than 6H t			
^b See Table	TS/PS-3 for see	ding dates.	Irrigation,	if consistently	applied,		Transition Turf Seed Mix ^e Ruebens Canadian bluegrass	Poa compressa 'Ruebens'	Cool	Sod	2,500,000	0.5		e	ue grama for the 2.0 lbs PLS of Va		s grama.	
may exter	d the use of coo ites should be do	l season spe	cies during	the summer n	nonths.		Dural hard fescue	Festuca ovina 'duriuscula'	Cool	Bunch	565,000	1.0						
	done using a Bri				ed by 50		Citation perennial ryegrass Lincoln smooth brome	Lolium perenne 'Citation' Bromus inermis leyss 'Lincoln'	Cool	Sod	247,000	3.0						
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able 14-12. n Name iety) le grass wheatgrass leatgrass (Hachita) s) rama owers wer eflower fie clover fie clover clov	Jrban Storm Dra Scientific Name Festuca ovina Poa canbyi Elymus lanceolatus Pascopyrum smithii Chondrosum gracile Panicum virgatum Boutelou curtipendula Lolium multiflorum Faillardia aristata Ratibida columnaris Petalostemum purpurea Liatris punctata Linum lewisii Penstemon strictus Achillea millefolium 4L-9 through 14-s	d Seed Mix Growth Season Cool Cool Cool Cool Cool Warm Warm Warm Warm Cool 	ria Manual ria Manual ria Manual ria Manual ria for all of right of of rig	Volume 3 Cher Soils in Seeds/Lb 680,000 926,000 154,000 110,000 825,000 389,000 191,000 227,000 TOTAL 132,000 1,230,000 293,000 592,000 2,770,000 TOTAL Hed wildflower wers are desin mough 14-12.	Lbs PLS/ Acre Drilled 0.6 0.5 5.7 7.9 1.1 1.0 2.0 10.0 28.8 0.25 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.3 1.14	Chapter 14 Lbs PLS/Acre Broadcast or Hydroseeded 1.2 1.0 11.4 15.8 2.2 2.0 4.0 20.0 57.6 0.50 0.40 0.12 0.40 1.4 1.5	SC-6 IP-3. Rock Sock Inlet Protect IP-4. Silt Fence Inlet Protect IP-5. Over-excavation Inlet IP-6. Straw Bale Inlet Protect CIP-1. Culvert Inlet Protection Propriety inlet protection dev More information is provided Inlets Located in a Sump When applying inlet protection during larger runoff events. than the top of the curb open localized flooding. If the inl becomes clogged with sedim localized flooding, public sat Area inlets located in a sump rock socks (on paved surface stacked around the area inlet products providing equivaler Inlets Located on a Slope For curb and gutter inlets on in conjunction with curb soct also see the Check Dam Fact Maintenance and I Inspect inlet protection frequ Inspect for tears that can of the BMP (e.g., gravel) Check for improper instat the inlet or bypassing to properly trenched around Look for displaced BMP	ction for Sump/Area Inlet tion for Sump/Area Inlet tion for Sump/Area Inlet Protection ction for Sump/Area Inlet ion vices should be installed in d below on selecting inlet p o ion in sump conditions, it is For curb inlets, the maximu- ing to allow overflow into t let protection height is great ent, runoff will not enter th fety issues, and downstream o setting can be protected th tes), sediment control logs/st c (on pervious surfaces), oven at functions. e paved sloping streets, block ks in the gutter leading to the t Sheet. Removal nently. Inspection and main a result in sediment directly) washing into the inlet. allation resulting in untreate an unprotected downstream d the inlet can result in flow Ps that are no longer protect fP.	accordance v rotection for important th um height of the inlet duri- ier than the c ie inlet and m a crossion and rough the us raw wattles of er-excavation k and rock so er-excavation k and rock so entering the entering the inlet. For e vs under the s ing the inlet.	vith manufac sump and or at the inlet cc the protective nurb elevation ay bypass it, id amage fror e of silt fence embedded in a around the i beck inlet protective inlets located ance include inlet, as well assing the BN xample, silt f ilt fence and Displacemeet tion. Traffic	cotection turer specific a-grade locat ontinue to fue barrier sho ms without , particularly possibly ca n bypassed if e, concrete b the adjacent nlet, and pro- ection is record along unpa s: as result in the directly into nt may occu	on (IP) acations. tions. acati	 	Urba nlet Protection Remove sediment accum BMP effectiveness, typic protection. For silt fence Remove sediment accum the functionality of the B Propriety inlet protection manufacturer specificatio in a timely manner to pre-	n Storm Drainage Criteria M n (IP) nulation from the area upstree cally when it reaches no more e, remove sediment when it a nulation from the area upstree BMP. n devices should be inspected ons. If proprietary inlet inse event devices from breaking	eam of the i re than half accumulate eam of the i d and main ert devices ; and spillir	nlet protection the storage ca is to a depth of nlet protection tained in accor are used, sedim g sediment int	pacity of the no more that as needed to dance with nent should b o the storm of

				S/PS)	EC-2	EC-2 Ter	mporary and P	erman	ent See	eding ("	<u>(8/PS)</u>		Temporary an	d Permanent S	Seedin	g (15/P	5)
eding dates for the highest the spring from April throu						Table TS	/PS-2. Minimum Drill Seed	ding Rates fo	or Perennial	Grasses			Table TS/PS-2	2. Minimum Drill Seeding	Rates for I	Perennial Gra	isses (cont.)
ezes. If the area is irrigate propriate seeding dates.	d, seeding may o	ccur in su	immer months, as we	ell. See Table	e TS/PS-3 for	Common ^a Name	Botanical Name	Growth Season ^b	Growth Form	Seeds/ Pound	Pounds of PLS/acre	-	Common Name	Botanical Name	Growth Season ^b	Growth Form	Seeds/ Pound
Table TS/PS-1. Mini	imum Drill Seed	ing Rate	s for Various Temp	orary Annua	al Grasses	Alakali Soil Seed Mix Alkali sacaton	Sporobolus airoides	Cool	Bunch	1,750,000	0.25	_	Sandy Soil Seed Mix Blue grama	Bouteloua gracilis	Warm	Sod-forming bunchgrass	825,000
Specie	e ^a Gi	rowth	Pounds of Pure Live Seed	Planting Depth		Basin wildrye Sodar streambank wheatgrass	Elymus cinereus Agropyron riparium 'Sodar'	Cool Cool	Bunch Sod	165,000 170,000	2.5 2.5	_	Camper little bluestem	Schizachyrium scoparium 'Camper'	Warm	Bunch	240,000
(Common	name) Se	eason	(PLS)/acre ^c	(inches)	_	Jose tall wheatgrass	Agropyron elongatum 'Jose'	Cool	Bunch	79,000	7.0	-	Prairie sandreed Sand dropseed	Calamovilfa longifolia	Warm	Open sod Bunch	274,000 5,298,000
1. Oats2. Spring whe		Cool Cool	35 - 50 25 - 35	1 - 2	_	Arriba western wheatgrass Total	Agropyron smithii 'Arriba'	Cool	Sod	110,000	5.5 17.75		Vaughn sideoats grama	Sporobolus cryptandrus Bouteloua curtipendula 'Vaughn'	Cool Warm	Sod	191,000
3. Spring barl	-	Cool	25 - 35	1 - 2	_	Fertile Loamy Soil Seed Mix Ephriam crested wheatgrass	Agropyron cristatum	Cool	Sod	175,000	2.0	-	Arriba western wheatgrass	Agropyron smithii 'Arriba'	Cool	Sod	110,000
4.Annual rye5.Millet	0	Cool Varm	10 - 15 3 - 15	$\frac{72}{\frac{1}{2} - \frac{3}{4}}$		Dural hard fescue	'Ephriam' Festuca ovina 'duriuscula'	Cool	Bunch	565,000	1.0	-	Total Heavy Clay, Rocky Foothill See				
 Sudangrass Sorghum 		Varm Varm	5–10 5–10	$\frac{1}{2} - \frac{3}{4}$ $\frac{1}{2} - \frac{3}{4}$	_	Lincoln smooth brome	Bromus inermis leyss 'Lincoln'	Cool	Sod	130,000	3.0	-	Ephriam crested wheatgrass ^d	Agropyron cristatum 'Ephriam'	Cool	Sod	175,000
8. Winter who	eat (Cool	20–35	1 - 2	_	Sodar streambank wheatgrass Arriba western wheatgrass	Agropyron riparium 'Sodar' Agropyron smithii 'Arriba'	Cool	Sod Sod	170,000 110,000	2.5 7.0	-	Oahe Intermediate wheatgrass	Agropyron intermedium 'Oahe' Bouteloua curtipendula	Cool	Sod	115,000
9. Winter bar 10. Winter rye	2	Cool Cool	20-35	1 - 2	_	Total High Water Table Soil Seed M	lix				15.5	_	Vaughn sideoats grama ^e	Vaughn' Bromus inermis leyss	Warm	Sod	191,000
11. Triticale		Cool	25–40	1 - 2	_	Meadow foxtail Redtop	Alopecurus pratensis Agrostis alba	Cool Warm	Sod Open sod	900,000 5,000,000	0.5	-	Lincoln smooth brome Arriba western wheatgrass	'Lincoln' Agropyron smithii 'Arriba'	Cool	Sod	130,000
usually produc	e enough dead-p	lant resid	ing in adequate plan ue to provide protect	tion from		Reed canarygrass	Phalaris arundinacea	Cool	Sod	68,000	0.5	-	Total				
	er erosion for an a d or mowed close		year. This assumes nches.	that the cove	r	Lincoln smooth brome	Bromus inermis leyss 'Lincoln'	Cool	Sod	130,000	3.0		doubled if seed is broadcast and	and rates are based on drill seeding d should be increased by 50 percent variable seeding may be substituted	nt if the seeding	g is done using a	Brillion Drill o
			r drilling only where ons exist. When hyd			Pathfinder switchgrass	Panicum virgatum 'Pathfinder' Agropyron elongatum	Warm	Sod	389,000	1.0			raulic mulching should be done as			
seeding is used	d, hydraulic mulc	hing shou	Ild be applied as a se seeds from being en	parate	L	Alkar tall wheatgrass Total	'Alkar'	Cool	Bunch	79,000	5.5 10.75		^c If site is to be irrigated, the tran	nsition turf seed rates should be do			
the mulch.			igation, if consistent			Transition Turf Seed Mix ^e			0.1	0.500.000			-	be used on slopes steeper than 6H plue grama for the 2.0 lbs PLS of V		s grama.	
may extend the	e use of cool seas	son specie	es during the summer	months.		Ruebens Canadian bluegrass Dural hard fescue	Poa compressa 'Ruebens' Festuca ovina 'duriuscula'	Cool Cool	Sod Bunch	2,500,000 565,000	0.5	L					
			s broadcast, or incre by hydraulic seeding.			Citation perennial ryegrass Lincoln smooth brome	Lolium perenne 'Citation' Bromus inermis leyss	Cool	Sod Sod	247,000	3.0						
L						Total	'Lincoln'	000	504	150,000	7.5						
	n Storm Drainage				Chapter 14	SC-6			olume 3	rotocti	n (IP)			oan Storm Drainage Criteria			
Urba			or all other Soils i	-	reas		tection for Sump/Area Inlet			rotectio	on (IP)		Inlet Protectio Remove sediment accur BMP effectiveness, typi	on (IP) mulation from the area upstrically when it reaches no mo	ream of the i	inlet protection	pacity of the
Urba getation Table 14-12. Rec Common Name S	ommended See	ed Mix f		Lbs PLS/ Acre		IP-3. Rock Sock Inlet Pro IP-4. Silt Fence Inlet Prote IP-5. Over-excavation Inle	etection for Sump/Area Inlet ection for Sump/Area Inlet et Protection			rotectio	on (IP)		Remove sediment accur BMP effectiveness, typi protection. For silt fence Remove sediment accur the functionality of the	on (IP) mulation from the area upstr ically when it reaches no mo ce, remove sediment when it mulation from the area upstr BMP.	ream of the i ore than half t accumulate ream of the i	inlet protection f the storage ca es to a depth o inlet protection	pacity of the f no more the n as needed to
etation Table 14-12. Rec ommon Name (Variety) S p fescue Fessi	commended Sec cientific Gro Name Sec tuca ovina C	ed Mix f owth ason	Form Seeds/Lb	Lbs PLS/ Acre Drilled	Lbs PLS/Acre Broadcast or	IP-3. Rock Sock Inlet Pro IP-4. Silt Fence Inlet Prote IP-5. Over-excavation Inle	ection for Sump/Area Inlet ection for Sump/Area Inlet et Protection stection for Sump/Area Inlet			rotectio	on (IP)		 Remove sediment accur BMP effectiveness, typi protection. For silt fenc Remove sediment accur the functionality of the 3 Propriety inlet protection manufacturer specificat 	on (IP) mulation from the area upstr ically when it reaches no mo ce, remove sediment when it mulation from the area upstr BMP. on devices should be inspect- tions. If proprietary inlet ins	ream of the i ore than half accumulate ream of the i ed and main aert devices a	inlet protection f the storage car s to a depth o inlet protection ntained in accor are used, sedin	pacity of the f no more the n as needed to rdance with nent should
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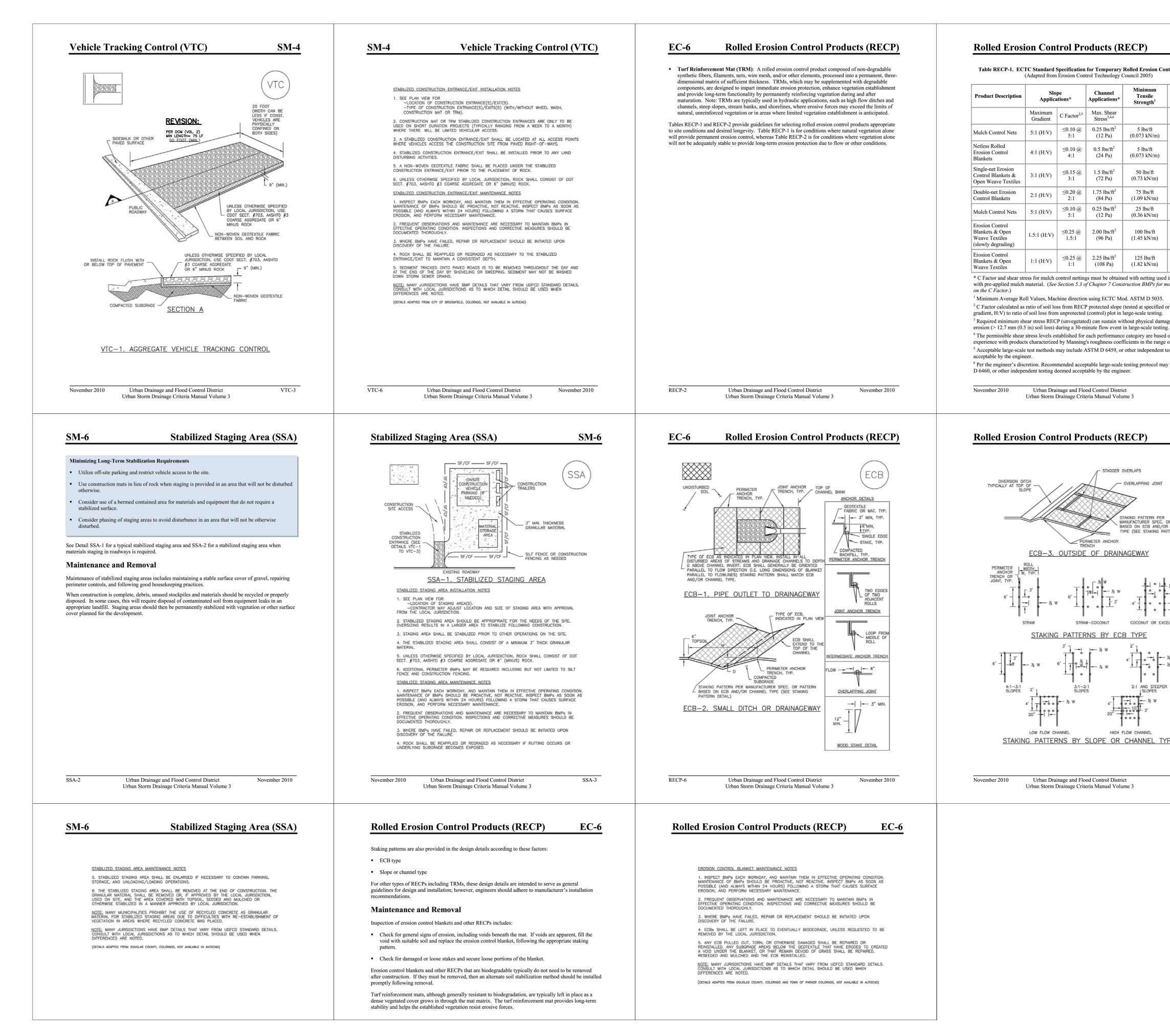


48 HRS BEFORE YOU DIG CALL 1-800-922-1987

CAUTION



<u>P)</u>	Inlet Protection (IP)	<u>SC-6</u> <u>SC-6</u>	Inlet Protection (IP)		FILING N OL PLA
	<complex-block> Image: Section and Sec</complex-block>	CIP 1. SEE PLA -LOCA -TYPE 2. INLET PR IS COMPLET IN STALL IN 3. MANY JU CONSULT W CONSULT W DIFFERENCE INLET PROT 1. INSPECT MAINTENANC PROSENEL CONSULT W DIFFERENCE 1. INSPECT MAINTENANC PROSENEL CONSULT W PROSENEL SOCK S	NLET_PROTECTION_INSTALLATION_NOTES AN VIEW FOR: AITON OF INLET PROTECTION, S OF INLET PROTECTION (IP.1, IP.2, IP.3, IP.4, IP.5, IP.6) ROTECTION SHALL BE INSTALLED PROMPTLY AFTER INLET CONSTRUCTION OR PAVING TE (TYPICALLY WITHIN 48 HOURS), IF A RAINFALL/RUNOFF EVENT IS FORECAST, LET PROTECTION PRIOT TO ONSET OF EVENT. UNSDICTIONS HAVE BMP DUETALS THAT YARY FROM UDECD STANDARD DETAILS, WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN ES ARE NOTED. TECTION MAINTENANCE NOTES TO BMPS SHOULD BE PROACTIVE, NOT REACTIVE, INSPECT BMPS AS SOON AS (AND ALWAYS WITHIN 24 HOURS) FOLJOWICA STORM THAT CAUSES SURFACE NOT DETAILS THAT YARY FROM UDECD STANDARD DETAILS, WITH IOSCH, JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN ES ARE NOTED. TECTION MAINTENANCE AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. CE OF BMPS SHOULD BE PROACTIVE, NOT REACTIVE, INSPECT BMPS AS SOON AS (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE NOT DETAILS ON THE AND AND TREATIVE, INSPECT TOMAINTAIN BMPS IN OFERTORM NECESSARY MAINTENANCE. IT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPS IN OFERTORM NECESSARY MAINTENANCE. IT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPS IN OFERTORM NECESSARY MAINTENANCE ARE NECESSARY TO MAINTAIN BMPS IN OFERTORM NECESSARY MAINTENANCE. IT OBSERVATIONES AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPS IN OFERTORM NECESSARY BAND CORRECTIVE MEASURES SHOULD BE ED THOROUGHY. IT OBSERVATIONES AND MAINTENANCE UNTIL THE UPSTREAM DISTURED AREA IS INTO TY STABLIZED, UNLESS THE LOCAL JURISDICTION APPROVES EARLIER REMOVAD. OF IECTION IN STREETS. INLET PROTECTION AND ALCHED, OR OTHERWISE STABILIZED IN A MAINTER BY THE LOCAL JURISDICTION. ED FROM TOWN OF PARKER, GUARMAD AND OTH OF ANRARA, GUARMAD, NOT AWALHAE IN AUTOCOM STANDERS NOTE D ON INTERVES AND BUTLICHED, OR OTHERWISE STABLIZED IN A MAINTER D INTO THOS INTO THE SALVAY PAPE FORM UDOFCD STANDARD DETAILS. INTO TRODUCTION IN THE DEVINE THAT VARY FROM UDOFCD STANDALDE IN AUTOCOM STARLES OF PROPRETARY INLET PROTEC		DER CRESCENT, SUITE 110 DO SPRINGS, CO 80903 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955.5485 719,955,555,555,555,555,555,555,555,555,5
3	NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED. August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3	IP-7 IP-8	Urban Drainage and Flood Control District August 2013 Urban Storm Drainage Criteria Manual Volume 3		20 BOULT COLORA PHONE: 7
)	EC-4 Mulchin	g (MU) SC-3	Straw Bale Barrier (SBB)	Straw Bale Barrier (SBB) SC-3	
	 must be tacked or fastened by a method suitable for the condition of the site. Straw mulch n anchored (and not merely placed) on the surface. This can be accomplished mechanically b with the aid of tackifiers or nets. Anchoring with a crimping implement is preferred, and is recommended method for areas flatter than 3:1. Mechanical crimpers must be capable of tu mulch fibers into the soil to a depth of 3 inches without cutting them. An agricultural disk, ideal substitute, may work if the disk blades are dull or blunted and set vertically; however, have to be weighted to afford proper soil penetration. Grass hay may be used in place of straw; however, because hay is comprised of the entire pl seed, mulching with hay may seed the site with non-native grass species which might in turn the native seed. Alternatively, native species of grass hay may be purchased, but can be diff and are more expensive than straw. Purchasing and utilizing a certified weed-free straw is a less costly mulching method. When using grass hay, follow the same guidelines as for straw above). On small areas sheltered from the wind and heavy runoff, spraying a tackiffer on the mulch for holding it in place. For steep slopes and special situations where greater control is neede control blankets anchored with stakes should be used instead of mulch. Hydraulic mulching consists of wood cellulose fibers mixed with water and a tackifying age be applied at a rate of no less than 1,500 pounds per arc: (1,425 lbs of fibers mixed with a ltackifer) with a hydraulic mulcher. For steep slopes, up to 24 hours to dry; therefore, it sl applied immediately prior to inclement weather. Application to roads, waterways and existi should be avoided. Erosion control mats, blankets, or nets are recommended to help stabilize steep slopes (gene steeper) and waterways. Depending on the product, these may be used alone or in conjunct or straw mulch. Normally, use of these products will be restricted to relatively small areas.	v crimping or he king the long vhile not an he frame may ant including out-compete icult to find n easier and (provided s satisfactory d, erosion nt and should east 75 lbs of equired for ould not be ng vegetation rally 3:1 and on with grass e used instead or allowed binder BMP osion and s for de full		 STRW, BALE INSTALLATION NOTES SEE FRAN YIEW FOR: JOCATION(S) OF STRW BALES. STRW BALES SHALL CONSIST OF CARTIFIED WEED FREE STRW OR HAY, LOCAL JURISON OF HAM REQUIRE PROCESSION AND AND AND AND AND AND AND AND AND AN	DATE: DATE: DATE: COR AND ON BEHALF OF M&S CIVIL CONSULTANTS, INC.
	MU-2 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3	June 2012 SBB-2	Urban Drainage and Flood Control District November 2010 Urban Storm Drainage Criteria Manual Volume 3	November 2010 Urban Drainage and Flood Control District SBB-3 Urban Storm Drainage Criteria Manual Volume 3	APRV'D. BY:
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	EC-6	EC-6 Rolled	Erosion Cor	ntrol Product	s (RECP)		FILING NO.	DETAILS	⁹ FGR06
	ntrol Products							SOL	3–1 F 6
		Table RECP-2. ECTC Standard Sp (Adapted from: 1)	pecification for Perma Erosion Control Techno	nent ¹ Rolled Erosion Co blogy Council 2005)	ontrol Products		NCT	NTR	02-
 		Product Type	Applications				RA	8	
Image: A state of the sta		TDMs with a minimum thickness of	Gradient	Shear Stress ^{4,5}	Strength ^{2,3}		NG	Z	
Image: A state of the sta		0.25 inches (6.35 mm) per ASTM D 6525 and UV stability of 80% per			kN/m)		RL	DSI(ALE: DNTAL: /A ical: /A
<form> Image: Another Another Andrew And Another And A</form>					kN/m)		STE	ER(SCA HORIZ(N, N, N,
		¹ For TRMs containing degradable com			kN/m)		AT	&	
	24 months	degradable portion of the matting alone. ² Minimum Average Roll Values, maching	ine direction only for te				AD	5 V	00-6(0r 387
	24 months	3 Field conditions with high loading and with a tensile strength of 44 kN/m (3,00	l/or high survivability re 00 lb/ft) or greater.				STE	AD	BY: BY: NO.
Control Control Control array The Second with a control of the sound we control of the	26 months	erosion (> 12.7 mm (0.5 in.) soil loss) d ⁵ Acceptable large-scale testing protocol	uring a 30-minute flow	event in large scale testir	ng.		ME	GR	DJECT SIGNED AWN B ECKED
ref advances RCP should be insufficient or sequence of packating. Regulating of packating, regulation is and packating regulation is and							Η		DES DES DR/
mem medical Office Workshame And PROFILE Notework water and prevent water and pr		type of product used, it is important to e corners of the material are secured using	ensure no gaps or voids g stakes and trenching.	exist under the material a Continuous contact betw	nd that all een the product			30903	
	greater	products. Often wooden stakes are used and maintenance challenges and general	l to anchor RECPs; how lly take a long time to b	vever, wood stakes may p	resent installation			SQ	
	on historical			only used ECB application	ons, including:		PRFSCF	SPRING 55.5485	
								RADO (
EC-6 EC-6 Control Control Products (RECP) ************************************	include ASTM						20 ROI	COLO	
No. 0	RECP-3				November 2010				N S
No. 0						_			TS, I
No. 0	EC-6	EC-6 Rolled	Erosion Con	itrol Product	s (RECP)				NA NA
• STATUSH • STATUSH					<u> </u>				
• STATUSH • STATUSH		EROSION_CONTROL_BLANKET_IN	STALLATION_NOTES					Ш	SNC
IF WITCHING CONTRICTIONS CONTRICTIONS 		1. SEE PLAN VIEW FOR: -LOCATION OF ECB.		UT, OR EXCELSIOR).					U U
No. International Sector Sector Name International Sector Sector Name International Sector Sector Name International Sector Sector Name No. A. MUTAKING TRENCH SHALL BE USED 10 JOIN ROLLS OF ECBS TOGETHER No. MUTAKING TRENCH SHALL BE USED 10 JOIN ROLLS OF ECBS TOGETHER No. MUTAKING SECTOR Sector Name International Sector Sector Name International Sector Sector Name A. MUTAKING TRENCH SHALL BE USED 10 JOIN ROLLS OF ECBS TOGETHER No. MUTAKING SECTOR Sector Name International Sector Sector Name International Sector Sector Name International Sector Sector Name A. MUTAKING Sector Name International Sector Sector Name I. M. Y International Sector Sector Name International Sector Sector Name International Sector Sector Name International Sector Sector Name I. M. Y International Sector Sector Name International Sector Sector Name International Sector Sector Name International Sector Sector Name I. M. Y International Sector Sector Name International Sector Sector Name International Sector Sector Name International Sector Sector Name I. M. Y International Sector Sector Name International Sector Sector Name International Sector Sector Name International Sector Sector Name I. M. Y International Sector Sector Namine International Sector		2. 100% NATURAL AND BIODEC SOME JURISDICTIONS MAY ALLC	GRADABLE MATERIALS ARE DW OTHER MATERIALS IN	PREFERRED FOR RECPS, A SOME APPLICATIONS.					
No. 001/07 No. 001/07 No. 001/07 THENE TENNED SHULL BE USED A OWN POLIS OF FERMETER OF ALL BARKET MENOR No. 0001/07 MARKET SHULL BE USED TO ADM POLIS OF FERMETER NO. NEW USE AN 000ELPPING JOINT. No. 001/07 INTERNET AND/OR TERNO'S SHULL BE USED A SAME NO. SO FERMETER NO. NEW USE AN 000ELPPING JOINT. No. 001/07 INTERNET AND/OR TERNO'S SHULL BE USED TO JOIN POLIS OF FERMETER NO. NEW USE AN 000ELPPING JOINT. No. 001/07 INTERNET AND/OR TERNO'S SHUL BE USED TO JOIN POLIS OF FERMETER FOR EGBS IN SOCRES. I. NUTRIE SECOND AND MULTIME DIA NO. MULCING ON THEO IN THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE SAME NO. MULCING ON THE OLISIES OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS I. NUTRIE SECOND AND MULTIME DIA THE PROCESS OF INSTALLING EGBS	R PATTERN SLOPE TERN DETAIL)	3. IN AREAS WHERE ECBS ARE TOPSOIL AND PERFORM FINAL SUBGRADE SHALL BE SMOOTH BE IN FULL CONTACT WITH SU	E SHOWN ON THE PLANS, GRADING, SURFACE PREP AND MOIST PRIOR TO EC JBGRADE. NO GAPS OR VI	, THE PERMITTEE SHALL PL ARATION, AND SEEDING AND CB INSTALLATION AND THE I OIDS SHALL EXIST UNDER T	ACE) MULCHING. ECB SHALL 'HE				
		4. PERIMETER ANCHOR TRENCI	H SHALL BE USED ALONG	THE OUTSIDE PERIMETER	OF ALL			NO	MTS,
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Steve Kuehster	(4)	
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