Small Site
Erosion & Sediment Control Manual
for Notice of Intent Submittals

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Sediment is the main pollutant in our surface water. The construction industry is a critical partner in protecting and restoring water quality. The contents in this manual are provided to guide you during the Notice of Intent (NOI) process from NOI application, through construction and to the final NOI inspection. Please ask questions!

**Introduction**

Polluted stormwater runoff is the main cause of surface water pollution in the United States, and sediment is the main water pollutant. Construction activities can generate 400 times the amount of erosion compared to undisturbed land. This means that 400 years worth of erosion can occur during one year of construction. The Federal Clean Water Act’s National Pollutant Discharge Elimination System (NPDES) Stormwater Regulations require that stormwater discharges be authorized under discharge permits. The goal of the NPDES stormwater permit program is to reduce the amount of pollutants entering streams, lakes, and rivers as a result of stormwater runoff from disturbed sites, including residential, commercial and industrial areas.

Jefferson County is required by the state to oversee grading activities from ground breaking until final landscaping to improve the quality of stormwater from construction sites. This manual explains the principles of erosion and sediment control and illustrates the best management practices (BMPs) used to minimize erosion and sedimentation. These principles establish the requirements for a Notice of Intent as found in the Zoning Resolution Section 16 – Land Disturbance. All land disturbances must conform to the performance standards (Part E) in the Land Disturbance section of the Zoning Resolution.

**Submittal Requirements**

A. The landowner and/or applicant must submit a Notice of Intent to the Planning and Zoning Division at least 10 calendar days prior to the proposed land disturbance activity, if the following conditions are met:

- the proposed land disturbance area covers more than 10,000 square feet, but less than one acre, or
- the proposed land disturbance volume of earth moved (cut and fill including the house excavation and driveway) is greater than or equal to 300 cubic yards.

The NOI must be approved before a building permit will be issued, and the NOI must be closed along with the building permit before a certificate of occupancy will be issued.

A full Grading Permit is required if the following conditions exist:

- the proposed cuts and fills will exceed ten vertical feet, or
- the land disturbance area will cover one acre or more, or
- the existing slope of the proposed disturbed area is more than or equal to 30%, or
- the site is located on North Table Mountain, South Table Mountain, Green Mountain, the Hogback, a floodplain overlay zone, or a geologic hazard overlay zone

If these conditions are exceeded, a full grading permit is required. **If cuts and fills of roads or drives exceed ten vertical feet, a grading permit is required regardless of the disturbance area or volume.**

For land disturbance areas of one acre or greater, the landowner and/or contractor is responsible for obtaining a permit for Stormwater Discharges Associated with Construction Activity from the Colorado Department of Public Health and Environment, at least 10 days prior the start of construction activities. The permit must be kept current throughout the construction duration. State stormwater permit applications are available at this address: [http://www.cdphe.state.co.us/wq/PermitsUnit/wqcdpmt.html](http://www.cdphe.state.co.us/wq/PermitsUnit/wqcdpmt.html)

B. A Notice of Intent form shall be signed by the owner of the property or by the applicant on behalf of the owner. Notice of Intent forms are available from the Planning and Zoning Division Web site under the “Applications, Forms & Handouts” tab. Submit one form for each project, even if it includes more than one lot.

C. A non-refundable fee. Fees are on-line at our web site or call 303-271-8700. Checks to be made payable to: JCBCC.

D. A copy of a deed that shows current ownership of the parcel, tract or lot.

E. Evidence of access (County maintained R.O.W. or access easement).

F. Three copies of a grading, erosion and sediment control (GESC) plan.
Principles of Erosion & Sediment Control

Erosion control is different from sediment control, and both are needed to stabilize a construction site. Erosion controls may consist of temporary seeding, installing erosion control blankets, and mulching. Erosion controls make physical contact with the soil to keep it in place. Sediment controls are structures such as sediment traps, check dams, silt fence and sediment control logs ('straw wattle' is a common filed name) and are designed to keep eroded sediment on the property. The following are common techniques:

**Keep Soil on the Construction Site**
The best way to minimize the risk of creating erosion and sedimentation problems is to disturb as little of the land surface as possible. When development is tailored to the natural contours of the land, little grading is necessary, and the erosion potential is consequently lower. Some methods to minimize risks are:

- Align roads along contours rather than straight up and down hills.
- Locate building pads on the flattest portions of the site.
- Keep disturbed areas small.
- Use erosion controls to prevent soil from eroding.
- Use sediment controls such as silt fence, sediment control logs, rock check dams, sediment traps, etc. where needed during construction to prevent sediment from leaving the site.

If you need assistance in determining the best control method, please contact an engineer in Planning & Zoning at 303-271-8753.

**Apply Erosion Control Principles**
The primary goal is to prevent erosion from happening. Use erosion control such as trenching, seeding and installing erosion control blankets during and immediately after construction to reduce erosion.

**Retain Existing Vegetation Wherever Feasible**
When laying out site improvements, locate buildings between existing tree clusters and build roads around trees. Avoid clearing vegetation around building pads, where construction will not be taking place. Also avoid disturbing vegetation on steep slopes or in other critical areas such as drainage ways, marshes, etc.

**Vegetate and Mulch Disturbed Areas**
Revegetate all disturbed areas that will not be covered with buildings, gravel or pavement. Before seeding an area, make sure drainage controls are installed. Establish temporary vegetative cover on areas that will be exposed for longer than 30 days. Plant establishment will be more successful if graded slopes are roughened or scarified before seeding, as discussed in the seeding section of this document. It is cheaper to establish and remove a temporary cover than to repair the gullying and sediment damage that is likely to occur if your site is not stabilized.

**Keep Runoff Velocities Low**
- Minimize straight flow path lengths – create meanders.
- Construct channels with gentle gradients.
- Line channels with rough surfaces, such as rock check dams or erosion control blankets; (Figure 4; see appendix)
Applying Sediment Control Measures

Most of the Best Management Practices (BMPs) in this section are temporary measures used during construction. Some BMPs such as sediment traps and rock check dams may be used during construction, and cleaned out for the transition into a permanent post-construction stormwater BMP structure.

Divert Runoff Away from Disturbed Areas

Do not allow runoff to cross a newly disturbed or seeded slope, except within a drainage ditch. Dikes and ditches can also be used at the base of a disturbed slope to protect downstream areas by diverting sediment-laden runoff to a sediment trap. Construct a sediment barrier or swale all the way around a disturbed area to prevent clean runoff from entering the area and also to prevent silt-laden runoff from escaping.

Trap Sediment On-Site

Locate sediment barriers in relatively level areas or in natural depressions. Install silt fences or sediment control logs below disturbed areas so that runoff will be detained long enough for suspended sediment to settle. A flat area at the base of a slope is a good location for a silt fence, sediment control log, or sediment trap because the runoff can slow down before reaching the barrier, and the sediment has a place to settle. For hills exceeding 2:1 slopes, it is a good idea to use multiple sediment traps both for reduced flow velocities and for sediment management. On large sites in addition to a sediment trap, there should be a BMP for every 100’ of flow path, and no BMP should have more than one acre of drainage area upstream.

When sediment depth reaches one-third of the structure height, remove accumulated sediment. Immediately repair any structural damage. If evidence exists that water has bypassed the structure, repair immediately.

Vehicle Tracking Pad

This is also called a gravel construction entrance and is designed to remove the mud that becomes caked in truck tires and to keep it on the project site. This is required at the exit of the construction access where there is a potential to track mud off of the property; the tracking pad must be constructed as shown in Figure 1.
**Sediment Barriers for Sheet Flow Applications**

Sediment barriers can be inexpensive, easy solutions for reducing sedimentation (Figures 2 and 3). However, they must be placed in the proper location, installed and maintained correctly. If such a barrier fails, there can be more damage than if no barrier had been installed, creating sediment problems and expensive repair costs.

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**Silt Fence**

Do not install silt fence in a flow path, swale or ditch.

Installation Procedure (Figure 2):

- Install silt fence parallel to contours.
- Excavate a trench approximately 4 inches wide and 10 inches deep along the line of fencing, and bury bottom of fabric, with stakes every 8 feet.
- Backfill the trench over the base of the fabric, and compact the soil.

Note: In the steep, rocky portions of the county, install sediment control logs instead of fabric silt fence. Rock fall protection with steel fencing is required if there is a potential for rocks to leave the property during construction.

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**Sediment control logs**

May be used in a flow path, swale or ditch.

Installation Procedure (Figure 3):

- Install sediment control logs parallel to contours.
- Trench 2 to 3 inches deep by the with of the control log.
- Mesh bags stuffed with combinations of rice and straw make of the log and must be staked every four feet.

Note: Watch for water bypassing control log, and repair gaps immediately. When using control logs along a sidewalk for sediment control, stake on top of the dirt without trenching.

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**Design Criteria**

<table>
<thead>
<tr>
<th>The area draining to the barrier is 1 acre or less.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The maximum slope gradient behind the barrier is 2:1.</td>
</tr>
<tr>
<td>The maximum slope length behind the barrier is 100 ft (30 m).</td>
</tr>
</tbody>
</table>

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- Silt fence may be used for sheet flow or to contain small piles of dirt.
- Silt fence can be used to keep sediment on the property.
- Straw wattles can be staked along the back of the sidewalk and can be left in place to provide temporary site stabilization.
Sediment Barriers for Channeled Flow (not silt fence)

Sediment barriers such as 6 inch or larger native rock check dams, wire-reinforced check dams and sediment control logs can be used in small swales (Figure 4). The barriers reduce the velocity of flow and erosion in the swale. General guidelines are as follows:

- Check dams should be spaced so that the top of the downhill check is at the same height as the base of the uphill check dam. This reduces the distance between check dams and erosion in the swale.
- Extend the barrier across the swale so that sediment-laden runoff will NOT flow around the check dams.

Storm Sewer Inlets and Culverts

Storm sewer inlets and culverts in the right-of-way and other infrastructure need protection from sediment. Install structures such as rock barriers or weighted wattles around inlets after obtaining an access permit (Figures 5 and 6).

Waste Control

The landowner and/or contractor is responsible for controlling waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste. Additionally, spill prevention and containment BMPs for construction material, waste, and fuel must be provided.
Establishing Vegetative Cover

Vegetation may be a temporary or permanent cover. Temporary cover is an erosion control measure used on stockpiles or to stabilize an area that may not be at final grade. Annual or native grasses are typically planted. Permanent cover with irrigation will stabilize the site in one growing season. Permanent cover with non-irrigated native grasses takes about three growing seasons to establish.

Revegetation

Revegetation includes:
• seedbed preparation
• planting
• mulching and crimping
• follow-up maintenance

Before beginning any revegetation project, a landowner should examine the soil, landscape, and timing that will influence performance of plants and success of the project. Seeding may be temporary or permanent. Annual (living for one season) grasses are often used for temporary cover, whereas perennial grasses are used for permanent or multi-season protection.

Native grasses should be used in revegetation projects.

Slope Influences on Revegetation

<table>
<thead>
<tr>
<th>Slope</th>
<th>Success</th>
</tr>
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<tbody>
<tr>
<td>&lt;5:1 (20% grade)</td>
<td>Very Good</td>
</tr>
<tr>
<td>4:1 (25% grade)</td>
<td>Good</td>
</tr>
<tr>
<td>3:1 (33% grade)</td>
<td>Fair</td>
</tr>
<tr>
<td>&gt;2:1 (50% grade)</td>
<td>Poor</td>
</tr>
</tbody>
</table>

Seedbed Preparation

Stockpile topsoil that was removed during grading. Direct concentrated water flow away from the stockpile. Protect the topsoil from erosion, and reapply it when preparing the seedbed. Ripping or chiseling to a depth of 12 inches or more should be performed to break up any compacted layers that may restrict root or water penetration. The surface should be free of rills and gullies. Control noxious weeds by mowing at least three times during the growing season. Weeds need to be less than 12 inches in height.

Add organic matter (compost) to the soil. Applying fertilizer to native seedling is not recommended when planting into natural soils because fertilizer tends to encourage weed growth, rather than enhance early grass development.
**Planting Window**

Grass seed should be planted in a weed-free seedbed during the “planting window” for the project area. Planting may be done anytime within the window as long as the soil is not frozen or wet. Plant winter wheat or rye as temporary cover when out of the window. The “planting windows” for perennial grasses in Jefferson County are:

<table>
<thead>
<tr>
<th></th>
<th>Mountains</th>
<th>Plains</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-irrigated Plantings</strong></td>
<td>October 1 - April 30</td>
<td>October 1 - April 30</td>
</tr>
<tr>
<td><strong>Irrigated Plantings</strong></td>
<td>April 1 - June 30</td>
<td>March 15 - July 15</td>
</tr>
</tbody>
</table>

Erosion blankets or crimped mulch are required for ground stabilization outside the planting windows.

**Planting Techniques**

Broadcast seeding may be accomplished with hand-held or vehicle-mounted spreaders. Seed is broadcast onto a prepared, roughened seedbed, followed by raking or dragging the surface to cover as much of the seed as possible with about 1/4” to 3/8” of soil. Some of the seed will remain visible and will not germinate. Specified seeding rates have accounted for some seed not germinating.

**Mulching**

After seeding, a mulch of long-stemmed, weed- and seed-free grass hay should be crimped into the ground with a disker to protect the site. Apply 1.5 to 2 tons per acre. This is approximately one standard rectangular bale per 650 square feet, and will allow precipitation to infiltrate.

On areas with slopes >= 30% or in windy areas, anchor erosion control netting over the mulch to help keep the mulch in place. Use netting that is photo degradable so that it will disappear on its own after a few years.

**Weeds**

Weeds will usually appear before grass seedlings. There are countless seeds in the soil waiting for an opportunity to grow. Most of the weeds will be annuals or biennials. While they may seem to be smothering the grass, they will not likely be able to compete with the grass in the second and third years. In fact, sometimes the weeds may even be beneficial, cooling the soil, conserving soil moisture, and protecting against erosion. It is recommended to mow at least three times during the growing season to help prevent weeds from developing seeds. If wild flowers and/or shrubs are planted with the grasses, then no herbicides should be used.

**Time**

It takes at least two or three growing seasons (for non-irrigated plantings) before revegetation success can be evaluated. If soil conditions are suitable (unrestricted rooting depth, no erosion, adequate surface topsoil replacement), weeds are under control, good seed has been planted correctly, AND the weather is “normal”, then seedlings should be established by the second growing season. Native species have a reputation of being picky about soil moisture and temperature conditions and may take longer to establish.

**Site Specific Recommendations**

USDA-Natural Resources Conservation Service can offer site-specific recommendations. Their phone number is 720.544.2809. Some of the more commonly used introduced species are listed in tables A-L. Reference the tables to determine what seed mixes are appropriate for your site location.
Maintenance of Erosion & Sediment Control
Best Management Practices

Maintenance and Inspection

Construction sites with a State Stormwater Discharge Permit must be inspected by the permittee or designated party. The condition of the structural Best Management Practices (BMPs) must be documented every 14 days or within 48 hours of a stormwater runoff event. Some maintenance examples are illustrated below:

- Remove sediment and reinstall collapsed silt fence as needed. Provide additional erosion control BMPs if the sediment control is not effective.

- Straw wattles flattened by construction traffic are not effective and must be replaced.

- Move straw wattles when accessing the site or choose a different BMP to avoid damaging the BMP.

- Replace or add more rock if mud is tracked through a vehicle tracking pad and onto the street.
Figures
Figure 1 - Vehicle Tracking Control
Figure 2 - Silt Fence Barrier
Figure 3 - Sediment Control Log
Figure 4 - Rock Check Dam
Figure 5 - Area Inlet Protection
Figure 6 - Reinforced Rock Berm
Figure 7 – Erosion Blanket
Figure 8 – Sediment Trap
**Figure 1 - Vehicle Tracking Control**

**VEHICLE TRACKING CONTROL (VTC) INSTALLATION NOTES**

1. 'VTC' SHALL BE INSTALLED AT THE EXIT OF THE CONSTRUCTION ACCESS WHEN THERE IS A POTENTIAL FOR TRACKING MUD OFF OF THE PROPERTY.

2. AN ACCESS PERMIT IS REQUIRED IF ACCESSING COUNTY RIGHT OF WAY OR IF A NEW DRIVEWAY CUT IS REQUIRED.

3. RIP RAP USED FOR THE 'VTC' SHALL BE 3”–6” AND SHALL BE ANGULAR. A MINIMUM DEPTH OF 9” IS REQUIRED.

4. A GEOTEXTILE SEPARATOR IS REQUIRED UNDER THE RIP RAP PAD; USE NILEX NW35, OR EQUIVALENT.

5. CONSTRUCTION FENCE SHALL BE LOCATED ADJACENT TO BOTH SIDES OF THE 'VTC' TO AVOID SHORT CUTTING.

6. 'VTC' SHALL BE REMOVED AT THE END OF CONSTRUCTION. ONCE REMOVED, THE DISTURBED AREAS SHALL BE TOPSOILED, SEEDED AND MULCHED.
Figure 2 - Silt Fence Barrier

SILT FENCE (SF) INSTALLATION NOTES
1. 'SF' BARRIERS INDICATED ON THE NOTICE OF INTENT PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITY.

2. 'SF' SHALL BE TRENCHED INTO THE GROUND WITH AT LEAST 10" OF SILT FENCE BURIED.

3. ANCHOR TRENCH SHALL BE EXCAVATED BY TRENCHER OR BY PICKAX. TRENCH SHALL BE COMPACTED SUCH THAT THE SILT FENCE RESISTS BEING PULLED OF THE ANCHOR TRENCH BY HAND.

4. THE 'SF' FABRIC SHALL BE LOCATED ON THE UPHILL SIDE, WITH THE STAKING ON THE DOWNHILL SIDE.

5. SEDIMENT ACCUMULATION UPSTREAM OF THE 'SF' BARRIER SHALL BE REMOVED WHEN THE SEDIMENT HEIGHT REACHES 6 INCHES.

6. 'SF' BARRIERS SHALL STAY IN PLACE UNTIL THE UPSTREAM DISTURBED AREAS ARE STABILIZED. ONCE REMOVED, ANY DISTURBED AREAS SHALL BE SEEDED AND MULCHED.

NOTE: THICKNESS OF MATERIAL HAS BEEN EXAGGERATED FOR CLARITY
Figure 3 - Sediment Control Log

SEDIMENT CONTROL LOG (SCL) INSTALLATION NOTES

1. 'SCL' INDICATED ON THE NOTICE OF INTENT PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITY.

2. 'SCL' SHALL CONSIST OF STRAW, MULCH, OR COCONUT FIBER AND SHALL BE CONTAINED IN A PHOTODEGRADABLE NETTING.

3. 'SCL' SHALL BE TRENCHED 2 INCHES INTO THE GROUND.

4. 'SCL' SHOULD NOT BE PLACED IN CONTINUOUS CONCENTRATED FLOW SWALES.

5. SEDIMENT ACCUMULATION UPSTREAM OF THE 'SCL' SHALL BE REMOVED WHEN THE SEDIMENT HEIGHT IS HALF OF THE HEIGHT OF THE 'SCL.'

6. 'SCL' MAY OR MAY NOT NEED TO BE REMOVED, DEPENDING ON THE LOCATION AND APPLICATION USE. IF REMOVED, ANY DISTURBED AREAS SHALL BE SEEDED AND MULCHED.
**Figure 4 - Rock Check Dam**

ROCK CHECK DAM (CD) INSTALLATION

NOTES

1. RIP RAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 12 INCHES.

2. THE ENDS OF THE 'CD' SHALL BE A MINIMUM OF 12 INCHES HIGHER THAN THE CENTER OF THE 'CD'.

3. SEDIMENT ACCUMULATION UPSTREAM OF THE 'CD' SHALL BE REMOVED WHEN THE SEDIMENT HEIGHT IS HALF THE HEIGHT OF THE 'CD'.

4. THE 'CD' SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED.

5. WHEN A 'CD' IS REMOVED, THE EXCAVATION SHALL BE FILLED WITH COMPACTED BACK FILL. ANY DISTURBED AREAS SHALL BE SEEDED AND MULCHED.

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FLOW

LENGTH ‘L’

CREST LENGTH ‘CL’

CHANNEL GRADE

TOP OF CHECK DAM = WATER SURFACE ELEVATION

12”

48”

12”

36”

6” AND LARGER RIP RAP

CLEAN EXCAVATION LINE

SECTION A-A’
Figure 5 - Area Inlet Protection

**AREA INLET PROTECTION (AIP) INSTALLATION NOTES**

1. A REINFORCED ROCK BERM (RRB) SHALL BE PLACED AROUND THE OPENING OF THE AREA INLET, WITH NO GAPS.

2. 1–1/2” CRUSHED ROCK OR RECYCLED CONCRETE MAY BE USED IN THE ‘RRB’.

3. WIRE MESH SHALL BE MADE OF 10 GAUGE WIRE CHICKEN WIRE AND SHALL COME IN 48” WIDTHS WITH A MAXIMUM OPENING OF 1 INCH.

4. WIRE MESH SHALL BE SECURED WITH WIRE TIES EVERY 6 INCHES ALONG THE LENGTH.


6. THE ‘AIP’ SHALL STAY IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IN STABILIZED.
Figure 6 - Reinforced Rock Berm

REINFORCED ROCK BERM (RRB) INSTALLATION NOTES

1. A ‘RRB’ SHALL BE PLACED AT THE THROAT OF ALL CULVERT FLARED END SECTIONS ON THE UPSTREAM END.

2. 1–1/2" CRUSHED ROCK OR RECYCLED CONCRETE MAY BE USED.

3. WIRE MESH SHALL BE MADE OF 10 GAUGE WIRE CHICKEN WIRE AND SHALL COME IN 48” WIDTHS WITH A MAXIMUM OPENING OF 1 INCH.

4. WIRE MESH SHALL BE SECURED WITH WIRE TIES EVERY 6 INCHES ALONG THE LENGTH.


6. THE ‘RRB’ SHALL STAY IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED.
EROSION BLANKET (EB) INSTALLATION NOTES

1. PREPARE SOIL BY SMOOTHING AND REMOVING ANY CLUMPS OF VEGETATION, AS WELL AS PLACING SEED OR FERTILIZER.


3. UNROLL THE CENTER BLANKET IN THE DIRECTION OF WATER FLOW ON THE BOTTOM OF THE CHANNEL. SECURELY FASTEN ‘EB’ TO SOIL SURFACE WITH STAPLES (OR STAKES) AS SHOWN IN THE PATTERN GUIDE ACCOMPANYING THE PARTICULAR ‘EB.’

4. PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH A 4–6 INCH OVERLAP. SECURE ‘EB’ WITH A DOUBLE ROW OF STAPLES, STAGGERED 4 INCHES APART AND 4 INCHES ON CENTER.

5. ANCHOR FULL-LENGTH EDGE OF ‘EB’ AT TOP OF SIDE SLOPES WITH A ROW OF STAPLES APPROXIMATELY 12 INCHES APART IN A 6-INCH DEEP x 6-INCH WIDE TRENCH. BACKFILL, AND COMPACT THE TRENCH AFTER STAPLING.

6. OVERLAP ADJACENT BLANKETS 2–5 INCHES, AND STAPLE.

7. ANCHOR THE END OF THE BLANKET WITH A ROW OF STAPLES APPROXIMATELY 12 INCHES APART IN A 6–INCH DEEP x 6–INCH WIDE TRENCH. BACKFILL, AND COMPACT THE TRENCH AFTER STAPLING.
SEDIMENT TRAP (ST) INSTALLATION NOTES

1. ‘ST’s INDICATED ON THE NOTICE OF INTENT PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITY.

2. ‘ST’s SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED.

3. THE TOP OF THE EARTHEN BERM SHALL BE A MINIMUM OF 6 INCHES HIGHER THAN THE TOP OF THE OVERFLOW STRUCTURE.

4. THE CENTER OF THE OVERFLOW STRUCTURE SHALL BE A MINIMUM OF 6 INCHES BELOW THE SIDES OF THE STRUCTURE.

5. SEDIMENT ACCUMULATED UPSTREAM OF THE RIP RAP SHALL BE REMOVED WHEN THE THE SEDIMENT HEIGHT IS HALF THE HEIGHT OF THE OVERFLOW STRUCTURE.

6. WHEN A ‘ST’ IS REMOVED, THE EXCAVATION SHALL BE FILLED WITH COMPACTED BACK FILL. ANY DISTURBED AREAS SHALL BE SEEDED AND MULCHED.
Native Seed Mix Tables

A - Loamy or Clayey Soils Mix
B - Shallow Foothills Mix
C - Overflow Drainage Bottoms Mix
D - Conifer Mix
E - Mountain Home “Firewise” Mix
F - Pike’s Peak Granite Mix
G - High Elevation Mix >8500’
### A - Loamy or Clayey Soils Mix

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Percent of Mix</th>
<th>(Drilled Planting) PLS lbs./Acre</th>
<th>(Broadcast) PLS lbs./Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western wheatgrass</td>
<td>Arriba</td>
<td>25</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Green needlegrass</td>
<td>Lodorm</td>
<td>20</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Blue grama</td>
<td>Lovington</td>
<td>20</td>
<td>0.6</td>
<td>1.2</td>
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<tr>
<td>Buffalograss</td>
<td>Texoka</td>
<td>10</td>
<td>1.7</td>
<td>3.3</td>
</tr>
<tr>
<td>Sandberg bluegrass</td>
<td>--------</td>
<td>10</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Sideoats grama</td>
<td>Vaughn</td>
<td>15</td>
<td>1.4</td>
<td>2.8</td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td>100</td>
<td>10 lbs/ac.</td>
<td>19.9 lbs/ac.</td>
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### B - Shallow Foothills Mix

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Percent of Mix</th>
<th>(Drilled Planting) PLS lbs./Acre</th>
<th>(Broadcast) PLS lbs./Acre</th>
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<tbody>
<tr>
<td>Big bluestem</td>
<td>Kaw</td>
<td>20</td>
<td>2.2</td>
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<td>Sideoats grama</td>
<td>Vaughn</td>
<td>20</td>
<td>1.8</td>
<td>3.6</td>
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<td>Little bluestem</td>
<td>Pastura</td>
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<td>1.4</td>
<td>2.8</td>
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<td>Yellow indiangrass</td>
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<td>2</td>
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<td>Western wheatgrass</td>
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<td>0.3</td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td>100</td>
<td>9.5 lbs./ac.</td>
<td>18.9 lbs./ac.</td>
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</table>

### C - Overflow Drainage Bottoms Mix

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Percent of Mix</th>
<th>(Drilled Planting) PLS lbs./Acre</th>
<th>(Broadcast) PLS lbs./Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western wheatgrass</td>
<td>Arriba</td>
<td>45</td>
<td>7.2</td>
<td>14.4</td>
</tr>
<tr>
<td>Green needlegrass</td>
<td>Lodorn</td>
<td>20</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Switchgrass</td>
<td>Nebraska 28</td>
<td>15</td>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Blue grama</td>
<td>Lovington</td>
<td>10</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Yellow indiangrass</td>
<td>Holt</td>
<td>5</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Big bluestem</td>
<td>Kaw</td>
<td>5</td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td>100</td>
<td>11.3 lbs./ac.</td>
<td>22.6 lbs./ac.</td>
</tr>
</tbody>
</table>

### D - Conifer Mix

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Percent of Mix</th>
<th>(Drilled Planting) PLS lbs./Acre</th>
<th>(Broadcast) PLS lbs./Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona fescue</td>
<td>Redondo</td>
<td>20</td>
<td>0.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Western wheatgrass</td>
<td>Rosana</td>
<td>15</td>
<td>2.4</td>
<td>4.8</td>
</tr>
<tr>
<td>Big bluegrass</td>
<td>Sherman</td>
<td>15</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Sheep fescue</td>
<td>Covar</td>
<td>15</td>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Blue grama</td>
<td>Lovington</td>
<td>15</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Slender wheatgrass</td>
<td>San Luis</td>
<td>10</td>
<td>1.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Mountain brome</td>
<td>Bromar</td>
<td>10</td>
<td>1.9</td>
<td>3.8</td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td>100</td>
<td>8.0 lbs./ac.</td>
<td>16.0 lbs./ac.</td>
</tr>
</tbody>
</table>

### E - Mountain Home “Firewise” Mix

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Percent of Mix</th>
<th>(Drilled Planting) PLS lbs./Acre</th>
<th>(Broadcast) PLS lbs./Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue grama</td>
<td>Lovington</td>
<td>20</td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Streambank wheatgrass</td>
<td>Sodar</td>
<td>20</td>
<td>2.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Western wheatgrass</td>
<td>Rosana</td>
<td>10</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Thickspike wheatgrass</td>
<td>Critana</td>
<td>10</td>
<td>1.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Canby bluegrass</td>
<td>Canbar</td>
<td>20</td>
<td>0.8</td>
<td>1.5</td>
</tr>
<tr>
<td>Sheep fescue</td>
<td>Covar</td>
<td>20</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td>100</td>
<td>7.3 lbs./ac.</td>
<td>14.5 lbs./ac.</td>
</tr>
</tbody>
</table>
### F - Pike’s Peak Granite Mix

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Percent of Mix</th>
<th>(Drilled Planting) PLS lbs./Acre</th>
<th>(Broadcast) PLS lbs./Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue grama</td>
<td>Lovington</td>
<td>20</td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Little bluestem</td>
<td>Pastura</td>
<td>15</td>
<td>1.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Sheep fescue</td>
<td>Covar</td>
<td>15</td>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Arizona fescue</td>
<td>Redondo</td>
<td>10</td>
<td>0.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Indian ricegrass</td>
<td>Paloma</td>
<td>10</td>
<td>1.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Canby bluegrass</td>
<td>Canbar</td>
<td>10</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Western wheatgrass</td>
<td>Rosana</td>
<td>10</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Thickspike wheatgrass</td>
<td>Critana</td>
<td>10</td>
<td>1.1</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td></td>
<td>100</td>
<td>7.2 lbs./ac.</td>
<td>14.1 lbs./ac.</td>
</tr>
</tbody>
</table>

### G - High Elevation Mix >8500'

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Percent of Mix</th>
<th>(Drilled Planting) PLS lbs./Acre</th>
<th>(Broadcast) PLS lbs./Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona fescue</td>
<td>Redondo</td>
<td>20</td>
<td>0.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Alpine bluegrass</td>
<td>--------</td>
<td>20</td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Canby bluegrass</td>
<td>Canbar</td>
<td>20</td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Western wheatgrass</td>
<td>Rosana</td>
<td>10</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Thickspike wheatgrass</td>
<td>Critana</td>
<td>10</td>
<td>1.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Slender wheatgrass</td>
<td>San Luis</td>
<td>10</td>
<td>1.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Mountain brome</td>
<td>Bromar</td>
<td>10</td>
<td>1.9</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td></td>
<td>100</td>
<td>7.8 lbs./ac.</td>
<td>15.6 lbs./ac.</td>
</tr>
</tbody>
</table>
**SEED QUOTE**

Customer: Paul Ellis

Job Name: Jefferson County Pikes Peak Granite Mix

### Common Name | PLS Lbs
---|---
Blue Grama | 1.20
Little Bluestem | 2.10
Sheep Fescue | 1.40
Arizona Fescue | 0.90
Indian Ricegrass | 2.50
Canby Bluegrass | 0.60
Western Wheatgrass | 3.20
Thickspike Wheatgrass | 2.20

**Totals** = 14.10

Bid Price is = $8.64 /PLS Lb

$121.85 /Acre

---

**Sales Staff:**

Glenn

Paul,

I didn't put a minimum on your mixes, but I would say when ordering however, that 10 pounds would be the minimum. However, I would recommend to your homeowners that they seed 1 pound of seed per 1000 s.f.

These seed mix totals are 14.1 pounds and 15.6 pounds per acre. In actuality that isn't much seed to cover an area so I would suggest that when you speak with your homeowners that they keep in their minds "one pound per 1000 square feet" as to the amount of seed they each may need. I would recommend that the homeowners "bulk" up their seed with sand or cat litter so they can get areas covered. If you have question don't hesitate to call.

Thanks

Glenn Ledall

Sales Representative

Pawnee Buttes Seed, Inc.
*** SEED QUOTE ***

Customer: Paul Ellis  Date: April 30, 2012
Contact:  Phone:
Address: Fax:
City, State, Zip: 

Acres: 1  Job Name: Jefferson County High Elevation Mix

Seeding Rate/Acre:

<table>
<thead>
<tr>
<th>Common Name</th>
<th>PLS Lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona Fescue</td>
<td>1.80</td>
</tr>
<tr>
<td>Alpine Bluegrass</td>
<td>1.20</td>
</tr>
<tr>
<td>Canby Bluegrass</td>
<td>1.20</td>
</tr>
<tr>
<td>Western Wheatgrass</td>
<td>3.20</td>
</tr>
<tr>
<td>Thickspike Wheatgrass</td>
<td>2.20</td>
</tr>
<tr>
<td>Slender Wheatgrass</td>
<td>2.20</td>
</tr>
<tr>
<td>Mountain Brome</td>
<td>3.80</td>
</tr>
</tbody>
</table>

Totals 15.60

Bid Price is = $6.95 /PLS Lb
$108.45 /Acre

Sales Staff: Glenn

Paul,

I didn't put a minimum on your mixes, but I would say when ordering however, that 10 pounds would be the minimum. However, I would recommend to your homeowners that they seed 1 pound of seed per 1000 s.f. These seed mix totals are 14.1 pounds and 15.6 pounds per acre. In actuality that isn't much seed to cover an area so I would suggest that when you speak with your homeowners that they keep in their minds "one pound per 1000 square feet" as to the amount of seed they each may need.

I would recommend that the homeowners "bulk" up their seed with sand or cat litter so they can get areas covered. If you have questions don't hesitate to call.

Thanks
Glenn Ledall
Sales Representative
Pawnee Buttes Seed, Inc.