STANDARD

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Final soil stabilization shall be the final ground cover defined by the site plan or associated documents. Temporary soil stabilization shall include grasses from seed and mulching as described below:

The seedbed shall be well settled and firm, but friable enough that seed can be placed at the seeding depth specified. The seedbed shall be reasonably free of weeds. Soils that have been over-compacted by traffic or equipment, especially when wet, shall be tilled or ripped to breakup rooting restrictive layers and then harrowed, rolled or packed to prepare the required firm seedbed. Mulch shall be applied at a rate of 2 ½ tons per acre and shall be attached by an approved method suitable for the type of mulch used. Mulch shall be spread uniformly, in a continuous blanket, after seeding is complete. Mulch shall be clean, weed and seed free, long stemmed straw of oats, wheat or rye. At least 50% of mulch, by weight, shall be ten inches or longer. Mulch shall be spread by hand or blower-type mulch spreader. Mulching shall be started on the windward side of relatively flat areas or on the upper part of a steep slope and continued uniformly until the area is covered. The mulch shall not be bunched. Immediately following spreading, the mulch shall be anchored to the soil by a v-type wheel land packer or a scalloped-disk land packer designed to force mulch into the soil surface a minimum of 3 inches. It is the contractor's responsibility to adjust the weights used by the equipment in order to achieve the required crimping depth. All seeded areas shall be mulched after seeding on the same day as the seeding. The type of a seed mix used will depend upon the following factors: ternporary vs. permanent revegetation; time of year; soil type and slope. As a general rule, temporary revegetation will utilize annual grasses while permanent revegetation should utilize perennial grasses. The seed mix and rate of application shall be as follows:

Minimum Drill Seeding Rates for Annual Grasses

Species (Common Name)	Growth Season	Pounds of Pure Live Seed (PLS)/acre	Planting Depth (inches)
1. Oats	Cool	35-50	1-2
2. Spring Wheat	Cool	25-35	1-2
3. Spring Barley	Cool	25-35	1-2
4. Annual ryegrass	Cool	10-15	½
5. Millet	Warm	3-15	½-3/4
6. Sudangrass	Warm	5-10	½-3/4
7. Sorghum	Warm	5-10	½-3/4
8. Winter Wheat	Cool	20-35	1-2
9. Winter Barley	Cool	20-35	1-2
10. Winter Rye	Cool	20-35	1-2
11. Triticale	Cool	25-40	1-2

NOTE:
HAND BROADCASTING MAY BE REQUESTED BY VARIANCE, BUT SEED RATES MUST BE DOUBLED.

CITY OF AURORA, COLORADO

AURORA WATER DEPARTMENT — DATE 9/1/10

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SEEDING & MULCHING

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Minimum Drill Seeding Rates for Perennial Grasses

Alkali Soil Seed Mix

Common Name	Botanical Name	Growth Season	Growth Form	Seeds/ Pound	Pounds of PLS/acre
Alkali sacaton	*Sporobolus airoides*	Warm	Bunch	1,750,000	2.0
Blue grama	*Bouteloua gracilic 'Hachita'*	Warm	Sod-forming bunchgrass	825,000	3.0
Akali grass	*Puccinella distans*	Cool	Sod	1,200,000	1.0
Sideoats grama	*Bouteloua curtipendula 'Butte'*	Warm	Sod	191,000	2.0
Sodar streambank wheatgrass	*Agropyron riparium*	Cool	Sod	170,000	1.0
Inland Saltgrass	*Distichlis stricta*	Warm	Sod	613,200	5.0
Arriba western wheatgrass	*Agropyron smithii*	Cool	Sod	110,000	6.0
Buffalograss	*Dactyloides 'Sharp's Improved'*	Warm	Sod	52,000	10.0
Total					**30.0**

Sandy Soil Seed Mix

Common Name	Botanical Name	Growth Season	Growth Form	Seeds/ Pound	Pounds of PLS/acre
Blue grama	*Bouteloua gracilic 'Hachita'*	Warm	Sod-forming bunchgrass	825,000	4.0
Little bluestem	*Schizachyrium scoparium 'Pastura'*	Warm	Bunch	240,000	3
Prairie sandreed	*Calamovilfa longifolia*	Warm	*Open sod*	274,000	3
Sand dropseed	*Sporobolus cryptandrus*	Warm	Bunch	5,298,000	2
Sideoats grama	*Bouteloua curtipendula 'Butte'*	Warm	Sod	191,000	3
Western wheatgrass	*Agropyron smithii "Arriba"*	Cool	Sod	110,000	4.0
Sand Bluestem	*Andropogon hallii 'Garden'*	Warm	Sod	113,300	2.0
Switchgrass	*Panicum virgatum*	Warm	Sod	389,000	6.0
Indian Ricegrass	*Oryzopsis hymenoides*	Cool	Bunch	141,000	4.0
Total					**31.0**

STANDARD

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Sandy Loam to Clay Loam Soil Seed Mix					
Common Name	**Botanical Name**	**Growth Season**	**Growth Form**	**Seeds/ Pound**	**Pounds of PLS/acre**
Blue Grama	*Bouteloua gracilis 'Hachita'*	Warm	Sod-forming bunch grass	825,000	4.0
Buffalograss	*Dactyloides "Sharps Improved"*	Warm	Sod	52,000	4.0
Sideoats grama	*Bouteloua curtipendula 'Butte'*	Warm	Sod	191,000	6.0
Sand dropseed	*Sporobolus cryptandrus "Native"*	Warm	Bunch	5,298,000	1.0
Western wheatgrass	*Agropyron smithii "Arriba"*	Cool	Sod	110,000	7.0
Junegrass	*Koeleria cristata*	Cool	Bunch	2,315,400	1.0
Little Bluestem	*Schizachyrium Scoparium 'Blaze'*	Warm	Bunch	260,000	2.0
Green Needlegrass	*Stipa Viridula 'Lodorn'*	Cool	Bunch	181,000	5.0
Total					**30**

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SEEDING & MULCHING

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Damp or low areas, Ditches, Detention Ponds

Common Name	Botanical Name	Growth Season	Growth Form	Seeds/ Pound	Pounds of PLS/acre
Buffalograss	*Buchloe dactyloides*	Warm	Sod	52,000	2.0
Blue grama	*Bouteloua gracilis (Chondrosum gracilis) 'Hachita'*	Warm	Sod-forming bunch grass	825,000	3.0
Switchgrass	*Panicum virgatum 'Blackwell'*	Warm	Sod	389,000	6.0
Western Wheatgrass	*Pascopyrum smithii*	Cool	Sod	110,000	6.0
Sand dropseed	*Sporobolus cryptandrus*	Warm	Bunch	5,298,00	1.0
Inland saltgrass	*Distichlis stricta*	Warm	Sod	613,200	3.0
Prairie cordgrass	*Spartina pectinata*	Warm	Sod	183,000	1.0
Little Bluestem	*Schizachyrium scoparium 'Blaze'*	Warm	Bunch	260,000	2.0
Sideoats Grama	*Boutelova curtipendula*	Warm	Sod	191,000	3.0
Green Needlegrass	*Stipa viridula 'Lodorn'*	Cool	Bunch	181,000	1.0
Big Bluestem	*Andropogon gerardi 'Pawnee'*	Warm	Bunch	144,240	1.0
Yellow Indiangrass	*Sorghastrum nutans 'Holt'*	Warm	Bunch	174,720	1.0
Total					30.0

Where there is persistent water, add the following:

Wooly sedge	*Carex lanuginose*			322,340	4 ounces
Nebraska sedge	*Carex nebrascensis*			534,100	8 ounces
Baltic rush	*Juncus balticus*			12,300,000	4 ounces
Aster	*Aster laevis*			1,216,000	3 ounces
Showy milkweed	*Asclepias speciosa*			58,112	5 ounces
Wild Bergamot	*Monarda fistulosa*			1,400,136	3 ounces
Yarrow	*Achillea millefolium*			2,770,000	1 ounces
Subtotal					28 ounces/acres
Total					**31.75 pls lbs/acre**

	Annual Grasses		**Perennial Grasses**	
Seeding Dates	Warm	Cool	Warm	Cool
January 1-March 15				
March 16-April 30	4	1, 2, 3		
May1-May 15	4			
May16-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		8		

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Number codes for annual species refer to specific seeding periods for: (1) oats; (2) Spring wheat; (3) spring barley; (4) annual ryegrass; (5) millet; (6) sundangrass; (7) sorghum; (8) winter wheat; (9) winter barley; (10) winter rye; and (11) triticle.

To provide temporary erosion control between the seeding dates specified, utilize surface roughening (on the contour or perpendicular to prevailing winds) and/or apply a mulch.

The seeding dates for perennial species are generally in the spring from March through early May, and in the fall after mid-October until snow cover or frozen soil precludes planting. Fall seeding is referred to as "dormant seeding" because the seeds will lie dormant through the winter and germinate in the spring. When "dormant seeding", add a nurse crop to the mix to provide some vegetative cover during the fall and Winter months. Acceptable nurse crops are Winter Wheat (5 lbs PLS/acre) or Regreen (5 lbs/acre).

Perennial grasses can be seeded using a drill seeder in areas previously planted with temporary grass cover. In this case, the annual grass shall be mowed prior to seeding. Broadcast seeding of permanent grasses should not be done with a live or dead crop of annual grasses without first reworking and preparing the topsoil.

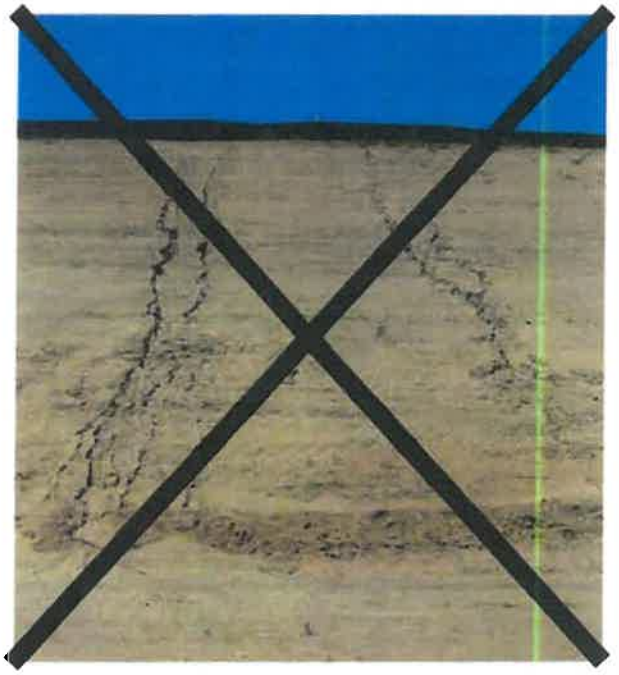
Seed mixes for projects including or adjacent to Parks, Recreation & Open Space Department properties and facilities (existing and future) will be determined by the Parks, Recreation & Open Space Department. Projects funded by the Parks, Recreation & Open Space Department will be required to comply with the Department's standard specifications regarding seeding, mulching and maintenance. All projects including Parks, Recreation & Open Space Department properties and facilities will be required to receive approval of the Department prior to final acceptance of the vegetative cover.

STANDARD

Temporary Seeding - should be established as quickly as possible in areas where work has been completed or when there will be no work for an extended period of time. Site planning and phasing should include measures to ensure that disturbed areas are seeded within fourteen (14) calendar days after final grading, earth disturbance activities have been completed or when work is suspended for longer than thirty (30) days.

Key Installation and Maintenance Requirements:

- Seeding should only be applied after appropriate seedbed and soil preparations have been made to ensure the seedbed is conducive to plant growth. This may include soil amendments and/or grading and tilling
- Seed shall only be applied by drill seeding equipment.
- Seeded areas shall be covered with crimped straw mulch or erosion blankets to protect the seedbed and facilitate germination.
- Seeded areas shall be inspected to verify germination, vegetative growth, and adequate ground cover. Seeded areas that fail to develop uniform, established cover shall be reseeded



Disturbed areas without adequate vegetative cover (temporary or permanent) are vulnerable to surface erosion, such as this example.

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AURORA WATER DEPARTMENT — DATE 1/12/10

CITY ENGINEER — DATE 1-15-10

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Mulching - consists of evenly distributing straw over a disturbed area to provide for temporary stabilization or protection for a seed bed. The straw must be adequately secured by crimping the mulch into the ground to provide immediate protection against raindrop and wind erosion for exposed soils and promote the growth of vegetation by providing moisture retention and protection of seedbeds against extremes in temperature.

Key Installation and Maintenance Requirements:

- Mulch should be applied along the contour of the grade or slope and mechanically anchored to a depth of at least 3-inches. Mulch should be applied uniformly, and maintained at a rate of coverage that will allow no more than 10% of the surface to be exposed (2 ½ tons per acre minimum). In other words, 90% of the area shall be properly crimped with the mulch standing vertically. Mulch that is simply lying on the ground does not meet the City's requirements.
- Inspections should verify the integrity of the mulch application, installation and the need for re-application. For temporary stabilization and for applications to protect seed bed, mulch should be reapplied when coverage does not meet the installation criteria.
- Hydro mulching is not appropriate unless an irrigation system is operated to facilitate germination.

Steep slopes (such as the example below) and active drainage swales are not appropriate applications for mulching. Installations need to be evaluated for density and uniformity of cover, and proper anchoring. Areas with poor coverage and sparse vegetative cover need to be evaluated for re-application.

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AURORA WATER DEPARTMENT — DATE 9/1/10

CITY ENGINEER — DATE 9-2-10

SEEDING & MULCHING