

**APPENDIX B. SAGEBRUSH CONSTRUCTION/RECLAMATION UNIT**

**CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: SAGE  
KEYSTONE XL STEELE CITY**

<b>UNIT NAME:</b>	<b>SAGEBRUSH</b>	
<b>UNIT CODE:</b>	<b>SAGE</b>	
<b>UNIT DESCRIPTION:</b>	Sagebrush vegetation types on the Keystone XL Project are dominated by Wyoming big sagebrush ( <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ) and/or silver sagebrush ( <i>Artemisia cana</i> ). Big sagebrush and/or silver sagebrush communities provide habitat for greater sage grouse and several other important wildlife species.	
<b>UNIT LOCATION:</b>	Sagebrush occurs in limited areas north of the Missouri River and is scattered south of the Missouri River throughout Montana and northwest South Dakota to the Moreau River in Spreads 1 to 5.	
<b>UNIT GOALS:</b>	<ul style="list-style-type: none"> <li>• Re-establish vegetation with a substantial component of big or silver sagebrush, and native perennial grasses and forbs.</li> <li>• Maintain wildlife habitat, especially sage-grouse and livestock grazing production.</li> <li>• Complete all work to standards specified in the CMR Plan, contract documents and Details, applicable permits, easement descriptions, and Keystone’s satisfaction.</li> </ul>	
<b>SPECIAL CONSIDERATIONS:</b>	<ol style="list-style-type: none"> <li>1. Note that timing restrictions to avoid impacts to greater sage grouse occur throughout this Con/Rec Unit. See Alignment Sheets for timing restriction locations.</li> <li>2. Mow vegetation rather than grade the soil where sagebrush occurs as practicable. Maintaining sagebrush root structures promotes sagebrush reestablishment.</li> <li>3. Utilize trench and working side topsoil salvage to maintain sagebrush root structures on the spoil side where shown on Alignment Sheets or directed by Keystone.</li> <li>4. Apply seed mix in two applications. Drill seed perennial grasses where slopes allow. Broadcast seed sagebrush and forbs.</li> </ol>	

**CONSTRUCTION**

<b>ROW WIDTH:</b>	Typically 110 feet.
<b>CLEARING:</b>	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> <li>A. Mow or otherwise remove (e.g. hydroaxe) woody vegetation to ground level as directed by Keystone.</li> <li>B. Leave root crowns and root structures in place to the maximum extent practicable.</li> <li>C. Minimize clearing equipment on the ROW.</li> </ol>
<b>TOPSOIL SALVAGE:</b>	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> <li>A. Utilize trench and working salvage (Detail 54) on slopes less than 5% where shown on Alignment Sheets or as directed by Keystone.</li> <li>B. Where grading is necessary, salvage topsoil from entire area to be graded (Detail 53).</li> <li>C. Salvage topsoil horizon at depths as shown on Alignment Sheets or as directed by Keystone.</li> </ol>
<b>TRENCHING:</b>	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.
<b>BACKFILL, DECOMPACTION AND REGRADING:</b>	As specified in the CMR Plan to avoid slumping over the trench, relieve compaction, and match adjacent topography. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> <li>A. Do not decompact areas where topsoil was not salvaged and sagebrush root structures remain in place unless directed by Keystone.</li> <li>B. Avoid scalping more than one inch of undisturbed topsoil on the spoil side when backfilling spoil and redistributing stockpiled topsoil.</li> </ol>
<b>TEMPORARY EROSION CONTROL:</b>	As specified in the CMR Plan and authorized by Keystone to limit dust, prevent off-site sedimentation or erosion, and accelerated erosion on the ROW.

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**RECLAMATION**

**SEEDBED PREPARATION:**

As specified in the CMR Plan.

ADDITIONAL REQUIREMENTS:

- A. Dirt clods should typically be smaller than 4 inches diameter.
- B. Cultipack or roll ROW to firm topsoil prior to reseeding as authorized by Keystone.
- C. The seedbed should be firm enough so that the boot heel of an average adult penetrates the soil to a depth of approximately one-half inch.

**SEEDING METHOD, SEED MIX AND RATE:**

As specified in the CMR Plan. See Detail 70 for a description of seeding procedures and approved equipment.

ADDITIONAL REQUIREMENTS:

- A. Seed will be provided by Keystone and managed by the Contractor. The Contractor will store seed a dry, secure location.
- B. The Contractor will store any unused seed in a dry, secure location and notify Keystone as to the seed's disposition. Keystone may elect to change the storage location.
- C. The seed mix will be broadcast-seeded in one application. Seeded areas will be dragged with a chain to lightly cover seed.
- D. Cover crop: If permanent seeding is delayed to the following growing season, QuickGuard will be seeded at a rate of 80 pounds per acre per Keystone direction.

**Sagebrush-1 Seed Mixture SAGE-1  
(Spread 1)**

**BROADCAST SEEDING RATE<sup>1</sup>**

SCIENTIFIC NAME	COMMON NAME	VARIETY <sup>2</sup>	Pounds	
			PLS/ Acre	PLS/ sq.ft.
<b>GRASSES:</b>				
Agropyron smithii*	Western wheatgrass	Rosana	5.00	- 12
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.50	- 5
Koeleria cristata*	Prairie junegrass	VNS	0.10	- 5
Poa sandbergii*	Sandberg bluegrass	VNS, High Plains	0.40	- 8
Stipa comata	Needle-and-thread	VNS	2.50	- 6
<b>Subtotal</b>			<b>9.50</b>	<b>- 36</b>
<b>FORBS:</b>				
Achillea millefolium*	Yarrow	VNS, Great Northern	0.05	- 3
Dalea candida	White prairie clover	Antelope	0.25	- 2
Dalea purpurea	Purple prairie clover	Kaneb, Bismarck	0.25	- 1
<b>Subtotal</b>			<b>0.10</b>	<b>- 8</b>
<b>SHRUBS:</b>				
Artemisia cana*	Silver sagebrush	VNS	5.00	- 98
Ceratoides lanata*	Winterfat	Open Range	0.50	- 1
<b>Subtotal</b>			<b>5.00</b>	<b>- 98</b>
<b>TOTAL</b>			<b>15.55</b>	<b>- 141</b>

VNS: Variety not specified

<sup>1</sup>Based on a broadcast seeding rate of 150 Pure Live Seed (PLS) per square foot.

<sup>2</sup>This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.

NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

\*Identified as species associated with sage-grouse habitat in Bird and Schenk (2005).

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Sagebrush-2 Seed Mixture SAGE-2 (Spreads 2, 3)			BROADCAST SEEDING RATE <sup>1</sup>	
SCIENTIFIC NAME	COMMON NAME	VARIETY <sup>2</sup>	Pounds PLS/ Acre	PLS/ sq.ft.
<b>GRASSES:</b>				
Agropyron smithii*	Western wheatgrass	Rosana, Rodan	3.00	- 8
Agropyron spicatum	Bluebunch wheatgrass	Goldar	1.50	- 5
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	- 3
Calamovilfa longifolia	Prairie sandreed	Goshen, Bowman	0.75	- 5
Koeleria cristata*	Prairie junegrass	VNS	0.10	- 5
Poa sandbergii*	Sandberg bluegrass	VNS, High Plains	0.25	- 5
Schizachyrium scoparium	Little bluestem	Badlands, Itasca	0.50	- 3
Stipa comata	Needle-and-thread	VNS	2.00	- 5
	<b>Subtotal</b>		<b>9.40</b>	<b>- 39</b>
<b>FORBS:</b>				
Achillea millefolium*	Yarrow	VNS, Great Northern	0.05	- 3
Dalea candida	White prairie clover	Antelope	0.25	- 2
Dalea purpurea	Purple prairie clover	Kaneb, Bismarck	0.25	- 1
	<b>Subtotal</b>		<b>0.10</b>	<b>- 8</b>
<b>SHRUBS:</b>				
Artemisia cana*	Silver sagebrush	VNS	2.00	- 39
Artemisia tridentata var. wyomingensis *	Wyoming big sagebrush	VNS	1.00	- 57
Ceratoides lanata*	Winterfat	Open Range	0.50	- 1
	<b>Subtotal</b>		<b>3.00</b>	<b>- 96</b>
	<b>TOTAL</b>		<b>14.85</b>	<b>- 142</b>

VNS: Variety not specified

<sup>1</sup>Based on a broadcast seeding rate of 149 Pure Live Seed (PLS) per square foot.

<sup>2</sup>This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.

NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

\*Identified as species associated with sage-grouse habitat in Bird and Schenk (2005).

Sagebrush-3 Seed Mixture SAGE-3 (Spreads 4, 5)			BROADCAST SEEDING RATE <sup>1</sup>	
SCIENTIFIC NAME	COMMON NAME	VARIETY <sup>2</sup>	Pounds PLS/ Acre	PLS/ sq.ft.
<b>GRASSES:</b>				
Agropyron smithii*	Western wheatgrass	Rosana, Rodan, Walsh	2.50	- 6
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	- 3
Buchloe dactyloides*	Buffalograss	Tatanka, Bismarck	3.00	- 4
Calamovilfa longifolia	Prairie sandreed	Goshen, Pronghorn	0.50	- 3
Distichlis spicata	Inland saltgrass	VNS	0.25	- 3
Koeleria cristata*	Prairie junegrass	VNS	0.10	- 5
Poa sandbergii*	Sandberg bluegrass	VNS	0.20	- 4
Schizachyrium scoparium	Little bluestem	Badlands, Itasca	0.50	- 3
Stipa comata	Needle-and-thread	VNS	2.00	- 5
Stipa viridula	Green needlegrass	Lodorm, AC Mallard Escovar	0.75	- 3
	<b>Subtotal</b>		<b>10.90</b>	<b>- 39</b>
<b>FORBS:</b>				
	<b>Subtotal</b>		<b>0.10</b>	<b>- 8</b>
<b>SHRUBS:</b>				
Artemisia cana*	Silver sagebrush	VNS	2.00	- 39
Artemisia tridentata var. wyomingensis *	Wyoming big sagebrush	VNS	1.00	- 57
	<b>Subtotal</b>		<b>3.00</b>	<b>- 96</b>
	<b>TOTAL</b>		<b>15.00</b>	<b>- 147</b>

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	<p>VNS: Variety not specified  <sup>1</sup>Based on a broadcast seeding rate of 149 Pure Live Seed (PLS) per square foot.  <sup>2</sup>This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.          NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.          *Identified as species associated with Sage-grouse habitat in Bird and Schenk (2005).</p>
<b>SEEDING DATE:</b>	September 15 to May 15, depending on climatic conditions.
<b>MULCHING AND MATTING:</b>	All sagebrush will be mulched regardless of slope. Refer to Detail 52 for straw mulch. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.
<b>SLOPE AND TRENCH BREAKERS:</b>	As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 3 for slope breakers and Detail 7 for trench breakers. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.
<b>MANAGEMENT PRACTICES</b>	
<ol style="list-style-type: none"> <li>1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan.</li> <li>2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with KXL approval.</li> <li>3. Monitor revegetation and soil stability post construction. Areas of failed reclamation will be repaired. Sagebrush establishment in this Con/Rec Unit will be monitored on lands administered by the Bureau of Land Management (BLM).</li> <li>4. Monitor and control noxious weeds as specified in the Montana and South Dakota Noxious Weed Management Plans.</li> </ol>	