

TransCanada–Keystone XL Steele City

Contact Record

Date/Time: 06.07.2010	Meeting	Phone Conversation	E-Mail (attach)	<i>(highlight)</i>
Agency/Organization(s):	Natural Resources Conservation Service (NRCS), South Dakota State Office			
Person(s) Involved:	NRCS: Kent Cooley (Soil scientist), Stan Boltz (State Range Scientist) WESTECH: Lisa Larsen, Corey Baker			

Notes: WESTECH requested a meeting with the SD NRCS State Office to solicit comments on the Keystone XL CON/REC Units and revegetation mixes. The meeting was held in Rapid City, SD at the NRCS Office. CON/REC Units were previously sent to SB and KC electronically for their review. LL and CB described the project, explained how CON/REC Units were created and provided background on formulation of seed mixes. SB and KC repeatedly expressed surprise over the level of thoroughness and scope of reclamation planning.

Both SB and KC agreed that forbs are not needed in the mixes based on the fact that they tend to reestablish well on their own. Seed rates were satisfactory for a Critical Area planting. SB suggested a few changes to species composition and varieties (see attached CON/REC Units with track changes).

CB and LL questioned SB and KC about landowner communications, regarding reclamation issues per the SD PUC conditions. They recommended the following ideas to disseminate information to landowners:

- County Conservation Districts (meetings, printed materials)
- FSA Newsletter
- Town meetings
- Internet
- TransCanada letter/Land Agents


KC wondered if it would be possible to utilize the pipeline trench to characterize soils for NRCS soils surveys.

Is follow up required?	Yes - send revisions using track changes (attached). Clarify if trench can be utilized to characterize soils. Contact during reclamation to be on-site to observe.
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Commitments made:	See attached CON/REC Units changes
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Recorded by:	Lisa Larsen and Corey Baker, WESTECH
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**CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: MG
KEYSTONE XL STEELE CITY**

UNIT NAME:	MIXED GRASSLANDS	
UNIT CODE:	MG	
UNIT DESCRIPTION:	Mixed grasslands are dominated by native perennial grasses such as western wheatgrass, needle-and-thread, blue grama, Sandberg bluegrass, prairie junegrass, little bluestem, prairie sandreed, green needlegrass and bluebunch wheatgrass.	
UNIT LOCATION:	Mixed grasslands are the most extensive native vegetation type on the Keystone XL Project and occur primarily south of the Missouri River in Montana and throughout South Dakota on Spreads 2 through 8.	
UNIT GOALS:	<ul style="list-style-type: none"> • Re-establish native vegetation and prevent accelerated erosion. • Maintain wildlife habitat and livestock grazing production. • Complete all work to standards specified in the CMR Plan, contract documents and Details, applicable permits, easement descriptions, and Keystone’s satisfaction. 	
SPECIAL CONSIDERATIONS:	None unless otherwise directed by Keystone.	
CONSTRUCTION		
ROW WIDTH:	Typically 110 feet.	
CLEARING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.	
TOPSOIL SALVAGE:	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. ADDITIONAL REQUIREMENTS: A. Salvage topsoil horizon at depths shown on Alignment Sheets or as directed by Keystone.	
TRENCHING:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.	
BACKFILL, DECOMPACTION AND REGRADING:	As specified in the CMR Plan to avoid slumping over the trench, relieve compaction, and match adjacent topography. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.	
TEMPORARY EROSION CONTROL:	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.	
RECLAMATION		
SEEDBED PREPARATION:	As specified in the CMR Plan. ADDITIONAL REQUIREMENTS: A. Dirt clods should typically be smaller than 4 inches diameter. B. Topsoil should be as firm as practicable prior to seeding. 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.	

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

**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 MG seed mix will be applied at locations shown on the Alignment Sheets or as directed by Keystone. The MG seed mix will be drill seeded unless slopes are too steep or soils are too rocky to safely operate seeding equipment, in which case, broadcast seeding will be conducted.
- 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.

**Mixed Grassland Seed Mixture MG-1
(Spreads 2, 3)**

SCIENTIFIC NAME	COMMON NAME	VARIETY ²	DRILL SEEDING RATE ¹	
			Pounds PLS/Acre	PLS/sq.ft.
GRASSES:				
<i>Agropyron smithii</i>	Western wheatgrass	Rosana, Rodan	3.00	- 8
<i>Agropyron spicatum</i>	Bluebunch wheatgrass	Goldar	1.50	- 5
<i>Agropyron trachycaulum</i>	Slender wheatgrass	Pryor	1.00	- 3
<i>Bouteloua gracilis</i>	Blue grama	Bad River	0.30	- 6
<i>Calamovilfa longifolia</i>	Prairie sandreed	Goshen, Bowman	0.75	- 5
<i>Koeleria cristata</i>	Prairie junegrass	VNS	0.10	- 5
<i>Poa sandbergii</i>	Sandberg bluegrass	VNS, High Plains	0.25	- 5
<i>Schizachyrium scoparium</i>	Little bluestem	Badlands, Itasca	0.50	- 3
<i>Stipa comata</i>	Needle-and-thread	VNS	2.00	- 5
<i>Triticum aestivum x Secale cereale</i>	QuickGuard Sterile Triticale	-	20.00	- 5
TOTAL			29.40	- 50

VNS: Variety not specified

¹Based on a drill seeding rate of 50 Pure Live Seed (PLS) per square foot. Where broadcast seeding is used, the rate will be doubled.

²This may not be a complete list; other named varieties listed by USDA-NRCS in Montana are acceptable.

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

**Mixed Grassland Seed Mixture MG-2
(Spreads 4, 5)**

SCIENTIFIC NAME	COMMON NAME	VARIETY ²	DRILL SEEDING RATE ¹	
			Pounds PLS/Acre	PLS/sq.ft.
GRASSES:				
<i>Agropyron smithii</i> ³	Western wheatgrass	Rosana, Rodan, Walsh	2.50	- 6
<i>Agropyron trachycaulum</i>	Slender wheatgrass	Pryor	1.00	- 3
<i>Bouteloua gracilis</i>	Blue grama	Bad River	0.30	- 6
<i>Buchloe dactyloides</i>	Buffalograss	Texoka, Plains Tatanka, Bismarck ecotype	3.00	- 4
<i>Calamovilfa longifolia</i>	Prairie sandreed	Goshen, Pronghorn	0.50	- 3
<i>Distichlis spicata</i>	Inland saltgrass	VNS	0.25	- 3
<i>Koeleria cristata</i>	Prairie junegrass	VNS	0.10	- 5
<i>Poa sandbergii</i>	Sandberg bluegrass	VNS, High Plains	0.20	- 4
<i>Schizachyrium scoparium</i>	Little bluestem	Badlands, Itasca	0.50	- 3
<i>Stipa comata</i>	Needle-and-thread	VNS	2.00	- 5
<i>Stipa viridula</i>	Green needlegrass	Lodorm, AC Mallard Ecovar	0.75	- 3
<i>Triticum aestivum x Secale cereale</i>	QuickGuard Sterile Triticale	-	20.00	- 5
TOTAL			31.10	- 50

VNS: Variety not specified

¹Based on a drill seeding rate of 50 Pure Live Seed (PLS) per square foot. Where broadcast seeding is used, the rate will be doubled.

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


³If western wheatgrass is unavailable, thickspike wheatgrass (*Agropyron dasystachyum* var. Critana, Bannock, or Elbee) may be substituted at a rate of 2.0 PLS pounds per acre.

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

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

	Mixed Grassland Seed Mixture MG-3 (Spreads 6,7, 8)			DRILL SEEDING RATE ¹	
	SCIENTIFIC NAME	COMMON NAME	VARIETY ²	Pounds	
				PLS/ Acre	PLS/ sq.ft.
GRASSES:					
	<i>Agropyron smithii</i> ³	Western wheatgrass	Rosana, Rodan, Walsh	3.00	- 6
	<i>Agropyron trachycaulum</i>	Slender wheatgrass	Pryor	1.00	- 3
	<i>Bouteloua curtipendula</i>	Sideoats grama	Butte, Pierre, Trailway	1.25	- 6
	<i>Bouteloua gracilis</i>	Blue grama	Bad River	0.20	- 4
	<i>Calamovilfa longifolia</i>	Prairie sandreed	Goshen, Bowman Pronghorn	1.00	- 6
	<i>Koeleria cristata</i>	Prairie junegrass	VNS	0.10	- 5
	<i>Poa sandbergii</i>	Sandberg bluegrass	VNS, High Plains	0.25	- 5
	<i>Schizachyrium scoparium</i>	Little bluestem	Blaze, Camper, Cimmaron Badlands, Itasca	1.00	- 6
	<i>Stipa viridula</i>	Green needlegrass	Lodorm, AC Malard Ecovar	1.00	- 4
	<i>Triticum aestivum x Secale cereale</i>	QuickGuard Sterile Triticale	-	20.00	- 5
		TOTAL		28.80	- 50
	VNS: Variety not specified				
	¹ Based on a drill seeding rate of 50 Pure Live Seed (PLS) per square foot. Where broadcast seeding is used, the rate will be doubled.				
	² This may not be a complete list; other named varieties listed by USDA-NRCS in South Dakota and Nebraska are acceptable.				
	³ If western wheatgrass is unavailable, thickspike wheatgrass (<i>Agropyron dasystachyum</i> var. Critana, Bannock, or Elbee) may be substituted at a rate of 2.0 PLS pounds per acre				
	NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.				
SEEDING DATE:	August 1 to May 15, depending on climatic conditions.				
MULCHING AND MATTING:	As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 4 for erosion control matting, Detail 52 for straw mulch, and Detail 64 for wood mulch. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.				
SLOPE AND TRENCH BREAKERS:	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. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.				
MANAGEMENT PRACTICES					
<ol style="list-style-type: none"> 1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan. 2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with Keystone approval. 3. Monitor revegetation and soil stability post construction. 4. Monitor and control noxious weeds as specified in the Montana and South Dakota Noxious Weed Management Plans. 					

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

UNIT NAME:	RIPARIAN	
UNIT CODE:	RIP	
UNIT DESCRIPTION:	Riparian woodlands include forested and shrub dominated areas around streams and rivers. Common trees and shrubs include plains cottonwood, green ash, box elder, Russian olive, sandbar willow, Wood's rose, snowberry, and silver sagebrush. Herbaceous understories are often dominated by Kentucky bluegrass, western wheatgrass, and redtop.	
UNIT LOCATION:	Primarily located on floodplains and terraces along streams and rivers in Spreads 1 to 6. This Con/Rec Unit is relatively limited on the Keystone XL Steele City Project.	
UNIT GOALS:	<ul style="list-style-type: none"> • Prevent damage to vegetation adjacent to the ROW when removing trees. • Restore native grass understory. • Stabilize slopes to prevent erosion. • Adequately decompact soil. • Complete all work to standards specified in the CMR Plan, contract documents and details, applicable permits, and Keystone's satisfaction. 	
SPECIAL CONSIDERATIONS:	<ol style="list-style-type: none"> 1. Note that this type may be adjacent to or associated with wetlands and stream crossings. 2. Implement wetland and stream crossing procedures as shown on Alignment Sheets or directed by Keystone. 3. Wetland or stream crossing procedures will take precedent over this Con/Rec Unit should discrepancies occur. 	

CONSTRUCTION

ROW WIDTH:	Typically 110 feet.
CLEARING:	<p>As specified in the CMR Plan.</p> <p><u>ADDITIONAL REQUIREMENTS:</u></p> <ol style="list-style-type: none"> A. Salvage timber if directed by landowner. B. Fell and clear trees to avoid injuring adjacent trees. C. Tree stumps shall be removed for 5 feet either side of the trench line and where necessary for safe and level construction. D. Where necessary on living trees with overhanging branches, cut broken branches at the fork; preserve the branch collar on the standing tree. E. Dispose of woody debris according to landowner direction as approved by Keystone; otherwise chip and incorporate with subsoil (amount not to inhibit revegetation) or remove to designated site approved by Keystone. F. Mow shrubby vegetation to ground level and leave rootstock intact unless grading is necessary.
TOPSOIL SALVAGE:	<p>As specified in the CMR Plan to maintain the topsoil resource and reclamation potential.</p> <p><u>ADDITIONAL REQUIREMENTS:</u></p> <ol style="list-style-type: none"> A. Salvage topsoil horizon at depths shown on Alignment Sheets or as directed by Keystone.
TRENCHING:	<p>As specified in the CMR Plan.</p> <p><u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.</p>
BACKFILL, DECOMPACTION AND REGRADING:	<p>As specified in the CMR Plan to avoid slumping over the trench, relieve compaction, and match adjacent topography.</p> <p><u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.</p>
TEMPORARY EROSION CONTROL:	<p>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.</p> <p><u>ADDITIONAL REQUIREMENTS:</u></p> <ol style="list-style-type: none"> A. Insure adequate erosion control is in place during construction to prevent sediment from reaching any associated streams or rivers.

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

RECLAMATION

SEEDBED PREPARATION: As specified in the CMR Plan.
ADDITIONAL REQUIREMENTS:
A. Dirt clods should typically be smaller than 4 inches diameter.
B. Topsoil should be as firm as practicable prior to seeding.

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 RIP seed mix will be applied at locations shown on the Alignment Sheets or as directed by Keystone. The RIP seed mix will be drill seeded unless slopes are too steep or soils are too rocky to safely operate seeding equipment, in which case, broadcast seeding will be conducted.

			DRILL SEEDING RATE ¹	
			Pounds	
			PLS/	PLS/
			Acre	sq.ft.
SCIENTIFIC NAME	COMMON NAME	VARIETY ²		
GRASSES:				
<i>Agropyron smithii</i>	Western wheatgrass	Rosanna, Rodan, Walsh	4.00 5.00	- 10 13
<i>Agropyron trachycaulum</i>	Slender wheatgrass	Pryor	1.00	- 3
<i>Bouteloua gracilis</i>	Blue grama	Bad River	0.40 0.20	8 4
<i>Elymus canadensis</i>	Canada wildrye	VNS	2.00 3.00	- 5 8
<i>Poa sandbergii</i>	Sandberg bluegrass	VNS, High Plains	0.40	- 8
<i>Stipa viridula</i>	Green needlegrass	Lodorm	2.50	- 10
<i>Triticum aestivum x secale cereal</i>	QuickGuard Sterile Triticale	-	20.00	- 5
TOTAL			10.30 31.30	- 44 35

VNS: Variety not specified
¹Based on a drill seeding rate of 44 Pure Live Seed (PLS) per square foot. Where broadcast seeding is used, the rate will be doubled.
²This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.
³In Spreads 4-6, big bluestem and switchgrass will be added to the mix at the rates shown below:
 Panicum virgatum, Switchgrass, (Varieties Forestburg, Nebraksa 28, Pathfinder, Summer, Trailblazer), at 2.00 pounds PLS/acre
 Andropogon gerardii, Big bluestem, (Varieties Sunnyview, Bison, Bonilla, Champ, Rountree, Bonanza), 15 3.00 pounds PLS/acre
 NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

SEEDING DATE: As appropriate for the specified seed mix.


MULCHING AND MATTING: As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 4 for erosion control matting, Detail 52 for straw mulch, and Detail 64 for wood mulch.
ADDITIONAL REQUIREMENTS:
A. Respread wood debris may negate the need for straw mulch per Keystone direction.

SLOPE AND TRENCH BREAKERS: 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.
ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

MANAGEMENT PRACTICES

1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan.
2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with Keystone approval.
3. Monitor revegetation and soil stability post construction.
4. Monitor and control noxious weeds as specified in state Noxious Weed Management Plans.

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

UNIT NAME:	SAGEBRUSH	
UNIT CODE:	SAGE	
UNIT DESCRIPTION:	Sagebrush vegetation types on the Keystone XL Project are dominated by Wyoming big sagebrush (<i>Artemisia tridentata ssp. 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.	
UNIT LOCATION:	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.	
UNIT GOALS:	<ul style="list-style-type: none"> • Re-establish vegetation with a substantial component of big or silver sagebrush, and native perennial grasses and forbs. • Maintain wildlife habitat, especially sage-grouse and livestock grazing production. • Complete all work to standards specified in the CMR Plan, contract documents and Details, applicable permits, easement descriptions, and Keystone’s satisfaction. 	
SPECIAL CONSIDERATIONS:	<ol style="list-style-type: none"> 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. 2. Mow vegetation rather than grade the soil where sagebrush occurs as practicable. Maintaining sagebrush root structures promotes sagebrush reestablishment. 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. 4. Apply seed mix in two applications. Drill seed perennial grasses where slopes allow. Broadcast seed sagebrush and forbs. 	
CONSTRUCTION		
ROW WIDTH:	Typically 110 feet.	
CLEARING:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> A. Mow or otherwise remove (e.g. hydroaxe) woody vegetation to ground level as directed by Keystone. B. Leave root crowns and root structures in place to the maximum extent practicable. C. Minimize clearing equipment on the ROW. 	
TOPSOIL SALVAGE:	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> A. Utilize trench and working salvage (Detail 54) on slopes less than 5% where shown on Alignment Sheets or as directed by Keystone. B. Where grading is necessary, salvage topsoil from entire area to be graded (Detail 53). C. Salvage topsoil horizon at depths as shown on Alignment Sheets or as directed by Keystone. 	
TRENCHING:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.	
BACKFILL, DECOMPACTION AND REGRADING:	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"> A. Do not decompact areas where topsoil was not salvaged and sagebrush root structures remain in place unless directed by Keystone. B. Avoid scalping more than one inch of undisturbed topsoil on the spoil side when backfilling spoil and redistributing stockpiled topsoil. 	
TEMPORARY EROSION CONTROL:	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.	

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

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 RATE¹

SCIENTIFIC NAME	COMMON NAME	VARIETY ²	Pounds	
			PLS/ Acre	PLS/ sq.ft.
GRASSES:				
<i>Agropyron smithii*</i>	Western wheatgrass	Rosana	5.00	- 12
<i>Agropyron trachycaulum</i>	Slender wheatgrass	Pryor	1.50	- 5
<i>Koeleria cristata*</i>	Prairie junegrass	VNS	0.10	- 5
<i>Poa sandbergii*</i>	Sandberg bluegrass	VNS, High Plains	0.40	- 8
<i>Stipa comata</i>	Needle-and-thread	VNS	2.50	- 6
	Subtotal		9.50	- 36
FORBS:				
<i>Achillea millefolium*</i>	Yarrow	VNS, Great Northern	0.05	- 3
<i>Artemisia frigida*</i>	Fringed sagewort	VNS	0.05	- 5
<i>Dalea candida</i>	White prairie clover	Antelope	0.25	- 2
<i>Dalea purpurea</i>	Purple prairie clover	Kaneb, Bismark/Bismarck	0.25	- 1
	Subtotal		0.10	- 8
SHRUBS:				
<i>Artemisia cana*</i>	Silver sagebrush	VNS	5.00	- 98
<i>Ceratoides lanata*</i>	Winterfat	Open Range	0.50	- 1
	Subtotal		5.00	- 98
	TOTAL		15.60	- 146

VNS: Variety not specified

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

²This 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).

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

Sagebrush-2 Seed Mixture SAGE-2 (Spreads 2, 3)			BROADCAST SEEDING RATE ¹	
			Pounds PLS/ Acre	PLS/ sq.ft.
SCIENTIFIC NAME	COMMON NAME	VARIETY ²		
GRASSES:				
<i>Agropyron smithii</i> *	Western wheatgrass	Rosana, Rodan	3.00	- 8
<i>Agropyron spicatum</i>	Bluebunch wheatgrass	Goldar	1.50	- 5
<i>Agropyron trachycaulum</i>	Slender wheatgrass	Pryor	1.00	- 3
<i>Calamovilfa longifolia</i>	Prairie sandreed	Goshen, Bowman	0.75	- 5
<i>Koeleria cristata</i> *	Prairie junegrass	VNS	0.10	- 5
<i>Poa sandbergii</i> *	Sandberg bluegrass	VNS, High Plains	0.25	- 5
<i>Schizachyrium scoparium</i>	Little bluestem	Badlands, Itasca	0.50	- 3
<i>Stipa comata</i>	Needle-and-thread	VNS	2.00	- 5
	Subtotal		9.40	- 39
FORBS:				
<i>Achillea millefolium</i> *	Yarrow	VNS, Great Northern	0.05	- 3
<i>Artemisia frigida</i> *	Fringed sagewort	VNS	0.05	- 5
<i>Dalea candida</i>	White prairie clover	Antelope	0.25	- 2
<i>Dalea purpurea</i>	Purple prairie clover	Kaneb, Bismarck	0.25	- 1
	Subtotal		0.10	- 8
SHRUBS:				
<i>Artemisia cana</i> *	Silver sagebrush	VNS	2.00	- 39
<i>Artemisia tridentata</i> var. <i>wyomingensis</i> *	Wyoming big sagebrush	VNS	1.00	- 57
<i>Ceratoides lanata</i> *	Winterfat	Open Range	0.50	- 1
	Subtotal		3.00	- 96
	TOTAL		14.90	- 147

VNS: Variety not specified

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

²This 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).

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

	Sagebrush-3 Seed Mixture SAGE-3 (Spreads 4, 5)			BROADCAST SEEDING RATE ¹	
	SCIENTIFIC NAME	COMMON NAME	VARIETY ²	Pounds PLS/Acre	PLS/sq.ft.
GRASSES:					
	<i>Agropyron smithii</i> *	Western wheatgrass	Rosana, Rodan, Walsh	2.50	- 6
	<i>Agropyron trachycaulum</i>	Slender wheatgrass	Pryor	1.00	- 3
	<i>Buchloe dactyloides</i> *	Buffalograss	Texoka, Plains Tatanka, Bismarck ecotype	3.00	- 4
	<i>Calamovilfa longifolia</i>	Prairie sandreed	Goshen, Pronghorn	0.50	- 3
	<i>Distichlis spicata</i>	Inland saltgrass	VNS	0.25	- 3
	<i>Koeleria cristata</i> *	Prairie junegrass	VNS	0.10	- 5
	<i>Poa sandbergii</i> *	Sandberg bluegrass	VNS, High Plains	0.20	- 4
	<i>Schizachyrium scoparium</i>	Little bluestem	Badlands, Itasca	0.50	- 3
	<i>Stipa comata</i>	Needle-and-thread	VNS	2.00	- 5
	<i>Stipa viridula</i>	Green needlegrass	Lodorm, AC Mallard Eseovar Ecovar	0.75	- 3
	Subtotal			10.80	- 39
FORBS:					
	<i>Achillea millefolium</i> [±]	Yarrow	VNS, Great Northern	0.05	- 3
	<i>Artemisia frigida</i> [±]	Fringed-sagewort	VNS	0.05	- 5
	<i>Dalea candida</i>	White prairie-clover	Antelope	0.25	- 2
	<i>Dalea purpurea</i>	Purple prairie-clover	Kaneb, Bismark	0.25	- 1
	Subtotal			0.10	- 8
SHRUBS:					
	<i>Artemisia cana</i> *	Silver sagebrush	VNS	2.00	- 39
	<i>Artemisia tridentata</i> var. <i>vaseyana</i>	Mountain big sagebrush	VNS, Hobble Creek	0.50	- 29
	<i>Artemisia tridentata</i> var. <i>wyomingensis</i> *	Wyoming Big-big sagebrush	VNS, Gordon Creek	1.00	- 57
	<i>Ceratoides lanata</i> [±]	Winterfat	Open Range	0.50	- 1
	Subtotal			3.00	- 96
	TOTAL			15.00	- 147
				13.80	- 166
VNS: Variety not specified ¹ Based on a broadcast seeding rate of 149 Pure Live Seed (PLS) per square foot. ² 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).					
SEEDING DATE:	September 15 to May 15, depending on climatic conditions.				
MULCHING AND MATTING:	As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 4 for erosion control matting, Detail 52 for straw mulch, and Detail 64 for wood mulch. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.				
SLOPE AND TRENCH BREAKERS:	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. ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.				
MANAGEMENT PRACTICES					
<ol style="list-style-type: none"> 1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan. 2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with KXL approval. 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). 4. Monitor and control noxious weeds as specified in the Montana and South Dakota Noxious Weed Management Plans. 					

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

UNIT NAME:	SALT PANS	
UNIT CODE:	PAN	
UNIT DESCRIPTION:	Salt pans are relatively flat, isolated features with highly saline, sodic, or alkaline soils. Topsoil is very thin or non-existent. Surface rock or salt crusts may be present in some areas. Vegetation is usually sparse, although inland saltgrass may form relatively dense stands in some areas. Other common species include thickspike wheatgrass, blue grama, foxtail barley, and Sandberg bluegrass. Big sagebrush is frequently present.	
UNIT LOCATION:	Salt pans occur in relatively limited areas on the Keystone XL Steele City Project in Spreads 1 to 5. A few small, isolated areas occur in northern Montana, with more extensive areas in northwestern South Dakota north of the Cheyenne River.	
UNIT GOALS:	<ul style="list-style-type: none"> • Re-establish native vegetation. • Maintain wildlife habitat and livestock grazing production. • Complete all work to standards specified in the CMR Plan, contract documents and Details, applicable permits, easement descriptions, and Keystone's satisfaction. 	
SPECIAL CONSIDERATIONS:	<ol style="list-style-type: none"> 1. Topsoil is typically very thin within Salt Pans. It is often necessary to salvage portions of the B soil horizon to have sufficient material to respread a suitable growth medium across the ROW. 2. Trench-only topsoil salvage is specified in some areas of flat topography. 3. Triple-lift soil handling procedures may be necessary in some areas to avoid mixing inert subsoils with the limited amounts of topsoil. 4. Salt Pans may be impassable when wet. 5. Excess rock may be brought to the surface during construction. 	

CONSTRUCTION

ROW WIDTH:	Typically 110 feet.
CLEARING:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.
TOPSOIL SALVAGE:	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> A. Salvage topsoil horizon at depths shown on Alignment Sheets or as directed by Keystone. B. Salvage depths are typically 4-6 inches. A minimum of 4 inches will be salvaged to insure that sufficient material is salvaged to respread a suitable growth medium across the ROW. C. Trench-only topsoil salvage (Detail 56) is specified in some areas of flat topography to limit grading and maintain intact root structures to the extent practicable. Trench-only topsoil salvage will be completed at locations shown on the Alignment Sheets or where directed by Keystone. D. Note that triple-lift soil handling procedures may be required in portions of this type to avoid mixing inert subsoils with the limited amounts of topsoil. Triple-lift soil handling will be completed where directed by Keystone.
TRENCHING:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.
BACKFILL, DECOMPACTION AND REGRADING:	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"> A. Subsoil and topsoil decompaction will be completed as directed by Keystone to avoid exposing excessive amounts of rock or mixing inert subsoils with more productive soil horizons.
TEMPORARY EROSION CONTROL:	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. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.

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

RECLAMATION

SEEDBED PREPARATION: As specified in the CMR Plan.
ADDITIONAL REQUIREMENTS:
A. Dirt clods should typically be smaller than 4 inches diameter.
B. Shallow (i.e. less than 6 inches) harrowing or discing will be completed in areas where topsoil was not salvaged to loosen the upper soil horizons as directed 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 in a dry, secure location during construction.
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 PAN seed mix will be broadcast-seeded at locations shown on the Alignment Sheets or as directed by Keystone. 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.

Salt Pans Seed Mixture (PAN)

SCIENTIFIC NAME	COMMON NAME	VARIETY ²	BROADCAST SEEDING RATE ¹	
			Pounds PLS/Acre	PLS/sq.ft.
GRASSES:				
<i>Agropyron dasystachyum</i>	Thickspike wheatgrass	Bannock, Critana	9.00	- 31
<i>Bouteloua gracilis</i>	Blue grama	Bad River	0.80 0.40	- 16 8
<i>Buchloe dactyloides</i>	Buffalograss	Tatanka, Bismarck ecotype	3.00	- 4
<i>Distichlis spicata</i>	Inland saltgrass	VNS	2.00	- 24
<i>Poa sandbergii</i>	Sandberg bluegrass	VNS	0.80	- 16
<i>Triticum aestivum x Secale cereale</i>	QuickGuard Sterile Triticale	-	20.00	- 5
SHRUB:				
<i>Artemisia tridentata</i> var. <i>wyomingensis</i>	Big sagebrush	-	1.00	- 57
<i>Atriplex canescens</i>	Four-wing saltbush	-	1.00	- 1
TOTAL			33.60	- 149
			37.20	- 146

VNS: Variety not specified

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

²This 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.

SEEDING DATE: August 1 to May 15, depending on climatic conditions.

MULCHING AND MATTING: As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 4 for erosion control matting, Detail 52 for straw mulch, and Detail 64 for wood mulch.
ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

SLOPE AND TRENCH BREAKERS: 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.
ADDITIONAL REQUIREMENTS: None unless otherwise directed by Keystone.

MANAGEMENT PRACTICES

1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan.
2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with Keystone approval.
3. Monitor revegetation and soil stability post construction. Note that revegetation is anticipated to be very sparse due to native soil productivity.
4. Monitor and control noxious weeds as specified in the Montana and South Dakota Noxious Weed Management Plans.