

Appendix D

Construction Techniques in the Sand Hills Region

United States Department of State 4.3.1

Reference: Keystone XL Project Environmental Report
Soils

Request:

Can you confirm if experts from the University of Nebraska were consulted relative to the approach to construction in the Sand Hills area? Does the approach to construction in the Sand Hills area accommodate any changes to local climate? Are the proposed construction and restoration methods within the Sand Hills terrain still appropriate if during the life of the pipeline system, average rainfall in the Sand Hills area substantially increases or substantially decreases in response to climate change? Will grasslands in the Sand Hills be restored with native grasses?

Response:

Yes, experts at the University of Nebraska were consulted in July 2008 with regard to construction and reclamation in the Sandhills (see attached spreadsheet). University scientists who were consulted for the project included Dr. Jerry Volesky, Dr. Dave Wedin, and Dr. David Loope. Scientists at South Dakota State University were also contacted and included Dr. Alexander Smart and Dr. Eric Mousel. Mr. Gabe Robertson of the Nebraska Department of Roads was contacted on July 17, 2008, and again on April 28, 2009 regarding reclamation procedures the highway department uses in the Sandhills. Suggestions from university scientists and the Nebraska Department of Roads were incorporated into the draft Sandhills Construction/Reclamation Unit, a site specific-reclamation plan that itemizes construction, erosion control, and revegetation procedures in the Sandhills (see attached writeup).

Following consultation with university scientists and the Nebraska Department of Roads, a meeting was held with Michael Kucera, the State Resource Conservationist with the NRCS, in Lincoln, Nebraska, on November 17, 2008. Mr. Kucera was provided with the draft Sandhills Construction/Reclamation Unit for review and discussion. Minor revisions were made to the draft Sandhills Construction/Reclamation Unit to incorporate Mr. Kucera's input. A follow-up meeting with Mr. Kucera was held in June 2010, following release of the DEIS, for additional discussions regarding reclamation in the Sandhills and other parts of Nebraska.

Native perennial grass species will be used to revegetate the Sandhills and other native vegetation types that will be crossed by the project. Native grass species that will be used in the seed mix include those that were recorded during pedestrian surveys of the project, and that have been recommended by the NRCS, university scientists, and the Nebraska Department of Roads. These species have evolved in the central Great Plains and are adapted to the climate extremes that have occurred in the past and may occur again in the future. Should long-term precipitation

patterns in the Sandhills continue to change and vary, vegetation on the project would adapt similarly to vegetation in areas adjacent to the project.

Name	Title/Position	Association	Phone	Relative Experience with Sand Hills	Correspondence
Dr. Jerry Volesky	Associate Professor - Range and Forage Specialist	University of Nebraska Cooperative Extension	308-696-6710	Grazing management and systems research at the Gudmundsen Sandhills Laboratory	left mesg 7/14, he left mesg w me 7/15, spoke over phone on 7/15 12:30pm
Dr. Dave Wedin	Grasslands Ecologist	University of Nebraska - School of Natural Resources	402-472-9608 (o) 402-730-8543 (c)	Principal investigator on the Sand Hills Biocomplexity project	left mesg 7/14, spoke over phone on 7/17 2:30pm
Dr. Geoffrey M. Henebry	Senior Scientist, Professor	South Dakota State University	605-688-5351	Co-investigator on the Sand Hills Biocomplexity project	left mesg 7/15 - spoke over phone on 7/21
Dr. David Loope	Geosciences Professor	University of Nebraska	402-472-2647	Co-investigator on the Sand Hills Biocomplexity project	left mesg 7/15, spoke over phone on 7/17
Dr. Alexander "Sandy" Smart	Assistant Professor, Range Scientist	South Dakota State University	605-688-4017		spoke over phone on 7/15 3pm
Dr. Eric Mousel	Assistant Professor, Range Livestock Production Specialist	South Dakota State University	605-688-5455	Use to work at University of NE, has family that live in the Sand Hills	spoke over the phone on 7/18 2:30pm
Bob Atkenson	Area Engineer	NRCS - Holt County, Nebraska	402-336-3796	Has worked on sand blowout repair	left mesg 7/17 with receptionist, spoke over phone 7/17 at 3pm
Gabe Robertson	Highway Environmental Programs Specialist (Roadside Stabilization)	Nebraska Department of Roads	402-479-4685		spoke over phone on 7/17 10am – asked that I send an email, sent email on 7/17 10am, sent info. over email on 7/18 2pm

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

UNIT NAME:	SANDHILLS	
UNIT CODE:	SH	
UNIT DESCRIPTION:	Native prairie on sandy soils dominated primarily by warm- season grasses such as little bluestem, big bluestem, sand bluestem, prairie sandreed, and sideoats grama. Steep slopes are common. Soils are very fine and extremely prone to wind erosion.	
UNIT LOCATION:	The Sandhills occupy approximately 23,000 square miles primarily central Nebraska and limited areas of southern South Dakota. Spreads 7 through 9 of the Keystone XL project cross the northeastern corner of the Sandhills primarily in Rock, Holt, Garfield, and Wheeler counties, Nebraska.	
UNIT GOALS:	<ul style="list-style-type: none"> • Maintain soil structure and stability to the greatest extent practicable. • Stabilize slopes to prevent erosion. • Restore native grass species. • Maintain wildlife habitat and livestock grazing production. <ul style="list-style-type: none"> • 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. The ROW has been sited to avoid ridgetops and blowouts to the extent practicable. 2. Utilize tracked equipment or low-ground-pressure equipment to the maximum extent practicable on steep slopes or in areas with minimal vegetation cover. 3. Minimize grading and side-slope cuts to the maximum extent practicable. 4. Stabilize topsoil salvage piles with bio-degradable tackifier. 5. Apply straw or native hay mulch for erosion control after regrading as directed by Keystone. 6. Install erosion control matting after regrading as specified by Keystone. In some areas, tackifier may be used in place of matting if approved by Keystone 7. Permanent slope breakers and trench breakers are not required unless specifically directed by Keystone. 8. Do not decompact the ROW unless specifically directed by Keystone. 9. Seed mix will be applied in two passes using a rangeland drill and broadcast seeder at the specified rates. 10. Final cleanup, erosion control, and revegetation must be within 10 miles of pipe lowering in within this Con/Rec Unit. 11. The ROW will not be utilized for access or project traffic following final cleanup within the Con/Rec Unit. 12. Fence revegetated ROW from livestock where necessary as directed by Keystone. 	
CONSTRUCTION		
ROW WIDTH:	Typically 110 feet. Note that 200 feet of ROW has been identified in many areas within this type to allow for spoil storage in hilly terrain. Do not utilize the additional workspace unless necessary and directed by Keystone.	
CLEARING:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> 1. Do not clear more than 110 feet of ROW unless directed by Keystone. 2. Leave root crowns and root structures in place to the maximum extent practicable. 3. 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. D. Stabilize topsoil salvage piles with bio-degradable tackifier as directed by Keystone. 	

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TRENCHING:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> A. Anticipate substantial trench caving and a wide trench. B. Insure that topsoil (salvaged or unsalvaged) is not lost to trench caving.
BACKFILL, DECOMPACTION AND REGRADING:	As specified in the CMR Plan to avoid slumping over the trench and match adjacent topography. <u>ADDITIONAL REQUIREMENTS:</u> A. Do not decompact the ROW (subsoil or topsoil) unless specifically directed by Keystone. B. Avoid scalping more than one inch of undisturbed topsoil on the spoil side when backfilling spoil and redistributing stockpiled topsoil. C. Final cleanup, erosion control, and revegetation must be within 10 miles of pipe lowering in within this Con/Rec Unit.
TEMPORARY EROSION CONTROL:	As specified in the CMR Plan to limit dust, prevent off-site sedimentation or erosion, and accelerated erosion on the ROW. <u>ADDITIONAL REQUIREMENTS:</u> A. Stabilize topsoil salvage piles with biodegradable tackifier as directed by Keystone. B. Install other erosion control to prevent erosion within the ROW, and off-ROW impacts as directed by Keystone. C. Maintain and/or reinstall erosion control features to ensure proper function at all times.
RECLAMATION	
SEEDBED PREPARATION:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> A. Cultipack or roll ROW to firm topsoil prior to reseeding as authorized by Keystone. B. Hodder gouger or other imprinter may be used to create microsites for seed germination and lessen the effects of wind erosion 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. <u>ADDITIONAL REQUIREMENTS:</u> 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 SH seed mix will be applied at locations shown on the Alignment Sheets or as directed by Keystone. D. The seed mix will be applied in two applications. The first application will be drill seeded. The second application will be broadcast seeded over the drill seeding. E. Seed for the drill application will be provided in separate bags from seed for the broadcast application to accommodate different seeding rates. F. <u>Cover crop:</u> 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.

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		Sandhills (SH) Seed Mixture			DRILL SEEDING RATE ¹	
					Pounds PLS/Acre	-
SCIENTIFIC NAME	COMMON NAME	VARIETY ²				
GRASSES:						
<i>Agropyron dasystachym</i>	Thickspike wheatgrass	Critana, Bannock	1.00	-	4	
<i>Andropogon gerardii</i>	Big bluestem	Bonanza, Champ, Pawnee, Rountree	1.00	-	3	
<i>Andropogon hallii</i>	Sand bluestem	Champ, Garden County, Goldstrike	1.00	-	3	
<i>Bouteloua curtipendula</i>	Sideoats grama	Butte, Pierre, Trailway	2.00	-	9	
<i>Bouteloua gracilis</i>	Blue grama	Bad River	0.25	-	5	
<i>Calamovilfa longifolia</i>	Prairie sandreed	Goshen, Pronghorn	0.75	-	5	
<i>Eragrostis trichodes</i>	Sand lovegrass	Nebraska 27	0.30	-	10	
<i>Elymus canadensis</i>	Canada wildrye	Source identified	3.00	-	8	
<i>Lolium perenne</i> ³	Perennial ryegrass	Linn	3.80	-	20	
<i>Schizachyrium scoparium</i>	Little bluestem	Camper, Blaze, Badlands, Itasca	3.00	-	18	
<i>Panicum virgatum</i>	Switchgrass	Blackwell, Pathfinder, Nebraska 28	1.00	-	9	
<i>Stipa viridula</i>	Green needlegrass	Lodorm	2.00	-	8	
TOTAL			19.10	-	102	
¹ Based on a drill seeding rate of approximately 102 Pure Live Seed (PLS) per square foot; total PLS/sq ft does not include perennial ryegrass which is used as a companion crop. Seed rates will be doubled where broadcast seeding is used. ² These varieties are from Univ. of Nebraska-Lincoln Ext. Circ. 120; other named varieties listed by the USDA-NRCS in Nebraska are acceptable. ³ Perennial ryegrass may be used as a companion crop where additional erosion control is required or mulching is not possible. NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.						
SEEDING DATE:	November 1 to June 30, 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: A. All portions of the Project within this Con/Rec Unit will receive either straw mulch or erosion control matting at locations shown on Alignment Sheets or as directed by Keystone. B. Biodegradable pins approved by Keystone will be used in place of metal staples within this Con/Rec Unit.					
SLOPE AND TRENCH BREAKERS:	Slope breakers and trench breakers are not required in this Con/Rec Unit unless specifically 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. Fence the revegetated ROW from livestock use as directed by Keystone. 4. Monitor revegetation and soil stability post construction. Areas of failed reclamation will be repaired. 5. Monitor and control noxious weeds as specified in the Nebraska and South Dakota Noxious Weed Management Plans. 						