CLARK ENGINEERING
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CapX2020

Delivering electricity you can rely on

Construction Storm Water Pollution Prevention Plan

CapX2020 - Big Stone South to Brookings County

345 kV Transmission Line

Grant - Deuel - Brookings Counties, South Dakota

July 2015

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APPENDICES

1.0 Construction Activity Information

Construction Activity Information				
Project Name				
CapX2020 – Big Stone South to Brookings County 345 KV Transmission Line				
Project Location				
Briefly describe where construction activity occurs. *Include address if available*. Big Stone South to Brookings County 345 k V Transmission Line.				
Counties: Grant, Deuel, Brookings	State, Zip Code: SD			
Latitude and longitude of approximate centroid of project: Lat: 44.841 Long: 96.541				
Method of collection of latitude/longitude: Geographic Information System (GIS) Software (ESRI ArcGIS)				
All cities where construction will occur: NA				
All counties where construction will occur: Grant, Deuel, Brookings	All townships where construction will occur: 111 N 47 W,111 N 48 W, 112 N 47W, 112 N48 W, 113N 47 W, 113N48W, 114N 47 W, 114 N48 W, 115 N 47W, 115N48W, 116N47W, 116N48W, 117N47W, 117N 48 W 118N47W,118N48W, 119N47W, 119 N48W, 120N47W, 120N48W, 121N46W, 121N47W			
Project Size	**Disturbed Area**			
Total project = 74 miles	Total disturbed area= 0.18 ac at each of 371 sites			
Project Type				
Residential:	Commercial/Industrial:	Road Construction:		
Residential and Road Construction:	Other (describe): Transmission Line			
Receiving Waters				
Water Body ID	Name of Water Body	Type	Special Water?	Impaired Water?
HUC 10170202	Big Sioux River	River	No	No
HUC 07020003	Lac qui Parle River	River	No	No
Dates of Construction				
Construction Start Date: August 2015	Estimated Completion Date: December 2017			

2.0 Contact Information

Owner/Party Responsible for Long Term Operation and Maintenance of the Permanent Stormwater Management System		
Business or Firm Name: Xcel Energy		
Primary Contact: Last name, First Name, Title: Samuel, Joseph Senior Project Manager	E-mail: joseph.m.samuel@xcelenergy.com	Telephone: 612-337-2338
Mailing Address: 414 Nicollet Mall, MP-8	City: Minneapolis	State, Zip Code: MN, 55401
I understand that additional erosion and sediment control measures may be needed if unforeseen erosion problems occur or if the submitted plan does not function as intended. The requirements of this plan shall run with the land and be the obligation of the Primary Responsible Party until such time as the plan is properly completed, modified, or voided.		
Signature:	Date:	

SWPPP Consultant		
Business or Firm Name: Clark Engineering Corporation		
Primary Contact: Last name, First Name, Title: Paul Clinton, PLA, CPESC Project Manager	E-mail: pclinton@clark-eng.com	Telephone: 605-331-2505
Mailing Address: 114 1st Ave. NW	City: Watertown	State, Zip Code: SD, 57201
Alternate Contact: Last Name, First Name, Title: Justin Petersen Senior Project Engineer	E-mail: jpetersen@clark-eng.com	Telephone: 605-878-0414
This SWPPP appears to fulfill the technical criteria for erosion control and the requirements of the State of South Dakota. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		
Signature:	Date:	

Contractor/Primary Responsible Party (person who will oversee implementation of the SWPPP)		
Business or Firm Name: Xcel Energy		
Primary Contact: Last name, First Name, Title: Little, Jason General Foreman Civil Const.	E-mail: jason.r.little@xcelenergy.com	Telephone: 612-201-2743
Mailing Address: 8701 Monticello Ln. N.	City: Maple Grove	State, Zip Code: MN, 55369
I certify under penalty of law that this document and all attachments will be revised or maintained under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		
Signature:	Date:	

3.0 General Construction Project Information

3.1 *Construction Activity*

The CapX2020 transmission line project involves the construction of approximately 371 towers over the course of 74 miles. This SWPPP covers the activities of the transmission line, which include right-of-way preparation, foundation construction, tower installation, and line stringing.

The CapX2020 - Big Stone South to Brookings County - 345 kV Transmission Line (Project) will improve community electrical transmission reliability to customers in the local project area, improve the reliability of the bulk electric system serving South Dakota and portions of neighboring states, and facilitate generation development. This effort includes construction of new electrical transmission line. This project involves Xcel Energy and Otter Tail Power Company. Xcel Energy will act as the Construction Manager.

The route generally extends south from the proposed Big Stone South Substation southwest of the Big Stone Power Plant and terminates at the Brookings County Substation as shown in the Route Map in Appendix B. This transmission line project is located in Grant, Deuel, and Brookings Counties, South Dakota. The transmission line will be located in 150 foot right of way. The project will generally parallel some roads, section lines, and property lines. The power line structures will consist of single-poles self-weathering structures that will range in height between 110 and 180 feet high with span range of 600 to 1,200 feet depending site-specific conditions.

The Facility Permit Application documents are available on the South Dakota Public Utilities Commission webpage:

North Segment: http://www.puc.sd.gov/Dockets/Electric/2012/el12-063.aspx
South Segment: http://www.puc.sd.gov/Dockets/Electric/2013/el13-020.aspx

For the purposes of the tower construction SWPPP, these plans will be modified based on site specific conditions, including specific construction work areas for each construction phase, season of construction, and erosion risk factors. Typical tower erosion control plans located in Appendix A will be modified as necessary according to site conditions.

Xcel Energy will act as owner/operator (Contractor) and will install and maintain erosion/sediment controls and other BMPs. After the project is complete and the disturbed area along the transmission route is stabilized, Xcel Energy will submit the final notice of termination (NOT) to the South Dakota DENR.

This SWPPP does not include work at the substations or individual assembly area and laydown yards. The work at the substation, civil site, and laydown yards are covered by separate SWPPPs.

Construction of the Tower Sites will involve temporary road access creation, transmission right-of-way (ROW) tree clearing, foundation work for the transmission towers, tower erection, and power line stringing. Construction crews may be working on different stages and/or locations of the project at the same time to ensure project completion is on schedule. Work is expected to begin in August 2015 and be completed in December 2017. Some of this work will be performed during periods of frozen ground to minimize impact to wetlands.

Initial tower site stabilization will utilize one of the typical tower erosion control plans in Appendix A. The plans will be modified in the field to meet specific site conditions. Temporary stabilization will be implemented as required between phases of construction (site preparation, foundation installation, structure erection, and wire stringing). Tower construction and erection may require modification to the site stabilization plan due to unknown factors such as the size and type of tower construction equipment needed. Equipment used for erection can range from cranes to helicopters. In addition to the construction of the towers, minor road construction may occur at access points. The final phase will be permanent stabilization of the impacted areas. Permanent stabilization will be based on the previous land use. The typical land uses at the tower sites are agricultural crop land, pastures / hay land, and wetlands.

New impervious surfaces will be limited to the exposed towers; therefore, permanent runoff control measures will not be required along the transmission line route. The permanent foundation of each tower will impact 0.18 acres.

Surface water

A project location map showing surface water and tower locations along the proposed route are provided in Appendix H.

Site Map

Tower BMP Location maps in Appendix H of this SWPPP identifies the following features:

- Locations of towers.
- Potential BMP Applications
- Locations of sensitive areas, such as steep slopes, and concentrated drainage areas.
- Surface waters and existing wetlands
- Access points/Tracking pads

Key examples of these measures are designing the tower locations and selecting work areas at each tower to avoid wetlands, using construction mats when traversing or working from wetland or soft soil areas; selecting silt fence or wattles to control erosion downstream of the foundation construction area; and installing appropriate BMPs on impacted sites.

Should responsibilities and/or contractors change during the construction period, the SD DENR NOT/Permit Modification form will be submitted to the SD DENR.

3.2 Existing Site Conditions

The existing conditions along the transmission line consist of agricultural lands. Some trees exist along the route.

Receiving waters include the following and its tributaries:

- Big Sioux River
- Lac qui Parle River

3.3 *Soil Information*

The surficial geology of the Project area consists of fill material and recent alluvial deposits. Construction work areas include both hydric and non-hydric soils. Soil types include silt loam, loam, silty clay loam, loamy sand, sandy loam, loamy fine sand, and muck. The following soils are found along the transmission line route.

Map Unit Symbol	Map Unit Name
Aa	Allivar sandy loam, 0 to 2 percent slopes
AbA	Allivar sandy loam, 0 to 2 percent slopes
AbB	Allivar sandy loam, 2 to 6 percent slopes
AbC	Allivar sandy loam, 6 to 9 percent slopes
ArA	Arvilla sandy loam, 0 to 2 percent slopes
ArB	Arvilla sandy loam, 2 to 6 percent slopes
ArC	Arvilla sandy loam, 6 to 9 percent slopes
AvD	Arvilla Sioux complex, 6 to 15 percent slopes
Ba	Badger silty clay loam, 0 to 1 percent slopes
BbA	Barnes clay loam, 0 to 2 percent slopes
BbB	Barnes clay loam, 2 to 6 percent slopes
BbC	Barnes clay loam, 3 to 9 percent slopes
Bc	Cubden silty clay loam
BcB	Barnes-Buse loams, 2 to 6 percent slopes
BcE	Barnes-Buse loams, 15 to 25percent slopes
Bf	Brookings silty clay loam, 0 to 2 percent slopes
BgD	Buse-Barnes loams, 9 to 20 percent slopes
BhE	Buse-Barnes loams, 9 to 40 percent slopes, very stony
BkB	Buse-Lamoure, channeled, complex, 0 to 40 percent

	slopes
BmC	Barnes - Svea - Buse loams, 2 to 9 percent slopes
BnD	Barnes - Svea - Buse loams, 2 to 12 percent slopes, stony
BoE	Buse-Langhei complex, 15 to 40 percent slopes
Bp	Buse-Singsaas complex, 6 to 9 percent slopes
BsC	Buse - Barnes loams, 9 to 40 percent slopes
BvE	Cubden silty clay loam
Cu	Divide loam
Da	Darnen loam, 2 to 6 percent slopes
DaB	Castlewood silty clay
Db	Doland loam, 2 to 6 percent slopes
DoB	Divide loam
Dv	Egan-Ethan complex, 2 to 6 percent slopes
EaB	Eckman loam, 2 to 6 percent slopes
EcB	Fairdale loam, channeled
Fa	Fordville loam, 0 to 2 percent slopes
FbA	Forman - Aastad loams, 0 to 2 percent slopes
FcB	Forman - Aastad loams, 1 to 6 percent slopes
FdA	Fordville loam, 0 to 2 percent slopes
FdB	Fordville - Renshaw loam, 2 to 6 percent slopes
FeA	Forman - Buse loams, 6 to 9 percent slopes
FgB	Forman - Aastad loams, 0 to 2 percent slopes
FgC	Forman - Aastad loams, 1 to 6 percent slopes
FmA	Fordville-Renshaw loams, 2 to 6 percent slopes
FmB	Forman - Buse -Aastad loams, 2 to 9 percent slopes
FrB	Forman - Buse -Aastad loams, 2 to 15 percent slopes
FtC	Fulda silty clay loam
FtD	Heimdal - Sisseton loams, 2 to 6 percent slopes
Fy	Heimdal - Sisseton loams, 6 to 9 percent slopes
HbB	Heimdal - Svea loams, 0 to 2 percent slopes
HbC	Heimdal - Svea loams, 2 to 6 percent slopes
HcA	Hamerly - Badger complex
HcB	Hegne - Fulda silty clay loams
Hm	Kranzburg-Brookings silty clay loams, 0 to 2 percent slopes
HtA	Kranzburg-Brookings silty clay loams, 1 to 6 percent slopes
KrA	La Prairie loam, 0 to 2 percent slopes, occasionally flooded
KrB	LaDelle silt loam
La	LaDelle silt loam, 0 to 2 percent slopes
Lb	Lamoure silty clay loam, 0 to 1 percent slopes

Ld	Lamoure-Rauville silty clay loams, channeled
Lk	Lowe-Ludden complex, 0 to 1 percent slopes
Lm	Lowe loam
Lr	Maddock-Egeland sandy loams, 6 to 9 percent slopes
Lw	Marysland loam
MaC	Marysland loam, 0 to 1 percent slopes
Mg	McIntosh-Badger silty clay loams, 0 to 2 percent slopes
Mr	McIntosh-Lamoure silty clay loams, 0 to 2 percent slopes
Mt	Nutley - Sinai silty clays, 6 to 12 percent slope
Mu	Oldham silty clay loam, 0 to 1 percent slopes
NsC	Orthents, gravelly
Od	Parnell silty clay loam, 0 to 1 percent slopes
Ok	Parnell silty clay loam, ponded
Pa	Parnell - Vallers complex
Pb	Peever clay loam, 0 to 2 percent slopes
Pc	Peever clay loam, 2 to 6 percent slopes
PcA	Peever - Cavour complex
PcB	Peever clay loam, 0 to 2 percent slopes
Pd	Peever clay loam, 2 to 6 percent slopes
PeA	Playmoor silty clay loam
PeB	Playmoor silty clay loam
Ph	Poinsett silt loam
Pm	Poinsett silty clay loam, 6
Po	Poinsett-Waubay silty clay loams, 0 to 2 percent slopes
PoC	Poinsett-Waubay silty clay loams, 1 to 6 percent slopes
PwA	Rauville silty clay loam, 0 to 1 percent slopes
PwB	Renshaw loam, 0 to 2 percent slopes
Ra	Renshaw loam, 2 to 6 percent slopes
RbA	Rauville silty clay loam
RbB	Renshaw - Sioux complex, 6 to 15 percent slope
Rc	Renshaw loam, 0 to 2 percent slopes
RcD	Renshaw loam, 2 to 6 percent slopes
ReA	Renshaw-Sioux complex, 6 to 9 percent slopes
ReB	Sioux - Renshaw complex, 15 to 40 percent slopes
RsC	Singsaas-Buse complex, 0 to 2 percent slopes
SaE	Singsaas-Buse complex, 2 to 6 percent slopes
SbA	Singsaas-Waubay silty clay loams, 1 to 6 percent slopes
SbB	Sisseton Heimdal loams, 9 to 15 percent slope

ScB	Svea loam
ScD	Swenoda fine sandy loams, 0 to 2 percent slopes
Sd	Singsaas - Waubay silty clay loams, 0 to 2 percent slopes
SeA	Singsaas - Waubay silty clay loams, 1 to 6 percent slopes
ShA	Sioux-Renshaw complex, 9 to 15 percent slopes
ShB	Southam silty clay loam, 0 to 1 percent slopes
ShD	Strayhoss-Maddock complex, 2 to 6 percent slopes
So	Swenoda-Lanona sandy loams, 0 to 2 percent slopes
StB	Swenoda-Lanona sandy loams, 2 to 6 percent slopes
SwA	Tonka silt loam
SwB	Vallers loam
Ta	Vallers - Tonka complex
Va	Vienna-Buse complex, 6 to 9 percent slopes
Vc	Vienna - Buse complex, 6 to 9 percent slopes
VnC	Lamoure silty clay loam, coteau, 0 to 1 percent slopes, occasionally flooded
VwC	Lowe loam, 0 to percent slopes occasionally flooded
Z152A	La prairie loam, 0 to 2 percent slopes, rarely flooded
Z154A	Fordtown loam, 0 to 2 percent slopes, rarely flooded
Z163A	Renshaw - Fordville loams, coteau, 2 to 6 percent slopes
Z166A	Esteline silt loam, coteau, 0 to 2 percent slopes
Z171B	Renshaw - Fordville loams, coteau, 2 to 6 percent slopes
Z182A	Esteline silt loam, coteau, 0 to 2 percent slopes

4.0 Storm Water Pollution Prevention Plan (SWPPP)

4.1 Notice of Intent

A Notice of Intent (NOI) for coverage under the General Permit for Storm Water Discharges Associated with Construction Activities has been submitted to the SD DENR. A copy of the permit may be downloaded from http://denr.sd.gov/des/sw/IPermits/ConstructionGeneralPermit2010.pdf.

4.2 Permit and Erosion Control Contact Information Posting

The Contractor is required to post and maintain for public viewing a copy of the Department of Environment and Natural Resources authorization letter. The authorization letter will be located at each of the three staging yards. The Contractor is also required to post and maintain for public viewing an Erosion Control Contact Information Posting (ECCIP) sign. The sign shall include the name and contact information of the Contractor. The letter and ECCIP sign must be posted in a prominent location such as the project's information board or at the project field office, or in a mailbox at the three staging yards.

4.3Modifications to the SWPPP

The SWPPP may be amended whenever there is a change in design, construction, operation, or maintenance that has a significant effect on the potential for the discharge of pollutants to the waters of the state or proves to be ineffective at minimizing pollutants present in the storm water. The Contractor is responsible to implement these changes within seven (7) calendar days. After the project commences, all approved changes to the SWPPP maps must be documented electronically by the Consultant.

4.4 Keeping the SWPPP Current

The Consultant and Owner will be responsible to maintain an original copy of the SWPPP utilizing GIS on tablets at the project site. Due to the linear nature of the project, a copy of the SWPPP will be available at each of the three staging yards. Up to date SWPPP maps and inspections results will be kept current and distributed to the project team utilizing GIS on tablets. Any modifications to the SWPPP will be documented and made part of the SWPPP using the tablet recordkeeping system. Modifications of BMPs will be recorded and submitted to the Contractor for implementation via weekly meetings and on the tablet system. The SWPPP must be retained by the Owner for a period of three (3) years from submittal of the Notice of Termination. The SWPPP maps will be available to all construction teams and will be updated in real time and in unison on the tablet/mobile mapping system. In general, this narrative document remains static while the mapping is continuously updated, inspection reports are generated, and corrective actions are documented separately in the electronic realm of the tablet computers.

4.5 Record Keeping

During an inspection by the State, the Contractor/Consultant will be asked to produce record keeping documents. The Consultant will work with the Contractor to maintain proper records in electronic format assessable on tablets on-site, which includes the following:

1. Copies of the Notice of Intent and SWPPP Permit shall be posted on-site in the job trailer, laminated on a board, placed in a mail box at the three staging yards, or other location that can be accessed by State employees during an inspection.
2. The Consultant shall maintain all inspection reports with the SWPPP in electronic format assessable on tablets on-site. The inspection reports should note significant rainfall events, repairs needed to BMPs, grading activities on site, and spills that occurred on site. The Corrective Action follow-up inspection report should note spills cleaned up and repairs or changes made since the last inspection report. (e.g. If the silt fence needed to be repaired, note in the follow-up inspection that the silt fence was repaired and is now in good condition.)
3. Consultant shall note when grading activities started and ended and when stabilization BMPs were installed.
4. Consultant shall maintain a log of repairs to describe repair, replacement, and maintenance of BMPs as noted in the maintenance inspection reports.
5. If any spills occur, the responsible Contractor shall record date, material, and quantity of material spilled as well as efforts to clean up and remove waste and prevent future spills. This information shall be immediately passed on to the Owner and Consultant.
6. The Consultant shall track all changes made to the SWPPP due to weather conditions, changing site conditions, and as directed by the State or Owner in the best interests of storm water and pollution management. Contractor shall note updates to the SWPPP, including additions of new BMPs, replacement of failed BMPs, significant changes in the activities, changes in personnel, changes in inspection and maintenance procedures, updates to site maps, etc.
7. Consultant shall record the times and dates of SWPPP training, who attended, and what topic(s) were covered.
8. Consultant shall record daily rainfall and weather conditions.

4.6 Inspections

The Consultant will be required to perform inspections on the project at the following minimum frequency until the site has reached final stabilization and a Notice of Termination is submitted to the SDDENR:

1. Prior to the removal of any surfacing or topsoil.
2. Once every seven calendar days (minimum). When runoff is unlikely due to winter conditions the inspections may be reduced to once a month.
3. Within 24 hours after every rainfall of 0.5 inch or greater.
4. After a snow melt that causes erosion.
5. Within 24 hours of a complaint being made to the Contractor or Consultant.
6. Once a site is in active construction, the site will require at least monthly inspections until the entire project is complete, stabilized, and permanent cover is established (i.e., 70% cover established) and the Notice of Termination (N.O.T.) has been submitted to the SD DENR.
7. Inspections of non-active portions of the project will cease during frozen ground conditions.

The Consultant reserves the right to perform inspections more frequently than identified and additional inspections will be made if obvious items of non-compliance exist. If the Contractor fails to participate in any inspection, it does not relieve them of their responsibility to comply with any corrective or maintenance actions needed.

Items noted as being non-compliant or needing maintenance as a result of the inspections must be corrected within seven (7) calendar days. The site shall continue to be considered in non-compliance until the issue has been corrected to the satisfaction of the Consultant. Non-compliant sites shall be reported to the Owner weekly.

4.7 Notice of Termination

The Contractor is responsible for complying with the SWPPP until a Notice of Termination (N.O.T.) of coverage under the General Permit has been issued. The N.O.T. will be prepared for submittal to the SDDENR when all storm water discharges covered by the permit are eliminated and final stabilization has been achieved on all portions of the site for which the permittee is responsible. Final stabilization means either or a combination of:

1. All soil disturbing activities at the site have been completed and a uniform perennial vegetative cover with a density of 70% of the native cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed; or
2. For construction projects on land used for agricultural purposes, final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to waters of the state, and areas which are not being returned to their pre-construction agricultural use must meet the final stabilization criteria in (1) above.

4.8 Training

Persons responsible for Preparing, Overseeing, and Implementing have received the appropriate training required under the General Construction Permit. New staff will be trained prior to performing the tasks outlined above. Training certificates will be collected on an ongoing basis and maintained with the SWPPP. See Appendix F for required training records.

5.0 Erosion Prevention and Sediment Control

5.1 Site Preparation BMPs

Before land disturbing work activities begin, areas not to be disturbed will be delineated with flags, stakes, signs, or other equivalent means and clearly label the limit of all areas not to be disturbed. These areas will also be labeled on the tablet mapping.

Erosion prevention and sediment controls will be established at all down-gradient perimeters before any up-gradient land disturbing activities begin or after the minimum of necessary clearing and grubbing activities are completed. These controls are only required on down-gradient perimeters. If selected BMPs are not sufficient for erosion prevention and sediment control, additional temporary BMPs will be established. The down-gradient perimeter erosion prevention and sediment controls may include but are not limited to:

- Erosion Prevention and Sediment Control for Sheet Flow Zones along Down-gradient Perimeter
- Sediment Barriers (Silt fence, straw bales, earth dikes, rock check dams, sediment control logs)
- Mulch (slash mulch, hydro mulch, disc-anchored straw mulch)
- Temporary and permanent seeding and planting
- Erosion Control Blankets

5.2 Erosion Prevention BMPs

Erosion prevention practices include, but are not limited to, the following procedures:

- Within 14 days (7-days for sites draining to special and surface waters), stabilize disturbed areas as soon as possible after construction activity on a portion of the site that has temporarily or permanently ceased construction activity.
- Stage construction work, to the extent practicable, to minimize the amount of disturbed areas that are not stabilized at any one time.
- Temporary stabilization practices include but are not limited to: mulches, erosion control blanket, or equivalent measures.

5.3 Sediment Control BMPs

Sediment control practices include, but are not limited to, the following procedures:

- Minimize vehicle tracking of sediment from the site and on to paved roads (through the use of slash mulch or crushed rock).
- Provide temporary stockpiles with silt fence or equivalent sediment controls.
- All storm drain inlets, within down-gradient reaches of the construction site runoff areas, must be protected by appropriate BMPs during construction until all sources with potential for discharging to the inlet have been stabilized.

5.4 Wetland Protection BMPs

Tower locations in wetlands are identified in Appendix H. Impacts to wetlands will be avoided if possible and otherwise minimized to the extent possible. Protect wetlands in order to avoid impacts as follows:

- For zones of sheet flow to wetlands: If the project layout allows, maintain a minimum of 25 foot grass filter strip or silt fence or equivalent BMP down-gradient of the area to be disturbed.
- For zones of concentrated flow to wetlands: Construct and maintain a diversion dike, rock check dam, silt dam, sediment trap, temporary or permanent sediment basin or wet sediment basin.

5.5 Special and Surface Waters BMPs

The following sediment control practices will be used to minimize sediments from entering surface waters:

- Silt fence, covers, temporary seeding, or other sediment control will be utilized surrounding temporary soil piles.
- If vehicle tracking is an issue at any of the construction locations, a rock truck scrub pad or equivalent will be set up at the entrance/exit to the construction area.
- Mud or soil tracked onto paved public roads will be removed within 24 hours of discovery.
- Vegetative buffers will be utilized where appropriate.
- Vegetative disturbance will be minimized during all construction activities.
- Stream crossings will be avoided to the extent practical. Temporary bridges or equivalent will be utilized as necessary.

In addition to the activities outlined above, the following procedures will be used for special and surface waters:

- Stabilize disturbed areas draining to special and surface waters within 7-days after construction activity.
- Buffer Zone: An undisturbed buffer zone of not less than 50 feet shall be maintained at all times around special and surface waters. If encroachment into the buffer is necessary to complete the project, then all potential water quality, scenic and other environmental impacts must be minimized through the use of additional or redundant BMPs, and the area must be restored once construction is complete.
- No refueling operations shall take place within 100 feet of wetlands or special or surface waters.

5.6 *Environmental Review Mitigation Measures*

This site does not have special mitigation measures; however, all the measures that are presented in this SWPPP should be implemented to the maximum extent practicable and set forth a mitigation hierarchy:

- First avoid or eliminate to the extent practicable;
- Second reduce and minimize; and
- Always rectify and compensate as appropriate.

Key examples of these measures are designing the locations and selecting work areas to avoid wetlands and areas of special status species and their habitats; using construction mats when traversing or working from wetland or soft soil areas; selecting silt fence as the default erosion control downstream of the construction area; and using rapid stabilization of disturbed areas at all locations.

5.7 *Contractor Activities*

Due to the number of project activities and tower locations, the construction will generally take place in phases. Construction crews will move along the project route as their work progress. BMPs will be employed as required prior to construction. Vegetative buffer strips will be maintained near lakes, streams, and wetlands where practicable. In general, silt fence, flags, stakes, and signs will be used to delineate areas before work begins. Infiltration into surrounding soils may be the primary treatment in areas that discharge to farmland or natural depressions. Stockpiled materials required for backfilling or final stabilization will have temporary erosion control and diversions around base, as necessary.

As construction activities are phased, each phase should maintain BMPs from the previous activity and install any other BMPs necessary to prevent erosion and sediment from leaving the construction site.

When site grading is necessary the Contractor will separate topsoil from fill material to use during permanent soil stabilization. Soil piles will be stabilized or protected with seed, tarps, silt fence, or an equivalent BMP.

Access roads will be stabilized with rock, mulch, or equivalent at high erosion areas and construction access road entrances. Rock construction entrances, mud mats, rumble tracks, daily sweeping or other approved BMPs will be installed near entrance locations off impervious public roads to reduce/eliminate tracking of mud onto these roads.

Construction mats may be used to limit areas of disturbance in soft or wet ground, such as in wetlands. Construction mats may not be required during frozen ground conditions in wetlands.

Dewatering BMPs will be used to reduce sediment transfer and scouring of the ground during dewatering activities. In wetland locations, a silt bag will also be used. Flocculants may also be used in wetland locations if the sediment is too fine for the filter media, but will be applied in an appropriate amount so that it is not discharged with the water. This SWPPP will be amended with flocculent information when used. Dewatering will follow wetland permit requirements.

Concrete delivery trucks shall use self-contained washout units or all concrete washout shall occur at the concrete subcontractor's business. Where the concrete washout for tools and equipment does occur, all liquid and solid wastes generated by concrete washout operations shall be contained in a self-contained washout unit or impermeable liner. The liquid and solid wastes shall not contact unprotected ground, and there shall not be runoff from the concrete washout operations or areas.

Ground disturbed during any construction activity will be stabilized as soon as possible but not longer than 14 days (7-days for sites draining to special or surface waters) after the activity has been completed in that area. BMPs will be used as appropriate to the site specific situation.

Slopes within 200 feet of Surface Water

For drainage or diversion ditches, describe practices to stabilize the normal wetted perimeter within 200 linear feet of the property edge or point of discharge to surface water. The remaining portions of the temporary or permanent ditch or swale must be stabilized within 14 days after connecting to surface waters and construction in that portion of the ditch has temporarily or permanently ceased.

Positive slopes adjacent to public waters and wetlands will have the normal wetted perimeter within 200 linear feet of the property edge or point of discharge to a surface water stabilized at the close of each day when forecasts for precipitation are indicated that evening, and/or overnight including weekends. Once work is completed, it will be stabilized permanently as soon as practical but no later than 14 days (7 days for sites draining to special waters). See above for more information on slope erosion prevention practices.

6.0 Non-Structural BMPs

Nonstructural BMPs such as good housekeeping measures can, to some degree, prevent the deposition of pollutants on the urban landscape or remove pollutants at their source. The source of pollutants for assimilation into storm water is the land surface itself, especially the impervious surfaces in the urban area. Thus, it is expected that when nonstructural measures are effectively implemented, they will reduce the amount of pollutants being deposited on land surfaces for eventual contact with storm water and transported to the receiving water system. Therefore, the Contractor should evaluate and determine which appropriate good housekeeping measures listed below could be used.

6.1 Good Housekeeping BMPs

To reduce the risk of spills or other accidental exposure of material and substances to storm water runoff, the following good housekeeping practices should be implemented:

1. Dust generated as a result of the construction project will be controlled by water if necessary.
2. Vegetated areas not essential to the construction project will be preserved and maintained as noted on the plans.
3. Stabilized entrances should be created to reduce vehicle tracking of sediments off sites. The entrances will be cleaned and maintained as necessary. Any sediment tracked off site or on public roads shall be cleaned at the end of each day.
4. If used, wheel wash water will be collected and allowed to settle out suspended solids prior to discharge. Wheel wash water will not be discharged directly into any storm water system or storm water treatment system.
5. Cement, cement kiln dust, fly ash, new concrete washings, concrete pumping, residuals from concrete saw cutting (either wet or dry), mixer washout waters, and other pH modifying materials will be collected on site and managed to prevent contamination of storm water runoff.

6.2 Material Storage BMPs

Improperly storing material on site can lead to the release of materials and chemicals that can cause storm water runoff pollution. Proper storage techniques include the following:

1. Locate material storage areas away from storm drains, ponds, and drainageways.
2. Isolate and consolidate bulk materials from storm water runoff by providing berms or other means to keep the material from migrating into drainage systems.
3. Only needed products will be stored on-site by the Contractor. Whenever possible, all products will be completely used before properly disposing of the container off-site.
4. Contractor will store materials in an orderly manner in appropriate containers and under cover, if possible.

5. Store containers, drums, and bags away from direct traffic routes to prevent accidental spills.
6. Store toxic or hazardous liquids within curbed areas or secondary containers.
7. Assign responsibility of hazardous material inventory to a limited number of people who are trained to handle such materials.

6.3 Material Inventory BMPs

This section should be followed if hazardous materials are stored on-site. The following description provides the basic steps in completing a material inventory:

1. Identify all chemical substances present at work site. Perform a walk-through of the site, review purchase orders, list all chemical substances used, and obtain Material Safety Data Sheets (MSDS) for all chemicals.
2. Label all containers. Labels shall provide name and type of substance, stock number, expiration date, health hazards, handling suggestions, and first aid information. This information can also be found on an MSDS.

Clearly mark on the hazardous materials inventory which chemicals require special handling, storage, use, and disposal considerations. Decisions on the amounts of hazardous materials that are stored on site shall include an evaluation of any emergency control systems that are in place. All storage areas shall be designed to contain any spills

The following materials are expected to be present onsite during construction:

- Fuel, Oil, and other petroleum based products
- Cleaning substances and detergents
- Woods and metals
- Concrete
- Fertilizer

6.4 Waste Disposal BMPs

To limit exposure of waste to storm water, the following practices should be implemented:

1. All liquid waste materials will be collected and stored in a sealed metal container approved by the Consultant.
2. Pick up and deposit all trash and construction debris from the site and dispose of properly. Containers may be covered if necessary.
3. Mobile sanitary facilities or access to sanitary facilities will be available, as necessary along the project. Sanitary waste will be collected from the portable units in a timely manner by a licensed waste management contractor and will be disposed of at a wastewater treatment facility or as required by local regulations.
4. To minimize waste, Contractor shall recycle and reuse materials whenever feasible.

6.5 *Operation and Maintenance BMPs*

To assure that equipment and work related processes are working well, the following practices should be implemented:

1. Make sure all equipment and vehicles are working properly and preventative maintenance is kept up with on both to reduce the chance of leakage.
2. Routinely inspect equipment and processes for leaks or conditions that could lead to discharges of chemicals or contact of storm water with raw materials, waste materials, or products used on site.
3. Equipment fueling is the activity most likely to result in a spill. Refueling operations will take place in approved areas and will not be located within 100 feet of a wetland or waters of the state where a spill would immediately flow into these surface waters. Secondary containment is required for all oil/fuel tanks and containers used for refueling areas. These refueling areas will be secured when not in use to prevent spills caused by acts of vandalism. The equipment operator will be present during all fueling operations including helicopter refueling associated with line stringing operations.
4. Designate contained areas of the site for auto/equipment parking, vehicle refueling, and routine maintenance of equipment. Contractor shall use drip pans, curbing, sand filters, oil/water separators, or other controls to prevent contaminated water runoff.
5. Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants will be conducted on an impervious surface and under cover during wet weather to prevent the release of contaminants onto the ground.
6. Petroleum products will be stored in tightly sealed containers which are clearly labeled.
7. Fertilizers used will be applied only in the amounts specified or recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in an enclosed area. The contents of any partially used bags of fertilizer will be transferred to a sealable container to avoid spills.
8. If used, all paint containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to manufacturer's instructions or State and local regulations.

6.6 *Spill Prevention and Response*

In addition to good housekeeping measures, the Contractor should detail what Spill Prevention and Response measures should be used. The following practices are recommended for spill prevention and cleanup:

1. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained by the Contractor of the procedures and the location of the information and cleanup supplies.
2. Materials and equipment necessary for spill cleanup will be kept in a designated area on-site. Equipment and materials may include items such as brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose. Spill response equipment will be inspected, maintained, and replaced as necessary.
3. All spills will be contained and cleaned up immediately after discovery. The waste materials shall be disposed of properly.
4. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
5. The Contractor will be notified immediately when a spill or the threat of a spill is observed. The Contractor will assess the situation and determine the appropriate response. The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize migration into storm water runoff. If the release has impacted on-site storm water, it is critical to contain the released materials on-site and prevent their release into receiving waters.
6. The Contractor shall record date, description of the spill, quantity of material spilled as well as a description of what caused it and efforts to clean up and remove the waste. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one.
7. If oil sheen is observed on surface water (e.g. settling ponds, detention ponds, swales), action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.

6.7 *Spill Notification*

The Contractor will be responsible for reporting spills of petroleum product or other toxic, hazardous, or regulated substance to the Owner; the Owner will notify the SD DENR immediately if any one of the following conditions exists:

1. The discharge threatens or is in a position to threaten the waters of the state (surface water or ground water).
2. The discharge causes an immediate danger to human health or safety.
3. The discharge exceeds 25 gallons.
4. The discharge causes a sheen on surface water.
5. The discharge of any substance that exceeds the ground water quality standards of ARSD (Administrative Rules of South Dakota) chapter 74:51:01.
6. The discharge of any substance that exceeds the surface water quality standards of ARSD chapter 74:51:01.
7. The discharge of any substance that harms or threatens to harm wildlife or aquatic life.
8. The discharge of crude oil in field activities under SDCL (South Dakota Codified Laws) chapter 45-9 is greater than 1 barrel (42 gallons).

To report a release or spill, call DENR at 605-773-3296 during regular office hours (8 a.m. to 5 p.m. Central time). To report the release after hours, on weekends or holidays, call State Radio Communications at 605-773-3231 within 24 hours of having knowledge of the discharge. Reporting the release to DENR does not meet any obligation for reporting to other state, local, or federal agencies. Therefore, the responsible person must also contact local authorities to determine the local reporting requirements for releases. DENR recommends that spills also be reported to the National Response Center at (800) 424-8802. A spill of hazardous materials should be reported to the DENR at 605-773-3153.

6.8 *Training and Participation*

A training program will be implemented to familiarize all on-site personnel with procedures outlined in this SWPPP and with requirements in all other permits or regulations. The training program will include tailgate meetings with crews beginning each construction phase and a written presentation that can be given to new individuals joining crews and used as a refresher as needed.

7.0 Storm Water Management System

7.1 *Methods of Ensuring Surface Water Quality*

The intent of the SWPPP is that no sediment laden waters leave the project work areas without exposure to an erosion or sediment control device.

The only non-storm water discharge allowed by the General Permit for Storm Water Discharges Associated with Construction Activities is uncontaminated ground water or waters, used as a best management practice, to wash vehicles and control dust. It is the responsibility of the Contractor to obtain a General permit to discharge under the South Dakota Surface Water Discharge System for temporary discharge activities in South Dakota (dewatering permit) for all other non-storm water discharges. All monitoring, testing, and other requirements of the dewatering permit are the responsibility of the Contractor.

Pumping (mechanically discharging) sediment laden water including ponded storm water or contaminated trench dewatering into the storm sewer or off the project site is not covered under the General Permit. It is the responsibility of the Contractor to obtain and comply with a dewatering permit if one is required for these activities. The Consultant will notify the SDDENR if the Contractor is observed pumping sediment laden water into the storm sewer or off site. Pumping sediment laden water through inlet protection is not allowed as a BMP. In lieu of pumping sediment laden water the following are some methods the Contractor may use to control sediment laden water.

- The best method is for the Contractor to maintain positive drainage during all phases of the project to prevent water from ponding on the project.
- Treat the sediment laden water onsite through the use of filter bags, deflocculating chemicals, sediment basins, or a portable containment system.
- Pump or discharge the water to other portions of the site. This is allowed if the waters do not leave the project limits.

7.2 *Non Storm Water Discharges*

It is expected that the following non-storm water discharges will occur from the site during the construction period:

1. Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred)
2. Uncontaminated groundwater (associated with dewatering activities)
3. Waters used to wash vehicles without detergent
4. Water used to control dust

7.3 *Cumulative Impervious Surface*

New impervious surface will be limited to the exposed towers; therefore, permanent runoff control measures will not be required along the transmission line.

7.4 *Treatment of New Runoff*

New impervious surface will be limited to the exposed towers; therefore, permanent runoff control measures will not be required along the transmission line

7.5 *Runoff Treatment Feasibility*

The site has no limitations on runoff treatment. Vegetative buffer strips will be maintained near lakes, streams, and wetlands and around the perimeter of sites where practicable. Infiltration into surrounding soils may be the primary treatment in areas that discharge to farmland or natural depressions.

7.6 *Alternative Treatment Methods*

Alternative treatment methods are not applicable to this site.

8.0 Temporary and Permanent BMPs

8.1 *Temporary and Permanent BMPs*

Sites that drain to a special or surface water will have all exposed soil areas stabilized within seven (7) days. Other locations will be stabilized within 14 days. Temporary and Permanent BMPs include:

- Vegetative Buffers
- Grading
- Seeding
- Mulch (slash mulch, hydro mulch, disc-anchored straw mulch)
- Erosion Control Blankets
- Sod
- Rock
- Infiltration
- Street Sweeping of tracked sediment

Examples of these BMPs are shown in Appendix C Standard Plates for Erosion Control *Sediment Control Practices.*

8.2 *Sediment Control Practices*

The following sediment control practices will be used to minimize sediments from entering surface waters:

- Dewatering BMPs as described in Section 8.3 will be utilized.
- Sediment control practices, such as installing sediment barriers, or other approved BMP, on down-gradient perimeters will be implemented before up-gradient land disturbing activities begin. Infiltration into surrounding soils may be primary treatment at appropriate non-wetland locations.
- Silt fence, covers, temporary seeding, or other sediment control will be utilized surrounding temporary soil piles.
- If vehicle tracking is an issue at any of the construction locations, a rock truck scrub pad or equivalent will be set up at the entrance/exit to the construction area.
- Mud or soil tracked onto paved public roads will be removed within 24 hours of discovery.
- Vegetative buffers will be utilized where appropriate.
- Vegetative disturbance will be minimized during all construction activities.
- Stream crossings will be avoided to the extent practical. Temporary bridges or equivalent will be utilized as necessary.

8.3 *Dewatering and Basin Draining*

Dewatering will be conducted in a manner to minimize chance of transporting sediment or causing erosion. Intake hoses must be provided with a filtering device such as a sedimentation filter bag and discharge lines must be protected with energy dissipation BMPs as necessary. Energy dissipation methods may include hay bales, mulch, rip rap, sand bags, or plastic sheeting, depending on the proposed flow and velocity.

Dewatering BMPs for upland locations include: 1) sedimentation filter bag, 2) hay bales and silt fence structure, 3) infiltration, 4) or equivalent. Infiltration will be used if the ground is flat and erosion and sediment transfer are not occurring during dewatering.

Dewatering BMPs for wetland locations include: 1) sedimentation filter bag, 2) hay bales and silt fence structure, 3) filter socks, 4) or equivalent. Flocculants may also be used in wetland locations if the sediment is too fine for the filter media, but should be applied in an appropriate amount so that it is not discharged to the surface water. The SWPPP should be amended with flocculent information when used. Dewatering will follow wetland permit requirements.

8.4 *Final Stabilization*

Final stabilization will be dependent on the construction work location. Final stabilization occurs when a minimum of 70% of seeding is established.

Non-agricultural: Site will be returned to pre-existing grading to the extent possible. Final stabilization will be achieved primarily with slash mulch and grass seeding. Areas which are prone to erosion will be stabilized with seed and erosion control blankets.

Agricultural: Final stabilization will be achieved by returning the disturbed land to its preconstruction agricultural use. The Contractor will work with the landowner to rectify any damage, soil compaction, and rutting.

Permanent stabilization will be established on all disturbed areas and all temporary synthetic and structural erosion prevention and sediment control BMPs (such as silt fence) must be removed prior to submission of the Notice of Termination (N.O.T.) BMPs designed to decompose on site (such as some compost logs) may be left in place if acceptable by the landowner.

8.5 *Modifications of BMPs to Prevent Property Damage*

The Contractor is responsible to maintain drainage. In the event that an erosion or sediment control device is obstructing drainage and damage to property is possible, the Contractor may temporarily modify or remove the device to facilitate drainage. An example is inlet protection in a sump location surrounded by buildings. If a device is removed for this purpose, the Contractor shall immediately notify the Consultant to discuss and implement alternatives to comply with the SWPPP and General Permit.

8.6 *Soil Surface Stabilization Practices*

After construction begins, soil surface stabilization shall be applied within 14 days to all disturbed areas that may not be at final grade but will remain dormant (undisturbed) for periods longer than 21 calendar days. Within 14 days after final grade is reached on any portion of the site, permanent or temporary soil surface stabilization shall be applied to disturbed areas and soil stockpiles. The following table lists the amount of time various erosion control measures are applicable.

Maximum Time Limits of Land Exposures for Selection of Erosion Controls	
Erosion Control Method	Maximum Allowable Period of Exposure (Months)
Surface Roughening	1
Mulching	12
Temporary Revegetation	12 – 24
Permanent Revegetation	24 Or More
Soil Stockpile Revegetation	2
Early Application of Road Base	1

8.7 *Maintenance*

The Contractor is responsible for maintaining and repairing all temporary erosion control, sediment control, and permanent erosion control measures until the Notice of Termination (N.O.T.) is filed. General maintenance requirements are listed but are not all inclusive and additional measures may need to be taken to comply with the General Permit and SWPPP.

1. Silt fence will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
2. Sediment build-up will be removed from silt fence when it has reached one-half the height of the fence.
3. Sediment basins and traps and inlet protection devices will be checked and sediment removed when depth reaches approximately 50 percent of the structure's capacity and at the conclusion of the construction.
4. Inlet protection device should be cleaned or replaced if standing water is evident 48 hours after a rain event. Damaged devices must be repaired.
5. Check dams will be inspected for stability and sediment will be removed when depth reaches half the height of the dam.
6. All seeded areas will be inspected for bare spots, washouts, and healthy growth free of significant weed infestations until final stabilization is established.
7. Any deltas and sediment deposited in surface waters, including drainage ways, catch basins and other drainage systems, will be removed and cleaned up and those areas re-established where sediment removal results in exposed soil. The removal and stabilization will take place within seven (7) days of discovery unless precluded by legal, regulatory, or physical access constraints.
8. A maintenance inspection report will be made after each inspection. A copy of the report form to be completed by the inspector is shown in Appendix D.
9. All controls will be maintained in good working order by Contractor. Necessary repairs will be initiated by the Contractor within seven (7) days of site inspection. A log of repairs shall be maintained to describe repair, replacement, and maintenance of BMPs as noted in the maintenance inspection reports.
10. The Contractor will be responsible for inspections, maintenance and repair activities, and completing out the inspection and maintenance report.

8.8 *Removal of Temporary Erosion and Sediment Control Devices*

The Contractor is responsible to remove all temporary erosion control and sediment control devices when the site reaches final stabilization. The Consultant may recommend specific temporary erosion control and sediment control devices to remain in place past final stabilization.

8.9 *Anticipated BMPs*

The typical BMPs are shown in Appendix A and the anticipated typical BMPs at each tower site are shown in Appendix H.

9.0 Seeding

9.1 Seedbed Preparation

Topsoil will be restored to the original depth over all disturbed areas. Soil stabilization shall be in accordance with the SWPPP.

Compacted soils shall be decompacted by tilling or other methods.

Initial preparation of newly graded areas for seeding shall be worked to a depth of approximately 3 inches. Every effort shall be made to obtain this depth on the first pass with tillage equipment. The final prepared seedbed shall be left in a roughened condition consisting mainly of lumps two to 3 inches in diameter, for maximum resistance to erosion.

9.2 General Seed Mix for Buffer Area and Road Ditches

Millborn #2 Waterway mix will be used unless there is a specific request from a landowner.

Millborn #2 Waterway Mix:

- 20% Tall Fescue
- 20% Perennial Ryegrass
- 45% Brome
- 15% Timothy

Seeding Rate is 25 lbs/Acre

Fertilize with 13-13-13 at 400 lbs/Acre

Spring /Summer / Fall Cover crop: Oats

- 10 lbs/Acre

Winter Cover crop: Winter Wheat

- 10 lbs/Acre

9.3 *Pollinator Seed Mix*

Description: CP42 Pollinator Mix-Native Habitat Development for Pollinators
This mix uses the revised NRCS pollinator specs from October 2014.
Seeding Rate: 5 lbs/Acre

Scientific Name	Common Name	% of Mix	Rate/Acre	
Grasses:				
Andropogon gerardii	Big Bluestem	18.00%	0.9	PLS lb
Bouteloua curtipendula	Sideoats Grama	16.00%	0.8	PLS lb
Schizachyrium scoparium	Little Bluestem	24.00%	1.2	PLS lb
Sporobolus heterolepsis	Prairie Dropseed	2.00%	0.1	PLS lb
Forbs:				
Agastache foeniculum	Anise Hyssop	2.50%	2	PLS oz
Aster laevis	Smooth Blue Aster	1.25%	1	PLS oz
Astragalus canadensis	Canada Milk Vetch	2.50%	2	PLS oz
Baptisia alba	White Wild Indigo	0.63%	0.5	LS oz
Chamaecrista fasciculata	Partridge Pea	5.00%	4	PLS oz
Dalea candidum	White Prairie Clover	1.88%	1.5	PLS oz
Dalea purpurea	Purple Prairie Clover	3.75%	3	PLS oz
Gentiana flavida	Cream Gentian	0.63%	0.5	PLS oz
Helenium autumnale	Sneezeweed	1.25%	1	PLS oz
Heliopsis helianthoides	Ox-eye Sunflower	1.25%	1	PLS oz
Lobelia siphilitica	Great Blue Lobelia	0.63%	0.5	PLS oz
Liatris pycnostachya	Prairie Blazingstar	1.25%	1	PLS oz
Monarda fistulosa	Wild Bergamot	1.25%	1	PLS oz
Oenothera biennis	Common Evening Primrose	3.75%	3	PLS oz
Penstemon digitalis	Foxglove Beardtongue	2.50%	2	PLS oz
Penstemon grandiflorus	Large-flowered Beardtongue	0.63%	0.5	PLS oz
Ratibida pinnata	Yellow Coneflower	1.25%	1	PLS oz
Rudbeckia hirta	Black-eyed Susan	3.75%	3	PLS oz
Solidago rigida	Stiff Goldenrod	1.25%	1	PLS oz
Vernonia fasciculata	Common Ironweed	0.63%	0.5	PLS oz
Zizia aurea	Golden Alexanders	2.50%	2	PLS oz

9.4 *Wetland Emergent Mix*

Description: MSI Wetland Emergent Mix

Seeding Rate: 5 lbs seed, 20 lb seed carrier with MycoApply (25 lb total/ acre (1 bag))

Scientific Name	Common Name	Rate/Acre	
Grasses:			
Calamagrostis canadensis	Blue Joint Reed Grass	0.05	lb
Elymus virginicus	Virginia Wildrye Reed	1.50	lb
Glyceria grandis	Manna Grass Rice	0.20	lb
Leersia oryzoides	Cut Grass	0.40	lb
Scolochloa festucacea	White Top	0.03	lb
Spartina pectinata	Prairie Cord Grass	0.40	lb
Sphenopholis obtusata	Prairie Wedgegrass	0.45	lb
Forbs:			
Alisma subcordatum	Common Plantain	0.20	lb
Asclepias incarnata	Swamp Milkweed	0.05	lb
Eupatorium maculatum	Joe Pye Weed	0.02	lb
Eupatorium perfoliatum	Boneset	0.01	lb
Helenium autumnale	Sneezeweed	0.05	lb
Mimulus ringens	Monkey Flower	0.10	lb
Verbena hastata	Blue Vervain	0.10	lb
Sedges, Rushes, & Wetland Species:			
Beckmannia syzigachn	American Slough Grass	0.50	lb
Carex atherodes	Wheat Sedge	1.10	lb
Carex brevior	Plains Oval Sedge	1.20	lb
Carex hystricina	Porcupine Sedge	0.01	lb
Carex laeviconica	Smoothcone Sedge	0.03	lb
Carex pellita	Woolly Sedge	0.01	lb
Carex praegracilis	Clustered Field Sedge	0.01	lb
Carex vulpinodea	Brown Fox Sedge	0.20	lb
Juncus balticus	Baltic Rush	0.01	lb
Juncus dudleyi	Dudley's Rush	0.01	lb
Juncus torreyi	Torrey's Rush	0.01	lb
Scirpus acutus	Hardstem Bulrush	0.01	lb
Scirpus atrovirens	Dark Green Bulrush	0.20	lb
Scirpus fluvialtilis	River Bulrush	0.01	lb
Scirpus pungens	Chairmaker's Rush	0.05	lb
Scirpus validus	Softstem Bulrush	0.10	lb
Sparganium eurycarpum	Giant Bur Reed	0.25	lb