EXHIBIT A
SCOPE OF SERVICES

BEST MANAGEMENT PRACTICES FOR ESTABLISHMENT OF SALT-TOLERANT GRASSES ON ROADSIDES

BACKGROUND

MnDOT and the University are nearing the end of an important research project, funded by the Local Road Research Board (LRRB) in 2010 (*Developing Salt-Tolerant Sod Mixtures for use as Roadside Turf in Minnesota*). The project has identified a number of turfgrasses that can be used on roadsides in Minnesota where salt applications limit typical turf growth. The University has also begun testing of optimized mixtures of these grasses that could be utilized by public officials in both seeding and sodding operations. The Sod Quality Assurance program, a cooperative effort of the Minnesota Crop Improvement Association, along with MnDOT, the Minnesota Turf Association, and the University has resulted in increased availability of salt-tolerant sod. In fact, sod fields planted in 2012 included cultivars identified in our current project (the salt-tolerant grass mixtures are referred to as MNST). During the past year, environmental conditions at certain times have not been conducive to proper sod and seed establishment of MNST along roadsides. This could be due to any number of factors including heat, drought, lack of nutrients, insufficient soil preparation, poor soil quality, or soil compaction. Several stakeholders have voiced their concerns about the future of the salt-tolerant sod program due to some installation failures. In order to build on current research results, the University will conduct a two-phase research project to address the concerns of these stakeholders.

During the first phase of the research, the University will work with MnDOT, contractors, and sod growers to identify roadside sites that have been planted with previous and current versions of the recommended MNST mix (both sod and seed installations). These assessments will help identify those practices that lead to a successful establishment and those conditions that result in failures. Then, informed by the findings from the first phase of the project, the University will commence with research trials to answer important questions about roadside turf establishment practices. The results will help provide contractors and stakeholders with guidelines on best management practices before, during, and after the installations of MNST sod or seed, which will be both environmentally and economically beneficial.

OBJECTIVE

The major benefit that this project will provide is new information about how to properly establish salt-tolerant turf along roadsides. This is an important step in the full implementation of our initial work on salt-tolerant turfgrasses for roadsides. The end-users of our results will be contractors, public works employees, and homeowners, all of whom can struggle with proper management of newly laid sod or recently seeded turf areas along roadsides. Improved recommendations for establishment and care of these grasses will lead to reduced costs of re-vegetation, reduced complaints from taxpayers, and reduced environmental risk caused by soil erosion near roadsides.

SCOPE

Phase 1: The University will assess sites across Minnesota where MNST sod or seed (or other salt-tolerant mixtures such as 60B) have been used. The number of sites will likely be in the range of 30-50, but a final determination will depend on distance between sites, cooperation of contractors, etc. For each site, the University will evaluate turf quality and species composition, test soil compaction, collect soil samples, and identify areas that pose an environmental risk (erosion, etc.). The University will work with MnDOT and contractors to determine seeding/sodding date, how the site was prepped, initial maintenance, etc. When appropriate, the University will talk to other stakeholders at each site (home or business owners) for further information about the maintenance of the site.

Phase 2: Using information from Phase 1, the University will design research trials on best practices for salt-tolerant turf establishment that will address concerns identified by site assessments. Factors to be studied could include time of year for seeding or sodding, fertilizer applications, watering frequency, soil amendments, gypsum application, etc. Final determination of research trial objectives will be done in consultation with the Technical Advisory Panel (TAP).

ASSISTANCE

For roadside trials, the University will need assistance with traffic control, when necessary. The University will also need access to projects that have recently had MNST installed or seeded.

WORK PLAN

Task Descriptions

Task 1: Assessment of Recently-Established Roadside Turfgrass Areas
The University will assess sites across Minnesota where MNST sod or seed is known to have been used.

Task 2: Literature Review and Research Plan
The University will use results of Task 1, along with a comprehensive literature review, to determine a set of experiments (at least 2) that will focus on how to properly establish MNST (sod and seed) along roadsides in Minnesota.

Task 3: First Year Field Research on Salt-Tolerant Roadside Turf Establishment.
The University will conduct research to establish best management practices for the establishment of salt-tolerant roadside turf.

Task 4: Second Year Field Research on Salt-Tolerant Roadside Turf Establishment.
The University will conduct research to establish best management practices for the establishment of salt-tolerant roadside turf.

Task 5: Completion of Field Research
The University will complete their field research. In addition, the University will also develop recommendations on installation standard specifications based on their findings. The University will also assist with the creation of detailed diagrams and instructions for turfgrass sod and seed installations along roadsides.

Task 6: Compile Report, Technical Advisory Panel Review and Revisions
The University will prepare a draft report, following MnDOT's publication guidelines, to document project activities, findings and recommendations. This report will need to be reviewed by the TAP, updated by the University's Principal Investigator and then approved by the Technical Liaison before this task is considered complete. Holding a TAP meeting to discuss the draft report and review comments is strongly encouraged. The University should consult TAP members for clarification or discussion of comments.

Task 7: Final Published Report Completion
During this task, the Approved Report will be processed by MnDOT's Contract Editors. The editors will review the document to ensure the document meets the publication standard. The University will then prepare a Final Report and submit it for publication through MnDOT's publishing process.

Task Deliverables

Task:	Deliverable(s):
1:	A Summary Report, describing the task findings, submitted to MnDOT
2:	A 2-Year Research Plan for Conducting Field Trials, submitted to MnDOT
3:	A Summary Report, describing the first year field trials, submitted to MnDOT
4:	A Summary Report, describing results from all field trials, submitted to MnDOT
5:	A Summary Report, with preliminary results from all field trials, will be submitted to MnDOT; Installation Standard Specification Recommendations
6:	Approved Report
7:	Final Published Report

PROJECT SCHEDULE

Task Durations

Months:	2013						2014											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Task 1	X	X	X	X	X	X												
Task 2						X	X	X	X	X	X	X						
Task 3													X	X	X	X	X	X
Task 4																		
Task 5																		
Task 6																		
Task 7																		

Months:	2015											
	19	20	21	22	23	24	25	26	27	28	29	30
Task 1												
Task 2												
Task 3	X	X	X	X	X	X						
Task 4							X	X	X	X	X	X
Task 5												
Task 6												
Task 7												

Months:	2016											
	31	32	33	34	35	36	37	38	39	40	41	42
Task 1												
Task 2												
Task 3												
Task 4	X	X	X	X	X	X						
Task 5							X	X	X	X	X	X
Task 6												X
Task 7												

Months:	2017						
	43	44	45	46	47	48	49
Task 1							
Task 2							
Task 3							
Task 4							
Task 5							
Task 6	X	X	X	X	X		
Task 7					X	X	X

Task Completion Dates

Task:	Completion Date:
1:	December 31, 2013
2:	June 30, 2014
3:	June 30, 2015
4:	June 30, 2016
5:	December 31, 2016
6:	May 31, 2017
7:	July 31, 2017