

**EXHIBIT A
SCOPE OF SERVICES**

MODERNIZING ROAD CONSTRUCTION PLANS AND DOCUMENTATION

BACKGROUND

Plans and specifications have a variety of information. Current construction documents reflect the needs of close to 20 years ago and it can be hard to visualize plans in 3D with current standard submittals. Constructability is hard to understand because the current process is lagging behind available technology. This research will investigate what is really needed on construction plans and what does the contractor really need to build what is proposed. It will also identify the necessary requirements to provide for construction plans. The requirements need to change and may be a sliding scale based on the project being constructed. What goes in a plan set for a total reconstruction might look different than what goes in the set or is required for a total reconstruction.

OBJECTIVE

This research will assist Minnesota's city and county engineers in getting a better understanding of how and which types of plans, models, and other bid documents are used and delivered electronically in the construction industry, and how these practices can be employed in Minnesota cities' and counties' business practices. Visualization in 3D can be difficult with the current 2D standard submittals. The 3D modeling is being implemented by leading contractor companies, as well as some Departments of Transportation (DOTs) including MnDOT. However, these models are not provided in an electronic format as part of bid documents. Instead, hundreds of pages of plans, models, and other bid documents are provided in hard copy. Potential benefits of this research would be reduced design staff time and costs, reduced design review times, reduced requests for information and field corrections, as well as reduced amount of paper used and reduced office supply costs. A better understanding of electronic bid submittals and electronic project delivery would help to improve entire work process flows from planning to design and construction while setting new requirements and standards for construction plans and documentation. The users will be Minnesota city and county employees involved in design, contracts and construction. The workshops with Minnesota city and county engineers will allow researchers to assess the recommendations reached through the study, and how electronic plans, models and other bid documents are viewed by the implementers in Minnesota cities and counties.

SCOPE

This research will use a state of practice examination to identify both owner and contractor needs for construction plans and documents in electronic formats. Interviews will also be conducted with those organizations to gain a better understanding of how construction plans and documents are used in those organizations. Minnesota cities and counties personnel will also be interviewed to have a better understanding of current design and construction practices within Minnesota cities and counties. A workshop with Minnesota city and county employees involved in design, contracts, and construction, will be conducted to verify that the research recommendations align with Minnesota cities' and counties' business practices. Finally, an implementation guidance will be provided.

WORK PLAN

Task Descriptions

Task 1: Minnesota Cities and Counties and MnDOT Practices

The first task will explore the current design and construction practices within Minnesota cities and counties and MnDOT. The University will interview state engineering consultants during this effort. This will include looking at accuracy, time/cost efficiency, current standard plans and other bid submittals, current work flow processes, and legal requirements for these practices. The University will collect policies and procedures and requesting suggestions for improvements.

Task 2: Other DOT and European Practices

Under Task 2, the University will explore how other DOTs and transportation authorities in European countries such as Norway and England provide construction plans and other bid documents. The University will gather information on policies and procedures as well as manuals for guidance. The University will look at advantages and disadvantages of each and request information on the background and suggestions for improvement.

Task 3: Industry Practices

Task 3 will be similar to the first two tasks, except the focus will be on industry including building construction industry since they are ahead of horizontal construction sector in terms of implementing 3D modeling. The University will investigate what type of plans and other bid documents industry actually needs and uses in electronic format in their work processes.

Task 4: Presentation/Workshop with Minnesota City and County Engineers

In Task 4, the University will present to the team of Minnesota cities and counties personnel, MnDOT personnel and other key people such as designers, construction manager and inspectors with the findings from the first three tasks. From this information, Minnesota cities and counties will select up to three ideas/concepts/tools for further investigation to develop guidance specific for Minnesota cities and counties. The University will hold a workshop with key personnel (Minnesota cities and counties and Federal Highway Administration [FHWA]) for this selection.

Task 5: Draft Guidance

During this task, the University will develop draft guidance for using the methods selected in Task 4. This guidance will provide some steps for incorporation in the design, bid, and construction processes. The University will work closely with Minnesota cities and counties personnel and base some of the guidance off the information collected in during the first three tasks. This guidance does not include tool development nor does it include implementation by Minnesota cities and counties.

Task 6: Compile Report, Technical Advisory Panel Review and Revisions

A draft report will be prepared, following Minnesota Local Road Research Board (LRRB) publication guidelines, to document project activities, findings and recommendations. This report will need to be reviewed by the Technical Advisory Panel (TAP), updated by the University's Principal Investigator (PI) to incorporate technical comments, and then approved by Technical Liaison before this task is considered complete. Holding a TAP meeting to discuss the draft report and review comments is strongly encouraged. TAP members may be consulted for clarification or discussion of comments.

Task 7: Editorial Review and Publication of Final Report

During this task, the Approved Report will be processed by Minnesota LRRB's Contract Editors. The editors will review the document to ensure it meets the publication standard. This task must be completed within the contract time because the editors will provide editorial comments and request information from the Principal Investigator.

Task Deliverables

Task:	Deliverable(s):
1:	White Paper of Practices (anticipated 10-20 pages)
2:	White Paper of Practices (anticipated 10-20 pages)
3:	White Paper of Practices (anticipated 10-20 pages)
4:	Presentation and Workshop Meeting Minutes
5:	Guidelines (anticipated 10-20 pages), for incorporation in Minnesota cities' and counties' road design manual
6:	A Draft Report and Final Report, approved for publication
7:	Final Published Report

PROJECT SCHEDULE**Task Completion Dates**

Task:	Draft Deliverable Due Date:	Final Task Approval Date:
1:	August 31, 2014	October 31, 2014
2:	August 31, 2014	October 31, 2014
3:	August 31, 2014	October 31, 2014
4:	October 31, 2014	November 30, 2014
5:	February 28, 2015	March 31, 2015
6:	April 30, 2015	July 31, 2015
7:		October 31, 2015

Task Durations

Months:	2014								2015									
	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												
Task 3	X	X	X	X	X	X												
Task 4						X	X											
Task 5							X	X	X	X	X							
Task 6											X	X	X	X	X			
Task 7																X	X	X

Key Milestones

Key Milestones	Target Date	Description
Presentation/Workshop with Minnesota City and County Engineers	October 1, 2014	Workshop to be held with key Minnesota city and county personnel to present the results from the first three tasks.

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