



STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

RICK SNYDER
GOVERNOR

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DIRECTOR

July 20, 2017

Mr. Russell L. Jorgenson, P.E.
Division Administrator
Federal Highway Administration, Michigan Division
315 West Allegan Street, Room 201
Lansing, Michigan 48933

Dear Mr. Jorgenson:

Fiscal Year 2014 Michigan State Transportation Innovation Council
Incentive 3D Positioning for Construction

Thank you for your recent request for close out information regarding the State Transportation Innovation Council (STIC) incentive funding used for the Michigan Department of Transportation's (MDOT's) 3D Positioning for Construction effort. Below are final project details:

Project or Product Description

The project provided Construction Manual Guidance and the creation of an Automated Machine Guidance Special Provision (AMG SP). This documentation provided criteria for inspection activities and for the prime contractor to follow when using Automated Machine Guidance (AMG) in lieu of staking. A one-day summit on 3D Positioning was held with stakeholders from the Federal Highway Administration (FHWA), MDOT, contractors, consultants, and software/hardware vendors as a knowledge transfer and to gain feedback on the documentation.

How the Work Specifically Meets the Program Criteria

The goal is to make progress toward electronic construction and slowly shift away from portable document format (PDF) paper plan sheets to electronic data as part of the contract. These principals also move the department toward Civil Integrated Management (CIM) where electronic data flows from one phase of a project to the next (design to construction to asset management). This 3D Positioning for Construction STIC began the evolution by putting criteria around the contractor's use of AMG throughout the state. The resulting stake-less construction pushes innovation by using electronic field inspection methods. Use of technology increases efficiencies, quality, and construction site safety.

Result of the Project

The main deliverable of the project was the AMG Special Provision, which opened the door to innovation. Once MDOT made the use of AMG official, it created the need for other changes. Two positions were created to perform quality assurance activities on 3D models and digital data throughout a project's development. This resulted in higher quality electronic deliverables to contractors. Using electronic construction, the department expects to realize reduced construction delays associated with potential plan revisions by supplying the contractor with data instead of PDF plan sheets. MDOT construction staff began to innovate on how to inspect the contractor's work using automated methods without the use of wooden stakes. We created the Digital Delivery Working Group made up of MDOT staff, contractors, and consultants to further the activities started with the STIC project.

Challenges

The main challenge has been gaining consensus for the contract language in the AMG SP between MDOT and the contractors' association. With increased use on projects and more experience with AMG, we are on our third revision. Cultural changes to shift from paper-based processes to electronic has also proved challenging. There is fear of limiting competition by requiring digital activities. However, to mitigate this risk, we are seeking additional STIC funding to train Disadvantaged Business Enterprises and small contracting companies. There is also a perceived risk of digital data as part of a contract, in a legal context, based on experience in dealing with construction claims and responsibilities.

Lessons Learned

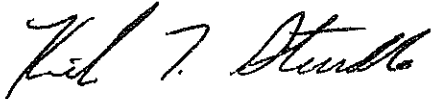
Collaboration with stakeholders is critical in acceptance of new initiatives. The AMG SP standardized contractor requirements for the use of AMG technology, although optional, caused concerns from stakeholders which necessitated changes to the AMG SP language regarding ownership of the model and the associated risk. These concerns will continue until we can achieve data as part of a contract where stakeholders all work from the same data and there is formal ownership and documented change process. Training of both MDOT and contractor staff will be necessary to further evolve AMG technology and digital delivery of contract information, as previously described.

Expense Report

FHWA STIC Funding Amount (MDOT Job #125808)	\$45,500.00
Total Cost (Consultant Survey Solutions Inc.)	\$43,956.54

If you have any questions, please contact either me or Bradley C. Wieferrich, Bureau of Development Director, at 517-241-3998 or weiferichb@michigan.gov.

Sincerely,



Kirk T. Steudle
Director

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