

CHECKLIST TO DESIGNATE AREAS OF EVALUATION FOR REQUESTS FOR PROPOSAL (RFP)

Research Administration Use Only

	REQUISITION NUMBER 1848	DUE DATE 11/30/2015	TIME DUE Noon est
MDOT PROJECT MANAGER Jeff Triezenberg	JOB NUMBER (JN) TBD		CONTROL SECTION (CS) n/a

DESCRIPTION Development of 3D and 4D Bridge Models and Plans

Check all items to be included in RFP			Provide only checked items below in proposal
Check the appropriate Tier in the box below			
<input type="checkbox"/> TIER I (\$50,000-\$150,999)	<input checked="" type="checkbox"/> TIER II (\$150,000-\$1,000,000)	<input type="checkbox"/> TIER III (>\$1,000,000)	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Understanding of Service
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Past Performance
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Qualifications of Team
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Quality Assurance/Quality Control
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location: The percentage of work performed in Michigan will be used for all selections unless the project is for on-site inspection or survey activities, then location should be scored using the distance from the consultant office to the on-site inspection or survey activity.
N/A	N/A	<input type="checkbox"/>	Presentation
N/A	N/A	<input type="checkbox"/>	Technical Proposal (if Presentation is required)

The prime consultant/vendor is responsible for the successful completion of the service and is expected to perform at least 40 percent of the services, by dollar value. The basis of payment is Actual Costs for Universities and Actual Costs plus Fixed Fee for Consultants as defined in standard MDOT contracts.

If your organization is interested in providing services, please indicate your interest by submitting a proposal following the **research guidelines** near the top of MDOT's Request for Proposals Web page at http://www.michigan.gov/mdot/0,1607,7-151-9625_32842--_00.html.

RFP SPECIFIC INFORMATION

Problem Title: Development of 3D and 4D Bridge Models and Plans
OR Number: OR15-191

This is Best Value Selection which means the budget amount submitted with the proposal is a component of the proposal score, not the determining factor of the selection.

PROPOSAL SUBMITTAL INFORMATION

PROPOSAL AND BID SHEET EMAIL ADDRESS –

mdot-rfp-response@michigan.gov with a CC to
mdot-research@michigan.gov

GENERAL INFORMATION

Any questions relative to the Research Problem Statement must be submitted by e-mail to:

mdot-research@michigan.gov. Questions must be received by 4 business days prior to the RFP due date at 5:00 p.m. EST. All questions and answers will be placed on the MDOT RFP Web site as soon as possible after receipt of the questions and at least three (3) days prior to the due date listed above. The names of organizations submitting questions will not be disclosed.

MDOT is an equal opportunity employer and MDOT DBE firms are encouraged to apply. The participating DBE firm, as currently certified by MDOT's Office of Equal Opportunity, shall be listed in the Proposal.

MDOT AND RESEARCH FORMS REQUIRED AS PART OF PROPOSAL SUBMISSION:

5100D- Request for Proposal Cover Sheet

Schedule of Research Activities Form- Appendix B

Deliverables Table- Appendix A

5100J- Consultant Data and Presignature sheet is required for signatory on this proposal

Research Proposal Budget Form Worksheet Appendix C (Universities)

Or

Budget Exhibits required in [Priced Proposal Guidelines](#) (Consultants)

MANDATORY ELECTRONIC SUBMITTAL

Proposals submitted for this project must be submitted electronically.

The following are Requirements for Electronic Submittals:

- Proposals must be prepared using the most current Research guidelines found at the top of the page- [MDOT – Research Proposal Guidelines](#).
- The proposal must be bookmarked to clearly identify the proposal sections (See Below)
- For any section not required per the RFP, the bookmark must be edited to include “N/A” after the bookmark title.
- Proposals must be assembled and saved as a single PDF file
- PDF file must be 5 megabytes or smaller
- PDF file must be submitted via e-mail to MDOT-RFP-Response@michigan.gov with a cc to mdot-research@michigan.gov
- MDOT’s requisition number and company name must be included in the subject line of the e-mail. The PDF shall be named using the following format:
 - **Requisition#XXX_Company Name.PDF**
- MDOT will not accept multiple submittals
- Proposals must be *received* by MDOT on or before the due date and time specified in each RFP

If the submittals do not comply with the requirements, they may be determined unresponsive.

The Proposer will receive an e-mail reply/notification from MDOT when the proposal is received. Please retain a copy of this e-mail as proof that the proposal was received on time. Proposers are responsible for ensuring the MDOT receives the proposal on time.

****Contact Contract Services Division immediately at 517-373-4680 if you do not get an auto response****

Required Bookmarking Format for RESEARCH ADMINISTRATION PROPOSALS ONLY:

1. Request for Proposal Cover Sheet Form 5100D
 - A. Consultant Data and Signature Sheet, Form 5100J (if applicable)
2. Understanding of Service
3. Qualifications of Team
4. Past Performance
5. Quality Assurance / Quality Control Plan
6. Location
7. Pricing Documents/Bid Sheet (if applicable)
8. Appendices

Michigan Department of Transportation

SCOPE OF SERVICE FOR RESEARCH SERVICES OR#:15-191

LOCATION: Statewide

WORK DESCRIPTION: Research on Development of 3D and 4D Bridge Models and Plans

ANTICIPATED START DATE: March 1, 2016

ANTICIPATED COMPLETION DATE: March 31, 2018

MDOT RESEARCH PROJECT ADMINISTRATION MANAGER:

Jeff Triezenberg
6333 Lansing Road
Lansing, Michigan 48917
E-MAIL: mdot-research@michigan.gov

GENERAL INFORMATION:

1. PROBLEM TO ADDRESS

MDOT's road design, survey, and construction processes are rapidly developing and implementing 3D and 4D (4D is time or project schedule) modeling for plan set development and operational management. Research is needed to develop and standardize bridge 3D and 4D bridge modeling in coordination with these other processes. The models will be used by bridge designers during the design process to size and place bridge components, confirm fit-up of precast elements, identify conflicts, show part-width and multi-stage construction, and demonstrate accelerated bridge construction sequence. They should communicate the bridge plan set to engineers and contractors in a unique new way that will help to coordinate and implement global project activities. Finally, the model should be standardized so that in the future it can be integrated with or communicate with bridge operational needs, including bridge inspection, load rating, and management

2. RESEARCH OBJECTIVES

1. Review state-of-the-art bridge modeling.
2. Recommend a framework to efficiently develop a model that meets the needs of bridge designers, engineers, and contractors.
3. Demonstrate 3D modeling capabilities for representative MDOT bridge types.
4. Develop instructions and training materials.

3. URGENCY AND IMPLEMENTATION BENEFIT TO MDOT

The scale of implementation will partially depend on the ability of the research team to develop efficiencies.

Implementation of 3D and 4D Bridge models will provide coordinated survey and plan development with other MDOT roadway design and survey processes. The models would also help MDOT with the operational management of its bridges. Additionally, models will improve the contract plan's effectiveness in communicating designs to bridge contractors resulting in reduced oversights and errors during the bidding process and construction.

4. RISKS OR OBSTACLES TO RESEARCH

Ideally, MDOT could make use of the 3D model for bridge inspection needs. In order to make this an efficient process, a model should be created from the existing Bridge Management Database in an automated process. The report should address the feasibility of creating 3D models for inspection from the database.

MDOT is currently contracted with Michigan Technological Research Institute to develop field inspection 3D models generated by the Unreal Engine 4 software for use in the field on tablets. This project should coordinate with the development of the product from that project titled, Wireless Data Collection and Retrieval of Bridge Inspection and Management Information OR14-021.

5. DESIRED QUALIFICATIONS IN AN INVESTIGATOR(S)

Investigators should have a background in the design and construction administration of bridge projects (preferably MDOT projects). Additionally, a strong background in CADD software (specifically Bentley MicroStation) and automating drafting procedures is preferred. Finally, investigators should have strong technical writing skills.

There is no statistical qualification requirement for this proposal.

CONSULTANT RESPONSIBILITIES:

1. Phase I: Review State-of-the-Art Bridge Modeling – Review current practices of the highway bridge design community and the American Association of Highway and Transportation Officials (AASHTO) Subcommittee on Bridges and Structures (SCOBS). Report common practices and uses for 3D bridge CADD models in Michigan and other states. Report requirements other DOTs, agencies, or companies have developed for 3D CADD models. Meet with MDOT personnel to determine their business needs. Areas of interest within MDOT include Design, Bridge Management, Construction, and Maintenance. Present findings in a written report that will be included as a chapter in the final research report.
 - a) Literature review
 - b) Survey of practices at other state DOTs
 - c) Interview all interested parties within MDOT
 - d) Preliminary Report I – Phase I findings

2. Phase II: Make Recommendations – Recommend a framework to efficiently develop a model that meets the needs of bridge designers, engineers, and contractors. The model should be integrated with road 3D modeling practices and be part of the overall highway spatial datum. The model should be standardized so that in the future it can be integrated, or at least communicate with bridge operational needs, including bridge inspection, load rating, and management. The framework should include considerations for best use of solids, feature solids, macros, feature cells, parameter sets, multiple models, references, etc. The preferred language for macros is VBA. Efforts should concentrate on displaying the visible concrete and structural steel elements for a bridge. The feasibility of adding rebar and prestressing strands should be investigated. Consideration should also be made for showing the model at various stages of construction (4D) and staged construction scenarios. Recommendations should compare the current business process and explain advantages/disadvantages of 3D CADD. Software platforms used to create 3D models should focus on products currently available to MDOT (e.g. Bentley MicroStation9., GEOPAK, etc.) so that financial barriers to implementation remain low. Present findings in a written report to be included as a chapter in the final research report.
 - a) Develop recommendations for a framework to create 3D bridge models
 - b) Preliminary Report II – Phase II findings
3. Phase III: Demonstrate 3D modeling capabilities – Create 3D and 4D models for 3-6 representative bridge types demonstrating the macros, wizards, shape libraries, and processes to make model development intuitive and efficient. The geometry of the sample bridges can be determined by the PI; however, bridges should include (at a minimum) piles, footings, abutment walls, pier(s), bearings, back walls, primary and secondary support members, deck, and barriers. Bridge geometry should be accurately modeled, including beam cambers and deck haunches. Present findings to MDOT in a live demonstration meeting.
 - a) Produce 3D and 4D bridge model examples
4. Phase IV: Develop instructions and training material – Document the use of any recommended techniques in a training manual. The manual should be self-explanatory, user-friendly, and unambiguous. It should contain step-by-step instructions on how to use any special techniques, macros, wizards, feature cells, or shape libraries developed with this project. Incorporate graphics such as screen shots, diagrams, and flow charts for instructional purposes.
 - a) Final report
 - b) Present models
 - c) Develop instructions and training material

Failure of any of the above will be found in noncompliance with the contract.

DELIVERABLES:

Macros, VBA code, wizards, shape libraries, and procedures created to intuitively and efficiently develop 3D bridge models. Several demonstration 3D bridge models in a .dgn format. Digital files

could be emailed if size allows, otherwise digital files can be delivered in a method at the PI's discretion.

Report number I, II, and the final report must be submitted in .pdf format. Submit draft final report at approximately 75% of report completion.

User's manual may be .pdf document, or Wiki format.

MDOT RESPONSIBILITIES:

Existing 3D models for road. Plan sets as requested. Information on the Bridge Management Database if requested.

COORDINATION PROCEDURES

Work will be completed in compliance with the Research Implementation Manual

CONSULTANT PAYMENT

All billings for services must be directed to the Department and follow the current Research Implementation Manual. This document contains instructions and forms that must be followed and used for billing. Payment may be delayed or decreased if the instructions are not followed.

Payment to the Consultant for services rendered shall not exceed the maximum amount unless an increase is approved in accordance with the contract with the Consultant.

Direct expenses, if applicable, will not be paid in excess of that allowed by the Department for its own employees in accordance with the State of Michigan's Standardized Travel Regulations. Supporting documentation must be submitted with the billing for all eligible expenses on the project in accordance with the Reimbursement Guidelines. The only hours that will be considered allowable charges for this contract are those that are directly attributable to the activities of this project.

The use of overtime hours is not acceptable unless prior written approval is granted by the MDOT project manager. Reimbursement for overtime hours that are allowed will be limited to time spent on this project in excess of forty hours per person per week. Any variations to this rule should be included in the priced proposal submitted by the Consultant and must have prior written approval by the MDOT project manager.

The basis of payment is Actual Costs for Universities and Actual Costs plus Fixed Fee for Consultants as defined in standard MDOT contracts.

PROPOSAL INFORMATION AND SCORING

Formal proposals are required and shall include the information as outlined in these Guidelines. This section is the information required in the proposal that will be used to score the qualifications of each consultant's proposal. The section numbering correlates to the score sheet. Therefore, the consultant should format their proposals consistent with the outline provided.

1. UNDERSTANDING OF SERVICE: 40 POINTS

Describe understanding of the service intended to be proposed. This information is to be based on the scope of services.

Problem Statement and Background Summary- demonstrates good understanding of problem, looks objectively at problem, specifies problem limits and restricts scope appropriately, and cites relevant literature.

Research Plan- cites specific objectives clearly, technical approach responds to all written and implied requirements, difficult areas are identified and details to overcome are given, represents novel idea or technical approach, plan is feasible, and effort is consistent with scope of problem.

Products and Implementation- proposal clearly defines products to be delivered at completion, includes practical, realistic implementation plan.

MDOT Involvement- MDOT involvement is not excessive and is clearly defined and quantified.

2. QUALIFICATIONS OF TEAM: 30 POINTS –

Describe the structure of the project team including the roles of all key personnel and subcontractors. For each subcontractor describe role in service and include what percent of the task that the subcontractor is expected to provide. Provide résumés for each of the key staff of the prime and subcontractor.

Facilities- proposer has adequate access to equipment and/or laboratory required in study.

Staffing- personnel availability is clearly defined, shows a depth of qualified personnel, proposer has ability to manage a project of this size an sufficient resources to complete study, qualifications are directly related to the requirements of the project, plans for specific key personnel assignment included, and there is a reasonable balance between subcontractor and prime contractor.

Statistical Qualification- The required knowledge level for a research team in statistical analyses, if defined, will be in the RFP under the heading DESIRED QUALIFICATIONS IN AN INVESTIGATOR(S).

Proposals not documenting statistical training and experience levels required in the RFP may be classified as non-responsive.

3. RELEVANT PAST PERFORMANCE: 30 POINTS

The project manager will contact references and review relevant performance evaluations from the past 5 years.

Record of past accomplishment- proposer satisfactorily completed past projects, was cooperative and flexible, and ended past projects according to the original budget and time schedule.

4. QUALITY ASSURANCE/QUALITY CONTROL (QAQC) PLAN: 5 POINTS

The proposer provided an outline of a QA/QC process. The QA/QC Manager is experienced with MDOT standards and practices.

5. LOCATION: 5 POINTS

The percentage of work hours performed in Michigan will be used for all selections unless the project is for on-site inspection or survey activity. The combination of location and percentage of work performed in Michigan should not exceed 5 points.

Percentage of Work To Be Done in Michigan Score	
95% to 100%	5
80% to 94%	4
50% to 79%	3
25% to 49%	2
10% to 24%	1
Less than 10%	0

6. PRICE: 40 POINTS

Cost score is based on the lowest cost proposed divided by the current proposer cost multiplied by 40. Lowest bid shall receive 40 points.

TOTAL POINTS: 150

Research Proposal Budget Form Worksheet

Project Title _____
 Research Organization _____
 Date _____

									FY1	FY2	FY3	FY4	TOTAL	
SALARIES & WAGES -- MUST COMPLY WITH OMB CIRCULAR A-21														
Specify number of hours to be worked and hourly rate for each individual below: Examples of role of individual are Principal Investigator, Technician, Grad Student, etc. Annual wage increases must not exceed 2%														
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-Total Salary & Wages									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	

FRINGE BENEFITS -- MUST COMPLY WITH OMB CIRCULAR A-21

Indicate Employee, appropriate negotiated rate for each and description of who the rate applies to.
 (e.g. - Sam Smith, 25%, Summer Faculty. The rate is negotiated between the university and it's cognizant agency

Name									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-Total Fringe Benefits					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

SUBCONTRACTOR -- MUST COMPLY WITH OMB CIRCULAR A-21

A copy of the subcontractor's budget must be attached. An MDOT approved subcontract is required for subcontractor costs in excess of \$25,000 prior to payment of invoices that contain subcontractor work. List all subcontractors on a separate line.

Subcontractor Name & Amt.									\$0.00
Subcontractor Name & Amt.									\$0.00
Sub-Total Subcontractor					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

TRAVEL -- MUST COMPLY WITH OMB CIRCULAR A-21

Must be in accordance with IDS contract requirements.

In-State Travel (Destinations within Michigan) Provide a separate table itemizing costs.									\$0.00
Out-of-State Travel (Prior approval required) Provide a separate table itemizing costs.									\$0.00
Sub-Total Travel					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

SUPPLIES -- MUST COMPLY WITH OMB CIRCULAR A-21 (Few items not allowed are: computers, printers, monitors, fax machines, printer paper, toner cartridges, pens, pencils, legal pads, clips, rubber bands, post-it notes, books, notebooks, binders, folders, diskettes, postage stamps, chairs, office furniture, calendars, paper punches, business cards, staplers, waste cans, etc.)

Provide details if cost exceeds \$2,000. Individual line items in excess of \$1,000 require a detailed explanation regardless of total cost

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
Sub-Total Supplies		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

CAPITAL EQUIPMENT -- MUST COMPLY WITH OMB CIRCULAR A-21 - Purchased specifically for this project

List items with a value in excess of \$500. Equipment in excess of \$5,000 requires prior approval.

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
Sub-Total Equipment		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

OTHER EXPENSES -- MUST COMPLY WITH OMB CIRCULAR A-21 (Few items not allowed are: memberships in professional & scientific organizations, local telephone lines, cell phones, etc.)

Any project expense which does not fall into another category. Provide detailed explanation of the expense and applicable breakdown of costs (e.g. graduate student tuition).

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
Sub-Total Other Expenses		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Total Sub-Totals \$0.00 \$0.00 \$0.00 \$0.00 \$0.00

INDIRECT COSTS -- MUST COMPLY WITH OMB CIRCULAR A-21

Indirect cost rates are negotiated between the university and it's cognizant agency. Indicate the type of negotiated indirect rate used and the percentage (e.g. On Campus Research, 52%)

(Type)		(%)								
			FY1	FY2	FY3	FY4				
Enter \$ Amt per FY							\$0.00	\$0.00	\$0.00	\$0.00
Total Indirect Costs							\$0.00	\$0.00	\$0.00	\$0.00

TOTAL PROJECT COSTS \$0.00 \$0.00 \$0.00 \$0.00 \$0.00

UNIVERSITY MATCHING FUNDS \$0.00

TOTAL MDOT PROJECT COSTS \$0.00 \$0.00 \$0.00 \$0.00 \$0.00