ATTACHMENT 39 – Mn/DOT CONSULTANT SERVICES WORK TYPE DEFINITION DATED MARCH 26, 2003

(8 pages)

Mn/DOT Office of Technical Support—Consultant Services
Work Type Definition
Rev. 1 (3/26/03)

Work Type Name	**3.1 Bridge Design**
Work Type Owner	Office of Bridges & Structures (Bob Miller)
Work Type Input	Inputs may include some or all of the following: • Approved bridge preliminary plan; • Foundation geotechnical report; • Bridge Survey; • Geometric layouts; • Road plans. • Hydraulic Reports
Work Type Definition	*Bridge preliminary design* involves preparing a preliminary plan upon which final design can be based and may include surveys, foundation report, horizontal and vertical controls, and structure type. *Bridge final design* involves production and/or review of professionally engineered bridge plans which conform with acceptable design standards and which meet the specific requirements of Mn/DOT, American Association of State Highway & Transportation Officials (AASHTO), and/or the Federal Highway Administration (FHA). *Bridge study* involves report preparation of specific bridge related issues.
Work Type Output	Bridge construction plans and documents.
Specific Examples of Output	• Certified final bridge construction plans, including non-standard special provisions, 100% complete and ready for construction contract bidding, that meet all project specific requirements. • Final reports, which may require certification, that meet all project specific requirements. • Bridge preliminary plans, 100% complete, as the basis for final bridge plan design and preparation. • All design services, a set of computations and electronic design files in a format compatible with Mn/DOT's Microstation (latest version). • Cost estimates and construction documents, including special provisions.
Quality Attributes of Output	Consultant to check/verify bridge plans in conformance with Mn/DOT Bridge Design Manual and their documented QA/QC Plan. In some cases this requires a complete, independent analysis. Consultant's QA/QC plan must address their methods of verifying their work, including review submittals, comments from previous submittals, and final deliverables.

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Work Type Name	**3.1 Bridge Design (cont.)**		
Levels of Work Type Output (Compare & Contrast)			
Level 1 Average Bridge Design	*Level 2 Complex Bridge Design*	*Level 3 Specialty Bridge Design*	*Level 4 Bridges & Structure Studies*
1. Bridges with multiple spans and some aesthetic treatments. 2. Structural steel beam bridges with moderate skews. 3. Pre-stressed concrete beam bridges with moderate to high skews. 4. Substructures supported on pile or spread footings. 5. High or low parapet type abutments. 6. Long wingwalls supported on footings. 7. Includes designs for both new construction and bridge renovation. 8. Moderate staging may be required. 9. May include preliminary and final design services. 10. May include attached cantilever retaining walls.	1. Curved structural steel girder bridges. 2. Straight structural steel girder bridges with skews greater than 20 degrees. 3. Post tensioned concrete box girders supported on falsework during construction. 4. Rigid Frames with balanced lateral loads and/or moderate skew. 5. Bridges with extensive aesthetic treatments or complex geometry. 6. River crossings. 7. Railroad bridges. 8. Includes designs for both new construction and bridge renovation. 9. Significant staging may be required. 10. May include special provisions. 11. May include preliminary and final design services. 12. May include attached cantilever retaining walls or earthen walls	1. Segmental post tensioned concrete box girder bridges. 2. Steel box girder bridges. 3. Truss bridges. Concrete or steel arch bridges. 4. Major river crossings with unique geotechnical conditions. 5. Rigid Frames with unbalanced lateral loads and/or high skew. 6. Includes designs for both new construction and bridge renovation. 7. Includes development of construction specifications. 8. May include preliminary and final design services. 9. May include attached cantilever retaining walls or earthen walls.	1. This work involves evaluation of new or in place structures (includes bridges, retaining walls, earthen walls, culverts, other miscellaneous structures) and the preparation of studies & reports relating to the structures' design, construction, and/or maintenance issues. 2. Studies include but are not necessarily limited to: • Field investigations; • Structural, mechanical, electrical analysis; • Bridge ratings • Repair cost estimates; • Bridge life expectancy estimates; • Development of design and construction specifications for non-standard projects.

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3.1 Bridge Design Minimum Technical Qualifications	
Requirements of the Professional Staff	
Minimum Number of Staff	• At least two professionals are required *at the local office* for Level 1 and Level 2 Projects. One of the professionals is required to perform independent checks of data, calculations and reports of the other. • At least two professionals are required for Level 3 and Level 4 Projects. One of the professionals is required to perform independent checks of data, calculations and reports of the other. • Number of professional and technical support personnel must be recorded and updated.
Professional Certification/Licensure	• The qualified engineering personnel shall have engineering training, experience, knowledge, and expertise in the appropriate areas necessary to do the project in accordance with AASHTO, FHWA, Mn/DOT, and all other applicable design policies, procedures, practices and standards. • At least one of the engineers shall be a Minnesota Board Registered Professional Civil Engineer as specified under *Minimum Number of Staff.*

3.1 Bridge Design Minimum Technical Qualifications	
Requirements of the Professional Staff (cont.)	

Qualifying Experience	• Level 1
	  ○ Satisfactory experience must be demonstrated on at least two certified bridge plans of at least Level 1 complexity in the last ten years *(these projects may be from Minnesota or other states)*; *and*
	  ○ Satisfactory experience on at least three certified bridge plans in the last ten years *of any complexity* (e.g., Simple*, Level 1, Level 2, or Level 3) on the Minnesota State Highway System or Minnesota's County or Municipal Highway Systems. The purpose of this qualification is to demonstrate an understanding of Mn/DOT policies in assembling bridge plans; *and*
	  ○ Staff of local office must be capable of total completion of project.
	
	• Level 2
	  ○ Satisfactory experience must be demonstrated on at least two certified bridge plans of at least Level 2 complexity in the last ten years *(these projects may be from Minnesota or other states)*; *and*
	  ○ Satisfactory experience on at least three certified bridge plans in the last ten years *of any complexity* (e.g., Simple*, Level 1, Level 2, or Level 3) on the Minnesota State Highway System or Minnesota's County or Municipal Highway Systems. The purpose of this qualification is to demonstrate an understanding of Mn/DOT policies in assembling bridge plans; *and*
	  ○ Staff of local office must be capable of total completion of project
	  Note: A professional qualification of Level 2 includes automatic qualification for Level 1 and Level 4.
	
	*(*Note: Simple projects are less complex than Level 1 and not included for pre-qualification but may be used for this criteria)*;

3.1 Bridge Design Minimum Technical Qualifications	
Requirements of the Professional Staff (cont.)	

Qualifying Experience	• Level 3
	  ○ Satisfactory experience must be demonstrated on at least two Level 3 projects in the last ten years *(these projects may be from Minnesota or other states)*; *and*
	  ○ Staff from firm's out-of-state offices with project specific expertise may provide the majority of services; however, *local office must be capable of providing project management* as a minimum.
	
	Note: A professional qualification of Level 3 includes automatic qualification for Level 4.
	Note: Professional qualifications of Level 3 will be qualified for Levels 1 and/or 2 if they are staffed locally to do the work and meet all other pre-qualification criteria.
	
	• Level 4
	  ○ Satisfactory experience must be demonstrated on at least two Level 4 projects in the last ten years; *and*
	  ○ Staff from firm's out-of-state offices with project specific expertise may provide the majority of services; however, *local office must be capable of providing project management* as a minimum.
	
	Note: Professional qualifications of Level 4 will be qualified for Levels 1 and/or 2 if they are staffed locally to do the work and meet all other pre-qualification criteria.

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3.1 Bridge Design Minimum Technical Qualifications	
Requirements of the Firm	
Past Record & Experience of Firm	• Level 1 and 2: Firm must have a local Minnesota office capable of total completion of project that meets Mn/DOT's schedules. • Level 3 and 4: Out-of-state personnel may substantially complete the project; however, the firm must have a local Minnesota office capable of project management as a minimum extent of participation. • Firm must be capable of delivering bridge plans in Microstation (current Mn/DOT version) and special provisions and reports in Microsoft Word (current Mn/DOT version). Level 1 • Firms qualifying for Levels 1 must utilize Prestress Girder, Steel Beam, Slab Span, and Pier Design programs. Level 2 • Firms qualifying for Level 2 must utilize Prestress Girder, Steel Beam, Slab Span, Pier Design and Curved Steel Girder programs. Levels 3 and 4 • Firms qualifying for Levels 3 and 4 must list all programs specific to the work type they are applying. Levels 1, 2, 3 and 4 • Firm's Quality Assurance Plan must certify that they independently validate the accuracy of their bridge analysis and design software programs and program updates. The QA Plan must provide the methodology for the independent validation. The QA Plan must identify the person/position responsible for program updates and validation. • Firm's QA Plan must certify their methodology for checking/verifying the accuracy of their work (i.e. designs, drawings, report preparation). • *Note: Mn/DOT currently follows Load Factor Design (LFD) criteria for bridge designs. Load Resistance Design Factor (LRFD) will be adopted in Calendar Year 2003. All LRFD software must also be validated against design examples illustrated in Mn/DOT's LRFD Manual. The Manual will be made available prior to adoption of LRFD criteria.*

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3.1 Bridge Design Minimum Technical Qualifications	
Submittal Requirements	
Requirements of Professional Staff	• Qualifying experience of key personnel for each category/level of work applied for shall be documented by resumes and personal experience histories. • Other professional and technical personnel used to support pre-qualification shall also be documented.
Requirements of Firm	• Satisfactory experience of the firm in the category shall be documented by reference to completed projects. • Levels 1, 2, and 3: Submit no more than three hard copies of relevant work samples (consisting of General Plan and Elevation sheets and no more than five additional representative sheets, on 11" x 17" bond) that meet the qualifications for each category. *Note: If the samples were not produced for Minnesota's State, County State Aid, or equivalent systems, then also submit no more than three work samples that do.* • Level 4: Submit no more than two hard copies of relevant work samples ($8^1/_2$"x11" is preferred over 11"x17"). Each sample shall consist of no more than 20 relevant sheets. • Work samples of current key personnel may be submitted in lieu of work samples of the firm. To qualify as relevant work sample plans of key personnel that personnel must have been either the registered engineer who certified the plan as the Engineer of Record or a registered engineer with significant participation in plan preparation (i.e. plan sheets initialed for design and/or checking). • Submit copy of *pertinent* sections of Firm's Quality Assurance (QA) Plan that addresses Levels of work being applied for. *It is not required to submit the entire QA Plan.* The QA submittal must include the firm's procedures for checking designs and plan drawings, for updating and validating design software, and verifying information and data contained in special reports. Mn/DOT reserves the right to request additional QA information.
Project Documentation	• Project examples may be submitted electronically on CD's or you can submit project examples in hard copy (i.e. reports, plans, etc.).

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