

Nebraska Department of Roads
STANDARD WORK CATEGORIES



2012

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Standard Work Categories

A. Professional Services

- 100. Corridor Studies
- 101. Environmental Studies
 - A. NEPA Studies
 - B. Other Environmental Studies
- 102. Transportation Planning
- 103. Traffic Operation Studies
- 104. Traffic Operation Design
- 105. Highway Design-Major
 - A. Rural
 - B. Urban
- 106. Highway Design - Minor
 - A. Rural
 - B. Urban
- 107. Bridge Design
 - A. Major
 - B. Minor
- 108. Railroad Design
- 109. Construction Inspection
 - A. Bridge
 - B. Roadway
 - C. Traffic Control Devices
 - D. Railroad Construction and Improvement Projects
- 110. Building Design and Inspection
- 111. Electrical and Mechanical Design
- 112. Railroad Planning
- 113. Intelligent Transportation Systems (ITS)

B. Support Services

- 200. Aerial Photography
- 201. Aerial Photogrammetry
- 202. Engineering Surveying
- 203. Geodetic Surveying
- 204. Land Surveying
- 205. Materials Testing
- 206. Bituminous Design
 - A. Surfacing
 - B. Resurfacing
- 207. Geological Studies
- 208. Bridge Structural Analysis
- 209. Hydraulic and Hydrologic Studies
- 210. ROW Design
- 211. Public Involvement
- 212. Value Engineering

Standard Work Categories Descriptions

A. Professional Services

100. **Corridor Studies:** This class of work is defined as professional and technical efforts required to provide engineering location studies of alternate corridors which may include feasibility study corridor alternates analysis, preparation of design assumptions, corridor study report and participation in location public hearings.

* MQS: Reference Statement C, Page 11

101. **Environmental Studies:**

A. **NEPA Studies:** This work is limited to the study of the environmental and ecological effects of proposed transportation improvements. It does not include determinations of traffic capacity or engineering feasibility, nor does it involve the design of the transportation improvement. This class of work is defined as the estimation of the effects of proposed transportation improvements on the total quality of the human environment. Factors to be assessed, but not limited to, include effects on natural resources, erosion and sedimentation, wildlife habitat and migration, air, water and soil pollution, noise levels and aesthetics, human, social, economic and cultural patterns.

B. **Other Environmental Studies:** This class of work includes such work as pre-investigative assessment work and site investigative work required by the Nebraska Department of Environmental Quality for petroleum remediation. It also includes work such as wetland and channel delineation, mitigation design and permitting and any other work associated with the environmental that would not fall under the NEPA studies.

*MQS: Reference Statements B and C Page 11. (See page 12 Double Qualification Standards.)

102. **Transportation Planning:** This class of work is concerned with solutions to problems involving the movement of people and commodities efficiently, economically, safety and comfortably. This class of work may include the comparison and selection of the best route or routes among several alternatives as well as improvement or expansion of existing routes.

* MQS: Reference statement A & C, Page 11 (See page 12 for Double Qualification Standards).

103. **Traffic Operation Studies (e.g. safety):** This class of work includes studies of existing traffic operations both urban and rural. The requirements are to determine the most effective ways to improve traffic flow and safety, largely by the application of traffic engineering techniques and other corrective measures. It includes sign inventories, signal inventories, intersection and crossing diagrams, study and evaluation of high accident locations, traffic flow and volume study and vehicle speed study. This class of work does not include the preparation of construction plans or the writing of specifications.

* MQS: Reference Statement C, Page 11

* MQS = MINIMUM QUALIFICATION STANDARDS

104. **Traffic Operations Design:** This class of work involves the use of effective traffic engineering to improve traffic and safety by the use of traffic control devices. This category includes the preparation of design plans and specifications, and may include administration of the actual construction of the traffic control devices.
- * MQS: Reference Statement C, Page 11
105. **Highway Design - Major**
- A. **Rural:** This class of work is defined as the production of competently engineered highway plans, designed to high standards as determined by traffic volumes, and includes related computations and specifications. A major rural facility is a high volume, complex, non-routine location, which requires heavy earthwork and major drainage structure design. A portion of this work may require urban section and interchange design.
- * MQS: Reference statement C, Page 11
- B. **Urban:** This class of work is defined as the production of competently engineered plans, designed to high standards as determined by traffic volumes, and includes related computations and specifications. A major urban facility is a high volume, complex freeway, expressway or arterial street design with considerable storm sewer design, roadway lighting design and utility conflicts.
- * MQS: Reference statement C, Page 11
106. **Highway Design - Minor**
- A. **Rural:** This class of work is defined as the production of competently engineered highway plans, designed to standards, as determined by traffic volumes and related computations and includes specifications. A minor rural facility is a secondary, primary or major highway generally located through a rural area which presents no unique or complex design problems. This work may include widening, reconstruction and adjustment of utilities.
- * MQS: Reference Statement C, Page 11
- B. **Urban:** This class of work is defined as the production of competently engineered plans, designed to standards, as determined by traffic volumes and includes related computations and specifications. A minor facility is a non-complex street design, not having unique design problems or a considerable amount of storm sewer design or utility conflicts.
- * MQS: Reference statement C, Page 11
107. **Bridge Design**
- A. **Major:** This class of work is defined as the production of competently engineered bridge plans for a highly complex structure. This category includes, but is not limited to, preparation of construction plans for high level structures with underwater piers, complex interchange structures with curved girders or other major complex bridge structures, or those of advanced or unusual design concepts.
- * MQS: Reference Statement C, Page 11
- * MQS = MINIMUM QUALIFICATION STANDARDS

B. **Minor:** This class of work is defined as the production of competently engineered bridge plans for a relatively simple structure. This category includes, but is not limited to, preparation of construction plans for non-complex bridge structures. Non-complex bridge structures as defined here, are all of those structures not covered under major bridge design.

* MQS: Reference statement C, Page 11

108. **Railroad Design:** This class of work is defined as the production of competently engineered railroad plans, designed to standards, as determined by anticipated traffic density and related considerations and includes specifications and computation of quantities. This work is generally on light density railroad lines carrying up to 5 million gross ton miles per mile, per year. This category could include but is not limited to: preparation of construction plans for rail or rail related facilities including new connections between two or more existing lines, intermodal freight terminals, sidings or relocation of existing lines, and plans for upgrading or replacing existing rail facilities. Facilities means tracks, ties, roadbed and related structures including terminals, team tracks and appurtenances, bridges and other structures used or useable for rail service operations.

* MQS: Reference statement C, Page 11

109. **Construction Inspection**

A. **Bridge:** This class of work is defined as the quality control of construction techniques and materials used in bridge construction. This work involves the inspection of all materials used, such as concrete, steel and the inspection of the superstructure, substructure, pilings, footings and deck systems to assure that the minimum specifications are met on all types of bridges.

* MQS: Reference statement G, Page 12

B. **Roadway:** This class of work is defined as the quality control of construction techniques and materials used in roadway construction. This work involves the inspection of all materials used, such as concrete, steel, culverts, bituminous materials, etc., to assure that they meet the minimum specifications. The inspection of box culvert construction and other types of small drainage structures and systems are included in this class of work.

* MQS: Reference statement G, Page 12

C. **Traffic Control Devices:** This class of work is defined as the quality control of construction techniques and materials used in the construction of traffic signals. This work involves the inspection of all materials used, such as concrete, steel, wires, poles, cables and conduits and the inspection of the pole foundations, loops, signal heads and controller units to assure the minimum specifications are met. This inspection includes the operation, height, plumbness and appearance of the signals.

* MQS: Reference statement G, Page 12

* MQS = MINIMUM QUALIFICATION STANDARDS

D. Railroad Construction and Improvement Projects: This class of work is defined as the quality control of construction techniques and materials used in new railroad construction and rehabilitation projects. This work involves the inspection of all materials used such as rail, ties and ballast, and includes surfacing, cross tie renewal, gauging, relaying rail, ditching, ballast regulating and grading, to assure that minimum specifications are met.

* MQS: Reference statement G, Page 12

110. **Building Design and Inspection:** This class of work is defined as the inspection, design and preparation of plans and specifications for office facilities and transportation associated structures such as highway maintenance garages, truck weighing station buildings, maintenance and storage buildings. This work includes, but is not limited to redesign and renovation of existing structures and offices.

* MQS: Reference statement C & E, Page 11

111. **Electrical and Mechanical Design:** This class of work involves the application of electricity and the utilization of heat and mechanical power in the design and operation of equipment. This category includes, but is not limited to, wiring and air conditioning in buildings, traffic control devices, roadway lighting, etc.

* MQS: Reference statement C, Page 11

112. **Railroad Planning:** This class of work is concerned with the analysis of Nebraska's rail system but primarily the analysis and ranking of selected light density lines for possible federal assistance. This planning function involves an economic analysis using benefit/cost criteria and includes engineering inspections to determine track condition and rehabilitation estimates. It may include the preparation of an annual plan update and public hearing participation.

* MQS: Reference statement B & C, Page 11 (See Page 12 for Double Qualification Standards)

113. **Intelligent Transportation Systems (ITS):** This class of work involves all elements necessary to deploy the short and long range plans for the program. This includes the planning and design of ITS field equipment. It includes the evaluation, selection and deployment of leased systems (i.e. automated work zones, roadway sensors). Additionally, this class of work includes the evaluation and selection to enhance and maintain current ITS software solutions.

* MQS: Reference statement B & C, Page 11 (See Page 12 for Double Qualification Standards)

* MQS = MINIMUM QUALIFICATION STANDARDS

B. Support Services

200. **Aerial Photography:** This class of work includes taking precision quality photographs from air camera station(s) which are suitable for subsequent photogrammetric mapping and planning studies.
- * MQS: Reference statement B, Page 11
201. **Aerial Photogrammetry:** This class of work includes obtaining information about physical objects and environment through processes of recording, measuring and interpreting photographic images. It includes derivation and production of topographic and planimetric maps, surveys, plan sheets and analytical aerial triangulation based on measurements and information obtained from aerial photographs and could include measurement and computation as a basis of payment.
- * MQS: Reference statement B, Page 11
202. **Engineering Surveying:** This class of work is concerned with making physical measurements to obtain both horizontal and vertical distances for use in the planning, design and construction of engineering projects. It includes route surveys for transportation facilities, topographic surveys to determine the relief of a particular tract of land, and hydrographic surveys to determine the shore and banks of bodies of water and depths of particular points.
- * MQS: Reference statement D, Page 11
203. **Geodetic Surveying:** This class of work involves making precise surveys over areas of such considerable extent that the curvature of the earth must be considered. It includes traverse triangulation, trilateration, precise leveling, and astronomic direction finding.
- * MQS: Reference statement D, Page 11
204. **Land Surveying** This class of work includes the determination of boundaries of tracts of land or the measurement of the lengths and directions of lines forming the boundaries of the tract and the writings of descriptions of land areas for conveying purposes.
- * MQS: Reference statement D, Page 11
205. **Materials Testing:** This class of work involves securing samples of materials used in the activities of NDOR, and conducting tests on those samples in accordance with approved specifications.
- * MQS: Reference statement G, Page 12
- * MQS = MINIMUM QUALIFICATION STANDARDS
206. **Bituminous Design**
- A. **Surfacing:** This class of work is defined as competently engineered plans for bituminous (asphaltic concrete) surfacing, designed to standard specifications. This work will include, but is not limited to performing all necessary subgrade and/or soil surveys, locating materials pits for bituminous sand construction, if required, and conducting the necessary prospecting, sampling, testing and reporting. Providing the plans and reports, which include design details, soils reports, quantities, cost estimates and etc.

B. **Resurfacing:** This class of work is designed as competently engineered plans for bituminous (asphaltic concrete) resurfacing, designed to standard specifications. This work will include providing the design calculations and plans, quantities, cost estimates, etc.

* MQS: Reference statement C and G for Surfacing, Pages 11 and 12

Reference statement C for Resurfacing, Page 11

207. **Geological Surveys:** This work involves tracing various soils and geological horizons to optimize highway and bridge locations where the geological makeup could seriously affect subgrades and foundation conditions. This category includes sampling and testing pertinent horizons, determining soils engineering characteristics, locating bedrock and prospecting for sand, gravel and cohesive soils to be used in highway construction and writing geotechnical reports.

* MQS: Reference statement B, Page 11

208. **Bridge**

A. **NBIS Bridge Inspections:** This class of work will involve the performance of bridge inspections necessary to comply with National Bridge Inspection Standards (NBIS).

B. **Load Rating:** This class of work will involve rating bridges in accordance with AASHTO codes using state approved software "LARS".

* MQS: Reference statement A for field work, Page 11

Reference statement C for office work, Page 11

209. **Hydraulic and Hydrologic Studies:** This class of work involves studies of drainage basins or stream diversions to define the most practical design for all hydraulic related issues in flood plains, bodies of water, or marsh areas. This includes the sizing of various types of drainage structures and defining road grade requirements across flood plains

* MQS: Reference statement C, Page 11

* MQS = MINIMUM QUALIFICATION STANDARDS

210. **ROW Design**

A. **Land Ownership Research:** Work effort in this category covers tasks needed to research and assemble data necessary to establish ownership, boundaries, and encumbrances of all land parcels affected by the project to include both existing public Right of Way (ROW), and properties not currently held as public ROW. Work tasks include researching at their customary place of record all titles, deeds, plats, street dedications, street vacations, easements of record, council minutes, road records, survey files, leases, mortgages, deeds of trust, assignments, liens, encumbrances, or any other documentation as needed to establish a five year record of ownership of the property.

* MQS: Reference statement H, Page 11

B. **Right of Way Plans:** Work effort in this category covers tasks needed to create Right of Way plans to encompass the entire project boundary. ROW plans shall be of sufficient size and scale to clearly and accurately illustrate or identify the land survey information, section lines, property monuments, outlots, lot numbers, block numbers, lot lines, subdivision names, section-township-ranges, plan scale, north arrow, street names, city name, town name, county name, city or town boundaries, county lines,

state lines, topography survey items, property lines, ownership information, tract numbers, existing right of way, existing easements, existing control of access, existing control of access breaks, proposed construction elements, grading limits, construction limits, ROW to be acquired, easements to be acquired, control of access to be acquired, control of access breaks to be acquired, project alignment, station and offsets of new and existing ROW, station and offsets of new and existing control of access, construction notes, do not disturb notes, and any other information that will assist in the appraisal and negotiations of the new acquisitions and/or the review of the adequacy of the project ROW needs. Work effort also includes the creation of a situation plan sheet that identifies the location and boundaries of both the project, and the individual tracts within the project. Work also performed under this task includes the creation of a summary of quantities table listing the areas of existing and new ROW, permanent easements, temporary easements, and any other special easements for each tract.

* MQS: Reference statement C and D, page 10

C. Legal Description and/or Plats: Work effort in this category covers tasks needed to prepare the plats and/or legal descriptions to geographically describe all ROW acquisitions, control of access, control of access breaks, permanent easements, and temporary easements used in the preparation of the instrument of conveyance. The legal description will include the caption (sometimes called the preamble), the body (metes and bounds, etc.), area of acquisition(s), exceptions (mineral rights, etc.) and any reservations or reversions.

* MQS:Reference statement A, C, or D, page 10

211. **Public Involvement:** This class of work will include preparing for and conducting, or assisting NDOR in conducting public information meetings and/or public hearings. Public Meetings and hearings will be conducted be in compliance with the most current version of the NDOR Public Participation/Involvement Manual (*Pursuing Solutions Through Public Involvement*).

In addition to conducting the meetings, the work may include preparation of handout and presentation materials including such items as project fact sheets, project mosaics, PowerPoint presentations, engineering statements and others as may be requested by the State. Materials may need to be provided in both English and Spanish versions. Services will also include preparation of meeting notes, investigation of and responses to assembled public comments, and other public meeting documentation.

* MQS Reference statement A

212. **Value Engineering:** This class of work includes leading value engineering studies to improve project quality, reduce project costs, foster innovation, eliminate unnecessary and costly design elements, and ensure efficient investments. Such studies will assist the Department with compliance with requirements contained in 23 CFR Part 627. VE studies performed for the Department must satisfy requirements contained in the United States Code and Code of Federal Regulations.

Consultants shall provide a team leader who is qualified as a Certified Value Engineer as defined by the Society of Value Engineers. It is preferable that the team leader be a Registered Civil Engineer with experience in the design of highway projects.

* MQS Reference statement C

Minimum Qualification Standards

Statement A: At least one *professional with experience in the category of work is required and will be referenced on DR Form 498. Additional professional and technical personnel supporting qualification in the category will also be referenced on DR Form 498. Satisfactory experience in the category of work will be demonstrated on DR Form 498 by reference to completed projects.

Statement B: *Professional status in this category will be demonstrated on DR Form 498 by reference to resumes and personal experience histories of the firm's principals or key personnel. Other personnel supporting qualification in the category will be so referenced on DR Form 498. Satisfactory experience in the category of work will be demonstrated on DR Form 498 by references to completed work. When specialized equipment is necessary for satisfactory performance of the work, firms shall list on DR Form 498 the type, make, and model of such equipment owned by the firm.

Statement C: Professional status in this category will be demonstrated on DR Form 498 by reference to at least one person registered by the Nebraska State Board of Examiners for Professional Engineers and Architects as a professional engineer.¹ Resumes of personnel so referenced will indicate the extent and nature of experience in this category of work. Other personnel supporting qualification in this category will be so referenced on DR Form 498. Satisfactory experience in the category will be demonstrated by reference to completed projects.

Firms may designate one or more individuals, holding a certificate of registration granted by the Nebraska State Board of Examiners for Professional Engineers and Architects as a professional engineer, as responsible for the practice of engineering in Nebraska for the firm. The designated individual or individuals shall have full authority to make all final engineering decisions on behalf of the firm with respect to the work performed by the firm. This designation will not relieve the firm of any responsibility or liability imposed upon it by law or by contract.

Statement D: All requirements expressed in Statement "C" will apply with the exception that in lieu of registration as a professional engineer, the applicant shall be registered as a Land Surveyor by the Nebraska State Board of Examiners for Land Surveyors.

Statement E: All requirements expressed in Statement "C" will apply with the exception that in lieu of registration as a professional engineer, the applicant shall be registered as an architect with the Nebraska State Board of Examiners for Professional Engineers and Architects.

Statement F: All requirements expressed in Statement "C" will apply with the exception that in lieu of registration as a Professional Engineer, registration as a landscape architect by the Nebraska State Board of Examiners for Landscape Architects is required.

¹ * Professional as referred to in Statements A and B above is defined as a person(s) highly experienced, educated and/or trained in those work categories referred to in this manual on pages 5-10.

Statement G: All requirements expressed in Statement "C" will apply with the addition:

When specialized equipment is necessary for satisfactory performance of the work, firms shall list on DR Form 498 the type, make, and model of such equipment owned by the company.

Double Qualification Standards: The use of double qualification standards for work categories on pages 5 and 8 in this manual are there to indicate that in cases where this type of work would have engineering involved, the qualification for the engineering would be Statement C.

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