

SUBPART E – EXHIBITS

MT505.40

MT505.40 MINIMUM DOCUMENTATION FOR CONSERVATION CONTRACTORS

GENERAL – ALL PRACTICES

SURVEYS

Survey notes shall be complete and conform to NRCS Technical Release 62 and/or Chapter 1 of the Engineering Field Handbook.

As a minimum, all survey notes should contain the following as appropriate:

1. Standard loose-leaf notes, approved forms or electronic recorder with printout.
2. Notes shall be legible.
3. Project name (individual or group).
4. Job or construction item name.
5. Purpose of survey (planning, design, layout, etc.).
6. Survey party members and their assignments.
7. Date and page numbers.
8. Heading for columns describing rod readings.
9. Complete descriptions of benchmarks, references, physical features.
10. In design surveys, a description of the location of any power line, gas line, water line or other utility that may be affected by construction.
11. Designate centerline, right and left, up and downstream.
12. Sketches and description illustrating physical features, to better define a survey.
13. Sketches or descriptions of what markings on stakes mean.
14. Closure calculations for all traverses.
15. Calculation checks with signature of checker.

DRAWINGS

Two copies of reproducible drawings or four copies of non-reproducible drawings shall be submitted. Each NRCS field office will have differing capabilities as to what size and type of drawing can be reproduced. (Distribution: 1 approved copy returned to designer, 1 copy for NRCS, 2 copies for owner.)

Drawings shall be developed in such a manner that all information covered below is addressed.

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As a minimum, design drawings shall contain the following:

A. Drafting

Drafting shall be performed with efficiency and in a manner that will result in clarity and understanding of the information presented.

1. Drawings shall be complete and logically laid out in accordance with principles in the Montana Drafting Guide.
2. Standard drawings should be used when possible.
3. Copy machine and previously drawn parts may be used to assemble new drawings. (Cut and paste, copy.)
4. All lines and letters shall be clear, sharp and legible so copies can be made.
5. All drawings for a job should be the same size. Use standard sheets when possible (i.e., "N" or "E" size sheets).
6. Notes on drawings shall be limited to those required for interpretation of the drawing. Leave off calculations and notes not needed for construction.

B. Descriptive Information

1. Job class above title block and approval signature in title block (first page only).
2. Individual, group or project name.
3. Title of drawing (plan, sections, detail, etc.).
4. County, State.
5. Name of organization making the drawing.
6. Designers initials and date.
7. Initials of draftsman and date.
8. Initials of person checking drawing(s).

C. Location Map

D. Plan view drawing showing layout of the job. An aerial photo with improvements drawn on it can sometimes be used if a title block is added. Views with more than one scale may be needed. Plan view should include as appropriate:

1. Access to the site and important physical features (roads, buildings, fences, canals, etc.).
2. North arrow.
3. Drawing scale (Bar Scale).
4. Benchmarks and survey control.
5. Location of all known utilities that may be affected by or which could be a hazard during construction.
6. Location of existing physical features, where construction will be affected.

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E. Profile for pipes, ditches, dikes showing:

1. Stations at bottom, increasing left to right.
2. Elevation to scale on the left.
3. Labeled natural groundline and improvements.
4. Labeled hydraulic gradeline if applicable.
5. Stations, elevations and descriptive notes where construction profile changes or structures occur.

F. Typical cross sections for excavations and embankments showing:

1. View in direction of increasing stations.
2. Dimensions and elevations.
3. Applicable station under each cross section.
4. Center line or offset line on each cross section.
5. Stated direction of typical view.
6. Upstream or downstream designations on cross sections.

G. Structure Details (with dimensions) showing:

1. Plan view.
2. Elevation view.
3. End view.
4. Section views.
5. Detail views.
6. Three dimensional view (if complexity requires additional clarification). Sometimes a single three dimensional view with dimensions can replace plan, elevation and end views.

H. Notes and Tables

Drawing notes or tables showing elevations, dimensions, pressure ratings, descriptions of size of all valves, special fittings, gates and appurtenances.

DESIGN

If the contractor provides design services for a specific practice standard, the CONSTRUCTION SERVICES letter to the contractor, Exhibit MT505.43, pages 1-4 shall be updated as changes are made in the Montana Supplement to the Engineering Field Handbook.

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Design shall be in accordance with current NRCS Practice Standards. Design procedures shall be in accordance with sound engineering practices, and in accordance with NRCS reference materials. Documentation of the design shall be complete and in a form that presents a logical sequence of development.

SPECIFICATIONS

NRCS standard specifications shall be followed. Specific construction details will supplement the specification as appropriate. Descriptions that cannot be conveniently shown on the drawings, or as written in the NRCS standard specifications shall be supplemented in the construction details of the specification.

SCHEDULE OF QUANTITIES

A schedule of quantities shall be provided, along with appropriate and checked calculations. Calculations shall be in a form that can be understood by the qualified NRCS technical person.

COMPLETION CHECK NOTES

Completion check notes are the official record documenting that the job was built in accordance with approved plans and specifications. Notes shall be complete, clear and in enough detail to describe the completed work, and documentation that the as-built quantities are correct.

Completion Check Notes Shall Include:

1. Description of benchmarks used as references.
2. Adequate number of elevations at key points to assure that the job will function as designed.
3. Adequate number of measurements to assure that key elements of the structure are in accordance with the design.
4. Brand names, model numbers, ASTM test designations, and other pertinent data which describe manufactured items incorporated in the job.
5. Notes documenting any changes that vary from the design, coupled with new supporting design documentation.
6. Signature of person making completion check and date.

A schedule of checked final quantities and checked backup computations shall be provided.

MISCELLANEOUS

No construction shall be performed prior to approval of the drawings and specifications by the appropriate NRCS employee.

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AS-BUILT DRAWINGS

The contractor shall add final as-built lines, grades, and quantities to a copy of the drawings. This will constitute a final “as-built” drawing. The contractor shall document the practice was built according to plans and specifications on the first page of the drawings. They shall also document that the as-built quantities are correct.

Owner’s acceptance on the as-built drawings should be encouraged.

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MT505.41 SPECIFIC DOCUMENTATION FOR CONSERVATION PRACTICES

Below are guidelines for specific practices that supplement the GENERAL – ALL PRACTICES requirements, (i.e., each approved contractor shall meet both the appropriate GENERAL – ALL PRACTICES plus the SPECIFIC DOCUMENTATION FOR CONSERVATION PRACTICES for each conservation practice(s).

DOCUMENTATION REQUIREMENTS ARE TO BE DEVELOPED FOR OTHER CONSERVATION PRACTICES IN THIS FORMAT.

LANDLEVELING (PRACTICE STANDARD 464)

Design Surveys

Survey notes shall be on survey notebook paper, on grid paper, or on computer input forms. If electronic instruments are used for surveying, a computer printout of the input data shall be provided.

Whatever method of data recording is used, the data listed on MT505.40(1) to MT505.40(5) under the GENERAL – ALL PRACTICES section of this document shall be provided. If grid paper is used for recording original surveys, the general criteria for drawings as listed above shall be incorporated on the grid sheet.

If the NRCS computer program “PSD” (Plane Surface Design) is to be used, data shall be submitted on computer input sheets as described in Montana NRCS Technical Note No. 12. Other computer programs such as LANDIMPROVE used for design shall be documented in a professional manner.

In addition to GENERAL SURVEYS, the following information shall be provided:

1. Plane of best fit.
2. Location and elevation of water source.
3. Location and elevation of drain(s).
4. Grid spacing (maximum of 100 feet).
5. Desired direction of irrigation.
6. Method of water delivery to field (gated pipe, concrete ditch, earthen ditch/siphon tubes, etc.).
7. Location of, and information about ditch pads, roads, ditches, etc., that are to be constructed with cut or fill from the field or borrow areas.

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Design

In addition to GENERAL DESIGN the following information shall be provided:

1. Method used to calculate yardage. A copy of the cut/fill volume computations for all alternatives shall be provided.
2. Grid designations.
3. Designation of fringe areas.
4. Total cut yardage.
5. Total fill yardage.
6. Cut/fill ratio.
7. Quantity of fill or waste from the leveled field or borrow area to complete the land leveling, ditch pad, ditch filling, etc.
8. Quantity of material to be added to the field from ditches, etc.
9. Elevation of field at water source.
10. Elevation of field at drain(s) location.
11. Slope in direction of irrigation.
12. Cross slope.

Drawings

Construction drawings shall contain all applicable items listed under GENERAL – ALL PRACTICES. A drawing can be constructed from computer printout sheets, if computer computations are performed. The computer sheet drawing shall have appropriate identification information added by hand (i.e., field boundaries, fringe areas, water source, drain location, benchmark location, north arrow, etc.). Supplemental specifications shall be provided if needed.

Completion Check Notes

In addition to GENERAL COMPLETION CHECK NOTES the check notes shall contain the following:

1. A minimum of two lines of elevation shots in the direction of irrigation and one line across the slope. Shot spacing shall not exceed 100 feet.
2. At least one shot at field level groundline at the water source and one at the drain(s).
3. If any of the shots are out of tolerance, additional elevations shall be taken to the extent necessary to determine acceptability of the job.

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IRRIGATION PIPELINES (PRACTICE STANDARD 430)

Design Surveys

In addition to GENERAL SURVEY data, the following shall be provided:

1. Description, elevation and the pressure of water source.
2. Profile of pipeline route, with adequate shots to define all high and low spots in the pipeline.
3. Elevations and locations of all turnouts.
4. Topography and elevation shots as required at inlet and outlets.
5. Dimensions, etc., as required for pump hookup.
6. Elevations and stations or topographic map to show key elevations and locations in the field.
7. Location of all appurtenances (i.e., air valves, pressure relief valves, etc.).

Completion Check Notes

In addition to GENERAL COMPLETION CHECK NOTES the following information shall be provided:

1. As-built measurement along pipeline to each turnout and change in pipe size and rating.
2. As-built measurements of structures.
3. Elevations of turnouts and other elements of the system, where elevation is critical to the function of the system.
4. If steel pipe is used, a complete description of the pipe coating, including details of the method used to coat the pipe at welds and cuts. Include cathodic protection requirements, if needed.
5. If plastic pipe is used, complete details on pipe brand, ratings, and ASTM or NRCS designations.

STOCKWATER PIPELINES, TANKS AND SPRINGS (PRACTICE STANDARDS 516, 614, AND 574)

Design Surveys

In addition to GENERAL SURVEY requirements, design surveys may be accomplished by careful inspection of 7-1/2 minute USGS quadrangle maps, by altimeter and measuring wheel or tape, by instrument surveys, or by a combination of these methods. The degree of accuracy required will depend on how critical lengths and elevations are to be designed. For example, on low head, low gradient gravity systems, accurate, detailed profile surveys are required. On shallow pipelines that must be drained in the winter, surveys must be accurate enough to assure drainage of the pipe. The survey procedure used on each type of project shall be approved by the local NRCS technical representative.

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Completion Check Notes

In addition to GENERAL COMPLETION CHECK NOTES the check notes shall contain the following:

1. Length measurements from a measuring wheel or tape. If a measuring wheel is used, the average of two measurements shall be made and the average shall be recorded.
2. Stationing of each air valve, tank, drain or similar feature.
3. Measured size of each tank.
4. Measurements of tank base, drains and other appurtenant structures as required to confirm as-built quantities.
5. Surveyed elevations of key points on low gradient, low pressure systems where elevation is critical.
6. Details of make, model, rating for valves; and make, both type and model capacity for tanks.
7. Details of sump, pressure tank, pressure relief valves and other fittings at the well.

GRASSED WATERWAY (PRACTICE STANDARD 412)

Design Surveys

In addition to GENERAL SURVEY the original ground surface and controlling side elevations shall be profiled. Cross sections shall be surveyed to permit dividing the waterway into reaches of uniform slope and shape. Cross sections shall be spaced a maximum of 100 feet apart.

Completion Check Notes

In addition to GENERAL COMPLETION CHECK NOTES the following items are required:

1. Cross sections of completed waterway at 200-foot minimum intervals, minimum of two cross sections, and a minimum one cross section per defined reach. Mulching and seeded widths noted on cross sections.
2. Plotted profile of constructed waterway.
3. Measured length of completed waterway and completed surface area in acres.
4. Description of condition of seeding, mulching, etc.

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GENERAL EARTHWORK AND RELATED STRUCTURAL WORK

Design Surveys

In addition to GENERAL SURVEYS, the need for profiles, sections, or topographic surveys shall be job specific. In general, survey detail shall be obtained to define the topography on which a project is to be constructed.

Subsurface investigations may be needed to determine details as water table level, bedrock location, or similar subsurface features. This may be done with an auger or by digging pits. The subsurface conditions shall be described in writing.

Completion Check Notes

1. Description of benchmarks used as references.
2. Adequate number of elevations at key points to assure that the job will function as designed.
3. Adequate number of measurements to assure that key elements of the structure are in accordance with the design.
4. Brand names, model numbers, ASTM test designations, and other pertinent data which fully describe manufactured items incorporated in the job.
5. Notes concerning any changes that vary from the design.
6. Signature of person making completion check and date.

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MT505.43 CONSTRUCTION SERVICES

U.S. Department of Agriculture
Natural Resources Conservation Service

** - EXAMPLE ONLY - **
CONSTRUCTION SERVICES

DEAR CONTRACTOR:

This acceptance entitles _____ (name of person), hereinafter referred to as Contractor to perform construction services in connection with USDA, Natural Resources Conservation Service (NRCS) administered conservation practices in _____ County(s), Montana for the period of _____.

The following sequence of events needs to be followed so NRCS approval of the conservation practice can be made.

1. A qualified NRCS representative will make a needs and feasibility determination for the project. This determination must be made prior to start of any survey, design or construction work by the contractor. The NRCS representative will check the landowners compliance with the National Environmental Policy Act (NEPA), Archaeological and Historical, Floodplain requirements, and other Federal and State laws and permits as applicable. Results of the needs and feasibility determination, along with resource information concerning soils, other resources, and minimum design parameters will be provided to the landuser.
2. Application for cost-share and/or NRCS technical assistance must be made prior to start of any construction work by the contractor. If design, plans and specifications are to be provided by the NRCS, the schedule for providing such services will be arranged with the landuser.
3. Designs performed by the contractor need to be in accordance with NRCS standards, specifications and minimum design parameters so NRCS can make necessary approvals. Reference material needed for design and documentation requirements will be provided by the NRCS.
4. Engineering design, layout, checkout and completion measurement surveys need to be accomplished and documented in accordance with current NRCS approved procedures, standards and specifications. NRCS cannot make approval unless the conservation measure is adequately documented.
5. You are to provide quality control during construction, making sure that the conservation measure is built in accordance to the approved plans and specifications. NRCS will provide quality assurance.
6. You are to build the conservation measure to design line and grade.

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7. Documentation for engineering surveys and design will be submitted for NRCS review and concurrence. NRCS must approve the design prior to start of construction layout.
8. Upon completion of construction, one copy of all required documentation for surveys, final designs, as-built drawings, checkout notes and quantity calculations shall be provided to the NRCS. The conservation practice cannot be approved by NRCS until this documentation is received.
9. The (CONTRACTOR DOCUMENTATION) (Form MT-ENG-6) shall be provided to the NRCS upon completion of construction.
10. Documentation shall be made on the as-built drawings that the practice was built in accordance to the plans and specifications.
11. The NRCS will make random, periodic field checks and quality reviews of completed work to assure that practices were installed in accordance with NRCS approved drawings, specifications and practice standards. Results of such checks and reviews will be discussed with the contractor and landuser.
12. If deficiencies are found, a timely plan for correction shall be prepared by NRCS.
13. Minimum documentation requirements for surveys, design, specifications, schedule of quantities, completion check notes and as-built drawings are attached to this letter.
14. You need to be aware of and comply with the State of Montana. Professional Engineers and Land Surveyors, Laws and Rules, for all surveys and designs submitted, when the “Practice of Engineering” or the “Practice of Land Surveying” is required as defined by state law. In certain cases as defined by state law, only professional engineers or professional land surveyors may assume legal responsibility for surveys and designs.
15. NRCS does not certify conservation contractors, and does not give contractors engineering job approval authority. This letter gives you a listing of the documentation required which will be the basis for NRCS certification of the conservation practice.

You are authorized to perform the applicable services for the listed practices:

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(210-V-NEM, Amend. MT28, Jan. 1994)

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[NOTE: List appropriate conservation practice, number, and technical assistance for only those conservation practices that the contractor has adequate training. Also list the survey, design, layout, and checkout limits given for each practice as discussed in National Engineering Handbook, MT505.10(b)(2) and MT505.10(b)(3).]

<u>Practice Standard</u>	<u>No.</u>	<u>Technical Assistance.</u>
Irrigation Land Leveling (EXAMPLE ONLY)	464	1. Design Surveys 2. Design 3. Layout 4. Construction Checks 5. Determination that practice installation meets NRCS specifications. 6. Documentation of units performed.

<u>Practice Standard</u>	<u>No.</u>	<u>Technical Assistance.</u>
Land Smoothing (EXAMPLE ONLY)	466	1. Design Surveys 2. Design 3. Layout 4. Construction Checks 5. Determination that practice installation meets NRCS specifications. 6. Documentation of units performed.

<u>Practice Standard</u>	<u>No.</u>	<u>Technical Assistance.</u>
Structure for Water Control (EXAMPLE ONLY)	587	1. Design Surveys 2. Layout 3. Construction Checks 4. Documentation of units performed.

<u>Practice Standard</u>	<u>No.</u>	<u>Technical Assistance.</u>
Stockwater Pipeline (EXAMPLE ONLY)	516	1. Construction Layout 2. Construction Checks 3. Determination that practice installation meets NRCS specifications. 4. Documentation of units performed.

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** - EXAMPLE ONLY -**

Minimum Documentation

The attached MT505.40 MINIMUM DOCUMENTATION FOR CONSERVATION CONTRACTORS AND MT505.41 SPECIFIC DOCUMENTATION FOR CONSERVATION PRACTICES WILL PROVIDE YOU THE MINIMUM DOCUMENTATION REQUIREMENTS. *(NOTE: The appropriate NRCS team member and field engineer are to attach appropriate portions of Exhibit MT505.40 and MT505.41 to this letter.)*

The NRCS will make at least one design/construction check annually for each type of practice that you install when you provide technical assistance. Ten percent spot checks will be made for each type of practice that you have documented for specification compliance, including the units performed.

Enclosed are copies of the NRCS practice standards and specifications for which you are authorized to provide services. Other technical material which may be of help to you may also be available through this office. NRCS will assist you with your technical problems and questions.

Jake Goodperson, NRCS Official

Enclosures

CONCURRED BY:

Field Engineer

Date

NOTE: This letter is effective for one (1) year and can be updated on an annual basis. An NRCS employee will provide additional training in policies, methods, standards, specifications, etc., as needed.

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(210-V-NEM, Amend MT28, Jan. 1994)