

**PLANNING PROCEDURES****(a) Design Folder (see National Engineering Manual, Section 511.11a).**

(1) A design folder will be used to include calculations, summaries, and other supporting documents on projects such as dams, animal waste systems, and certain other, more complex conservation practices. Complex conservation practices are generally regarded as job approval category Class IV and V. See Exhibit NE-001, page NE 5-23a.

(2) The design folder is a logical place to file the survey notes for the job. These notes can be manually recorded survey notes or a hard copy of an electronic survey. All notes must be signed and dated by the Party Chief. See Engineering Field Manual, Chapter 1, for more detail.

(3) A design folder will contain the calculations for hydrology, hydraulics, quantities of embankment, excavation, drainfill and rock, lengths of pipe, fence, diversion, and waterway. A summary sheet for quantities will also be included.

(4) Printouts from applicable computer programs can be used in lieu of manual computations.

(5) All calculations will be checked for accuracy by another person and be initialed at the top of the page. Computer printouts will also be checked and initialed to indicate proper data input and that results are within reasonable expectations.

(6) There are two things to check on any set of calculations: accuracy and procedure.

Calculations can be checked for accuracy by any of the designer's coworkers as long as they possess the basic math skills to do so. Procedures, i.e., selection of applicable equations or methods of design, must be

checked by a person with appropriate job approval authority for the job being designed.

Computer printouts must also be checked by a person with appropriate job approval authority.

(7) Design folders will also include copies of pertinent correspondence, including geologic reconnaissance reports plus any applicable CFSA (ASCS) photos, pictures, sketches, etc.

**(b) Design Reports (see National Engineering Manual, Section 511.11b).**

(1) A design report will be prepared for all dams, animal waste projects, and other more complex conservation practices. See Exhibits NE-002, 003, 004, and 005 on pages NE 5-23b through 23j.

(2) A design report is a short, narrative summary of the design decisions and background of a project. It is brief and informative, easily understood by:

- Owners of the project
- NRCS technical reviewers
- NRCS management personnel
- Other reviewing agencies (DWR, DEQ, etc.)

(3) Design reports convey only essential information. They are written in layman's language with a minimum of engineering and government jargon. They are not written just for the sake of writing a report. Their value is in a quick recall of information such as:

- (i) Landowner information for permit responsibilities or any agreed to scheduling.
- (ii) NRCS job review for approval by a person with higher job approval authority.

(iii) DWR or DEQ review prior to issuing permits.

(iv) Review by NRCS management when determining workload for construction inspection, etc.

(v) Supporting or changing the hazard classification.

(vi) Review of original design in case of failure or repair under some other program, such as EWP, ECP, etc.

(vii) Review of original design in case of expansion or upgrading the project, such as doubling the size of an animal waste facility or raising a dam to provide for increased storage or flood protection.

(viii) Basic design decisions to provide continuity to the design in cases where the original designer does not complete the project. These situations can arise when weather causes interruptions, when people transfer to other jobs, or when work priorities change, causing job reassignments.

**(a) Construction Documents**

(1) A construction plan is developed for the benefit of the builder and construction inspector. It consists of two things:

- (i) Drawings
- (ii) Specifications

(2) A good, professional construction plan will answer three basic questions:

**Survey**--Can another person, unfamiliar with the site, find it and stake it out for construction?

**Quantities**--Could a contractor give the owner a quote without having to call the NRCS office for additional information?

**Materials**--Can a supplier/fabricator deliver the right length, strength, and number of items to the job without having to call the NRCS office for clarification?

(3) Distribution and Delivery of Final Plans

(i) A well thought out construction plan is very ineffective if it never leaves the office. Reproduction of the plan is the least costly item of the whole technical assistance (TA) process.

(ii) Enough copies of the plan should be reproduced to provide at least one for:

- Owner
- Contractor
- Each fabricator or supplier
- NRCS inspector
- NRCS file copy
- NRCS "as built" copy
- Any reviewing agencies, such as Nebraska DWR, DEQ, etc.
- Other concerned individuals or agencies, such as Game & Parks etc.

(iii) The method of delivery may vary from job to job. The preferred method

is for the NRCS to deliver all copies of the plan to the owner with a letter of transmittal explaining the owner's options and responsibilities.

The owner's responsibility would be to provide the selected contractor with his/her copy of the plan and also the supplier's copies.

The contractor can then pick suppliers of his/her choice and give them a copy of the plan.

(4) Basic requirements for construction drawings:

(i) Survey

- Legal description and map of physical location (the surveyor must be able to find the right drainage on the right farm in the right county).
- Show the permanent physical features of the site. Example (1)--project the centerline or baseline until it intersects a fenceline; then set a hub in the fenceline and identify a station on it. Example (2)--locate one corner of the bottom of a waste storage pit by angle and distance from a certain corner of a building or lot corner by measuring it on the design drawings; then find the same distance and angle with transit and tape during construction stakeout.
- Benchmark location, description, and elevation.
- Stationing on the centerline of dam, principal spillway and emergency spillways, particularly at intersections.

- These survey points and physical features of the site, when identified on the drawing and combined with dimensions and angles shown on the drawings, ensure that the constructed location will be the same as the designed location.
  - Dimensions between pipe joints, supports, antiseep diaphragms, drains, top widths, etc.
  - Horizontal dimensions of drains, pipe supports, anti-seep diaphragms, emergency spillway widths.
  - Elevations of embankment (or ridge) top, flow lines, riser base, foundation drains, etc. Side slope ratios.
- (ii) Quantities
- 1) Show all quantities on the same page to accommodate quotations. Use a Table of Quantities to show all work items.
  - Check all listed quantities against the cost estimate. They should appear in both places.
  - Subsidiary items must be accounted for in both the cost estimate and the Table of Quantities.
- (iii) Materials
- Include material statements in the Table of Quantities only to identify the item, i.e., 24" CMP. The details, such as thickness, coating, and couplings shall be shown on the standard drawings (or material specifications).
  - Check all of the supplier's items in the Table of Quantities against the specifications to
- make sure that the quality of materials is described.
- (5) Standard drawings should be used wherever possible.
- (i) See Engineering Field Manual (EFM), Appendix 2 for a list of standard drawings. They are available for most pipes, risers, fences, retaining walls, etc.
- (ii) Each standard drawing is accompanied by a sheet of "Instructions and Design Assumptions". These instructions should be reviewed on each new job to determine any limitations and allow for consistent usage.
- (6) Specifications are integral parts of the construction plans. Engineering work in Nebraska uses four sets of construction specifications.
- (i) Practice specifications are found in Section IV of the Field Office Technical Guide (FOTG). They are used on routine practices where a simple description of the work will suffice. They can also be used in combination with other specifications. For example, where a terrace might be built to protect the finished borrow area for a dam, S-600 could be included in the same package with the construction specifications for the dam.
- (ii) The "PL-46" Series specifications are almost identical to the "PL-566" series. "PL-46" specs will be used on larger CO-01 projects such as dams built by the NRDs or other private contracts.
- (iii) The "NE" series specifications are an abbreviated version of the "PL-46" series. They apply to small dams designed by field office staffs and built by small contractors. They are component specs and are written for individual construction tasks such as embankment, excavation, conduit installation, concrete placement, etc.

- (iv) "PL-566" Series (found in the National Engineering Handbook, Section 20) are used on contracts for project work (watershed dams).
- (v) Specifications are either "construction specs" or "material specs".
- Construction specs cover installation. They are either method specs, i.e., three passes of a sheepsfoot roller, or end result specs, i.e., earth fill compacted to 95% of standard proctor density.
  - Material specs cover the quality of manufactured or fabricated materials used on the job. Examples are sand or gravel gradations, pipe material, i.e., CMP, PVC, etc., wall thickness, type of corrugations, etc.
- (vi) The numbering system for "NE" series, "PL-46" series and "PL-566" series specifications are all the same. Construction specifications have numbers below 300, while material specifications have numbers from 500 to 599.
- (vii) When using the "NE" series, the "500" material specs are not needed. These specs are meant to be used in conjunction with the Nebraska standard drawings. These drawings contain quality statements and take the place of a material spec. In some instances such as drainfill material, the gradation can be included as a note on the drawing.
- (viii) The numbering system for the FOTG practice specifications begin with an "S" prefix corresponding to the standard, such as S-412, waterway construction, S-600, terrace construction, etc.

## **(b) FINAL REVIEW AND APPROVAL**

- (1) All jobs checked and approved by other staff persons are to be consistent with appropriate job approval authority. See Nebraska NRCS policy in the National Engineering Manual (NEM), Section NE501.04(a).
- (2) All jobs which are submitted to a state agency (DWR, DEQ, etc.) for construction permits require an engineer's review, approval, and signature. See Nebraska NRCS policy in the National Engineering Manual (NEM), Section NE501.03(b) and C.
- (3) The requirements of the reviewing agencies must also be honored. This pertains to the number of copies submitted and the size of the drawings, etc.

## **(c) RECORDS**

- (1) As-built plans are prepared for the following:
- (i) All jobs which are Class V approval category.
  - (ii) All inventory size dams, regardless of job approval category.
- See Exhibits NE-006 and 007 on pages NE 5-23k and NE 5-231 for relative heights described in DWR regulations and NRCS criteria.
- (iii) Any other jobs (approval category Class I-IV) which are potentially significant. Examples include:
    - Animal waste projects because of the possibility of later expansion or changing regulations.
    - Dams smaller than "inventory size" because of data needed when emergency programs such as EWP or ECP materialize.

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- Water/sediment basins, diversions or underground outlets which are installed to solve unusual or severe erosion or water control problems.
- (2) Design records should be preserved:
- (i) For all jobs listed in (1), above.
  - (ii) By keeping the pertinent information, including the design report, and any disk files of survey and computer design results. Disk files are in addition to hard copy files.
- (3) For guidance on content of as built plans, design folders and reports, see National Engineering Manual (NEM), sections 511 and 512.