

STATEMENT OF WORK
Waste Storage Facility (313)
Tennessee

These deliverables apply to this individual practice. For other planned practice deliverables refer to those specific Statements of Work.

DESIGN

Deliverables:

1. Design documentation that will demonstrate that the criteria in the NRCS conservation practice standard Waste Storage Facility have been met and are compatible with other planned and applied practices.
 - a. Practice purpose(s) as identified in the conservation plan.
 - b. List of required permits to be obtained by the client.
 - c. Compliance with NRCS national and state utility safety policy (NEM Part 503-Safety, Subpart A - Engineering Activities Affecting Utilities 503.00 through 503.06.
 - d. Environment Evaluation including a completed TN-CPA 25 form
 - e. List of facilitating practices and their role in the function of the waste storage facility.
 - f. Topographic Map and Site Plan - A topographic map (2 ft contours) and site plan shall be created with the following elements included:
 - i. Existing structures, vegetation boundaries and utilities (both above ground and below ground)
 - ii. Wells (including age, depth, and casing size) waterways, roadways, the size, type location, direction, slope and material construction for all culverts and pipelines. This includes but is not limited to waterlines potable and non-potable, liquid transfer lines, conduit for other piping.
 - iii. Permanent benchmark location and elevation
 - iv. Location of subsurface/geologic test pits and elevations
 - v. North arrow and drawing scale (shown as bar scale)
 - vi. Proposed structures, roadways and facilities
 - vii. Title block with name of project, designer's and preparer's names, and stamps where required.
 - viii. Distance to houses owned by family or others, public buildings, or other restrictive features.
 - g. Geologic/Soils Investigation and Report
 - i. For new or existing in-ground liquid waste storage facilities, a geologic investigation shall be performed that addresses the engineering suitability of the soil, foundation characteristics of the site, and the potential for the facility to contaminate ground water. The site investigation is made to determine the geologic conditions and to provide the engineer with information for use in design and construction. The following items will apply to the investigation and report:
 1. The soils/geologic investigation should be detailed enough for an accurate description of what materials will be encountered during construction.
 2. Photographs of the site, samples, pits, cores, etc. for documentation.
 3. Special attention to water table depth and seepage potential must be considered in each design where earthen in-ground liquid storage is proposed or already existing.
 4. The investigation must evaluate soils to a depth of two feet below the planned bottom grade of the storage structure. Deeper investigations may be required in karst regions.
 5. The soils/geologic investigation shall be performed by qualified geologist. A qualified geologist is defined as an individual who is a Registered Professional Geologist licensed by the State of Tennessee or an individual who meets the requirements for the title of Certified Professional Geologist, as defined by the American Institute of

STATEMENT OF WORK
Waste Storage Facility (313)
Tennessee

Professional Geologists.

6. A licensed engineer or a NRCS person with the appropriate level of engineering approval authority should be on-site to provide proposed or existing dimensions and bottom elevation of the structure, answer questions/concerns that the soil scientist and/or geologist may have, and document elevations and locations of the excavated pits.
7. Proper equipment must be available on-site to perform the investigation.
8. A report shall be made which details the interpretations, conclusions and design assumptions relative to the geologic information. At a minimum, the report should include as appropriate:
 - a. Interval (depth range through which soil is consistent in observed parameters)
 - b. Estimate particle size distribution (by weight, for fraction < 3 inches)
 - c. Percent cobbles and boulders (by volume, for fraction > 3 inches)
 - d. Angularity of coarse material
 - e. Color of moist material, including presence of mottling. Mottling may be an indicator of the zone of water table fluctuation
 - f. Relative moisture content
 - g. Structure
 - h. Consistency (saturated fine-grained materials) or relative density (coarse-grained materials)
 - i. Plasticity of fines
 - j. Group name and USCS Symbol according to ASTM D-2488 flow charts
 - k. Geologic origin and formal name if known
 - l. Sample (size, identification number, label, depth interval, date, location, name of investigator)
 - m. Other remarks or notes (mineralogy of coarse material, presence of mica flakes, roots, odor, pH)
 - n. Test hole or pit identification number
 - o. Station and elevation of test hole or pit
 - p. Depth (or elevation) of water table after stabilizing; give date measured and number of hours open
 - q. Depth to rock, refusal (limiting layer), or total depth drilled or dug
- ii. Above ground fabricated waste storage facilities
 1. For above ground liquid waste storage facilities, sufficient investigation shall be performed to document the engineering suitability of the soil and foundation characteristics of the site to support the weight of the facility and its contents.
- iii. Soils should be tested for:
 1. USCS classification (ASTM D2487)
 2. Atterberg Limits (ASTM D2487)
 3. Compaction - Standard Proctor (ASTM D698, Method A)
 4. Permeability (ASTM D5084, Method C) - Sufficient data must be gathered to support whether the proposed or existing in-ground waste storage facility and/or waste treatment lagoon can be certified to meet NRCS current standards for seepage. The method used to gather data for certifying existing waste storage facilities should be the least costly method, but the method must provide sufficient detail and information to lead to a sound decision. Method and technology used to certify existing facilities is very much dependent on the site characteristics and the

STATEMENT OF WORK
Waste Storage Facility (313)
Tennessee

- degree of detail needed to form a decision.
5. Sample size. Appendix 10D of NRCS's Agricultural Waste Management Field Handbook, Part 651 (AWMFH) contains guidance on sample size for laboratory testing.
 - h. Practice standard criteria related computations and analyses to develop plans and specifications including but not limited to:
 - i. Geology and Soil Mechanics (NEM Subpart 531a).
 - ii. Storage Volume and Maximum Operating Level. NRCS approved software for determining whether storage volume is adequate is AWM as described and available at <http://www.wcc.nrcs.usda.gov/awm/awm.html>. Tennessee climatic data will be used.
 - iii. Structural, Mechanical and Appurtenances.
 - iv. Maximize Clean Water Diversion.
 - v. Environmental Considerations (e.g. liner failure, location, breaching, air quality).
 - vi. Safety Considerations (NEM Part 503- Safety, Subpart A, 503.06 through 503.12). Appropriate safety precautions have been addressed to restrict animal and human access.
 2. The client shall be provided with written plans and specifications which shall include drawings and descriptions that adequately describes the location, elevation, placement, construction, and material requirements to install each practice required for the design. These plans and specifications shall be adequate to allow the client to obtain any required permits.
 3. Design Report and Inspection Plan/ Quality Assurance Plan as appropriate (NEM Part 511, Subpart B Documentation, 511.11 and Part 512, Subpart D Quality Assurance Activities, 512.30 through 512.32). Also refer to NRCS Sample Quality Assurance Plan.
 4. A cost estimate for the facility. If funded through EQIP, then cost estimate shall be based on the applicable EQIP Cost List. Any item that is not listed on the cost list should be included in a separate cost section that states the following items are not listed on the EQIP Cost List. Document where the prices for items not shown in the cost list were obtained.
 5. Operation and Maintenance Plan
 6. Certifications that the design meets practice standard criteria and comply with applicable laws and regulations (NEM Subpart A, 505.03(b)(2)) which states that the individual will certify on the drawings "to the best of my professional knowledge, judgment and belief, these plans meet applicable NRCS standards". If applicable, Stormwater Pollution Prevention Plan. The Tennessee Department of Environment and Conservation Water Quality Control Board Division of Water Pollution Control requires that any construction site involving clearing, grading or excavation that result in an area of disturbance of one or more acres meet the requirements of Chapter 1200-4-5 Permits, Effluent Limitations and Standards. This rule is available at <http://www.state.tn.us/environment/wpc/publications>. Additional information on this permit can be found at <http://www.state.tn.us/environment/permits/conststrm.php>.
 7. Certification for existing waste storage facilities will also include a statement by the individual that certifies "to the best of my professional knowledge, judgment and belief, the current waste storage facility meets applicable NRCS standards".
 8. Design modifications during installation as required.
 9. Is there adequate consideration of revegetation of disturbed areas and a plan for the disposal of excess spoil material in this SOW?

INSTALLATION

Deliverables

1. Pre Installation conference with client and contractor.
2. Verification that client has obtained required permits.
3. Provide competent or qualified personnel for staking and layout according to plans and specifications including applicable layout notes. Stake the waste storage facility. Set and mark a

STATEMENT OF WORK
Waste Storage Facility (313)
Tennessee

sufficient number of stakes to outline the top dimensions. Set slope stakes as required to enable the owner or contractor to excavate the planned facility and place spoil materials to planned lines and grades. Set finish stakes for structures only after the rough grading has been completed. The number of finished stakes needed should be pre-determined with the contractor or owner. Offset stakes shall be set where possible to reduce destruction of control points during earthwork. Set stakes for any and all pipelines or structures designed as part of the system to assure all design elevations and slopes are correct. Use of grade rod to set stakes to facilitate performing construction checks. The staking requirement shall include provision for a single replacement of accidentally destroyed finish control points.

4. Provide competent personnel to perform inspection, and testing of each stage of the construction. This will include but not be limited to testing of the compaction of any embankment material not just limited to soil liner compaction testing, testing of the integrity of any non soil liner construction, concrete testing for all proposed structures, pressure testing of pipelines where applicable.
 - a. Actual materials used. Photos of all materials, as well as product brochures, labels, receipts are some of the articles that shall be used as documentation of proper materials.
 - b. Inspection records
 - i. Compaction tests - equipment used, numbers of passes, moisture content and or method of testing to verify specified level of standard proctor.
 - ii. Concrete tests
 - Steel reinforcement location, spacing and size.
 - Concrete tickets to ensure conformance with specified design mix.
 - Concrete slump, air, strength and temperature.
 - Curing method.
3. Facilitate and implement required design modifications with client and original designer.
4. Advise client/NRCS on compliance issues with all federal, state, tribal, and local laws, regulations and NRCS policies during installation.
5. Certification that the installation process and materials meet design and permit requirements.

CHECK OUT

Deliverables

1. Construction Check
 - a. Construction checks should be performed as the work progresses. Determine the adequacy of the work by photographs, observations, making measurements, and running engineering surveys of the completed components. Construction checks made during construction are considered adequate supporting data and need not be duplicated at the time the facility has been completely installed. Record all survey check data and observations in the engineering field book.
 - b. Excavated storage facility:
 - i. Make a visual inspection of the site and note the physical appearance. Side slopes and shaped spoil should be uniform, relatively smooth, and of neat appearance and be not steeper than the minimum specified.
 - ii. Take at least one longitudinal and one lateral cross section of the storage facility. Where the spoil is shaped, extend the cross sections from natural ground beyond the toe of the spoil on one side to natural ground beyond the outside toe of the spoil on the other side.
 - iii. Check constructed grades against planned grades and note difference. Draw final constructed dimensions in red on a set of "as built" plans for easy comparison.
 - iv. Compute excavation quantities when needed for contracting or cost share purposes.
 - v. Since it is not practical for earth-moving equipment to excavate to exact

STATEMENT OF WORK
Waste Storage Facility (313)
Tennessee

elevations and side slopes as specified, excavated storage facilities will be acceptable where the following conditions are met:

1. The top width and length are ± 5 percent of the planned dimensions.
 2. Constructed side slopes are not steeper than the minimum design slope required by the Technical Guide IV Standards and no more than 0.5:1 flatter than the specified design slope. If the slope is more than 0.5:1 flatter than the specified design slope, then the storage time and storage volume of the facility needs to be revised along with corresponding sections of the CNMP.
 3. The excavated spoil material does not exceed the permissible height and is shaped as specified in the specifications.
 4. The depth of the facility is no more than 0.1 foot less than the planned elevation.
 5. The depth of the facility is no more than 0.1 foot more than the planned elevation unless allowed by the geologic and soils investigations.
 6. The as-built cross sectional area equals or exceeds the planned cross sectional area.
- vi. Documentation of compaction (i.e., equipment used and passes and or method of testing to verify specified level of standard proctor).
- c. Embankment Storage Facilities:
- i. Profile the center line of the embankment. Extend the profile across the spillway where applicable. Record profile rod readings at all stations established during layout and at all breaks in grade.
 - ii. Take at least one cross section of the embankment at a location that represents the weakest section. Record rod readings at each edge of the crown, at each toe, and at intermediate points between the top and each toe.
 - iii. Take at least one longitudinal and one lateral cross section of the storage facility. Where the spoil is shaped, extend the cross sections from natural ground beyond the toe of the spoil on one side to natural ground beyond the outside toe of the spoil on the other side.
 - iv. Check constructed grades against planned grades and note difference. Compute constructed side slopes and record in check-out notes.
 - v. Compute earthfill and excavation quantities when needed for contracting or cost share purposes.
 - vi. Structures will be acceptable where all of the following conditions are met:
 1. An earth embankment will be acceptable with respect to side slopes where:
 - a. Side slopes as constructed are not steeper than the minimum design sloped required by the Technical Guide IV Standards and no more than 0.5:1 flatter than the designed slope plus allowance for shrinkage.
 - b. Upstream constructed slope shall not be steeper than 2:1 and no steeper than a 3:1 using a compacted clay liner.
 - c. The constructed cross-sectional area equals or exceeds the planned cross-sectional area and has at least 95% of the embankment width at all elevations with shrinkage added.
 - d. Constructed crown elevations are not more than 0.1 feet below planned elevations, with allowance for settlement added.
 - e. The spillway elevation does not vary from the planned elevation by more than 0.1 feet.
 - f. The minimum required freeboard is not lowered by more than 0.1 feet.
- d. Compacted Clay Liner will be checked and documented for:

STATEMENT OF WORK
Waste Storage Facility (313)
Tennessee

- i. Overall dimensions as mentioned above.
 - ii. Quality and thickness of the liner.
 - iii. Verification that the specific discharge requirements are met.
 - iv. Proper cover over the liner.
- e. Concrete and prefabricated waste storage facilities will be checked and documented for:
- i. Steel reinforcement.
 - ii. Concrete tickets to ensure conformance with specified design mix.
 - iii. Concrete slump, air, and temperature.
 - iv. Curing method.
 - v. Constructed dimensions, elevations, and grades against planned dimensions, elevations and grades and note differences.
 - vi. Letter of certification from manufacturer for prefabricated structures.
- f. Geomembrane lined storage facilities will be checked and documented for:
- i. Overall dimensions as mentioned in above.
 - ii. Quality and thickness of liner, manufacturer and note in the engineering field book.
 - iii. When required, proper joining of the liner.
 - iv. When required, proper cover over lining.
- g. Litter storage/Dry stacking facilities – Use Tennessee form TN-ENG-313CC can be used to certify construction
- h. Extent of practice units applied
- i. As-Built documentation
- j. Final quantities
- k. Equipment installed in accordance with the manufacturer's recommendation and by someone certified to do the installation in a way that the warranty is insured.
- l. Certification that the installation meets NRCS standards and specifications and is in compliance with permits (NEM Subpart A, 505.03(c)(1), <http://www.info.usda.gov/CED/ftp/CED/NEM.html>). The NEM specifies that final as-built drawings will include certification statement by the responsible individual that "to the best of my professional knowledge, judgment, and belief this practice is installed in accordance with the plans and specifications and meets NRCS standards."
2. Progress reporting and Payment. *The "Certification Agreement" signed by technical service providers in TechReg stipulates they have a responsibility to provide information to NRCS regarding their activities with USDA producers. All progress for technical services obtained from technical service providers must be reported in TechPRS before payment to TSP can be made. Progress to be reported in TechPRS is limited to planning activities and implementation of practices (design, installation, checkout) under any program when TSP monies fund that activity. This includes technical services obtained through program participant contracts, federal contracts, cooperative agreements, contribution agreements, and architectural and engineering contracts. All TSP progress will be reported in TechPRS, which is accessible from the TechReg website at <http://techreg.usda.gov> . Click on "Progress Reporting System."*

REFERENCES

- NRCS Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard - Waste Storage Facility, 313.
- NRCS Agricultural Waste Management Field Handbook (AWMFH)
- NRCS National Engineering Manual (NEM).
- NRCS National Environmental Compliance Handbook
- NRCS Cultural Resources Handbook