

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**WASTE TREATMENT  
Code 629  
(No.)**



**DEFINITION**

The use of unique or innovative mechanical, chemical or biological technologies that change the characteristics of manure and agricultural waste.

**PURPOSE**

To use manure and waste treatment facilities to improve water quality and air quality by:

- Reducing the nutrient content, organic strength, and/or pathogen levels of manure and agricultural waste;
- Reducing odors and gaseous emissions;
- Facilitating desirable waste handling and storage; and/or
- Producing value added byproducts that facilitate manure and waste utilization.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies where there is a need to implement waste treatment technologies that are not within the scope of other NRCS conservation practice standards (CPS) and that are sufficiently developed for incorporation into a manure or agricultural waste management system. This includes new or unique components or processes.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

**CRITERIA****General Criteria Applicable to All Purposes**

**Laws and Regulations.** Plan, design, and construct waste treatment facilities and processes to meet all Federal, state, and local laws and regulations. Chapter 62-620 Florida Administrative Code (F.A.C.), Chapter 62-621 F.A.C., and Chapter 62-670 F.A.C. for permitting requirements by the Florida Department of Environmental Protection (FDEP).

Impact to cultural resources, wetlands and Federal and state protected species shall be evaluated and avoided or minimized to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

**Utilities.** Locate all buried utilities in the project area including drainage tile and other structural measures.

**Design.** The waste treatment technology provider shall complete and supply to the land owner/operator a detailed design of the facility/process clearly identifying the objectives and anticipated outcomes of implementation.

When the planned technology involves a system or process, include in the design documentation a process diagram containing, at a minimum, the following information:

1. Volumetric flow rates including influent, effluent, and recycle streams.
2. Waste load projections including volume, mass, and characteristics of the waste important to the waste treatment facility or process.
3. Unit process volumes and hydraulic retention times where appropriate.
4. Air emissions projections from the system.
5. Nutrient fate projections within the system.
6. Process monitoring and control system requirements as described below in the "Monitoring" section of the criteria.

It is the responsibility of the technology provider to furnish information from a university or other independent research entity to document the effectiveness of the technology to achieve its intended purpose.

Provide independent, verifiable data demonstrating results of the use of the facility or process in other similar situations and locations. If available document the effectiveness of the technology under different climatic factors. Documentation from peer reviewed journals is preferable.

Document impacts and mitigation measures, if required by state or local agencies, where use of a waste treatment facility or process to improve one resource concern negatively impacts another.

Design and construct components of the waste treatment facility according to applicable Florida NRCS CPS. Be consistent with sound engineering principles when the criteria for the design of components are not addressed in a Florida NRCS CPS.

Vegetate all disturbed areas in accordance with Florida NRCS CPS Critical Area Planting, Code 342.

**Location.** Locate the waste treatment facility as near the source of manure or other waste as practicable with minimum distance as stated in Florida NRCS CPS Waste Storage Facility, Code 313.

Locate the waste treatment facility with slope, distance of manure and other waste transmission, vehicle access, wind direction, proximity of streams and flood plains, other sensitive areas, and visibility taken into consideration.

**Components.** Waste treatment facilities and processes may consist of multiple components. Where criteria for individual components are described in existing NRCS CPS, use those CPS and their specific criteria for planning, designing, and installation of that component.

Where components of a facility or process are not described in a current NRCS CPS, include a minimum of a one year warranty documentation provided by the system provider on all construction or applied processes. In addition, include a warranty provided by the manufacturer that describes the service life of each component and what the warranty covers.

The waste treatment facility or process shall have a minimum practice life of ten years. Where components have less than a ten year service life, identify their planned replacement during the life of the practice in the Operation and Maintenance Plan.

**Expected System Performance.** Clearly document the expected system performance prior to system installation. At a minimum, document the expected system volumetric flow rate, expected macro-nutrient reductions or change in form, expected pathogen reductions, gaseous ammonia and hydrogen sulfide emissions reductions (or increases).

**Operating Costs.** The system provider shall furnish an annual estimate of operating costs and the time, labor, energy, and equipment requirements for each waste treatment component of the waste management system and on the operation cost or savings the waste treatment component will have on the waste management system as a whole. Identify as estimates the operating costs not based on actual data. Adequately document the anticipated operation cost or savings of the waste treatment component on the entire system.

**Monitoring.** Install equipment needed to properly monitor and control the waste treatment facility or process as part of the system. Include those parameters identified in the design documentation with the process control parameters to be monitored. Identify parameters considered critical to proper system operation in the Operation and Maintenance Plan. Monitor run status of critical equipment and unit processes.

**Byproducts.** Implement a waste treatment process or operation that shall not result in discharge of byproducts harmful to the environment.

Handle and store all byproducts in such a manner as to prevent nuisances to neighbors or to the public at large.

Plan byproducts to be land applied to supply plant nutrients to meet the criteria in Florida NRCS CPS Waste Utilization, Code 633 and Nutrient Management, Code 590.

Handle and dispose any unmarketable or unused byproducts in accordance with all applicable Federal, state, and local laws and regulations. Prepare a plan with NRCS approval for dealing with such byproducts prior to utilization of the process or installation of the waste treatment facility. Include a listing of any permits or permissions required for the execution of the plan.

Recycle byproducts to the maximum extent possible without causing a hazard to the environment.

**Safety.** Include safety features to minimize hazards in the design of the process or facility. Provide guards and shields for moving parts of the equipment used in the treatment process. Fence and post warning signs around waste treatment facilities where needed to prevent children and others from entering a hazardous area.

Implement all treatment processes in accordance with all safety regulations. Utilize protective clothing when handling potentially harmful chemicals that may be used in the process. Provide proper ventilation.

**Additional design criteria for stormwater wet detention-chemical treatment system condition.** Design conveyance facilities to collect stormwater from areas of concern and route it to the stormwater treatment system. Determine the capacity of conveyance facilities by an analysis of the expected runoff rate, the planned stormwater storage pond capacity, and the planned treatment facility.

Equip sumps with inlets designed to protect the collection facilities from erosion. Provide a dike, ditch, water control structure or other structure if needed to limit the entrance of stormwater runoff into the designed inlet.

Where sediment is a concern, install a sediment control basin as the first stage of the treatment train at the inflow to the wet detention pond.

The wet detention pond provides for the storage and treatment of runoff. Design storage facilities to store the collected stormwater runoff until it is treated within the system or reuse.

Design storage ponds created by earthen dams, enclosed embankments, excavated pits, and the related appurtenant structures according to the Florida NRCS conservation practice standard Pond, Code 378.

Design concrete and steel regulating reservoirs to meet all loads associated with the structure.

Design the wet detention pond to have sufficient volume to hold a minimum of 1 inch of runoff from the area of concern. Increase this volume as needed to achieve the water quality treatment goals or discharge requirements.

Develop an emergency response plan for spills and/or pond embankment failures for all wet detention ponds.

Design the wet detention treatment system to meet the appropriate water quality criteria and/or goal(s) for the receiving water body.

Wetland and chemical treatment are the primary treatment methods; however, if another treatment method is used, verify that the following minimum design criteria listed have been met:

- removes the required excess contaminate(s),
- create no secondary surface or groundwater water quality concerns, and
- create no adverse impacts on existing wetland systems.

Determine the level of contaminate removal required by using site-specific water quality data and water quality goals. Where water quality data are not available, use long-term model simulation to determine the amount of contaminate to be removed. Validate the computer model used for the site.

Wetland treatment cells shall be designed in accordance with Florida NRCS conservation practice standard, Constructed Wetland, Code 656.

## CONSIDERATIONS

Waste treatment may require specific total solids and nutrient contents of the waste stream. Consider using pretreatment options such as dilution or settling to adjust the solids content before entering the waste treatment facility or process.

Consider evaluating the visual impact of the waste treatment facility or process within the overall landscape context. Consider implementing a screen with vegetative plantings, landforms, or other measures to alleviate a negative impact or to enhance the view.

Consider locating the chemical treatment facility upstream of the wet detention pond to reduce the frequency of required cleanout. Also, this wet detention pond can be smaller, but there will be an increase in the amount of chemical agent required.

Consider locating the chemical treatment facility downstream of the wet detention pond to control flow rate more closely. This will allow for less chemical agent, but clean-out of a smaller settling area will be more frequent.

Consider designing the stormwater treatment facility to economically maximize reuse of stormwater for irrigation or other agricultural uses where practical.

Consider the maximizing flood control benefits of wet detention ponds.

Consider planning nutrient and pest management measures on fields contributing runoff to limit contaminate-laden stormwater as much as practical.

Consider designing the wet detention pond as an "offline" system that captures the initial first flush of stormwater runoff and allows subsequent stormwater runoff from larger storms to bypass. The bypassed

volume would not be treated. This would maximize stormwater treatment since the first flush volume of stormwater runoff tends to be higher in contaminate concentration.

Consider elevation and distance from various components to take advantage of gravity flow where possible.

Consider protecting system components from storm events and excessive sedimentation.

Consider fencing the area to prevent access where livestock is present.

Consider the reduction of downstream flows or aquifer recharge volumes dependent on runoff due to the detention pond.

Consider the impact by this practice on existing wetland hydrology.

### **PLANS AND SPECIFICATIONS**

Prepare plans and specifications for waste treatment facilities in accordance with the criteria of this standard and sound engineering practice.

Plans and specifications shall include, but not limited to, the following items:

1. Layout and installation details of livestock facilities, waste collection points, waste transfer components, waste treatment and storage facilities, including documentation.
2. Location of all inflow and discharge pipelines, pipeline materials, diameter and slope.
3. Details of support systems for all components of the treatment facility.
4. Fencing and signage as appropriate for safety purposes.
5. Required tests to determine the effectiveness of the waste treatment as appropriate.
6. Other plans to manage the system including a nutrient management plan for proper land application of byproducts.
7. Location of utilities and notification requirements.

Additional requirement in the plans and specifications for stormwater wet detention-chemical treatment system:

1. Type and amount of chemicals to be used,
2. Type of wetland plants, and
3. Type and description of monitoring requirements which including frequency and parameters to be monitored.

### **OPERATION AND MAINTENANCE**

Develop an operation and maintenance (O&M) plan and review the O&M with the owner/operator prior to construction of a waste treatment facility or implementation of a waste treatment process. Plan the O&M to be consistent with the proper operation of all system components. The O&M Plan shall include, but not limited to, the following requirements:

- Recommended loading rates of the waste treatment facility or process for hydraulic and critical pollutant parameters.
- Proper operating procedures for the waste treatment facility or process, including the amount and timing of any chemicals added.
- Operation and maintenance manuals for pumps, blowers, instrumentation and control devices, and other equipment used as components of the waste treatment facility or process.
- Description of the planned startup procedures, normal operation, safety issues, and normal maintenance items. This includes procedures for the planned replacement of components with less than a ten year service life.

- Alternative operation procedures in the event of equipment failure.
- Troubleshooting guide.
- Monitoring and reporting plan designed to demonstrate system performance on an ongoing basis.

Additional requirement in the O&M for stormwater wet detention-chemical treatment system condition

- Periodic cleaning and re-grading of collection facilities to maintain proper flow lines and functionality,
- Periodic checks of treatment areas for flow lines and functionality,
- Periodic vegetation maintenance in treatment areas to ensure optimal use and stability of site,
- Periodic checks and removal of debris as necessary from trash racks and structures to assure proper operation,
- Periodic removal of sediment from traps and/or storage facilities to maintain design capacity and efficiency,
- Inspection or testing of all pipeline and pumping plant components and appurtenances, as applicable,
- Routine maintenance of all mechanical components in accordance with the manufacturer's recommendations,
- Periodic removal and proper disposal of chemical sludge where used, and
- Emergency response procedures and local contacts.

## REFERENCES

Chapter 62-620, Chapter 62-621, and 62-670 F.A.C.

Florida NRCS CPS

Constructed Wetland, Code 656  
Critical Area Planting, Code 342  
Nutrient Management, Code 590  
Pond, Code 378  
Waste Storage Facility, Code 313  
Waste Utilization, Code 633

General Manual

Title 420-Part 401  
Title 450-Part 401  
Title 190-Parts 410.22 and 410.26

National Cultural Resources Procedures Handbook

National Environmental Compliance Handbook

National Food Security Act Manual

National Planning Procedures Handbook

Florida Supplements to Parts 600.1 and 600.6