

## **Instructions**

### **Solid Waste Storage Facility 3 Bins**

#### **General Description**

This standard detail is a solid waste storage facility constructed of concrete masonry units assembled on a 6 inch thick concrete slab. The applicable practice standards which it may be used are Composting Facility (practice code 317) or Waste Storage Facility (practice code 313). It is intended to assist with putting construction drawings together for small livestock operations. It may have other agricultural applications, where solid waste is generated and must be stored for treatment and/or utilization,

The structure may be used as a Composting Facility, but the operation and maintenance of a compost facility is considerably more management intensive than for a Waste Storage Facility. There are many sources of information regarding composting, recipes, Carbon Nitrogen ratios of various materials, temperature monitoring, turning of the mix, required moisture content, etc. The USDA NRCS Ag Waste Management Field Handbook (NRCS National Engineering Handbook – NEH – part 651, and USDA NRCS National Engineering Handbook – NEH 637, Chapter 2, Composting have some excellent information.

As a Solid Waste Storage Facility, the operation and maintenance requirements are less of a burden for the operator than is the case for Composting Facility. The decision as to how the structure is to be used should be made by the cooperators with input and guidance from the NRCS person(s) providing conservation planning assistance.

In any practice standard application the volume of each of the three bins is the critical factor when sizing the Waste Storage Facility for a particular operation. Each bin has a maximum volume of 41 cubic feet.

The structure should be sited on a firm foundation that is free draining and not subject to flooding. It should be placed so that it is convenient to load with manure or other materials from the source, presumably a livestock facility. It should also offer a convenient traffic patterns for timely delivery to cropland, orchard or other point of use as described in the associated practice of Waste Recycling (practice code 633). Surface water management (Diversion, practice code 362; Dike, practice code 356) may be required depending on the topography and rainfall at the farm. If the drainage area above the preferred site is small, the surface water management may be reasonably accomplished by arrows on the plan view with the notation, “shape to drain away from the compost facility.”

#### **Design Criteria and Specifics**

There are no structural computations supporting this design – the vertical steel within the walls, the full depth grouting of the concrete masonry units (CMU), and the reinforcing steel in the bond beam blocks at the top of the 4 ft high walls should be sufficient to withstand static loading from any material reasonably expected to be stored within.

**Quantities**

1.	<u>Excavation (will vary from site to site)</u>		<u>Cubic Yards</u>
2.	<u>Gravel, Base Course (will vary from site to site)</u>		<u>Cubic Yards</u>
3.	<u>3,000 PSI Concrete</u>	<u>1</u>	<u>Cubic Yard</u>
4.	<u>8"X8"X8" Concrete Masonry Units (CMU)</u>	<u>21</u>	<u>Each</u>
5.	<u>8"x8"x16" Concrete Masonry Units (CMU)</u>	<u>87</u>	<u>Each</u>
6.	<u>8"x8"x16" Bond Beam Concrete Masonry Units (CMU), Also called "knock out blocks"</u>	<u>18</u>	<u>Each</u>
7.	<u>8"x8"x8" Bond Beam Concrete Masonry Units (CMU), may have to be cut with a grinder</u>	<u>3</u>	<u>Each</u>
8.	<u>#4 Steel Reinforcing Bar</u>	<u>114</u>	<u>Linear Feet</u>
9.	<u>Welded Wire Fabric 6"x6" 6/6 gauge</u>	<u>46</u>	<u>Square Feet</u>
10.	<u>Channel Iron 3" x 1 1/2"</u>	<u>24</u>	<u>Linear Feet</u>
11.	<u>Mortar/Grout (Joints and Block Fill)</u>	<u>1.6</u>	<u>Cubic Yards</u>
12.	<u>Cover (Corrugated Metal or Other Approved Materials)</u>	<u>84</u>	<u>Square Feet</u>
13.	<u>2"x6" Pressure Treated Boards</u>	<u>70</u>	<u>Linear Feet</u>

## Limitations

The structure isn't intended to hold up to dynamic loadings such as bucket dumps from backhoes and skid steer loaders and definitely not for impacts from moving vehicles or machinery. The Solid Waste Storage bins should not receive any fill against the back side as it is not designed or intended to function as a retaining wall. Such situations should have a site specific design instead of applying this standard detail as a project component. Verify the ground at all prospective sites as soft, poorly consolidated soils may allow differential settling or induce cracking in the bottom slab.

## Site Specific Additions to the Construction Drawings

The two sheets of the drawings should be clear enough for any contractor or proficient, "do it yourselfer," to construct. As part of a construction drawing package it needs to include a plan view, general construction notes and if the size is beyond 5 sheets an index on the cover sheet is required. Compute the excavation and backfill quantities. Adjust the quantities and engineer's estimate. You should be using local costs. Be sure to amend the title block to include the sheet number (corresponding to the detail's position in the final set of construction drawings), the cooperater name and the Soil & Water Conservation District we are working with.

At the total project level, a plan view sheet showing the location of the tank in relation to existing site features is required. The cover sheet showing the information in National Engineering Manual parts 503 and 541 are required. Give recipient of the design enough information to make layout of the components easy. Show a bench mark (with a symbol, matching narrative description, and the elevation of the bench mark(s)) somewhere in the design so elevations of features can be set (including this tank) Excavation, fill or site preparation and other installation special requirements needed should be covered in the project construction notes. Seeding requirements for disturbed areas should be part of the project design (either Critical Area Planting, code 342; or Conservation Cover, practice code 327 depending on anticipated ease or difficulty to establish vegetation).

If using the AutoCadd file to create a digital set of drawings, please note that the model is actually multiple models with various materials and phases of installation shown. This is not the normal manner of using the CADD. Future editions of this standard detail will use a single model and rely on layer control for depiction in the viewports of the layouts. It is recommended that using the model, use the complete model, then use properties and layer control to depict important features for various layouts and viewports.

## Construction

During construction it is important to make sure that the concrete pad is properly installed; welded wire fabric supported by chairs to ensure it is in the middle of the concrete, the concrete is 3,000 psi, the #4 steel reinforcing is supported in place so as not to create problems when the block walls go up, and that the concrete is moist cured for 7 days.

Full grouting of the voids in the concrete blocks is important to protect the reinforcing from moisture and oxygen which cause corrosion. Full grouting lends strength to the walls. Ensure that the required amount of Portland cement is used with making the grout.

**It is an OSHA requirement that any protruding steel be secured to prevent the possibility of impalement. This applies to the #4 vertical reinforcing bars. Let us have no tragedies on our projects.** Finally, be sure that provisions are made for the moist cure called for in the construction notes.

We should be visiting the site to check on the block laying.

**Operation and Maintenance:** The O & M plan for the component needs to include at least the design volume, the expected frequency of tank emptying and procedures, periodic maintenance and tank cleaning requirements, and instructions to contact NRCS if there are problems.

**References:** ACI 318 – Concrete Strength Design; Waste Storage Facility conservation practice standard - Code 313; Engineering Field Manual (National Engineering Handbook part 650 Chapter 17 – Materials), Section IV of the USDA NRCS Pacific Islands Area FOTG; USDA NRCS Agricultural Waste Management Field Handbook (National Engineering Handbook part 651 Chapter 10 – Component Design), USDA NRCS National Engineering Handbook Section 637 Chapter 2, Composting.