

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

MANURE TRANSFER

(No.)
Code 634



DEFINITION

A manure conveyance system using structures, conduits, or equipment.

PURPOSE

To transfer animal manure (bedding material, spilled feed, process and wash water, and other residues associated with animal production may be included) through a hopper or reception pit, a pump (if applicable), and a conduit to:

- a manure storage/treatment facility,
- a loading area, and/or
- to agricultural land for final utilization.

CONDITIONS WHERE PRACTICE APPLIES

The manure transfer component is a part of a planned agricultural manure management system.

Where manure is generated by livestock production or processing and a conveyance system is necessary to transfer manure from the source to a storage/treatment facility and/or a loading area, and/or from storage/treatment to an area for utilization. This includes hauling manure from one geographical area with excess

manure to a geographical area that can utilize the manure in an acceptable manner.

This practice does not include the land application of manure. Criteria for land application of manure is included in NRCS conservation practice standard Nutrient Management, Code 590 or Waste Utilization, Code 633.

CRITERIA

Criteria for all purposes

Laws and regulations. Manure transfer components shall comply with all Federal, state, and local laws, rules and regulations.

Structures. All structures, including those that provide a work area around pumps, shall be designed to withstand the anticipated static and dynamic loading. Structures shall be designed to withstand earth and hydrostatic loading in accordance with NRCS National Engineering Handbook, Section 6, Structural Design or other equivalent design manual. Covers, when needed, shall be designed to support the anticipated dead and live loads.

Reception pits shall be sized to contain a minimum of one full day's manure production. For reception pits collecting runoff, the reception pit shall be sized to also contain at least the volume of runoff from the 25-year, 24-hour storm. Additional capacity shall be added as needed for freeboard and emergency storage.

Openings to structures to receive manure from alley scrape collection shall be a minimum of 9 square feet with one dimension no smaller than 4 feet. The opening shall be equipped with a grate designed to support the anticipated loads.

When curbs are needed in conjunction with structures, they shall be constructed of either concrete or wood. Curbs shall be of sufficient

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

Section IV

height to ensure total manure flow into the structure and be adequately anchored.

Pipelines. Design of pipelines shall be in accordance with sound engineering principles considering the type of load on the pipe, exposure, etc. The minimum pipeline capacity from collection facilities to storage/treatment facilities shall be the maximum peak flow anticipated on a daily basis.

Pipelines used for transferring waste to an irrigation system shall meet the requirements of Florida NRCS conservation practice standard, Irrigation Water Conveyance, Pipeline, Code 430.

All pipes shall be designed based on the type of material and total solids content and shall convey the required flow without plugging. Flow velocities shall be sufficient to minimize settling of solids in the pipeline.

Clean-out access shall be provided for gravity pipelines at a maximum interval of 200 feet for lines carrying non-bedded manure. For pipelines carrying bedded manure the maximum interval shall be 150 feet. Gravity pipelines shall not have horizontal curves or bends except minor deflections (less than 10 degrees) in the pipe joints unless special design considerations are used.

Where slurry manure is transferred in a gravity system, a minimum of 4 feet of head is required on the pipe system.

Gravity discharge pipes used for emptying a storage/treatment facility shall have a minimum of two gates or valves, one of which shall be manually operated.

See Agricultural Waste Management Field Handbook, Chapter 10, for guidance on the design of gravity flow pipes.

Other Conduits. Concrete lined ditches shall be designed in accordance with Florida NRCS conservation practice standard Lined Waterway or Outlet, Code 468. A minimum design velocity of 1.5 feet per second shall be used.

Pumps. Pumps installed for manure transfer shall meet the requirements of Florida NRCS conservation practice standard Pumping Plant, Code 533. Pumps shall be sized to transfer manure at the required system head and volume. Type of pump shall be based on the consistency of the manure and the type of bedding used. Consideration for pump

installations shall be based on manufacturer's recommendations.

Safety. The system design shall consider the safety of humans and animals during construction and operation.

Open structures shall be provided with covers or barriers such as gates, fences, etc. Ventilation and warning signs shall be provided for manure transfer systems as necessary to warn of the danger of entry and to reduce the risk of explosion, poisoning, or asphyxiation.

Pipelines from enclosed buildings shall be provided with a water-sealed trap and vent or similar devices where necessary to control gas entry into buildings.

Barriers shall be placed on push-off ramps to prevent tractors or other equipment from slipping into waste collection, storage, or treatment facilities.

Biosecurity. Manure that is known or believed to have pathogens shall be disposed of in accordance with the recommendations of the state veterinarian.

If the manure contains antibiotics, the person utilizing the manure shall be informed of the type of antibiotic in the manure.

Additional Criteria for Transfer of Manure to Agricultural Land for Final Utilization

Waste utilization. Manure shall be applied to the utilization area in amounts, uniformity, rates, and at a time consistent with the requirements of Florida NRCS conservation practice standard Nutrient Management, Code 590 or Waste Utilization, Code 633 as appropriate.

Where manure is to be spread on land not owned or controlled by the producer, the manure management plan, as a minimum, shall document the amount of waste to be transferred, the nutrient content of the waste, the date of transfer, and who will be responsible for the environmentally acceptable use of the waste. Provisions shall be made to inform the receiver of the manure of the proper storage and/or utilization requirements of the manure.

The minimum pipeline capacity from storage/treatment facilities to utilization areas shall ensure the storage/treatment facilities can be emptied within the time limits stated in the management plan for manure utilization.

Hauling equipment. Equipment used for hauling manure from one geographical area to another area shall be capable of hauling the manure without spillage, leakage, or wind-blown losses during transport. Hauling equipment shall meet all applicable local, state, and federal laws regarding highway transportation.

Weight limits of roads used for hauling waste shall be followed.

Additional Criteria for Transfer of Animal Manure to Manure Storage and Treatment Facility

Inlet. Inlets shall be of any permanent type designed to resist corrosion, plugging, freeze damage, and ultraviolet ray deterioration while incorporating erosion protection as necessary.

Pipe inlets may be steel, concrete, aluminum, HDPE, or PVC as required in Florida NRCS conservation practice standard for Pond, Code 378. However if corrugated steel is used, it shall be adequately protected with an appropriate coating.

Inlets from enclosed buildings shall be provided with a water-sealed trap, vent, or similar device if there is a potential based on design configuration, for gases to enter buildings or other confined spaces.

Pipe inlets shall have a minimum diameter of 6 inches and shall be designed to carry the required flow without plugging. Preferably pipes should be installed on a slope of 1 percent or greater and preferably 1.5 percent or greater. Pipes shall be installed far enough below the ground surface to avoid freezing or be provided with other protective measures.

Pumped inlets shall be sized to meet the requirements of the pumping equipment.

Gravity flow inlet pipes for liquids only may outlet at or above the maximum operating level which is the design volume less the volume contribution of precipitation and runoff from the 25-year, 24-hour storm event. The slope of the pond at the pipe outlet shall be protected from erosion by paving or by extending the pipe outlet to a point where the discharge will not fall on the slope. Pipes shall be supported on pilings of pressure treated wood, steel, concrete, or masonry and anchored to prevent dislodging or flotation. Pilings shall be installed so as to maintain liner integrity.

Large diameter gravity loading pipes for solids and liquids shall outlet at the bottom of the pond, and the effective head (vertical difference between the top of drop inlet and the design volume elevations) shall be no less than 4 feet.

Pushoff ramp slopes shall be no steeper than 4 horizontal to 1 vertical (4:1). Paved slopes shall be no flatter than 1 percent or greater and preferably 1.5 percent or greater and will not be used when appreciable bedding material is used.

Outlet. No outlet shall automatically release storage from the required storage volume. Manually operated outlets shall be of permanent type designed to resist corrosion and plugging.

CONSIDERATIONS

Consider route selection and timing of manure transfer to minimize impact of nuisance odors on others.

Consider equipment type and covering of manure to minimize particulate matter generation during transport of manure.

In locating structures, utilize existing topography to the greatest extent possible to generate head on structures and reduce pumping requirements.

Consider economics (including design life), overall manure management system plans, and health and safety factors.

Vehicles used to transfer manure should be sized to reduce the danger of rollover.

Consider possible contamination of domestic water systems and ground water.

Consider the operating space requirements of loading and unloading of equipment in the vicinity of the manure transfer components.

Consider the subsurface conditions, i.e., depth to bedrock, water table, etc., when locating and designing structures.

Pipelines used for transferring manure should be flushed with clean water after use.

When applicable and compatible, consider the joint use of manure transfer pipelines with irrigation system design requirements.

The pipe pressure rating required may need adjusting based on manure temperature.

Section IV

Consider the use of corrosion resistance and water tightness in the selection of pipe material and joints.

Consider the potential for salt (struvite) deposits in smaller diameter pipes.

Consider the need for appropriate check valves, anti-siphon protection and open air breaks in all pipelines.

Provisions should be made for removing solids from conveyance conduits such as concrete lined ditches, etc.

Consider the sanitation needs of all conveyance equipment that leaves the farm in order to prevent the spread of disease.

PLANS AND SPECIFICATIONS

Plans and specifications for installing manure transfer systems shall be in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) Plan must be prepared and reviewed with the landowner or operator responsible for the application of this practice. The O&M Plan shall provide specific instructions for proper operation and maintenance of each component of this practice and shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

The operation and maintenance plan shall describe what actions will be taken to minimize flies and other insects during the transfer of manure.

For the hauling of manure from one geographical area to another, record keeping will be required and may include such items as:

- the type, nutrient content, and amount of manure transferred,
- the solids percentage of the manure,
- the date of the transfer,
- the name and address of the source and destination of the manure, and
- the condition of the manure as left at the destination (spread, stockpiled, and covered, etc.).

REFERENCES

Agricultural Waste Management Field Handbook, Chapter 10
Florida NRCS Conservation Practice Standards:
Irrigation Water Conveyance, Pipeline, Code 430
Lined Waterway or Outlet, Code 468
Pond, Code 378
Pumping Plant, Code 533
Nutrient Management, Code 590
Waste Utilization, Code 633
NRCS National Engineering Handbook, Section 6, Structural Design