

**Title 35: Environmental Protection**  
**Subtitle E: Agriculture Related Pollution**  
**Chapter I: Pollution Control Board**

**PART 506**  
**LIVESTOCK WASTE REGULATIONS**

**SUBPART A: GENERAL PROVISIONS**

Section

- 506.101 Applicability
- 506.102 Severability
- 506.103 Definitions
- 506.104 Incorporations by Reference
- 506.106 Alternatives, Modifications and Waivers

506.311 Additional Design and Construction Standards for Construction in a Flood Fringe Area

506.312 Additional Design and Construction Standards for Construction in a Karst Area

**AUTHORITY:** Authorized by Section 27 of the Environmental Protection Act [415 ILCS 5/27] and Section 55 of the Livestock Management Facilities Act and implementing the Livestock Management Facilities Act [510 ILCS 77].

**SUBPART B: STANDARDS FOR THE DESIGN AND CONSTRUCTION OF LIVESTOCK WASTE LAGOONS**

Section

- 506.201 Applicability
- 506.202 Site Investigation
- 506.204 Lagoon Design Standards
- 506.205 Liner Standards
- 506.206 Groundwater Monitoring
- 506.207 Construction in a Karst Area
- 506.208 Construction in a Flood Fringe Area
- 506.210 Secondary Containment

**SOURCE:** Adopted in R97-15(A) at 21 Ill. Reg. 6851, effective May 20, 1997; amended in R97-15(B) at 22 Ill. Reg.20605, effective November 12, 1998; amended in R01-28 at 25 Ill. Reg. 14883, effective November 15, 2001.

**SUBPART A: GENERAL PROVISIONS**

**Section 506.101 Applicability**

This Subpart applies to 35 Ill. Adm. Code 506. The applicability of Subpart B, Standards for the Design and Construction of Livestock Waste Lagoons, is set forth at Section 506.201 of this Part. The applicability of Subpart C, Standards for the Design and Construction of Livestock Waste Handling Facilities Other Than Lagoons, is set forth at Section 506.301 of this Part.

**SUBPART C: STANDARDS FOR THE DESIGN AND CONSTRUCTION OF LIVESTOCK WASTE HANDLING FACILITIES OTHER THAN LAGOONS**

Section

- 506.301 Applicability
- 506.302 Site Investigation
- 506.303 Non-lagoon Livestock Waste Storage Volume Requirements
- 506.304 General Design and Construction Standards
- 506.305 Additional Concrete Design and Construction Standards
- 506.306 Additional Metal Design and Construction Standards
- 506.307 Additional Earthen Material Design and Construction Standards
- 506.308 Additional Synthetic Material Design and Construction Standards
- 506.309 Additional Wooden Material Design and Construction Standards
- 506.310 Additional Design and Construction Standards for Construction in an Area with Shallow Aquifer Material

**BOARD NOTE:** Upon the effective date of this Part, the emergency rules at 35 Ill. Adm. Code 505, Livestock Waste Regulations, will no longer apply. This Part will take the place of those emergency rules. Additionally, the standards and specifications for the construction of livestock waste handling facilities contained in this Part shall be used in conjunction with the regulations at 8 Ill. Adm. Code 900.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.102 Severability**

If any provision of this Part or its application to any person or under any other circumstances is adjudged invalid, such adjudication does not affect the validity of this Part as a whole or of any portion not adjudged

invalid.

### Section 506.103 Definitions

Except as stated in this Section, or unless a different meaning of a word or term is clear from the context, the definition of words or terms in this Part shall be the same as that applied to the same words or terms in the Environmental Protection Act [415 ILCS 5] or the Livestock Management Facilities Act [510 ILCS 77]. For the purposes of this Part, the terms included in this Section shall have the following meanings:

*“Animal Feeding Operation” means a feeding operation as defined in the Illinois Environmental Protection Act and the rules promulgated under that Act concerning agriculture related pollution. [510 ILCS 77/10.7]*

*“Animal Unit” means a unit of measurement for any animal feeding operation calculated as follows:*

*Brood cows and slaughter and feeder cattle multiplied by 1.0.*

*Milking dairy cows multiplied by 1.4.*

*Young dairy stock multiplied by 0.6.*

*Swine weighing over 55 pounds multiplied by 0.4.*

*Swine weighing under 55 pounds multiplied by 0.03.*

*Sheep, lambs, or goats multiplied by 0.1.*

*Horses multiplied by 2.0.*

*Turkeys multiplied by 0.02.*

*Laying hens or broilers multiplied by 0.005.*

*Laying hens or broilers multiplied by 0.01 (if the facility has continuous overflow watering).*

*Laying hens or broilers multiplied by 0.03 (if the facility has a liquid manure handling system).*

*Ducks multiplied by 0.02. [510 ILCS 77/10.10]*

For species of animals in an animal feeding operation not specifically listed in this definition, the animal unit factor shall be determined by dividing the average mature animal weight by 1,000. The average mature animal weight shall be determined by the Department with guidance from the University of Illinois Cooperative Extension Service.

*“Aquifer material” means sandstone that is five feet or more in thickness, or fractured carbonate that is ten feet or more in thickness; or sand, gravel, or sand and gravel, as defined in this Section, such that there is at least two feet or more present within any five foot section of a soil boring performed in accordance with Sections 506.202 and 506.302 of this Part.*

*“Department” means the Illinois Department of Agriculture. [510 ILCS 77/10.20].*

*“Filter Strip” means a strip or area of vegetation for removing sediment, organic material, organisms, nutrients, and chemicals from runoff or wastewater. A filter strip must be sized to process the amount of material expected to be released from the lagoon.*

*“Flood fringe” means that portion of the floodplain outside the floodway.*

*“Floodplain” means that land adjacent to a body of water with ground surface elevations at or below the 100-year frequency flood elevation.*

*“Floodway”, for the six counties including Cook, DuPage, Kane, Lake, McHenry and Will, means the channel and that portion of the floodplain adjacent to a stream or watercourse as designated by the Illinois Department of Natural Resources pursuant to Section 18g of the Rivers, Lakes, and Streams Act [615 ILCS 5/18g], which is needed to store and convey the anticipated future 100-year frequency flood discharge with no more than a 0.1 foot increase in stage due to the loss of flood conveyance or storage, and no more than a 10% increase in velocities. [615 ILCS 5/18g(d)(1)] For the remaining 96 counties, “floodway” means the channel of a river, lake or stream and that portion of the adjacent land area that is needed to safely store and convey flood waters. Where floodways have been delineated for regulatory purposes, the mapped lines show the floodway encroachment limits and will be used. For other*

areas, floodway limits will be estimated, using hydrologic and hydraulic calculations, to preserve adequate conveyance and storage so that stage increases for the 100-year frequency flood would not exceed 0.1 foot.

“Grass Waterway” means a natural or constructed waterway, usually broad and shallow covered with erosion-resistant grasses, used to conduct surface water from or through a cropland . A grass waterway is used to convey any lagoon release to an area or structure where it would be contained, such as at an additional berm, or processed, such as at a filter strip, or conveyed to another area, such as by a terrace.

“Gravel” or “Sand and gravel” means unconsolidated materials that contain a matrix (particles of two millimeters or less) that is consistent with the definition of “sand” and particles larger than two millimeters in size.

“Karst Area” means an area with a land surface containing sinkholes, large springs, disrupted land drainage, and underground drainage systems associated with karstified carbonate bedrock and caves or a land surface without these features but containing a karstified carbonate bedrock unit generally overlain by less than 60 feet of unconsolidated materials. [510 ILCS 77/10.24]

“Karstified Carbonate Bedrock” means a carbonate bedrock unit (limestone or dolomite) that has a pronounced conduit or secondary porosity due to dissolution of the rock along joints, fractures, or bedding plains. [510 ILCS 77/10.26]

“Lagoon” or “earthen livestock waste lagoon” means any excavated, diked, or walled structure or combination of structures designed for biological stabilization and storage of livestock wastes. A lagoon does not include structures such as manufactured slurry storage structures or pits under buildings as defined in rules under the Environmental Protection Act concerning agriculture related pollution. [510 ILCS 77/10.25]

“Licensed Professional Engineer” means a person, corporation or partnership licensed under the laws of the State of Illinois to practice professional engineering. [415 ILCS 5/57.2]

“Licensed Professional Geologist” means an individual who is licensed under the laws of the State of Illinois to engage in the practice of

*professional geology in Illinois.* [225 ILCS 745/15]

“Livestock Management Facility” means any animal feeding operation, livestock shelter, or on-farm milking and accompanying milk-handling area. Two or more livestock management facilities under common ownership, where the facilities are not separated by a minimum distance of 1/4 mile, and that share a common livestock waste handling facility shall be considered a single livestock management facility. Livestock management facilities at educational institutions, livestock pasture operations, facilities where animals are housed on a temporary basis such as county and state fairs, livestock shows, race tracks, and horse breeding and foaling farms, and market holding facilities are not subject to the Livestock Management Facilities Act or the requirements of this Part. [510 ILCS 77/10.30]

“Livestock shelter” means any covered structure, including but not limited to livestock houses or barns, in which livestock are enclosed at any time.

“Livestock Waste” means livestock excreta and associated losses, bedding, wash waters, sprinkling waters from livestock cooling, precipitation polluted by falling on or flowing onto an animal feeding operation, and other materials polluted by livestock. [510 ILCS 77/10.35]

“Livestock Waste Handling Facility” means individually or collectively those immovable constructions or devices, except sewers, used for collecting, pumping, treating, or disposing of livestock waste or for the recovery of by-products from the livestock waste. Two or more livestock waste handling facilities under common ownership and where the facilities are not separated by a minimum distance of 1/4 mile shall be considered a single livestock waste handling facility. [510 ILCS 77/10.40] The Livestock Management Facilities Act and this Part do not apply to: livestock waste handling facilities at educational institutions; livestock pasture operations; or facilities where animals are housed on a temporary basis, such as county and State fairs, livestock shows, race tracks, horse breeding and foaling farms, and market holding facilities.

“Maintained” means, with reference to a livestock waste lagoon, that the livestock waste lagoon is inspected (including but not limited to

inspection for burrow holes, trees and woody vegetation, proper freeboard, erosion, settling of berm, berm top integrity, leaks, and seepage) and preventive action is taken as necessary to assure the integrity of the lagoon and its berm and associated appurtenances.

*“Modified” means structural changes to a lagoon that increase its volumetric capacity.* [510 ILCS 77/10.43]

*“New Facility” means a livestock management facility or a livestock waste handling facility the construction or expansion of which is commenced on or after May 21, 1996 (the effective date of the Livestock Management Facilities Act). Expanding a facility where the fixed capital cost of the new components constructed within a 2-year period does not exceed 50% of the fixed capital cost of a comparable entirely new facility shall not be deemed a new facility as used in the Livestock Management Facilities Act.* [510 ILCS 77/10.45] For facilities that have ceased operation on or after July 13, 1999, commencement of operations at a facility that has livestock shelters left intact and that has completed the requirements imposed under Section 13(k) of the Livestock Management Facilities Act [510 ILCS 77/13(k)] and 8 Ill. Adm. Code 900.508 [510 ILCS 77/13(k)] For facilities that have ceased operation prior to July 13, 1999, commencement of operations at a facility that has livestock shelters left intact and that has been operated as a livestock management facility or livestock waste handling facility for 4 consecutive months at any time within the previous 10 years shall not be considered a new or expanded livestock management or waste handling facility.

*“Owner or Operator” means any person who owns, leases, controls, or supervises a livestock management facility or livestock waste-handling facility.* [510 ILCS 77/10.50]

*“Person” means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, political subdivision, state agency, or any other legal entity or their legal representative, agent, or assigns.* [510 ILCS 77/10.55]

*“Placed in service” means the placement of livestock waste in a livestock waste handling facility upon the completion of construction or modification in accordance with the requirements of this Part.*

*“Sand” means unconsolidated materials, where 70% or more of the particles are of size 0.06 millimeters to 2.00 millimeters, and which, according to the USDA soil texture classification scheme, includes soil textures of sand, and loamy sand, and portions of sandy loam and sandy clay loam.*

*“Seasonal high water table” means the highest level of the water table encountered on a yearly basis, where water table is the surface on which the fluid pressure in the soil pore space is equal to the atmospheric pressure. The location of the water table is determined by the level at which water stands in a shallow well open along its length and penetrating the surficial deposits just deeply enough to encounter standing water in the bottom.*

*“Terrace” means an embankment or combination of embankment and channel constructed across a slope to control erosion by diverting and temporarily storing surface runoff instead of permitting it to flow uninterrupted down the slope. A terrace may be used to convey the released material to a grass waterway, a filter strip, or a secondary berm.*

*“USDA-NRCS” means the United States Department of Agriculture’s Natural Resources Conservation Service.*

*“Void” means an underground opening generally produced by dissolution of rock in a karst area.*

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

#### **Section 506.104 Incorporations by Reference**

a) The Board incorporates the following materials by reference:

1) APHA. American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005, (202) 789-5600, “Standard Methods for the Examination of Water and Wastewater”, 20<sup>th</sup> Edition, 1995.

2) ASAE. American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659, (616) 429-5585: “Manure Storages”, ASAE Standards 1998, ASAE EP393.2, December 1997, pp. 649-652.

“Design of Anaerobic Lagoons for Animal Waste Management”, ASAE Standards 1998, ASAE EP403.2, August 1993, pp. 656-659.

- 3) IDNR-ISGS. Illinois Department of Natural Resources-Illinois State Geological Survey, 615 E. Peabody Drive, Champaign, IL 61820-6964, (217) 333-4747, “Karst Terrains and Carbonate Rocks of Illinois”, Illinois Map 8, 1997.
  - 4) MWPS. MidWest Plan Service, 122 Davidson Hall, Iowa State University, Ames, IA 50011-3080, (515) 294-4337:  
“Livestock Waste Facilities Handbook” MWPS-18, 3rd Edition, 1993.  
“Concrete Manure Storages Handbook” MWPS-36, 1st Edition, 1994.  
“Circular Concrete Manure Tanks” Technical Resource TR-9, March 1998.
  - 5) NTIS. National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, (703) 487-4600, “Methods for the Determination of Inorganic Substances in Environmental Samples”, EPA Publication No. EPA-600/R-93/100 (August 1993), Doc. No. PB 94-120821.
  - 6) USDA-NRCS. United States Department of Agriculture - Natural Resources Conservation Service, 1902 Fox Drive, Champaign, IL 61820:  
“Waste Holding Pond”, Illinois Field Office Technical Guide, Section IV, IL425, p. 5, June 1992.  
“Waste Storage Structure”, Illinois Field Office Technical Guide, Section IV, IL313, p. 6, June 1992.  
“Waste Treatment Lagoon”, Illinois Field Office Technical Guide, Section IV, IL359, p. 5, June 1992.
- b) This Section incorporates no later amendments or editions, but does include errata sheets specific to the referenced document.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

## **Section 506.106 Alternatives, Modifications and Waivers**

- a) All requests for alternatives, modifications, and waivers to this Part, where allowed by Sections 13(e) and 15(a) of the Act [510 ILCS 77/13(e),15(a)] or this Part shall be made in writing to the Department. Construction may not begin or continue until the request for alternative, modification, or waiver is granted.
- b) Each request for an alternative, modification, or waiver shall contain a certification from a Licensed Professional Engineer or Licensed Professional Geologist, as relevant, that the grant of the modification is at least as protective of the groundwater, surface water and the structural integrity of the livestock waste management facility as the stated requirements or that the alternative or waiver is at least as protective as the stated requirements.
- c) The Department shall notify the applicant in writing of its determination within 30 days after receipt of the request for an alternative, modification, or waiver. To grant the requested alternative, modification, or waiver, the Department must determine that the modification is at least as protective of the groundwater, surface water and the structural integrity of the livestock waste management facility as the stated requirements or that the alternative or waiver is at least as protective as the stated requirements.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

## **SUBPART B: STANDARDS FOR THE DESIGN AND CONSTRUCTION OF LIVESTOCK WASTE LAGOONS**

### **Section 506.201 Applicability**

This Subpart shall apply to any new or modified lagoon, the design of which has not been approved by the Department prior to November 15, 2001. The standards and specifications for livestock waste lagoon construction contained in this Subpart shall be utilized in the design plans and construction of the lagoon in accordance with the registration of lagoons required in 8 Ill. Adm. Code 900.Subpart F.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.202 Site Investigation**

- a) The owner or operator of a lagoon constructed pursuant to this Subpart shall conduct a site investigation in accordance with the requirements of this Section to determine the following:
  - 1) Whether aquifer material is considered present (or not present) within 50 feet of the planned bottom of the lagoon;
  - 2) Whether the proposed lagoon is to be located within the floodway or flood fringe of a 100-year floodplain; and
  - 3) Whether the proposed lagoon is to be located within a karst area or within 400 feet of a natural depression in a karst area.
- b) The owner or operator shall perform one or more soil borings that shall be located within the final lagoon area or within 20 feet of the final exterior berm toe. The boring shall be performed to determine the presence of aquifer material or karstified carbonate bedrock as follows:
  - 1) The soil boring shall extend to a depth that includes 50 feet below the planned bottom of lagoon native soil or to bedrock;
  - 2) If bedrock is encountered, additional soil borings may be necessary to verify the presence of aquifer material or karstified carbonate bedrock;
  - 3) Continuous samples shall be recovered from each soil boring; and
  - 4) Upon completion, the boring(s) shall be properly abandoned and sealed pursuant to the Illinois Water Well Construction Code at 77 Ill. Adm. Code 920.120.
- c) If the Department determines that additional soil borings are necessary to ensure the protection of the groundwater, surface water or the structural integrity of the livestock waste management facility, the Department shall require additional soil borings.
- d) As an alternative to performing the soil boring(s) required under subsection (b) or (c) of this Section, the owner or operator of the lagoon may propose to the Department to utilize alternative information source(s). The Department shall

evaluate the proposal; determine whether the alternative information source(s) will result in a site investigation that will be at least as protective of the groundwater, surface water and the structural integrity of the livestock waste management facility as would have resulted from data resulting from soil borings; and notify the owner or operator of the Department's finding.

- e) Notwithstanding the other requirements of this Subpart, if the site investigation determines that the lagoon is to be located in the flood fringe of a 100-year floodplain, the design of the lagoon shall include the additional requirements of Section 506.206 of this Subpart.
- f) If the results of the soil boring conducted pursuant to Section 506.202(b) of this Subpart indicate the proposed lagoon is to be located in a karst area or if the proposed lagoon is to be located within an area designated as "Sink hole areas" on "Karst Terrains and Carbonate Rocks of Illinois", IDNR-ISGS Illinois Map 8, the following requirements shall be met:
  - 1) The Department shall conduct a visual inspection of the surrounding area to determine the presence of natural depressions during the pre-construction site inspection as required pursuant to 8 Ill. Adm. Code 900.604(a). Construction may not occur within 400 feet of a natural depression in a karst area; and
  - 2) The Licensed Professional Engineer or Licensed Professional Geologist shall evaluate the results of the soil boring conducted pursuant to subsection (b) of this Section. If, as a result of the soil boring, a void of 1 foot or greater in vertical distance is discovered, the following requirements shall be met:
    - A) The Department may require additional borings to determine the extent of the void;
    - B) Notwithstanding the other requirements of this Subpart, the owner or operator shall submit to the Department a plan for the design of the lagoon that shall include the additional design requirements set forth in Section 506.207 of this Part

- and shall include any additional design requirements deemed necessary by the Licensed Professional Engineer; and
- C) The Department shall review and approve the plan required pursuant to subsection (f)(2)(B) of this Section prior to construction. The Department may also require additional design criteria before the plan is approved and construction may begin.

If, as a result of the soil boring, no voids of 1 foot or greater in vertical distance are discovered, the design shall include the additional requirements as set forth in Section 506.207 of this Subpart.

- g) The site investigation in accordance with subsection (b), (c), (d), (e), or (f) of this Section shall be conducted under the direction of a Licensed Professional Engineer or Licensed Professional Geologist.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

### Section 506.204 Lagoon Design Standards

- a) The owner or operator of *any livestock waste lagoon subject to this Subpart shall construct or modify the lagoon in accordance with:*
- 1) *“Design of anaerobic lagoons for animal waste management”, ASAE Engineering Practice 403.2; or the guidelines published by the United States Department of Agriculture’s Natural Resource Conservation Service titled “Waste Treatment Lagoon”, which are incorporated by reference in Section 506.104 of this Part; and*
  - 2) The additional design standards specified in subsections (c) through (h) of this Section. [510 ILCS 77/15(a)]
- b) *The department may require changes in design or additional requirements to protect groundwater, such as extra liner depth or synthetic liners, when it appears groundwater could be impacted. [510 ILCS 77/15(a)]*

- c) The owner or operator shall conduct a site investigation in accordance with Section 506.202 of this Part to determine if aquifer material is present (or not present) within 50 feet of the planned bottom of the lagoon.
- d) The owner or operator shall, as a part of the lagoon design, include the use of a liner and implement groundwater monitoring in accordance with following conditions:
- 1) If the uppermost aquifer material is located above or within 20 feet of the lowest point of the planned lagoon bottom (as measured from the top of any proposed liner), then the lagoon design shall include both a liner and groundwater monitoring.
  - 2) If the uppermost aquifer material is located between 20 to 50 feet from the lowest point of the planned lagoon (as measured from the top of any proposed liner), then the lagoon design shall include a liner, but no groundwater monitoring is required.
  - 3) If no aquifer material is located within 50 feet from the lowest point of the planned lagoon (as measured from the top of any proposed liner), then the lagoon design shall require neither a liner nor groundwater monitoring.
- e) If the owner or operator determines that a liner is required for the lagoon pursuant to this Section, the design of the lagoon shall include an in-situ soil liner, borrowed clay or clay/bentonite mixture, or a synthetic liner meeting the requirements of Section 506.205 of this Part.
- f) If the owner or operator determines that groundwater monitoring is required for the lagoon pursuant to this Section, the design of the lagoon shall include the implementation of a groundwater monitoring program in accordance with Section 506.206 of this Part and 8 Ill. Adm. Code 900.Subpart F.
- g) Any livestock waste lagoon subject to the provisions of this Part shall meet or exceed the following:
- 1) Berm:
    - A) The minimum bermtop width shall be 8 feet;
    - B) The berm may contain no outlet piping that extends

through the berm unless the piping discharges to another lagoon or is a component of a recirculating flush system;

lots, roofs or other surfaces where collected precipitation is directed into the lagoon, plus the volume of any wash down liquids utilized within the facility that are also directed into the lagoon. In no case shall this volume be less than the precipitation and runoff generated by a 25-year, 24-hour storm event and directed to the lagoon; and

- 2) Berm slope:
  - A) Exterior and normally exposed interior (above the liquid level elevation corresponding to the summation of the sludge volumes and minimum design volume) earthen walls shall have side slopes not steeper than a 3 to 1 ratio of horizontal to vertical and a vegetative cover shall be established on any exposed berm areas and kept mowed or otherwise maintained to eliminate erosion or other berm deterioration;
  - B) Interior berm earthen walls below the liquid level elevation corresponding to the summation of the sludge volumes and minimum design volume shall have side slopes not steeper than a 3 to 1 ratio of horizontal to vertical; or a 2 to 1 ratio of horizontal to vertical if designed by a Licensed Professional Engineer and maintained to eliminate berm deterioration;
- 3) The lagoon's total design volume shall be not less than the volume calculated as the summation of the following:
  - A) A minimum design volume, as calculated pursuant to subsection 5.4.1.1, ASAE EP403.2, ASAE Standards 1998, pp. 656-659;
  - B) A livestock waste volume, that shall be sufficient to store the waste generated by the facility for a period not less than 270 days as determined in accordance with ASAE EP403.2, ASAE Standards 1998, p. 656;
  - C) Runoff and wash down volumes generated during a 270-day period, including all runoff and precipitation from
- 4) In addition to the lagoon's total design volume, a freeboard shall be provided as follows:
  - A) For lagoons serving a livestock management facility with a maximum design capacity of less than 300 animal units and not collecting runoff from areas other than the exposed surface of the lagoon (including associated interior berm slopes and flat bermtop areas), the top of the settled embankment shall be not less than 1 foot above the fluid surface level of the lagoon total design volume; or
  - B) For all other lagoons, the top of the settled embankment shall be not less than 2 feet above the fluid surface level of the lagoon total design volume;
- 5) Subsurface drainage lines in the immediate area of the livestock waste lagoon shall be removed or relocated to provide for a minimum separation distance of not less than 50 feet between the outermost extent of the lagoon (exterior toe of the berm) and the subsurface drainage line;
- 6) The minimum separation distance between the outermost extent of a lagoon (exterior toe of the berm) and any potential route of groundwater

D) A sludge accumulation volume, as calculated pursuant to subsection 5.4.1.4, ASAE EP403.2, ASAE Standards 1998, p. 658;



contamination, as defined in the Illinois Environmental Protection Act [415 ILCS 5] shall be not less than 100 feet. In addition, the minimum separation distance between the outermost extent of a lagoon (exterior toe of the berm) and a non-potable well, an abandoned or plugged well, drainage well or injection well shall be not less than 100 feet;

- 7) The design and construction of the lagoon shall include the installation of a lagoon liquid level board or staff gauge within the interior of the liquid storage volume. The liquid level board or staff gauge shall include a mark at the liquid level elevation corresponding to the summation of the sludge volume and minimum design volume and shall be designated as the "STOP PUMPING" elevation. The liquid level board or staff gauge shall also be marked at the liquid level elevation corresponding to the summation of the sludge volume, minimum design volume, runoff and wash down volumes, and livestock waste volume and shall be designated as the "START PUMPING" elevation;
- 8) *The livestock waste supply to a single-stage lagoon must be below the minimum design volume level* [510 ILCS 77/25(b)(2)]; and
- 9) The location of the lagoon and the associated livestock management facility shall be in compliance with all setback provisions of the Illinois Environmental Protection Act [415 ILCS 5], the Livestock Management Facilities Act [510 ILCS 77], and the rules promulgated thereunder.
- h) *The owner or operator of the earthen livestock lagoon may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives.* [510 ILCS 77/15(a)] The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water and the structural integrity of the livestock waste management facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

### Section 506.205 Liner Standards

- a) The design of a liner constructed from in-situ soils, borrowed clay or a clay/bentonite mixture, or a synthetic liner pursuant to Section 506.204(d) of this Part shall comply with the requirements of this Section.
- b) A liner constructed using in-situ soil or borrowed clay or clay/bentonite mixtures shall meet the following standards:
  - 1) The minimum liner thickness shall be 2 feet;
  - 2) The liner shall be constructed in lifts not to exceed 6 inches in compacted thickness;
  - 3) The liner shall be compacted to achieve a hydraulic conductivity equal to or less than  $1 \times 10^{-7}$  centimeters/second; and
  - 4) The construction and compaction of the liner shall be carried out to reduce void spaces and allow the liner to support the loadings imposed by the waste disposal operation without settling.
- c) Any synthetic liner used in the construction of a livestock waste lagoon shall meet the following standards:
  - 1) The liner shall be designed to perform equivalent to or better than a liner that conforms to subsection (b) of this Section;
  - 2) The liner manufacturer shall provide to the owner or operator the liner maintenance guidelines and shall certify that the liner is chemically compatible with:
    - A) The livestock waste being stored; and
    - B) The supporting soil materials;
  - 3) The liner shall be supported by a compacted base free from sharp objects;
  - 4) The liner shall have sufficient strength and durability to function at the site for the design period under the maximum

expected loadings imposed by the waste and equipment and stresses imposed by settlement, temperature, construction and operation;

- 5) The liner seams shall be made in the field according to the manufacturer's specifications. All sections shall be arranged so that the use of field seams is minimized and seams are oriented in the direction subject to the least amount of stress; and
- 6) The owner or operator shall maintain a copy of the manufacturer's compatibility statement and liner installation and maintenance guidelines at the facility.
- d) The design, construction and installation of the liner in accordance with this Section shall be conducted under the direction of a Licensed Professional Engineer. Upon completion of construction or installation of the liner, the supervising Licensed Professional Engineer shall certify, pursuant to 8 Ill. Adm. Code 900.605(a), that the liner meets all the applicable requirements of this Section. Such certification shall include all supporting justification and data.
- e) The owner or operator of a livestock waste lagoon shall submit to the Department a copy of the Licensed Professional Engineer's Certification prior to placing the lagoon in service in accordance with 8 Ill. Adm. Code 900.605.
- f) *The owner or operator of the earthen livestock lagoon may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. [510 ILCS 77/15(a)]* The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water and the structural integrity of the livestock waste management facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

#### **Section 506.206 Groundwater Monitoring**

- a) The owner or operator of any livestock waste lagoon required to implement groundwater monitoring pursuant to Section 506.204(d) of this Part shall implement a monitoring program

that meets the requirements of this Section and 8 Ill. Adm. Code 900.Subpart F.

- b) The groundwater monitoring network shall consist of a minimum of three monitoring wells located within 20 feet of the exterior toe of the berm. At least two of the required wells shall be located down gradient of the lagoon based on local groundwater conditions. For the purposes of groundwater monitoring network design, multiple cell lagoons shall be considered as a single lagoon.
- c) The monitoring wells shall be installed in accordance with the following:
  - 1) The requirements of the Illinois Water Well Construction Code at 77 Ill. Adm. Code 920.170;
  - 2) The top of the well screen shall be set at the estimated seasonal low water table elevation;
  - 3) Monitoring wells shall utilize a minimum of a five foot screened interval; and
  - 4) The screen shall be set in a sand pack that extends at least one foot above and one foot below the screened interval.
- d) The owner or operator shall sample the wells, analyze the samples, and report the results in accordance with the requirements of 8 Ill. Adm. Code 900.Subpart F.
- e) *The owner or operator of the earthen livestock lagoon may, upon written request and with written approval from the department, modify or exceed these standards in order to meet site specific objectives. [510 ILCS 77/15(a)]* The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water and the structural integrity of the livestock waste management facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

#### **Section 506.207 Construction in a Karst Area**

- a) *A new earthen livestock waste lagoon constructed in a karst area shall be designed to prevent seepage of the stored material to groundwater. Owners or operators of proposed facilities shall consult with the local soil and*

*water conservation district, the University of Illinois cooperative extension service, or other local, county, or state resources relative to determining the possible presence or absence of such areas.* [510 ILCS 77/15/(a-5)(2)]

- b) Any lagoon subject to the provisions of this Subpart, constructed in a karst area, shall be designed and constructed utilizing a rigid material such as concrete or steel.
- c) The owner or operator of the earthen livestock lagoon may, upon written request and with written approval from the Department, modify or exceed the standards of this Section in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water and the structural integrity of the livestock waste management facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

#### **Section 506.208 Construction in a Flood Fringe Area**

*A new earthen livestock waste lagoon may be constructed within the portion of a 100-year floodplain that is within the flood fringe and outside the floodway provided that the facility is designed and constructed so that livestock waste is not readily removed during flooding and meets the requirements set forth in the Rivers, Lakes, and Streams Act [615 ILCS 5], Section 5-40001 of the Counties Code [55 ILCS 5/5-40001], and executive order number 4 (1979).* [510 ILCS 77/15(a-5)(1)] The following criteria shall be incorporated into the design of a lagoon proposed for construction in the flood fringe of a 100-year floodplain:

- a) The lagoon berms shall be designed and constructed to withstand the hydrostatic pressures from flood waters that may be exerted on the berms during a flood event.
- b) The elevation of the lowest point on the bermtop shall be at the summation of the elevation of the 100-year flood plus a freeboard. The freeboard height shall be a minimum of two feet.
- c) For lagoons with unequal length and width dimensions, the lagoon shall be oriented with the longest dimension parallel to the expected direction of floodwater flow.
- d) Any monitoring wells installed pursuant to

Section 506.206 of this Subpart shall be mounted flush with the surrounding soil surface or otherwise physically protected from the flood waters.

- e) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

#### **Section 506.210 Secondary Containment**

*Notwithstanding any other requirement of this subpart or 8 Ill. Adm. Code 900, every earthen livestock waste lagoon constructed pursuant to this subpart shall include the construction of a secondary berm, filter strip, grass waterway, or terrace, or any combination of those, outside the perimeter of the primary berm if an engineer licensed under the Professional Engineering Practice Act of 1989 and retained by the registrant determines, with the concurrence of the department, that construction of such a secondary berm or other feature or features is necessary in order to ensure against a release of livestock waste from the lagoon that encroaches or is reasonably expected to encroach upon land other than the land occupied by the livestock waste handling facility of which the lagoon is a part; or that enters or is reasonably expected to enter the waters of this state; or that enters or may reasonably be expected to enter a natural depression in a karst area and shall be so designed.* [510 ILCS 77/15(a)] The following criteria shall be incorporated into the design of a system utilized for secondary containment:

- a) A grass waterway constructed, installed, or utilized for the purposes of this Section shall meet or exceed the following:
  - 1) A grass waterway shall be designed and constructed to transfer the maximum expected flow rate of livestock waste that may reasonably be expected to be released from the lagoon;
  - 2) A grass waterway shall direct the flow of livestock waste away from the lagoon berm to a filter strip, secondary berm, terrace, or combination of these; and

- 3) Vegetation shall be established and maintained to provide adequate ground cover.
- b) A filter strip constructed, installed, or utilized for the purposes of this Section shall meet or exceed the following:
  - 1) A filter strip shall be designed and constructed to function at the maximum expected hydraulic loadings that may reasonably be expected to come from the lagoon; and
  - 2) Vegetation shall be established and maintained to provide adequate ground cover.
- c) A secondary berm constructed, installed, or utilized for the purposes of this Section shall meet or exceed the following:
  - 1) The storage volume created as a result of the construction of a secondary berm shall be of sufficient capacity to contain the portion of the lagoon liquid that may reasonably be expected to be released from the lagoon plus any accumulated precipitation; and
  - 2) A vegetative cover shall be established. The area shall be maintained by periodic mowing, the removal of woody plant species, or other measures to prevent erosion and berm deterioration.
- d) A terrace constructed, installed, or utilized for the purposes of this Section shall meet or exceed the following:
  - 1) The terrace shall direct the livestock waste to a filter strip or grass waterway constructed or installed pursuant to the requirements of this Section; and
  - 2) Vegetation shall be established and maintained to provide adequate ground cover on those portions of the terrace where crops are not grown.
- e) The owner or operator of the earthen livestock lagoon may, upon written request and with written approval from the Department, modify or exceed the standards of this Section in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the

groundwater, surface water and the structural integrity of the livestock waste management facility as the requirements of this Part.

(Source: Added at 25 Ill. Reg. 14883, effective November 15, 2001)

**SUBPART C: STANDARDS FOR THE DESIGN AND CONSTRUCTION OF LIVESTOCK WASTE HANDLING FACILITIES OTHER THAN LAGOONS**

**Section 506.301 Applicability**

The applicability of this Subpart shall be as follows:

- a) Sections 506.302, 506.310, 506.311, and 506.312 of this Subpart shall apply to the newly constructed livestock waste handling components of new livestock waste handling facilities, other than livestock waste lagoons, the design of which has not been approved by the Department prior November 15, 2001.
- b) Sections 506.303, 506.304, 506.305, 506.306, 506.307, 506.308, and 506.309 of this Subpart shall apply to the newly constructed livestock waste handling components of new or existing livestock waste handling facilities, other than livestock waste lagoons, the design of which has not been approved by the Department prior to November 15, 2001.

The standards and specifications for livestock waste handling facility design and construction contained in this Subpart shall be utilized in the design plans and construction of the waste handling facility in accordance with the requirements of 8 Ill. Adm. Code 900.Subpart E.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.302 Site Investigation**

- a) The owner or operator of a livestock waste handling facility shall conduct a site investigation in accordance with the requirements of this Section to determine the following:
  - 1) Whether aquifer material is considered present (or not present) within 5 feet of the planned bottom of the livestock waste handling facility;
  - 2) Whether the proposed facility is to be

- located within the floodway or flood fringe of a 100-year floodplain; and
- 3) Whether the proposed facility is to be located within a karst area or within 400 feet of a natural depression in a karst area.
- b) Except for facilities that are proposed to be located within an area designated as “Sink hole areas” on “Karst Terrains and Carbonate Rocks of Illinois”, IDNR-ISGS Illinois Map 8, the owner or operator shall obtain soil samples from within the final livestock waste handling facility area or within 20 feet of the livestock waste handling facility boundaries. The sampling shall be performed to determine the presence of aquifer material or karstified carbonate bedrock as follows:
- 1) The soil sampling shall begin at the soil surface and extend to a depth that includes a minimum of 5 feet below the planned bottom of the livestock waste handling facility native soil or to bedrock;
  - 2) If bedrock is encountered, additional soil samplings may be necessary to verify the presence of aquifer material or karstified carbonate bedrock;
  - 3) Continuous samples shall be recovered from each soil sampling; and
  - 4) Upon completion, any boring used for sampling shall be properly abandoned and sealed pursuant to the Illinois Water Well Construction Code at 77 Ill. Adm. Code 920.120. Any excavation used for sampling that is within the construction boundaries of the livestock management facility or livestock waste handling facility shall be restored by the addition of soil compacted in lifts no greater than 6 inches.
- c) If the Department determines that additional soil samplings are necessary to ensure the protection of the groundwater, surface water or the structural integrity of the livestock waste handling facility, the Department shall require additional soil samplings.
- d) As an alternative to performing the soil sampling required under subsection (b) or (c) of this Section, the owner or operator of the livestock waste handling facility may propose to the Department to utilize alternative information source(s). The Department shall evaluate the proposal; determine whether the alternative information source(s) will result in a site investigation that will be at least as protective of the groundwater, surface water and the structural integrity of the livestock waste handling facility as would have resulted from data resulting from soil borings; and notify the owner or operator of the Department’s finding.
- e) Notwithstanding the other requirements of this Subpart, if aquifer material is located above or within 5 feet of the lowest point of the livestock waste handling facility, the design of the facility shall include the additional requirements of Section 506.310 of this Subpart.
- f) Notwithstanding the other requirements of this Subpart, if the site investigation determines that the livestock waste handling facility is to be located in the flood fringe of a 100-year floodplain, the design of the facility shall include the additional requirements of Section 506.311 of this Subpart.
- g) If the proposed livestock waste handling facility is to be located within an area designated as “Sink hole areas” on “Karst Terrains and Carbonate Rocks of Illinois”, IDNR-ISGS Illinois Map 8 or if the results of the soil sampling conducted pursuant to Section 506.302(b) of this Subpart indicate the proposed livestock waste handling facility is to be located in a karst area, the following requirements shall be met:
- 1) The Department shall conduct a visual inspection of the surrounding area to determine the presence of natural depressions during the pre-construction site inspection as required pursuant to 8 Ill. Adm. Code 900.505(a). Construction may not occur within 400 feet of a natural depression in a karst area;
  - 2) The owner or operator shall perform one or more soil borings that shall be located within the final livestock waste handling facility area or within 20 feet of the livestock waste handling facility boundaries to determine the presence of voids. The boring shall begin at the soil surface and extend to a depth that includes a minimum of 20 feet below the planned bottom of the livestock

waste handling facility;

- 3) Continuous samples shall be recovered from each boring;
- 4) The Licensed Professional Engineer, Licensed Professional Geologist, or USDA-NRCS representative designated to perform such functions shall evaluate the results of the soil boring. If a void of 1 foot or greater in vertical distance is discovered from the soil boring performed pursuant to subsection (g)(2) of this Section, the following requirements shall be met:

- A) The Department may require additional borings to determine the extent of the void;
- B) Notwithstanding the other requirements of this Subpart, the owner or operator shall submit to the Department a plan for the design of the facility that shall include the additional design requirements set forth in Section 506.312 of this Part and shall include any additional design requirements deemed necessary by the Licensed Professional Engineer; and
- C) The Department shall review and approve the plan required pursuant to subsection (g)(4)(B) of this Section prior to construction. The Department may also require additional design criteria before the plan is approved and construction may begin.

If, as a result of the soil boring, no voids of 1 foot or greater in vertical distance are discovered, the design shall include the additional requirements set forth in Section 506.312 of this Subpart.

- 5) Upon completion of the boring(s) required pursuant to subsection (g) of this Section, the boring(s) shall be properly abandoned and sealed pursuant to the Illinois Water Well Construction Code at 77 Ill. Adm. Code 920.120.

- h) The site investigation in accordance with subsections (b), (c), (d), (e), (f), and (g) of this Section shall be conducted under the direction of a Licensed Professional Engineer, a Licensed Professional Geologist, or a representative of the USDA-NRCS designated to perform such functions.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

### **Section 506.303 Non-lagoon Livestock Waste Storage Volume Requirements**

- a) Livestock waste handling facilities *that handle waste in a liquid or semi-solid form shall be designed to contain a volume of not less than the amount of waste generated during 150 days of facility operation at design capacity.* [510 ILCS 77/13(a)(1)(B)] In addition, the design and volume of livestock waste storage structures that handle waste in a liquid or semi-solid form shall include the following:
  - 1) Runoff volumes generated during a 150-day period, including all runoff and precipitation from lots, roofs and other surfaces where precipitation is directed into the storage structure. In no case shall this volume be less than the precipitation and runoff generated by a 25-year, 24-hour storm event and directed to the livestock waste handling facility;
  - 2) The volume of all wash down liquid generated during the 150-day period that is directed into the livestock waste handling facility; and
  - 3) A freeboard of 2 feet, except for structures with a cover or otherwise protected from precipitation.
- b) Livestock waste handling facilities that handle waste in a solid form *shall be sized to store not less than the amount of waste generated during 6 months of facility operation at design capacity.* [510 ILCS 77/14(a)(4)]
- c) Pump stations, settling tanks, pumps, piping, or other components of a livestock waste handling facility that temporarily hold or transport waste to a storage facility sized pursuant to this Section shall be exempt from the storage volume requirements of this Section.

- d) The design of any livestock waste storage structure required to incorporate a freeboard pursuant to subsection (a) of this Section shall include a liquid level board or staff gauge. The liquid level board or staff gauge shall include a mark corresponding to the summation of the livestock waste volume and the additional wash down volume pursuant to subsection (a) of this Section, and shall be designated as the "START PUMPING" elevation.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.304 General Design and Construction Standards**

- a) Livestock waste handling facilities shall be designed and constructed according to the following requirements:

- 1) Storage and transport surfaces, other than those constructed of concrete, intended to come into contact with livestock waste shall be constructed or installed to achieve a hydraulic conductivity equal to or less than  $1 \times 10^{-7}$  centimeters per second.
- 2) Storage and transport surfaces constructed of concrete and intended to come into contact with livestock waste shall be constructed or installed to achieve a hydraulic conductivity equal to or less than  $1 \times 10^{-6}$  centimeters per second.
- 3) Notwithstanding subsection (a)(1) of this Section, storage and transport surfaces constructed at enclosed livestock waste handling facilities intended to house poultry that come into contact with livestock waste that is in dry or solid form shall be constructed or installed to achieve a hydraulic conductivity equal to or less than  $1 \times 10^{-6}$  centimeters per second.
- 4) The livestock waste handling facility shall withstand, at a minimum, the following loads:
  - A) Lateral loads due to soil and equipment, which shall be obtained from Table 2 of the MidWest Plan Service Concrete Manure Storages

- B) Handbook, MWPS-36; Lateral loads due to livestock waste scraping and handling equipment;
- C) Lateral and vertical loads due to the handling and storage of livestock waste;
- D) Vertical loads on tank tops, slats, and other horizontal surfaces, which shall be obtained from Table 3 of the MidWest Plan Service Concrete Manure Storages Handbook, MWPS-36; and
- E) Vertical loads due to mobile equipment, stationary equipment, and structures housing the livestock.

- 5) The construction materials shall be chemically compatible with the livestock waste being handled and stored and the supporting soil materials.
- 6) The livestock waste handling facility shall be designed and constructed to prevent erosion and damage resulting from the transport, handling, and storage of livestock waste.
- 7) Existing subsurface drainage lines in the immediate area of the livestock waste handling facility shall be removed or relocated to provide for a minimum separation distance of not less than 50 feet between the outermost extent of the livestock waste handling facility and the subsurface drainage line.
- 8) The minimum separation distance between the outermost extent of the livestock waste handling facility and any potential route of groundwater contamination, as defined in the Illinois Environmental Protection Act [415 ILCS 5], shall be not less than 100 feet. In addition, the minimum separation distance between the outermost extent of the livestock waste handling facility and a non-potable well, an abandoned or plugged well, drainage well, or injection well shall be not less than 100 feet.

- 9) The design and construction of livestock waste handling facilities shall include a backflow prevention device to prevent siphoning or gravity flow of livestock waste in the opposite direction of intended use.
- b) In addition to the requirements listed in this Section, livestock waste handling facilities shall be designed and constructed pursuant to the following:
- 1) Concrete livestock waste storage tanks shall be designed and constructed in accordance with MidWest Plan Service Concrete Manure Storages Handbook, MWPS-36, or, in the case of circular concrete tanks, Circular Concrete Manure Tanks, MWPS TR-9.
  - 2) Components of livestock waste handling facilities that temporarily hold or transport waste for the purpose of liquid and solid separation, including but not limited to settling basins and settling tanks, shall be designed and constructed in accordance with MidWest Plan Service Livestock Waste Facilities Handbook, MWPS-18, or NRCS Waste Storage Structure, IL313.
  - 3) Components of livestock waste handling facilities holding semi-solid waste, including but not limited to picket dam structures, shall be designed and constructed in accordance with MidWest Plan Service Livestock Waste Facilities Handbook, MWPS-18, or similar standards used by the USDA-NRCS.
  - 4) Components of livestock waste handling facilities holding solid waste, including but not limited to temporary manure stacks, shall be designed and constructed in accordance with MidWest Plan Service Livestock Waste Facilities Handbook, MWPS-18, or similar standards used by the USDA-NRCS, including but not limited to Waste Storage Structure, IL313.
  - 5) Holding ponds used for the storage of livestock feedlot run-off and waste storage ponds shall be designed and constructed in accordance with MidWest Plan Service Livestock Waste Facilities Handbook, MWPS-18, or similar standards used by the USDA-NRCS, including but not limited to Waste Holding Pond, IL425.
- c) In areas where the seasonal high water table may encroach upon the bottom of the livestock waste storage structure, a perimeter foundation drainage tubing shall be installed as follows:
- 1) The drainage tubing must be located at a horizontal distance that provides sufficient drainage to maintain the water table elevation below the bottom of the footings.
  - 2) The tubing shall drain freely to a surface water outlet or other subsurface drainage outlet.
  - 3) The tubing must include a sampling port to allow the monitoring, sampling, and reporting of any discharge from the tubing in accordance with the requirements of 8 Ill. Adm. Code 900.Subpart E.
  - 4) The owner or operator shall take necessary measures to divert the discharge from the drainage tubing, away from surface water, if monitoring results pursuant to subsection (c)(3) of this Section indicate that the tubing is discharging livestock waste. Such measures shall include, but not be limited to, diverting the flow to crop production area naturally lower in elevation than the livestock facility, or providing a manhole with a gate valve that could be closed in an emergency.
- d) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility as the requirements of this Part.
- (Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)
- Section 506.305 Additional Concrete Design and Construction Standards**
- a) In addition to the requirements set forth in



Section 506.304 of this Subpart, the design and construction of concrete components of livestock waste handling facilities shall meet the following requirements:

- 1) Construction joints shall be incorporated into the concrete in accordance with the design guidance provided in MidWest Plan Service Concrete Manure Storages Handbook, MWPS-36, or, in the case of circular concrete tanks, Circular Concrete Manure Tanks, TR-9;
  - 2) Water stops shall be incorporated into construction joints in accordance with the design guidance provided in MidWest Plan Service Concrete Manure Storages Handbook, MWPS-36, or, in the case of circular concrete tanks, Circular Concrete Manure Tanks, TR-9;
  - 3) Concrete minimum compressive strength requirements shall be in accordance with the design guidance provided in Table 28 of MidWest Plan Service Concrete Manure Storages Handbook, MWPS-36, or, in the case of circular concrete tanks, Table 1 of Circular Concrete Manure Tanks, TR-9; and
  - 4) The strength, cover, and bending requirements for concrete reinforcement shall be in accordance with the design guidance provided in Table 1 of MidWest Plan Service Concrete Manure Storages Handbook, MWPS-36, or, in the case of circular concrete tanks, Circular Concrete Manure Tanks, TR-9.
- b) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

### **Section 506.306 Additional Metal Design and Construction Standards**

- a) In addition to the requirements set forth in Section 506.304 of this Subpart, the design and construction of metal components of livestock waste handling facilities shall meet the following requirements:
- 1) All metal surfaces shall be protected by a corrosion resistance system;
  - 2) Concrete footings and bases shall meet the strength and load requirements set forth in Sections 506.304 and 506.305 of this Subpart;
  - 3) The connection of dissimilar metals shall be minimized; and
  - 4) Metal components of livestock waste handling facilities shall be constructed or installed according to the manufacturer's specifications and guidelines.
- b) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed the standards of this Section in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

### **Section 506.307 Additional Earthen Material Design and Construction Standards**

- a) In addition to the requirements set forth in Section 506.304 of this Subpart, the design and construction of earthen components of livestock waste handling facilities shall meet the following requirements:
- 1) The construction and compaction of the earthen component shall be carried out to reduce void spaces and allow the earthen component to support the loadings imposed by the livestock waste without settling;

- 2) The minimum top width of any berm incorporated into the design of any earthen component shall be 8 feet; and
  - 3) Walls incorporated into the design of an earthen component shall have side slopes not steeper than a 2.5 to 1 ratio of horizontal to vertical.
- b) The floor of enclosed deep bedded livestock systems and poultry litter systems that handle waste in dry or solid form, and utilize an earthen base shall be constructed to achieve a hydraulic conductivity of equal to or less than  $1 \times 10^{-6}$  centimeters per second.
- c) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.308 Additional Synthetic Material Design and Construction Standards**

- a) In addition to the requirements set forth in Section 506.304 of this Subpart, the design and construction of synthetic components of livestock waste handling facilities shall meet the following requirements:
- 1) The synthetic material shall be supported by a compacted base free from sharp objects;
  - 2) The use of field seams shall be minimized. All field seams shall be made according to the manufacturer's specifications and oriented in the direction subject to the least amount of stress;
  - 3) The synthetic material shall be resistant to or otherwise protected from damage from construction or operation and degradation by ultraviolet light;
  - 4) Synthetic components shall be

designed for use in livestock waste handling facilities and shall be installed according to the manufacturer's specifications and guidelines;

- 5) The liner shall be chemically compatible with the livestock waste being handled and stored and the supporting soil materials; and
  - 6) The liner shall have sufficient strength and durability to function at the site under the maximum expected loadings imposed by the waste and equipment and stresses imposed by settlement, temperature, construction, and operation.
- b) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility as the requirements of this Part.

(Source: Added at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.309 Additional Wooden Material Design and Construction Standards**

- a) In addition to the requirements set forth in Section 506.304 of this Subpart, the design and construction of wooden components of livestock waste handling facilities shall meet the following requirements:
- 1) Wooden materials shall be naturally resistant or treated to resist damage from decay and corrosion; and
  - 2) Construction fasteners shall be resistant to corrosion.
- b) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility

as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.310 Additional Design and Construction Standards for Construction in an Area with Shallow Aquifer Material**

- a) In addition to the other requirements of this Subpart, if aquifer material is located above or within 5 feet of the lowest point of the proposed livestock waste handling facility as determined under Section 506.302 of this Subpart, the design and construction of the facility shall comply with the requirements of this Section.
- b) Livestock waste handling facility components constructed of concrete shall ensure that concrete footings extend below the maximum frost depth.
- c) Livestock waste handling facility components constructed of earthen materials shall include the installation of an earthen or synthetic liner.
  - 1) Earthen liners shall meet the following requirements:
    - A) The liner shall consist of in-situ soil, borrowed clay, or clay/bentonite mixtures;
    - B) The minimum liner thickness shall be 2 feet;
    - C) The liner shall be constructed in lifts not to exceed 6 inches in compacted thickness; and
    - D) The construction and compaction of the liner shall be carried out to reduce void spaces and allow the liner to support the loadings imposed by the waste disposal operation without settling.
  - 2) Synthetic liners shall meet the design and construction requirements set forth in Section 506.308 of this Subpart and shall have a minimum thickness of 40 mil.
  - 3) The design, construction, and installation of the liner required

pursuant to this Section shall be conducted under the direction of a Licensed Professional Engineer. Upon completion of construction or installation of the liner, the supervising Licensed Professional Engineer shall certify that the liner meets all the applicable requirements of this Section. Such certification shall include all supporting justification and data.

- 4) The owner or operator of the livestock waste handling facility shall submit to the Department a copy of the Licensed Professional Engineer's liner certification prior to placing the livestock waste handling facility in service in accordance with 8 Ill. Adm. Code 900.506(a).
- d) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.311 Additional Design and Construction Standards for Construction in a Flood Fringe Area**

*No new non-lagoon livestock management facility or livestock waste handling facility may be constructed within the floodway of a 100-year floodplain. A new livestock management facility or livestock waste handling facility may be constructed within the portion of a 100-year floodplain that is within the flood fringe and outside the floodway provided that the facility is designed and constructed to be protected from flooding and meets the requirements set forth in the Rivers, Lakes, and Streams Act [615 ILCS 5], Section 5-40001 of the Counties Code [55 ILCS 5/5-40001], and executive order number 4 (1979). [510 ILCS 77/13(b)(1)] Notwithstanding the other requirements of this Subpart or 8 Ill. Adm. Code 900, the following criteria shall be incorporated into the design of a non-lagoon livestock management facility or livestock waste handling facility proposed for construction in the flood fringe of a 100-year floodplain:*

- a) The berms and walls shall be designed and constructed to withstand the hydrostatic pressures from flood waters that may be exerted on the berms and walls during a flood event;
- b) The elevation of the lowest point on the berm top and wall shall be at the elevation of the 100-year flood plus a minimum of two feet;
- c) For facilities with unequal length and width dimensions, the facility shall be oriented with the longest dimension parallel to the expected direction of floodwater flow; and
- d) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural integrity of the livestock waste handling facility as the requirements of this Part.

integrity of the livestock waste handling facility as the requirements of this Part.

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

(Source: Amended at 25 Ill. Reg. 14883, effective November 15, 2001)

**Section 506.312 Additional Design and Construction Standards for Construction in a Karst Area**

- a) *A new non-lagoon livestock waste handling facility constructed in a karst area shall be designed to prevent seepage of the stored material into groundwater in accordance with ASAE EP393.2. Owners or operators of proposed facilities should consult with the local soil and water conservation district, the University of Illinois cooperative extension service, or other local, county, or state resources relative to determining the possible presence or absence of such areas. [510 ILCS 77/13(b)(2)]*
- b) Any livestock waste handling facility constructed in a karst area shall be designed and constructed utilizing a rigid material such as concrete or steel.
- c) The owner or operator of the livestock waste handling facility may, upon written request and with written approval from the Department, modify or exceed these standards in order to meet site specific objectives. The owner or operator shall demonstrate that such modification shall be at least as protective of the groundwater, surface water, and the structural