APPENDIX A

WASTEWATER LAGOON SYSTEMS

Introduction:

The design criteria and construction standards contained herein are for the purpose of regulating and controlling the location, construction, maintenance and protection of wastewater lagoon systems used for private onsite domestic waste disposal. These requirements are intended to carry out the provisions set forth in Kansas Administrative Regulations (K .A.R .) 28-5-2 to 28-5-9 and the guidelines established by the Kansas Department of Health and Environment (KDHE) and the Cooperative Extension Service, Kansas Department of Agriculture, Kansas State University, Manhattan, Kansas . When properly designed, installed and maintained, odors from household lagoons are infrequent and visual impacts are minimal.

Lagoon System:

A wastewater lagoon is a small non-discharging pond that receives only domestic waste. This pond has an average operational water depth of three to five feet (5'). All domestic wastewater must be included in the wastewater system including grey water (laundry wastewater and sink wastewater).

Table 1: Minimum Required Distances from household Lagoon

Property Line	50 feet
Private or Public Well	100 feet
Pond, perennial stream, or lake	50 feet
Public Water Line	25 feet
Private Water Line	10 feet
Dwelling from which wastewater originates	50 feet
Other buildings on same property	10 feet
Public Utility Lines	25 feet

Note: Distances measured from maximum water level.

Lagoon Size:

The lagoon system will be sized and designed considering several factors provided on the permit application and soil evaluation. Table 2 shows wastewater pond designs.

Table 2:

Design Size	Water Surface	Bottom	Top	Slope
M35	35'	5'	47'	3: 1
M40	40'	10'	52'	3: 1
M45	45'	10'	59'	3.5: 1
M50	50'	15'	64'	3.5:1

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Sewer Line to Lagoon:

The sewer line from the residence to the lagoon shall be a minimum of a four (4) inch diameter solid pipe. Schedule 40 or heavier is best, but SDR 35 will be approved. However, under high traffic areas, for example a driveway, Schedule 80 or heavier pipe must be used or the pipe needs to be double encased. Al l joints will have solvent welded joints.

Minimum slope of the line shall be 1/8 inch per foot (1 foot per 100 feet). The maximum slope shall not exceed 3/8 inch per foot or 3 feet per 100 feet. Sewer line slopes should not vary in order to avoid accumulation of solids in the pipe.

The trench bottom should he undisturbed soil and free of rocks or other material that could rupture the line. Backfill shall he compacted around the sides of the line at least 2 inches over the top of the line. The remainder of the trench shall be filled and mounded over trench to allow for settling.

At least two (2) cleanouts shall be provided. One clean out shall be located just outside the house (or inside) and the second shall be located near the lagoon. Additionally, a clean out is highly recommended every 100 feet or at every change in directions of the sewer line. Clean outs may be a "T" or "Y" the same size as the sewer line.

The line should enter below the water surface and at least 18 inches above the bottom and should extend to near the center of the lagoon. The end should be anchored and supported. A splash pad of at least 2 feet X 2 feet must be placed under the pipe outlet location. A splash pad is concrete or flat rock pad and is essential to prevent the disruption of a lagoon seal.

Construction:

Any type of construction equipment may be used to build the wastewater pond. However, it is essential to have firm compaction of the lagoon area and berms. Construction shall not be done when the soil is muddy or excessively soft. Muddy soil is difficult to work and forms clods, which can prevent smoothing of the top of the dike. Excessively dry soil does not allow for proper soil compaction. When a backhoe is used for construction, additional compaction may be necessary for proper compaction.

Topsoil shall be removed from the pond and dike area before beginning the embankment construction and should be stockpiled for later use on the embankment.

Embankment slopes shall not be steeper than 3 feet (horizontal) to 1 foot (vertical).

The slopes shall ensure that the minimum design size of the pond maintains at least two feet of freeboard above the normal functional pond depth of five feet. The top of the slope berm shall have a minimum width of four feet. Surface water shall be diverted from the lagoon by constructing a diversion terrace around the upslope side of the lagoon (when required by the authorized representative).

The pond bottom and embankment surfaces shall be of uniform slope and free of rocks, slope debris. ridges and ruts that may interfere with mowing the embankment.

Topsoil should be replaced on embankment surface once the lagoon is completed. Perennial groundcover is necessary to reduce erosion. Groundcover shall be seeded as soon as it is feasible to plant the desired groundcover choice. A protective straw or hay cover mulch is encouraged to hold the soil and seed in place until the cover is established.

FIGURE 1 depicts a typically constructed wastewater lagoon system.

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Fencing Requirements:

The legal liability created by the wastewater lagoon lies entirely with the landowner or resident. To help protect the landowner and resident from liability exposure, the pond area must be fenced. The following fencing requirements are minimum standards. If these standards are not adequate to keep children or animals out of the lagoon area, the landowner is responsible for constructing and maintaining a more restrictive fence that will prevent access to the lagoon.

Fencing diagrams are shown in **FIGURES 2, 3 and 4.** Fencing material must be a minimum of 4 feet tall and taller is highly recommended. Fence openings shall be no larger than 2"X4" or consist of combination cattle panels or woven wire. Types of acceptable fencing include chain link, welded wire, woven wire, horse panels or combination cattle panels. The combination cattle panels or woven wire must have smaller opening at the bottom or throughout the fence (2"x4"). When using the combination cattle type panels or woven wire at least one row of barb wire must be placed around the top. If livestock is accessible to the lagoon area all of the fence types should have barb wire and be placed at the bottom of the lagoon berm toe (outside). Without livestock, fence may be placed around the top of the lagoon berm, but cannot be any closer than 2 feet from the inside edge of the top of the embankment. Any type of fence posts may be used, but solid, sturdy corner posts are required or the corners must be securely anchored. Posts placed between the corners cannot be further than 10 ft apart. The fencing material must be flush to the ground at all points. Fence must be maintained properly at all times.

A hung gate of sufficient size (minimum of 4 ft. width and 4 Ft. tall) must be located to accommodate the entrance of a mower. This gate must provide the same degree of resistance to entry as the fence. A locked gate is recommended to restrict unauthorized access.

Abandoned Wastewater Lagoons:

Any abandoned wastewater lagoon must have the fence removed, and completely filled in with soil. Abandoned wastewater lagoons are those are no longer required for its original intent. It is at the responsibility of the current landowner to eliminate the abandoned wastewater lagoon.

Maintenance:
In order for a lagoon to work properly, the landowner is responsible for keeping all vegetation shorter than 2 Feet high. The landowner must take the means necessary to keep cattails, trees, and tall weeds out of the entire wastewater lagoon. Refer to K-State Research and Extension Water Quality Series Bulletin MF-2290 "Wastewater Pond Operation, Maintenance, and Repair" for detailed information on lagoon maintenance. Copies can be obtained through the local K-State Extension Office.

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Appendix B

Illustrative Examples for acreage requirements under **2-5.3 Suitable Site:**

After the Sanitary Code amendment date:

Example A is buying unplatted land to build a new house. Since the purchase is made after the amendment of this code and a new deed will be issued for the property, the parcel must meet the 5-acre minimum requirement.

Example B is buying a rural home that currently sits on an 80-acre parcel, but the entire 80 acres is not being purchased. Example B must purchase at least 5 acres from the original parcel.

Land deeded or platted prior to the Sanitary Code Adoption Date, September 1, 1993:

Example C purchased a one acre plat in 1989. Example C is exempt from meeting any acreage requirement. However, the separation distances required by the Marshall County Sanitary Code must still be met and a permit must be obtained for either a domestic well or a septic system.

Land deeded or platted prior to the amendment date but after the adoption of the Sanitary Code:

Example D purchased land to build a home in 1995. The location had a private well for a water supply. Marshall County Sanitary Code requirements in effect at the time the parcel was deeded required Example D to purchase a minimum of at least two acres. Parcels deeded with rural water supply were required to have at least 40,000 square feet of land. Regardless of parcel size, all domestic water wells, modified and new septic systems must meet the separation distances of the Marshall County Sanitary Code.

Whenever a parcel of land is broken into smaller parcels, all parcels must meet the Sanitary Code acreage requirement in effect at the time it is deeded. This would include subdivision plats and deeded parcels.

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Figure 1: Domestic Lagoon System Construction

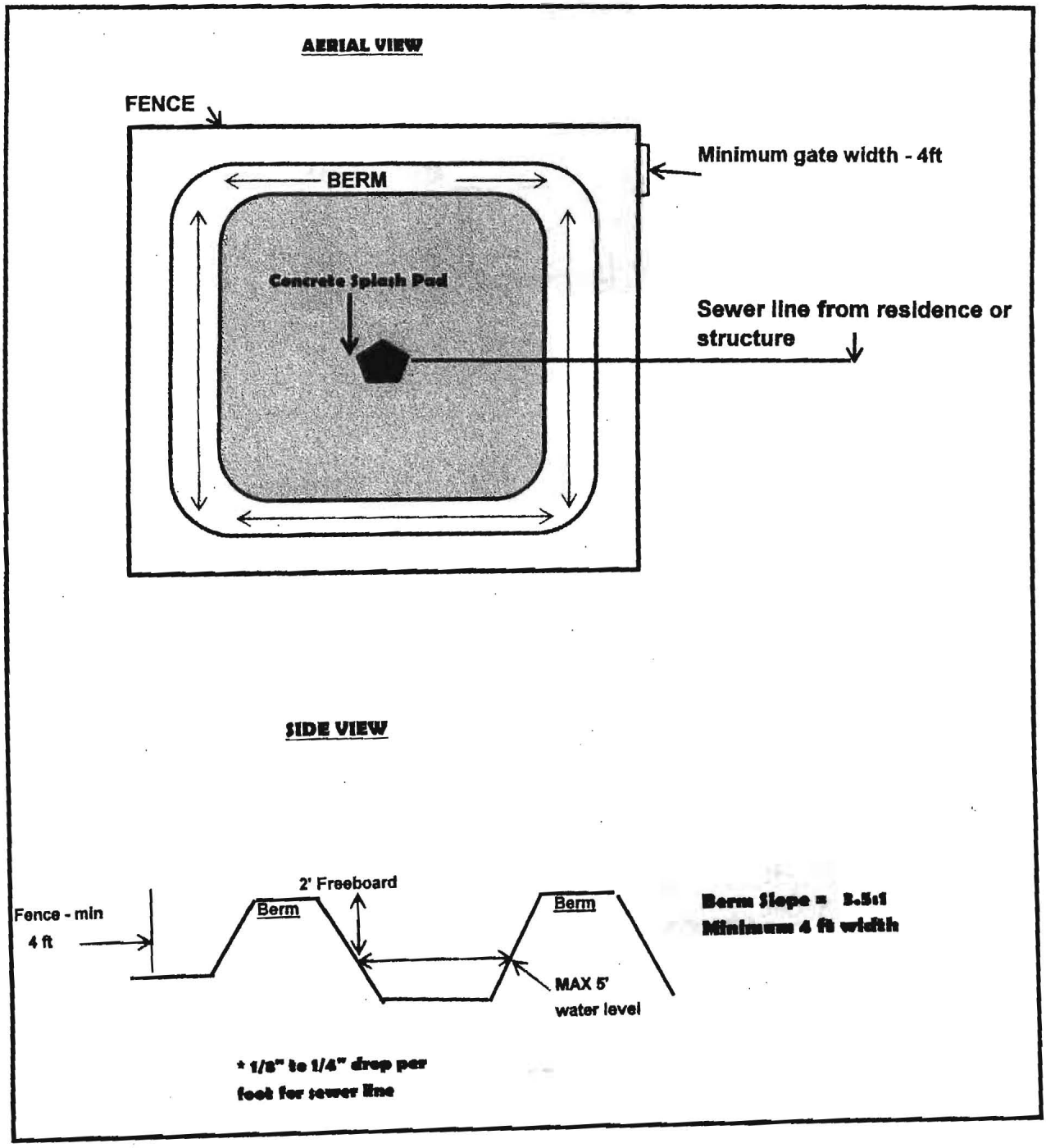

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Figure 2: Lagoon Fencing

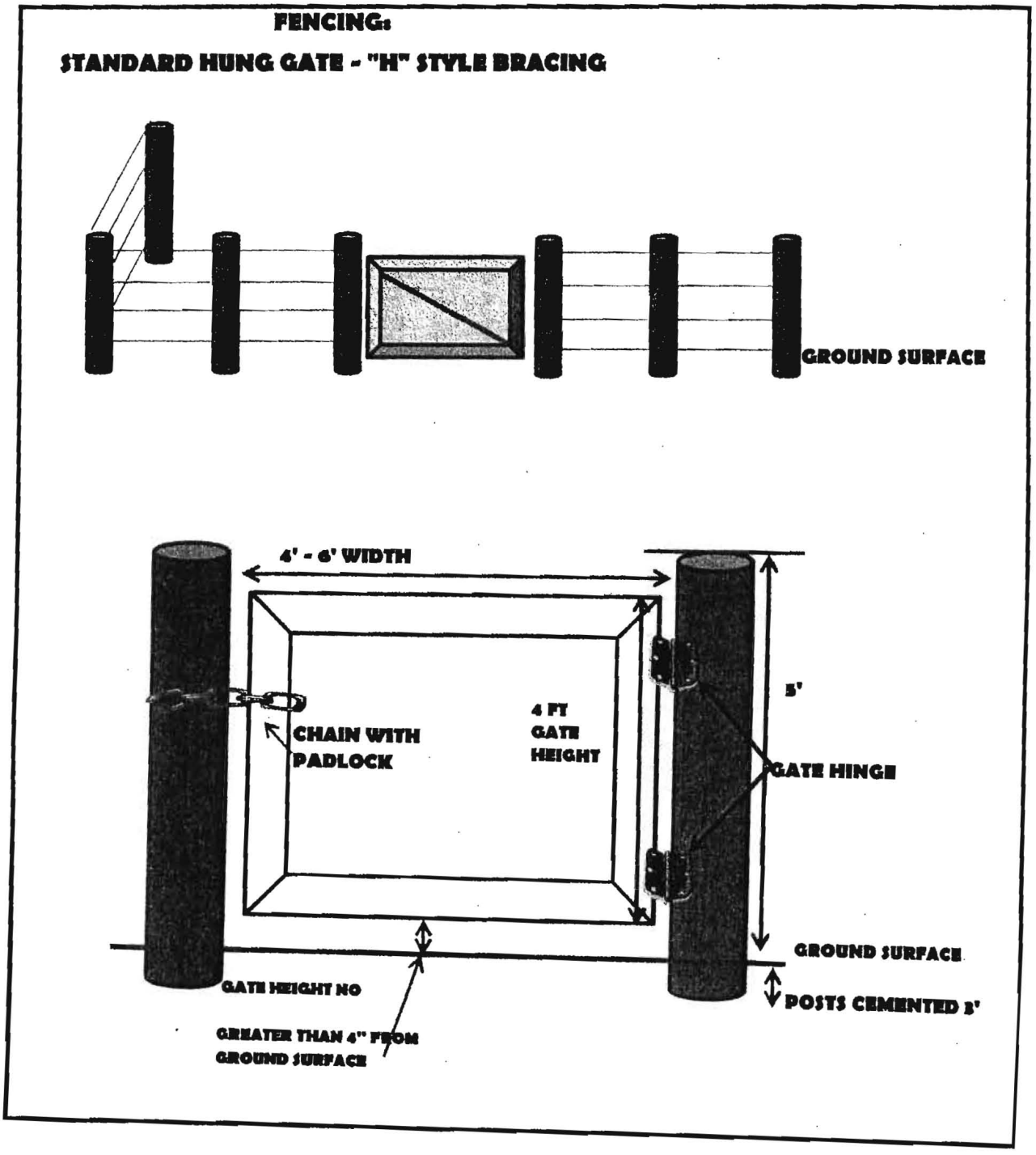

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Figure 3: Standard Bracing

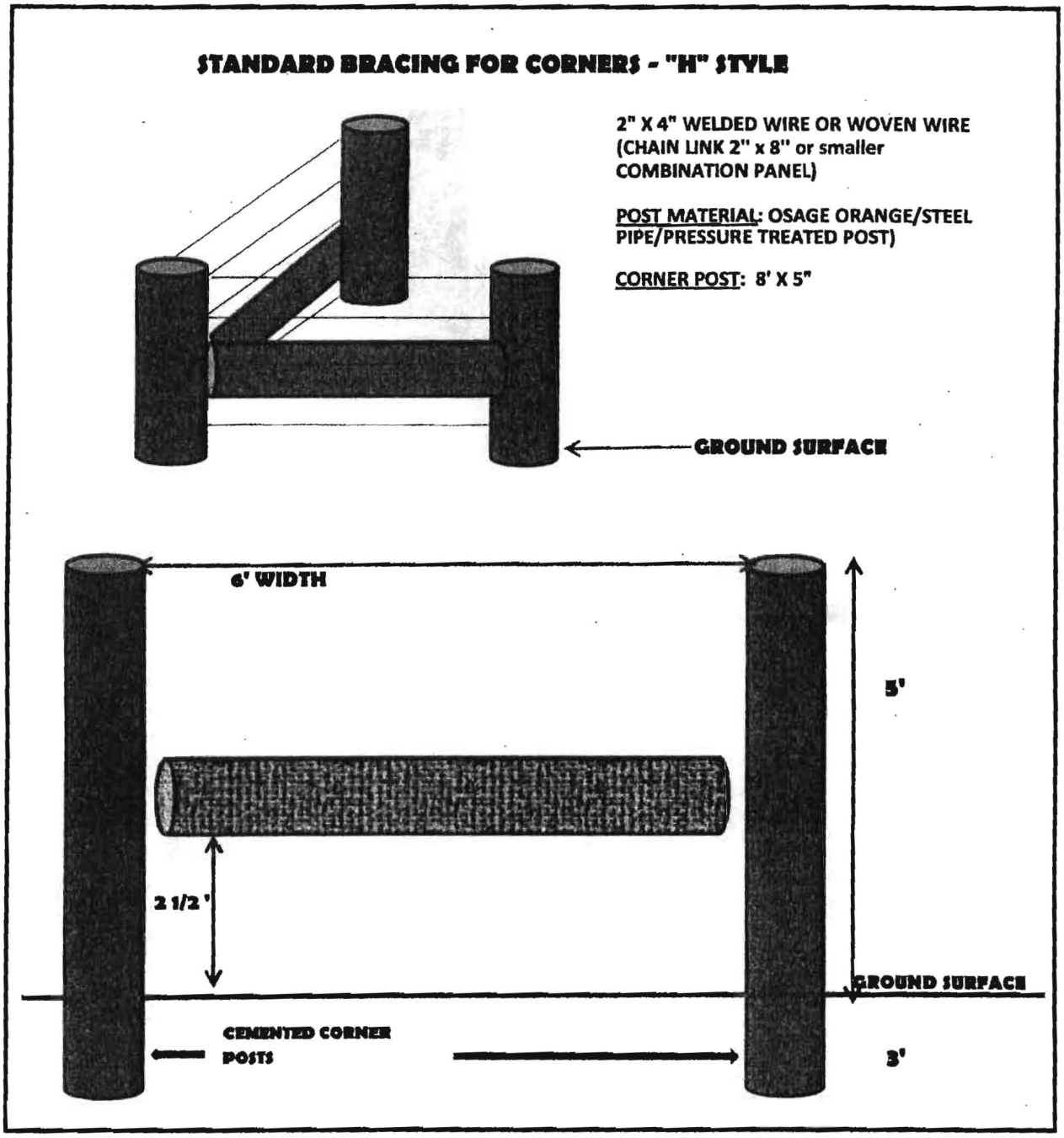

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FIGURE 5: Lagoon Fencing

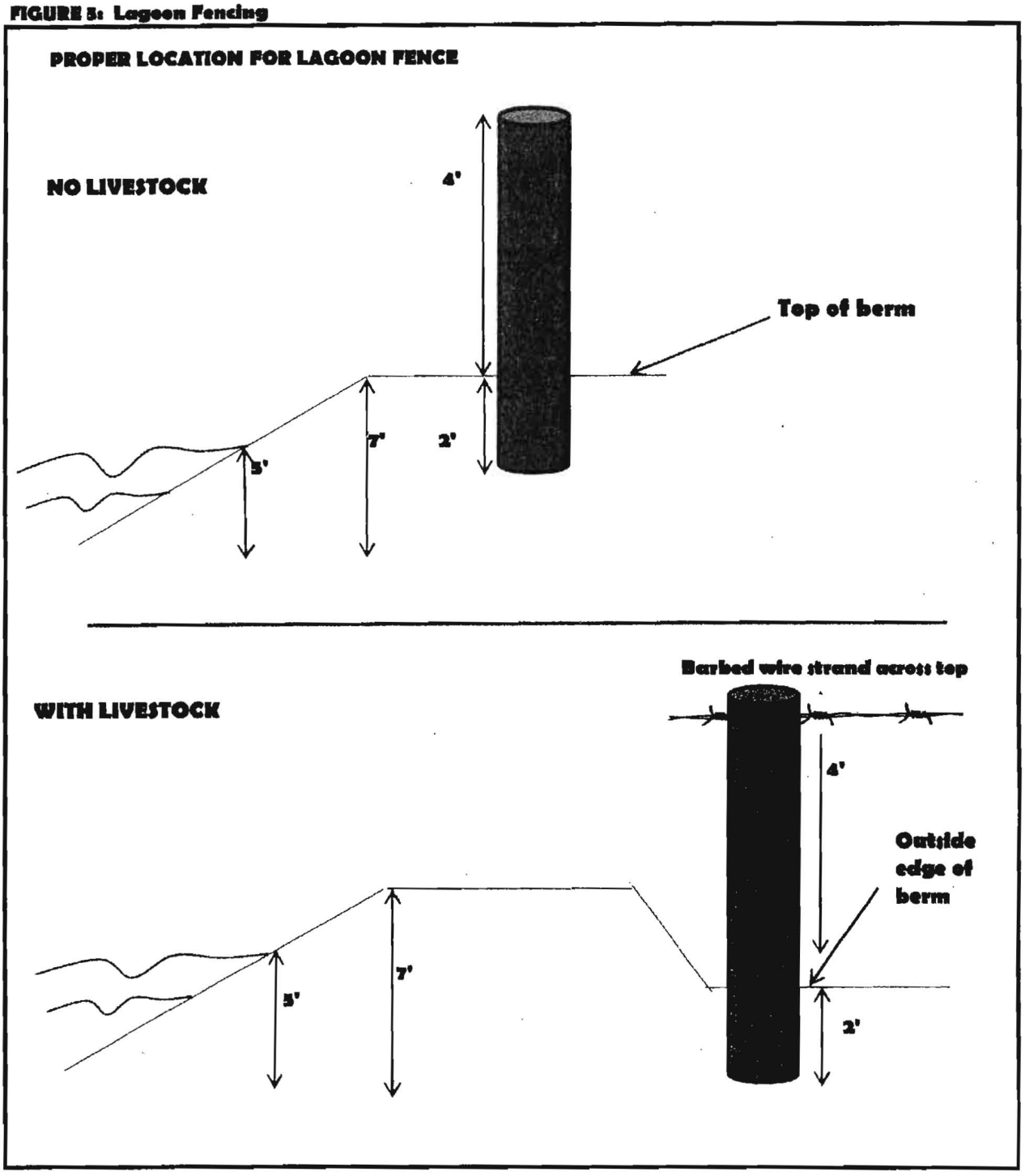

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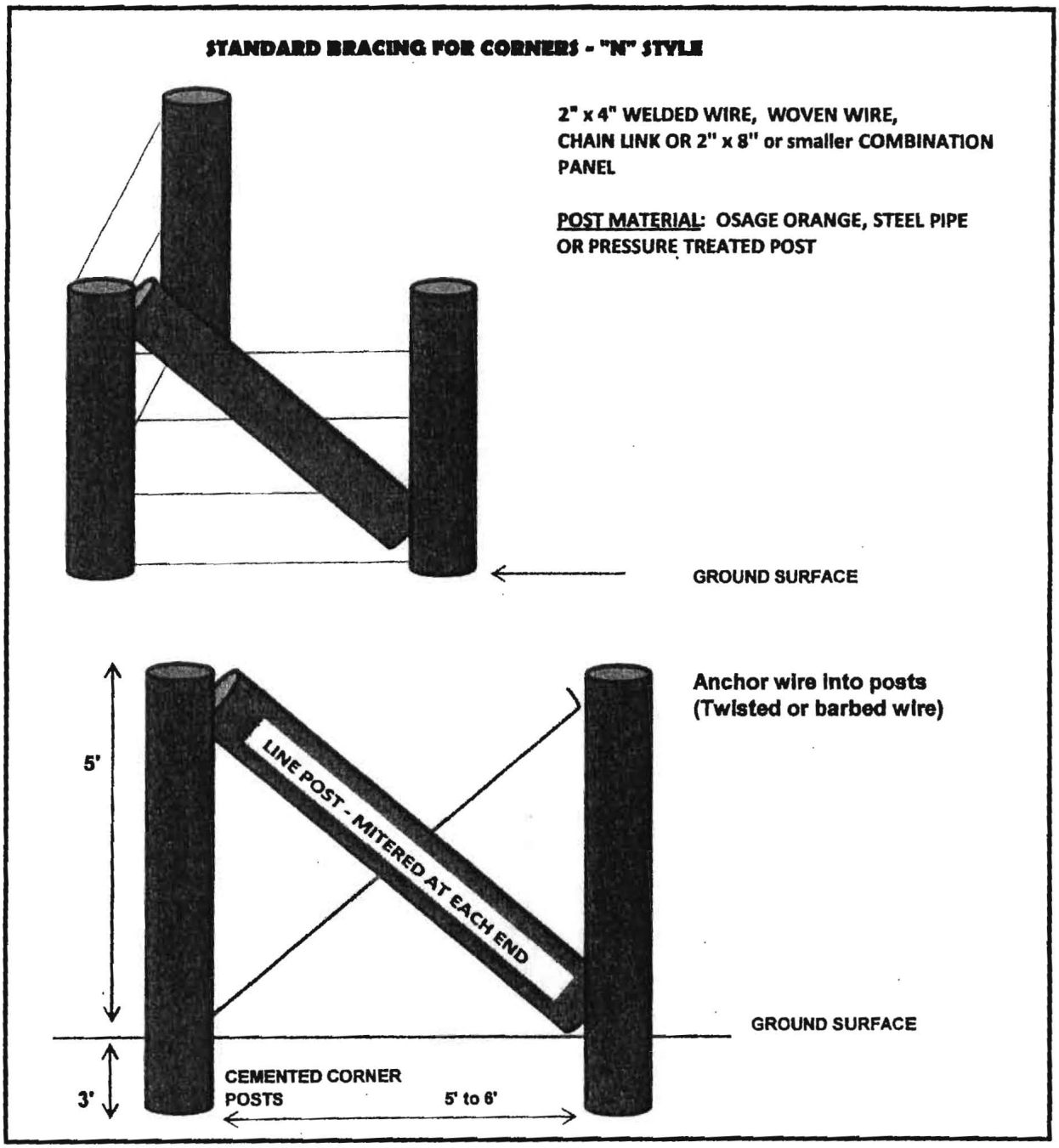
FIGURE 4: Standard Bracing Continued



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