Section 4 Siting Criteria for Vegetative Treatment Systems

Section 4

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Introduction

Siting Criteria for Vegetative Treatment Systems identifies specific risk factors for reviewing a potential VTS site. Limits are not identified for any of these factors. Check with your state environmental agency or other appropriate conservation agencies for information on state-specific siting regulations or other limitations applicable to construction of a VTS.

Information from NRCS Agricultural Waste Management Field Handbook, Chapter 7, Geological and Ground Water Considerations and Chapter 8, Siting Agricultural Waste Management Systems is used in this section.

Purpose

VTSs typically offer significant value to siting runoff management systems within rural watersheds for open lot animal feeding facilities. These systems replace large holding ponds with natural grasslands or forage production areas which provide advantages for wildlife, reduce odors and other gaseous emissions, and enhance visual appearance of the livestock system.

However, VTS land requirements, as well as environmental risks associated with potential connection to surface and ground water, must be considered in the evaluation of a potential VTS site. Risk factors are introduced that should be closely evaluated during review of appropriate VTS site strengths and weaknesses. Some risk factors may be significant enough to eliminate a site from consideration for a VTS.

This section reviews key principles to be considered in siting of a VTA and related system components. Three steps should be considered in this process:

Step 1: Preparation of an overhead map of the area around the open lot livestock system including potential VTA sites and potential offsite impact areas

Step 2: Review of potential sites for environmental and neighbor risks

Step 3: Identification of a preferred site

Mapping a potential VTS site

Placement of a VTS to avoid unnecessary environmental and neighbor risks should begin by developing a map for use in evaluating potential sites. The following steps provide tools for use in potential site evaluation.

Step 1: Develop a base map of the area around the open lot system where a VTS is being considered (fig. 4–1).

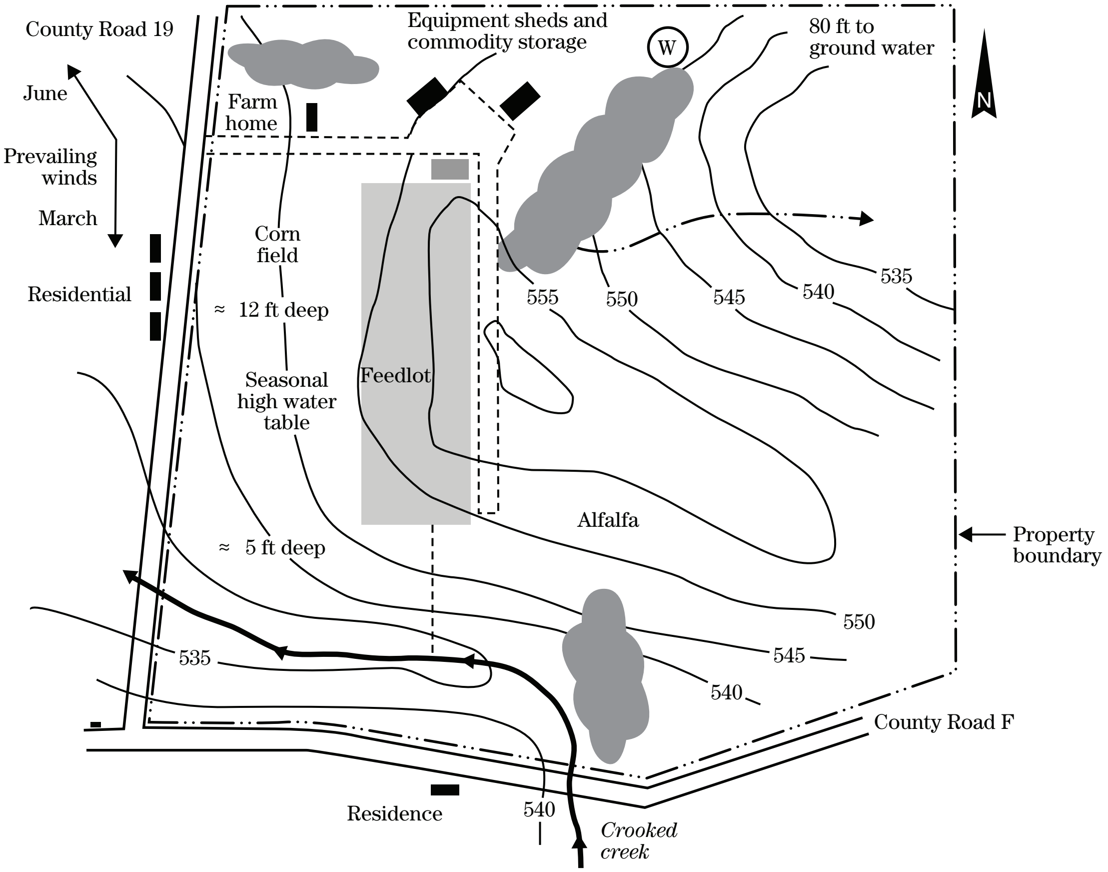
The planning process should begin with a base map. A topographic survey or aerial photograph is a preferred starting point. Potential sources of topographic maps are summarized in appendix A. Although the decision-maker's objectives will influence the scope and detail of the survey, the following data should be obtained and included on the map:

- Property lines, local roads
- Locations of adjacent residences, public facilities (schools, churches, parks), and business locations
- Positions of farm homes, buildings, other permanent structures, roads, and paved areas
- Edges of wooded areas
- Contour lines showing elevation—A USGS topographic map (or equivalent) should provide appropriate elevation information.
- Land uses
- North arrow
- Map scale

Key features that influence environmental risks that should be noted include:

- Soil types
- Location of wet areas, streams, and surface waters
- Prevailing summer and winter wind directions
- Depth to ground water—Regional water table maps, well logs for local wells, and knowledge of seasonal high water tables can be used to identify ground water location.
- Rock outcrops and other geological features
- Wells and septic systems
- Karst topography and sinkholes
- Flood plains

Figure 4–1 Base map for identifying potential VTS sites



USDA NRCS Agricultural Waste Management Field Handbook, Chapter 5, Role of Soils in Waste Management, discusses soil physical and chemical characteristics which could impact a particular soils suitability for VTA installation. [*ftp://ftp.wcc.nrcs.usda.gov/downloads/wastemgmt/AWMFH/awmfh-chap5.pdf*]. Chapter 7, Geologic and Ground Water Considerations, discusses potential ground water issues on VTA suitability. [*ftp://ftp.wcc.nrcs.usda.gov/downloads/wastemgmt/AWMFH/awmfh-chap7.pdf*]

Step 2: Conduct a site analysis to identify potential issues or problems (fig. 4–2).

The purpose of a site analysis diagram is to identify potential environmental risks and opportunities associated with installation of the VTA. A review of potential surface water, ground water, and odor risks is provided later in this section including three assessment tools for reviewing a site (tables 4–1, 4–2, and 4–3). Individual state regulatory agencies may have state-specific tools for evaluating site-related risks that emphasize issues of regional concern. Any potentially permitted facility should identify if state-specific rules or evaluation procedures apply. If not, tables 4–1, 4–2, and 4–3 will assist with a review off-site strengths and weaknesses. Higher risk issues identified should be identified on the base map or within a summary of site considerations.

Figure 4–2 Base map after identification of site issues than may influence location of a VTS

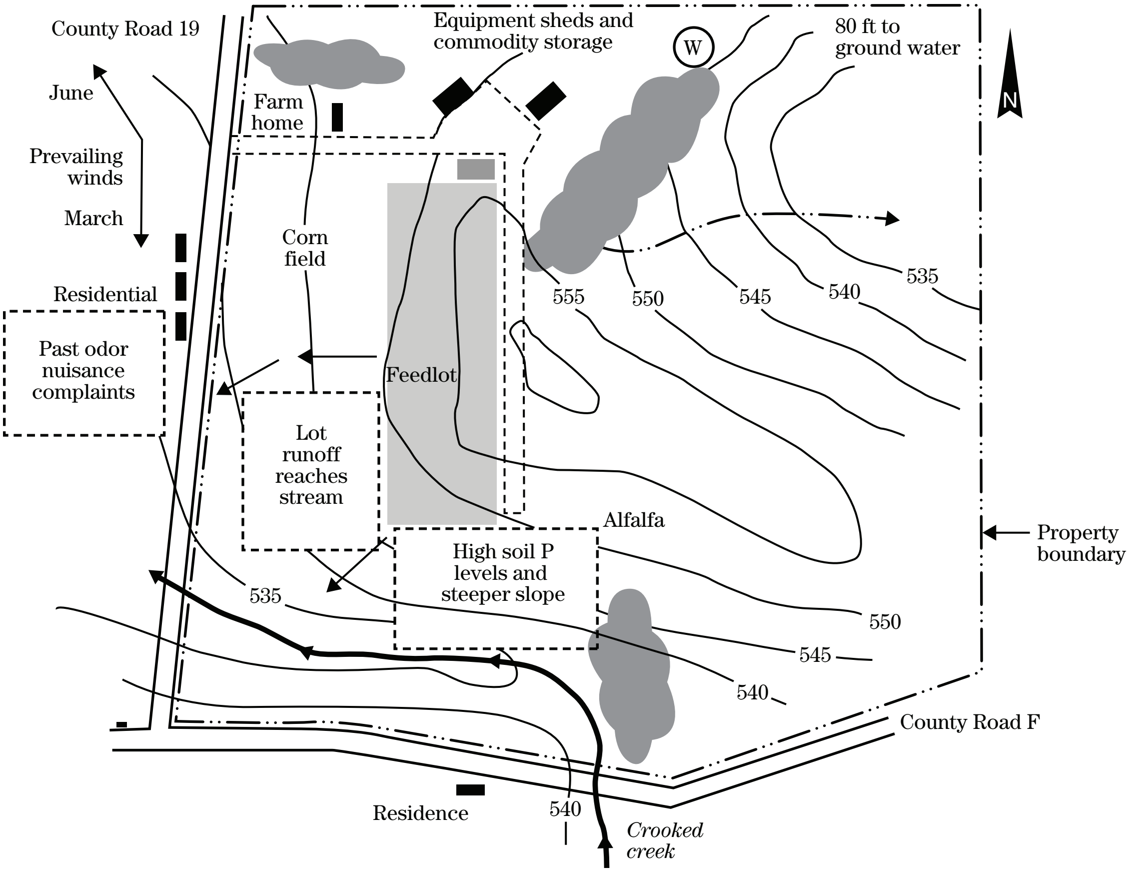


Table 4–1 Risk assessment tool for evaluating connections to ground water associated with a VTS. Use this tool to identify high risk situations that should be identified on a base map for potential VTS location.

Issue	High risk	High-moderate risk	Moderate-low risk	Low risk
Characteristics of soil (below storage site and solids settling basin; see surface water discussion for soil properties for VTAs)	Coarse-textured soils: Clean gravel (GP), or clean sands (GW, SW, SP)	Fine sand, silty, sand and gravel mixes (SM, GM, GW-GM, GP-GM, SW-SM, SP-SM)	Medium-textured soils: silt, clay, and sand-silt-clay mixes, organic mixes, organic silts, and organic clays (GC, , SC, MH,ML, ML-CL, GW-GC, GC-GM, SW-SC, SP-SC, SC-SM)	Fine-textured soils: clay (CL or CH)
Travel distance and time:				
Soil depth below VTA to fractured rock, coarse-textured soils or Karst	Very shallow soils (<20 in)	Shallow (20–30 in)	30–48 in deep	>48 in deep
Soil depth below storage or settling basin to fractured rock, coarse-textured soils or Karst	<4 ft below storage bottom or depth is unknown		High risk geology is more than 4 ft below storage bottom	Impermeable layer of clay or unfractured bedrock exists between storage and high-risk geology
Flow distance from feedlot and VTS to:				
Private well	<100 ft down slope of barnyard/feed lot/ VTA site		100–200 ft down slope of barnyard/ feed lot	>200 ft downslope or well is located upslope from barnyard/feed lot/VTA
Public water well	<1,000 ft down slope of barnyard/feed lot/ VTA or Less than separation distance required by state or local regulations		>1,000 ft down slope of barnyard/feed lot/ VTA	>2,000 ft downslope or Well is located upslope from yard/ feed lot/VTA or More than separation distance required by state or local regulations
Ground water flow direction: Location of water well in relation to pollution sources	Well is in or near depression near and down gradient of pollution source or Surface water runoff from livestock yard, settling basin, or VTA can reach well head	Down slope from most pollution sources	Upslope from or at grade with pollution sources. No surface water runoff reaches drinking water source	Upslope from all pollution sources; all surface water is diverted away from drinking water source
Depth to ground water	<10 ft	10–20 ft	20–50 ft	>50 ft
Higher risk site features or other connections to ground water within area of proposed VTA	___Karst material ___Sink-holes ___Drainage wells, ___Shallow fractured bedrock ___Exposed bedrock	___Depressions		

Table 4–2 Risk assessment tool for evaluating connections to surface water associated with a VTS. Use this tool to identify high risk situations that should be identified on a base map for potential VTS location.

Issue	High risk	High-moderate risk	Moderate-low risk	Low risk
Flood plain	VTS system in located in 10-yr flood plain	VTS system in located in 25-yr flood plain		VTS system is located outside of 25-yr flood plain
Soil: Infiltration rates:	<0.6 in/h or > 2 in/h for VIB <0.2 in/h or > 2 in/h for VTA			0.6–2.0 in/h for VIB 0.2–2.0 in/h for VTA
Are there areas of excessive soil compaction, which inhibit plant growth and infiltration?	Soil compaction is a common problem, limiting plant growth			There is little or no soil compaction. It is not limiting to plant growth
What is the slope of the area to be used for:				
VTAs	>10%	5–10% or <1%	1–3%	1–5%
VIBs	Dependent upon earth moving costs to create a flat basin	>3%		0–1%
Is there damage from gully, sheet or rill erosion	Erosion sites are not controlled and perpetually get worse	Erosion control measures installed, some are failing, and no signs of improvement are apparent	Control measures have been installed, but few signs of potential failure are showing	There is no damage occurring or control measures are very successful
Area for VTS	<0.5 acres of VTS to 1 a of feedlot	>.5 and <1 a of VTS per 1 a of feedlot	1–2 a of VTS to 1 a of feedlot	>2 a of VTS to 1 a of feedlot
Discharges from VTA:				
Where would discharge drain	Excess water is released directly to surface water	Excess water is released into ditch, waterway, or ravine	Excess water is released into crop or pasture land	Topography does not allow water to runoff from proposed VTA site
Down gradient distance to surface water from edge of proposed VTA?	<100 ft	100–199 ft	200–500 ft	>500 ft
Soil phosphorus levels	P Index review suggest a very high risk or >150 ppm Bray 1 or comparable soils analysis	P Index review suggest a high risk or >100 ppm Bray 1 or comparable soils analysis		P Index review suggest a low to moderate risk or <50 ppm Bray 1 or comparable soils analysis

Table 4–3 Risk assessment tool for evaluating odor nuisance risks associated with a VTS. VTAs alone will produce little or no odor. A runoff collection basin, settling basin, and the feedlot are more likely odor sources. Answer the following questions relative to these three odor sources. Use this tool to identify high risk situations that should be identified on a base map for potential location of storage or settling basins.

Issue	High risk	High-moderate risk	Moderate-low risk	Low risk
Direction: Neighbors are…	Located downwind for prevailing winds during wet seasons of the year (typically spring)		Located downwind for prevailing winter winds only	Located upwind for prevailing winds during wet seasons of the year (typically spring)
Homes, public use areas, or businesses Distance:				
300 a.u. and less	<¼ mile	¼–½ mi	½–1 mi	>1 mi
>300 a.u.	<½ mi	½–1 mi	1–2 mi	>2 mi
Elevation: Neighbors are located at…	Lower elevation than odor source **and** in valley	Lower elevation than odor source **and** in open area	Similar elevation than odor source **and** in open area	Higher elevation than odor source or sizeable hill, shelterbelt, or other change in topography lies between neighbor and odor source
Typography	Open flat terrain is located between odor source and neighbor			Significant variation in terrain exists between the odor source and neighbor resulting from forests, shelterbelts, buildings, or hills
Visibility (feedlot and runoff storage component of VTS)	Odor source is highly visible due to location close to road	Odor source is recessed from neighbors and road but visible	Partial screening by topography or vegetation of odor sources from neighbors and roads	Full screening by topography or vegetation of odor sources from neighbors and roads
Wind speed	Odor source is located in protected area (due to trees or topography) with low wind speeds			Odor source is located in open area with no trees or topography slowing wind speed

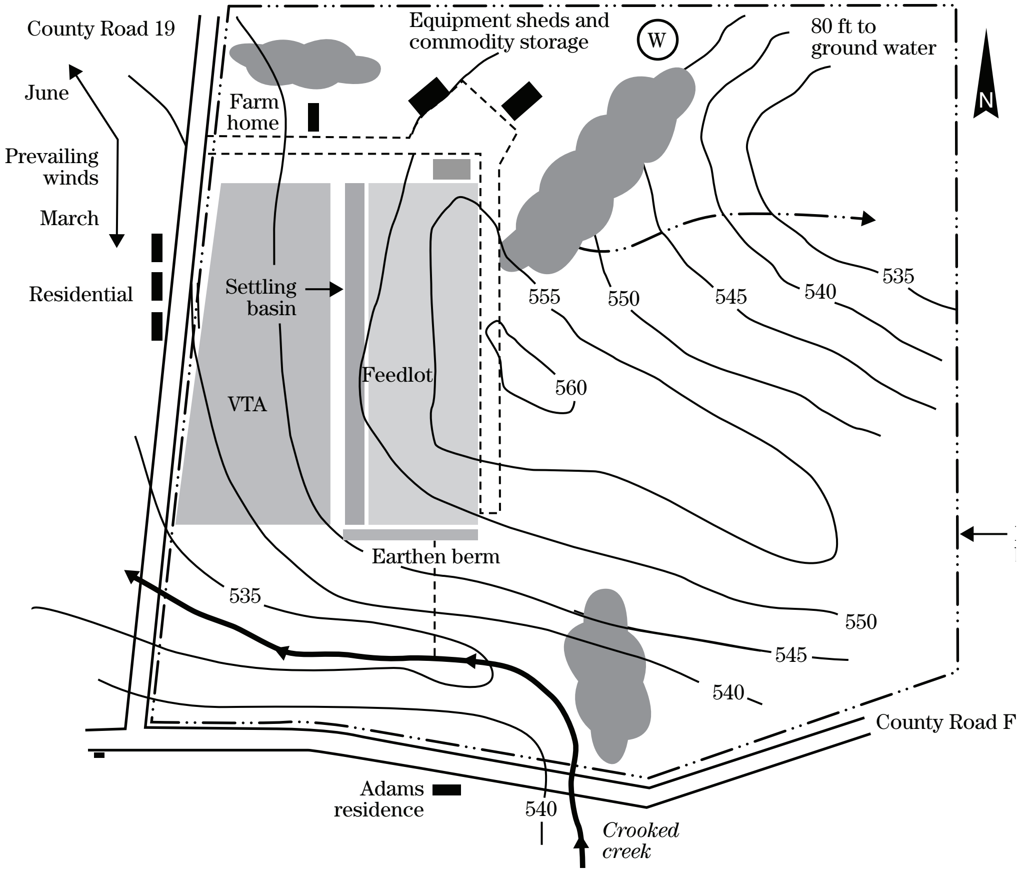
After completing these risk assessments, some of the following issues may also be important:

- Are there conflicts or incompatibilities in land use within the neighborhood (VTA bordering a neighbor's home)?
- Will potential VTA sites fit with normal traffic pattern (animals, equipment, and people)?
- Is there a history of neighbor odor concerns? Are storage and settling basin components being added that may cause odor concern?
- Are there potential neighbor or general public visual concerns?
- Will potential VTS sites require expensive relocation of buildings and utilities?
- Is a potential VTA site already high in soil P levels?
- Does a potential VTA site include areas of potential erosion?

Step 3: Develop an initial concept plan showing potential site(s) of a proposed VTS (fig. 4–3).

Next, a concept plan or plans are developed to evaluate alternative VTA component locations (fig. 4–3). The areas required for collection, storage, solids removal, and VTA are determined and displayed at this step of the process. At the concept plan stage, assume that a VTA area at least equal to the area of the feedlot and related drainage area will be needed. A site should then be evaluated for the ability to provide sufficient space for adequate VTA area. If the space appears to be marginal, a more exact estimate of VTA or VIB should be reviewed. If sufficient space still is not available, a conventional runoff holding pond and land application site should be considered.

Figure 4–3 Base map after identifying preferred VTS site



Additional related VTA siting issues, such as associated use areas, access ways, water management measures, vegetated buffer areas, and ancillary structures should be drawn freehand to approximate scale and configuration directly on the site analysis plan or an overlay. In instances where several sites may satisfy the decisionmaker's objectives, propose the site that best considers cost differences, neighbor concerns, environmental impacts, legal ramifications, and operational capabilities.

The final step in this process is a finalized site plan for the proposed VTS. However, before proceeding to a final site map, a number of environmental issues associated with site selection should be reviewed in greater depth. As those risks are reviewed, consider if high risks can be identified on your base map. With each environmental risk, an associated assessment tool is included (tables 4–1, 4–2, and 4–3).

Assessing ground water risks

A proposed VTA site should be evaluated for potential risks to ground water. More critical factors specific to a VTA installation that impact ground water are reviewed and can be assessed for an individual site using table 4–1. A more complete description of these factors critical to any manure management system can be found in NRCS Agricultural Waste Management Field Handbook, chapter 7, (*http://www.info.usda.gov/CED/ftp/CED/neh651-ch7.pdf*).

Soil characteristics—Many biological, physical, and chemical processes break down, lessen the potency, or otherwise reduce the volume of contaminants moving through the root zone of surface soils. These processes, collectively called attenuation, retard the movement of contaminants into deeper subsurface zones. The soil's attenuation potential increases as clay content increases, the soil deepens, and distance increases between the contaminant source and the well or spring. The cation exchange capacity of clay soils limits movement of positively charged contaminants such as ammonium (NH_4^+). Clay also has a very low permeability, thus slowing contaminant movement and increasing the contact time that allows more opportunity for attenuation. Deeper soil increases the contact time a contaminant will have with mineral and organic matter of the soil. Longer contact time provides greater opportunity for attenuation.

Travel distance and time—The greater the travel time of a contaminant, the greater the opportunity for attenuating the contaminant. The depth to ground water and the horizontal distance between the source of the contamination and a well, spring, or other ground water supply influences the time of travel.

Ground water flow direction—A desirable site for a VTS is in an area where ground water flows from the facility in a direction away from a well, spring, or potable aquifer source. The direction of flow in a water table aquifer generally can be ascertained from the topography. In most cases, the slope of the land indicates the ground water flow direction. However, radial flow paths and unusual subsurface geology can too often invalidate this assumption. Local information on ground water flow direction may be available through a Soil and Water Conservation District or NRCS office or through private well drillers. In addition, a VTS site should be checked for its potential location within a recharge area for a public water source. The local rural water district or municipal water supplier should be able to identify these recharge areas.

Proximity to designated use aquifers, recharge areas, and well-head protection areas—A potential VTA site should be reviewed for its proximity to sensitive ground water areas including:

- Sole source or other types of aquifers whose uses have been designated by the state
- Important recharge areas
- Well-head protection areas

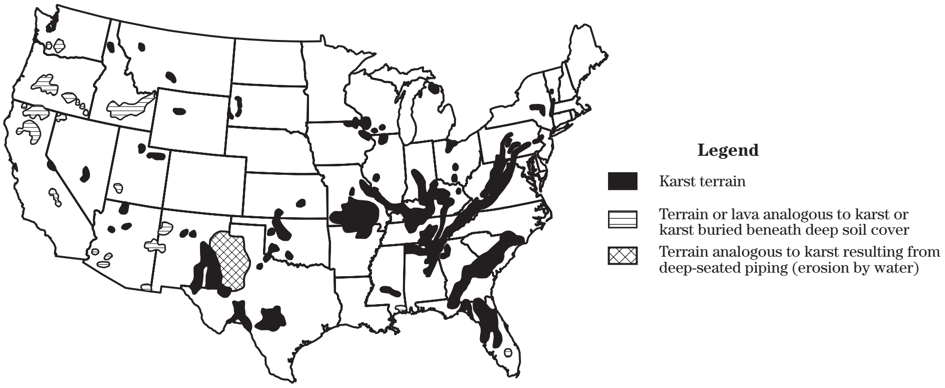
Depth to ground water—The elevation and shape of the water table may vary throughout the year. Obtain preliminary estimates of the depth to seasonal high water table from well logs, published soil surveys, and the NRCS National Soil Characterization database. Site-specific ground water depths may vary from values given in these sources. Stabilized water levels observed in soil borings or test pits provide the most accurate determination in the field. Seasonal variations in the water table also may be inferred from the logs of borings or pits. Perennially saturated soil is typically gray. Perennially aerated soil is typically various shades of red, brown, or yellow.

Depth to bedrock—Storage systems may be restricted by shallow depth to bedrock because of physical limitations or state and local regulations. Vegetative practices, such as filter strips, may be difficult to establish on shallow soil or exposed bedrock. Waste stored or land applied in areas of shallow or outcropping rock may contaminate ground water because fractures and joints in the rock provide avenues for contaminants.

For runoff holding ponds and solids settling basins, shallow bedrock generally is a serious condition requiring special design considerations. Bedrock of all types is nearly always jointed or fractured when considered as a unit greater than 0.5 to 10 acres in area. Fractures in any type of rock can convey contaminants from an unlined storage to an underlying aquifer. Fractures have relatively little surface area for attenuation of contaminants. In fact, many fractures are wide enough to allow rapid flow. Pathogens may survive the passage from the site to the well, and thereby cause a health problem. Consider any rock type within 2 feet of the design to be a potential problem.

High risk geological features—Sinkholes, karst topography, or underground mines may disqualify a site. The physical hazard of ground collapse and the potential for ground water contamination are severe limitations. Common regions of the United States with karst topography are illustrated in figure 4–4.

Figure 4–4 Generalized map of areas of karst and analogous terrains. State and local soils and geological surveys should provide a more accurate local characterization of high risk geological features such as karst topography.



Reducing odor nuisances

The movement or dispersion of airborne emissions from an animal production facility is affected by many factors including topography, prevailing winds, and facility orientation. Odor plumes decrease exponentially with distance, but long distances are needed if no odors, gases, or dust are to be detected downwind from a source.

VTSs are unlikely to be a source of odor nuisances. However, if storage is included in the VTS, the storage can produce some odors. A settling basin with significant accumulation of wet solids is also likely to cause odor concerns. Solids storage and composting areas can also cause odors. However, none of these sources is likely to be as large of a source as the open lot where cattle are housed. Despite the lower odor risk of a VTS, it is still important that basic principles of siting a facility to reduce neighbor risk be considered (table 4–3).

Prevailing winds should be considered so facilities are sited to minimize odor transport to close or sensitive neighbors. Odor moves the same direction as wind direction and disperses laterally very little. By recognizing prevailing wind direction especially during wetter periods of the year, one can begin to identify those neighbors at greatest risk. If options exist for siting of any runoff storage, solids settling basin, or temporary stack of harvested solids, location of those facilities to avoid placing neighbors immediately downwind based upon prevailing winds can offer significant nuisance reduction.

For open lot systems, spring and early summer conditions can often be the period of greatest odor nuisances. Prevailing winds are often changing during the spring from being dominated by winter weather pattern to being driven by summer weather patterns. Officials associated with local airports may have statistical data on prevailing wind direction versus time of year.

Distance is a second key consideration. Although models are beginning to be developed for predicting distance of odor travel, general distance recommendations are difficult to make. However, more is always better. If sources of odor can be located to increase distance to the neighbor, there may be value in reducing odor nuisances.

Elevation is also an important consideration. Avoid location of an odor source upslope from a nearby neighbor. During times of greatest potential odor risks, calm evening hours, odors settle near the ground and tend to move downslope. Downslope neighbors, especially those located in a valley or depression, are at greatest risk from an upslope odor source.

Downwind of a facility, variable topography is preferable to flat terrain. Hills, shelterbelts, stacked bales of hay, and buildings all encourage mixing of the odors from an odor source with fresh air thus encouraging dilution and reduced impact on neighbors. If facilities, hills, or trees can be located between a neighbor and an odor source, the odor nuisance can be reduced.

Wind speed is important for mixing fresh air with odorous air and reducing the area impacted by an odor source. High wind speeds contribute to greater turbulence, greater dilution of odorous air, and less chance of neighbors being impacted by an odor source. It is preferable to avoid locations for an odor source downwind of a shelter belt or hill. Open locations where few obstructions slow the wind speed are preferred locations for odor sources.

Connections to surface water

A review of surface water risks associated with a VTS should consider several risk factors. Table 4–2 can be used to assess those risks for an individual site.

Flood plain—VTAs and associated storage and treatment components should be located outside the 25-year flood plain. State and local regulations should be checked for separation requirements from even less frequent flood events. Information on flood plains can be obtained locally from county planning and zoning agencies, Soil and Water Conservation Districts, and NRCS offices.

Soil type—Identification of the soils in the proposed location of the alternative treatment system gives prior knowledge of suitability for construction of VIBs or VTAs and nutrient treatment capabilities. Soils with moderate permeability are best for VIBs and VTAs. Soils with high permeability will reduce potential for discharge from a VTA, but increase the risk to ground water. Soils with a low permeability improve protection of ground water, but increase the potential for a discharge from the VTA. For VIBs, soils with 0.6 to 2 inches per hour to a 5-foot depth are recommended. For VTAs, soils with 0.2 to 2 inches per hour to a 5-foot depth are suggested.

Slope—Zero slope is preferred for VIBs. Slopes from 1 to 5 percent provide the maximum opportunity time for treatment of effluent within a VTA.

Erosion damage—The site should be reviewed for past damage due to erosion. Gully erosion will require greater investment in land leveling to ensure uniform runoff flow over the VTA. Past indication of gully or sheet erosion will also suggest that the soils may not be suitable for withstanding erosion from additional runoff flow volumes.

Sufficient area for VTA—A rough rule of thumb for assessing the area available for a VTA is 1 acre of potential VTA area for every acre of feedlot. Thus, a 10-acre feedlot will require approximately 10 acres of VTA. Additional area may be required for solids settling and possibly runoff storage. If the available land base is less than this rough rule of thumb, a more accurate calculation of VTA and VIB area should be made using procedures in sections 5 and 6. Greater areas than the 1 to 1 ratio of VTA to runoff area further reduce the risk of a discharge from a VTA. Some systems have been designed with as large as a 2 to 1 area ratio.

Separation requirements between VTAs and environmentally sensitive areas are intended to reduce the potential impact of discharges from VTAs on designated streams, rivers, lakes, and wetlands. For some VTSs, discharge is likely and treatment within VTA will not reduce pollutant concentration to acceptable levels for discharge to surface waters. Additional separation distance allows opportunity for infiltration of pollutants into soil or their dilution. Separation distances are arbitrary (more is better) and may be established by state or local regulations. Drainage from a VTA into pasture or crop land is preferred over drainage into ditch or waterway where channel flow occurs directly into surface waters.

VTS site soil P level—A thorough soil testing program should be conducted for sites considered for a VTS. Soil P test levels should be obtained within the potential VTA or, better yet, a P index evaluation conducted on any potential VTS site. A VTS should not be located where high soil P levels already exist. The poultry industry has learned that pasture sites with high P levels from past litter applications will produce significant off-site movement of P with runoff water. Although feedlot runoff should not contribute significant P to a VTS (assuming good solids settling in advance), a site with high P levels from past manure applications should be avoided due the potential for soluble P movement from these sites.

Is a proposed site unacceptable?

Not every site is suitable for a VTS. Because of the limited past experience with VTS on commercial farms, a relatively high standard for VTS sites will need to be followed until better field experience is available. In the end, a site-specific analysis must be prepared by the producer comparing the baseline technology performance with that of the VTS as described in section 2 to determine if a site is acceptable. However, before making this substantial investment in such an analysis, ask the following questions:

- Does your site violate any minimum requirements established by the permitting authority or state environmental agency (likely to be one in the same)? A Yes answer is most likely a VTS stopper.
- Have any high or high to moderate risk factors been identified in tables 4–1 and 4–2? There are significant differences in the degree of importance of individual risk factors in these two tables. The level of risk is often specific to local or regional conditions. Any high or high to moderate risk factors should be reviewed with independent experts before proceeding further.
- Do any of the higher risk factors identified represent a VTS stopper? This answer should be determined locally based upon state-specific regulations and local environmental priorities. However, there are some factors that will make application of a VTS a substantial challenge for almost all circumstances. Some of these include:
  - Slopes greater than 8 to 10 percent. Research and field experience with VTS options on high slopes is almost non-existent and the risk of runoff is substantial.
  - Less than 1 acre available for the VTS (VTA and settling basin) per acre of feedlot surface. To encourage significant infiltration and modest runoff release from a VTA, space limitations should not be violated.
  - High soil P levels. Dissolved P moves from sites with high P levels in spite of permanent vegetation. Sites with a direct connection to surface waters and high soil P levels should be avoided.
  - High risk geological features. If a VTS cannot be separated from high risk geological features such as Karst material, shallow fractured or exposed bedrock, or drainage wells, a VTS should not be installed.
  - Less than 100 feet to private wells or 1,000 feet to public water supplies (check local Wellhead Protection Area regulations for greater setback requirements) produce too great of liability for all runoff control systems including VTS.

Conceptual design

The risk assessment of a proposed VTS site should lead one to some preliminary design decisions including the following:

- *Siting*—Is the proposed site still acceptable after completing the risk assessment? Are there alternative sites that may have advantages? At the conclusion of this process, a preliminary decision should be made as to the preferred site for a VTS.
- *VTS system options*—Several options were discussed in section 3. Which of these options is the better fit for a proposed site? If space is limited, systems involving a VIB may be preferred. If close proximity to surface waters is of concern, options that include greater storage and passive or active management of runoff release, oversized VTAs, or additional treatment (VIB prior to VTA) might be considered.
- *Location of VTS components*—What is the relative location for the solids removal component? VTA? Other selected components?
- *Utilities*—Does this design allow for gravity flow of runoff liquids through the system, or will electrical service be required to pump runoff? Is there a need for other utilities in the area around the VTS (water supply, roads for equipment access)? Identify the utilities and services that will need to be provided to the VTS site.
- *Footprint of components*—One should do a preliminary size estimate for individual components and compute the area required for these components? Don't forget to include space for berms and access roads. The footprint of these components should be added to the developing map for the proposed site. Sections 5, 6, and 7 provide tools for sizing settling basins, VTAs, and VIBs.

With these conceptual design decisions made, the proposed VTS is now ready to endure the scrutiny of the design process for the individual components (sec. 5 through 7) and the comparison of the proposed alternative technology with the baseline system (sec. 1). Selection of a preferred site is especially critical for the comparison process of alternative versus conventional treatment systems. Several site-specific conditions are required for this comparison process including soil types, slopes, and dimensions of VTS components. Refer to section 2 for additional site specific information required of the performance comparison process.