

A Multi-level Approach to Siting New Swine Facilities

Determining the most favorable location for new swine facilities in Iowa is highly site-specific. While being mindful of potential odor impacts on neighbors, the siting process can be relatively simple or highly complex, depending on the situation. Factors that must be considered include operation size, orientation, terrain, vegetation, local historical weather patterns and neighbor proximity. Iowa State University's Community Assessment Model (CAM) has been used as an advisory tool to help farmers make decisions on new swine operations. Except for terrain and vegetation, CAM is capable of incorporating the above-mentioned factors, as well as the impacts of using research-grounded odor mitigation strategies as they are developed. The decision on whether to use CAM could be made through a multi-level approach to siting. For example, CAM would not be needed in situations that present straightforward choices, such as an isolated area with few neighbors. Siting decisions instead could be accomplished with some basic tools. A multi-level approach — outlined below — would focus on the complexity of each individual situation. Objectives must be:

- Timely, so that delays to siting approval are avoided
- Easily documented, to support the permitting process
- Cost-effective
- Consistency in matching the complexity of the proposed site with the appropriate approach

Level 1: Web-based self-evaluation

(To be considered when the proposed farm will be the only odor source in the immediate area; terrain is relatively flat; and windbreaks or other vegetative buffers exist) As a first step to new swine facility site evaluation, the swine farmer will evaluate the proposed site using information from an ISU website that is currently under development on swine odor and facility siting. The website will have graphs of potential odor exposure based on general location within Iowa, facility size and distance. The producer would select weather data from the most appropriate location for the proposed site. They would select the proposed facility size and use the graph corresponding to the closest distance to any neighbor. This graph could be printed and used with a plat map to document that the site will be acceptable. Cost: Free.

Level 2: Advisor-based evaluation

(To be considered when features of terrain (e.g., rolling hills, valleys, greenbelts) need to be taken into consideration; windbreaks or vegetative buffers exist; and a farmer would benefit from more assurance of suitability of location than afforded by Level 1.) If site selection for a new swine facility appears to present more complexity than can be evaluated through the Level 1 self-evaluation, a farmer may wish to use a Level 2 advisor-based evaluation. In this approach, an ISU Extension field specialist (agricultural engineering, livestock or state staff) will be contacted and asked to assist in site evaluation. They will assist with completion of the evaluation documentation by giving advice based on local wind rose information, knowledge of terrain and vegetation surrounding the proposed site and a cursory analysis of multi-neighbor and multiple livestock sites within a close range. Some basic mitigation technologies also will be discussed. Cost: Fee-for-service priced at approximately \$500. If the advisor or producer believes CAM would be helpful, they will complete forms necessary for the model run and Level 3 analysis.

Level 3: Model-based evaluation

(To be considered when Levels 1 & 2 results indicate neighbors may have excess potential odor exposure; the farmer is interested in evaluating the impact of mitigation techniques as they are developed; multiple livestock sites exist within the immediate area; model results are desired in order to communicate more effectively with neighbors; or the farmer wishes to further investigate the suitability of the proposed site.) A CAM model run may be deemed necessary by the producer or advisor. The model has the capability of incorporating the impact of mitigation strategies as new information (research data) becomes available. Cost: \$500 if it originates after a Level 2 analysis or \$1,000 if it originates after Level 1.

Taking Odor Mitigation to the Next Level: A Priority for Iowa Agriculture

Project Management	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Personnel - General	\$1,104,800	\$1,122,021	\$1,150,495	\$1,179,862	\$1,210,150	\$5,767,328
Odor analysis equipment/maintenance	\$679,239	\$30,751	\$32,016	\$32,415	\$32,832	\$807,254
Tier 1 Projects	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Covers - swine, dairy	\$578,398	\$1,203,067	\$625,595	\$0	\$0	\$2,407,059
Biofilters - swine	\$420,073	\$811,276	\$454,351	\$0	\$0	\$1,685,701
Vegetative environmental buffers - swine, layers	\$290,873	\$562,508	\$314,609	\$0	\$0	\$1,167,990
Diet manipulation - all	\$62,438	\$123,435	\$67,532	\$0	\$0	\$253,405
Siting assistance to producers - swine	\$14,421	\$14,998	\$15,598	\$0	\$0	\$45,017
Data collection (6 times per year)	\$140,663	\$585,156	\$867,389	\$630,168	\$164,575	\$2,387,950
Total Tier 1 Projects	\$1,506,866	\$3,300,440	\$2,345,074	\$630,168	\$164,575	\$7,947,122
Tier 2 Projects						
Advanced biofilters - swine	\$0	\$52,105	\$54,224	\$33,879	\$0	\$140,208
Vegetative environmental buffers - beef, dairy	\$46,035	\$61,638	\$78,415	\$51,827	\$52,135	\$290,050
Biofilters - layers	\$406,917	\$0	\$0	\$0	\$0	\$406,917
Wet scrubbers - layers, swine	\$0	\$432,450	\$0	\$0	\$0	\$432,450
Electrostatic particulate ionization - layers, swine	\$0	\$0	\$359,316	\$0	\$0	\$359,316
Biocurtains - layers, swine	\$0	\$0	\$0	\$623,715	\$0	\$623,715
Topical treatments - layers, turkeys	\$0	\$0	\$0	\$0	\$351,801	\$351,801
Siting model for all species	\$179,200	\$182,368	\$185,663	\$189,089	\$192,653	\$928,973
Data collection (3 weeks/season)	\$59,790	\$227,999	\$387,439	\$387,439	\$585,543	\$1,648,210
Total Tier 2 Projects	\$691,942	\$956,560	\$1,065,057	\$1,285,950	\$1,182,131	\$5,181,640
Emerging Technology Projects						
Ultraviolet treatment - lab scale	\$423,653	\$245,208	\$252,572	\$0	\$0	\$921,433
Ultraviolet treatment - pilot scale	\$0	\$0	\$0	\$330,590	\$0	\$330,590
Ultraviolet treatment - commercial scale	\$0	\$0	\$0	\$0	\$284,852	\$284,852
Phase 1 - Solid injection	\$0	\$111,518	\$84,194	\$74,020	\$0	\$269,732
Phase 1 - Oil cover on deep pits	\$0	\$44,251	\$45,516	\$40,915	\$0	\$130,682
Phase 1 - Topical application delivery	\$90,505	\$68,841	\$0	\$0	\$0	\$159,346
Phase 2 & other emerging technologies	\$0	\$0	\$0	\$500,000	\$500,000	\$1,000,000
Total Emerging Technology Projects	\$514,158	\$469,818	\$382,282	\$945,525	\$784,852	\$3,096,635
Total Costs	\$4,497,004	\$5,879,590	\$4,974,924	\$4,073,920	\$3,374,541	\$22,799,979