



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

12 August 2021 [via email]

John W. Gehrke
Farm Loan Chief
Illinois Farm Service Agency, USDA
3500 Wabash Ave.
Springfield, IL 62711-8287
john.gehrke@usda.gov

**Re: Sole Source Aquifer Project Review
New Livestock Operation and Associated Animal Waste Management
Mason County, IL**

Dear Mr. Gehrke:

I have reviewed the information you provided regarding the above-referenced project. The proposed hog barn and associated manure application sites are located within the Mahomet Sole Source Aquifer (SSA), which EPA has designated under the authority of the Safe Drinking Water Act, Section 1424(e). Animal wastes can be a source of pathogens (e.g., coliform bacteria) and other contaminants (e.g., nitrate), which can leach down and contaminate groundwater. Areas with sandy soils, such as the area in Mason County in which the proposed barn and land application sites are to be located, are particularly vulnerable. In a phone conversation in July 2021, Illinois EPA Source Water Protection staff also highlighted the lack of a protective clay confining layer as another reason why groundwater in this area is vulnerable.¹ To protect the groundwater beneath and adjacent to the proposed hog barn and associated manure application sites, the owner(s) and operator(s) must implement best management practices. A list of recommended best management practices is provided below.

The livestock operation and animal waste management must be designed, constructed, and operated so as to minimize nonpoint source pollution entering groundwater.

¹ Use of Real-Time Sensors to Temporally Characterize Water Quality in Groundwater and Surface Water in Mason County, Illinois, 2017–19: <https://pubs.er.usgs.gov/publication/sir20205108>

- A registered professional engineer should certify the construction of the manure storage facility (concrete pit) and the mortality management and composting areas, to minimize leaching or discharge of liquids to the groundwater. Prior to this certification, the applicant must inform the engineer that the location is within an EPA-designated Sole Source Aquifer. Design certification has been provided in accordance with state requirements intended to prevent seepage or groundwater contamination (e.g., 8 IAC 900.502(c); 510 ILCS 77/13(b)(3); and 35 IAC 501.402(g)).
- We strongly recommend the owner/operator (or designee) complete periodic inspections² of the concrete floor and walls of the manure management facility, such as each time the manure is emptied for land application. Additionally, pump-outs should be inspected periodically to ensure covers are intact, so as to prevent inflow of rainwater and ensure adequate freeboard is maintained to prevent manure overflow.
- We understand that perimeter foundation drain monitoring (e.g., for nitrate-N, phosphate-P, chloride, sulfate, ammonia-N) will be required by the State of Illinois (State) upon initiation of the project and strongly recommend that such monitoring be continued periodically as long as the facility is in operation. Ongoing perimeter foundation drain monitoring is recommended to help identify, and quickly mitigate, any animal waste impacts to groundwater as the barn and foundations age (e.g., if cracks develop in the concrete or the waterstop material). We note that the plans call for water from the perimeter foundation drain to be gravity-drained or pumped to daylight; the owner/operator or designee should periodically inspect the foundation drain receiving outlet for animal waste impacts.
- The owner/operator should notify the State regarding any indication of manure or animal waste release to groundwater (510 ILCS 77/18).
- Any pre-application staging of manure outside of the manure waste management system (concrete pit) should be limited to very short durations and only within areas that will limit seepage into groundwater (e.g., concrete pad) and that will limit stormwater run-off or run-on (e.g., berms / covers). Likewise, mortality management compost, which is planned to be on an inwardly-sloped concrete pad with a cover to prevent stormwater influx, should be properly managed so that contaminants will not leach into groundwater.

Careful land application is particularly important given the sandy soils in the project area. If too much manure is applied, excess nitrogen will convert to nitrate, which can leach downward and contaminate the groundwater.^{3,4}

² See Chapter 13 of the NRCS Agricultural Waste Management Field Handbook, as well as NRCS Conservation Practice Standard Code 313, Waste Storage Facility, and associated Operation & Maintenance Plan.

³ 35 IAC 560.203, Excerpt: "Caution should be exercised in applying wastes, particularly on porous soils, so as not to cause nitrate or bacteria contamination of ground waters. Such shallow ground waters are often the source of private wells in rural areas."

⁴ See also Illinois NRCS Nitrogen Management Guidelines.

- The applicant should inform any other parties (including contractors and land owners) who accept, handle, or transport the manure from the facility that the area is underlain by sensitive groundwater (the Mahomet SSA).
- The applicant should not land apply (including by injection and incorporation methods) manure during rainfall (35 IAC 560.207) or when the ground is saturated, frozen, or snow-covered (35 IAC 560.206) at any site above the Mahomet SSA.
- The applicant should land apply manure as close to planting time as possible, i.e., in the spring or, if a cover crop will be planted, in early fall – when a crop that will use the nutrients is planted. Based on the storage capacity described in the facility’s application (12 months), this should be achievable. Planting of fall/winter cover crops should be encouraged.⁵
- When conditions allow (i.e., not saturated, frozen, or snow-covered AND when a crop will be present), land application of manure should target the root zone and enhance plant uptake and reduce losses (e.g., run-off, vapors, and leaching to groundwater).⁶ The owner / operator or designee should consider using slower application speeds, split applications, and injection equipment which have been reported to reduce nutrient leaching to below the root zone.^{7,8}
- A comprehensive Nutrient Management Plan (NMP) should be maintained and implemented (e.g., soil characteristics⁹, manure and soil nutrient testing, crop rotations, and manure application records)¹⁰ for each land application site above the Mahomet SSA. We understand that the State of Illinois does not require NMP for operations with less than 1000 animal units, but voluntarily complying with requirements for large operations (e.g., 8 IAC 900 Subpart H) is strongly recommended to protect the sensitive groundwater in this area. We understand the applicant, with assistance from experienced professionals, intends to develop their nutrient management plan during the first year following construction.
- Application rates should be limited based on the results of nitrogen leaching risk assessment(s)¹¹, in addition to the requirements in 8 IAC 900.801 and 510 ILCS 77/20. A nitrogen leaching assessment should be completed for each land application field over the Mahomet SSA to determine the amount of nitrogen that the soil can handle at different times of the year to ensure protection of the SSA. Other sources that contribute nitrogen and phosphorus to the soil (e.g., crop rotation, other fertilizers) should be considered, and realistic yield goals should be used.

⁵ According to the 2019 Illinois Nutrient Loss Reduction Strategy report, cover cropping can be one of the most effective in-field strategies for reducing both nitrate-nitrogen and total phosphorus loss, including reducing downward leaching. <https://www2.illinois.gov/epa/topics/water-quality/watershed-management/excess-nutrients/Documents/NLRS-Biennial-Report-2019-Final.pdf>

⁶ Illinois Agronomy Handbook, including Chapter 9 Managing Nitrogen
<http://extension.cropsciences.illinois.edu/handbook/pdfs/chapter09.pdf>

⁷ <https://extension.unin.edu/manure-management/manure-application-methods-and-nitrogen-losses>

⁸ <https://uvdiscoveyrfarms.org/wp-content/uploads/sites/1255/2020/07/Managing-File-Drained-Landscapes.pdf>

⁹ See, for example, Chapter 4 of the NRCS Agricultural Waste Management Field Handbook

¹⁰ See also NRCS Conservation Practice Standard Code 590, Nutrient Management, and associated resources.

¹¹ NRCS Part 302 – Nutrient Management Policy Implementation

- For any tiled fields, the applicant should apply manure only when the soil is relatively dry. Managing drainage water by raising drain outlets before manure application is also recommended to reduce transport of contaminants.
- For irrigated fields, good water management is needed to prevent excessive leaching of soluble nutrients such as nitrate, and any additional irrigation to leach salts from soils should be timed to minimize the leaching of nitrates.¹²
- Periodic groundwater monitoring is recommended (such as at the on-site irrigation well as described below), so that the owner(s) and operator(s) can implement corrective actions if any impacts, such as increasing contaminants (e.g., nitrates, nitrites, coliform bacteria), are observed in groundwater downgradient of the sites where manure is land applied.¹³

The adjacent land application site includes an existing irrigation water well. It is important that all wells are properly located, installed, and maintained to prevent the well from becoming a pathway for contamination into the groundwater.

- When a well is no longer needed, it must be properly sealed.
- The applicant should confirm all areas where manure will be produced, handled, or stored are at a lower elevation than the water well location(s), or provide for other means (e.g., raised casing, berms) to prevent contaminated run-off from contaminating the well.
- Periodic sampling of the water well is recommended to evaluate groundwater quality (e.g., nitrates, nitrites, coliform bacteria).

If best management practices, including those listed above, are followed, this project is not likely to contaminate the Mahomet Sole Source Aquifer, designated under the authority of the Safe Drinking Water Act, Section 1424(e), so as to create a significant hazard to public health. We request that USDA-FSA, prior to loan approval, ask the farmer applicant to confirm in writing their receipt, understanding, and intention to make good faith efforts to implement the recommendations in this letter. Subsequent implementation could be via incorporation of these best management practices into their nutrient management plan.

As always, we suggest that during construction and maintenance, appropriate safeguards and best management practices are in place to ensure that local ground water supplies and neighboring drinking water wells are not endangered. Such precautions could include notifying general contractors that the site is sensitive, using “green infrastructure” practices where possible to reduce potential impacts of stormwater run-off, securing adequate precautions for fueling/servicing large equipment, and developing contingency plans to handle the release of any hazardous materials.

Please inform the Region 5 Sole Source Aquifer Program if future developments significantly change the scope or potential impacts of the project.

¹² Chapter 11 of the NRCS Agricultural Waste Management Field Handbook

¹³ See also NRCS Conservation Practice Standard Code 353, Monitoring Well

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This correspondence only addresses the Sole Source Aquifer Program. The project is responsible for ensuring compliance with any other federal, state, and local environmental requirements. EPA reserves its authority under the Safe Drinking Water Act and other federal law.

Thank you for your cooperation. If you have any further questions, please contact me by email at bosscher.valerie@epa.gov or call me at (312) 886-6731.

Sincerely,
**VALERIE
BOSSCHER**

Digitally signed by
VALERIE BOSSCHER
Date: 2021.08.12
15:34:48 -05'00'

Val Bosscher
Sole Source Aquifer Coordinator
Ground Water and Drinking Water Branch