



Waukesha County
Department of Parks and Land Use

MEMORANDUM

TO: Town of Delafield Plan Commission
Town of Delafield Board
Waukesha County Park & Planning Commission

FROM: Jason Fruth, Planning & Zoning Manager

DATE: November 20, 2023

SUBJECT: Thomas Farms water analysis
DELT 0809.995, DELT 0809.996 and DELT 0811.999

Planned Development District No. 1

The Town of Delafield adopted an ordinance amendment in 2022 that created Section 17.04 5. R. “Planned Development District No. 1 (PDD No. 1).” The town has a pending rezoning request to amend the zoning of the Thomas Farm to PDD No. 1 and a public hearing has been scheduled for December 5, 2023. PDD No. 1 contains a number of unique requirements that must be considered by the Town Plan Commission and Board as part of the review of the required General Development Plan component of the rezoning consideration process. Requirement 4.b.6. of PDD No. 1 stipulates a water study to assess water table considerations relative to private water supplies and natural resources.

Water Supply Alternatives

The prospective developer has explored different options for water supply to the Thomas Farm site and discussed options with town and county staff.

- Municipal water. In considering the density allowances of PDD No. 1, the parties have determined that extension of municipal water to the site from the City of Pewaukee or City of Delafield is not feasible at the present time.
- Community water supply. Town staff does not believe that an alternative private community water supply system is viable because of the challenges of long term oversight and administration of a community water utility by a homeowners association.
- Private wells. Because of the described impediments to municipal water extension or a community water supply, the developer is proposing private wells for single family homes and private wells shared by side by side condominium units. The surrounding subdivisions and neighborhoods similarly rely upon private wells and municipal sewer.

Consultant's Analysis

The developer retained a consultant, GZA Environmental, Inc. to assess water supply considerations relating to the use of private wells to serve the development site. GZA evaluated the cumulative drawdown of 11 hypothetical pumping wells around the perimeter of the Thomas Farms property. The GZA modeling considers per capita water use and the projected number of dwelling units. GZA's findings conclude the following:

- The preliminary stormwater management plan for the development would provide post-development infiltration volume of 13,398,000 cubic feet of water annually, which is 94.2% of pre-development infiltration volume. The Waukesha County Stormwater Management & Erosion Control Ordinance requires a 90% infiltration standard.
- When considering anticipated well pumping and water consumption and the projected 94.2% infiltration rate, GZA estimated the water table drawdown at the property boundary to be approximately four to five feet.
- The maximum anticipated water table drawdown is less than the natural groundwater fluctuation of six feet that is observed in USGS monitoring wells in the area.
- Existing nearby subdivisions were studied using the same modeling methodology; neighboring developments likely have a similar water table drawdown if inputting today's enhanced stormwater management infiltration requirements.
- Flows of groundwater towards Pewaukee Lake will be maintained.

Southeastern Wisconsin Regional Planning Commission (SEWRPC)

Waukesha County requested the technical assistance of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) relative to groundwater supply considerations. SEWRPC offered the following assessment relative to balancing pre-development infiltration and post-development infiltration:

- When any form of land development occurs and hard surfaces are created, groundwater re-charge is likely to be affected unless measures are taken to infiltrate stormwater.
- Net water loss can occur when private well water is pumped and discharged to an off-site downstream wastewater treatment facility or pumped and lost to evaporation in the form of lawn sprinkling unless measures are taken to offset the loss.
- Enhanced stormwater infiltration can be considered to offset water use and to maintain pre-development infiltration rates.
- SEWRPC Technical Report #47 shows the majority of the Thomas Farm site is mapped as having high or moderate groundwater recharge potential.
- *In general, based upon models used in Commission Technical Report No. 47, groundwater recharge in the general area of the proposed Thomas Farms development likely range from 3 to 7 inches per year, **averaging 5 inches per year.***
- *Assuming the entire Thomas Farms 151.9-acre site has a uniform 5-inch groundwater recharge rate, this equals roughly 63.3 acre-feet per year of groundwater recharge. At the estimated 77 gallons per capita per day water demand proposed for the development, the total volume of water drawn from wells in the proposed development is projected to be 33.8 gallons per minute (54.5 acre-feet per year).*
- *To sustain predevelopment local groundwater elevations and flow paths, stormwater management must infiltrate predevelopment groundwater recharge volumes **plus** that lost to residential water pumping. Therefore, to sustain predevelopment groundwater conditions, groundwater recharge on a site scale must strive to increase from 63.3 acre-feet per year to 117.8 acre-feet per year. With this example, average groundwater recharge infiltration across the entire site would need to increase from 5 inches per year to 9.3 inches per year.*

Collier Consulting Analysis

The Lake Pewaukee Sanitary District retained a consultant, Collier Consulting to assess groundwater considerations related to the proposed development. The Collier report notes, *Any actions that increase infiltration at the Development can be expected to increase recharge to the shallow ground water system and will help to compensate for any net loss from the shallow aquifer due to pumping from the residential wells.*

Summary

While GZA, Collier and SEWRPC have all examined the water supply issue in a unique manner and each entity offers its own perspective, the three entities have all identified stormwater infiltration as being a potential option for ensuring that shallow groundwater levels are not negatively impacted by development. All three entities conclude that Pewaukee Lake levels are unlikely to be affected by the use of private wells, particularly if stormwater infiltration is used to offset water withdrawal.

The developer has submitted preliminary stormwater management plan materials to the Waukesha County Department of Parks & Land Use, Land Resources Division (LRD). LRD has advised that there appears to be sufficient space on site to meet the county's standard stormwater management requirements. LRD has further advised that a variety of infiltration practices can be explored to enhance infiltration rates to offset water consumption. Projections suggest that existing groundwater supply can be sustained and balanced when considering post-development groundwater recharge compared to pre-development conditions. Given the site conditions which naturally have high and moderate infiltration rates, use of enhanced infiltration techniques can increase the average groundwater infiltration across the site.