
**Staff Analysis of Proposed Amendment to the
Dane County Water Quality Plan,
Removing a Prior Condition of Approval
in the Waunakee Urban Service Area**

History of Amendments to the Waunakee Urban Service Area

The Waunakee Urban Service Area (USA) was established in 1971 with the adoption of the first sewer service plan. Environmental Corridors were delineated in 1985. The first amendment occurred in 1988. There have been 16 amendments to this service area since its creation totaling 1,562 acres of developable land and 674 acres of Environmental Corridor. The most recent amendments of the service area by the Village were recommended by the Commission and approved by the Wisconsin DNR (WDNR) in the spring of 2022, adding roughly 63 acres in the northeast corner of Waunakee (WDNR Project Number DC-0216) and in May 2023 (WDNR Project Number DC-0223), adding roughly 40 acres to the southwest edge of the Waunakee USA.

Description of Proposed Amendment

The subject area of the proposed amendment is located south of Woodland Drive and west of Century Avenue/CTH Q, within the Village of Waunakee (see Map 1 and 2). This area (approximately 125 acres) was originally brought into the Waunakee Urban Service area in 2018 and is subject to [CARPC Resolution No. 2017-21](#), by reference in the DNR approval letter dated January 11, 2018 ([DC-0191](#)). The Regional Planning Commission's staff analysis report ([1705 Waunakee Staff Analysis](#)) for the original amendment area describes the original amendment area more fully. Resolution No. 2017-21 included several conditions of approval related to stormwater management, environmental corridors and resource management, and wastewater capacity. Because the area is within the Joint Waunakee/Westport Planning Area, the Village voluntarily adopted the more stringent Town of Westport stormwater ordinances during the time of the original amendment process. This was reflected in Resolution No. 2017-21 and the conditions contained therein, notably condition (1)(e), which states:

"Infiltrate 100% of the increased post-development runoff volume from the 100-year, 24-hour design storm in accordance with the Town of Westport Stormwater Ordinance."

The Village's amendment request is to remove condition (1)(e) of CARPC Resolution No. 2017-21 or amend it to be consistent with current statutory requirements related to stormwater infiltration. No other conditions of Resolution 2017-21 are proposed to be amended. The Waunakee-Westport Joint Planning Commission recommended approval of the amendment and the Village of Waunakee Village Board passed Resolution No. R23-6, authorizing Village staff to pursue the urban service area amendment. The Town of Westport has been notified of the proposed amendment and has not objected to it.

Chapter 14.12(2)(e)(1) of the current Dane County Ordinance, which sets the minimum level of control for all communities in Dane County, states: "For new development, design practices to infiltrate sufficient runoff volume so that post-development infiltration volume shall be at least 90% of the pre-development infiltration volume, based upon average annual rainfall." Condition (1)(e), which may be referred to as 100% volume control for the 100-year storm, is a higher level of volume control than the current ordinance requiring 90% volume control for the average annual rainfall.

The stated reasoning for the amendment request in the Village's application centers around an inability to meet the higher standard of volume control due to site soil conditions having

generally poor infiltration capacity. The Village's application also states that condition (1)(e) is not enforceable pursuant to [Wisconsin Statute 281.33\(6\)\(a\)\(1\)](#). While State statute 281.33(6)(a)(1) precludes a local ordinance from requiring greater than 90% volume control, it is CARPC staff's understanding that this does not apply to conditions of approval to amendments to the areawide water quality management plan. This understanding has been informed by staff's discussions with WDNR staff and legal counsel. Hence, development within the amendment area which does not meet the volume control standard of condition (1)(e) could not be considered consistent with the *Dane County Water Quality Plan*, and therefore, an amendment is required to remove the condition if the Village has determined that it no longer can meet it.

Existing Conditions

Natural Resources

The proposed amendment area is in the Sixmile Creek watershed (HUC 070900020602; see Map 3). No floodplains occur in the amendment area.

Wastewater from the amendment area will be treated at the Madison Metropolitan Sewerage District (MMSD) Wastewater Treatment Facility. The treated effluent is discharged to Badfish Creek and Badger Mill Creek, bypassing the Yahara chain of lakes.

Wetlands

DNR's Wisconsin Wetland Inventory (WWI) shows one wetland within the amendment area that is classified as palustrine persistent emergent wet meadow. This wetland is part of a larger complex to the southwest that is associated with Dorn Creek.

A wetland delineation ([link to report](#)) was conducted within the amendment area and the adjacent service area by Taylor Conservation, LLC, a DNR-qualified assured delineator in May 2022. The site investigation and field delineation determined there was one sedge/wet meadow wetland within the adjacent service area, totaling approximately 10 acres (see Map 9). This wetland has a surface water connection to Dorn Creek. The dominant vegetation was tussock sedge (*Carex stricta*), lake sedge (*Carex lacustris*), cattails (*Typha angustifolia*), jewel weed (*Impatiens capensis*), reed canary grass (*Phalaris arundinacea*), pussy willow (*Salix discolor*), red osier dogwood (*Cornus alba*), and cottonwood (*Populus deltoides*). This wetland, including a minimum 75' vegetated buffer, will be designated as environmental corridor per the adopted policies and criteria for environmental corridors ([link to document](#)). The field delineation did not identify any wetlands within this current amendment area. Drain tiles were installed in 2020 in a low-lying portion of cropland just upstream of the delineated wetland and within the amendment area, eliminating the wetland hydrology (see Map 9). This area is generally proposed as stormwater management areas or open space.

The WWI also shows a continuation of the wetland complex identified above, downstream of the amendment area (see Map 3). Wetlands within the larger wetland complex are hydrologically connected to Dorn Creek.

Dorn Creek

The proposed amendment area is within the Dorn Creek subwatershed. Dorn Creek, also referred to as Spring Creek ([WBIC 805600](#) / WATERSID 11694), flows approximately 6.5 miles through agricultural lands and ends in Governor Nelson State Park where it combines with Six Mile Creek and subsequently flows into Lake Mendota. The watershed covers 12.7 square miles and includes a few springs that contribute to the creek's base flow. Dorn Creek is approximately 0.4 miles southwest of the proposed amendment area boundary. Dorn Creek is listed as impaired by the WDNR for elevated water temperature, degraded biological integrity and recreational restrictions due to pathogens. These impairments stem from *E. coli*, Total Phosphorus, and Sediment/Total Suspended Solids.

There has been a WDNR monitoring location on Dorn Creek at the County Highway Q bridge ([Station 133065](#)) since 1995. Field measurements from 2019 indicated dissolved oxygen levels

of 7.73 mg/L and a macroinvertebrate score of 4.2. The WDNR does not have any chloride monitoring data for Dorn Creek. The United States Geological Survey (USGS) baseflow monitoring station ([USGS 05427930](#)) indicated chloride levels of 35.4 to 36.4 mg/L in 2020. Chronic and acute toxicity levels are 395 mg/L and 797 mg/L, respectively. The creek is considered to have cool-cold headwater, macroinvertebrate, and cool-warm headwater natural communities.

Sixmile Creek

The proposed amendment area is also within the Sixmile Creek watershed. Sixmile Creek (or Six Mile Creek) ([WBIC 805500](#) / WATERSID 11691) is approximately 12.1 miles long and flows through the Village of Waunakee, ultimately draining into Lake Mendota. The 43-square-mile watershed encompasses predominately agricultural lands and the growing community of Waunakee. The creek is listed as an Exceptional Resource Water by the WDNR. The creek provides spawning areas for Lake Mendota's fish and offers a warm water sport fishery. Sixmile Creek is impaired for Total Phosphorus. There is a WDNR monitoring station at the confluence of Dorn Creek and Sixmile Creek ([Station ID 10042332](#)). Summer/fall 2017 field measurements indicated dissolved oxygen of 6.1 to 11.1 mg/L, an average transparency of 102.1 to 117.5 cm, and a macroinvertebrate index score of 2.0 to 2.7. Limited chloride monitoring results from a station east of the amendment area at Mill Rd Bridge ([Station ID 133063](#)) indicated that chloride levels averaged 97 mg/L in 2011. There are no active USGS baseflow monitoring stations on Sixmile Creek downstream of the amendment area. Sixmile Creek has cool-cold and cool-warm main stem natural communities.

Springs

The Wisconsin Geological and Natural History Survey (WGNHS) maintains an inventory of springs in Dane County, and throughout the state. From 2014 and 2017, the WGNHS surveyed springs statewide that were expected to have flow rates of at least 0.25 cubic feet per second (cfs). There are no known springs in or near the proposed amendment area from that survey.

Groundwater

Groundwater modeling, using the 2016 Groundwater Flow Model for Dane County developed by the WGNHS ([link to website](#)), shows that baseflow in Sixmile Creek at the confluence with Dorn Creek (see location on Map 3) has decreased from 21.8 cfs during pre-development conditions (no well pumping) to 18.9 cfs in 2010 (Table 1). This decrease is primarily due to the combined impacts of high capacity well groundwater withdrawals contributing to reduced stream baseflow.

In 2012, the WGNHS published a report, *Groundwater Recharge in Dane County, Wisconsin, Estimated by a GIS-Based Water-Balance Model*, ([link to report](#)) estimating the existing groundwater recharge rates in Dane County based on the soil water balance method. The study estimates that the existing groundwater recharge rate in the proposed amendment area ranges from 9 to 10 inches per year.

Endangered Resources

The WDNR Bureau of Endangered Resources maintains a database representing the known occurrences of rare plants, animals, and natural communities that have been recorded in the Wisconsin Natural Heritage Inventory ([link to website](#)). A screening review of this database conducted by Regional Planning Commission staff for species designated as endangered, threatened, or of special concern did not identify any within a one-mile radius of the amendment area. A one-mile buffer was considered for terrestrial and wetland species and a two-mile buffer for aquatic species. One federal reptile species of concern was identified within a two-mile radius. Additional review by the WDNR Bureau of Endangered Resources is not required. The revision of the stormwater condition is not anticipated to have any effect on endangered resources.

The amendment area was reviewed for the High Potential Zone (species likely present) for the federally endangered Rusty Patched Bumble Bee. None of the proposed amendment area falls within the High Potential Zone.

Soils and Geology

The amendment area is located within the Waunakee Moraines Land Type Associations of Wisconsin. The Association classifies the surficial geology of this area as rolling till plain and irregular drumlins with scattered bedrock knolls, lake plains, and outwash plains. Soils are predominantly well drained silt and loam over calcareous sandy loam till or bedrock.

Surface elevations within the amendment area range from around 910 feet to 980 feet. The amendment area includes areas of steep (12%) with some isolated areas of very steep (>20%) slopes associated with the ridges in the northwest and central areas of the site (see Map 4). There are no steep slopes adjacent to riparian areas.

According to the USDA Natural Resource Conservation Service (NRCS) Soil Survey of Dane County, the soils in the amendment area are in the Plano – Ringwood - Griswold association. These soils are moderately well drained and well drained, deep silt loams and loams. A detailed breakdown of soil classifications and characteristics was provided in Table 2 and 3 of the original staff analysis report for this area (refer to [1705 Waunakee Staff Analysis](#)).

Hydric soils are good indicators of existing and former (drained) wetlands. There are four hydric soils within the amendment area – the Wacousta, Elvers, and Orion soils (the Wa, Ev, and Os map units) (see Map 5). Hydric soils also extend to the southwest, coinciding with the wetland complex described above.

According to the Soil Survey Geographic data for Dane County developed by the NRCS ([link to web soil survey](#)), the Troxel, Plano and Elburn soils (the TrB, PnB, PnC2, and EfB map units) are not hydric, but they do have a seasonal (April to June) zone of water saturation within 5 feet of the ground surface. The Troxel and Plano soils are classified as well drained and moderately well drained, and therefore, do not pose a limitation for buildings with basements. The Elburn soil is classified as somewhat poorly drained and poses severe limitations for buildings with basements.

Soil evaluations were conducted by Vierbicher and CGC to determine subsurface conditions. A total of 71 soil test pits were conducted within the amendment area and adjacent service area (see Map 6). Map 6 indicates that 29 (~41%) of the test pits contain soil conditions considered “good” for infiltration, which was defined by the applicant as having a layer of soil with an infiltration capacity of 0.5 inch/hour or greater. Most of these locations, however, were located on an upslope and the effective infiltration rate was no more than 0.5 inch/hour. Groundwater and redox soils indicating seasonal high groundwater were also observed in areas.

Bedrock was not encountered during soil evaluations. According to WGNHS data, the depth to bedrock in the amendment area ranges from less than 10 to 400 feet, with the shallowest depths (0-10 feet) being in the northeast and deepest depths (100-400 feet) being in the southwest corner of the amendment area (see Map 8).

As is common throughout much of the upper Midwest, karst features such as enlarged bedrock fractures are prevalent in the local dolomite uplands. Based on the WGNHS karst potential data and soil evaluations completed, most of the amendment area has limited potential for karst features.

Dane County ordinance requires infiltration practices receiving runoff from all source areas containing impervious surfaces to be located so that the separation distance between the bottom of the infiltration system and the elevation of seasonal high groundwater, or the top of bedrock, is at least 5 feet, along with certain soil filtering characteristics, except that there is no minimum separation distance for roofs draining to surface infiltration practices. Soil test pits are required as part of the stormwater management plan to assure that infiltration practices are sited in locations that will not adversely affect groundwater quality. Based on the

soil evaluations completed to date, many areas of the site have been determined to have insufficient separation from groundwater.

Proposed Urban Services

The original amendment application in 2017 proposed development which was predominantly residential along with smaller institutional, commercial, and mixed-use components (including existing development). The conceptual development plans have been updated but maintain similar proposed land uses.

Wastewater from the amendment area will be treated at the Madison Metropolitan Sewerage District (MMSD) Wastewater Treatment Facility. The treated effluent is discharged to Badfish Creek and Badger Mill Creek, bypassing the Yahara chain of lakes.

Open Space

There is a total of approximately 24.6 acres of open space and stormwater management areas proposed in the amendment area (see Map 2). The open space and stormwater management areas proposed in the current development plan area are generally consistent with the environmental corridor proposed as part of Resolution 2017-21.

Stormwater Management System

Condition (1)(e) of Resolution 2017-21 requires design practices within the development to infiltrate 100% of the increased post-development runoff volume from the 100-year, 24-hour design storm, in accordance with Town of Westport stormwater ordinance. Effectively, this means that during the 100-year design storm event, there shall be no additional runoff volume in the post-development condition as compared to the pre-development condition. Whereas Dane County ordinance Ch. 14.12(2)(e)(1) requires design practices in the post-development condition to infiltrate 90% of the pre-development infiltration volume, based upon average annual rainfall. The average annual rainfall series is defined as the actual measured precipitation in Madison, Wisconsin between March 12, and December 2, 1981. Within this rainfall series, there are many small events, and the largest storm event is between and 1-year and 2-year design storm event. Compared to the current Dane County 90% standard, the 100% volume control for the 100-year storm is a much higher volume control standard and requires infiltrating a large volume of water for a single, large storm event rather than infiltrating smaller amounts from smaller rainfalls over the course of the year. By comparison, other developments which have elected to exceed the 90% standard have done so by infiltrating 100% of the average annual rainfall. For context, it is also helpful to understand that the Town of Westport is a relatively low-density township. In a more urbanized area with higher densities, it becomes increasingly harder to match predevelopment infiltration volumes due to the higher amounts of impervious areas.

The subject area of the proposed amendment is comprised of predominantly active agricultural land uses. There is a ridge in the middle of the amendment area running northeast to southwest, which generally splits the existing drainage into two. Runoff from the northwestern half concentrates within an existing drainageway that flows southwest to the wetlands located within the service area to the west, while the majority of runoff from the southeastern half concentrates within a valley that flows offsite and to the larger wetland complex to the south. The wetlands to the southwest also receive significant flow from upstream areas. A portion of the drainageway within the amendment area is former wetlands that have been drained. After leaving the amendment area, runoff from both subwatersheds flows through offsite lands within the Town of Westport and concentrates within mapped perennial streams or constructed drainageways within the larger wetland complex to the south, then enters Dorn Creek approximately 2,000 feet south of the amendment area. A small portion of the amendment area flows offsite to the northeast and through existing development within the Village of Waunakee, eventually making its way to Six Mile Creek.

A stormwater management plan (SWMP) was not submitted with the application at the time of the original amendment. The preliminary plan called for regional basins along the drainageway

and southwest corner and dispersed infiltration areas, including depressed boulevards with bioretention areas. While it was known that soil mapping indicated the possibility of high groundwater tables which may impact final stormwater design, no insitu soil analysis data was available, and it was assumed that incorporating bioretention facilities higher in the landscape would be sufficient in meeting the proposed standard to meet 100% volume control for the 100-year storm.

A preliminary SWMP for the Kilkenny Farms-West development area, dated March 13, 2023, was submitted with the Village's application and covers most of the current amendment area (subject to Resolution 2017-21) as well as the service area to the west and a portion of the area to the northeast (subject to DCRPC Resolution No. 482). The proposed plan is similar to the original amendment concept and includes a series of stormwater basins located along the drainageway as well as additional stormwater basins throughout the amendment area, generally located within areas of better soil conditions to maximize the infiltration potential (see Map 6). Within the amendment area, runoff will be collected and conveyed within a network of storm sewers and overland flow routes to one of the stormwater basins prior to discharge offsite. The post-development drainage conditions generally match the predevelopment conditions. The proposed basins are intended to provide stormwater control for the residential portions of the development, while the areas of proposed commercial development will be required to handle all stormwater management on their respective sites. The application states that all requirements for water quality treatment, volume control and infiltration (to the current 90% standard required by ordinance), and peak flow attenuation will be met. The proposed stormwater management facilities are anticipated to be located within public outlots and will ultimately be owned and maintained by the Village.

A soil investigation completed by the development design team indicated variable infiltration potential across the site, including areas of high groundwater and poor soil conditions for infiltration. The best areas for infiltration are generally in upslope areas and still only provide marginally infiltrative soils at 0.5 inch/hour. The final stormwater management plan may be fine-tuned as final construction plans are developed; however, it is expected that the final volume of infiltration achieved will remain above the 90% level (for the average annual rainfall) required by current ordinance. Dispersed, small-scale green infrastructure practices, such as private rain gardens, downspout disconnection, porous pavements, and rainwater harvesting may be considered for implementation by private landowners to further increase the volume of infiltration achieved across the development site.

The preliminary SWMP submitted with the current application achieved infiltration of 55% of the additional post-development runoff volume from the 100-year storm (10.59 ac-ft), approximately 8.62 ac-ft short of meeting the condition (1)(e) requirement to achieve 100% volume control for the 100-year storm. The plan achieved 89.3% infiltration of the predevelopment infiltration volume for the average annual rainfall, just shy of the Dane County requirement to infiltrate 90% of the average annual rainfall.

After review by CARPC staff and the Village stormwater reviewer, suggestions were made to increase the efficiency of the system and achieve an increased level of infiltration. Additionally, the development team was asked to consider offsite infiltration as a way of meeting the volume control standard; while this was considered, it was determined by the Developer to not be feasible. Considering the feedback provided, the Village submitted a revised stormwater management plan, dated May 24, 2023, as an amendment to the application. In the revised plan, infiltration of 76% of the additional post-development runoff volume from the 100-year storm (14.82 ac-ft) was achieved, approximately 4.77 ac-ft short of meeting the condition (1)(e) requirement. The revised plan achieved 93.3% infiltration of the predevelopment infiltration volume for the average annual rainfall. Currently, the area dedicated to infiltration facilities is approximately 2.7% of the Kilkenny Farms-West plat area (excluding the area of commercial development which will be required to provide their own stormwater controls). In accordance with Ch. 14.12(2)(e)(3) of the Dane County ordinance, the minimum area required to be dedicated to meeting the infiltration goal is 2% of the site.

It appears the development team has made reasonable accommodations to meet the volume control standard to the maximum extent possible, but still is unable to achieve 100% volume control for the 100-year storm in accordance with the original condition (1)(e).

The amendment area is not within a thermally sensitive watershed. Pretreatment of stormwater runoff for total suspended solids (TSS) and peak rate control will be required prior to entering the wetlands located west and southwest of the amendment area in accordance with NR 151 regulations. This will be provided by the proposed stormwater management facilities and will help mitigate the effects of development on the water resources.

South of the amendment area, Dorn Creek flows beneath Meffert Road through an existing culvert. The size of culvert is unknown; however, based on current FEMA floodplain mapping for the 1%-annual-chance and 0.2%-annual chance flood events, it appears the culvert acts as a flood control device and water backs up behind it. During large storm events exceeding the capacity of the culvert, stormwater will overtop Meffert Road at the location of the culvert. Removing the 100% volume control for the 100-year storm will result in an additional volume of water reaching this point; however, the peak rate of flow will still match predevelopment conditions in accordance with peak rate control requirements. Based on a desktop review of these conditions and the relative size of the amendment area to the contributing watershed, it is anticipated that removing the 100% volume control for the 100-year storm requirement will have a minimal impact on these downstream drainage conditions.

Performance Standards

The Village of Waunakee stormwater management and performance standards are contained within Chapter 109 of the Village of Waunakee Code of Ordinances. Town of Westport stormwater standards are contained within Title 10, Chapter 4 of The Town of Westport Code of Ordinances. Dane County stormwater management and performance standards are within Dane County Code of Ordinances, Chapter 14. WDNR stormwater regulations are contained in Administrative Code Chapters NR 151 and NR 216. Development within the amendment area will be required to follow the more protective standards contained within the respective ordinances, as well as conditions contained within Resolution No. 2017-21 (where not subsequently amended), based on WDNR approval DC-0191 which brought this area into the Waunakee Urban Service Area.

The Village of Waunakee proposes stormwater management performance measures for the amendment area to meet applicable standards required by the State of Wisconsin, Dane County, and Village of Waunakee stormwater regulations at the time of the stormwater management plan approval, which include:

1. Require post-construction sediment control (reduce total suspended solids leaving the site by at least 80%, with a minimum of 60% of that control occurring prior to infiltration for residential land uses and 80% occurring prior to infiltration for commercial, industrial, and institutional land uses), for the average annual rainfall series. This is consistent with the standards currently required by Dane County and Village of Waunakee ordinances.
2. Require post-construction peak runoff rate control for the 1-, 2-, 10-, 100-, and 200-year, 24-hour design storms (using NRCS MSE4 storm distributions) to match predevelopment peak runoff rates. This is consistent with Dane County and Village of Waunakee ordinances.
3. Require post-development infiltration (stay-on) volume of at least 90% of the predevelopment infiltration (stay-on) volume for the average annual rainfall series. This is consistent with the standards currently required by Dane County and Village of Waunakee ordinances.
4. Maintain predevelopment groundwater annual recharge rate of 9 to 10 inches per year as estimated by the Wisconsin Geological and Natural History Survey in a 2012 report

titled “Groundwater Recharge in Dane County, Wisconsin Estimated by a GIS-Based Water Balance Model”. This is consistent with the standards currently required by Dane County and Village of Waunakee ordinances.

5. Treat the first one-half inch of runoff to provide oil and grease control using the best available technology for commercial, institutional, and any other land uses where the potential for pollution by oil or grease, or both, exists. This is consistent with the standards currently required by Dane County and Village of Waunakee ordinances.

Impacts and Effects of Proposal

Environmental Corridors

The conceptual development plans have been updated along with the proposed amendment. There is a total of approximately 24.6 acres of environmental corridors proposed within the area of the proposed amendment (see Map 2), which will include proposed stormwater management areas and open space (some of which overlap the 75’ vegetated buffer required for the wetland located in the amendment area to the west) in accordance with the Environmental Corridor Policies and Criteria ([link to document](#)) adopted in the *Dane County Water Quality Plan*. Some of what is proposed as Environmental Corridor also coincides with what would be considered Stewardship Areas, as described below.

Protection Areas are required for inclusion in Environmental Corridors when those areas are added to the urban service area. Protection Areas include natural resource features such as the 1% annual chance floodplain; waterbodies, streams and wetlands, plus their required vegetative buffers; riparian steep slopes; existing public lands, parks, and conservancy areas; and existing stormwater management facilities. Protection Areas are mapped based on regionally available information, such as the Wisconsin Wetland Inventory data. There is a small area along the western edge of the current amendment area that comprises the wetland buffer area for the wetland located in the service area to the west that is considered a Protection Area (see Map 12).

Stewardship Areas are natural resources that are not legally protected from development, but still provide important benefits to the region, and are advised to be considered for inclusion in Environmental Corridors, above the minimum requirements. This concept is described more fully in the [Regional Development Framework](#) (RDF) and is aimed at achieving the goal of conserving water resources and natural areas. The Stewardship Area recommendations include natural resource features such as the 0.2% annual chance floodplain, potentially restorable wetlands, internally drained areas, hydric soils, current/potential Ice Age Trail Corridor, and Natural Resource Area boundaries identified in the Dane County Parks and Open Space Plan. The drained wetlands and areas of hydric soils within the amendment area would be considered Stewardship Areas and are generally located in areas proposed as Environmental Corridor with the updated development plans (see Map 2 and 5).

Surface Water Impacts

Development creates impervious surfaces (e.g., streets, parking areas, and roofs) and typically alters the natural drainage system (e.g., natural swales are replaced by storm sewers). Without structural best management practices (e.g., detention basins and infiltration basins) this would result in increased stormwater runoff rates and volumes, as well as reduced infiltration. Without structural best management practices for erosion control, development would also cause substantial short-term soil erosion and off-site siltation from construction activities. Scientific research has well documented that without effective mitigation measures, the potential impacts of development on receiving water bodies can include the following:

- Flashier stream flows (i.e., sudden higher peaks)
- Increased frequency and duration of bank-full flows
- Reduced groundwater recharge and stream base flow
- Greater fluctuations in water levels in wetlands
- Increased frequency, level (i.e., elevation), and duration of flooding

- Additional nutrients and urban contaminants entering the receiving water bodies
- Geomorphic changes in receiving streams and wetlands

Natural drainage systems attempt to adapt to the dominant flow conditions. In the absence of mitigation measures, the frequency of bank-full events often increases with urbanization, and the stream attempts to enlarge its cross section to reach a new equilibrium with the increased channel forming flows. Higher flow velocities and volumes increase the erosive force in a channel, which alters streambed and bank stability. This can result in channel incision, bank undercutting, increased bank erosion, and increased sediment transport. The results are often wider, straighter, sediment laden streams, greater water level fluctuations, loss of riparian cover, and degradation of shoreland and aquatic habitat.

Since 2002, there have been stormwater management standards in effect at the state, county, and local level to require stormwater management and erosion control plans and structural best management practices designed to address the impacts of development on water quality, runoff volumes, peak flows, water temperature, and groundwater recharge. In 2011, county and local standards for runoff volume control were increased beyond state standards to further address the potential stormwater impacts of development. Since 2010 many communities adopted even higher standards for volume control through their own ordinances or as part of USA amendment agreements. In 2017, State statute 281.33(6)(a)(1) was changed to limit the ability of local governments to adopt higher standards for runoff volume through local ordinances. In response to climate change, the City of Madison adopted peak rate control for the 200-year storm event in their ordinance in June 2020. Dane County adopted this same peak rate control requirement as well as requirements for closed basins in November 2021, which made these requirements universal to all communities in Dane County.

The proposed amendment would remove a higher standard for runoff volume control than is the current statutory requirement; it would not remove the requirement for volume control altogether, nor remove any other standards related to stormwater management. The Village of Waunakee proposes to mitigate the urban nonpoint source impacts of the proposed development by requiring the implementation of various stormwater best management practices that are designed and constructed to meet current applicable Dane County standards for pollutant reduction, runoff volumes, peak flows, water temperature, and groundwater recharge to address the potential water quality impacts of stormwater runoff from the proposed development on the receiving waters.

The Village is an active participant in the Wisconsin Salt Wise Partnership, having attended training courses provided by WI Salt Wise and implementing best practices to reduce the amount of salt usage for winter road maintenance.

The Village of Waunakee is also a participant in the Madison Area Municipal Storm Water Partnership (MAMSWaP), which is a coalition of Dane County municipalities and organizations working together to promote practices that reduce and improve stormwater runoff into Dane County lakes, rivers, and streams. The MAMSWaP Information and Education (I&E) Committee works to develop and implement projects and plans through regional outreach and consistent messaging throughout the communities, including maintaining the www.ripple-effects.com website, distributing tools and articles to municipalities, community groups, and neighborhood associations, and providing presentations to focused audiences. Specific goals include promoting beneficial onsite reuse of leaves and grass clippings, proper use of lawn and garden fertilizers and pesticides, and promoting infiltration of residential stormwater runoff from rooftops, driveways, and sidewalks.

Groundwater Impacts

Without effective mitigation practices, as natural areas are converted to urban development, the ground/surface water balance in streams and wetlands shifts from a groundwater-dominated system to one dominated more and more by surface water runoff. This can result in subsequent reductions in stream quality and transitions to more tolerant biological communities.

Groundwater modeling indicates that the cumulative effects of well withdrawals have resulted in a 2.9 cfs decrease in baseflow in Sixmile Creek at the confluence with Dorn Creek (see location Map 3) from predevelopment (no pumping) to 2010 (Table 1). An additional 1.0 cfs decline compared to 2010 conditions is anticipated for the year 2040, according to modeling, reducing the baseflow to 17.9 cfs.

Table 1 Modeled Baseflow Results Due to Current and Anticipated Future Municipal Well Water Withdrawals (All Municipal Wells)			
Stream	No Pumping	2010	2040
<i>Sixmile Creek</i>	<i>21.8 cfs</i>	<i>18.9 cfs</i>	<i>17.9 cfs</i>

The loss of baseflow from the cumulative effects of well water pumping is a regional issue, beyond the boundaries of a single USA Amendment or even a single municipality. This issue is discussed along with potential management options in the updated *Dane County Groundwater Protection Planning Framework* ([link to report](#)). Maintaining pre-development groundwater recharge by infiltrating stormwater runoff helps to replenish groundwater, maintain baseflow, and mitigate this impact. The current statutory requirement to infiltrate 90% of the predevelopment average annual rainfall will still apply.

Comments at the Public Hearing

A public hearing was held on the proposed amendment at the May 11, 2023, meeting of the Capital Area Regional Planning Commission. The Village of Waunakee Community Development Director, consulting engineer for the Village, and the engineering consultant for the proposed development gave an overview and spoke in favor of the amendment. There were no registrants attending the public hearing opposed to the amendment. There was one written comment received prior to the meeting, which is included as Attachment 1. Commissioners inquired about State Statute 281(33)(6)(a), the proposed stormwater management plan for the development, design alternatives, and stormwater standards. Staff addressed these questions and comments during the public hearing or have attempted to address them within this report.

Conclusions and Staff Water Quality Recommendations

The proposed application seeks to remove condition (1)(e) of CARPC Resolution No. 2017-21 or amend it to be consistent with current statutory requirements related to stormwater infiltration. No other conditions of Resolution 2017-21 are proposed to be amended. The currently proposed development is substantially consistent with the original amendment application, although minor updates to the environmental corridor are being made based on updated development plans.

Since 2002, there have been stormwater management standards in effect at the state, county, and local level to require stormwater management and erosion control plans and structural best management practices designed to address the impacts of development on water quality, runoff volumes, peak flows, water temperature, and groundwater recharge. In 2011, county and local standards for runoff volume control were increased beyond state standards to further address the potential stormwater impacts of development. Since 2010 many communities adopted even higher standards for volume control through their own ordinances or as part of urban service area amendment agreements. In 2017, State statute 281.33(6)(a)(1) was changed to limit the ability of local governments to adopt higher standards for runoff volume through local ordinances. In response to climate change, the City of Madison adopted peak rate control for the 200-year storm event in their ordinance in June 2020. Dane County adopted this same

peak rate control requirement as well as requirements for closed basins in November 2021, which made these requirements universal to all communities in Dane County. The prior condition proposed to be removed exceeds the current statutory requirements for volume control.

The Village of Waunakee proposes to mitigate the urban nonpoint source impacts of the proposed development by requiring the implementation of stormwater best management practices that are designed and constructed to meet current applicable Dane County standards for pollutant reduction, runoff volumes, peak flows, water temperature, and groundwater recharge to address the potential urban nonpoint source impacts of the proposed development on the receiving waters.

It is the Regional Planning Commission staff's opinion that the proposed amendment is consistent with water quality standards under Wisconsin Statute 281.15, and the adopted Policies and Criteria for the Review of Sewer Service Area Amendments to the *Dane County Water Quality Plan*, with the applicable state and local requirements identified below. Additional actions have also been recommended below to further improve water quality and environmental resource management.

State and Local Requirements

Regional Planning Commission staff recommends approval of this amendment, based on the land uses and services proposed, and in recognition of the state and local requirements for the following:

1. State and local review and approval of stormwater management plan(s) is required, including Regional Planning Commission staff review and approval as part of the sewer extension review process.
 - a. Stormwater and erosion control practices are required to be installed prior to other land disturbing activities. Infiltration practices are required to be protected from compaction and sedimentation during land disturbing activities.
 - b. Peak rates of runoff are required to be controlled for the 1-, 2-, 10-, 100-, and 200-year 24-hour design storms to "pre-development" levels, in accordance with the Village of Waunakee and Dane County Stormwater Ordinances.
 - c. Sediment control is required that achieves at least 80% sediment control for the amendment area based on the average annual rainfall, with a minimum of 60% of that control occurring prior to infiltration for residential land uses and 80% occurring prior to infiltration for commercial, industrial, and institutional land uses, in accordance with the Village of Waunakee and Dane County Stormwater Ordinances.
 - d. Runoff volume control is required that maintains the post development stay-on volume to at least 90% of the pre-development stay-on volume for the average annual rainfall period, in accordance with the Village of Waunakee and Dane County Stormwater Ordinances.
 - e. Maintaining pre-development groundwater recharge rates from the Wisconsin Geological and Natural History Survey's 2012 report, *Groundwater Recharge in Dane County, Wisconsin, Estimated by a GIS-Based Water-Balance Model* (a range of 9 to 10 inches/year) for the amendment area or by a site-specific analysis, when required by the Village of Waunakee and Dane County Stormwater Ordinances.
 - f. Treat the first one-half inch of runoff to provide oil and grease control using the best available technology for commercial, institutional, and any other land uses where the potential for pollution by oil or grease, or both, exists. This is consistent with the standards currently required by Dane County and Village of Waunakee ordinances.

2. Easements and perpetual legal maintenance agreements with the Village, to allow the Village to maintain stormwater management facilities if owners fail to do so, are required for any facilities located on private property.
3. Environmental corridors are required to be delineated to meet the Environmental Corridor Policies and Criteria adopted in the *Dane County Water Quality Plan*.

Additional Agreements

In addition to the existing state and local requirements, the Village of Waunakee and development team have agreed to pursue the following water resource management measures for the amendment area:

1. Removal of condition 1(e) from CARPC Resolution No. 2017-21, which stated:

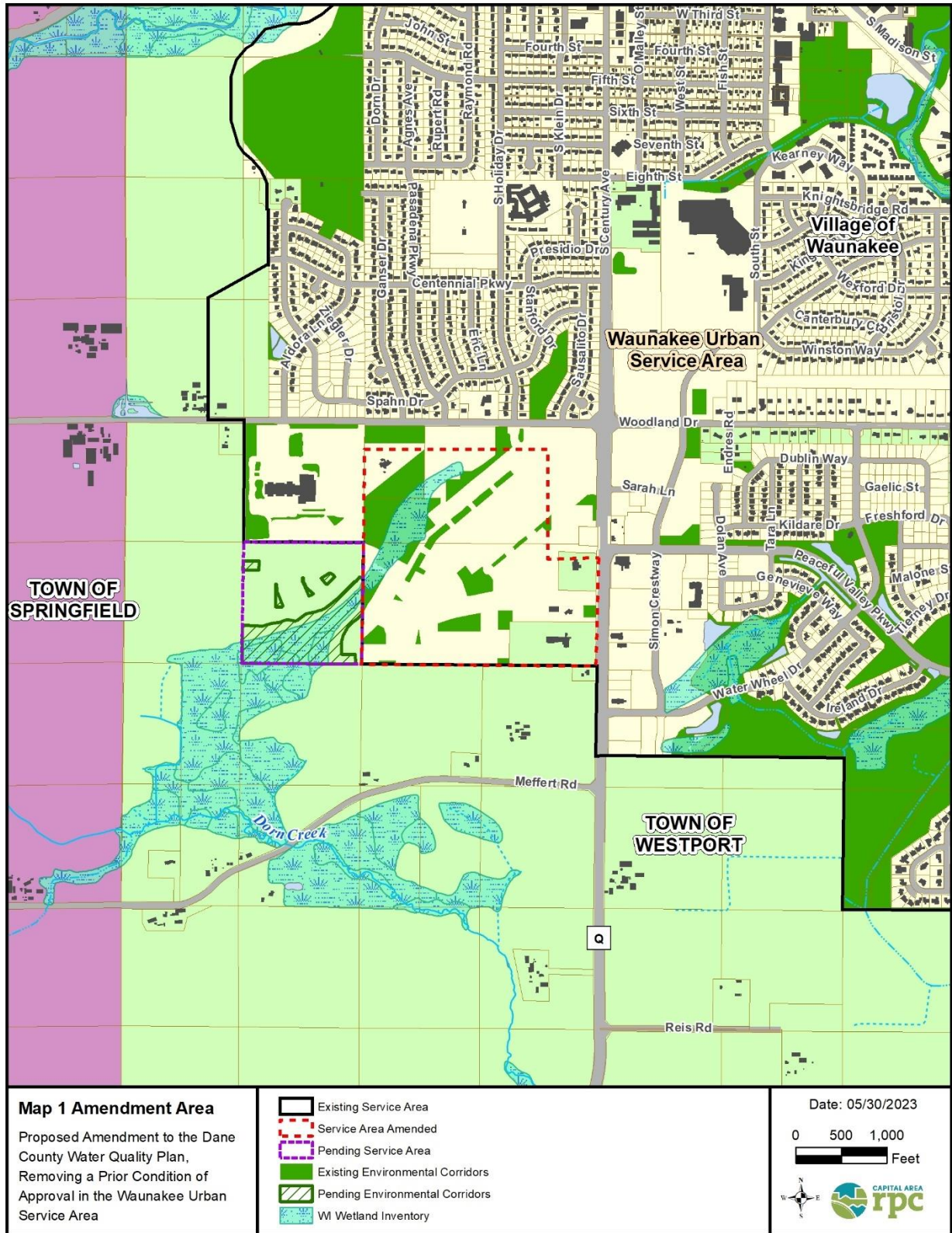
“Infiltrate 100% of the increased post-development runoff volume from the 100-year, 24-hour design storm in accordance with the Town of Westport Stormwater Ordinance.”

Recommendations

It is recommended that the Village of Waunakee pursue the following to further improve water quality and environmental resource management:

1. Continue to participate in regional water quality initiatives including Wisconsin Salt Wise, the Madison Area Municipal Storm Water Partnership, and Yahara WINs.
2. Promote the use of small-scale, green infrastructure stormwater practices, such as private rain gardens, downspout disconnection, porous pavements, and rainwater harvesting, to further increase the volume of infiltration achieved within the proposed development.

Map 1 – Amendment Area



Map 2 Aerial (2022)

Proposed Amendment to the Dane County Water Quality Plan,
Removing a Prior Condition of
Approval in the Waunakee Urban
Service Area

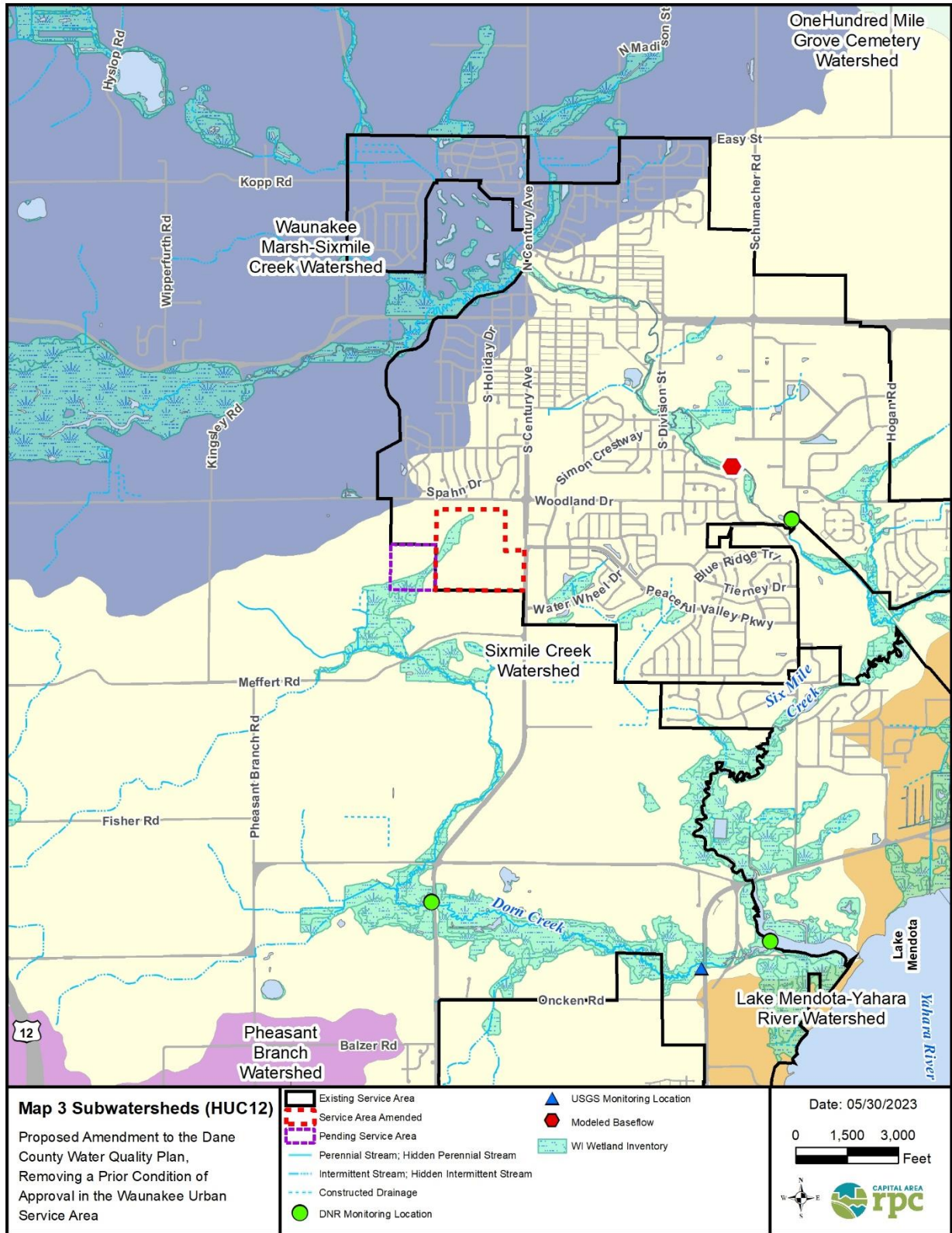
- Existing Service Area
- Existing Environmental Corridors
- Service Area Amended
- Pending Service Area
- Pending Environmental Corridors

Date: 05/26/2023

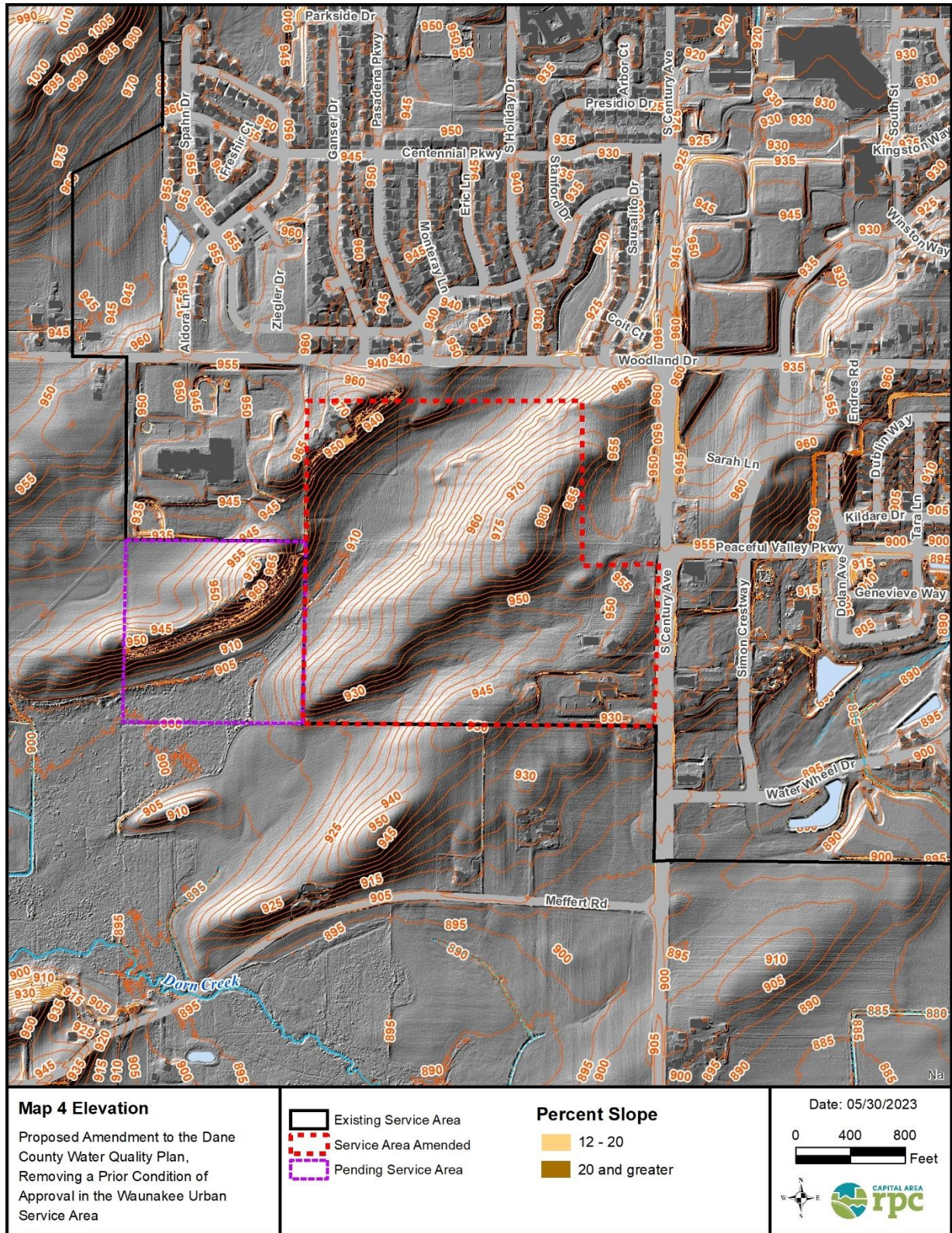
0 500 1,000 Feet

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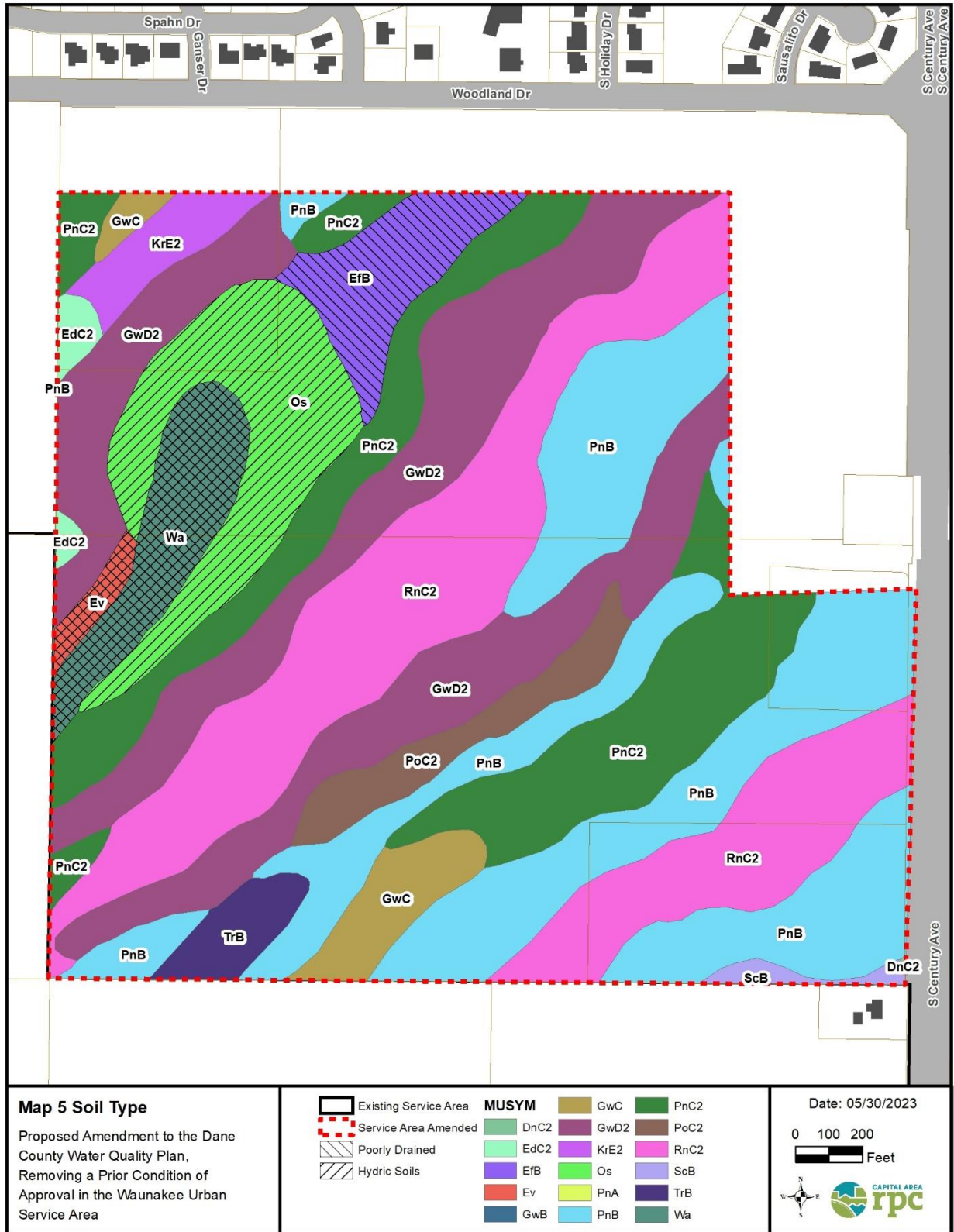
Map 3 – Subwatersheds



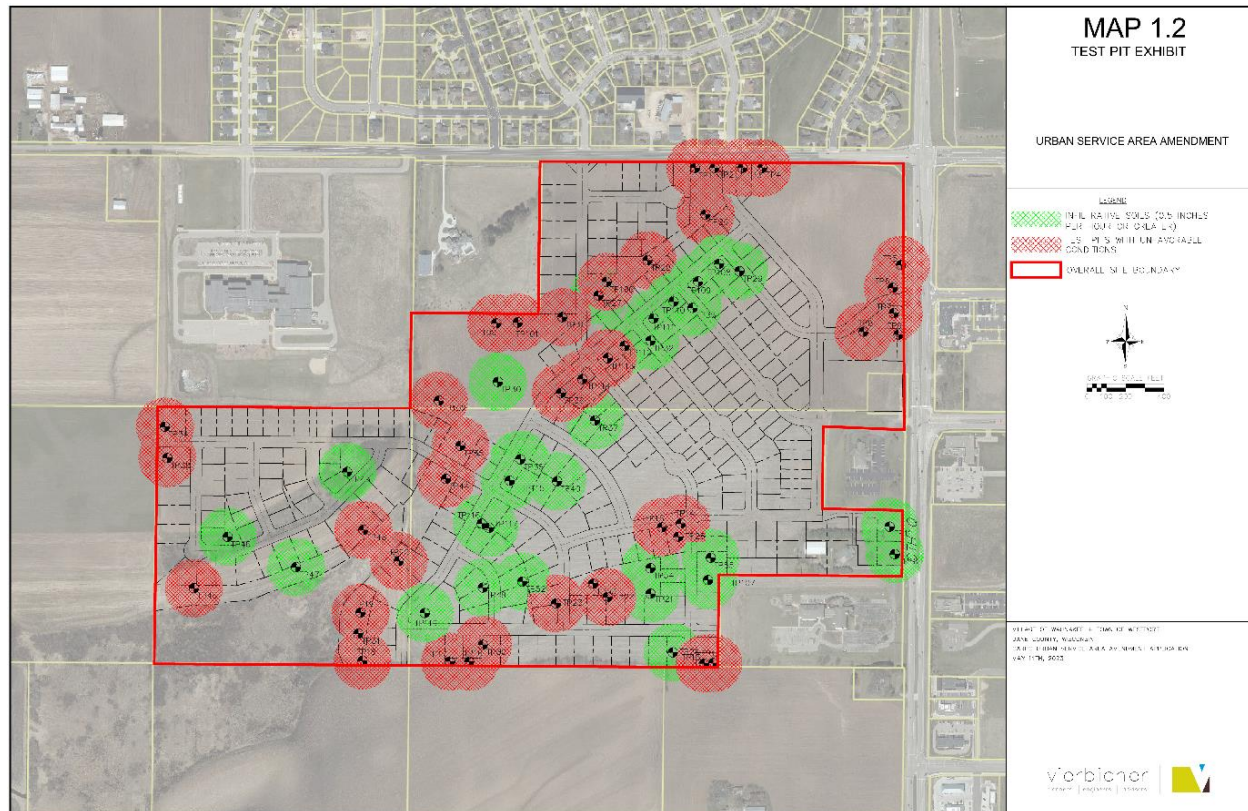
Map 4 – Elevations



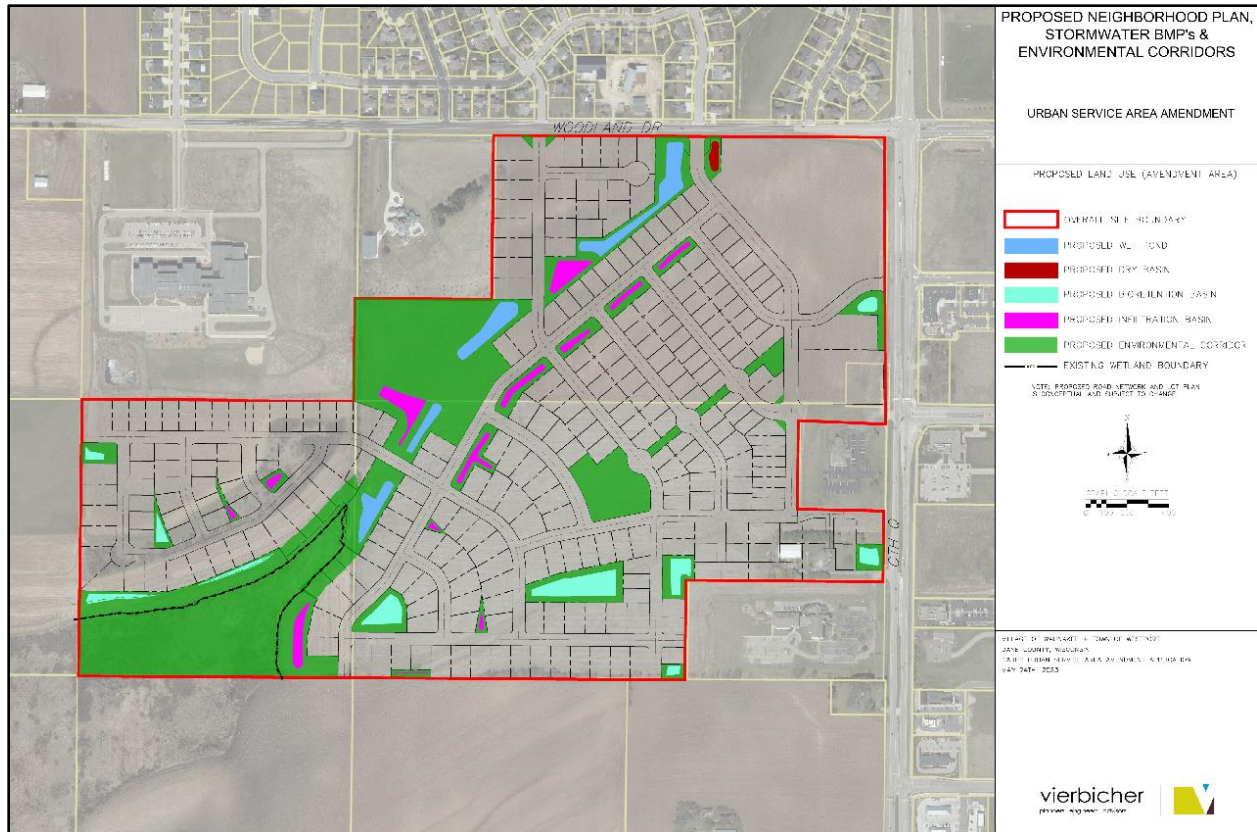
Map 5 - Soil Type



Map 6 – Geotechnical Soils Investigation



Map 7 – Proposed Stormwater Management



Map 8 – WGNHS Bedrock Depth and Potential Karst Features

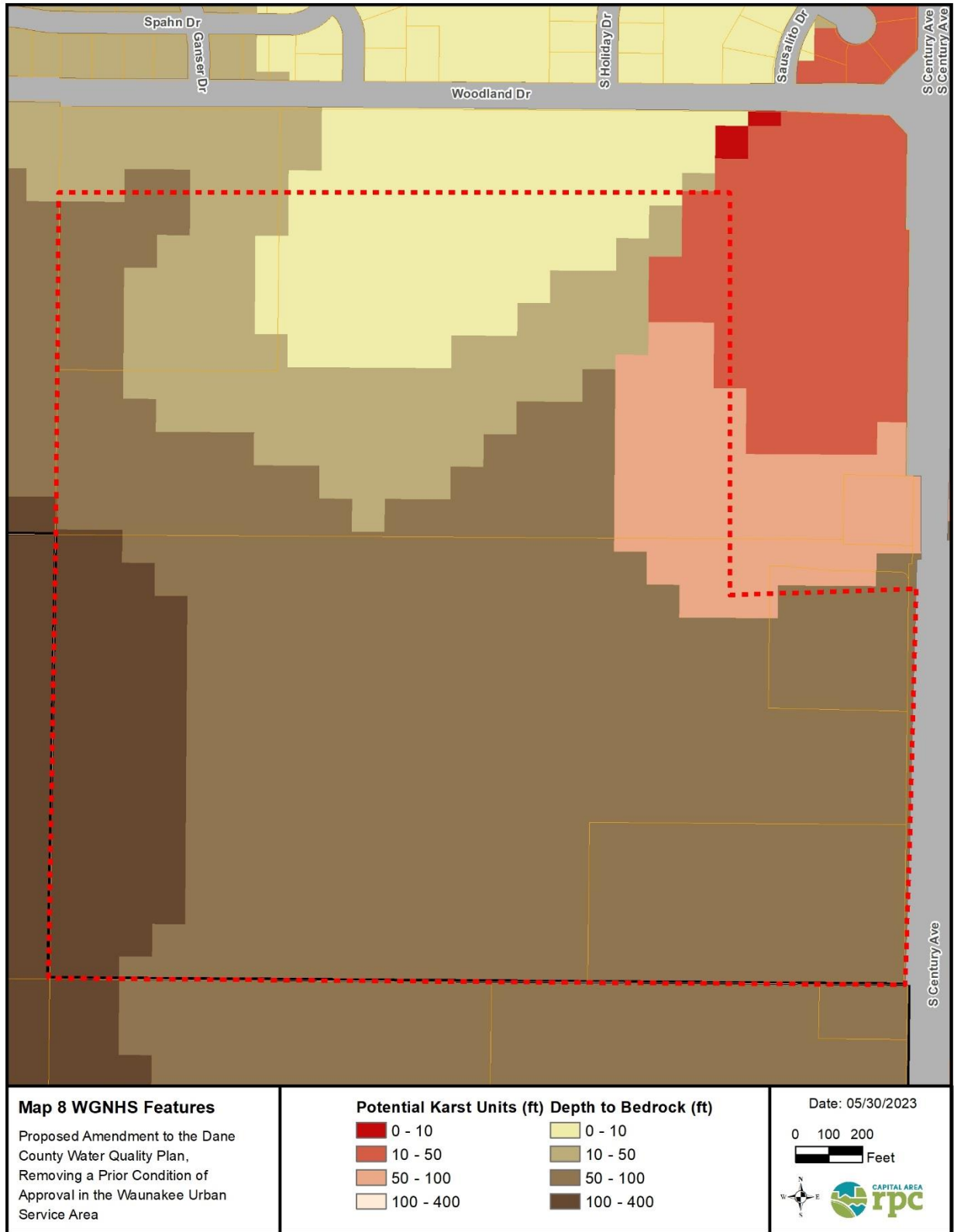
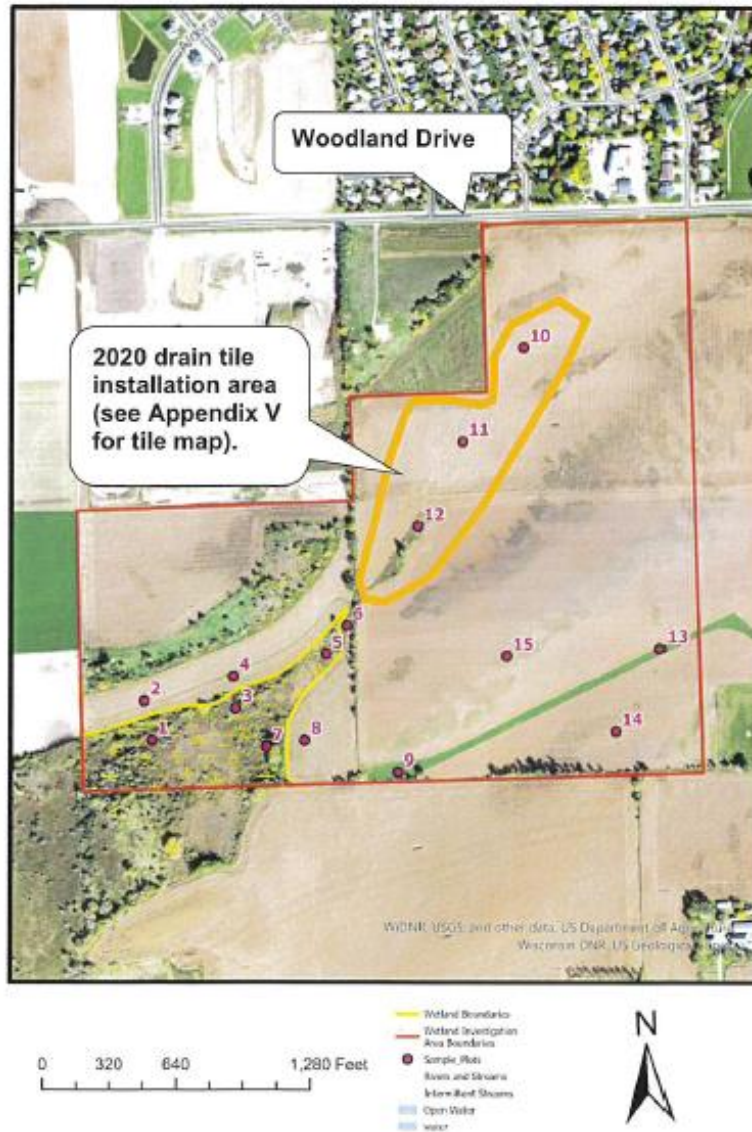


Figure 2: Investigation Area, Wetlands & Sample Plots.
Imagery Source: National Agricultural Imagery Program, 2015.



Attachment 1 – Written Public Comments

From: [Tom Mathies](#)
To: [Info](#)
Subject: Village of Waunakee USAA
Date: Thursday, May 11, 2023 2:25:08 PM

Dear Commissioners,

I am unable to attend your meeting this evening but would like to submit comments.

For this evening's public hearing, the Village of Waunakee's USAA application states:

... the Village does not believe condition (1)(e) is enforceable pursuant to 2017 Wisconsin Act 243. Per Wisconsin Statute 281.33(6)(a)(1), a Village cannot "require more than 90% of the difference between the pre-development annual runoff volume at a site and the post-development annual runoff volume at a site to be retained on site."

The application omits part of the statute:

(a) Notwithstanding subs. (3) and (3m), a **city, village, town, or county** may enact and enforce provisions of an **ordinance** that are stricter than the uniform standards for storm water management established by the department under this section if the stricter provisions are necessary to do any of the following:

1. Control storm water quantity or peak flow to address existing flooding problems or prevent future flooding problems, except that an ordinance under this subdivision may not require more than 90 percent of the difference between the pre-development annual runoff volume at a site and the post-development annual runoff volume at that site to be retained on site.

<https://docs.legis.wisconsin.gov/statutes/statutes/281/iii/33/6/a>

Taken at face value, this statute applies only to an ordinance enacted by a city, village, town, or county.

The application does not explain how this statute would constrain a DNR decision or why DNR action would be needed to amend a local ordinance.

If you determine that this statute is relevant to your decision then I request that you include your reasoning for such a determination. Such a determination could set a precedent for future amendments.

I am not writing in support of or opposition to this USAA application. You may find other grounds to recommend approval or denial of this application.

Sincerely,

Tom Mathies
Town of Verona Resident