June 1, 2021

Staff Analysis of Proposed Amendment to the *Dane County Water Quality Plan*, Revising the Sewer Service Area Boundary and Environmental Corridors in the Waunakee Urban Service Area

History of the Amendments to the Waunakee Urban Service Area

The Waunakee Urban Service Area was established in 1971 with the adoption of the first sewer service plan. The boundaries of the Waunakee Urban Service Area were cleaned up in 1977 and Environmental Corridors delineated in 1984/1985. The first amendment occurred in 1988. There have been 14 amendments to this service area since its creation totaling 1,481 acres of developable land and 652 acres of Environmental Corridor. Although it is not the case with the current request because it is outside the boundaries of the cooperative planning area, amendments to the Waunakee Urban Service Area have been made as a joint application by Waunakee and Westport. The most recent amendments of the service area by the Village were recommended by the Commission and approved by the WDNR in 2018: Emerald Grove Lane (#1801--single residential lot) and at Peaceful Valley Parkway (#1705) off of Highway Q.

Existing Conditions

Land Use

The Village of Waunakee is requesting amendment to the Waunakee USA east of its current business/industrial park southwest of the intersection of East Main Street (State Highway 19 and 113) and Hogan Road. The requested amendment area is identified in the Village of Waunakee and Westport Comprehensive Plan and is included in the Urban Footprint mapping of the Regional Development Framework's 2035 and 2050 growth scenarios. The area is roughly 20 acres in size and currently located within the Town of Westport. The Village has extra-territorial zoning jurisdiction over this area and plans to annex these lands in the near future. Planned future land use for the area is "Business Park," which allows office, industrial, manufacturing, and sales or service uses. The Village application notes that hotels are allowed conditionally as well. An agricultural implement dealership currently occupies a portion of the site. This business will remain in place and will not be connected to municipal services at this time.

Surrounding Planned Land Uses Include:

- North: Agricultural Preservation, Environmental Corridor
- West: Business Park
- South: Mixed-use, Residential
- East: Business Park

Table 1
Existing and Planned Land Use

Land Use Category	Existing Land Use Acres (see Map 3)	Proposed Land Use Acres (see Map 4)
Agriculture	7.5	
Commercial Retail and Service	12.4	16.3
Transportation, Utilities, Communication	0.0	1.3
Stormwater Management	0.0	2.5
Total	**19.9**	**19.9**

Cultural and Historic Sites

The Wisconsin Historical Society (WHS) has been contacted regarding the presence of any known archaeological sites or cemeteries within the amendment area. The Waunakee Urban Service Area amendment is not in proximity to wetlands, drainages, or other landscape features that are typical indicators of American Indian settlement and the parcel has been subjected to significant ground disturbance. WHS is not recommending a survey at this time. (Attachment 1).

Natural Resources

The proposed amendment area is in the Sixmile Creek watershed (HUC 070900020602; Map 5). No wetlands or 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) does not show wetland within or adjacent to the amendment area.

The wetland inventory shows excavated ponds belonging to the Village, emergent / wet meadow, and scrub / shrub wetlands downstream of the amendment area (Map 5). The 2008 Dane County Wetlands Resource Management Guide (link to report) classifies these downstream wetlands as Group V wetlands, wetlands that no longer exist or function as a wetland but has the potential to be restored. Further downstream, the wetlands associated with Sixmile Creek are classified as Group II wetlands. Group II wetlands have experienced some alteration but are particularly valuable for protecting the Yahara River and chain of lakes. The Group II wetlands are to be of the highest priority for protection.

Sixmile Creek
The proposed amendment area is within the Sixmile Creek watershed. Sixmile Creek is 12.08 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 DNR. The creek provides spawning areas for Lake Mendota's fish and offers a warm water sport fishery. The lower reach of the creek (from mile 0 to 8.5) is impaired for Total Phosphorus. There is a DNR monitoring station on Sixmile Creek at the Mill Road Bridge. Limited chloride monitoring results from that station indicated that chloride levels averaged 97 mg/L in 2011.

USGS baseflow monitoring indicated chloride levels of 43 mg/L in 2015-2016. Sixmile Creek has cool-cold and cool-warm main stem natural communities.

Springs

Springs represent groundwater discharge visible to the casual observer. The Wisconsin Geological and Natural History Survey (WGNHS) maintains an inventory of springs in Dane County, and throughout the state, based on field surveys conducted between 2014 and 2017. For the purposes of the inventory, a spring is defined as a discrete point of groundwater discharge flowing at approximately 0.25 cubic feet per second or more at the time of the survey. Neither the proposed amendment area nor the surrounding Sixmile Creek watershed contain inventoried springs.

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 Mill Road (see location on Map 5) has decreased from 9.1 cfs during pre-development conditions (no well pumping) to 7.6 cfs in 2010 (Table 4). This decrease is due to the combined impacts of high capacity well groundwater withdrawals contributing to reduced stream baseflow. For example, Waunakee wells withdraw groundwater that would otherwise flow downgradient towards the Sixmile Creek system. By 2040 at the same locations, flow is modeled to decrease to 7.1 cfs. This decrease is due to increased pumping to serve a growing population.

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 rare plants, animals, or natural communities within a 1to 2-mile radius of the amendment area. A 1-mile buffer was considered for terrestrial and wetland species and a 2-mile buffer for aquatic species.

The amendment area is within the High Potential Zone (species likely present) for the federally endangered Rusty Patched Bumble Bee. Section 7 of the Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service when any action that is carried out, funded, or permitted by a federal agency may affect a federally listed endangered or threatened species. However, much of the proposed amendment area currently consists of disturbed ground and row crops and is not considered to be suitable habitat for the Rusty Patched Bumble Bee. The WDNR typically recommends that projects within the High Potential Zone include native trees, shrubs, and flowering plants; plants that bloom spring through fall; and the removal and control of invasive species in any habitat used for foraging, nesting, and overwintering. The USFWS developed a list of plants favored by Rusty Patched Bumble Bee (link to list). Implementing these conservation measures should be coordinated with the WDNR Endangered Resources Review Program, as needed.

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,

Surface elevations within the amendment area range from around 932 feet to 957 feet. There are some small isolated areas of steep (> 12%) and very steep (>20%) slopes along the southwest and southeast edges, primarily associated with road embankments (Map 6). These

small areas of steep slopes are not riparian and do not require inclusion in environmental corridors.

According to the Natural Resource Conservation Service (NRCS) Soil Survey of Dane County, the soils in amendment area are in Dodge – St. Charles - McHenry association. These soils are moderately well drained and well drained, deep silt loams. Table 2 shows detailed classification for soils in the amendment area (Map 7) while Table 3 shows important soil characteristics for the amendment area.

There are no hydric soils within the amendment area (see Map 7). Hydric soils are good indicators of existing and former (drained) wetlands.

According to the Soil Survey Geographic data for Dane County developed by the USDA Natural Resources Conservation Service (link to web soil survey), the Plano, Griswold, Dodge, and McHenry soils (the PnB, GwC, DnB, and MdC2 map units) do not have a seasonal (April to June) zone of water saturation within 5 feet of the ground surface. These soils are all classified as well drained.

Table 2
Soils Classification

Soil	% of Area	General Characteristics
Plano Silt Loam; PnB	92.2	Deep, well drained and moderately well drained, nearly level to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses slight limitations for development due to shrink/swell potential and low bearing capacity.
Griswold Loam, GwC	4.6	Deep, well-drained gently sloping to moderate steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and a severe hazard of erosion. Poses moderate limitations for development due to bearing capacity and shrink/swell potential.
Dodge Silt Loam; DnB	1.8	Deep, well drained, gently sloping and sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate to severe hazard of erosion. Poses moderate limitations for development due slope and shrink/swell potential.
McHenry Silt Loam; MdC2	1.4	Deep, well drained, gently sloping to moderately steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and a moderate to severe hazard of erosion. Poses slight to moderate limitations for development due to slope, shrink/swell potential and low bearing capacity.

Source: Soil Survey Geographic data for Dane County developed by the USDA Natural Resources Conservation Service

Table 3
Soils Characteristics

Characteristic	Soil Map Symbols (see Map 7)	% of Area
Prime Agricultural Soils	DnB, PnB	94.0
Hydric Soils (Indicates Potential / Restorable Wetlands)	None	0
Poorly Drained Soils with Seasonal High Water Table (< 5')	None	0
Soils Associated with Steep Slopes (> 12%)	None	0
Soils Associated with Shallow Bedrock (< 5')	None	0
Best Potential for Infiltration in Subsoils	DnB, GwC, MdC2, PnB	100.0

Source: Soil Survey Geographic data for Dane County developed by the USDA Natural Resources Conservation Service

According to WGNHS data, bedrock within the western portion of the amendment area is in the Trempleau Group. Bedrock in the Trempealeau Group is quartz sandstone, dolomitic siltstone, silty dolomite, and sandy dolomite, consists of two formations including the Jordan and underlying St. Lawrence Formations, which were combined as one mapping unit. Thickness is about 75 feet, where not eroded. The eastern portion of the amendment area is in the Tunnel City Group. Bedrock in the Tunnel City Group is medium to very fine-grained quartz sandstone, locally very glauconitic, and consists of two formations including the Lone Rock and Mazomanie Formations. Thickness is up to 150 feet. According to WGNHS data, the depth to bedrock in the amendment area ranges from less than 10 feet to 50-100 feet, with the shallowest depths being in the west-central and deepest depths being in the southeast 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. Karst features such as vertical fractures and conduits provide primary pathways for groundwater movement and can dramatically increase groundwater susceptibility when present. The location of karst features is difficult to predict, and the thickness and type of the overlying soil greatly affects how much water drains into them. Where clay soils are thick, infiltration rates are likely to be very low. However, where bedrock fractures are near the surface infiltration rates can be very high. Based on the WGNHS karst potential data, karst features may be encountered in the western part of the amendment area, where the stormwater facilities are proposed to be located, at depths ranging from about 0 to 18 feet. The Wisconsin Department of Natural Resources Conservation Practice Standard 1002 - Site Evaluation for Stormwater Infiltration requires field verification for areas of the development site considered suitable for infiltration. This includes a site assessment for karst features in this area. If shallow karst features are found, adequate protection measures are required to address any potential for groundwater contamination.

There is no minimum separation distance for roofs draining to surface infiltration practices. However, the Dane County ordinance requires infiltration practices 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 for residential arterial roads and 3 feet for other impervious surfaces. 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.

Proposed Urban Services

Parks and Open Space

There are no proposed parks as part of the amendment area. There is a total of 2.5 acres of stormwater management areas proposed in the western part of the amendment area (see Map 4).

Water System

The Waunakee Water and Light Commission provides municipal water through five high-capacity wells (Map 10). Well #1 (505' depth) has a capacity of 650 gallons per minute (gpm). Well #2 (420' depth) and Well #3 (600' depth) both have a capacity of 1,100 gpm. Well #4 (700' depth) has a capacity of 1,200 gpm. Well #5 (752' depth) has a capacity of 1,000 gpm. In total, the gross capacity of the municipal wells is approximately 5,050 gpm (7.24 million gallons per day, MGD). The firm capacity (with the largest well assumed to be out of service) is approximately 3,850 gpm (5.51 MGD). The Village has four elevated storage tanks and one ground-level reservoir, with a combined capacity of 1.35 million gallons. According to the 2019 Annual Report to the Public Service Commission of Wisconsin (2019 Annual Report), the Village pumped an average of 844 gpm (1.22 MGD), approximately 22% of its firm pumping capacity). In 2019, the maximum amount pumped in any one day was 2.44 MGD, which is reported to be due to extreme weather conditions. According to the Village's application, current average daily demand on the system is 1,079,200 gpd (1.08 MGD) and the estimated

peak hourly demand is 3,750 gpm, based on a peak daily demand factor of 2.5 (ratio of maximum day to average day) and a peak hourly demand factor of 2.0 (ratio of maximum hour to average hour).

In 2019, total water losses accounted for an average of 135,167 gpd (0.14 MGD), approximately 11% of the total water pumped, with most of this coming from unreported and background leakage. From 2015 to 2019, water losses in the Village's distribution system ranged from 9% to 18%. The Wisconsin Administrative Code PSC 185.85(4)(b) requires a utility with more than 1,000 customers to submit a water loss control plan to the Public Service Commission if the utility reports its percentage of water losses exceed 15%. In 2019, there were two main breaks and three service breaks.

Water service within the proposed amendment area will be provided by a new 8-inch-diameter water main extended westward in the proposed right-of-way, connecting from an existing 8-inch water main in Hogan Road. The Village estimates that the average daily water demand for the amendment area will be 16,130 gpd, with a peak demand of 40,325 gpd (0.04 MGD). This assumes 1,000 gallons/acre (commercial use) per day and a peak daily demand factor of 2.5. The peak hourly demand is estimated to be 56 gpm, based on a peak hourly demand factor of 2.0.

Wastewater

Sanitary sewer service will be provided to the proposed amendment area by connection to the Village's existing sanitary sewer collection system. The northernly proposed commercial lots (northern basin) will be served by a 10" sanitary sewer running across multiple currently undeveloped parcels and connecting to the Village's Industrial Park Interceptor Sewer (IPIS) north of Lillian Street. The southernly proposed lot (southern basin) will be served by the existing 8" sanitary sewer main in Hogan Road, which ultimately discharges to the IPIS. It is anticipated that development within the amendment area will connect to these sewers through gravity fed mains and laterals. From the Village's system, wastewater will flow via the Northeast Interceptor-Waunakee Extension sewer pipe to Madison Metropolitan Sewerage District's (MMSD's) Pumping Station 14, then eventually to the Nine Springs Treatment Facility.

The amendment area consists of 16.13 ac of planned commercial area contributing to wastewater flows. The Village estimates the amendment area will generate an annual average daily flow of 16,130 gpd (11 gpm) of wastewater, which assumes 1,000 gpd per acre for commercial development based on the Sanitary Sewer Comprehensive Plan for the Village of Waunakee, prepared by Strand Associates in 2018 (hereinafter referred to as Sanitary Sewer Comprehensive Plan). Of this total flow, the northern subbasin will contribute 6,260 gpd and the southern subbasin will contribute 9,870 gpd. With a peaking factor of 4.0, peak wastewater flow is estimated to be 64,520 gpd (45 gpm), with the northern subbasin contributing 25,040 gpd (17 gpm) and the southern subbasin contributing 39,480 gpd (27 gpm).

The proposed 10" sanitary sewer is anticipated to have a minimum capacity of 507 gpm, assuming a slope of 0.28% (minimum allowable per NR 110). The existing 8" sanitary sewer in Hogan Road has a calculated capacity of 332 gpm, assuming an existing slope of 0.40% (minimum allowable per NR 110). The amendment area will be the only source of wastewater flows to these sewers at this time. Both receiving sewers have capacities well above the anticipated average daily flows and peak daily flows from the contributing subbasins within the amendment area.

The reported average daily flow to the IPIS corresponding to the current level of development in the sewershed is 270 gpm (388,500 gpd), according to the Sanitary Sewer Comprehensive Plan and as referenced in the application. According to correspondence with Strand Associates, an assessment of the sewers in the area was completed in 2021 to verify sewer sizes, slopes, and flows. During flow monitoring of the IPIS completed by Strand Associates from March 16, 2021 to April 19, 2021, actual peak flows of approximately 250 gpm were recorded, indicating that the flow projections contained in the Sanitary Sewer Comprehensive Plan may be conservative. The reported capacity of the limiting segment of the IPIS is 680 gpm, according to the Sanitary

Sewer Comprehensive Plan and as referenced in the application. However, according to the 2021 assessment, the actual capacity of the 15" IPIS sewer was calculated to be approximately 900 gpm. It is believed that the original assumptions that went into the capacity calculations in the Sanitary Sewer Comprehensive Plan were overly conservative. The additional estimated flow from the amendment area is not expected to exceed the capacity of the IPIS sewer under current development conditions.

The estimated future daily peak flow to the IPIS from the existing sewershed upon full development is 740 gpm, according to the Sanitary Sewer Comprehensive Plan. Including the daily peak flow of 45 gpm from the amendment area, the future estimated daily peak flow to the IPIS is approximately 785 gpm. As supported by the aforementioned flow monitoring, the Village reports that the existing businesses in the business park are generating less wastewater flows than was projected in the Sanitary Sewer Comprehensive Plan. Nonetheless, upon full development of the existing sewershed and amendment area, it is anticipated that wastewater flows may approach or even exceed the capacity of the limiting segment of the IPIS. The Village is aware of this potential issue and will continue to monitor actual sewer flows.

Wastewater Treatment Facility

Madison Metropolitan Sanitary District (MMSD) will provide wastewater treatment for the amendment area. The Nine Springs Treatment Facility has a design capacity of 56.0 million gallons per day (mgd) and received an average influent hydraulic loading of 46.0 mgd (82% of design capacity) in 2019, including infiltration and inflow. It is expected to reach 90 percent of current hydraulic design capacity around 2026 based on current projected growth rate assumptions. This currently occurs on occasion, with flows exceeding 90 percent design capacity in October of 2019. MMSD has completed a long-range plan that evaluated various options for expanded treatment capacity to serve its current and future service area. For the 20-year planning period, treatment for this area is expected to remain at the existing wastewater treatment facility location with expanded capacity of the system as the need is foreseen.

Wastewater treatment at the district's Nine Springs Treatment Facility does not remove chloride and the concentration of chloride that arrives at the plant does sometimes exceed the water quality standard. In 2015, AECOM completed a study for MMSD which determined that while possible, treatment would be cost-prohibitive, energy intensive, and involve other environmental impacts (link to report). MMSD's Wisconsin Pollutant Discharge Elimination System (WPDES) permit requires pollution prevention and source reduction initiatives for chlorides, such as the Wisconsin Salt Wise Partnership (link to website).

MMSD has not had issues meeting its other WPDES permit limits for the quality of effluent discharged to Badfish Creek and Badger Mill Creek, according to their 2019 Compliance Maintenance Annual Report (CMAR) (link to report). Effluent quality summarized here refers to Badfish Creek, where nearly all (97%) discharge is released. Below is a summary of the major effluents reported on in the 2019 CMAR:

- The effluent biological oxygen demand (BOD) quality for 2019 was below the monthly average limit, with a monthly average of 5.8 mg/L (31% of the limit) and a maximum of 9 mg/L (47% of the limit) for the months of February and March.
- The effluent total suspended solids (TSS) quality for 2019 was well below the monthly average limit, with a monthly average of 4.9 mg/L (25% of the limit) and a maximum of 6.0 mg/L (30% of the limit) for the months of January and July.
- The effluent ammonia (NH_3) quality for 2019 was well below the monthly average limits (limits vary by month), with a monthly average of 0.31 mg/L (4-17% of the limit) and a maximum of 0.71 mg/L (17% of the limit) for the month of March.
- The effluent phosphorus (P) quality for 2019 was well below the monthly average limit, with a monthly average of 0.28 mg/L (18% of the limit) with a maximum of 0.34 mg/L (23% of the limit).

In the case of phosphorus, the effluent was below the current 1.5 mg/L permit limit but not low enough to meet future water quality-based effluent limits (WQBEL) for phosphorus. MMSD has implemented a Watershed Adaptive Management approach, leading a diverse group of partners called Yahara Watershed Improvement Network (Yahara WINs) in implementing phosphorus reducing practices in the watershed (link to website). This adaptive management approach is currently limited to the Yahara Watershed.

Stormwater Management System

The Village of Waunakee stormwater management and performance standards are contained within Chapter 109 of the Village of Waunakee Code of Ordinances. The Village contracts with Strand Associates for stormwater management plan review. Dane County Code of Ordinance, Chapter 14, contains stormwater management and performance standards which apply to all areas of Dane County. The amendment area will be required to follow the more stringent standards contained within the respective ordinances, as well as Wisconsin DNR requirements contained in NR 151 and 216.

Preliminary conceptual stormwater management for the amendment area consists of a privately-owned system of stormwater basins located in the low-lying, mid-western portion of the amendment area, straddling the proposed public roadway. The proposed basins are intended to meet all local and state requirements for the amendment area, while offsite runoff which enters the area will bypass the proposed system and be conveyed in a 60" storm sewer pipe along the proposed right-of-way. Both the onsite stormwater discharge and the offsite bypass will leave the amendment area at the western edge of the amendment area and enter an existing floodway, which drains across adjacent private properties to an unnamed tributary of Sixmile Creek. The Village does not anticipate impacts to the downstream drainage patterns, and it has been reported that the downstream property owners have been made aware of the future development plans. The proposed stormwater management facilities will be maintained by the owner(s) and a maintenance agreement will be recorded with the Dane County Register of Deeds.

Detailed stormwater management plans will need to be prepared for review and approval prior to beginning any development construction. These plans will be required to meet all stormwater management and performance standards of the Village of Waunakee, as well as those of Dane County and Wisconsin Department of Natural Resources.

Performance Standards

The Village proposes stormwater management measures to meet or exceed standards required by the State of Wisconsin (NR 151), Dane County (Chapter 14), Village of Waunakee (Chapter 109) stormwater regulations, as follows:

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 a minimum of 80% occurring prior to infiltration for commercial, industrial, and institutional land uses) for the 1-year, 24-hour design storm. This is consistent with the standards currently required by Dane County.

2. Require post-construction peak runoff rate control for the 1-, 2-, 10-, and 100-year, 24-hour design storms (using NRCS MSE4 storm distributions) to match predevelopment peak runoff rates. This is consistent with the standards currently required by Dane County.

3. Require post-development infiltration (stay-on) volume of at least 90% of the pre-development infiltration (stay-on) volume for the average annual rainfall. This is consistent with the infiltration standard for new development currently required by Dane County regulations.

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.

5. Treat the first 0.5 inches of runoff to provide oil and grease control using the best available technology for commercial or industrial land uses and any other uses where the potential for pollution by oil or grease, or both, exists. This is consistent with the standards currently required by Dane County.

Impacts and Effects of Proposal

Environmental Corridors

There are no environmentally sensitive areas within or adjacent to the amendment area. The proposed amendment Area includes approximately 2.5 acres of environmental corridor for stormwater management areas (See Map 2).

Meeting Projected Demand

Interim CARPC projections (draft) for 2050 suggest that an additional 9,000 residents, 2,800 housing units, and 4,100 jobs can be expected in the Waunakee Urban Service Area over the next 30 years. Preliminary modeling in Urban Footprint for the Regional Development Framework shows over 80% of future employment growth within ¼ mile of the requested amendment area. As indicated in application, the Village sees the area as good fit for future retail that will serve the local population. Urban Footprint modeling shows 1,750 people (850 households) within ½ mile of the requested amendment area in 2050, almost all of which is planned development and not existing.

Phasing

The requested amendment is less than 100 acres. A phasing plan is not required. However, development of the two commercial lots with frontage along 19/113 is anticipated to occur within 10 years. There is currently no plan or timeline for sale and redevelopment of the implement dealership.

Surface Water Impacts

Development creates impervious surfaces (i.e., 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 (i.e., 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 bankfull 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 adopted higher standards for runoff volume through local ordinances.

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 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.

Regional partners are actively working to address chlorides through the Wisconsin Salt Wise Partnership. Participation in the chloride reduction trainings provided by WI Salt Wise is open to any municipality and private winter maintenance professional in the region. Village of Waunakee staff attended winter salt certification class for winter road maintenance in 2017.

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 1.5 cfs decrease in baseflow in Sixmile Creek at Mill Road (see location Map 5) from predevelopment (no pumping) to 2010 (Table 4). An additional 0.5 cfs decline compared to 2010 conditions is anticipated for the year 2040, according to modeling, reducing the baseflow to 7.1 cfs.

Table 4
Modeled Baseflow Results
Due to Current and Anticipated Future Municipal Well Water Withdrawals (All Municipal Wells)

Stream	No Pumping	2010	2040
Sixmile Creek	*9.1 cfs*	*7.6 cfs*	*7.1 cfs*

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 model developed for the 2014 WDNR report *Ecological Limits of Hydrologic Alteration in Dane County Streams* (link to report) no significant change in the fish community status from 2010 conditions is expected to occur as a result of the projected 2040 reduction in baseflow in Sixmile Creek.

Comments at the Public Hearing

A public hearing was held on the proposed amendment at the May 13, 2021 meeting of the Capital Area Regional Planning Commission. Representatives of the Village of Waunakee and the consultants for the proposed development registered in favor of the amendment. There were no registrants opposed to the amendment. Several Commissioners inquired about the proposed stormwater management plan and noted that current standards result in a higher volume of runoff post development compared to current conditions. Commissioner Minihan noted that the Village of Waunakee is a model for other communities of development that is not "developer driven".

Conclusions and Staff Water Quality Recommendations

There is sufficient existing treatment plant system capacity at MMSD to serve the proposed amendment area. There is also sufficient existing or planned wastewater collection system capacity to serve the proposed amendment area.

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 adopted higher standards for runoff volume through local ordinances.

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 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 Wis. Stat. § 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 existing 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-, and 100-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, 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. Oil and grease control are required that treats the first 0.5 inches of run-off using best management practices at commercial and industrial sites, in accordance with the Village of Waunakee and Dane County Stormwater Ordinances.

f. 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.

2. Field verification for areas of the development site considered suitable for infiltration including a site assessment for karst features is required by the Wisconsin Department of Natural Resources Conservation Practice Standard 1002 - Site Evaluation for Stormwater Infiltration.

3. 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. Stormwater management facilities shall be placed in public outlots whenever feasible and designated as environmental corridor to meet the Environmental Corridor Policies and Criteria adopted in the *Dane County Water Quality Plan*.

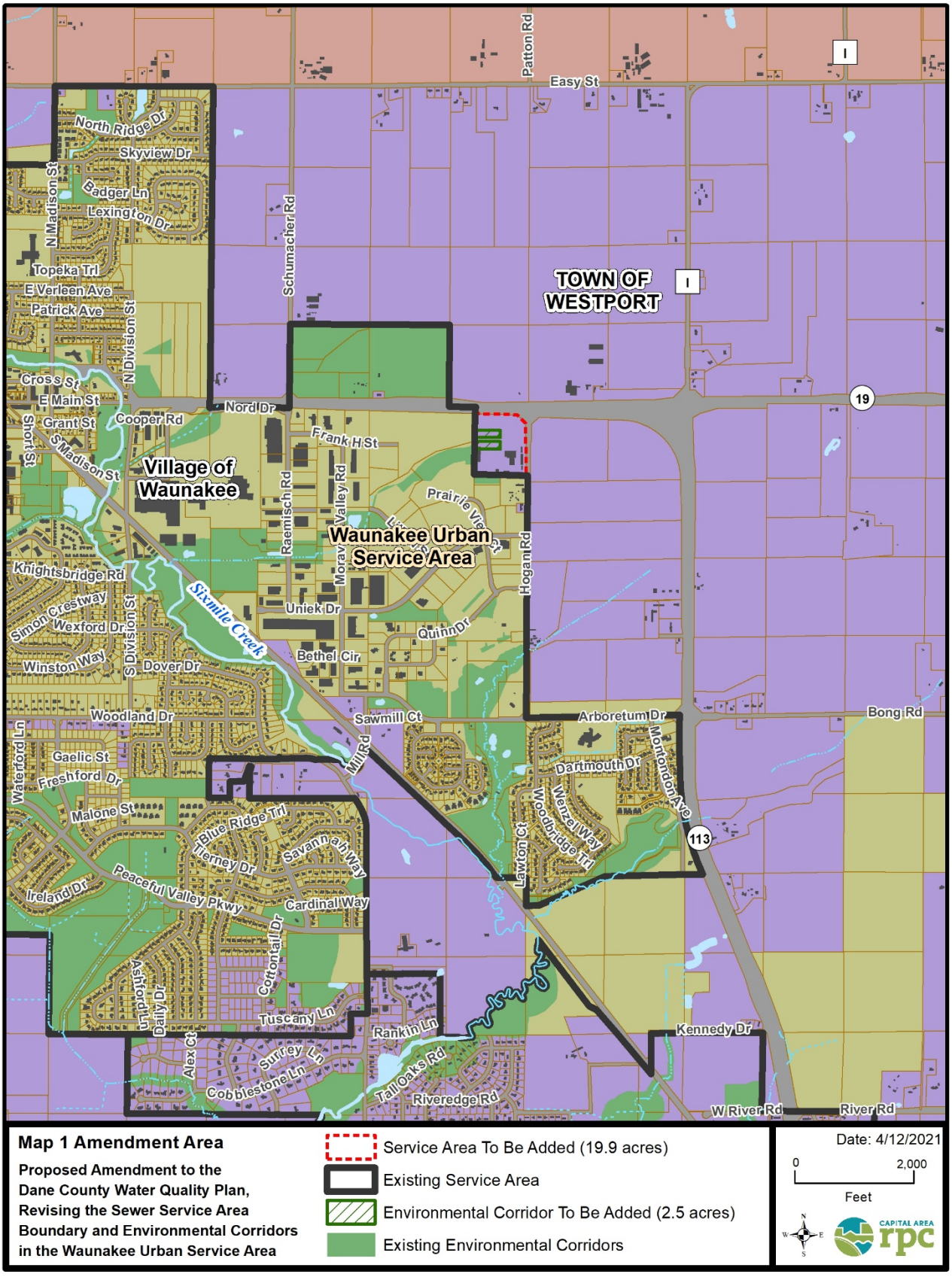
Recommendations

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

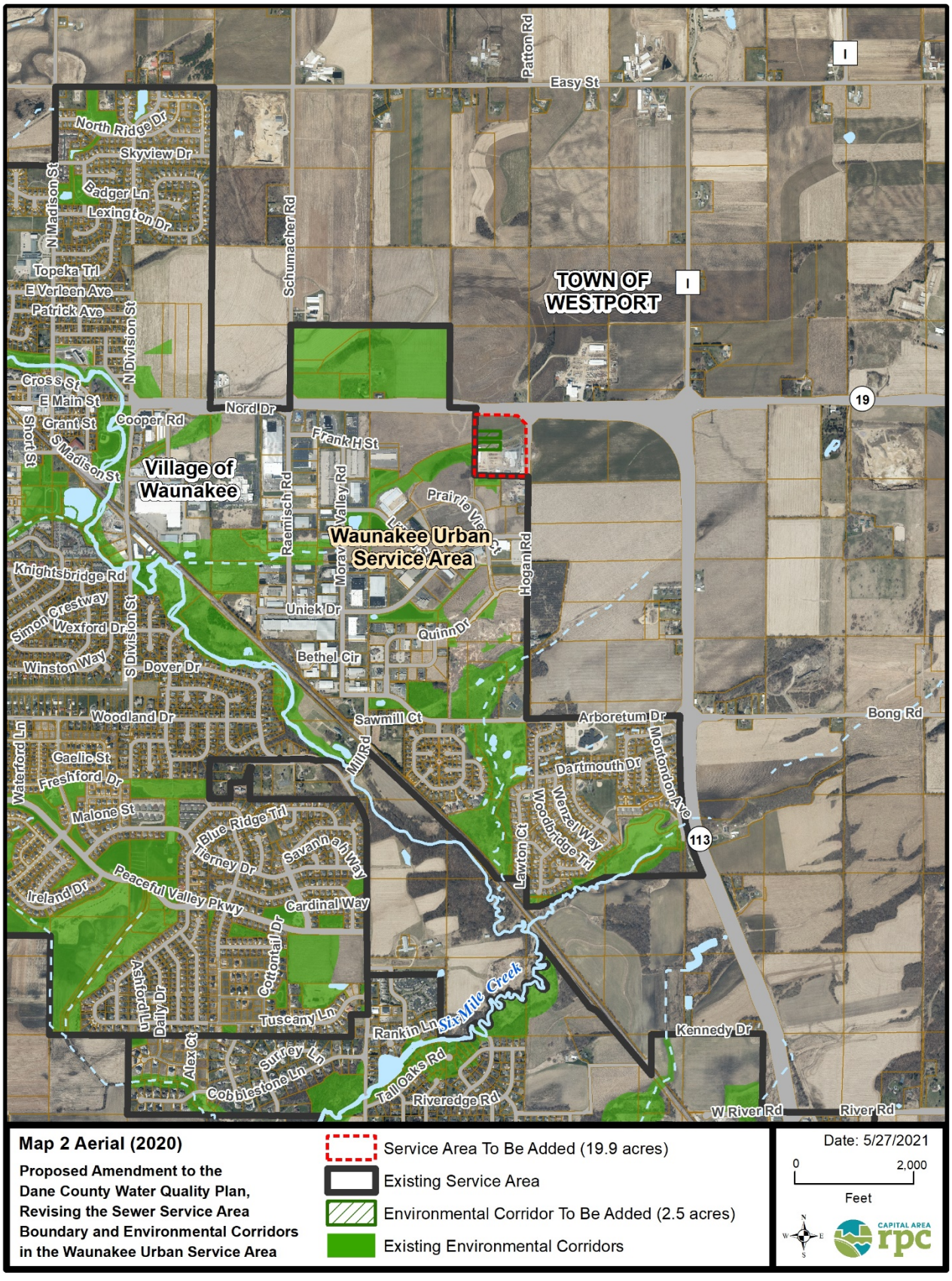
1. Continue to foster the responsible use of chlorides by encouraging businesses to use winter maintenance companies who have attended the winter salt certification classes offered by Wisconsin Salt Wise.

2. Encourage the use of native flora favored by the Rusty Patched Bumble Bee in landscaping to provide suitable habitat for this pollinator, where appropriate.

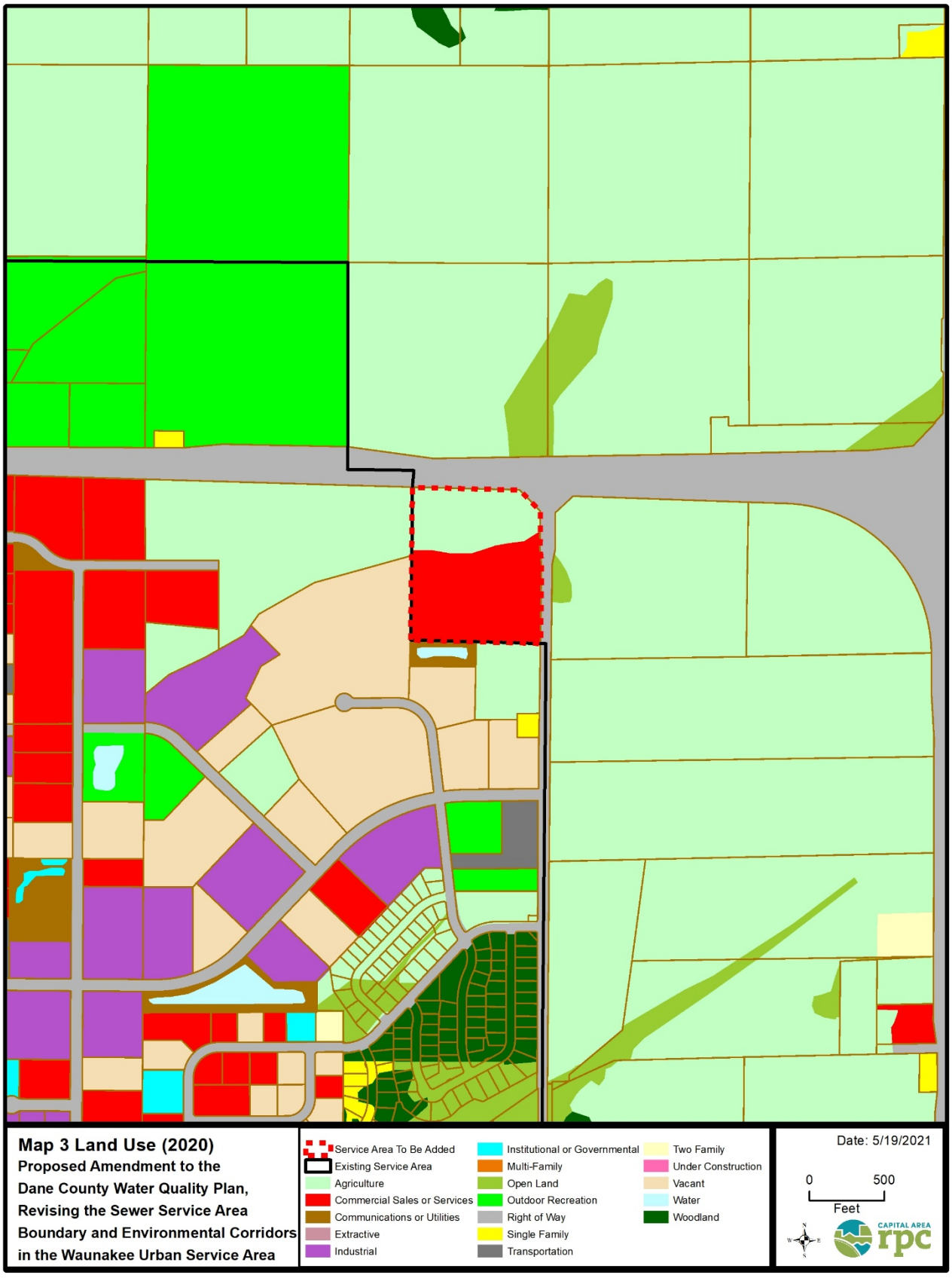
Map 1 - Amendment Area



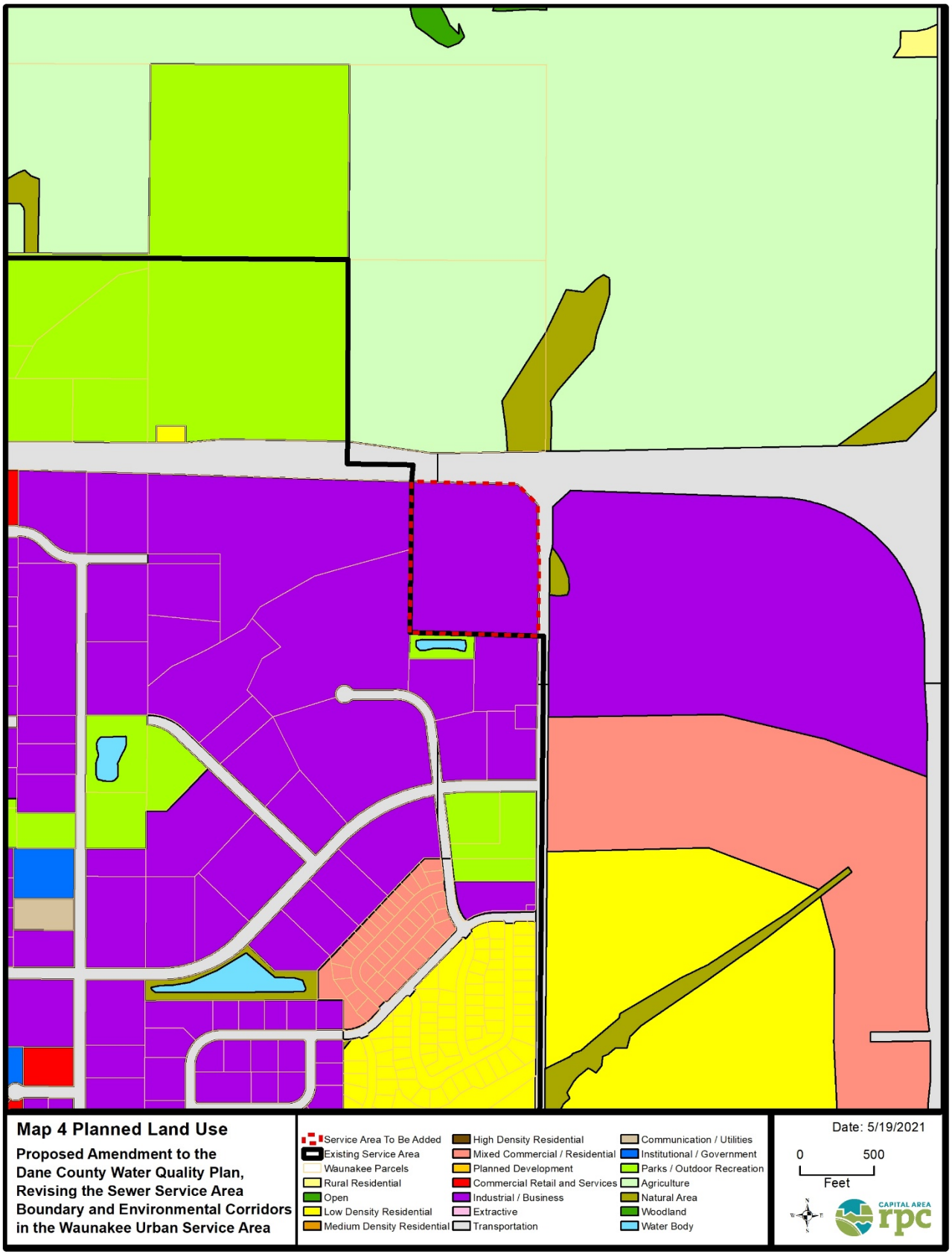
Map 2 – Aerial


TOWN OF WESTPORT
Village of Waunakee
Waunakee Urban Service Area
Easy St
Patton Rd
North Ridge Dr
Skyview Dr
Badger Ln
Lexington Dr
N Madison St
Topeka Trl
E Verleen Ave
Patrick Ave
N Division St
Schumacher Rd
Cross St
E Main St
Grant St
Cooper Rd
S Madison St
Nord Dr
Frank H St
Raemisch Rd
Valley Rd
Prairie View Ln
Hogan Rd
Knightsbridge Rd
Simon Crestway
Wexford Dr
Winston Way
S Division St
Dover Dr
Uniek Dr
Quinn Dr
Bethel Cir
Woodland Dr
Sawmill Ct
Arboretum Dr
Bong Rd
Waterford Ln
Gaelic St
Freshford Dr
Mill Rd
Dartmouth Dr
Montondon Ave
Malone St
Blue Ridge Trl
Tierney Dr
Savannah Way
Peaceful Valley Pkwy
Ireland Dr
Cardinal Way
Lawton Ct
Wenzel Way
Woodbridge Trl
Cottontail Dr
Ashford Ln
Daily Dr
Tuscany Ln
Six Mile Creek
Rankin Ln
Kennedy Dr
Alex Ct
Surrey Ln
Cobblestone Ln
Tall Oaks Rd
Riveredge Rd
W River Rd
River Rd
19
113
I
Map 2 Aerial (2020)
Proposed Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Waunakee Urban Service Area
Service Area To Be Added (19.9 acres)
Existing Service Area
Environmental Corridor To Be Added (2.5 acres)
Existing Environmental Corridors
Date: 5/27/2021
0
2,000
Feet
CAPITAL AREA rpc

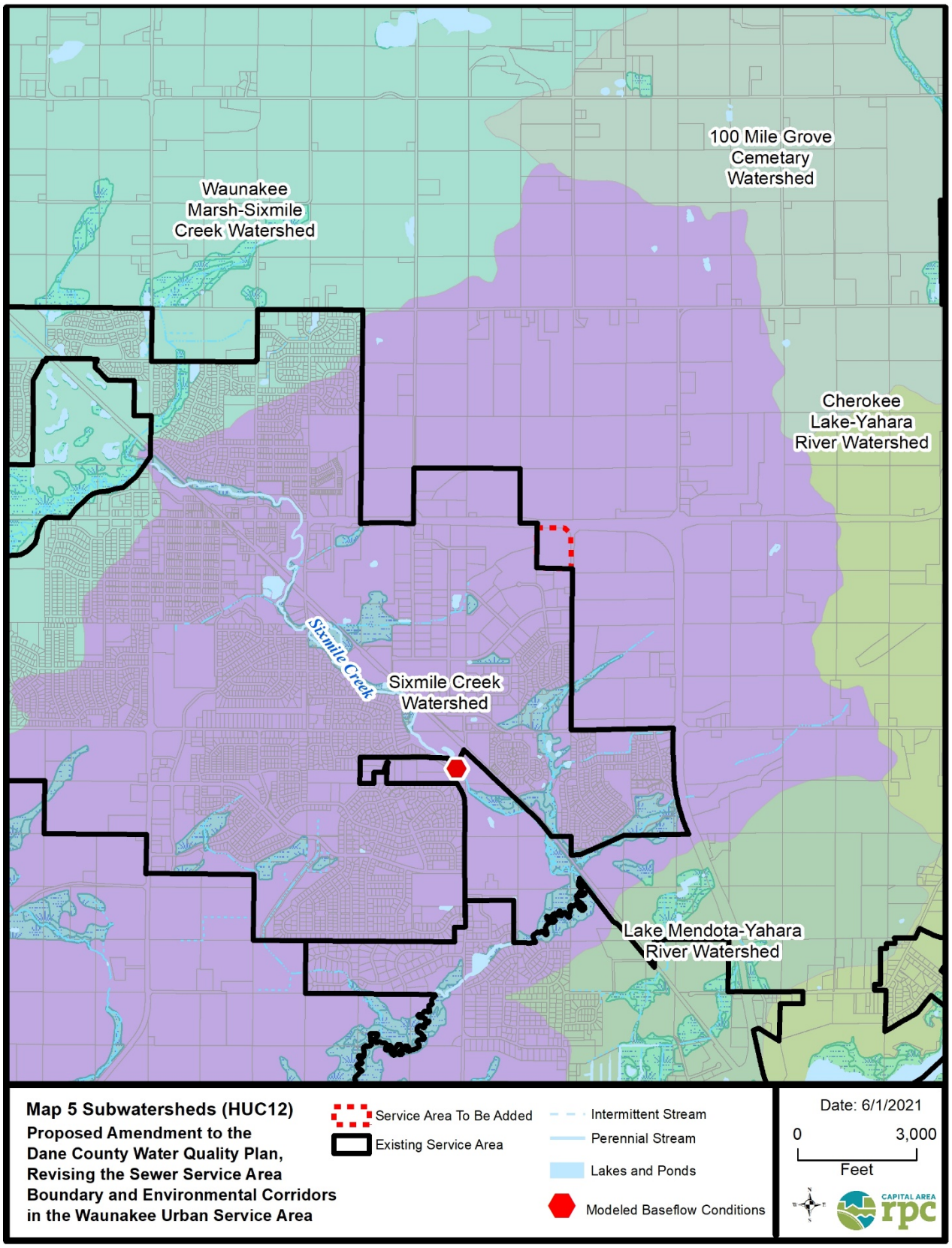
Map 3 – 2015 Land Use



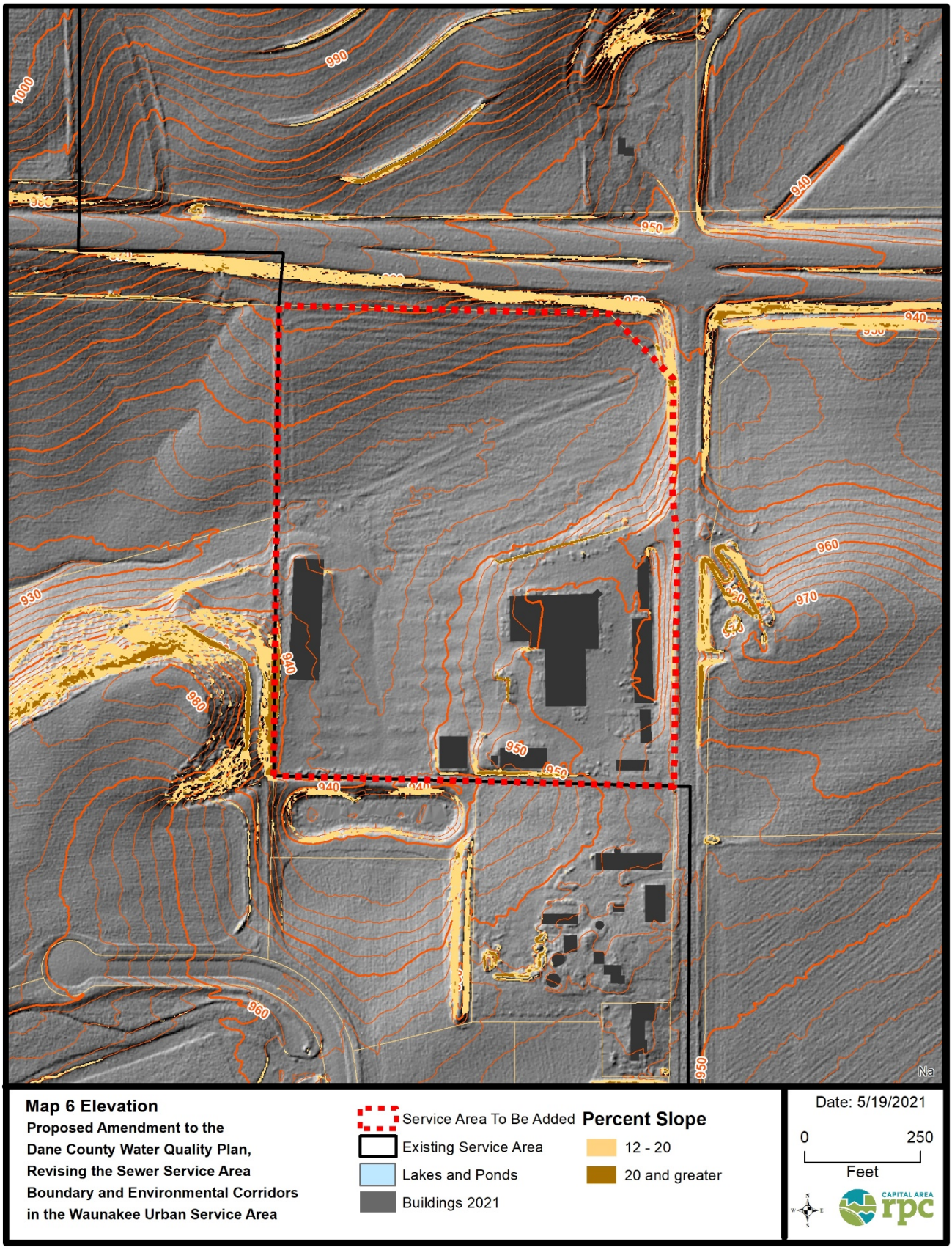
Map 4 – Planned Land Use



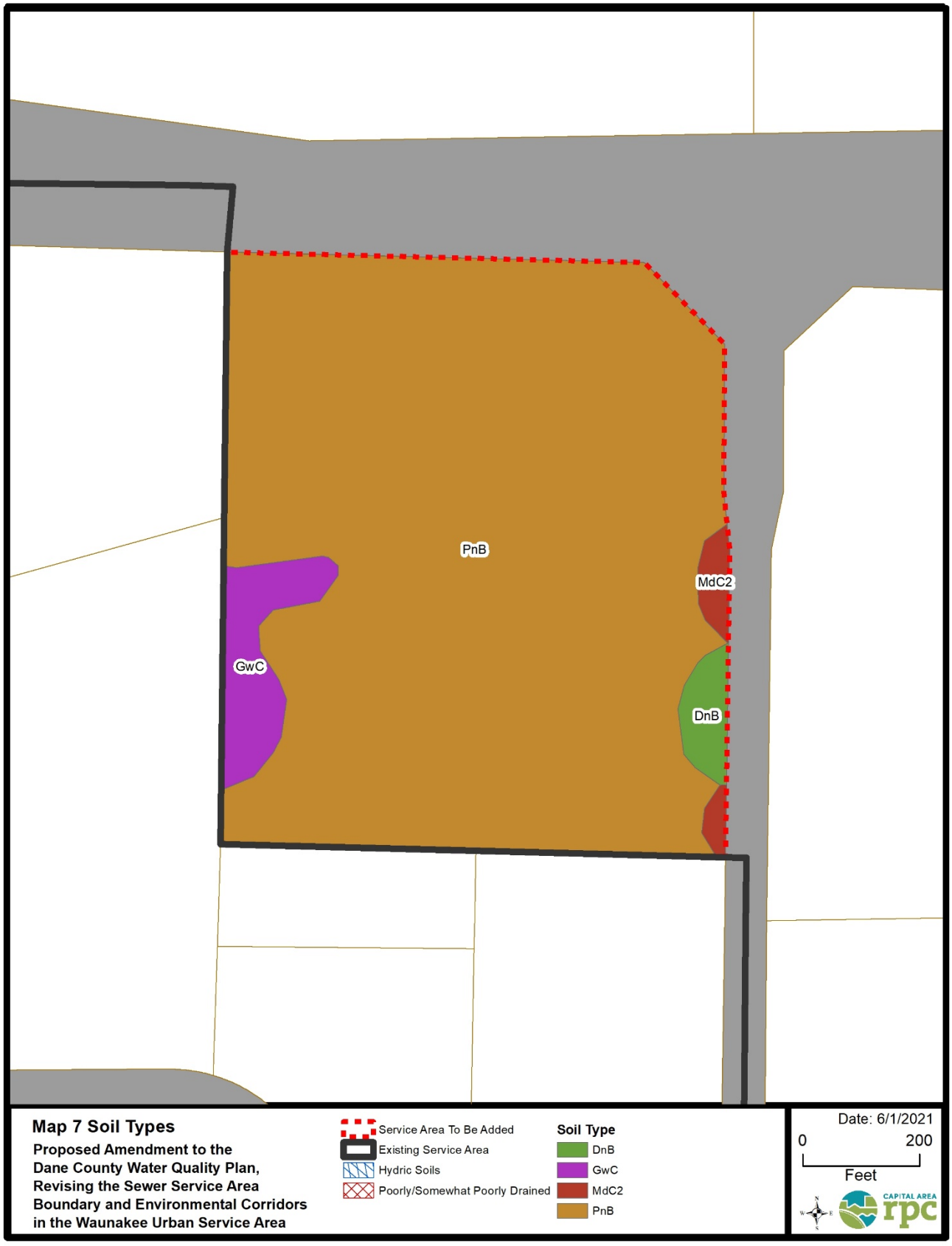
Map 5 – Subwatersheds



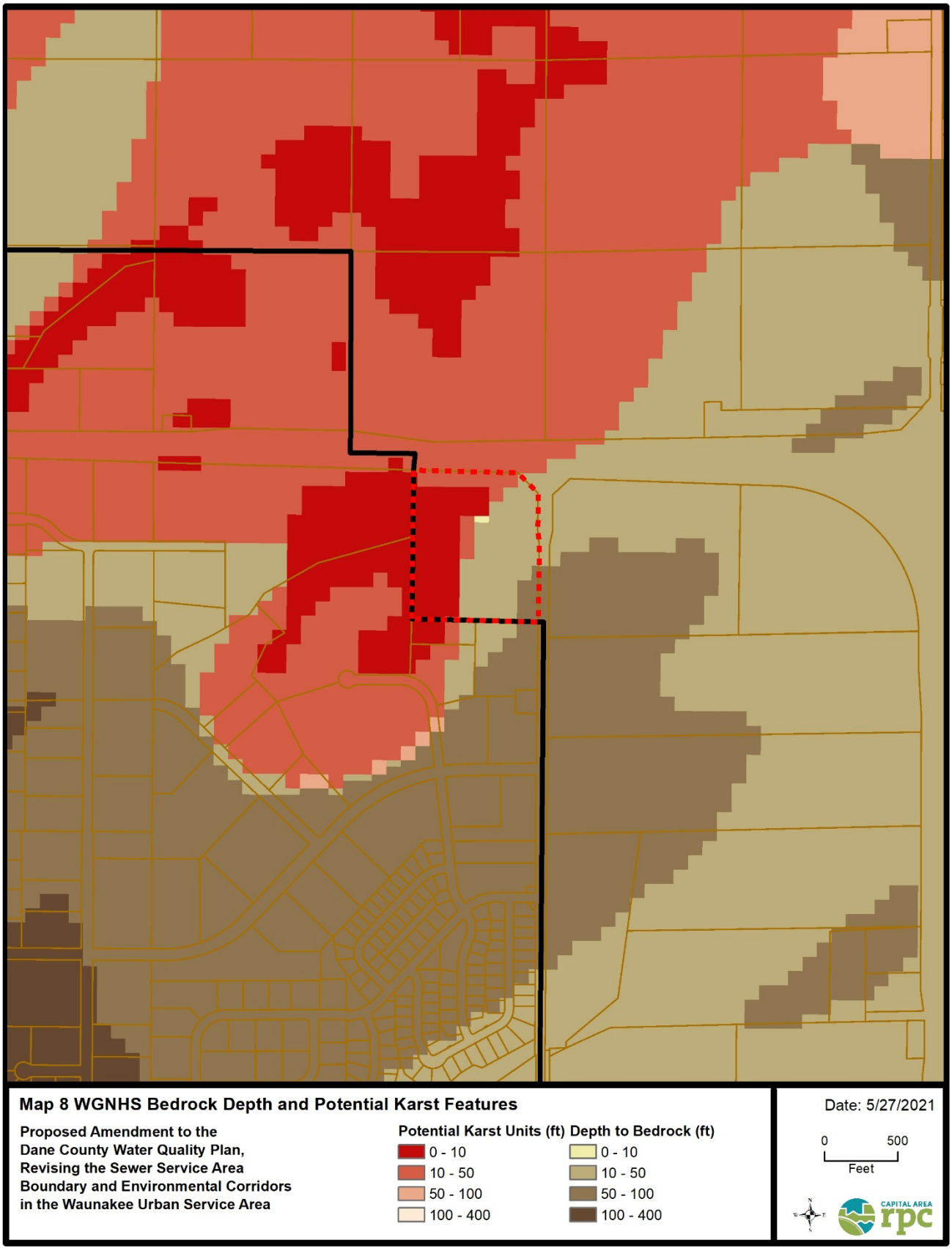
Map 6 - Elevations



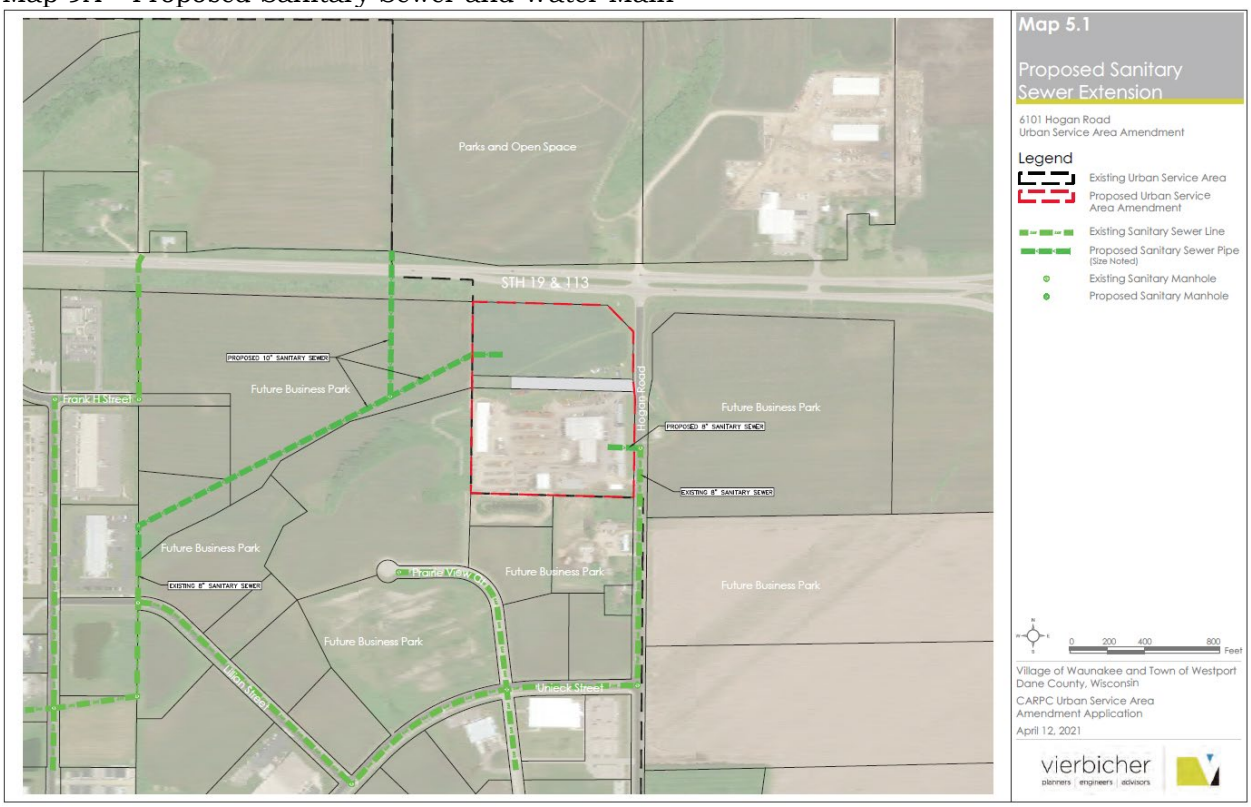
Map 7 - Soil Type

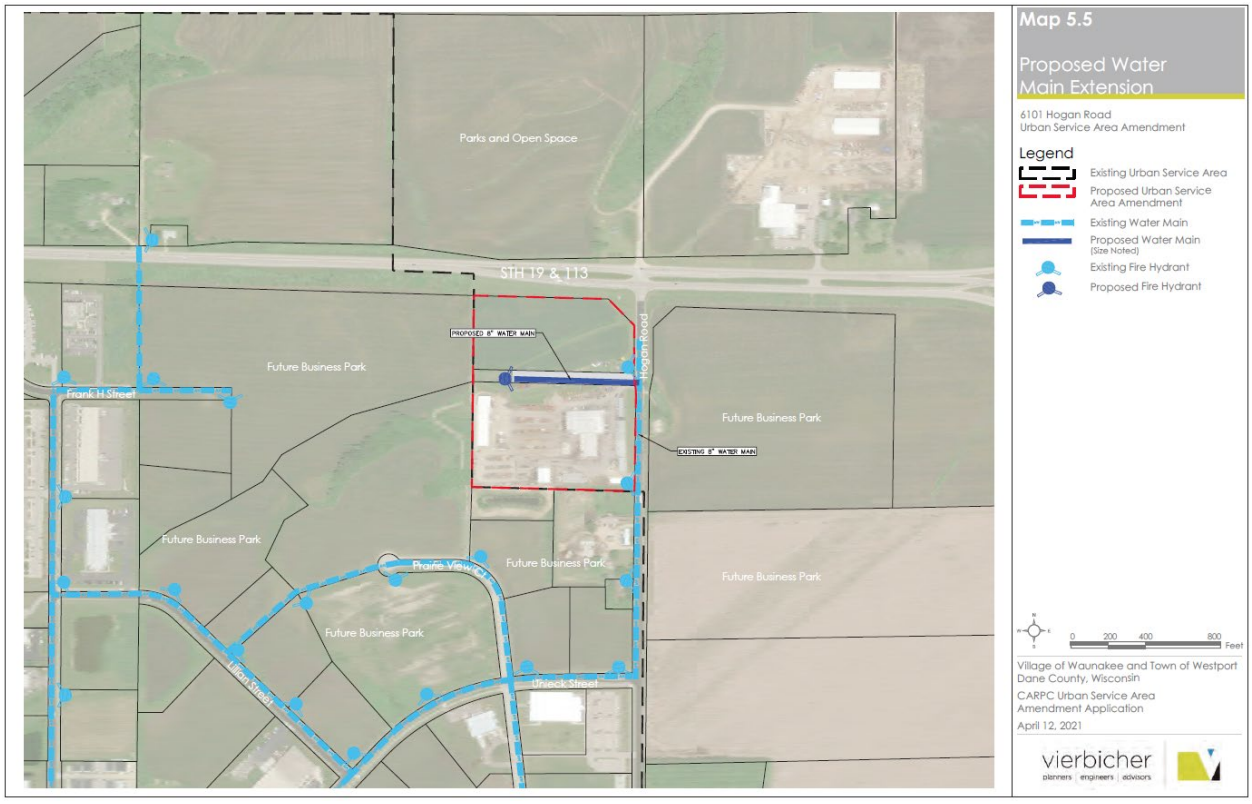


Map 8 – WGNHS Bedrock Depth and Potential Karst Features

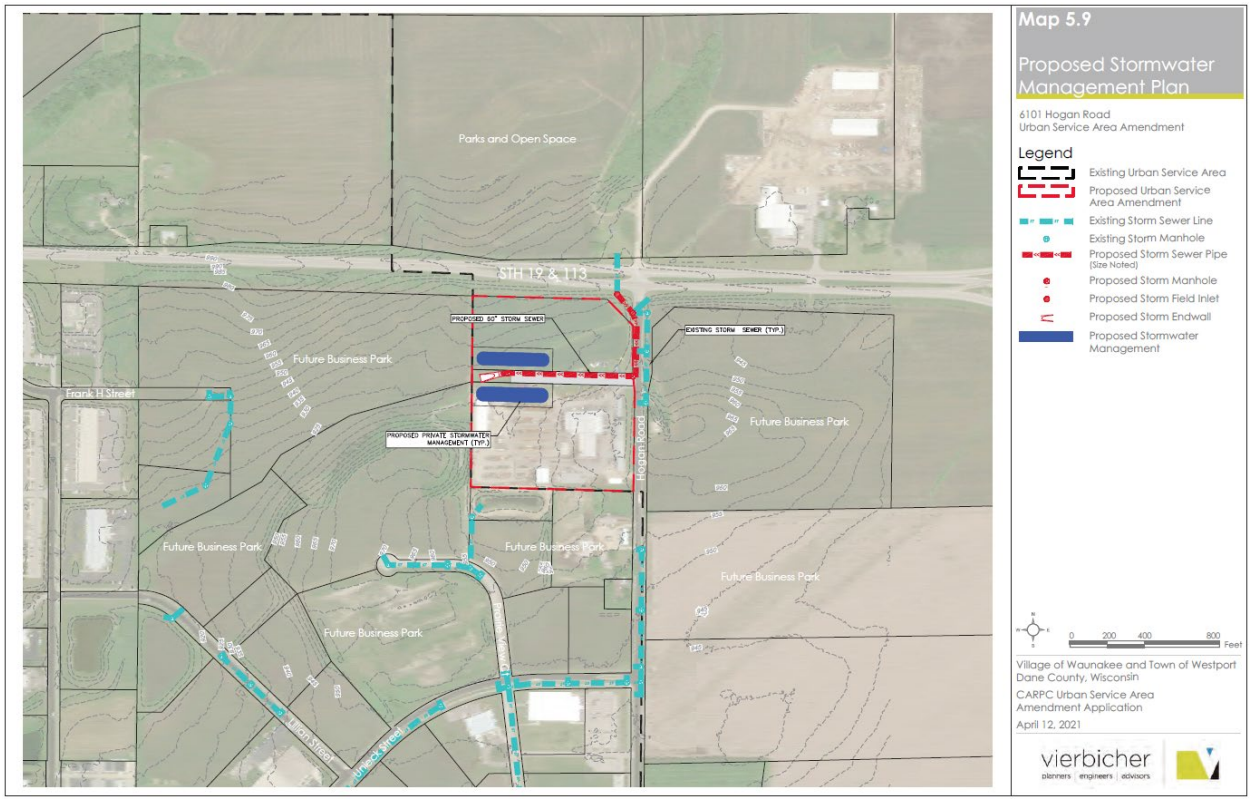


Map 9A – Proposed Sanitary Sewer and Water Main

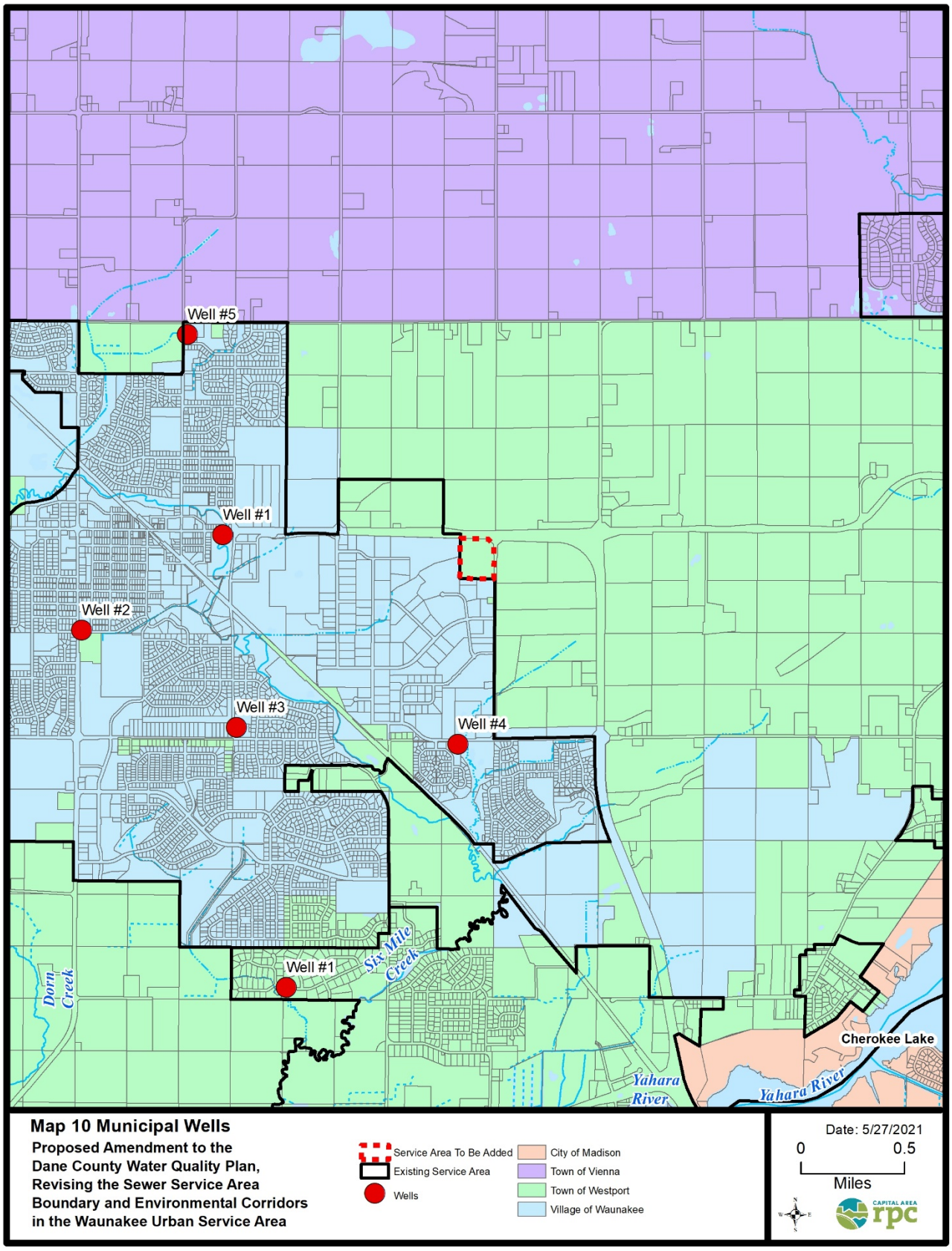




Map 9B – Proposed Stormwater Management



Map 10 – Municipal Wells



Attachment 1 – Wisconsin Historical Society Letter

WISCONSIN HISTORICAL SOCIETY

May 20, 2021

Mr. Sean Higgins
Capital Area Regional Planning Commission
City-County Building, Room 362
210 Martin Luther King Jr. Boulevard
Madison, WI 53703-2558

RE: Proposed Amendments to Sun Prairie and Waunakee Urban Service Areas, Dane County, Wisconsin

Dear Mr. Higgins:

No previously recorded archaeological sites have been recorded in, or adjacent to the parcels delineated in the amendment. However, given proximity to Token Creek and the inclusion of landforms often associated with pre-Contact village and campsites, we recommend Phase I archaeological survey of the Sun Prairie Urban Service Area amendment in advance of any ground disturbance. The Waunakee Urban Service Area amendment is not in proximity to wetlands, drainages, or other landscape features that are typical indicators of American Indian settlement and the parcel has been subjected to significant ground disturbance. Therefore, we see no reason why the Waunakee amendment cannot proceed without survey.

Under Wisconsin law, Native American burial mounds, unmarked burials, and all marked and unmarked cemeteries are protected from intentional disturbance. If anyone suspects that a Native American burial mound or an unmarked or marked burial is present in an area, the Wisconsin Historical Society should be notified.

If human bone is unearthed during any phase of a project, **all work must cease**, and the **local authorities must be contacted**. The police or sheriff will determine if the burial is a criminal matter or if it should be referred to the Wisconsin Historical Society at 1-800-342-7834 to be in compliance with Wis. Stat. § 157.70 which provides for the protection of all human burial sites. W**ork cannot resume until the Wisconsin Historical Society gives permission**.

This letter does not constitute a Wisconsin Historical Society review for any project that may be governed by Federal or State Compliance laws, e.g. Section 106, Wis Stat. §44.40, Wis Stat. §66.1111, or Wis Stat. §157.70

If you have any questions, or if you need additional information, please feel free to contact me.

Sincerely;

Amy L. Rosebrough
Staff Archaeologist
State Archaeology and Maritime Preservation
608-264-6494
Amy.rosebrough@wisconsinhistory.org