October 3, 2022

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

History of the Stoughton Urban Service Area

The Stoughton Urban Service Area (USA) was first delineated in the early-1970s when the Dane County Regional Planning Commission originally adopted its first Land Use Plan. The first amendment to the Stoughton Service Area occurred in 1985 to delineate Environmental Corridors and ensure the SSA boundaries reflected the City's adopted 1984 master plan. This amendment resulted in a net reduction of 450 total acres, 150 developable acres, and 300 acres of Environmental Corridor. There has been a total of 11 amendments to this urban service area since its creation totaling 227 net acres of developable land and a net reduction of Environmental Corridor acres due to a refinement of the original delineation in 1985. The most recent amendment of the service area by the City of Stoughton was recommended by the Commission and approved by the Wisconsin DNR in July 2022.

Planning in Stoughton

The City of Stoughton updated their comprehensive plan in 2017. The Comprehensive Plan is substantially consistent with the adopted 2050 Regional Development Framework (RDF), even though the requested amendment area is not featured in the RDF 2035 or 2050 growth scenarios. The amendment area is bounded on two sides by what the City calls "community character corridors" in its Comprehensive Plan. In addition, this area is identified in the City's future land use maps as a "planned neighborhood," in this case as largely a continuation of the existing residential development pattern. The Plan notes, "small areas of Two Family Residential and Multi-Family Residential would be appropriate for properties adjacent to STH 138, CTH A and Aaker Road." City of Stoughton residential development has—for the most part—shifted to predominantly multifamily units in larger buildings, reflecting development in already developed areas and along corridors, consistent with the RDF. The requested amendment area was identified as a "logical extension" of development by City and CARPC staff during the creation of the RDF growth scenario. However, it was ultimately not included in the model because other in-progress or highly likely development was sufficient to meet projected demand. But as is often the case with land development, the requested amendment area was brought to market prior to other expanding areas in Stoughton.

Existing Conditions

Land Use

The City of Stoughton is requesting amendment to the Stoughton USA south of the City, adjacent an existing single-family residential neighborhood near the intersection of CTH-A/Acker Road and 4th Street/Taylor Lane. The amendment area is contiguous to the north with the existing USA boundary. Existing land uses adjacent the requested amendment area include agriculture/rural residential to the west and south, low-density residential to the north, and open land/outdoor recreation to the east. The surrounding area is envisioned as predominantly single-family residential with some multi-family and other uses like parks found in suburban residential development in the City's planning documents. Multi-family and neighborhood office/business uses are possible adjacent CTH-A and Hwy-138. The requested amendment area is 32.6 acres.

Surrounding Planned Land Uses:

- North: Open Space, Park, Single-family Residential
- West: Mixture of Low-Density Residential
- South: Agriculture
- East: Open Space, Single-family Residential

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	23.8	
Open Land	6.7	1.4
Parks/Outdoor Recreation		4.2
Residential, Low-Density		10.6
Residential, Medium-Density		5.6
Residential, Rural	0.3	0.3
Right-of-Ways	1.3	10.0
Water	0.5	0.5
Total	**32.6**	**32.6**

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 proposed amendment area is not in proximity to any known sites and WHS does not recommend any further investigation (see Attachment 1).

Natural Resources

The proposed amendment area is in the City of Stoughton-Yahara River (HUC 12: 070900020903) watershed (Map 5). Delineated wetlands are present within the amendment area. There are no floodplains within the amendment area.

Wastewater from the amendment area will be treated at the Stoughton Wastewater Treatment Facility (Map 5). The treated effluent is discharged to the Yahara River.

Wetlands

WDNR's Wisconsin Wetland Inventory (WWI) shows one wetland too small to delineate within the amendment area. A wetland delineation (link to report) was conducted by Taylor Conservation, LLC in October 2020. The site investigation and field delineation determined that there were three wetlands within the study area (see Map 11). Wetland 1 is described as a fresh (wet) meadow and the dominant vegetation was reed canary grass (*Phalaris arundinacea*) and clearweed (*Pilea pumila*). Wetland 2 is described as a fresh (wet) meadow and the dominant vegetation was clearweed, Japanese knotweed (*Fallopia japonica*), and red osier dogwood (*Cornus alba*). One of the sampling points for Wetland 2 contained approximately 30-40% absolute cover of invasive species in the ground layer. The delineator classified both Wetlands 1 and 2 as "moderately susceptible" to stormwater runoff. Wetland 3 is described as a farmed wetland and the dominant vegetation was fall panicum (*Panicum dichotomiflorum*) and nut

sedge (*Cyperus esculentus*). Wetland 3 received a non-federal jurisdictional determination (EXE-SC-2022-13-0197) and is exempt from Wisconsin wetland regulations.

Wetlands 1 and 2, with a minimum 75' vegetated buffer, are required to be designated as Environmental Corridor per the adopted Policies and Criteria for Environmental Corridors (link to document), as part of the *Dane County Water Quality Plan*.

In addition to the wetlands within the amendment area, there are also other wetlands near the amendment area. According to the WWI, the wetlands associated with the Yahara River approximately 0.02 miles to the east are classified as palustrine persistent emergent/wet meadow, persistent narrow-leaved deciduous forest, persistent broad-leaved deciduous forest, excavated open water, and broad-leaved deciduous scrub/shrub. The wetlands directly to the northwest/west are palustrine persistent emergent/wet meadow that is farmed in dry years, narrow-leaved persistent emergent/wet meadow, broad-leaved deciduous forest, and excavated standing water.

Yahara River

The Yahara River (WBIC 798300 / WATERS ID 355202) is 63 miles long and originates in Columbia County, connecting Lakes Mendota, Monona, Kegonsa, and Waubesa. The Lower Yahara River subwatershed (the portion downstream of Lake Kegonsa) is approximately 44 square miles. A 22-mile segment of the Lower Yahara River from Lake Kegonsa downstream to its mouth at the Rock River has been listed as an impaired water per Section 303(d) of the Clean Water Act since 1998. Pollutants of concern are sediment/total suspended solids and total phosphorus, which have resulted in a degraded habitat and low dissolved oxygen. Total Maximum Daily Loads (TMDL) for total phosphorus and sediment were approved by the US EPA on September 28, 2011. The water was assessed during the 2018 listing cycle and based on the sample data the total phosphorus listing was removed. The Stoughton and Lake Kegonsa segment (from mile 16.33 to 22.08) is downstream of the amendment area and supports a Warmwater Sport Fishery (see Map 5).

There has been a Rock River Coalition / Yahara WINs monitoring location on the Yahara River at Prospect Street (Station ID 10040742) since 2013. Field measurements from 2021 indicated dissolved oxygen levels of 6.7 to 10 mg/L, transparency of 52 to 120 cm, and macroinvertebrate index scores of 2.0 to 2.3. Chloride data is not collected at this monitoring location. USGS baseflow monitoring on the Yahara River at the Forton Street Bridge (Station ID 05429700) measures discharge and water level but does not collect water quality data.

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. From 2014 – 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.

Groundwater

Groundwater modeling, using the 2016 Groundwater Flow Model for Dane County developed by the WGNHS (link to website), shows that 2010 modeled baseflow in the Yahara River at Westchester Circle (see Map 5), decreased compared to predevelopment flow conditions (207 to 156 cfs; see Table 4). These reductions are due to the cumulative effects of well water withdrawals from multiple municipalities in the groundwatershed. Pre-development conditions represent no well pumping within the model.

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 approximately 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 identified two natural communities within a 1 to 2-mile radius of the amendment area. Therefore, it is recommended that a formal Endangered Resources Review for potential impacts to endangered resources be conducted by WDNR staff or one of their certified reviewers and habitat protection measures be implemented if species are found.

The amendment area is within the High Potential Zone (species likely present) for the federally endangered Rusty Patched Bumble Bee (link to web map). 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. 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 East Johnstown-Milton Moraines Land Type Associations of Wisconsin. The Association classifies the surficial geology of this area as undulating hummocky moraine and outwash plain complex with scattered lake plains.

Surface elevations within the amendment area range from around 849 feet to 882 feet. There are some small, isolated areas of steep (> 12%) and very steep (>20%) slopes associated with the road embankment along Taylor Lane/South Fourth Street (see 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 Batavia-Houghton-Dresden association. These soils are well drained and poorly drained, deep and moderately deep silt loams and mucks that are underlain by silt, sand, and gravel. Table 2 shows detailed classification for soils in the amendment area (see Map 7) while Table 3 shows important soil characteristics for the amendment area.

There is one hydric soil, Wacousta (Wa map unit), within the amendment area (see Map 7). Hydric soils are good indicators of existing and former (drained) wetlands. All of the hydric soils within the amendment area are proposed for inclusion in environmental corridors.

According to the Soil Survey Geographic data for Dane County developed by the USDA Natural Resources Conservation Service (link to web soil survey), all of the other, non-hydric, soils within the amendment area are classified as well drained and do not have a seasonal (April to June) zone of water saturation within 5 feet of the ground surface.

Table 2
Soils Classification

Soil	% of Area	General Characteristics
Dresden Silt Loam; DsC2	38.4	Well drained, gently sloping to steep slopes on benches in stream valleys. Soils have medium fertility, moderate permeability, and a severe hazard of erosion. Poses moderate limitations for development due to slope.
Kegonsa Silt Loam; KeB	35.3	Well drained, nearly level and gently sloping, moderately deep soils on benches on outwash plains. Soils have medium fertility, moderate to rapid permeability, and moderate hazard of erosion. Poses no limitations for development.
Dresden Silt Loam; DrD2	13.5	Well drained, gently sloping to steep soils on benches in stream valleys. Soils have medium fertility, moderate permeability, and a very severe hazard of erosion. Poses severe limitations for development due to slope.
Troxel Silt Loam; TrB	7.8	Deep, well drained and moderately well drained, gently sloping soils in draws, on fans, and in drainageways. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses severe limitations for development due to low bearing capacity.
Wacousta Silty Clay Loam; Wa	4.9	Deep, poorly drained, nearly level soils on low benches in old lake basins. Soils have low fertility, moderately slow permeability, and no hazard of erosion. Poses severe limitations for development due to ponding and depth to saturated zone.

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	KeB, TrB	43.1
Hydric Soils (Indicates Potential / Restorable Wetlands)	Wa	4.9
Poorly Drained Soils with Seasonal High Water Table (< 5')	Wa	4.9
Soils Associated with Steep Slopes (> 12%)	DrD2	13.5
Soils Associated with Shallow Bedrock (< 5')	None	0
Best Potential for Infiltration in Subsoils	DsC2, KeB, DrD2	87.2

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

According to WGNHS data, bedrock within all but the northeastern corner of the amendment area is in the Trempealeau 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 bedrock in the northeastern corner 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 100-200 feet, with the shallowest depths generally being in the southern portion and deepest depths being in the eastern portion of the amendment area.

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. Karst features may be encountered within the proposed environmental corridors at depths ranging from 113-157 feet (see Map 8).

Given the expected separation of typical stormwater management practices compared to the anticipated depth of potential karst (over 20 feet), there is not a concern for groundwater contamination due to karst features. In addition, WDNR Conservation Practice Standard 1001 - Wet Detention Pond (2007) and WDNR Conservation Practice Standard 1002 - Site Evaluation for Stormwater Infiltration (2017) require field verification for areas of the development site considered suitable for stormwater management. 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.

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, along with certain soil filtering characteristics. 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.

Proposed Urban Services

Parks and Open Space

The proposed development includes 3.6 acres for park (1.6 acres in the existing urban service area and 2 acres within the amendment area) within an outlot in the northeastern portion of the amendment area (see Map 9B). Five stormwater management areas, totaling 4.16 acres within the amendment area and 0.17 acres within the existing urban service area, are also proposed. A trail corridor is proposed along the northern edge of the Magnolia Springs Subdivision and falls within the existing urban service area boundary. All park, stormwater, and open space areas are proposed for placement in public outlots and environmental corridors.

Wastewater

Sanitary sewer service will be provided to the amendment area by connection to the City's sanitary sewer collection and treatment system. Each lot will be served by an individual sewer lateral, and the entire amendment area will gravity drain via proposed 8-inch sanitary sewer main connecting to existing sewer main located at the intersection of South Page Street and Isham Street (see Map 9A). This sewer ultimately connects to the City's West Interceptor, which flows to the City of Stoughton Wastewater Treatment Facility.

Portions of the two parcels which are included in the amendment area and are intended to develop together are already within the urban service area. For estimating wastewater flows and general infrastructure planning, the entire development is being considered together. The proposed development within the amendment area consists of single-family residential (60 dwelling units) and two-family residential (58 dwelling units) land uses contributing to wastewater flows. The City estimates that the amendment area will generate an annual average of 28,840 gallons per day (gpd) of wastewater, or 20 gallons per minute (gpm). This assumes 2.8 persons per single-family dwelling unit and 2.1 persons per two-family dwelling unit, and an average wastewater generation rate of 100 gallons per capita per day (gpcd). The City estimates that the amendment area will generate a peak daily flow rate of 115,000 gpd, or 80 gpm, utilizing a peaking factor of 4.

The proposed 8-inch sanitary sewers within the amendment area are each anticipated to have a minimum capacity of 332 gpm, based on a design slope of 0.40% (minimum allowable per NR 110), which will provide sufficient capacity for the anticipated peak flows from the amendment area. The existing sewer in South Page Street ranges from 6-inch to 10-inch. The City reports that the 6-inch sewer is the limiting section and has a capacity of 193 gpm, based on historical records of the City, and currently receives a peak daily flow of approximately 85 gpm. Together with the estimated peak daily flows from the amendment area, this limiting section of sewer will receive approximately 166 gpm, exceeding the Stoughton Utilities requirement to operate at no more than 80% of pipe-full capacity. Thus, the 6-inch sewer will be upsized to 8-inch sewer which will give it a capacity of 426 gpm and provide sufficient capacity for the additional flow from the amendment area. The interceptor sewers further downstream have been reported to have sufficient capacity for the proposed amendment.

Wastewater Treatment Facility

The Stoughton Wastewater Treatment Facility (WWTF) will provide wastewater treatment for the amendment area. The WWTF is located on Mandt Parkway and discharges to the Yahara River within the City of Stoughton-Yahara River watershed. The rated monthly design flow capacity of the facility is 2.06 MGD and the maximum daily design flow capacity is 4.0 MGD. In the year 2021, the facility received an average monthly influent hydraulic loading of 1.14 MGD (56% of the design monthly capacity), including infiltration and inflow, according to the 2021 Compliance Maintenance Annual Report (CMAR) (link to 2021 CMAR). The existing capacity of the WWTF is anticipated to support the additional wastewater flows from the proposed amendment area.

The City did not have any issues meeting its WPDES permit (effective May 2020, expires March 2025) limits for the quality of effluent discharged to Yahara River in the most recently reported calendar year, except for one limit exceedance in the month of April due to maintenance (see below). Below is a summary of the major effluents reported on in the 2021 CMAR:

- The biological oxygen demand (BOD) effluent quality for 2021 was below the monthly average limit, with a monthly average of 5.0 mg/L (20% of the limit) and a maximum of 10.0 mg/L (40% of the limit) for the month of July.
- The total suspended solids (TSS) effluent quality for 2021 was below the monthly average limit, with a monthly average of 8.7 mg/L (43% of the limit) and a maximum of 13.0 mg/L (65% of the limit) for the month of June.
- The ammonia (NH3) effluent quality for 2021 was below the monthly average limit (varies by month), with a monthly average of 9.8 mg/L (1-39% of the respective limits) and a maximum concentration of 14.9 mg/L (24% of the limit) for the month of March.
- The phosphorus (P) effluent quality for 2021 was below the monthly average limit, except for the month of April when the limit was exceeded due to a shutdown of the digester for cleaning. The monthly average was 0.46 mg/L (average of 46% of the monthly limit) with a maximum of 1.07 mg/L (107% of the limit) in the month of April.

The WWTF discharges to a tributary to the Rock River, and thus the WPDES permit includes TSS and phosphorus limits to comply with the Total Maximum Daily Load (TMDL) developed for the Rock River Basin to protect and improve water quality. To meet the future water quality-based effluent limit (WQBEL) for phosphorous, the Stoughton WWTF has been approved by Wisconsin DNR to implement a watershed adaptive management approach (WAM). The adaptive management interim limitation for phosphorus is 0.6 mg/L, expressed as a six-month average (May through October and November through April), and goes into effect beginning the period from May 1, 2023, through October 31, 2023. Additionally, a 1.0 mg/L monthly average has been required beginning May 2020 (previous limit was 1.3 mg/L). Stoughton WWTF will participate in the Yahara Watershed Improvement Network (Yahara WINs) to implement phosphorus reducing practices within the watershed (link to website).

Water System

Stoughton Water Utility provides municipal water through a public water distribution system which includes approximately 378,000 lineal feet of water main and four active high-capacity groundwater wells within the City. Three of the wells pump directly into the distribution system and one pumps into a reservoir, where two booster pumps are then used to pump into the distribution system. The active wells are at depths ranging from approximately 969 to 1,137 feet with an average capacity of 990 to 1,320 gallons per minute (gpm). In total, the gross capacity of the municipal wells is approximately 4,520 gpm, or 6.52 million gallons per day (MGD). The firm capacity (with the largest well assumed to be out of service) is approximately 3,200 gpm, or 4.61 MGD, although the City also maintains two standby high-capacity groundwater wells. The City has one ground-level reservoir and two elevated tanks, with a combined storage capacity of 1.30 million gallons. According to the 2021 Annual Report to the Public Service Commission of Wisconsin (link to 2021 Annual Report), the City pumped an average of 918 gpm, or 1.32 MGD, in 2021, which is approximately 31% of its firm pumping capacity. In 2021, the maximum amount pumped in any one day was 2.05 MGD.

Water losses in the City's distribution system were an average of 86,263 gpd, or 0.09 MGD, in 2021, which accounted for 7% of the net water supplied in 2021. Approximately 77% of this was due to unreported and background leakage, with the remaining due to reported leaks and other apparent losses. In 2021, there were 8 main breaks and 3 service breaks which were repaired. Water losses in the City's distribution system were 11% in 2020 and 8% in 2019. 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 (PSC) if the utility reports its percentage of water losses exceeds 15%.

The City estimates the current average daily demand on the system is 781 gpm, or 1.13 MGD, and reports a peak daily demand of 1,422 gpm, or 2.05 MGD, which matches the maximum amount pumped in any one day in 2021. This translates to a peak daily factor of 1.82.

Portions of the two parcels which are included in the amendment area and are intended to develop together are already within the urban service area. For estimating water demand and general infrastructure planning, the entire development is being considered together. Water supply within the amendment area will be provided by extending 8-inch water main from the intersection of South Page Street and Isham Street, 340 feet south along the proposed extension of South Page Street, and from the intersection of South Fourth Street and Isham Street, 640 feet south along Fourth Street/Taylor Lane to Future Road "B" within the amendment area (see Map 9A). Water main will be stubbed to the west and south coinciding with street stubs for possible future development outside of the current urban service area, as well as to planned development to the northwest. Individual service laterals will be provided to each lot within the amendment area.

The annual average daily water demand for the amendment area is anticipated to be approximately 28,900 gallons per day (gpd), or 20 gpm. This assumes 2.8 persons per single-family dwelling unit and 2.1 persons per two-family dwelling unit, and an average water demand of 100 gpcd. The estimated peak hourly demand is 4,800 gallons/hour, or 81 gpm, based on a peak hourly demand factor of 4. The estimated average daily water demand represents an increase of approximately 2% of the current demands on the system. Further, the City conducted water modeling of the amendment area and does not have concerns with available fire flow. It is anticipated that the existing water supply system will support the additional demand from the proposed amendment area.

Stormwater Management System

The City of Stoughton stormwater management and performance standards are contained within Chapter 10, Article IV of the City of Stoughton Code of Ordinances. Dane County Code of Ordinances, Chapter 14, contains stormwater management and performance standards which apply to all areas of Dane County, and which were recently updated at the end of 2021. The amendment area will be required to follow the more protective standards contained within

the respective ordinances, as well as Wisconsin DNR requirements contained in NR 151 and 216.

The amendment area is within the City of Stoughton-Yahara River watershed and currently consists of mostly agriculture lands with wooded and wetland areas in the northeast corner. The western and eastern edges both generally drain toward the center of the amendment area where runoff then flows northeast to the onsite wetlands. From there, it crosses South Fourth Street/Taylor Lane and flows through additional wetlands and backwaters of the Yahara River, then flows into the Yahara River approximately 1,100 feet to the northeast of the amendment area.

Additionally, there is an approximate 250-acre watershed to the south consisting of mostly agricultural lands which drains through the site along the same flow path. A centralized drainage swale within the central portion of the development will maintain conveyance of runoff from this off-site watershed and route it through the site, bypassing proposed stormwater management practices.

Development within the amendment area will meet, or exceed, current stormwater regulations for peak rate control and attenuation, water quality (TSS reduction), volume control (infiltration), and oil/grease control. Pretreatment of stormwater runoff prior to entering the wetlands will be required in accordance with NR 151 regulations. In addition to meeting current stormwater regulations, the City's application indicates the development will control post-development runoff volumes to match predevelopment levels for the 1-year through 200-year, 24-hour storm events. This exceeds current state, county, and local requirements for volume control and will help mitigate negative impacts to downstream properties, water resources, and conveyances due to the proposed development.

Conceptual stormwater management areas have been located in the northwest quadrant (Outlot 2), northeast quadrant near the existing wetland (Outlot 3), and along the centrally located drainage swale (Outlot 4 and 5) (see Map 9B). It appears the drainage patterns will generally match existing conditions with runoff from the upstream subwatershed continuing to flow through the site and with the primary discharge point from the site being northeast of the wetland near South Fourth Street/Taylor Lane. Any stormwater facilities placed in outlots dedicated to the public will be owned and managed by the City; any stormwater facilities privately owned and managed will be subject to a stormwater maintenance agreement to be recorded with the Dane County Register of Deeds.

The preliminary plan includes a combination of wet detention basins and an infiltration basin to meet all stormwater management requirements. Based on general soil data from the NRCS Soil Survey, the majority of site soils are classified as having a hydrologic soil group (HSG) of B and are generally considered well-drained or moderately well-drained. An on-site soil investigation will be required prior to final design, but the site appears to have good potential for infiltration and karst is not a concern. Refer to the Natural Resources section of this report for additional information on soils.

A detailed stormwater management plan review and approval is required prior to beginning any development construction. The plan will be required to meet all stormwater management and performance standards of the City of Stoughton, Dane County, and WDNR.

Performance Standards

The City of Stoughton proposes stormwater management performance measures to meet or exceed standards required by the State of Wisconsin (NR 151), Dane County (Chapter 14), and City of Stoughton (Chapter 10). The proposed stormwater standards for new development are as follows:

1. Require post-construction sediment control (reduce total suspended solids leaving the site by at least 80%, as compared to no runoff management controls; with a minimum of 60% of that control occurring in a detention pond 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 average annual rainfall period. This is consistent with the standards currently required by Dane County and City of Stoughton 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 the standards currently required by Dane County and City of Stoughton ordinances.

3. Require post-construction volume control for the 1-, 2-, 10-, 100-, and 200-year, 24-hour design storms (using NRCS MSE4 storm distributions) to match predevelopment runoff volumes. This exceeds the standards currently required by Dane County and City of Stoughton ordinances.

4. Require post-development infiltration (stay-on) volume of at least 90% of the pre-development infiltration (stay-on) volume for the average annual rainfall period. This is consistent with the standards currently required by Dane County and City of Stoughton ordinances.

5. Maintain predevelopment groundwater annual recharge rates of approximately 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 City of Stoughton ordinances.

Impacts and Effects of Proposal

Environmental Corridors

The proposed amendment area includes a total of approximately 6.2 acres of Environmental Corridor (see Map 12). This will include delineated wetlands with associated buffers and proposed stormwater management, park, and open space areas in accordance with the Environmental Corridor Policies and Criteria (link to document) adopted in the *Dane County Water Quality Plan* (See Map 2). Some of what is proposed as Environmental Corridor also coincides with mapped Stewardship Areas, as described below. An additional 5.9 acres are proposed as Environmental Corridor within the existing urban service area to the north and includes the same elements listed above.

Protection Areas are required for inclusion in Environmental Corridor 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.

The 2050 Regional Development Framework is designed to serve as a guide for local communities as they plan for future growth and development. One of the three goals of the RDF is to foster regional development that conserves water resources and natural areas. The RDF objective to achieve this goal is to enhance Stewardship and natural resource areas. Stewardship Areas are advisory areas to consider for inclusion in Environmental Corridors above the minimum requirements. 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 proposed amendment area includes 3.3 acres mapped as Stewardship Area, including potentially restorable wetlands and hydric soils, of which 1.3 acres are proposed to be designated as Environmental Corridor with this amendment (see Map 12).

Meeting Projected Demand
Stoughton is projected to grow by roughly 5,700 people and 2,300 households over the next 30 years. The proposed amendment would add 60 detached and 58 attached (duplex) single-family homes. The Regional Development Framework estimates that 68% of households added to the City of Stoughton between 2020 and 2050 will be in already developed areas. Between January 2020 through February 2022, approximately 74 permitted housing units were recorded in Stoughton. Twenty percent of units (15) were constructed inside already developed areas. The remainder were constructed just along the edge of existing development or future centers.

Historic development trends provide useful context for understanding community planning and proposed USA expansions. The City of Stoughton population count in the 2020 census was 12,916. This represents 2% of Dane County's population. The City's population increased 5% from 2010 to 2020, compared to Dane County's 15% increase. The Regional Development Framework estimates that Stoughton will grow to 19,364 people by 2050. Around half of units have been single family structures, slightly below in the 1980s and 2010s and slightly above in the 1990s and 2000s. Total multifamily units have likewise remained at about half of all units, but the composition of structures has changed from a mix of sizes to predominantly larger buildings with five or more units.

The shift to larger multifamily buildings is consistent with regional trends. The growing proportion of multifamily housing units in Stoughton reflects a region-wide shift towards more infill and redevelopment, especially in downtown areas and along major transportation corridors. This shift is driven by factors including the cost of single-family homes rising faster than average incomes, population growth outpacing the supply of new homes, local plans, policies to encourage residential and mixed-use growth along corridors and in centers, the large millennial generation entering their homebuying years, and the burden of student debt on abilities to purchase homes.

While the entirety of the development for this proposed amendment area is conventional suburban residential development, significant multi-family developments northwest, west, and southwest of Stoughton are planned. In addition, redevelopment and infill developments along Main Street/USH-51 and of the Uniroyal property are highly likely. These future developments will shift the balance of residential development strongly towards already developed areas and to multi-family structures.

Phasing
The proposed amendment area is smaller than 100 acres. A phasing plan is not required.

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 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. 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 of the communities in Dane County.

The City of Stoughton 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. The City is exceeding current standards by requiring higher levels of volume control for this development.

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. City of Stoughton staff attended winter salt certification class for winter road maintenance in 2014.

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 51 cfs decrease in baseflow of the Yahara River at Westchester Circle (location of modeling shown on Map 5) from predevelopment (no pumping) to 2010 (see Table 4). An additional 8 cfs decline compared to 2010 conditions is anticipated for the year 2040, according to modeling.

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

Stream	No Pumping	2010	2040
Yahara River	*207 cfs*	*156 cfs*	*148 cfs*

Generally, groundwater discharge occurs along the entire length of perennial streams and is the source of stream baseflow. 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 regional groundwater model is a useful tool for evaluating different configurations and scenarios of municipal groundwater well withdrawals on these stream systems

Comments at the Public Hearing

A public hearing was held on the proposed amendment at the September 8, 2022, meeting of the Capital Area Regional Planning Commission. Representatives from the City of Stoughton spoke in favor of the amendment. There was one registrant, Steve Glass with 350 Wisconsin, opposed to the amendment. His comments are primarily related to climate impacts of new development (see Attachment 2). Commissioner Terrell expressed concerns regarding protection of the wetlands in the amendment area and commented that the stormwater management plan should address wetland impacts. Commissioner Greb inquired about using native plantings for stormwater management.

Conclusions and Staff Water Quality Recommendations

There is sufficient existing treatment plant system capacity at the Stoughton Wastewater Treatment Facility 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. 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 of the communities in Dane County.

The City of Stoughton 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 flow rates, water temperature, and groundwater recharge to address the potential urban nonpoint source impacts of the proposed development on the receiving waters.

In addition, the City of Stoughton and development team for this plat have agreed to higher stormwater management standards for this amendment area. Namely, there will be no increase in runoff volume for all storm events through the 200-year, 24-hour design storm.

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-, 100-, and 200-year 24-hour design storms to "pre-development" levels, in accordance with the City of Stoughton 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 period, with a minimum of 60% of that control occurring prior to infiltration, in accordance with the City of Stoughton 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 City of Stoughton 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 City of Stoughton and Dane County Stormwater Ordinances.

2. Easements and perpetual legal maintenance agreements with the City, to allow the City 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 for stormwater management areas to meet the Environmental Corridor Policies and Criteria adopted in the *Dane County Water Quality Plan*.

Additional Agreements for the Amendment Area

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

1. Require no increase in runoff volume for the 1-year through the 200-year, 24-hour design storms.

Recommendations

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

1. Continue to foster the responsible use of chlorides by collaborating with Wisconsin Salt Wise and encouraging public and private winter maintenance professionals to attend the winter salt certification classes offered by Wisconsin Salt Wise.

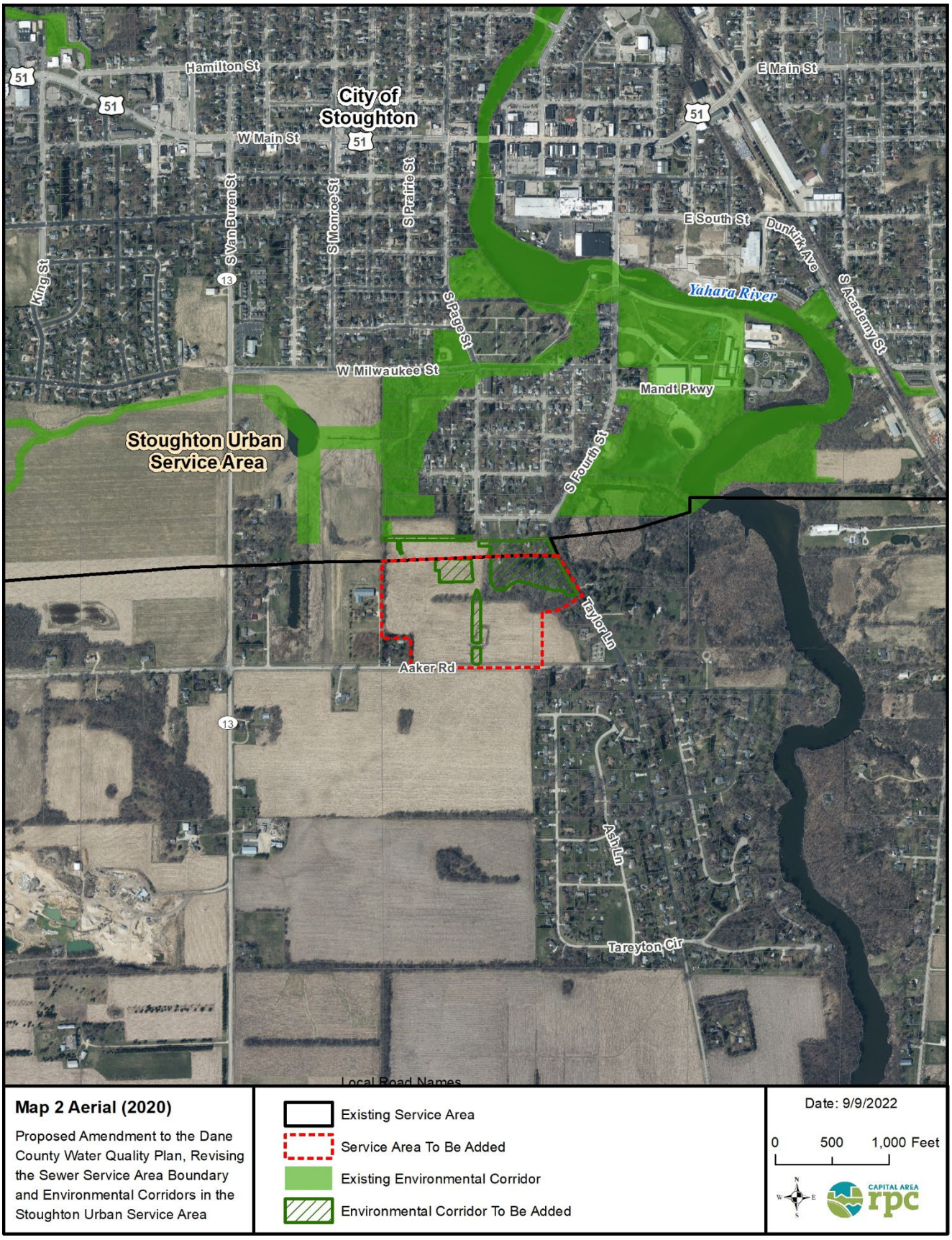
2. Develop and implement a restoration plan for the wetland and woodland in the amendment area.

3. Request a formal Endangered Resources Review by the WDNR or one of their certified reviewers for potential impacts to endangered resources like rare plants, animals and natural communities and take necessary habitat protection measures if species are found.

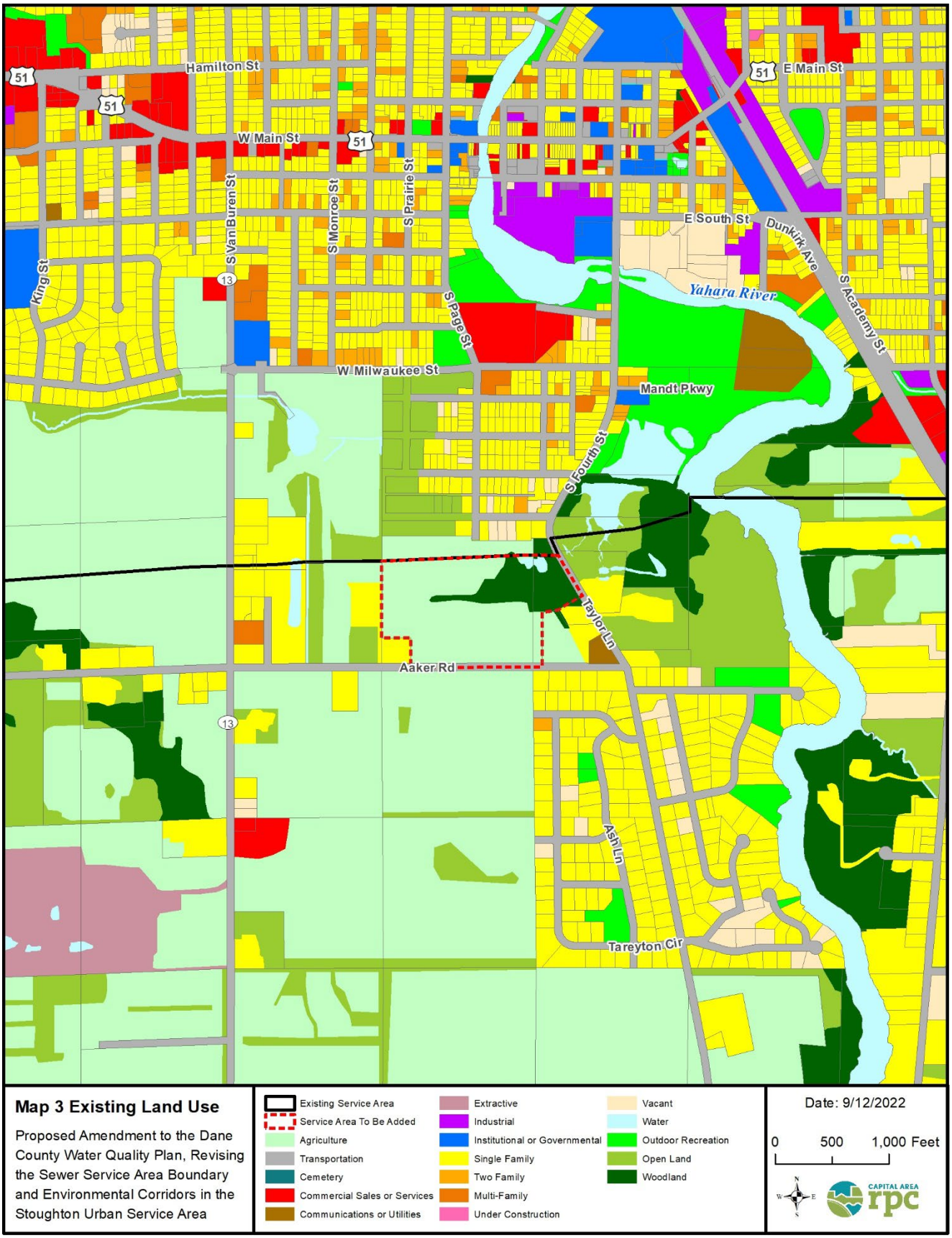
4. Encourage the use of native flora favored by the Rusty Patched Bumble Bee in landscaping to provide suitable habitat for this pollinator, where appropriate.

Map 1 - Amendment Area

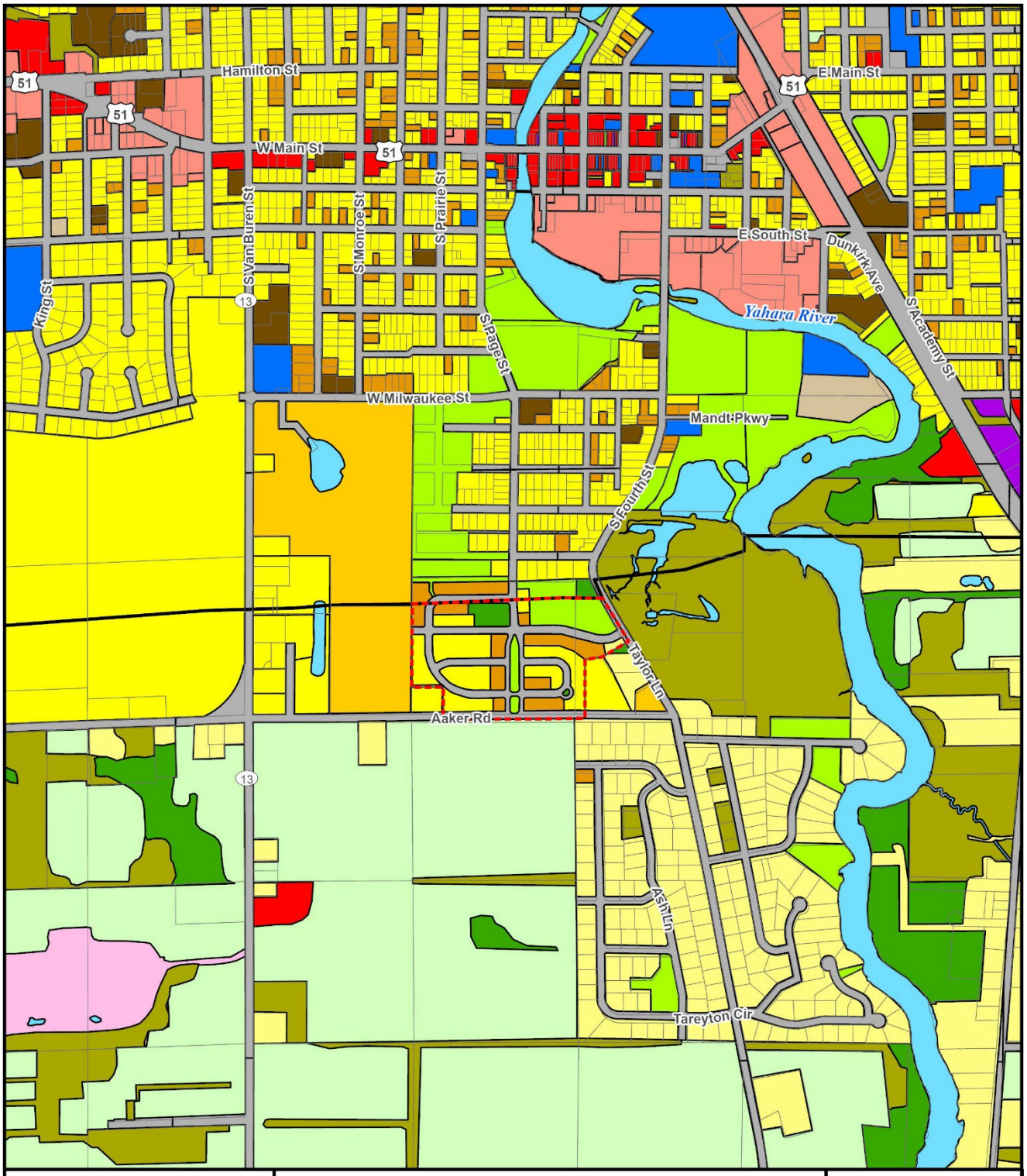
Map 2 – Aerial


Hamilton St
City of Stoughton
W Main St
E Main St
E South St
Dunkirk Ave
S Academy St
Yahara River
King St
S Van Buren St
S Monroe St
S Prairie St
S Page St
W Milwaukee St
Mandt Pkwy
S Fourth St
Stoughton Urban Service Area
Taylor Ln
Aaker Rd
Ash Ln
Tareyton Cir
Local Road Names
Map 2 Aerial (2020)
Proposed Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Stoughton Urban Service Area
Existing Service Area
Service Area To Be Added
Existing Environmental Corridor
Environmental Corridor To Be Added
Date: 9/9/2022
0 500 1,000 Feet
CAPITAL AREA rpc

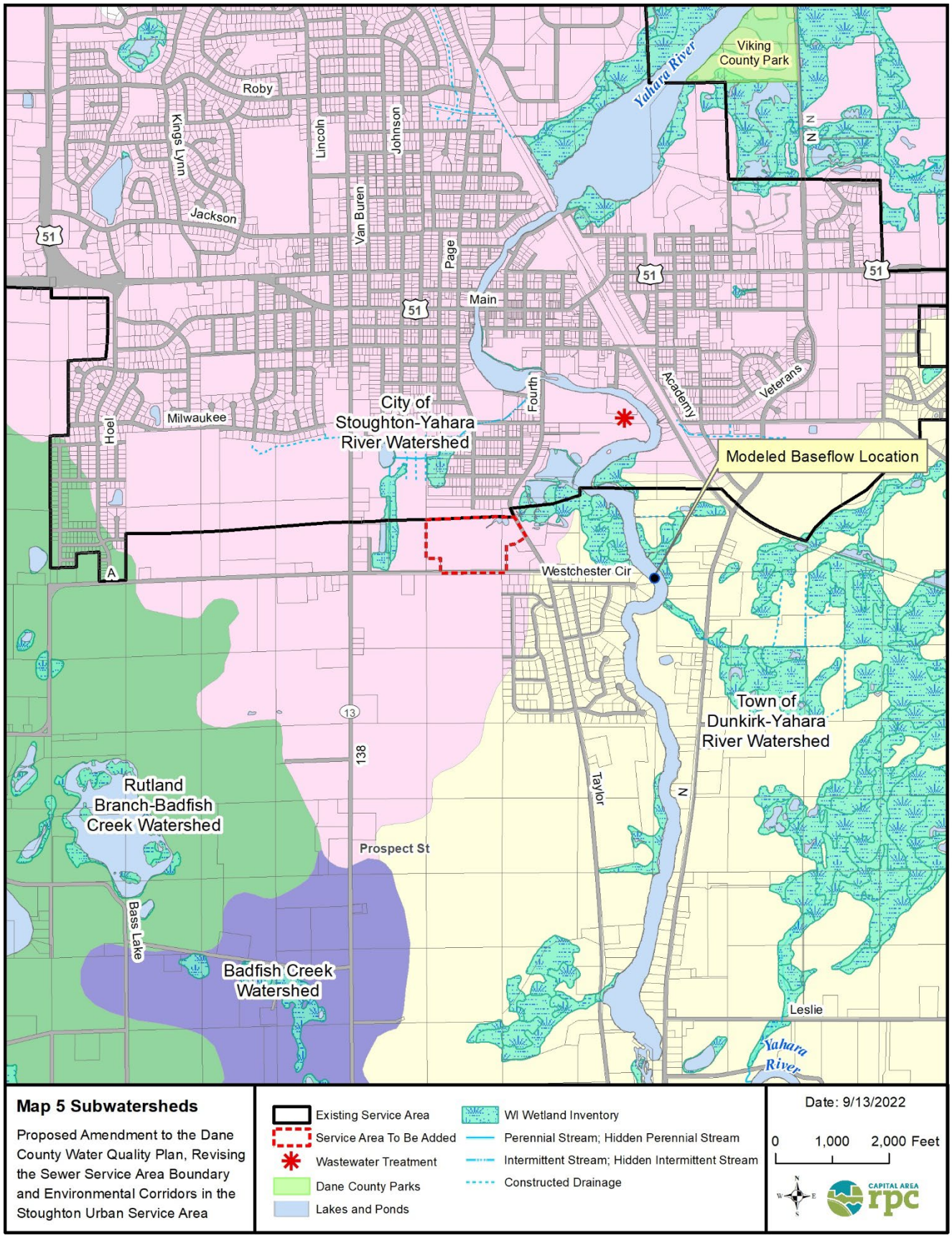
Map 3 – 2021 Land Use



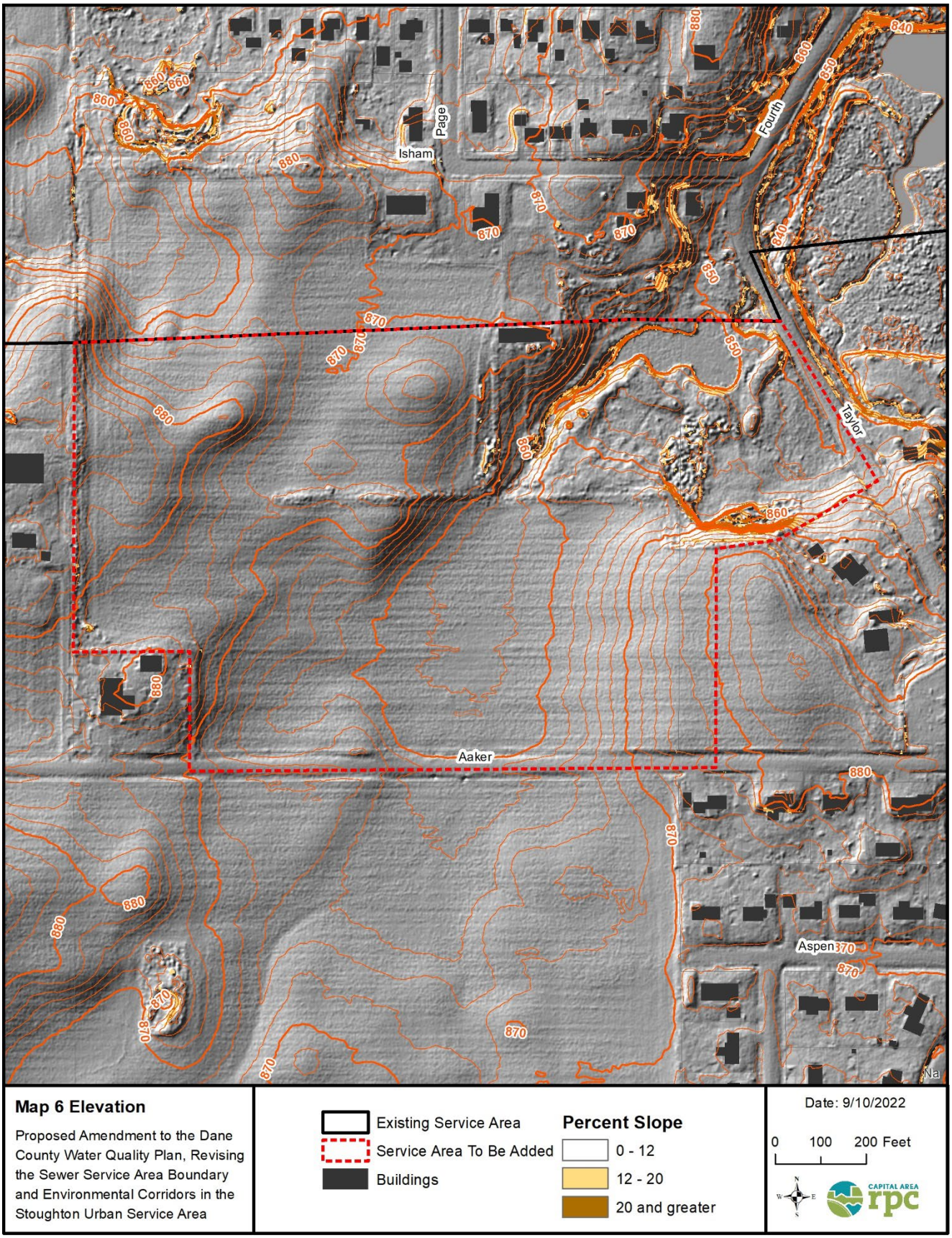
Map 4 – Planned Land Use



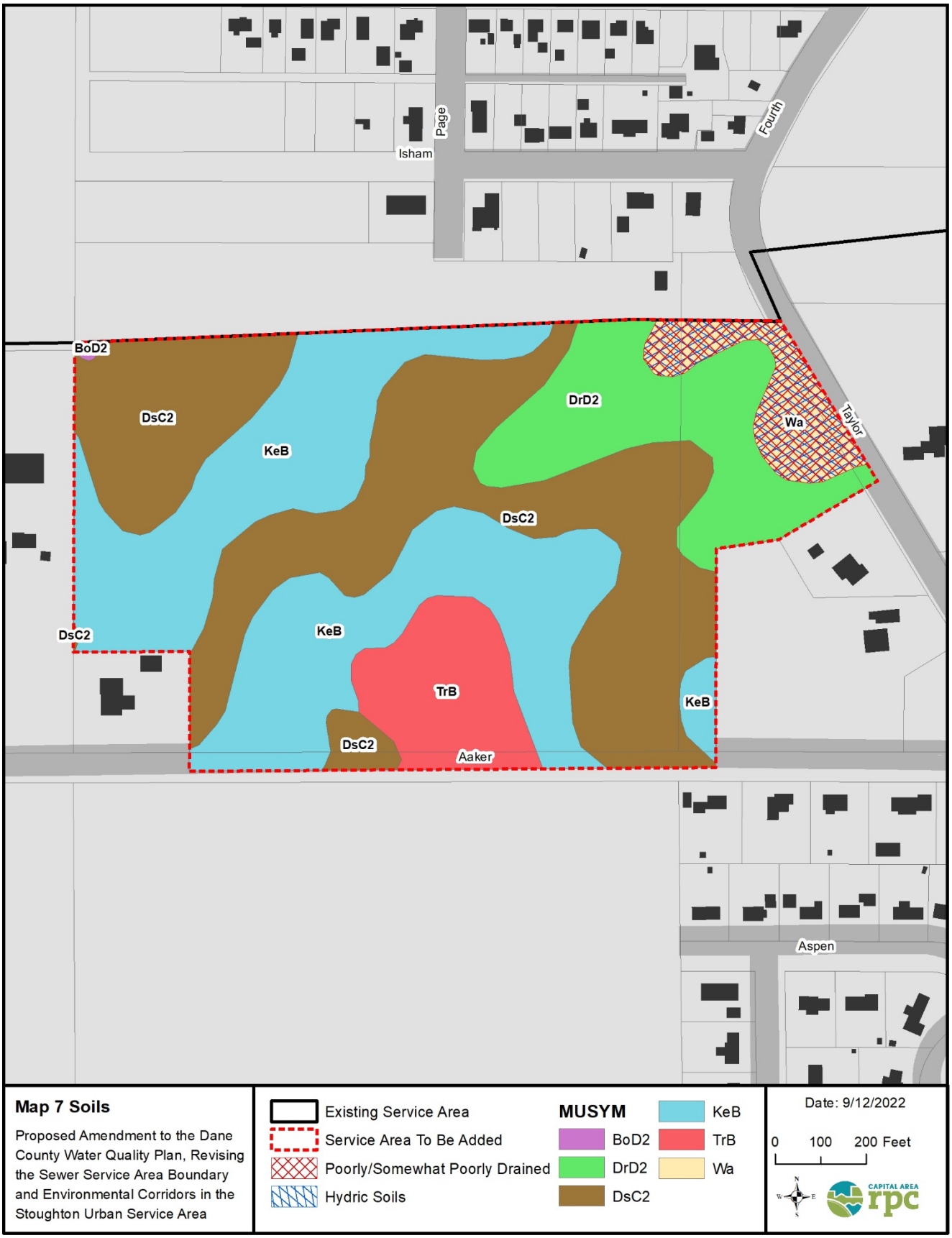
Map 5 – Subwatersheds



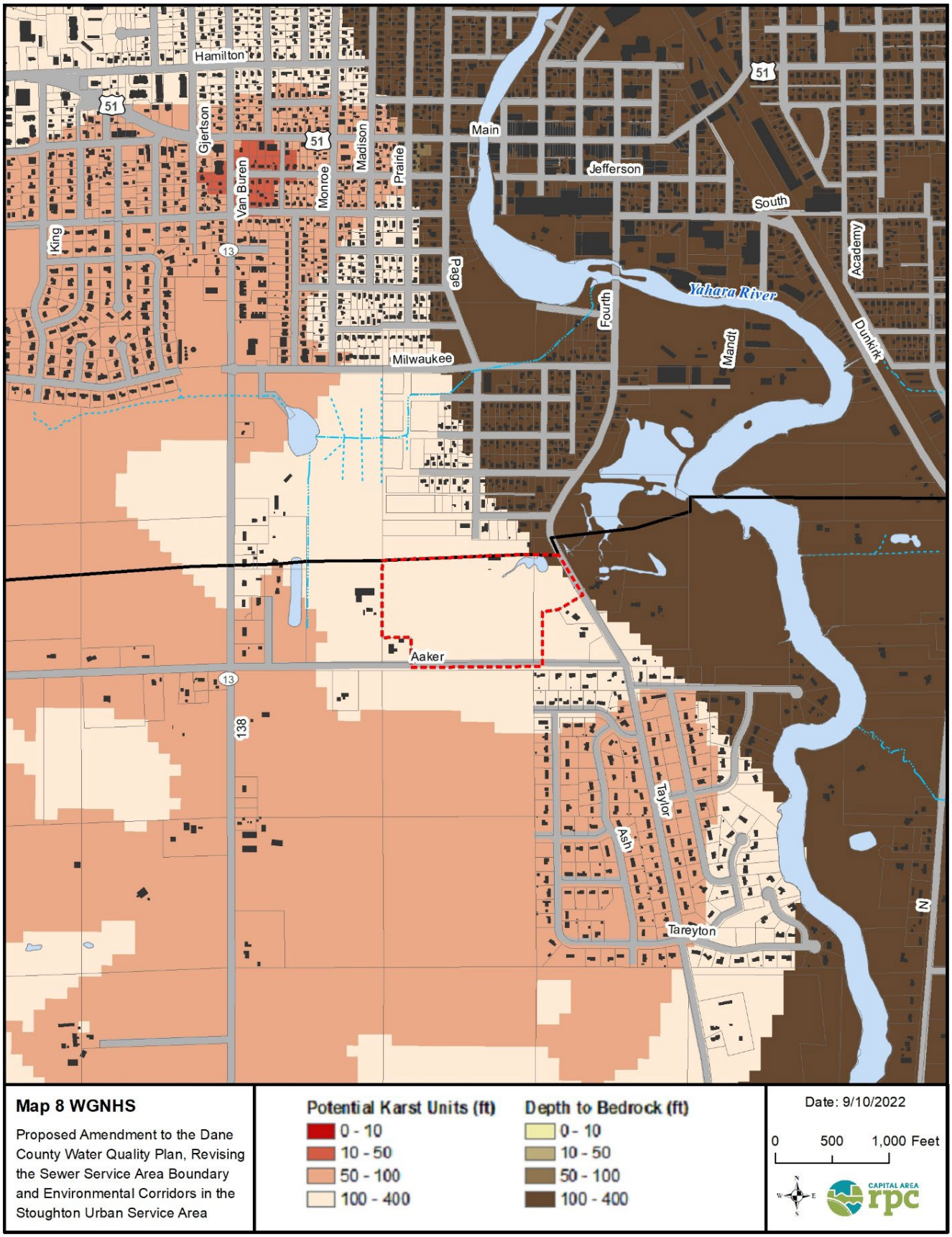
Map 6 – Elevations



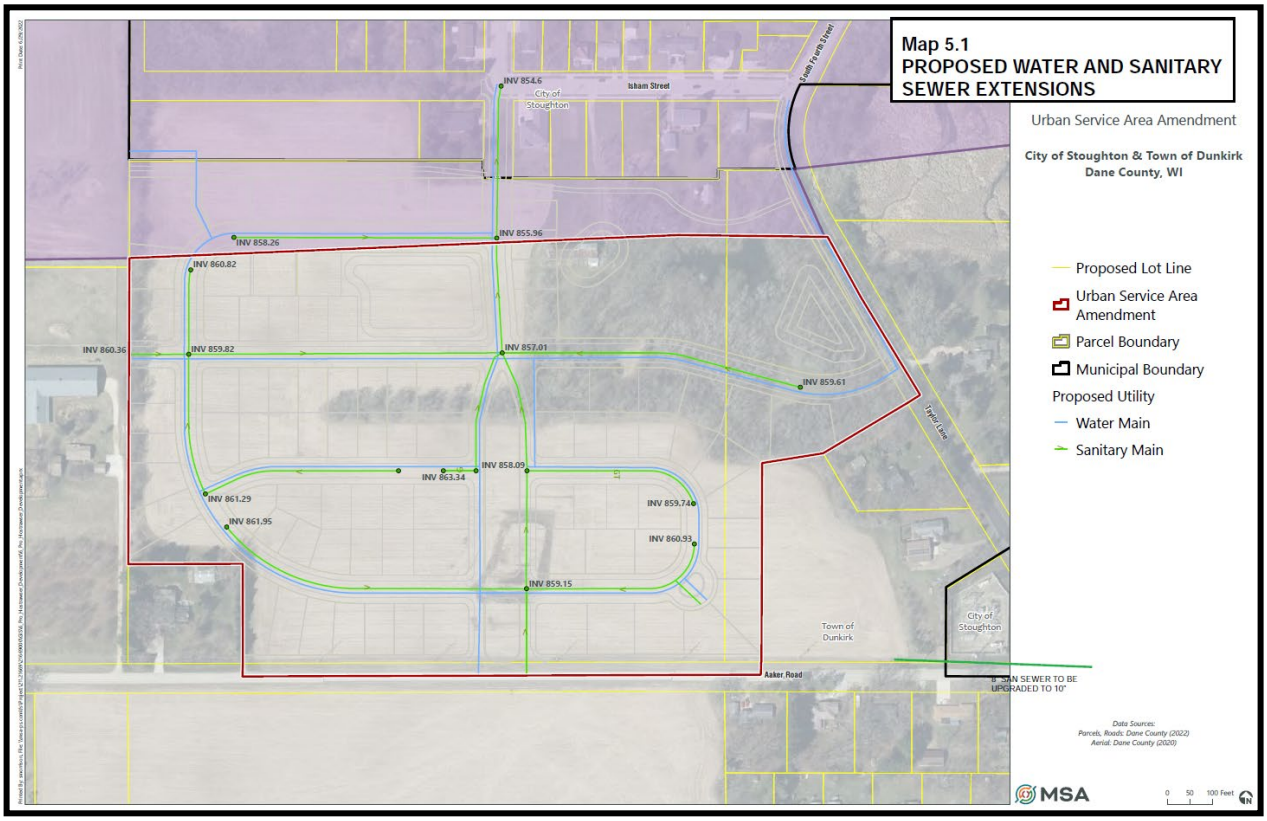
Map 7 - Soil Type



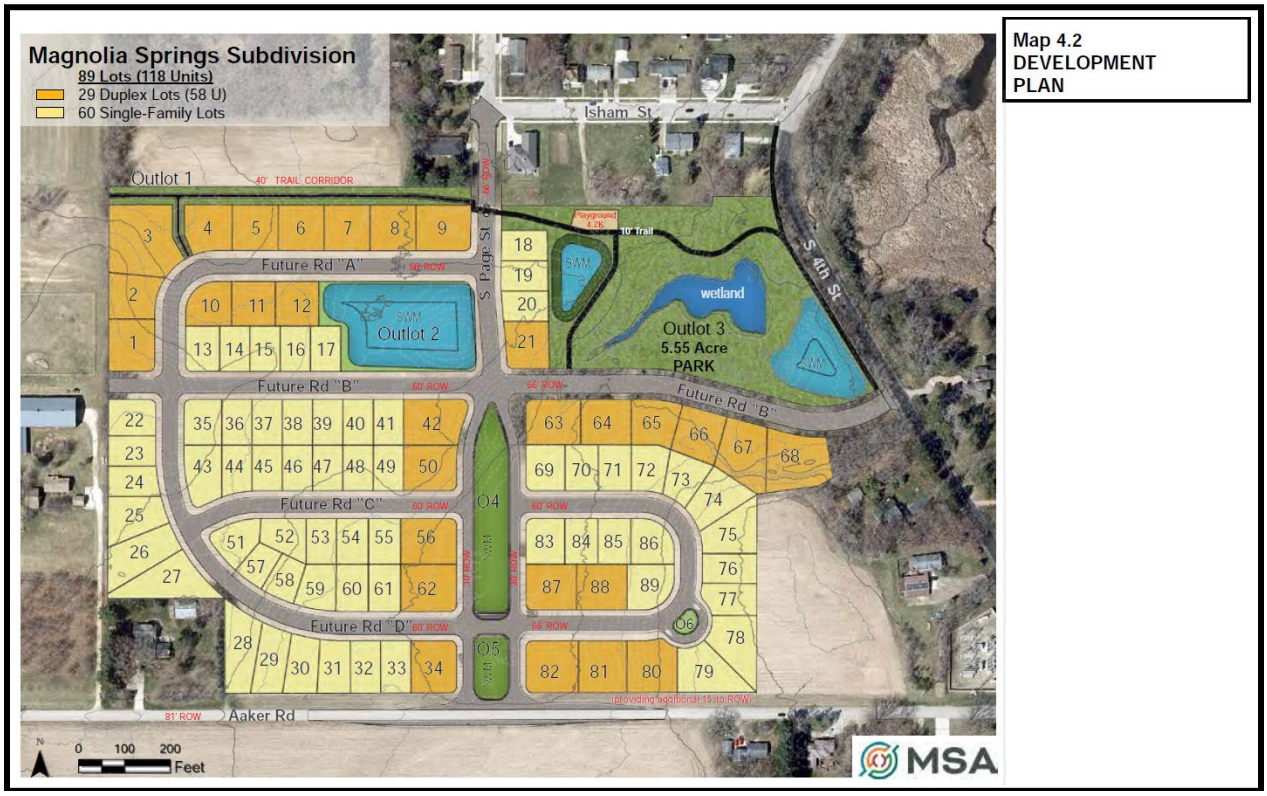
Map 8 – WGNHS Bedrock Depth and Potential Karst Features



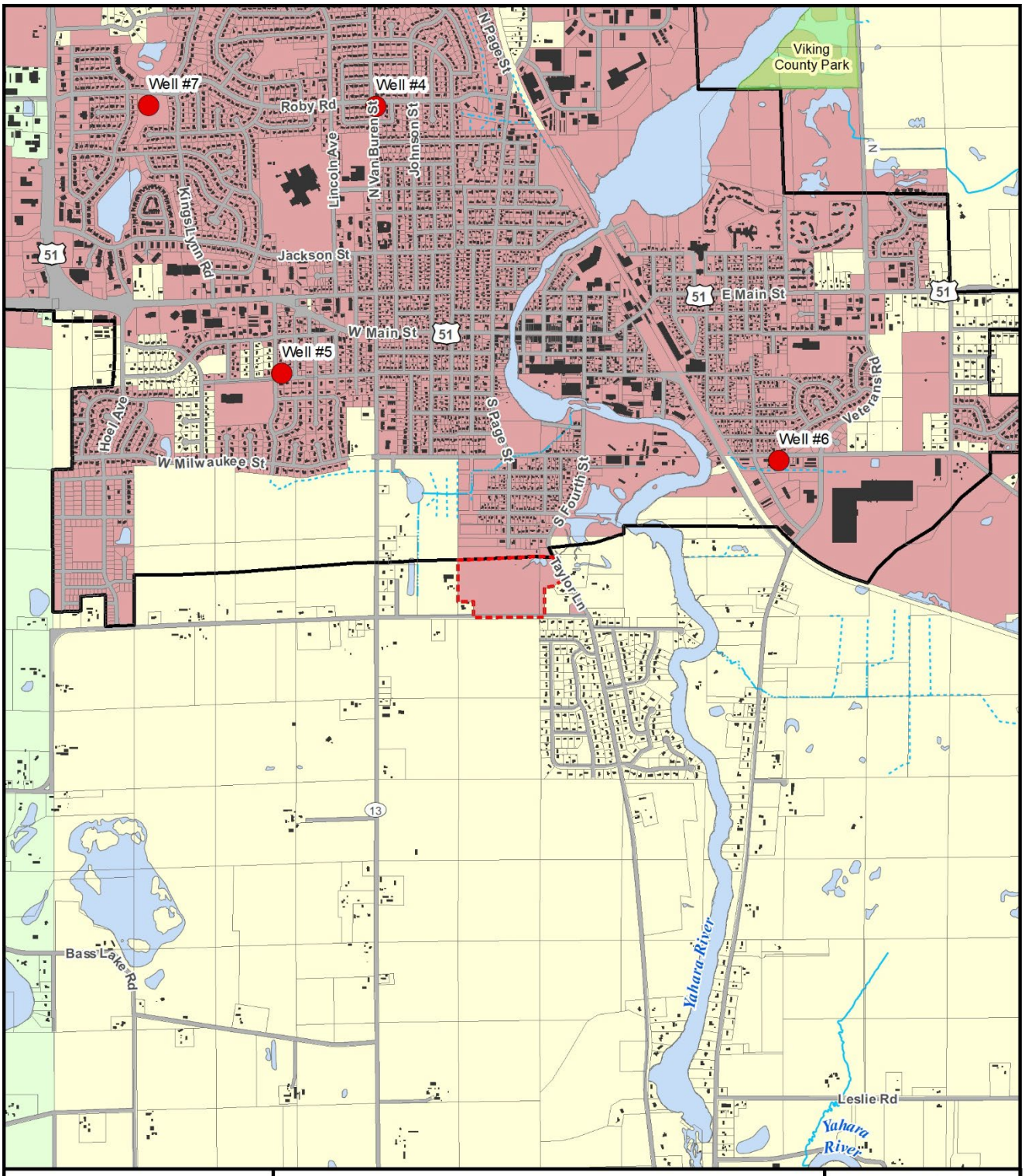
Map 9A – Proposed Sanitary Sewer and Water Main



Map 9B – Proposed Stormwater Management



Map 10 – Municipal Wells



Map 10 Municipal Wells

Proposed Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Stoughton Urban Service Area

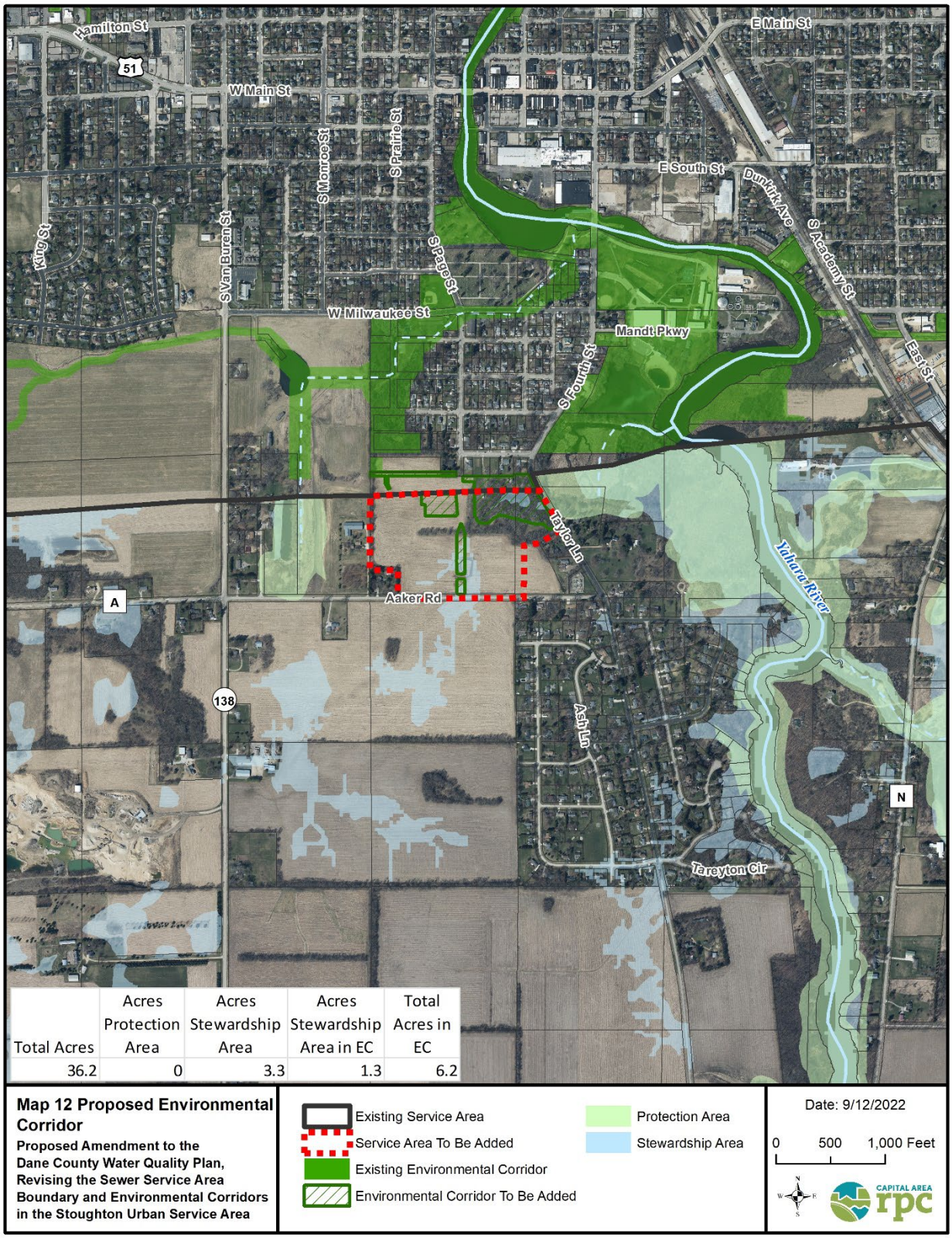
Existing Service Area
Service Area To Be Added
Wells
Town of Rutland
Town of Dunkirk
City of Stoughton

Date: 9/10/2022

0 1,000 2,000 Feet

Map 11 – Wetland Delineations

Map 12 – Proposed Environmental Corridor



Attachment 1 – Wisconsin Historical Society Letter

WISCONSIN HISTORICAL SOCIETY

Sean Higgins
City of Stoughton

9/13/22

Dear Sean,

I have checked our records for cultural resources in the Sewer Service Area northwest of the intersection of Taylor Lane and Aaker Road. Our records indicate that there are no burials nor other cultural resources in this location. An absence of evidence in our records does not mean, however, that cultural material will be found during construction. We would appreciate it if you contacted my office if any such evidence is found.

Sincerely,

James M Skibo
State Archaeologist
Wisconsin Historical Society

Collecting, Preserving and Sharing Stories Since 1846
816 State Street Madison, Wisconsin 53706
wisconsinhistory.org

Steve Glass Comments to CARPC public hearing on 09.08.22
Thank you for allowing me to speak.

I am Steve Glass, a member of 350 Wisconsin, a non-profit group of climate-concerned citizens dedicated to reducing carbon emissions statewide, towards a global community that protects our beautiful planet and supports the flourishing of all living beings. I also speak as a member of the 350 Wisconsin Dane County Working Group and as a Certified Ecological Restoration Practitioner.

The Dane County Working Group of 350 Wisconsin does not support the proposed amendment to the Water Quality Plan, on two grounds.

1.On policy grounds we oppose because the City of Stoughton is seeking a policy change in order to get approval for a project proposal. This is a **violation of process** - we should not change policy in order to get an exception to the rule. By this I mean that local land use plans should follow the guidelines of the plan, instead of the plan following the lead of local land use plans, as appears to be the case in this instance.

2. On a substantive level, we oppose both the Water Quality Plan policy amendment and the proposal itself for two reasons.

1. While the amendment justifications purport to achieve reductions greenhouse gas emissions–a goal of the Dane County Climate Action Plan– in reality the project is in direct opposition to the Dane County Climate Action Plan. The Dane County Plan includes, among others, this goal:

   "By reducing our GHG emissions by more than 45% by 2030, we can give a major boost to economic development in Dane County, a major boost to equity, and a major boost to public health."

2. The amendment and project justifications are based on claims that are not supported by scientific evidence.

Consider two claims in the City of Stoughton's project application, sent to CARPC by Rodney Scheel, Director of Planning & Development on July 27.

- Claim 1 is that: . "*the project will reduce greenhouse gas emissions and foster community climate resilience . . .*"

- *And Claim 3 is* that the project *Conserves farmland, water resources, natural areas, and fiscal resources.*

*C*laim #1 cannot be supported by evidence presented by the project design, application materials, and the current physical condition of the site, nor by common sense. The project will not decrease greenhouse gas emissions such as CO2 but rather will increase them in at least three ways.

1. The site already in its current weedy state will sequester some carbon in the soil. But,when the site is disturbed–as it was recently when the topsoil was apparently scraped off and stockpiled on site–carbon is released.
2. Any decrease in vegetative cover and corresponding increase in roofs, and paved surfaces, will, by definition, reduce the site's ability to sequester carbon.
3. Carbon emissions will increase due to fossil fuels used in preparation and construction of the project; CO2 emissions will increase due to the production and transport of the materials required to construct the homes, build roads, etc.

Claim #3, that the project *Conserves farmland, water resources, natural areas, and fiscal resources, also is not* supported by the evidence - for four reasons:

1. If farmland is taken out of production, clearly farmland is lost and not preserved.
2. Water resources will not be preserved because stormwater runoff will increase due to increase in roofs and paved surfaces. Storm water is likely to pollute downstream waters with contaminants and sediment. Despite a stormwater management plan, my experience with stormwater is that the creation of stormwater is best avoided. It cannot be mitigated or managed effectively and efficiently by traditional approaches.
3. Storm water flowing over the land does not infiltrate to ground water thus depleting rather than restoring this valuable resource.
4. CO2 emissions will likely increase because managing and moving water and storm water requires energy, which produces greenhouse gas emissions and costs time and money.

Thank you.