August 3, 2021

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 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 acres. There has been a total of 9 amendments to this urban service area since its creation totaling 175 net acres of developable land and a net reduction of Environmental Corridor acres. Environmental Corridor in the SSA currently totals 848 acres. 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 2011.

Planning in Stoughton

The *Stoughton Comprehensive Plan* received its most recent major amendment in 2017. The Plan's "Future Land Use Map" identifies the current amendment request as "Planned Mixed Use." The requested amendment area is recommended to be a mix of commercial and residential. Recommended use types in the City's zoning code include neighborhood-scale business, large format retail, senior housing, multi-family housing, and mixed-use development. The *Stoughton Comprehensive Plan* calls out the land in the requested amendment specifically on page 70, articulating the land uses proposed and highlighting the design challenges to pedestrian access discussed in the amendment application.

Existing Conditions

Land Use

The City of Stoughton is requesting amendment to the Stoughton USA. The area is located at the northwestern corner of the City, abutting Town of Dunn, Town of Dunkirk, and Town of Rutland. The majority of the area is currently within the City. Three town islands currently exist in the amendment area: a roughly 1.5-acre parcel in the Town of Rutland and two parcels totaling around 14 acres in the Town of Dunkirk. The amendment area is split in half by USH 51. Existing land use is primarily agriculture, woodlands, other open lands, and single-family. Proposed land use to the east of USH 51 includes large-scale multi-family and duplex residential, open space/park, and stormwater management. Proposed uses immediately west of USH 51 include commercial and stormwater management, while large and small-scale multi-family residential, single-family residential, open space/park, and stormwater management uses are proposed further west.

Surrounding Planned Land Uses Include:

- North: Planned Mixed-Use
- South: Commercial (adjacent STH 51)
- East: Commercial, Residential
- West: Commercial, 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	36.3	0.0
Commercial	0.0	14.4
Natural Area	0.0	15.5
Open Land	20.1	0.0
Recreation	0.4	0.0
Residential	12.7	32.3
Transportation	8.1	13.6
Vacant	0.7	0.0
Water	0.0	10.5
Woodlands	11.9	3.9
Total	**90.2**	**90.2**

Cultural and Historic Sites

The Wisconsin Historical Society has been contacted regarding the presence of any known archaeological sites or cemeteries within the amendment area. Given negative results from previous surveys near the amendment area, survey of the entire site is unlikely to result in identification of significant resources. However, WHS indicates that a small portion of the southeast corner of the amendment area may contain deposits or burials given its similarity to other sites in Dane County. (See Attachment 1).

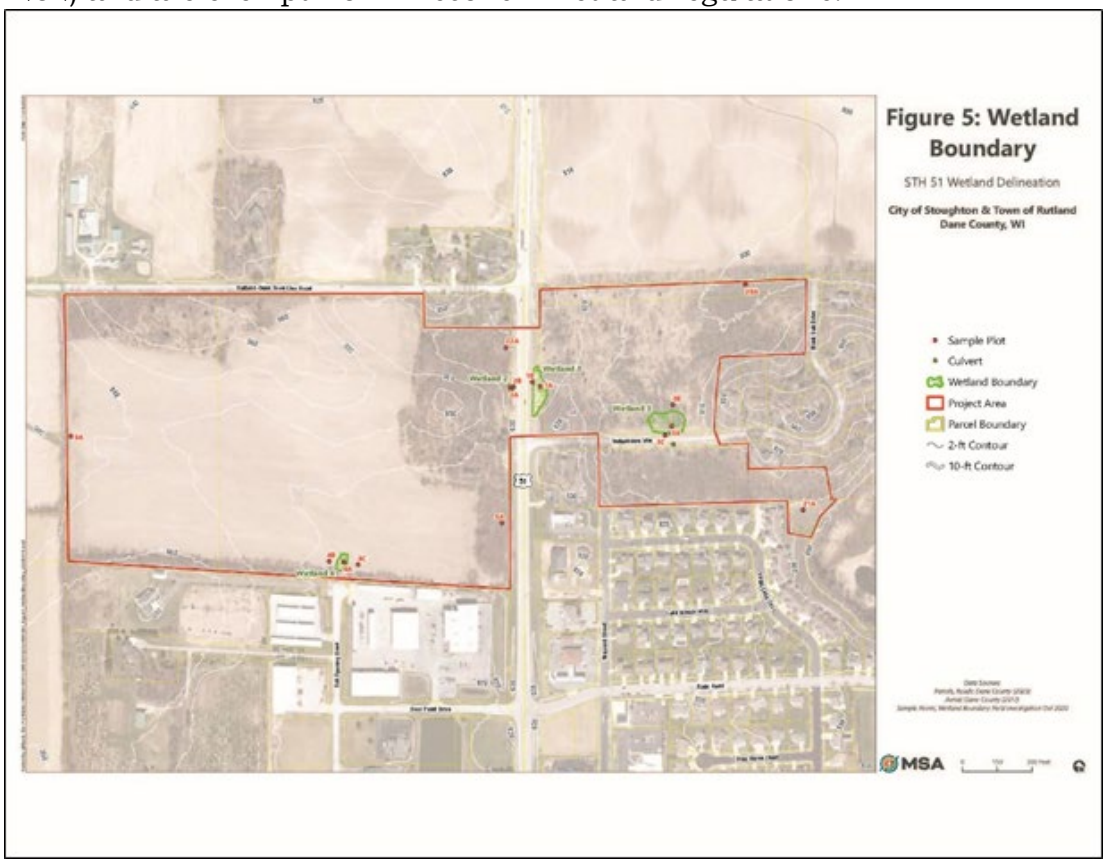
Natural Resources

The proposed amendment area is in the Lake Kegonsa-Yahara River (HUC 12: 070900020902) and City of Stoughton-Yahara River (HUC 12: 070900020903) watersheds (Map 5), (link to DNR data). 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

DNR's Wisconsin Wetland Inventory does not show any wetlands within the amendment area.

A wetland delineation was conducted by MSA Professional Services, Inc. in October 2020. The site investigation and field delineation determined there were four small emergent / wet meadow wetlands totaling approximately 0.53 acres (see figure below). Wetland 1 is associated with the outfall of a culvert beneath USH 51. The dominant vegetation observed in Wetland 1 was reed canary grass (*Phalaris arundinacea*). Wetland 2 is associated with the upstream side of a culvert beneath USH 51. The dominant vegetation observed in Wetland 2 was fowl bluegrass (*Poa palustris*), multiflora rose (*Rosa muliflora*), reed canary grass, yellow foxtail (*Setaria pumila*), and common buckthorn (*Rhamnus cathartica*). Wetland 3 is associated with the upstream side of a culvert beneath Velkommen Way. The dominant vegetation observed in Wetland 3 was barnyard grass (*Echinochloa crusgalli*). Wetland 4 is in a localized depression in an agricultural field. The dominant vegetation observed in Wetland 4 was maize (*Zea mays*). DNR wetland staff has reviewed the wetland delineation report and has issued an approval (WIC-SC-2020-13-03825) for filling Wetlands 1 through 4. The four wetlands received a non-federal jurisdictional determination (WIC-SC-2020-13-04262) and are exempt from Wisconsin wetland regulations.



The WWI includes emergent / wet meadow and forested wetlands downstream of the eastern portion of the amendment area that are associated with Virgin Lake.

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 (Map 5). 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 USEPA 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. Volunteer water quality monitoring is conducted at Prospect Street (Station ID 10040742) as part of the Yahara WINs Adaptive Management initiative. In April and May 2021, data was collected for both water chemistry and biology; however chloride data was not collected. The spring 2021 monitoring indicated field measurements of dissolved oxygen of 6.7 to 10 mg/L, an average transparency of 85 to 120 cm, and a macroinvertebrate index score of 2.27. USGS baseflow monitoring on the Yahara River at Forton Street Bridge (Station 05429700) measures discharge and water level but does not collect water quality data.

Springs

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

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 Main Street (see Map 5), decreased compared to predevelopment flow conditions (202 to 152 cfs; 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 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 species within a one-mile radius of the amendment area. A one-mile buffer was considered for terrestrial and wetland species and a two-mile buffer was considered for aquatic species. One state fish species of concern and one federal reptile species of concern were identified within a two-mile radius.

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

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 898 feet to 967 feet. The amendment area includes small portions of significant areas of steep (>12%) slopes associated with the existing development in the eastern portion of the amendment area (see Map 6).

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 (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 Batavia and Troxel soils (the BbB and TrB map unit) are not hydric, but they do have a seasonal (April to June) zone of water saturation within 5 feet of the ground surface. These soils are classified as moderately well drained or well drained and therefore do not pose a limitation for buildings with basements.

Table 2
Soils Classification

Soil	% of Area	General Characteristics
Batavia Silt Loam; BbB	32.3	Deep, well drained, nearly level to sloping soils on high benches. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses moderate limitations for development due to shrink/swell potential.
Kidder Silt Loam; KdC2	22.6	Deep, well drained, gently sloping to very steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and severe hazard of erosion. Poses moderate limitations for development due to steep slopes.
Boyer Sandy Loam; BoD2	9.5	Well drained, gently sloping to moderately steep soils on benches in valleys. Soils have low fertility, moderately rapid to rapid permeability, and a severe hazard of erosion. Poses severe limitations for development due to slope.
Dodge Silt Loam; DnC2	9.3	Deep, well drained, gently sloping and sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a severe hazard of erosion. Poses moderate limitations for development due to slope, shrink/swell potential, and low bearing capacity.
Kidder Silt Loam; KdB	6.8	Deep, well drained, gently sloping to very steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and moderate hazard of erosion. Poses slight to moderate limitations for development due to shrink/swell potential.
Dresden Silt Loam; DsC2	6.7	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.
Troxel Silt Loam; TrB	5.6	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.
Dodge Silt Loam; DnB	4.0	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.
Kegonsa Silt Loam; KeB	2.5	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.

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	BbB, KdB, TrB, DnB, KeB	51.2
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%)	BoD2	9.5
Soils Associated with Shallow Bedrock (< 5')	None	0
Best Potential for Infiltration in Subsoils	BbB, KdC2, BoD2, DnC2, KdB, DsC2, DnB, KeB	93.7

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

According to WGNHS data, bedrock within the northwestern 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, consists of two formations including the Lone Rock and Mazomanie Formations. Thickness is up to 150 feet. Portions of the western and eastern portions of the amendment area are in the

Trempealeau Group and Prairie du Chien Group, except for the southcentral portion of the amendment area which is in the Ancell Group. Bedrock in the Trempealeau Group is quartz sandstone, dolomitic siltstone, silty dolomite, and sandy dolomite, and 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. Bedrock in the Prairie du Chien Group is dolomite, minor sandstone, cherty dolomite, vuggy, sandy, and oolitic, and consists of two formations including the Shakopee and Oneota Formations. Thickness is up to 145 feet in eastern Dane County. Bedrock in the Ancell Group is medium-grained, mature quartz sandstone, and consists of two formations including the Glenwood and St. Peter Formations. Thickness is about 100 feet. According to WGNHS data, the depth to bedrock in the amendment area ranges from as little as 10 feet to up to 200 feet, with the shallowest depths generally being in the eastern part and deepest depths generally being in the western part 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 amendment area at depths ranges from 65 to 101 feet in the western part of the amendment area and from 33 to 82 feet in the eastern part of the amendment area (see Map 8), which is well below the depth that would be a concern for stormwater infiltration. 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, 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 a total of approximately 26 acres of parks, open space, and stormwater management areas proposed as public outlots in the amendment area (See Map 4).

Water System

Stoughton Water Utility provides municipal water through a public water distribution system which includes approximately 370,961 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 991 to 1,324 gallons per minute (gpm). In total, the gross capacity of the municipal wells is 4,543 gpm (6.54 million gallons per day, MGD). The firm capacity (with the largest well assumed to be out of service) is approximately 3,219 gpm (4.64 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 2020 Annual Report to the Public Service Commission of Wisconsin (link to 2020 Annual Report), the City pumped an average of 958 gpm or 1,379,921 gpd (1.38 MGD), approximately 30% of its firm pumping capacity. In 2020, the maximum amount pumped in any one day was 2.25 MGD.

The City estimates the current average daily demand is 1,050 gpm or 1.51 MGD, with an estimated peak daily demand of 1,911 gpm or 2.75 MGD. According to the 2020 Annual Report, the average daily demand from retail customers is 835 gpm or 1.20 MGD.

Water losses in the City's distribution system were an average of 155,458 gpd (0.16 MGD) in 2020, which accounted for 11% of the net water supplied in 2020. Approximately 86% of this was due to unreported and background leakage, with the remaining due to reported leaks and other apparent losses. In 2020, there were 11 main breaks and 18 service break which were repaired. Water losses in the City's distribution system were 10% in 2018 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%.

Water supply within the amendment area east of USH 51 will be provided by extension of an existing 10-inch water main stub on Nygaard Street; the area west of USH 51 will be connected to the east area via 10-inch water main crossing beneath USH 51 and also receive water supply via extension of existing 10-inch water main from the Kettle Park West development to the south. It has been noted in the City's application that development west of USH 51 will be contingent upon the Developer extending this water main from the Kettle Park West development along Oak Opening Drive and connecting to the amendment area to create a loop of the public water supply system as well as provide redundancy within the amendment area. Within the amendment area, 8-inch and 10-inch water main will be extended throughout, and individual service connections will be provided to each proposed lot; water main dead-ends will correspond to proposed roadway dead-ends intended for possible future development. Public water supply is not anticipated to be extended to the 14 existing single-family residential lots within the amendment area at this time, although this demand has been included in the estimates below.

The annual average daily water demand for the amendment area is anticipated to be 95,690 gallons per day (gpd) or 66 gpm. This assumes an average demand of 100 gallons per person per day (gpdc), 2.5 persons per single-family unit, and 1.8 persons per multi-family unit for residential land uses; and 1,750 gpd per acre for commercial land uses. The estimated peak daily demand is 191,380 gpd or 133 gpm (0.19 MGD), based on a peak daily factor of 2.0. The City estimates the peak hourly demand to be 237 gpm, based on a peak hourly demand factor of 4.0 for residential land uses and 2.5 for commercial land uses. These estimates are reasonable based on land use and the 2020 Annual Report. The estimated average daily water demand and peak daily

demand represent an increase of approximately 8% and 9%, respectively, of the current demands on the system; however, it is anticipated that the existing water supply system will support the additional demand from the proposed amendment area.

Wastewater

Sanitary sewer service will be provided to the amendment area by connection to the City's sanitary sewer collection and treatment system. The entire amendment area will gravity drain to existing sewer located within a public sanitary sewer easement between Lots 183 and 184 of the Blue Heron Addition to John Nygaard's Virgin Lake Estates plat (dated July 19, 2000). This sewer connects to existing sewer main on Virgin Lake Drive to the south, then flows to the Roby Road Interceptor, and ultimately to the City of Stoughton Wastewater Treatment Facility. Within the amendment area, the proposed lots will be served by 8-inch sanitary sewer main and individual sewer laterals.

The proposed new development within the amendment area consists of 9 single-family residential lots, 9 small-scale multi-family lots (56 total units), 3 large-scale multi-family lots (292 units), and 2 commercial lots (approximately 16 acres) contributing to wastewater flows. There are also 14 existing single-family residential lots within the amendment area which have been included in the wastewater flow estimates, although sewer service is not anticipated to be extended to these lots at this time. The City estimates that the amendment area will generate an annual average of 91,790 gpd of wastewater, or 64 gpm. This assumes 2.5 persons per single-family dwelling unit (existing and proposed), 1.8 persons per multi-family dwelling unit, and an average wastewater generation rate of 100 gpcd for residential land uses; and 1,500 gpd per acre (gpd/ac) for commercial land uses. Utilizing a peaking factor of 4 for residential areas and 2.5 for commercial areas, it is estimated that the amendment area will generate a daily peak flow of 231 gpm. This estimate is consistent with typical design wastewater generation rates for the proposed residential and commercial lots.

The proposed 8-inch sanitary sewer main within the amendment area is 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 8-inch sanitary sewers downstream in Virgin Lake Drive and Roby Road also have estimated capacities of 332 gpm, and currently receive peak flows of 45 gpm and 122 gpm, respectively, based on City of Stoughton Public Works staff estimates as provided within the application. Together with the proposed flows from the amendment area, the existing 8-inch interceptor sewer on Roby Road will exceed pipe-full capacity; additionally, Stoughton Utilities requires that sanitary sewers operate at approximately 80 percent capacity. To accommodate the additional flows from the amendment area, the limiting section of the Roby Road interceptor sewer will be upsized to a 10-inch sewer and provide an estimated capacity of 606 gpm. With this proposed upgrade, the receiving sewers have sufficient capacity to handle the anticipated peak flow from the amendment area.

<u>Wastewater Treatment Facility</u>

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 of the Lower Rock River Basin. 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 2020, the facility

received an average monthly influent hydraulic loading of 1.13 MGD (55% of the design capacity), including infiltration and inflow, according to the 2020 Compliance Maintenance Annual Report (CMAR) (link to 2020 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. Below is a summary of the major effluents reported on in the 2020 CMAR:

- The biological oxygen demand (BOD) effluent quality for 2020 was well below the monthly average limit, with a monthly average of 2.4 mg/L (10% of the limit) and a maximum of 3 mg/L (12% of the limit) for the months of February through April, September, and October.
- The total suspended solids (TSS) effluent quality for 2020 was below the monthly average limit, with a monthly average of 6.4 mg/L (32% of the limit) and a maximum of 8 mg/L (40% of the limit) for the months of September and October.
- The ammonia (NH3) effluent quality for 2020 was below the monthly average limit (varies by month), with a monthly average of 4.92 mg/L (average of 12% of the respective limits) and a maximum of 13.83 mg/L (46% of the respective limit) for the month of September.
- The phosphorus (P) effluent quality for 2020 was below the monthly average limit, with a monthly average of 0.36 mg/L (average of 33% of the respective monthly limits) with a maximum of 0.51 mg/L (51% of the limit).

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 is 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).

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. The amendment area will be required to follow the more stringent standards contained within the respective ordinances, as well as DNR requirements contained in NR 151 and NR 216.

The conceptual stormwater management plan for the amendment area consists of four areas of stormwater management within public outlots, each containing a combination of wet retention basins and infiltration basins to address stormwater quality and quantity requirements for the proposed 51 West Addition development. The 14 existing

lots on the east edge of the amendment area were included in preliminary stormwater calculations; however, any redevelopment of these lots will require further analysis of stormwater runoff conditions to verify conformance with stormwater management requirements. The majority of runoff from the proposed amendment area will flow to the stormwater facilities through a network of storm sewer pipes for treatment and peak flow attenuation prior to discharge offsite. Given the downstream susceptibility to flooding, the City has proposed peak runoff rate and volume control performance measures much stricter than the current requirements of county and local ordinance. This development will be required to create no increase in stormwater runoff peak flows and no increase in runoff volumes for all design storm events up to and including a 200-year, 24-hour storm event. This greatly exceeds current state, county, and local requirements for stormwater management and is intended to mitigate negative impacts to downstream properties and conveyances due to the proposed development. The proposed stormwater management facilities within public outlots will ultimately be owned and maintained by the City.

The downstream flow paths from the amendment area are somewhat poorly defined and include several closed basins and mapped wetlands. Locations of post-development stormwater discharge from the amendment area will closely match pre-development locations. Discharge from the western stormwater basins will flow west into the Town of Rutland then north across Rutland-Dunn Townline Road into the Town of Dunn through a series of large wetlands and internally drained areas, and ultimately to Lake Kegonsa. Discharge from the southern and southeastern basins will flow south through wetlands and internally drained areas (Virgin Lake Park and Paradise Pond) within the City of Stoughton, then east through urbanized areas of the City, and ultimately to the Yahara River. Discharge from the northeastern basins will flow north through internally drained agricultural fields within the City of Stoughton, then into the Town of Pleasant Springs through agricultural and developed areas, and ultimately to Lake Kegonsa.

Within the amendment area there are two closed basins with greater than 12” of depth from invert to the lowest outlet, both of which will be filled with the proposed development. Preliminary stormwater calculations have appropriately included this storage volume within the pre-development condition and proposed stormwater management areas make up for the loss in storage capacity. Although not a requirement at this time, in addition to the 200-year peak rate and volume control previously mentioned, preliminary modeling of back-to-back 100-year storm events indicates there will be no increase in peak runoff rate or runoff volume from the northeastern and southeastern subwatersheds (east of USH 51); the modeling indicates no increase in peak runoff rates and a slight increase in runoff volumes for the western and southern subwatersheds (west of USH 51). Nonetheless, due to the enhanced peak rate and volume controls being implemented, no adverse impacts to downstream properties are anticipated for storm events up to the 200-year, 24-hour design storm event.

A detailed stormwater management plan will need to be prepared for review and approval prior to beginning any development construction. The plan will be required to meet the agreed upon standards of peak rate and volume control through the 200-year 24-hour event, in addition to the stormwater management and performance standards of the City of Stoughton, Dane County, and DNR.

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) 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 in a retention 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 1-year, 24-hour design storm. 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-, 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 and exceeds standards required by City of Stoughton ordinances. In addition, require post-construction peak runoff rate control for the 200-year, 24-hour design storms (using NRCS MSE4 storm distributions) to match predevelopment peak runoff rates. This exceeds 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. This is consistent with the standards currently required by Dane County and City of Stoughton ordinances.

5. Maintain predevelopment groundwater annual recharge rate of 9 to 10 inches per year, as estimated by the Wisconsin Geological and Natural History Survey in a 2012 report titled “Groundwater Recharge in Dane County, Wisconsin Estimated by a GIS-Based Water Balance Model.” This is consistent with the standards currently required by Dane County and City of Stoughton ordinances.

6. Treat the first one-half inch 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 and City of Stoughton ordinances.

Environmental Corridors

The proposed amendment area includes approximately 26 acres of environmental corridor (See Map 2). This includes approximately 12 acres of park space proposed as public outlots. Planned stormwater management areas (approximately 13.2 acres) have also been designated as environmental corridors.

Impacts and Effects of Proposal

Meeting Projected Demand

Stoughton is projected to grow by roughly 5,700 people and 2,300 households over the next 30 years. Employment is projected to increase by 1,300 jobs. The proposed amendment would add an estimated 357 housing units, 95% of which would be multi-family. Net residential density for the requested amendment is 16 dwelling units per acre. Modeling in Urban Footprint of a preliminary version of the site plan projected around 300 jobs from commercial land uses. Net employment density is estimated at 19 jobs per acre.

Phasing

The requested amendment does not exceed 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 adopt higher standards for runoff volume through local ordinances. In response to climate change, the City of Madison adopted peak rate control for the 200-year storm event in their ordinance in June 2020. Dane County is expected to do the same this summer, which will make this requirement 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 or exceed 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 peak rate and volume control for this development.

Regional partners are actively working to address chlorides through the Wisconsin Salt Wise Partnership (link to website). 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 lead to 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 52 cfs decrease in baseflow of the Yahara River at Main Street (location of modeling shown on Map 5) from predevelopment (no pumping) to 2010 (Table 4). An additional 8 cfs decline compared to 2010 conditions is anticipated for the year 2040, according to modeling.

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.

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	*202 cfs*	*150 cfs*	*142 cfs*

The model developed for the 2014 Wisconsin DNR report *Ecological Limits of Hydrologic Alteration in Dane County Streams* (link to report) could not accurately predict the effect of the projected reduction in baseflow on the Yahara River fish community since it is a flow controlled (dammed), rather than a natural, system. The report also noted that the predicted responses of many large river fish species, such as emerald shiner and freshwater drum, to flow reductions are probably not as robust as those for smaller stream species because there were few large rivers in the fish model dataset that have low baseflow yields. More research is needed to develop a different approach to evaluate the ecological effects of the flow changes that are predicted to occur in the Yahara River.

Maintaining pre-development groundwater recharge helps to maintain baseflow and mitigate any reductions. The City of Stoughton proposes to maintain the pre-development annual recharge rate (estimated as 9 to 10 inches per year for this area according to the Wisconsin Geological and Natural History Survey study). Experience has shown that this criterion is generally met when 90% of pre-development runoff volume is maintained for the development area through infiltration measures. The return of treated effluent to Yahara River also effectively compensates for local groundwater withdrawals within the Yahara River watershed.

Comments at the Public Hearing

A public hearing was held on the proposed amendment at the July 8, 2021 meeting of the Capital Area Regional Planning Commission. Representatives of the City of Stoughton and the development team spoke in favor of the amendment. Commissioners had several questions related to the proposed stormwater management plan including the ultimate flow path of stormwater runoff from the amendment area and the potential for closed basins in the amendment area. Commissioner Minihan raised a concern about stormwater runoff to the west having the potential to flood the Rutland-Dunn Townline Road.

The Town of Dunn submitted an email (Attachment 2) requesting stormwater management for the 200-year event and noting concerns with traffic on Rutland-Dunn Townline Road. The City of Stoughton responded (Attachment 2) to the Town of Dunn's email reiterating their commitment to stormwater peak rate and volume control through the 200-year event and working with the DOT on transportation issues.

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.

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 or exceed 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.

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. However, 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 is expected to do the same this summer, which will make this requirement universal to all of the communities in Dane County.

In addition, the City of Stoughton and development team for this plat have agreed to higher stormwater management standards for this amendment area to address the stormwater concerns associated with closed basins and those raised by the Town of Dunn. Namely, there will be no increase in peak rate or 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 state and local requirements and agreements 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 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, 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. Oil and grease control is required that treats the first one-half inch of runoff using best management practices at commercial and industrial sites, in accordance with the City of Stoughton and Dane County Stormwater Ordinances.

f. Maintain 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. Stormwater management facilities shall be placed in public outlots whenever feasible and designated as environmental corridor.

3. Environmental corridors are required to be delineated to include the proposed parks and 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. Peak rates of runoff are required to be controlled for the 200-year 24-hour design storm to "pre-development" levels.

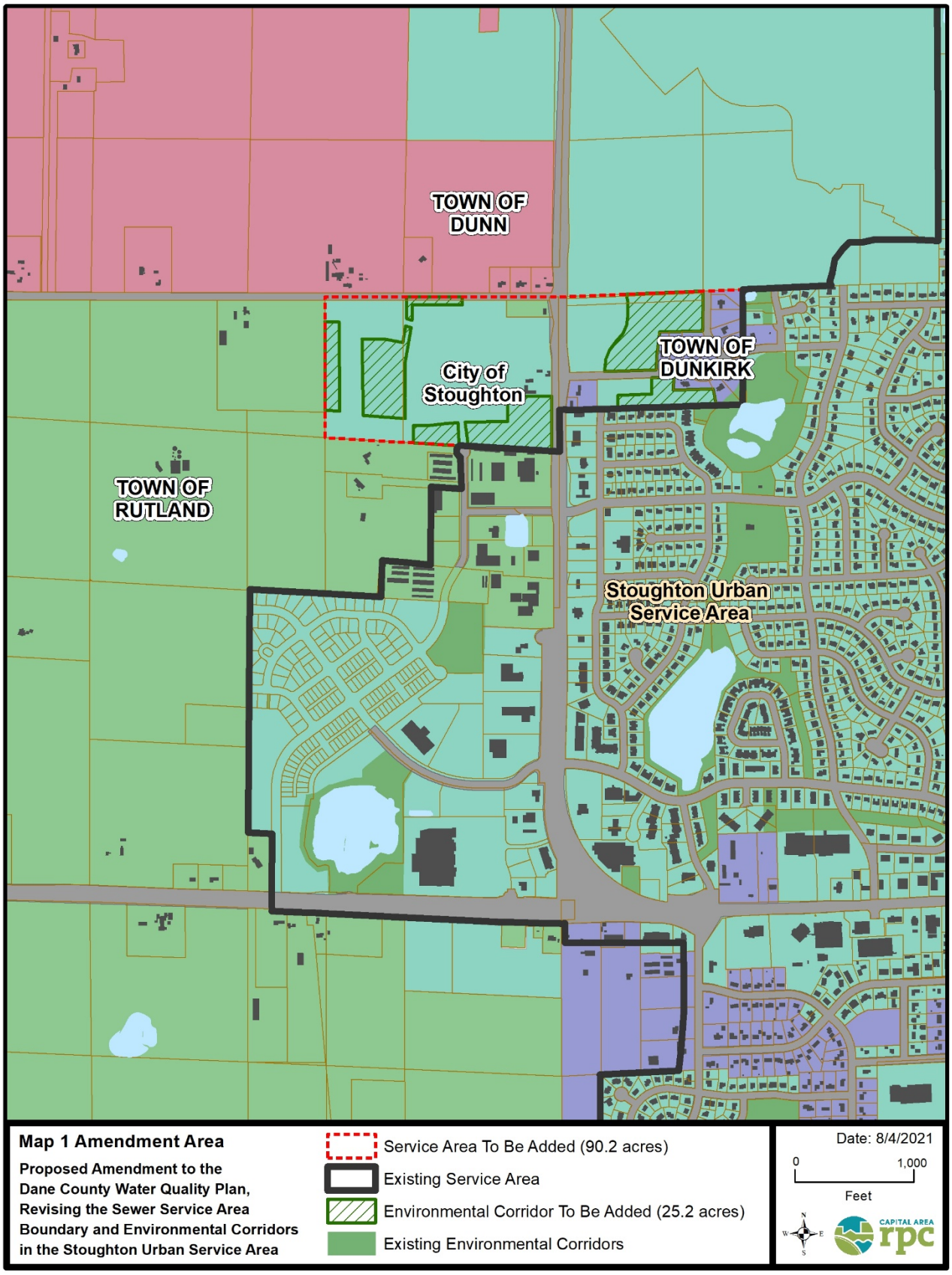
2. Require no increase in runoff volume for the 1-year through the 200-year, 24-hour design storms.

Recommendations

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

1. Continue to encourage the responsible use of deicers and water softeners by participating in the trainings and outreach activities of the Wisconsin Salt Wise Partnership.

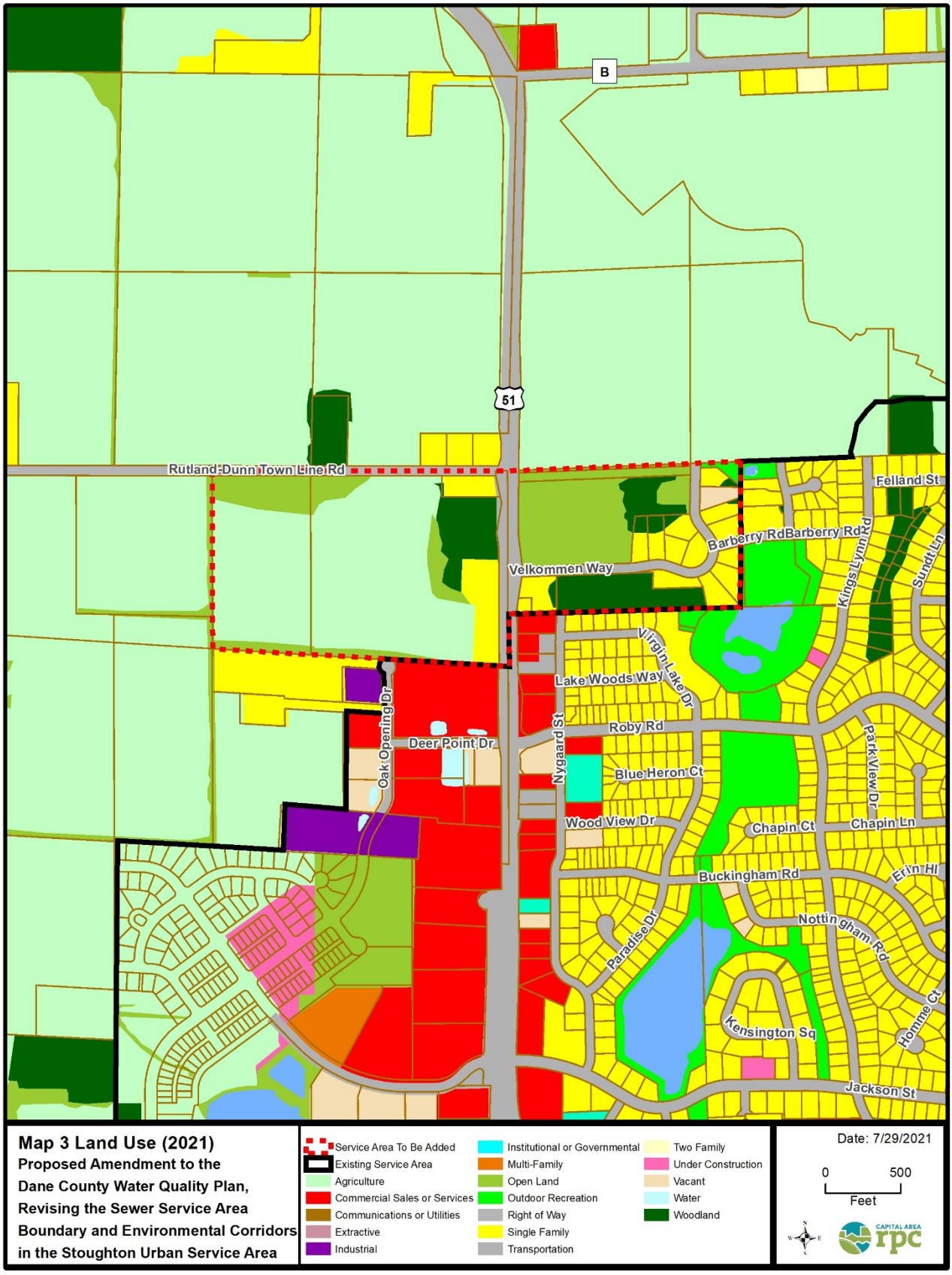
Map 1 - Amendment Area



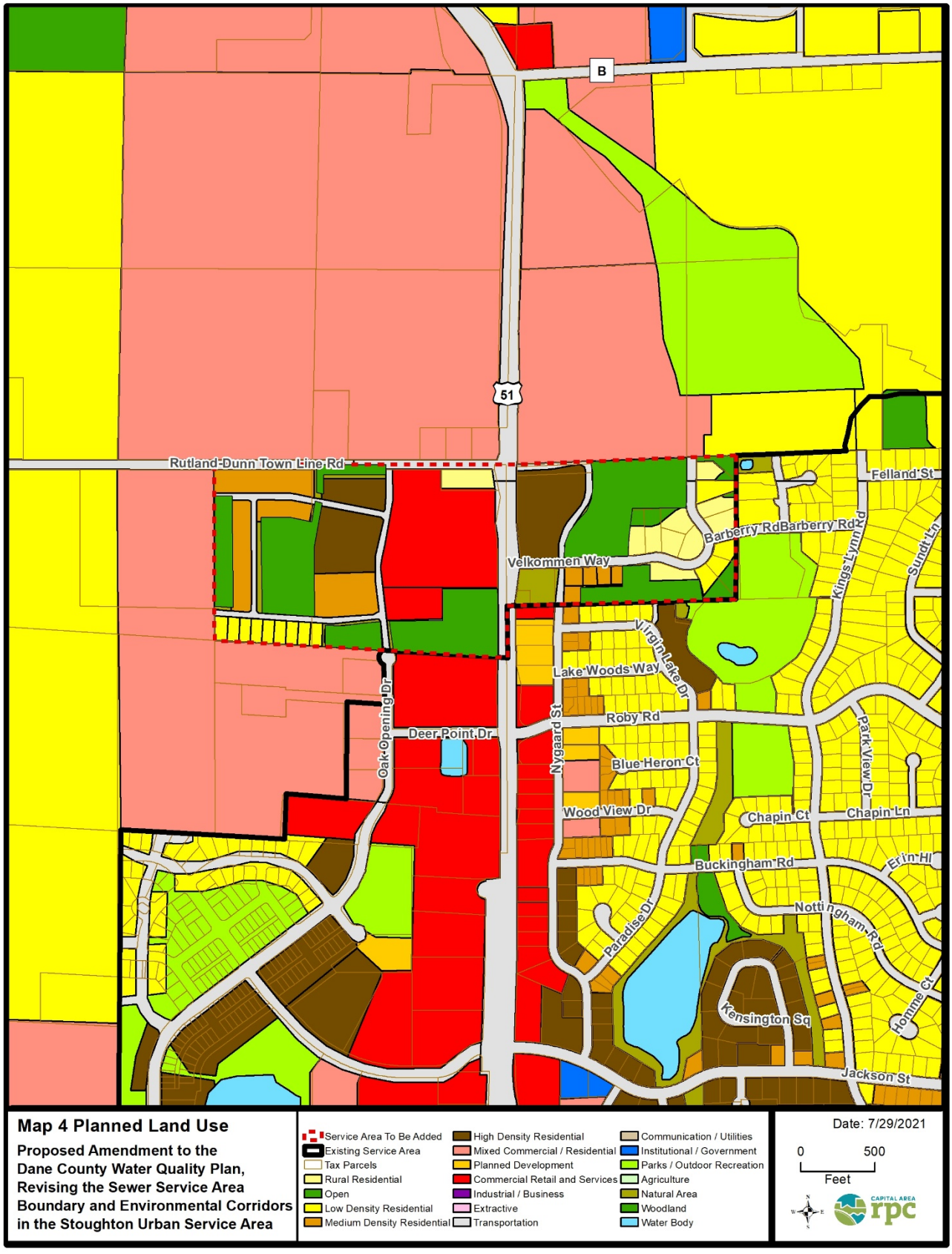
Map 2 – Aerial


TOWN OF DUNN
Rutland-Dunn Town Line Rd
City of Stoughton
TOWN OF DUNKIRK
TOWN OF RUTLAND
Stoughton Urban Service Area
McComb Rd
51
138
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
Service Area To Be Added (90.2 acres)
Existing Service Area
Environmental Corridor To Be Added (25.2 acres)
Existing Environmental Corridors
Date: 8/3/2021
0
1,000
Feet

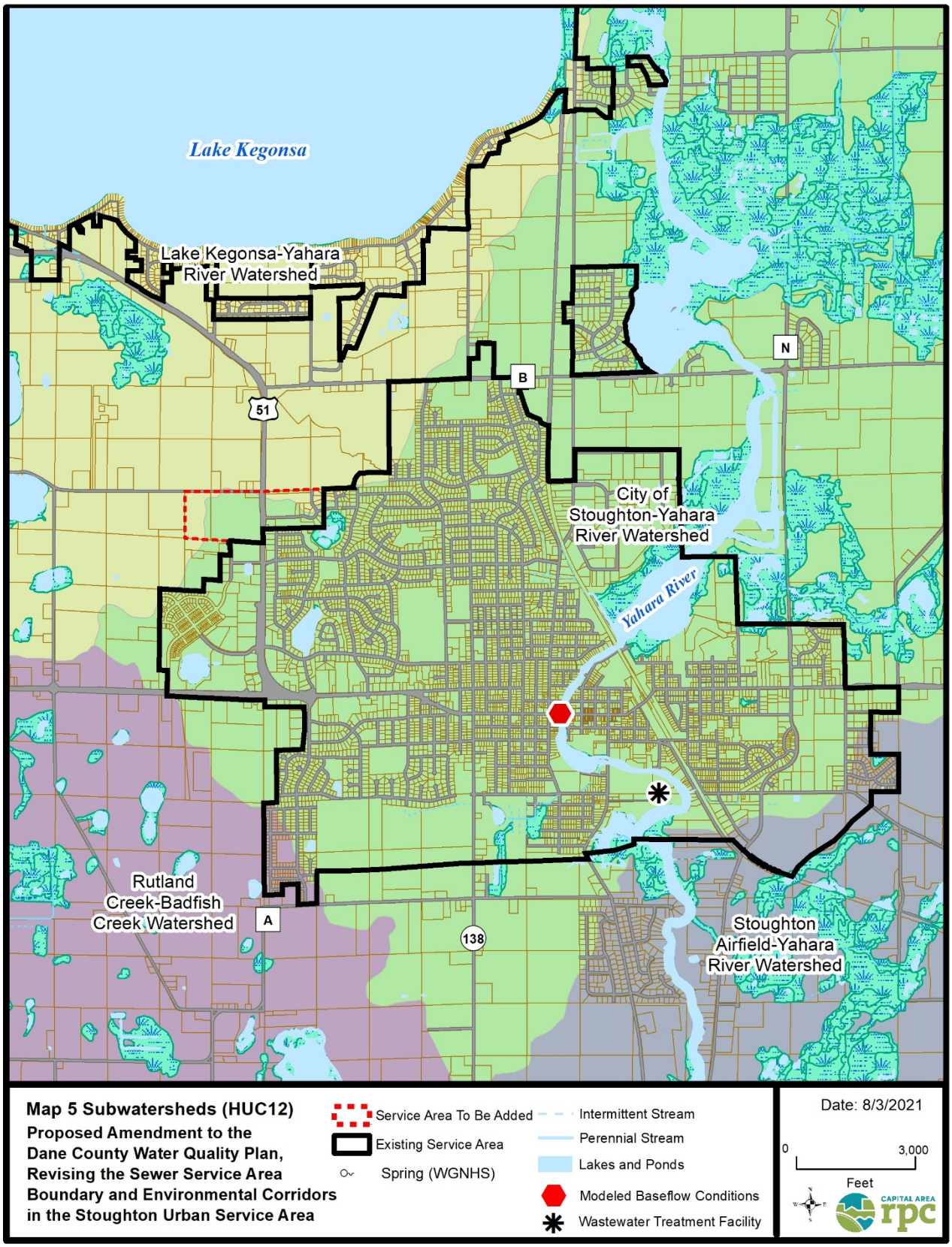
Map 3 – 2015 Land Use



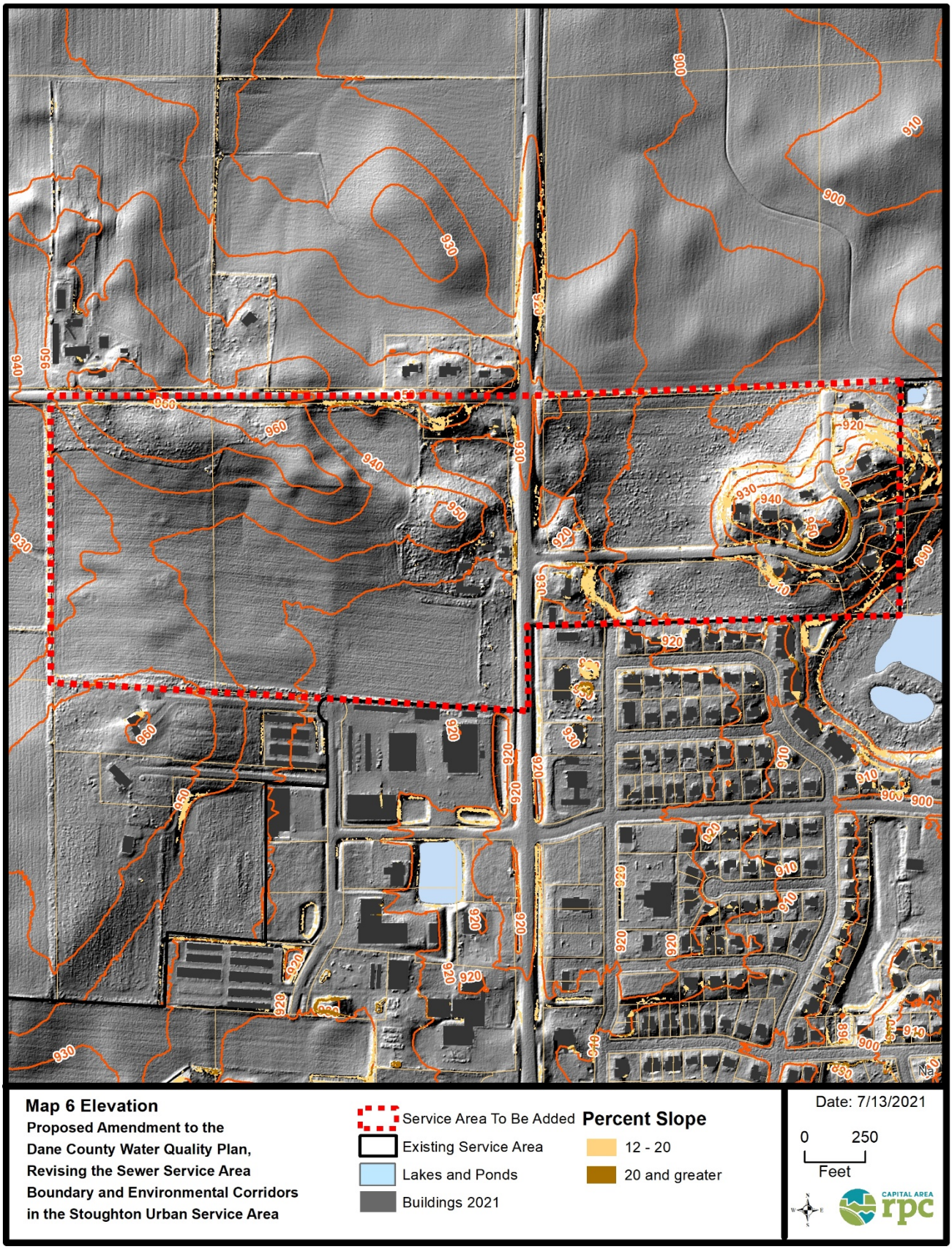
Map 4 – Planned Land Use



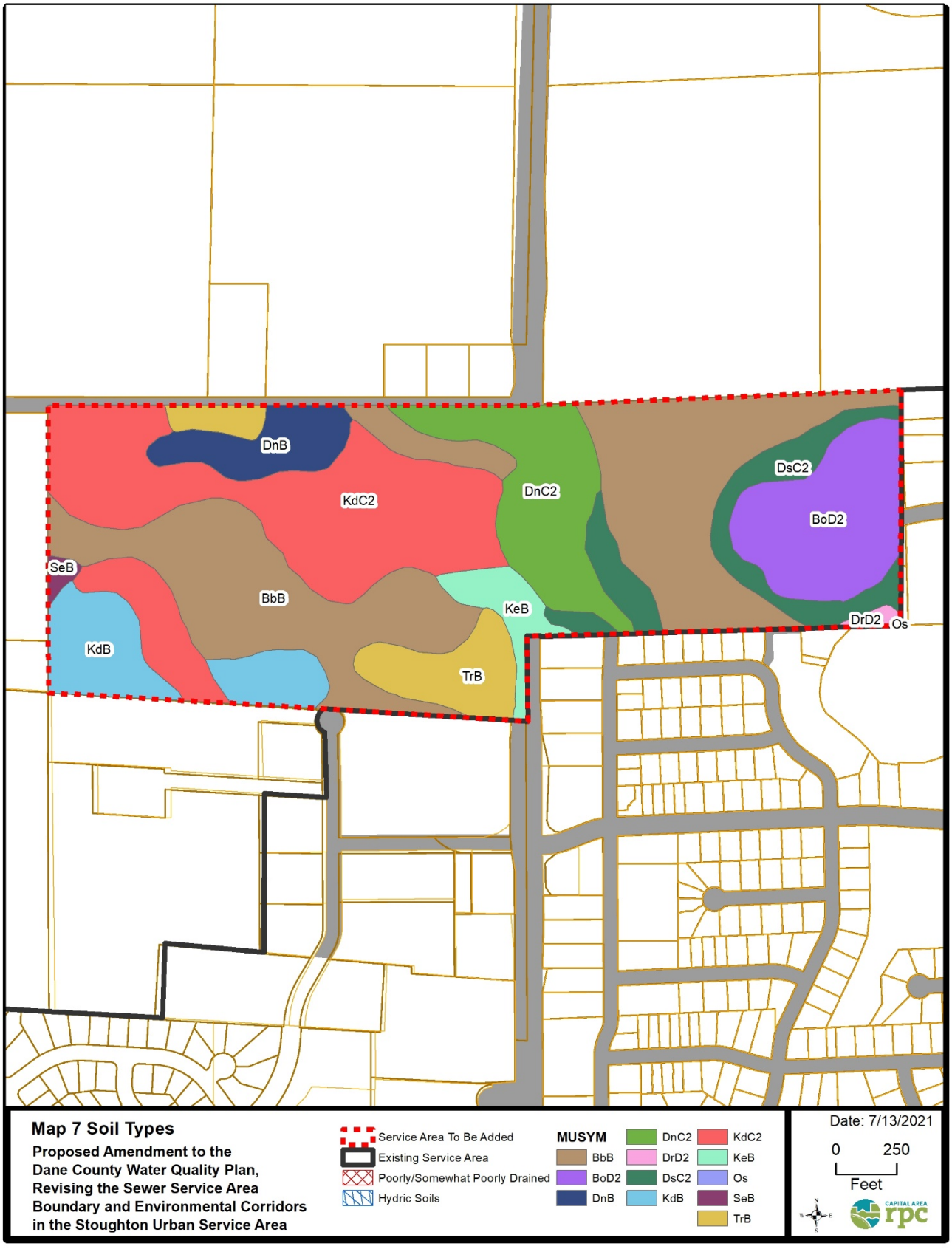
Map 5 - Subwatersheds



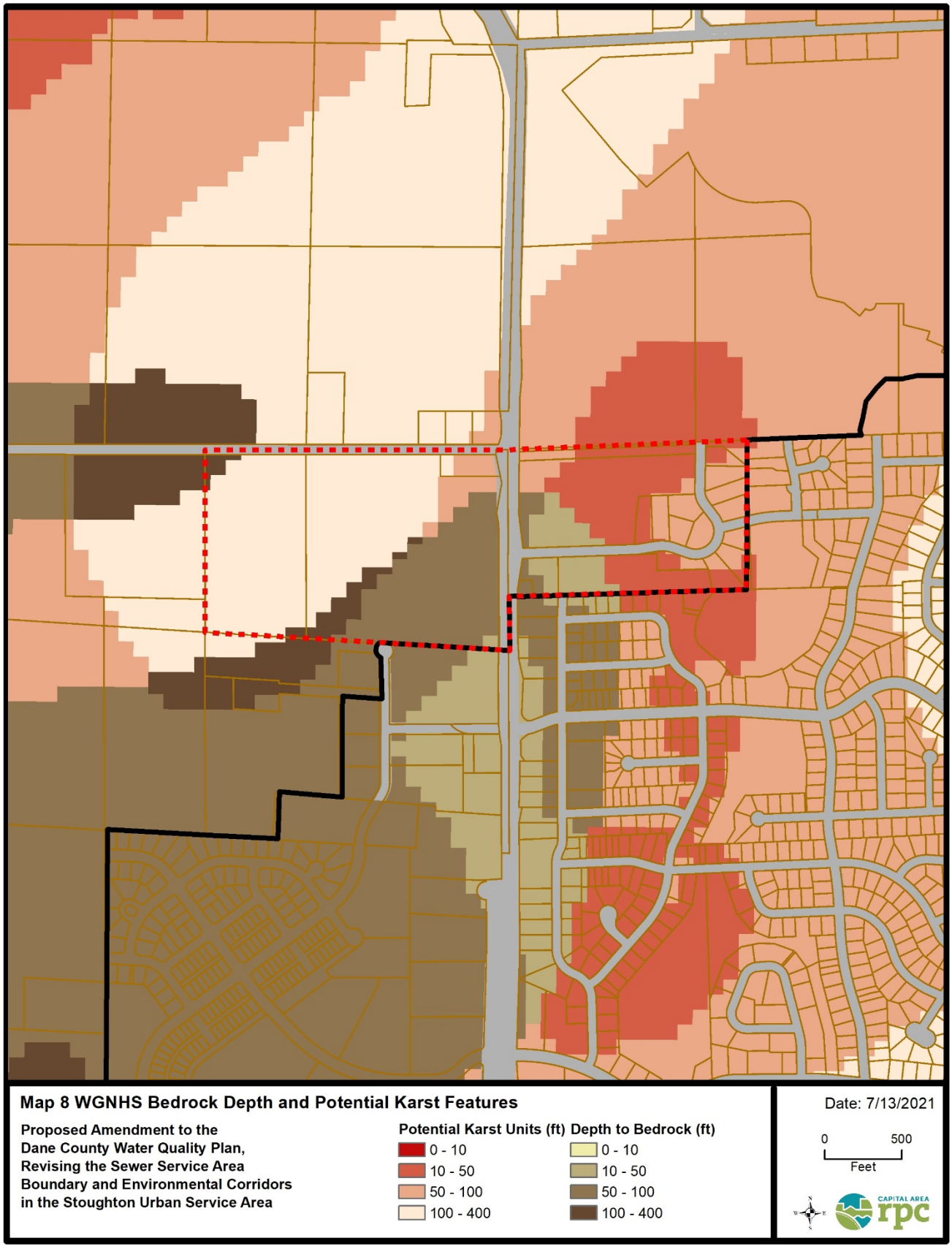
Map 6 - Elevations



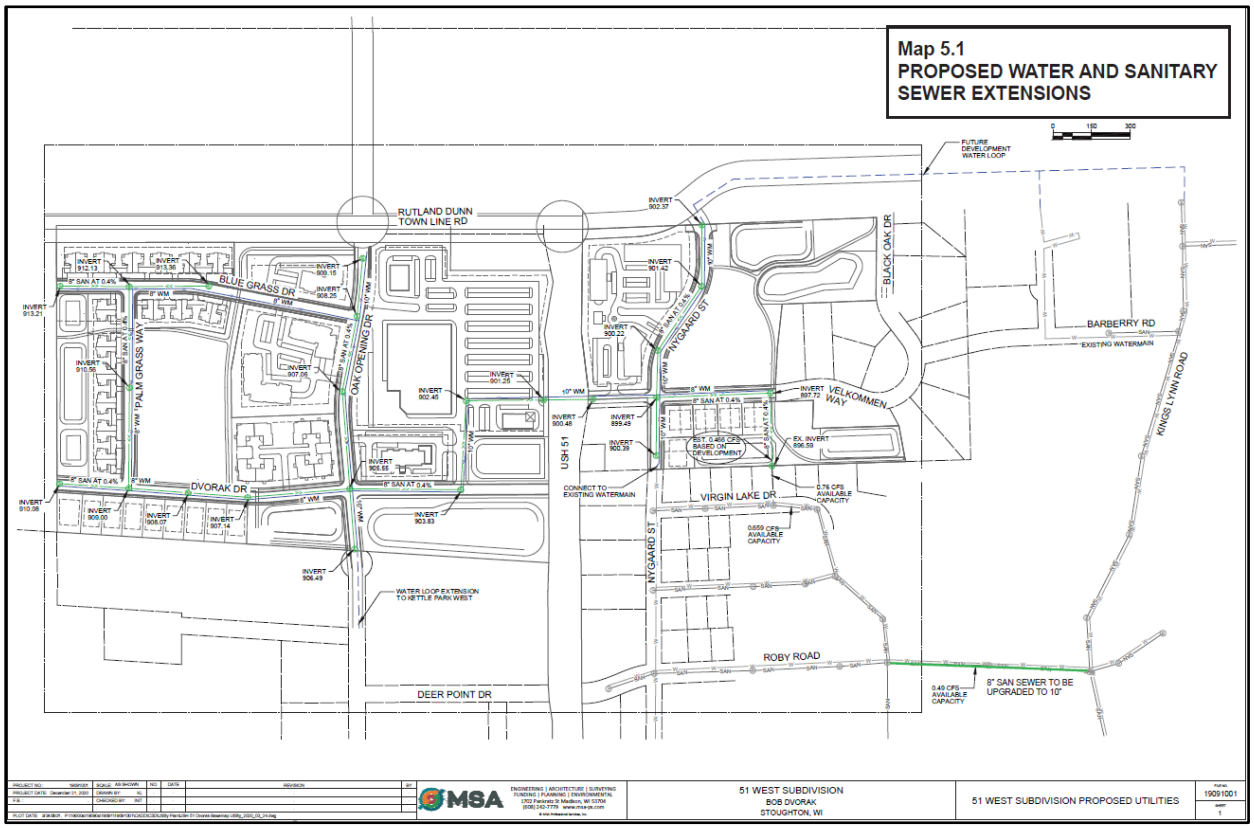
Map 7 - Soil Type

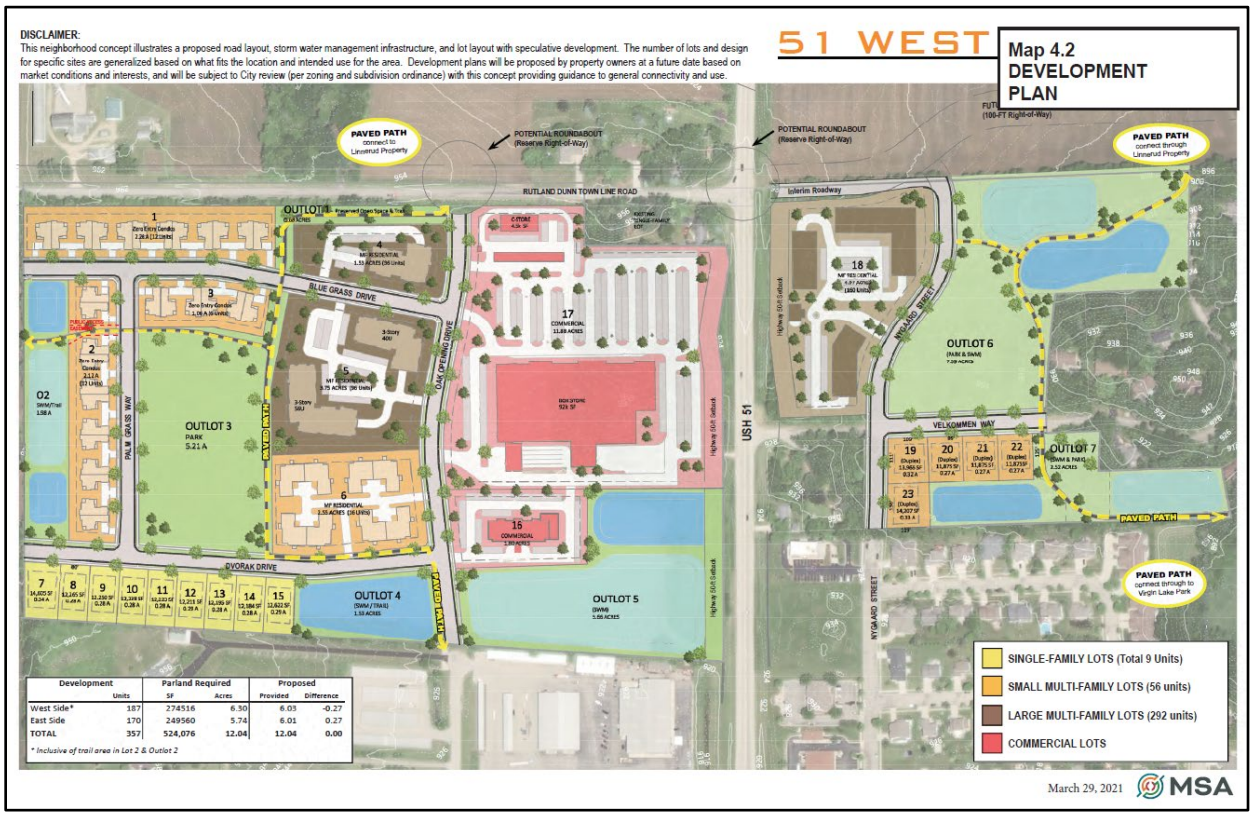


Map 8 – WGNHS Bedrock Depth and Potential Karst Features



Map 9 – Planned Utilities and Stormwater Management

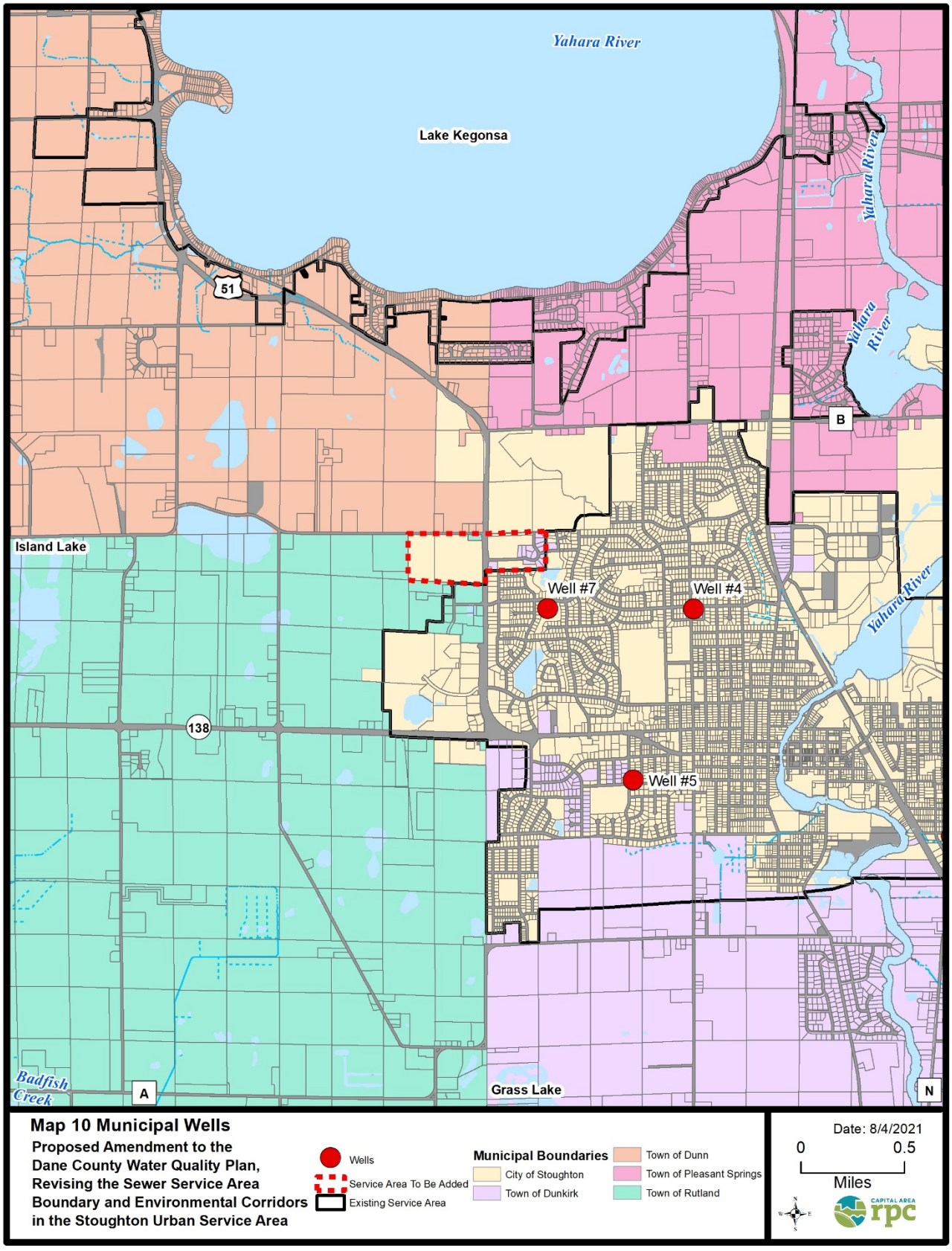




Development	Units	Parland Required SF	Parland Required Acres	Proposed Provided	Proposed Difference
West Side*	187	274516	6.30	6.03	-0.27
East Side	170	249560	5.74	6.01	0.27
TOTAL	357	524,076	12.04	12.04	0.00

* Inclusive of trail area in Lot 2 & Outlot 2

Map 10 – Municipal Wells



Attachment 1 – Wisconsin Historical Society Letter

WISCONSIN HISTORICAL SOCIETY

July 28, 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 Stoughton Urban Service Area, Dane County, Wisconsin

Dear Mr. Higgins:

No previously recorded archaeological sites have been recorded in, or adjacent to the parcel delineated in the amendment. Some survey has taken place along roadways within the area, with negative results. We do not feel that archaeological survey of the amendment area would result in the identification of significant cultural resources over most of the amendment area, but a portion of the southeastern amendment area near a small wetland and on the south-southeast side of a hill may warrant further investigation. Village deposits with some burials have been found in similar settings in Dane County. The area of concern is marked in yellow on the enclosed map.

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. **Work 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

Mike Rupiper

From: Ben Kollenbroich <bkollenbroich@town.dunn.wi.us>
Sent: Thursday, July 8, 2021 3:04 PM
To: Mike Rupiper
Subject: Stoughton USA Expansion Comments

Hi Mike,

I apologize for the late timing of these comments, but I just learned that CARPC is meeting tonight regarding USA expansion for Stoughton. I spoke with Ed and he will likely voice these comments at the meeting tonight, but I wanted to email you as well. The Town's two primary concerns are stormwater runoff and traffic planning.

Our first concern is stormwater runoff and management from the development. Planning for a 200 year flood event will be critical, particularly as it appears the land generally slopes toward Town of Dunn properties. It does appear that the City references and may be planning for the anticipated changes to the Dane County ordinance in regards to 200 year, 24 hour storm events, and the Town would like to ensure that this 200 year plan is followed by including it as a condition of any CARPC approval.

Our second concern is traffic coming from the new development and on to Rutland-Dunn Townline Road, leading to potential conflicts with farming vehicles. Plans should be made that will take into consideration the number of farm machinery/equipment that travels down this rural road, especially since traffic is routed to Rutland Dunn through Oak Opening Drive. Signs should be placed that help drivers recognize that farm equipment may be traveling down the road. An alternative could be that this road is directed to an intersection with HWY 51, rather than Rutland-Dunn Townline Road in order to discourage additional traffic on to Rutland-Dunn. I recognize that this may be outside the purview of CARPC, but wanted to also share this comment in case CARPC can incorporate such signage requirements or road route plans into any approval.

Thank you and please let me know if you need any additional information.

Ben Kollenbroich
Planning & Land Conservation Director
Town of Dunn

1

Mike Rupiper

From: Rodney J. Scheel <rjscheel@ci.stoughton.wi.us>
Sent: Tuesday, July 20, 2021 9:33 AM
To: 'bkollenbroich@town.dunn.wi.us'
Cc: Mike Rupiper; Tim Swadley
Subject: RE: Stoughton USA Expansion Comments

Follow Up Flag: Follow up
Flag Status: Flagged

Ben,

The City of Stoughton is committed to responsible stormwater management and has been working with the 51 west development team to assure that post-development runoff rates and volumes are equal or lesser than pre-development rates for most storm events, up to and including the "200 year" storm. We expect less runoff overall after development is complete.

Regarding traffic patterns, the City and the development team are working with the Wisconsin DOT on access to Hwy 51. Most traffic to and from the site will use Hwy 51, and per DOT direction, most of that traffic will need to access the highway via the existing intersections at Rutland Dunn Town Line Road and Deer Point Drive. The intersection of Rutland Dunn and Hwy 51 will be improved as necessary to handle the additional traffic. We expect limited additional traffic on Rutland Dunn west of Oak Opening Dr.

Let me know if you have further questions.

Have a good day.

Rodney Scheel
Director of Planning & Development
City of Stoughton
608.873.6619