

---

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

---

## **History of the Verona Urban Service Area**

The Verona Urban Service Area (USA) was established in 1971 with the adoption of the first sewer service plan and originally included about 1,320 acres. Around 20 amendments have been made to the Verona USA since that time totaling roughly 3,800 acres. The last time the City of Verona requested amending the Verona USA was in November, 2018 when 32 acres were added.

## **Existing Conditions**

### ***Land Use***

The City of Verona is requesting amendment to the Verona USA in two locations. The area referred to hereafter as “Area A” is located south of County Highway M and east of Range Trail on the south side of Verona, south of U.S. Highway 18. (See Map 1A) The parcel is alternately referred to as the “Gust Property” or “The Woods at Cathedral Point” in application materials, taking the names of the current farm owner and the Veridian Homes planned neighborhood. The northernmost part of the proposed development shown on the Veridian site plan is already within the USA. It was added by Resolution RPC No. 896 in October 1999 and approved by the DNR in January 2000.

The area referred to hereafter as “Area B” is located in the northwest corner of the Epic campus just to the east of the Epic solar field and south of the Epic construction annex building. Area B is landlocked with respect to public roads and is served by private drives that connect the Epic construction annex building to the rest of the Epic campus. Both Area A and Area B are connected to the USA on two sides.

Surrounding Planned Land Uses Include:

### Area A

- North: Continuation of planned neighborhood shown in application
- West: Low density residential neighborhood
- South: Continuation of planned neighborhood shown in application
- East: Rural density residential neighborhood

<b>Area A Existing Land Use</b>	<b>Acres</b>
Agriculture	31.9
Open Land	5.2
Transportation	1.6
Woodland	1.0
Water	0.3
<b>TOTAL</b>	<b>40.0</b>

<b>Area A Proposed Land Use</b>	<b>Proposed Acres</b>	<b>Env. Corridor Acres</b>
Low Density Residential	20.8	
Transportation	9.3	
Parks / Open Space / Stormwater	9.2	9.2
Medium Density Residential	0.7	
<b>TOTAL</b>	<b>40.0</b>	<b>9.2</b>
<b>NET DEVELOPABLE</b>	<b>30.8</b>	

#### Area B

- The requested amendment area is located within the Epic Campus which is planned as a commercial use into the future.

<b>Area B Existing Land Use</b>	<b>Acres</b>
Agriculture	1.5
Open Land	6.2
Under Construction	0.1
<b>TOTAL</b>	<b>7.8</b>

<b>Area B Proposed Land Use</b>	<b>Proposed Acres</b>	<b>Env. Corridor Acres</b>
Commercial	4.5	
Open Space / Stormwater Management	3.3	3.3
<b>TOTAL</b>	<b>7.8</b>	<b>3.3</b>
<b>NET DEVELOPABLE</b>	<b>4.5</b>	

The Town of Verona and City of Verona adopted an Intergovernmental Agreement in 2016 ([link to agreement](#)). This agreement seeks to achieve mutual understanding between the municipalities on the location, timing, and planning of development areas. Area A is located within the “City Growth Area” identified under that agreement and Area B is currently located within the City of Verona. Town of Verona was made aware of the applications for SSA amendment by the City and has not submitted formal comment.

### ***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. They have identified no previously recorded sites within the amendment area (see Attachment 1). In addition, there are no landscape features that are typical indicators of American Indian settlements present in the amendment areas.

The WHS previously identified a burial site to the northeast of Area B. This site, the Nine Mound burial site, cuts across a portion of the Epic Campus. The site is currently protected under a conservation easement.

## ***Natural Resources***

The proposed amendment areas are in the Upper Sugar River Watershed. Area A is located towards the southern edge of the Badger Mill Creek subwatershed (HUC 070900040201, Map 5), a tributary of the Upper Sugar River. Area B is in the eastern portion of the Headwaters Sugar River subwatershed (HUC 070900040202). Wastewater from the amendment areas will be treated at the Madison Metropolitan Sewerage District Wastewater Treatment Facility. The treated effluent is discharged to Badfish Creek and Badger Mill Creek, bypassing the Yahara chain of lakes. The amendment areas are not located in floodplains. Area A has one Wisconsin Department of Natural Resources (WDNR) mapped wetland in the northeast corner. Steep (> 20%) forested slopes border the wetland. There is a mapped, unnamed, intermittent, tributary to Badger Mill Creek shown as running southeast to northwest through the site. However, in May 2019 a WDNR Water Management Specialist conducted a site visit and reviewed the site. Her determination was that the mapped intermittent tributary does not have a defined channel and is therefore determined to be not navigable/public. A site visit by CARPC staff in June 2019 also confirmed the lack of a defined bed and bank on the site. Area B has no surface water resources.

### Wetlands

In the northeast corner of Area A, there is a kettle pond of about half an acre. Roughly one third of an acre is present within the boundaries of the amendment area. The wetland is one in a complex of kettle features to the northeast of Area A. The amendment area drains away from the kettles toward the west of the site. The isolated kettle pond in the northeast corner of Area A will be preserved as an environmental corridor with a 75' buffer. Current trees will be preserved, and a wetland delineation is underway.

Area B does not have wetland resources.

### Badger Mill Creek

Runoff from Area A will eventually reach Badger Mill Creek 1.5 miles downstream. Badger Mill Creek is designated as a Class II trout stream by the WDNR for fish management purposes, in accordance with NR 1.02(7). The creek flows 9.44 miles through Verona and the southwest side of Madison. Badger Mill Creek's 34 square mile watershed contains roughly equal portions of residential (25%) and agricultural (23%) lands. It is classified as a Variance Stream for Uses and Designated Standards [NR 104.05(2)], which allows the WDNR to relax certain water quality standards for this stream to allow discharge of treated municipal wastewater from Madison Municipal Sewerage District (MMSD). These stream Use Standards are state water quality standards established to guide water quality planning under NR 121.

In 1998, MMSD began discharging about 3.3 mgd (5 cfs) of highly treated effluent to Badger Mill Creek as a means of maintaining creek baseflow. This additional effluent serves as compensation for groundwater extracted from the Sugar River basin by municipal wells. Groundwater modeling has indicated that well water withdrawals reduced baseflow in Badger Mill Creek by approximately 35 percent and by approximately 6 percent in the Sugar River (compared to pre-development or no pumping conditions). After groundwater is pumped and used, the wastewater is diverted to MMSD's Nine Springs treatment plant and discharged to Badfish Creek, in the adjacent Rock River basin, and Badger Mill Creek, in the Sugar River Basin. This return of treated effluent helps to restore the water balance within the Sugar River basin and, more importantly, improves aquatic habitat in Badger Mill Creek by removing low baseflow as a limiting habitat condition.

Increased flow has sustained trout populations in Badger Mill Creek, but levels of chlorides, total phosphorus, dissolved phosphorus, and ammonia remain a concern. Since Badger Mill Creek is a coldwater stream, it is sensitive to temperatures increases caused by urban runoff. Stormwater management practices within the watershed are required to provide thermal controls so that warm water does not enter the stream and negatively impact the aquatic ecosystem.

Badger Mill Creek does not show significant biological impairments for macroinvertebrates or fish. In 1998, miles 2-5 of the creek were listed as impaired for total suspended solids (TSS) by the WDNR. In 2002, the creek was delisted when TSS was analyzed again. According to a 2017 WDNR fisheries assessment, MMSD effluent has helped support fish communities by maintaining steady baseflow in the creek, has not altered the fish community, and has not caused problematic thermal impacts. In 2018 WDNR assessments, miles 0-5 of Badger Mill Creek did not show biological impairments but did show phosphorus impairments, prompting a proposal for the creek to be listed as an impaired water. Chloride and temperature were also assessed but did not result in any proposed impairment additions.

The portion of Badger Mill Creek downstream of Area A (miles 2 – 5) has degraded habitat and high phosphorus concentrations. The creek's fish community is rated "Fair." Excessive amounts of phosphorus and sediment continue to be a concern for the water body. The United States Geological Survey (USGS) monitors flow, temperature, specific conductance and dissolved oxygen near the Bruce Street crossing in Verona just downstream of where the intermittent stream joins Badger Mill Creek ([link to USGS station data](#)).

### Headwaters Sugar River

Runoff from Area B drains to the southwest, through a detention pond, and then downstream ¼ mile to a culvert under Country View Road. The culvert empties to an intermittent stream that flows another 0.6 miles before reaching the Sugar River, an Exceptional Resource Water (ERW) under the state's anti-degradation rules, NR 102 and NR 207. ERWs are not significantly impacted by human activities and provide valuable fisheries or unique habitat features. The Sugar River is also designated a Class II trout cold water community. Much of the headwaters subwatershed remains undeveloped with agriculture (52%) and open/woodland (32%) occupying the most area. The headwaters of the Sugar River are located on the outskirts of the expanding Madison metropolitan urban area. Though historically and predominantly agricultural, this portion of the watershed is experiencing a gradual change in land use. Changes in land use, hydrology, and sediment transport within the watershed will have long-term impacts on all areas downstream.

For 2020, the Sugar River section downstream of amendment Area B (miles 56.14 – 82.33) is proposed for the WDNR's list of impaired waters. This addition was prompted by high phosphorus concentrations which pose a risk for the river's biological community. This was an increase from 2017 phosphorus concentrations which did not warrant an impaired listing. Even though phosphorus concentrations are high, the river's biological community is not degraded (macroinvertebrates received a "Fair" score; fish scored as "Excellent"). However, continued high phosphorus concentrations will likely lead to lower quality biological communities over time. Decreasing phosphorus contributions to the river would help sustain current biological communities. As a cold water system fed by groundwater, warm runoff poses an issue for the Sugar River. Occasionally, the river exceeds ideal temperatures which is also expected to decrease the quality of the fish community. Proper thermal controls in runoff management are required within the watershed. The Sugar River is an important regional resource and maintaining its exceptional qualities requires responsible management of both agricultural and urban land uses.

### Springs

Springs represent groundwater discharge visible to the casual observer. The Wisconsin Geological and Natural History Survey (WGNHS) maintains an inventory of springs in Dane County and throughout the state based on field surveys conducted between 2014 and 2017. For the purposes of the inventory, a spring is defined as a discrete point of groundwater discharge flowing at approximately 0.25 cubic feet per second or more at the time of the survey. There are no inventoried springs in the Badger Mill Creek subwatershed, thus no springs in proposed amendment Area A.



Area B likewise has no springs and the closest surveyed spring is 2.7 miles to the northwest (Map 5). When surveyed in 2014, this spring had a flow of 0.29 cfs.

### Groundwater

Groundwater modeling, using the 2016 Groundwater Flow Model for Dane County developed by the WGNHS ([link to website](#)), shows that baseflow in Badger Mill Creek at the confluence of the intermittent stream coming from proposed amendment Area A (see location on Map 5) has increased from 2.3 cfs during pre-development conditions (no well pumping) to 3.4 cfs in 2010 (Table 4). This increase is due to the MMSD effluent discharge into Badger Mill Creek upstream of this confluence. On the Sugar River, close to Area B, flow was modeled to have decreased from 9.5 cfs to 7.8 cfs as a result of 2010 pumping rates (Table 4; see location Map 5). By 2040, flow is modeled to decrease slightly to 7.5 cfs. This decrease is due to increased pumping to serve a growing population in Verona, Middleton, and Madison's west side.

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 proposed amendment Area A ranges from 9.2 to 10.4 inches per year.

Groundwater was encountered in only one of the 25 soil borings conducted in Area A by CGC, Inc. in April 2019. Boring 14, located near the center of the amendment area had a depth to groundwater of 5.5 feet. After four days, water rose to 3 feet below the surface. Perched water was encountered at three additional soil boring sites - 18, 22, and 24 – at depths ranging from 3 to 5.5 feet. These three sites are located along the southern edge of the amendment area.

### Ice Age Trail

The Ice Age Trail is a National Scenic Trail that traces ice age formations across Wisconsin ([see online Map](#)). Its creation began in the 1950s. The hiking trail, over 1,000 miles long, is entirely within Wisconsin and is one of only eleven National Scenic Trails. It is built and maintained by volunteers and managed through a partnership among the National Park Service, the WDNR and the Ice Age Trail Alliance. The trail passes through a variety of properties owned by private individuals as well as by nonprofit organizations, municipal, county, state and federal agencies. Sections of the trail pass currently through or adjacent to residential areas in the Village of Cross Plains, City of Verona, and City of Madison, such as in the Ice Age Falls Plat north of CTH PD.

A 6.4 mile segment of the trail winds through Verona. It goes through multiple county parks and passes to the east of Area A through restored prairie and oak savanna and an isolated kettle complex, a remnant of the last ice age. The Ice Age Trail Alliance owns about 23 acres in this "Moraine Kettles Preserve" bordering Area A. For over a decade, volunteers have worked on trail maintenance and ecological restoration in the preserve. As part of their land management, they occasionally conduct prescribed burns.

### 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 one species of special concern (plant) within a one-mile radius of amendment Area A and several species and a community of special concern (insect, reptile, plants and community) within a one-mile radius of amendment Area B. It is recommended that the City request a complete Endangered Resources Review by the WDNR for potential impacts to endangered resources like rare plants, animals and natural communities in the amendment areas.

### Soils and Geology

Amendment Area A is located within the West Johnstown-Milton Moraines Land Type Associations of Wisconsin. The Association classifies the surficial geology of this area as rolling hummocky moraine and outwash plain complex with scattered bedrock knolls. Soils are predominantly well drained silt and loam over sandstone or dolomite calcareous sandy loam till, or calcareous gravelly sandy outwash. Amendment Area B is located within the Hills and Valleys - Wisconsin River Drainage Land Type Associations of Wisconsin. The Association classifies the surficial geology of this area as well drained and moderately well drained silty and loamy soil with a silt loam or sandy loam surface over noncalcareous clayey or loamy residuum or over silty loess; most areas over limestone, sandstone, or shale bedrock.

Surface elevations in amendment Area A range from around 975 feet to 1,030 feet. Amendment Area A includes areas of steep (> 12%) and very steep (>20%) slopes adjacent to the existing natural swale sloping through the site from southeast to northwest as well as west of a natural kettle in the northeast corner of the amendment area. Surface elevations in amendment Area B range from 1,000 to 1,050 feet. Amendment Area B includes substantial areas of steep slopes throughout the amendment area with some very steep slopes along the northern edge of the amendment area. There are no steep slopes adjacent to riparian areas, which would require designation as environmental corridors .

According to the Natural Resource Conservation Service (NRCS) Soil Survey of Dane County, the soils in amendment Area A are in the Basco-Elk mound-Gale association and soils in amendment Area B are in the Edmund-Sogn-Port Byron association. Basco-Elk mound-Gale association soils are moderately well drained to somewhat excessively drained, moderately deep and shallow silt loams and sandy loams that are underlain by sandstone. Edmund-Sogn-Port Byron association soils are excessively drained to moderately well drained, shallow, very shallow, and deep silt loams that are underlain by dolomite or silt. Tables 2A and 2B show detailed classification for soils in the amendment areas (see Map 7A and 7B) while Tables 3A and 3B show important soil characteristics for the amendment areas (see Map 7A and 7B).

Hydric soils are good indicators of existing and former (drained) wetlands. As expected, there are hydric and poorly drained soils (the SaA soil map units) in the area of the wetland within amendment Area A (see Map 7A). There are no hydric soils within amendment Area B (see Map 7B).

According to the Soil Survey Geographic data for Dane County developed by the USDA Natural Resources Conservation Service ([link to web soil survey](#)), the St. Charles and Troxel soils (the ScB and TrB map units) are not hydric, but they can have a seasonal (April to June) zone of water saturation within 5 feet of the ground surface. All of these soils are classified as well drained. Soils with seasonal high water tables that are also classified as well drained or moderately well drained generally do not pose limitations for buildings with basements. The St. Charles and Troxel soils also have the best potential for high rates of infiltration in the subsoils, due to the sand and gravel layers that exist in these soils below the clay layer.

**Table 2A**  
**Soils Classification**

Soil	% of Area	General Characteristics
<i>St. Charles Silt Loam; ScB</i>	25.7	Deep, well drained, sloping soils to moderately steep soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate to severe hazard of erosion. Poses moderate limitations for development due to slopes, shrink/swell potential and low bearing capacity.
<i>Troxel Silt Loam; TrB</i>	16.7	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 moderate limitations for development due to shrink/swell potential and depth to saturated zone.
<i>Gale Silt Loam; GaC2</i>	11.4	Moderately deep, well drained, gently sloping to moderately steep soils on uplands. Soils have medium fertility, moderate permeability, and a severe hazard of erosion. Poses moderate to severe limitations for development due to low bearing capacity, steep slopes, shrink/swell potential, and depth to soft bedrock.
<i>Basco Silt Loam; BaB2</i>	11.0	Moderately deep, well drained and moderately well drained, gently sloping to steep soils on side slopes and the tops of ridges in the high uplands. Soils have medium fertility, slow permeability, and a moderate to severe hazard of erosion. Poses moderate to severe limitations for development due to depth to soft bedrock, bearing capacity, shrink/swell potential, and steep slopes.
<i>McHenry Silt Loam; MdC2</i>	10.4	Deep, well drained, gently sloping to moderately steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and a moderate to severe hazard of erosion. Poses slight to moderate limitations for development due to slopes, shrink/swell potential and low bearing capacity.
<i>Basco Silt Loam; BaC2</i>	9.4	Moderately deep, well drained and moderately well drained, gently sloping to steep soils on side slopes and the tops of ridges in the high uplands. Soils have medium fertility, slow permeability, and a moderate to severe hazard of erosion. Poses moderate to very severe limitations for development due to depth to soft bedrock, bearing capacity, shrink/swell potential, and steep slopes.
<i>Kidder Loam; KdD2</i>	6.9	Deep, well drained, gently sloping to very steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and a very severe hazard of erosion and are moderately droughty. Poses severe limitations for development due to steep slopes.
<i>Dodge Silt Loam; DnC2</i>	3.6	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 to slope, shrink/swell potential and low bearing capacity.
<i>Kidder Loam; KdC2</i>	3.6	Deep, well drained, gently sloping to very steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and a severe hazard of erosion. Poses moderate limitations for development due to steep slopes.
<i>Sable Silty Clay Loam; SaA</i>	1.2	Deep, nearly level and gently sloping, poorly drained soils on low benches in stream valleys. Soils have high fertility, moderate permeability, and a low hazard of erosion. Poses severe to very severe limitations for development due to low bearing capacity, moderate shear strength and compressibility, flooding, depth to saturated zone and shrink/swell potential.

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

**Table 2B**  
**Soils Classification**

Soil	% of Area	General Characteristics
<i>Gale Silt Loam; GaD2</i>	58.8	Moderately deep, well drained, gently sloping to moderately steep soils on uplands. Soils have medium fertility, moderate permeability, and a very severe hazard of erosion. Poses severe limitations for development due to low bearing capacity, steep slopes, shrink/swell potential, and depth to soft bedrock.
<i>Edmund Silt Loam; EdC2</i>	25.3	Shallow, well drained, gently sloping to moderately steep soils on uplands. Soils have low fertility, moderately slow permeability, and a very severe hazard of erosion. Poses severe limitations for development due to steep slopes, depth to hard bedrock, and shrink/swell potential.
<i>Troxel Silt Loam; TrB</i>	14.2	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 moderate limitations for development due to shrink/swell potential and depth to saturated zone.

*Dodgeville Silt Loam;  
DpC*

1.7

Moderately deep, well drained, gently sloping to moderately steep soils on top of ridges and on upper sides slopes on uplands. Soils have medium fertility, moderate permeability, and a severe hazard of erosion. Poses very severe limitations for development due to slope, depth to hard bedrock, and shrink/swell potential.

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

**Table 3A**  
**Soils Characteristics**

Characteristic	Soil Map Symbols (see Map 7)	% of Area
Prime Agricultural Soils	ScB, TrB	42.4
Hydric Soils (Indicates Potential / Restorable Wetlands)	SaA	1.2
Poorly Drained Soils with Seasonal High Water Table (< 5')	SaA	1.2
Soils Associated with Steep Slopes (> 12%)	KdD2	6.9
Soils Associated with Shallow Bedrock (< 5')	BaB2, BaC2, GaC2	31.9
Best Potential for High Rates of Infiltration in Subsoils	KdC2, KdD2, MdC2, ScB, TrB	63.3

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

**Table 3B**  
**Soils Characteristics**

Characteristic	Soil Map Symbols (see Map 7)	% of Area
Prime Agricultural Soils	TrB	14.2
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%)	GaD2	58.8
Soils Associated with Shallow Bedrock (< 5')	DpC, EdC2, GaD2	85.8
Best Potential for High Rates of Infiltration in Subsoils	TrB	14.2

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

According to WGNHS data, bedrock within amendment Area A is in Ancell Group. Bedrock in the Ancell Group is quartz sandstone, dolomitic siltstone, silty dolomite, and sandy dolomite. It consists of two formations, the Jordan and the underlying St. Lawrence, which were combined as one mapping unit. The thickness is about 75 feet where not eroded. According to WGNHS

data, bedrock within amendment Area B is in the Prairie de Chien Group. Bedrock in the Prairie du Chien Group is dolomite, minor sandstone, cherty dolomite; vuggy, sandy, and oolitic, consists of two formations, the Shakopee and the Oneota. According to WGNHS data, the depth to bedrock in amendment Area A ranges from less than 5 feet to greater than 150 feet, with the shallowest depths being in the southwest and deepest depths being in the northeast amendment area (see Map 8A). The depth to bedrock in amendment Area B ranges from 5 feet to 50 feet, with the depths being relatively consistent throughout the amendment area (see Map 8B).

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 are 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 are not expected to be encountered in amendment Area A but may be encountered in amendment Area B at a depth range of 0 to 30 feet. The Wisconsin Department of Natural Resources Conservation Practice Standard 1002 - Site Evaluation for Stormwater Infiltration requires field verification for areas of the development site considered suitable for infiltration. This includes a site assessment for karst features in this area. If karst features are found, adequate protection measures are required to address any potential for groundwater contamination.

There is no minimum separation distance for roofs draining to surface infiltration practices. However, the Dane County ordinance requires infiltration practices to be located so that the separation distance between the bottom of the infiltration system and the elevation of seasonal high groundwater or the top of bedrock is at least 5 feet for residential arterial roads and 3 feet for other impervious surfaces. Soil test pits are required as part of the stormwater management plan to assure that infiltration practices are sited in locations that will not adversely affect groundwater quality.

## **Proposed Urban Services**

### ***Parks and Open Space***

There are total of approximately 9.2 acres of parks, open space, and stormwater management areas proposed in amendment Area A (See Map 10A). This includes approximately 3.6 acres for stormwater management, 2.0 acres for parks, and 3.5 acres for open space including two access points to the Ice Age National Scenic Trail. Veridian and the City has expressed an interested in dedicating the open space adjacent to the Ice Age Trail to the Ice Age Trail Alliance.

An additional 4.2 acres of park and open space are being added in the portion of the proposed development that is already within the urban service area. This includes the wetland kettle in that area (See Map 2A).

There are approximately 3.3 acres of stormwater management and open space planned for Area B (See Map 10B).

### ***Water System***

The Verona Water Utility currently operates five high capacity wells with a combined capacity to deliver 8,740,000 gallons per day (gpd), or 6,069 gallons per minute (gpm), per the Verona 2018 Public Service Commission (PSC) annual report (see Map 10). Well #1, yielding 369 gpm, is 771 feet deep. Well #2, yielding 1,000 gpm, is 1,153 feet deep. Well #3, yielding 1,000 gpm, is 1,033 feet deep. Well #4, yielding 1,500 gpm, is 1,100 feet deep. Well #5, yielding 2,200 gpm, is

1,493 feet deep. The current firm pumping capacity (with the largest well out of service) is 3,869 gpm and the current reported average peak hourly water demand is 2,900 gpm.

It is planned that Well #1, which was built in 1932 and is located close to the central commercial area, will be abandoned in the future as it has a relatively shallow casing of 114 feet and has seen increases in chloride and nitrate-nitrogen concentrations. A planned future Well #6, is currently being built northeast of amendment Area A, near the intersection of Whalen Road and Liberty Drive. Bid plans and specifications have been prepared for the proposed well and approvals have been granted by the PSC and WDNR. A 2017 report completed by the AECOM, titled Well Site Investigation Report – Proposed Well 6 City of Verona, WI, states that the anticipated pumping capacity will be up to 2,000 gpm.

The Verona Water Utility currently operates four reservoirs for water storage: #1 Central Zone Elevated Tank (300,000 gallons), #2 North High Pressure Elevated Tank (500,000 gallons), #3 Well 5 Ground Reservoir (500,000 gallons) with a 2,000 gpm supply booster station, and Southeast High Pressure Elevated Tanks (300,000 gallons) with a 1,000 gpm booster station, totaling a maximum storage capacity of 1,600,000 gallons. The 2018 average daily water demand was approximately 1,100,000 gallons.

The 2015 Water System Master Plan report, by AECOM, projects the 2040 average daily demand to be 3.33 mgd with a peak hour demand of 8,000 gpm with a projected population increase from 11,500 people in 2015 to 22,000 in 2040, representing a 2.5 percent increase year-over-year. The Master Plan includes the proposed amendment areas within the evaluation area (Map 9). The report also recommends the addition of future 12-inch mains looping around both amendment areas. Amendment Area A is within the Southeast Pressure Zone and will be served by an extension from the existing watermain on Range Trail. This watermain will then be looped back into the system on south side of the amendment Area. Amendment Area B is within the Central Pressure Zone and will be served by an extension from an existing watermain serving an existing building, the Annex Building, immediately north of the amendment area. Proposed land use from the Master Plan is consistent with the proposed land use for the amendment areas.

The estimated average daily water demand for amendment Area A will be 56,700 gallons based on 140 housing units with an associated population of 378 individuals and 150 gallons per person per day demand. Using a daily peaking factor of 2 and an additional hourly peaking factor of 2, the peak daily demand and peak hourly demand for amendment Area A is estimated to be 76 gpm and 145 gpm, respectively. The estimated average daily water demand for amendment Area B will be 3,000 gallons based on a 5 acre building and a 600 gallon per acre per day demand. Using a daily peaking factor of 2 and an additional hourly peaking factor of 2, the peak daily demand and peak hourly demand for amendment Area B is estimated to be 4.2 gpm and 8.4 gpm, respectively. The combined daily demand will be 59,700 gallons. Therefore, the additional demand associated with the amendment areas will be accommodated based on the current pumping and storage capacity and future projected demands.

Water losses in the City's distribution system peaked at a level of 24% of net water supplied in 2014 resulting from several breakages during the year. The City responded by committing to quarterly water loss monitoring by the Water Utility. Subsequent losses were 3% in 2015, 2% in 2016, 8% in 2017, and 11% in 2018. The Wisconsin Administrative Code PSC 185.85(4)(b) requires a utility with more than 1,000 customer to submit a water loss control plan to the Public Service Commission if the utility reports its percentage of water losses exceed 15%. While water losses have not yet reached 15% of net water supplied, the upward trend from 2016 suggests that the City Water Utility should continue efforts to reduce breaks, leaks, and other sources of water losses within their system.

## **Wastewater**

Sanitary sewer service will be provided to amendment Area A through an existing public sanitary sewer interceptor that currently traverses through the amendment area. The existing

interceptor will be realigned to follow the proposed road alignment. Amendment Area A proposes to add approximately 140 family dwellings. Assuming 2.7 residents per unit and using a residential per capita value of 150 gallons per person per day and a peaking factor of 4.0, it is estimated that the amendment area will generate a peak hourly flow of 145 gpm.

Sanitary sewer service for amendment Area B will be connected directly into an existing sanitary sewer lift station at the northeast corner of the amendment area, which currently also serves the existing Annex Building. Amendment Area B proposes to include a maintenance building that will be no greater than 5 acres. Assuming a wastewater generation rate of 600 gpd per acre, the 5 acre building will produce 3000 gpd. Using a peaking factor of 4.0, it is estimated that the amendment area will generate a peak hourly flow of 8.3 gpm.

Both amendment area sanitary networks will drain into progressively larger mains prior to entering into the MMSD Pump Station Number 17. Current average daily flow from the City of Verona to the MMSD wastewater treatment plant was 0.94 mgd in 2016. The projected average daily and peak flows from the addition of both amendment areas are below the capacity of the interceptors. MMSD has a regular capital improvement planning process to periodically evaluate their system capacity and expanded the capacity of the system as the need is foreseen.

#### Wastewater Treatment Facility

MMSD will provide wastewater treatment for the amendment area. The Nine Springs Treatment Facility has a design capacity of 50 million gallons per day (mgd) and received an average of 42.1 mgd in 2017, including infiltration and inflow. It is expected to reach 90 percent of current hydraulic design capacity around 2026 based on current projected growth rate assumptions. MMSD has completed a long-range plan that evaluated various options for expanded treatment capacity to serve its current and future service area. For the 20-year planning period, service to this area is expected to remain at the existing wastewater treatment facility location with expanded capacity of the system as the need is foreseen.

Wastewater treatment at the district's Nine Springs Treatment Facility does not remove chloride and the concentration of chloride that arrives at the Nine Springs Plant can exceed the water quality standard. In 2015, AECOM completed a study for MMSD which determined that while possible, treatment would be cost-prohibitive, energy intensive, and involve other environmental impacts ([link to report](#)). MMSD's Wisconsin Pollutant Discharge Elimination System (WPDES) permit which requires pollution prevention and source reduction initiatives for chlorides, such as the Wisconsin Salt Wise Partnership ([link to website](#)). MMSD has not had any issues meeting its WPDES permit limits for the quality of effluent discharged to Badger Mill Creek according to their 2017 Annual Report ([link to report](#)). In 2017, the effluent monthly average Total Suspended Solids ranged from 3.2 to 7.6 milligrams per liter (mg/L), below the 10 to 16 mg/L permit limit for Badger Mill Creek. The effluent monthly average ammonia ranged from 0.13 to 0.59 mg/L, below the 1.1 to 3.8 mg/L permit limit for Badger Mill Creek. The effluent monthly average total phosphorus ranged from 0.22 to 0.38 mg/L, below the current 1.5 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.5 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. MMSD has implemented a Watershed Adaptive Management approach, leading a diverse group of partners called Yahara Watershed Improvement Network (Yahara WINs) in implementing phosphorus reducing practices in the watershed ([link to website](#)). This adaptive management approach is currently limited to the Yahara Watershed.

#### ***Stormwater Management System***

The preliminary stormwater management plan for amendment Area A includes a regional detention basin with adjacent infiltration facility located at the amendment area low spot on the west-central side of the site. In the proposed stormwater management plan, all of the proposed single family residential development within the amendment area will drain to this series of facilities. Two kettle depressions, the end of a series of seven kettles in the area, are

located in the northeast corner of the proposed development (one in the amendment area one in a previous amendment area). The final kettle currently discharges in less than the 1 year storm event and drains towards the proposed multi-family residential area (located in a previous amendment area). The proposed stormwater management plan for the development will route this discharge to the road right-of-way, via storm sewer.

The preliminary stormwater management plan for amendment Area B proposes to expand an existing downstream detention facility for the purpose of water quality treatment and rate control and to construct a new onsite infiltration facility to address runoff volume reductions and thermally enhanced site runoff. All of the existing EPIC stormwater facilities are privately owned and maintained with yearly inspection by the City.

The stormwater facilities for both amendment areas will generally be located to adequately provide water quality treatment (80% TSS reduction) followed by volume reduction facilities, which will provide for annual stay-on (90% stay-on of the average annual storm). It is anticipated that infiltration performance will further reduce TSS (and other pollutants such as Total Phosphorus) from stormwater discharges. Collectively, the stormwater facilities will provide peak discharge rate control to account for storms up to and including the 100-year rainfall event. All stormwater facilities within amendment Area A are anticipated to be dedicated to the public upon completion while the facilities in Area B are anticipated to remain private.

The WDNR 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 on the site to locate infiltration facilities appropriately so that performance can be maximized while protecting groundwater resources. As such, the City may require stormwater management plans that incorporation of volume reduction strategies (i.e. bioretention, porous pavement, green roofs, etc.) higher in the landscape should limiting conditions be found at the proposed stormwater management facilities locations along the edges of the site.

#### Performance Standards

The City of Verona proposes stormwater management performance measures to meet or exceed standards required by the State of Wisconsin (NR 151), Dane County (Chapter 14), City of Verona (Chapter 15) 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 the 1-year, 24-hour design storm. This is consistent with the standards currently required by Dane County.
- 2) Require post-construction peak runoff rate control for the 1-, 2-, 10-, and 100-year, 24-hour design storms to “pre-settlement” peak runoff rates. This is consistent with the range of design storms currently required by Dane County but exceeds the Dane County requirement of matching the “pre-developed” peak runoff rate.
- 3) Require post-development stay-on volume of at least 90% of pre-development stay-on volume. This is consistent with the stay-on standard for new development currently required by Dane County regulations.
- 4) Include provisions and practices to reduce the temperature of runoff. This is consistent with the standards currently required by Dane County.
- 5) Maintain pre-development groundwater annual recharge rate of 9.2 to 10.4 inches per year for amendment Area A and 13.1 inches per year for amendment Area B 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.



- 6) Treat the first 0.5 inches of run-off using best management practices to provide oil and grease control at commercial and industrial sites, in accordance with the City of Verona Stormwater Ordinance. This is consistent with the standards currently required by Dane County.

### ***Environmental Corridors***

Amendment Area A includes 9.2 acres of environmental corridor (See Map 2A). This includes the kettle wetland and buffer in accordance with the Environmental Corridor Policies and Criteria ([link to document](#)) adopted in the *Dane County Water Quality Plan*. The planned parks, open space, and stormwater management areas within the amendment area have also been designated as environmental corridors.

An additional 4.2 acres of environmental corridor are being designated within the existing urban service area north of Amendment Area A (See Map 2A). This includes the kettle wetland and buffer in accordance with the Environmental Corridor Policies and Criteria adopted in the *Dane County Water Quality Plan*. The planned park and open space areas proposed within the existing urban service area have also been designated as environmental corridors..

Amendment Area B includes 3.3 acres of environmental corridor (See Map 2B) for open space and stormwater management areas.

### **Impacts and Effects of Proposal**

#### ***Meeting Projected Demand***

Current projections suggest that an additional 6,233 residents and 2,920 housing units can be expected in the Verona USA between 2010 and 2040. Land demand projections in 2014 estimated that a total of 721 additional residential acres would be needed by 2040 to accommodate that growth. Approximately 1,600 additional acres in non-residential uses would also be required.

Preliminary Department of Administration (DOA) population estimates for 2019 indicate that 14,440 residents call Verona home. Verona's population has increased by roughly 2,000 residents since 2010, faster than originally expected. Verona's population has already surpassed the projected population for around the year 2022 or 2023.

#### ***Phasing***

Neither requested amendment area exceeds 100 acres and is therefore not required to have a phasing plan. All land within both the proposed amendment areas will likely develop within 10 years. Development of Site B would commence within the current or next construction season. Development of Site A will first require annexation of the property into the City of Verona. As such, development will begin in the near future.

#### ***Surface Water Impacts***

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

- Flashier stream flows (i.e., sudden higher peaks)

- Increased frequency and duration of bankfull flows
- Reduced groundwater recharge and stream base flow
- Greater fluctuations in water levels in wetlands
- Increased frequency, level (i.e., elevation), and duration of flooding
- Additional nutrients and urban contaminants entering the receiving water bodies
- Geomorphic changes in receiving streams and wetlands

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

Since 2002, there have been stormwater management standards in effect at the state, county, and local level to require stormwater management and erosion control plans and structural best management practices designed to address the impacts of development on water quality, runoff volumes, peak flows, water temperature, and groundwater recharge. In 2011, county and local standards for runoff volume control were increased beyond state standards to further address the potential stormwater impacts of development. Since 2010 many communities adopted even higher standards for volume control through their own ordinances or as part of USA amendment agreements. In 2017, State statute 281.33(6)(a)(1) was changed to limit the ability of local governments to adopted higher standards for runoff volume through local ordinances.

The City of Verona 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 standards for pollutant reduction, runoff volumes, peak flows, water temperature, and groundwater recharge to address the potential water quality impacts of stormwater runoff from the proposed development on the receiving waters.

Regional partners including the City of Madison, the Madison Metropolitan Sewerage District, Madison Water Utility, and others, are actively working to address chlorides through the Wisconsin Salt Wise Partnership. The City of Verona has participated chloride reduction trainings provided by WI Salt Wise. New development is not expected to exacerbate effluent chloride concentrations since the new high efficiency water softeners currently required by Wisconsin's plumbing code are substantially more efficient than the old timer based softeners still found in many homes ([link to report](#)).

### ***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, with subsequent reductions in stream quality and transitions to more tolerant biological communities.

Groundwater modeling indicates that the cumulative effects of well withdrawals and effluent discharge from MMSD have resulted in a 1.1 cfs increase in baseflow in Badger Mill Creek at the confluence of the intermittent stream coming from Area A between predevelopment (no pumping) and 2010 (Table 4). A 0.5 cfs decline compared to 2010 conditions is anticipated for the year 2040, according to modeling, reducing the baseflow to 2.9 cfs. This, however, remains above the predicted predevelopment baseflow and demonstrates how MMSD effluent compensates for local groundwater withdrawals.

According to the 2014 WDNR report *Ecological Limits of Hydrologic Alteration in Dane County Streams* ([link to report](#)), Badger Mill Creek has a fish community that would be sensitive to reductions in baseflow, with American brook lamprey, brown trout, and mottled sculpin being the most sensitive to flow change. Therefore continuation of the MMSD effluent return, or some other method of maintaining baseflow, is important for the watershed.

The Sugar River, downstream of Area B, is modeled to have a 2010 baseflow of 7.8 cfs compared to its original pre-development (no pumping) baseflow of 9.5 cfs (see Table 4). With increased groundwater withdrawals to serve a growing population, baseflow is modeled to slightly decrease to 7.5 cfs in 2040. 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.

<b>Table 4</b> <b>Modeled Baseflow Results</b> <b>Due to Current and Anticipated Future Municipal Well Water Withdrawals</b> <b>(All Municipal Wells) and MMSD Effluent Discharge</b>			
Stream	No Pumping	2010	2040
<i>Badger Mill Creek</i>	<i>2.3 cfs</i>	<i>3.4 cfs</i>	<i>2.9 cfs</i>
<i>Sugar River</i>	<i>9.5 cfs</i>	<i>7.8 cfs</i>	<i>7.5 cfs</i>

## Comments at the Public Hearing

A public hearing was held on the proposed amendment at the August 8, 2019 meeting of the Capital Area Regional Planning Commission. David Lonsdorf, representing the Ice Age Trail Alliance, submitted written comments (Attachment 2) and spoke at the public hearing. Concerns centered around enhancing the compatibility of the proposed residential development with the maintenance and management (e.g. prescribed burns) of the adjacent segment of the Ice Age Trail and the need for appropriate stormwater management measures for the moraine kettles. Several Commissioners echoed these concerns. Commissioners also suggested looking to other examples where there is residential development along the Ice Age Trail for examples of how to address these concerns.

Commission staff subsequently held several meetings with representatives of the Ice Age Trail Alliance, the Veridian development team, and the City of Verona, to discuss these concerns and options to address them. Actions have been recommended to the City of Verona to further improve water quality and environmental resource management in response to the issues raised.

## Conclusions and Staff Water Quality Recommendations

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

Since 2002, there have been stormwater management standards in effect at the state, county, and local level to require stormwater management and erosion control plans and structural

best management practices designed to address the impacts of development on water quality, runoff volumes, peak flows, water temperature, and groundwater recharge. In 2011, county and local standards for runoff volume control were increased beyond state standards to further address the potential stormwater impacts of development. Since 2010 many communities adopted even higher standards for volume control through their own ordinances or as part of urban service area amendment agreements. In 2017, State statute 281.33(6)(a)(1) was changed to limit the ability of local governments to adopted higher standards for runoff volume through local ordinances.

The City of Verona 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 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.

The City of Verona has been participating in trainings offered by regional partners actively working to achieve source reduction of chlorides by encouraging the responsible use of deicers and water softeners through the Wisconsin Salt Wise Partnership.

Veridian has been an active participant in the Green Tier Clear Waters Initiative ([link to website](#)), which aims to reduce the sediment and nutrient delivery to Dane County's lakes and streams from construction activities, beyond the current state and local requirements.

It is the Regional Planning Commission staff's opinion that the proposed amendment is consistent with water quality standards under Wis. Stat. § 281.15, with the conditions of approval identified below. Additional actions have also been recommended below to further improve water quality and environmental resource management.

### ***Conditions***

Regional Planning Commission staff recommends approval of this amendment, based on the land uses and services proposed, and conditioned on the continued commitment of the City of Verona to pursue the following:

1. Submit a detailed stormwater management plan for Regional Planning Commission staff review and approval (in conjunction with DCL&WCD staff) prior to any land disturbing activities in the amendment area. The stormwater management plan shall include the following:
  - a. Install stormwater and erosion control practices prior to other land disturbing activities. Protect infiltration practices from compaction and sedimentation during land disturbing activities.
  - b. Control peak rates of runoff for the 1-, 2-, 10-, and 100-year 24-hour design storms to "pre-settlement" levels, in accordance with the City of Verona Stormwater Ordinance.
  - c. Provide 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 Verona Stormwater Ordinance.
  - d. Maintain 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 Verona Stormwater Ordinance.
  - e. Include provisions and practices to reduce the temperature of runoff, in accordance with the City of Verona Stormwater Ordinance.

- f. Treat the first 0.5 inches of run-off using best management practices to provide oil and grease control at commercial and industrial sites, in accordance with the City of Verona Stormwater Ordinance.
  - g. 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 9.2 to 10.1 inches/year for amendment Area A and 13.1 inches/year for amendment Area B or by a site specific analysis, in accordance with the Dane County Stormwater Ordinance.
  - h. No increase in the kettle high water levels compared to predevelopment conditions for a given rainfall event (for Area A).
2. Conduct a field verification for areas of the development site considered suitable for infiltration including a site assessment for karst features as required by the Wisconsin Department of Natural Resources Conservation Practice Standard 1002 - Site Evaluation for Stormwater Infiltration (for Area B).
  3. Stormwater management facilities shall be placed in public outlots whenever feasible and designated as environmental corridor. Easements and perpetual legal maintenance agreements with the City, to allow the City to maintain stormwater management facilities if owners fail to do so, shall be provided for any facilities located on private property.
  4. Delineate environmental corridors to include delineated wetlands and their buffers (for Area A), stormwater management areas, and open space to meet the Environmental Corridor Policies and Criteria adopted in the *Dane County Water Quality Plan*. Submit plats showing environmental corridors for Regional Planning Commission staff review and concurrence prior to recording.
  5. 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.

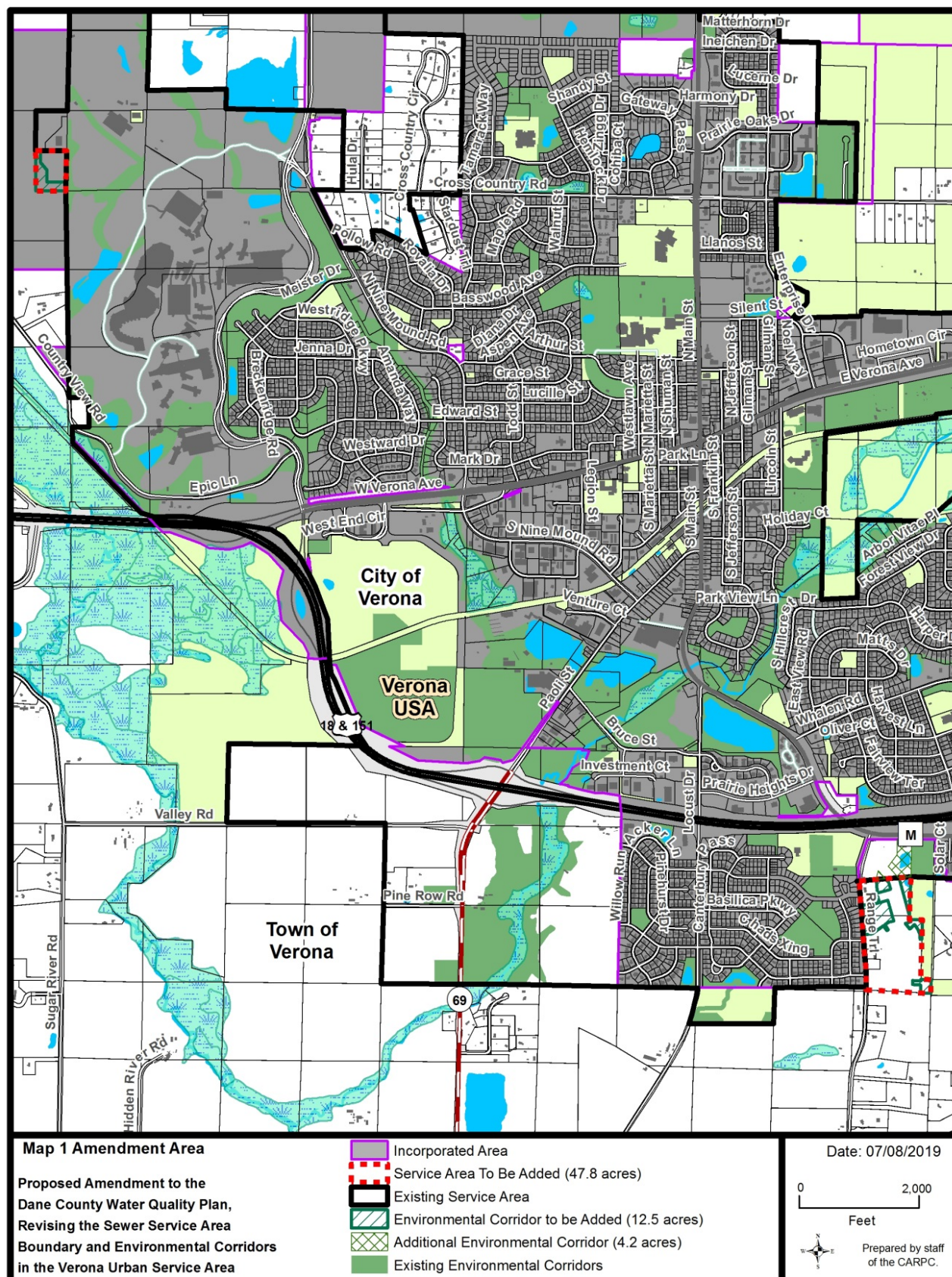
### **Recommendations**

It is also recommended that the City of Verona pursue the following:

1. 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.
2. The City, Veridian, and the Ice Age Trail Alliance will work together to agree upon the design and installation of a suitable buffer, with appropriate vegetation and plantings, along the rear of lots 24 through 33 adjacent to the Ice Age Trail Alliance property (for Area A).
3. The City, Veridian, and the Ice Age Trail Alliance will work together to develop language to be included in the Declaration of Covenants and Restrictions for the lots along the Ice Age Trail Alliance property stating that prairie burning will occur to maintain the Ice Age Trail property and, if necessary, establishing any other requirements needed for the compatibility of the trail and adjacent residences (for Area A).
4. Collaborate with watershed-wide efforts to share information on activities and concerns within the Badger Mill Creek watershed and to coordinate efforts.

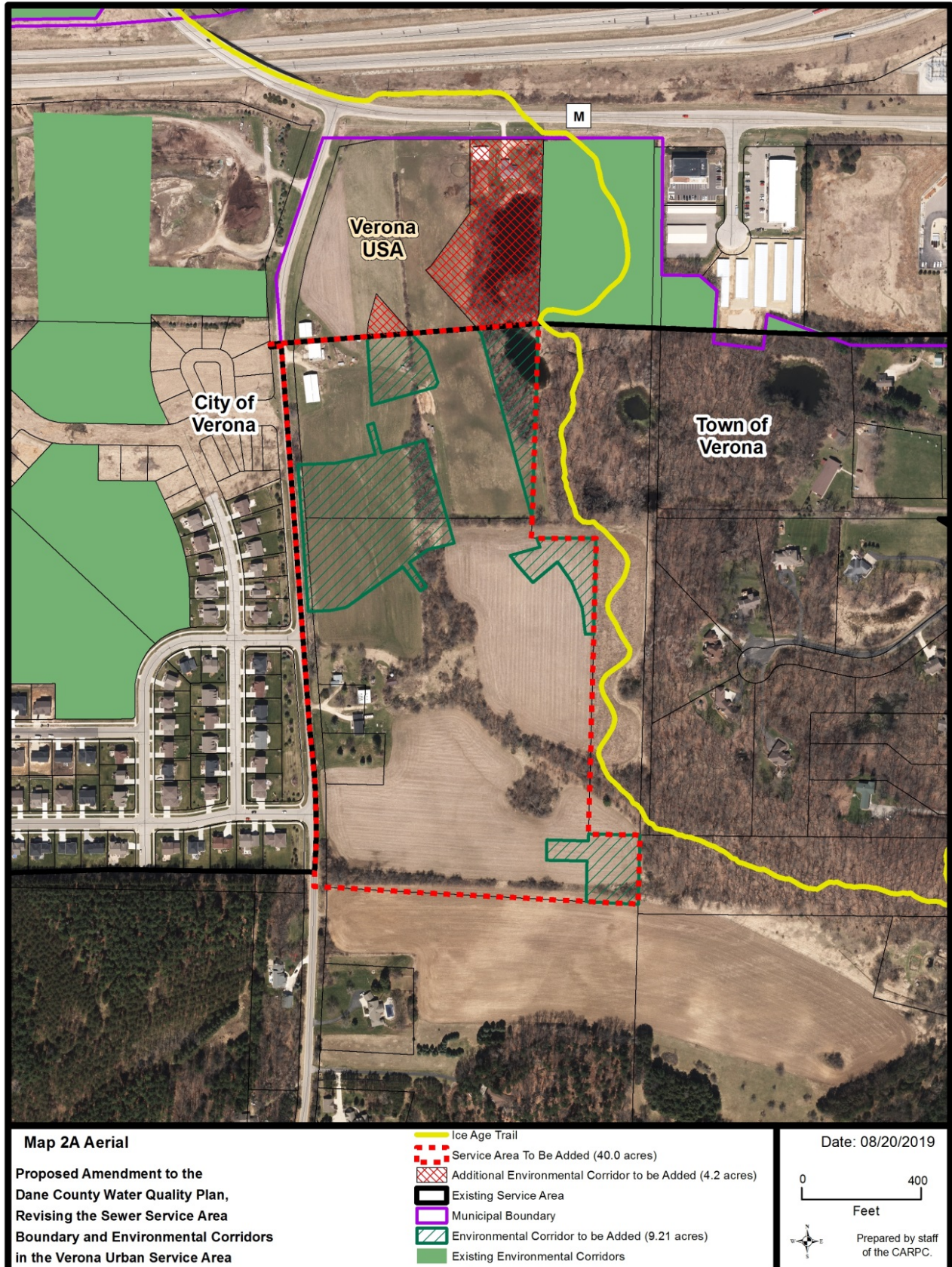


## Map 1 - Amendment Areas



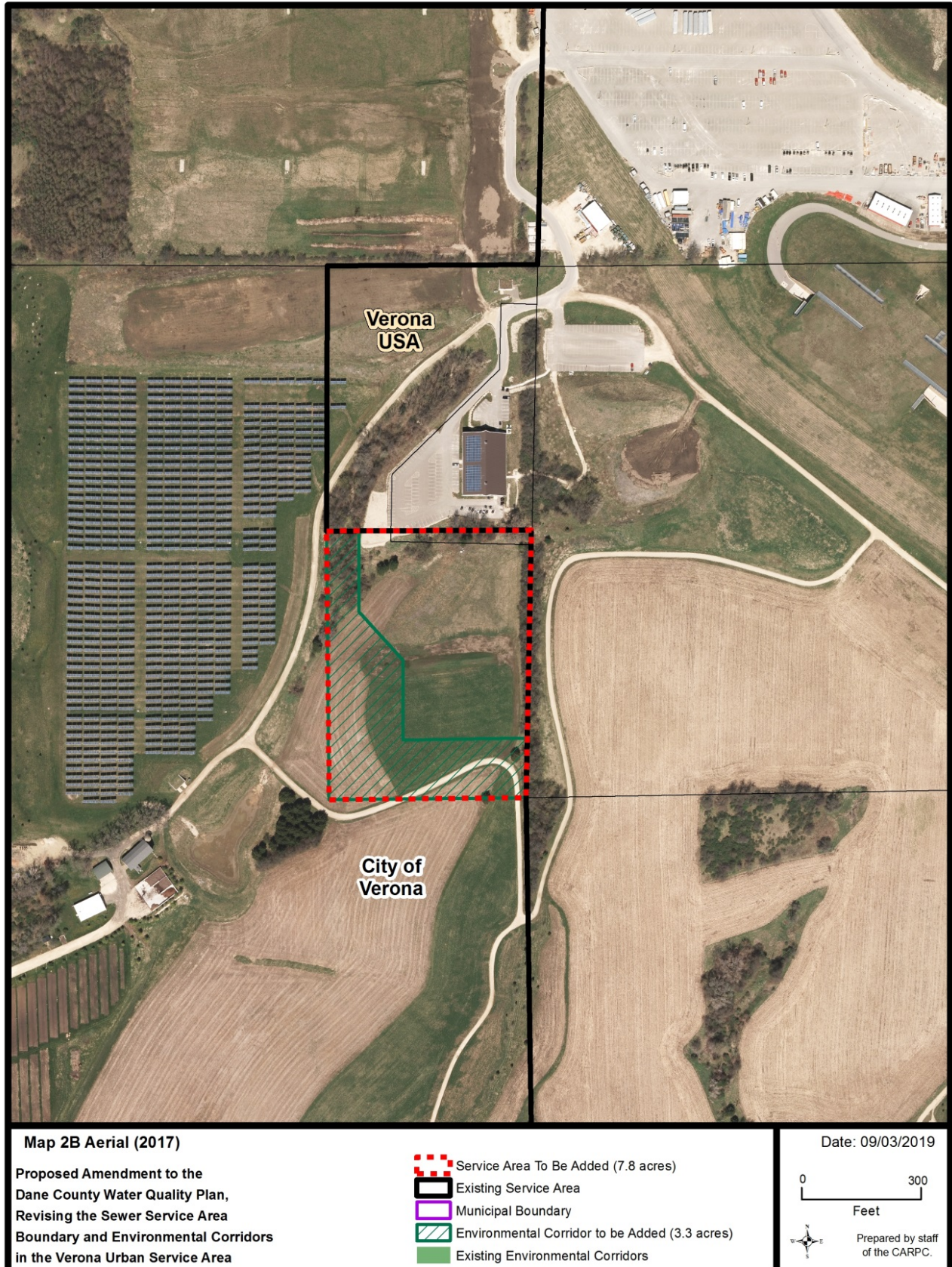


Map 2A – Aerial (Gust)



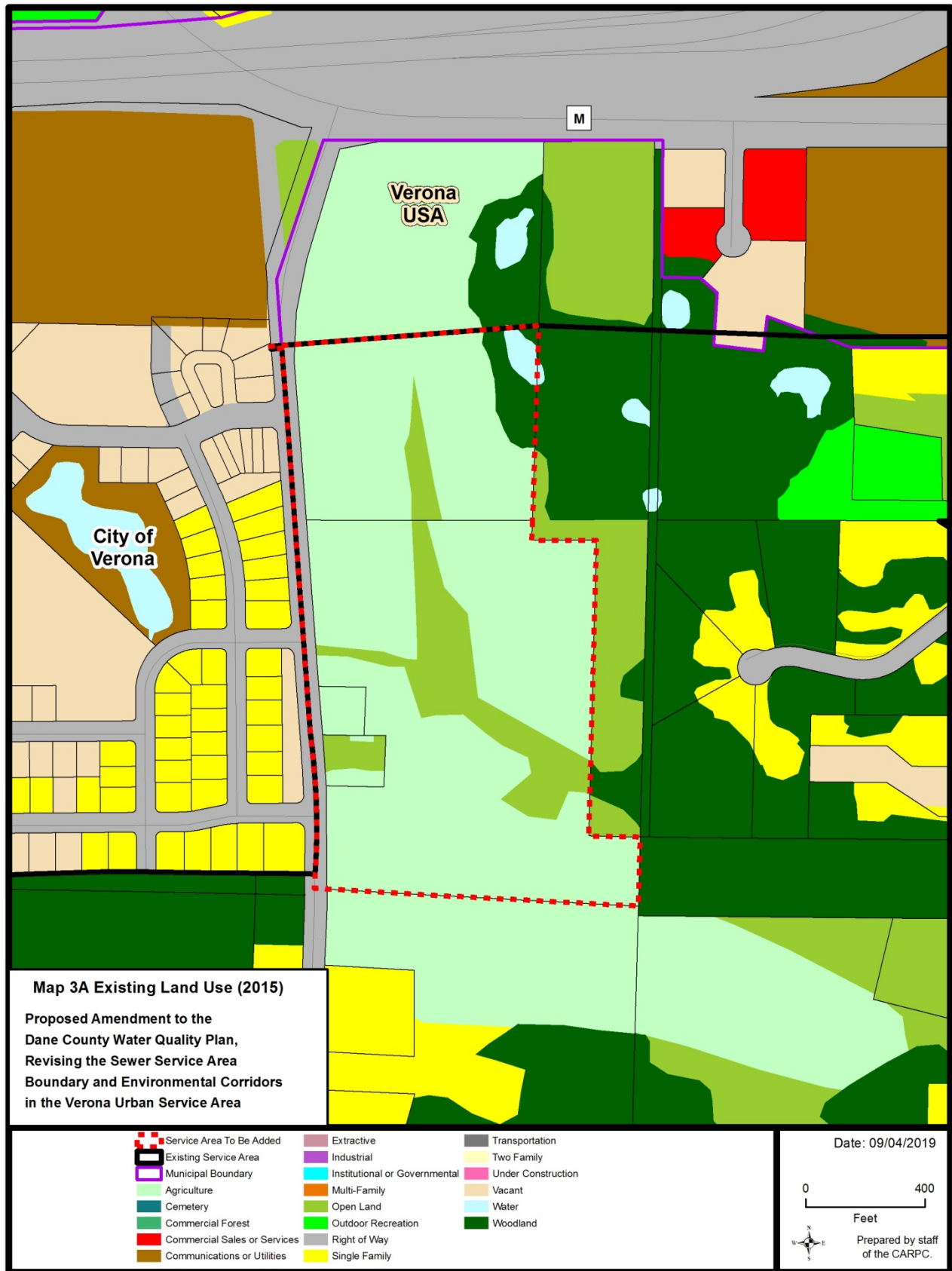


Map 2B – Aerial (Epic)

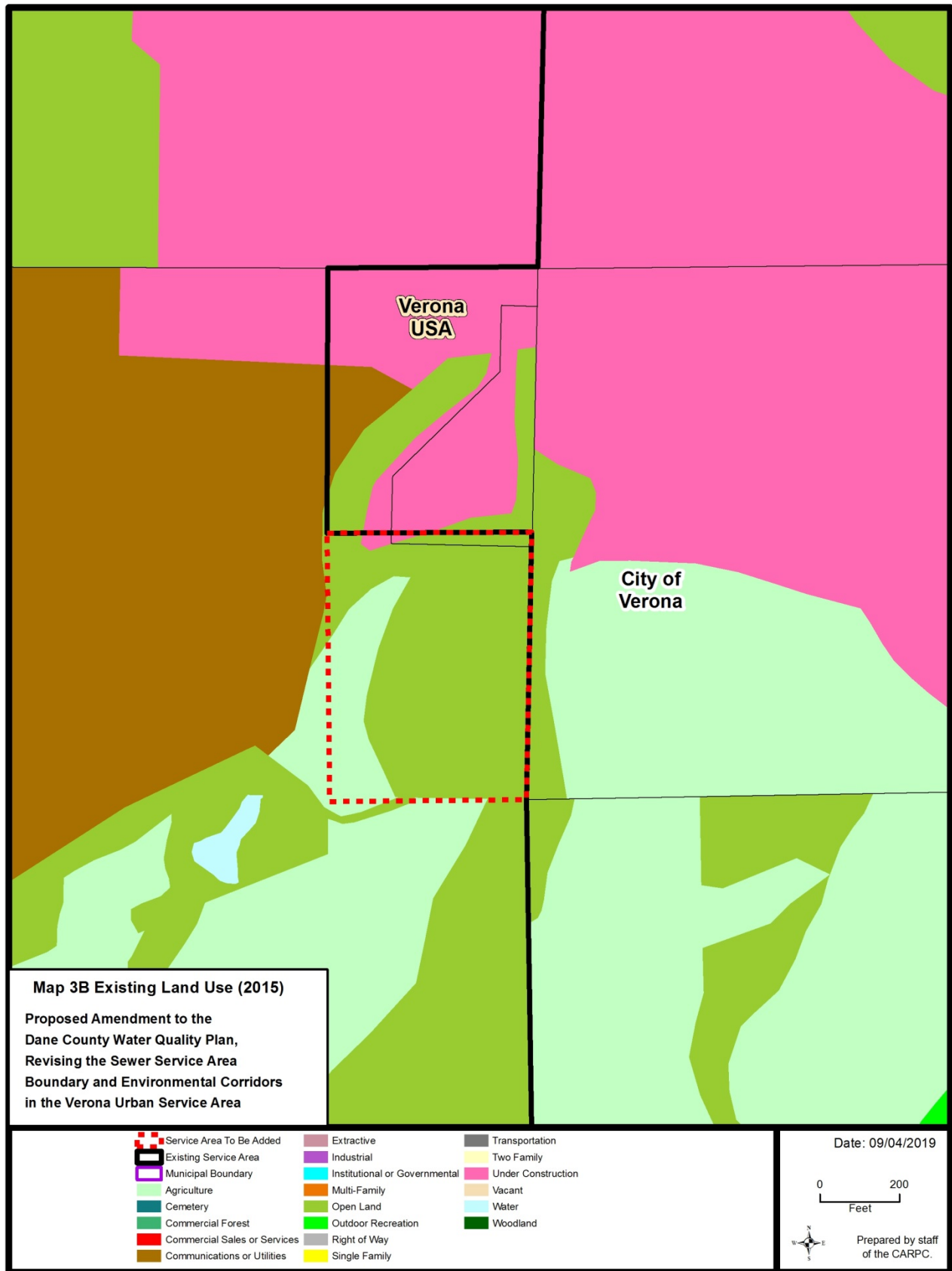




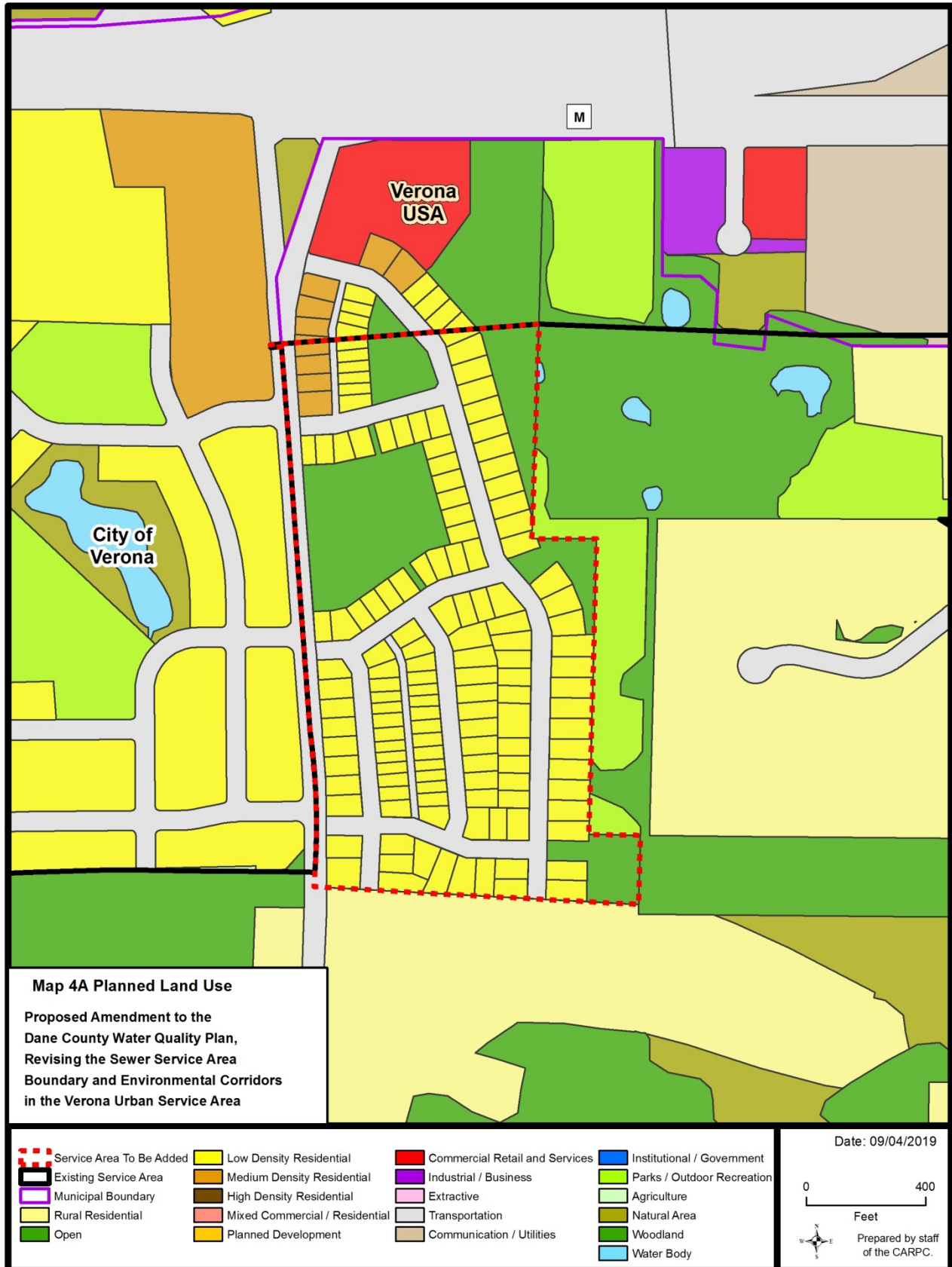
Map 3A – Existing Land Use



Map 3B – Existing Land Use



Map 4A – Planned Land Use

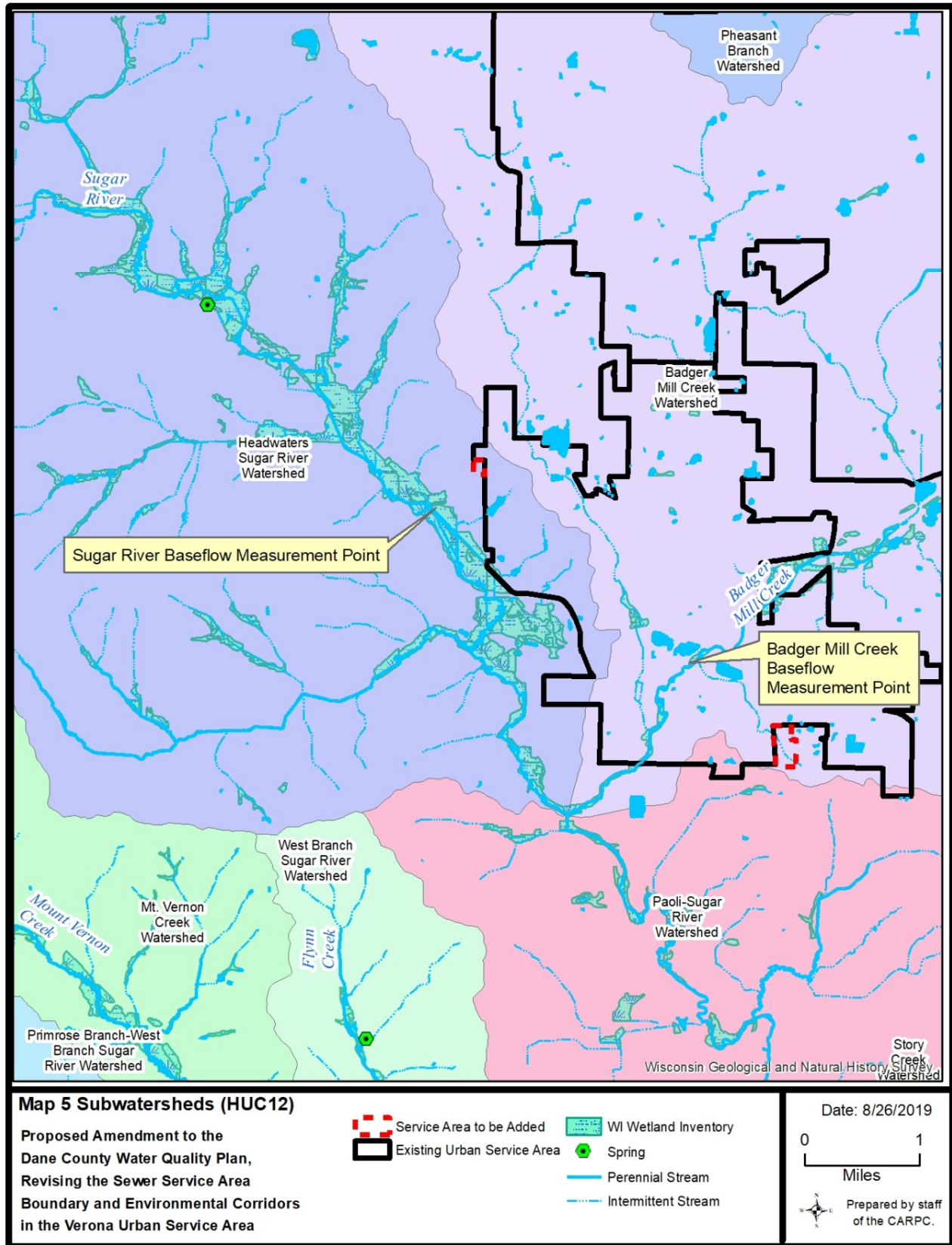


Map 4B – Planned Land Use



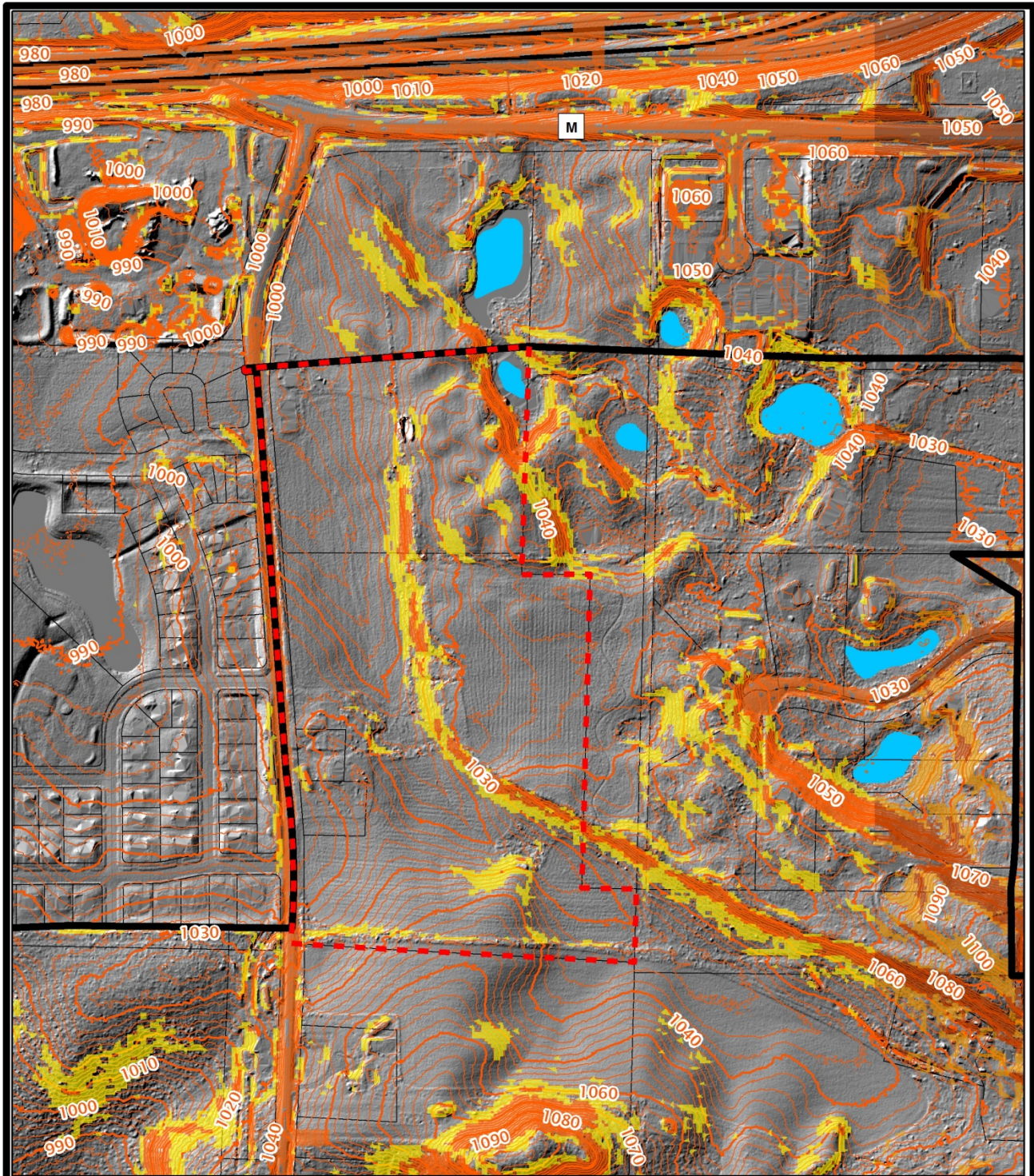


Map 5 - Subwatersheds





Map 6A - Elevations



### Map 6A Elevation

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



Service Area to be Added



Existing Service Area Boundary



Contours (10ft) 2009



Lakes and Ponds

#### Percent Slope

12 to less than 20

20 and greater

Date: 09/04/2019

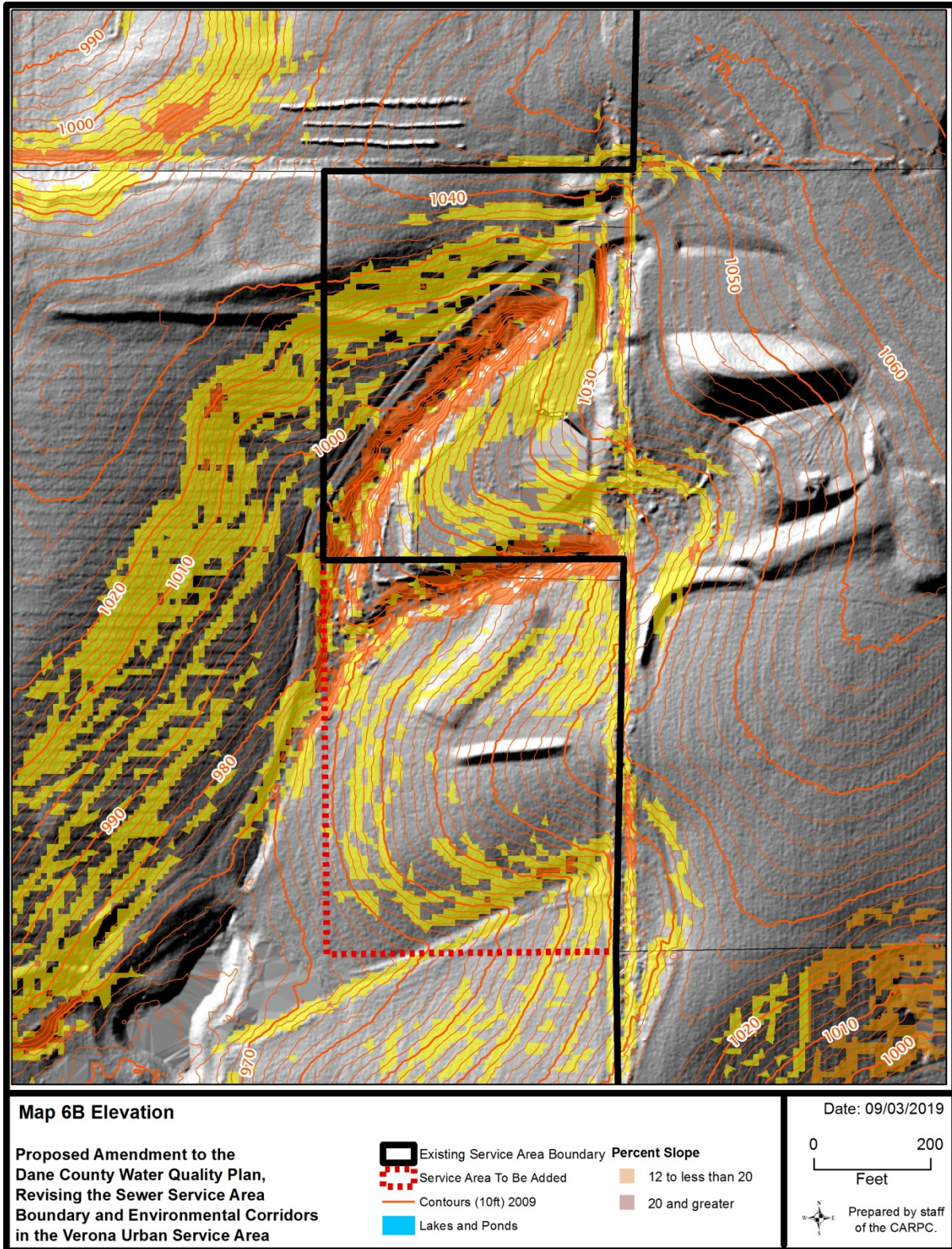
0 400  
Feet



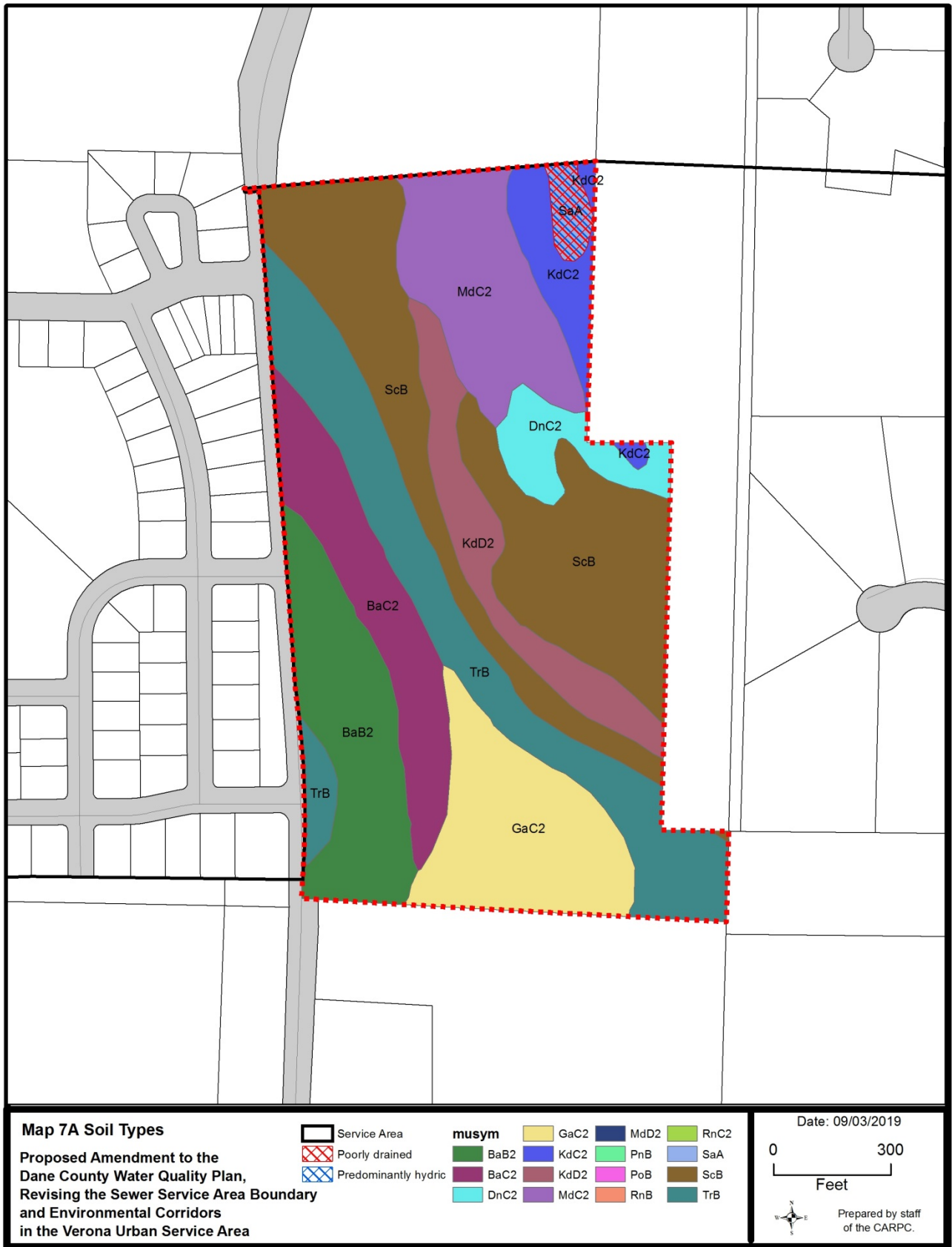
Prepared by staff  
of the CARPC.



Map 6B – Elevations

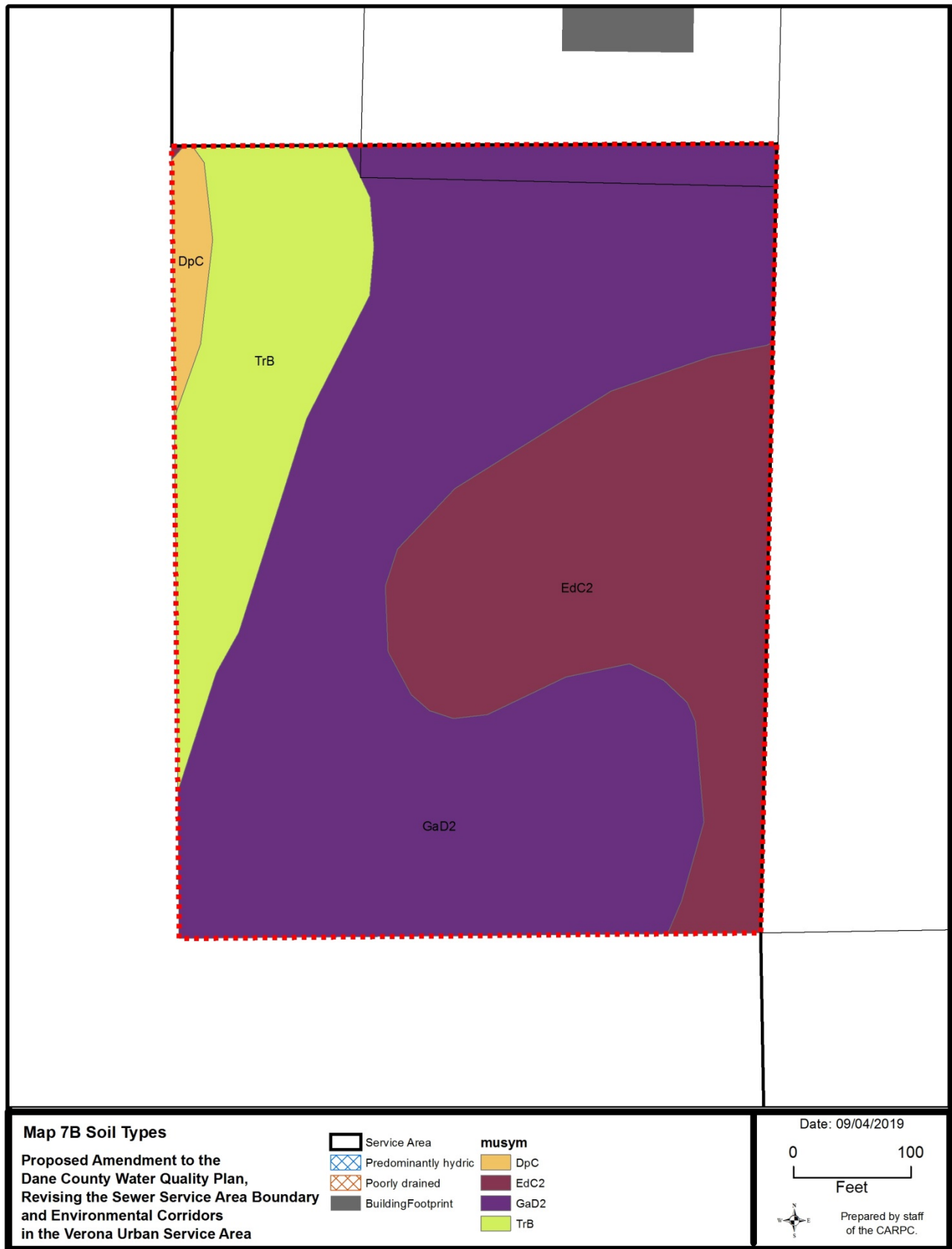


Map 7A - Soil Type

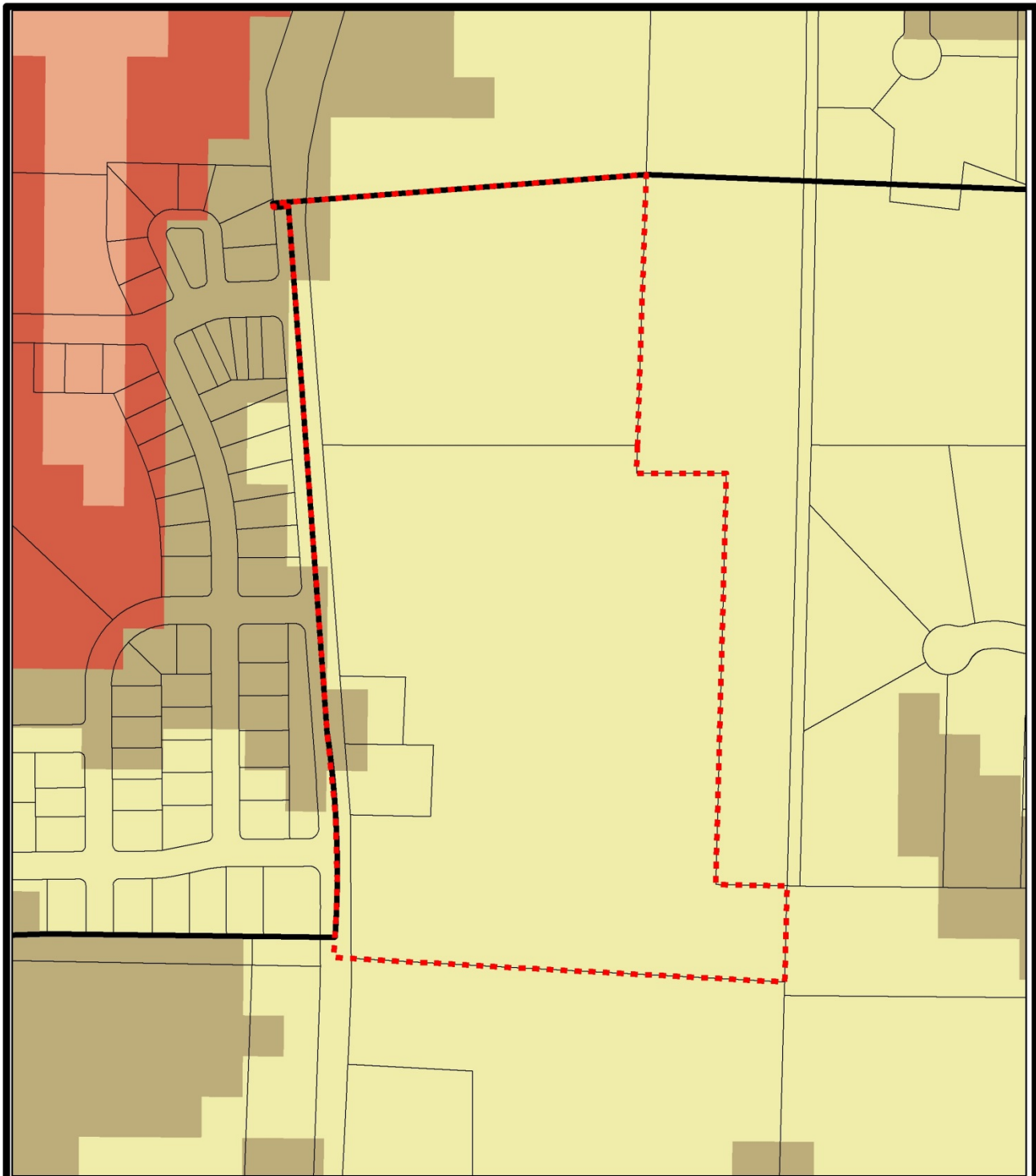




Map 7B - Soil Type



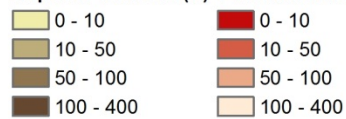
Map 8A – WGNHS Bedrock Depth and Potential Karst Features



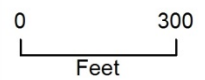
**Map 8A WGNHS Bedrock Depth and Potential Karst Features**

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

Depth to Bedrock (ft) Potential Karst Units (ft)

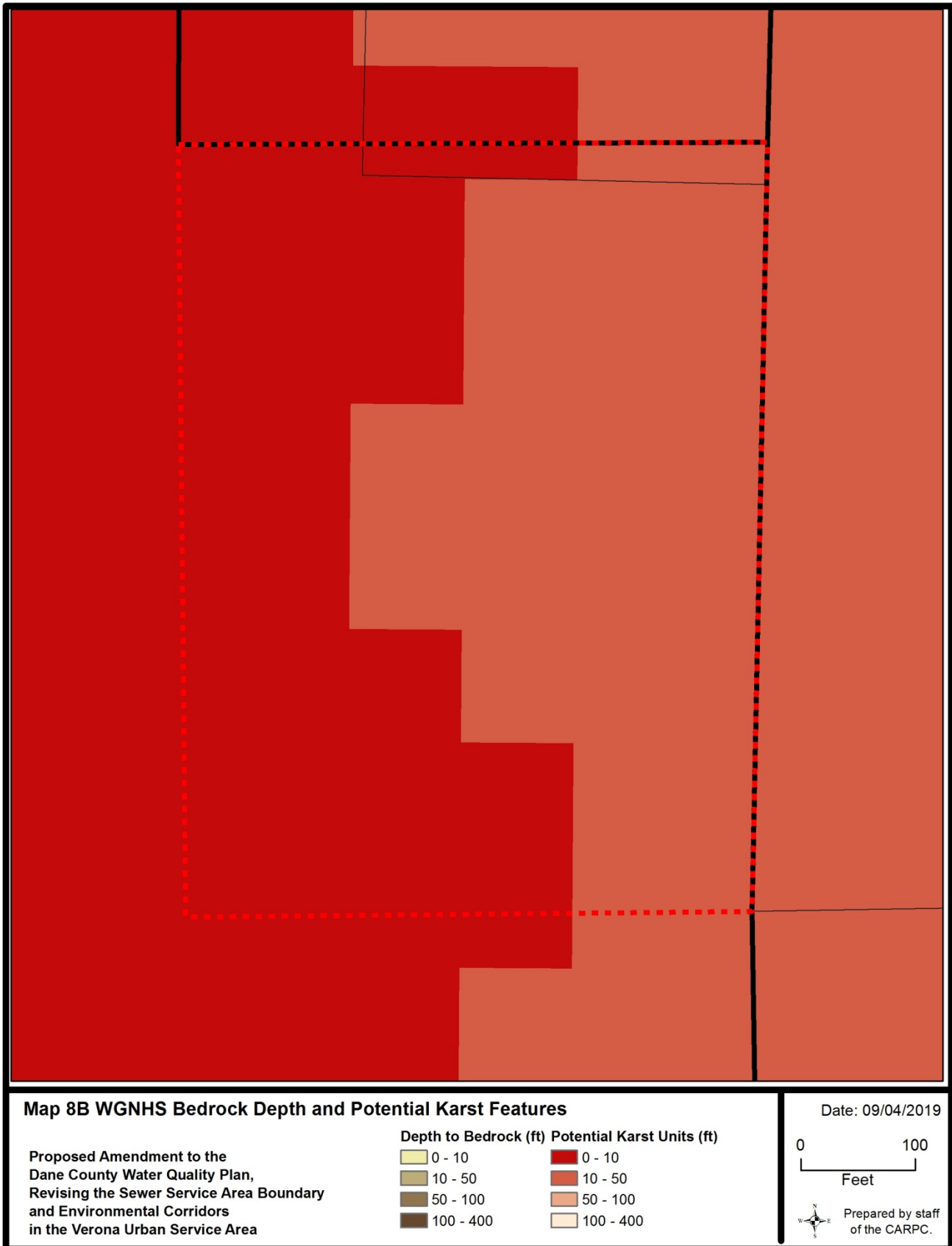


Date: 09/04/2019

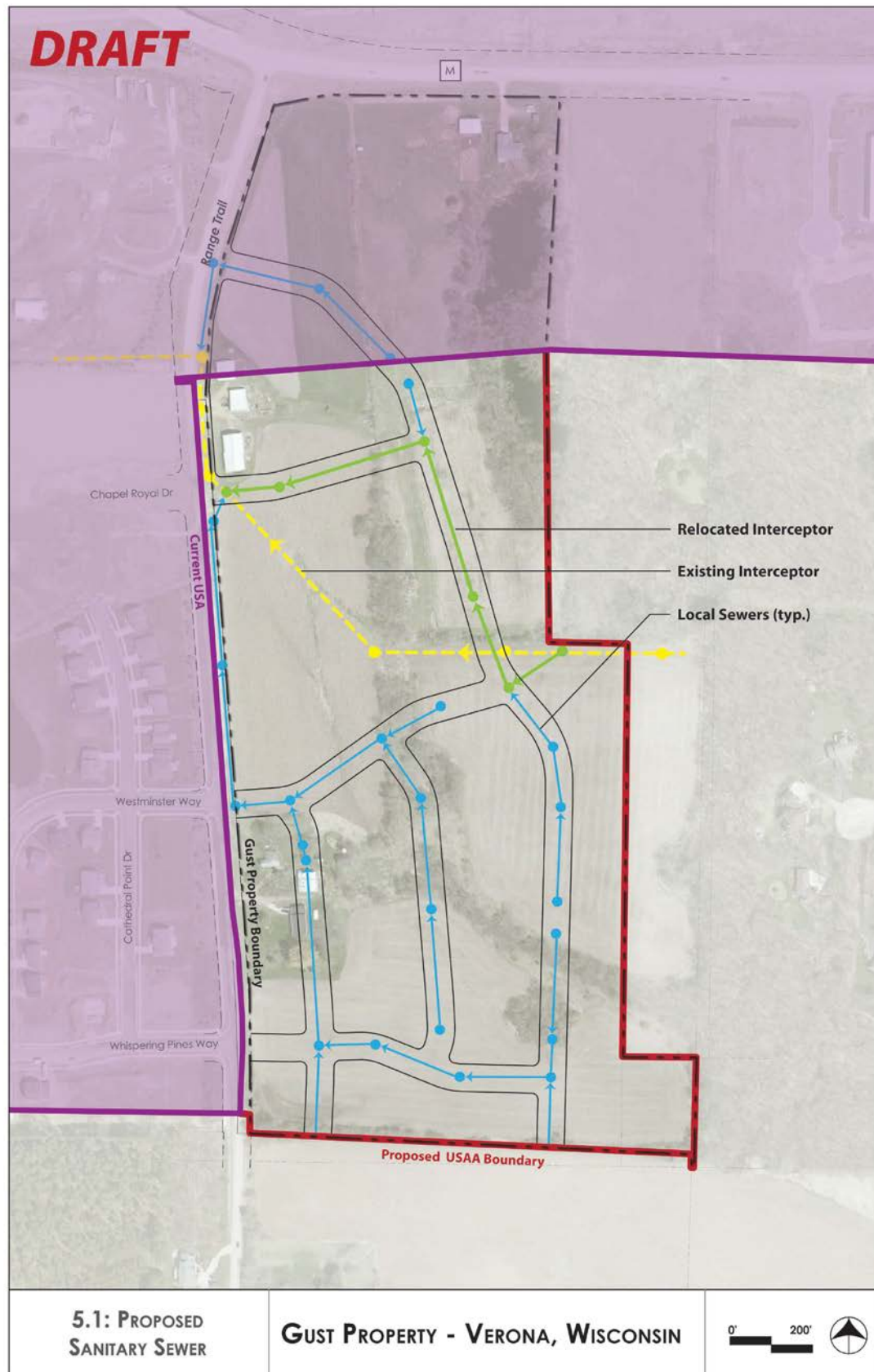


Prepared by staff  
of the CARPC.

Map 8B – WGNHS Bedrock Depth and Potential Karst Features



Map 9A – Planned Sanitary Sewer Service

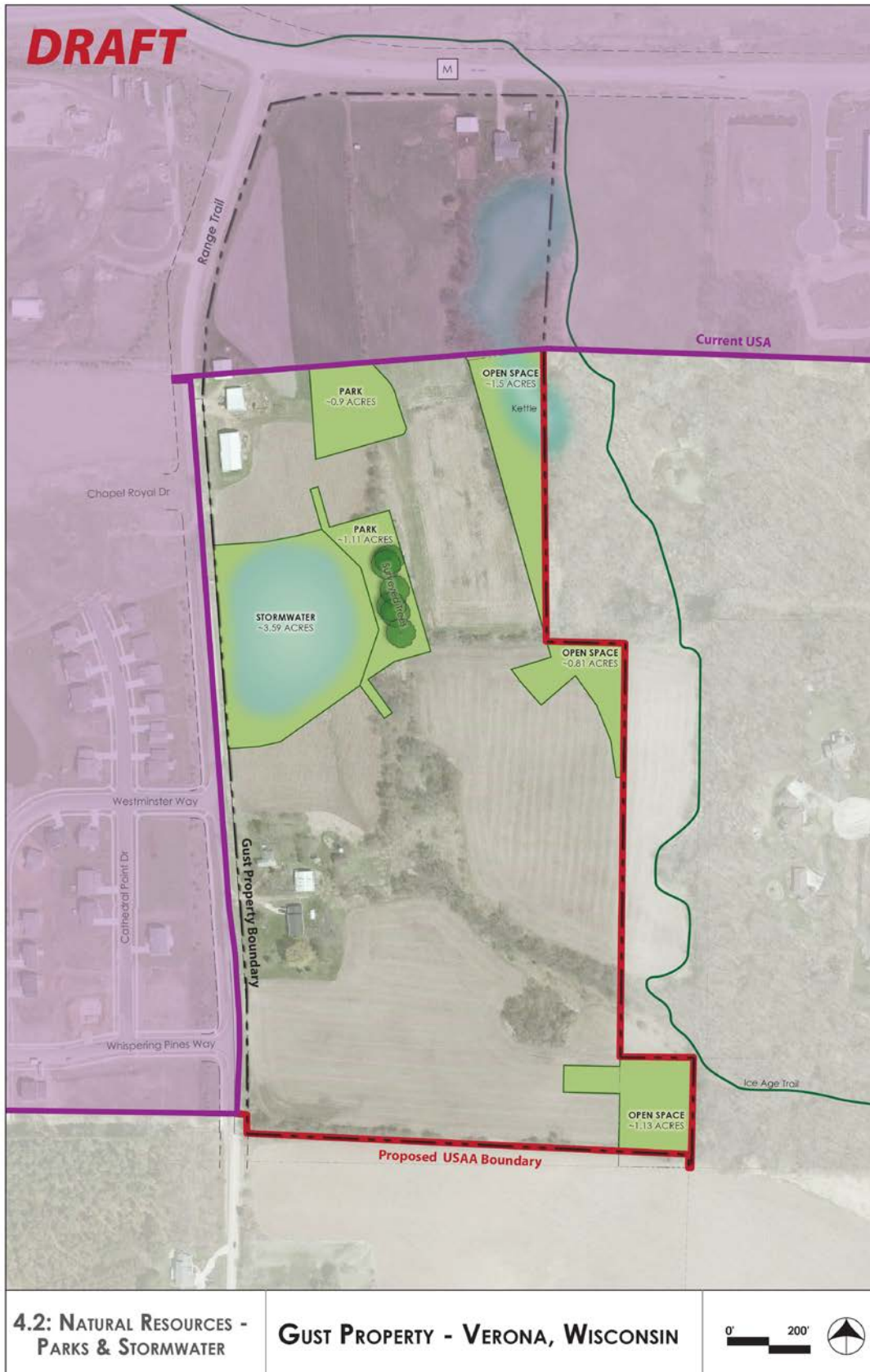




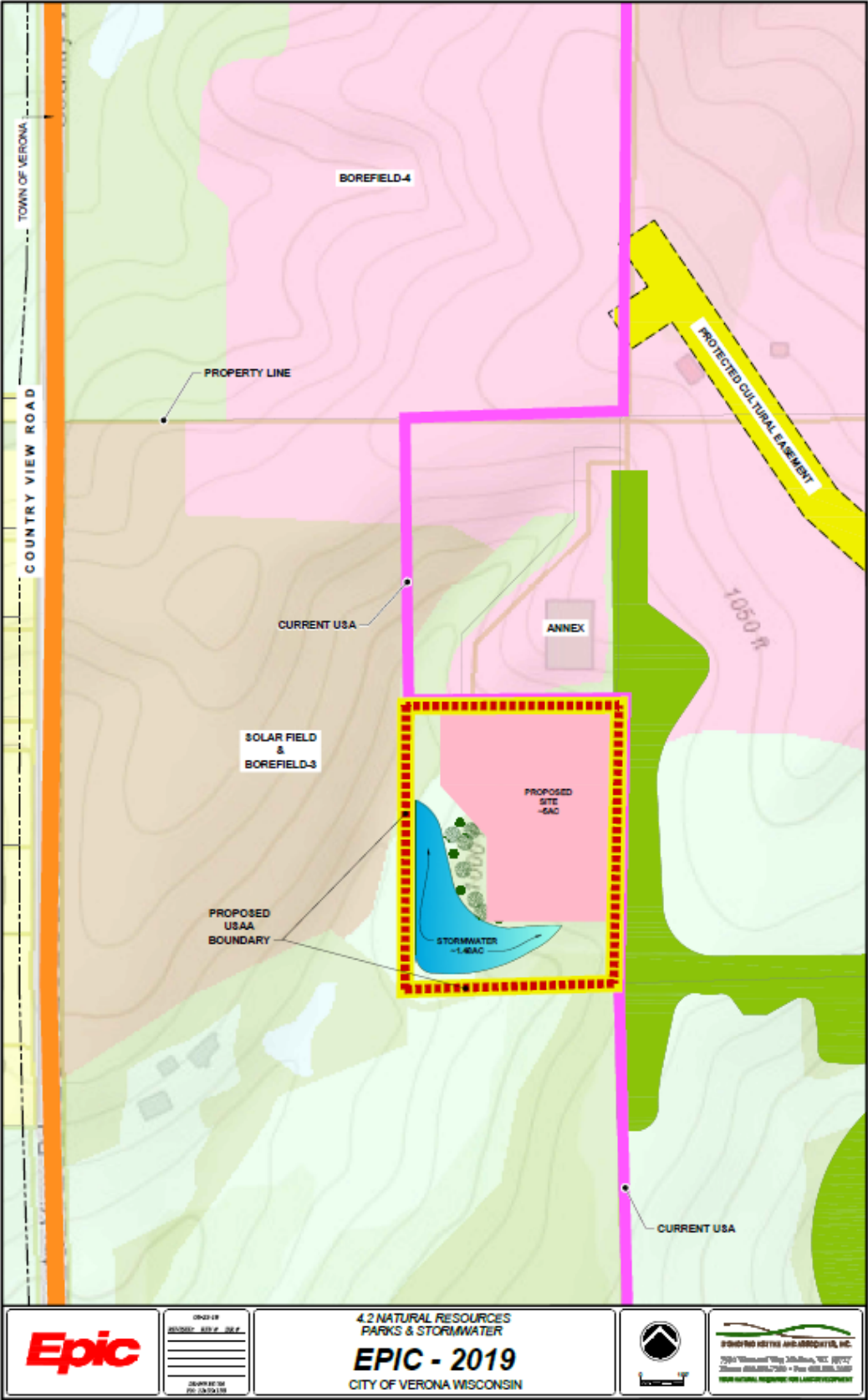
Map 9B – Planned Sanitary Sewer Service



Map 10A – Proposed Stormwater Management System

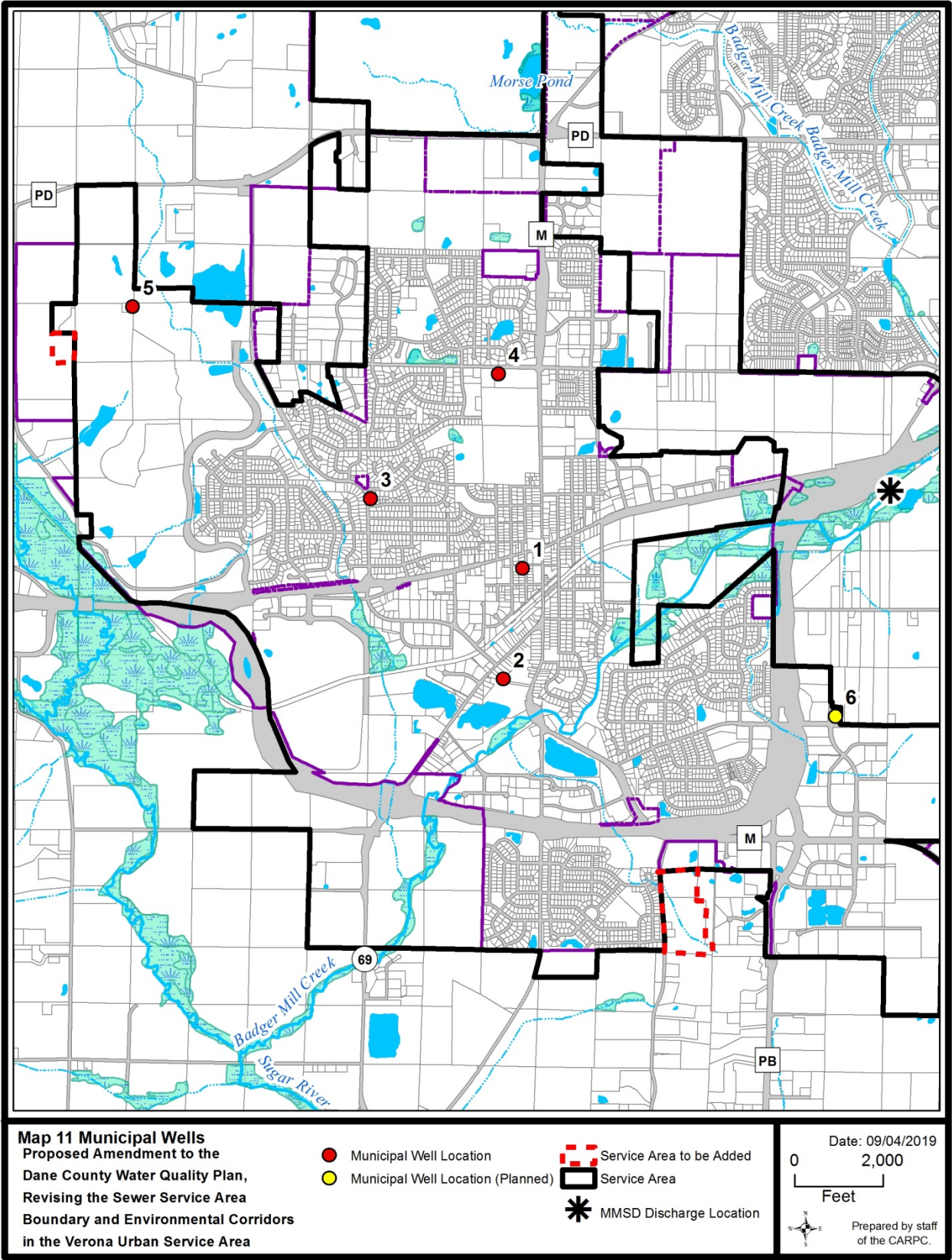


Map 10B – Proposed Stormwater Management System





Map 11 – Municipal Wells







28 August 2019

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

RE: Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Verona Urban Service Area, Dane County, Wisconsin

Dear Mr. Higgins:

Your submittal included two parcels: Northern Parcel and Southern Parcel. No previously recorded archaeological sites have been recorded in, or adjacent to the parcels delineated in the amendment. A review of available evidence indicates that no wetlands, drainages, or other landscape features that are typical indicators of American Indian settlement are present. Therefore, we see no reason why the project cannot proceed as designed.

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. If we are contacted, **work cannot resume until the Wisconsin Historical Society gives permission**. If you have any questions concerning the law, please contact the Wisconsin Historical Society at 1-800-342-7834.

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,

John H. Broihahn  
State Archaeologist  
State Archaeology and Maritime Preservation  
608-264-6496, [john.broihahn@wisconsinhistory.org](mailto:john.broihahn@wisconsinhistory.org)

Collecting, Preserving and Sharing Stories Since 1846

816 State Street Madison, Wisconsin 53706

[wisconsinhistory.org](http://wisconsinhistory.org)

**COMMENTS FOR CARPC Meeting  
about proposed Gust/Moraine Kettles Development  
August 8, 2019**

I am David Lonsdorf, of 1717 Beach Road, Town of Verona, a long time volunteer with the Ice Age Trail Alliance, and a recent President of the Board, and the principal steward for about 10 years of the “Moraine Kettles Preserve”, the section of Ice Age National Scenic Trail immediately east of the proposed development.

I understand that Kevin Thusius, the Ice Age Trail Alliance Director of Land Conservation, has been working with Chris Ehlers of Veridian, and the City of Verona to try to lessen the impacts of this development on the IAT corridor, but as of yet they have not come up with a final agreement. Kevin is out of town and was unable to come to the meeting tonight, so he asked me to represent the IATA's interests.

We are concerned about several issues - the impact this development will have on the Ice Age Trail users, our on the ground stewardship and management of these lands, and also possible negative impacts, including water runoff, on the ecologically sensitive areas around the kettle ponds, prairies, and restored oak savannas.

The placement of some 250 dwellings immediately west of the Reserve will have an obvious and profound negative impact on the hiker's experience. I don't think any more detailed explanation is needed on this point.

Our management of the restored prairie and oak savanna includes annual “prescribed fires” which help eliminate weeds and invasive species and promotes growth of desirable plants on the restoration. The current concept plan shows at least 10 dwellings abutting right on the edge of the restored prairie, which may cause problems at the time of these burns. For safety, we would like to see a “set back” on this line of non-fire tolerant trees, wooden structures, play materials, etc.

There are at least seven “kettle ponds” in the Moraine Kettles Preserve, not just the two largest ones shown on the Veridian Concept Plan. These are residuals of the last glacier's meltoff, and have been in place

for at least 10,000 years. They swell greatly in the time of abundant rain or after snow melt and shrink dramatically in drier periods. They are all linked together, and drain to the north, into the largest one. At times, usually at least once a year, this largest and most northern one, shown on the concept plan, will overflow and drain large amounts of water to the west through the "multi-family housing" area shown on the concept plan. The kettles have no other input besides rainwater or snow melt, and have no other exit besides overflowing to the west to Badger Mill Creek.

This is a fragile, and rare ecosystem, and more than ten years of effort, including thousands of volunteer hours and thousands of dollars, have gone into their restoration and preservation. We would like to see that CARPC ensure that this development will not affect the intricate hydrology of these ponds adversely, by either discharging more water into them through runoff, or preventing proper drainage at the time of higher water. Or conversely, by increasing the water runoff, causing the ponds to drain or even disappear. Either of these outcomes could cause irreparable damage to this several thousand-year-old ecosystem.

Thank you.

Map of trail location is  
in correct