May 1, 2024

# Staff Analysis of Proposed Amendment to the *Dane County Water Quality Plan* **Revising the Sewer Service Area Boundary and Environmental Corridors in the Central Urban Service Area** ***"High Point - Raymond"***

## History of the Central Urban Service Area

The Central Urban Service Area (USA) was established in 1971 with the adoption of the first sewer service plan and originally included about 29,000 acres. The first City of Madison amendment to the Central Urban Service Area occurred in 1987. There have been 119 amendments to this service area since its creation totaling roughly 12,700 acres of developable land and 4,800 acres of Environmental Corridor. City of Madison has applied for 65 amendments totaling 9,600 developable acres and 3,500 acres of Environmental Corridor. The most recent amendment of the service area was recommended by the Commission and approved by the Wisconsin DNR (WDNR) in 2023.

## Planning in Madison

The City of Madison updated their comprehensive plan in 2023. The document was originally adopted in 2018. The Comprehensive Plan is substantially consistent with the adopted 2050 Regional Development Framework (Framework). The requested amendment is located partly within an employment district. It is also partly within an area planned for development that should be considered through the lens of designing "Complete Neighborhoods." The development plan for the amendment is detailed in the City's Westside Neighborhood Development Plan.

## Existing Conditions

### *Land Use*

The City of Madison is requesting an amendment in two parts to the Central USA on the far west side of Madison. The northern expansion area (also referred to as northern subarea) is bounded, in clockwise order beginning with north, by Mid Town Road, Raymond Road, Jeffy Trail, and Mica Road. The southwestern expansion area (also referred to as southwestern subarea) is bounded to its west by South Pleasant View Road and to its south by CTH-PD.

**Surrounding Planned Land Uses, Southwest:**

- **North**: Existing mixed housing types
- **West**: Natural area and rural residential
- **South**: Commercial retail and service
- **East**: Commercial offices, park/open land, and a mixture of single-family detached and multi-family residential

**Surrounding Planned Land Uses, Northern:**

- **North**: Existing mixed housing types and commercial retail and service

- **West**: Natural area and rural residential
- **South/East**: Existing commercial, single-family residential, multi-family residential, and natural area

**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 | 84.8 | |
| Commercial Retail and Services | | 21.2 |
| Natural Area | | 61.2 |
| Open Land | 24.5 | |
| Parks/Outdoor Recreation | | 6.1 |
| Recreation | 36.2 | |
| Residential, High-Density | | 15.3 |
| Residential, Low-Density | | 72.2 |
| Residential, Medium-Density | | 15.8 |
| Residential, Rural | 41.1 | 0.3 |
| Transportation/Communication/Utilities | 21.3 | 46.9 |
| Vacant, Subdivided | 12.4 | |
| Water | 0.2 | |
| Woodlands | 18.5 | |
| | 239.0 | 239.0 |

### *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. WHS was unable to respond during the preparation of this report due to a records system migration. As of 2020, no sites had been recorded in or immediately adjacent to the amendment areas.

### *Natural Resources*

The proposed amendment area is in the Badger Mill Creek (HUC 12: 070900040201) subwatershed (see Map 5). Mapped wetlands and high-quality woodlands are present within the amendment areas.

Wastewater from the amendment area will be treated at the Madison Metropolitan Sewerage District (MMSD) Wastewater Treatment Facility (see Map 5). The treated effluent is currently discharged to Badfish Creek and Badger Mill Creek, bypassing the Yahara chain of lakes.

**Wetlands**

WDNR's Wisconsin Wetland Inventory (WWI) shows one wetland classified as palustrine open water, three wetlands too small to delineate and one excavated pond within the southwestern subarea. These WWI wetlands are mapped in an area proposed for placement in environmental corridors. The WWI shows two excavated ponds within the northern amendment area. A wetland delineation will be required prior to development due to the presence of WWI wetlands.

**Badger Mill Creek**

Badger Mill Creek (WBIC 888100 / WATERSID 13654) is 5 miles long and flows through the southwest side of the City of Madison and bisects the City of Verona. The Badger Mill Creek subwatershed is approximately 34 square miles and encompasses predominantly residential and agricultural land uses until its confluence with the Upper Sugar River in the Town of Verona. Badger Mill Creek is included on the state 303d list of impaired waters for total phosphorus due to high phosphorus levels.

There has been a citizen-based stream monitoring location on Badger Mill Creek at Lincoln Street (Station ID 10012953) since 2018. Field measurements from 2023 indicated dissolved oxygen levels of 6 to 10.4 mg/L, average transparency of 85 to 120 cm, and a macroinvertebrate index score of 2.25. The active USGS baseflow monitoring station (USGS 05435943) in this watershed collects data on discharge rates, dissolved oxygen, specific conductance, water level, and temperature; but does not collect chloride data.

The main branch of 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). Badger Mill Creek is also classified as a Variance Stream for Uses and Designated Standards per NR 104.05(2), which allows the WDNR to relax certain water quality standards for this stream to allow discharge of treated municipal wastewater. These stream use standards are state water quality standards established to guide water quality planning under NR 121.

Since 1998 MMSD has been discharging approximately 3.3 million gallons per day (MGD), or 5 cubic feet per second (cfs), of highly treated effluent back to Badger Mill Creek as a means of maintaining baseflow in the creek to compensate for groundwater being taken out of the Sugar River basin by municipal water wells. Prior to 1998, Verona had its own wastewater treatment plant which discharged to Badger Mill Creek, while wastewater from MMSD's treatment plant was all discharged to Badfish Creek in the adjacent Rock River basin. Previous groundwater modeling, of conditions prior to the treated effluent return, indicated that well water withdrawals had reduced baseflow in Badger Mill Creek in the Sugar River, compared to pre-development or no pumping conditions. Current modeling indicates that Badger Mill Creek would have had no flow in drought conditions experienced in 2010, without the treated effluent return. The treated effluent return has effectively restored the water balance between these two basins and has improved aquatic habitat in Badger Mill Creek by removing low baseflow as a limiting condition caused by the well water withdrawals. In May 2023, the MMSD Commission voted to discontinue its effluent flow to Badger Mill Creek to meet new phosphorus requirements.

**Morse Pond**

The majority of the southwest amendment area is within the internally drained watershed of Morse Pond (also called closed basins or glacial kettle depressions). The WDNR Surface Water Data Viewer classifies Morse Pond (WBIC 872800 / WATERS ID 902180) as a 13-acre seepage lake. WDNR's WWI identifies 8.5 acres of open water surrounded by about 4.5 acres of emergent wet meadow wetland. The Morse Pond subwatershed is approximately 1.6 square miles within the Badger Mill Creek watershed. It is a thermally sensitive watershed since it is tributary to Badger Mill Creek.

From a hydrologic perspective, internally drained watersheds, often possess significant seasonal and inter-annual variability in water levels as there is no natural outlet. Morse Pond has no natural outlet and the only mechanisms for water to leave the basin under average rainfall conditions are by infiltration and evapotranspiration, causing concern for flooding as its watershed develops. These two processes can be quite slow compared to watershed runoff entering the basin. For example, it might take weeks for the pond to infiltrate and evaporate runoff from a single storm event that may have lasted only several hours. Thus, the natural water level of a glacial depression typically varies seasonally and from year to year, often creating a dynamic balance of open water and surrounding wetland communities. The vegetation communities that often inhabit these areas, which are wet in many years but dry up during periods of drought, are sometimes referred to as prairie pothole communities.

**Springs**

Springs represent groundwater discharge visible to the casual observer. The Wisconsin Geological and Natural History Survey (WGNHS) maintains an inventory of springs in Dane County and throughout the state. From 2014 to 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 the Badger Mill Creek subwatershed.

**Groundwater**

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

Groundwater modeling using the 2016 Groundwater Flow Model for Dane County, developed by the WGNHS (link to website), has been used to model estimated baseflows in many streams throughout Dane County. Modeling of 2010 estimated baseflow in Badger Mill Creek at Old PB Road, downstream south of the amendment area (see location on Map 5), shows an *increase* in baseflow within Badger Mill Creek from predevelopment (i.e., no pumping) to 2010 modeled conditions, which is due to the MMSD treated effluent return discharge into Badger Mill Creek upstream of this point. However, a decline in baseflow is anticipated from 2010 conditions to 2040 modeled conditions due to the cumulative effects of well water withdrawals from multiple municipalities in the ground-watershed to support increasing development. Refer to Table 4 for additional information.

**High Quality Woodlands**

The Dane County Mature Forest web map shows mature forest (present since 1939), surrounded by areas that reforested after 1939, in the southwestern amendment area. This area of mature forest is proposed for placement in environmental corridors. There is also mature forest, surrounded by previously mature forest converted to agriculture and areas that reforested after 1939, in the northern amendment area. It is CARPC staff's opinion that these areas represent remnants of an oak savannah forest.

**Ice Age National Scenic 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 3.1-mile segment of the trail winds through Madison and connects directly to the 6.3-mile Verona segment. It starts at the University Ridge Golf Course and passes east through County-owned land (part of the Ice Age Trail Natural Resource Area) in the southwestern amendment area before heading south.

**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 CARPC staff for species designated as endangered, threatened, or of special concern identified two special concern insect species; one threatened plant species; several endangered species: one insect, two plant, and one turtle species; and one natural community within a 1 to 2-mile radius of the amendment area. State lands were identified within a 1-mile radius of the amendment area: the Ice Age Trail. Therefore, it is recommended that a formal Endangered Resources Review be conducted by the WDNR or one of their certified reviewers for potential impacts to endangered resources, and habitat protection measures to be implemented if species are found.

The entire amendment area is within the High Potential Zone (species likely present) for the federally endangered Rusty Patched Bumble Bee (link to web map). Section 7 of the Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service when any action that is carried out, funded, or permitted by a federal agency may affect a federally listed endangered or threatened species. The WDNR typically recommends that projects within the High Potential Zone include native trees, shrubs, and flowering plants (plants that bloom spring through fall) and the removal and control of invasive species in any habitat used for foraging, nesting, and overwintering. The USFWS developed a list of plants favored by Rusty Patched Bumble Bee (link to list). Implementing these conservation measures should be coordinated with the WDNR Endangered Resources Review Program as needed.

**Soils and Geology**

The amendment area is located within the West Johnstown-Milton Moraines Land Type Association of Wisconsin. The Association classifies the surficial geology of this area as rolling hummocky moraine and outwash plain complex with scattered bedrock knolls.

Surface elevations within the amendment area range from around 990 feet to 1139 feet. There are large areas of steep (>12%) and very steep (>20%) slopes in both amendment areas (see Map 6), as well as some small areas adjacent to Badger Mill Creek. Other than the steep slopes associated with the creek, the remaining steep slopes in the amendment area are not riparian and do not require inclusion in Environmental Corridors.

According to the Natural Resource Conservation Service (NRCS) Soil Survey of Dane County, the soils in most of the southwestern amendment area and half of the northern amendment area are in the Batavia-Houghton-Dresden association. These soils are wellto-poorly drained, deep-to moderately deep silt loams and mucks that are underlain by silt, sand, and gravel. The soils in the remainder of the amendment areas are in the Dodge-St. Charles-McHenry association. These soils are well to moderately well drained deep silt loams. Table 2 shows detailed classifications for soils in the amendment area (see 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 NRCS (link to web soil survey), the St. Charles, Troxel, Plano, and Salter soils (the ScB, TrB, PnA, and PrC map units) are not hydric, but they do have a seasonal (April to June) zone of water saturation within 5 feet of the ground surface. The St. Charles, Troxel, and Plano soils are classified as moderately well and well drained, and therefore do not pose a limitation for buildings with basements. The Salter soils are somewhat poorly drained and may pose a limitation for buildings and basements.

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

| Soil | % of Area | General Characteristics |
|---|---|---|
| | | ***Southwestern Amendment Area*** |
| Dresden Silt Loam; DsC2 | 23.7 | 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 | 19.1 | 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. |
| Dresden loam; DrD2 | 10.8 | Well-drained, gently sloping to steep soils on benches in stream valleys. Soils have medium fertility, moderate permeability, and a very severe hazard of erosion. Poses severe limitations for development due to slope. |

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| Kegonsa Silt Loam; KeB | 10.8 | 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. |
| Grays Silt Loam; GsB | 10.2 | Deep, well drained and moderately well drained, nearly level to sloping soils on benches in old lake basins. Soils have medium fertility, moderate permeability, and a low hazard of erosion. Poses moderate limitations for development due to bearing capacity. |
| Rodman Sandy Loam; RpE | 8.1 | Excessively drained, moderately steep and steep sloils on side slopes of benches in stream valleys. Soils have very low fertility, moderately rapid permeability, and a very severe hazard of erosion. Poses severe limitations for development due to slope. |
| Salter sandy loam; ShA | 6.1 | Deep, somewhat poorly drained, nearly level and gently sloping soils on low benches in old lake basins. Soils have medium fertility, moderate permeability, and a low hazard of erosion. Poses severe limitations for development due to seasonal high water table. |
| Batavia Silt Loam; BbB | 5.2 | 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. |
| Warsaw Silt Loam; WrC2 | 3.7 | Gently sloping and sloping, well-drained soils 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. |
| McHenry Silt Loam; MdC2 | 1.0 | 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. |
| Pecatonica Silt Loam; PeB | 1.0 | Deep, well-drained, gently sloping and sloping soils on glaciated uplands and high benches in stream valleys. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses slight limitations for development. |
| ***Northern Amendment Area*** | | |
| St. Charles Silt Loam; ScB | 17.5 | 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. |
| Dodge Silt Loam; DnC2 | 11.1 | 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. |
| Batavia Silt Loam; BbB | 10.7 | 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. |
| Rockton Silt Loam; RoC2 | 10.3 | Moderately deep, well-drained, gently sloping to moderately steep soils on dolomite-controlled uplands. Soils have medium fertility, moderate permeability, and a severe hazard of erosion. Poses severe limitations for development due to depth to bedrock. |

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|---|---|---|
| McHenry Silt Loam; MdB | 7.7 | Deep, well drained, gently sloping to moderately steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and a moderate hazard of erosion. Poses slight limitations for development. |
| Ringwood Silt Loam; RnC2 | 6.5 | 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, low bearing capacity, and erodibility. |
| Kidder Soils; KrE2 | 6.3 | 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. Poses severe limitations for development due to slope. |
| McHenry Silt Loam; MdC2 | 6.2 | 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. |
| Plano Silt Loam; PnC2 | 4.3 | Deep, well drained and moderately well drained, nearly level to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a severe hazard of erosion. Poses moderate limitations for development due to depth to saturated zone and slope. |
| Dodge Silt Loam; DnB | 4.2 | 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. |
| Batavia Silt Loam; BbC2 | 4.0 | Deep, well drained, nearly level to sloping soils on high benches. Soils have high fertility, moderate permeability, and a severe hazard of erosion. Poses moderate limitations for development due to slope. |
| Troxel Silt Loam; TrB | 3.6 | 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. |
| Kidder Loam; KdD2 | 2.4 | 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. Poses severe limitations for development due to slope. |
| Plano Silt Loam; PnB | 2.1 | Deep, well drained and moderately well drained, nearly level to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses slight limitations for development due to shrink/swell potential and low bearing capacity. |
| Kidder Soil; KrD2 | 1.6 | 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. Poses moderate limitations for development due to slope. |

*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 | ScB, TrB, BbB, MdB, KeB, GsB, DnB, PnB, PeB, PnA | 46.2 |
| 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%) | KrE2, DrD2, RpE, KdD2, KrD2, MdD2 | 13.9 |
| Soils Associated with Shallow Bedrock (< 5') | None | 0 |
| Best Potential for Infiltration in Subsoils | ScB, BbB, DsC2, DnC2, MdB, MdC2, KeB, RnC2, KrE2, DrD2, GsB, RpE, PnC2, DnB, BbC2, ShA, KdD2, PnB, WrC2, KrD2, MdD2, GsD2, PeB, PnA | 83.8 |

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

According to WGNHS data, bedrock within the majority of the southwestern amendment area and approximately half of the northern amendment area are in the Prairie du Chien Group. 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. The bedrock in the southwestern corner of the southwestern amendment area is in the Trempealeau Group. Bedrock in the Trempealeau Group is quartz sandstone, dolomitic sandstone, silty dolomite, and sandy dolomite, and consists of two formations including the Jordan and underlying St. Lawrence Formations, which are combined as one mapping unit. Thickness is about 75 feet, where not eroded. The bedrock in a small portion of the northern amendment area is the Ancell Group. 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. The bedrock in the central portion of the northern amendment area is in the Sinnipee Group. Bedrock in the Sinnipee Group is dolomite with some limestone and sale, and consists of three formations including the Galena, Decorah, and Platteville Formations. According to WGNHS data, the depth to bedrock in the amendment area ranges from 0-121 feet, with the shallowest depths being in the central portion of the norther amendment area and deepest depths being in the southwest corner of the southwestern amendment area.

As is common throughout much of the upper Midwest, karst features such as enlarged bedrock fractures are prevalent in the local dolomite uplands. Karst features such as vertical fractures and conduits provide primary pathways for groundwater movement and can dramatically increase groundwater susceptibility when present. The location of karst features is difficult to predict, and the thickness and type of the overlying soil greatly affects how much water drains into them. Where clay

soils are thick, infiltration rates are likely to be very low. However, where bedrock fractures are near the surface infiltration rates can be very high. Karst features may be encountered in the amendment area at depths ranging from 0 to 121, with the shallowest depths coinciding with the shallow bedrock in the central portion of the northern amendment area. This can pose a concern for potential groundwater contamination if improperly managed. Proposed stormwater management practices in the northern amendment area could be affected by the potentially shallow karst.

The *WDNR Conservation Practice Standard 1001 – Wet Detention Pond* (2007) and *WDNR Conservation Practice Standard 1002 – Site Evaluation for Stormwater Infiltration* (2017) requires field verification for areas of the development site considered suitable for stormwater management. This includes a site assessment for karst features in this area. If shallow karst features are found, adequate protection measures are required to address any potential for groundwater contamination.

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

## Proposed Urban Services

### *Parks and Open Space*

The proposed development includes one 4-acre park and 61 acres of stormwater management area and other open space within the amendment area (see Map 2). All park, stormwater, and open space areas are proposed for placement in Environmental Corridors.

### *Wastewater*

Overview

Sanitary sewer service will be provided to the amendment areas by direct connection to the Madison Metropolitan Sewerage District (MMSD) wastewater collection and treatment system or by connection to the City of Madison sanitary sewer collection system, which then flows to the MMSD system (see Map 9A). Local sewers within the northern expansion area will be sized and configured based on final layout. Due to a drainage divide, the western half of this area will gravity flow and connect to existing 8-inch sewer stubs at one or more of the adjacent roadways to the west and south. These existing local sewers flow to the south/southwest and connect to the MMSD-owned Nine Springs Valley (NSV) – Midtown Extension interceptor. The eastern half of this area will gravity flow east and connect directly to the Nine Springs Valley – Mineral Point Extension interceptor. Most of the southwestern expansion area will be dedicated as stormwater and open space; however, the portion which will be developable along Raymond Rd will connect directly to the Nine Springs Valley – Morse Pond Extension interceptor. The NSV – Morse Pond interceptor connects into the NSV – Midtown interceptor, which then connects into the NSV – Mineral Point interceptor. Ultimately, wastewater flow from both expansion areas will flow via the NSV - Mineral Point interceptor to Pump Station 12 within the MMSD system, and eventually to the Nine Springs Treatment Facility.

Collection System

The proposed amendment consists of approximately 102 acres of residential land uses and 21 acres of commercial/office land uses contributing to wastewater flows. The City estimates that the amendment area will generate an annual average of approximately 229,750 gallons per day (gpd) of wastewater, or 160 gallons per minute (gpm). This assumes between 1.75-2.5 persons/unit for the mix of residential types and an average wastewater generation rate of 100 gallons per capita per day (gpcd) for residential land uses. For commercial/office land uses, this assumes approximately 550 employees and an average wastewater generation rate of 15 gpcd. The City estimates that the amendment area will generate a peak daily flow rate of approximately 919,000 gpd (0.92 MGD), or 638 gpm, utilizing a peaking factor of 4.0 for all land uses.

Proposed sewers to serve the amendment area have not been designed but will be sized based on specific sub-sewersheds. The City's application provides specific capacities for critical downstream segments of sewer. The downstream section of sewer along Flagstone Drive is planned for upsizing of observed flows exceed 50% of capacity, otherwise no downstream local sewers are reported to have capacity constraints. The *2018 MMSD Collection System Evaluation,* prepared by CARPC and MMSD staff, shows that the receiving MMSD interceptor sewers have sufficient capacity to serve the amendment area. However, by 2030 the section of interceptor sewer upstream of Pump Station 12 is anticipated to exceed capacity and system upgrades will be needed prior to actual flows reaching capacity in this segment. Pump Station 12 has a firm capacity of 32.0 MGD and is not anticipated to reach 90% of capacity until 2040.

Based on the estimated wastewater loading and capacity of the existing sewers, the City has shown that there is sufficient existing or planned wastewater collection system capacity to serve the proposed amendment area.

Wastewater Treatment Facility

Madison Metropolitan Sewerage District (MMSD) will provide wastewater treatment for the amendment area. The amendment area will need to be annexed into the MMSD service boundary. The Nine Springs Wastewater Treatment Facility (WWTF) is located on Moorland Road, Madison, and currently discharges treated effluent to Badfish Creek within the Badfish Creek Watershed (Lower Rock River Basin) and Badger Mill Creek within the Upper Sugar River Watershed (Sugar-Pecatonica Basin). The rated monthly design flow capacity of the facility is 56.0 million gallons per day (MGD) and the maximum daily design flow capacity is 68.6 MGD. In the year 2022, the facility received an average monthly influent hydraulic loading of 36.3 MGD (65% of the 56.0 MGD design capacity), including infiltration and inflow, according to the 2022 Compliance Maintenance Annual Report (CMAR) (link to 2022 CMAR). It is expected to reach 90% of current hydraulic design capacity around 2026 based on current projected growth rate assumptions. This already occurs on occasion, although average flows did not exceed 70% design capacity for any month in 2022. MMSD completed a facility plan in 2017, titled Liquid Processing Facilities Plan, that recommended improvements to the liquid treatment processes at the plant, including the addition of hydraulic capacity. These improvements are being implemented in multiple phases between 2018 and 2030. For the 20-year planning period, treatment for this area is expected to remain at the existing wastewater treatment facility location with expanded capacity of the

system as the need is foreseen. MMSD staff were contacted regarding this amendment and provided comments but did not have concerns with serving this additional area.

MMSD did not have issues meeting its WPDES permit limits for the quality of effluent discharged to Badfish Creek and Badger Mill Creek, according to their 2022 CMAR. Permit limits are specific to each outfall; however, effluent sampling is performed upstream of the flow split to each outfall. Effluent quality summarized here refers to Badfish Creek, where approximately 95% of discharge is released. Below is a summary of the major effluents reported on in the 2022 CMAR for the Badfish Creek outfall:

- The biochemical oxygen demand (BOD) effluent quality for 2022 was well below the monthly average limit, with a monthly average of 3.0 mg/L (16% of the limit) and a maximum concentration of 4 mg/L (21% of the limit) for the month of January through April.

- The total suspended solids (TSS) effluent quality for 2022 was below the monthly average limit, with a monthly average of 5.3 mg/L (27% of the limit) and a maximum concentration of 7 mg/L (35% of the limit) for the month of September and November.

- The ammonia (NH3) effluent quality for 2022 was below the monthly average limits (limits vary by month), with a monthly average of 0.213 mg/L (3-12% of the limit) and a maximum concentration of 0.452 mg/L (12% of the limit) for the month of March.

- The phosphorus (P) effluent quality for 2022 was below the monthly average limit, with a monthly average of 0.32 mg/L (23-43% of the limit) and a maximum concentration of 0.43 mg/L (43% of the limit) for the month of September.

Badfish Creek is a tributary to the Rock River, and thus the WPDES permit for MMSD includes phosphorus and TSS limits for effluent to Badfish Creek to comply with the Total Maximum Daily Load (TMDL) developed for the Rock River Basin to protect and improve water quality. In addition to the TMDL limits, future water quality-based effluent limits (WQBEL) have been considered in the WPDES permit. The interim limit for phosphorus discharged to Badfish Creek is a 1.0 mg/L monthly average required beginning May 2020 (previous limit was 1.5 mg/L), with a final WQBEL of 0.225 mg/L. Additionally, an interim limit of 0.6 mg/L, expressed as a six-month average (May through October and November through April) is required beginning May 2020, with a final WQBEL of 0.075 mg/L. To meet the WQBEL for phosphorous, MMSD has implemented a Watershed Adaptive Management (WAM) approach, leading a diverse group of partners called Yahara Watershed Improvement Network (Yahara WINs) in implementing phosphorus reducing practices in the Yahara Watershed (link to Yahara WINs website).

The Nine Springs WWTF does not remove chloride from influent. A 2015 study completed by AECOM determined that while possible, treatment would be cost-prohibitive, energy intensive, and involve other environmental impacts (link to report). MMSD has been granted a variance from the chronic water quality standard for chloride of 395 mg/L required by NR 105. With this variance, the WPDES permit sets interim (variance) monthly limits above the chronic water quality standard and requires MMSD to implement chloride source reduction measures. One such source reduction initiative which MMSD participates in is the Wisconsin Salt Wise Partnership (link to Salt Wise website).

### *Water System*

Overview

Water will be provided to the amendment areas by connection to the City's municipal water system. The Madison Water Utility provides municipal water through a public water distribution system which includes approximately 4,850,215 lineal feet of water main, 23 high-capacity wells (two of which are in-active), and 40 booster pumps. A primary pump within each well unit pumps into an onsite reservoir, while one or more booster pumps within each well unit pump into the distribution system. The active wells are at depths ranging from approximately 500 to 1,188 feet, with a capacity of 1,100 to 2,520 gallons per minute (gpm) entering the distribution system. In total, the gross capacity of all municipal well pumps is approximately 67.7 million gallons per day (MGD) or 47,038 gpm. The firm capacity (with the largest well assumed to be out of service) is approximately 64.1 MGD or 44,517 gpm. The City has six elevated storage tanks, three standpipes, and 24 reservoirs, with a combined storage capacity of 43.0 million gallons. The City's water system is comprised of multiple pressure zones. The proposed amendment area is within Pressure Zone 8.

Nearby municipal wells are shown on Map 10. The proposed amendment area is not within the 100-year zone of contribution for any existing municipal wells.

Water supply will be provided by connecting to existing water mains in the adjacent roadways. Proposed water mains within the development area have not been designed but will generally include larger mains along primary roadways and smaller diameter mains along local streets.

System Evaluation

According to the 2022 Annual Report to the Public Service Commission of Wisconsin (link to 2022 Annual Report), the City pumped an average of 17,163 gpm, or 24.72 MGD, in 2022, which is approximately 15% of its firm pumping capacity. In 2022, the maximum amount pumped in any one day was 22,368 gpm, or 32.21 MGD. The City's application reports that the City-wide average daily demand is approximately 31.0 MGD and the demand within Pressure Zone 3 is approximately 3.3 MGD.

Water losses in the City's distribution system were an average of 1.07 MGD in 2022, which accounted for 12% of the net water supplied. Approximately 98% of this was due to unreported and background leakage, with the remaining due to reported leaks. In 2022, there were 227 main breaks and 30 service breaks which were repaired. Water losses in the City's distribution system was 14% in 2021 and 11% in 2020. The Wisconsin Administrative Code PSC 185.85(4)(b) requires a utility with more than 1,000 customers to submit a water loss control plan to the Public Service Commission (PSC) if the utility reports its percentage of water losses exceeds 15%.

The proposed amendment consists of approximately 102 acres of residential land uses and 21 acres of commercial/office land uses contributing to water demand. The City anticipates the annual average daily water demand for the amendment area to be approximately 165,000 gpd (0.16 MGD), or 115 gpm. This assumes 3,017 persons in the residential units using an average daily demand of approximately 52 gallons per day (gpd) and 549 employees in the commercial/office land uses using an average daily demand of approximately 15 gpd, based on the City's application. The estimated peak daily demand is approximately 202 gpm, using a peak daily demand of 1.76 (per City's application, based on 10-year

historical data). The estimated peak hourly demand is approximately 401 gpm, using a peak hourly demand factor (peak hour to AADV) of 3.5 based on previous City records.

Including the projected demand from the amendment area, as well as the additional demand from the concurrently pursued "Felland Road" urban service amendment (#2403 C-Madison USAA) (contributing a peak daily demand of 116 gpm), the total peak daily demand on the water system is anticipated to be 22,686 gpm. The peak hourly demand is anticipated to be 60,704 gpm. This represents an increase of approximately 1% in the current demand for the system. The estimated peak hourly demand based on these calculations exceeds the current pumping capacity of the wells and a modest amount of water from storage (representing approximately 2% of the available storage capacity) will be required to meet the peak hourly demands on the system (note: this is already the case without adding the additional demand from the amendment area). Nonetheless, it is anticipated that the existing water supply system will support the additional demand from the proposed amendment area. The City notes in their application that the water system in this area will be capable of providing 3,500 gpm for 3.0 hours for firefighting purposes. Overall, it is anticipated that the existing water supply system will support the additional demand from the proposed amendment areas.

### *Stormwater Management System*

Both subareas of the proposed amendment are within the Badger Mill Creek subwatershed (HUC 12: 070900040201).

Northern Subarea Existing Conditions

The northern subarea consists of mostly agricultural lands, some remnant woodlands, and a cluster of platted low-density residential land uses. There is a ridge which generally divides the northern subarea in half, with the eastern portion draining east to a constructed drainage way which runs along Marty Road south, through constructed stormwater areas, and eventually entering Badger Mill Creek just south of Raymond Road. The western portion of the amendment area generally drains west through the adjacent City of Madison neighborhood, then enters Badger Mill Creek less than 0.5 miles to the southwest (within the northern edge of the southwestern subarea).

Southwestern Subarea Existing Conditions

The southwestern subarea consists of mostly natural/open space, a couple low-density residential properties, and existing right-of-way. Runoff in this subarea generally drains to one of two isolated onsite closed basins (also called closed basins or glacial kettle depressions) or to the north toward Badger Mill Creek which runs through the amendment area. Runoff from the southern half, as well as overflow from the closed basins onsite drains to Morse Pond. Thus, the southern two-thirds of the southwestern subarea is within the larger internally drained watershed of Morse Pond. From a hydrologic perspective, internally drained watersheds often possess significant seasonal and inter-annual variability in water levels as there is no natural outlet. Morse Pond has no natural outlet and the only mechanisms for water to leave the basin under average rainfall conditions are by infiltration and evapotranspiration, causing concern for flooding as its watershed develops, although there is an emergency pumping plan in place to control water levels. These two processes can be quite slow compared to watershed runoff entering the basin. Thus, the natural water level of a glacial depression typically varies seasonally and from year to year, often creating a dynamic balance of open water and

surrounding wetland communities. The vegetation communities that often inhabit these areas, which are wet in many years but dry up during periods of drought, are sometimes referred to as prairie pothole communities. Internally drained watersheds require developing stormwater management systems that avoid unintended impacts on surrounding properties and water resources. Changes to the watershed resulting in increased volumes of runoff (e.g., from an increase in impervious surfaces) can potentially impact surrounding and downstream properties and water resources if the volume increase is not mitigated.

Proposed Stormwater Plan

There are mapped wetlands in the southwestern subarea and two excavated ponds shown on the WWI mapping in the northern subarea. If these areas develop in the future, stormwater modeling should account for the current level of peak rate and volume control being achieved in the existing condition. If these areas are determined to, in fact, contain wetlands, then appropriate vegetated buffers and inclusion in environmental corridor will be necessary. Additionally, pretreatment of stormwater runoff prior to entering the wetlands would be required in accordance with NR 151 regulations.

A detailed stormwater management report was not provided with the City's application but will be required at the time of the sanitary sewer extension review. However, new development within the amendment area will need to meet or exceed current stormwater regulations for peak rate control and attenuation, water quality (TSS reduction), volume control (infiltration), thermal control, and oil/grease control. For the portions of the southern subarea in a closed basin watershed, it will be necessary to model the volume of storage within the closed basin in predevelopment conditions, meet the 90% stay-on requirement without exemption, and meet additional requirements for sites subject to inundation. Where feasible, development within the amendment area should strive to match the predevelopment stay-on volume (i.e., provide 100% stay-on), particularly for those areas within the Morse Pond watershed.

Detailed stormwater management plan review and approval is required prior to beginning any development construction. The plan will be required to meet all stormwater management and performance standards of the City of Madison, Dane County, and WDNR current at the time of development. Temporary stormwater management and erosion control using appropriate best management practices during construction will also be required.

**Performance Standards**

The City of Madison stormwater management and performance standards are contained within Chapter 37 of the City of Madison Code of Ordinances. Dane County stormwater standards are detailed within the Dane County Code of Ordinances, Chapter 14. WDNR stormwater standards are within Administrative Code Chapters NR 151 and NR 216. Development within the amendment area will be required to follow the more protective requirements contained within the respective standards.

The City proposes stormwater management performance measures for the amendment area to meet, or exceed, applicable stormwater standards currently required by the State of Wisconsin, Dane County, and City of Madison, and include:

1. Peak runoff rate control is required for the 1-, 2-, 10-, 100-, and 200-year, 24-hour design storms to limit post-development runoff to "pre-development" levels, in accordance with the City of Madison and Dane County Stormwater Ordinances.

2. Sediment control is required to achieve at least 80% sediment control for the amendment area based on the average annual rainfall period, with sediment control pretreatment occurring prior to infiltration for runoff from parking lots and new road construction within commercial, industrial, and institutional land uses, in accordance with the City of Madison and Dane County Stormwater Ordinances.

3. Runoff volume control is required to maintain the post-development infiltration (stay-on) volume to at least 90% of the pre-development infiltration (stay-on) volume for the average annual rainfall period, without exception for sites determined to be within a closed basin watershed, in accordance with the City of Madison and Dane County Stormwater Ordinances.

4. Maintain predevelopment groundwater recharge rates (a range of 9 to 10 inches/year for the amendment area) determined 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*", or by a site-specific analysis, if allowed by ordinance as an elective alternative to meeting the 90% stay-on requirement if more than two percent (2%) of the site is required to be used as effective infiltration area, in accordance with City of Madison and Dane County Stormwater Ordinances.

5. Thermal control is required to reduce the temperature of stormwater runoff from development sites within thermally sensitive watersheds, in accordance with the City of Madison and Dane County Stormwater Ordinance.

6. Oil and grease control are required to treat the first 0.5 inches of runoff using best management practices at commercial and industrial sites and any other uses where the potential for pollution by oil or grease, or both, exists, in accordance with the City of Madison and Dane County Stormwater Ordinances.

## Impacts and Effects of Proposal

### *Environmental Corridors*

The proposed amendment area includes a total of approximately 61 acres of Environmental Corridor (see Map 11). This will include intermittent stream with associated buffer, park, open space, and proposed stormwater management areas in accordance with the Environmental Corridor Policies and Criteria (link to document) adopted in the *Dane County Water Quality Plan*. Proposed Environmental Corridors include all areas currently mapped as Protection Areas and some areas which coincide with mapped Stewardship Areas.

Protection Areas are required for inclusion in Environmental Corridors when those areas are added to the urban service area. Protection Areas include natural resource features such as the 1% annual chance floodplain; waterbodies, streams and wetlands, plus their required vegetative buffers; riparian steep slopes; existing public lands, parks, and conservancy areas; and existing stormwater management

facilities. Protection areas are mapped based on regionally available information, such as the Wisconsin Wetland Inventory data.

The proposed amendment area includes 47.6 acres mapped as Stewardship Area, including potentially restorable wetlands, current Ice Age Trail Corridor, and internally drained areas, of which 43.2 acres are proposed to be designated as Environmental Corridor with this amendment (see Map 11). Stewardship Areas are natural resources that are not legally protected from development, but still provide important benefits to the region, and are advised to be considered for inclusion in Environmental Corridors, above the minimum requirements. This concept is described more in the 2050 Regional Development Framework (Framework) and is aimed at achieving the goal of conserving water resources and natural areas. The Stewardship Area recommendations include natural resource features such as the 0.2% annual chance floodplain, potentially restorable wetlands, internally drained areas, hydric soils, current/potential Ice Age Trail Corridor, and Natural Resource Area boundaries identified in the Dane County Parks and Open Space Plan.

### *Meeting Projected Demand*

Draft CARPC projections for 2050 suggest that an additional 114,000 residents, 59,000 housing units, and 72,000 jobs can be expected in the Central Urban Service Area over the next 30 years. Modeling in Urban Footprint for the Regional Development Framework located future business development districts and a center in the vicinity of this amendment request. The amendment area would add roughly 1,000 residential units. Employment potential for the 20 acres of commercial retail and services is about 550 jobs.

### *Phasing*

Development of the northern amendment is expected within two to five years. Development of the southwestern amendment area is likely within 10 years.

### *Surface Water Impacts*

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

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

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

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

The City of Madison proposes to mitigate the urban nonpoint source impacts of the proposed development by requiring the implementation of stormwater best management practices that will be designed and constructed to meet current Dane County standards for pollutant reduction, runoff volumes, peak flows, water temperature, and groundwater recharge. Such practices will help to address the potential water quality impacts of stormwater runoff from the proposed development on the receiving waters. Additionally, by way of expansion of key transportation corridors, the City is proposing important regional stormwater facilities on or near the amendment area to address regional flooding problems. This project is technically independent of the proposed development within the amendment area but has the potential to enhance or abate potential nonpoint source impacts of developments.

Regional partners are actively working to address chlorides through the Wisconsin Salt Wise Partnership. WI Salt Wise's chloride reduction training courses are open to all municipal and private winter maintenance professionals in the region. City of Madison staff have attended winter salt certification classes and training for winter road maintenance and are encouraged to stay current on the latest trainings and development. The City of Madison is also a participant in the Madison Area Municipal Storm Water Partnership (MAMSWaP), which is a coalition of Dane County municipalities and organizations working together to promote practices that reduce and improve stormwater runoff into Dane County lakes, rivers, and streams. The MAMSWaP Information and Education (I&E) Committee works to develop and implement projects and plans through regional outreach and messaging throughout the communities, including maintaining the www.ripple-effects.com website, distributing tools and articles to municipalities, community groups, and neighborhood associations, and providing presentations to focused audiences. Specific goals include promoting proper leaf management, proper

lawncare practices, reduction in chlorides pollution from over-use of salt, and rainwater harvesting for beneficial reuse.

### *Groundwater Impacts*

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

Groundwater modeling results indicating the cumulative effects of well withdrawals and effluent discharge from MMSD in baseflow of the Badger Mill Creek at Old PB Road (see location on Map 5) are shown in Table 4. Modeling indicates a 2.9 cfs increase in baseflow since predevelopment (i.e., no pumping) conditions; however, a 0.2 cfs decline compared to 2010 conditions is estimated for the year 2040 (this assumes continuation of effluent return to Badger Mill Creek).

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

| Stream | Pre-Development | 2010 | 2040 |
|---|---|---|---|
| Badger Mill Creek *(FID 7704)* | 0.55 cfs | 3.48 cfs | 3.29 cfs |

*Source: 2016 Groundwater Flow Model for Dane County, developed by the WGNHS (link to website)*

Generally, groundwater discharge occurs along the entire length of perennial streams and is the source of stream baseflow. The loss of baseflow from the cumulative effects of well water pumping and urbanization is a regional issue, beyond the boundaries of a single USA Amendment or even a single municipality. This issue is discussed along with potential management options in the updated *Dane County Groundwater Protection Planning Framework* (link to report). Maintaining pre-development groundwater recharge by infiltrating stormwater runoff helps to replenish groundwater, maintain baseflow, and mitigate this impact. The regional groundwater model is a useful tool for evaluating different configurations and scenarios of municipal groundwater well withdrawals on these stream systems.

## Comments at the Public Hearing

A public hearing was held on the proposed amendment at the April 11, 2024, meeting of the Capital Area Regional Planning Commission. Representatives from the City of Madison spoke in favor of the amendment. There were no registrants opposed to the amendment. Commissioner Terrell inquired about the surrounding land uses, including existing public green space and future planned land uses, to which City staff addressed during the meeting. Commissioner Hampton asked for clarification on the City's intent to annex the Town of Verona. City staff responded that there are no plans to actively

pursue annexation at this time. Commissioner McKeever raised the issue of groundwater table cone of depressions due to groundwater well pumping. City staff and Commissioners discussed this issue and its relationship to regional development.

## Conclusions and Staff Water Quality Recommendations

There is sufficient existing treatment plant system capacity at MMSD's Nine Springs Wastewater Treatment Facility and sufficient existing or planned wastewater collection system capacity to serve the proposed amendment area.

The City of Madison proposes to mitigate the potential urban nonpoint source impacts of the proposed development on the receiving waters by requiring the implementation of stormwater best management practices that are designed and constructed to meet current standards for pollutant reduction, runoff volumes (stay-on), peak flow rates, water temperature, and groundwater recharge. The City is also implementing regional stormwater facilities to address flooding and urban nonpoint source impacts in the region.

It is CARPC staff's opinion that the proposed amendment is consistent with water quality standards under Wis. Stat. § 281.15, and the adopted Policies and Criteria for the Review of Sewer Service Area Amendments to the *Dane County Water Quality Plan*, with the existing state and local requirements identified below. In addition to the existing state and local requirements, additional actions have also been recommended below to further improve water quality and environmental resource management.

### *State and Local Requirements*

CARPC staff recommend approval of this amendment in recognition of the state and local requirements for the following:

1. 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.

2. 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. Peak runoff rate control is required for the 1-, 2-, 10-, 100-, and 200-year, 24-hour design storms to limit post-development runoff to "pre-development" levels, in accordance with the City of Madison and Dane County Stormwater Ordinances.

    b. Sediment control is required to achieve at least 80% sediment control for the amendment area based on the average annual rainfall period, with sediment control pretreatment occurring prior to infiltration for runoff from parking lots and new road construction within commercial, industrial, and institutional land uses, in accordance with the City of Madison and Dane County Stormwater Ordinances.

c. Runoff volume control is required to maintain the post-development infiltration (stay-on) volume to at least 90% of the pre-development infiltration (stay-on) volume for the average annual rainfall period, without exception for sites determined to be within a closed basin watershed, in accordance with the City of Madison and Dane County Stormwater Ordinances.

d. Maintain predevelopment groundwater recharge rates (a range of 9 to 10 inches/year for the amendment area) determined 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*", or by a site-specific analysis, if allowed by ordinance as an elective alternative to meeting the 90% stay-on requirement if more than two percent (2%) of the site is required to be used as effective infiltration area, in accordance with City of Madison and Dane County Stormwater Ordinances.

e. Thermal control is required to reduce the temperature of stormwater runoff from development sites within thermally sensitive watersheds, in accordance with the City of Madison and Dane County Stormwater Ordinance.

f. Oil and grease control are required to treat the first 0.5 inches of runoff using best management practices at commercial and industrial sites and any other uses where the potential for pollution by oil or grease, or both, exists, in accordance with the City of Madison and Dane County Stormwater Ordinances.

3. 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.

4. Environmental Corridors are required to be delineated to meet the Environmental Corridor Policies and Criteria adopted in the Dane County Water Quality Plan.

### *Recommendations*

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

1. Seek to provide volume control to maintain post-development infiltration (stay-on) volume to 100% of the pre-development infiltration (stay-on) volume, for the average annual rainfall period, for development areas within the Morse Pond subwatershed, where feasible.

2. Conduct a tree inventory of the existing old growth woodlands located in the southwestern subarea to identify trees of high value prior to any land disturbances within this woodland, and work with CARPC to preserve high-value trees to the extent the City determines practicable.

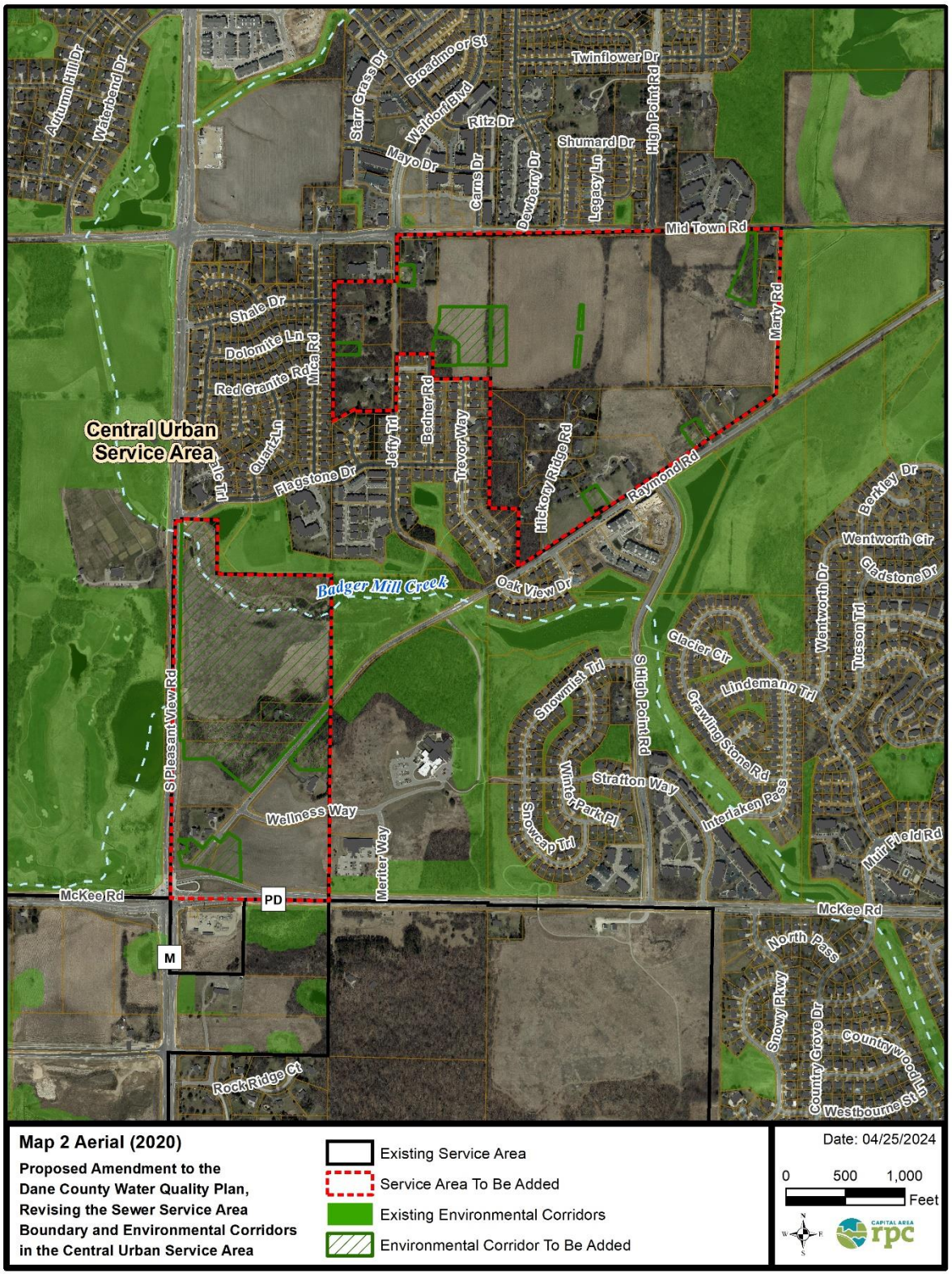
3. Continue to participate in regional water quality initiatives including Wisconsin Salt Wise, the Madison Area Municipal Storm Water Partnership (MAMSWaP), and Yahara WINs.

4. Encourage the removal and control of invasives and the use of native flora favored by the federally endangered Rusty Patched Bumble Bee in landscaping to provide suitable habitat for this pollinator, where appropriate, for the entire amendment area within the High Potential Zone for the bee.

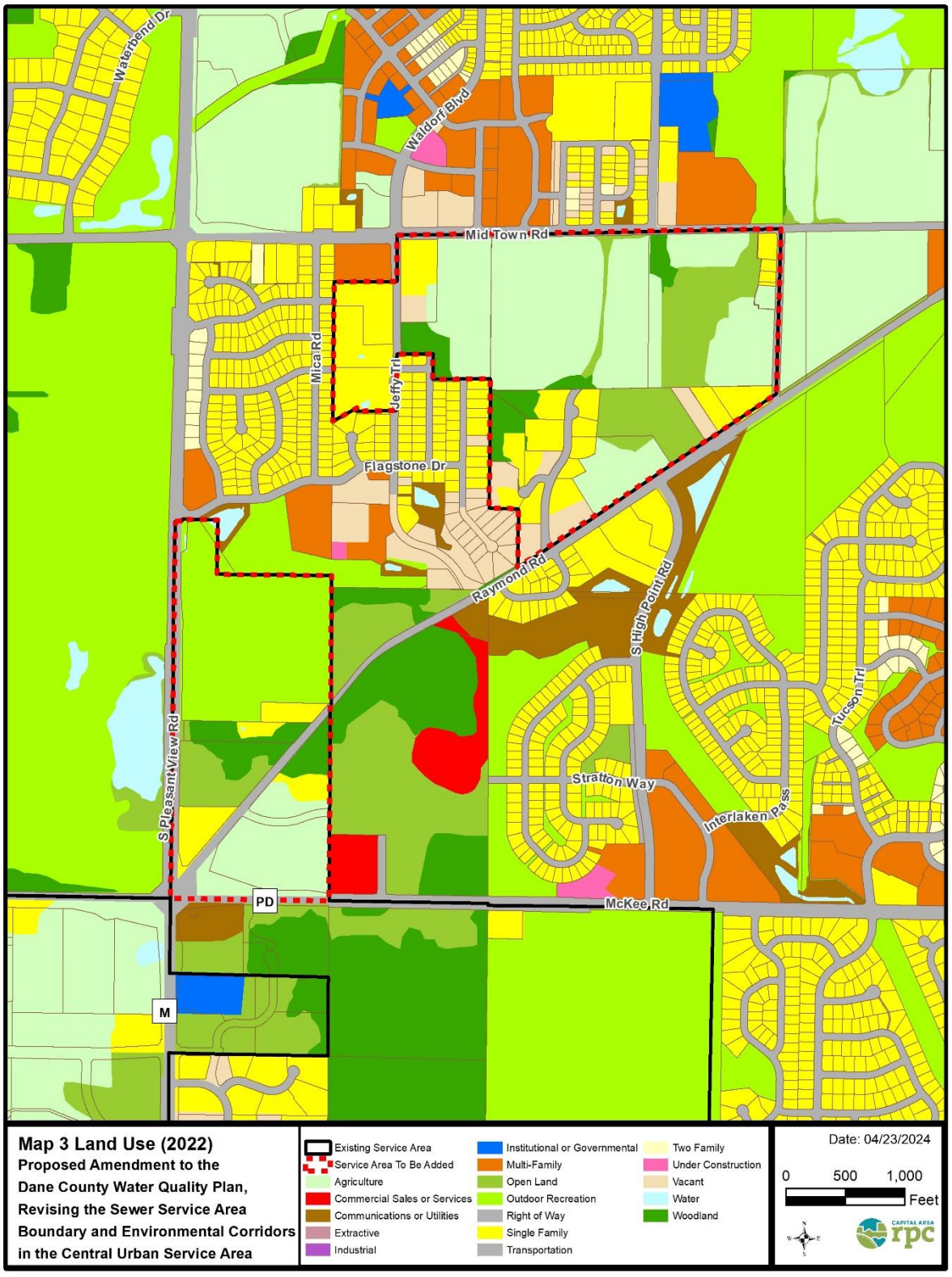
5. Request a formal Endangered Resources Review by the WDNR for potential impacts to endangered resources like rare plants, animals, and natural communities, and take necessary habitat protection measures if species are found, based on the results of screening conducted.

## Map 1 – Amendment Area

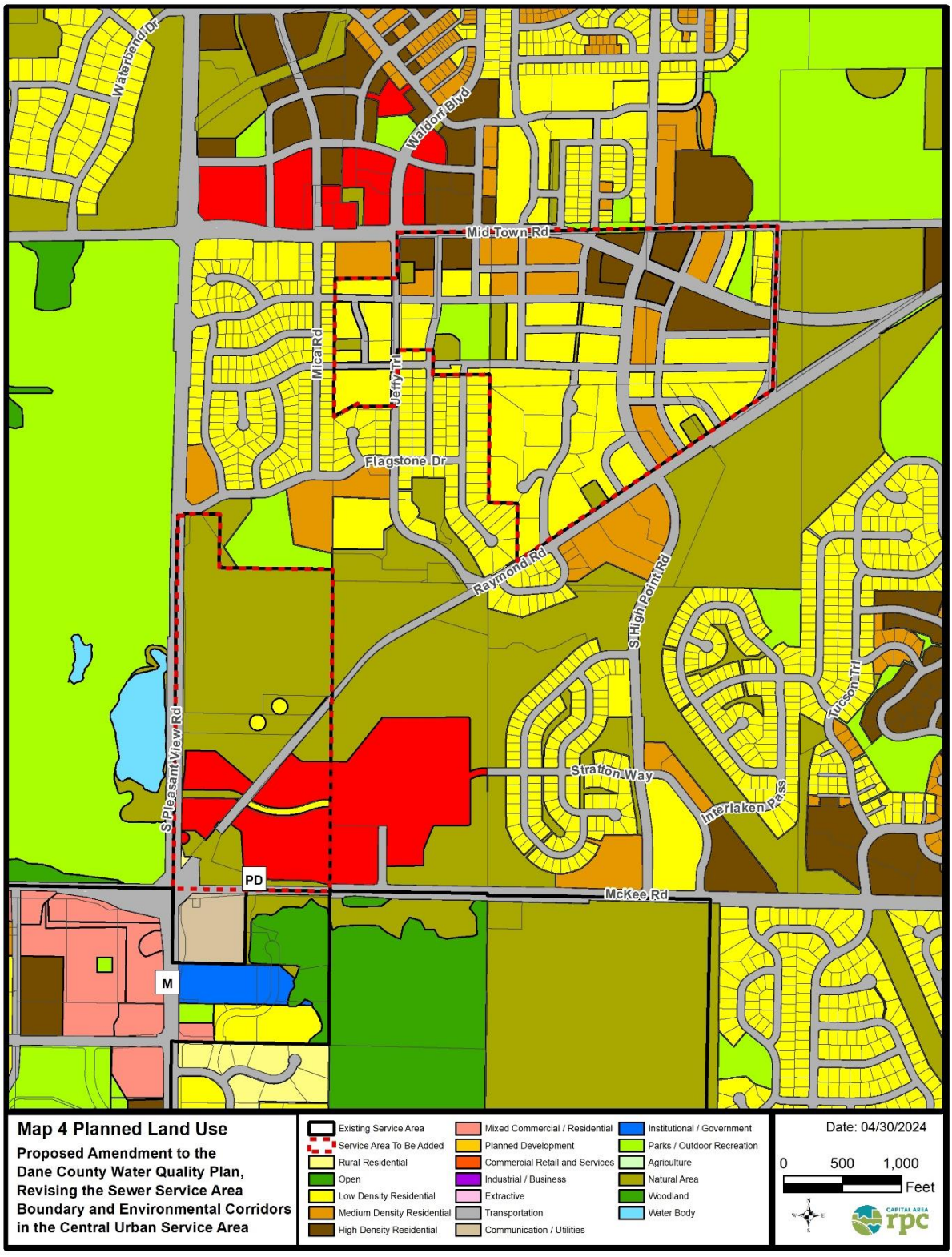
## Map 2 – Aerial


Central Urban Service Area
Badger Mill Creek
Mid Town Rd
Raymond Rd
Oak View Dr
McKee Rd
Wellness Way
S Pleasant View Rd
Rock Ridge Ct
Shale Dr
Dolomite Ln
Red Granite Rd
Mica Rd
Quartz Ln
Flagstone Dr
Jeffy Tri
Bedner Rd
Trevor Way
Hickory Ridge Rd
Marty Rd
Twinflower Dr
Starr Grass Dr
Broadmoor St
Waldorf Blvd
Ritz Dr
Mayo Dr
Carms Dr
Dewberry Dr
Legacy Ln
Shumard Dr
High Point Rd
Autumn Hill Dr
Waterbend Dr
Berkley Dr
Wentworth Cir
Gladstone Dr
Wentworth Dr
Tucson Trl
Glacier Cir
Lindemann Trl
Crawling Stone Rd
S High Point Rd
Snowmist Trl
Strafton Way
Winter Park Pl
Snowcap Trl
Interlaken Pass
Muir Field Rd
Merlter Way
North Pass
Snowy Pkwy
Country Grove Dr
Countrywood Ln
Westbourne St
PD
M
Map 2 Aerial (2020)
Proposed Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Central Urban Service Area
Existing Service Area
Service Area To Be Added
Existing Environmental Corridors
Environmental Corridor To Be Added
Date: 04/25/2024
0 500 1,000
Feet
CAPITAL AREA rpc

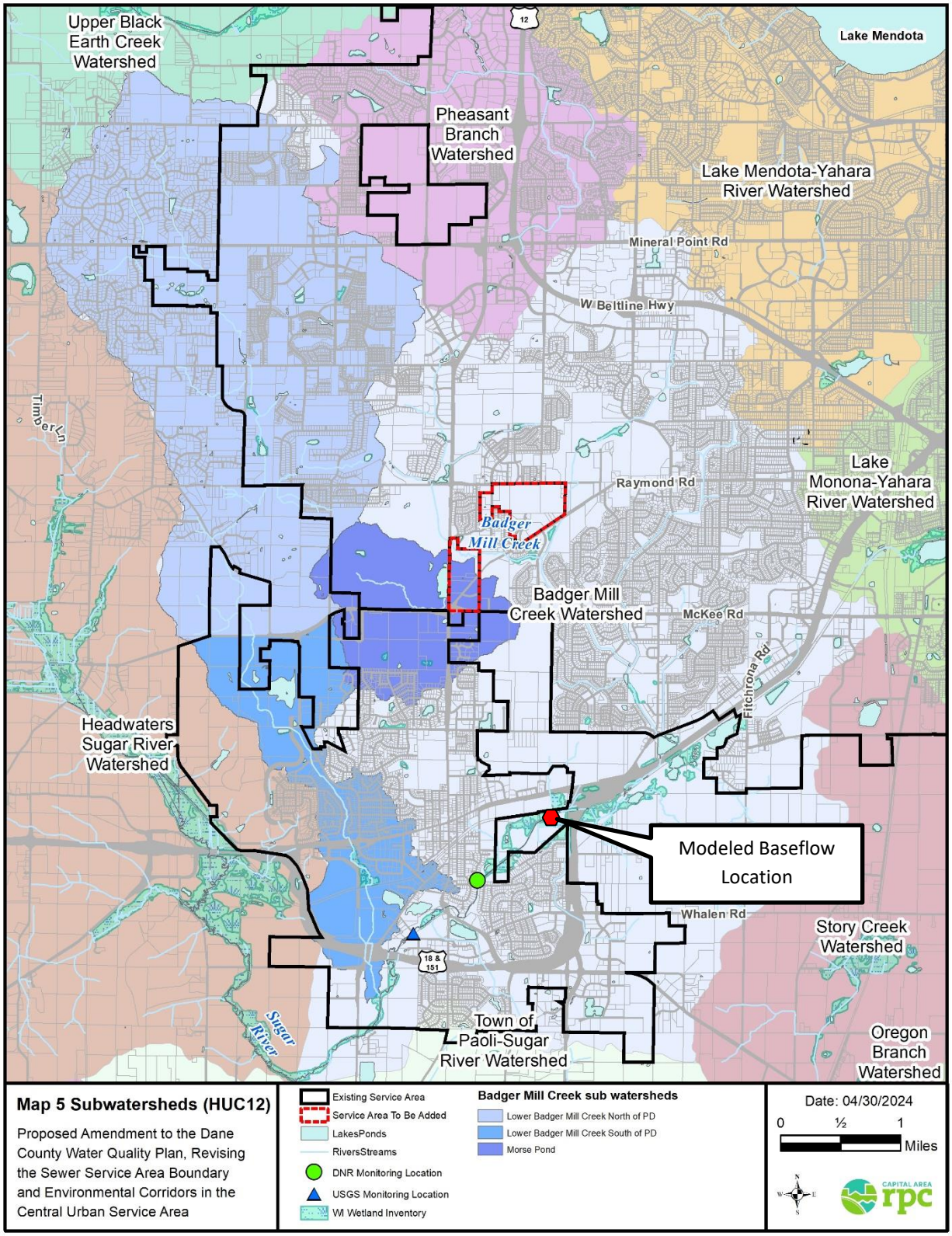
## Map 3 – Existing Land Use



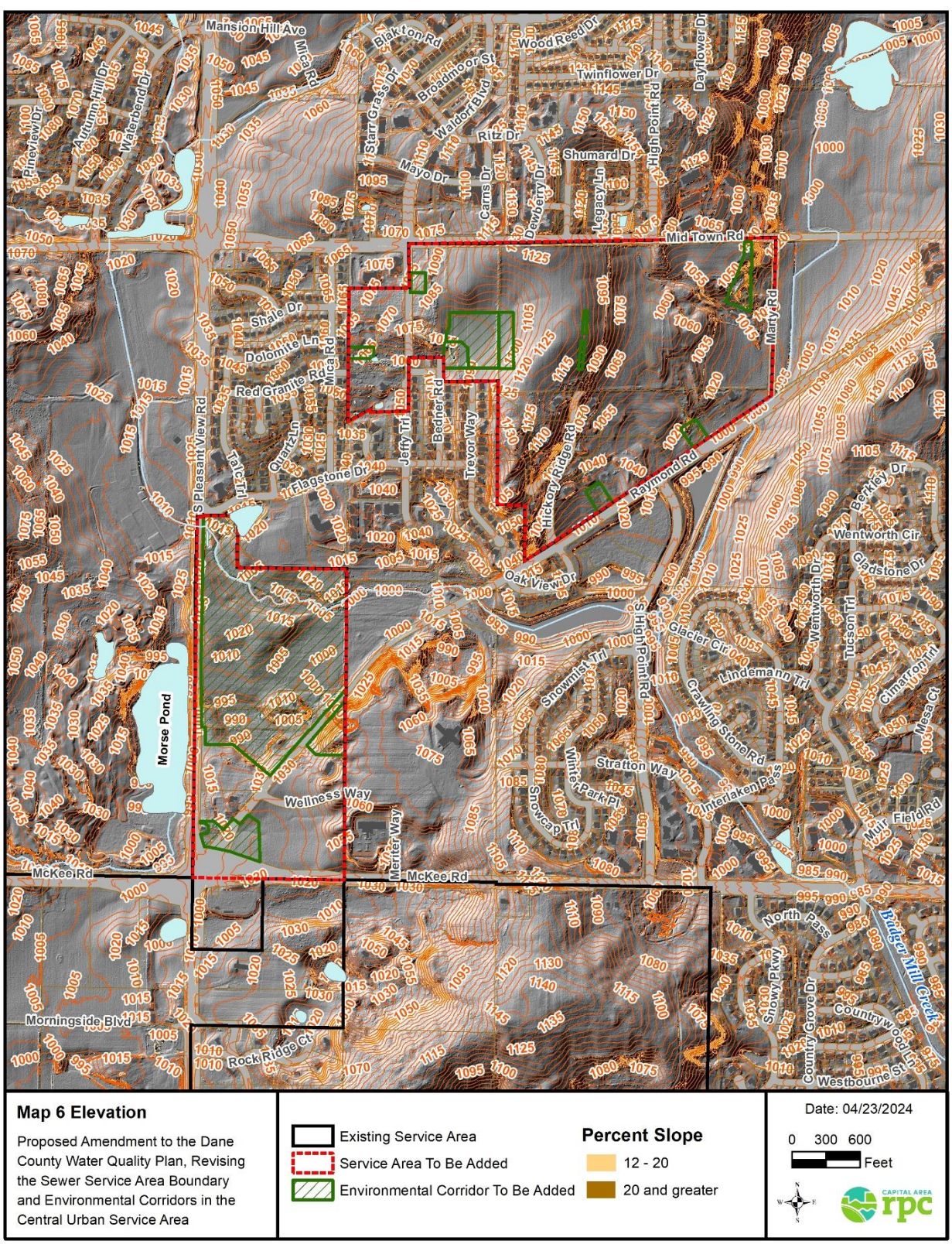
## Map 4 – Planned Land Use



## Map 5 – Subwatersheds

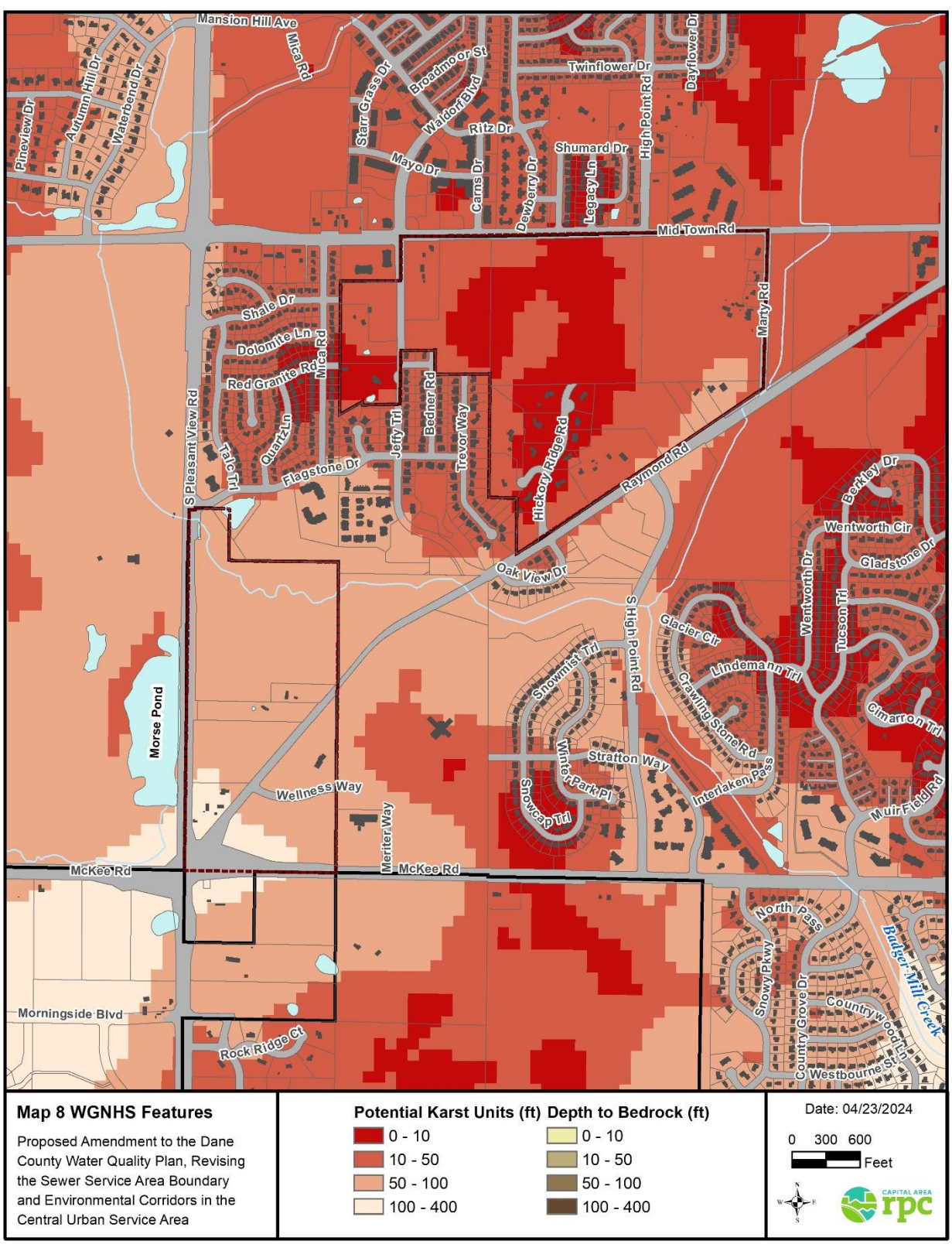


## Map 6 – Elevations

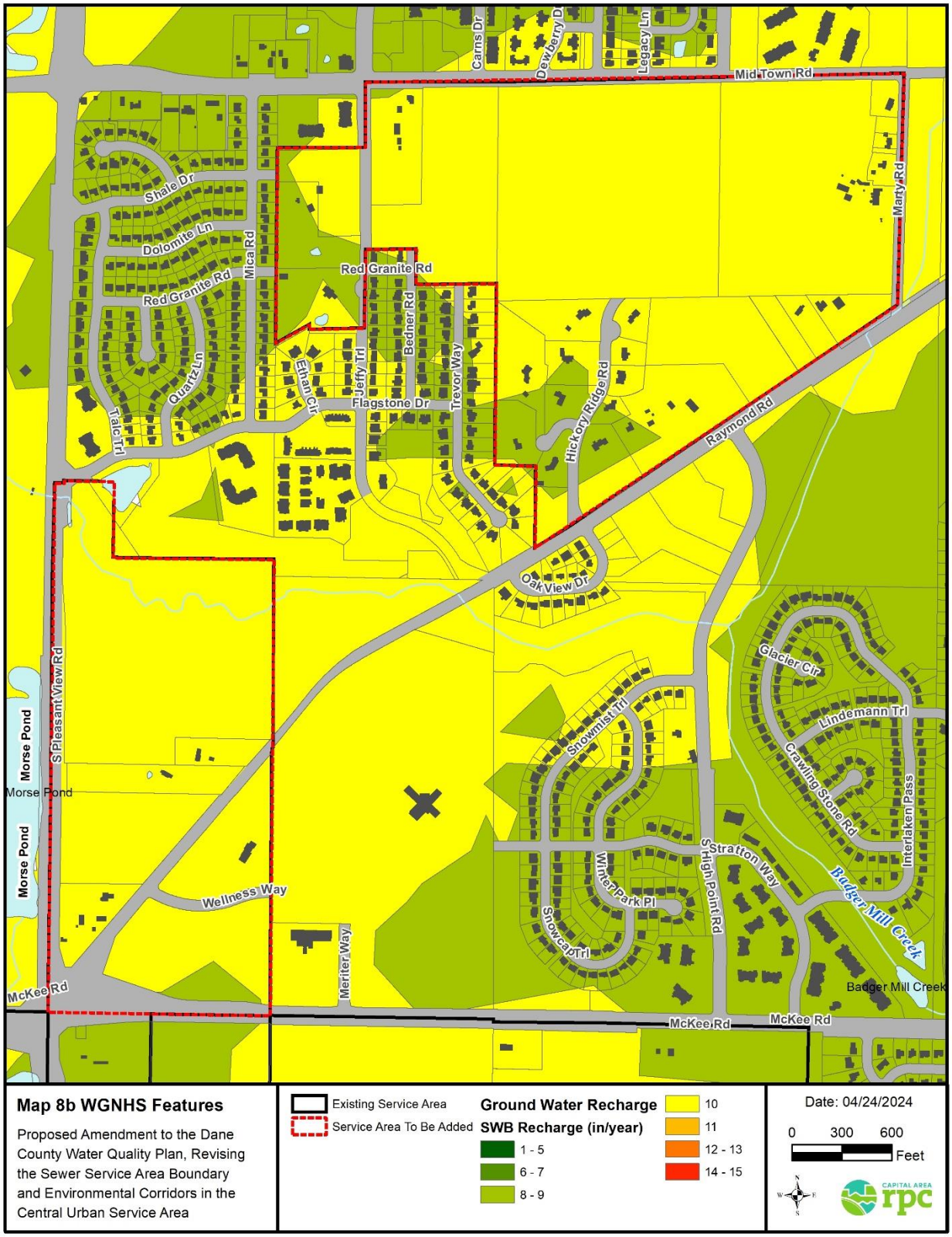


## Map 7 - Soil Type

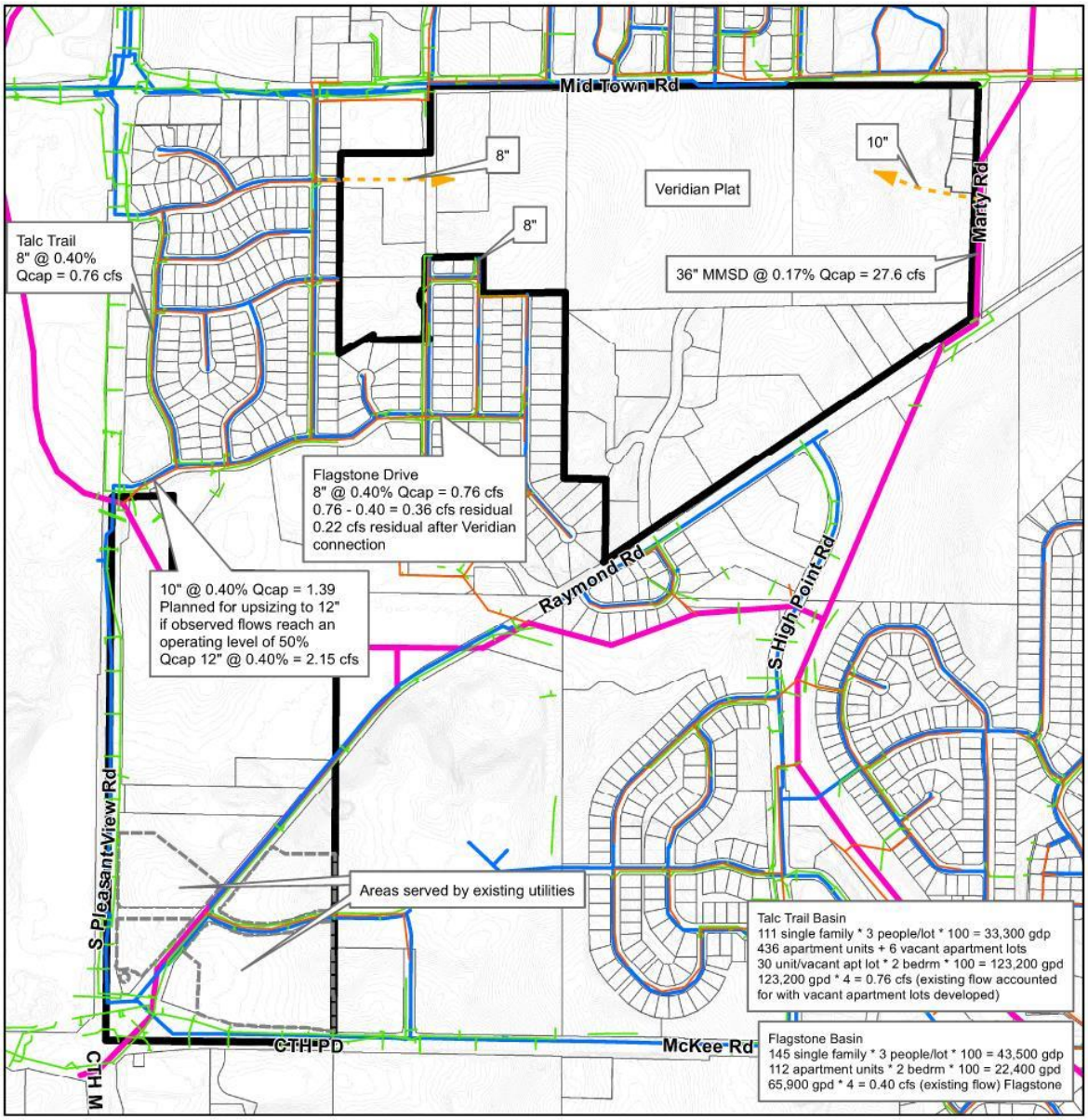
## Map 8 – WGNHS Bedrock Depth and Potential Karst Features



## Map 8b – WGNHS Groundwater Recharge



## Map 9 – Proposed Sanitary Sewer and Water Main




**Utilities**

**City of Madison CUSA Expansion**
**April 2024**

CUSA Amendment Area

2 Foot Elevation Contour
Water Main
Sanitary Main
MMSD Interceptor
Storm Sewer
Future Sanitary Main

Veridian Plat (Marty Farm Property)
East portion of plat
171 lots
168 single family = 0.31 cfs
3 multi-family, 15.15 ac * 35 du/ac * 2 people/du = 1,059 people = 0.65 cfs

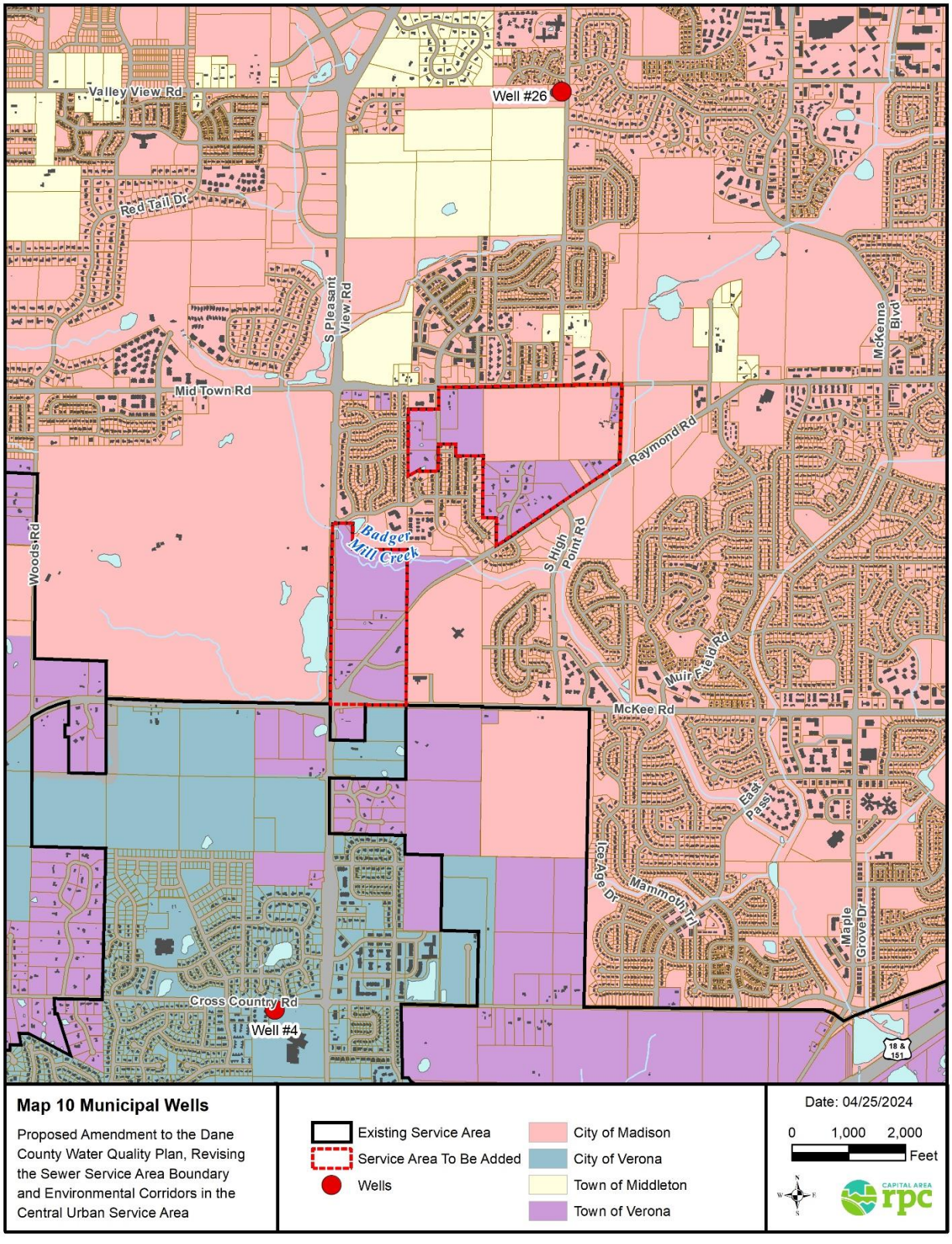
West portion of plat
76 single family lots (3 people/lot)
91,200 gpd * 4 = 0.14 cfs

0 800 1,600 Feet

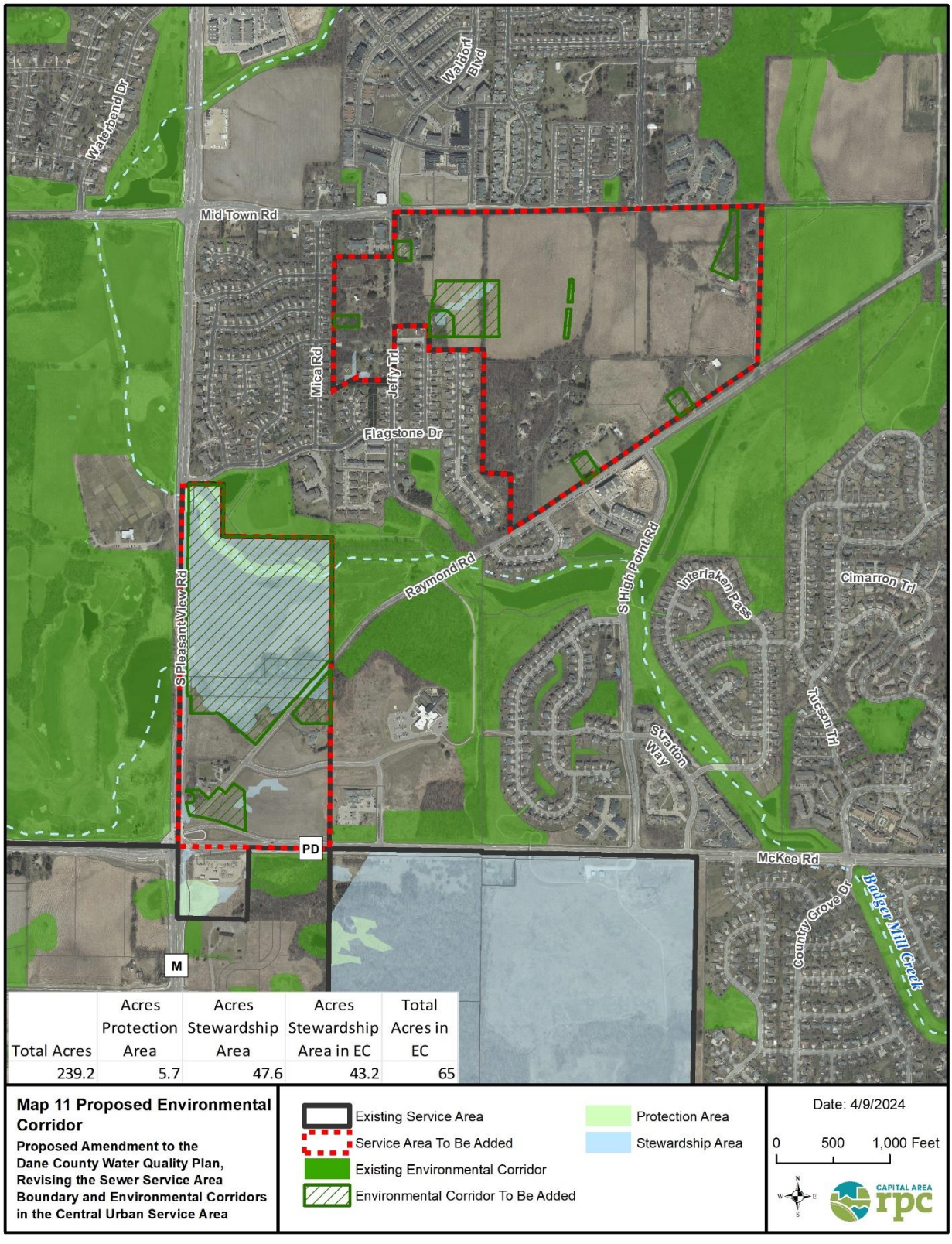
City of Madison Planning Division
Date: 2/20/2024

Data Source(s): Madison Planning Division, Dane County
Document Path: M:\Planning Division\Projects - Planning Department\CUSA\High Point-Raymond 2023\Maps\MXD\Map 5 Utilities_.mxd

## Map 10 – Municipal Wells



## Map 11 – Proposed Environmental Corridor




| Total Acres | Acres Protection Area | Acres Stewardship Area | Acres Stewardship Area in EC | Total Acres in EC |
|---|---|---|---|---|
| 239.2 | 5.7 | 47.6 | 43.2 | 65 |

**Map 11 Proposed Environmental Corridor**

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

Existing Service Area
Service Area To Be Added
Existing Environmental Corridor
Environmental Corridor To Be Added
Protection Area
Stewardship Area

Date: 4/9/2024

0 500 1,000 Feet

CAPITAL AREA rpc