
Staff Analysis of Proposed Amendment to the *Dane County Land Use and Transportation Plan and Water Quality Plan*, Revising the Central Urban Service Area and Environmental Corridor Boundaries in the Northeast Neighborhood of the City of Fitchburg

1. **Applicant:** City of Fitchburg
2. **Description of Proposal**

Amendment Area The City of Fitchburg requests an amendment to the Central Urban Service Area adding the Northeast Neighborhood, in the northeast corner of Fitchburg. The neighborhood is bounded by US Highway 14 to the west, Larsen Road to the east, and Nine Springs Creek to the north. The southern boundary is Lacy Road between US Hwy 14 and CTH MM, and Swan Creek from CTH MM to Larsen Road. The amendment totals 985.9 acres, and is primarily in agricultural use. The area includes 176.8 acres of existing development including 86.5 acres of right-of-way, 63.0 acres of residential development (approximately 52 homes), 19.8 acres of mineral extraction, and 7.6 acres of commercial development. Environmental corridors are proposed for 273.5 acres. The amendment would add 542.3 developable acres to the Central Urban Service Area. [See: Map 1, Map 2, Map 3, and Table 1]

Proposed Development The amendment area is proposed to include residential and mixed-use development, commercial and institutional uses, as well as retaining agriculture, wetland, open space and green space. The residential component consists of a variety of residential uses including low-density, medium--high-density, and mixed use. The low-density residential development is proposed as single-family residences on small lots at a minimum average density of five units per acre. Medium to high-density development calls for single-family and multifamily residences at a minimum average of 10 units per acre. Mixed use areas include a variety of compatible land uses, including multi-story buildings with retail or service uses on the first floor and residences or offices above. The residential component of the mixed use development will be in the range of 8-20 units per acre. The amendment area is anticipated to accommodate 944 to 1,570 residential units: 477-763 low density units, 401-641 medium density units and 66-161 units in mixed-use development. Based on averages in the City of Fitchburg, the residential development is estimated to accommodate up to 3,454 residents, including 520 school-aged children.

Approximately 65 acres within the amendment area are planned for a variety of commercial uses including a business park, office, retail and services. The proposed business park is intended to be a mixture of professional offices, specialized manufacturing, or other compatible light industrial uses.

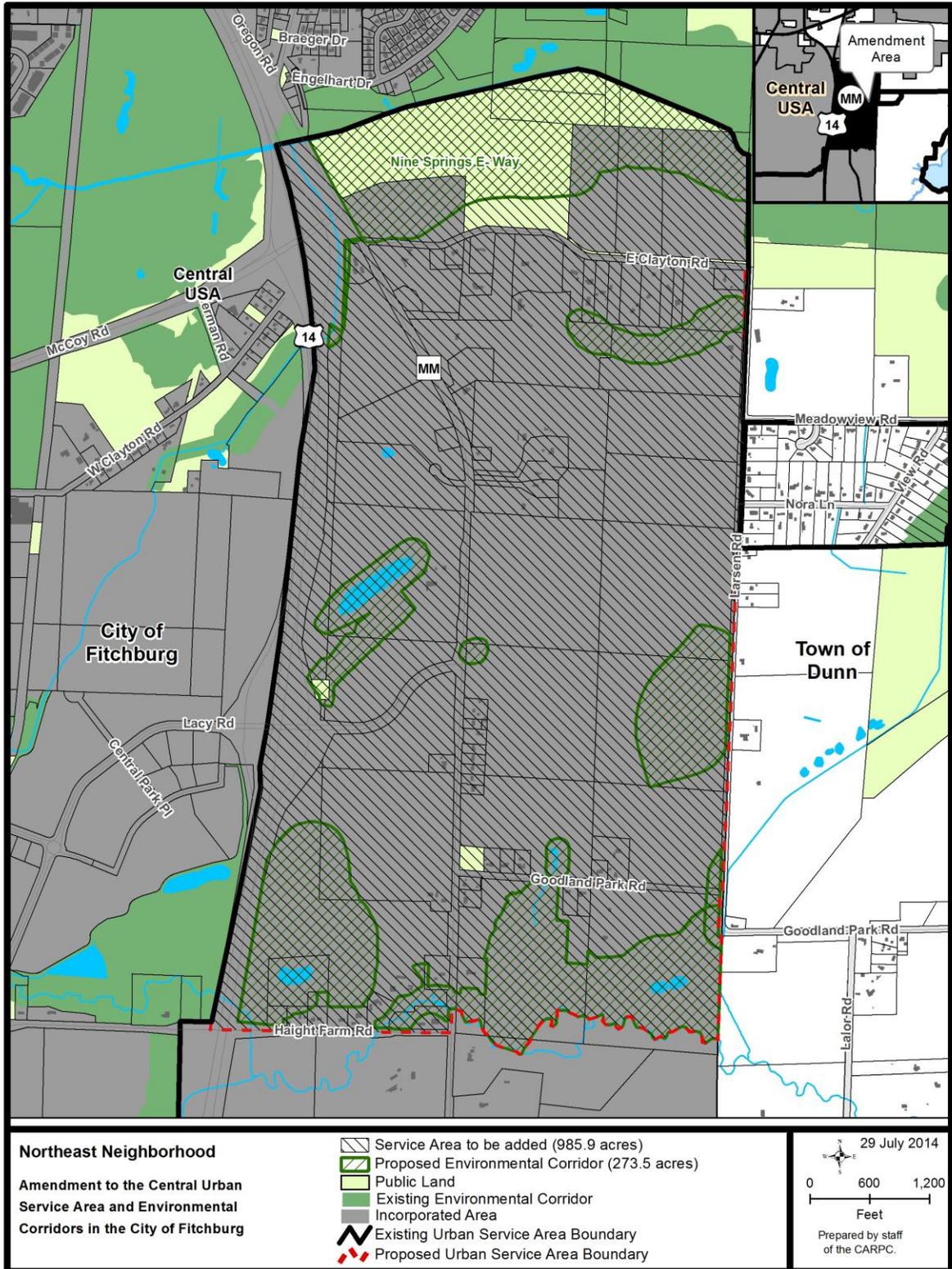
Institutional uses are proposed for approximately 13 acres on two sites. While there are no current plans for specific institutional uses, the City expects the uses to include land and facilities owned by a municipality, school district, or non-profit entity that provides services for residents such as government administration buildings, police/fire stations, schools, places of worship, parks, playgrounds, and wells.

The amendment proposal designates approximately 69 acres north of East Clayton Road for agricultural use. The City has chosen this designation to continue the pastoral setting for this portion of the Nine Springs E-Way and wetland complex, and to meet the desires of the private landowner farming the eastern portion of the area. The agricultural area is included within the USA expansion area to create a logical and describable urban service area boundary leaving no island. The properties in question are zoned "A-X—Exclusive Agriculture" and are identified in both the *City of Fitchburg Farmland Preservation Plan* and

Dane County's State-certified farmland preservation plan. These lands comply with Farmland Preservation, Law Wis. Stats. § 71.09(11), and enable landowners to receive tax credits. The Plan Commission may zone lands out of the "A-X—Exclusive Agriculture" district but only after holding a public meeting and finding all of the following:

- Rezoned land is better suited for a use not allowed in the farmland preservation zoning district
- The rezone is consistent with all applicable comprehensive plans
- The rezone is substantially consistent with the county's certified farmland preservation plan
- The rezone will not substantially impair or limit current or future agricultural use of surrounding parcels of land that are zoned for or legally restricted to agricultural use

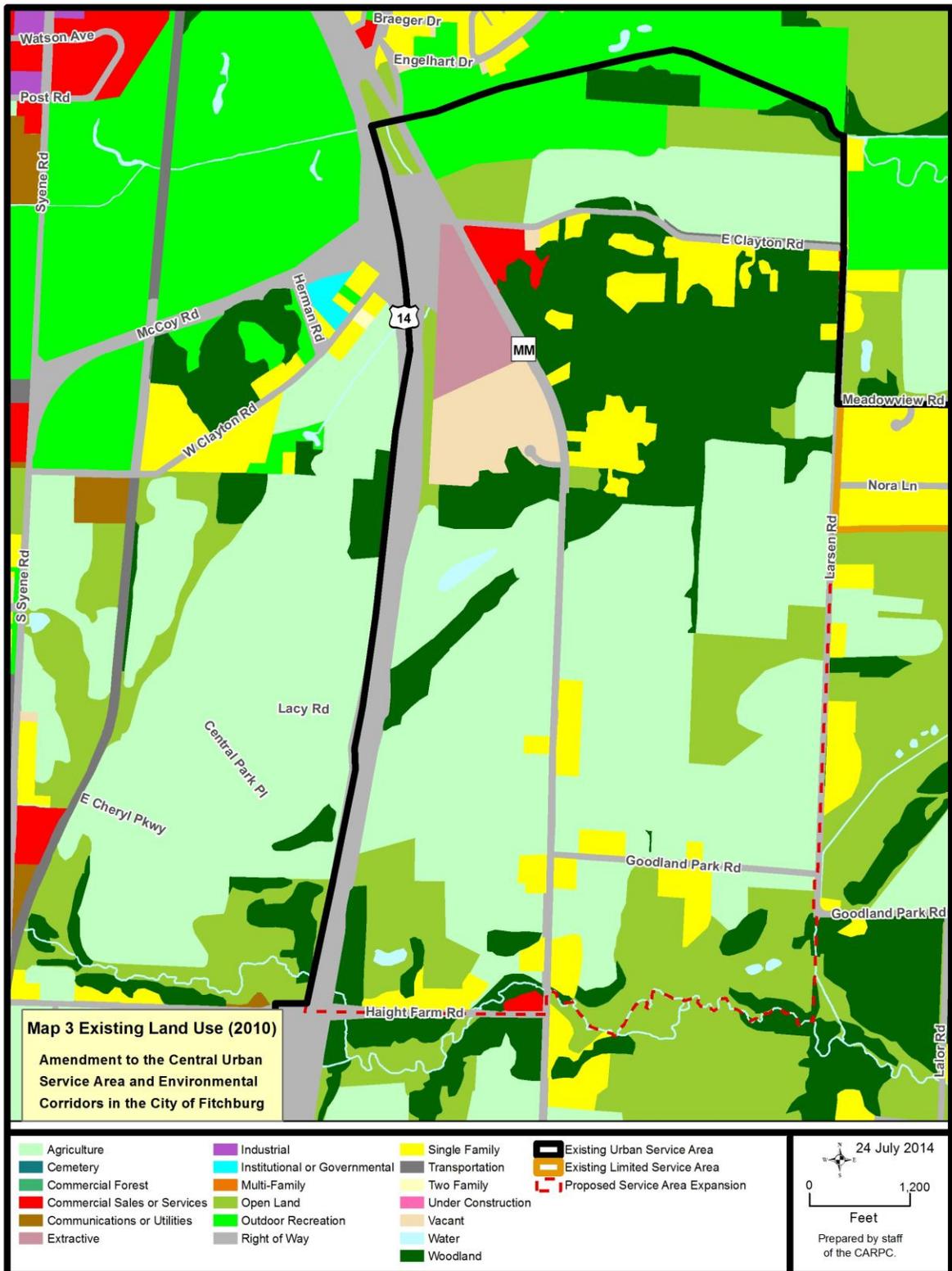
Map 1- Proposed Amendment Area



Map 2 – Aerial



Map 3 - Existing Land Use



Wetlands make up 135 acres of the amendment area, all of which are to be designated as environmental corridors, providing vegetative wetland buffers and protection from direct stormwater runoff. Another 218 acres are planned as green space, with 98.7 of those acres in environmental corridors; and 32 acres are planned as open space i.e. publicly owned lands, and 1.2 acres in environmental corridors.

Green space—designated “NEN Green Space” in the *Northeast Neighborhood Plan*—is “...intended to provide a continuous corridor of open space connecting areas of important natural, cultural, and historical resources, while also providing for wildlife movement and habitat. This land use category includes but is not limited to steep slopes, the dry mesic forest east of County Highway MM in the northern part of the Amendment Area, the Swan Creek and other environmental corridor in the southern and eastern portions of the Area, and the drumlin and related land area west of County Highway MM.” A portion of the lands in this category are privately owned. City staff estimates that roughly 30 of the 218 total acres (13.8%) may be subject to future development. According to the neighborhood plan, changing land uses to a higher intensity in these areas may require an overlay zoning district and would be subject to the following conditions:

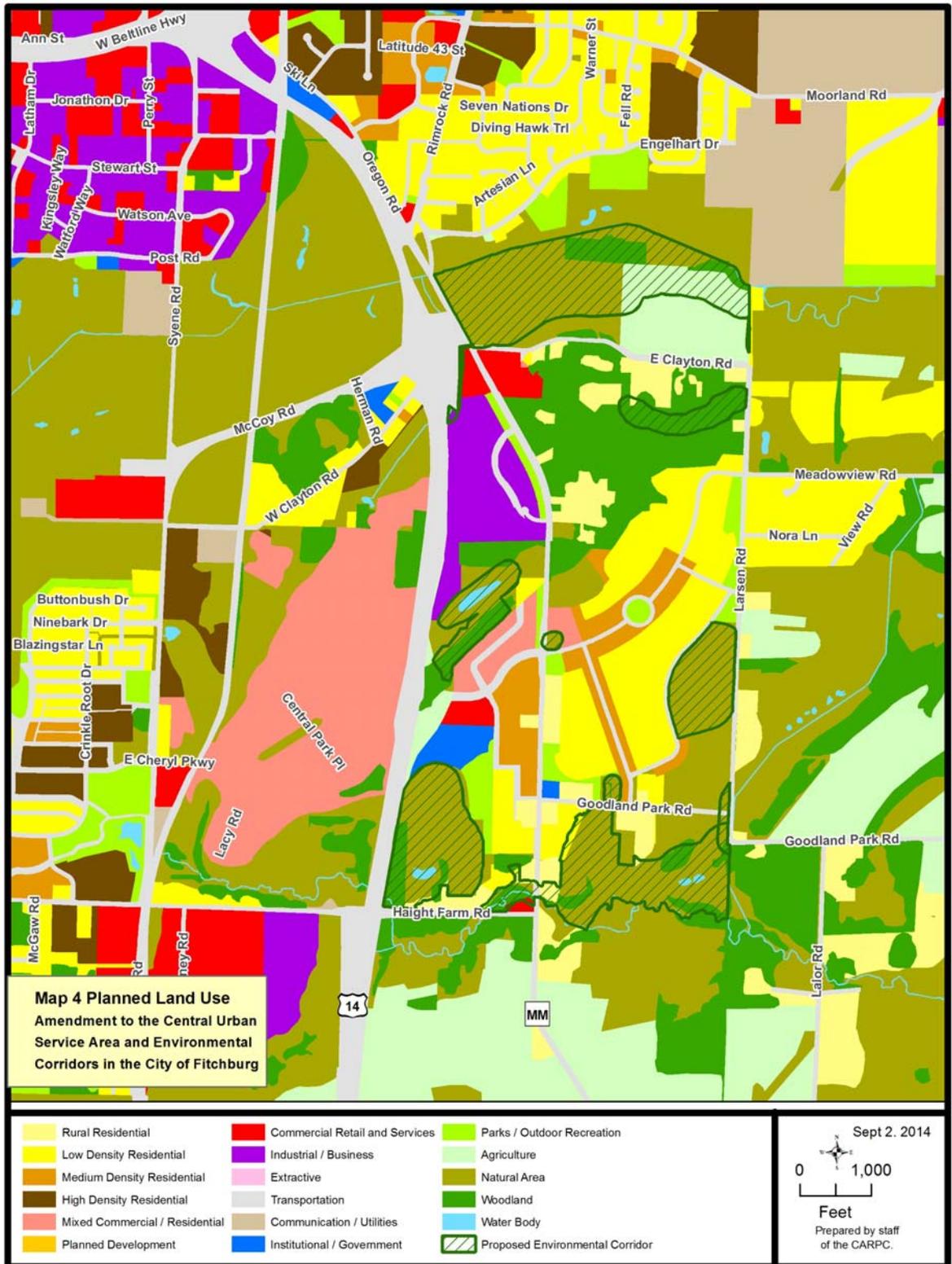
- A maximum lot coverage of 20% of the gross area (“coverage” is inclusive of building footprints as well as patios, decks, hardscapes, etc.)
- Coverage exceeding 20% would require Plan Commission approval based on the overall harmony of the proposal with the existing site as well as the applicant’s ability to ensure minimal site disruption and mitigate any negative impacts on area natural resources.
- Where additional standards, policies, ordinances, or other plan documents are in place, the more restrictive standards shall apply.

The proposed density of land use in the neighborhood generally declines from west to east. Open space is planned along the southern portion of Larson Road to buffer the Northeast Neighborhood from less intensively developed parts of the neighboring towns. Environmental corridors are proposed for the northern and southern ends of the neighborhood and will act as buffers to the Dane County Nine Springs E-way and Swan Creek. [See: Map 4] (Map 4 has been modified in this version to accurately represent the proposed land use)

Table 1 - Central Urban Service Area, Northeast Neighborhood Requested by the City of Fitchburg

| Proposed Land Use | Density (units/acre) | | Total (ac.) | % of Total | Housing Units | No. of Persons | No. of Students | Existing Develop. | Environ. Corridor | Developable |
|--------------------------|----------------------|------------|--------------|-------------|---------------|----------------|-----------------|-------------------|-------------------|--------------|
| | Proposal | CUSA | | | | | | | | |
| Existing Residential | | | 68.6 | 7% | | | | 62.9 | 5.7 | |
| Residential 1 | 4.6 | | 164.3 | 17% | 763 | 1,961 | 366 | | | |
| Residential 2 | 11.4 | | 56.2 | 6% | 641 | 1,494 | 154 | | | |
| Mixed Use | 7.1 | | 23.4 | 2% | 166 | 332 | 20 | | | |
| Residential Total | 6.4 | 6.9 | 312.5 | 32% | 1,570 | 3,454 | 520 | 62.9 | 5.7 | |
| Commercial | | | 64.5 | 7% | | | | 7.6 | 1.2 | |
| Mineral Extraction | | | | | | | | 19.8 | | |
| Institutional | | | 12.7 | 1% | | | | | | |
| Agriculture | | | 69.3 | 7% | | | | | 30.4 | |
| Street R-O-W | | | 131.5 | 13% | | | | 86.5 | 1.0 | |
| Wetland | | | 135.3 | 14% | | | | | 135.3 | |
| Open Space | | | 32.3 | 3% | | | | | 1.2 | |
| Green Space | | | 217.6 | 22% | | | | | 98.7 | |
| Undetermined | | | 10.2 | 1% | | | | | | |
| TOTAL | | | 985.9 | 100% | 1,570 | 3,454 | 520 | 176.8 | 273.5 | 542.3 |

Map 4 – Planned Land Use



3. Existing Environment

Natural Resources The proposed amendment is partially in the Swan Creek sub-watershed and partially in the Nine Springs Creek sub-watershed, both of which are in the Yahara – Waubesa Watershed in the Lower Rock River Basin. Swan Creek flows east to the Waubesa Wetlands and Lake Waubesa. Nine Springs flows east to Lake Waubesa. [See: Map 5]

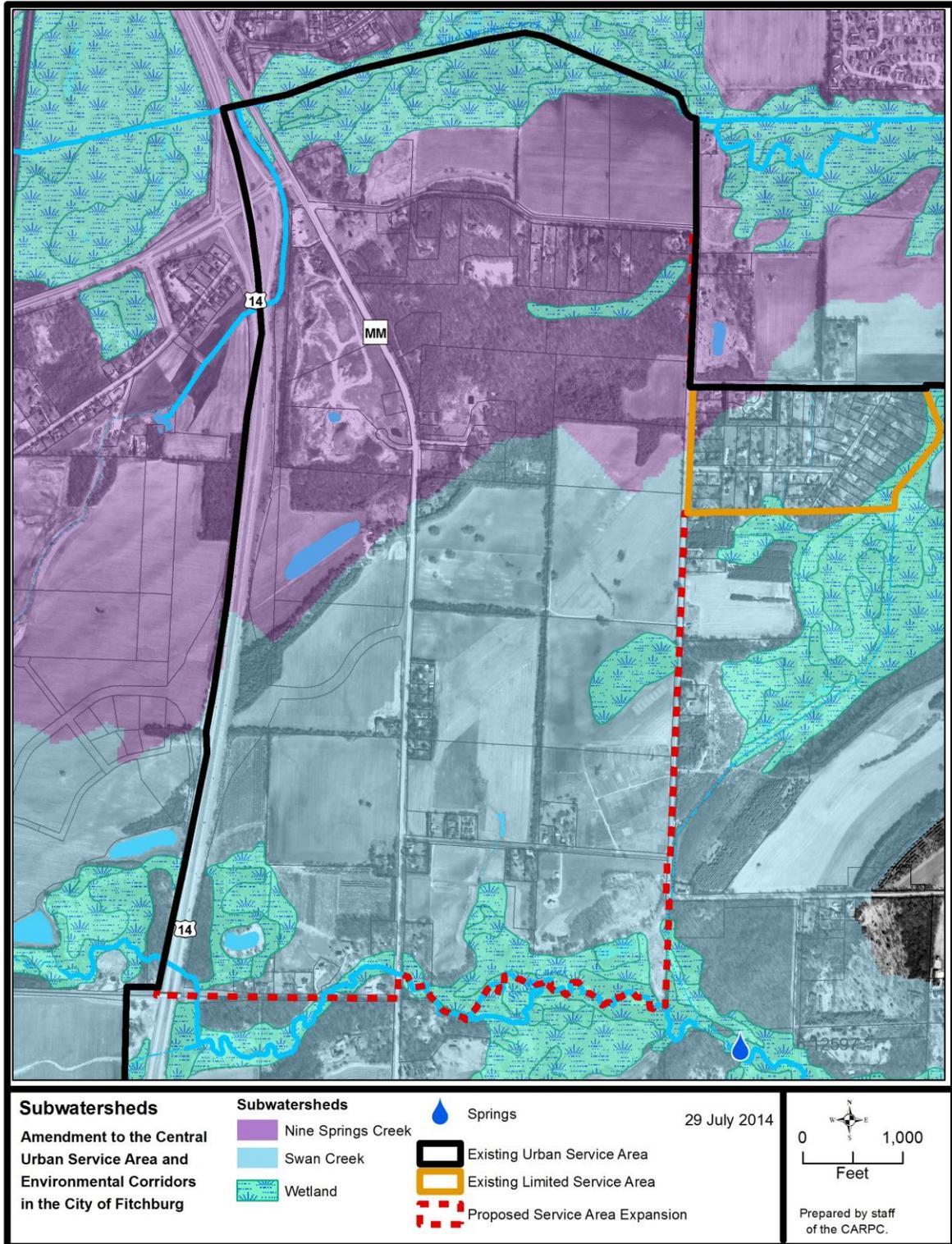
Swan Creek

The Swan Creek sub-watershed is approximately 4,353 acres. The current land use in the sub-basin is primarily agricultural. The amendment area is approximately 11 percent of the sub-basin. The stream channel is approximately 2.6 miles long, from its mouth at Lake Waubesa upstream to the confluence of the north and south branches just west of State Trunk Highway 14. Swan Creek has an average slope of 0.30% and base flow is estimated at 1.1 cubic feet per second (cfs) (*Dane County Water Quality Plan*; 2004). There are a number of springs and wetlands in the watershed. [See: Map 6]

Water quality in Swan Creek is very good based on the Hilsenhoff Biotic Index (*Dane County Water Quality Plan*; 2004). Swan Creek is not on the WDNR 303(d) list of impaired water bodies. The Dane County Water Body Classification study lists Swan Creek as a developing stream with protection and enhancement as the management objectives. Swan Creek is designated an Area of Special Natural Resource Interest (ASNRI) by the WDNR.

The City of Fitchburg hired Montgomery Associates Resource Solutions (MARS) to conduct a stream habitat assessment as part of the McGaw Park Neighborhood Plan (2008). They found that the south branch of Swan Creek had some desirable characteristics typical of a small, headwater stream. The site was heavily wooded, allowing for a dense canopy of vegetation over the stream. Undercuts to the banks were typically small, though there were some areas of clear erosion and instability. The stream is susceptible to siltation and erosion due to the relatively steep slopes along the stream banks combined with adjacent agricultural activities. However, the riparian environment was generally appropriate and stable. The in-stream habitat was a blend of desirable and undesirable features. The water was cool to the touch, and, when and where flowing, seemed to be of appropriate velocity. Based on the temperature and flow monitoring this waterway is several degrees colder than the downstream portion of Swan Creek. The mean summer temperature was approximately 57° F (max: 63° F). The flow velocity was approximately 0.51 ft./s. The substrates were generally what would be expected of such a headwater stream: a mix of substrate sizes, dominated by gravels and cobbles, with some boulders. Also, there were no aquatic macrophytes, and only minimal coverage of algae and mosses, both signs of a healthy headwater stream. On the other hand, there was a high degree of siltation throughout this site. Walking in the stream released plumes of silt that seemed to take about 15 to 20 minutes to settle. There were some areas of the stream in which flow was interrupted by overabundances of boulders or tree-falls, creating stagnant, somewhat isolated pockets of standing waters. These pockets also had subjectively warmer water temperatures that are undesirable in a headwater stream. The invertebrate sampling for this section of the south branch of Swan Creek indicated a moderate level of diversity, a potentially small level of organic pollution, and an overall good quality of habitat. The electrofishing survey for the south branch of Swan Creek indicated a relatively high number of fish, predominantly the cool-water brook stickleback. The presence of a number of warm water species suggests the shift from a less tolerant cool water community to a more tolerant warm water community.

Map 5 - Subwatersheds



The MARS stream assessment found that the section of Swan Creek east of Lalor Road, has a high degree of degradation. The riparian vegetation is dominated by mowed lawn and other grasses, with evidence of tree removal. There is very little canopy cover present at this site. The banks show a high potential for erosion and instability. The in-stream habitat indicates high levels of disturbance and disruption. The water is very silty and murky, and, in many places, stagnant and deep. The sediments are predominantly silts and clays with little to no riffle habitat. This stretch of Swan Creek contains a mean summer temperature of approximately 59° F (max: 66° F), slightly warmer than the south branch of Swan Creek. The invertebrate sampling for this section of Swan Creek indicated very good water quality but, a very low level of diversity and poor habitat quality. The electrofishing survey conducted in 2008 for this section of Swan Creek indicated a relatively smaller number of fish with a more diverse and even distribution of species representative of both cool water and warm water communities.

Nine Springs Creek

Nine Springs Creek is six miles long and intermittent until just east of Fish Hatchery Road where it picks up flow from the springs that give the stream its name. The creek empties into the Yahara River just above Upper Mud Lake. Portions of the stream have been ditched and straightened, and the stream runs through an urbanizing area. Channelization has increased summer water temperatures, reduced habitat, and increased sedimentation and excessive growth of aquatic plants. Urban storm water from the cities of Fitchburg and Madison also delivers pollutants to the creek. The creek could function as a warm water sport fishery if restoration measures are undertaken . Nine Springs Creek is included on the state's 303(d) Impaired Waters list as well as the Rock River Basin Total Maximum Daily Load (TMDL) project as a first priority stream due to phosphorus and sediment loading degrading habitat and causing elevated temperatures and low dissolved oxygen levels in the stream. The WDNR has designated the creek as being a Limited Forage Fishery (LFF) with the potential of becoming a Warm Water Sport Fishery (WWSF) if these impairments can be removed. The target TMDL phosphorus concentration for Nine Springs Creek is 0.075 mg/L. Summary of USGS data for Nine Springs¹ indicates that mean baseflow concentrations have shown a downward trend in phosphorus, showing some improvement (ranging from 0.20 mg/L in 1979 to 0.11 mg/L in 2010). However, minimum dissolved oxygen levels show a steady decline (from 5.3 mg/L to 2.7 mg/L over the same time period) prompting the 303d Impaired Waters Listing.

Nine Springs Creek is rated fair using the Hilsenhoff Biotic Index (HBI) (RPC 2004). This rating is calculated by ranking the sensitivity of aquatic macro invertebrates. A rating of fair indicates a fairly significant level of organic pollution.

Swanson and Bahr (2004) found that the springs feeding Nine Springs Creek produce a consistent flow and concluded that this flow is due to a "layered aquifer system that includes high permeability features" (p.756). They also concluded that the "steady nature of spring flow would suggest that the effective aquifer, or flow path, length is rather long" (p. 754). Upon modeling the spring flow they noted that the actual flow conditions were only met in models with high permeability zones which would indicate relatively high flow between layers.. The principal groundwater concern is the decrease in groundwater levels due to urban pumping and loss of natural recharge due to increasing numbers of impervious surfaces in the absence of infiltration enhancement practices, resulting in reduced baseflow in the stream.

¹ Source: CARPC cooperative water resources monitoring program and U.S. Geological Survey.

Wetlands

Wetland delineation surveys were conducted by Natural Resources Consulting Inc. for a portion of the project site and Wisconsin Wetland inventory data were used to delineate the remaining wetlands. Seven wetland areas were identified in the amendment area and on Map 6.

1. The Dane County Nine Springs E-Way located at the northern boundary of the Amendment Area;
2. A wooded wetland south of East Clayton Road;
3. A disturbed/farmed wetland north of Goodland Park Road and just west of Larsen Road;
4. A wetland immediately north of Goodland Park Road;
5. The Swan Creek wetlands located at the southern boundary of the Amendment Area (These wetlands and their related buffers, from U.S. Highway 14 east to the eastern City boundary, are designated in the *Dane County Parks and Open Space Plan 2006—2011* within a Natural Resource Area Boundary, indicating interest by Dane County to acquire when willing sellers are found, and specifically excluding land-use limitations²);
6. A disturbed/farmed wetland located just east of County Highway MM, north of Lacy Road;
7. A wetland located between U.S. Highway 14 and County Highway MM, north of Lacy Road;

The listed wetlands account for 135 acres (13.7%) of the amendment area.

In addition to the seven wetland on the site, the South Waubesa Marsh located downstream of the amendment area is described in the survey of Dane County Wetlands conducted as part of the development of the original Dane County Water Quality Plan (Bedford and Zimmerman 1974). The South Waubesa Marsh is a wetland complex of more than 400 acres located at the southwest end of Lake Waubesa. It is one of several important large peat deposits on the Yahara River system and is one of Dane County's most outstanding wetlands. At the time of the survey the wetland vegetation was a rich community of springs, fens, sedge meadow, shallow marsh, deep marsh, and shrub carr on a deep bed of peat. The wetlands were classified as Priority Group I wetlands, targeted for protection and restoration.

² "A natural resource area consists of land that is specifically set aside for the protection of a valuable natural environment and/or greenbelt corridor that were identified through a public process. This can include habitat protection and open space preservation. Recreation at natural resource areas is a secondary objective, and users are encouraged to enjoy the resource as is. Passive recreation activities dominate the site use. If at all, active recreation only takes place on the fringes or in small pockets (areas) of a natural resource area. Natural resource areas may include off-road regional trails and surrounding lands belonging to another category, such as recreation parks or wildlife areas...Typically lands protected within these project areas should be large, contiguous blocks that may include a mixture of agricultural working lands, water, wetlands, steep topography, prairie and forests. Some of these lands may be protected through fee title purchase, however, much of the protection of larger landscapes can be achieved through purchase of conservation easements and continue to remain under private ownership. Land or easements are only purchased from willing sellers. Natural Resource Area boundaries have no bearing on any zoning or land use decisions and participation by private landowners or local units of government to carry out any outlined resource protection initiatives is on a voluntary basis."

The WDNR and The Nature Conservancy have purchased 538 acres of land in and around the Waubesa Wetlands. These lands are cooperatively managed as the Waubesa Wetlands State Natural Area. The WDNR describes the Waubesa Wetlands State Natural Area as follows:

“Located in an old lobe of Lake Waubesa along its southwest shore, Waubesa Wetlands is one of the highest quality and most diverse wetlands remaining in southern Wisconsin. Nine major springs and numerous smaller ones located within and around the area provide the wetland with an abundance of high quality water. The extensive wetlands and high quality of the water contribute significantly to the water quality of Lake Waubesa. Two inlet streams are also present - Murphy Creek and Swan Creek. Peat deposits - up to 95' deep in places - underlie a mix of sedge meadow, fen, and shrub-carr communities. The sedge meadow is a complex of different species that vary in abundance and structure in response to the complex hydrological system.

*Other parts of the site feature quaking sedge mats, calcareous fens, springs and streams with submerged aquatics, and deep spring cones lined with filamentous algae and purple-colored bacteria. The carbonate rich fens feature numerous species including grass-of-parnassus, Riddell's goldenrod, northern bog aster, lesser fringed gentian, and sage willow. Other abundant wetland species are common lake sedge, tussock sedge, American woolly-fruited sedge, common bur-reed, swamp loosestrife, American water horehound, blue-joint grass, and numerous asters. Bird life is diverse and features four rare species: least bittern (*Ixobrychus exilis*), American bittern (*Botaurus lentiginosus*), great blue heron (*Ardea herodias*), and black tern (*Chlidonias niger*). Other birds include sandhill crane, green heron, marsh and sedge wren, blue-winged teal, green-winged teal, and willow flycatcher. The state-threatened Blanding's turtle (*Emydoidea blandingii*) has also been found here. Waubesa Wetlands is owned by the DNR and The Nature Conservancy and was designated a State Natural Area in 1974.”*

As a State Natural Area the Department of Natural Resources manages the area to perpetuate the native biotic communities. The land within a State Natural area is limited to scientific research and compatible recreation.

Between where Murphy Creek and Swan Creek flow into Lake Waubesa is a short creek termed Deep Spring Creek, this stream is fed by a highly productive deep spring that is reported to be lined with at least seven different species of Purple Sulfur Bacteria (DeWitt et al, 2006). The great fen is located south of Deep Spring Creek, and is known to contain the rare and endangered calcareous fens. The Dane County Parks & Open Space Plan recommends expanding the Natural Resource Area for the South Waubesa Marsh along Swan Creek & Murphy's Creek to USH 14 (Dane County 2006, p. 53). CARPC staff documented the presence of fen indicator species as well as threatened plant species during 2013 survey of wetlands in Dane County.

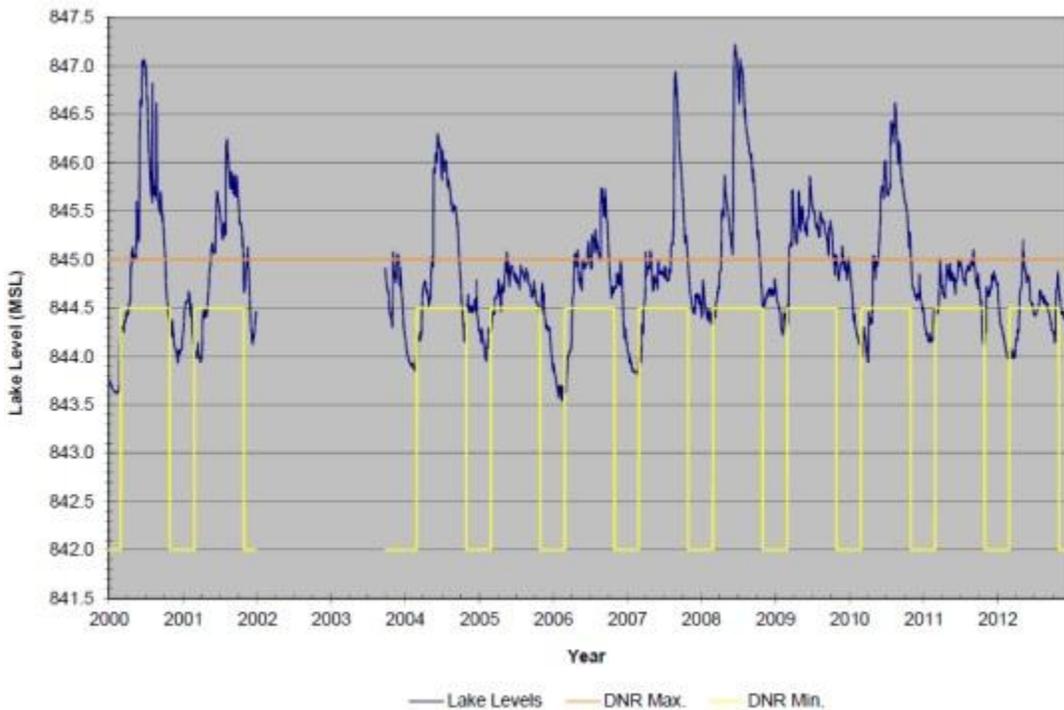
Lake Waubesa

Lake Waubesa is the smallest of the Yahara lakes with an average surface area of 2,080 acres. The total Lake Waubesa watershed, including the watershed of the upstream Yahara lakes, is approximately 303 square miles (193,920 acres). The amendment area is approximately 0.2% of the total watershed area.

The lake levels for the Yahara Chain of Lakes, (Mendota, Monona, Waubesa and Kegonsa) are managed by Dane County as set forth in the lake level orders established in 1979 by the WDNR and temporarily amended in 2009. The orders require lake level coordination of the entire chain of lakes as a system, including the City of Stoughton Dam. The target maximum water level for Lake Waubesa is 845.00 feet and the 100-yr flood elevation is 847 feet. The target minimum water level for Lake Waubesa is 844.5 feet from the first spring runoff occurring after March 1st until October 30th and 842.0 feet the rest of the year. The persistent problem of high water levels on Lake Waubesa is evidenced by the fact that there were over 800 days when the lake level exceeded the target maximum water level between 2000 and 2008. The exceedances often lasted for months at a time (see Figure 1).

Lake Waubesa was removed from the WDNR 303(d) list of impaired water bodies in 2006. It was previously listed for mercury contaminated fish tissue. The Dane County Water Body Classification study lists Lake Waubesa as an urban water body with the management objectives of enhancement and restoration. Lake Waubesa is designated an Area of Special Natural Resource Interest (ASNRI) by the WDNR.

Figure 1 – Lake Waubesa Water Levels



Source: Dane County Department of Land & Water Resources

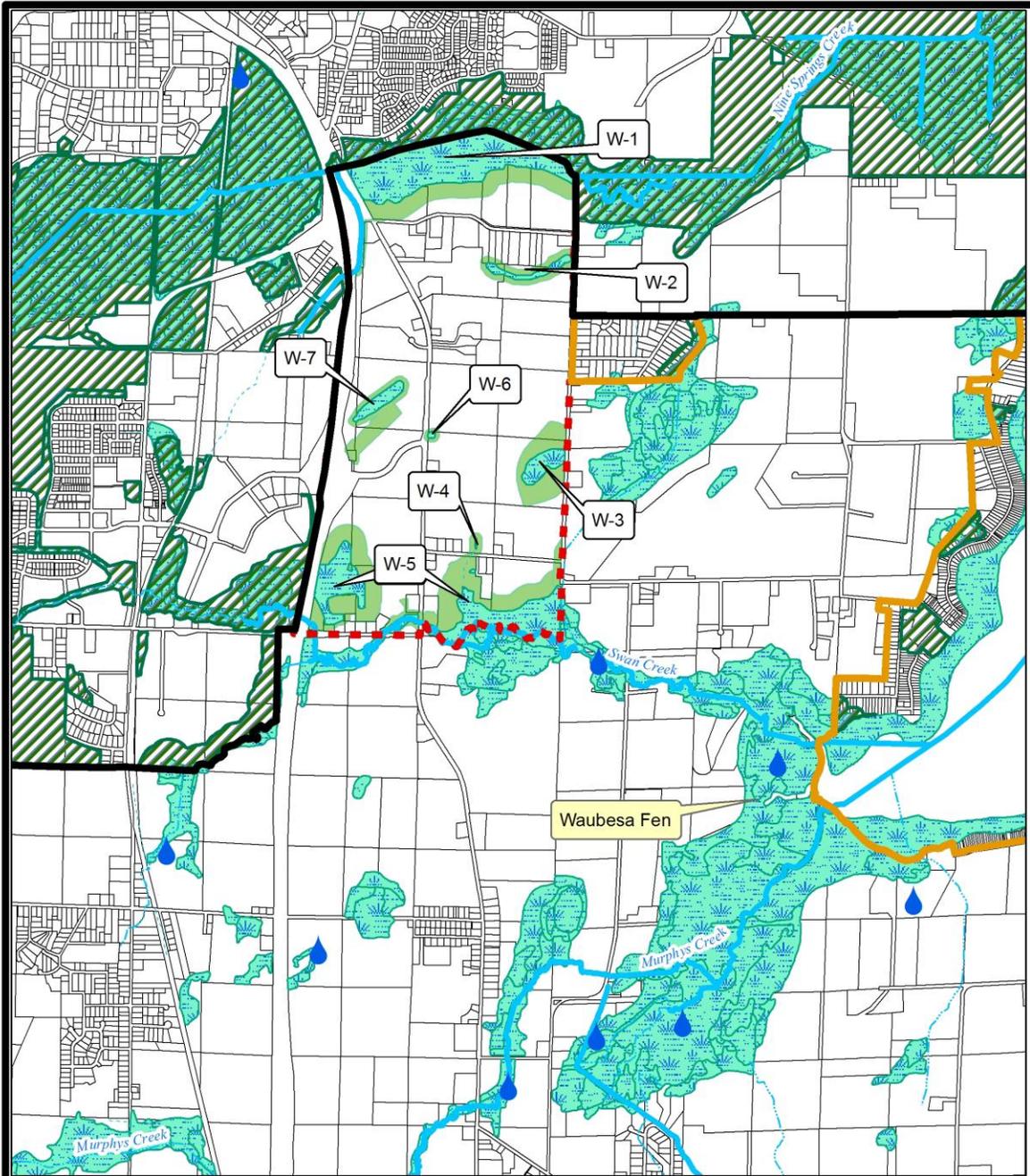
Map 6 shows the location of the northeast neighborhood to many natural resources described above. The Map includes the existing environmental corridors, WDNR Mapped wetlands, springs, streams and the proposed environmental corridors for the northeast neighborhood.

The Land Type Associations of Wisconsin classifies the amendment area as being in the Dane-Jefferson Drumlins and Lakes. The surficial geology of this area is described as an undulating complex of till plains with drumlins, outwash plains, lake plains and muck deposits. Surface elevations in the amendment area range from around 850 feet to 1000 feet. [See: Map 7 and Map 8]

According to the Natural Resource Conservation Service (NRCS) Soil Survey of Dane County, the majority of soils in the amendment area are in the Dodge-St. Charles, McHenry association. These soils are primarily moderately well drained and well drained, deep silt loams. Table 2 shows detailed classification for the major soils in the amendment area. Table 3 shows important soil characteristics for the amendment area. [See also: Map 9]

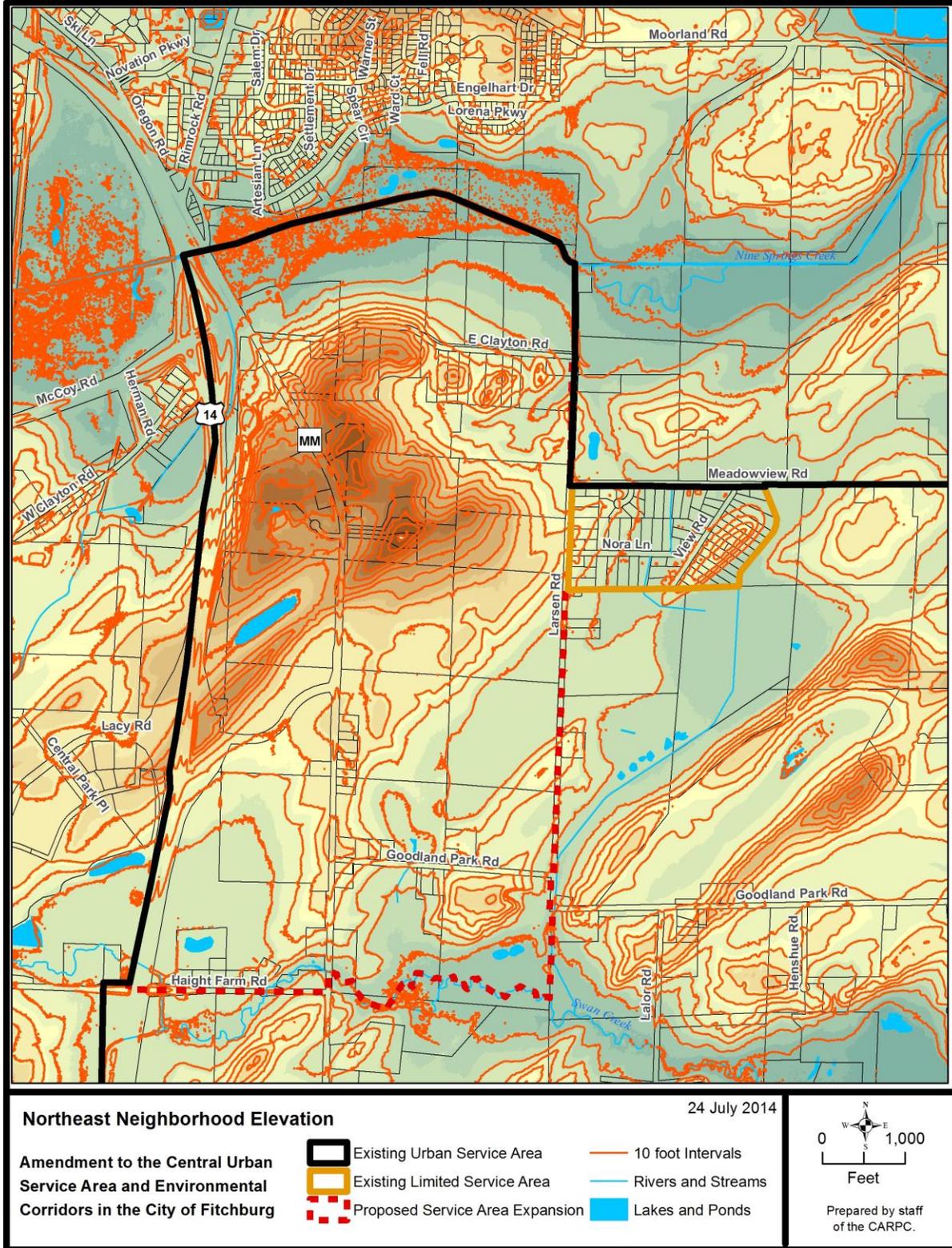
The depth to groundwater is over 25 feet in the northern portion of the amendment area and varies between 25 and less than 10 feet for the southern 1/3rd of the site according to the *Dane County Groundwater Protection Plan*. The regional groundwater model estimates In 2009, the Wisconsin Geological and Natural History Survey published a report estimating the existing groundwater recharge rates in Dane County based on the soil water balance method. The study estimates the existing groundwater recharge rate in the amendment area to be 9 to 10 inches per year. [See: Map 11] Soils with associated prime farmland area shown in Map 12 and Soils associated with high groundwater area are shown in Map 14.

Map 6 – Regional Context of Natural Resources

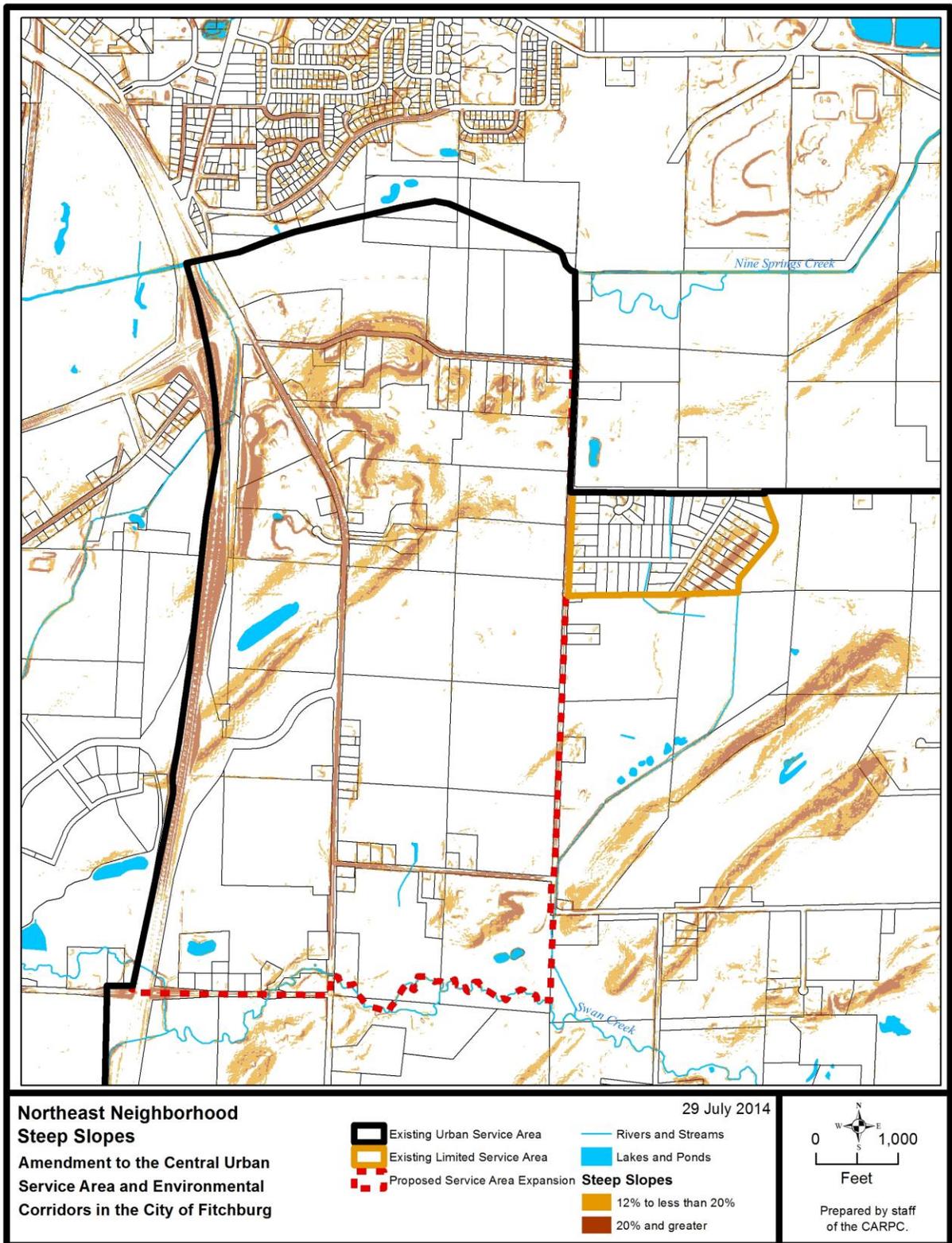


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|--|--|--|-------------------------|
| <p>Regional Context of Natural Resources</p> <p>Amendment to the Central Urban Service Area and Environmental Corridors in the City of Fitchburg</p> | | <p>24 July 2014</p> | <p>0 2,000 Feet</p> |
| <p> Existing Urban Service Area</p> <p> Existing Limited Service Area</p> <p> Proposed Service Area Expansion</p> | <p> Springs</p> <p> Wetlands</p> <p> Existing Environmental Corridor</p> <p> Proposed Environmental Corridor</p> | <p>Prepared by staff of the CARPC.</p> | |

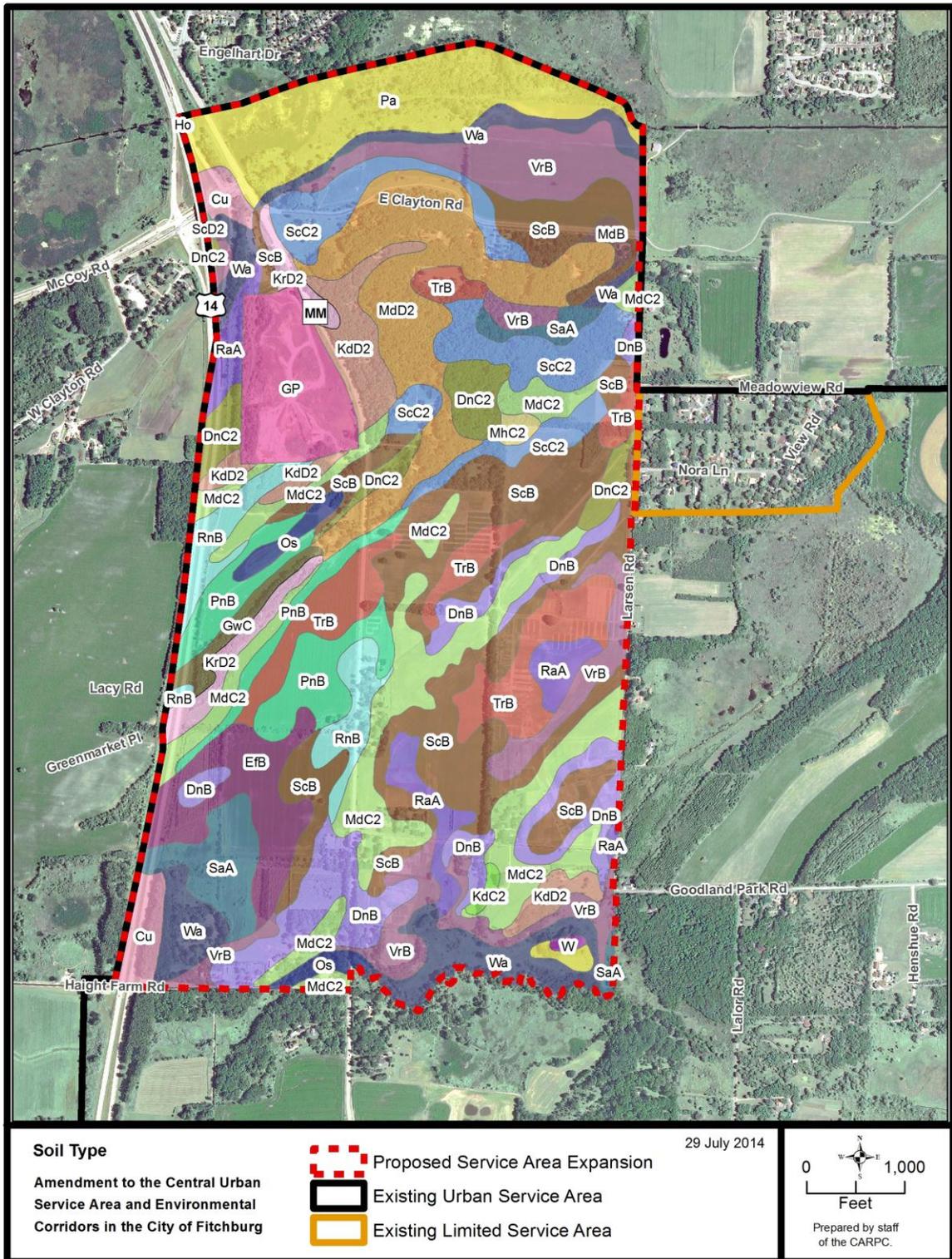
Map 7 – Northeast Neighborhood Elevation



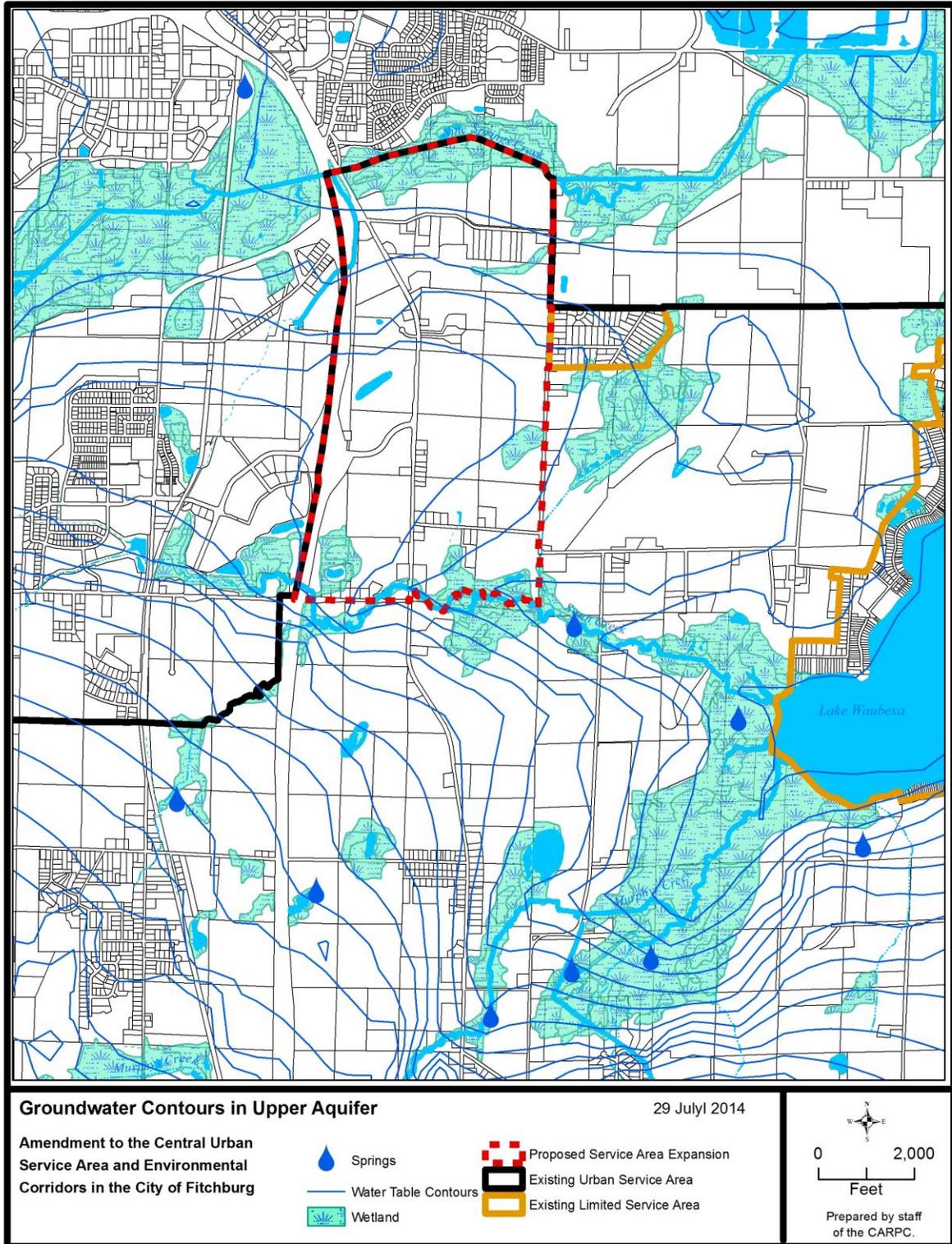
Map 8 – Northeast Neighborhood Steep Slopes



Map 9- Soil Type



Map 10 – Groundwater Contours in Upper Aquifer



Map 11 – Pre-Development Groundwater Recharge

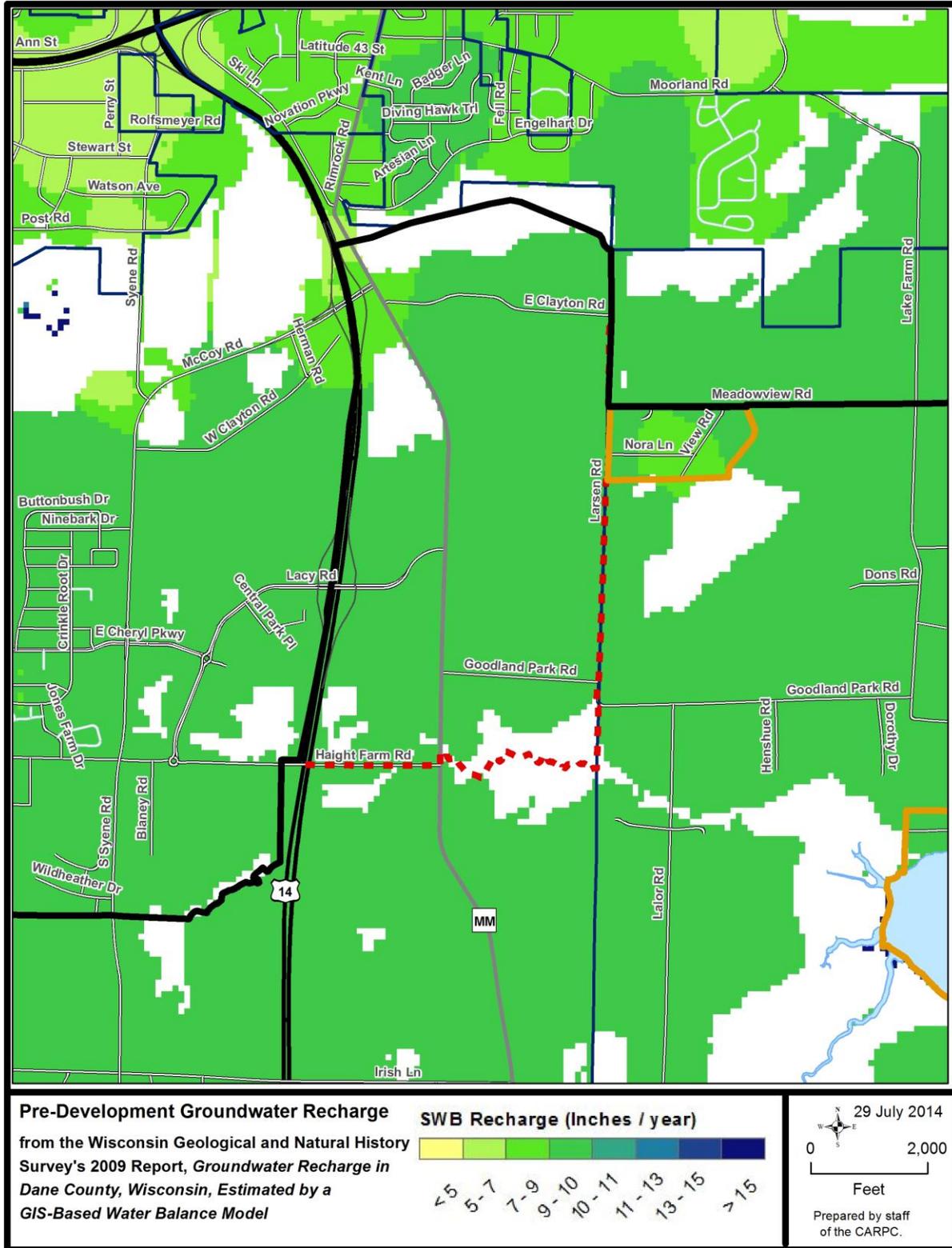


Table 2 – Soils Classification

| Soil | % of Area | General Characteristics |
|---------------------------------------|-----------|---|
| Cut and fill | 2% | Cut and Fill |
| Dodge silt loam; DnB,DnC2 | 8% | Shallow, well-drained, gently sloping to moderately steep soils on uplands. Soils have low fertility, moderately slow permeability, and a severe hazard of erosion. Poses severe limitations for development due to dolomite bedrock at a depth of 1 to 2 feet. |
| Elburn silt loam; EfB | 3% | Deep, well drained and moderately well drained, gently sloping to moderately steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and a moderate hazard of erosion. Poses moderate to severe limitation to development due to slope, erodibility and load bearing capacity. |
| Gravel Pit; GP | 4% | This area is a gravel pit. |
| Griswold loam; GwC | 1% | 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. |
| Houghton muck; Ho | 0% | Deep, very poorly drained, nearly level soils on low benches and bottoms in stream valleys. Soils have medium fertility, moderately rapid permeability, and a severe hazard of flooding. Poses very severe limitations for development due to seasonal high water table and very low bearing capacity. |
| Kidder loam; KdC2, KdD2, KrD2 | 5% | Deep Well-drained, gently sloping to very steep soils on glaciated uplands. Soils have medium fertility, moderate permeability, and severe hazards of erosion. Poses slight to severe limitations to development due to slope, moderate bearing capacity, shrink-swell potential and stability. |
| McHenry silt loam; MdB, MdC2, MdD2 | 17% | Deep, well drained, gently sloping to moderately steep soils on glacial uplands. Soils have medium fertility, moderate permeability, and a severe to very severe hazard of erosion. Poses moderate to severe limitations for development due to slopes. |
| Military loam; MhC2 | 0% | Moderately deep, well-drained, sloping to steep soils on glaciated uplands. These soils area in area of shallow glacial drift where sandstone bedrock is exposed. Soils have medium fertility, moderate permeability, and severe hazards of erosion. Possess moderate to severe limitations for development due to slope, difficulty in excavation and erodibility. |
| Orion silt loam, wet; Os | 1% | Deep, somewhat poorly drained, nearly level soils on flood plains and narrow stream bottoms. Soils have high fertility, moderate permeability, seasonal high water table, and severe hazard of flooding. Poses very severe limitations for development due to seasonal high water table and very low bearing capacity. |
| Palms muck; Pa | 8% | Deep, very poorly drained, nearly level organic soils on low benches in stream valleys. Soils have medium fertility, moderately rapid permeability, and seasonal high water table. Poses very severe limitations for development due to seasonal high water table and very low bearing capacity. |
| Plano silt loam; PnB | 4% | Deep, well drained and moderately well drained, nearly level to sloping soils on glacial uplands. Soils have high fertility, moderate permeability, and a slight to severe hazard of erosion. Poses slight to moderate limitations for development due to slope and low bearing capacity. |
| Radford silt loam; RaA | 3% | Deep, somewhat poorly drained, nearly level and gently undulating alluvial soils in low drainage ways and stream channels. Soils have high fertility, moderate permeability, and a seasonally high water table. Poses very severe limitations for development due to seasonal high water table and very low bearing capacity. |
| Ringwood silt loam; RnB | 3% | Deep, well drained, gently sloping to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate to severe hazard of |

| Soil | % of Area | General Characteristics |
|---|-----------|---|
| | | erosion. Poses slight to moderate limitations for development due to low bearing capacity and slopes. |
| Sable silty clay loam; SaA | 3% | Deep, poorly drained, nearly level to gently sloping soils on low benches in stream valleys. Soils have high fertility, moderate permeability, and a seasonal high water table. Poses severe to very severe limitations for development due to seasonal high water table and very low bearing capacity. |
| St. Charles silt loam; ScB, ScC2, ScD2 | 20% | Deep, well drained and moderately well drained, nearly level to moderately steep soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses slight to moderate limitations for development due to low bearing capacity. |
| Troxel silt loam; TrB | 6% | Deep, well drained and moderately well drained, gently sloping soils in draws, on fans, and in drainage ways. Soils have high fertility, moderate permeability, a moderate hazard of erosion, but are subject to flooding. Poses severe limitations for development due to low bearing capacity and frequent flooding. |
| Virgil silt loam; VrB | 8% | Deep, somewhat poorly drained, nearly level and gently sloping soils on low benches on uplands and in stream valleys. Soils have high fertility, moderately slow permeability, a seasonal high water table, and a moderate hazard of erosion. Poses severe limitations for development due to seasonal high water table and low bearing capacity. |
| Wacousta silty clay loam; Wa | 6% | Deep, poorly drained, nearly level soils on low benches in old lake basins. Soils have low fertility, moderately slow permeability, and a seasonal high water table. Poses very severe limitations for development due to seasonal high water table and low bearing capacity. |

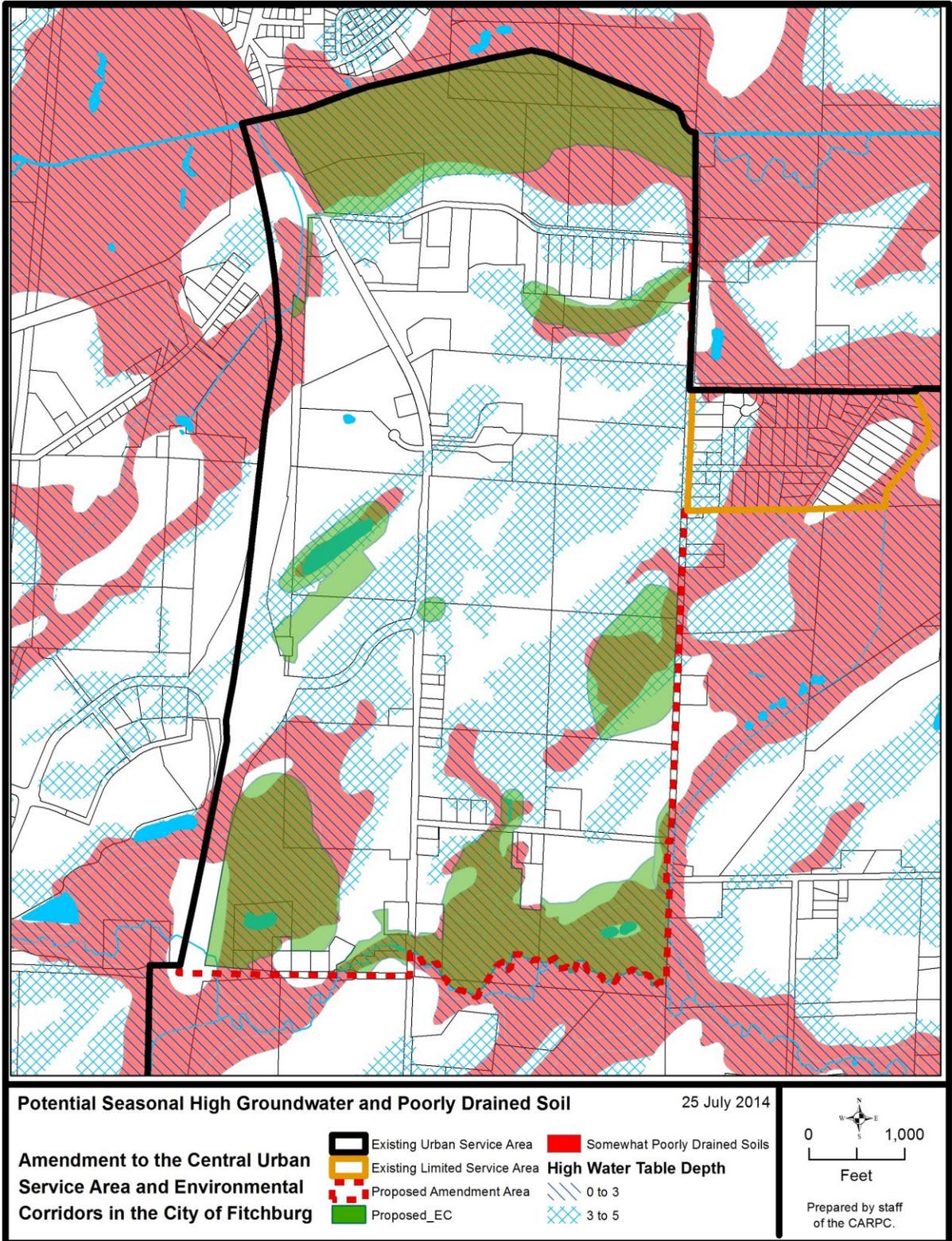
Source: Dane County Soil Survey

Table 3 – Soils Characteristics

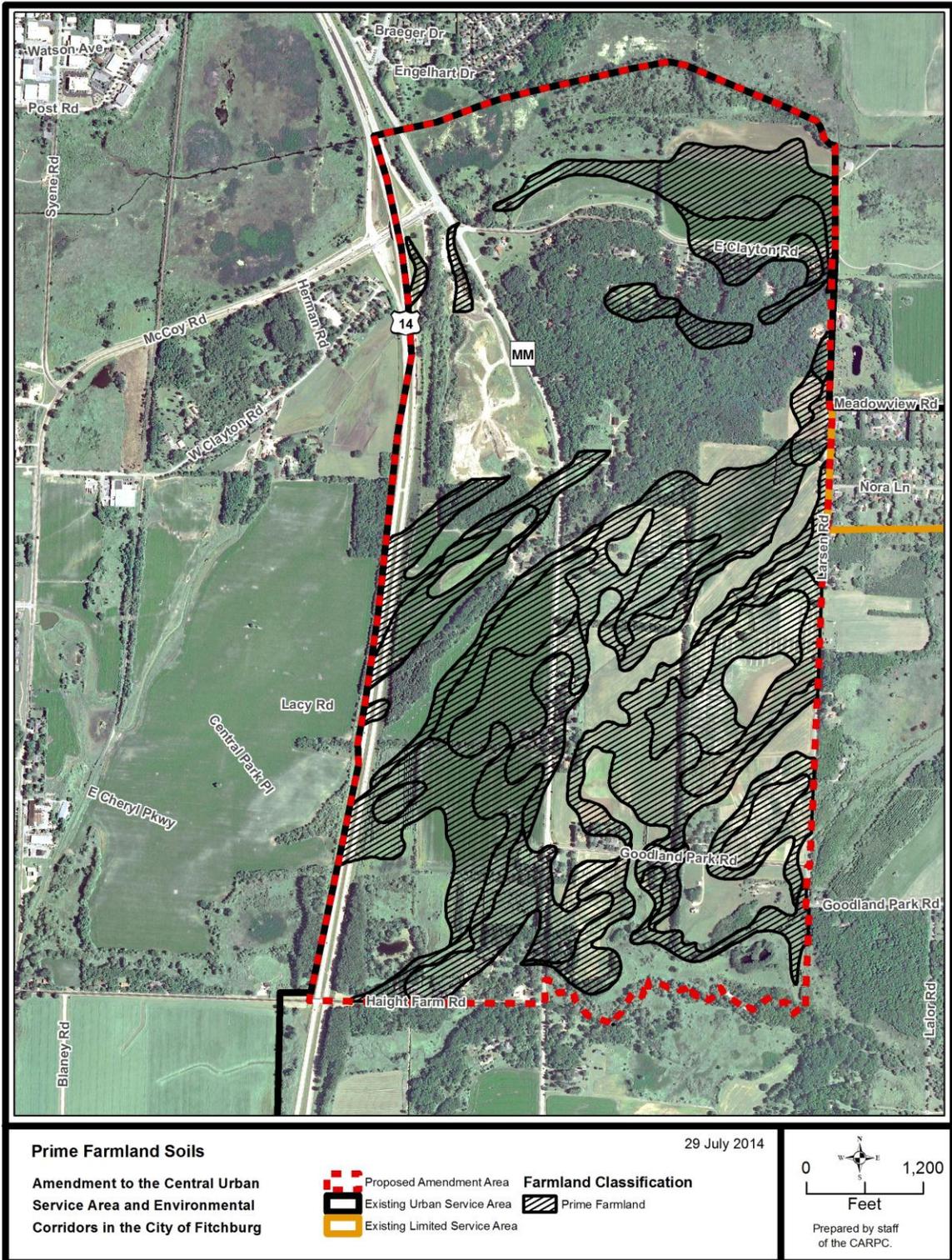
| Characteristic | Soil Map Symbols [See: Map 9 (p. 18)] | % of Area |
|---|---|-----------|
| Prime Agricultural Soils | EfB, TrB, VrB, DnB, MdB, PnB, RnB, ScB | 44% |
| Hydric Soils (Indicates Potential / Restorable Wetlands) | Ho, Wa, Pa, SaA, OS, EfB, TrB, RaA | 36% |
| Soils with Seasonal High Water Table < 5 ft. | Ho, Wa, Pa, SaA, Os, EfB, TrB, VrB, RaA, PnB, ScB, ScC2, ScD2 | 47% |
| Soils Associated with Steep Slopes | KdD2, ScD2, MdD2 | 8% |
| Soils Associated with Shallow Bedrock < 5 ft. | MhC2 | 0% |
| Poorly Drained Soils | Ho, Wa, Pa, SaA, Os | 17% |
| Best Potential for High Rates of Infiltration (3.6" / hr.) | DnB | 6% |

Source: Dane County Soil Survey

Map 12 – Potential Seasonal High Groundwater and Poorly Drained Soil



Map 13 – Prime Farmland Soils



Woodlands

A dry mesic forest community with a mature oak canopy is located in the Amendment Area, containing a moderate to low quality floristic community, intruded upon by non-native plant species. A perennial natural spring identified in the northern portion of the dry mesic forest community may contribute to the base flow of a perennial/intermittent waterway extending northeast into the wetland area.

Threatened and Endangered Resources

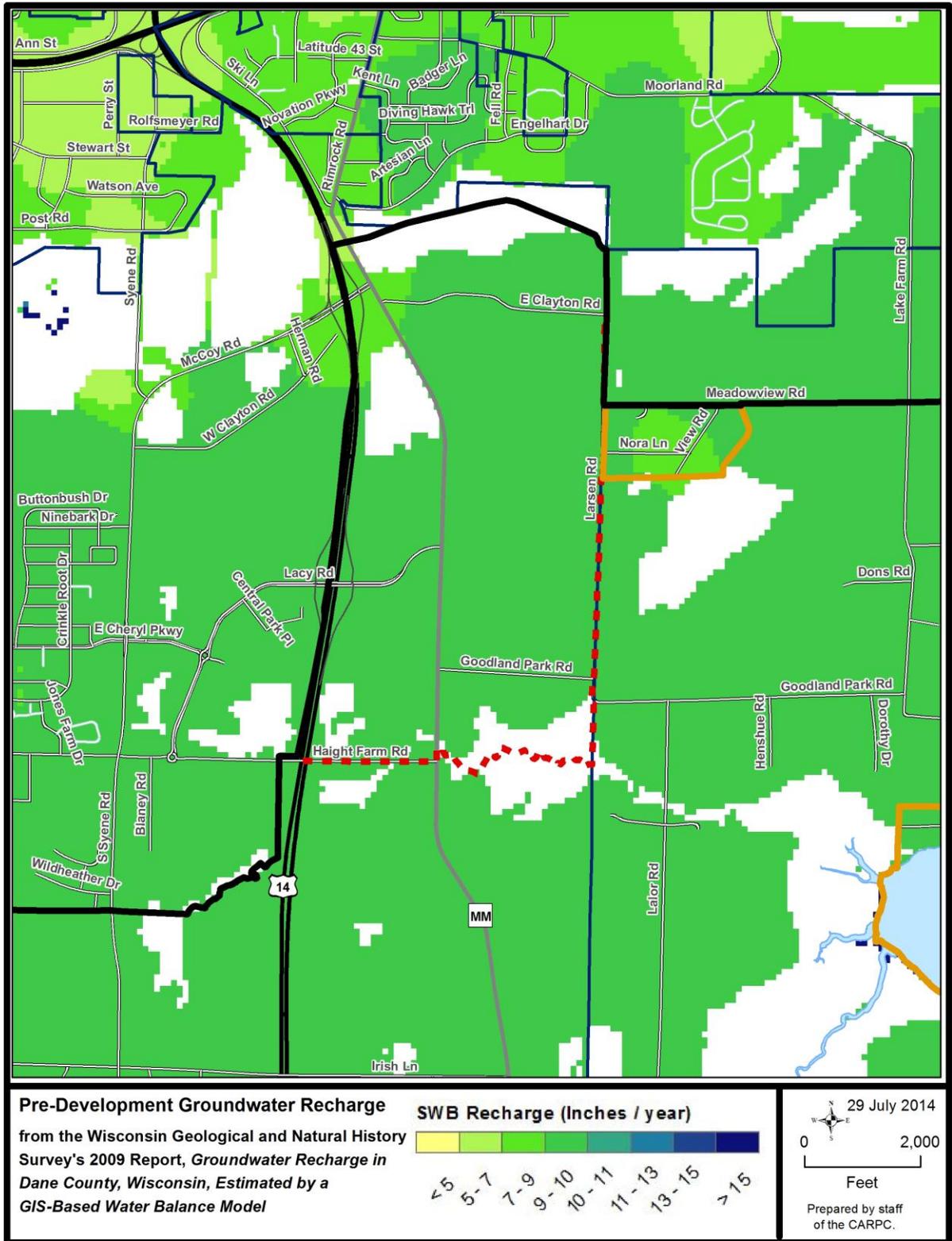
Early in the initial planning process, the DNR Bureau of Endangered Resources, along with the State of Wisconsin Natural Heritage Inventory (NHI), undertook an analysis of the Amendment Area and adjacent and proximate lands (hereafter "Study Area") to identify any Threatened, Endangered, and Special Concern Species within the Study Area.

As a result of the analysis, three endangered vegetative species were documented in the Study Area, the wetland communities calcareous fen, shrub-carr, and southern sedge meadow. Based on the common species found in each of these communities, and the inventory of understory species in the Study Area, the analysis did not indicate that any of these endangered wetland communities are located in the Amendment Area. The Pasley property at the south end of the Amendment Area has sedge meadow and fresh meadow wetland communities. Although not observed, the biologist undertaking the study noted that a portion of the wetland may be a calcareous fen.

Analysis of historical records of rare species known to occur in the vicinity of the Amendment Area indicated a possible existence of eleven rare plant species and two aquatic animals within 2 miles of the amendment area. A comparison of the plant species database and the inventory of understory species in the Amendment Area indicate that none of the rare plant species are present within the Amendment Area.

The DNR notes in their analysis that "the lack of additional known occurrences does not preclude the possibility that other endangered resources may be present." The DNR further notes that "absences of an NHI occurrence in a specific area should not be used to infer absence of rare species." Thus, even though rare and endangered species were not identified in the understory inventory of the Amendment Area, this does preclude the presence of an endangered or threatened species in the Area.

Map 14 - Pre-Development Groundwater Recharge



Archaeology

The Wisconsin State Historical Society (WSHS) reviewed the amendment location and found that several archaeological sites are reported within the proposed amendment area, and several portions of the area have previously been surveyed for cultural resources. Given the presence of several reported archaeological sites, the WSHS recommends that areas not previously surveyed for cultural resources be surveyed by a qualified archaeologist, with particular attention focused on relocation and evaluation of archaeological site DA-0532, and additional investigations to better define the limits and condition of archaeological site DA-0467. Three copies of the survey report should be sent to the CARPC.

Under Wisconsin law, Native American burial mounds, unmarked burials, and all marked and unmarked cemeteries are protected from 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 Wisconsin Historical Society must be contacted. Work cannot resume until the Burial Sites Preservation Office gives permission. (See WSHS response letter, attached)

Land Use. The majority of the amendment area is in agricultural use. There are approximately 52 existing residences on 63 acres, 86 acres of existing right-of-way, 8 acres in commercial use, 20 acres in mineral extraction, and 308 acres of woodland and open space including a portion of the Nine Springs E-Way.

Land uses surrounding the amendment area are as follows:

North: Nine Springs E-Way (City of Fitchburg and City of Madison)

Residential, Open Land (City of Madison)

South: Open Land, Agriculture, Residential, Woodlands (City of Fitchburg)

East: Outdoor Recreation, Residential, Open Land (Town of Blooming Grove)

Residential (including Waubesa LSA), Open Land, Woodland, Agriculture (Town of Dunn)

West: Agriculture, Open Land, Woodlands (City of Fitchburg)

Transportation System

The major roadways serving the amendment area are: U.S. Highway (USH) 14, a four-lane principal arterial freeway that forms the western boundary of the amendment area; County Trunk Highway (CTH) MM, a two-lane minor arterial that is located parallel to USH 14; and Lacy Road, an east-west minor arterial. A new relocated four-lane divided section of Lacy Road between CTH MM and existing Lacy Road provides interchange access to USH 14. A currently unutilized north-south rail corridor, jointly owned by the City and the Village of Oregon, is located approximately 0.5 miles west of the amendment area.

The City of Fitchburg contracts with Metro Transit for fixed-route bus service within the Fish Hatchery Road corridor. Bus service is not currently available within the immediate vicinity of the amendment area. The Madison Area Transportation Planning Board's Rideshare Etc. Program provides ride-matching services for individuals interested in car- or vanpooling. Dane County contracts with private providers, Transit Solutions and We Care Transportation, for limited group ride service for the elderly and persons with disabilities. The routes serve trips to nutrition sites, senior center activities, adult day care and shopping.

CTH MM is rated as “least suitable” for bicycling because of the roadway’s narrow 3-foot shoulders, high traffic speeds, and moderately high traffic volumes. The new section of Lacy Road from CTH MM through the USH 14 interchange area includes a paved multi-use path and on-street bicycle facilities. The Capital City Trail parallels East Clayton Road within the amendment area. The Swan Creek residential subdivision, located approximately ½ mile west of the amendment area, has a multi-use path system, including a path on the west side of Syene Road connecting to the Capital City Trail. The subdivision also includes dual-sided sidewalks along most of the local streets with single-sided sidewalks on some streets that serve multi-family residences.

4. Consistency or Conflict With Adopted Plans and Policies

Consistency With Plans The proposed addition to the Central Urban Service Area is entirely within the City of Fitchburg. The City of Fitchburg Comprehensive Plan includes a policy that in no case shall there be more than 1,875 acres of available developable land in the CUSA. This limit is determined by 20 years plus a 5-year flexibility factor at a rate of 75 acres per year – the maximum average annual development as determined by the Comprehensive Plan. If both the Northeast Neighborhood and the North Stoner Prairie amendment areas are added to the Central Urban Service Area, the resulting developable acreage added to the CUSA in Fitchburg brings the total very close to the self-imposed cap. The City estimates that there are 1,126 acres of available developable land in the CUSA in Fitchburg, according to a June 1, 2013 analysis. The City notes in the applications that additions of 498.4 available developable acres in the Northeast Neighborhood and 246.6 available developable acres in the North Stoner Prairie amendment, brings the total to approximately 1,871 developable acres – just under the 1,875 maximum identified in the Comprehensive Plan.

CARPC’s identification of “developable acres” differs from the City of Fitchburg calculations of “available developable land”. The CARPC calculation relies on land use identified in the latest land use survey (2010) and estimates developable acres in urban service areas by identifying land that is neither in developed land use categories nor in the undevelopable categories and does not take into account availability or incorporate local knowledge of feasibility of development. (CARPC calculations identify the Northeast Neighborhood as adding 542.3 developable acres to the CUSA. The North Stoner Prairie amendment would add another 224.5 developable acres.) The acreage being added is consistent with the official 2035 land demand for the Central Urban Service Area of 3,685 acres.

The proposed development within the Northeast Neighborhood amendment area is consistent with the City of Fitchburg’s Northeast Neighborhood Plan, adopted by the Fitchburg City Council as an amendment to the City of Fitchburg Comprehensive Plan on April 27, 2010. The Fitchburg City Council passed a resolution on February 25, 2014 endorsing the amendment of the CUSA to include the Northeast Neighborhood after finding the amendment consistent with the Comprehensive Plan. This resolution has been included as part of the USA amendment application.

The amendment area is principally zoned Transitional Agriculture, Rural Development and Rural Residential and is designated as a future neighborhood within the future development boundary in the *City of Fitchburg Farmland Preservation Plan*.

There is currently one landholding that is zoned Exclusive Agriculture (A-X) per the City's zoning ordinance. The Wisconsin Department of Agriculture, Department of Agriculture, Trade and Consumer Protection (DATCP) has certified the A-X zoning district as a "Farmland Preservation (FP) District." The property is also planned as FP in the Dane County Farmland Preservation Plan. The property is planned for continued and future agricultural use. It will remain in the A-X zoning district per the City of Fitchburg's *Northeast Neighborhood Plan* and its Comprehensive Plan. The property will continue to be identified in the *Dane County Farmland Preservation Plan* and will remain subject to an agricultural conservation easement. The City has discussed these issues with both Dane County Planning and Development and DATCP staff and is pledging to work with both entities to ensure consistency with applicable County policy and State statutes. As indicated by the applicant, the City of Fitchburg is committed to agricultural preservation and planning:

The City is committed to protecting its agricultural resources and land outside of the future growth boundary. The City has a Farmland Preservation zoning ordinance/district certified by the Wisconsin Department of Agriculture, Trade and Consumer Protection, a rural residential "cluster"/transfer of development rights ordinance, a local foods/community gardens program, coordinated agricultural tourism initiatives, and is currently in the process of developing a comprehensive "Agriculture Plan" to formulate a holistic and integrated approach to agricultural planning and development within the City.

-City of Fitchburg Staff

There is no conflict with the *Dane County Park and Open Space Plan*.

Consistency With CARPC Advisory Goals and Objectives The Capital Area Regional Planning Commission has adopted 14 goals as part of the advisory *land Use and Transportation Plan*. The amendment request is evaluated with respect to each of these goals based on CARPC staff's professional judgment, since the plan does not provide any metrics or indicators for this evaluation. Eight of the goals are supported and one is somewhat supported by the amendment. The amendment is neutral or has offsetting effects with respect to four goals, and potentially conflicts with the goal of compact development.

1. Promote the development of balanced communities throughout the county with sufficient commercial, industrial, residential, and open space land to meet the needs of existing and future residents.

The amendment supports the CARPC goal of development of balanced communities. The proposed development adds a mix of residential, commercial and institutional uses, and also includes open space and significant green space in the proposal for the amendment area.

2. Promote compact urban development in new areas adjacent to existing urban areas and in the redevelopment or infill development of existing neighborhoods.

The proposed amendment potentially conflicts with the goal to promote compact urban development in that, at the maximum number of new residential development proposed in the amendment area, the overall density is approximately 6.4 units per acre, lower than the residential density of 6.9 units per acre for the CUSA as a whole. The amendment proposes a range of 944 to 1570 housing units, with the lower end of the range resulting in 3.9 units per acre.

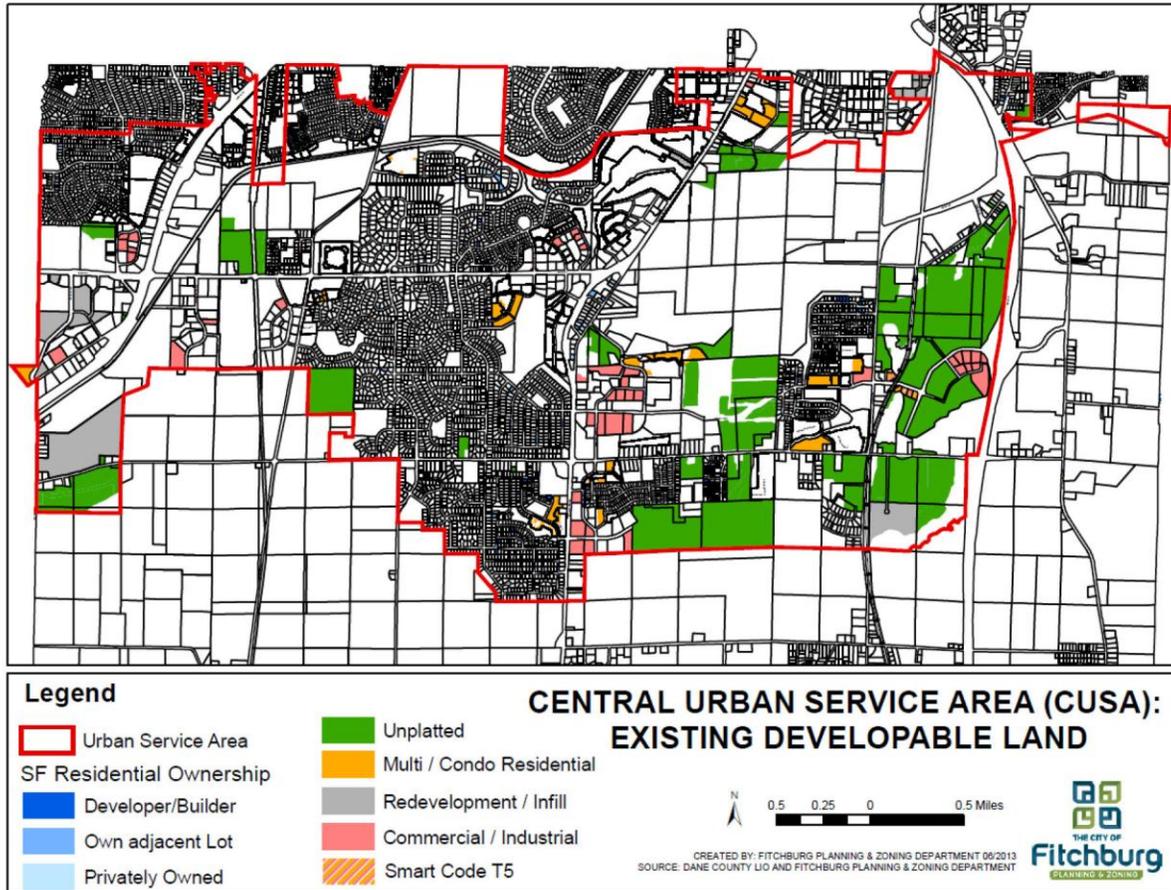
However, these calculations include 23.4 acres of mixed-use development, where not all acreage is devoted exclusively to the residential uses. The low-density residential is described as a minimum average density of 5 units per acre, and the medium to high-density residential category is described as a minimum average density of 10 units per acre. The overall residential density depends on where the number of units actually developed in each of these categories falls within the proposed range of units.

In support of this goal, the Business Park component does include some standards for higher densities. The City has also identified four redevelopment/infill areas within the CUSA. [See: Map 15]

1. Orchard Pointe, located in the western portion of the City, just south of McKee Road: This area was reclaimed from a former quarry and platted and is planned for commercial retail and business uses, with a small portion of the area planned for mixed-use.
2. The northeast corner of the City along Rolfsmeyer Drive, in close proximity to the City of Madison: This area formerly consisted of a mixture of businesses and large residential lots. This area is designated as a Tax Incremental Financing District (TIF) and is planned for future industrial uses.
3. The Traceway Drive area, just west of Fish Hatchery Road: The City is in early discussions with the property owner of The Pines and The Fairways apartment complexes to develop a revitalization plan for the former Ridgewood Apartments in this area.
4. The north side of McKee Road, and mainly east of Verona Road, as identified in the City's Arrowhead Redevelopment Plan adopted by the Council on October 11, 2012: In accordance with the Plan, the City will be installing a street from McKee Road to the Verona Road frontage road to provide redevelopment/infill opportunities in the area.

Map 15

**City of Fitchburg: Central Urban Service Area (CUSA):
Available Developable Land**



3. Promote the development of functionally and visually distinct communities encouraging compact, mixed-use neighborhoods and the efficient provision of a full range of public services.

The proposed amendment somewhat supports the goal to promote functionally and visually distinct communities. Although the City of Fitchburg and the City of Madison are immediately adjacent to one another, a community separation is created in the location of the amendment area by the Nine Springs E-Way, and supported by the designation of environmental corridors along the northern boundary of the amendment area. With the exception of a small commercial area, the area north of East Clayton Road is planned to remain undeveloped, preserving wetlands, and agricultural and open space uses.

4. Provide a full range of safe and affordable housing opportunities and choices for all residents throughout the county.

The amendment supports the goal of providing a full range of housing choices. The amendment area provides a range of densities in single family housing, as well as providing multifamily residential units and mixed-use development.

5. Provide an integrated, all-mode transportation system which offers the efficient, effective and safe movement of people and goods, and provides mode choice wherever possible while enhancing and, where relevant, preserving the character and livability of the neighborhoods and residential areas where transportation facilities are located.

The amendment supports this goal with a proposed bike and trail network connecting to the Capital City Bike Trail. [See: Map 16] The City also currently contracts with Madison Metro for bus service and anticipates and accommodates future bus service within the amendment area. The Northeast Neighborhood Plan was developed with attentiveness to design considerations improving transit route efficiency. Details outlined in the Plan include the following:

- Considerations for ingress/egress including avoiding left-turns on to thoroughfares and collectors as well as avoiding one-way loops (routing that enters and exits the neighborhood at the same point)
- Avoiding turning movements by buses and circuitous routes while maintaining a ¼ mile walking distance standard
- Ensuring that high-density dwellings front on transit corridors
- Anticipating bus routes as well as stop and transfer point locations in the design of the neighborhood

The City also envisions a future rail/bus rapid transit line connecting Oregon and Fitchburg to the City of Madison along an unused north-south rail corridor, owned by the City and the Village of Oregon, approximately 0.5 miles west of the amendment area.

6. Encourage concentration of employment and activity centers at nodes and along transit corridors to maximize the efficiency of the existing and future transportation system.

This goal is supported by the Northeast Neighborhood Plan's attentiveness to design considerations improving transit route efficiency. Although there is currently no transit service within the amendment area, employment and activity centers are located along major roads that are capable of serving transit. The closest transit route to the amendment area (bus #16) reaches the intersection of Ski Ln. (Oregon Rd.) and Rimrock Rd. (CTY Hwy MM), less than ¼ mile north of the amendment area. The majority of public transit serving Fitchburg (#40, 44, 47, 48, and 75) runs north-south along S. Fish Hatchery Rd. roughly 2.0 miles to the west.

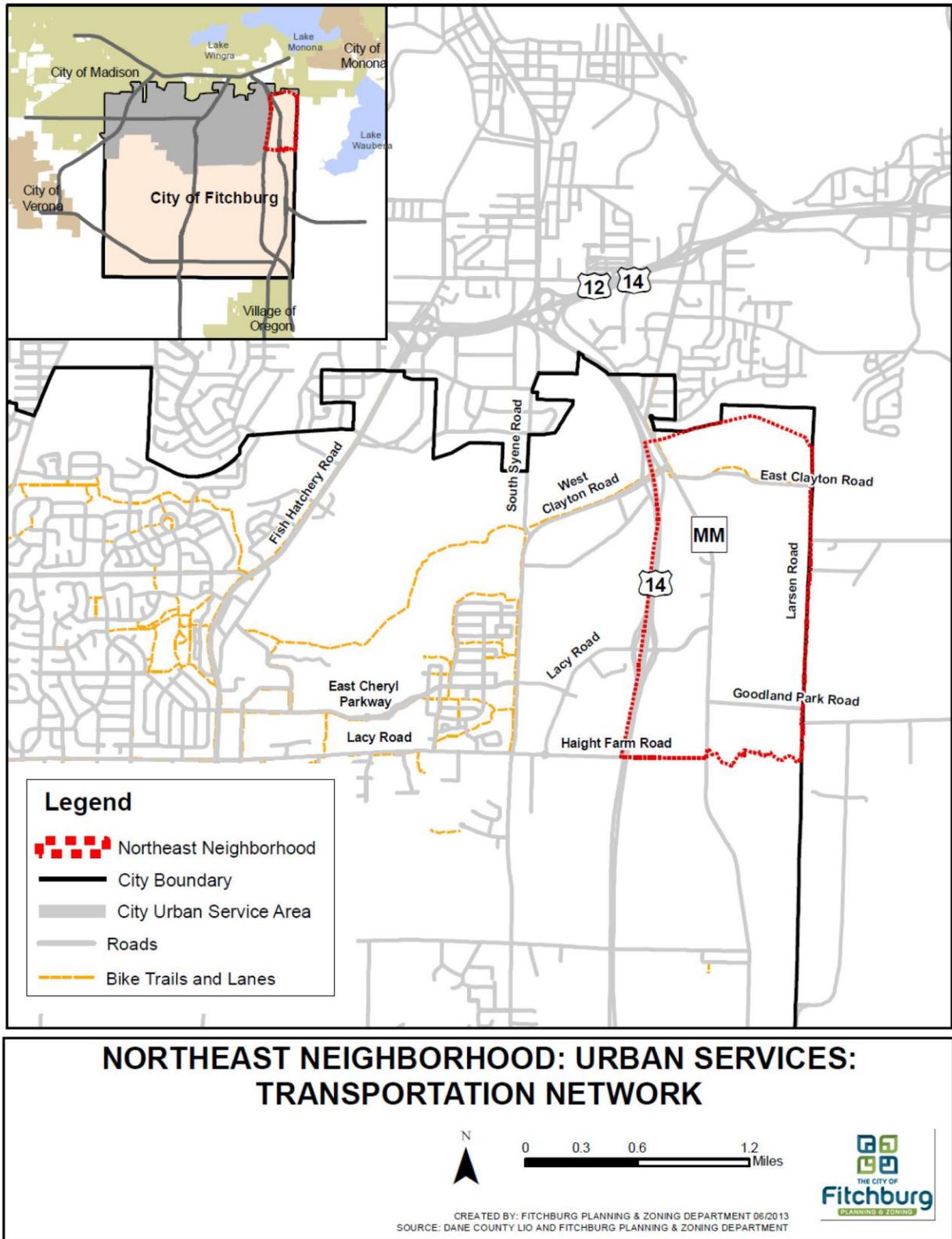
The area adjacent the amendment area is mentioned in at least one long-range, regional transportation planning document. The Madison Area Transportation Planning Board's (MPO) *Regional Transportation Plan 2030* (Drafted 2006) identifies congestion levels and projected street classifications. The plan also outlines potential public transit improvements, infrastructure improvements, and the location and size of projected employment/activity centers to 2030. The plan identifies Lacy Rd. between South Syene Rd. as an infrastructure improvement area, noting the need for substantial improvements and an intersection at Hwy 14. These improvements were in response to what were documented as "very congested" and "congested" conditions along S. Syene Rd., McCoy Rd., and north-bound CTY Hwy MM. These improvements have since been constructed and terminate at what would be the center of the Northeast Neighborhood. Hwy 14 (west of the amendment area) is currently classified as a "Principal Artery."

Long-range transportation plans do not identify public transit routes or infrastructure through the amendment area though they do propose express bus service along Hwy 14 and identify a potential park-and-ride location near Lacy Rd. and Hwy 14. The MPO's plan also calls out the area southwest of the amendment area as a major employment and activity center (roughly S. Syene Rd. and S. Cheryl Pkwy.), projecting employment at around 2,500 people for the year 2030.

7. *Support and maintain the central urban core as the region's major activity center and seek greater diversity and vitality in that area.*

The amendment neither supports nor conflicts with this goal. The proposed development calls for a variety of uses but does not detract from the vitality of Downtown Madison.

Map 16 – Transportation Network



8. Promote an economic development strategy that will provide suitable employment opportunities and a stable and diversified economic base.

In addition to residential uses, the proposed amendment area includes commercial, office, industrial and institutional uses generating future employment opportunities and a diversified economic base. The amendment supports this goal.

9. Protect agricultural lands and limit non-farm developments in order to maintain the county as one of the nation's most productive agricultural areas.

The amendment area is primarily farmland currently in agricultural use, and looked at in this limited way, the amendment would appear to conflict with the goal of protecting agricultural lands and limiting non-farm development. Approximately 44% of the amendment area (\cong 434 acres) includes prime agricultural soils. The proposed development for the amendment area does include approximately 69 acres in the northern portion of the area, north of East Clayton Road designated for continued agricultural use. The agricultural area continues the pastoral feel of the Nine Springs E-Way and wetlands and includes a farm protected from development by a Dane County conservation easement. The agricultural area is proposed to be included in the urban service area in order to create a neater, more logical boundary and avoid creating a hole in the service area.

However, the City of Fitchburg maintains a *Farmland Preservation Plan* which details protection of agricultural areas. Additionally, Fitchburg is the only city in the State of Wisconsin that has farmland preservation zoning certified by the Department of Agriculture, Trade and Consumer Protection. More than one half of Fitchburg—roughly 10,640 acres—is covered by “A-X—Exclusive Agriculture” zoning. (Fitchburg’s boundary encloses approximately 22,500 acres.) This agricultural zoning will make it more difficult to develop non-farm uses in the future. The Plan Commission may zone lands out of the “A-X—Exclusive Agriculture” district but only after meeting a number of criteria (see page 2).

While the amendment area itself conflicts with the goal of protecting agricultural lands, Fitchburg’s overall commitment, through its long-range plans and zoning code, to the preservation of farmland overshadows the negative effects of this amendment on the preservation of farmland. The amendment area in question constitutes a limited amount of non-farm development when weighed against the extensive amount of farmland that is currently being protected under Fitchburg’s zoning code. In this sense, the amendment and the wider planning context have offsetting effects with respect to this goal.

10. Promote planning and design that preserves and restores environmental functions and protects important environmental, cultural and historic resources.

The proposed amendment supports the preservation and restoration of environmental function by including wetland buffers greater than CARPC requirements, connecting environmental corridors with green space, planning for wetland restoration and preserving heritage trees.

11. Develop and promote a countywide system of open space corridors as a framework to protect the natural environment and scenic values, and provide outdoor recreation opportunities.

The amendment supports the goal of promoting a countywide system of open space corridors to protect the natural environment and scenic values through the designation of environmental corridors totaling 273.5 acres including the Nine Springs E-way, woodlands, dry-mesic forests, Swan Creek corridor, and other wetland areas. The corridors, in addition to other green space designated in the plan, provide a continuous network of open space connecting areas of important natural, cultural, and historical resources while also providing for wildlife movement and habitat. Environmental corridors at the north end of the amendment area connect with an extensive stretch of environmental corridor including the Nine Springs E-way. At the south end of the amendment area, environmental corridor along Swan Creek connects with designated environmental corridors to the west, and dedicated open space in the Town of Dunn to the east.

The wetlands and buffer at the southern boundary of the amendment area are designated in the *Dane County Parks and Open Space Plan* as a Natural Resource Area Boundary. [See: Footnote 2, p. 11]

12. Promote, conserve and restore all water resources in the region as to both quality and quantity.

The proposed amendment supports water quality and quantity through infiltration practices, detention ponds, wetland buffers, woodland preservation, and planned open space.

13. Promote a sustainable capital area region. A sustainable region is one that is far-seeing enough, flexible enough, and wise enough to maintain and enhance its physical, environmental, and social systems of support.

This amendment is neutral with respect to this CARPC goal. The applicant has identified no specific sustainability elements in the proposal. However, the City of Fitchburg has several programs that promote sustainability. The creek support program provides homeowners with a list of sustainable actions that they can pledge to do. Those who participate receive a reduction in their stormwater utility bill. In addition to the creek supporter program there are specific stormwater management actions for which the City of Fitchburg will credit both residential and nonresidential properties. The City is participating in a water conservation campaign and has a toilet rebate program. The City of Fitchburg's water rates increase as a customer uses more water. This rate structure is designed to more accurately distribute the costs of the additional infrastructure needed to meet peak demands and to encourage residents to use water wisely.

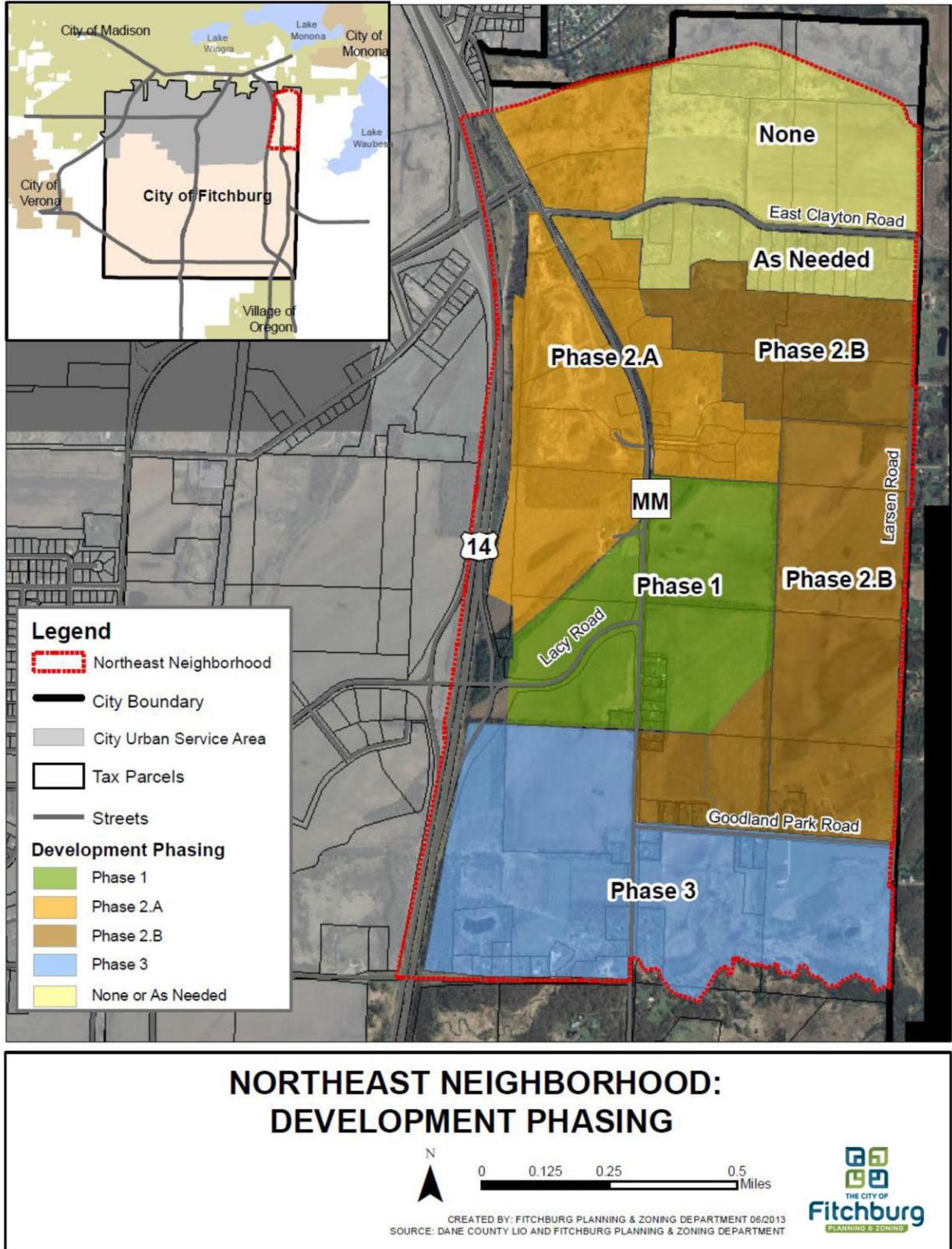
14. The CARPC shall work with communities to update the Dane County Water Quality Plan. In addition to the elements required by NR 121 of the Wisconsin Administrative Code, the Plan shall also define areas that can be developed with measures to protect, restore or minimize degradation of water quality.

The City of Fitchburg has not participated in the FUDA process with the Capital Area Regional Planning Commission. The City conducted their own analysis of future urban development areas prior to the establishment of the CARPC FUDA process, upon which the comprehensive plan is based, with information on natural resources provided by CARPC staff. The amendment is neutral with respect to this goal.

Contiguity The proposed amendment meets the CARPC criteria for contiguity with existing urban service areas. The proposed expansion is contiguous to the existing Central Urban Service Area to the north and west, and on the northern part of the east side.

Staging CARPC policies require that service area expansion requests containing over 100 acres of land include 10-year staging boundaries. The proposed amendment adds 515.4 developable acres. The City of Fitchburg Comprehensive Plan states that development, on average, shall not exceed 75 acres per year within the CUSA. Development is planned in four phases corresponding to service areas of proposed sanitary sewer interceptors and water mains, plus additional areas to remain undeveloped or developed as needed. Construction is estimated to occur in three (3), ten year phases: Phase 1 followed by Phases 2A and 2B, and finally Phase 3. Phase 1 centers around Lacy Road and the intersection with CTH MM. Phase 2A is to the north of Phase 1, and Phase 2B is along the eastern side of the amendment area. The southern part of the amendment area is Phase 3. areas Additional areas include the northeast corner of the amendment area north of East Clayton Road that is not proposed for development, and the area south of East Clayton Road (designated as "As Needed" on the development phasing plan) which may be developed at a future point by owners of the existing properties. [See: Map 17]

Map 17 – Northeast Neighborhood: Development Phasing



Need. CARPC staff is in the process of updating the method of projecting population and land demand for urban service areas. Staff recently presented to the Commission preliminary population updates that indicate slower population growth than had previously been projected. However, these preliminary updates and new methods are not completed, and the current analysis is based on currently approved and adopted land demand projections. The currently adopted CARPC land demand calculations use a projected population of 379,411 in the Central Urban Service Area in 2035 and estimate that 3,685 additional developed acres are needed to accommodate the land demand of the 2035 population. The proposed amendment adds 542.3 developable acres, within the anticipated land demand for the CUSA. (The City of Fitchburg has simultaneously requested an amendment in the North Stoner Prairie Neighborhood that proposes adding 224.5 developable acres to the CUSA.) The last amendment to the CUSA was a request by the City of Madison to add 10.6 developable acres south of Old Sauk Road, approved by the Wisconsin Department of Natural Resources on December 13, 2013. The CARPC also recently adopted an addition of 0.2 developable acres in the Town of Westport, which has not yet been approved by the DNR.

Based on housing and employment projections and City goals and policies for community development as stated in the Comprehensive Plan, the City of Fitchburg has projected its own land demand for the 20-year planning horizon from 2010-2029. The projections call for an average of 75 acres per year over the 20 year timeframe, or a total of 1,500 acres over 20 years. The City of Fitchburg Comprehensive Plan policy states, and the Northeast Neighborhood amendment application reiterates that, while additions to the CUSA may exceed the 375 acres per 5 year average, in no case shall there be more than 1,875 acres of available developable land in the CUSA: the 1,500 acre 20-year need plus a 5-year flexibility factor at a rate of 75 acres per year. The City of Fitchburg has provided in its application an inventory of available developable CUSA lands as of January, 2013, totaling approximately 1,126 acres within the City. This area includes 23 acres designated for Residential – Single Family use, approximately 66 acres designated for Residential – Multi-Family or Condominium use, approximately 98 acres designated for Commercial/Industrial use, approximately 140 acres designated for Redevelopment/Infill use, approximately 5 acres in the City’s Smart Code zoning district, and approximately 794 acres that are not platted. This is equivalent to approximately 131 single family and 413 multi-family units. The City describes each of the vacant or redevelopment areas in the amendment application. [See: Map 15] The City also specifically identifies four areas within the CUSA that are targeted for redevelopment and infill. (For more information, see “Goal 2 - The City calculates 246.6 available developable acres in the North Stoner Prairie amendment area and 498.4 available developable acres in the Northeast Neighborhood, bringing the total to approximately 1,871 developable acres –essentially fulfilling the 1,875 acre need identified in the Comprehensive Plan.

5. Proposed Urban Services

Public Water System

Future water usage for the Amendment Area is estimated at 385,000 gallons per day (g.p.d.) at full build-out. This projection is based on current water usage rates and planned land uses in the amendment area. Peak hour water demand for the amendment area is estimated to be 55,377 (gallons per hour) g.p.h. Maximum day ratio used is 2.04 and maximum hour ratio used is 1.69. Table 4 provides average daily water usage estimates for each development phase.

Table 4 – Northeast Neighborhood, Water Use

| Projected Water Usage per Development Phase | Residential Water Usage g.p.d. | Commercial/Industrial Water Usage g.p.d. | Average Daily Water Usage g.p.d. | Cumulative Peak Hourly Water Usage g.ph. |
|--|---------------------------------------|---|---|---|
| I | 100,277 | 20,699 | 120,977 | 17,378 |
| 2A | 6039 | 73,167 | 79,206 | 28,756 |
| 2B | 108,616 | 2,012 | 110,628 | 44,648 |
| 3 | 58,445 | 16,244 | 74,689 | 55,377 |
| 4 | 0 | 0 | 0 | 55,377 |
| TOTAL | 273,377 | 112,124 | 385,501 | 55,377 |

The water demand will be met through existing wells and piped to the development. Care will need to be taken to balance water demand and the length of transmission pipe in order to supply water meeting the City's requirement of a 3 day maximum pipe travel time. Depending on the development pattern it may be necessary to extend a single supply line and complete a supply loop after water demands increase.

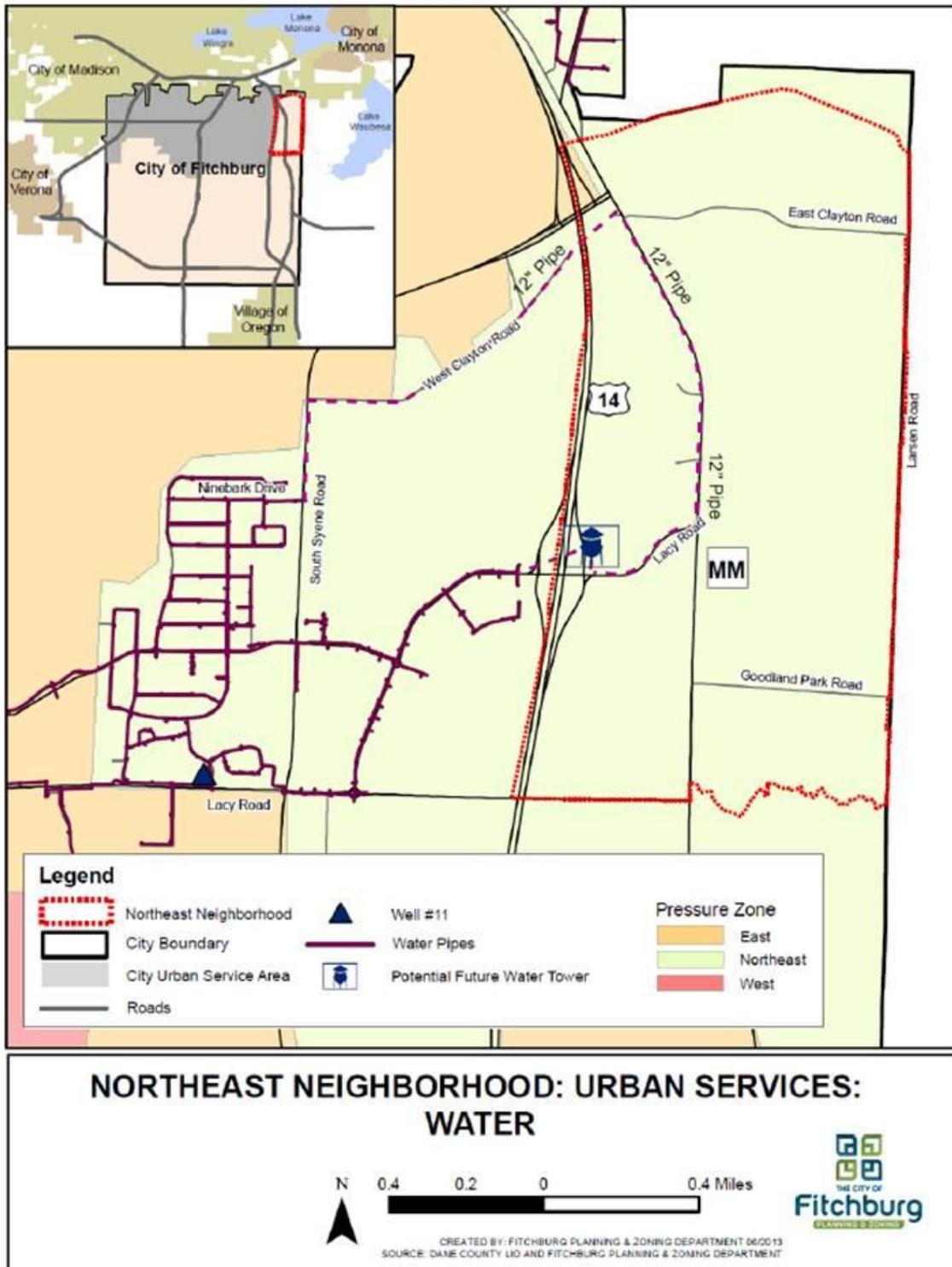
Wastewater The amendment area will be served by the Madison Metropolitan Sewerage District ("MMSD"). The City will collect all wastewater from the amendment area and discharge it into MMSD's Nine Springs Valley interceptor ("NSVI") located north of East Clayton Road. The NSVI will convey all wastewater to MMSD's wastewater treatment plant located approximately 0.5 miles northeast of the amendment area. Average daily flow to MMSD is estimated to be 366,000 g.p.d. based on the water use and wastewater generation in the City of Fitchburg in the past 10 years.

Two sewer interceptors are proposed within the City's wastewater collection system to convey wastewater from the amendment area to the NSVI. The City will obtain all necessary permits from the DNR and CARPC, as well as Dane County and MMSD for all municipal sewer extensions and MMSD sewer interceptor connections.

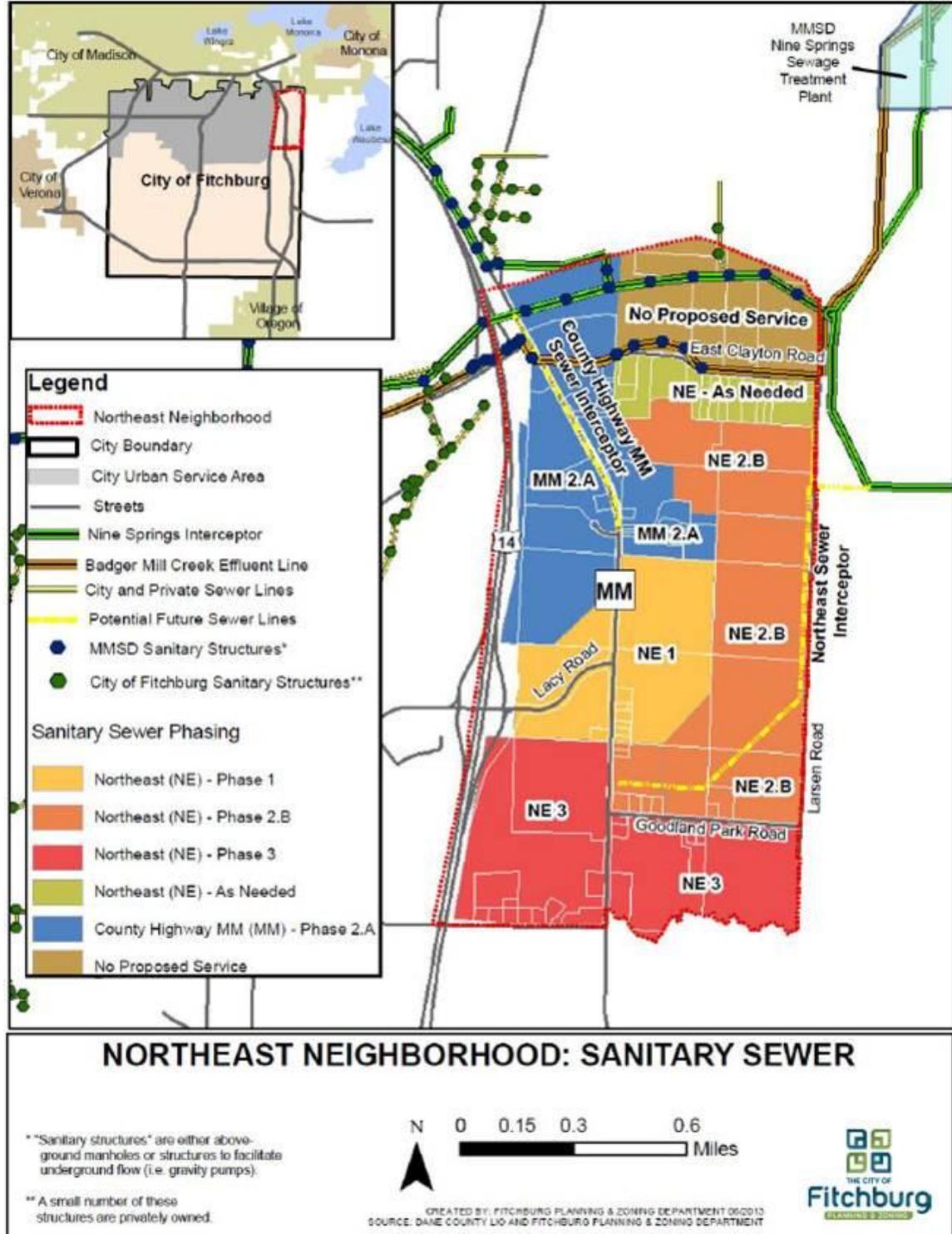
All of the amendment area, with the exception of the planned Institutional land use located in the southwest portion, will be serviceable by gravity sewer. The aforementioned Institutional land use may require private grinder pumps.

Two sewer interceptors are proposed within the City's wastewater collection system to convey wastewater from the amendment area to the NSVI. These proposed interceptors are identified as follows:

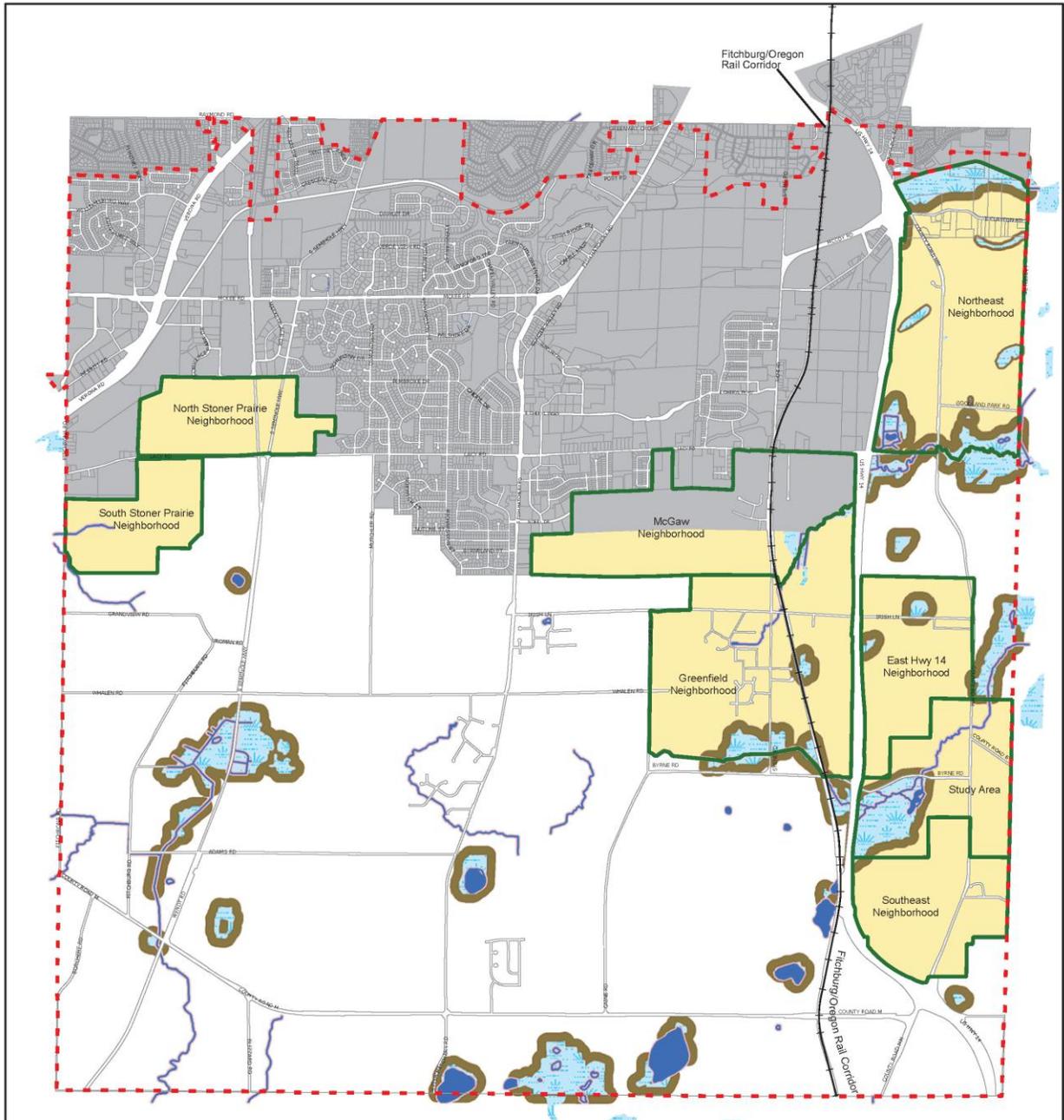
Map 18 – Northeast Neighborhood Urban Services: Water



Map 19 – Northeast Neighborhood Urban Services: Sanitary Sewer



Map 20 – Future Urban Development Boundary



Legend

- | | | |
|---|---|--|
|  Future Urban Development Boundary |  Intermittent Streams |  City Limits |
|  Future Neighborhoods |  Streams Buffer - 75 ft. |  Railroad Corridor |
|  Urban Service Area |  Wetlands | |
|  Open Water |  Wetlands Buffer - 300 ft. | |



Prepared by: Planning/Zoning
 Source: Planning/Zoning &
 Dane County LIO
 Revised: 2/2011



1. Northeast Sewer Interceptor: This interceptor will connect to the NSVI on Meadowview Road, extending west on Meadowview Road to Larson Road, continuing south on Larsen Road, and then southwest to County Highway MM and north of Goodland Park Road. This interceptor will serve approximately 252 acres in the amendment area. Based on proposed land uses, a 12-inch interceptor will be required to collect wastewater from this area.

2. County Highway MM Sewer Interceptor: This interceptor will connect to the NSVI north of East Clayton Road near U.S. Highway 14, extending south along U.S. Highway 14 to Lionello Court. This interceptor will service approximately 73 acres in the northwestern portion of the amendment area. Based on proposed land uses, an 8-inch interceptor will be required to collect wastewater from this area.

The MMSD Pumping Station 11 is expected to be at capacity during periods of peak flow around 2015, and is currently being upgraded to increase capacity. The Nine Springs Treatment Facility has a design capacity of 50 million gallons per day (mgd) and received an average of 47.2 mgd in 2008, including infiltration. It is expected to reach capacity by 2020 depending on growth rate assumptions. The 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 through current interceptor routes with expanded capacity of the system as the need is foreseen.

Stormwater Management System The City of Fitchburg has proposed stormwater treatment and management measures to achieve the following outcomes:

1. Peak rate control such that post-development peak runoff rate shall not exceed the pre-development peak runoff rate for the 1, 2, 10, and 100-year 24-hour design storm events.
2. Development sites shall maintain a recharge rate of 9.5 inches/year which is the recharge rate identified in the Wisconsin Geological and Natural History Survey (2009), under post-development conditions and maintain a post-development annual stay-on volume of at least 90% of the pre-development annual stay-on volume. This criterion is based on the desire to maintain baseflow discharge to streams and wetlands.

While the 2007 Ruekert-Mielke Conceptual Northeast Neighborhood Storm Water Management Plan noted that 100% stay-on should be achieved, in 2010 the Northeast Neighborhood Plan Land Use Committee altered this requirement to the level proposed with this urban service amendment. This was accomplished for the following reasons:

- (1) Analysis conducted for the City's McGaw Neighborhood Plan demonstrated that a volume control standard of 90% *with no cap on infiltration area* will result in post-development groundwater recharge that is greater than the pre-development recharge rate indicated by the Wisconsin Geological and Natural History Survey's Map of Dane County recharge rates. Meeting or exceeding current recharge rates will maintain the supply of groundwater flow to the springs, and hence should help provide protection to any springs that are hydraulically connected to the shallow groundwater within the Amendment Area.
- (2) The increase in recharge that would likely result from mandating 100% stay-on infiltration volume may lead to groundwater mounding due to enhanced recharge above pre-development conditions and could have a negative impact on existing development to the east of the amendment area by creating a potential for groundwater induced flooding.

3. The exclusions and exemptions defined in State and County standards shall apply except that no exemptions from infiltration requirements for areas where the soil infiltration rate is less than 0.6 in/hr will apply. This criterion is based on recognition that water quality treatment and runoff volume reduction through evapotranspiration may be feasible with biofiltration systems even in areas of low-permeability soil. The maximum size of effective infiltration areas where soil infiltration rate is less than 0.6 in/hr is 4% of the total development site.
4. Thermal Control: Reduce temperature of storm water runoff within watershed prior to discharge to creeks or similar water bodies will be achieved through infiltration.
5. Storm water infiltration and treatment Best Management Practices (hereafter "BMP") designs shall limit ponding duration to 24 to 48 hours, a time period deemed appropriate for plant survival. This criterion is based on the importance of vegetation survival to sustainable infiltration area performance and the importance of not directing too much runoff to individual biofiltration areas.
6. Post Construction Total Suspended Solids Water Quality: Total Suspended Solids load shall be reduced by 80% based on an average annual rainfall as compared to no controls and 60% for a five year 24 hour event.
7. Oil and Grease Control: Potential for oil or grease, first 0.5 inches of runoff treated (commercial and industrial) using the best available technology.
8. Phosphorous: Demonstrate a reduction of existing agricultural phosphorous loading to creeks or similar water bodies by at least 50% at fully-developed, stabilized conditions.
9. "In-line" wet ponds in areas of perennial stream flow or spring flow should be avoided to provide thermal protection for streams during dry weather (baseflow) conditions. Baseflow augmentation through storm water infiltration practices will also provide dry weather thermal benefits. There may be certain situations where in-line ponds are the BMP.
10. Conveyance of storm water through stream and wetland buffers shall be accomplished by open, vegetated drainage swales to the extent practicable. Outfalls to water bodies shall be designed to disperse water and avoid concentrated discharges.
11. City staff shall have flexibility in reviewing and approving storm water management plans to address site-specific challenges, such as the potential for groundwater-induced flooding, unsuitable soil conditions, or limited space for storm water management facilities
12. Development review procedures utilized by the City in the amendment area should allow for variance from the aforementioned requirements, 1. – 11., if unique site-specific issues exist, and should also allow for the evolution of design practices and future regulatory standards (An example of an appropriate variance from the aforementioned requirements is in situations where maintaining the 90% of the pre-development stay-on volume results in groundwater recharge rates in excess of 7.6 inches per year that may cause concerns about groundwater-induced flooding downgradient, in which case the City may conclude that maintaining the 7.6 inches/year recharge rate alone is an appropriate requirement.)

Environmental Corridors

Environmental corridors account for approximately 274 acres (27.7%) of the Amendment Area, with approximately 135 of these acres in the Wetland land use category.

Development within the environmental corridors will be prohibited consistent with the policies of the Capital Area Regional Planning Commission and the City's comprehensive plan requirements. The City of Fitchburg is committed to the protection and restoration of the wetlands, streams, and their related habitats and water bodies. This is evidenced by proposing the following measures:

- 1) a 300-foot vegetative buffer around the wetland along the Nine Springs Creek. This wetland contains significant functional values due primarily to the water quality protection, flood storage functions, wildlife habitat, and direct hydrologic connection to Nine Springs Creek. (W-1 in Map 21)

- 2) a 100-foot vegetative buffer around the wooded wetland and the spring draining into the wetland south of East Clayton Road . (W-2 in Map 21)

- 3) 75-foot vegetative buffer to the west and up to 430 feet to the north and southeast of the delineated wetland boundary. Possesses reduced functional value in its current state due primarily to agricultural disturbance, 18" of sedimentation. Although degraded , it likely provides valuable stop over habitat for migratory birds (FWS). However, nesting success is generally low in row cropped fields do to the frequency of disturbances (NRCS). The wetland is adequately protected with a 75-foot buffer consistent with adopted policies of the Dane County Water Quality Plan, but additional vegetative buffer was added to provide expanded upland habitat. (W-3 in Map 21)

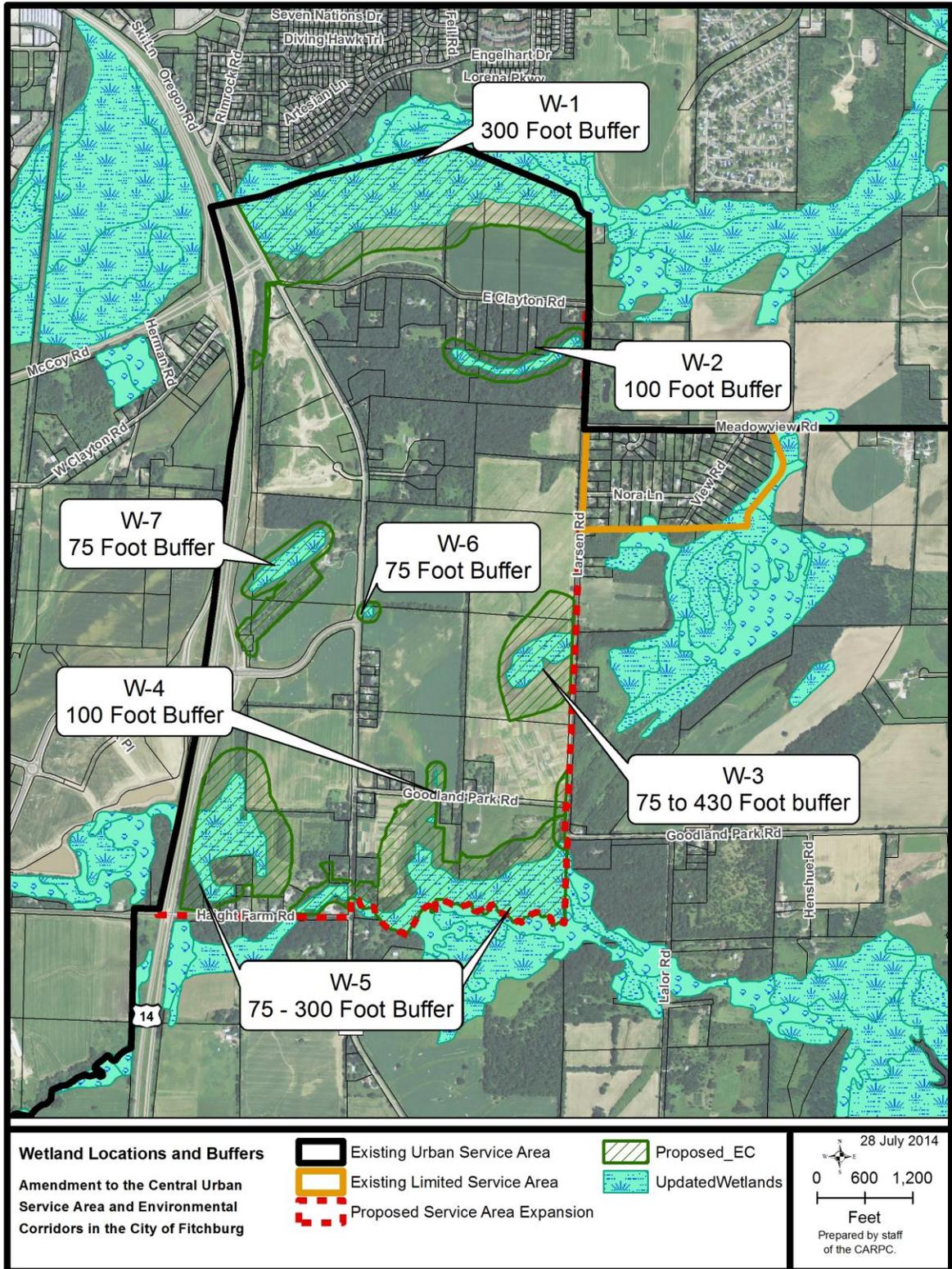
- 4) 100-foot vegetative buffer around the wetland immediately north of Goodland Park Road. This 0.12-acre wetland is an excavated pond and possesses minimal functional value due to its limited native vegetation. (W-4 in Map 21)

- 5) 300-foot vegetative buffer around the wetlands associated with Swan Creek is consistent with adopted policies of the Dance County Water Quality Plan and the City of Fitchburg standards . Contains significant functional values due primarily to the water quality protection, flood storage functions, wildlife habitat, and direct hydrologic connection to Swan Creek. Swan Creek is identified as an area of special natural resource interest by the WDNR, necessitating the 300-foot buffer.(W-5 in Map 21)

- 6) 75-foot vegetative buffer around the disturbed/farmed wetland just east of County Highway MM , north of Lacy road. This 0.25acre wetland possesses minimal functional value due to farming activities. Minimum 75-foot buffers combined with stormwater management practices that promote water quality protection are therefore adequately protective of this wetland, and meet adopted policies of the Dance County water Quality plan. (W-6 in Map 21)

- 7) 75-foot vegetative buffer around the wetland between U.S Highway 14 and County highway MM, north of Lacy road. Possesses minimal functional value due to farming activities. The steep wooded slope adjacent to the wetland should be designated as environmental corridor as well to protect against slope instability and erosion. Minimum 75-foot buffers combined with stormwater management practices that promote water quality protection are therefore adequately protective of this wetland, and meet adopted policies of the Dance County water Quality plan. (W-7 in Map 21)

Map 21 – Wetland Conditions and Buffers



The restoration and enhancement opportunities of the wetlands are to focus on increasing the diversity of the wetland plant community while reducing populations of non-native invasive species. Other environmental projects include the restoration for woodland and oak savanna areas as well as prairie vegetation within the uplands of the environmental corridors. The environmental corridor in the northern part of the proposed amendment area is composed of hardwood forest on steep slopes with “Heritage” and “Specimen” trees defined by the City Parks, Recreation, and Forestry Department. The area indicates moderate restoration potential as non-oak dominated woods generally warrant lesser restoration efforts.

Parks and Open Space account for 249.9 acres of the proposed Amendment Area. The open spaces connect the W-3 wetland to the Swan Creek wetlands (W-5) and there are opportunities to enhance the connectivity between the two wetlands by enhancing the habitat in the open space. The open space between the corridors have not received protected status and could be developed in the future. Efforts should be made to protect these connection areas, to restore the land cover to native vegetation, and to preserve the areas through city easements or covenants and through designation as environmental corridors.

The land to the south of Swan Creek is not part of the amendment area, and does not have official environmental corridor designation. However the city of Fitchburg has proposed a 300 foot buffer to protect the wetlands and streams directly to the south of Swan Creek.

The proposed environmental corridors exceed CARPC criteria for corridor designation.

Public Safety Services. The proposed amendment meets the CARPC criteria and standards for provision of a full range of urban public safety services. The City of Fitchburg maintains a service standard of 5 minute for fire response and 8 minutes for EMS response. It is expected that the amendment area will meet these standards following the construction and relocation plans detailed below.

The Fitchburg Police Department is located at 5520 Lacy Road, approximately 2 miles west of the amendment area. Police services are distributed across the City through three police districts, with resources allocated based on the number and type of service calls, population and geography of the district. As conditions change, the districts and resource allocations may shift. The department currently is staffed by 46 officers and 12 civilian employees. With an estimated 2013 population of 25,465, the staffing level provides a ratio of 1.8 officers and 0.47 civilian employees per 1,000 residents. The City projects that 4 to 6.5 additional officers and 1 to 1.5 additional civilian employees will eventually be needed to serve the projected population of the amendment area. Police response time averages 4 minutes and 31 seconds for all calls for service throughout the City of Fitchburg. The police service level available meets the criteria recommended by the CARPC for urban services.

Fire protection and emergency medical services will be provided by the City of Fitchburg Fire Department and the Fitch-Rona Emergency Medical Service. Currently there are two fire stations: Station One at 5791 Lacy Road, and Station Two at 5415 King James Way. Station One is closest to the amendment area, located approximately three miles to the west. The Fitch-Rona EMS currently operates from two stations: Fitchburg Fire Station Two at 5415 King James Way and 416 Venture Court in the City of Verona. As the result of a 2009 study of Fitchburg’s fire station and EMS unit locations, confirmed by a Fire Station Oversight Committee in 2014, the City plans a relocation of Fire Station Two, to be known as the Northwest Station, to the vicinity of McKee Road and the Badger State Trail in the next few years.

Fire Station One is expected to be relocated sometime between 2016 and 2018 to a location near South Syene Road, between McCoy and Lacy Road, and known as the Northeast Fire Station. The City also reports that the Mayor will be proposing in the latest Capital Improvement Plan that the construction of the proposed Northeast Fire Station be moved up to 2016-17 from 2017-18. The City anticipates the need for a third EMS station, likely to be housed at the Northeast Fire Station, to serve the amendment area. From the current station locations, fire response time to the amendment area is under 5 minutes for all but a small portion of the amendment area. Following construction of the Northeast Station, the entire amendment area is expected to have response times within the City's goal of 5-minute fire response and 8-minute EMS response. The City currently has a Fire Insurance (ISO) rating of 3 for land within the CUSA and a rating of 6 for lands outside of the CUSA but within five miles of a City or automatic aid fire station. These ratings meet the CARPC criteria for urban service levels.

Street and Sanitation Services. The City of Fitchburg Public Works Department will provide street design layout, street snow removal, and refuse/recycling collection for the amendment area. The City contracts with a private refuse and recycling collection company for most residences while residences and businesses not covered by these collection services are required to provide service through their own contract.

School and Park Facilities. Approximately 892 acres of the amendment area are located within the Oregon School District, and approximately 93 acres are within the Madison Metropolitan School District. No new residential units are planned within the Madison Metropolitan School District. Up to 1,570 residential units are planned within the Oregon School District, potentially adding 520 students to the Oregon school system. Elementary schools currently serving the amendment area are Netherwood Knoll Elementary School at 276 Soden Drive, and Prairie View Elementary School at 300 Soden Drive, both approximately 5.2 miles south of the amendment area. Oregon Middle School is located at 501 Pheasant Oak Drive, approximately 5.1 miles south of the amendment area, and Oregon High School is at 456 N. Perry Parkway, approximately 4.7 miles south of the amendment area.

The amendment area does not currently include any city parks, but parks are available nearby. The closest community park is McGaw Park, located one mile from the amendment area. The Capital City Bike Trail extends through the amendment area, and the City's proposed Heritage Circle Trail runs north-south west of U.S. Highway 14 and, if connected, will meet the Capital City Trail.

While the future land use plan identifies open space lands in the west, south, and southwest of the site, the exact acreage and configuration of future park facilities is dependent on final designs in these areas. Future plans for open lands designated as "NEN Green Space" vary according to the terrain and ecology. These lands are intended to "provide a continuous corridor of open space connecting areas of important natural, cultural, and historical resources, while also providing for wildlife movement and habitat." With the exception of a small portion, these lands are undevelopable due to site constraints i.e. steep slopes, corridor buffers, etc. Their future appearance—and potential recreational uses—will depend on the natural features that are there currently. These areas coincide with those designated in the *City of Fitchburg Comprehensive Park, Open Space and Recreation Plan, 2010-2015* as either "Class 2" or "Class 3" priorities (of three possible classes). Much of the space designated "NEN Green Space" or given a priority class in the respective plans is notable for the high concentration of heritage trees (200+ years old) and specimen trees.

The *City of Fitchburg Comprehensive Park, Open Space and Recreation Plan, 2010-2015* calls for a neighborhood park within ¼ walking distance of most City residents, and area parks within ½ mile of most City residents. The City requires parkland dedication of 2,900 square feet per new residential unit, and the projected residential land uses in the amendment area will require approximately 66 acres of new park land that may be satisfied through site dedication, fee-in-lieu of dedication, or off-site dedication.

6. Impacts or Effects of Proposal

Surface Water.

Development typically creates impervious surfaces (i.e., streets, parking areas, and roofs) and in the absence of mitigation measure, can alter the natural drainage system (i.e., natural swales are replaced by storm sewer) resulting in increased stormwater runoff rates and volumes, as well as reduced infiltration. Development can also cause substantial soil erosion and off-site siltation during construction, if adequate erosion control measures are not taken.

Scientific research has well documented that without mitigation measures, the potential impacts of development on receiving water bodies can include:

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

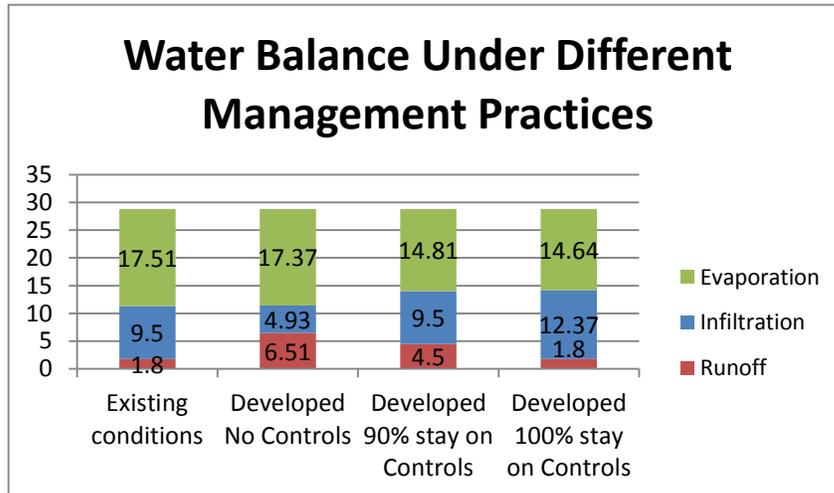
Natural drainage systems attempt to adapt to the dominant flow conditions. The frequencies of bank-full events often increase with urbanization and the stream attempts to enlarge its cross section to reach a new equilibrium with the increased channel forming flows. Higher flow velocities and volumes 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, as well as loss of riparian cover, shoreland, and aquatic habitat.

These changes in hydrology, combined with increased pollutant loading, can have a dramatic effect on the aquatic ecosystem of streams. It is important to realize that flow is a major determinant of the physical habitat in a stream, which in turn determines the biotic composition of stream communities. A growing body of literature documents that channel geomorphology, habitat structure, and complexity are determined by prevailing flow conditions, which in turn determine the biota that can inhabit the area. This is true for both the fish and the aquatic insects upon which they feed. Studies of streams affected by unmanaged urbanization have shown that fish populations either disappear or become dominated by rough fish that can tolerate the associated lower water quality levels.

The City of Fitchburg proposes to mitigate the urban non-point source impacts of the proposed development by implementing various stormwater best management practices that are designed and constructed in accordance with performance standards that meet or exceed current water quality standards. While this will reduce the likely impacts of the proposed development, it does not completely address the potential impacts on the receiving waters.

There is concern that meeting runoff volume control may result in groundwater mounding and exacerbate flooding in the Meadowview neighborhood. This concern can be addressed by designing infiltration devices that are designed to match predevelopment ground water recharge rates. It should be noted that to achieve 100% stay-on without exceeding groundwater recharge rates would require use of rainwater for landscape irrigation or other consumptive uses such as flushing toilets. Based on the development density of the site, 90% volume control through infiltration should be achievable while matching the groundwater recharge rate. This will result in an increase in runoff volume from the site and can lead to increases in flood peaks and flow durations at downstream locations, increases in erosion, and increases in sediment transport, even if peak runoff rates are controlled. Achieving the stay on goal of 90% while maintaining the recharge rate is especially important for the watersheds draining to the wetland across Larson road. The risk of ground water mounding resulting in flooding appears to be less in the western half of the site and there may be specific situations where exceeding the recharge target in order to achieve the stay-on goal is advisable. As shown in Figure 2, the difference in achieving 100% stay-on for this site would result in approximately 2.9 inches of additional infiltration on an annual basis.

Figure 2 - Water Balance Assuming 28.81 Inches of Annual Rainfall and Existing Conditions CN of 68



Utilizing stormwater for irrigation or utilizing stormwater management devices that promote evapotranspiration in order to achieve 100% stay-on was discussed with the City of Fitchburg. Concerns were raised that designing a system dependent on stormwater for irrigation may require supplemental irrigation water and that the likely sources for this water would be either shallow ground water or potable water. Shallow groundwater withdrawals will have a greater impact on stream baseflow than deep municipal wells and using potable water for irrigation increased deep aquifer ground water withdrawals and wastes energy. The City has not realized the expected conservation measures in the few stormwater reuse projects within it's boundaries. The property owner of a water reused cistern chose to replace irrigated vegetation with rock instead of having to actively manage the rainwater reuse system. In a second example, the stormwater irrigation pond at the Nine Springs Golf course does not have enough storage to supply enough irrigation water during extended periods without rain. When the surface water supply is exhausted, groundwater is used for irrigation.

Instead of stormwater reuse, City staff have promoted the use of native plants that do not require irrigation.

Implications for Meadowview Neighborhood

The Meadowview neighborhood has experienced significant flooding in the past due to a low position in the watershed and poor drainage (the subdivision was built in a converted wetland). An evaluation of the flooding was performed in 2001 and recommended actions to improve a drainage swale were taken in 2005. The 2001 report was reviewed as part of the staff analysis and found to be very conservative in its estimation of contributing area and existing CN. The report estimated 261 acres drained to the wetland east of Larson Road and that the existing condition Curve Numbers ("CN") for the two watersheds were 77 and 78. The more detailed topographic map used to delineate the drainage areas for the northeast neighborhood reduced the drainage area from 261 acres to 196 acres and the runoff will match an existing condition CN of 68. Based on the analysis of drainage area and CN it can be concluded that the benefits of enhanced drainage in the Meadowview neighborhood will still be valid at full build out of the Northeast Neighborhood provided that the City's stormwater management criteria are met.

Implications for Swan Creek and Lake Waubesa

The stream habitat assessment conducted as part of the McGaw Park Neighborhood Plan found that the south branch of Swan Creek is susceptible to siltation and erosion due to the relatively steep slopes along the stream banks combined with adjacent agricultural activities. It found that there is a high degree of siltation throughout the stream section. Any increase in runoff volumes due to development can increase the transport of these sediments downstream to the South Waubesa Marsh and Lake Waubesa.

The South Waubesa Marsh was described in the survey of Dane County Wetlands as a rich community of springs, fens, sedge meadow, shallow marsh, deep marsh, and shrub carr on a deep bed of peat. Fens and sedge meadows are extremely susceptible to changes in water levels and inundation periods (Minnesota Board of Water and Soil Resources, 2006). Maintaining the storm "bounce" and duration to the wetlands will also require the control of stormwater runoff volumes due to development in the amendment area. The risk of flooding residents in Meadowview needs to be balanced with the protection of stream banks and the downstream wetlands. Maintain recharge and achieving 90% is an achievable goal that meets the state and county standards and will limit the increase in stormwater runoff volume. However, there is some increased risk of bank erosion and sediment scour due to the increased duration of flow in the creek.

Groundwater

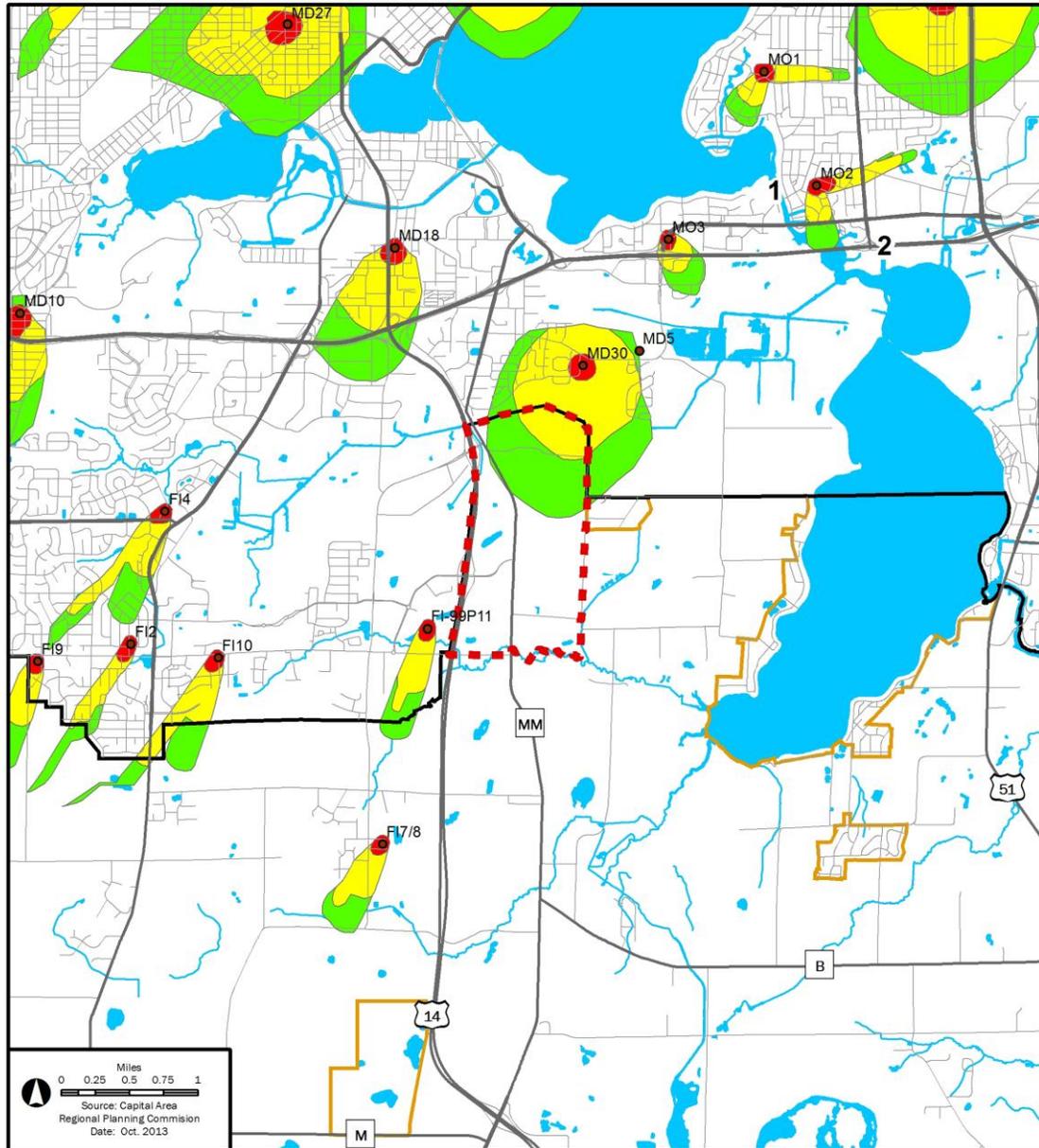
An important potential impact associated with urban development is declining groundwater levels resulting from groundwater pumping and wastewater diversion. In addition, as natural areas are converted into urban development, the groundwater--surface water balance in streams and wetlands shifts from a groundwater-dominated system to one dominated by surface water runoff, with subsequent reductions in stream quality and transitions to more tolerant biological communities.

To better understand the degree of water quantity impacts to Swan Creek, Nine Springs Creek and local springs, and to suggest management strategies; groundwater modeling was conducted as part of the planning for the amendment area. A recently updated version of the WGNHS Dane County Regional Groundwater Model was used to assess the potential water quantity impacts of development of the Northeast Neighborhood area on baseflow in the associated streams. Model results were produced for existing conditions and under projected 2035 well withdrawals and land use. All future developed land was assumed to be held to the 90% stay-on standard (volume control). The results of the modeling show that Swan Creek would have less than a 2% reduction in baseflow in the reach nearest the Northeast Neighborhood amendment area and a 3.5% reduction in the upper most reach of the stream. The impacts of groundwater withdrawals on Nine Springs are more significant with August baseflow reductions ranging from 8-19%. The reductions in baseflow are based on regional withdrawals and not on the withdrawals associated only with Northeast Neighborhood.

The results of particle tracking indicate that precipitation that recharges the groundwater system and eventually discharges to the Waubesa fens occurs over a large area. The groundwater particles occur in a broad band in areas that are south/southwest of Swan Creek and originate in areas that are outside Northeast Neighborhood. [See: Map 11]

Map 22 – Zones of Contribution

**Zones of Contribution for Municipal Wells
Fitchburg FUDA, Dane County, WI**



- Existing Urban Service Area
- Existing Limited Service Area
- Proposed Service Area Expansion
- 5-Year
- 50-Year
- 100-Year

Zones of Contribution (ZOC) indicate the area contributing groundwater to a well for an assumed pumping rate and travel time. This simulation assumes projected 2030 pumping rates for communities based on 2030 population estimates spread evenly among both existing and planned wells. ZOCs provide the technical basis for communities in developing wellhead protection plans. Source: 2000 Regional Groundwater Model

Since the impacts of development are gradual and cumulative, it is important to minimize them for all development. One promising strategy is to mimic pre-development hydrology through stormwater management measures, low impact development, and green infrastructure. Maintaining pre-development infiltration also helps reduce the peak flow rate and volume of runoff, resulting in less stream bank erosion, reduced cutting and widening of channels and stream beds, and less pollutants being transported to the stream (surface water impacts). The applicant proposes to mitigate the groundwater impacts of the proposal by meeting existing state, county, and municipal standards. RPC staff recommends an average annual recharge rate of 9 to 10 inches per year based on current recharge estimates for this part of Dane County by WGNHS 2009. This will make up for the amount of recharge loss resulting from impervious surfaces.

It will not, however, make up for the amount of water lost due to well water withdrawals. Mitigating the impacts of high capacity well withdrawals is a regional issue. Collaboration, cooperation, and coordination are needed among local units of government to achieve goals of sustainability. This is being coordinated at the regional level and will take some time to accomplish. In the meantime, it is recommended the applicant exceed the natural recharge rate, where possible, to mitigate its water use, as well as fostering water conservation and reuse practices.

Transportation System Impacts

The proposed amendment is intended for (1) a total of 190 developable acres of low to medium density residential development with a mix of housing types accommodating an estimated total of 1,421 to 2,333 new dwelling units; (2) 56.5 acres of commercial development; (3) a total of 12.7 acres of institutional development; and (4) 23.4 acres of mixed-use development. When fully developed, the amendment area could be expected to generate 20,000 to 24,000 vehicle trips (inbound and outbound total) on an average weekday depending upon the residential density and type and intensity of commercial development.

In 2009, the average daily traffic (ADT) volume on USH 14 was 29,100 south of the Beltline interchange and 21,400 north of the CTH MM interchange. The 2009 ADT volume on CTH MM was 10,200 north of McCoy Road, 5,200 north of Haight Farm Road (formerly Lacy Road), and 6,900 south of this road. The 2009 ADT volume on Haight Farm Road was 3,000 between Syene Road and CTH MM. (Counts on the new relocated Lacy Road between Syene Road and USH 14 are now significantly higher because of the USH 14 interchange constructed in 2012 while counts on CTH MM are likely lower with traffic shifting to USH 14). The 2009 ADT volume on Goodland Park Road was 940 east of CTH MM.

Past traffic counts on CTH MM indicate that it was beginning to experience some congestion during peak periods in the McCoy Road intersection area. As mentioned, the new USH 14/Lacy Road interchange has likely reduced traffic volumes on CTH MM. Travel forecast modeling conducted by MPO staff for the City of Fitchburg in 2007 as part of the neighborhood planning process indicated that CTH MM could accommodate the city's East side neighborhood development without having to be expanded to four lanes. More recent travel modeling conducted for the MPO's 2035 Regional Transportation Plan update also resulted in the same conclusion. The new Lacy Road was constructed with adequate capacity to handle anticipated development. Intersection improvements on CTH MM will be needed, however, and CTH MM should be reconstructed to urban standards with bicycle and pedestrian facilities as development occurs along the roadway. A detailed traffic analysis would be needed to make more detailed conclusions regarding the extent of intersection improvements needed and the timing of those improvements.

School System Impacts

The amendment is estimated to add up to 520 students to the Oregon School District when fully developed. The Oregon School District enrollment was 3,791 students in the 2013-14 school year. Enrollment increased 1.5% over the previous year (55 students), and 72.3% (1,591 students) over the last ten years. Oregon had the second fastest growth over the last decade among the 15 suburban school districts in Dane County.

Andy Wile of the Oregon School District has commented on the proposed amendment. He indicated that the District administration has been aware of the Northeast Neighborhood plan for many years. They are aware that full build-out of the plan would likely require an additional school facility. Previous work on their part identified a District property in the Village of Oregon as a potential location. Oregon and the District held prior discussions on the possible stormwater implications for that site. Mr. Wile indicated that construction of the Northeast Neighborhood would likely shift the School District's 2001 plans to convert the existing middle school into an elementary school and construct a new middle school on the Oregon property. He indicated that the increase in school-aged children living in the Northeast Neighborhood might warrant the acquisition of a suitable property in the vicinity of the Northeast Neighborhood for an elementary school.

7. Alternatives

The City of Fitchburg's amendment application provides details about the existing developable areas already within the City of Fitchburg and the CUSA. While these areas are substantial, the City has determined that additional need exists over the planning period. If the requested amendment is not approved, development may occur in alternative locations within the City or alternative expansion areas requested to fulfill needs. While alternative locations for the proposed development may exist within and outside the Central Urban Service Area, this proposal is consistent with City of Fitchburg plan for the Northeast Neighborhood and the *City of Fitchburg Cooperative Plan*. The area is a logical expansion of the Central Urban Service Area, and the developable acreage to be added is within the anticipated need for the Central Urban Service Area within the twenty year planning period.

8. Controversies, Comments Received, Unresolved Issues

During the development of the Northeast Neighborhood Plan, the City provided notice to the City of Madison, and the towns of Madison and Dunn. In the amendment application the City of Fitchburg reports that a representative from the Town of Dunn attended two plan development public meetings and identified the following concerns related to inclusion of the amendment area in the CUSA and subsequent development of the area:

1. Stormwater management in the Amendment Area and the potential for flooding in the Meadowview subdivision in the Town,
2. The effect of development on groundwater that feed springs in close proximity to the Amendment Area,
3. The effect of development on Lake Waubesa and associated wetlands.

The City reports that the Town of Dunn's general position is opposition to development of the amendment area. CARPC has also received one comment letter (attached) on this amendment from Professor Joy B. Zedler, Ph.D., Professor of Botany at the University of Wisconsin – Madison, who expressed concerns about the environmental impact of the amendment. Professor Zedler makes several important points which are also brought up in the CARPC staff analysis of the impacts of the proposed amendment. The following is a summary of her concerns, and each is followed by a brief response:

1. *Comment:* Agricultural runoff is damaging habitat diversity in the wetlands east of Larsen Road.

Response: The Water Quality Plan has many specific documentations of adverse impacts of historic and recent agricultural practices on the resources of the region. About half of the native wetlands of the state have been drained and no longer function as wetlands. The majority of this is from agricultural practices. Historically, wetlands have been underappreciated. More recently, federal and state incentives for agricultural conversion of wetlands have been reduce, but policies that allow farming practices to drain and otherwise adversely impact wetlands continue. The Clean Water Act, which is the law that enables CARPC's water quality planning work, precludes control of non-agricultural pollution other than in concentrated animal feeding operations and in impaired waters as part of the enforcement of a Total Maximum Daily Load (TMDL) of specific pollutants in impaired waters. The Yahara Lakes are subject to TMDL standards and efforts are under way to reduce both sediment and phosphorus from urban as well as agricultural land uses. The City of Fitchburg is subject to TMDL standards as well. The target in stream phosphorus

concentrations are 0.075 mg/L for wadeable (i.e. smaller) streams and 0.1 mg/L for large streams. The water quality goal for the Yahara River directly downstream of the Northeast Neighborhood is 0.075 mg/L of phosphorus.

2. *Comment:* Urbanization can be more damaging to habitat diversity due to increased runoff volume, increased nutrients in the runoff, and increased sediment.

Response: The potentials for these impacts have been documented in some detail in the staff analysis. The City proposes to maintain the 90% stay-on standard through infiltration practices to address the volume concern. More stringent volume control has been recommended by CARPC staff in the staff analysis, but it needs to be achieved through evaporative measures instead of increased infiltration, due to concerns for creating groundwater induced flooding in the areas of the Town of Dunn that have been developed in prior-converted wetlands. Such infiltration practices use biofiltration areas that capture nutrients, in a treatment train following a detention basin which settles sediment particles. The result, especially in Dane County (because of prohibition against the use of phosphorus on lawns) is a reduction of nutrient load once ground cover is established. During the construction phase of the development, short-term increase in sediment load is possible, and CARPC requires stormwater treatment facilities to be installed prior to other land disturbing activities to provide an additional protection for receiving waters. Under Wisconsin rules, municipalities are prohibited from adopting requirements for construction erosion control that is more stringent than standard practices adopted by the state.

3. *Comment:* Increased volume creates prolonged ponding of water (hydroperiods) in urbanized wetlands, facilitating native habitat degradation and domination by invasives.

Response: Volume control has been covered under #2. Additionally, staff recommends that the City implement measures to protect wetlands from prolonged ponding, through the application of the Minnesota wetland standard. It is recommended that the City undertake further volume control measures through recycling of stormwater by property owners.

4. *Comment:* Increased nutrient load is in the form of phosphorus and nitrogen and stormwater detention basins do not capture dissolved forms of these nutrients.

Response: The *Dane County Water Quality Plan* has been implementing infiltration practices since the early 90's and has advanced the practice of stormwater management from the simple installation of detention ponds to a treatment train design and dispersed infiltration practices including raingardens, biofiltration devices, stormwater recycling devices, and infiltration basins that reduce nutrient load. The City of Fitchburg has programs to encourage installation of rain barrels, and the proposed stormwater measures and conditions address this issue. The long-term nutrient load should be less than the current agricultural load due to prohibition for the use of phosphorus on lawns, and the lower nitrogen application in urban landscapes compared to agricultural row crops currently in place in Fitchburg. Further volume reduction measures recommended to the City could further reduce the load to receiving waters.

5. *Comment:* Lake Waubesa is already impaired by blue-green algal blooms, and increased nutrient discharge will further degrade the ecosystem services provided by the Lake and the adjacent wetlands.

Response: Two-thirds of the phosphorus in Lake Waubesa is from the discharge from Yahara Lakes upstream. The TMDL goal of 0.075 mg/L and the associated nutrient load allocation will apply to discharge from the upper lakes as well as runoff from the proposed development and the rest of the City of Fitchburg.

6. *Comment:* Wetlands provide ecosystem benefits to the entire region and they should be protected.

Response: This is the reason for the policy of protection included in the *Dane County Water Quality Plan*, which requires protection of all wetlands, regardless of size and quality, in environmental corridors, with a 75-foot minimum vegetative buffer (and a 300-foot minimum vegetative buffer for significant wetlands with the concurrence of WDNR), and protection from direct discharge of stormwater runoff into wetlands as part of stormwater management requirements associated with service area amendments.

Professor Zedler then raises the following questions:

1. Why should wetlands in the Town of Dunn be degraded by inadequate protection measures in Fitchburg?

Response: If by inadequate protection is meant the current stormwater standards, then the answer is that state stormwater standards are now imposed on all units of government as *maximum* standards. In a letter to CARPC, the WDNR has stated: "*Our primary comment relates to an apparent misunderstanding that any new standard adopted by the Dane County Water Quality Plan provides legal authority for DNR or CARPC to enforce such a standard at the local level. Since the proposed stormwater standards are stricter than state standards they could not be enforced by DNR or CARPC.*" However, because of the impairment in the Yahara water quality, TMDL standards are being imposed to reduce sediment and phosphorus discharge to the lakes and therefore to the wetlands upstream.

2. Why shouldn't farmers be required to leave a buffer where their runoff flows downstream?

Response: Farmers are not subject to the non-point source requirements of the Clean Water Act which is the enabling legislation for CARPC's water quality planning work. Therefore, historically, incentives have been used to achieve agricultural non-point source control instead of requirements. Under the TMDL, farmers are required to substantially reduce their share of pollution into the lakes.

3. Why shouldn't urban developers be required to provide adequate buffers and treatment wetlands (not just pits to collect Phosphorus)?

Response: The CARPC staff analysis outlines proposed measures that include buffers and stormwater treatment trains beyond detention ponds.

4. Why not establish a fine for improper protection of downstream wetlands? Fitchburg could require developers to establish a bond so that downstream residents could obtain funds to provide weed abatement and other mitigating measures, such as nitrogen traps at the point of entry.

Response: Bonds are typically required from developers as assurance for work completion (including stormwater measures). Weed abatement downstream cannot be directly attributed to a specific development. Fitchburg has a stormwater utility that collects funds to maintain stormwater facilities. A more effective approach would be for the City to spend its funds to ensure that the treatment facilities are operating effectively.

5. Will contractors use the latest science-based information to design their runoff-control structures, instead of "best" management practices that are proving to be ineffective?

Response: Best Management Practices are officially recognized by WDNR as providing adequate protection for receiving waters and resources. These practices are being continually improved and modified by WDNR to address documented shortcomings and needed treatment improvements in response to research findings. CARPC has also brought needed improvements to the attention of WDNR, as it performs its role in continuing area wide water quality management planning. However, for any given proposal, the currently adopted BMPs are deemed to be adequately protective by the WDNR.

A public hearing before the Capital Area Regional Planning Commission is scheduled for 7:00 p.m. on September 11, 2014 at the City of Fitchburg Council Chambers, 5520 Lacy Road, Fitchburg, Wisconsin. Notice of the public hearing has been sent to the local governments within the Central Urban Service Area.

Conclusions and Staff Recommendation

The proposed amendment would add 542.3 developable acres to the Central Urban Service Area, within the additional 3,685 developable acres called for in the latest CARPC land demand calculations. This report outlines that the proposed amendment supports nine CARPC goals by providing a mix of development types; creating an open space buffer between Fitchburg and the City of Madison; developing a range of housing choices; considering future transit provision in the location and development of the amendment area, and providing opportunities for pedestrian and bicycle travel; diversifying the economic base with new employment options; implementing standards for preserving and protecting environmental functions; establishing environmental corridors that contribute to the countywide network; and implementing plans and practices that promote and conserve water resources. The amendment is neutral with regard to four goals, and conflicts with the goal of compact development.

CARPC staff recommends approval of this amendment, based on the land uses and services proposed and conditioned on the City of Fitchburg commitment to pursuing the following:

1. Submit a detailed stormwater management plan for CARPC and DCL&WCD staff review and approval prior to any land disturbing activities in the amendment area. The stormwater management plan should 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-development” levels (i.e. maximum Runoff Curve Number = 68 for agricultural land use and hydrologic soil group B).
 - c. Maintain the post development stay-on volume to at least 90% of the pre-development stay-on volume for the one-year average annual rainfall period, as defined by WDNR.
 - d. Maintain pre-development groundwater recharge rates from the Wisconsin Geological and Natural History Survey’s 2009 report, *Groundwater Recharge in Dane County, Wisconsin, Estimated by a GIS-Based Water-Balance Model* (an average of 9-10 in./yr. for the amendment area) or by a site specific analysis.
 - e. Provide at least 80% sediment control for the amendment area in accordance with existing ordinances.
 - f. Stormwater practices should be publicly owned and managed or have perpetual legal maintenance agreements with the City to allow the City to maintain facilities if owners fail to do so.

It is also recommended that the City pursue the following:

1. Strive to achieve 100% stay-on volumes through stormwater volume controls in which stormwater is reused, evaporated or transpired
2. Maintain suitable wetland hydrology by controlling the wetland water level bounce for the 1-, 2-, and 10-year, 24-hour design storms to within 0.5 feet of existing conditions and providing a maximum drawdown time within the wetland of 24-hours for the 1- and 2-year, 24-hour storms and 72-hours for the 10- and 100-year, 24-hour storms.
3. Deep till all compacted pervious areas.
4. Have the areas of the amendment not previously surveyed for cultural resources surveyed by a qualified archaeologist, with special attention focused on relocation and evaluation of archaeological site DA-0532, and additional investigations to better define the limits and condition of archaeological site DA-0467. Send three copies of the report to the CARPC.
5. 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 Wisconsin Historical Society **must be contacted** at 1-800-3442-7834 to be in compliance with Wis. Stat. 157.70 which provides for the protection of all human burial sites. **Work cannot resume until the Burial Sites Preservation Office gives permission.** Questions concerning the law can be directed to Mr. Chip Brown, 608-264-6508.
6. Work with Dane County to plan and budget for improvements (intersections, urban cross-section with pedestrian and bicycle facilities) to the CTH MM corridor in the future as development of the neighborhood occurs.
7. Develop a street and multi-use path plan for the neighborhood prior to approval of platting of the first phases of development so that opportunities for future connections are not lost. In particular, the plans should identify bicycle route(s) not only to the Capital City Trail but also to Haight Farm Road, which provides a safe crossing of USH 14.
8. Conduct additional planning to identify a potential park-and-ride (PNR) facility near the Lacy Road interchange, which would be an excellent location for one. Inform the Wisconsin Department of Transportation (WisDOT) of the city's interest in a facility in this location. WisDOT is currently conducting a Southwest Region PNR study.
9. Add paved shoulders to Goodland Park Road and Haight Farm Road in the future in accordance with the City of Fitchburg's Bike and Pedestrian Plan.
10. Consider non-infiltration based volume control measures such as stormwater reuse and green roofs.

FWS <http://www.fws.gov/midwest/insider3/documents/RexJohnsonTechArticle.pdf>

NRCS http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_009930.pdf page 7



April 1, 2014

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

RE: Northeast Neighborhood Urban Service Expansion Area, Dane County, Wisconsin

Dear Ms. Weber:

Several archaeological sites are reported to lie within the proposed boundaries of the Northeast Neighborhood Urban Service Expansion Area.

DA-0467: Site H, a pre-Contact Native American camp first reported in 1910 and relocated in 1976. The significance of this site has not been evaluated.

DA-0532: Nine Springs Hill, a multi-component Native American camp with cultural deposits dating back to the last Ice Age. Site was reported by non-professionals and exact location and extent are unknown. Though the significance of this site has not been evaluated, potential for significance is high due to the age of the site.

DA-1041: A pre-Contact Native American site consisting of a small scatter of debris from stone tool production. The site investigators did not feel that the site was significant enough to warrant additional investigation.

DA-1375: Isolated find of a pre-Contact Native American projectile point. Site investigators did not feel that the site was significant enough to warrant additional investigation.

Several portions of the Northeast Neighborhood Urban Expansion area have previously been surveyed for cultural resources.

75-0214: Surveys conducted for the Lake Farms area and associated E-way. DA-0467 relocated.

89-5501: A proposed borrow pit tested in 1989. No cultural resources encountered.

93-2152: Survey along CTH 'MM'. No cultural resources encountered.

95-0946: Survey associated with proposed utility improvements. DA-1041 found.

97-0904: Survey associated with a bike trail. No cultural resources found within the proposed Urban Expansion area.

08-1013: Survey associated with USH 14/Lacy Road interchange. DA-1375 found.

Given the presence of several reported archaeological sites, we recommend that areas not previously surveyed for cultural resources be surveyed by a qualified archaeologist, with particular attention focused on relocation and evaluation of DA-0532. Additional investigations should also be conducted to better define the limits and condition of DA-0467 with regard to its potential significance. We do not recommend additional investigation of either DA-1041 or DA-1375. Please send **two** copies of the report directly to the Office of the State Archaeologist. A list of qualified archaeologists may be obtained at: <http://preview.wisconsinhistory.org/pdfs/hp/HPR-arch-consultants.pdf>

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816 State Street Madison, Wisconsin 53706

wisconsinhistory.org

Please note that 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 Wisconsin Historical Society **must be contacted** at 1-800-342-7834 to be in compliance with Wis. Stat. 157.70 which provides for the protection of all human burial sites. **Work cannot resume until the Burial Sites Preservation Office gives permission.** If you have any questions concerning the law, please contact Mr. Chip Brown, 608-164-6508.

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
(Northeast Neighborhood 1 and 2 4/2014)



DEPARTMENT OF
Botany

UNIVERSITY OF WISCONSIN-MADISON

June 5, 2014

To: CARPC Staff and Commissioners, and Kamran Mesbah, PE, Director of Environmental Resources Planning, Capital Area Regional Planning Commission, City County Building, Room 362, 210 Martin Luther King Jr. Blvd., Madison WI 53703 allcommissioners@CapitalAreaRPC.org, KamranM@capitalarearpc.org

From: Joy B. Zedler, Ph.D., Professor of Botany and
Aldo Leopold Chair of Restoration Ecology

Re: Northeast Neighborhood (NEN)

I am a wetland scientist; I reside at 2402 Lalor Road in the Town of Dunn at the headwaters of Murphy Creek. I have personal experience with runoff from Fitchburg, because a farm across the road from me despoils my native sedge meadow with sediment, nutrients, and pesticides. The runoff is converting native vegetation to Wisconsin's worst wetland weed (reed canary grass, *Phalaris arundinacea*). A graduate student of mine recently showed that the portion of my sedge meadow that is dominated by reed canary grass has only half as many plant species as the area in front of the invasion, and many of the associates of reed canary grass are weeds. Another student documented increased nitrogen content of plant leaves as we sampled plants away from and close to the culvert that imports Fitchburg runoff from the corn/soybean field. The source of the problem is nutrient-rich runoff and the outcome is continued degradation and loss of substantial value ("natural capital") due to runoff from a Fitchburg farm.

Here are my science-based concerns about urban development west of Larsen Road:

Agricultural runoff is damaging; urban runoff can be much worse. As rural agricultural lands convert to urban land use, the downstream wetlands lose native species and become dominated by invasive weeds, particularly reed canary grass and hybrid cattails (Boers, Veltman and Zedler 2007, Frieswyk & Zedler 2007: "Our results show that increased urbanization in the watersheds of the Green Bay coastal wetlands (Fig. 3) coincided with the loss of wet meadow habitat (Fig. 7).")

The components of urban runoff that cause the conversion of wetland vegetation to invasive weeds are excess water, excess nutrients in the runoff, and excess nutrient-rich sediment, based on patterns in the field and controlled experiments in mesocosms (Kercher and Zedler 2004, Kercher, Carpenter and Zedler 2004, Kercher, Herr-Turoff and Zedler 2007: "We discovered a three-step invasion and degradation process: (1) initially, resident native species declined with prolonged flooding and sediment additions, and (2) prolonged flooding, sedimentation, and nutrients accelerated *Phalaris* aboveground growth; biomass rose to 430 times that of the control within just two growing seasons. The dramatic expansion of *Phalaris* in the second year resulted in the formation of monospecific stands in over one-third of the treatments, as (3) native species continued their decline in year 2. Disturbances acted alone and in combination to make the resident wetland community more invasible and *Phalaris* more aggressive, leading to monospecific stands.").

Wetlands that hold water (i.e., prolonged hydroperiods) can support highly productive cattails at the expense of providing other ecosystem services, such as nutrient removal, soil stabilization, flood peak reduction, stormwater retention, and plant diversity support. In constructed wetlands, where we measured these six ecosystem services, we found the lowest levels in the wetland that became a wet pond (Doherty, Miller, Loheide, Prellwitz, Thompson, and Zedler In press): “Hence....ponding supported such high levels of NPP that other services appeared to be limited (suggesting tradeoffs).”

Settling ponds can remove some total suspended solids and some phosphorus, but dissolved phosphorus flows through the system, as does nitrogen (in both particulate and dissolved forms). Furthermore, nitrogen, which is poorly removed by wet ponds, is a major stimulus to species invasions in downstream wetlands (Herr-Turoff and Zedler 2005: “Increased N alone facilitates its suppression of native wetland vegetation (Green and Galatowitsch, 2002). Thus, *Phalaris* is presumed to have high N uptake and to increase retention of N within a wetland.”)

I often drive to/from work on Larsen Road and view the degraded wetland to the west. When it rains, I watch it collect enough water to become a pond, and when it rains heavily, it becomes a lake that spills over into the ditch along Larsen Road. The runoff is likely polluted with sediment, nutrients and pesticides. I have observed Swan Creek and Murphy Creek via canoe along the Lake Waubesa Wetlands (areas set aside by The Nature Conservancy and WDNR as a State Natural Area and recognized by Wisconsin Wetlands Association as a “Wetland Gem”). Wisconsin’s worst invasive weeds (reed canary grass and hybrid cattails) are poised to expand, as even more runoff and more nutrients flow downstream. And in Lake Waubesa, dense bluegreen algal blooms already occur in summer. More nutrient-rich runoff will further degrade the ecosystem services of both the lake and its adjacent wetlands.

These changes are inevitable if the NEN is allowed to develop without adequate buffers (at least 300’) around the maximum water level of the degraded wetland. A vegetated buffer could help absorb water, nutrients, and other pollutants. All one needs to do to see the effects of urbanization on our local wetlands is to compare vegetation along Swan Creek downstream from the Swan Creek development, or, at a much larger scale, the Nine Springs E-Way, which is dominated by the two worst wetland weeds in the state—reed canary grass and hybrid cattails. Waubesa wetlands need to be conserved and protected before it is too late. Upstream landowners who fail to protect downstream wetlands should be held responsible.

Why is it essential that our wetlands be protected from excess runoff of low quality water? In a updated analysis of the value of the world’s biomes, Costanza and colleagues (2014) provide new data that show the following (in 2007 US dollars): Four broad groups of wetlands provide \$125,521 per hectare per year in ecosystem services, all of which lead to human well-being. That amount is 25 times the average for all other biomes. And comparing just the estimated value for ecosystem services derived from inland wetlands (\$25,681/ha/yr) with that for cropland (\$5,441/ha/yr) the ratio is 4.6. These services benefit all in perpetuity, so long as wetlands are conserved and protected from degradation.

Clearly, our inland wetlands are extremely valuable and deserve protection. Since Costanza published his first estimates of ecosystem service values in 1997, wetlands have become relatively more important providers of global ecosystem services, because other lands have undergone conversions to alternative uses, such as urbanization. Those changes in land use have reduced overall values of global ecosystem services some \$4.3 - \$20.2 trillion/yr from 1997 to 2011 (ibid.).

Some questions CARPC staff should look into:

- Why should wetlands in the Town of Dunn be degraded by inadequate protection measures in Fitchburg?
- Why shouldn't farmers be required to leave a buffer where their runoff flows downstream?
- Why shouldn't urban developers be required to provide adequate buffers and treatment wetlands (not just pits to collect phosphorus)?
- How will the impacts of any new development be assessed through actual monitoring of water, nutrient, and sediment discharges?
- Why not establish a fine for improper protection of downstream wetlands? Fitchburg could require developers to establish a bond so that downstream residents could obtain funds to provide weed abatement and other mitigating measures, such as nitrogen traps at the point of entry.
- Will contractors use the latest science-based information to design their runoff-control structures, instead of "best" management practices that are proving to be ineffective? I refer to topsoil addition to vegetated wetlands, reliance on "thick" vegetation to stabilize soil, and use of productive vegetation to indicate the presence of other ecosystem services. In our recent writings (Doherty et al. In press and Leaflets 27-28), we show how assumptions and predictions of models based on *abiotic* factors do not always hold up to actual measures of *vegetated* wetlands.

The Town of Dunn aims to protect wetlands that provide ecosystem services that benefit human well-being. If we apply the average value for inland wetlands from Costanza et al. (2014) to ~1,000 acres (404.7 ha) of set-aside lands, we provide an estimated \$10,393,100 in ecosystem services per year. Even if that estimate is an order of magnitude too high, we still provide a million dollars in services annually, to the benefit of *all* in perpetuity (given wetland protection). Why should those values be diminished by inadequate buffering of upstream development to benefit *a few* people in the short term?

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- Leaflet #10. Why are wetlands so valuable? Online at uwarboretum.org/research – publications menu.
- Leaflet #27. How ponded runoff and invasive cattails reduced wetland ecosystem services in three experimental wetlands. Online at uwarboretum.org/research – publications menu.
- Leaflet #28. How ponded cattail marshes can export phosphorus: A conceptual model. Online at uwarboretum.org/research – publications menu.