2040 Comprehensive Plan















CITY OF CORCORAN

8200 County Road 116, Corcoran, MN 55340
763-420-2288
www.ci.corcoran.mn.us

NOVEMBER 25, 2019

ACKNOWLEDGEMENTS

City Council
Mayor Ron Thomas · Councilor Jonathan Bottema · Councilor Brian Dejewski ·
Councilor Mike Keefe · Councilor Alan Schultz · Councilor Tonya Lafave (former)

Planning Commissioners
Commissioner Dean Jacobs · Commissioner Meredith Wu ·
Commissioner Dorothy Theis · Commissioner Jennifer Brewington (former)

Parks and Trails Commissioners
Commissioner Thomas Anderson · Commissioner Debbie Regan · Commissioner Chad Robran ·
Commissioner Sharon Meister · Commissioner Judith Strehler ·
Commissioner Trish Krueger (former)

City Staff
City Administrator Brad Martens · Public Works Director Kevin Mattson ·
Administrative Services Director Jessica Beise · Code Compliance Official Mike Pritchard ·
Deputy Clerk Michelle Friedrich

Consultants
Wenck Associates, Inc.
Kent Torve · Susan Nelson · Jordan Shuck · Ed Terhaar · Matt Bowers

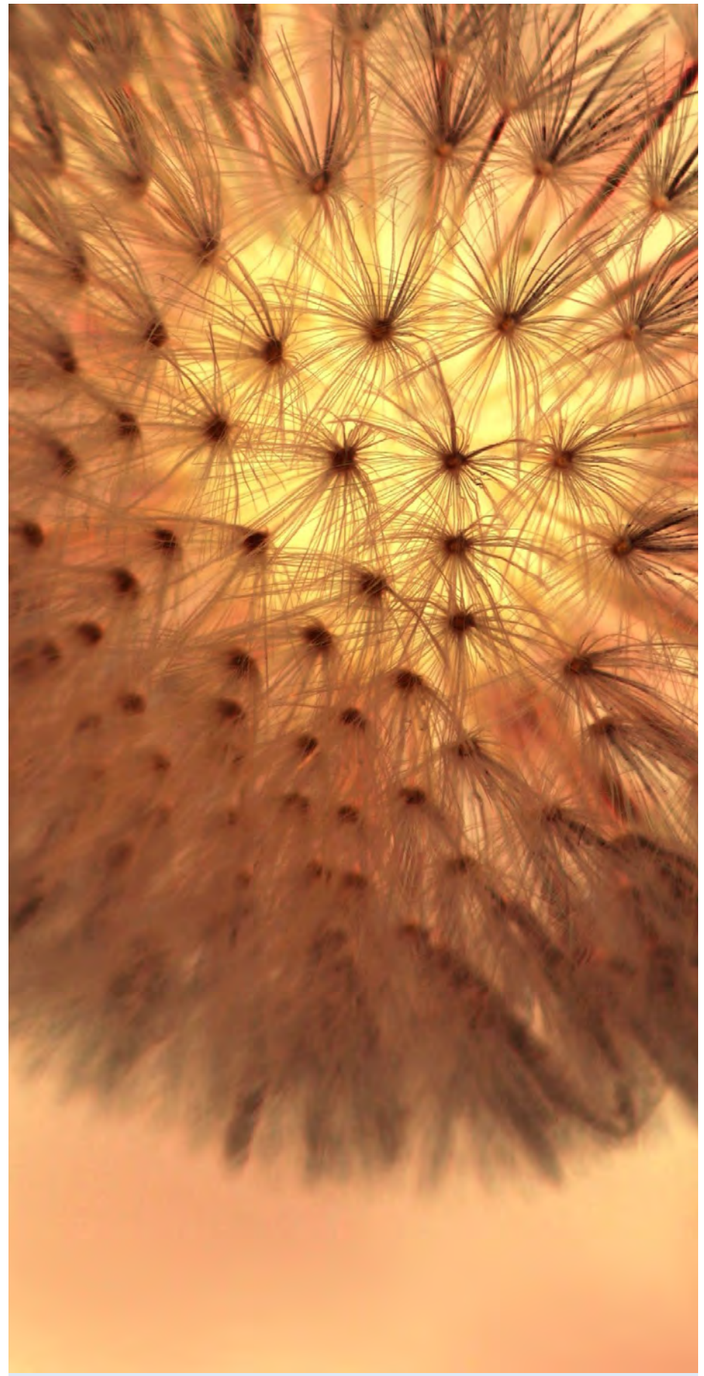
Landform
Kendra Lindahl · Danyelle Pierquet · Kevin Shay · Kathleen Hammer ·
Emily Othsus · JP Mansolf

Thank you to the many residents of Corcoran who shared their ideas and visions for the future City of Corcoran!

Picture/Image Credits -- Pexels.com • Brad Martens • Jessica Beise • Michelle Friedrich • Mike Pritchard

TABLE OF CONTENTS

TABLE OF CONTENTS



CHAPTER 1: INTRODUCTION AND COMMUNITY BACKGROUND


CITY HALL
ENTRANCE

INTRODUCTION AND COMMUNITY BACKGROUND

Metropolitan Planning Act

The Metropolitan Planning Act requires every City in the 7-county metropolitan area to create a 20-year comprehensive plan and update the plan every 10 years. The Metropolitan Council reviews every City's comprehensive plan to ensure the plan is compatible with regional system plans for sewer, transportation, parks and open space. The City of Corcoran has prepared an updated comprehensive plan that achieves the community's own vision and goals for the future, while meeting the Metropolitan Council's regional planning requirements.

2030 Plan

The City's 4th comprehensive plan, the 2030 Plan, was approved in March 2010. The 2030 Plan identified Corcoran as a growing community with a walkable downtown, along with commercial and industrial businesses, housing variety, and natural resources. The 2030 Plan continued to emphasize the importance of Corcoran's abundance of natural resources and open spaces.

2040 Vision Statement

Corcoran's 2040 Comprehensive Plan, the 2040 Plan, represents a community-generated update to the 2030 Plan. The update process involved Corcoran residents, the City Council, Planning Commission, and Parks and Trails Commission. The update process included 10 City Council work sessions focused on the Comprehensive Plan components and discussion at multiple City Council meetings. Two community-wide surveys and 3 community engagement sessions were held to identify a vision for Corcoran in the year 2040. This vision is supported by and will be achieved through a series of principles, goals, and policies related to land use and development.

The City of Corcoran in 2040 will be a vibrant community, defined by its dynamic Town Center, strong base of commercial and industrial businesses, variety of housing options, and high-value natural resources. The mixed-use Town Center, planned to be northeast of the junction of County Road 116 and County Road 10, will provide the community with a public gathering space as well as retail and job opportunities for residents. Corcoran's 2040 commercial, industrial, and business park developments will provide both local employment and a stronger, more diverse tax base. Broader housing options in 2040 will ensure a place in our community for first-time homebuyers, growing families, and seniors.

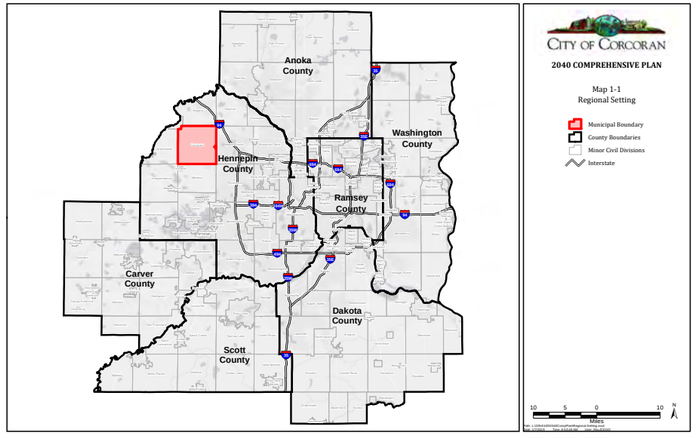
Corcoran is defined by its abundance of high-quality natural resources and open spaces along with its rural environment. These resources and rural character are intrinsic to our quality of life and has been of long-standing appeal for existing and new residents of the community. One of the two community surveys that were conducted as part of the 2040 Comp Plan update process was dedicated to answering the question "what is rural character?" Although the term rural character can mean different things to different people, key themes were clear. The survey showed that the community of Corcoran found importance in: open and green space, active farming and agriculture, large lots and low density, natural areas and wildlife, and amenities not found in more urban locations such as trails for hiking, horseback riding, and snowmobiling. The 2040 Plan will enable the residents of 2040 Corcoran to continue to share in this defining experience.

The visions of 2040 Corcoran will be achieved through the community's adherence to the following guiding principles:

1. Protection of the natural resources, open space, and rural character that define Corcoran's quality of life.
2. Creation of opportunities for a thriving Town Center with a range of retail, office, residential, and gathering spaces.
3. Creation of opportunities for expanded employment and tax bases combining commercial, industrial, and business park land uses.
4. Expansion of residential options to achieve life-cycle housing.
5. Support of rural residential development in non-urbanized Corcoran in a manner that preserves efficient, future urbanization and protects natural resources while allowing current economic benefit to landowners.

Regional Setting

Corcoran is located on the northwestern edge of Hennepin County, and is located 20 miles from downtown Minneapolis. Corcoran has remained generally rural and comprises just under 36 square miles of land. The vast majority of the city is located in the Rush Creek and Elm Creek Watershed systems, with a small area in southwest Corcoran draining into the Pioneer/ Sarah Creek watershed, and then emptying into the Crow River. Communities bordering Corcoran include the cities of Maple Grove, Medina, Greenfield, Hanover, and Rogers.



Map1-1: Regional Setting

(See page 15 for large size map.)

The Metropolitan Council has classified eastern and southern portions of Corcoran as "Emerging Suburban Edge." These are communities on the edge of the metropolitan area where substantial new growth has or is expected to occur. The western half of Corcoran is classified by the Metropolitan Council as a "Diversified Rural" area. Diversified Rural communities are defined by the Metropolitan Council as the sparsely developed parts of the region that host the widest variety of farm and non-farm uses. Uses include a mix of limited large-lot residential and clustered housing, agriculture, and facilities and services requiring a rural location. Limited growth is forecasted for these areas, and they are not currently planned for urban development. The Metropolitan Council has adopted a Flexible Development Ordinance for Diversified Rural communities to ensure that development patterns are efficient and cost-effective while also providing opportunities for landowners.

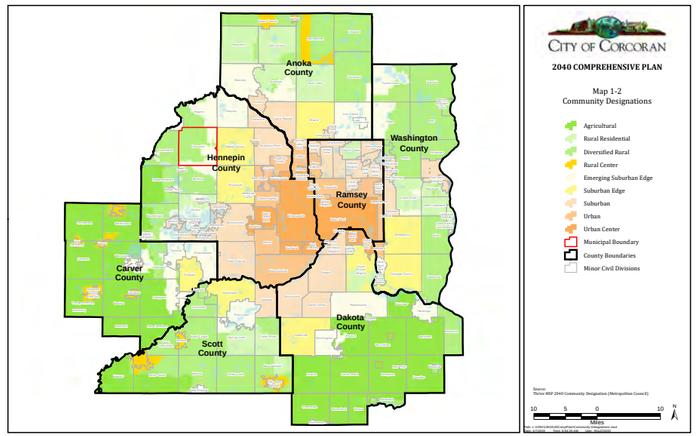
Emerging Suburban Edge

Communities include cities, townships and portions of both that are in the early stages of transitioning into urbanized levels of development. Emerging Suburban Edge communities are expected to plan for forecasted population and household growth at average densities of at least 3-5 units per acre for new development and redevelopment.

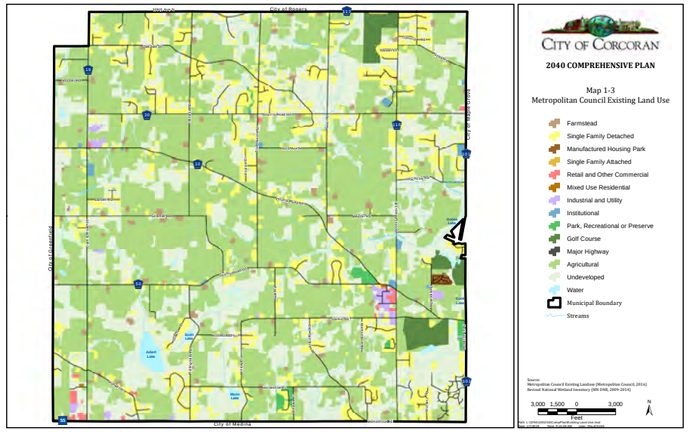
There are 9,075 acres in the 2040 Metropolitan Urban Service Area (MUSA). This designation allows development of land to occur at urban densities with urban infrastructure of City water, stormwater, and sewer facilities.

Diversified Rural

Communities are home to a variety of farm and nonfarm land uses including very large-lot residential, clustered housing, hobby farms and agricultural uses. Diversified Rural communities are expected to plan for growth not to exceed forecasts and in patterns that do not exceed 4 units per 40 acres, except when as part of open space preservation plan that is consistent with the flexible residential development guidelines outlined in Metropolitan Council policy. In addition, Diversified Rural communities are expected to manage land uses to prevent the premature demand for extension of urban services, and so that existing service levels will meet service needs.



Map 1-2: Community Designations *(See page 17 for large size map.)*



Map 1-3: Existing Land Use *(See page 19 for large size map.)*

Table 1-1: Existing Land Use Acreage

Land Use	Gross Acres	Net Acres
Agricultural/Rural	17848.03	13528.95
Commercial	62.86	61.77
Golf Course	445.69	361.91
Industrial	182.52	161.97
Manufactured Home Park	28.57	27.99
Parks and Open Space	111.29	96.40
Public/Semi-Public	162.36	120.69
Single Family Residential	3067.26	2490.69
Other	6.54	6.54
Grand Total:	**21915.11**	**16856.91**

Community Background

Agriculture remains a significant and valued part of the community. Open space and other high-quality natural resource areas are abundant, and these amenities are highly valued by residents. A remarkable 21 percent of the City's total land area consists of wetlands (National Wetland Inventory Areas), lakes, and open water, as well as 52 miles of streams. There are also mutliple areas of potential and possible wetlands throughout the City.

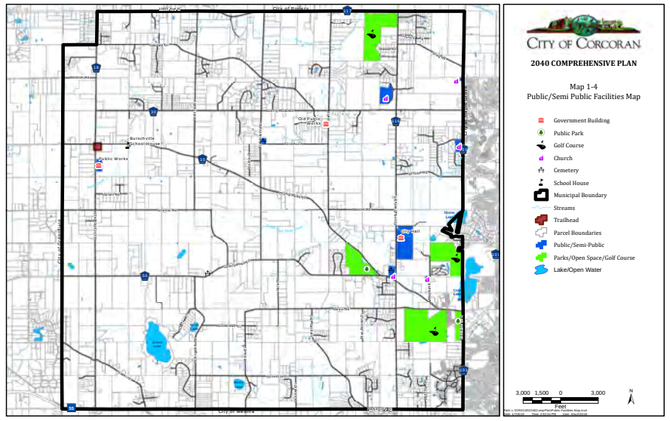
The City's 2020 and 2030 Plan included a Natural Resource Inventory (NRI) that identified all of the significant natural resource areas in the community. The NRI also provided recommendations and priorities for the preservation and enhancement of the natural systems. The Natural Resources Chapter of the 2030 Plan incorporated many of the NRI findings and recommendations.

Large lot, rural residential single-family homes are the predominant form of housing in Corcoran. A smaller number of suburban-sized lots are located near the Town Center and in other select areas. A manufactured home park is located in southeast Corcoran. Residents in Corcoran have identified the need for life-cycle housing in the community, in particular to address the lack of housing opportunities for first-time home buyers and downsizing seniors.

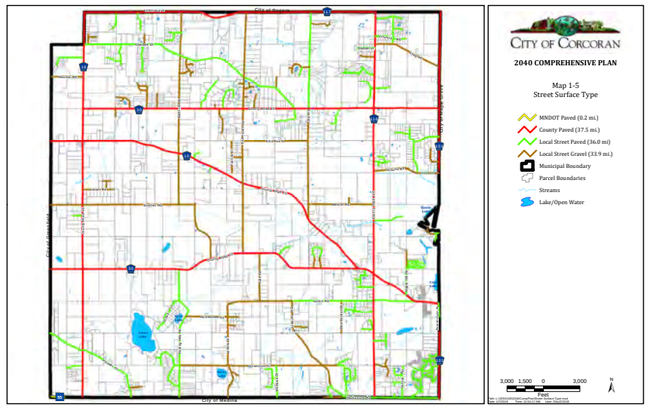
Commercial and industrial development in the City is limited, primarily due to the lack of municipal water and sewer services and the absence of major transport corridors. The City supports continuation and expansion of commercial and industrial enterprises in the area at County Road 116 and County Road 10. There is a rural service/commercial area located in northwest Corcoran at the intersection of County Roads 10 and 19. Commercial and industrial activities also occur in southwestern Corcoran, at the intersection of Highway 55 and County Road 19.

Corcoran has 2 main City facilities. This includes City Hall, which is shared by Administration and the Police Department and is located on County Road 116. The City also has a Public Works facility located on County Road 19 as well as a small auxiliary public work building located on Cain Road (old Public Works facility). Corcoran has a community park, a neighborhood park and a memorial garden park. The City is home to 3 golf courses and Corcoran Lion's Park, which hosts a multitude of events, including Hamel Rodeo, Corcoran Country Days, tractor pulls, etc. The North Hennepin Pioneer Society owns and maintains a historic single-room school on County Road 10. There are multiple churches and cemeteries in the City. These facility locations a can be viewed on Map 1-4.

The City is comprised of a network of different roadways, including State Highway, County Roads, and City Streets. Corcoran is unique in that the City's local streets are comprised of a nearly equal amount of pavement and gravel. Map 1-5 shows approximately 36 miles of paved roads and 34 miles of gravel roads.

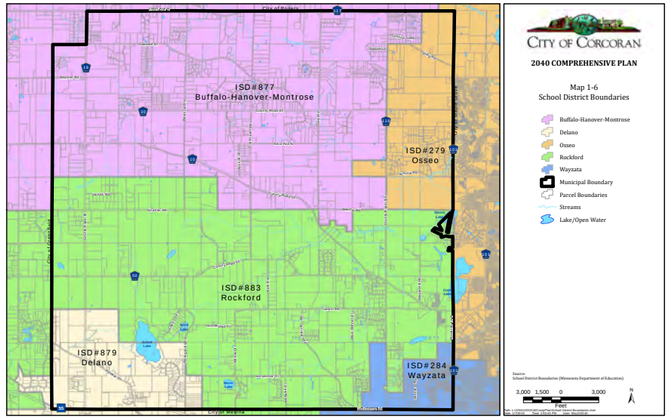


Map 1-4: Public Facilities *(See page 21 for large size map.)*



Map 1-5: Street Surface Type *(See page 23 for large size map.)*

Corcoran is divided between 5 different school districts: Buffalo-Hanover-Montrose Schools (ISD 877), Delano Public Schools (ISD 879), Osseo Area Schools (ISD279), Rockford Area Schools (ISD 883), and Wayzata Public Schools (ISD 284). There are no public schools located in Corcoran. One private school, St. John's Lutheran Church, offers pre-kindergarten through 8th grade education.



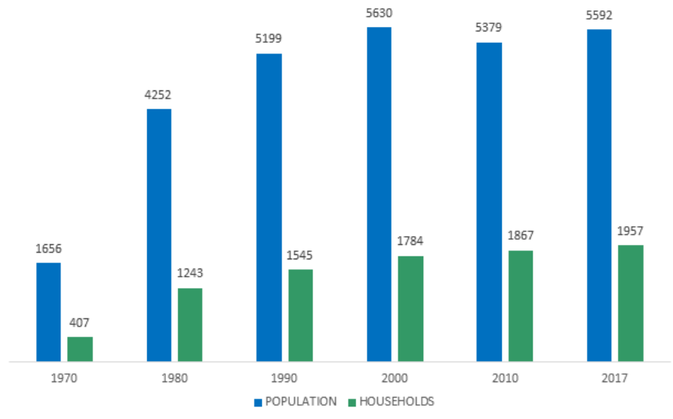
Map 1-6: School District Boundaries *(See page 25 for large size map.)*

Demographics and Forecasts

The City's population was estimated at 5,592 in 2017. Figure 1-1 provides historical population trends, demonstrating a significant period of growth during the 1970s, when many of the City's "large lot" neighborhoods were developed.

Population and Households 1970-2017

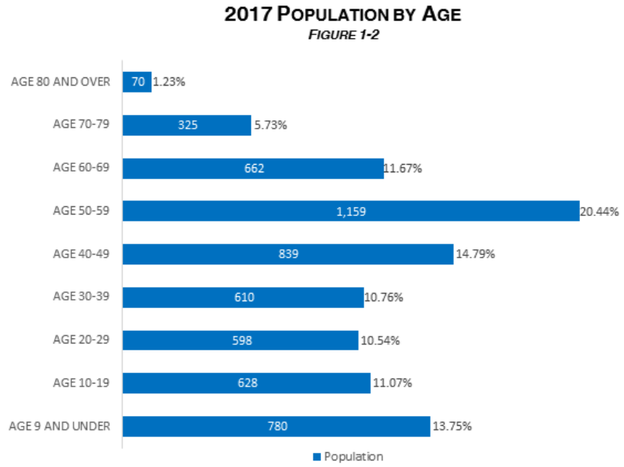
Figure 1-1



Sources: U.S. Census Bureau Decennial Census, Metropolitan Council Annual Estimates, and Metropolitan Council Forecasts.

The City's 2017 population is broken down by age and gender in Figure 1-2: Population by Age.

2017 Population by Age
Figure 1-2

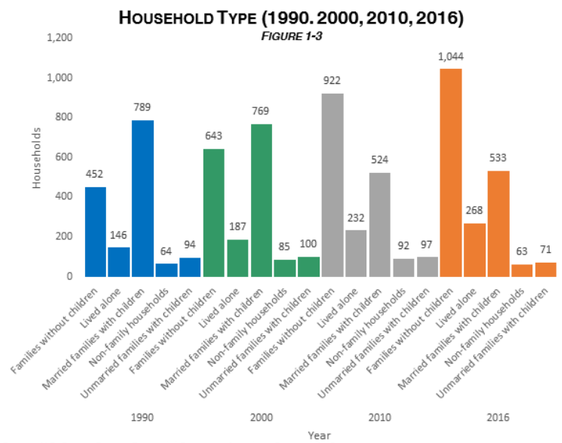


Source: U.S. Census Bureau Decennial Census or American Community Survey.

According to the American Community Survey, the City's 2017 median age was 43.3 years, which was higher than the median age of 36.3 years in Hennepin County. Approximately 24 percent of Corcoran's population was under the age of 18 in 2017, while 11.7 percent (up from 7.7 percent in 2010) of the population was over age 65. Like many cities in the U.S., the City's median age is expected to increase as the "baby boom" generation enters retirement.

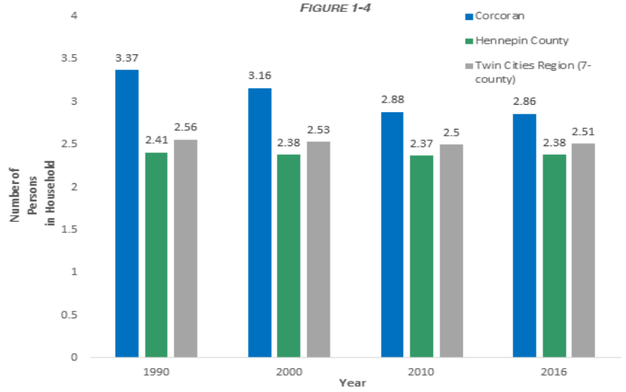
Over 52 percent of households are families without children with the average household size of 2.86. See Figure 1-3: Household Type in Corcoran; Figure 1-4 Average Household Size in Corcoran.

Household Type (1990. 2000, 2010, 2016)
Figure 1-3



Source: U.S. Census Bureau Decennial Census or American Community Survey.

Average Household Size
Figure 1-4

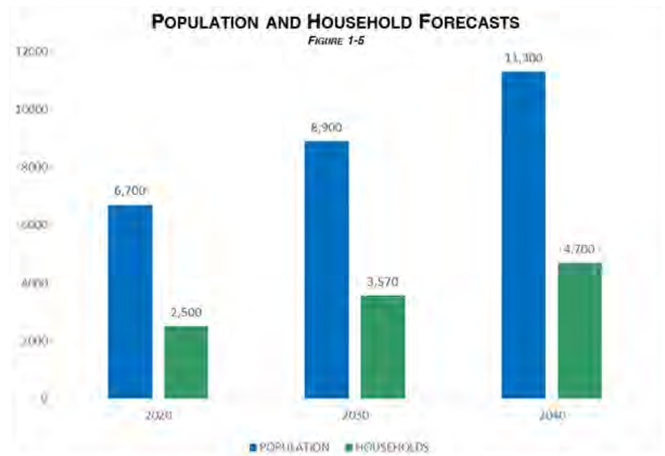


Sources: U.S. Census Bureau Decennial Census and Metropolitan Council Annual Estimates.

Forecasts

As part of the planning process, the City and the Metropolitan Council have agreed on household, population, and employment forecasts for the City. These forecasts underlie substantially all of the 2040 Plan elements. These forecasts are presented in Figure 1-5: Population and Household Forecasts. The City's future land use and infrastructure plans were developed to accommodate the 2040 forecasts. This ensures the City has guided enough land and has adequate infrastructure in place to accommodate projected growth.

Population and Household Forecasts
Figure 1-5



Source: U.S. Census Bureau Decennial Census, Metropolitan Council Estimates, and Metropolitan Council Forecasts.

Natural Characteristics

Corcoran's abundant, high-quality natural resources and open spaces are the predominant elements of the rural character that define the City. The City's open spaces consist primarily of farmed areas under active cultivation. Significantly, 47 percent of the City's land area consists of relatively undisturbed natural resource communities, including upland areas of savanna/pasture, maple/basswood woodlands, and oak forests, as well as wetlands, open water, and streams. Balancing preservation of these features with future growth is a cornerstone of the 2040 Plan.

Natural Resource Areas -- 47 Percent

19% Wetlands
2% Open Water
26% Upland Areas
Savanna/Pasture, Maple/Basswood woodlands, and Oak Forests

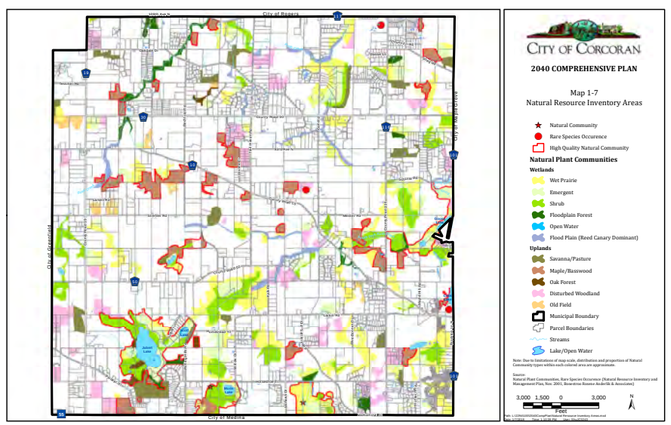
One of the goals of this Plan is to preserve the highest quality natural resources, as identified by the Natural Resource Inventory. The goal places priority on the natural resources patterns in the community in directing future development. The land use plan for the City is shaped by the existing environment. Sensitive natural areas create boundaries for development planning, affect the location of new services, and provide buffers between land uses.

Existing Natural Resources

The areas of Corcoran that are not farmed or have not been developed for residential, public, or commercial uses can be divided into 2 broad categories – Natural Areas and Semi-Natural Areas. The Natural Areas are defined by the existence of native plant communities and the Semi-Natural Areas are defined by areas where original vegetation has largely been replaced by non-native plant species.

Natural Areas

At the time of European settlement, northwestern Hennepin County was comprised primarily of maple-basswood forest and mesic oak forest (referred to as Big Woods), with inclusions of wet prairie, marshes, and lakes. Examples of this historic vegetation remain in locations scattered throughout the City, as identified on Map 1-7: Natural Resource Inventory. Some of the best examples of Big Woods remnants are found along both the north and south Rush Creek corridors. Other fragmented native forest remnants can be found in the west central portion of the City.



Map 1-7: Natural Resource Inventory Areas
(See page 27 for large size map.)

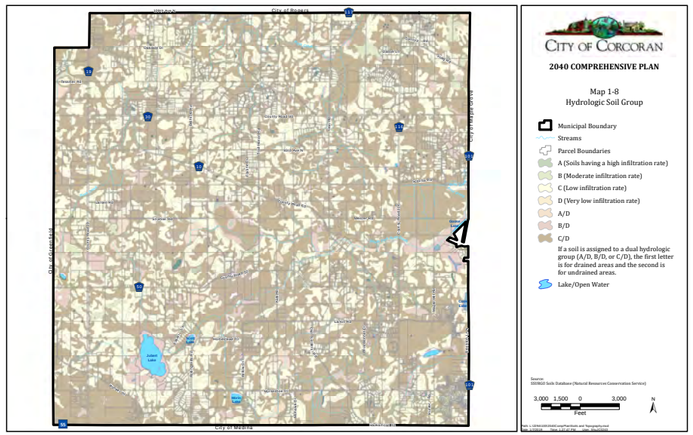
High-quality wetland areas occur within and adjacent to the Rush Creek corridors and Jubert Lake. The Minnesota County Biological Survey identifies 2 wetland areas to be of state-wide interest. One is a moderate quality wet meadow community in the southwest part of the City (Sections 34 and 35). While the diversity of the wet meadow has been reduced by ditching, the size of the complex and connections to other large wetlands contribute to its ranking. The second is a moderate quality tamarack swamp in the south-central part of the City (Section 33), that is part of a larger upland-wetland complex and includes Morin Lake. Corcoran is within the southwestern range of the tamarack swamp plant community, making this wetland area rare and unique within the City.

Semi-Natural Areas

Semi-natural areas are areas of land not subject to active use and that are dominated by vegetation not originally found in those locations. Examples include fallow pasture or crop land that has been retired (old field), degraded wetlands dominated by reed canary grass or other invasive species, and secondary growth or disturbed woodlands, typically dominated by box elder, green ash, and basswood. These areas still offer significant benefits for wildlife and water quality protection. These areas often form important buffers around and connections between higher quality Natural Areas. These Semi-Natural Areas form much of the open space and undeveloped lands within the City. Sites with proximity to high-quality natural resource areas or that tend to assist in the formation of connected natural resource corridors should be considered high priority for restoration.

Soils

The soils of northwestern Hennepin County are predominantly loams, which historically supported mixed hardwood forests, wet prairie, and savanna. These soils are also well-suited for agricultural crops such as corn, soybeans, hays, and pasture lands. Non-draining depressions occur frequently in this portion of northwestern Hennepin County and tend to support hydrophilic vegetation (i.e., wetland plants such as sedges, grasses, rushes, and wetland herbs) and organic soil accumulation.



Map 1-8: Hydrologic Soil *(See page 29 for large size map.)*

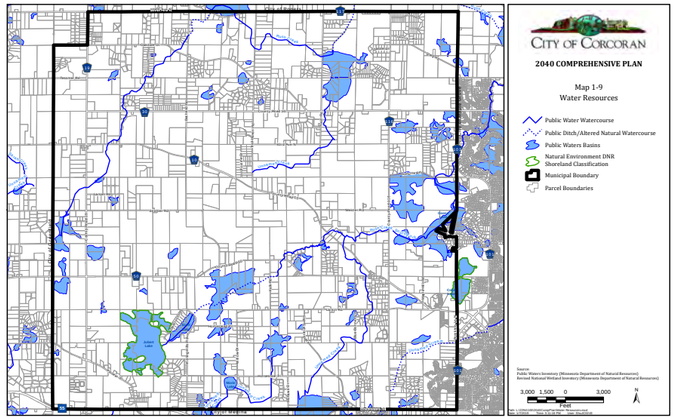
Water Resources

Water resources define and affect every aspect of the community's use and enjoyment of the Corcoran natural environment. Surface waters, both protected and non-protected, wetlands, and groundwater all dictate how the community lives, works, and plays. Water is a resource of common interest and importance throughout the community.

Surface Water

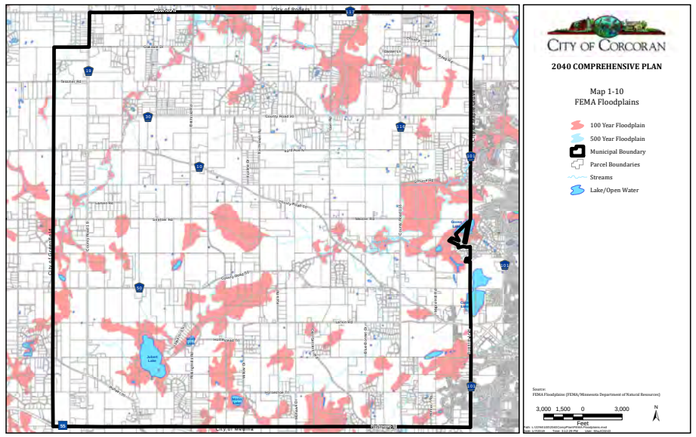
The City has a number of surface water resources, including the North Fork of Rush Creek in northwestern Corcoran and Rush Creek in the central and eastern portion of the City. There are also numerous tributary watercourses and ditches, wetlands, and several small named lakes.

A portion of the surface water resources are defined as "protected waters." Protected waters include lakes, rivers, wetlands or other bodies of water meeting standards set by State law. These sites provide public value for recreation, water quality, water supply, wildlife habitat, or are publicly owned. The Minnesota DNR has regulatory authority over protected waters, including issuance and enforcement of permits controlling activities that impact these areas.



Map 1-9: Water Resource *(See page 31 for large size map.)*

The City also has significant areas of FEMA Floodway and Floodplain.



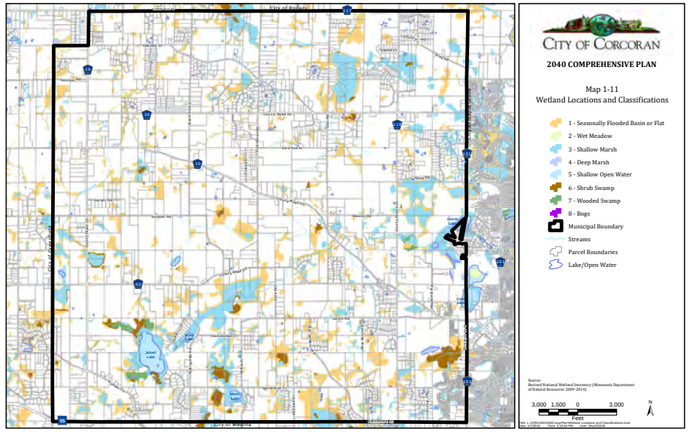
Map 1-10: FEMA Floodplains *(See page 33 for large size map.)*

Groundwater

Groundwater wells located in portions of northern and southwestern Corcoran collect water from the Prairie du Chien-Jordan Aquifer. The remaining wells in the City draw water from the Franconia-Ironton-Galesville Aquifer. Hennepin County leads efforts to protect this groundwater supply. The County monitors groundwater elevations and maintains an inventory of contamination sites.

Wetlands

Wetlands are common throughout Corcoran, covering approximately 19 percent of the City's land area. An even greater percentage of land is unbuildable due to its proximity to these wetlands. Corcoran's Wetlands provide a number of valuable services to the community, including natural flood control, cleaning flowing water, recharging groundwater, and creating valuable habitat for wildlife. Wetlands are an aesthetic amenity in many developments and can provide visual and spatial buffers between homes. Nearly all of Corcoran's wetlands are protected by Minnesota's Wetland Conservation Act and certain waterways are also affected by Federal regulations. Appropriate permits are required prior to any activities that fill, drain, or otherwise impact regulated wetlands.



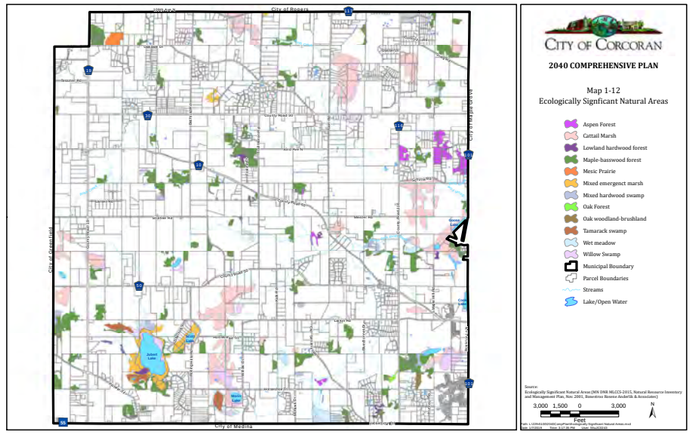
Map 1-11: Wetlands *(See page 35 for large size map.)*

Several resources exist to assist in identifying wetlands. The National Wetlands Inventory (NWI) is a national assessment of wetland resources, conducted by the U.S. Fish and Wildlife Service, between 1988 and 1992 within the State of Minnesota. The NWI is useful in giving an estimate of the extent (i.e. approximate geographic location) and type (i.e. system, hydrologic regime and predominant vegetation types) of wetlands within the City. The NWI survey was based strictly on aerial photography reconnaissance and interpretation and may be less accurate than some of the other sources.

The City's Natural Resource Inventory was completed in 2001 with inventories of both upland and wetland communities. Most areas were field-checked and mapped using current aerial photographs.

Prior to that, the Hennepin Conservation District (HCD) completed a remote assessment of wetland and potential wetland areas within Hennepin County based on a review of then-current aerial photographs, topography, and hydric soils information. This survey includes potential wetland areas not included in the NWI (altered or restorable) and omits wetlands that have been filled since the completion of the NWI.

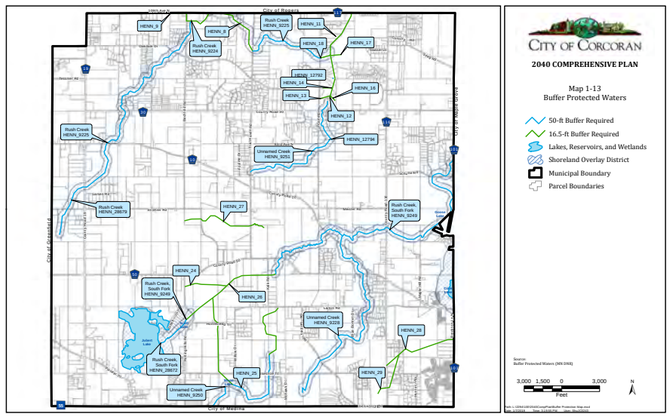
The 2008 Minnesota Land Cover Classification System (MLCCS) Mapping and Natural Resource Inventory included a field check and identified both upland and wetland communities of ecological significance.



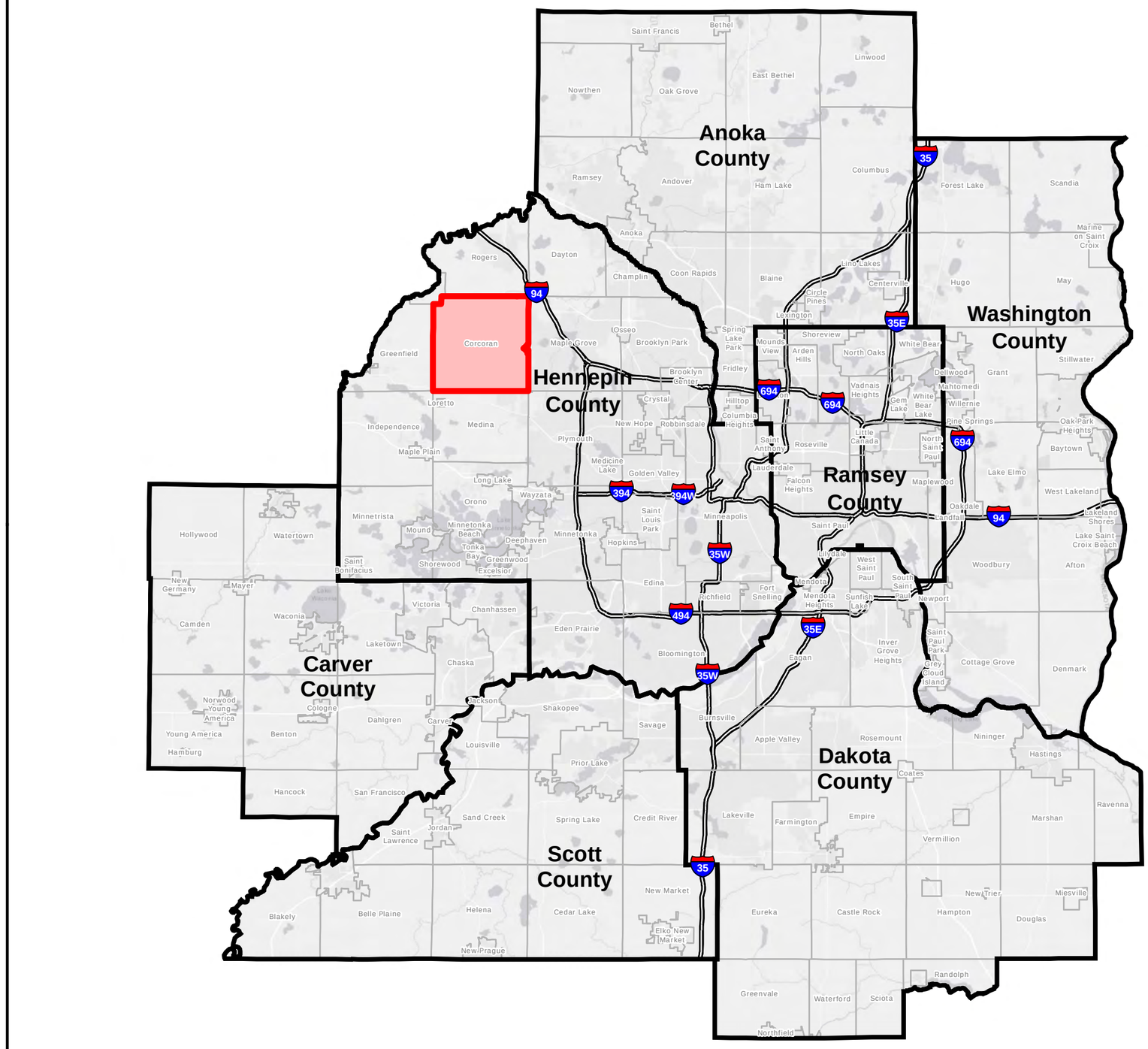
Map 1-12: Ecologically Significant Natural Areas *(See page 37 for large size map.)*

Natural Resources Protection

A variety of tools and strategies are available to the City to manage and protect its natural resources as identified in Chapters 5 and eleven.



Map 1-13: Buffer Protection Areas *(See page 39 for large size map.)*



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

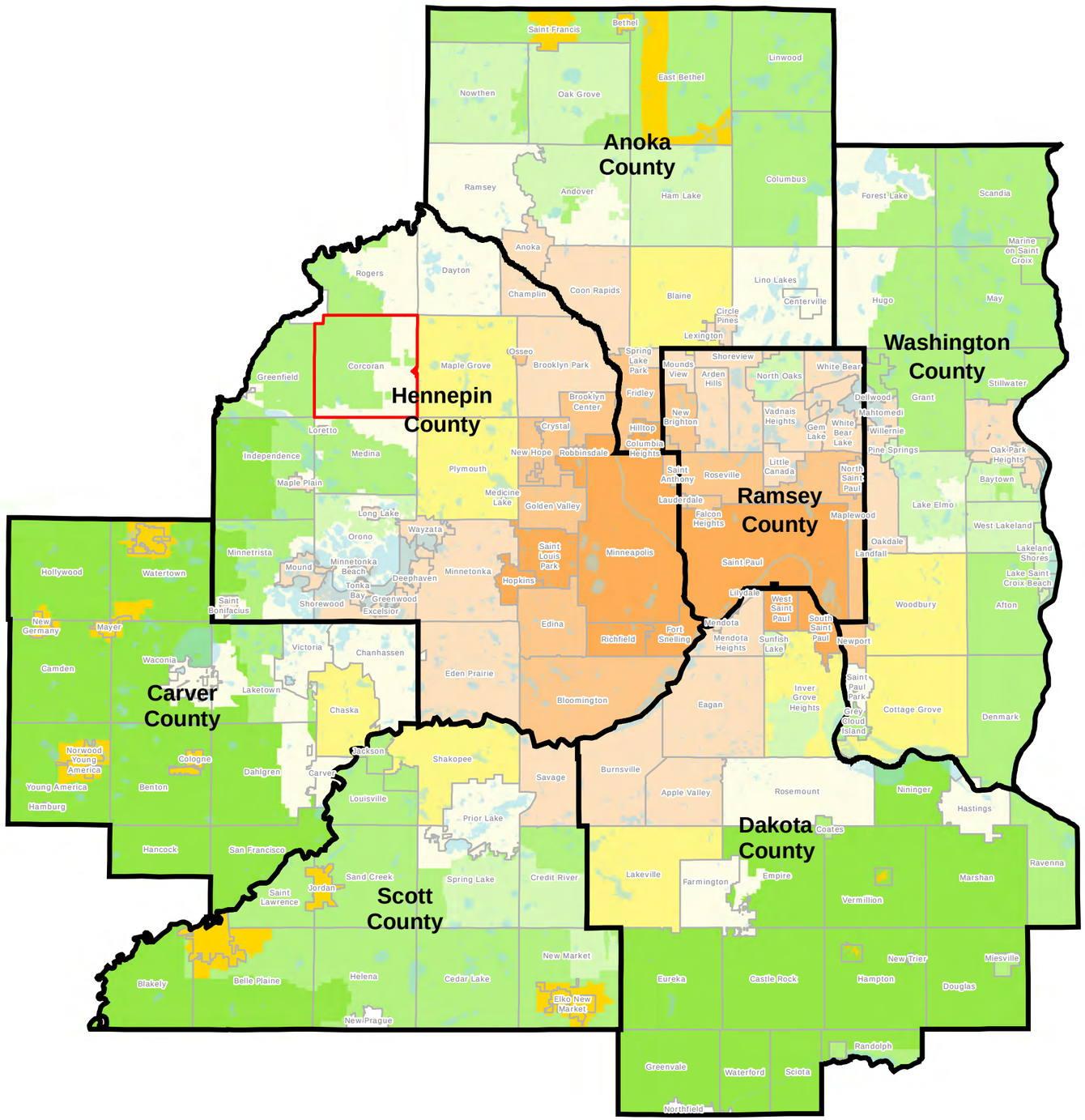
Map 1-1
Regional Setting

- Municipal Boundary
- County Boundaries
- Minor Civil Divisions
- Interstate

10 5 0 10
Miles

N

Path: L:\2294\100\2040CompPlan\Regional Setting.mxd
Date: 1/7/2019 Time: 8:53:48 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-2
Community Designations

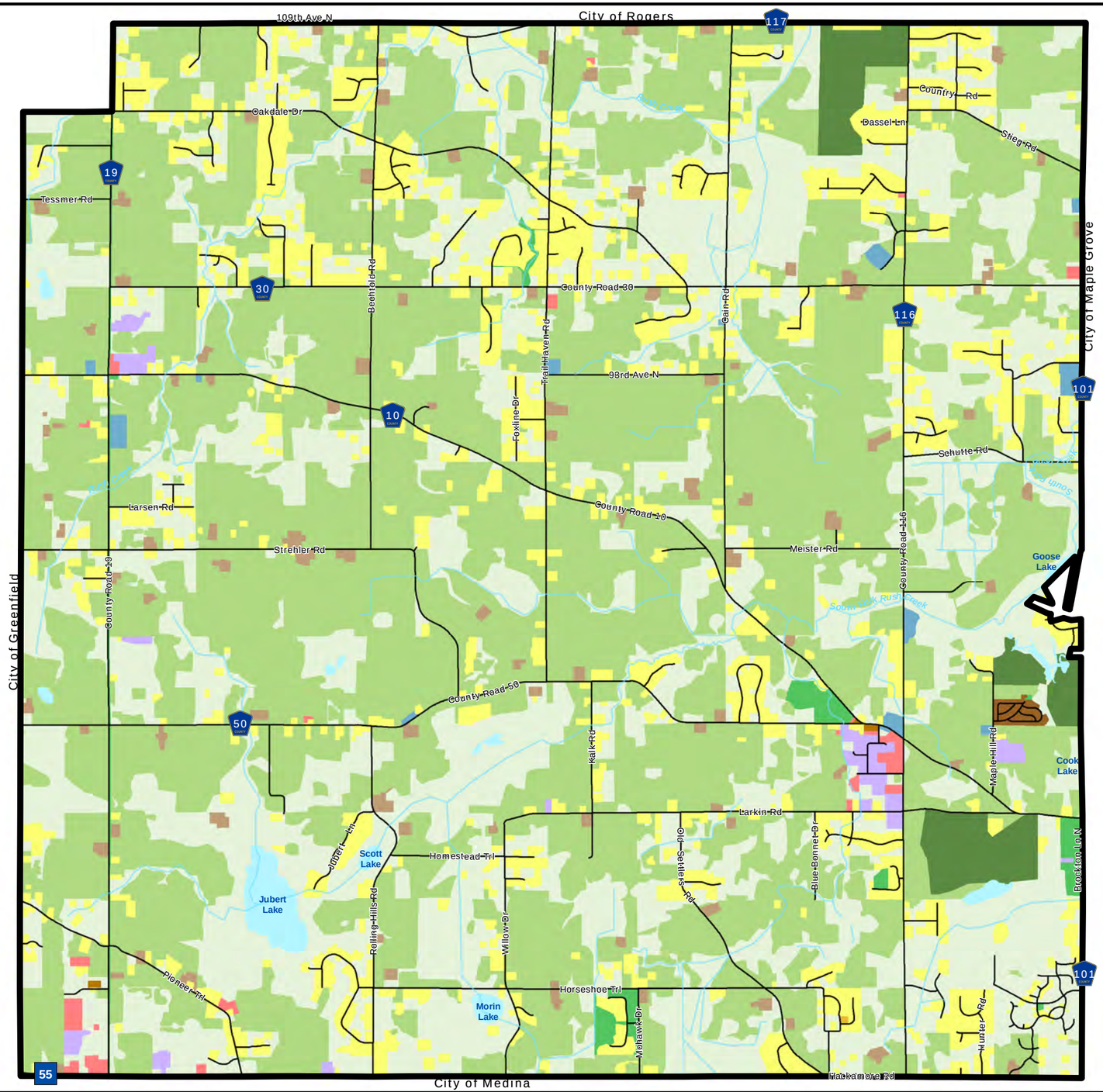
- Agricultural
- Rural Residential
- Diversified Rural
- Rural Center
- Emerging Suburban Edge
- Suburban Edge
- Suburban
- Urban
- Urban Center
- Municipal Boundary
- County Boundaries
- Minor Civil Divisions

Source:
Thrive MSP 2040 Community Designation (Metropolitan Council)

10 5 0 10
Miles

N

Path: L:\2294\100\2040CompPlan\Community Designations.mxd
Date: 1/7/2019 Time: 8:54:25 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-3
Metropolitan Council Existing Land Use

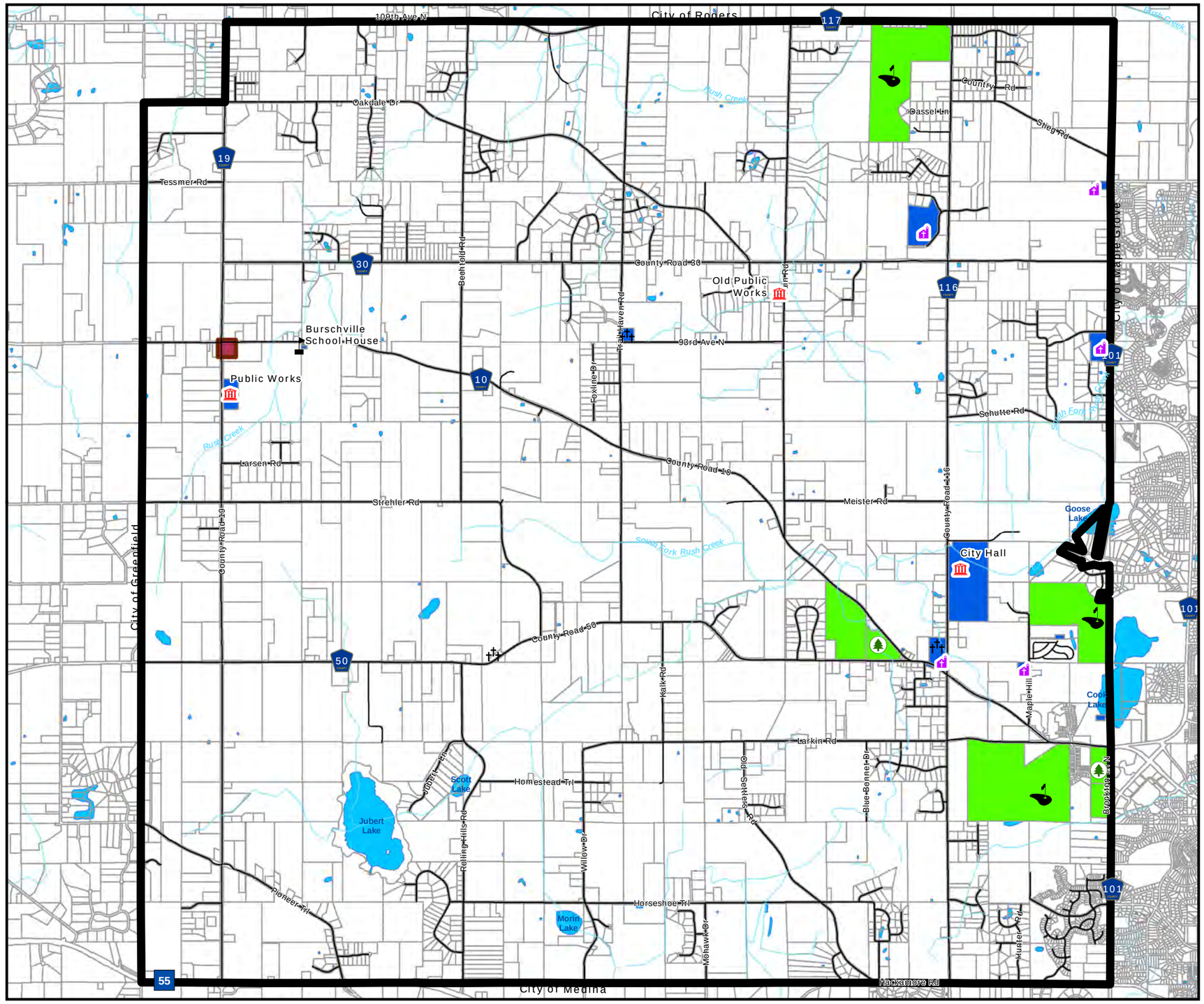
- Farmstead
- Single Family Detached
- Manufactured Housing Park
- Single Family Attached
- Retail and Other Commercial
- Mixed Use Residential
- Industrial and Utility
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Agricultural
- Undeveloped
- Water
- Municipal Boundary
- Streams

Source:
Metropolitan Council Existing Landuse (Metropolitan Council, 2016)
Revised National Wetland Inventory (MN DNR, 2009-2014)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Existing Land Use.mxd
Date: 1/7/2019 Time: 9:15:38 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

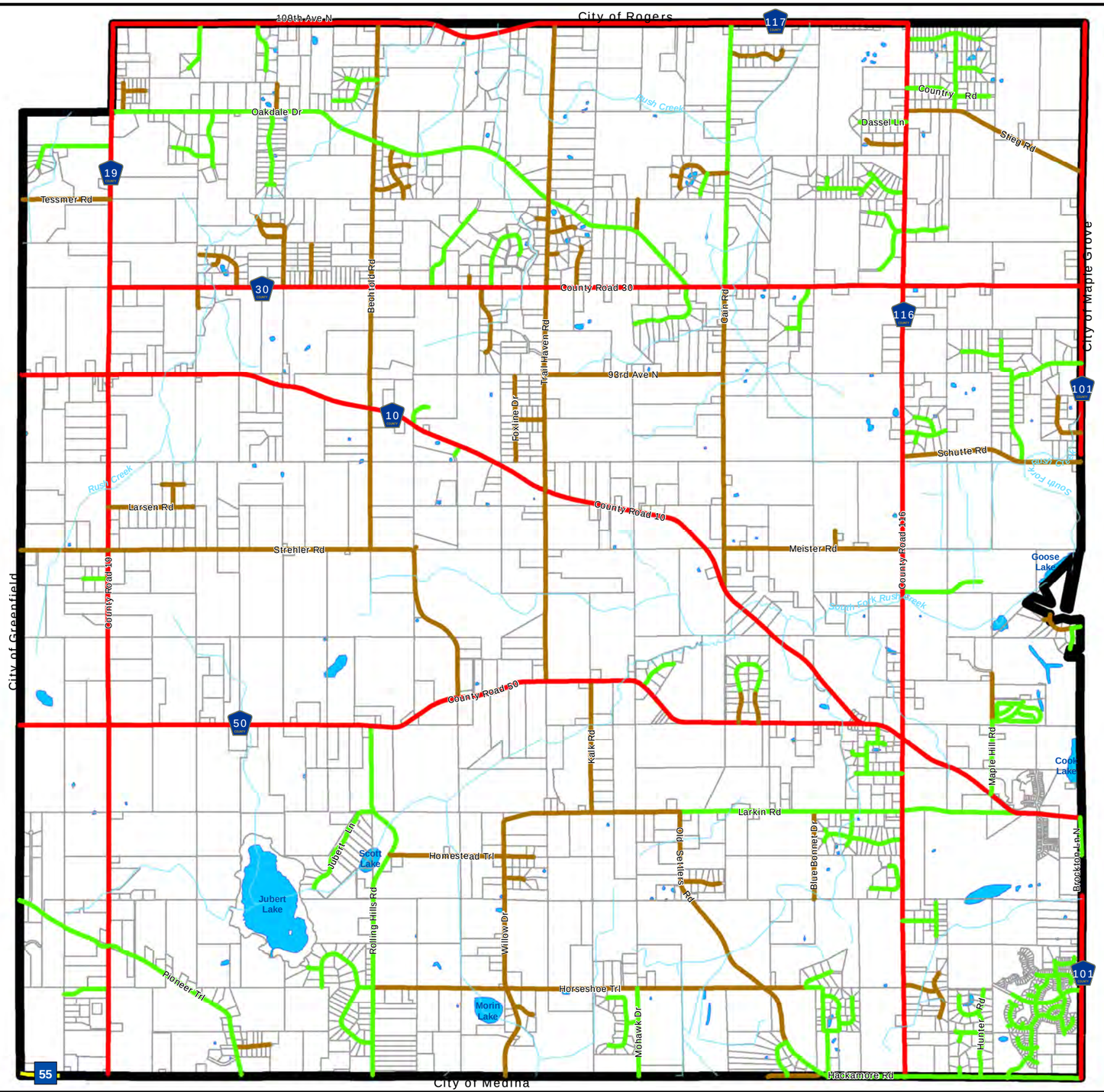
Map 1-4
Public/Semi Public Facilities Map

- Government Building
- Public Park
- Golf Course
- Church
- Cemetery
- School House
- Municipal Boundary
- Streams
- Trailhead
- Parcel Boundaries
- Public/Semi-Public
- Parks/Open Space/Golf Course
- Lake/Open Water

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Public Facilities Map.mxd
Date: 1/7/2019 Time: 2:53:34 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

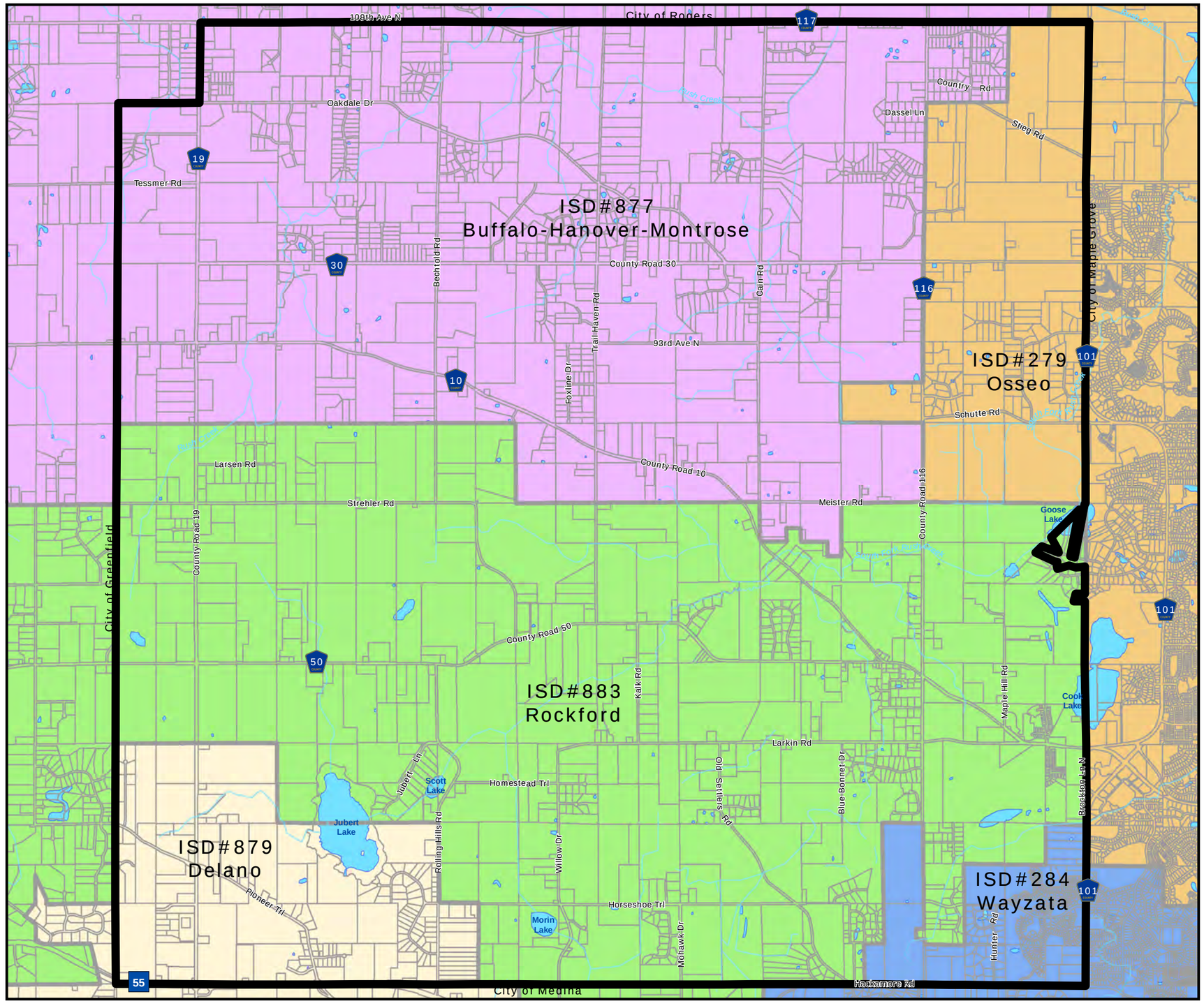
Map 1-5
Street Surface Type

- MNDOT Paved (0.2 mi.)
- County Paved (37.5 mi.)
- Local Street Paved (36.0 mi)
- Local Street Gravel (33.9 mi.)
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Street Surface Type.mxd
Date: 1/7/2019 Time: 11:54:17 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-6
School District Boundaries

- Buffalo-Hanover-Montrose
- Delano
- Osseo
- Rockford
- Wayzata
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

Source:
School District Boundaries (Minnesota Department of Education)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\School District Boundaries.mxd
Date: 1/7/2019 Time: 2:53:43 PM User: ShuJC0243

CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-7
Natural Resource Inventory Areas

- Natural Community
- Rare Species Occurence
- High Quality Natural Community

Natural Plant Communities

Wetlands

- Wet Prairie
- Emergent
- Shrub
- Floodplain Forest
- Open Water
- Flood Plain (Reed Canary Dominant)

Uplands

- Savanna/Pasture
- Maple/Basswood
- Oak Forest
- Disturbed Woodland
- Old Field
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

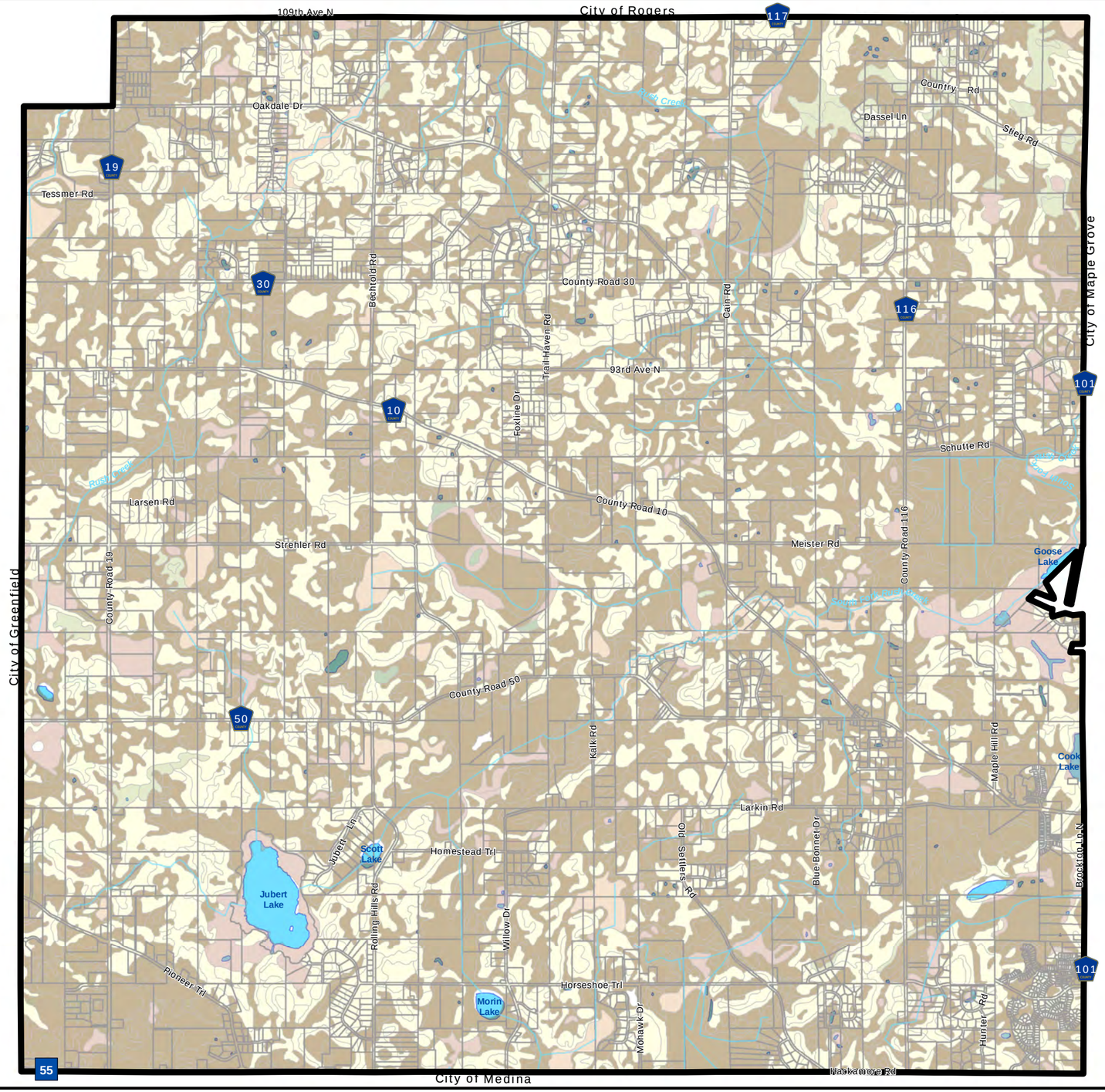
Note: Due to limitations of map scale, distribution and proportion of Natural Community types within each colored area are approximate.

Source:
Natural Plant Communities, Rare Species Occurence (Natural Resource Inventory and Management Plan, Nov. 2001, Bonestroo Rosene Anderlik & Associates)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Natural Resource Inventory Areas.mxd
Date: 1/7/2019 Time: 1:10:39 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-8
Hydrologic Soil Group

- Municipal Boundary
- Streams
- Parcel Boundaries
- A (Soils having a high infiltration rate)
- B (Moderate infiltration rate)
- C (Low infiltration rate)
- D (Very low infiltration rate)
- A/D
- B/D
- C/D

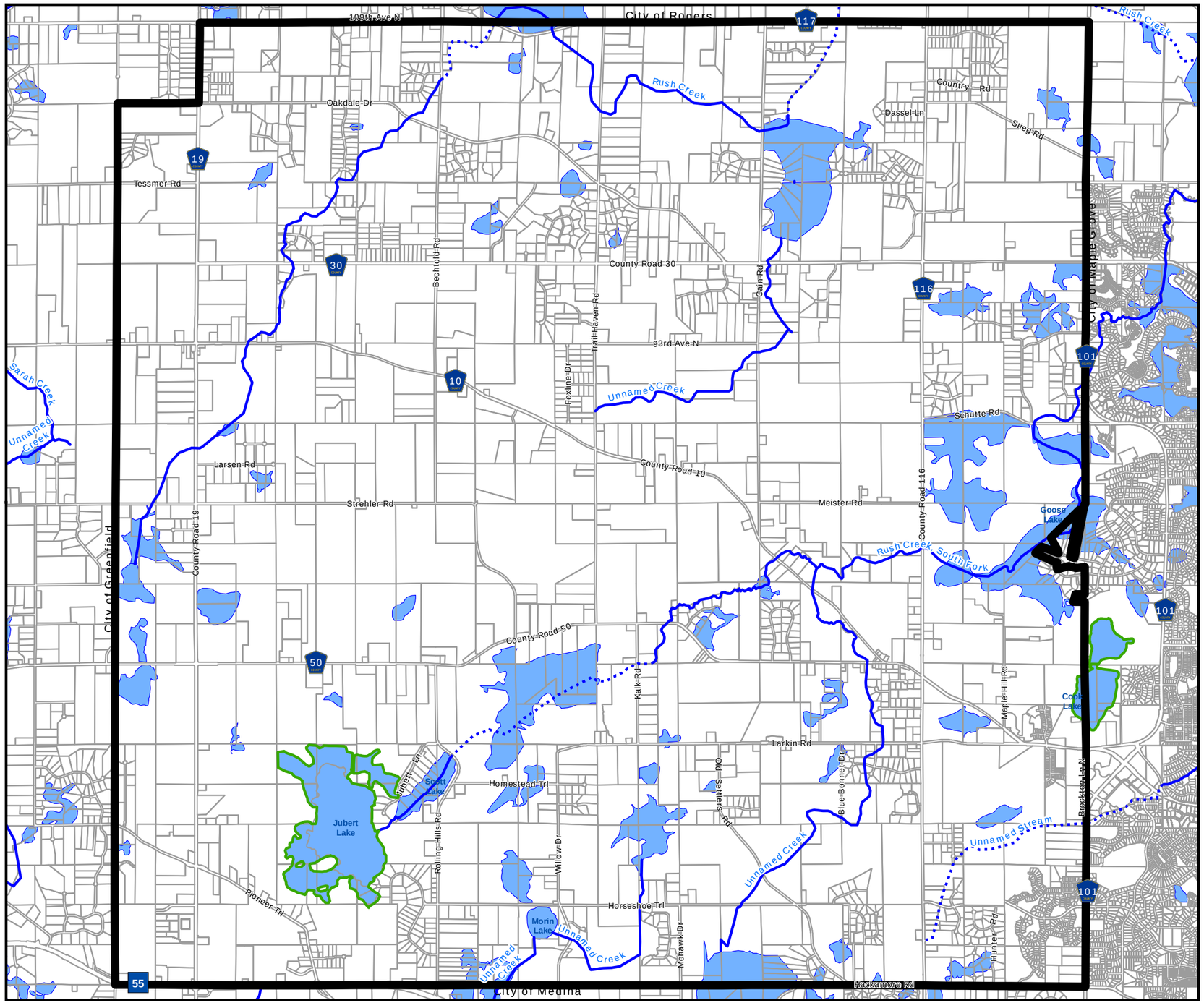
  If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.
- Lake/Open Water

Source:
SSURGO Soils Database (Natural Resources Conservation Service)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Soils and Topography.mxd
Date: 1/7/2019 Time: 1:27:47 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-9
Water Resources

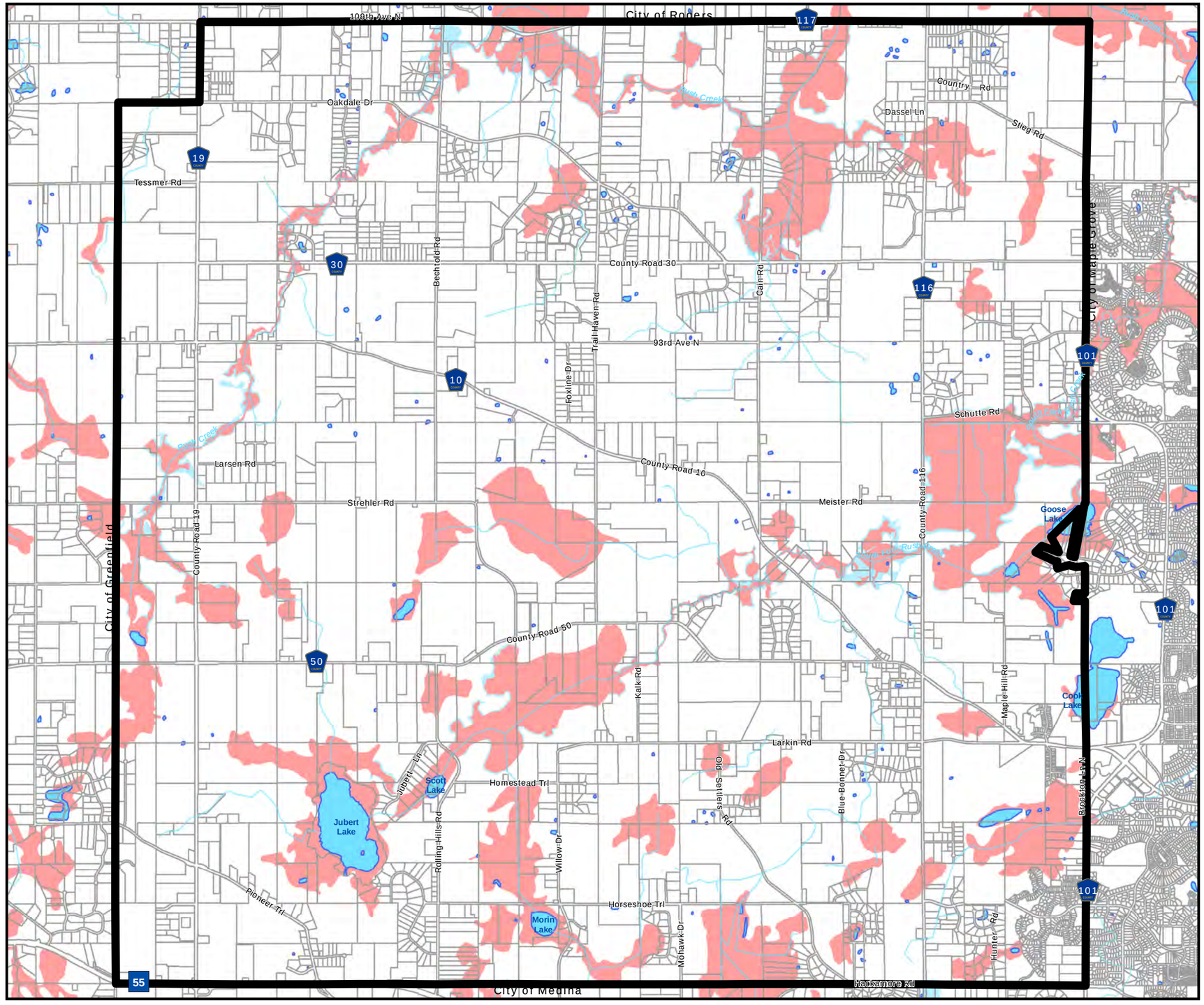
- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse
- Public Waters Basins
- Natural Environment DNR Shoreland Classification
- Municipal Boundary
- Parcel Boundaries

Source:
Public Waters Inventory (Minnesota Department of Natural Resources)
Revised National Wetland Inventory (Minnesota Department of Natural Resources)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Water Resources.mxd
Date: 1/7/2019 Time: 3:11:18 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-10
FEMA Floodplains

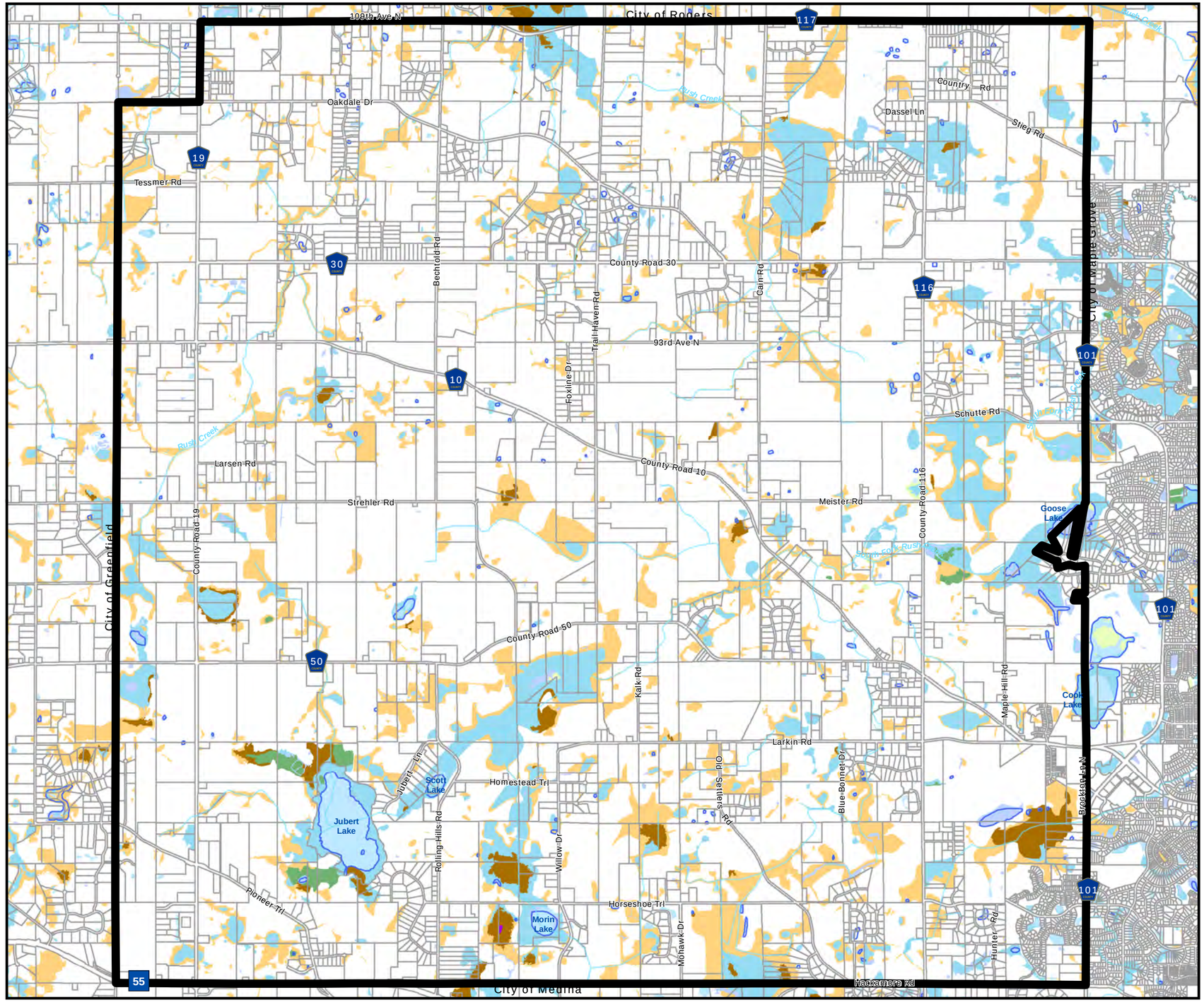
- 100 Year Floodplain
- 500 Year Floodplain
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

Source:
FEMA Floodplains (FEMA/Minnesota Department of Natural Resources)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\FEMA Floodplains.mxd
Date: 1/7/2019 Time: 3:12:29 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-11
Wetland Locations and Classifications

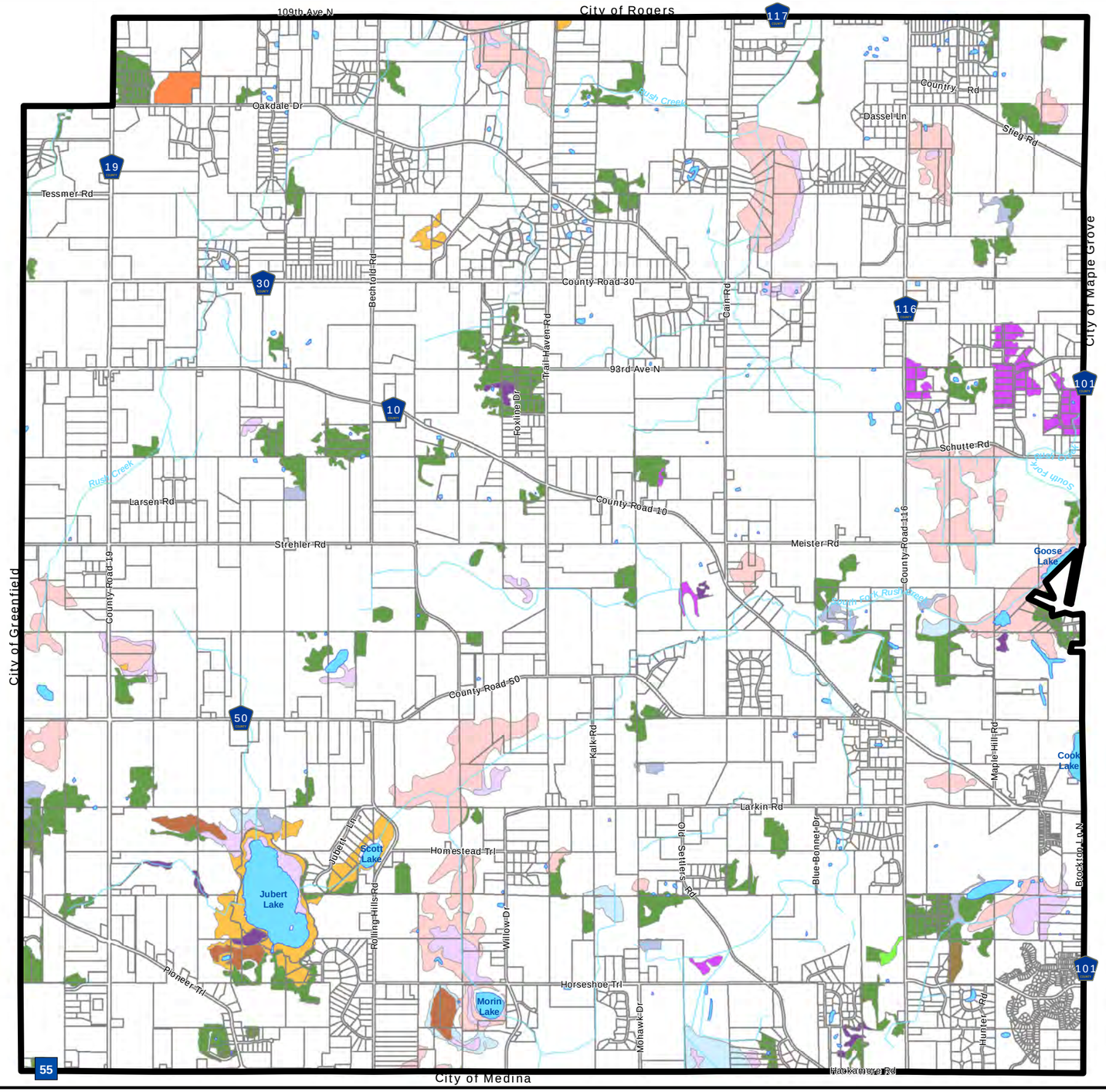
- 1 - Seasonally Flooded Basin or Flat
- 2 - Wet Meadow
- 3 - Shallow Marsh
- 4 - Deep Marsh
- 5 - Shallow Open Water
- 6 - Shrub Swamp
- 7 - Wooded Swamp
- 8 - Bogs
- Municipal Boundary
- Streams
- Parcel Boundaries
- Lake/Open Water

Source:
Revised National Wetland Inventory (Minnesota Department of Natural Resources 2009-2014)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Wetland Locations and Classifications.mxd
Date: 1/7/2019 Time: 3:19:04 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-12
Ecologically Signficant Natural Areas

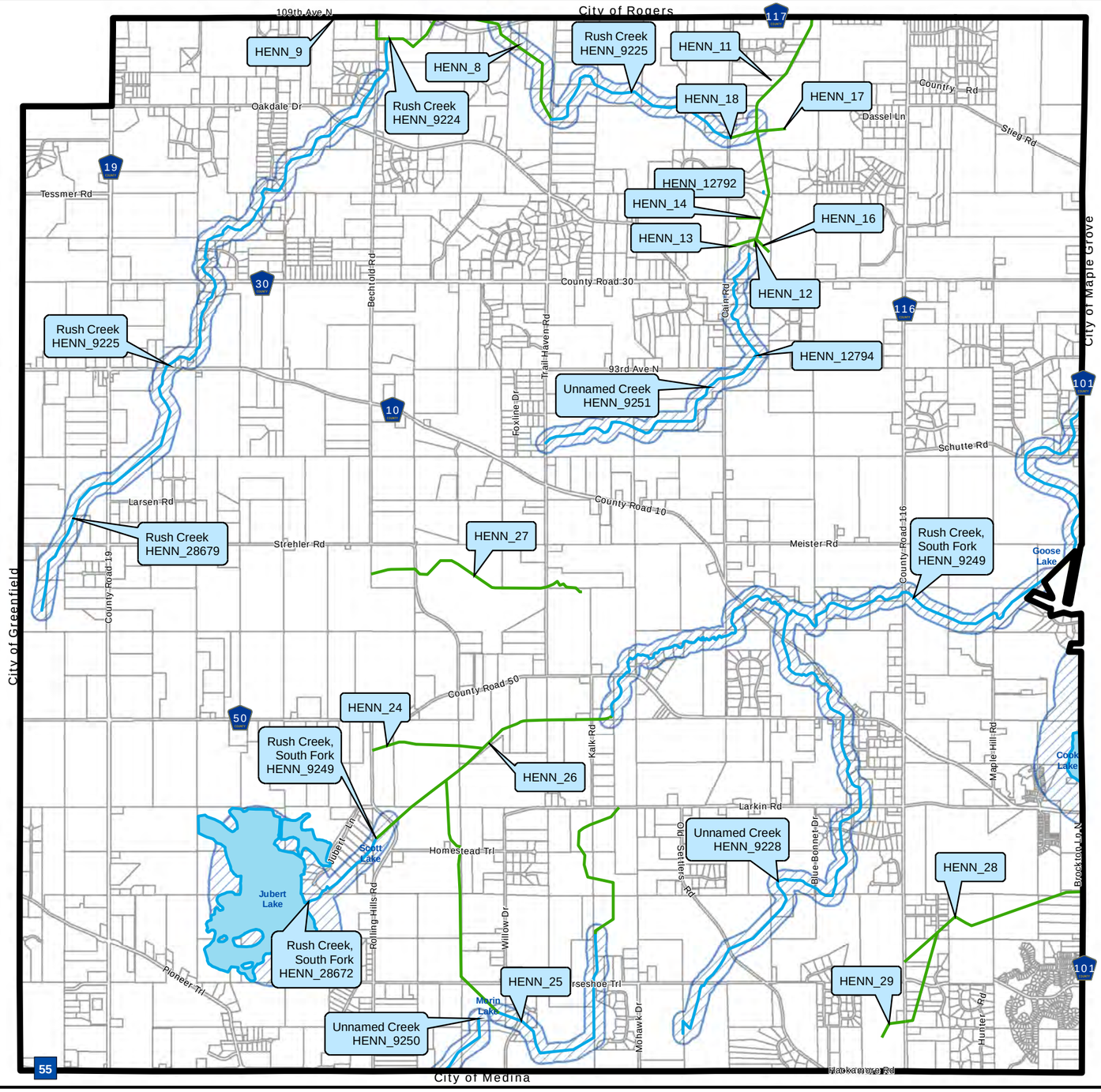
- Aspen Forest
- Cattail Marsh
- Lowland hardwood forest
- Maple-basswood forest
- Mesic Prairie
- Mixed emergenct marsh
- Mixed hardwood swamp
- Oak Forest
- Oak woodland-brushland
- Tamarack swamp
- Wet meadow
- Willow Swamp
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

Source:
Ecologically Significant Natural Areas (MN DNR MLCCS-2015, Natural Resource Inventory and Management Plan, Nov. 2001, Bonestroo Rosene Anderlik & Associates)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Ecologically Significant Natural Areas.mxd
Date: 1/7/2019 Time: 3:17:35 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 1-13
Buffer Protected Waters

- 50-ft Buffer Required
- 16.5-ft Buffer Required
- Lakes, Reservoirs, and Wetlands
- Shoreland Overlay District
- Municipal Boundary
- Parcel Boundaries

Source:
Buffer Protected Waters (MN DNR)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Buffer Protection Map.mxd
Date: 1/7/2019 Time: 3:19:55 PM User: ShuJC0243

CHAPTER 2: LAND USE

LAND USE

The 2040 Land Use Plan identifies the location and intensity of anticipated development within the City and establishes a framework in which that development may occur. The 2040 Land Use Plan was developed to support the community vision and guiding principles discussed in Chapter 1.

The 2040 Land Use Plan generally retains the land use categories created under the 2030 Plan. The MUSA boundary remains the same except for a small expansion of MUSA on Old Settlers Road in the southeast portion of the city to include all of a landowner's property east of the street. The plan also shows a future 932-acre expansion allowing Corcoran to continue to work with the Metropolitan Council Environmental Services (MCES), Loretto and Medina on the Maple Plain LS/RF Rehabilitation: Project 8081. This project would provide new facilities to serve Loretto, northwest Medina, and southwest Corcoran. This expansion is shown outside of the 2040 planning range.

Corcoran will see an increased opportunity for development as the Twin Cities metropolitan area continues to grow and communities closer to the core fully develop. Corcoran's scenic natural resource areas, proximity to rapidly growing neighboring communities, the development of the Highway 55 corridor, and the potential linking of County Road 30 with the future Highway 610 corridor all represent development assets, influences, and pressures.

The 2040 Plan seeks to create the flexibility to respond to market conditions while guiding land uses that adhere to the community's vision and guiding principles. The 2040 Land Use and Staging Plans meet the Metropolitan Council forecasts for potential development and provide methods through land use and density to meet the Metropolitan Council's residential density guidance of 3.0 housing units per net developable acre. As a regional planning organization, the Metropolitan Council's role is to ensure that regional infrastructure can accommodate Corcoran's potential growth and growth within the region. Meeting this minimum density requirement ensures that regional infrastructure is used in a cost-effective and efficient manner.

Goals and Policies

The community has established the following Goals and Policies to guide residential development in Corcoran.

Goal 1: Ensure housing development is compatible with existing and adjacent land uses and has access to key community features, natural features, and views of open spaces.

Policy 1: Establish development guidelines for appropriate amount of green spaces, viewshed analysis, paths, sidewalks, trails, and connections throughout the community.
Policy 2: Link residential neighborhoods via trails to City parks, Town Center, and other public and commercial areas.
Policy 3: Incorporate preservation of natural resources in residential developments.
Policy 4: Encourage innovation in subdivision design, such as clustering techniques, to preserve open space or natural features.
Policy 5: Undeveloped single-family residential land shall be developed with consideration for surrounding development and in a manner responsive to market needs.

Goal 2: Provide a variety of housing types, styles, densities, and choices to meet the housing needs of residents.

Policy 1: Provide a mix of housing types to provide for a full continuum of housing opportunities, including continued single-family growth and new opportunities for multiple family and senior housing developments.
Policy 2: Provide transitions or buffering from low density and rural residential areas to higher density uses.
Policy 3: Ensure that all new housing adheres to the highest standards of planning, design and construction.

Goal 3: Create new land use opportunities to expand and diversify the City's tax base by encouraging new commercial development.

Policy 1: Use the Mixed Use land use designation to develop a Town Center similar to that envisioned in the Corcoran Southeast District Plan and Design Guidelines adopted in 2016. These guidelines will be updated to reflect the new transportation policies in this plan.
Policy 2: Create performance standards for all commercial areas, including building and signage design guidelines, streetscaping, and inclusion of green space, paths, and sidewalks to connect commercial areas to neighborhoods.
Policy 3: Support and promote existing businesses and new businesses that are viable and responsive to the needs of the community.

Goal 4: Attract and encourage new light industrial, office-industrial, high tech and professional services, and maintain and expand existing businesses in Corcoran.

Policy 1: Encourage high-end business park development that attracts medical, technology, and similar industries that provide quality employment and wages.
Policy 2: Develop a market plan and strategy aimed at creating an industrial and high-end business park identity that will help recruit business and industry to Corcoran.
Policy 3: Create industrial and business park building, signage, and landscaping design guidelines that will result in high-quality building and site development.
Policy 4: Encourage use of "green", environmentally-friendly building and site development techniques in new developments through zoning requirements or incentives.

Goal 5: Create a community with housing, employment and service uses that reinforce the City's vision to allow development while working to retain key elements that define our rural character, such as wetlands, streams, wooded areas, natural topography and view corridors.

Policy 1: Create a land use plan that provides housing development types and locations required to meet the community's projected needs.
Policy 2: Create a staging plan that supports infrastructure expansion and land use growth plans.
Policy 3: Work with neighboring communities to ensure an integrated plan that is consistent with the Metropolitan Council's requirements and compatible with adjacent jurisdictions.
Policy 4: As development proceeds, protect the natural features, slopes, and sensitive areas that make Corcoran unique, such as streams, wetlands, lakes, woodlands, natural open space, and local parks.
Policy 5: Prepare long-range transportation and infrastructure plans that will direct and support growth and allow the City to financially plan for such growth.
Policy 6: Expand the level of community services to keep pace with orderly development.

Goal 6: Ensure that zoning and subdivision ordinances are consistent with the intent and specific direction of the land use plan.

Policy 1: Ensure that developers are aware of and perform according to the land use plan and all official controls.
Policy 2: Encourage creative approaches to land development to support preservation of open space and natural resources.
Policy 3: Coordinate plans for housing with plans for light industrial, office/industrial, and commercial areas to balance land uses, serve the qualty-of-life needs of the residential areas and foster a positive climate for business, jobs, and tax base growth.
Policy 4: Ensure compatibility of adjacent land uses.
Policy 5: Routinely update the zoning map to conform to the land use map.

2040 Land Use and Growth Management

Relationship to Metropolitan Council Thrive MSP 2040 Plan

In addition to guiding Corcoran's future growth, the community's 2040 Land Use Plan also relates to growth and development in the region as a whole. As part of the 7-county metropolitan area, Corcoran is expected to absorb its share of the region's growth. The Comprehensive Plan must demonstrate the City's capacity to absorb this growth. The Comprehensive Plan must also demonstrate that this growth will be managed to ensure efficient use of the region's sewer and transportation infrastructure.

The Metropolitan Council has developed the following land use policies to guide regional land use and development:

Orderly and Efficient Land Use: *Align land use, development patterns, and infrastructure to make the best use of public and private investment.*

Natural Resources Protection: *Conserve, restore, and protect the region's natural resources to ensure availability, support public health, and maintain a high quality of life.*

Water Sustainability: *Conserve, restore, and protect the quality and quantity of the region's water resources to ensure ongoing availability, support public health, and maintain a high quality of life.*

Housing Affordability and Choice: *Promote housing options to give people in all life stages and of all economic means viable choices for safe, stable, and affordable homes.*

Access, Mobility, and Transportation Choice: *Sustain and improve a multi-modal transportation system to support regional growth, maintain regional economic competitiveness, and provide choices and reliability for the system's users.*

Economic Competitiveness: *Foster connected land use options to provide businesses and industries with access to materials, markets, and talent.*

Building in Resilience: *Promote sensitive land use and development patterns to achieve Minnesota's adopted greenhouse gas emissions goals at the regional scale and to develop local resiliency to the impacts of climate change.*

METROPOLITAN COUNCIL

The City has prepared a plan that responds to both the community's goals as well as the Metropolitan Council's strategies for developing communities, as outlined in *Thrive MSP 2040*. The 2040 Plan adequately addresses community goals and regional strategies for the following reasons:

- The Plan identifies areas of low, medium, mixed and high density residential land use to expand housing densities and create opportunities for life-cycle and affordable housing.
- The Plan designates areas for mixed use development to accommodate retail, commercial, and housing uses to improve access to jobs and other services.
- The Plan protects natural resource areas by identifying sensitive areas and planning development accordingly. The Plan identifies strategies and policies to protect natural resource areas.
- The plan protects the quality and quantity of water resources.
- The Plan designates higher density housing opportunities along major transportation corridors to increase efficiency of the region's transportation system and take advantage of future transit opportunities.
- The plan creates opportunities for a variety of transportation methods, including automobile, walking, and bicycling.
- The plan provides opportunities for economic development by providing areas for commercial, office, and industrial uses throughout the City.
- The Plan achieves a minimum net density of 3 units/acre to ensure the region's infrastructure is used efficiently.

Forecasts

Corcoran is a unique community with a large amount of desirable undeveloped land. Due to its undeveloped nature, recent availability of municipal services, and the current economic state at the time of 2040 Plan preparation, it is a challenge for both the Metropolitan Council and the City to accurately anticipate the City's rate of growth. The 2040 forecasts are shown in Chapter 1, Figure 1-5.

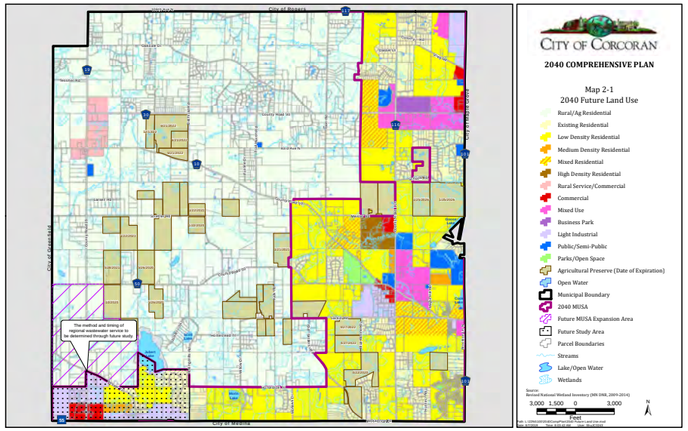
The potential number of housing units that could be accommodated in the 2040 urban service area exceeds the population and housing forecasts. The excess capacity of the 2040 service area will provide greater development flexibility as growth occurs. However, the City will manage development and the pace of growth based on the forecasts. It must be recognized that these figures present the urban service area only and do not provide projections for housing units and population over the entire City.

The Metropolitan Urban Service Area (MUSA) sewer system has been extended into the City, which has allowed new residential development in the southeast portion of the City and provided services to the existing industrial park in 2017. The availability of sanitary sewer increases opportunities for variety of residential densities and mixed residential uses, increasing housing options, and life-cycle housing in the community. It expands the City's ability to compete for commercial, industrial, and employment opportunities.

The 2040 Land Use Plan will guide and manage development pressure and growth by determining future land uses, development intensity, and areas for environmental protection. This Chapter establishes growth management strategies for the City to ensure that adequate infrastructure is in place to accommodate new growth and maintain a balance between residential and non-residential development. Urban uses and densities are focused in 3 areas of the City. The balance of the community is to remain Rural/Ag Residential, as defined below.

Table 2-1: 2040 Land Use Acreage Table

2040 Future Land Use	Net Acres	Percent Total Net Acres	Gross Acres	Percent Total Gross Acres
Ag Preserve	1,588.72	9.42%	2,078.36	9.48%
Rural/Ag Residential	9,276.27	55.03%	11,954.94	54.55%
Existing Residential	1,153.70	6.84%	1,586.74	7.24%
Low Density Residential	2,656.56	15.76%	3,694.72	16.86%
Medium Density Residential	66.04	0.39%	84.75	0.39%
Mixed Residential	449.88	2.67%	522.43	2.38%
High Density Residential	80.32	0.48%	128.75	0.59%
Mixed Use	459.08	2.72%	532.42	2.43%
Rural Service/Commercial	185.69	1.10%	198.15	.90%
Commercial	148.38	0.88%	173.81	0.79%
Business Park	76.89	0.46%	76.89	0.35%
Light Industrial	481.22	2.85%	563.34	2.57%
Parks/Open Space	76.85	0.46%	84.38	0.39%
Public/Semi-Public	157.30	.93%	235.42	%
Grand Total	**16,856.91**	**100.00%**	**21,915.11**	**100.00%**



Map 2-1: Future Land Use *(See page 51 for large size map.)*

The City used the minimum allowed densities in each residential land use category to calculate the overall average net density of 3.11 units/acre (net density is gross land area - wetlands and land below the 100-year OHWL). The following land uses and minimum densities are displayed in Table 2-2 and Table 2-3.

Table 2-2: 2040 MUSA Density

2040 Future Land Use	Gross Acres	Net Acres	Density Range	Minimum Units	Maximum Units
Existing Residential	1,586.74	1,153.70	0.5-1	577	1,154
Low Density Residential	3,694.72	2,656.56	3-5	7,970	13,283
Medium Density Residential	84.74	66.04	5-8	330	528
Mixed Residential	522.43	449.88	8-10	3,599	4,499
High Density Residential	128.75	80.32	10-30	803	2,410
Mixed Use	532.42	459.08	8-30	1,836	6,886
Grand Total	6,549.82	4,865.58		15,115	28,760
Net Density (units per acre)				**3.11**	

The City must demonstrate that it meets the regional density policy. The Metropolitan Council uses a slightly different calculation to determine compliance with the regional policy than the City used to evaluate the overall land supply. Because the 2030 Comprehensive Plan and development planned prior to 2030 was already determined to comply. The Metropolitan Council uses the following calculation for determining compliance of the 2040 Comprehensive Plan:

- Land planned for development prior to 2030 in the 2030 Plan that continues to be planned for development by 2030 in the new 2040 Plan is excluded from the calculation.
- Land planned for development prior to 2030 in the 2030 Plan that has now shifted in the Staging Plan to develop after 2030 is included in the calculation.
- The land outside the 2030 MUSA that was added to the 2040 MUSA is included in the calculation.
- The City may take credit for units in excess of the minimum density requirements for those developments included in the plat monitoring program (through 2016). The City may add the number of units and it gives the City some credit for approving plats that exceed the minimum densities allowed by the Comprehensive Plan.

The results of the density calculation using the Metropolitan Council's policy guidance is shown in Table 2-4. The Land Use Plan meets the minimum density of 3 units per acre for areas not approved in the 2030 Comprehensive Plan.

Table 2-4: Metropolitan Council Density Calculation

2040 Future Land Use	Net Acres	Density Range	Minimum Units	Maximum Units
Low Density Residential	127.15	3-5	381	636
Mixed Residential	1.23	8-10	10	12
Subtotal	128.38		391	648
Add Plat Monitoring Data			21	
Total	128.38	-	412	648
Density			3.21	5.0

Table 2-3: Residential Units and Density by Staging Area

		2020-2030			2030-2040*			Total		
2040 Future Land Use	**Density Range**	**Net Acres**	**Minimum Units**	**Maximum Units**	**Net Acres**	**Minimum Units**	**Maximum Units**	**Net Acres**	**Minimum Units**	**Maximum Units**
Existing Residential	0.5-1	30.74	15	31	1,122.96	561	1,123	1,153.70	577	1,154
Low Density Residential	3-5	1,124.28	3,373	5,621	1,516.50	4,549	7,582	2,640.78	7,922	15,849
Medium Density Residential	5-8	48.26	241	386	17.78	89	142	66.04	330	528
Mixed Residential	8-10	205.77	1,646	2,058	244.11	1,953	2,441	449.88	3,599	5,423
High Density Residential	10-30	80.32	803	2,410	-	-	-	80.32	803	2,410
Mixed Use	8-30	459.08	1,836	6,886	-	-	-	459.08	1,836	5,494
Grand Total		**1,948.45**	**7,915**	**17,392**	**2.901.35**	**7,153**	**11,289**	**4,849.80**	**15,068**	**30,858**
Density by Staging		**4.06**			**2.47**			**3.11**		

**The calculations include land in the Future Study Area. The study area includes 136.8 net acres of Existing Residential, 143.9 net acres of Low Density Residential, 17.8 net acres of Medium Density Residential, 60.3 net acres of Commercial and 271.9 net acres of Industrial.*

Land Use Categories

The variety of housing opportunities available is expected to increase dramatically as Corcoran grows. The 2040 Plan continues to provide a variety and range of residential land use designations and densities. The High Density Residential and Mixed Use areas are concentrated along major transportation routes to maximize the efficiency of these routes and relieve stress on the local road system.

A variety of commercial, industrial and public/semi-public land uses are provided to residents and landowners in Corcoran. Each of the land use categories is described below.

Table 2-5: Land Use Designations

Land Use Category	Description
Rural/Ag Residential	Development is agricultural and large lot residential. Area is not intended to receive municipal sewer and water. Density will not exceed 1 unit per 10 acres, except for areas developed under the flexible residential development guidelines in the Open Space & Preservation ordinance.
Agricultural Preserve	Specifically used to implement the Metropolitan Agricultural Preserves program according to MN Statute §473H. Density will not exceed 1 unit per 40 acres.
Existing Low Density Residential	Existing residential neighborhoods within the MUSA area. These areas are developed at approximately 1 unit per 2 acres and are not intended to be redeveloped.
Low Density Residential	Residential development at 3 to 5 units per acre.
Medium Density Residential	Residential development at 5 to 8 units per acre in Medium Density.
Mixed Residential	Residential development at 8 to 10 units per acre in Mixed Residential.
High Density Residential	Residential development at 10 to 30 units per acre.
Mixed Use	Mix of residential, retail and office uses either within 1 building or 1 development. Residential development at 8 to 30 units per acre
Commercial	Retail, office and service uses
Rural Service/ Commercial	Commercial, service and industrial uses, including contractor's yards and other industrial uses with outside storage. This area is not expected to have public sanitary sewer and water service within the 2040 planning period.
Business Park	Intended to accommodate a business campus at the northeast corner of CR 116/CR 30.
Light Industrial	Intended to provide a full range of industrial, manufacturing, warehousing and similar uses with limited outside storage.
Public/Semi-Public	Public facilities, included those owned by the City of Corcoran, semi-public facilities like places of worship and Rush Creek Golf Course.
Parks/Open Space	Public opens space and parks.

Rural/Ag Residential
The Rural/Ag Residential area is the community's largest land area and is intended to remain rural. The Metropolitan Council categorizes this area, existing outside the 2040 MUSA boundaries, as Diversified Rural. Diversified Rural areas are not within the Metropolitan Council's Long-Term Sewer Service area. However, the Metropolitan Council is in the preliminary stages of planning a new sanitary sewer treatment facility to serve the northwest metropolitan area, including those parts of Corcoran designated as Diversified Rural. The City will continue to monitor this planning effort.

The Rural/Ag Residential areas will continue to be defined by natural areas, such as wetlands and floodplains, and areas that are utilized for planted fields, pasture land, hobby farms, and large residential lots. The community must balance the desire all residents have for this rural experience with the needs of individual property owners in this area who may need to realize the value of their property now, rather than waiting for the arrival of urban services. This effort can be accomplished in part by amending the Open Space and Preservation Plat ordinance, which allows the use of smaller lots where natural resources are preserved and the development is designed to allow for future maximization of undeveloped spaces. This will allow a landowner to develop a portion of land while holding the remainder in a tract that is viable for future development. The undeveloped portion will not be held as open space for permanent conservation; rather, it will be held for future sewered densities through a temporary development agreement or deed restriction. The ordinance will also provide incentives for protecting natural resources.

Agricultural Preserve
This land use designation is specifically used to implement the requirements of the Metropolitan Agricultural Preserves program. All land parcels in the Rural/Ag Residential land use designation that meet the requirements for eligibility in the Metropolitan Agricultural Preserves program according to MN Statute §473H may apply to the City for enrollment.

When land is removed from the Metropolitan Agricultural Preserve program, the land use will revert to its underlying land use: Rural/Ag Residential outside of the MUSA and Low Density Residential in the MUSA.

Existing Residential
This land use designation accounts for existing residential development in the City of Corcoran at very low densities. The density for this area is 0.50, or roughly 1 unit per 2 acres.

Low Density Residential
This land use category identifies areas for single-family detached residential development at an average density of 3 to 5 units per acre. This land use category will be Corcoran's predominant land use inside the 2040 MUSA boundary. Residential development within or adjacent to environmentally sensitive areas will be guided as Low Density Residential to reduce development impacts to these areas. This category also includes Shamrock Golf Course and Pheasant Acres Golf Course.

Low Density Residential areas will also be located contiguous to Ag/Rural Residential areas to help create a transition from the rural environment to a more urbanized land use pattern.

Medium Density Residential
The intent of the Medium Density Residential district is to accommodate mid-density clusters of small lots and attached townhomes, ranging from 5 to 8 units per acre.

Mixed Residential
The Mixed Residential District will accommodate a range of housing types including a mix of small lot detached homes and attached side-by-side (row) or stack townhomes at a density of 8 to 10 units per acre. These medium-density housing categories are planned in areas that provide transitions to more intensive land uses, are served by higher-functioning roadways and are adjacent to other higher-density or mixed-use areas where a greater concentration of services will be provided.

High Density Residential
The purpose of this land use district is to accommodate the development of multiplex and low- to high-rise apartment buildings and condominiums. Development will occur at a density of 10-30 units per acre. Architecture, landscaping, open space, resident recreational areas, and surface water retention features are important in high density residential areas to ensure that development is appropriate and consistent with the community's character and environmental best practices. Ideally, streets and buildings will be designed around pedestrians to accommodate alternative transportation use such as bicycles and transit.

Mixed Use
The intent of the Mixed Use district is to allow for developments that combine residential and commercial uses into a coordinated, planned development project. Typically, mixed use developments will include townhomes, low- and high-rise apartments, retail buildings, and offices. Development may be stacked, with office or housing units located above main floor retail space. Residential density is planned at 8-30 units per acre. Not all mixed-use developments will be required to incorporate residential units. Mixed use developments will be oriented around pedestrians rather than automobiles. By providing walkable mixed-use areas, stress on the transportation system is reduced and a "sense of place" is created.

A portion of the Mixed Use designation is located on the east side of County Road 116 in what is considered the Downtown Core.This area is envisioned to provide a "main street" experience, with retail shops and service businesses mixed with residential and offices on the second floors of buildings.

The Town Center is the walkable traditional neighborhood supporting the Downtown Core. The Town Center is bound by City Hall on the north, County Road 10 on the south (a small portion extends south of County Road 10 at the southeast corner of County Road 10/116), County Road 116 on the west and Maple Hill Road on the east. The Town Center is intended to support the Downtown Core through walkable blocks, a variety of housing types and densities, and a unified public realm aesthetic. The Downtown Core is a subset of the Town Center and shall have additional design guidelines.

Special emphasis will be placed on providing accessible destinations and inviting design. Housing, retail, and other destinations are located in or near the Downtown Core to invite walking by creating pleasant and safe routes within the Town Center. A Town Square, City Hall Park, and 1 small Neighborhood Park create additional opportunities for physical activity and social connectedness.

Uses within the Town Center include: mixed use, public/semi-public, and mixed residential. The Town Center shall be developed in compliance with the standards in the Zoning Ordinance and the standards in the Corcoran Southeast District Plan and Design Guidelines adopted in 2016, as may be amended. This plan will be modified to reflect the transportation policy changes in this 2040 Plan, but the general principles remain unchanged.

The area located between the intersections of County Road 116 and County Road 30 on the west and County Road 30 and County Road 101 on the east is also guided as Mixed Use. Future connecting improvements to County Road 30 will enhance its role as a major east-west corridor to Highway 610 in Maple Grove. This General Mixed Use District will likely include a mix of uses, including commercial and retail services and offices.

The Zoning Ordinance establishes the Downtown Mixed Use and General Mixed Use district to support this land use designation. The Zoning Ordinance provides 2 distinct districts to acknowledge the uniqueness of each area. Within the district zoning standards, site and design performance standards have been established to support the vision and concept plans developed for each of the mixed use areas. Additionally, design guidelines have been adopted as part of the Zoning Ordinance for each of these areas. The City expects approximately 1/2 of these areas to develop with residential uses at a variety of densities but the City will plan for 8-30 units per acre on average.

Commercial
The areas are intended for development only when sanitary sewer and water are available. In addition to this land use category, additional commercial opportunities will be available within Rural Service/Commercial Mixed Use and Business Park districts.

Development of Commercial areas should include architectural themes and high-quality designs that reflect the rural character of the City as defined by the adopted Design Guidelines. Building designs and materials promoting this aesthetic, and details such as planting beds, ornamental fencing, decorative lighting, and sidewalks, will be required in Commercial areas.

Rural Service/Commercial
Located at the intersection of County Road 10 and County Road 19, the Rural Service/Commercial category provides a separate and distinct area for commercial land use. This area is intended to continue as a rural service area with commercial uses that may be maintained utilizing individual septic systems or approved alternative systems. This area is not expected to have public sanitary sewer and water service within the 2040 planning period.

This area will have less strict building and site development standards than other commercial areas to allow for contractors' yards and similar uses. The area can provide a relocation opportunity within the City for businesses that would not typically locate in high land-value areas. Zoning regulations will be developed to address the minimum design standards and specific screening requirements for this unique land use.

Figure 2-1:
Town Center Plan

Business Park
The Business Park category is intended to accommodate large office buildings and corporate campus developments, medical offices, technology centers, or light-industrial and office-warehouse developments that require larger sites. The Business Park district is located on County Road 30 east of County Road 116 and reflects the anticipated, substantial increases in traffic through the County Road 30 corridor to the planned, final stretch of Highway 610. These traffic levels will increase visibility for a business park and support the vision for this corridor as a major employment center.

Light Industrial

The Light Industrial category is intended to provide areas for manufacturing, warehousing, automotive, trucking, office, and other related industrial uses. These uses typically are not viewed as compatible with residential or some commercial uses.

Parks/Open Space and Public/Semi-Public Land Use Categories

These categories include Rush Creek golf course, all places of worship, the City Hall, Public Works, and all public parks and land.

Staging

The Metropolitan Council asks developing cities to provide anticipated rates of growth in 5-year increments. In its Thrive MSP 2040 vision plan, the Metropolitan Council defines strategies for developing communities to implement the policies.

These strategies include the following:

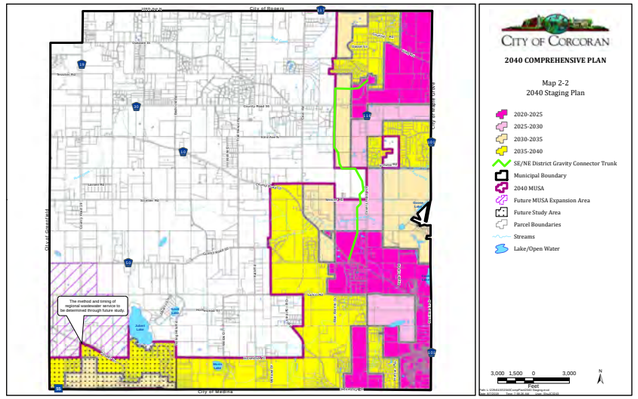
- Stage local infrastructure and development plans to accommodate 20 years' worth of forecasted growth.
- Select and implement local controls and tools for timing and staging of development throughout the community.
- Adopt ordinances or policies to accommodate growth and use land and infrastructure efficiently.
- Identify areas reserved for future urban development and develop strategies to minimize development in those areas that could preclude future urban development.
- Plan for necessary infrastructure improvements.

Development of a staging plan also provides several benefits to the City. A staging plan:

- Creates an orderly, logical growth pattern based on development patterns and availability of infrastructure.
- Allows for a connected transportation network.
- Clearly defines when land is available for development.
- Allows the City greater control over the pace and location of new development and the provision of necessary services.
- Provides greater ability to plan, budget, and set goals for future development.

The Staging Plan reflects anticipated sewer service areas located in the 3 corners of the City, where regional interceptors will be extended from adjacent communities. The Staging Plan boundaries follow the 2040 Land Use Plan boundaries. Areas outside the Staging Plan boundaries are the Rural/Ag Residential land use category, where development polices will be created to provide flexibility for development while preserving large land areas for future urbanization. The 2040 Staging Plan is displayed in Map 2-2.

Future land uses are broken down by staging areas and presented below in Map 2-1. Density assumptions were included to estimate the potential number of housing units to be accommodated in each staging area.



Map 2-2: 2040 Staging Plan *(See page 53 for large size map.)*

It is important to note, similar to the 2040 Land Use Plan, the Staging Plan total for each 5-year period represents total potential units based solely on the low end of the density range calculated by total net acres. The allowed pace of development will be based on the population and housing forecasts presented in Chapter 1, with an average of 230 units/year over the 20-year life of the plan.

Growth Management

Growth Framework

The City Council authorized an extensive public participation process for the adoption of the 2030 Comprehensive Plan. In the 2030 Comprehensive Plan, a large area of the City was added to the Metropolitan Urban Service Area (MUSA) to accommodate anticipated exponential growth. Since that time, growth has been less than anticipated and Metropolitan Council forecasts have been adjusted to reflect market conditions.

The MUSA intentionally includes more land than is needed to accommodate the forecasted growth. This policy was adopted as part of the 2030 plan to allow landowners and the City the flexibility to allow development to respond to market demand within the framework of this plan.

The City of Corcoran seeks to promote a more efficient use of land to allow the City to balance the demand for urban services and the ability of the City to provide those services in a fiscally and environmentally responsible manner.

The City will create a Growth Management Policy that will manage development based on the timing and sequence illustrated in the 2040 Sanitary Sewer Service Staging Plan. The Growth Management Policy will serve as a tool to determine when an area will open for development. A multitude of factors may cause certain areas of the City to develop at a faster rate than others. This Policy is intended to implement the Sanitary Sewer Service Staging Plan while at the same time provide flexibility to address unpredictable market conditions.

Another goal of the Growth Management Policy is to ensure that the City possesses sufficient administrative capacity to conduct the permitting and construction supervision processes. City staff is responsible for assessing adherence to the Comprehensive Plan, enforcing standards and requirements contained in codes and ordinances, determining that all the necessary public infrastructure and services either are in place or will be built, and ensuring that proposed development will not place a disproportionate economic burden on the community. It is essential that City staff has adequate capability to ensure that these requirements are met, consistent with City, regional and State laws, policies and regulations.

The Growth Management Plan may include the following guidelines:

- A certain percentage of the net developable area in a current staging area must be platted, and a certain percentage of these platted lots must have received Certificates of Occupancy before development will be allowed in subsequent or other staging areas. Staging in different districts will be considered independent of one another.
- A development ratio of non-residential to residential acreage may be required to manage tax base and infrastructure debt the City may incur with new development.
- Feasibility studies will be required to identify utility and transportation improvements necessary to support new development.
- Developer commitments to pay costs associated with development will be obtained.
- The City will evaluate land availability in each staging phase and the pace of growth as it relates to forecasts on an annual basis, or more frequently if warranted, to determine remaining development capacity within each staging area.

The Growth Management Policy may allow acceleration in staging if:

- A large-scale master planned project is located within both the current and next staging area and adequate infrastructure is in place or will be available to accommodate growth within the next staging area.
- A unique development project is proposed that achieves significant public benefits such as substantial preservation or restoration of natural resource areas, open space, park and/or trail dedication in excess of requirements; unique and desirable life-cycle or affordable housing opportunities; or greater tax base diversification.

Any development in an area prior to the designated staging phase will require a Comprehensive Plan Amendment.

Protecting Special Resources

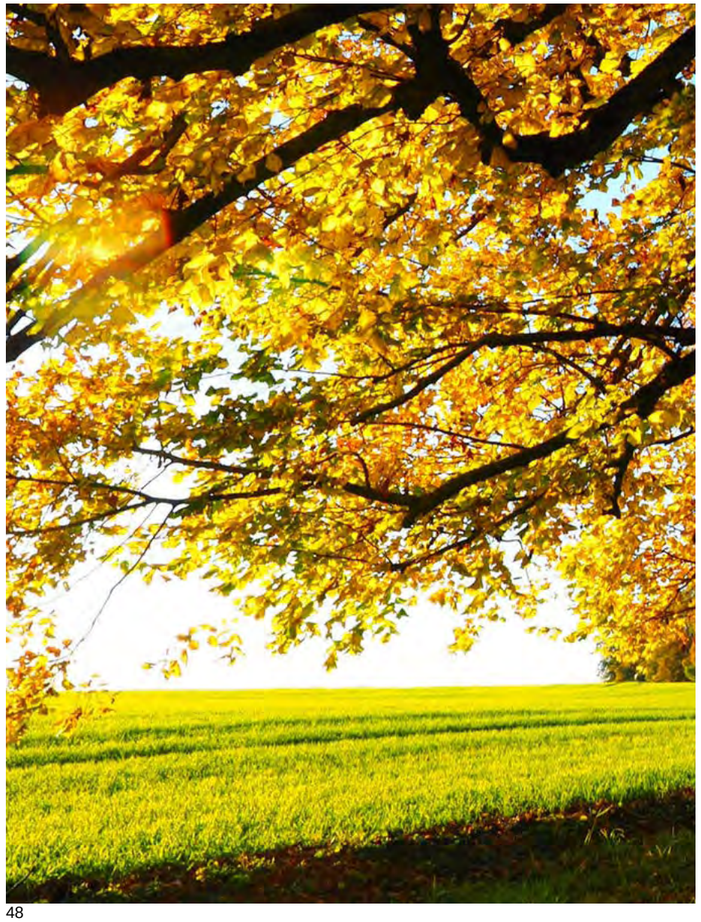
State law requires that comprehensive plans include strategies for protection of special resources including historic preservation and aggregate (mined) resources. These strategies are discussed below.

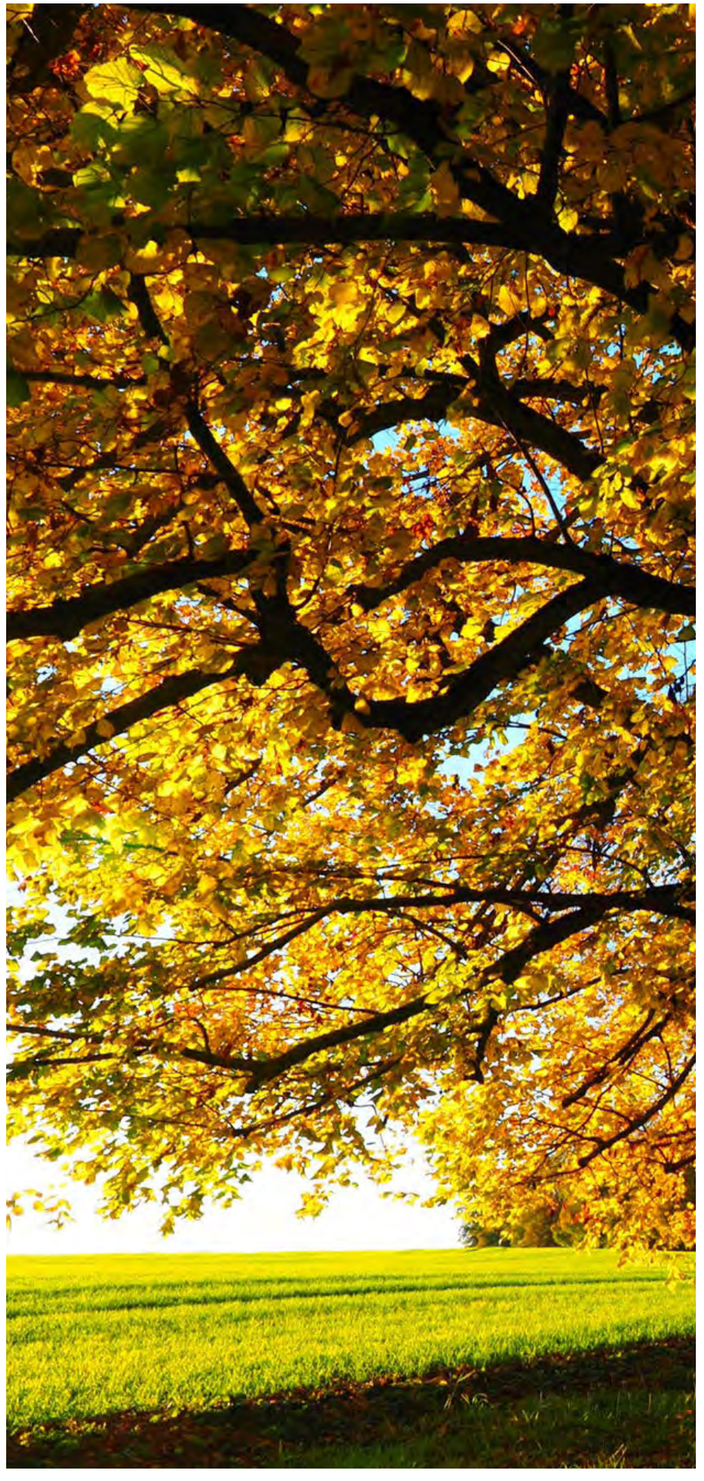
Historic Preservation

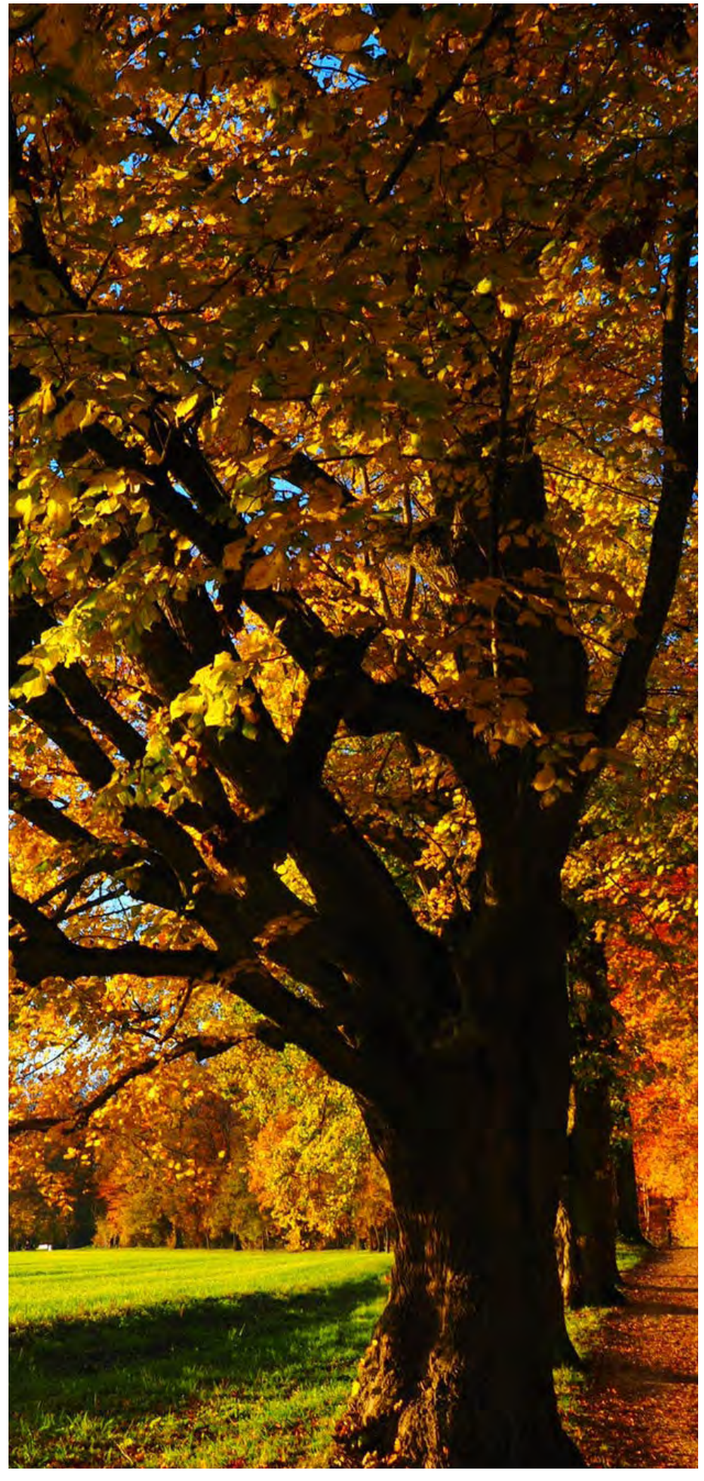
The Metropolitan Land Planning Act (Minn. Stat. 473.859 Subd. 2) requires that local comprehensive plans include a historic preservation element. Historic assets help to promote community pride and create a sense of community. The City of Corcoran values its historic assets and has developed this comprehensive plan to preserve the longstanding pattern of land use that makes Corcoran a unique place to live and work. To support this goal, the City will work toward the creation of an inventory of historically significant buildings, sites, landscape features and other landmarks. This process will include the evaluation of possible tools that can be applied to ensure preservation of these elements, including recognition, public communication and education and, where appropriate, public acquisition.

Aggregate Resources

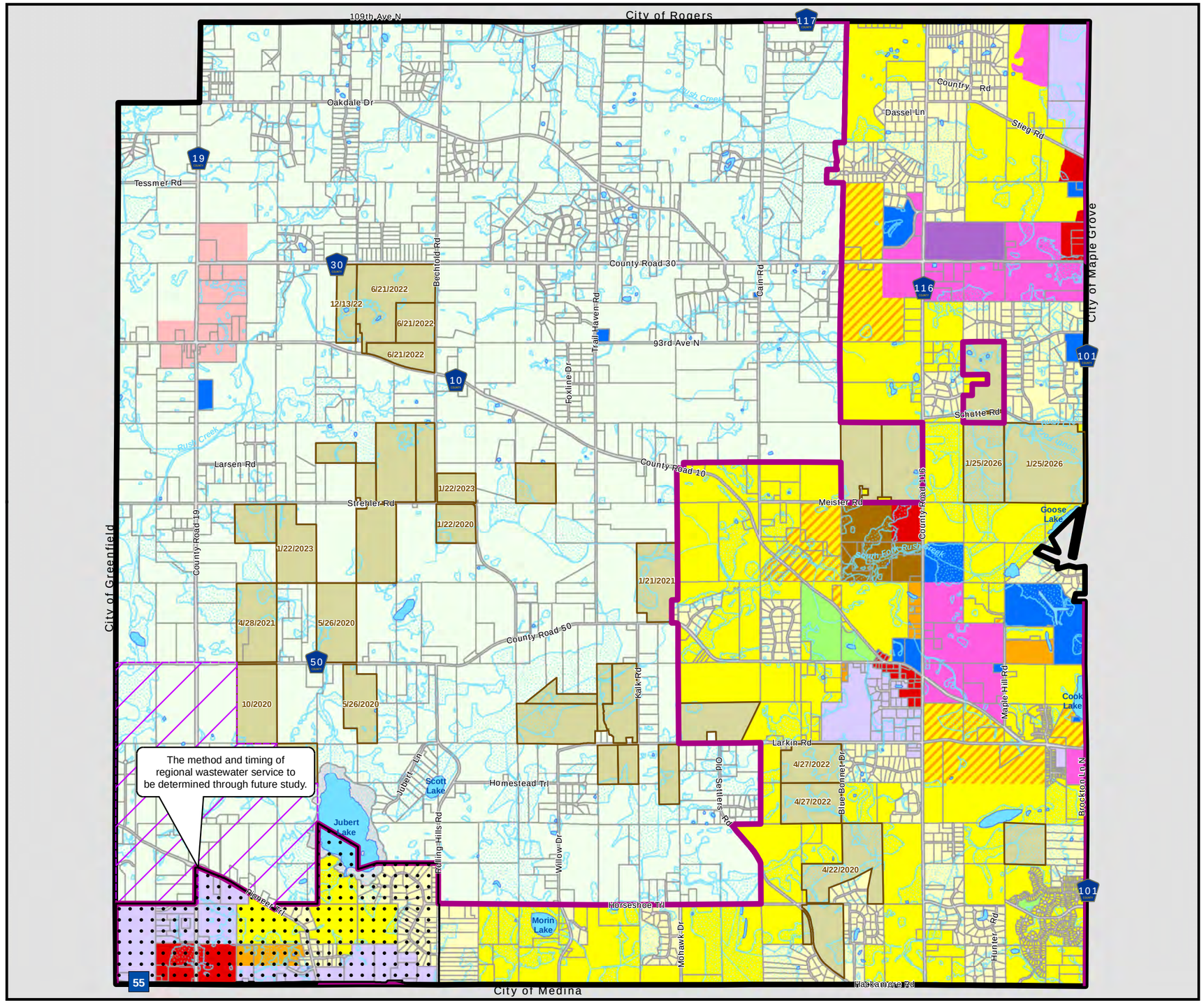
The Metropolitan Council requires cities to identify the location of aggregate resources within the community based on the Minnesota Geological survey within the Comprehensive Plan. No aggregate resources were identified in the City of Corcoran.








XX
SCHOOL
DISTRICT
1894



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 2-1
2040 Future Land Use

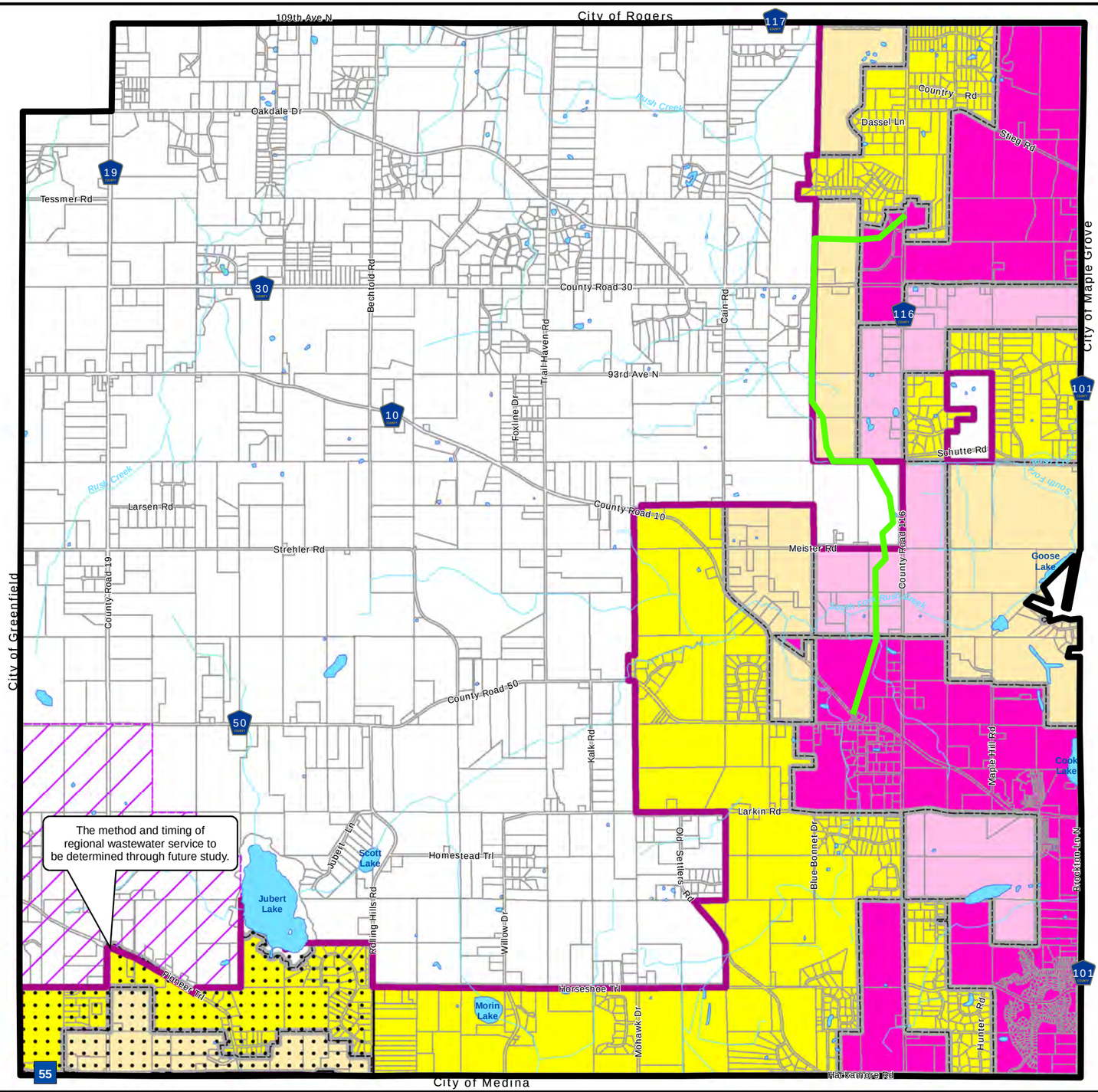
- Rural/Ag Residential
- Existing Residential
- Low Density Residential
- Medium Density Residential
- Mixed Residential
- High Density Residential
- Rural Service/Commercial
- Commercial
- Mixed Use
- Business Park
- Light Industrial
- Public/Semi-Public
- Parks/Open Space
- Agricultural Preserve (Date of Expiration)
- Open Water
- Municipal Boundary
- 2040 MUSA
- Future MUSA Expansion Area
- Future Study Area
- Parcel Boundaries
- Streams
- Lake/Open Water
- Wetlands

Source:
Revised National Wetland Inventory (MN DNR, 2009-2014)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\2040 Future Land Use.mxd
Date: 8/7/2019 Time: 8:03:42 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 2-2
2040 Staging Plan

- 2020-2025
- 2025-2030
- 2030-2035
- 2035-2040
- SE/NE District Gravity Connector Trunk
- Municipal Boundary
- 2040 MUSA
- Future MUSA Expansion Area
- Future Study Area
- Parcel Boundaries
- Streams
- Lake/Open Water

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\2040 Staging.mxd
Date: 8/7/2019 Time: 7:58:26 AM User: ShuJC0243

CHAPTER 3: HOUSING

HOUSING

The condition, affordability and availability of housing affects the social and economic health of every City. Corcoran has the opportunity to provide opportunities for housing options that will meet the needs of current and future residents. Housing should meet the needs of individuals and families throughout their lives, including single-family detached homes, townhomes, condominiums, apartments and senior housing.

The 2030 Comprehensive Plan identified a need to plan for and manage the development of a variety of housing types to ensure that development occurs in an efficient and cost-effective manner and represents an enhancement to, and not a negative impact on, existing residential neighborhoods. The 2040 Land Use Plan continues to provide housing opportunities for Corcoran's entire population (singles, families, and senior residents) through a variety of residential land uses and densities, including medium density, mixed residential, high density and mixed-use areas. The purpose of the Housing Plan is to establish plans and programs to meet the existing and projected housing needs in Corcoran. The Plan will guide the community's integration of housing goals and policies into land use, infrastructure, community development, transportation, and natural resource decisions.

This Housing Plan satisfies the requirements of the Metropolitan Land Planning Act and stipulations of MN Statute §473.859, Subd 2(c) and Subd 4. The plan includes background information on current housing supply and an assessment of current and future housing needs. Chapter 11 of the Comprehensive Plan includes implementation strategies for the Housing Plan and other plan chapters.

Goals and Policies

The vision statement, as described in Chapter 1, defines what the City of Corcoran should look like in the future. The goals and policies guide the Housing Plan to help achieve that vision for housing development. The goals and policies that follow were developed from the goals and policies prepared in the 2030 Comprehensive Plan and reaffirmed for the 2040 Comprehensive Plan Update. These goals and policies are listed below and are considered the City's Housing Action Plan.

Goal 1: Provide a healthy variety of housing types, styles, densities and choices to meet the housing needs of residents.

Policy 1: Provide a mix of housing types to provide housing opportunities, including continued single-family growth and new opportunities for multiple family and senior housing developments.
Policy 2: Periodically review land use regulations to determine the effectiveness of current ordinances in encouraging additional affordable units as well as encouraging modifications to keep existing housing stock desirable and livable.
Policy 3: Allow the creative use of site planning or Planned Unit Developments (PUD) to provide flexibility for development containing affordable housing, such as a reduction in lot size, setbacks, street width, floor area and parking requirements.
Policy 4: Encourage innovative subdivision design, including clustering techniques to preserve open space or natural features.
Policy 5: Promote development of neighborhood life-style centers that incorporate housing in a range of densities and affordability limits in close proximity to shopping, services, daycare, and medical services. Life-style design should include safe access to parks and schools and the ability to walk, bike, or have access to transit.
Policy 6: Consider developing a list of available resources and providers of in-home services to older adults and those with special needs.
Policy 7: The City supports preservation of the Maple Hill Estates manufactured home park as an affordable housing option in Corcoran.

Goal 2: Promote housing rehabilitation.

Policy 1: Support first-time homebuyers' programs to assist new homeowners entering the market for existing homes.
Policy 2: Consider supporting and actively promoting housing rehabilitation programs for existing owner-occupied homes and rental buildings or units. This includes promotion of all County and State programs and non-profit programs.
Policy 3: Consider utilizing the City's website, newsletter, and other sources for promotion and advertising of housing programs.
Policy 4: Consider creation of a housing maintenance code to maintain existing housing stock.
Policy 5: Consider programs that encourage maintenance of existing houses, including a housing remodeling fair, neighborhood watch programs, City beautification programs, and City-wide clean-up programs.

Goal 3: Improve the availability of affordable housing and senior housing.

Policy 1: Developers should be encouraged to address the provision of affordable housing within all new residential developments within the 2040 Metropolitan Urban Service Area (MUSA).
Policy 2: Consider participation in the Livable Communities Act Local Housing Incentives Program.
Policy 3: Utilize techniques such as land trusts to maintain long-term affordability.
Policy 4: Partner with, support and market programs offered by the County, State, Minnesota Housing Finance Agency, Federal government, and non-profits to fund the development of affordable housing. Increase the housing options available for housing developments.

Housing Assessment

Household Forecasts

Corcoran will continue to plan infrastructure and housing investments to meet the projected growth over the next 20 years. The City's housing supply should be diverse and consist of a variety of styles and price ranges to allow residents the option of living in Corcoran their entire lives, and to provide the opportunity for their children to do the same.

Housing Development Trends

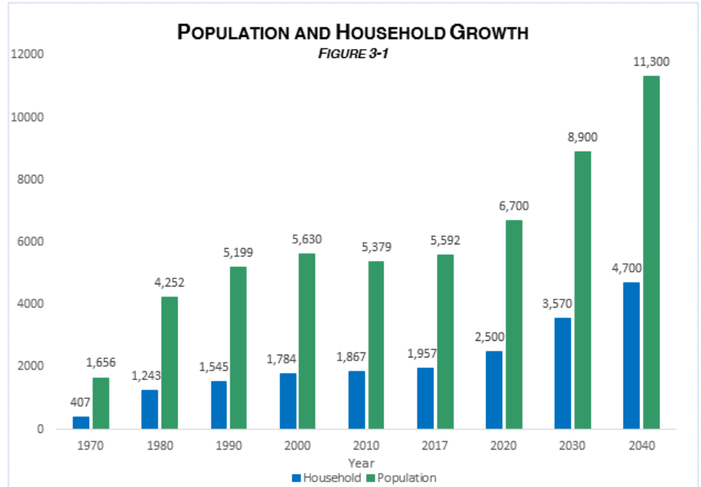
Table 3-1 and Figure 3-1 show Corcoran population and household growth since 1970 and forecasts through 2040. Each new household represents a new housing unit added to the community.

Table 3-1: Population and Household Growth

Year	Household	Population
1970	407	1,656
1980	1,243	4,252
1990	1,545	5,199
2000	1,784	5,630
2010	1,867	5,379
2017	1,957	5,592
2020	2,500	6,700
2030	3,570	8,900
2040	4,700	11,300

Source: Metropolitan Council, March 2018, Local Planning Handbook

Population and Household Growth
Figure 3-1



Sources: U.S. Census Bureau Decennial Census, Metropolitan Council Annual Estimates, and Metropolitan Council Forecasts.

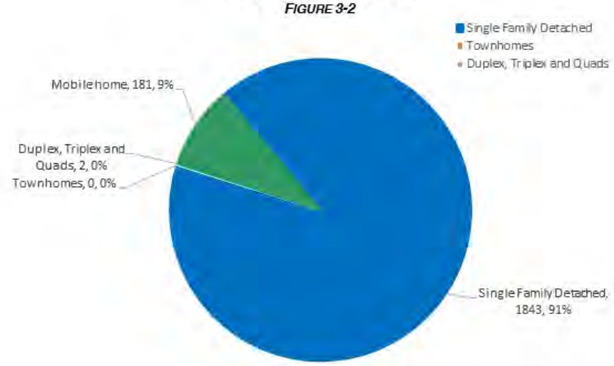
Corcoran's current housing stock consists primarily of rural residential and large lot detached single-family homes. As of the 2010 Census, the City contained 1,919 total housing units. Of these units, 186 are manufactured homes located in the City's mobile home park. The City of Corcoran has only recently been able to provide municipal sewer and water, which will allow the City to implement the City's vision to provide a variety of housing types, including a variety of apartments, condominiums and townhomes. The land use plan provides areas for medium and higher density residential development, which can accommodate these types of uses and provide housing options for Corcoran residents. An inventory of the City's housing stock, by number of dwelling units within a structure, is provided in Table 3-2 and Figure 3-2.

Table 3-2: Corcoran's Housing Stock

	1990	2000	2010	2017
Single-Family Detached	1,364	1,614	1,731	1,843
Townhomes (Single-Family Attached)	11	19	0	0
Duplex, triplex and quad	14	7	2	2
Manufactured Home	171	171	186	181
Other (Boat, RV, etc.)	4	-	-	-
Grand Total	1,564	1,811	1,919	2,026

Source: Decennial Census and Metropolitan Council Housing Stock 2017

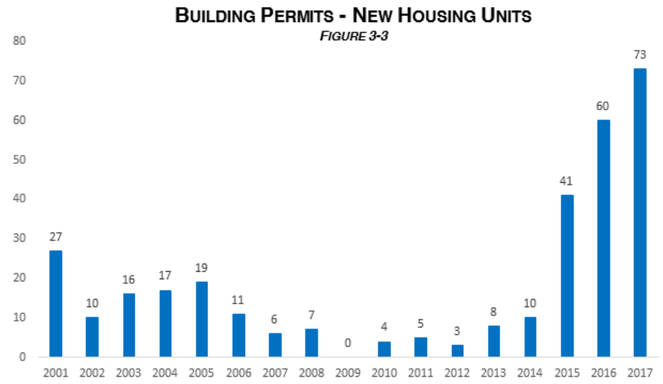
Housing Stock 2017
Figure 3-2



Source: U.S. Census Bureau Decennial Census and Metropolitan Council Housing Stock Estimates.

The City issued 198 new construction building permits between 2010 and 2017. The number of building permits issued per year since 2001 is shown in Figure 3-3.

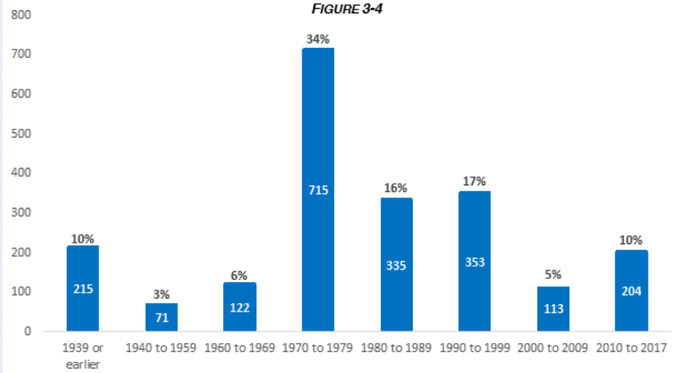
Building Permits - New Housing Units
Figure 3-3



Source: Metropolitan Council Residential Building Permit Survey.

Corcoran's housing stock is generally in good condition. Details on the age of Corcoran's housing stock are presented in Figure 3-4. A majority of homes (50 percent) in Corcoran were constructed in the 1970s and 1980s. Only 10 percent of the housing stock was constructed prior to 1939. As a result, Corcoran sees fewer housing maintenance issues than many older communities.

Age of Housing Stock
Figure 3-4



Source: Residential Building Permits Issued by Corcoran

Housing Prices and Rents

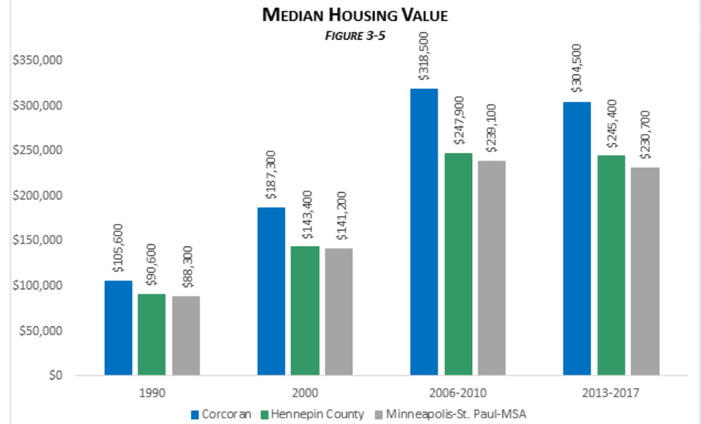
According to the 2010 Census, 91 percent (1,740) of housing units in Corcoran were owner-occupied and 6 percent (127) were renter-occupied, with 3 percent (52) of the units being vacant.. Table 3-3 and Figure 3-5 show the median housing value in Corcoran compared to Hennepin County and the greater metropolitan area from 1990 to 2017.

Table 3-3: Median Housing Value

	1990	2000	2010	2017
Corcoran	$105,600	$187,300	$318,500	$304,500
Hennepin County	$90,600	$143,400	$247,900	$245,400
Minneapolis-St. Paul, Bloomington, MN-WI Metropolitan Statistical Area	$88,300	$141,200	$239,100	$230,700

Source: Decennial Census (1990/2000) and American Community Survey 5 Year Summary File (2010/2017)

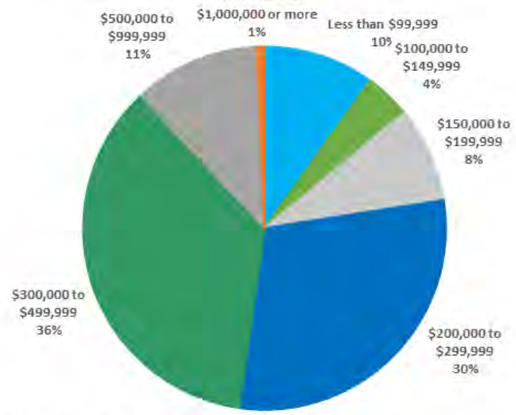
Median Housing Value
Figure 3-5



Source: U.S. Census Bureau Decennial Census and American Community Survey.

Another source for housing prices are Certificates of Real Estate Value filed with the Minnesota Department of Revenue when owner-occupied housing units are sold. The value (sale price) of owner-occupied housing units sold in Corcoran, during the years 2010-2016, is presented in Figure 3-6.

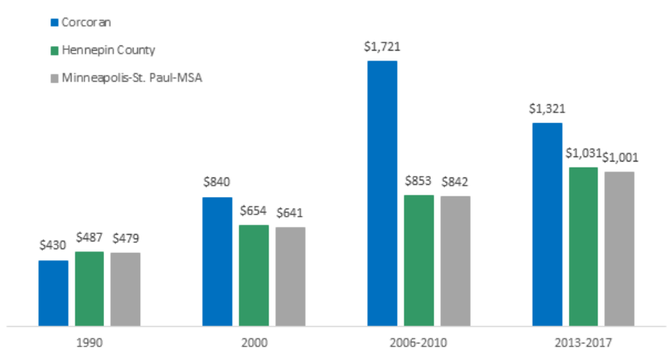
CORCORAN HOUSING VALUE (2010-2016)
FIGURE 3-6



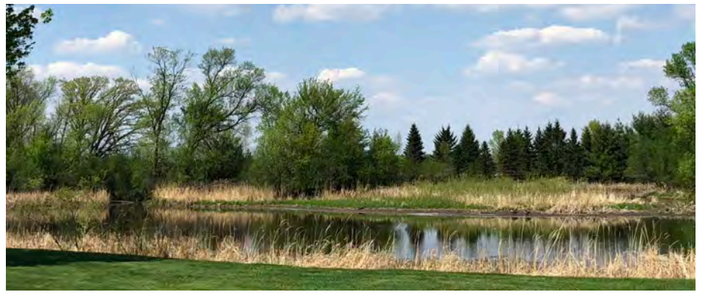
Source: Minnesota Department of Revenue, Certificate of Real Estate Value

Renter occupied units account for a small portion of the current housing in Corcoran. Figure 3-7 displays the median gross rent for these units.

MEDIAN GROSS RENT
FIGURE 3-7



Source: U.S. Census Bureau Decennial Census and American Community Survey.



HOUSING NEEDS

AFFORDABLE HOUSING

As part of the 2040 Regional Development Framework, the Metropolitan Council estimated that approximately 37,900 additional affordable housing units will be needed in the region during the planning period of 2021-2030. As part of Thrive 2040, the housing policy plan defines affordable housing as housing affordable to those householders earning 80 percent of area median income. According to Metropolitan Council 2017 Affordability Limits, the area median income for the 7-county Minneapolis-St. Paul (MSP) area adjusted by HUD to be applicable to a family of 4 was $90,400 in 2017. A family of 4 at 80 percent of this figure earns $72,320 and would be able to afford a home at a purchase price of $236,000 in 2018. Table 3-4 shows a breakdown of the number of units affordable by household income for Corcoran.

TABLE 3-4: EXISTING UNITS AFFORDABLE BY HOUSEHOLD INCOME

	Units	Percent of All Units
Affordable to Households with Income at or below 30 percent of AMI (less than or equal to $27,120)	121	6%
Affordable to Households with Income 31percent to 50 percent of AMI (over $27,100 and less than or equal to $45,200)	68	4%
Affordable to Households with Income 51percent to 80 percent of AMI (over $45,200 and less than or equal to $72,320)	552	28%
Affordable to Households with Income Above 80 percent of AMI (over $72,320)	1227	62%
Total Housing Units	**1968**	**100%**

Source: Metropolitan Council, March 2018, Corcoran Existing Housing Assessment, Local Planning Handbook

Currently there are approximately 732 homesteads in Corcoran valued at or below $236,000 (Hennepin County assessor's data/GIS). Using the total of 1,919 housing units from 2010 Census data, these 732 homesteads account for approximately 38 percent of the City's housing stock. Corcoran does not currently have any publicly subsidized units available. Most of the affordable housing at less than 50 percent AMI comes from the Maple Hill Estate manufactured home park in Corcoran. The manufactured home park is a recipient of the Metropolitan Council's Manufactured Home Park Preservation Grant, which has a goal of connecting the home park to the regional wastewater treatment center by matching up to 50% of the associated costs. This connection is expected to take place in 2019.

There is uncertainty associated with the extent to which future buyers will view a home as an investment and the amount of any premium they will be willing to pay for the benefits of ownership versus rental. While recent drops in interest rates and lower home prices have increased the availability of affordable housing options, changes in mortgage lending practices create new obstacles for lower income households to obtain financing. It is clear that jobs and income levels are the driving force in demand and sustainability. The Metropolitan Council has allocated a certain number of affordable housing units to be provided between 2021 and 2030 for each community within the region, based on the following 4 criteria:

- Household growth potential
- Ratio of local low-wage jobs to low-wage workers
- Current provision of affordable housing
- Transit service

Based on their analysis, the Metropolitan Council's affordable housing need for Corcoran is to create 377 new affordable housing units between 2021 and 2030. Table 3-5 shows the affordable housing units broken down into the three bands of affordability. The affordable housing allocation accounts for approximately 23 percent of the forecasted housing added from 2021 to 2030. The affordability limit is 80 percent of area median income for both owner-and renter-occupied housing units.

TABLE 3-5: AFFORDABLE HOUSING NEED ALLOCATION

Income Range	Number of Units
At or Below 30% AMI	152
From 31 to 50% AMI	168
From 51 to 80% AMI	57
Total Units	**377**

Source: Metropolitan Council

To provide opportunities for affordable housing in the community, the City is taking the appropriate regulatory measures within the Comprehensive Plan by guiding areas for higher density housing and including policies to promote affordable housing in residential land use areas. In Chapter 2, Table 2-3 shows the land use intended to develop between 2021 and 2030 that can address the affordable housing need. Guiding land at greater densities increases opportunities for affordable housing, as per-unit land and development costs decrease when density rises. While the City is doing its part in creating a Land Use Plan to guide areas for higher density housing, barriers to development of affordable housing still exist in Corcoran and the region. Some of these barriers are beyond the City's control and include the following:

- Steady increases in land prices and construction costs.
- Physical limitations of land due to wetlands, poor access, and poor soils that would increase the cost of development or construction.
- State, County and local tax structures.
- Lack of transportation and employment infrastructure.

TABLE 3-6: COST BURDENED HOUSEHOLDS BY AMI

Income Range	Number of Units
At or Below 30% AMI	42
From 31 to 50% AMI	42
From 51 to 80% AMI	104
Total Units	**188**

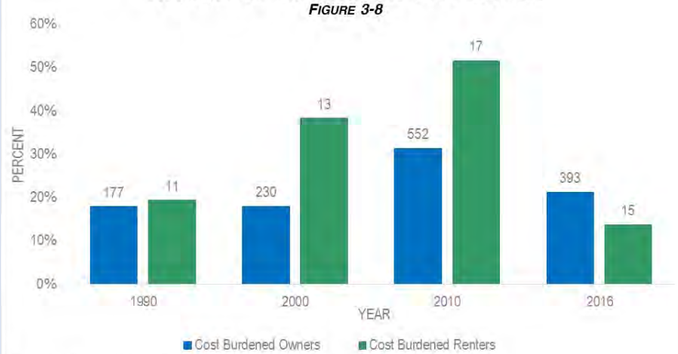
Source: Comprehensive Housing Affordability Strategy Data (CHAS), 2010-2014

Corcoran will promote affordable housing most effectively by adopting and enforcing land use and zoning standards that do not impede or deter affordable housing. Metropolitan Council defines a cost burdened household as one that is spending 30 percent or more of their annual household income on housing. The data on the percentage of owner and renter households in Corcoran that are classified as cost burdened is displayed in Figure 3-8.

A factor that contributes to the significant drop in cost burdened renters is the drop in average rent for Corcoran from 2010 to 2016 shown in Figure 3-8. This drop lowers the percentage of income spent on housing enough that most renters are no longer considered cost burdened.

HOUSEHOLDS EXPERIENCING COST BURDEN

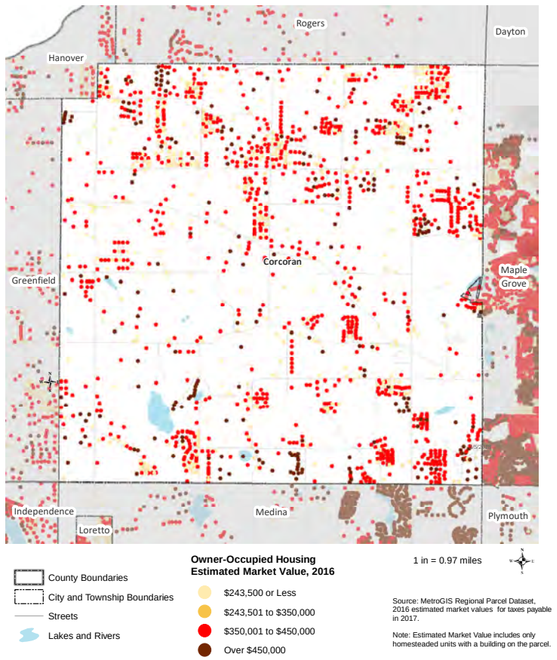
FIGURE 3-8



Source: U.S. Census Bureau Decennial Census and American Community Survey

Owner-Occupied Housing by Estimated Market Value - Corcoran

FIGURE 3-9



Life-Cycle Housing

Life-cycle housing is defined as housing that meets the housing needs of individuals and families throughout their lives. Generally, people desire diverse types of housing at various stages of their life-cycle. Usually, people between the ages of 0 and 19 are students living with their parents. Those between the ages of 20 and 24 are often renters and do not often become first time home-buyers until they reach the ages of 25 to 34. First-time homebuyers (25-34) and move-up renters often prefer to purchase modestly-priced single-family homes, townhomes, or rent upscale apartments. People aged 35 to 49 often are in their peak earning years and can afford to buy a larger home with more amenities, referred to as move-up housing. Empty nesters are usually between the age of 50 and 64 and many of them may decide to downsize to a smaller housing unit, as with younger seniors (between the ages of 65 to 74). This choice may include renting a multi-family unit, purchasing a lower-maintenance multi-family housing product such as a condominium or townhome, or purchasing a home in a retirement community. Older seniors (74 and above) may begin to require some level of assisted housing.

Senior Housing

As the community ages, there will be an increase in demand for smaller, low maintenance housing designed for the senior population. This demand might be accommodated through a variety of townhouse styles or apartments in mixed use settings. Empty nesters are a particularly active group on the younger end of the senior age range and locating developments near some of Corcoran's natural amenities and retail/service areas will be enticing to this group. For seniors, no longer able to live alone, supportive housing options such as assisted living or memory care units will be needed.

This Chapter identifies strategies to increase commercial and industrial development in the City of Corcoran. Economic health is an important component of a healthy and thriving community. A strong commercial and industrial base provides jobs to community residents, contributes to a community's tax base, and can be a source of psychological strength to a community. Commercial and industrial development will provide additional revenue for the City, which currently relies largely on residential property taxes for revenue. Commercial and industrial tax base will fund increased City services prompted by City growth. The 2040 Plan recognizes the inherent link between commercial development and the availability of skilled and educated workers, affordable housing, developable land and infrastructure.

Housing Tools

There are various housing finance tools available to the City of Corcoran and its residents to address the different housing needs. The City's existing and projected housing needs and a list of available tools to address them are considered below. The following tools are housing finance options available to the city:

Existing Housing Need

Preservation of manufactured housing:

- The City will support the use of any available homeownership resources for residents of manufactured housing, including first time homebuyer and rehabilitation resources.
- The City will include manufactured housing as an allowable use in land use and zoning districts assigned to the existing manufactured home community.
- The City will consider, by 2030, supporting a local notice of sale or first look provisions to provide residents time to consider cooperative ownership if/when the community becomes available for sale.

Future Housing Need

152 units affordable at 30% Area Median Income (AMI) or less, 168 units affordable at 31-50% (AMI) and 57 units affordable at 51-80% (AMI). For all bands of affordability listed above, the City will evaluate the use of the following tools to meet this need:

- Housing bonds
- Tax Abatement
- Tax Increment Financing (TIF)
- Application or support of developer application to Consolidated Request for Proposals – Minnesota Housing Finance Agency
- Application or partnership with Hennepin County to use the HOME Investment Partnerships Program (HOME) - U.S. Department of Housing and Urban Development
- Application or partnership with Hennepin County to use Community Development Block Grant Funds (CDBG) - U.S. Department of Housing and Urban Development
- Application or support of developer application to the Affordable Housing Incentive Fund (AHIF) – Hennepin County

The City will study, by 2030, the following tool and determine if it will be used to meet this need:

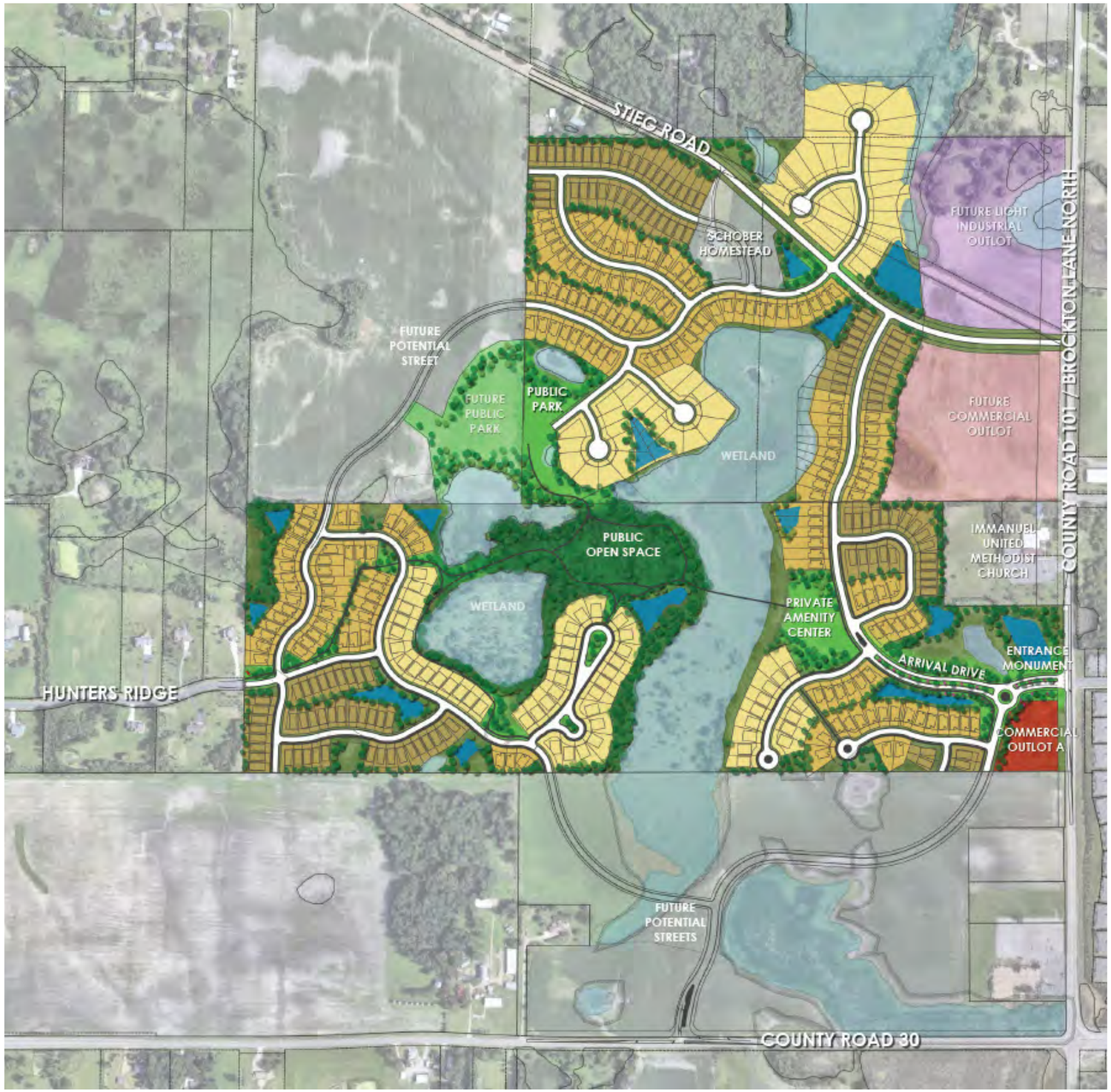
- The activation of the current HRA/EDA
- Participation in Livable Communities Act and application to relevant grant programs
- Site Assembly for projects at this affordability level

General Affordable Housing Need

The City will study, by 2030, the use of the following tools to meet affordable housing needs generally:

- Providing effective referrals to existing and future residents in need of affordable housing resources not provided by the City
- Staff capacity needs, including participation in regional housing efforts

The City will consider adopting a local Fair Housing Policy at which time it chooses to participate in Livable Communities Act programs.


STIEG ROAD
SCHOBER HOMESTEAD
FUTURE LIGHT INDUSTRIAL OUTLOT
FUTURE POTENTIAL STREET
FUTURE PUBLIC PARK
PUBLIC PARK
WETLAND
FUTURE COMMERCIAL OUTLOT
COUNTY ROAD 101 / BROCKTON LANE NORTH
PUBLIC OPEN SPACE
WETLAND
IMMANUEL UNITED METHODIST CHURCH
PRIVATE AMENITY CENTER
ARRIVAL DRIVE
ENTRANCE MONUMENT
COMMERCIAL OUTLOT A
HUNTERS RIDGE
FUTURE POTENTIAL STREETS
COUNTY ROAD 30

CHAPTER 4:
ECONOMIC COMPETITIVENESS


Red Barn Pet
Retreat

ECONOMIC COMPETITIVENESS

The Chapter identifies strategies to increase commercial and industrial development in the City of Corcoran. Economic health is an important component of a helathy and thriving community. A strong commercial and industrial base provides jobs to community residents, contributes to a community's tax base, and can be a source of psychological strength to a community. Commercial and industrial development will provide additional revenue for the City, which currently relies largely on residential property taxes for revenue. Commercial and industrial tax base will fund increased City services prompted by City growth. The 2040 Plan recognizes the inherent link between commercial development and the availability of skilled an deducated workers, affordable housing, developable land and infrastructure.

Goals and Policies

The City of Corcoran recognizes the importance of each component of the economic development cycle in the overall health and economic stability of the community. The City addresses economic development issues through the following goals and policies:

Goal 1: Promote cooperative efforts and utilize existing resources for economic growth in the City.

Policy 1: Continue to identify and tap into local, State and Federal resources to enhance economic development.
Policy 2: Explore County-wide economic development coordination options.
Policy 3: Promote coordination of the educational system and the business community to ensure the availability of qualified workers.

Goal 2: Promote economic stability and diversity to provide job opportunities to residents.

Policy 1: Support efforts to retain existing businesses and facilitate their expansion.
Policy 2: Support efforts to recruit new businesses and industries in appropriate locations.
Policy 3: Recognize the need to expand infrastructure in the City, including but not limited to roadways, parks/trails, utilities and telecommunications infrastructure, to support and promote continued economic development.
Policy 4: Target financial resources and programs to attract businesses that have an emphasis on job creation and businesses that meet or exceed livable wage requirements.
Policy 5: Encourage the availability of a range of housing types and values to accommodate an ample work force.

Goal 3: Promote efficient, planned commercial and industrial development.

Policy 1: Identify key commercial and industrial development opportunities in planned growth areas at locations with access to major transportation systems.
Policy 2: Encourage and facilitate infill development on vacant parcels to ensure maximum efficiency of land use.
Policy 3: Encourage compact commercial developments that will make efficient use of infrastructure and resources.
Policy 4: Encourage industrial, office, business and commercial development to locate within master planned industrial parks, business parks, or in the Town Center area.

Goal 4: Enhance the character of the City's commercial and industrial development.

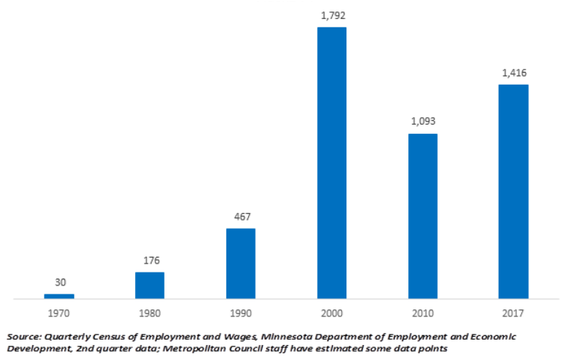
Policy 1: Support the provision of open/green space within commercial and industrial development.
Policy 2: Promote the rehabilitation and redevelopment of under utilized facilities by pursuing and making available various financial programs and assistance.

Economic Assessment

Expansion of the local economy is often tied to existing employers and industries. This section analyzes the existing types of industry concentrated in the City of Corcoran and the competitive environment defined by the presence of industry in surrounding communities.

Corcoran's existing employment base is dominated by small construction-related firms. This is in contrast to the metro area, which is much more diversified in its employment base. For example, approximately 41 percent of all jobs in Corcoran are construction-related, whereas approximately 5 percent of all metro area jobs are construction-related. (DEED Occupational Employment Statistics (OES) Therefore, as Corcoran looks to expand its commercial and industrial tax base, it will need to consider ways to diversify its existing employment base.

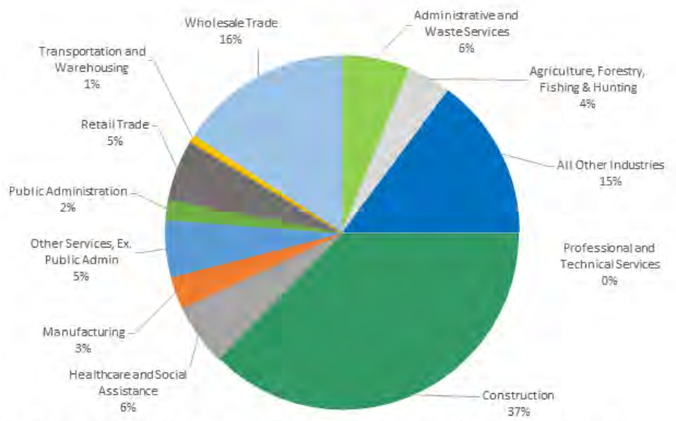
Employment in Corcoran
Figure 4-1



Source: Quarterly Census of Employment and Wages, Minnesota Department of Employment and Economic Development, 2nd quarter data; Metropolitan Council staff have estimated some data points

Although Corcoran's employment base more than doubled between 1990 and 2010, it still remains well below neighboring communities, especially Rogers, Maple Grove, and Plymouth (Table 15). Because some of these communities will continue to develop in coming years, Corcoran's employment base has been drawn back from the 4,000 job increase forcasted in the 2030 Comp Plan to approximatley 1,200 job increase in the 2040 forcasts per Metropolitan Council estimates.

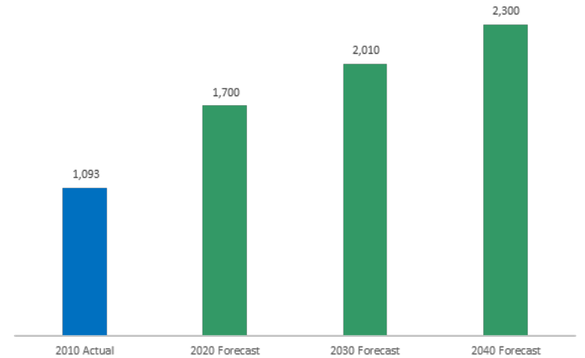
Employment by Industry 2017
Figure 4-2



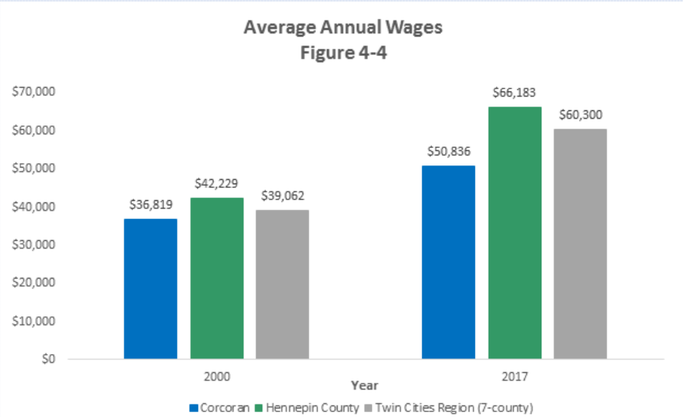
Source: Quarterly Census of Employment and Wages, Minnesota Department of Employment and Economic Development, 2nd quarter data; Metropolitan Council staff have estimated some data points

Most future employment locations will be in areas guided as Mixed Use and Business Park. The intensity levels of future commercial/industrial areas will include impervious coverage up to 70 percent based on City Code requirements. Additionally, buildings in these areas will continue to meet the City's commitment to high quality site-planning, architectural design, and landscaping.

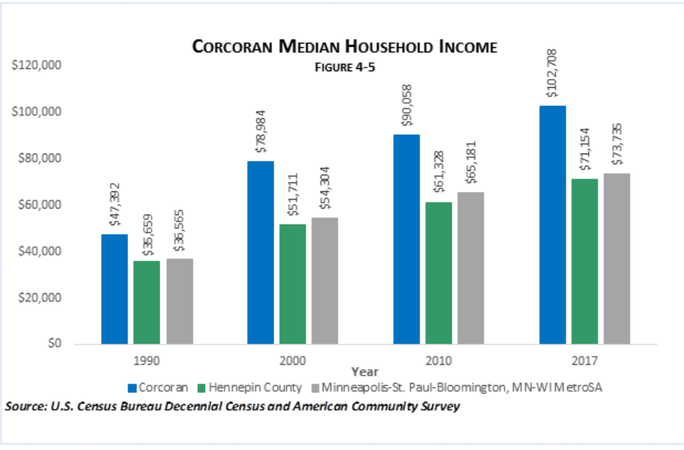
Forecasted Employment in Corcoran
Figure 4-3



Source: Quarterly Census of Employment and Wages, Minnesota Department of Employment and Economic Development, 2nd quarter data; Metropolitan Council staff have estimated some data points; and Metropolitan Council Forecasts.



Source: Quarterly Census of Employment and Wages, Minnesota Department of Employment and Economic Development, 2nd quarter data. Data are not adjusted for inflation.



Source: U.S. Census Bureau Decennial Census and American Community Survey

Corcoran Top Ten Workplaces for Residents in 2015
Table 4-1

Workplace City	Number of Workers
Minneapolis	298
Plymouth	261
Maple Grove	183
Corcoran	121
Medina	107
Minnetonka	92
Brooklyn Park	84
St. Paul	83
St. Louis Park	76
Eden Prairie	71
Other	925

Development in neighboring communities will continue to impact Corcoran for many years. There are several significant concentrations of commercial and industrial districts within 5 miles of Corcoran's boundaries in neighboring cities including Rogers, Dayton, Maple Grove, Plymouth, and Medina. Most of these districts are situated at the intersection of 2 or more major highways.

Each of these districts will strongly compete with any new commercial or industrial development within Corcoran for many years to come.

Although commercial and industrial development has been limited in Corcoran, the City has begun to more actively pursue economic development opportunities in recent years. The City has supported development and extended municipal services to its existing commercial and industrial enterprises in the area located at County Road 116 and County Road 10. The City has identified its Town Center as a key growth area. An industrial district located in the southwest portion of the City along Highway 55 and County Road 19 is identified for development in the coming years.

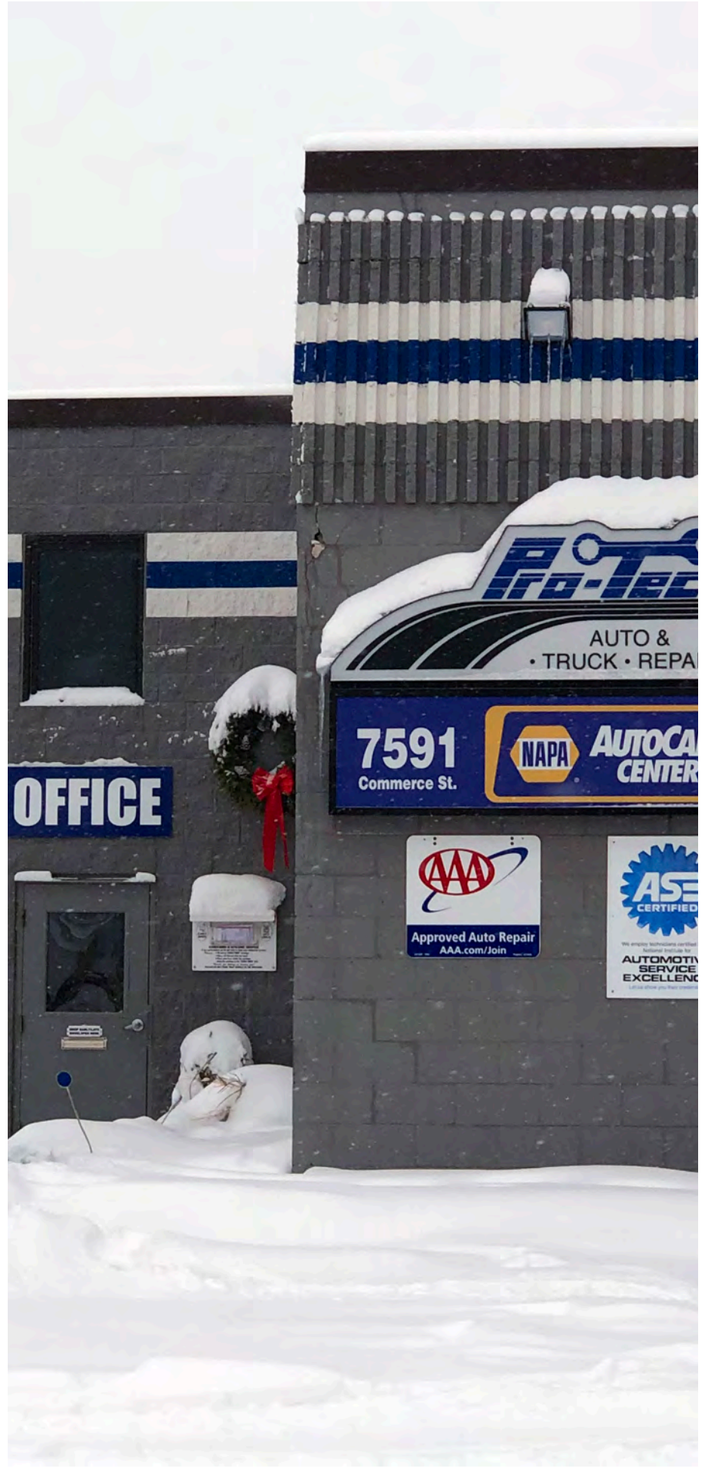
Economic Development Opportunities

The City anticipates the demand for commercial and industrial development will increase significantly by 2040. Therefore, the City's Land Use Plan identifies large areas of commercial, industrial, business-park, and mixed land use that will provide for a mix of jobs, ranging from retail and commercial service jobs to high end technology jobs.

The City's development plan for its downtown area provides an opportunity for additional economic development. The City has guided this area for Mixed Use on the 2040 Land Use Plan, providing flexibility for future development. The development plan is intended to promote investment in Corcoran's downtown, solidifying the area as an important community asset and focal point.

A future I-94 Brockton interchange planned in Dayton, and a Highway 610 interchange planned in Maple Grove, will impact the northeastern portions of Corcoran. These roadway improvements will significantly improve access to the City, making it a more desirable location for commercial and industrial development. To serve this future demand, the City has planned a large industrial/business park area and commercial/mixed use development in the northeastern portion of the City near each interchange.

Additionally, expanding municipal sewer and water services will provide for increased housing opportunities in the City. The continued increase in housing units will create additional demand for commercial services. Corcoran's parks, trails and open space system will be an integral part of the community's life. The system will provide recreational opportunities for park system patrons, while preserving existing natural and historic resources. The parks and trails system should be authentic to the identity of the City and unify neighborhoods to reinforce a sense of community pride.




CONCRETE SCIENCE
7545
Commerce St.
545


Corcoran Crossroads
Marketplace
762
UP FOR FUN?

CHAPTER 5:
PARKS AND TRAILS


Burke

PARKS AND TRAILS

Corcoran's parks, trails and open space system will be an integral part of the community's life. The system will provide recreational opportunities for park system patrons, while preserving existing natural and historic resources. The parks and trails system should be authentic to the identity of the City and unify neighborhoods to reinforce a sense of community pride.

This plan to develop, maintain and grow the park and trail system provides a benchmark from which to make decisions as investment opportunities arise. Goals provide decision-making guidance to the City. Policies provide actionable steps the Parks and Trails Commission and policymakers can take to ensure stewardship of financial, natural, and recreational resources and create a parks and trail system that is representative of the community's values. Diligent planning will result in:

- A system where making healthy lifestyle choices is integral to daily life.
- A system with quality resources and facilities that attract new development, businesses, and visitors.
- A venue for strengthening community engagement by giving visitors places to gather and interact.
- A community where key natural resources are protected before development occurs.
- A City that is known for promoting a high quality of life.

Application

This Plan places emphasis on park and trail development within the Metropolitan Urban Services Area (MUSA) as new development occurs. While park and trail locations are also identified in areas outside the MUSA, plans and proposed corridors are for guidance purposes and will be implemented over the long term as development occurs and opportunities to work with landowners arise.

The Parks and Trails Plan uses the City's 2003 Natural Resource Inventory as a foundation for the park and trail system to be developed in Corcoran over the next 20 years.

The plan incorporates national trends and standards as available from the National Recreation and Park Association (NRPA). NRPA publishes standards to help communities in planning, acquisition and development of park and open space. In more recent years, the NRPA is encouraging communities to benchmark their metrics and enter the data into their national database. Due to the limited number of communities participating in their benchmarking program at the time of this report, it is unclear how Corcoran's parks services compare to other communities of comparable size in Minnesota. The standards that the NRPA has used in the past provides guidance for how to place parks by park type and the general facilities you might see in each park.

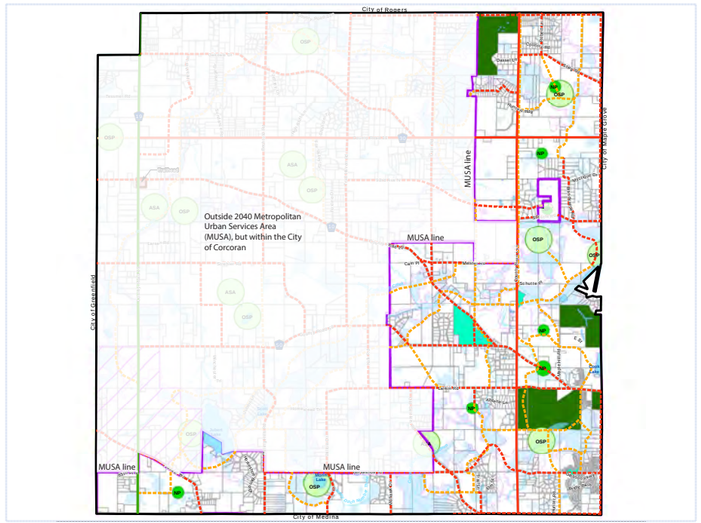
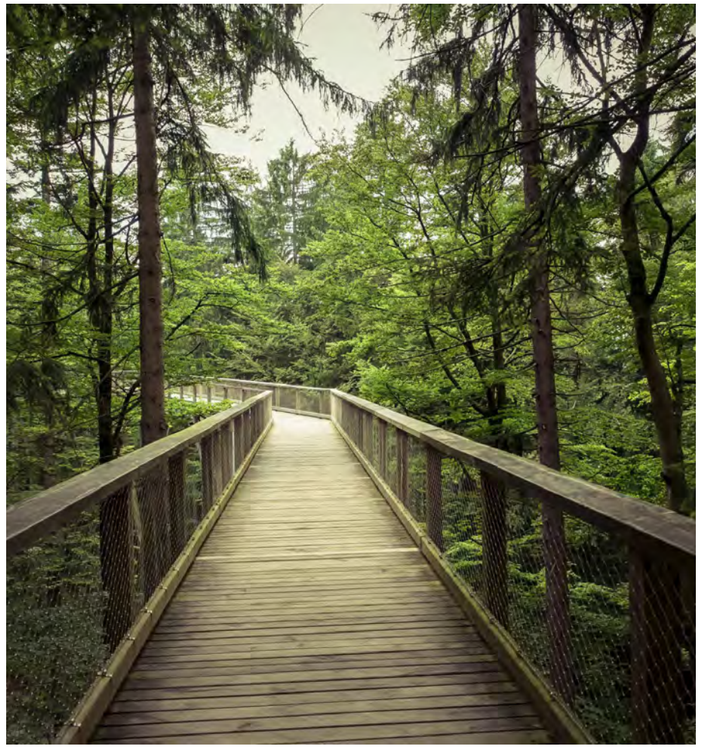


Figure 5-1: 2040 MUSA Inside Boundaries

The area within the 2040 MUSA is the emphasis for new park and trail development.



Goals and Policies

Goal 1: To implement this Parks and Trails Plan based on the needs of Corcoran residents and park system patrons.

Policy 1: Apply this plan when making recommendations to City Council.
Policy 2: Inform and seek input from other City advisory commissions on any issues or improvements that may be applicable to that commission.
Policy 3: Respond to the increasing maintenance, planning, and recreational demands made by the City and its park system patrons.
Policy 4: Track changes to the park and trail system to ensure a well-considered network.

Goal 2: To work cooperatively with neighboring communities, Hennepin County, the State of Minnesota and others in planning, developing, and financing the local park system.

Policy 1:Seek compatibility with adjacent local community plans and metropolitan, State and Federal plans and programs.
Policy 2: Seek cooperation, coordination and participation with local school districts in planning the joint use, development, and operation of the park and trail system.
Policy 3: Encourage community volunteer organizations to participate in park and trail development.
Policy 4: Require park dedication from all developers (commercial, industrial and residential) in the form of cash or land, according to the Park Dedication Ordinance and the fee schedule set by the City Council. All cash will be directed to the Park Fund and will be used for park land acquisition and development projects.
Policy 5: Review the park dedication formula on an annual basis to ensure it supports the needs of the park system and is comparable with area metropolitan communities.
Policy 6: Acquire park land when possible, in accordance with the City's Parks and Trails Plan to minimize costs and potential conflicts.

Goal 3: To develop a park system the public values and visits.

Policy 1: Design and build parks and trails early in the development process, so that they are available to new park system patrons.
Policy 2: Include private parks, when planned and funded by developers, as a neighborhood feature based on the provisions of the City's Park Dedication Ordinance.
Policy 3: Maintain an equitable distribution of parks throughout the community.
Policy 4: Develop a parks and trails system that is safe, enjoyable, and accessible.
Policy 5: Provide multi-use and multi-seasonal programs and activities.
Policy 6: Provide park system patrons with timely information regarding park and trail facilities and programs.
Policy 7: Establish design standards that create unity within the park and trail system and that emphasize the character of the City, its history, and landscape.
Policy 8: Park design should incorporate a general theme, but also allow diversity among parks to adapt to natural features, local history, or neighborhood character and needs.

Goal 4: To develop a system of parks and trails, with a variety of active and passive uses, that reflect the special character of the City, its history, and natural resources.

Policy 1: Select land for parks, trails or open space based on:

a. Its designation as a park or trail search area in the Parks and Trails Plan;
b. Its scenic or unique natural features;
c. Its ability to support desirable wildlife populations;
d. Its performance of important environmental functions;
e. Its proximity to the Natural Resource Corridors identified in the Natural Resource Inventory;
f. Its qualities conducive to recreational development;
g. A demonstrated need for additional parkland exists in an area.

Policy 2: Ensure park names reflect location by incorporating local historical names or features, a local access road, neighborhood name, benefactors, or prominent natural features of the area.
Policy 3: Develop a consistent signage policy for parks system, including directional and informational signs.
Policy 4: Preserve outstanding natural areas by discouraging development of prominent or highest quality landscape features and conserving natural resource areas. Protect wetlands and woodlands from undesirable impacts and fragmentation. Restore them to a high-quality condition when possible.

Goal 5: To provide a safe, equitable, and convenient trail network.

Policy 1: Apply this plan to coordinate development of the trail system.
Policy 2: Connect future trails to existing and adjacent community trails.
Policy 3: Encourage the use of utility easements and transportation right-of-ways for on-road route development.
Policy 4: Respect individual property rights. Trail development and routing should be a cooperative effort between the City and the landowners along the proposed route. Existing neighborhoods are encouraged to request trails and work with the City to identify their routes.
Policy 5: Require a 20-foot minimum trail easement to provide adequate bicycle and pedestrian circulation or access to schools, parks, downtown, churches, or other facilities.
Policy 6: Implement safe pedestrian crossing facilities on main roadways.
Policy 7: Maximize user safety by thoroughly considering conflicts between trail user groups, for example snowmobiles and equestrians.
Policy 8: Continue to show snowmobile trails on the City Parks and Trails Plan. Snowmobiles are an important recreational activity for many residents. A private organization maintains the current trail system. While the City does not own or maintain these trails, the City will make applicants aware of the desire to maintain routes through the City as development occurs.

Areas Outside the 2040 Metropolitan Urban Service Area (MUSA) Boundaries

Guidelines

The following guidelines will be applied to development proposals outside the 2040 MUSA boundary:

- Park and trail policies in areas outside the 2040 MUSA boundary will be consistent with the City's Comprehensive Plan and Subdivision Ordinances.
- Relevant development proposals will be presented to the Parks and Trails Commission before City Council approval, thereby allowing for review and recommendations regarding incorporation of trail easements, open space acquisition or park facilities.
- Park facilities generally should not be planned outside the 2040 MUSA, except for:
    - Trails that have been identified on the Natural Resource Inventory or the Parks and Trails Plan maps.
    - Parks that have been identified on the Parks and Trail System map.
    - Protection of significant natural areas that have been identified on the Natural Resource Inventory.
    - Athletic facilities may be considered, but are preferred in areas closest to the 2040 MUSA.

- Proposed parks and trails shown on the Parks and Trails System Map outside the 2040 MUSA areas are for guidance purposes and will be implemented over the long term as a part of new development through development dedication or cooperative purchase.

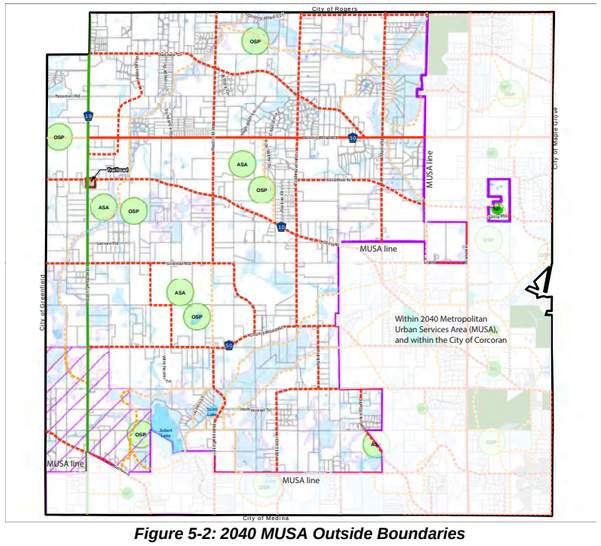


Figure 5-2: 2040 MUSA Outside Boundaries
The guidelines above apply to the area outside the 2040 MUSA.

Park Classification

Parks are divided into 1 of 3 categories: Neighborhood Park, Community Park and Linear Park. Parks may serve more than 1 purpose, for example a community park may also serve the immediate neighborhood park needs in addition to a more regional community park demand. The following park types and standards will be developed in Corcoran.

Neighborhood Park

Neighborhood Parks are the most local unit of the park system, providing area for recreational activities such as field games, court games, playground, skating, and neighborhood centers. These parks prioritize user groups living in the neighborhood. They are identified as NP – Neighborhood Park on the system map.

Neighborhood park sites should be in proximity to residential neighborhoods. Their design may be as simple as a playground or as intense as a public square. Siting neighborhood parks adjacent to community parks and local linear parks, corridors and parkways will expand the function of all types of open space. It will also entice residents from throughout the community to visit the park ensuring new parks do not function as private facilities for new developments.

Neighborhood park development criteria generally includes:

- An overall size of 5-20 acres.
- A service area of 1/4 to 1/2 mile.
- A physical geography suited for intense development.
- A frequency of 1 neighborhood park per 5,000 residents.

Community Park

Community parks serve a wider user group than neighborhood parks, and are often in proximity to secondary schools and other public facilities. These parks seek to preserve unique landscapes and natural areas, and as they have a larger overall size, the programming of passive and active recreation may occur within the same park without conflict. Community park development criteria generally includes:

- An overall size of 20-100 acres.
- A service area of up to a 2-mile radius.
- A frequency of 1 community park per 15,000 residents.

In addition to the existing Corcoran Community Park at County Road 10 and 50, there are 2 other types of planned parks that will serve the wider community and fall into this category: Community Playfields and Open Space/Natural Parks.

Community Playfield

Community playfields, identified as ASA-Athletic Search Area on the system map, are areas for intense recreational facilities such as athletic fields and swimming pools. Playfields should be integrated into community parks or may be co-located with school athletic facilities. They may also include a neighborhood park use.

Open Space/Natural Parks

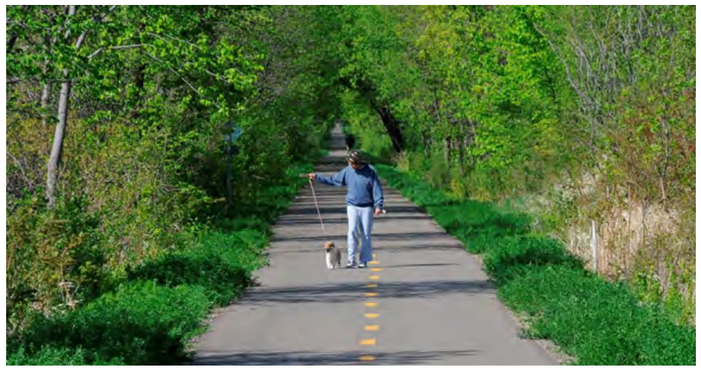
These parks are characterized by high-quality natural resources that merit preservation and which would be negatively affected by development. They are identified as Open Space and Preservation/Nature Park on the system map. Recreational uses are secondary to the preservation of natural open space and the conservation functions of these areas. Compatible recreational uses include hiking, picnicking and nature study.

Open space or natural park sites are typically within the high-quality natural community areas identified in the City's Natural Resource Inventory. They should be connected by trails to the City's Natural Resource Corridors and to other parks and will be left in a natural or semi-natural state, with minimal development.

Local Linear Parks, Trails, Corridors and Parkways

These areas are developed for 1 or more varying modes of recreational travel such as hiking, biking, and cross-country skiing. These features may traverse 1 or more municipality with width and length minimums varying by feature type – depending on their location within or outside right-of-way.

Linear parks and trail corridors are often found adjacent to major roadways within the County or other locations where needed to link cities to components of the local or regional recreation system or community facilities such as schools, libraries, or commercial destinations. These parks may also be located in planned greenway corridors or adjacent to creeks and stream corridors to provide public access to natural features, however such development should consider site and habitat impacts.



Existing City Parks (City of Corcoran owns 3 parks)

The Corcoran Community Park is located at the intersection of County Roads 10 and 50. The original park was approximately 16 acres. The City purchased a 60-acre parcel from Rockford Area Schools in 2018. The 60-acre parcel is located directly west of the original park and brings the total park area to approximately 76 acres. Park facilities include a playground, tennis and volleyball courts, softball fields, ice rinks, parking and a picnic shelter. The 60-acre parcel adds additional multi-use fields and parking to the Community Park.

Figure 5-3: Corcoran Community Park

The City has also begun developing park land on City Hall property. The site, including the Memorial Garden, is an estimated 8 acres. Once fully developed, this park will consist of picnic facilities and trails.

Figure 5-4: Corcoran City Hall and Memorial Park

Existing City Parks Continued

Wildflower Park has been dedicated as part of the Ravinia development and is owned by the City. A plan for development was approved and the park construction began in 2018.

Figure 5-5: Wildflower Park

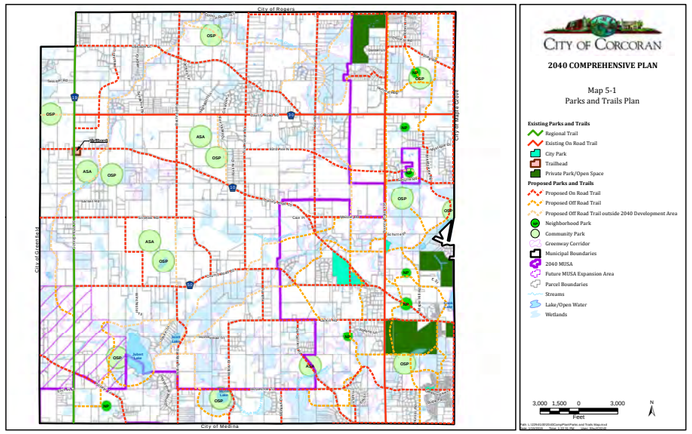
Private Park

The Corcoran Lions Club owns a multi-use facility at the intersection of County Roads 10 and 101. This is the site of the Hennepin County Fair, the Hamel Rodeo and a variety of other public entertainment events. While it is a privately owned and operated open space, the City's Goals and Policies (see Goal 2) prioritize keeping open communication with such entities to ensure cooperation and thoughtful planning of the City's parks and trails.

Figure 5-6: Corcoran Lions Park

Parks and Trails Locations

Proposed parks are identified on the 2040 Parks and Trails System Map, Map 5-1. Athletic complex and open space search areas are shown on this plan to indicate potential site areas, not exact property locations. These search areas are distributed throughout the community to aid further investigation for costs, ease of obtaining land, access and proximity to future growth and development. Many of these parks will be developed as new residential neighborhoods are constructed, increasing the need for parks. The City will work with developers and other landowners to identify the exact location and size of parks and trail alignments as development or park acquisition is proposed. The City will seek to co-locate trails with other infrastructure easements where feasible.



Map 5-1: Parks and Trails Plan *(See page 79 for large size map.)*

Future Parks

Demographics/Community Growth

The 2040 Comprehensive Plan uses the population forecasts and the context presented to recommend the number and distribution of park and trail facilities in the community. The National Recreation and Park Association (NRPA) has provided standards in the past for how to place parks by park type, and the general facilities you might see in each park. The NRPA is moving away from the minimum standards of service, as findings indicate that each City has unique needs, and is encouraging communities to benchmark their metrics and enter their data into the national database. Therefore, if more parkland than the minimum standards is required to serve the population in each neighborhood, the City may acquire land to meet this need.

Local Trends

In April 2017 the City surveyed residents regarding, "What amenities are important to you as a resident?" Key findings from 115 responses were used to guide the 2040 Parks and Trails plan, including the following:

- Parks and trails within a mile of each Corcoran neighborhood was valued by 51 percent.
- Green spaces (i.e. open space parks) were valued by 61 percent of respondents.

The 2017 survey supports a trend in past community surveys (in 2008 and 2004) also indicating that the City should develop trails, parks, and green spaces for park system patrons.

Future Projections by Type

According to NRPA standards, there should be 1 neighborhood park per 5,000 people within 1/4 to 1/2 mile of their home and 1 community park per 15,000 people within 2 miles of a residential neighborhood. As Corcoran is still developing, it is important to consider the proximity of new parks to new residential developments, and how the density of the development affects the size and quantity of park types. Applying only 1 standard of park need (for example overall population) would suggest Corcoran needs just 1 community park. However, considering just the land area of Corcoran within the 2040 MUSA suggests the community would need nearly 10 community parks.

While the overall acreage of parkland planned for Corcoran exceeds the standards set by the NRPA, not all neighborhoods have neighborhood or community parks within the recommended service areas. As population increases in each neighborhood, the City should acquire parkland in those neighborhoods to serve populations within each neighborhood.

Based on review of park development trends as indicated by NRPA, the City will have a projected need of 14 acres of park land for every 1,000 residents. With this standard in mind, and considering the character and existing ecological assets within Corcoran, the following is the planned system to serve approximately 11,300 people in 2040:

Neighborhood Parks

The City has one neighborhood park, Wildflower Park in the Ravinia neighborhood. By 2040, the City will need approximately 2-3 additional neighborhood parks, totaling approximately 10-60 acres. Neighborhood parks should be located within ½ mile walking distance of significant neighborhood developments.

- A new Town Square is planned in the downtown core, as part of the Corcoran Southeast District and Downtown Guidelines. The Town Square is categorized as a neighborhood park due to its scale and value to future downtown residents via programming. The Town Square is planned as a social center for the community, suitable for concerts and celebrations. It will be a public space to support the recreation in downtown.

Community Parks

In addition to the 2 existing community parks, the City will need 1 to 2 new community parks by 2040. These additional community parks would require approximately 20-200 new acres.

- *Community Playfields:* With the additional 60-acre parcel purchase from the Rockford School District, the City does not have an immediate need for additional playfields by 2040. The City will continue to work with landowners to identify opportunities to acquire additional land for future community playfields. A 2006 TKDA Needs Analysis and Recommendations offers metro-area guidelines for population-driven facility types and this study will serve as a continuing resource in the search for and design of both an athletic complex and the other identified parks.
- *Open Space Parks:* The City will consider adding approximately 60 acres of public open space. The space may be divided among 3 sites.

Local Linear Parks, Trails, Corridors and Parkways

See recommendations in Future Trails section that follows.

The projected 2040 parkland area need, based on the 2040 population forcast for Corcoran is 158 acres, with the total planned system range for projected parkland area 159 to 209 acres.The existing acreage of parks in Corcoran are on the low end of NRPA standards for neighborhood and community parks. The high end of the range is due to Corcoran's abundance of naturally occurring ecological assets. These assets are in most cases prohibited from development by environmental protection regulations. These ecological assets also support the unique character of Corcoran, a priority the community has identified as important to preserve (Policy 4, Goal 1). The community has also consistently conveyed the importance of maintaining the community's rural character. Open space is a key feature in rural character.

Recreation trends and community preferences will ultimately affect the number, size, and location of specific parks and facilities. The system master plan shows a concentration of new neighborhood parks within future neighborhoods where a density of new housing will support the need and use of those parks. The City will continue to work closely with the local school districts in future planning of playfields, athletic complexes, and additional park facilities.

Table 5-1: Projected Acres of Park Land

Park Name / Type	Existing Area (acres)	New Proposed Area (acres)
Neighborhood Parks	**5.13**	**10-60**
Wildflower Park	5.13	0
Town Center	0	4-5
Community Parks	**84**	**60**
City Hall Park/Memorial Garden	8	0
Community Playfields	76	0
Open Space Parks	0	60
Subtotal	**89.13**	**70-120**
Total Planned System	**159-209**	
Total Projected Need by 2040	**158 acres**	

Future Trails

Corcoran residents have expressed a strong interest in trails, particularly for walking and biking. The community also has a high level of interest in snowmobile and horseback trails. The community's value of trails has been implemented into this plan.

New to the 2040 Metropolitan Council Transportation Policy Plan, a Regional Bicycle Transportation Network (RBTN) has been established. The RBTN seeks to integrate a seamless network of on road bikeways and off road trails to improve conditions for bicycle transportation at the regional level. Corcoran's Trail System plan will consider connections to surrounding communities when planning on road bikeways and off road trails to support park system patrons interest in trails and the regional bicycle transportation network.

Table 5-2: City and County Trail System Within Corcoran

Total Trail Miles in 2040 MUSA	58	All Types
Total Trail Miles Outside 2040 MUSA	56	
Total Off Road Miles	50	Inside & Outside MUSA
Total On Road Miles	64	
Total Trail System Miles	**114**	

There are several categories of trails identified on the 2040 Parks and Trails Plan. The City of Corcoran is continuing to plan for a fully developed system ultimately offering up to 114 miles of trails. Trail categories and potential trail options are described in Figures 5-8 through 5-11:

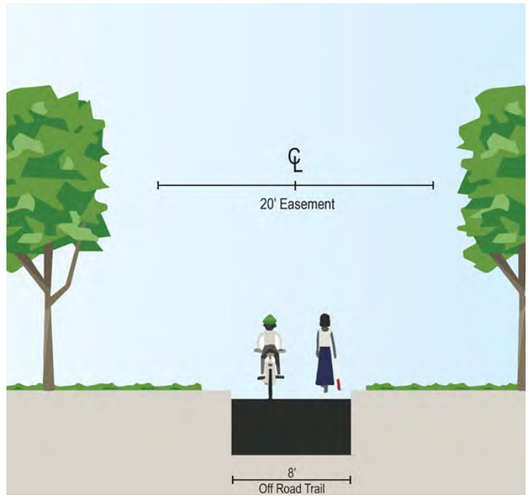


Figure 5-8: Off-Road Trail with 20' Easement

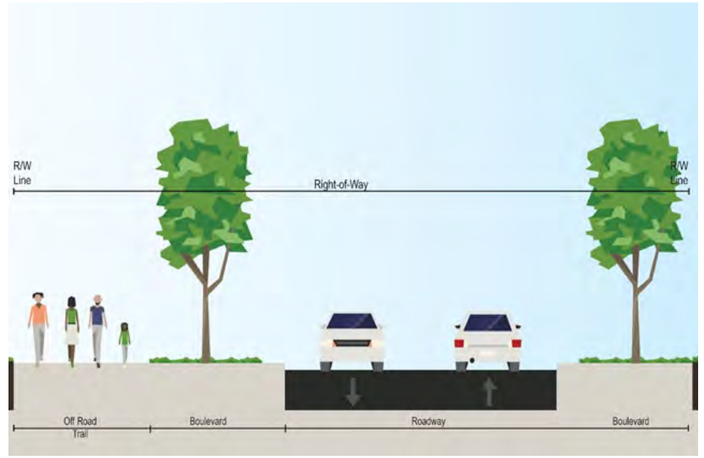


Figure 5-9: Off-Road Trail with Boulevard off Roadway

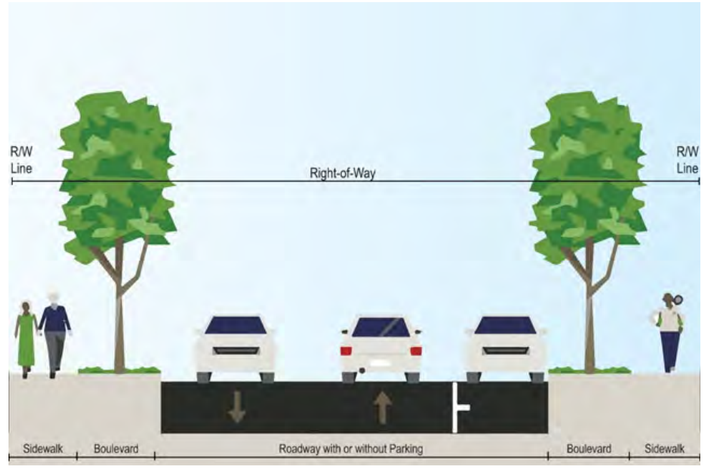


Figure 5-10: Sidwalk with Boulevard off Roadway

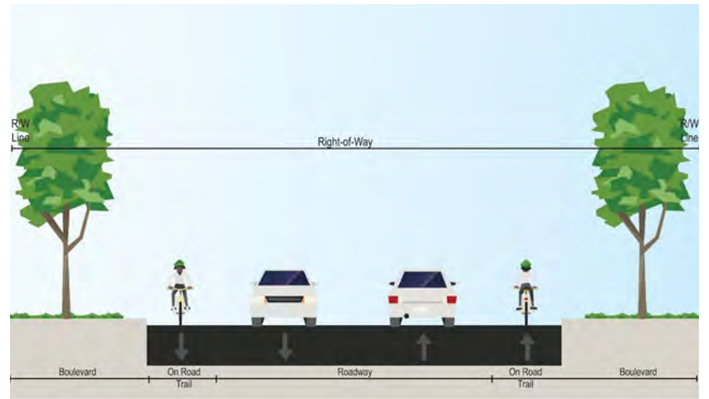


Figure 5-11: On Road Trail on Roadway with Boulevard

Regional Linking Trail

Regional linking trails are located to serve as linkages between components of the regional parks system. When feasible, linking trails should attempt to connect the population, economic, and social centers along its route. Corcoran has 1 existing regional linking trail, the Lake Independence Regional Trail, located along County Road 19 that stretches from Baker Park Reserve to Crow-Hassan Park Reserve. The general alignment is shown on the map along County Road 19. The length of this trail through Corcoran is approximately 6 miles. This trail is considered a Tier 2 alignment in the RBTN network. A proposed regional trail (Rush Creek Regional Trail) is also planned just outside the northern edge of Corcoran providing a connection point from County Road 101 near 117 to Crow-Hassan Park Reserve. A second RBTN, Tier 2 trail is proposed for County Road 101 between Corcoran and Maple Grove. No other RBTN network connections are proposed in the Metropolitan Council's 2040 TPP.

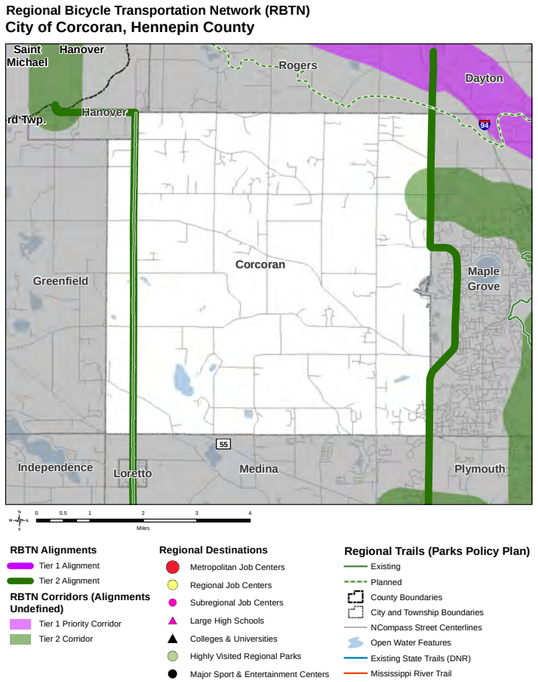


Figure 5-12: Regional Bicycle Transportation Network

Regional Trail Search Corridor Addition

Regional trail search corridors (RTSC) are proposed regional trails without a Metropolitan Council-approved master plan that identifies trail alignment. Because they do not have a Council-approved master plan, these corridors are not eligible for Regional Parks System funding for acquisition and development. Within Corcoran, a RTSC proposed by the Three River Park District was recommended as a system addition to the Metropolitan Council's 2040 Regional Parks Policy Plan. This RTSC's general alignment along County Road 116 is shown in Figure 5-13 as North-South 1. Figure 5-14 shows a refined version of the same RTSC identified as the Diamond Lake Regional Trail. This trail would connect several different existing and proposed regional trails and is the only RTSC in Corcoran.

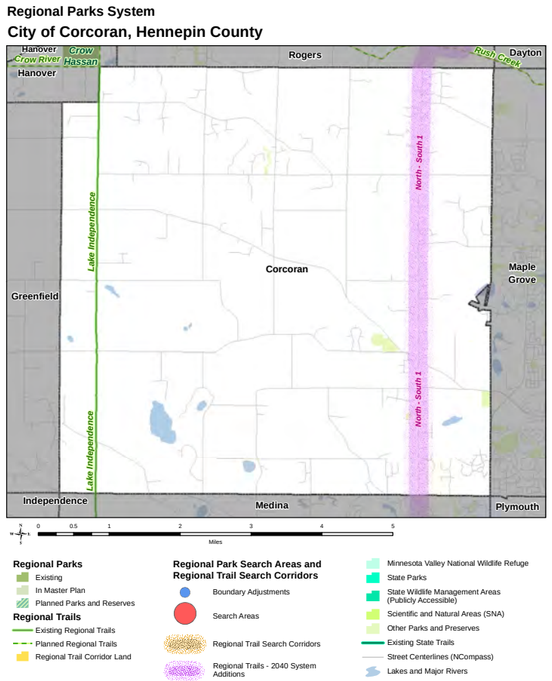


Figure 5-13: Regional Trail Search Area

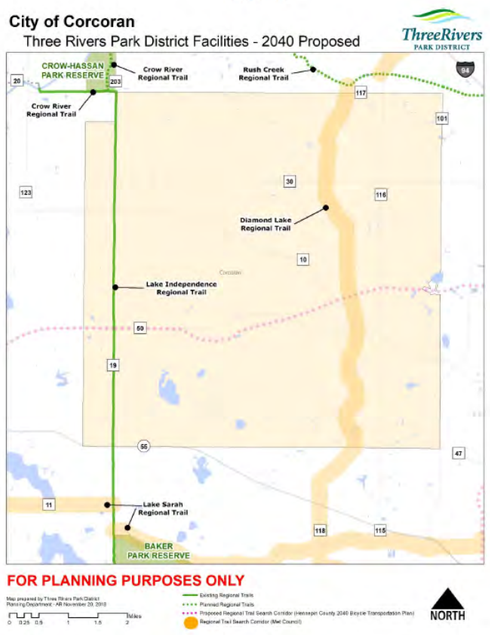


Figure 5-14: Diamond Lake RT Map

Figure 5-15: Conceptual Bike Trail System

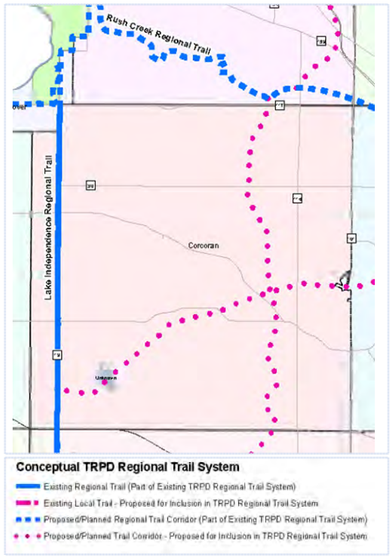


Figure 5-16: Conceptual Regional Trail System

County Trail

County trails, in this case proposed and managed by either Hennepin County as part of their regional bikeway system or Three Rivers Park District (TRPD) as part of their regional trail system, are often found adjacent to major roadways and locations needed to link cities and components of the local or regional recreation system and/or community facilities such as schools, libraries or commercial destinations. Three Rivers Park System has proposed a network of nearly 49 miles off road trails for Corcoran, generally aligning with Greenway Corridors. It should be noted that trail terminology varies from County to City. In this plan and in the City of Corcoran generally, terms of on road and off road trails are preferred. Hennepin County uses on street and off street terminology though they are functionally the same.

On Road Trail

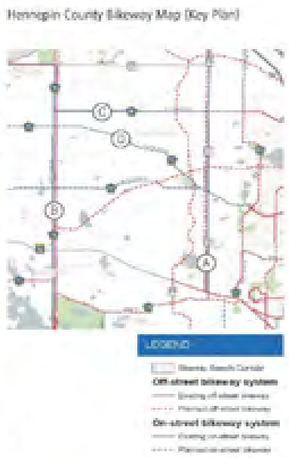
This trail type is a striped or signed bikeway on an existing road right-of-way or designated lane. The City has 1 4.5-mile on road trail along County Road 30 and 1 6-mile trail along County Road 116. By 2040, the City on road trail system is planned to include 31 miles; another 33 miles of on road trails are planned outside the MUSA.

Off Road Trail

An off road-trail is a multi-use trail, paved or gravel that is at least 8 feet wide. These trails are designed for bicycle, pedestrian, and other non- motorized uses. The City and County agencies combined are planning for approximately 49 miles of off road trails, 26 miles inside the 2040 MUSA and 23 miles outside that area. The City is investigating the possibility of co-locating an off-road trail over the natural gas pipeline easement in the southern half of the City.

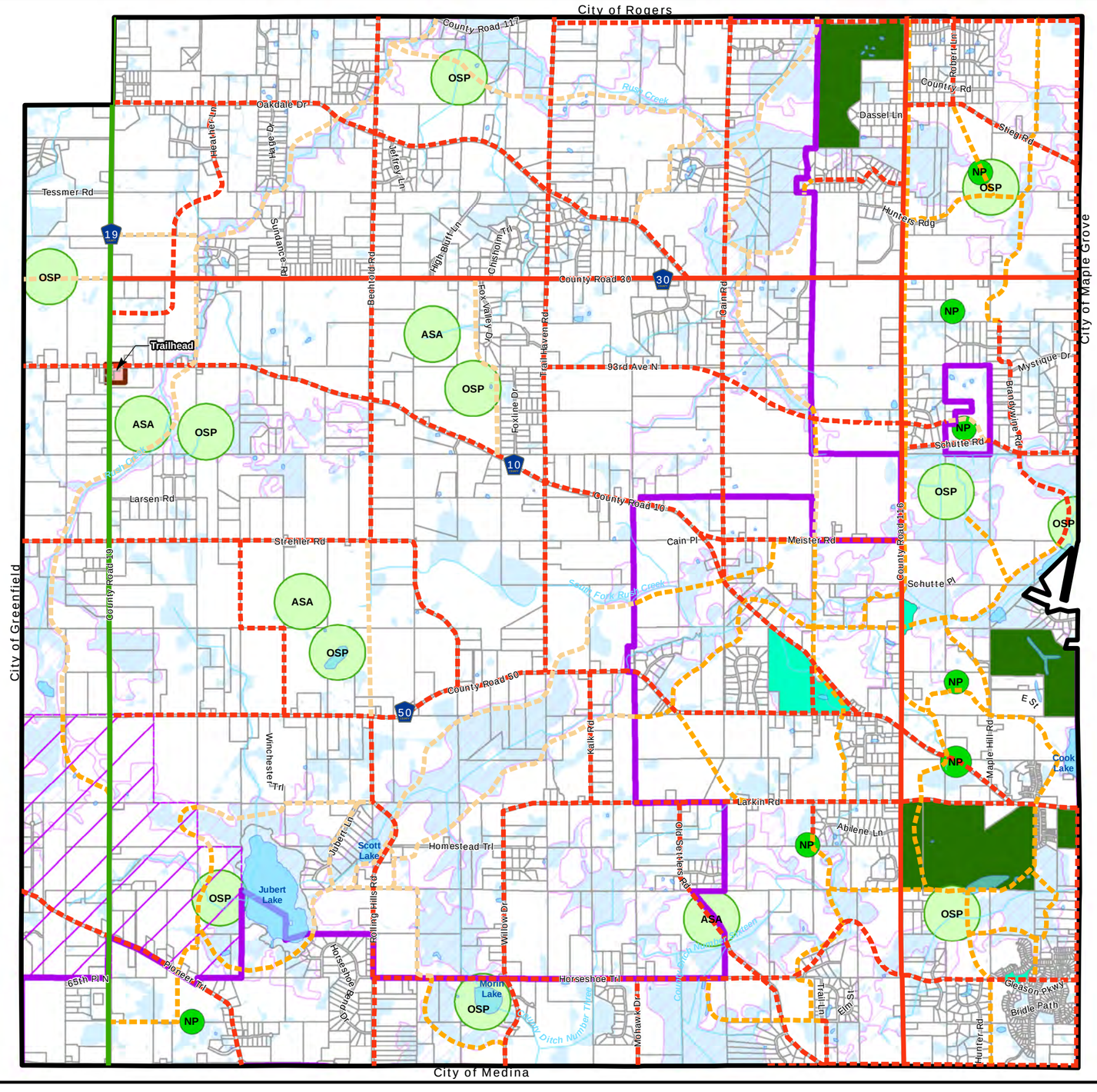

A On and Off-Street Example
County Road 116 in Medina
On-Street
Off-Street
On-Street


B On and Off-Street Example
Lake Independence Regional Trail (off-street) and County 19 in Loretto
On-Street
On-Street
Off-Street


Hennepin County Bikeway Map (Key Plan)
LEGEND
Off-street bikeway system
On-street bikeway system


C On-Street Example
County 30 in Corcoran
On-Street
On-Street


D Planned on-street bikeway (Unimproved)
County 10 in Corcoran
Narrow paved shoulder
Narrow paved shoulder



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 5-1
Parks and Trails Plan

Existing Parks and Trails
- Regional Trail
- Existing On Road Trail
- City Park
- Trailhead
- Private Park/Open Space

Proposed Parks and Trails
- Proposed On Road Trail
- Proposed Off Road Trail
- Proposed Off Road Trail outside 2040 Development Area
- Neighborhood Park
- Community Park
- Greenway Corridor
- Municipal Boundaries
- 2040 MUSA
- Future MUSA Expansion Area
- Parcel Boundaries
- Streams
- Lake/Open Water
- Wetlands

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Parks and Trails Map.mxd
Date: 1/15/2019 Time: 1:22:31 PM User: ShuJC0243

CHAPTER 6: TRANSPORTATION

TRANSPORTATION

The purpose of the transportation plan is to identify existing and future transportation needs in the City of Corcoran for the horizon year of 2040. The plan also identifies policies and planned actions to meet those transportation needs. The transportation chapter identifies the City of Corcoran goals and policies and describes the existing and future transportation system.

The impact on transportation systems and the responsibility for improvements to the system are a State, County, and City issue. While the City of Corcoran must provide the resources to accommodate transportation demands that coincide with its land use decisions and population growth, increased traffic from the growth of neighboring communities are also part of the traffic demand. The County and State share the responsibility of providing safe and efficient transportation through the City of Corcoran.

Corcoran is designated partially as an Emerging Suburban Edge community in the Metropolitan Council's *Thrive MSP 2040* plan. The planning area sets overall densities that the planned development patterns in the community can be expected to achieve.

There are many land use decisions that are tied to roadway improvements. Some land uses are not appropriate without adequate transportation facilities. The issue of what occurs first, development or the systems to support it, will be critical as it relates to transportation needs. Coordination of the infrastructure will be necessary to create a system that works to support the land uses both in and surrounding Corcoran. As the City develops, focus should be on protecting natural resources, ensuring sufficient public infrastructure, and developing transition strategies to increase density and encourage infill development.

Goals and Policies

Goal 1: Improve the transportation network for local and pass-through traffic.

Policy 1: Provide a comprehensive transportation system based upon functional classification of roadways that fully promotes connectivity and is coordinated with neighboring cities and counties.
Policy 2: Identify a transportation system that efficiently moves traffic, minimizes traffic conflicts as development occurs, and is consistent with MnDOT, Hennepin County, neighboring communities, and the City's land use plan.
Policy 3: Identify long-term planning for transportation corridors to manage access and capital improvements as development occurs.
Policy 4: Study the alignments of County Road 10 and County Road 50 represented on the Transportation Plan to improve the geometric configuration and align with the long-range City land-use plan.
Policy 5: Fund a Capital Improvements Program to ensure long-term street maintenance and reconstruction programs.
Policy 6: Plan and design transportation facilities that preserve natural resources and existing infrastructure where applicable.
Policy 7: Pave appropriate public gravel roads deemed necessary by the City as circumstances such as development, regional improvements, City needs, or other dictate, subject to financial feasibility and funding availability.

Goal 2: Ensure that planned transportation infrastructure, capacity, and access will accommodate proposed land uses and development.

Policy 1: Incorporate the use of innovative traffic management options and technologies. Coordinate transportation planning and system improvements with other government jurisdictions.
Policy 2: Comprehensively coordinate all transportation-related facilities as 1 system.
Policy 3: Incorporate land uses and access spacing guidelines compatible with the functional classification of the regional highway system.
Policy 4: Develop all additional elements of the street system (sidewalks, trails, lighting, landscaping, etc.) harmoniously with adjacent land uses and transportation objectives.

Goal 3: Incorporate elements in development standards related to bicycle and pedestrian uses.

Policy 1: In all residential and mixed-use areas, identify future pedestrian, trail, and bicycle facilities to connect neighborhoods with major commercial and park and recreational areas.
Policy 2: Design arterial highways in the City to prevent unregulated pedestrian and bicycle crossings and to protect pedestrian and bicycle movement paralleling vehicular traffic. Additional information regarding the trail system in Corcoran is provided in Chapter 5.

Support and Rationale for Transportation Goals and Policies

The concern over regional traffic on the City's road system can be managed internally to an extent. By providing a local street system that relies on internal connections between neighborhoods, local conflicts with regional traffic can be avoided in many instances. Where multiple trip options exist, traffic impacts on any 1 location are minimized. However, when traffic is concentrated to only a few practical routes, traffic conflicts affect everyone. Subdivision design will be required to include internal connections wherever possible.

The City expects that new development will be designed with sufficient traffic planning improvements and those impacts on the system will be kept to those routes that are properly intended for increased traffic levels. These goals and policies also carry an expectation that the City will work actively with its neighboring communities and other highway jurisdictions to improve traffic management on all routes through the City.

At the same time, Corcoran expects that transportation planning respects the City's other planning goals and designs roadways that enhance the environment of the community. This may mean innovative design techniques or routing of traffic to preserve sensitive areas. The City will work with all jurisdictions to ensure the accomplishment of both traffic needs and the City's land use goals.

On a community-wide basis, pedestrian movement is likely to be more recreational in nature. The predominant rural development pattern does not lend itself to reliance on walking or bicycling for daily commerce. However, the development of trail systems is a popular recreational attraction. The retrofitting of existing development areas and the design of new development areas (both urban and rural) with trail systems, bike ways, and sidewalks will be an important improvement for the community.

With the higher level of development activity envisioned by this Plan, roadway design and access will play a more important role in locating new development. The urban districts delineated in the land use plan are to be served by major collector or arterial roadways. New urban development within those districts will need to demonstrate more than the mere availability of utility services, or avoidance of natural resource areas. The potential for loading significant amounts of new traffic onto the City's street and highway system will require attention to the capacity of the higher function roadways serving the project area. In some areas, construction of new collector streets may be required as a pre-condition for approval of a new subdivision where it is not possible to mitigate downstream traffic impacts.

Access management is a key to controlling the impacts of new traffic generation and avoidance of congestion. Moreover, direct access to major streets (regardless of jurisdiction) has significant land use impacts in the creation of conflicts, increasing crash statistics, and decreasing land values. Corcoran will actively implement access management policies throughout the City and will require all subdivision design to comply with the highest thresholds of transportation planning.

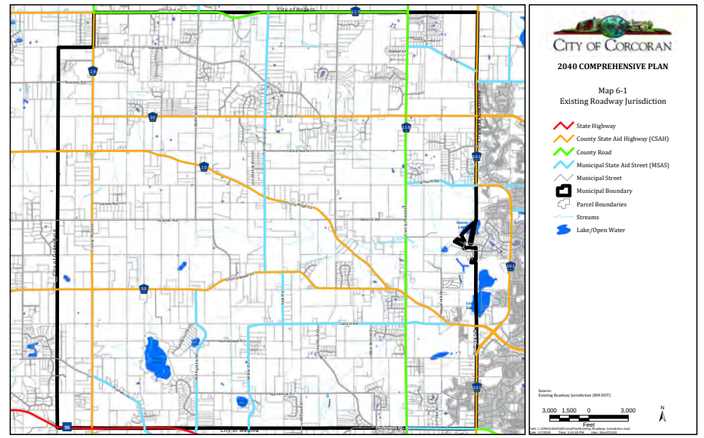
2018 Existing Transportation System

Transportation elements are divided into several sub-categories, each of which is an important piece of the overall transportation system. Several sub-categories are further divided into existing and 2040 conditions.

Highways and Streets

Roadway Jurisdiction

Roadways are categorized under the agency that is responsible for their maintenance. The State is responsible for the Federal Interstate, US Highways, Minnesota Trunk Highways (TH), and State Park Roads. The County is responsible for County State-Aid Highways (County Road) and County Roads (CR). Other roadways, including Municipal State-Aid Streets and municipal roads are the responsibility of the City of Corcoran. Map 6-1 shows the current jurisdiction for the area roadways.



Map 6-1: Existing Roadway Juristiction *(See page 91 for large size map.)*

Roadway Functional Classification

The functional classification of roadways provides guidelines for the safe and efficient movement of people and goods within the City. Roads are categorized based upon the level of access and mobility provided.

Functional classification of a roadway system involves determining what function each roadway should be performing with regard to travel within and through the City. The intent of a functional classification system is the creation of a roadway hierarchy that collects and distributes traffic from local roadways and collectors to arterials in a safe and efficient manner. Such classification aids in determining:

- Appropriate roadway widths
- Speed limits
- Intersection control
- Design features
- Accessibility
- Maintenance priorities

Functional classification helps to ensure that non-transportation factors, such as land use and development, are considered in planning and design of the roadway system.

A balanced system is desired, yet not always attainable due to existing conditions and characteristics. The criteria of the functional classification system are intended to be guidelines and are to be applied when plans are developed for the construction or reconstruction of a given classified route. It can, and does, occur that different roadways with very similar design characteristics may have different functional classifications. Some roadways, for a short segment, may carry higher volumes than a roadway with a higher classification. Spacing guidelines may not follow recommendations for a variety of reasons such as topography, environmental concerns, and land use type and density.

The 2 major considerations in the classification of roadway networks are access and mobility. Mobility is of primary importance on arterials, thus the limitation of access is a necessity. The primary function of a local roadway, however, is the provision of access, which in turn limits mobility. The extent and degree of access control is a very important factor in the function of a roadway facility. The functional classification types utilized are dependent upon one another in order to provide a complete system of streets and highways. The relationship of functional classification regarding traffic mobility and land access is shown below in Figure 6-1.

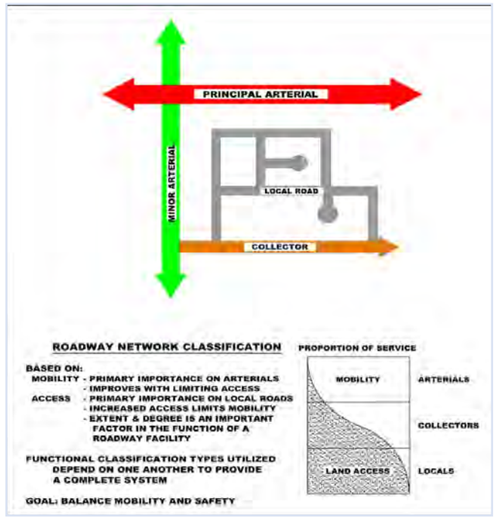


Figure 6-1: Existing Roadway Jurisdiction

A complete functional design system provides a series of distinct travel movements. Most trips exhibit 6 recognizable stages. These stages are as follows.

- Main movement
- Transition
- Distribution
- Collection
- Access
- Termination

As an example, Figure 6-2 depicts the hierarchy of movement by illustrating a hypothetical trip using a freeway, which comprises the main movement. When the vehicle leaves the freeway, the transition is the use of the freeway ramp at a reduced speed. The vehicle then enters the moderate speed arterial, the distribution function, to travel toward a neighborhood. From the arterial, the vehicle enters a collection road then a local access road that provides direct approach to the residence or termination point. Each of the 6 stages of the trip is handled by a facility designed specifically for that function. Speeds and volumes normally decrease as 1 travels through the 6 stages of movement.

It must be recognized that not all intermediate facilities are needed for various trip types. The character of movement or service that is provided has a function and these functions do not act independently.

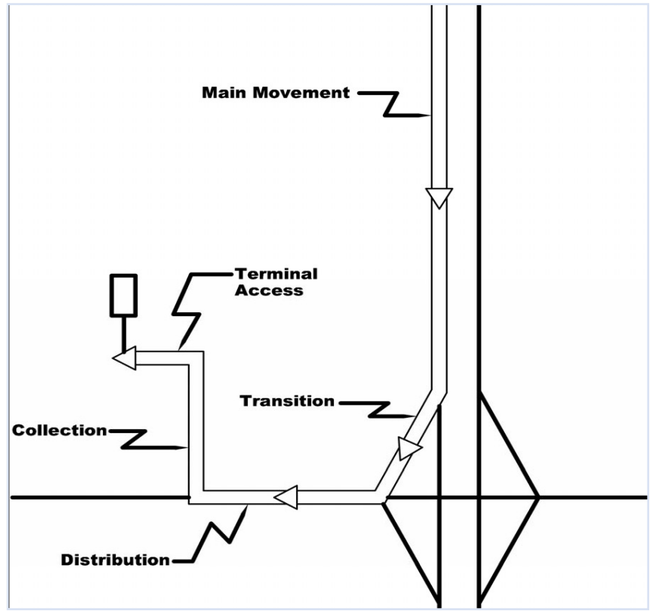


Figure 6-2: Existing Roadway Functional Classification

Principal Arterials

Principal arterials carry a higher proportion of total urbanized travel on a minimum of mileage. They also serve major activity centers, higher traffic volumes, and longer trips. Along these facilities, access needs to be limited in order to preserve the ability of the roadway to accommodate the volumes and to maximize safety. Principal arterials emphasize mobility over land access. Little or no direct land access should be allowed within an urban area. Grade separated intersections are required for freeways and are highly desired for other principal arterial roadways. In the Metro area, interstate freeways are classified as principal arterials. Highway 55 is a principal arterial within the City of Corcoran.

Minor Arterials

Minor arterial roadways connect the urban service area to cities and towns inside and outside the region and generally service medium to short trips. Minor arterials connect principal arterials, minor arterials, and collectors. The spacing ranges from 1/4 to 3/4 of a mile in metro centers to 1 to 2 miles in a developing area. The desired minimum average speed during peak traffic periods is 20 mph in fully developed areas and 30 mph in developing areas.

The emphasis for minor arterial roadways is on mobility rather than land access. In urban areas, direct land access is generally restricted to concentrations of commercial/industrial land uses. Minor arterials generally serve medium to short trips and provide use for local and limited stop transit service.

Minor arterials are divided into “A” minor arterials and “B” minor arterials. “A” minor arterials are roadways that are of regional importance because they relieve, expand, or complement the principal arterial system. “A” minor arterials are categorized into 4 types, consistent with Metropolitan Council guidelines:

Relievers
Minor arterials that provide direct relief for metropolitan highway traffic. There are currently no “A” minor arterial relievers within the City.

Expanders
Routes that provide a way to make connections between urban areas outside the I-494/I-694 beltway. County Road 101 is an example of an “A” minor arterial expander within Corcoran.

Connectors
Roads that provide connections to and among communities at the edge of the urbanized area and in rural areas. County Road 50, County Road 30, and County Road 19 are examples of an “A” minor arterial connector in Corcoran.

Augmenters
Roadways that augment principal arterials within the I-494/I-694 beltway. There are currently no augmenters within Corcoran.

A well-planned and adequately designed system of a principal and “A” minor arterials will allow the City’s overall street system to function the way it is intended and will discourage through traffic from using residential streets. Volumes on principal and minor arterials roadways are expected to be higher than on collector or local roadways.

“B” minor arterials provide a city-wide function, serving medium to long distance trips. There are currently 2 “B” minor arterials within the City, County Road 116, and County Road 117 (109th Avenue North).

Collector Streets

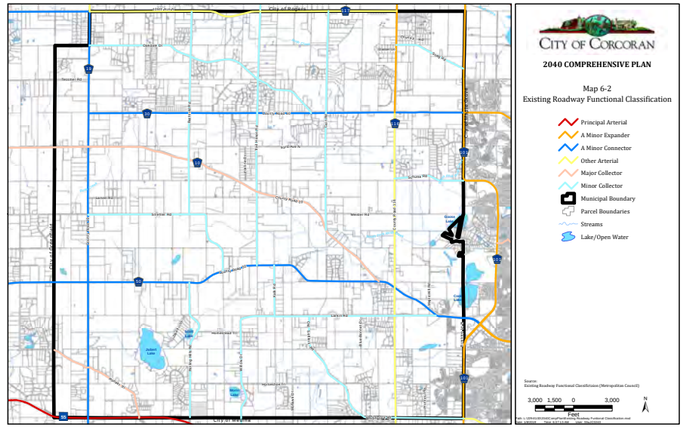
Collector streets provide more land access than arterials and provide connections to arterials, although not in all cases. As is the case with any roadway system, there will always be exceptions to the planning guidelines that are used to classify a roadway system. Collectors serve a dual function of accommodating traffic and the provision of more access to adjacent properties. Mobility and land access are equally important and direct land access should predominately be to development concentrations. Collector road spacing ranges from 1/4 to 3/4 of a mile in a fully developed area, and 1/2 to 1 mile in a developing area. Collectors can be broken down further into major and minor collectors.

Major collectors generally connect to minor arterials and serve shorter trips within the County or City. These roads supplement the arterial system in that mobility is slightly emphasized over access. An example of a major collector within Corcoran is County Road 10.

Minor collectors provide the connection between neighborhoods and commercial/industrial areas and the major collector/minor arterial system. Access is slightly emphasized over mobility in minor collectors. Oakdale Drive, Trail Haven Road, Kalk Road, and Willow Drive are examples of minor collectors within the City. Some of these are gravel roads, and the challenge of paving is discussed in the next section.

Local Streets

The lowest classification of roadways is the local roadway where access is provided with much less concern for control, but land service is paramount. Spacing for local streets is as needed to access land uses. Local roadways generally have lower speed limits in urban areas and normally serve short trips. Local streets will connect with some minor arterials but generally connect to collectors and other local streets. The development of local streets will be guided by the location of the existing and proposed minor arterials and collectors as well as by development and the expansion of local utilities. Abilene Lane, Foxline Drive, Horseshoe Bend Drive, Jackie Lane, and Sundance Road are examples of local streets. The existing roadway functional classification system is shown on Map 6-2.



Map 6-2: Existing Roadway Functional Classification *(See page 93 for large size map.)*

Corcoran has 36 miles of gravel roads, most of which are local streets and collector roads. The City continuously faces a challenge of when or if to reconstruct the gravel roads with pavement. A guideline used by Minnesota State Aid for paving gravel roads is an Annual Average Daily Traffic (AADT) of greater than 300, which occurs presently on various segments on the collectors of Trail Haven, Willow Larkin, etc. Given that the cost to pave all the gravel roads is estimated to be upwards of $50M in today’s dollars, it is not viable for the current tax base. Therefore, it will be an ongoing issue to prioritize the improvements based on traffic counts, financial feasibility, and political and resident support.

Access Management Guidelines

The management of thoroughfare access along roadway systems, particularly arterial and collector roadways is a very important component of maximizing the capacity and decreasing the crash potential along those roadway facilities. As mentioned in a previous section, arterial roadways have a function of accommodating larger volumes of traffic and often at higher speeds. Therefore, access to such facilities must be limited in order to protect the integrity of the arterial function. Collector roadways provide a link from local streets to arterial roadways and are designed to provide more access to local land uses since the volumes and speeds are often less than arterial roadways.

Studies have shown that as the density of access increases, whether public or private, the traffic-carrying capacity of the roadway decreases and the vehicular crash rate increases. Businesses suffer financially on roadways with poorly designed access, while well-designed access to commercial properties support long-term economic vitality.

As with many transportation related decisions, land use activity and planning are an integral part of the creation of a safe and efficient roadway system. Every land use plan amendment, subdivision, rezoning, conditional use permit, or site plan involves access and creates a potential impact to the efficiency of the transportation system. Properties have access rights and good design will minimize the deleterious effect upon the roadway system. Minnesota State Statutes requires that “reasonable, convenient, and suitable” access to property shall be provided. Access management is a combination of good land use planning and effective design of access to property.

The granting of access is shared by the State, County, and City with each having the permitting process responsibility over roadways under their control. The aforementioned authorities may also require the following while examining access:

- Dedication of public rights-of-way
- Construction of public roadways, trails, and bikeways
- Mitigation measures of traffic and/or other impacts
- Change in and/or development of new access points
- Dedication of trail easements

Using proper access guidelines helps all the agencies involved act in a coordinated manner. However, access spacing is important not just for new developments, but for existing developments and accesses as well. Processes should be developed to deal with existing corridors that have allowed improper access spacing in the past. In these cases, it is possible that the number of access points exceed the access spacing guidelines. These existing access points must be handled in a different manner than with new access points. It is desired to aggressively minimize any new accesses while consolidating, restricting, and/or reducing existing access points as redevelopment occurs. It is important to remember that access spacing guidelines are long term goals and not absolute rules.

Maintaining flexibility is important when promoting access consolidation, including consideration of existing conditions, physical barriers, or constraints. The traveling public benefits from access spacing whether using grade-separated crossings, frontage roads, right-turn only entrances/exits, etc. Given the number of agencies potentially involved in reviewing plats and access points, access guideline and corridor management practices should be implemented at the State, County, and City level.

MnDOT has developed guidelines for access management based upon their goals of safety, mobility, and statewide growth. As a part of their guidelines, 4 new categories were developed as an addition to the functional classification system:

- High Priority Interregional Corridors (IRC)
- Medium Priority IRC
- Regional Corridors
- Statewide Roads

These types of roadways link the State’s primary trade centers and the Twin Cities Metro area to one another. MnDOT has further divided the primary categories into sub- categories based upon the specific facilities and land use patterns surrounding the roadway. Highway 55 is recognized as a regional corridor.

The governmental unit controlling specific roadways also controls access to these roadways. For the most up-to-date access spacing guidelines, contact MnDOT and Hennepin County.

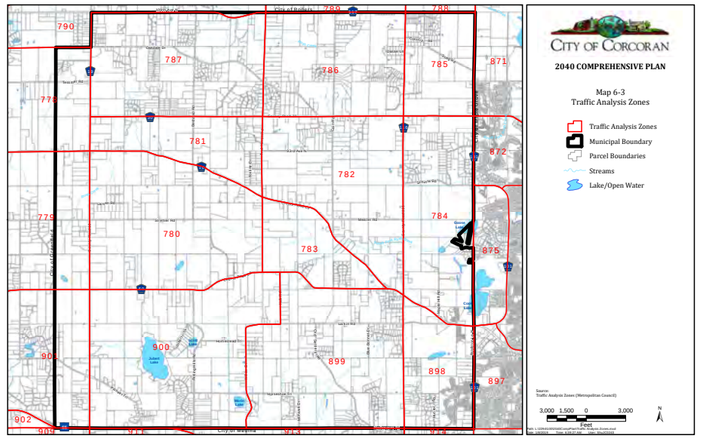
Traffic Volumes

The Metropolitan Council has projected the City's growth as shown in Table 6-1. The growth will be accommodated through development efforts. Map 6-3 shows the location of each traffic assignment zone (TAZ) within the City limits.

The Metropolitan Council's Transportation Policy Plan supports the maintenance and enhancement of transportation facilities to accommodate growth and reinvestment into the community.

Table 6-1: Forecast of Population, Households, and Employment By TAZ

	Population			Households			Employment		
TAZ	**2020**	**2030**	**2040**	**2020**	**2030**	**2040**	**2020**	**2030**	**2040**
778	49	52	48	19	21	20	51	53	52
779	108	113	105	41	45	43	27	28	27
780	324	342	317	123	138	131	30	31	30
781	282	295	273	107	119	113	201	212	207
782	520	974	1583	197	393	654	34	39	41
783	216	304	380	82	122	156	38	41	41
784	1249	1897	2559	475	764	1055	153	227	322
785	277	255	268	102	101	113	114	213	362
786	569	528	522	209	211	221	178	198	193
787	830	767	747	305	306	315	53	56	54
898	479	860	1354	177	344	566	75	83	88
899	992	1536	2123	367	614	887	548	588	598
900	739	922	966	273	369	403	169	193	213
901	110	116	108	41	46	45	30	48	72



Map 6-3: Traffic Analysis Zones *(See page 95 for large size map.)*

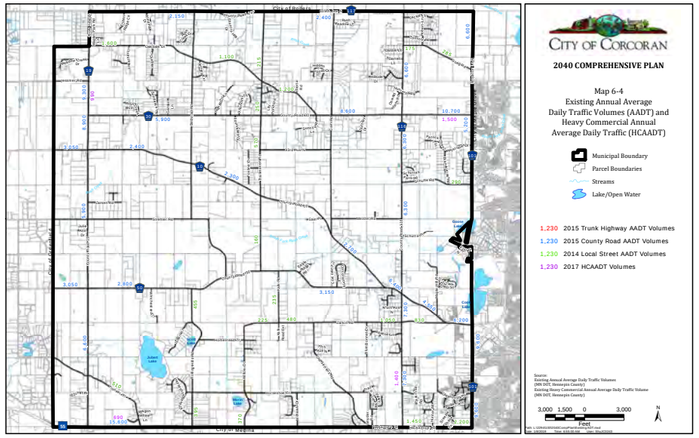
The most recent daily traffic volume information for the primary roadways in the City of Corcoran was obtained from MnDOT. Map 6-4 shows the existing average annual daily traffic (AADT) and heavy commercial average annual daily traffic (HCAADT) volumes within the City. There are no railroad facilities, barge facilities, or intermodal freight terminals in Corcoran. Most truck traffic in the City is either passing through or delivering goods to local busiensses.

The traffic volumes shown in Map 6-4 are used as a planning tool to help test the ability of a roadway to accommodate future volumes. In addition to the number of lanes provided, the daily capacity of any individual roadway is based upon many factors including:

- Number of access points per mile
- Number of signalized intersections per mile
- Percentage of truck traffic
- Physical grade of the roadways

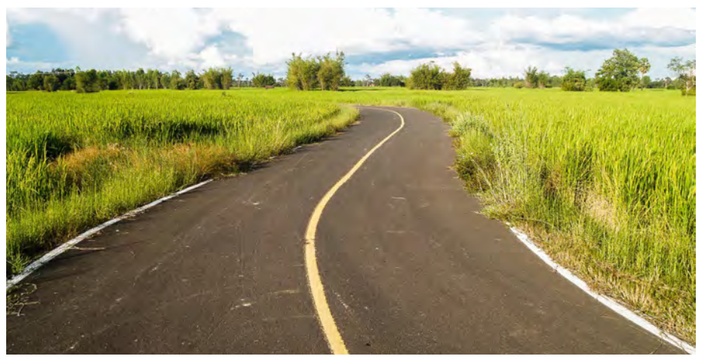
Level of service (LOS) is a qualitative measure describing operational conditions within a traffic stream, generally in terms of service measures such as:

- Speed and travel time
- Freedom to maneuver
- Traffic interruption
- Comfort and convenience



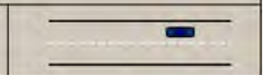
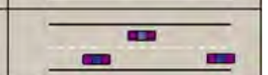
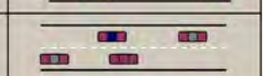
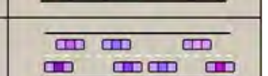
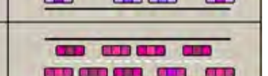
Map 6-4: Existing Annual Average Daily Traffic Volumes (ADT)

(See page 97 for large size map.)



Six levels, LOS A to LOS F, are generally used for traffic analysis. LOS A is the best with free flow conditions and little to no delay. LOS F is the worst with congestion, long delays, and forced flow. Table 6-2 shows how each level of service would look to motorists.

Table 6-2: Level of Service Description

Level of Service	Description	
A	Lower volumes Little to no delay Unimpeded movement	
B	Minor delays Reasonably unimpeded operation Slightly restricted movement	
C	Stable conditions More restricted movements Speeds controlled by higher volumes	
D	Higher density traffic Volumes near capacity Some noticeable congestion	
E	At capacity Major delays are common Lower speeds	
F	Failing condition Significant delays Very low speeds with stop and go traffic	

For planning purposes, a generalized average daily traffic (ADT) threshold for roadways is used. Table 6-3 shows the generalized ADT volume thresholds for a roadway type and number of lanes in terms of level of service.

Table 6-3: Generalized Planning Average Daily Traffic Volume Thresholds

Facility Type	Maximum ADT Volume at Level of Service[1]				
	A	**B**	**C**	**D[2]**	**E**
2-Lane Roadway					
Without Turn Lanes	3,000	4,500	6,500	8,500	10,000
With R Turn Lanes	4,750	7,200	10,300	13,500	15,900
With L Turn Lanes[3]	5,250	7,900	11,400	14,900	17,500
With L and R Turn Lanes[3]	7,500	11,250	16,250	21,250	25,000
4-Lane Roadway					
Without Turn Lanes	7,100	10,700	15,400	20,100	23,700
With R Turn Lanes	9,600	14,400	20,700	27,100	31,900
With L Turn Lanes[4]	10,100	15,200	21,900	28,600	33,700
With L and R Turn Lanes[4]	12,600	18,900	27,200	35,600	41,900

[1]ADT Volumes above the LOS E maximum threshold would be considered LOS F.
[2]LOS D is usually the lowest acceptable LOS allowed by most agencies within the metro area.
[3]Also considered the planning capacity for a 3-lane roadway (1 through lane in each direction with a center, 2-way left turn lane) without or with a right turn lane.
[4]Also considered the planning capacity for a 5-lane roadway (2 through lanes in each direction with a center, 2-way left turn lane) without or with a right turn lane.

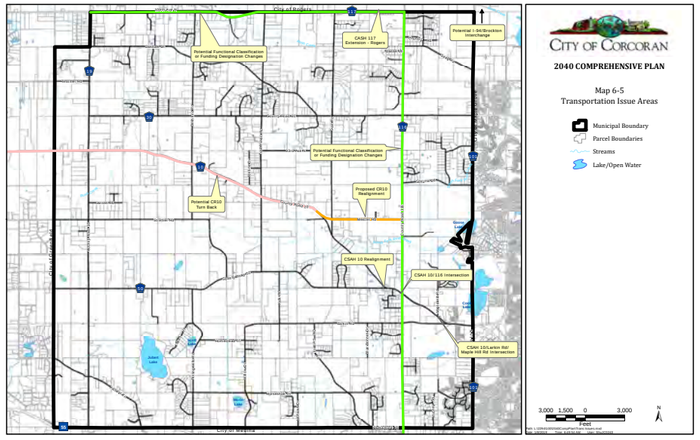
Note: Approximate values based upon several assumptions: Capacity assumptions per lane, Peak hour percentages, Directional orientation, ¼ mile signal spacing.

Transportation Issues

This section identifies transportation issues that affect the City's transportation plan. The section was compiled from several sources including:

- Highway 55 Corridor Coalition
- Hennepin County Transportation Systems Plan (HC-TSP)
- Comprehensive Plans from surrounding communities
- Corcoran's Vision

Some of the issues have been identified on Map 6-5. The City of Corcoran may or may not support all the issues that are discussed in the following section, but the issues have been discussed by others and may affect Corcoran.



Map 6-5: Trasportation Issue Areas *(See page 99 for large size map.)*

Highway 55 Corridor

Highway 55 is a primary transportation corridor linking the western communities in Wright County and Hennepin County to the Minneapolis/ St. Paul Metropolitan area. The corridor has become congested as the area has developed because there are no parallel routes to spread the traffic demand. Therefore, the capacity of Highway 55 must be increased.

The increasing traffic and capacity needs are a growing concern to the communities along the corridor. Direct access to Highway 55 and crashes along the corridor have raised the concern for the safety of everyone who uses the highway. MnDOT is currently faced with growing transportation needs throughout the State and decreasing transportation funding.

The Highway 55 Corridor Coalition has prepared a concept improvement plan for Highway 55. This plan proposes the provision of an improved facility with the potential of interchanges at County Road 101 and County Road 116. The plan proposes Highway 55 to be a 6-lane divided roadway from the City of Medina to County Road 116 in Corcoran and then a 4-lane divided highway from County Road 116 to County Road 19. The concepts developed within this corridor plan are a guide to help preserve future right-of-way along the corridor. Funding does not exist to construct any of the recommended improvements at this time.

County Road 10/County Road 50 Realignment

The existing intersection of County Road 10/County Road 50 has poor geometrics due to the angle the roads form as they intersect. The area also contains the City's largest municipal park, a historical church facility, tight corridor and limited right-of-way.

The City has a vision to develop this area as its downtown redevelopment. The County roadways would need to be realigned to improve geometrics and accommodate the City's vision. This realignment would aim to by-pass the downtown area as well as create a standard right- angle intersection at County Road 10 and County Road 116. The exact location of the realigned roadway has been previously studied, and will again require study and planning as the County seeks to reduce congestion and conflict points. The area should be studied in detail as development plans progress.

NW Hennepin County Transportation Improvements

The Northwest Hennepin County – I-94 Sub-Area Transportation Study (NW Hennepin Study) was completed in April 2008. The study was initiated to identify future transportation system needs, to address the changing needs within those communities, and to establish the groundwork for moving forward with requests for additional access to I-94. Through the study, some key issues were identified including a lack of an arterial roadway system in the area, physical constraints, congestion, and access to I-94. The study identifies an area south of I-94, which includes Corcoran, as an area that lacks an arterial roadway system.

Traffic volume forecasts for the year 2040 were developed based on Metropolitan Council projections of population, households, and employment. The study area roadway's capacities and deficiencies were identified so that communities can plan for additional capacity improvements or manage facilities effectively through access controls, right-of- way preservation, setback requirements, and/or land use and development controls. Improvements identified in the study were based on transportation system needs and growth trends with no account for available funding. Implementation priorities were established using the following criterion:

- Improving system connectivity to provide better east-west and north-south flow in immediate growth areas;
- Addressing current capacity issues at major intersections/ interchanges and overloaded segments;
- Addressing I-94 access issues to better balance access to I-94;
- Leveraging funding of federal, state, local, and private funds to the fullest extent.

County Road 30

The City plans for County Road 30 is to be the primary east-west corridor through Corcoran in the future. The extension of County Road 30 east of Corcoran will connect to the future Highway 610 interchange at I-94. Eventually, County Road 30 will be a 4-lane facility through Corcoran. The City plans for County Road 30 to be designed as a parkway through the City. Future development may need to provide larger right-of-way to accommodate a parkway design.

Interchange at I-94/Brockton Lane

As the northwest Hennepin County area grows, increased access to I-94 is necessary to relieve current access points and to balance flows on the arterial roadway system. The NW Hennepin Study examined an interchange at the Brockton Lane area due to spacing from other I-94 access points as well as connections to the arterial roadway system. This proposed regional access to I-94 serves to relieve adjacent interchanges, increase system efficiency and safety, and relieve overloads on other local system linkages. If access to I-94 in the Brockton Lane area is not provided, significant capacity enhancements to arterials and interchanges at TH 101 in Rogers and County Road 30 in Maple Grove would be needed.

River Crossings

The potential need for a new Crow River crossing was raised by the Wright County Transportation Plan in 1994, but was seen as being beyond the study period in the Hennepin County Transportation Systems Plan (HC-TSP). This potential link would extend County Road 30 in Hennepin County westerly to Wright County Road 144, thus providing an east-west connection between Buffalo to TH 610. The impacts of this river crossing are still being examined. The exact alignment of the County Road 30 extension and the river crossing has not yet been determined and will require further detailed study.

Transit System

Transit Link dial-a-ride service is provided in Corcoran. There are currently no other public transit facilities or services provided in Corcoran. As growth and development occur in the community it will be important to include transit options in designs. Park and Ride or carpool areas should be accommodated in site development or on public sites. Streets or parking lots can be designed with pull over locations to accommodate bus stops that do not impede traffic flow. While the City does not have public transit at this time, other types of transit solutions should not be ignored and should be explored.

Corcoran is currently designated as the Metropolitan Transit Market Area V. Transit Market Area V has very low population and employment densities and tends to be primarily rural communities and agricultural uses. General public dial-a-ride service may be appropriate here, but due to the very low-intensity land uses these areas are not well-suited for fixed-route transit service.

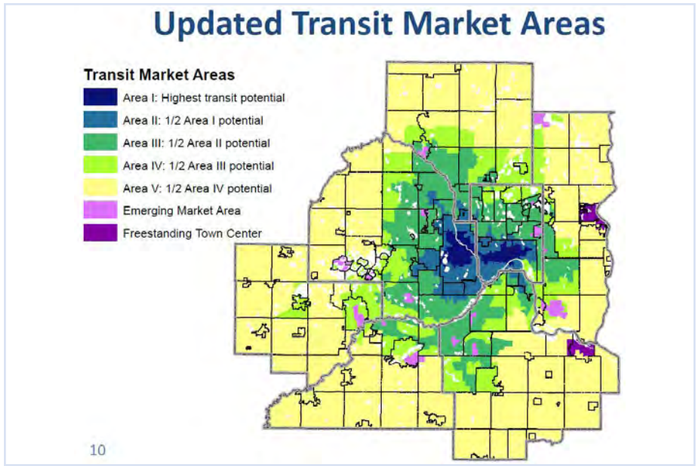


Figure 6-3: Transit Market Area V
Source: Metropolitan Council

Freight

There are no railroad facilities, barge facilities, or intermodal freight terminals within the City of Corcoran. Most truck traffic on TH 55 is passing through Corcoran to locations within the metro area. Data from MnDOT indicates a Heavy Commercial Average Annual Daily Traffic volume of 500-999 vehicles per day on TH 55 in Corcoran. Commercial trips on other roadways in Corcoran are either traveling through or delivering goods to local businesses.

Aviation Facilities

There are currently no public aviation facilities in the City of Corcoran. However, the City is within the region's general airspace which needs to be protected from potential obstructions to air navigation.

Under Minnesota Statutes §360, the State regulates the height of structures as they are defined and enforced under Aeronautics Rules and Regulations 8800.1200 Criteria for Determining Air Navigation Obstructions. Subparagraph 4(B) states:

> *Objects more than 200 feet above the ground or more than 200 feet above the established airport elevation, whichever gives the higher elevation, within 3 nautical miles of the nearest runway of an airport, and increasing in the proportion of the 100 feet for each additional nautical mile of distance from the airport but not exceeding 500 feet above ground, is a general obstruction.*

Notification to MnDOT Aeronautics is required when any object, as defined above, would affect general airspace. The City will include the following requirements with all applications:

> *Notification: Any applicant or property owner who proposes any construction or alteration that would exceed a height of 200 feet above ground level at the site, or any construction or alteration of greater height than an imaginary surface extending upward and outward at a slope of 100:1 from the nearest point of the nearest runway of a public airport shall notify the Commissioner at least 30 days in advance. Local reporting is in addition to any Federal permitting/review process (FAA Form 7460-8) involving a sponsor/ proposal.*

Bicycling and Walking

The existing and planned on-road and off-road bicycle facilities are shown in Map 5-1. In the 2040 Met Council Transportation Policy Plan, County Road 19 and County Road 101 are classified asTier 2 alignments for bicycle facilities. No other alignments or corridors are planned in Corcoran. As the area develops, enhancing the non-motorized facilities within Corcoran will be important in order to improve transportation sustainability within the City. Improved facilities and connections provide alternatives to driving, support options for residents who do not have a personal vehicle, and promotes healthy lifestyles and exercise.

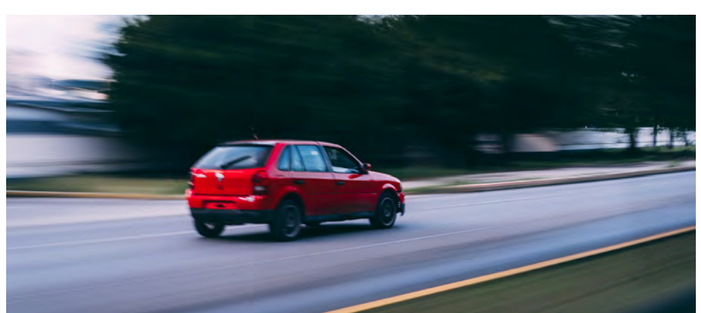
The City's integrated transportation network will include appealing and safe streets that are accessible to people walking and biking, as well as people driving motor vehicles. A combination of off-road and on-street bike and pedestrian facilities are included to give people safe and convenient options for active transportation.

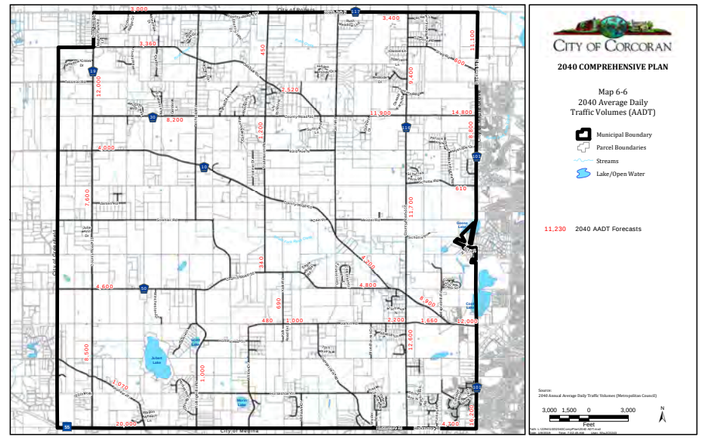
2040 Future Transportation System

Highways and Streets

2040 Traffic Projections

Year 2040 annual average daily traffic (AADT) forecasts were developed using data provided by the Metropolitan Council from the travel demand model. Future AADT for the roadways in Corcoran were projected based on the future land use, TAZ data, and population growth estimates. The volumes shown are generally lower than 2030 forecasts presented in the Hennepin County transportation plan. Those forecasts were developed in the 2005-2007 time frame, when development pressure in this area was higher. Since the 2030 volumes were developed, the Metropolitan Council has shifted regional growth to urban and developed areas, resulting in lower population and employment forecasts for Corcoran. The 2040 AADT volume forecasts are shown in Map 6-6.





Map 6-6: 2040 Average Daily Traffic Volumes *(See page 101 for large size map.)*

Jurisdictional Transfers (Planned or Possible)

The 2030 Hennepin County Transportation Systems Plan (HC-TSP) suggests turning County Road 10 and County Road 101 back to the City. The City does not support these turn backs. The decision has not been finalized and no timeframe has been designated.The City is continuing to work with Hennepin County to determine the feasibility of these possible changes.

Functional Classification Changes (Planned or Possible)

According to the 2030 Hennepin County Transportation Systems Plan (HC-TSP), County Road 116 and County Road 117 through Corcoran could warrant a change in either their functional classification or funding designation. These roadway segments should be monitored. The City of Corcoran should communicate with Hennepin County and the Metropolitan Council regarding any changes in either functional classification or funding designations that may arise.

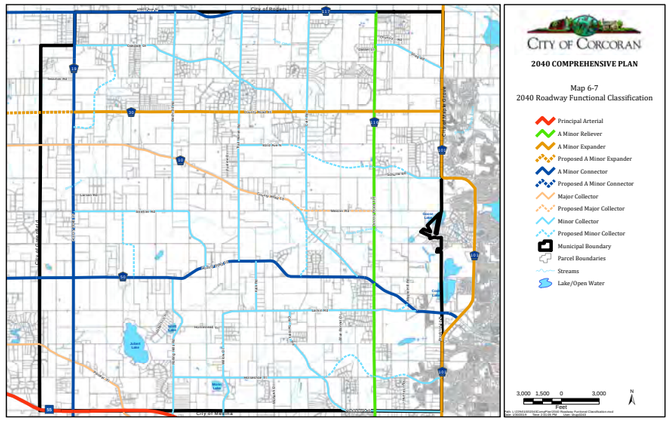
County Road 116 (Southern NW Hennepin Study Area Boundary to County Road 13)

County Road 116 from the southern boundary of the NW Hennepin Study area to County Road 13 is recommended to be upgraded from a "B" Minor Arterial to an "A" Minor Arterial Reliever. This route provides important north-south continuity within the area to more urbanized metro areas to the south. In addition, County Road 116 is proposed to be extended as an overpass from Territorial Road to County Road 13. This overpass will play a similar role to County Road 117 in terms of providing local traffic circulation without congesting the busy interchange areas.

County Road 117 (County Road 19 to County Road 116)

Currently, this route is a "B" Minor Arterial. This route helps provide east-west continuity in the area. This route provides connectivity into Wright County and through an extension to the east across I-94 will provide connectivity to County Road 81 and industrial/commercial areas along County Road 81. Therefore, this section of County Road 117 is recommended to be classified as an "A" Minor Arterial Connector due to its connectivity, spacing from County Road 30 and connection to other proposed north-south minor arterials such as County Road 116 and County Road 101.

County Road 30 Extension (County Road 19 to the West Study Area Boundary) Currently, County Road 30 is designated as an "A" Minor Arterial Connector from I-94 to County Road 19. The future local system plan identified a continuation of this route to the west into Wright County. This route is anticipated to be the main east-west mobility corridor as it serves Corcoran, Rogers as well as traffic from Wright County through a future crossing of the Crow River. At I-94, County Road 30 is planned to be realigned in the future to connect as the western leg of the I-94/TH 610 interchange. Due to the importance of this route as a mobility corridor, it is recommended by the study to be classified as an "A" Minor Arterial Expander. Map 6-7 shows the future 2040 functional classification of roadways.



Map 6-7: 2040 Roadway Functional Classification *(See page 103 for large size map.)*

Roadway Capacity Analysis

The projected future roadway network was analyzed at a planning level using year 2040 volume projections. No improvements were assumed to the roadway network, with the exception of TH 55. TH 55 was analyzed as a 4-lane segment with left and right turn lanes. It can be seen from these results that improvements may be necessary at some locations to avoid undesirable levels of service. Improvements such as adding left and right turn lanes at major intersections will improve the overall level of service for roadway sections by decreasing delays and improving traffic flow. Corcoran will continue to monitor traffic operations and pursue improvements at locations when necessary to provide acceptable levels of service. Roadway capacities for 2040 for selected roadway segments as shown in Table 6-4.

Table 6-4: 2040 Planning LOS

Segment	From - To	Los
Cty Rd 116	Entire segment in Corcoran	E
Cty Rd 101	Entire segment bordering Corcoran	D
Cty Rd 10/Cty Rd 50	Commerce Street to Cty Rd 101	E
Cty Rd 30	Cain Road – Cty Rd 101	E
Cty Rd 30	Cty Rd 19 – Cain Road	D
Cty Rd 117	West City Boundary – Cty Rd 116	B
Cty Rd 19	Cty Rd 50 – Cty Rd 117	E
Cty Rd 50	Cty Rd 19 – Cty Rd 10	C

Table 6-5 shows the existing and future number of lanes for selected roadway segments.

Table 6-5: Number of Lanes

Segment	From-To	Existing	Future
TH 55	Entire segment in Corcoran	2	2
CR 116	Entire segment in Corcoran	2	2
CSAH 19	Entire segment in Corcoran	2	2
CSAH 30	Entire segment in Corcoran	2	4
CSAH 50	Entire segment in Corcoran	2	2
CSAH 101	Entire segment in Corcoran	2	2

The Hennepin County Transportation Systems Plan (HC-TSP) also identifies County Road 116, County Road 30, and County Road 101 as having possible/probable congestion in 2040. As development occurs within the City, area roadways should be monitored to address congestion issues before it becomes significant.

Hennepin County has identified improvements that were used in their Base 2040 Roadway Network. This itemized list of improvements includes projects that are anticipated to be implemented by 2040 due to their inclusion in CIP's, the Transportation Improvement Plan (TIP) or some action that makes the improvement likely. Improvements identified by the County that would affect Corcoran are identified in Table 6-6.

Table 6-6: Hennepin County – Base 2040 Roadway Network Improvements

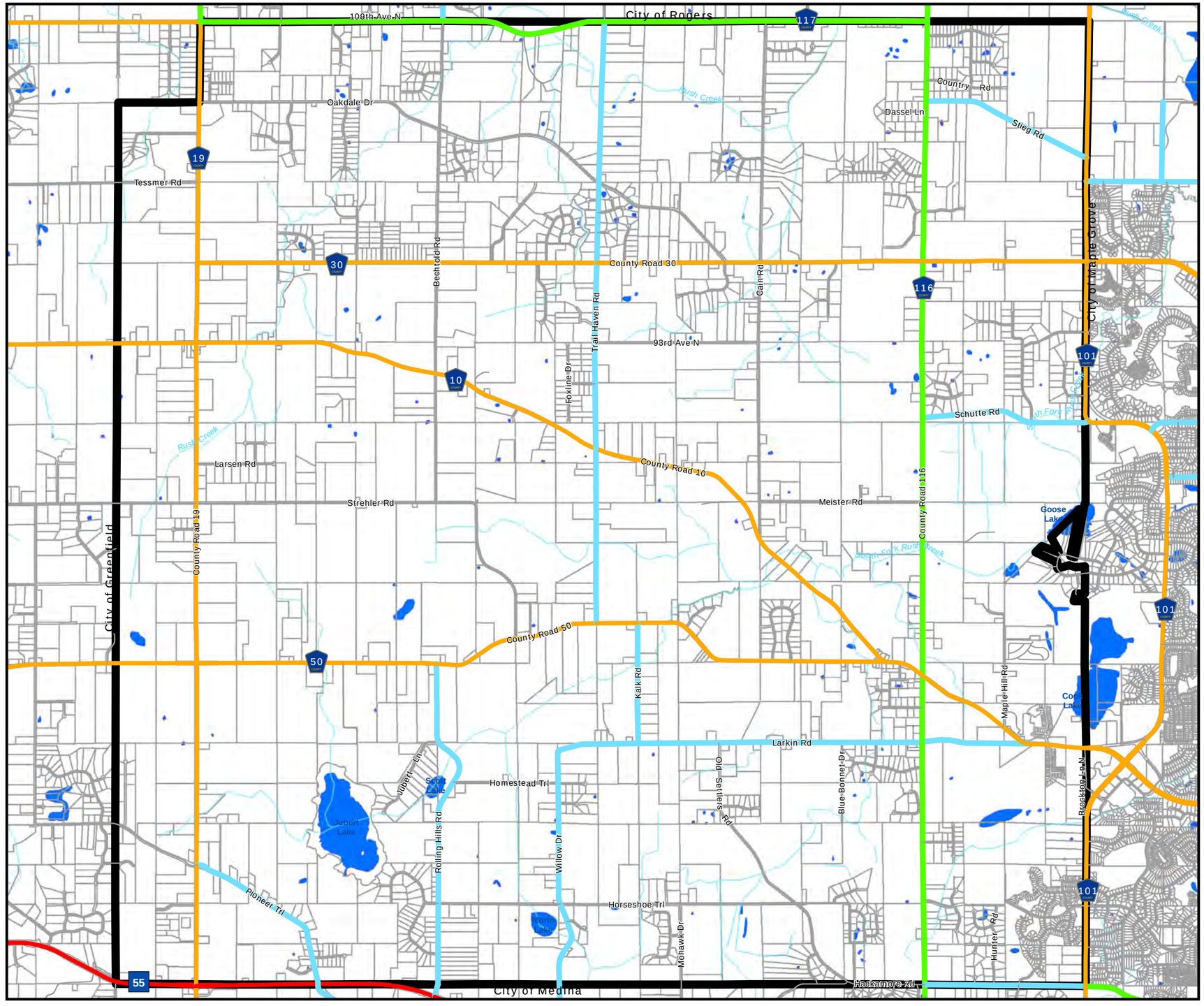
Roadway	Termini	City
MnDOT		
Trunk Highway 101	Conversion to limited access – north segment	Rogers
Hennepin County		
County Road 101	Reconstruct and add lanes with Laurel Creek	Rogers
County Road 116	Fletcher Bypass – extension to County Road 81	Rogers

The County also identified Optional 2030 Roadway Network Improvements. This roadway network incorporates some roadway elements that have been proposed by this and other studies and are still under evaluation. Table 6-7 identifies improvements that may impact Corcoran.

Table 6-7: Hennepin County – Optional 2030 Roadway Network Improvements

Roadway	Termini	City
MnDOT		
I-94 / Brockton Lane	New directional interchange	Rogers
Hennepin County		
County Road 30	New Crow River Bridge to Wright Co Cty Rd 144	Greenfield

Additional traffic studies will be needed prior to implementing any roadway improvements to ensure proper planning.



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 6-1
Existing Roadway Jurisdiction

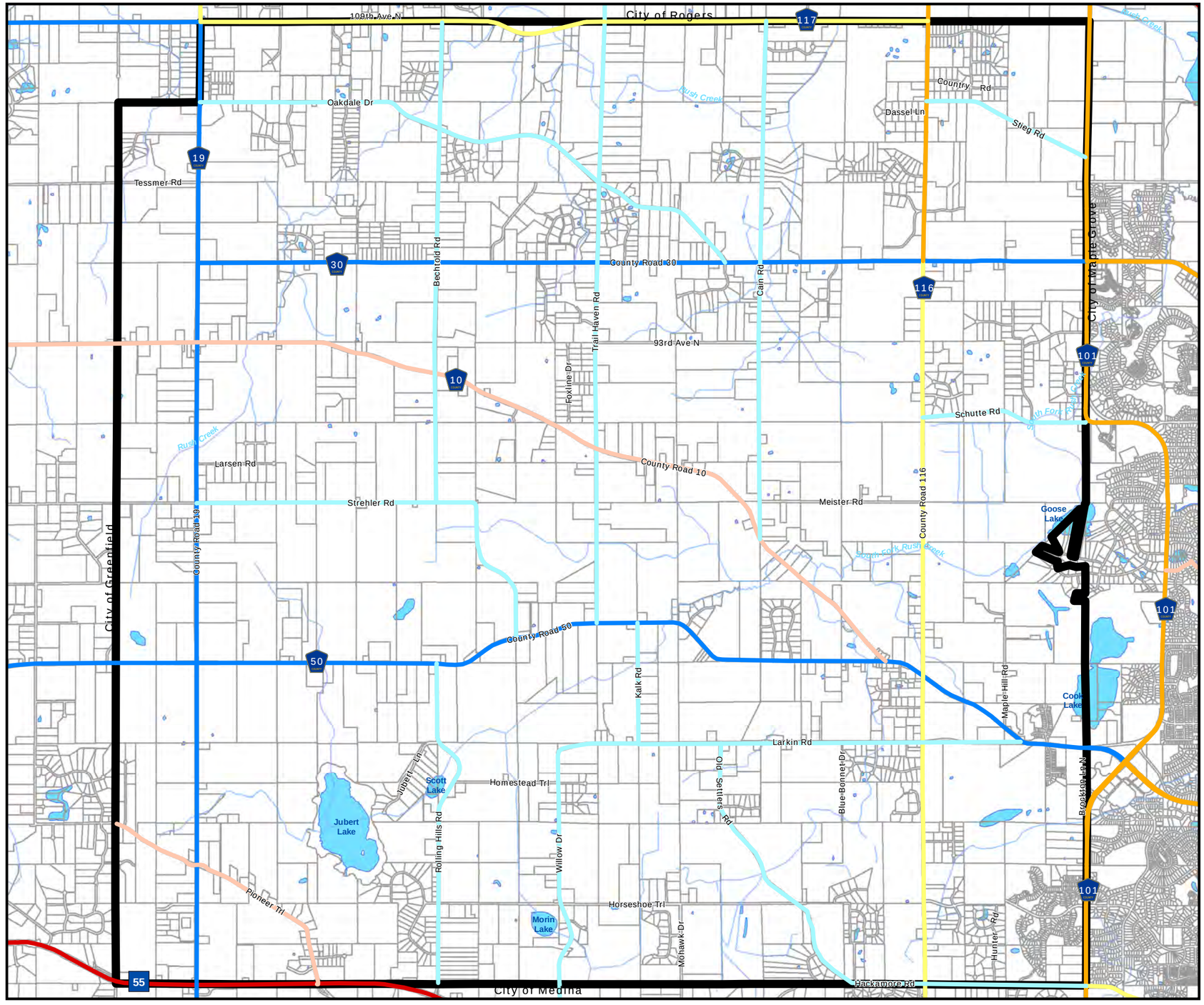
- State Highway
- County State Aid Highway (CSAH)
- County Road
- Municipal State Aid Street (MSAS)
- Municipal Street
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

Source:
Existing Roadway Jurisdiction (MN DOT)

3,000 1,500 0 3,000
Feet

N

Path: L:\12294\100\2040CompPlan\Existing Roadway Jurisdiction.mxd
Date: 1/7/2019 Time: 3:42:48 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 6-2
Existing Roadway Functional Classification

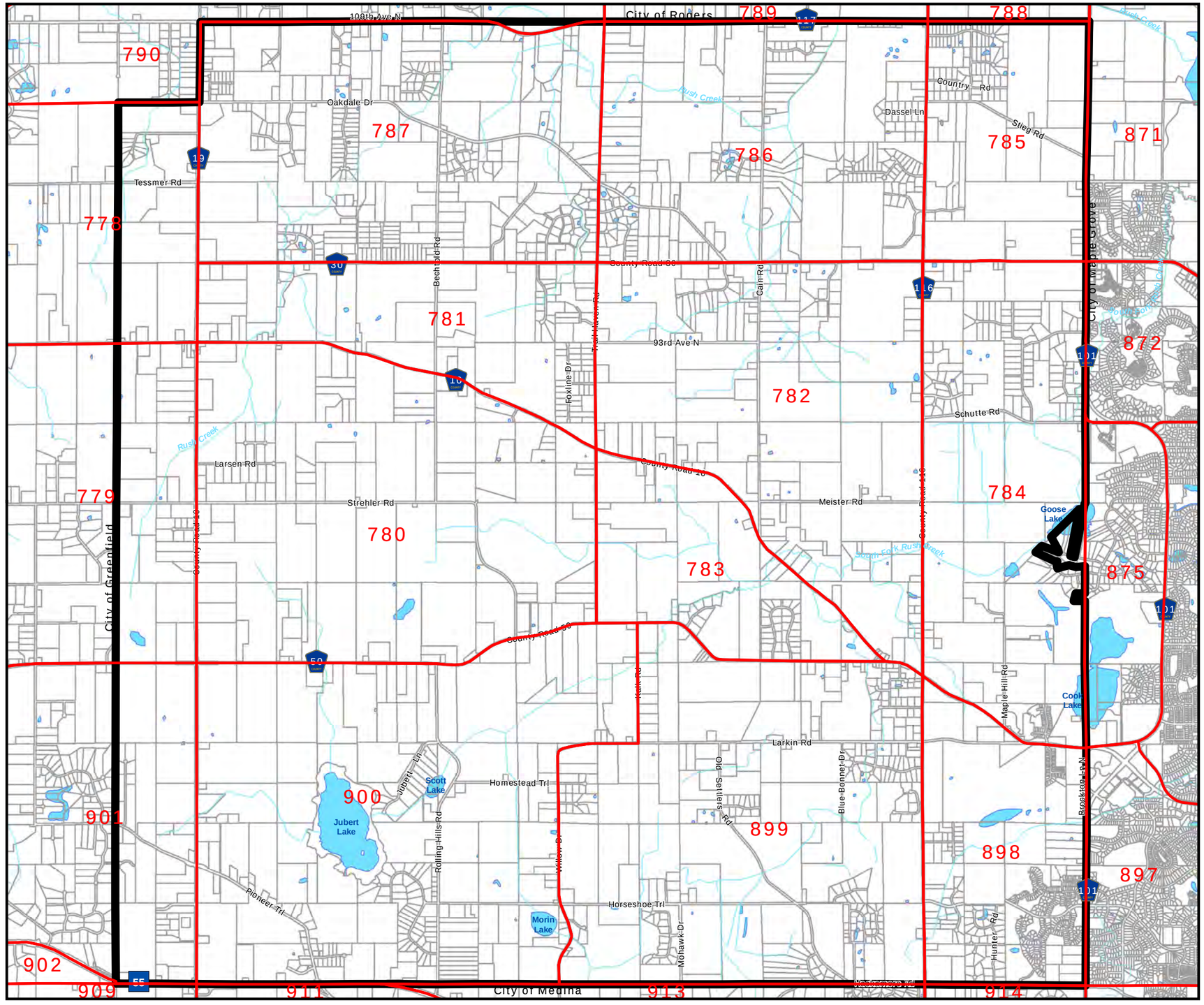
- Principal Arterial
- A Minor Expander
- A Minor Connector
- Other Arterial
- Major Collector
- Minor Collector
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

Source:
Existing Roadway Functional Classifictaion (Metropolitan Council)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Existing Roadway Funtional Classification.mxd
Date: 1/8/2019 Time: 6:37:13 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 6-3
Traffic Analysis Zones

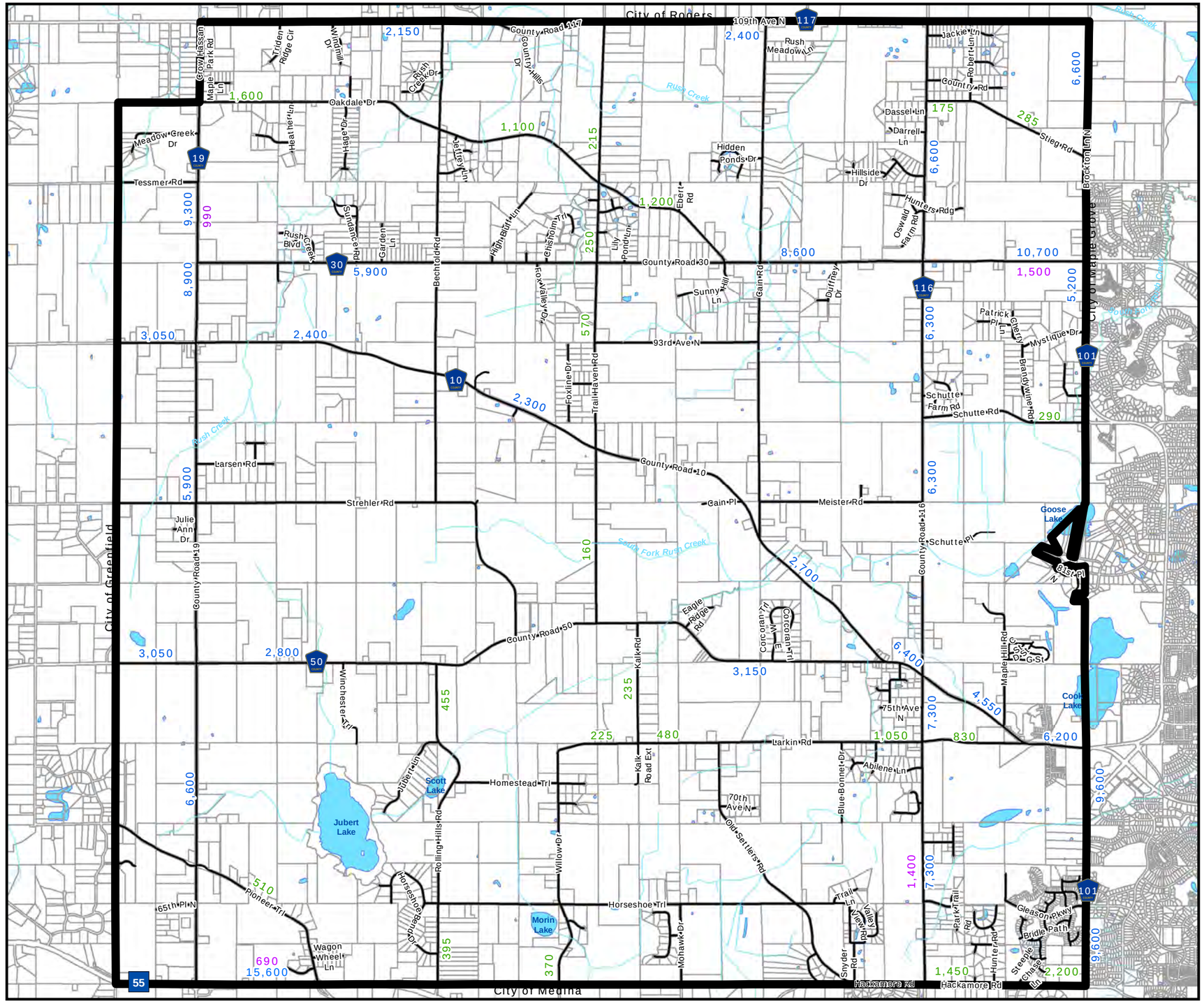
- Traffic Analysis Zones
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

Source:
Traffic Analysis Zones (Metropolitan Council)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Traffic Analysis Zones.mxd
Date: 1/8/2019 Time: 6:39:27 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 6-4
Existing Annual Average
Daily Traffic Volumes (AADT) and
Heavy Commercial Annual
Average Daily Traffic (HCAADT)

- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

1,230 2015 Trunk Highway AADT Volumes

1,230 2015 County Road AADT Volumes

1,230 2014 Local Street AADT Volumes

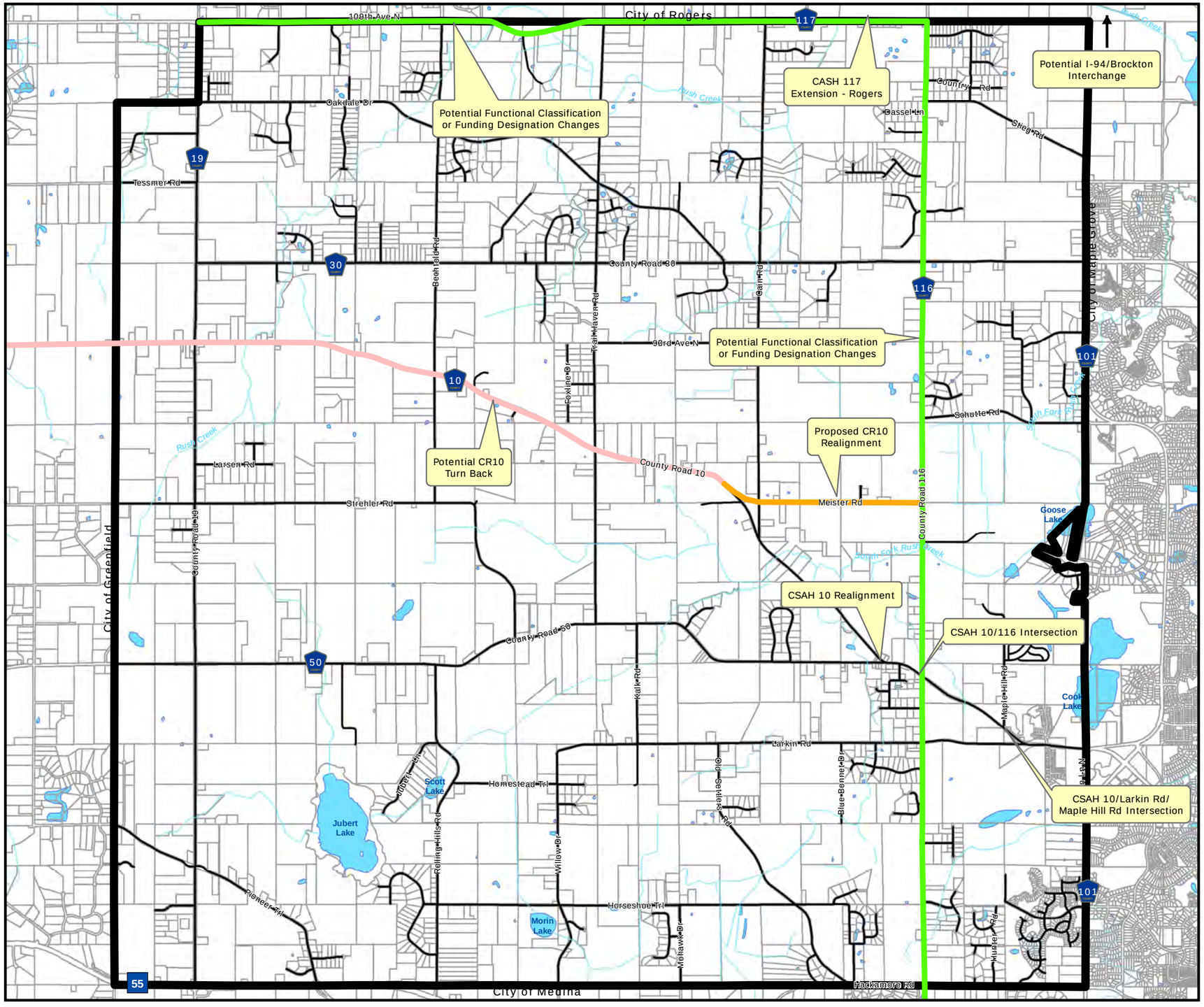
1,230 2017 HCAADT Volumes

Source:
Existing Annual Average Daily Traffic Volumes
(MN DOT, Hennepin County)
Existing Heavy Commercial Annual Average Daily Traffic Volume
(MN DOT, Hennepin County)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Existing ADT.mxd
Date: 1/8/2019 Time: 6:55:00 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

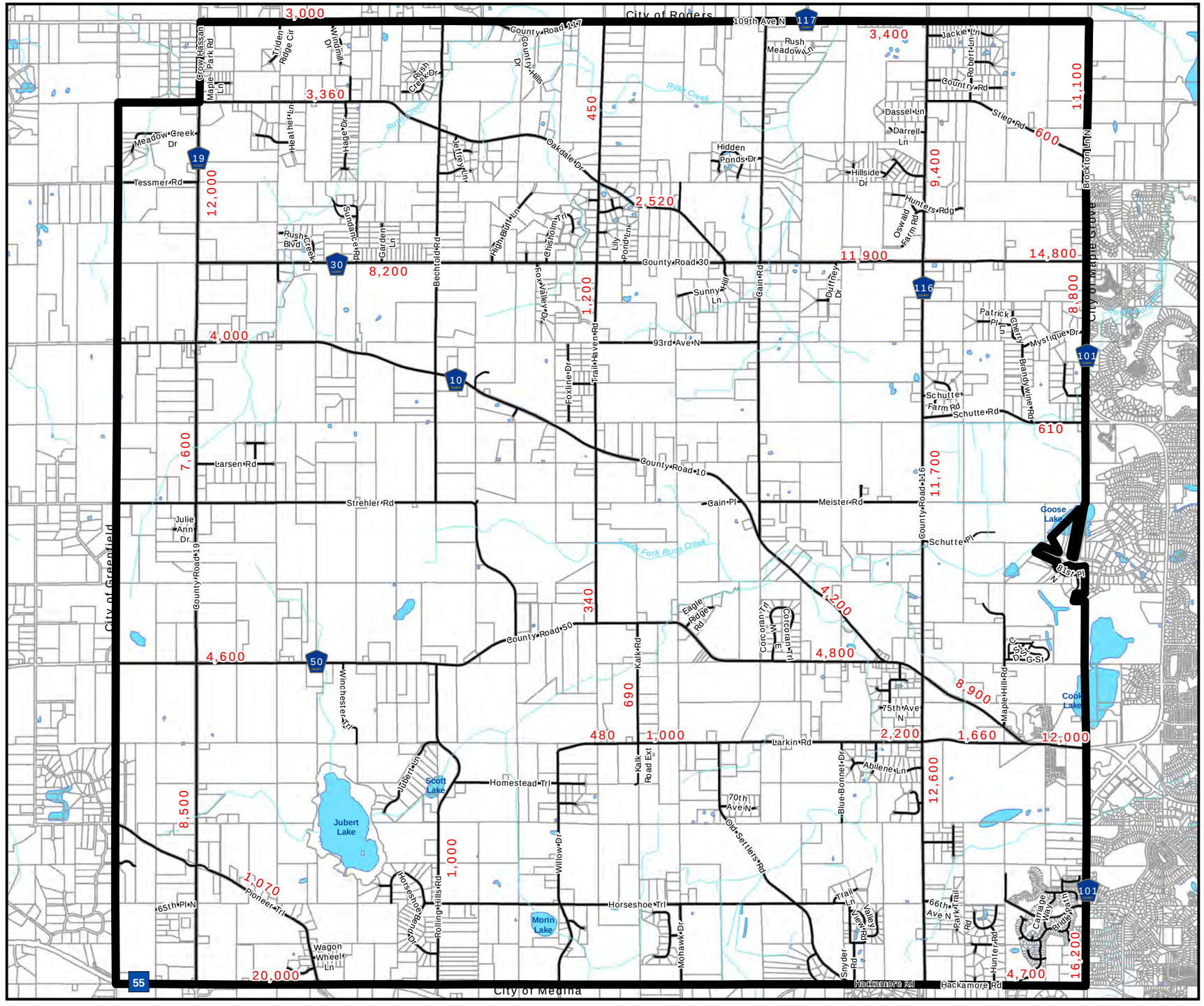
Map 6-5
Transportation Issue Areas

- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Trans Issues.mxd
Date: 1/8/2019 Time: 6:49:54 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 6-6
2040 Average Daily
Traffic Volumes (AADT)

- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

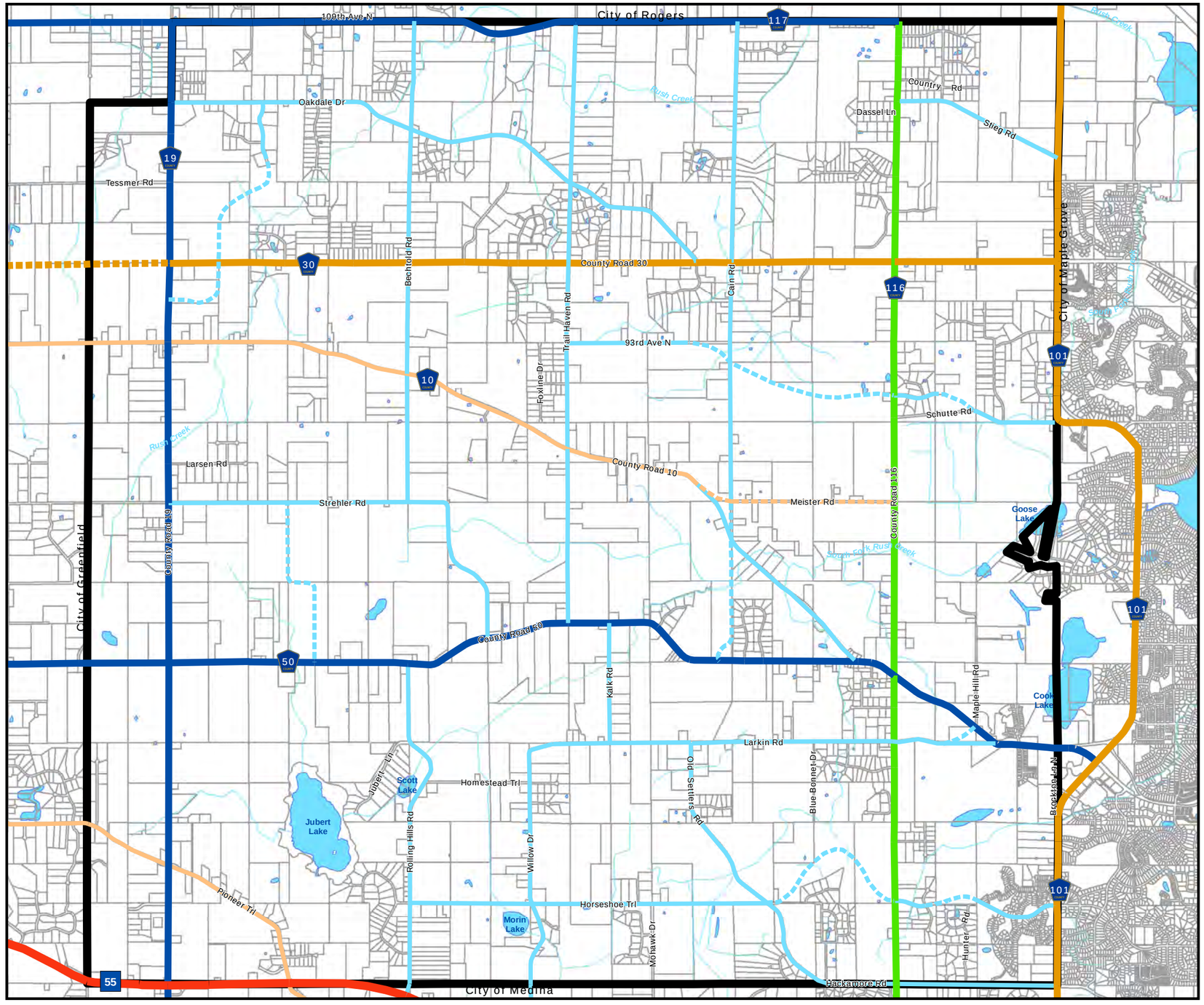
11,230 2040 AADT Forecasts

Source:
2040 Annual Average Daily Traffic Volumes (Metropolitan Council)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\2040 ADT.mxd
Date: 1/8/2019 Time: 7:02:45 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 6-7
2040 Roadway Functional Classification

- Principal Arterial
- A Minor Reliever
- A Minor Expander
- Proposed A Minor Expander
- A Minor Connector
- Proposed A Minor Connector
- Major Collector
- Proposed Major Collector
- Minor Collector
- Proposed Minor Collector
- Municipal Boundary
- Parcel Boundaries
- Streams
- Lake/Open Water

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\2040 Roadway Funtional Classification.mxd
Date: 1/30/2019 Time: 2:01:05 PM User: shuic0243

CHAPTER 7: WASTEWATER

WASTEWATER

On May 28, 2014, the Metropolitan Council adopted an updated 2040 Water Resources Policy Plan (WRPP). The 2040 WRPP includes the metropolitan wastewater system plan with which local comprehensive plans must conform. The intent of this chapter is to describe Corcoran's existing and proposed ultimate wastewater collection and disposal system and to demonstrate Corcoran's conformance with Metropolitan Council wastewater system planning, providing specific information needed to meet the 2040 WRPP requirements.

Metropolitan Council's Environmental Services Division (MCES) operates the Metropolitan Disposal System (MDS) that will ultimately provide wastewater service to the sewered portions of Corcoran. The MDS includes interceptor sewers, lift stations, forcemain, wastewater treatment plants, and other features necessary for the Metropolitan Council to operate a regional wastewater collection and treatment system. Corcoran currently has 2 connections to the MDS, 1 that is currently in use in the SE District and 1 that was recently constructed to the NE District that has not yet been utilized by the City. This section provides Corcoran's projections for wastewater flow increases that Metropolitan Council can use for regional wastewater planning purposes, including whether capacity upgrades will be needed at the Metropolitan Wastewater Treatment Plant (WWTP). The updated wastewater section reflects updated land use plans from what was envisioned in the City's 2030 Comprehensive Plan.

Goals and Policies

Goal 1: Construct the system including trunk and local collectors as development takes place within the City.

Policy 1: Require developers to construct a system in a size and manner to support future needs of the system.
Policy 2: Extend the system to adjacent properties as development takes place.

Goal 2: Operate in an efficient and sanitary manner to protect public health, safety and welfare, to safeguard municpal finances, and to support development and economic vitality within the community.

Policy 1: Implement preventative maintenance programs to protect and sustain the system.
Policy 2: Restrict the installation and use of individual sewage treatment systems when necessary or appropriate.

Metropolitan Council Interceptor Connections

Metropolitan Council has identified 3 connections to the MDS, 2 existing connections via the Elm Creek Interceptor and 1 future connection via the Maple Plain Interceptor. Corcoran's planned service areas to each of the MDS connections are as follows:

- **Southwest (SW) Corcoran Connection at Node SW-5**

This connection will serve SW Corcoran. The method and timing of regional wastewater service to SW Corcoran will be determined through future study. The Metropolitan Council's 2040 WRPP indicates wastewater treatment at the Blue Lake WWTP but this could change with future study.

- **Southeast (SE) Corcoran Connection at MCES Regional Lift Station L-80**

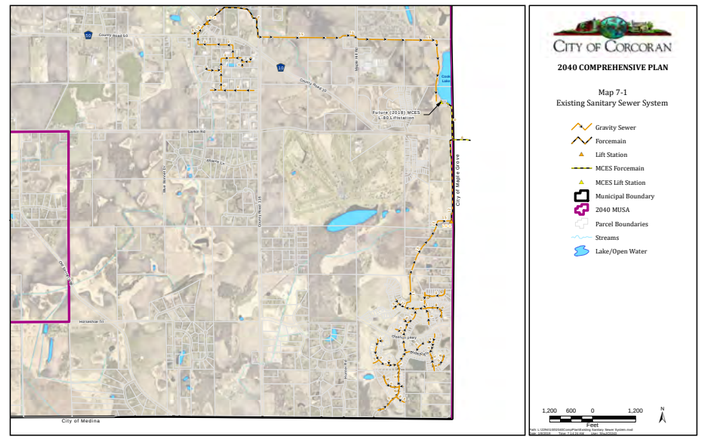
This connection will serve the eastern portion of SE Corcoran via the South Corcoran Extension of the Elm Creek Interceptor. Construction of the gravity sewer (15-inch) portion of the extension has been completed to the Corcoran border at County Road 10, and the L-80 lift station will begin operation in early 2019. With the 2017 connection of the downtown area, until the L-80 lift station is operational, the MCES is implementing temporary wastewater pumping/hauling (i.e., this wastewater is allowed to accumulate in the City's 15-inch gravity sewer upstream of a plug installed near Node SE-22).

- **Northeast (NE) Corcoran Connection at Node NE-18 (MCES Meter Station M310)**

This connection will serve NE Corcoran (and eventually also the western portion of SE Corcoran via diversion of wastewater to NE Corcoran). Construction of this meter station at the very NE corner of Corcoran was recently completed by MCES, providing access to the Rogers/Northeast Corcoran Leg of the Elm Creek Interceptor. The City initiated construction of the first trunk sewer connecting to this MCES Interceptor in December 2018, and anticipates substantial completion in July 2019.

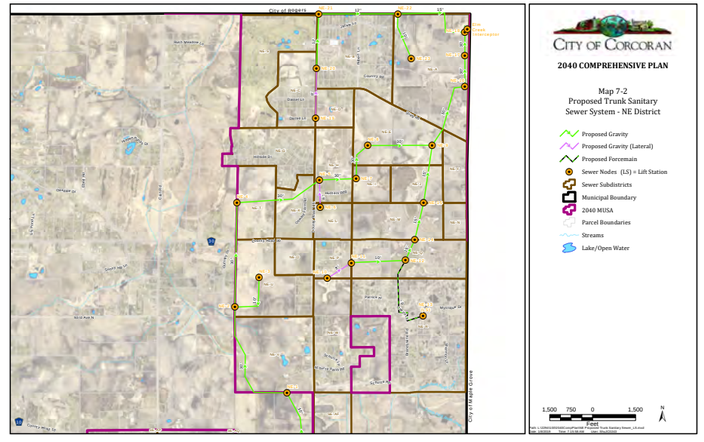
Corcoran only has two liftstations, the downtown lift station and the the Ravinia (County Road 101) lift station. These lift stations have capacities of 185 and 550 gpm, respectively, both of which are operating with current wastewater flows that are far below capacity.

Corcoran's existing sanitary sewer is shown on Map 7-1.

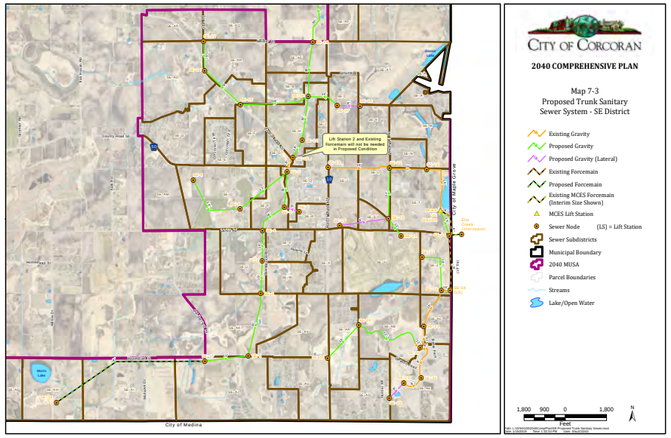


Map 7-1: Existing Sanitary Sewer *(See page 113 for large size map.)*

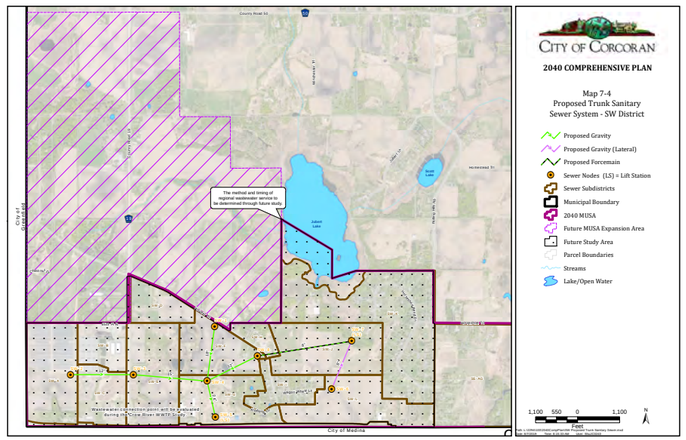
Corcoran's proposed trunk sanitary sewer system and the 3 proposed connection points to the MDS are identified on Maps 7-2 through 7-4. There is potential for expansion as the City continues to grow allowing for system capacity increases. Actual growth rates will generally affect only the timing of trunk sewer construction and not the design of the system, i.e., an ultimate trunk system based on full development of the depicted service areas has been designed.



Map 7-2: Proposed Trunk Sanitary Sewer System -- NE District
(See page 115 for large size map.)



Map 7-3: Proposed Trunk Sanitary Sewer System -- SE District
(See page 117 for large size map.)



Map 7-4: Proposed Trunk Sanitary Sewer System -- SW District
(See page 119 for large size map.)

Forecasts

The Metropolitan Council requires municipalities to include adopted forecasts for population, households, and employment in 10-year increments to 2040. Table 7-1 presents Metropolitan Council city-wide forecasts for Corcoran, as provided in Corcoran's System Statement issued by the Metropolitan Council in September 2015.

Table 7-1: City-Wide Population, Household, And Employment Forecasts

Year	Total Population	Total Households	Total Employment
2010[1]	5,379	1,867	1,093
2020	6,700	2,500	1,700
2030	8,900	3,570	2,010
2040	11,300	4,700	2,300

1 Actual

Table 7-2 presents Metropolitan Council forecasts for sewered population, households, and employees for the City of Corcoran. Based on discussions between the Metropolitan Council and Corcoran in December 2018, forecasts were revised from numbers initially provided in the Corcoran Local Planning Handbook.

Table 7-2: Sewered Population, Household, And Employment Forecasts

Year	Sewered Population	Sewered Households	Sewered Employment	Unsewered Households[2]
2010[1]	0	0	8	1,867
2020	1,550	580	1,020	1,920
2030	4,280	1,720	1,500	1,850
2040	7,650	3,190	1,840	1,510

1 Actual

2 Households served by individual sewage treatment systems.

In addition to the forecasts in the preceding Tables 7-1 and 7-2, Metropolitan Council also requires cities to provide projected average wastewater flows through 2040. The Metropolitan Council uses these forecasts to plan all future interceptors and wastewater treatment work needed to provide adequate service.

Table 7-3 presents average wastewater flow projections for Corcoran. The flow projections are based on the Metropolitan Council's December 2018 revised forecasts provided in Table 7-2, using 60 gallons per day per sewered resident and 15 gallons per day per sewered employee (these values are utilized for new development).

Table 7-3: Average Wastewater Flow Projections

Year	Average Wastewater Flow Projections (MGD)
2010	0.00
2020	0.11
2030	0.28
2040	0.49

Table 7-4 presents the average wastewater flow projections identified in Table 7-3, split by connection point to the MDS, and with the corresponding MCES wastewater treatment plant (WWTP) location shown for reference. The locations of these connection points are identified on Maps 7-2 through 7-4. The projections for the Blue Lake WWTP southwestest Corcoran was provided in the Metropolitan Council's 2040 WRPP. The projections for the Metropolitan WWTP (southeast and northeast Corcoran combined) are essentially the Metropolitan Council's December 2018 revised forecasts. The additional breakdown between southeast and northeast Corcoran reflects the City's anticipated split between these 2 areas.

Table 7-4: Average Wastewater Flow Projections By MDS Connection

Year	SW Connection (MGD)	SE Connection (MGD)	NE Connection (MGD)	Total Projected Average Flow (MGD)
	Blue Lake WWTP	Metropolitan WWTP	Metropolitan WWTP	
2010	0.00	0.00	0.00	**0.00**
2020	0.00	0.09	0.02	**0.11**
2030	0.00	0.20	0.08	**0.28**
2040	0.00	0.34	0.15	**0.49**

The total number of sewered households projected in 2040 is anticipated to be split into 2,210 households in SE Corcoran (which discharges to the South Corcoran Extension of the Elm Creek Interceptor) and 980 households in NE Corcoran (which discharges into the Rogers/Northeast Corcoran Leg of the Elm Creek Interceptor), which corresponds to sewered populations of 5,310 and 2,340, respectively. the projected 2040 sewered employment is anticipated to be split into 1,280 employees in SE Corcoran and 560 employees in NE Corcoran.

Trunk Sanitary Sewer System Design

Land Use

Corcoran's 2040 Land Use Plan serves as the basis for the development of the City's trunk sanitary sewer system by estimating volumes of wastewater generated by each land use type. Detailed descriptions of the various land uses including density ranges can be found in the land use chapter. Appendix A presents Corcoran's 2040 land use information split by sewer sub-district within the sewered portions of the City. Corcoran's sewer sub-district boundaries are shown on Maps 7-2 through 7-4.

Estimated Average Wastewater Flows

Municipal wastewater is made up of a mixture of domestic sewage, commercial and industrial wastes, groundwater infiltration, and sometimes surface water inflows. With proper design and construction, groundwater infiltration and surface water inflows, commonly referred to as infiltration/inflow (I/I), can be minimized. However, while Corcoran intends to minimize I/I into the trunk system, to be conservative a small amount of I/I (reflecting estimated I/I contributions into a new trunk sanitary sewer system) is included in the analysis and design of Corcoran's trunk sewer system to provide an appropriate level of service to Corcoran.

To estimate average wastewater flows generated within the various sewer sub-districts, unit flow rates (in gallons per acre per day) are multiplied by the acreage for each land use category as identified in Appendix A. The unit flow rates for designing Corcoran's trunk system are presented in Table 7-5. Wetland, right-of-way, and other undevelopable areas will not generate any sewer flow. The average wastewater flows for each sewer sub-district are presented in Appendix A.

Table 7-5: System Design Wastewater Unit Flow Rates

Land Use Type	Unit Flow Rate (Gallons/Acre/Day)
Ag Preserve	0
Business Park	1,000
Commercial	1,000
Existing Residential	270
High Density Residential	2,000
Light Industrial	1,000
Low Density Residential	750
Medium Density Residential	1,050
Mixed Residential	1,200
Mixed Use	1,500
Parks/Open Space	0
Public/Semi-Public	250
Rural/Ag Residential	0
Undevelopable	0

The calculation of average wastewater flow rates for use in Corcoran's trunk sanitary sewer design conservatively estimates wastewater generation at the municipal level so that no City trunk is undersized for its projected sewer sub-district. The values in Table 7-5 reflect conservative unit rate assumptions, particularly for commercial and industrial land uses, that allow Corcoran's trunk system to accommodate higher wastewater-generating land uses such as manufacturing without being undersized. The conservative approach to estimating flows allows the City to remain flexible in planning future development by allowing for the possibility of localized development of higher-intensity use while also protecting against potential sewer backups.

Design Flows

Corcoran's trunk sanitary sewer system must be capable of conveying the anticipated peak wastewater flow rate (peak hour). The peak wastewater flow rate, or design flow, is calculated by multiplying the average flow rate by a variable peak flow multiplier, called the Peak Flow Factor (PFF). The PFF can generally be described as inversely proportional to the average flow rate (as the average wastewater flows increase, the applied PFF decreases).

The PFF values applied in this study are shown in the following graphic as a curve and in tabular form. These values are generally conservative and widely used throughout the state for municipal sewer planning. The PFF values include a standard allowance for I/I, which is typical of new sanitary sewer construction as well as properly operating existing sewers.

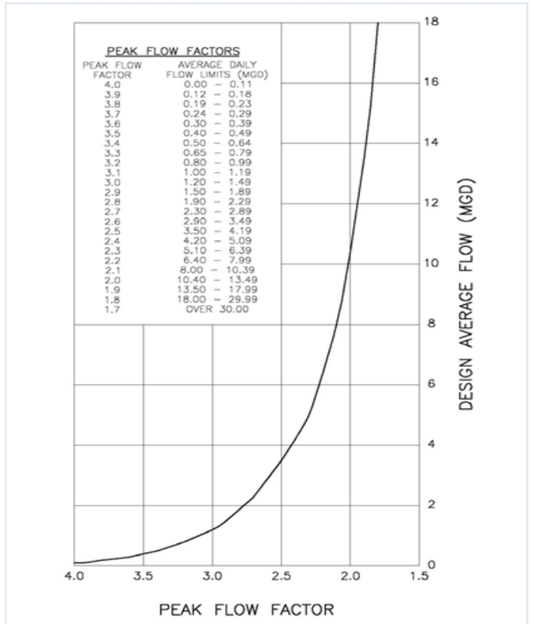


Figure 7-1: Peak Flows

The first step in estimating Corcoran's design flows involves designating each sewer sub-district to drain to a specific sewer node, generally the nearest down-gradient sewer node, within Corcoran's proposed trunk sanitary sewer system. To calculate the design flows in the system, the total average flow to each sewer node is multiplied by the corresponding PFF. Calculation of design flows for Corcoran is summarized in Appendix A.

Maps 7-2 through 7-4 identify the sewer sub-districts and sewer nodes included as part of the larger trunk sewer system. For the purposes of this narrative, a sewer node is identified within a trunk sewer system at the following locations:

- Upstream end of a trunk (generally considered 10" and larger) sewer pipe
- Trunk sewer junction points (nodes)
- Trunk sewer pipe size changes
- Lift stations

For lift stations, a node is identified as a lift station when the entire wastewater flow reaching that lift station will pass through the lift station. However, there will also likely be a few isolated, small lift stations that are required to serve smaller portions of some sewer subdistricts, rather than attempting to deepen long lengths of trunk sewer to provide gravity service to such small areas. Locations for this type of small lift station are not identified on Maps 7-2 through 7-4 or in Appendix A.

Trunk Sanitary Sewer System Sizing

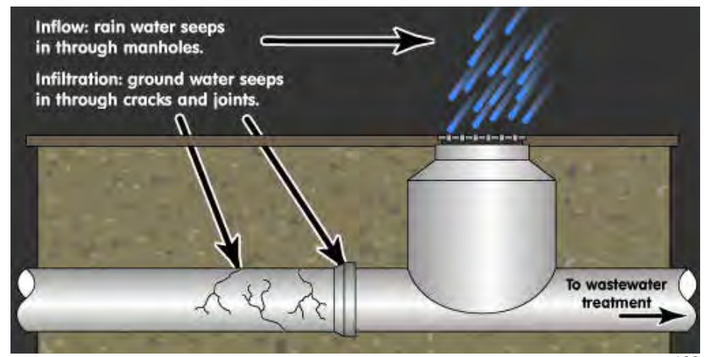
Corcoran's trunk sanitary sewer system layout is identified on Maps 7-2 through 7-4. The pipe sizing for Corcoran's trunk sewer system is based on several parameters including system design flows, trunk sewer length, and trunk sewer grade.

Based on the trunk system layout on Maps 7-2 through 7-4, the trunk sewer length between sewer nodes is determined (the "straight-line" length is generally increased somewhat to allow for the longer, "meandering length" that will typically result from following the actual street locations). The trunk sewer grade is determined based on the minimum sewer depth at each sewer node necessary to provide service to the contributing sewer sub-district(s). The design flows calculated in Appendix A indicate the minimum conveyance capacity that must be provided in the trunk sanitary sewer system between 2 given sewer nodes. With all these design parameters in place, the trunk sewer pipe diameter between 2 sewer nodes is calculated. Corcoran's trunk sanitary sewer system design calculations are presented in Appendix A. The system design presented in this Comprehensive Plan supersedes the trunk sanitary sewer system design information presented in Corcoran's 2030 Comprehensive Plan.

The wastewater flow projections in this Chapter, when combined with the sewer maps Maps 7-2 through 7-4 and design information contained in Appendix A, provide Metropolitan Council with Corcoran's wastewater generation and trunk sewer design information as required in the 2040 WRPP.

Infiltration and Inflow (I/I)

The Metropolitan Council's 2040 Water Resources Policy Plan (WRPP) states that the Metropolitan Council will establish I/I goals for all communities discharging wastewater to the MDS. As presented in the 2040 WRPP (Table A-2 thereof), I/I mitigation goals are determined by establishing the allowable peak flow rate, and are approximately equal to the previously-presented PFF values divided by 0.85. Communities that are identified as needing to eliminate excess I/I will be required to submit a work plan that details work activities to identify and eliminate sources of I/I. The Metropolitan Council can limit increases in service within those communities having excess I/I that do not demonstrate progress in reducing their excess I/I. The Metropolitan Council has not identified Corcoran as a community with observed excess I/I.



With Corcoran now beginning to utilize connections to the MDS, a primary wastewater system goal of Corcoran and the Metropolitan Council is the limitation of clear water inflow into wastewater collection systems. Based on the guidance in the Metropolitan Council's 2040 WRPP and the projected average wastewater flows in Table 7-3, Corcoran's corresponding I/I goals are presented in Table 7-6.

Table 7-6: Infiltration And Inflow Goal

Year	Allowable Peak Hourly Flow Rate Projections[1] (Mgd)
2010	0.00
2020	0.48
2030	1.20
2040	2.01

[1]*Projections include both system design flow and I/I flow components.*

The allowable peak hourly flow rate projections presented in Table 7-6 are not allotments and can be modified by Corcoran through its regular Comprehensive Plan Update or Comprehensive Plan Amendments. It should be noted that the peak flow rates provided in Appendix A do not represent actual metered peak flows and therefore should not be confused with the City's I/I goal in Table 7-6. Metropolitan Council will determine compliance with the City's I/I goal based on actual metered flow data at each connection to the MDS.

To limit the amount of I/I into Corcoran's future trunk sanitary sewer system, the City has enacted an ordinance prohibiting connections such as surface water and sump pump connections to the trunk sanitary sewer system as referenced in Appendix E. The City I/I implementation activities underway include televising, jetting, flow monitoring and lift station data analysis. Flow monitoring of City lift stations will occur along with monitoring data available from L80 and the NE metering station. Maple Hill Estates will connect in 2019 or 2020 and this connection will have a metering manhole for flow data collectiion.

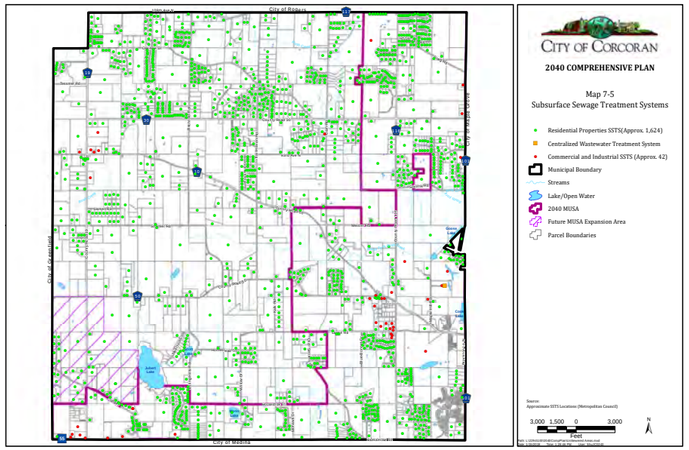
Individual Sewage Treatment Systems (ISTS)

The majority of residences (approximately 1,900) are on ISTS in Corcoran. Hennepin County is the responsible authority for permitting and tracking the installation, operation, maintenance, and enforcement of all ISTS in Corcoran.

Current Approach to ISTS:

- ISTS are abandoned when the structure is connected to the MCES sewer system.
- There are an estimated total of 1,900 ISTS in Corcoran which are shown on Map 7-5. The majority will remain in place, since they are outside the MUSA.
- Corcoran's role in managing ISTS for compliance involves cooperating with Hennepin County as the ISTS authority.

- I/I from portions of the ISTS swere pipes that remain in service followign connection to municipal sewer will be evaluated as part of the flow monitoring discussed at the end of the previous I/I secton.



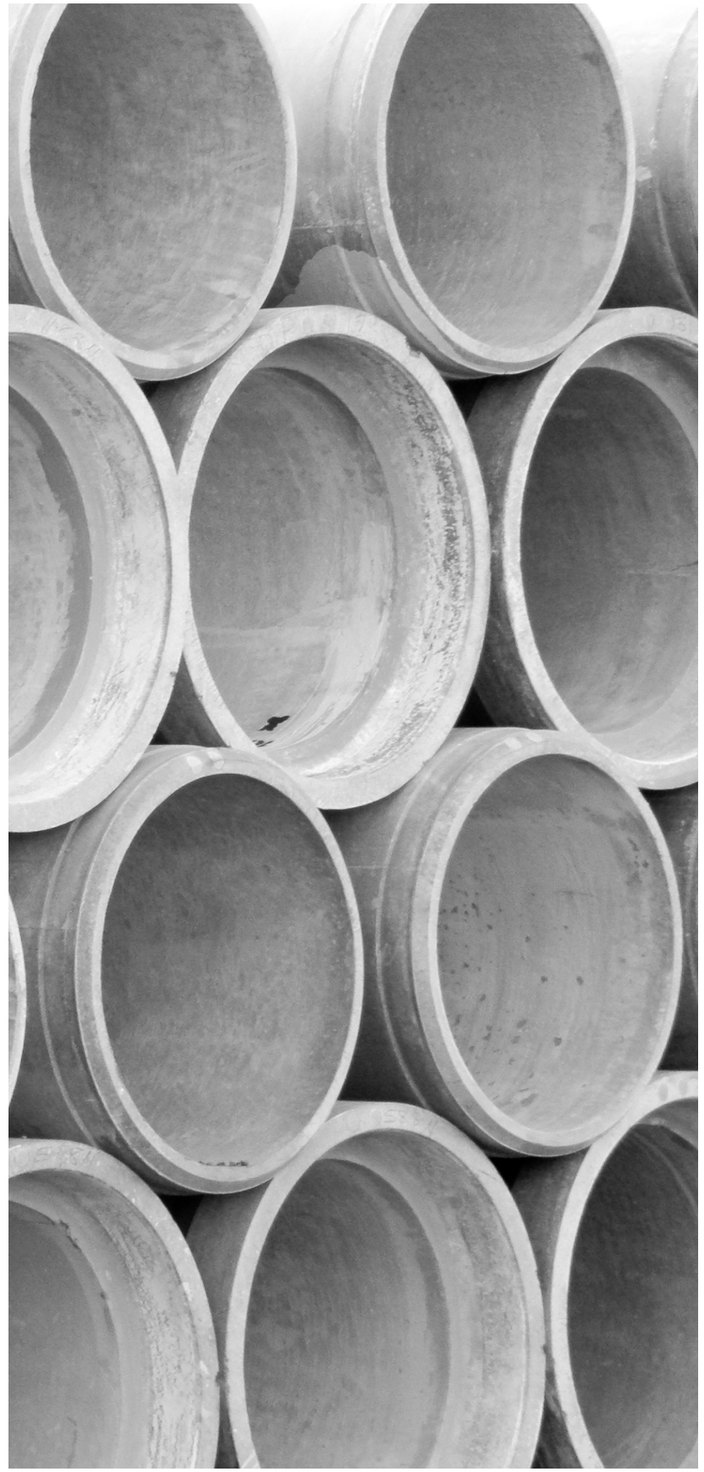
Map 7-5: Unsewered Areas *(See page 121 for large size map.)*

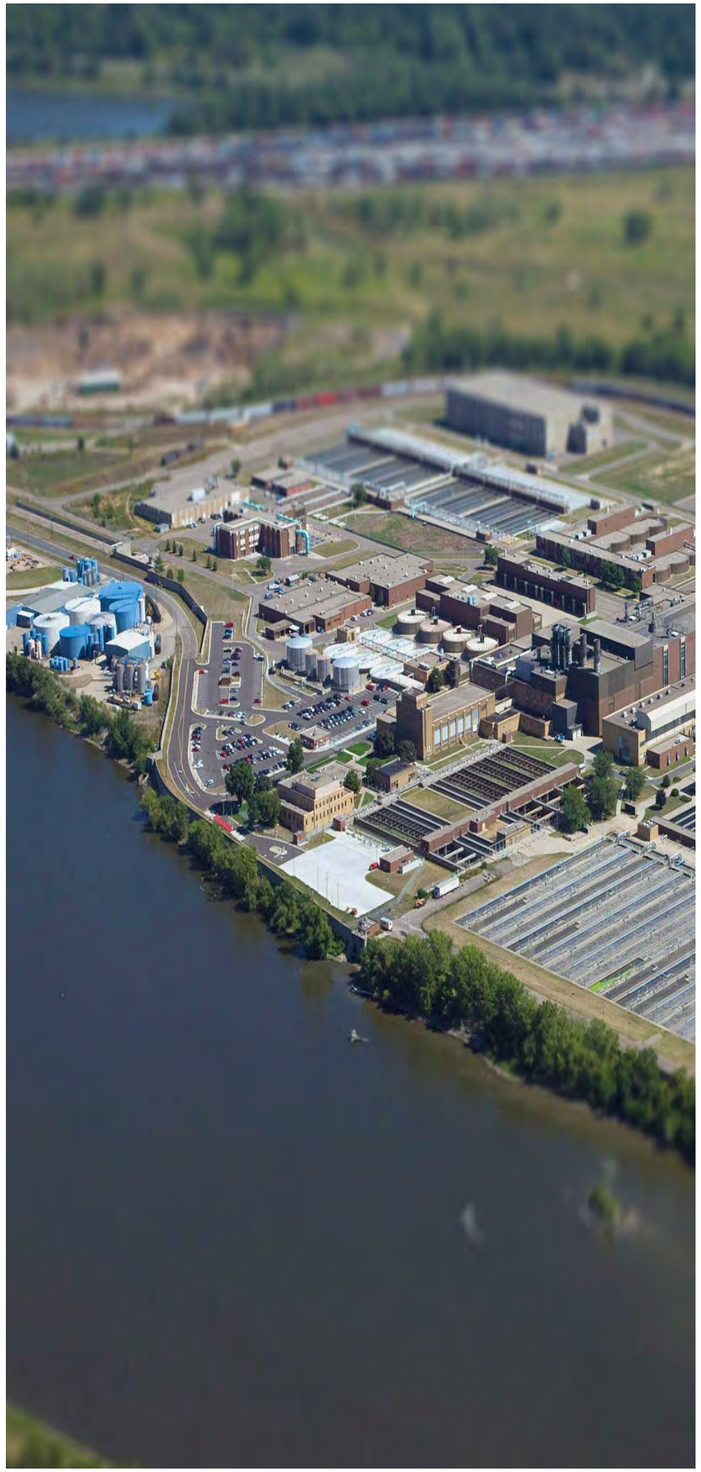
Intercommunity Flow Connections

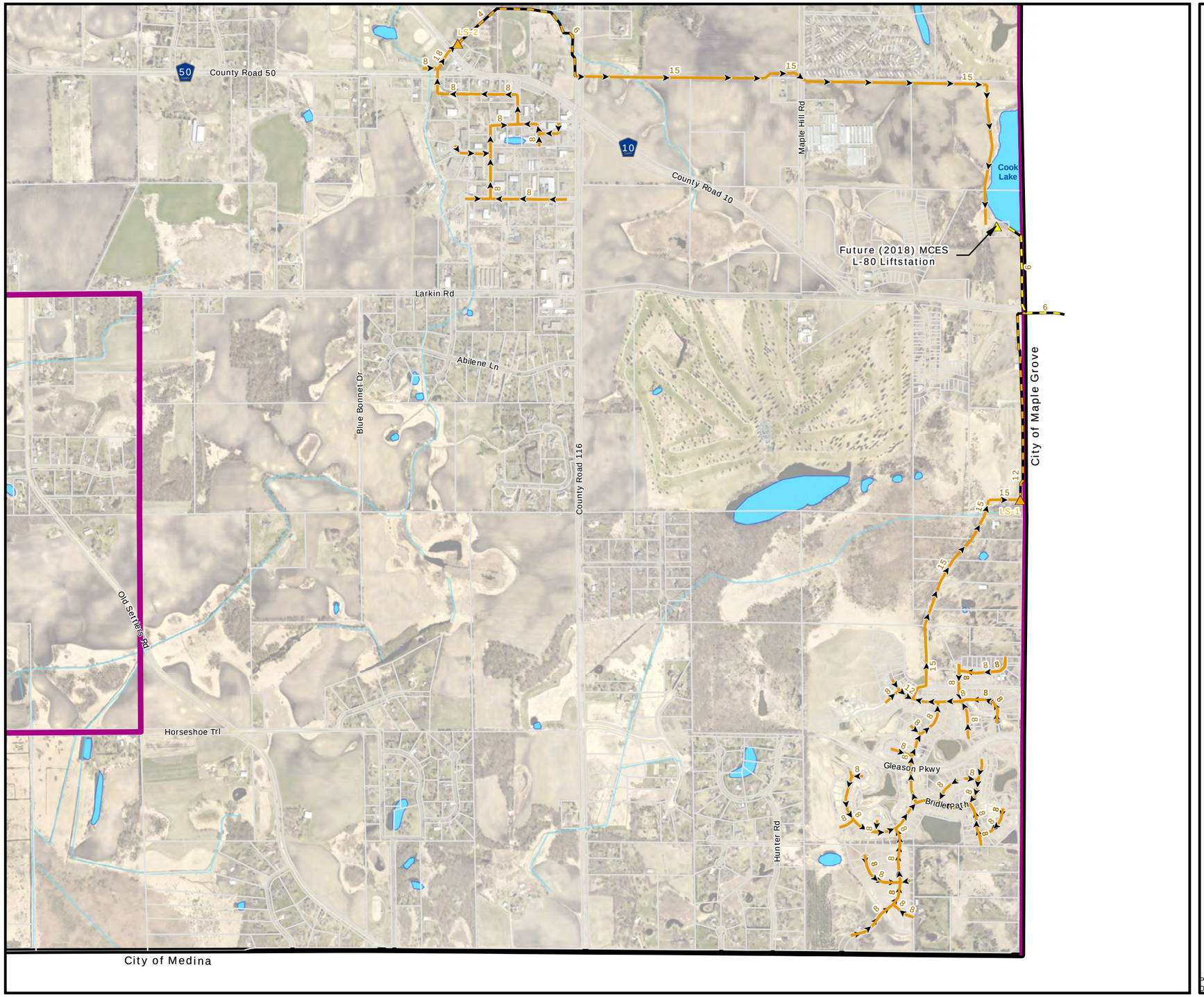
Corcoran currently has no intercommunity flow connections to neighboring municipalities.

Centralized Wastewater Treatment Systems

Corcoran has a current ordinance regulating the siting, maintenance, and monitoring of centralized wastewater treatment systems. Section 940 of the Corcoran Code requires that proposed centralized wastewater treatment systems be compliant with MPCA standards, comply with all City requirements, and have no adverse impact on the environment or neighboring properties. Corcoran City Code also requires that a management plan identifying an annual schedule for maintenance, inspection, and monitoring of the centralized wastewater treatment system be provided to the City for approval. Currently, there is 1 centralized wastewater treatment system in Corcoran within the manufactured home park, Maple Hill Estates. This system is anticipated to be connected to the existing City sewer in 2019 (connection near node SE-24).







CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

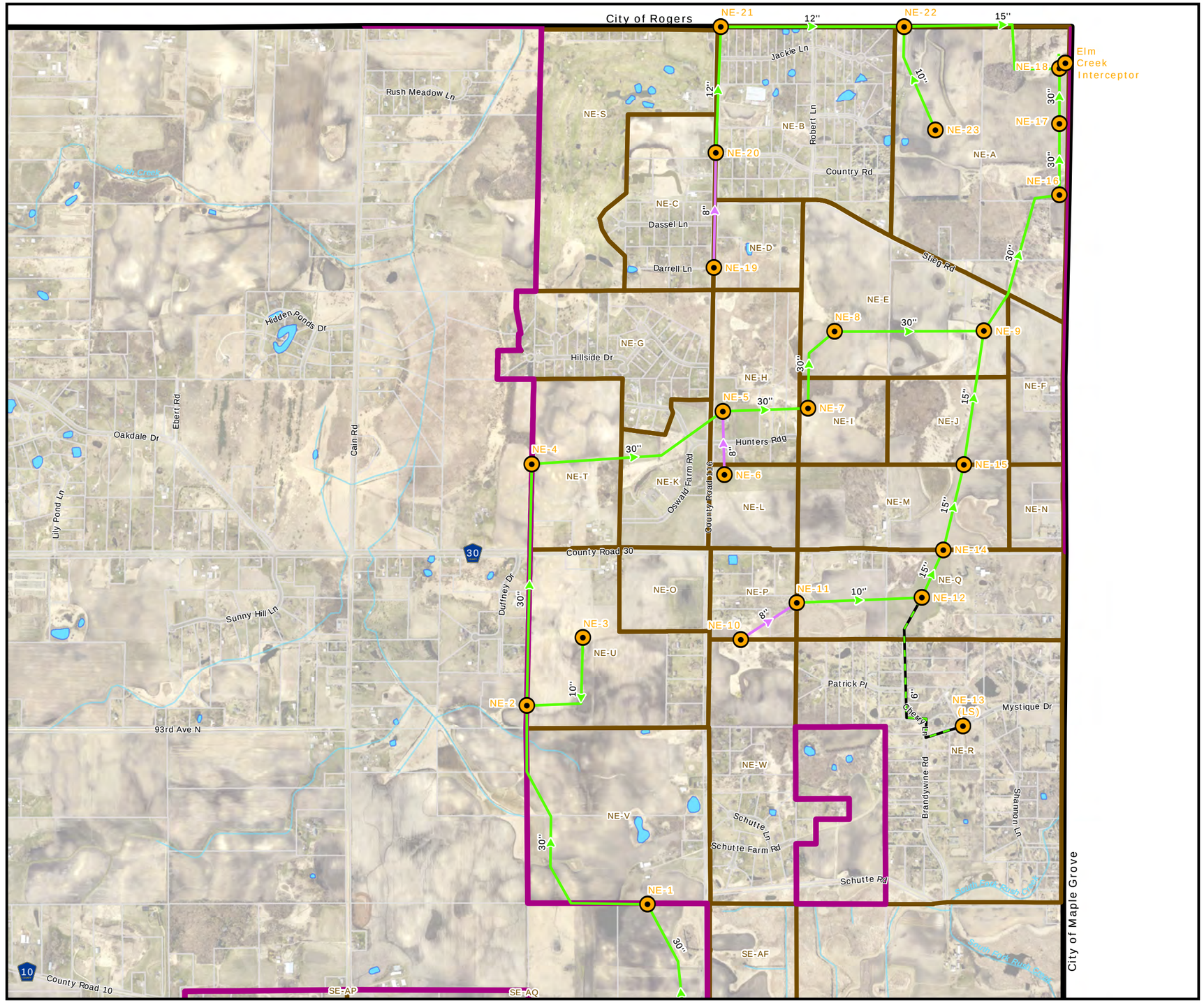
Map 7-1
Existing Sanitary Sewer System

- Gravity Sewer
- Forcemain
- Lift Station
- MCES Forcemain
- MCES Lift Station
- Municipal Boundary
- 2040 MUSA
- Parcel Boundaries
- Streams
- Lake/Open Water

1,200 600 0 1,200
Feet

N

Path: L:\2294\100\2040CompPlan\Existing Sanitary Sewer System.mxd
Date: 1/8/2019 Time: 7:14:24 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

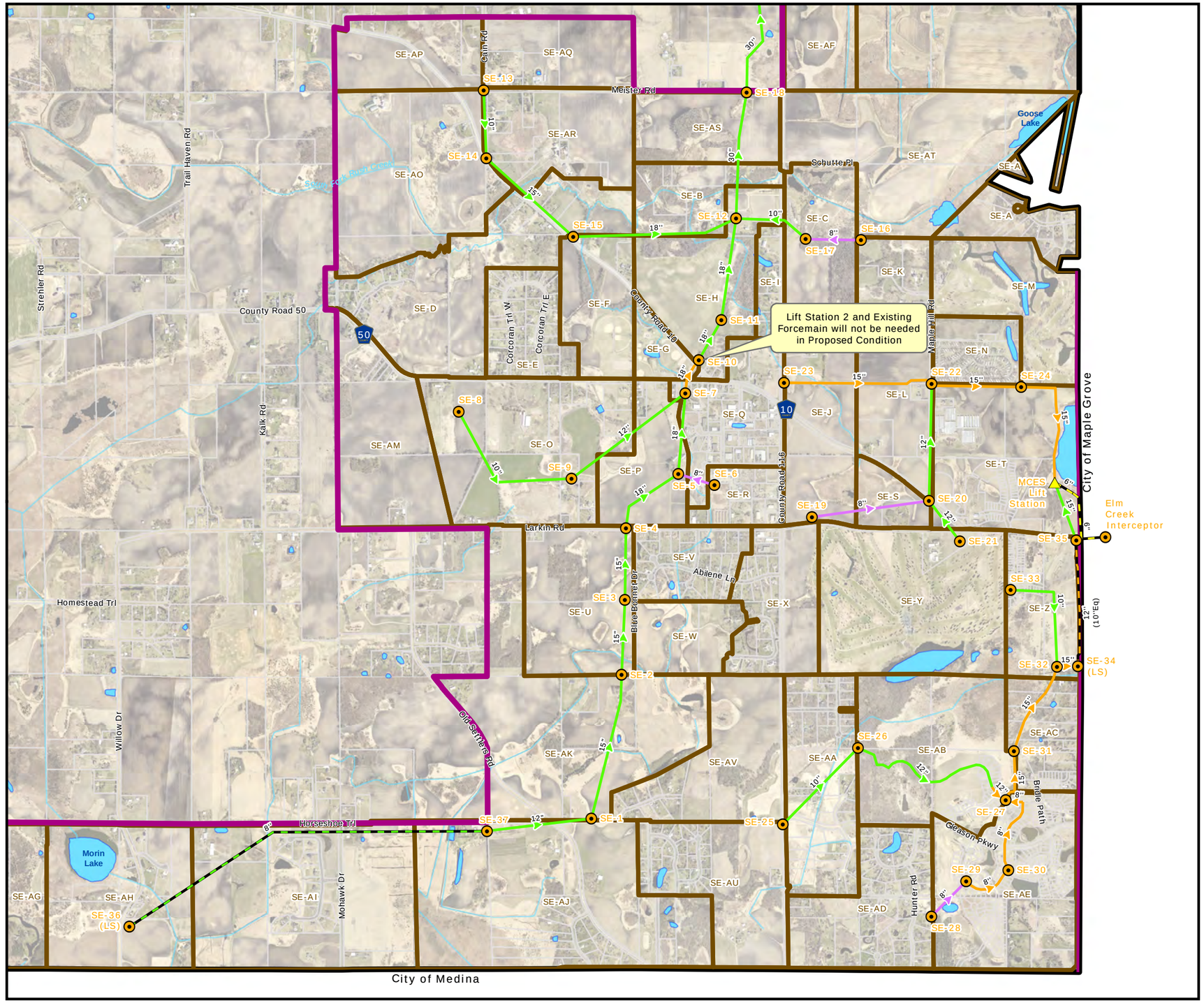
Map 7-2
Proposed Trunk Sanitary Sewer System - NE District

- Proposed Gravity
- Proposed Gravity (Lateral)
- Proposed Forcemain
- Sewer Nodes (LS) = Lift Station
- Sewer Subdistricts
- Municipal Boundary
- 2040 MUSA
- Parcel Boundaries
- Streams
- Lake/Open Water

1,500 750 0 1,500
Feet

N

Path: L:\2294\100\2040CompPlan\NE Proposed Trunk Sanitary Sewer_LS.mxd
Date: 1/8/2019 Time: 7:15:58 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

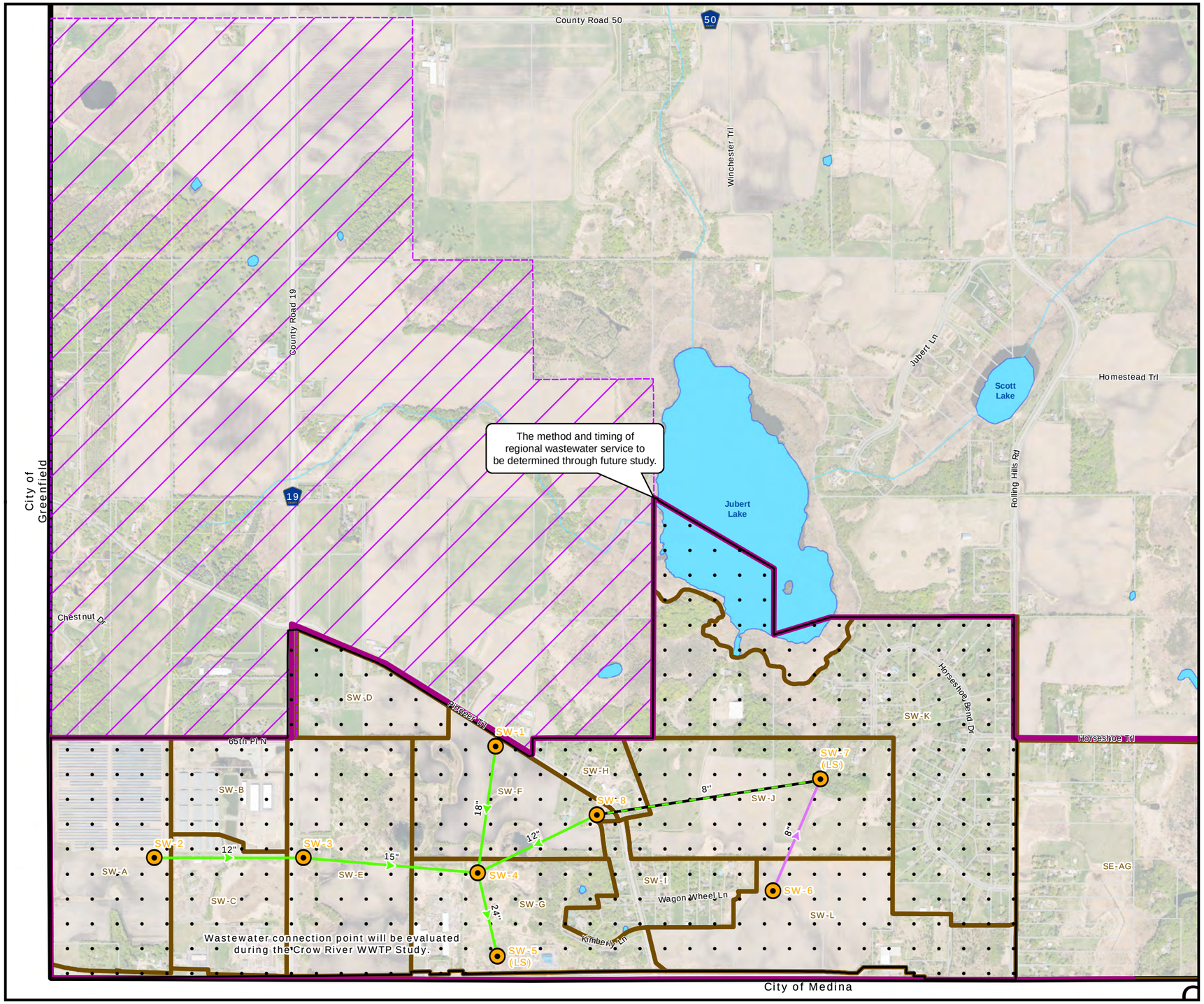
Map 7-3
Proposed Trunk Sanitary Sewer System - SE District

- Existing Gravity
- Proposed Gravity
- Proposed Gravity (Lateral)
- Existing Forcemain
- Proposed Forcemain
- Existing MCES Forcemain (Interim Size Shown)
- MCES Lift Station
- Sewer Node (LS) = Lift Station
- Sewer Subdistricts
- Municipal Boundary
- 2040 MUSA
- Parcel Boundaries
- Streams
- Lake/Open Water

1,800 900 0 1,800
Feet

N

Path: L:\2294\100\2040CompPlan\SE Proposed Trunk Sanitary Sewer.mxd
Date: 1/15/2019 Time: 1:32:33 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

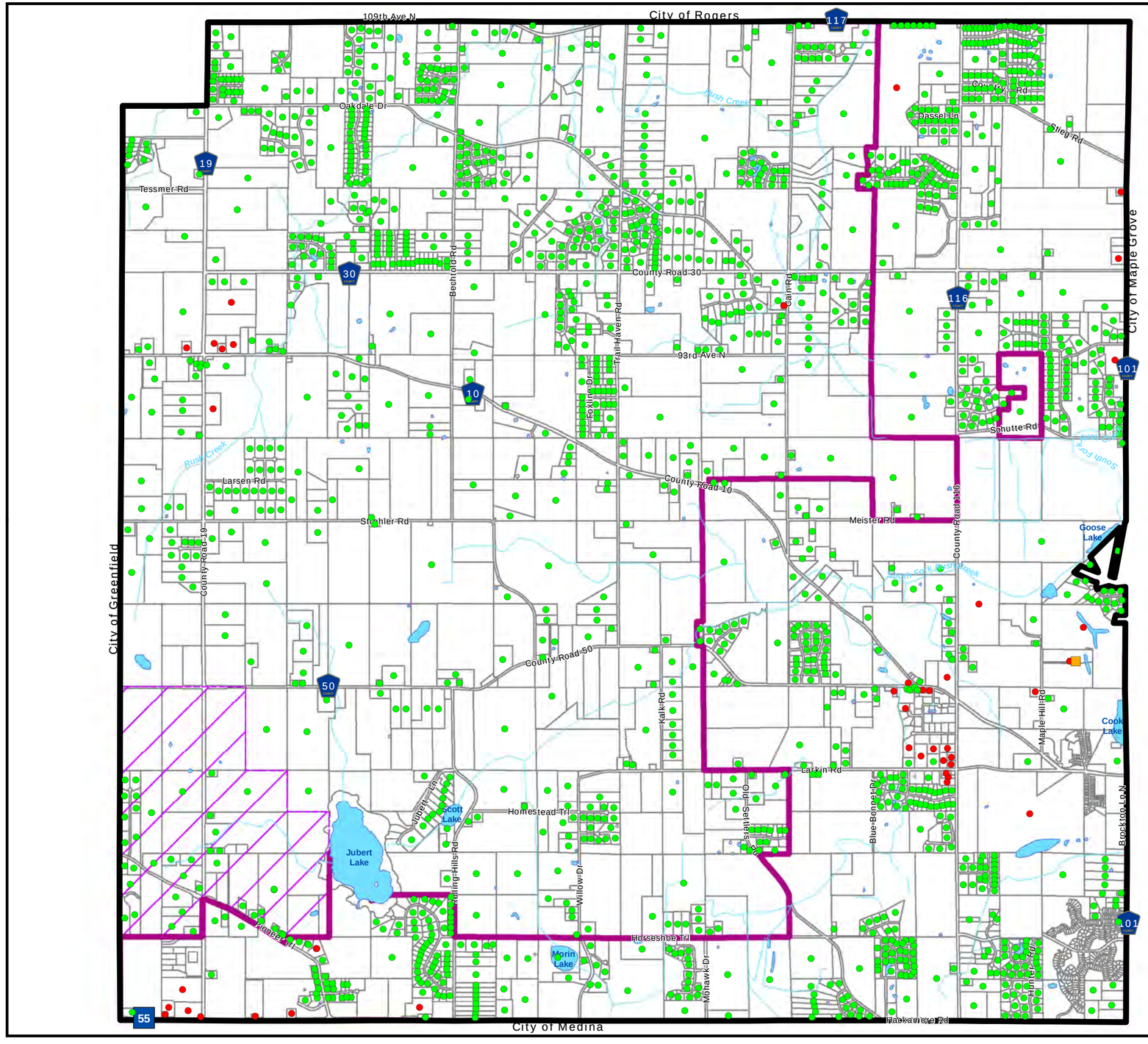
Map 7-4
Proposed Trunk Sanitary
Sewer System - SW District

- Proposed Gravity
- Proposed Gravity (Lateral)
- Proposed Forcemain
- Sewer Nodes (LS) = Lift Station
- Sewer Subdistricts
- Municipal Boundary
- 2040 MUSA
- Future MUSA Expansion Area
- Future Study Area
- Parcel Boundaries
- Streams
- Lake/Open Water

1,100 550 0 1,100
Feet

N

Path: L:\2294\100\2040CompPlan\SW Proposed Trunk Sanitary Sewer.mxd
Date: 8/7/2019 Time: 8:15:33 AM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 7-5
Subsurface Sewage Treatment Systems

- Residential Properties SSTS(Approx. 1,624)
- Centralized Wastewater Treatment System
- Commercial and Industrial SSTS (Approx. 42)
- Municipal Boundary
- Streams
- Lake/Open Water
- 2040 MUSA
- Future MUSA Expansion Area
- Parcel Boundaries

Source:
Approximate SSTS Locations (Metropolitan Council)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\UnSewered Areas.mxd
Date: 1/15/2019 Time: 1:28:46 PM User: ShuJC0243

CHAPTER 8: SURFACE WATER

SURFACE WATER

The City of Corcoran is rich with wetlands, streams, and lakes, and it is committed to protecting and restoring these important resources. To support that commitment and meet the requirements of the Elm Creek Watershed Management Commission, the Metropolitan Council, Minnesota Statutes §103B.235 and Minnesota Rules 8410, Corcoran prepared a Local Surface Water Management Plan (Local Plan) to assess the current condition of its surface waters, identify existing or potential problems related to surface water management, and develop and implement solutions. The Local Plan must be included as a chapter in the Comprehensive Plan. The full Local Plan is in Appendix B. Chapter 8 Surface Water provides a summary of Corcoran's local surface water management plan.

Goals and Policies

Corcoran's goals and policies for stormwater management are developed to reflect and support the City's commitments to protecting surface water quality. These commitments are documented primarily in the City's Stormwater Pollution Prevention Plan (SWPPP) and its Local Surface Water Management Plan (Local Plan), but they also reflect the goals and policies of the Elm Creek Watershed Commission (Commission) and those of other organizations and agencies that set laws, rules and standards or offer guidance regarding surface water protection and improvement.

The Commission's Third Generation Watershed Management Plan (WMP) identifies several goal areas and associated policies. Because the WMP guides much of the Local Plan content, and because the issues and goals identified in the WMP reflect similarly important issues in Corcoran, the City has developed policies within the same goal areas:

- Water quantity
- Water quality
- Groundwater
- Wetlands
- Drainage Systems

GOAL 1: Support the goals of the Commission to manage the quantity of stormwater runoff.

Policy 1: As land is developed or redeveloped, abide by the Commission's Rules and Standards regarding water quantity.
Policy 2: As appropriate, remove or support removal of unattached deadfall in Rush Creek and its tributaries.
Policy 3: Review ordinances and policies for consistency with Commission goals and policies for water quantity. These include ordinances and policies related to shorelands and floodplains.

GOAL 2: Corcoran recognizes the importance of maintaining and improving water quality in its lakes, wetlands, and streams and will adopt the policies below:

Policy 1: As land is developed or redeveloped, abide by the Commission's Rules and Standards regarding water quality.
Policy 2: Continue reviewing, updating and implementing components of the City's Stormwater Pollution Prevention Plan (SWPPP).
Policy 3: Participate in Municipal Separate Storm Sewer System (MS4) permit renewals and revise the City's SWPPP as needed.
Policy 4: Participate in the development and implementation of TMDL and WRAPS studies by attending meetings, providing feedback and helping identify projects that may offer water quality benefits.
Policy 5: As feasible, support or assist the Commission or other agencies with water quality monitoring.
Policy 6: As feasible, support studies that identify water quality problems and solutions. This includes but is not limited to Subwatershed Assessments.
Policy 7: Work with the Commission and other organizations and agencies, as appropriate, to pursue grant funding and other funding to support the development and implementation of water quality improvement projects.
Policy 8: As needed, review City ordinances and policies for consistency with Commission goals and policies for water quality. These include ordinances and/or policies regarding manure management.

GOAL 3: Many of the City's residents and business owners rely on individual wells for water supply, and this will likely continue for the foreseeable future. To support groundwater recharge and protection, the City adopts the following policies.

Policy 1: As land is developed or redeveloped, abide by the Commission's Rules and Standards regarding groundwater quality, particularly those requiring abstraction and/or infiltration of runoff.
Policy 2: Participate in the Commission's efforts to identify appropriate, cost-effective Best Management Practices regarding abstraction/ infiltration and groundwater recharge.
Policy 3: Participate in the Commission's efforts to educate the community about groundwater and its connection to stormwater runoff and surface water quality.

GOAL 4: Corcoran recognizes the importance of protecting its many wetlands. Minnesota's Wetland Conservation Act (WCA) established rules regarding wetland management, and it requires the appointment of a Local Government Unit (LGU) to administer them. In recognition and support of wetland management goals and requirements, Corcoran adopts the following policies.

Policy 1: As land is developed or redeveloped, abide by wetland buffer standards and established by local ordinance, Commission Rules and Standards, and state law.
Policy 2: As needed, review City ordinances and policies for consistency with Commission Rules and Standards and state law regarding wetland buffers.
Policy 3: As needed, review and revise the LGU agreement. This may include developing or updating an LGU contract or assuming the LGU role.

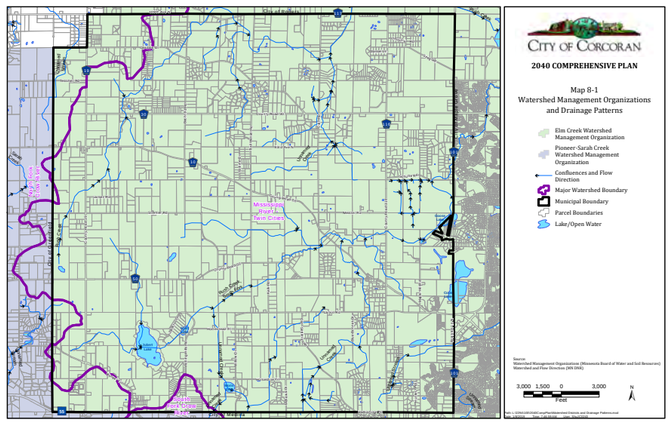
GOAL 5: In Corcoran, stormwater drainage is accomplished primarily through public and private ditches. County ditches have been under the authority of Hennepin County, but if requested, the Commission will review and reconsider the appointment of ditch authority. To support that goal, the City adopts the following policy.

Policy: Participate in Commission review of ditch authority.

GOAL 6: City operations and programs regarding stormwater management are documented primarily in its SWPPP and its Local Surface Water Management Plan (Local Plan), the latter reflecting many of the goals and policies of the Commission's WMP, including its goals for operations and programming. In support of those goals, the City adopts the following policies.

Policy 1: Participate in Technical Advisory Committee meetings and regular meetings of the Elm Creek Watershed Commission.
Policy 2: Continue the City's stormwater education program, concentrating on high-priority topics identified in its SWPPP. Accept educational assistance from the Commission as it becomes available.
Policy 3: As feasible, support and assist the Commission's monitoring program to assess water quality, water quantity, and biotic integrity and to evaluate progress in meeting TMDL goals.
Policy 4: Participate in developing Commission Rules and Standards regarding stormwater management, and as needed, review and revise local ordinances and policies for consistency with the Commission.
Policy 5: As needed, request technical or financial assistance, or both, from the Commission to support stormwater management or water quality improvement projects.

The City of Corcoran is situated almost entirely in theRush Creek and Elm Creek Watersheds, a drainage basin that also includes parts of Rogers, Dayton, Champlin, Maple Grove, Plymouth, and Medina (Map 8-1). As a member of the Elm Creek Watershed Management Commission Corcoran and other cities manage the watershed's surface water resources.



Map 8-1: Watershed Management Organization and Drainage Patterns

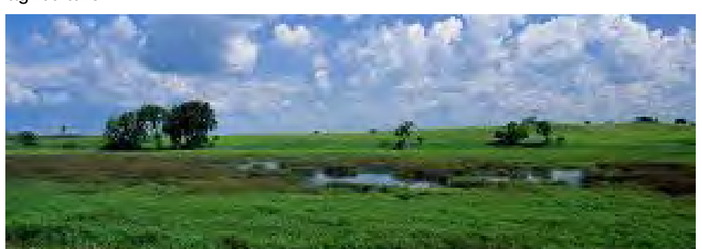
(See page 127 for large size map.)

One of the duties of the Commission is to prepare Watershed Management Plans (WMPs) that set goals, policies, rules, and standards for surface water management. The most recent WMP, the Third Generation Watershed Management Plan, was approved in 2015. According to Minnesota law, Corcoran must prepare a Local Plan after a WMP is updated to ensure that the City's approach to managing surface water resources is consistent with that of the Commission. This Local Plan satisfies that requirement.

Other regulations also influence or dictate the City's responsibilities regarding surface water management. They include the Municipal Separate Storm Sewer System (MS4) permit program, a federal and state initiative that requires the City to develop and implement a Stormwater Pollution Prevention Plan; the Minnesota Wetland Conservation Act; the Minnesota Buffer Law; and various Total Maximum Daily Load (TMDL) studies that aim to improve surface water quality by reducing the amount of pollution reaching our lakes, wetlands, and streams.

Current Conditions

An inventory of Corcoran's land and water resources finds a mosaic of farms, businesses, homesteads, and residential developments in a historical setting of maple-basswood forest and wet prairie. Land use has changed significantly since the time before European settlement. Logging and farming began the transition, and the many drainage ditches and tiles in the City hint at the effort needed to convert characteristically wet soils into ones better suited for agriculture.



Today Corcoran's agricultural tradition remains strong, especially in the north and west parts of the City. Urban residential and commercial development is increasing from the east and south and is expected to continue. Urban services such as piped sewer and water already serve parts of southeast Corcoran and are anticipated for more of the region delineated by the Metropolitan Urban Service Area (MUSA). Development within the MUSA and elsewhere offers opportunities to install urban stormwater Best Management Practices (BMPs), such as catch basins and stormwater treatment ponds, to prevent pollutants from being carried by stormwater runoff to surface waters.

Both urban and rural BMPs will be important to improve surface water quality in Corcoran. Much of the North Fork of Rush Creek and part of the South Fork have been designated as impaired by the Minnesota Pollution Control Agency (MPCA), meaning that water quality does not meet one or more state standards. The Elm Creek Watershed-wide TMDL Study and Watershed Restoration and Protection Strategy (WRAPS) identify measures that could correct the impairments. So do similar studies completed to correct impairments in the Pioneer-Sarah Creek Watershed, which includes a small area in southwest Corcoran. Applying the Commission's strict rules for stormwater treatment as land is converted from agricultural to other uses is expected to yield benefits throughout the City. Additional projects are planned to reduce surface water pollution from targeted areas.

Corcoran's interest in preserving natural resources is not limited to its waters. Remnant native plant communities persist, and the City's Parks and Trails Plan identifies search areas for greenway corridors and open spaces that coincide with ecologically significant communities in upland and wetland areas. Such areas provide habitat for many species and help protect water quality by limiting impervious surfaces and maintaining vegetation that infiltrates stormwater runoff.

Problems and Solutions

Some of the problems related to surface water management are described in the previous paragraphs. Additional issues and their possible solutions are identified in the WMP or by City staff, and all are discussed in the Local Plan. A summary of selected issues is given below.

- Ordinance adoption and review: The City will adopt a manure management ordinance and will review its wetland and shoreland ordinances for consistency with watershed rules and other regulations regarding buffers.
- Impaired waters projects: To help improve water quality in Rush Creek and elsewhere, the City will apply the Commission's strict development standards, connect sanitary sewer at Maple Hill Estates to the MCES system, continue septic system education, and implement one or more recommendations from the Rush Creek Headwaters Subwatershed Assessment. Chloride management will also be a focus of the City's efforts to protect water quality.
- Operation, maintenance, and inspection of privately-owned stormwater BMPs: Among other measures, the City will continue inspecting BMPs in accordance with the City's Stormwater Pollution Prevention Plan.
- Wetland improvements: The City will work with the Commission and other cities on potential wetland improvements north of the Ravinia development in Corcoran and south of the Laurel Creek development in Rogers. At the same time, the City will explore a possible stormwater pond retrofit in existing commericial and industrial areas in Corcoran.

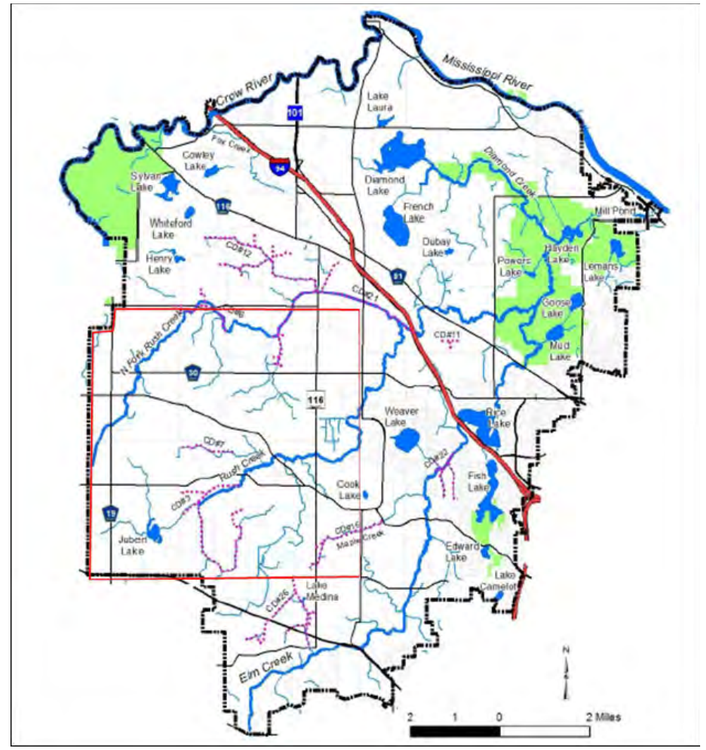
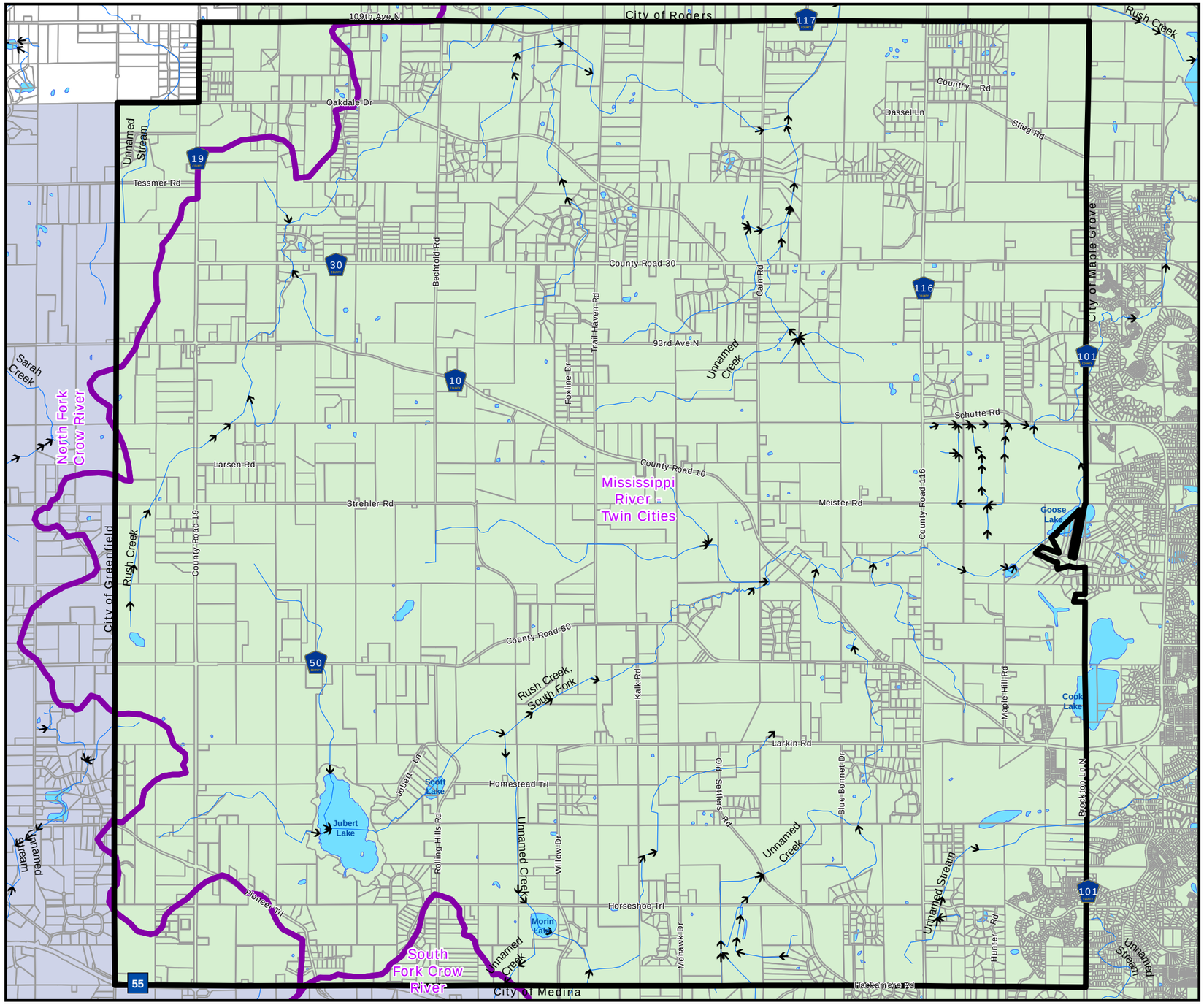


Figure 8-1: Elm Creek Watershed. Corcoran's approximate boundary is shown in red.

The City has prepared implementation and capital improvement plans that project expenses and possible funding sources through 2025. The Local Plan can be amended if needed to update these plans or other contents, with



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 8-1
Watershed Management Organizations and Drainage Patterns

- Elm Creek Watershed Management Organization
- Pioneer-Sarah Creek Watershed Management Organization
- Confluences and Flow Direction
- Major Watershed Boundary
- Municipal Boundary
- Parcel Boundaries
- Lake/Open Water

Source:
Watershed Management Organizations (Minnesota Board of Water and Soil Resources)
Watershed and Flow Direction (MN DNR)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Watershed Districts and Drainage Patterns.mxd
Date: 1/8/2019 Time: 7:46:59 AM User: ShuJC0243

CHAPTER 9: WATER SUPPLY

WATER SUPPLY

Minnesota Statute §473.859 requires Water Supply Plans (also referred to as Water Emergency and Conservation Plans) to be completed for all local units of government in the 7-county Metropolitan Area as part of the local comprehensive planning process. Additionally, Minnesota Statute §103G.291 requires all public water suppliers within the metro area or that serve more than 1,000 people to have a Water Supply Plan approved by the Minnesota Department of Natural Resources (DNR). An approved Water Supply Plan is also a requirement to obtain a Water Appropriations Permit Amendment from the DNR.

The City of Corcoran did not have a municipal water system at the time of the 2030 Comprehensive Plan Update, but with construction of new developments occurring since that time, Corcoran has initiated construction of its municipal water system. Water supply is currently provided via connection to the Maple Grove water supply system. A copy of the Corcoran Water Supply Plan is located in Appendix C. In southeast Corcoran, use of this water supply is currently expected to continue through 2030, though Corcoran may eventually move towards developing its own municipal supply wells and treatment system, as discussed further herein. In northeast Corcoran, water supply will initially be provided via connection to the Maple Grove water supply system; however, Corcoran will begin investigating and likely developing its own municpal supply prior to 2030.

Policies and Goals

Corcoran is committed to developing a sustainable infrastructure system. A sustainable water supply meets the public demand and requires the responsible use of water now and in the future, without unacceptable social, economic, or environmental consequences. The City of Corcoran core principles include to:

Goal 1: Construct the system including trunk and local collectors as development takes place within the City.

Policy 1: Require developers to construct a system in a size and manner to support future needs of the system.
Policy 2: Extend the system to adjacent properties as development takes place.

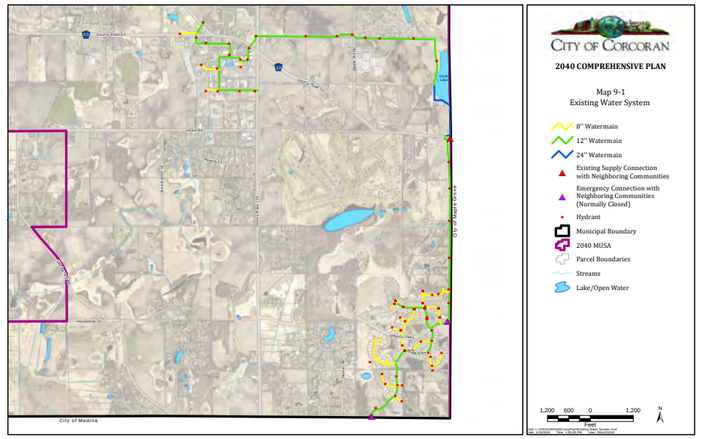
Goal 2: Operate in an efficient and sanitary manner to protect public health, safety and welfare, to safeguard municipal finances, and to support development and economic vitality within the community.

Policy 1: Implement preventative maintenance programs to protect and sustain the system.
Policy 2: Restrict the installation and use of private water supply wells when necessary or appropriate.

Water Supply System

The first housing development in the City of Corcoran to have municipal water and sewer services initiated construction in 2014 (Ravinia in southeast Corcoran). The water distribution system was extended from the Maple Grove water supply system (see Map 9-1) for the existing system layout. The downtown area of Corcoran was also recently connected, and discussions with other developers regarding other new developments in both southeast and northeast Corcoran are underway. However, given the very limited development that has occurred to date, historical water use data is not presented herein. Other residents of Corcoran meet water demand through private water wells.

As development continues in the City of Corcoran, expansion of the municipal water system will occur in those portions of the city designated for municipal services. The City of Corcoran has developed their initial conceptual water system plan to guide the creation and expansion of a municipal water supply, storage, and distribution system for city residents.



Map 9-1: Existing Water System

(See page 135 for large size map.)

Water Demands

Future water demands are determined based on served population projections and typical per capita water demand. Most of the City of Corcoran's current (2016) population of 5,498 meets water demands through private wells and therefore limited existing municipal water demand exists. As new development occurs going forward, municipal water demand will increase proportionally. It is assumed the portion of sewered households would directly relate to the portion of the population served by the future municipal water system.

To determine future water demand, typical total per capita water use in the metro area is applied to the projected served population. The average day total per capita demand used is 150 gallons per capita day (gpcd), which is similar to the observed water demand in Maple Grove. It is important to note, the total per capita water demand includes water uses for residential, commercial, public, and industrial water demands. A maximum day total per capita demand of 450 gpcd is used to determine the size of the conceptual water system, reflecting a peaking factor of 3 for the ratio of peak day demand to average day demand. The Metropolitan Council projects the number of people per household to gradually fall going forward, going from 2.68 people per household in 2020 to 2.40 people per household in 2040. Using a typical value of 2.5 people per household, the peak day water demand is 1,125 gallons per day per household. Using the Metropolitan Council's projected sewered populations, which are assumed to equal the municipal water populations, the projected water demands are presented in Table 9-1.

Table 9-1: City Of Corcoran Population And Water Demand Projections

Year	Total Population	Served Population*	Average Day Demand	Maximum Day Demand	Annual Demand
2010	5,379	0	-	-	-
2020	6,700	1,550	0.23 mgd	0.69 mgd	85 mgy
2030	8,900	4,280	0.64 mgd	1.92 mgd	234 mgy
2040	11,300	7,650	1.15 mgd	3.45 mgd	419 mgy

**Served population calculated from Metropolitan Council served households projections.*

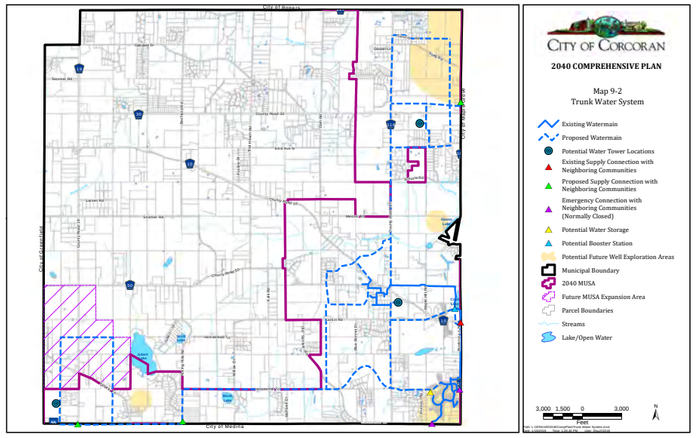
City of Corcoran water demand calculated based on an average day total per capita demand of 150 gpcd and maximum day total per capita demand of 450 gpcd (3.0 peaking factor).

As discussed in Chapter 7, the Metropolitan Council has projected southwest Corcoran's municipal services population to be still near zero in 2040, but just beginning to develop. The 2040 water demand is projected to be almost entirely from northeast and southeast Corcoran. The Metropolitan Council's forecasts do not differentiate between these 2 areas, but using a similar City-anticipated split as presented in Chapter 7, the 2040 demand of 1.15 mgd will be approximately 0.80 mgd from southeast Corcoran and 0.35 mgd from northeast Corcoran. The Maple Grove water distribution model provided to Corcoran indicates that average day demands of approximately 2.5 mgd have been planned for at each of the 2 primary Maple Grove connection points (i.e., one that is currently supplying southeast Corcoran near County Road 10 and one future connection for the northeast near County Road 30), well above the 2040 projected demands.

Conceptual Future Water Supply System

A conceptual layout of the future water supply system is shown on Map 9-2. The conceptual water system must consist of water supply to meet maximum day demands, water storage to meet peak hour demands and emergency storage needs, and a network of trunk and lateral water mains to deliver the water. Throughout the current planning period, the water supply is anticipated to be obtained from Maple Grove for southeast Corcoran. Initially, northeast Corcoran will utilize the Maple Grove water supply; however, Corcoran will begin investigating, and likely developing its own municipal supply within the planning period. Southwest Corcoran would most likely be supplied via a new Corcoran municipal system through a new City well, or possibly by private wells if development is limited. Conceptual water tower locations are shown on Map 9-2, but the exact location, timing and sizing of water towers will be dependent on future development locations and timing. Given that early water system operation essentially utilizes existing storage in Maple Grove, and given that adequate initial water supply pressures exist, no water towers are immediately needed in Corcoran at the very start of development activity. Given that development has been initiated in southeast Corcoran, more detailed water distribution model development has been conducted for this area, including the sizing and timing of the first water tower. The need for the first water tower in southeast Corcoran was determined to be at a peak day demand of approximately 1.75 mgd, which is anticipated to be a 1 mg tower near the downtown area. At projected demand growth, this tower does not appear to be needed until some point beyond the current planning period. At the same time this water tower is constructed, a booster station is anticipated to be constructed at the supply entrance point near County Road 10, unless Maple Grove has elected to install its own booster station for the adjacent Maple Grove area, which would likely provide the needed pressure boost in Corcoran. In northeast Corcoran, the first water tower will be needed when Corcoran switches from the Maple Grove supply to its own municipal supply.

At a conceptual level, the preliminary sizing of the water towers shown on Map 9-2 are as indicated in Table 9-2, noting that this reflects a more fully-developed condition in the service area shown (not 2040).



Map 9-2: Trunk Water System
(See page 137 for large size map.)

Table 9-2: City Of Corcoran Conceptual Water Tower Sizing

Development Area	Total Water Storage
Southeast	2 mg (Two 1 mg)
Northeast	1 mg
Southwest	0.75 mg

As noted previously, in the initial stages of development, the City of Corcoran will obtain its supply water from Maple Grove until such time that Corcoran develops its own water supply, which is anticipated to occur in northeast Corcoran first. This will require installation of Corcoran's own water supply wells and water treatment system(s). For example, to provide a water supply for the 2040 served population in northeast Corcoran, the City of Corcoran will need to supply 750 gpm, which would potentially require 3 groundwater wells (using an assumed capacity of 400 gpm per well and assuming one standby well). Additional information on well capacity potential is included later in this chapter.

The conceptual network of trunk water mains that will be needed to serve city growth is shown on Map 9-2, including potential locations for supply connections to neighboring communities. If, in the future, the City of Corcoran is able to supply water demand from its own municipal wells, the supply interconnections will then be maintained as emergency interconnections. The sizes of the trunk water mains shown on Map 9-2 will generally be 12-inch; however, some segments may be increased or decreased based on future design and distribution system modeling efforts.

The estimated capacity of groundwater wells in the City of Corcoran needs to be verified through geological studies. When the city gets closer to the point at which municipal wells are desired, the city will conduct a well exploration program to identify capacity and location of future wells. Future groundwater wells will require disinfection and fluoridation, and groundwater testing will also be conducted to determine if additional water treatment is needed. As the municipal water system develops, decisions will be made that reflect the core principles, sound engineering, and fiscal reasonability to serve the residents of the City of Corcoran.

Resource Sustainability

The City of Corcoran is committed to a sustainable water supply meeting the public demand without unacceptable social, economic, or environmental consequences. Any future municipal groundwater wells will contain continuous monitoring of groundwater levels to allow the city to investigate well interference and potential natural resource impacts. The following sections detail potential natural resource impacts, groundwater sustainability, and source water protection.

Natural Resource Impacts

In the current planning period, when Corcoran's water supply system will rely on interconnection with the City of Maple Grove, additional pumping demands will be placed on the municipal wells in Maple Grove that could further increase impacts to natural resources within that community. Therefore, Maple Grove should consider any possible impacts of this increased pumping when updating their water supply plans.

Relative to any future Corcoran municipal well installation, the 2015 Metropolitan Council System Statement identified very few surface water features that have interaction with the regional groundwater system. Only Jubert Lake and some areas of wetlands in northern Corcoran are indicated as receiving and discharging groundwater. A few scattered stream segments are also indicated as being supported by upwelling of groundwater. Future municipal well installation will need to consider the potential for any significant impacts to surface water bodies or water table aquifers. The 2015 System Statement identified one DNR groundwater level observation well just outside the northwestern corner of Corcoran. This well is indicated as having no trend in annual minimum groundwater levels (i.e., it is not trending up or down).

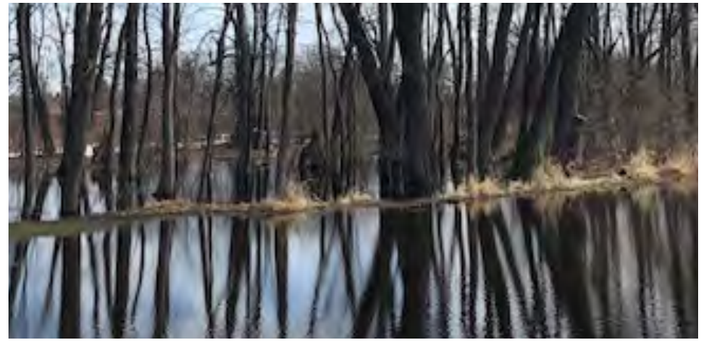
Sustainability

Initially, it is planned or contracted that Corcoran will receive water through its interconnections with Maple Grove. At some point in the future, Corcoran expects to develop their own municipal water supply wells to supplement projected future demands. Any future municipal water supply wells for the City of Corcoran would likely utilize the Franconia-Ironton-Galesville (FIG) aquifer as the primary source of water supply. Since the FIG aquifer can be highly variable in the Twin Cities area regarding sustainability factors of recharge, storage, transmissivity, and specific capacity, an accurate estimate of overall sustainability cannot be determined until the city studies the potential yield of this aquifer in greater detail. Yields from the FIG aquifer can typically range between 200 – 1,000 gpm in the northern metro area.

In addition to the FIG aquifer, it is also possible, but unlikely, the overlying drift aquifer may be utilized for large capacity water supply wells, if a sufficient thickness of coarse-grained, saturated sediments are located during a well siting study. Excellent drift aquifer deposits can produce yields greater than 1,000 gpm per well, when present. However, drift deposits tend to vary greatly over short distances, so the extent of good deposits can sometimes be limited to a small area.

Underlying the FIG aquifer is the Mt. Simon sandstone aquifer, which is generally capable of supplying wells with yields ranging from 500 – 1,000 gpm. However, since recharge to this aquifer is somewhat limited and over-pumping the aquifer can create an unsustainable condition where water levels do not stabilize over time, the DNR has greatly limited the number of new high-capacity Mt. Simon wells in the 7-county metro area. It is unlikely Corcoran would be allowed to develop their municipal wells in the Mt. Simon aquifer unless it can be demonstrated that all other viable options for water supply have been exhausted.

Further study will be required to better quantify the availability of groundwater for future municipal water supply wells. Studies will likely be a combination of investigation of existing well logs and geologic data in the area, along with a program of test drilling and test pumping at the sites thought to be most suitable for well exploration.



Finally, since many existing homes in Corcoran are served by private wells, the drilling and pumping of high capacity municipal wells introduces the remote chance of possible interference between wells. While it is expected that some of the area private wells will be abandoned and existing homes connected to the municipal water supply system, a number of private wells can also be expected to remain in the area as development occurs. Since private wells utilize shallow ground water, drawdown impacts from future municipal wells are likely. As potential yields and sustainability of the drift and FIG aquifer are examined in future years, potential impacts to private wells will need to be studied more closely. Any pumping tests in these aquifers should include measurement of water levels in nearby private wells, if possible, to quantify the impacts of well interference.

Source Water Protection Plan

Since Corcoran does not currently have municipal water supply wells, the city has not yet been required to complete a wellhead protection plan. Maple Grove has developed a plan, which covers Corcoran's water supply. Only after Corcoran drills their own municipal water supply wells will the city will be required to develop their own wellhead protection plan. Generally, the city will have a minimum of 2 years from the date a new well goes online to complete the associated wellhead protection plan. The plan must then be updated a minimum of every ten years or whenever a new well is added to the water supply system, whichever comes first.

Assuming no sources of surface water will be utilized as a municipal drinking water resource, no surface water protection plan will be required for the City of Corcoran.

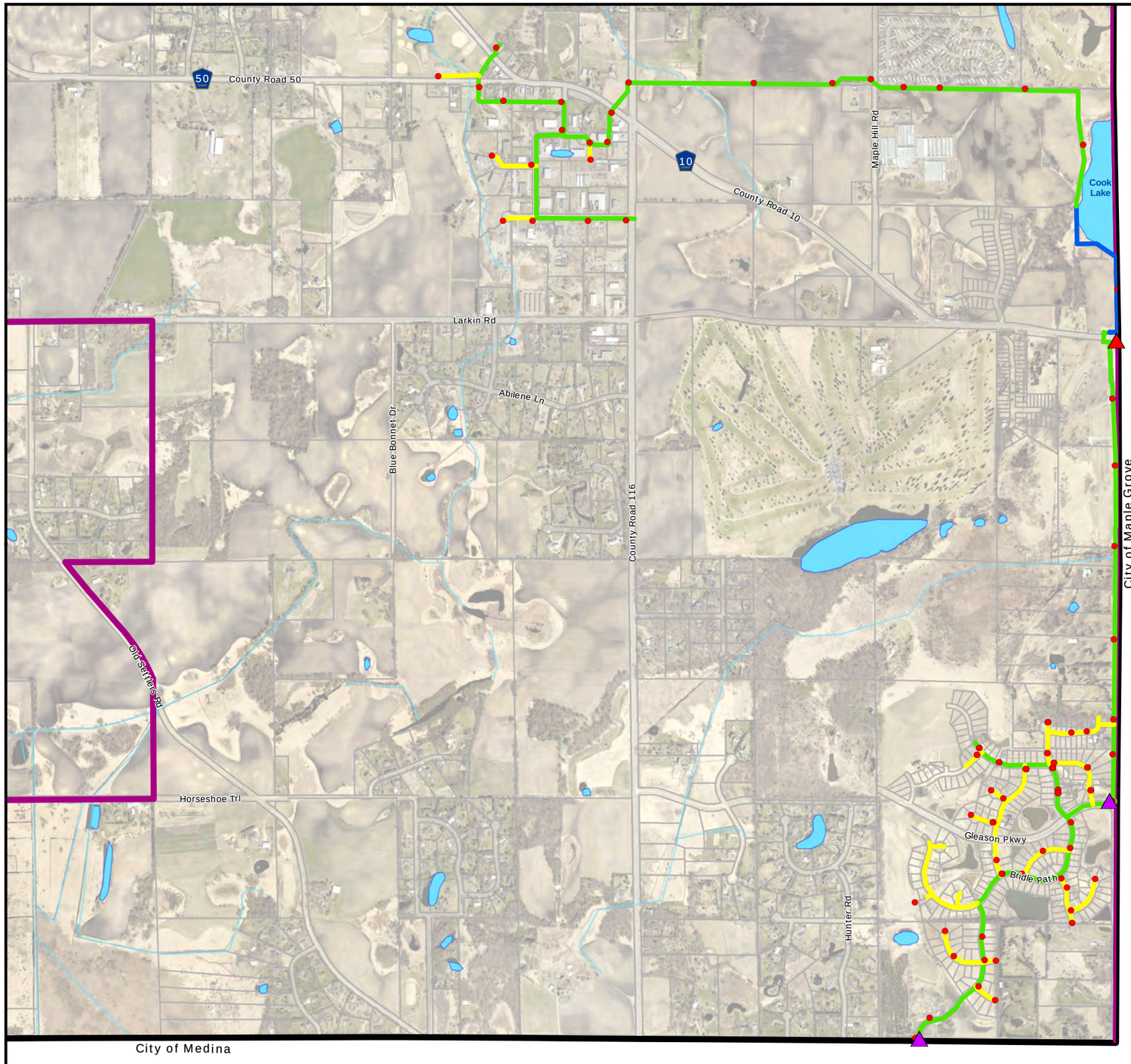
Water Conservation Plan

The City of Corcoran understands conserving water can be a cost-effective way to reduce the need to construct and operate additional water supply facilities. The City will explore water conservation programs to reduce demand for water, improve the efficiency in use and reduce loss and waste of water. Water conservation goals for the City will include the following:

- Reduce unaccounted water use.
- Monitor residential and total per capita water use as development continues.
- Reduce peak water demands.

The city will develop a water conservation plan to detail each of the conservation goals and how the water system compares to "benchmark" metrics for each of the goals. Potential conservation programs the city will review include:

- Metering all water usage and implementing meter testing.
- Conduct water audits to calculate unaccounted for water use.
- Establish conservation oriented water rates for City customers.
- Regulation and enforcement of federal, state, and local water regulations.
- Supply educational materials through various means to inform City residents.
- Conduct regular reviews of the effectiveness of developed conservation programs.



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 9-1
Existing Water System

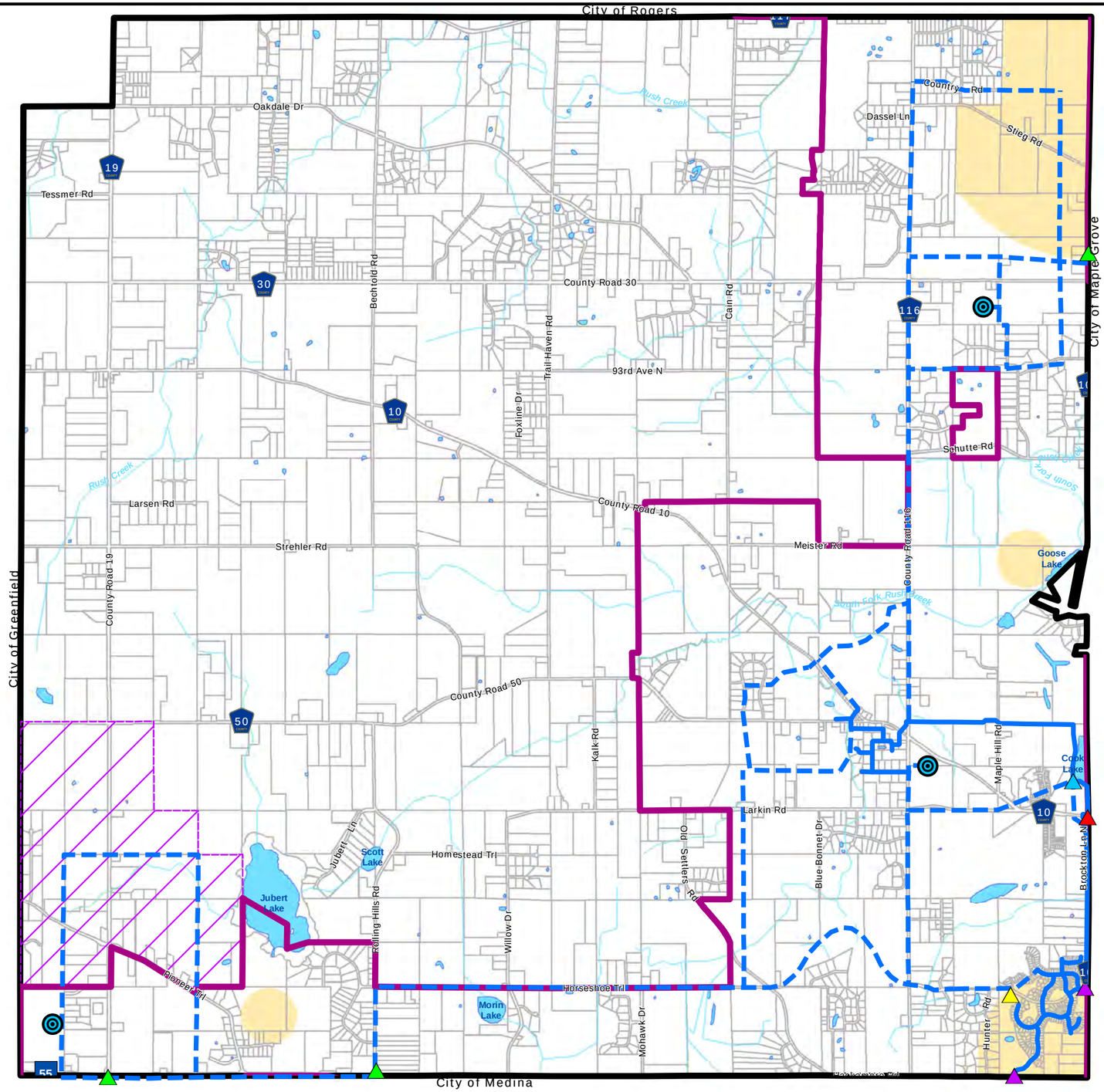
- 8'' Watermain
- 12'' Watermain
- 24'' Watermain
- Existing Supply Connection with Neighboring Communities
- Emergency Connection with Neighboring Communities (Normally Closed)
- Hydrant
- Municipal Boundary
- 2040 MUSA
- Parcel Boundaries
- Streams
- Lake/Open Water

1,200 600 0 1,200

Feet

N

Path: L:\2294\100\2040CompPlan\Existing Water System.mxd
Date: 1/15/2019 Time: 1:35:26 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 9-2
Trunk Water System

- Existing Watermain
- Proposed Watermain
- Potential Water Tower Locations
- Existing Supply Connection with Neighboring Communities
- Proposed Supply Connection with Neighboring Communities
- Emergency Connection with Neighboring Communities (Normally Closed)
- Potential Water Storage
- Potential Booster Station
- Potential Future Well Exploration Areas
- Municipal Boundary
- 2040 MUSA
- Future MUSA Expansion Area
- Parcel Boundaries
- Streams
- Lake/Open Water

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Trunk Water System.mxd
Date: 1/15/2019 Time: 1:36:40 PM User: ShuJC0243

CHAPTER 10: RESILIENCE

RESILIENCE

Resiliency is an idea that describes a community's capacity to respond and thrive under changing conditions while retaining healthy economic, social, and environmental systems. The concept of resiliency in the City of Corcoran is described here as it relates to a number of areas where the City can and should be prepared to respond to these changes.

Resiliency is another way to describe a healthy community that can respond to inevitable changes. Our resilient design principles include:*

***1. Diversity:** Diversity of systems reduces the potential negative impact to the whole City of the failure of any one particular system. Increasing the diversity of systems means that we will want to maximize the diversity of different business types, institutions, sources of food, and industries, etc.*

***2. Redundancy:** An increased redundancy of key infrastructure systems—including electrical power, fuel supply, waste water processing, food, and potable water supply - means that if one system is compromised, there is enough redundancy in the overall system to fill in for the compromised system until it can be replaced or repaired.*

***3. Modularity and Independence of System Components:** Resilience capacity will be increased when system components have enough independence that damage or failure of one part or component of a system is designed to have a low probability of inducing failure of other similar or related components in the system.*

***4. Capacity for Adaptation:** Resilience capacity will be increased by the relative adaptability of the various systems that comprise a City. City systems and infrastructure that are designed to quickly adapt to changing conditions and requirements will increase the overall resilience capacity of a City. The emergency management plan for the City will be evaluated to ensure capacity of the City system.*

***5. Environmental Responsiveness and Integration:** The resilience capacity of a city is increased by how responsive and integrated its systems and functions are with its natural systems, services and resources. Environmental responsiveness and integration will not only reduce the cost of creating and maintaining technical infrastructure, but reduce the relative probability of infrastructure suffering significant negative impacts from events.*

**Adapted from ResilientCity.org*

Goals and Policies

Goal 1: Explore additional opportunities to incentivize high quality stormwater management at a site scale and City scale.

Policy 1: Consider design standards for high quality stormwater amenities.
Policy 2: Consider strategies to encourage water reuse.
Policy 3: Consider strategies to reduce the use of potable water for irrigation.

Goal 2: Preserve floodplain areas for flood mitigation and water quality.

Policy 1: Continue to limit development in floodplain and shoreland zones through the adopted Floodplain and Shoreland Overlay Districts.
Policy 2: Continue to work with Elm Creek Watershed Management Commission to establish and enforce water quality standards.

Goal 3: Build, strengthen and encourage economic, social, and environmental systems that reinforce and amplify rural attributes.

Policy 1: Support practices that foster local food gardening practices and a local food gardening culture.
Policy 2: Support development patterns that preserve agricultural land. Encourage landowners to reenroll in agricultural conservation and preservation programs in the non-MUSA area.
Policy 3: Consider allowing small-scale rural tourism opportunities.
Policy 4: Consider a dark skies lighting policy for Corcoran.

Goal 4: Intensify the rural landscape with rich, diverse landscaping that supports pollinator species.

Policy 1: Encourage plant diversity and pollinator-friendly landscapes on private and public land.
Policy 2: Review lawn maintenance and open space ordinances to ensure that pollinator friendly landscapes are not prohibited or overly restricted.
Policy 3: Consider adoption of City practices that reduce or eliminate the use of systemic pesticides on public owned and managed land.

Goal 5: Develop land use policies that encourage preservation of agricultural activities and create developments that reflect the City's agricultural roots.

Policy 1: Encourage enrollment of land in the Rural/Ag Residential areas in the Metropolitan Agricultural Preserves Program.
Policy 2: Consider ordinances that create meaningful open spaces in both rural and urban areas of the City.

Goal 6: Explore controlled/planned development of solar energy production as an alternative method to agriculture to preserve open space and lower density development.

Policy 1: Continue to allow solar energy production as an accessory use.

Stormwater

Clean water and a clean environment are essential to a healthy community and a healthy life. As stormwater flows over the landscape the moving water can pick up sediment, bacteria, nutrients, pathogens, chemicals, phosphorus, nitrogen and other pollutants. It can carry these pollutants into nearby watercourses like creeks, drains, culverts, rivers, and lakes. Careful stormwater management can reduce erosion, prevent loss of land, and keep sediment and pollutants out of water.

Building a resilient stormwater system is as simple as recognizing that there are many opportunities to clean, reuse, or preserve water as it interacts with the built and unbuilt landscape. Intervening at many points in the water cycle creates resiliency because if one system temporarily fails, others are still in place to mitigate disaster scenarios. One example of resiliency in stormwater management is the City of Corcoran's robust effort to identify and preserve natural resources, such as wetlands and critical green corridors. As described further in Chapter 8 of this document, these natural systems are a critical partner to engineered systems. The City of Corcoran also encourages development projects that preserve and reuse water on site so that new developments don't impact and overtax existing or neighboring infrastructure.

Stormwater management is also guided to be multipurpose, focusing on both water quality and the quality of experience that waterbodies offer City and rural landscapes. People are drawn to water and like to live, recreate, shop, and relax near attractive, clean water features. Creating stormwater management systems that also function as public amenities provides economic benefits for a City that far outweigh any up-front costs.

Shoreland and Floodplain Management

Shorelands and floodplains are low lying areas of land around waterbodies that take on excess water during period of high rainfall and flooding events. Floodplains, as an ecosystem, also provide a number of valuable ecosystem services such as improving water quality, providing habitat for wildlife, and groundwater recharge. Best practices for shorelands and floodplains include requiring natural buffers adjacent to these areas, limiting development and partnering land use with other compatible land and resource management uses such as conservation easements, parks and trails and some agricultural uses.

The City of Corcoran has existing ordinances – in Sections 1050.020 and 1050.030 of the Zoning Ordinance – that limit development in floodplain areas and within a certain distance of waterbodies. The City will continue to enforce these regulations to protect these resources.

Rural Resiliency

Corcoran's rural character is beloved by long-time residents and is identified as a draw for newer residents. Two surveys conducted in 2017 as part of the Comprehensive Plan update confirmed residents' desire to preserve the rural character and land that is used for active agricultural production. At the same time, because of its' close proximity to the Twin Cities (and associated land-use and economic pressures) the City continues a slow evolution from a rural agricultural landscape to a more developed suburban edge of the metropolitan area.

In addition to production agriculture, rural services such as land management, water storage, nature management, alternative energy production, and rural-tourism can strengthen rural networks because they require natural resources and open space.

The visual aesthetic of the City of Corcoran is also a powerful tool for preserving and communicating the rural character. Plant species diversity should be encouraged in open space, residential and commercial landscaping, and on privately or publicly owned land. The sum of individual efforts can create a powerful impact and heighten the sense of rural character. In addition to planting for diversity, planting pollinator-friendly landscapes will be important in Corcoran to provide critical habitat for the wildlife that contribute enormous value to landscape health and agricultural systems.

The City of Corcoran has many tools and strategies already in place to protect its natural resources. Building rural resiliency will depend on the continued effort and support of these tools. An example of one of these tools is the Natural Resource Inventory that identified significant natural resource areas in the community and provided recommendations for the preservation and enhancement of these natural systems. Another is the Open Space and Preservation plat in Corcoran's Subdivision Ordinance. Open Space and Preservation (OS&P) plats aim to preserve natural resources, natural habitat, and vegetated corridors. Incentives for land owners to protect these landscapes helps preserve natural landscapes and viable tracts of land for long-term agricultural use.

Agricultural Preserves

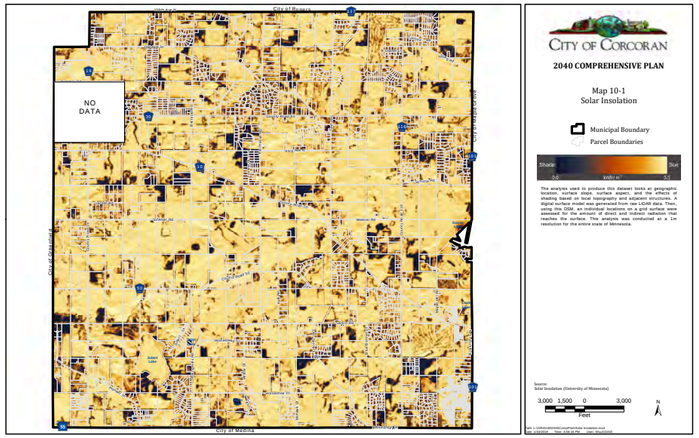
The City of Corcoran encourages the continuation of agricultural use within the community. This policy expresses the City's endorsement of the Metropolitan Agricultural Preserves program. All land parcels in the Rural/ Ag Residential land use designation that meet the requirements for eligibility in the Metropolitan Agricultural Preserves program according to Minnesota Statute §473H may apply to the City for enrollment. This policy is not intended to interfere with agricultural status of any lands prior to adoption of the Comprehensive Plan.

Solar Access Protection

The Metropolitan Land Planning Act (MN Statute §473.859, Subd. 2) requires that local comprehensive plans include an element encouraging the protection and development of access to direct sunlight for solar energy systems. The City of Corcoran will protect such access by requiring minimum standards for lot sizes, amounts of open space, yard setbacks, and maximum height of buildings for urban residents that create the opportunity for all building owners to develop solar energy facilities if desired. The City's zoning or other regulations have been written to ensure that solar energy systems are an allowable component of any building construction in the City.

In 2016 the City of Corcoran passed a solar ordinance amendment and approved 2 community solar gardens. The council has since modified the ordinance to prohibit new community solar gardens, but continues to allow solar energy production as an accessory use.

As development continues to edge into Corcoran's more rural settings, solar energy production may become a viable way to retain lower densities and open space, and create policy that incentivizes or allows this land use.

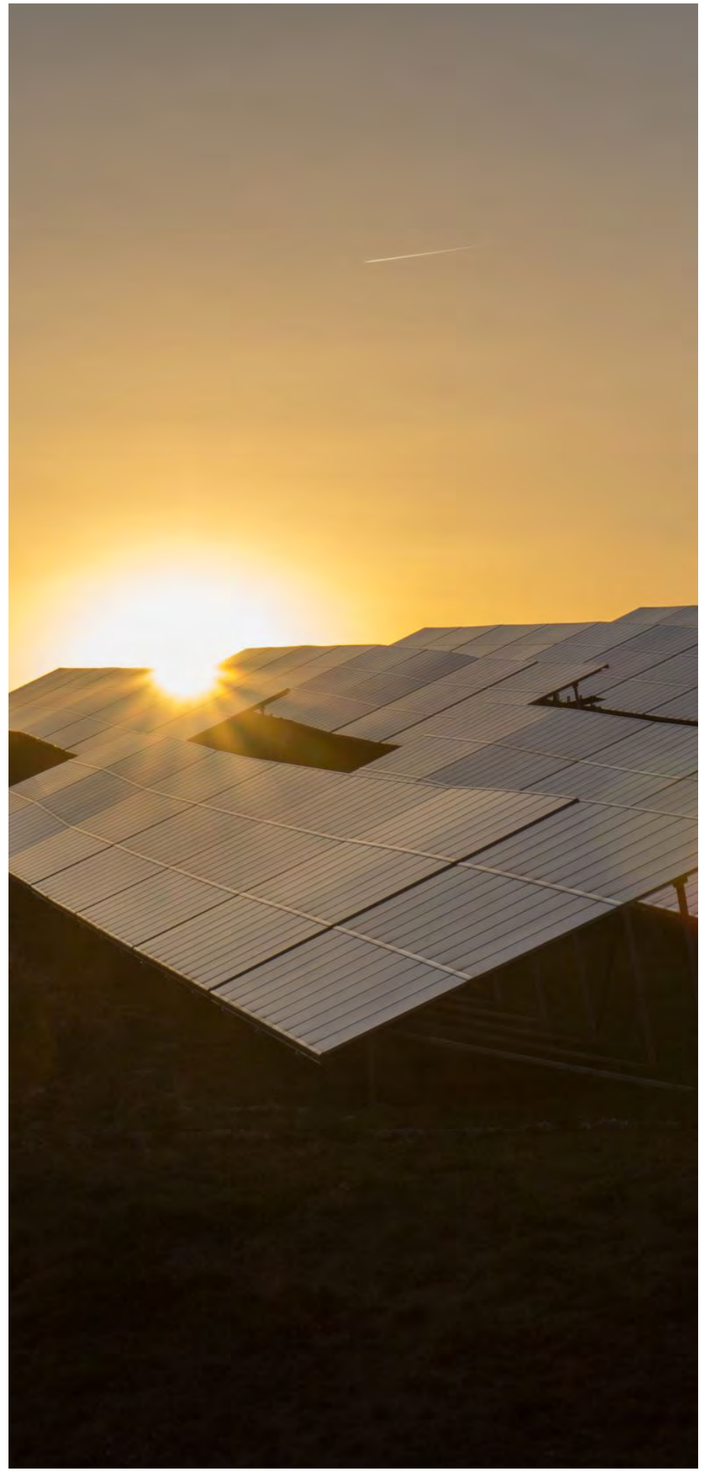


Map 10-1: Solar Insolation *(See page 143 for large size map.)*

Table 10-1: Gross and Rooftop Solar Resource Calculations

Gross Potential (Mwh/yr)	Rooftop Potential (Mwh/yr)	Gross Generation Potential (Mwh/yr)	Rooftop Generation Potential (Mwh/yr)
73,540,645	511,720	7,354,064	51,172

Source: Metropolitan Council Local Planning Handbook



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 10-1
Solar Insolation

Municipal Boundary
Parcel Boundaries

Shade — Sun
0.0 — kWh/m² — 3.5

The analysis used to produce this dataset looks at geographic location, surface slope, surface aspect, and the effects of shading based on local topography and adjacent structures. A digital surface model was generated from raw LiDAR data. Then, using this DSM, an individual locations on a grid surface were assessed for the amount of direct and indirect radiation that reaches the surface. This analysis was conducted at a 1m resolution for the entire state of Minnesota.

Source:
Solar Insolation (University of Minnesota)

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Solar Insolation.mxd
Date: 1/10/2019 Time: 3:38:16 PM User: ShuJC0243

CHAPTER 11: IMPLEMENTATION

Tables

IMPLEMENTATION

The Comprehensive Plan is a valuable tool to guide the development of land in the City as long as the visions, goals and policies called out in the Plan are implemented. The purpose of this Implementation chapter is to identify the specific strategies and action items that the City will undertake, over the course of several years, to ensure that the programs and policies established in the Plan are reflected in the decisions of the City. Official controls, such as land use and zoning regulations, subdivision regulations, and the zoning map, are required by State law to be consistent with the Comprehensive Plan. These controls represent the rules and regulations that govern City decisions related to growth and development.

Most chapters of the Comprehensive Plan identify implementation items. Those chapter-specific items are the detailed policies and programs that are proposed to carry out the goals and objectives of the individual chapters. The purpose of this Implementation chapter is to consolidate, in a single chapter, the collected implementation statements identified throughout the Plan for ease of future reference. These action items will happen at different times throughout the City's growth and are identified as follows: near-term (0-3 years), mid-term (4-7 years), long- term (8-10+ years), and ongoing (regular basis). Updates to these official controls are included in the following tables.

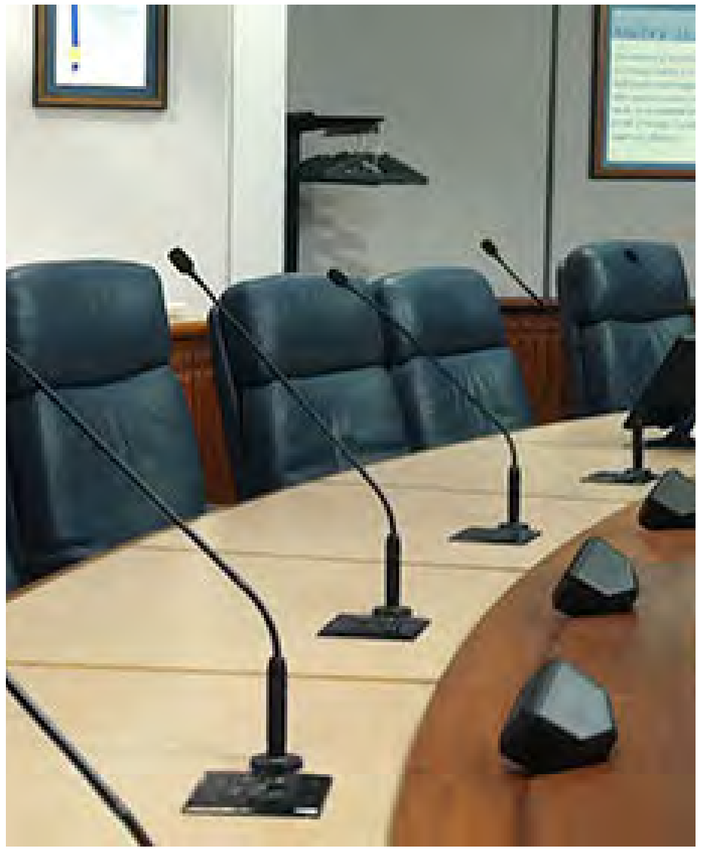


Table 11-1: Land Use

No.	Description	Timing
1	Amend the official zoning map to be consistent with the land use designations of the 2040 Land Use Map.	Near-term/ Ongoing
2	Prepare and adopt a Growth Management Policy consistent with the Metropolitan Council approved forecasts for sewered and unsewered growth. The plan will utilize a rolling average over five year increments so that a lower level of development can occur in some years and a higher level in other years, provided that the average annual residential permits does not exceed 230 units/year on average. If growth exceeds this rate, the City will coordinate with Metropolitan Council staff to discuss whether or not a forecast change or amendment is needed.	Near-term
3	Review and update residential zoning districts and requirements and subdivision regulations as needed to ensure that the densities envisioned in the Plan can be achieved.	Near-term/ Ongoing
4	Continue to review and update site and building design standards as needed to ensure high-quality residential, commercial, and industrial development in the community.	Near-term/ Ongoing
5	Update Open Space and Preservation Plat Ordinance to support clustering, future connection to sewer, and increased level of natural resource protection with incentives consistent with the flexible residential guidelines and City goals.	Near-term
6	Review and update zoning districts with associated uses and all site and design requirements.	Near-term
7	Review and update the zoning and subdivision ordinances as needed to reduce impediments to affordable housing.	Near-term
8	Encourage use of innovative development concepts where appropriate, such as mixed use development and cluster housing to provide life-cycle housing opportunities, minimize the need for automobiles, protect natural resources and maintain open space.	Near-term/ Ongoing
9	Update the Corcoran Southeast District Plan and Design Guidelines as needed to reflect the policy changes in the current 2040 Comprehensive Plan.	Near-term
10	Review and consider updates to ordinance standards that preserve rural character, including preservation of natural areas and agriculture, open spaces, and large lots with low density, especially in the non-MUSA area.	Near-term

Table 11-2: Housing

No.	Description	Timing
1	Develop policy to allow the creative use of site planning or PUDs that provide flexibility for development containing affordable housing, such as a reduction in lot size, setbacks, street width floor area and parking requirements.	Near-term/ Mid-term
2	Explore the suitabilit of various housing finance options and the housing needs they are meant to address.	Short-term
3	Consider developing housing maintenance and rental housing licensing ordinances to maintain existing housing stock.	Mid-term
4	Consider developing and promoting programs that encourage maintenance of existing housing, including neighborhood outreach programs, City beautification programs, City-wide clean up programs, etc.	Mid-term/ Long-term
5	Develop a policy stating the housing finance tools the City will use and what types of housing need the tools will be used to support.	Long-term

Table 11-3: Economic Competitiveness

No.	Description	Timing
1	Continue to participate in the I-94 Chamber of Commerce and explore other organizations which promote and attract local business.	Near-term/ Ongoing
2	Support efforts to retain existing businesses and facilitate growth, including reviewing and updating zoning ordinances as appropriate and making business visits.	Near-term/ Ongoing
3	Consider reactivating an Economic Development Authority.	Near-term/ Mid-term
4	Complete Market Studies as needed.	Ongoing

Table 11-4: Parks and Trails		
No.	**Description**	**Timing**
1	Park dedication fees will be reviewed annually to ensure the plan is implemented economically and effectively and updated as needed.	Near-term/ Ongoing
2	The City will identify land acquisition and protection strategies to assemble the parks, trails, and open space system.	Near-term/ Ongoing
3	Develop and routinely review and update standards for design and construction of public parks, trails and open space areas in the City. The City will apply best practices in mapping dedicated properties and researching and designing facilities.	Near-term/ Ongoing
4	Develop a policy to establish priorities for use of park dedication funds to achieve its Parks and Trails goals.	Near-term
5	Review and update as needed, the park and trail dedication requirements to ensure appropriate amount of dedication for developing parks and trails.	Near-term/ Ongoing
6	Work cooperatively with other communities in Northwest Hennepin County, Three Rivers Park District, Minnesota DNR, local landowners and others to implement this plan and make the most of available resources. The City will actively seek grant funding for land acquisition.	Near-term/ Ongoing

Table 11-5: Transportation		
No.	**Description**	**Timing**
1	Support the Brockton Interchange project and other mass transportation projects that will benefit Corcoran.	Near-term/ Ongoing
2	Advocate for additional resources for transportation improvements	Near-term/ Ongoing
3	Require public right of way dedication where deemed necessary on all newly platted lots, including right of way for future road and trail extensions for interconnectivity.	Near-term/ Ongoing
4	Develop a Right of Way Maintenance Policy.	Near-term
5	Continue to participate and monitor transportation activities by adjacent jurisdictions, Hennepin County, and the State.	Near-term/ Ongoing
6	Develop and execute a plan to analyze, prioritize, and improve gravel roads in Corcoran.	Near-term/ Ongoing

Table 11-6: Wastewater		
No.	**Description**	**Timing**
1	Develop a Wastewater Maintenance Plan.	Near-term
2	Review and update ordinances as needed to be consistent with the City's current ISTS responsibilities.	Near-term/ Ongoing

Table 11-7: Surface Water		
No.	**Description**	**Timing**
1	Connect sanitary sewer at Maple Hill Estates to a regional treatment system.	Near-term
2	Continue inspecting BMPs in accordance with the City's Stormwater Pollution Prevention Plan.	Ongoing
3	Review and update wetland and shoreland ordinances as needed for consistency with watershed rules and other regulations.	Near-term/ Ongoing
4	Apply the Commission's strict development standards, to help improve water quality in Rush Creek and elsewhere.	Near-term
5	Adopt a manure management ordinance.	Near-term
6	Implement one or more recommendations from the Rush Creek Headwaters Sub-watershed Assessment.	Near-term
7	Continue septic system education and work with Hennepin County on compliance.	Near-term/ Ongoing
8	Explore a stormwater pond retrofit in the existing commercial/ industrial area located at County Road 116 and County Road 10.	Near-term/ Mid-term
9	Work with the Commission and other cities on potential wetland improvements in Corcoran.	Near-term/ Mid-term

Table 11-8: Water Supply		
No.	**Description**	**Timing**
1	Implement notification system to inform customers when water availability conditions change.	Near-term
2	Revise City ordinance/codes to allow water reuse options.	Near-term
3	Conduct water conservation education and outreach.	Near-term/ Mid-term

Table 11-9: Resilience		
No.	**Description**	**Timing**
1	Limit development in floodplain and shoreland areas.	Near-term
2	Continue to allow solar energy production as an accessory use.	Near-term/ Ongoing
3	Review and develop policies that incentivize high quality stormwater management	Near-term/ Mid-term
4	Develop policies and ordinances that encourage plant diversity and pollinator-friendly landscapes on private and public land as well as lawn maintenance and open space ordinances to ensure that pollinator friendly landscapes are not prohibited or overly restricted.	Near-term/ Mid-term
5	Establish and enforce water quality standards	Near-term/ Mid-term
6	Develop policies to encourage preservation of agricultural lands and activities in rural areas.	Mid-term

APPENDICES

APPENDIX A: ULTIMATE WASTEWATER SYSTEM DESIGN

APPENDIX A - ULTIMATE SYSTEM AREAS

Sewer Subdistrict ID	Ag Preserve (acres)	Business Park (acres)	Commercial (acres)	Existing Residential (acres)	High Density Residential (acres)	Light Industrial (acres)	Low Density Residential (acres)	Medium Density Residential (acres)	Mixed Residential (acres)	Mixed Use (acres)	Parks/ Open Space (acres)	Public/ Semi-Public (acres)	Rural/Ag Residential (acres)	Unbuildable (acres)	Total (acres)
NE DISTRICT															
NE-A	0	0	0	0	0	72	67	0	0	44	0	0	0	48	230
NE-B	0	0	0	147	0	0	0	0	0	0	0	0	0	19	167
NE-C	0	0	0	45	0	0	17	0	0	0	0	0	0	24	87
NE-D	0	0	0	18	0	0	0	0	0	0	0	0	0	23	42
NE-E	0	0	0	0	0	0	115	0	0	0	0	0	0	30	146
NE-F	0	0	18	0	0	0	17	0	0	0	0	7	0	2	44
NE-G	0	0	0	73	0	0	0	0	0	0	0	0	0	37	110
NE-H	0	0	0	32	0	0	0	0	0	0	0	0	0	48	81
NE-I	0	0	0	0	0	0	34	0	0	0	0	0	0	6	40
NE-J	0	0	0	0	0	0	36	0	0	0	0	0	0	19	55
NE-K	0	0	0	0	0	0	0	0	0	25	0	25	0	10	61
NE-L	0	38	0	0	0	0	0	0	0	0	0	0	0	1	39
NE-M	0	39	0	0	0	0	0	0	0	39	0	0	0	15	93
NE-N	0	0	22	0	0	0	0	0	0	0	0	0	0	2	24
NE-O	0	0	0	0	0	0	0	0	0	34	0	0	0	6	40
NE-P	0	0	0	0	0	0	0	0	0	32	0	0	0	9	41
NE-Q	0	0	0	0	0	0	0	0	0	85	0	0	0	40	125
NE-R	0	0	0	179	0	0	0	0	0	0	0	14	0	90	283
NE-S	0	0	0	0	0	0	138	0	0	0	0	0	0	17	155
NE-T	0	0	0	0	0	0	0	0	79	0	0	0	0	0	79
NE-U	0	0	0	0	0	0	19	0	103	0	0	0	0	8	131
NE-V	0	0	0	0	0	0	153	0	0	0	0	0	0	14	167
NE-W	0	0	0	33	0	0	63	0	0	0	0	0	0	31	127
Subtotal	0	77	40	529	0	72	659	0	182	260	0	46	0	502	2,366

APPENDIX A - ULTIMATE SYSTEM AREAS

Sewer Subdistrict ID	Ag Preserve (acres)	Business Park (acres)	Commercial (acres)	Existing Residential (acres)	High Density Residential (acres)	Light Industrial (acres)	Low Density Residential (acres)	Medium Density Residential (acres)	Mixed Residential (acres)	Mixed Use (acres)	Parks/ Open Space (acres)	Public/ Semi-Public (acres)	Rural/Ag Residential (acres)	Unbuildable (acres)	Total (acres)
SE DISTRICT															
SE-A	0	0	0	22	0	0	0	0	0	0	0	0	0	31	52
SE-B	0	0	0	0	27	0	0	0	0	0	0	0	0	33	60
SE-C	0	0	0	0	0	0	0	0	0	34	0	8	0	37	79
SE-D	0	0	0	18	0	0	75	0	27	0	0	0	0	71	191
SE-E	0	0	0	51	0	0	3	0	0	0	0	0	0	12	66
SE-F	0	0	0	0	0	0	8	0	5	0	54	0	0	9	75
SE-G	0	0	0	0	0	0	2	0	0	0	19	0	0	3	24
SE-H	0	0	2	0	17	0	86	0	0	0	0	0	0	13	118
SE-I	0	0	0	0	2	0	0	17	0	0	0	0	0	5	24
SE-J	0	0	0	0	0	0	0	0	25	69	0	0	0	22	116
SE-K	0	0	0	0	0	0	33	0	1	0	0	0	0	7	41
SE-L	0	0	0	0	0	0	0	0	0	83	0	2	0	10	95
SE-M	0	0	0	0	0	0	0	0	0	0	0	65	0	42	107
SE-N	0	0	0	0	0	0	14	28	0	0	0	0	0	2	45
SE-O	14	0	0	0	0	0	153	0	0	0	0	0	0	36	203
SE-P	0	0	0	0	0	65	0	3	0	0	0	0	0	6	74
SE-Q	0	0	23	0	0	34	0	0	0	0	0	19	0	16	92
SE-R	0	0	0	0	0	27	0	0	0	0	0	0	0	10	37
SE-S	0	0	0	0	0	0	0	0	12	0	0	0	0	17	29
SE-T	0	0	0	0	0	0	105	0	25	0	0	1	0	32	162
SE-U	95	0	0	0	0	0	0	0	0	0	0	0	0	28	124
SE-V	0	0	0	42	0	0	0	0	0	0	0	0	0	19	61
SE-W	0	0	0	0	0	0	35	0	0	0	0	0	0	21	56
SE-X	0	0	0	37	0	5	17	0	19	0	0	0	0	11	91
SE-Y	0	0	0	0	0	0	74	0	101	0	0	0	0	32	207
SE-Z	0	0	0	0	0	5	15	0	0	13	0	0	0	45	79
SE-AA	0	0	0	71	0	0	7	0	0	0	0	0	0	41	119
SE-AB	2	0	0	0	0	0	81	0	0	0	5	0	0	85	171
SE-AC	0	0	0	19	0	0	5	0	0	0	0	0	0	36	59
SE-AD	0	0	0	53	0	0	30	0	0	0	0	0	0	35	118
SE-AE	0	0	0	0	0	0	134	0	0	0	0	0	0	41	174
SE-AF	0	0	0	0	0	0	6	0	0	0	0	0	0	73	79
SE-AG	0	0	0	54	0	0	35	0	0	0	0	0	0	69	158
SE-AH	0	0	0	8	0	0	76	0	0	0	0	0	0	74	158
SE-AI	0	0	0	35	0	0	107	0	0	0	0	0	0	102	243
SE-AJ	42	0	0	35	0	0	41	0	0	0	0	0	0	169	287
SE-AK	36	0	0	0	0	0	117	0	0	0	0	0	0	95	247
SE-AM	51	0	0	0	0	0	64	0	0	0	0	0	2	12	130
SE-AO	0	0	0	0	0	0	147	0	0	0	0	0	0	46	193
SE-AP	0	0	0	0	0	0	68	0	0	0	0	0	0	12	80
SE-AQ	0	0	0	0	0	0	76	0	0	0	0	0	0	5	80
SE-AR	0	0	0	0	0	0	21	0	54	0	0	0	0	31	105
SE-AS	0	0	23	0	35	0	0	0	0	0	0	0	0	20	78
SE-AT	0	0	0	0	0	0	79	0	0	0	0	0	0	128	207
SE-AU	0	0	0	28	0	0	69	0	0	0	0	0	0	26	123
SE-AV	13	0	0	17	0	0	53	0	0	0	0	0	0	38	120
Subtotal	253	0	48	488	80	137	1,837	48	268	200	77	95	2	1,704	5,238

APPENDIX A - ULTIMATE SYSTEM AREAS

Sewer Subdistrict ID	Ag Preserve (acres)	Business Park (acres)	Commercial (acres)	Existing Residential (acres)	High Density Residential (acres)	Light Industrial (acres)	Low Density Residential (acres)	Medium Density Residential (acres)	Mixed Residential (acres)	Mixed Use (acres)	Parks/ Open Space (acres)	Public/ Semi-Public (acres)	Rural/Ag Residential (acres)	Unbuildable (acres)	Total (acres)
SW DISTRICT															
SW-A	0	0	0	0	0	79	0	0	0	0	0	0	0	0	79
SW-B	0	0	0	0	0	30	0	0	0	0	0	0	0	4	34
SW-C	0	0	27	0	0	4	0	0	0	0	0	0	0	11	43
SW-D	0	0	0	0	0	31	0	0	0	0	0	0	0	1	31
SW-E	0	0	33	0	0	24	0	0	0	0	0	0	0	26	83
SW-F	0	0	0	0	0	0	45	0	0	0	0	0	0	13	58
SW-G	0	0	0	0	0	23	0	16	0	0	0	0	0	25	64
SW-H	0	0	0	13	0	0	0	0	0	0	0	0	0	2	16
SW-I	0	0	0	19	0	2	4	1	0	0	0	0	0	7	33
SW-J	0	0	0	1	0	0	78	0	0	0	0	0	0	9	88
SW-K	0	0	0	104	0	5	17	0	0	0	0	0	0	47	173
SW-L	0	0	0	0	0	75	0	0	0	0	0	0	0	3	78
Subtotal	0	0	60	137	0	272	144	18	0	0	0	0	0	148	779

APPENDIX A - ULTIMATE SYSTEM AVERAGE FLOWS

Sewer Subdistrict ID	Ag Preserve (mgd)	Business Park (mgd)	Commercial (mgd)	Existing Residential (mgd)	High Density Residential (mgd)	Light Industrial (mgd)	Low Density Residential (mgd)	Medium Density Residential (mgd)	Mixed Residential (mgd)	Mixed Use (mgd)	Parks/ Open Space (mgd)	Public/ Semi-Public (mgd)	Rural/Ag Residential (mgd)	Unbuildable (mgd)	Total (mgd)
NE DISTRICT															
NE-A	0.00	0.00	0.00	0.00	0.00	0.07	0.05	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.19
NE-B	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
NE-C	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
NE-D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.005
NE-E	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
NE-F	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
NE-G	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
NE-H	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
NE-I	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
NE-J	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
NE-K	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.01	0.00	0.00	0.04
NE-L	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
NE-M	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.10
NE-N	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
NE-O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05
NE-P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05
NE-Q	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.13
NE-R	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
NE-S	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
NE-T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.09
NE-U	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.14
NE-V	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
NE-W	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Subtotal	0.00	0.08	0.04	0.14	0.00	0.07	0.49	0.00	0.22	0.39	0.00	0.01	0.00	0.00	1.44

APPENDIX A - ULTIMATE SYSTEM AVERAGE FLOWS

Sewer Subdistrict ID	Ag Preserve (mgd)	Business Park (mgd)	Commercial (mgd)	Existing Residential (mgd)	High Density Residential (mgd)	Light Industrial (mgd)	Low Density Residential (mgd)	Medium Density Residential (mgd)	Mixed Residential (mgd)	Mixed Use (mgd)	Parks/ Open Space (mgd)	Public/ Semi-Public (mgd)	Rural/Ag Residential (mgd)	Unbuildable (mgd)	Total (mgd)
SE DISTRICT															
SE-A	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
SE-B	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
SE-C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05
SE-D	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.09
SE-E	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
SE-F	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
SE-G	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.002
SE-H	0.00	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
SE-I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02
SE-J	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.10	0.00	0.00	0.00	0.00	0.13
SE-K	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
SE-L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.13
SE-M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.016
SE-N	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.04
SE-O	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
SE-P	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
SE-Q	0.00	0.00	0.02	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SE-R	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
SE-S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
SE-T	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.11
SE-U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
SE-V	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
SE-W	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
SE-X	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.05
SE-Y	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.18
SE-Z	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.04
SE-AA	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
SE-AB	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SE-AC	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
SE-AD	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
SE-AE	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
SE-AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.004
SE-AG	0.00	0.00	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
SE-AH	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SE-AI	0.00	0.00	0.00	0.01	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
SE-AJ	0.00	0.00	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
SE-AK	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
SE-AM	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
SE-AO	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
SE-AP	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
SE-AQ	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SE-AR	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.08
SE-AS	0.00	0.00	0.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
SE-AT	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SE-AU	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SE-AV	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Subtotal	0.00	0.00	0.05	0.13	0.16	0.14	1.38	0.05	0.32	0.30	0.00	0.02	0.00	0.00	2.55

APPENDIX A - ULTIMATE SYSTEM AVERAGE FLOWS

Sewer Subdistrict ID	Ag Preserve (mgd)	Business Park (mgd)	Commercial (mgd)	Existing Residential (mgd)	High Density Residential (mgd)	Light Industrial (mgd)	Low Density Residential (mgd)	Medium Density Residential (mgd)	Mixed Residential (mgd)	Mixed Use (mgd)	Parks/ Open Space (mgd)	Public/ Semi-Public (mgd)	Rural/Ag Residential (mgd)	Unbuildable (mgd)	Total (mgd)
SW DISTRICT															
SW-A	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
SW-B	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
SW-C	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
SW-D	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
SW-E	0.00	0.00	0.03	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SW-F	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
SW-G	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.04
SW-H	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.004
SW-I	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
SW-J	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SW-K	0.00	0.00	0.00	0.03	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
SW-L	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
Subtotal	0.00	0.00	0.06	0.04	0.00	0.27	0.11	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.50

APPENDIX A - ULTIMATE SYSTEM DESIGN FLOWS

From Point	To Point	Area Added	Average Flow Added (mgd)	Total Average Flow (mgd)	PFF	Design Flow (mgd)
NE DISTRICT						
NE-1	NE-2	SE-18 Diversion, NE-V	0.12	1.62	2.9	4.70
NE-3	NE-2	NE-O, U	0.19	0.19	3.8	0.72
NE-2	NE-4		0.00	1.81	2.9	5.25
NE-4	NE-5	NE-T	0.09	1.90	2.8	5.33
NE-6	NE-5	NE-L	0.04	0.04	4.0	0.15
NE-5	NE-7	NE-G, H, K	0.07	2.01	2.8	5.64
NE-7	NE-8		0.00	2.01	2.8	5.64
NE-8	NE-9	NE-E	0.09	2.10	2.8	5.88
NE-10	NE-11	NE-W	0.06	0.06	4.0	0.22
NE-11	NE-12	NE-P	0.05	0.10	4.0	0.42
NE-13 (LS)	NE-12	NE-R	0.05	0.05	4.0	0.21
NE-12	NE-14	NE-Q	0.13	0.28	3.7	1.05
NE-14	NE-15	NE-M, N	0.12	0.40	3.5	1.41
NE-15	NE-9	NE-F, I, J	0.08	0.49	3.5	1.71
NE-9	NE-16		0.00	2.59	2.7	6.99
NE-16	NE-17		0.00	2.59	2.7	6.99
NE-17	NE-18		0.00	2.59	2.7	6.99
NE-19	NE-20	NE-C, D	0.03	0.03	4.0	0.12
NE-20	NE-21	NE-B, S	0.14	0.17	3.9	0.68
NE-21	NE-22		0.00	0.17	3.9	0.68
NE-23	NE-22	NE-A	0.19	0.19	3.8	0.71
NE-22	NE-18		0.00	0.36	3.6	1.30
NE-18	ECI		0.00	2.95	2.6	7.67

APPENDIX A - ULTIMATE SYSTEM DESIGN FLOWS

From Point	To Point	Area Added	Average Flow Added (mgd)	Total Average Flow (mgd)	PFF	Design Flow (mgd)
SE DISTRICT						
SE-A	M.G.[1]	SE-A	0.01	0.01	4.0	0.02
SE-36 (LS)	SE-37	SE-AG, AH, AI	0.19	0.19	3.8	0.72
SE-37	SE-1		0.00	0.19	3.8	0.72
SE-1	SE-2	SE-AJ, AK	0.13	0.32	3.6	1.14
SE-2	SE-3	SE-U, W	0.03	0.34	3.6	1.24
SE-3	SE-4	SE-V	0.01	0.36	3.6	1.28
SE-4	SE-5	SE-P	0.07	0.42	3.5	1.48
SE-6	SE-5	SE-R	0.03	0.03	4.0	0.11
SE-5	SE-7		0.00	0.45	3.5	1.58
SE-8	SE-9	SE-O, AM	0.16	0.16	3.9	0.63
SE-9	SE-7		0.00	0.16	3.9	0.63
SE-7	SE-10	SE-G, Q	0.06	0.68	3.3	2.23
SE-10	SE-11		0.00	0.68	3.3	2.23
SE-11	SE-12	SE-H	0.10	0.78	3.3	2.56
SE-13	SE-14	SE-AP, AQ	0.11	0.11	4.0	0.43
SE-14	SE-15	SE-D, AO, AR	0.28	0.39	3.6	1.41
SE-15	SE-12	SE-B, E, F	0.08	0.47	3.5	1.65
SE-16	SE-17	SE-K	0.03	0.03	4.0	0.10
SE-17	SE-12	SE-C, I	0.07	0.10	4.0	0.40
SE12	SE-18	SE-AS, AT	0.15	1.50	2.9	4.35
SE-18	NE-1	SE-AF	0.004	1.51	2.9	4.37
SE-19	SE-20	SE-S, X	0.07	0.07	4.0	0.27
SE-21	SE-20	SE-Y	0.18	0.18	3.9	0.69
SE20	SE-22		0.00	0.24	3.7	0.90
SE-23	SE-22	SE-J, L	0.26	0.26	3.7	0.96
SE-22	SE-24		0.00	0.50	3.4	1.71
SE-24	MCES LS	SE-M, N, T	0.16	0.67	3.3	2.20

APPENDIX A - ULTIMATE SYSTEM DESIGN FLOWS

From Point	To Point	Area Added	Average Flow Added (mgd)	Total Average Flow (mgd)	PFF	Design Flow (mgd)
SE-25	SE-26	SE-AA, AU, AV	0.13	0.13	3.9	0.50
SE-26	SE-27	SE-AB	0.06	0.19	3.8	0.72
SE-28	SE-29	SE-AD	0.04	0.04	4.0	0.15
SE-29	SE-30	SE-AE	0.10	0.14	3.9	0.54
SE-30	SE-27		0.00	0.14	3.9	0.54
SE-27	SE-31		0.00	0.33	3.6	1.17
SE-31	SE-32	SE-AC	0.01	0.33	3.6	1.21
SE-33	SE-32	SE-Z	0.04	0.04	4.0	0.15
SE-32	SE-34 (LS)		0.00	0.37	3.6	1.34
SE-34 (LS)	SE-35		0.00	0.37	3.6	1.34
SE-35	MCES LS		0.00	0.37	3.6	1.34
MCES LS	ECI [2]		0.00	1.04	3.1	3.22

[1] Potential (future) intercommunity connection to Maple Grove

[2] The capacity of this connection to the Elm Creek Interceptor is 2.1 mgd. Additional diversion of flow from the Southeast District to the NE District may ultimately be required.

APPENDIX A - ULTIMATE SYSTEM DESIGN FLOWS

From Point	To Point	Area Added	Average Flow Added (mgd)	Total Average Flow (mgd)	PFF	Design Flow (mgd)
SW DISTRICT						
SW-2	SW-3	SW-A	0.08	0.08	4.0	0.32
SW-3	SW-4	SW-B, C, D, E	0.15	0.23	3.8	0.87
SW-6	SW-7 (LS)	SW-H, I, J, L	0.15	0.15	3.9	0.58
SW-7 (LS)	SW-8	SW-K	0.05	0.20	3.8	0.74
SW-8	SW-4			0.23	3.8	0.87
SW-1	SW-4	SW-F	0.03	0.03	4.0	0.13
SW-4	SW-5 (LS)	SE-G	0.04	0.53	3.4	1.80
SW-5 (LS)	TBD [3]		0.00	0.53	3.4	1.80

[3] To be determined (actual routing/WWTP destination will be determined through future study)

APPENDIX A - ULTIMATE TRUNK SYSTEM DESIGN

From Point	To Point	Design Flow	Existing/ Proposed	Pipe Size	Pipe Material	Length	Upstream			Average Slope	Down-stream Elev	Capacity					Capacity to Design Flow Ratio
							Rim Elev	Invert Elev	Manhole Depth			Inlet Control		Outlet Control		Actual Capacity	
		(mgd)		(in)		(ft)	(ft)	(ft)	(ft)	(%)	(ft)	(cfs)	(mgd)	(cfs)	(mgd)	(mgd)	
NE DISTRICT																	
NE-1	NE-2	4.70	Prop.	30	PVC	4400	938	914.7	23	0.08	911.1	23.3	15.1	11.6	7.52	7.52	1.6
NE-3	NE-2	0.72	Prop.	10	PVC	2000	950	921.1	29	0.50	911.1	1.7	1.1	1.55	1.00	1.00	1.4
NE-2	NE-4	5.25	Prop.	30	PVC	4200	939	911.1	28	0.08	907.8	23.3	15.1	11.6	7.52	7.52	1.4
NE-4	NE-5	5.33	Prop.	30	PVC	3200	930	907.8	22	0.08	905.2	23.3	15.1	11.6	7.52	7.52	1.4
NE-6	NE-5	0.15	Prop.	8	PVC	1000	950	920.2	30	1.50	905.2	1.4	0.9	1.48	0.96	0.90	5.9
NE-5	NE-7	5.64	Prop.	30	PVC	1300	937	905.2	32	0.08	904.2	23.3	15.1	11.6	7.52	7.52	1.3
NE-7	NE-8	5.64	Prop.	30	PVC	1300	920	904.2	16	0.08	903.1	23.3	15.1	11.6	7.52	7.52	1.3
NE-8	NE-9	5.88	Prop.	30	PVC	3000	925	903.1	22	0.08	900.7	23.3	15.1	11.6	7.52	7.52	1.3
NE-10	NE-11	0.22	Prop.	8	PVC	1500	953	929.7	23	0.40	923.7	1.4	0.9	0.8	0.50	0.50	2.2
NE-11	NE-12	0.42	Prop.	10	PVC	2200	952	923.7	28	0.28	917.5	1.7	1.1	1.2	0.75	0.75	1.8
NE-13 (LS)	NE-12	0.21	Prop. FM	6	HDPE	3000	936	(905 LS)	(31 LS)	---	917.5	---	---	---	---	0.6	2.9
NE-12	NE-14	1.05	Prop.	15	PVC	1500	946	917.5	29	0.15	915.2	4.1	2.6	2.5	1.62	1.62	1.5
NE-14	NE-15	1.41	Prop.	15	PVC	1400	950	915.2	35	0.25	911.7	4.1	2.6	3.2	2.09	2.09	1.5
NE-15	NE-9	1.71	Prop.	15	PVC	2400	945	911.7	33	0.25	905.7	4.1	2.6	3.2	2.09	2.09	1.2
NE-9	NE-16	6.99	Prop.	30	PVC	2600	937	900.7	36	0.10	898.1	23.3	15.1	13.0	8.41	8.41	1.2
NE-16	NE-17	6.99	Prop.	30	PVC	1200	938	898.1	40	0.10	896.9	23.3	15.1	13.0	8.41	8.41	1.2
NE-17	NE-18	6.99	Prop.	30	PVC	800	933	896.9	36	1.00	888.9	23.3	15.1	41.1	26.6	15.1	2.2
NE-19	NE-20	0.12	Prop.	8	PVC	1800	919	912.4	7	0.40	905.2	1.4	0.9	0.77	0.50	0.50	4.1
NE-20	NE-21	0.68	Prop.	12	PVC	2000	931	905.2	26	0.22	900.8	2.2	1.4	1.68	1.08	1.08	1.6
NE-21	NE-22	0.68	Prop.	12	PVC	2800	925	900.8	24	0.22	894.6	2.2	1.4	1.68	1.08	1.08	1.6
NE-23	NE-22	0.71	Prop.	10	PVC	1500	928	907.1	21	0.50	899.6	1.7	1.1	1.6	1.00	1.00	1.4
NE-22	NE-18	1.30	Prop.	15	PVC	3200	918	894.6	23	0.15	889.8	4.1	2.6	2.51	1.62	1.62	1.2
NE-18	**ECI**	**7.67**	**Ex.**	**27**	**PVC**	**25**	**910**	**888.9**	**21**	**0.18**	**888.9**	**17.7**	**11.4**	**13.2**	**8.52**	**8.52**	**1.1**

APPENDIX A - ULTIMATE TRUNK SYSTEM DESIGN

From Point	To Point	Design Flow	Existing/ Proposed	Pipe Size	Pipe Material	Length	Upstream			Average Slope	Down-stream Elev	Capacity					Capacity to Design Flow Ratio
							Rim Elev	Invert Elev	Manhole Depth			Inlet Control		Outlet Control		Actual Capacity	
		(mgd)		(in)		(ft)	(ft)	(ft)	(ft)	(%)	(ft)	(cfs)	(mgd)	(cfs)	(mgd)	(mgd)	
SE DISTRICT																	
SE-A	**M.G.[1]**	**0.02**	**Ex.**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
SE-36 (LS)	SE-37	0.72	Prop. FM	8	HDPE	8000	972	(940 LS)	(32 LS)	---	964.6	---	---	---	---	1.1	1.5
SE-37	SE-1	0.72	Prop.	12	PVC	2000	980	964.6	15	0.22	960.2	2.2	1.4	1.7	1.08	1.08	1.5
SE-1	SE-2	1.14	Prop.	15	PVC	3500	985	960.2	25	0.30	949.7	4.1	2.6	3.5	2.29	2.29	2.0
SE-2	SE-3	1.24	Prop.	15	PVC	1800	980	949.7	30	0.25	945.2	4.1	2.6	3.2	2.09	2.09	1.7
SE-3	SE-4	1.28	Prop.	15	PVC	1800	968	945.2	23	0.15	942.5	4.1	2.6	2.5	1.62	1.62	1.3
SE-4	SE-5	1.48	Prop.	18	PVC	2000	970	942.5	28	0.15	939.5	6.2	4.0	4.1	2.64	2.64	1.8
SE-6	SE-5	0.11	Prop.	8	PVC	800	962	945.5	17	0.75	939.5	1.4	0.9	1.0	0.68	0.68	6.2
SE-5	SE-7	1.58	Prop.	18	PVC	2000	960	939.5	21	0.12	937.1	6.2	4.0	3.6	2.36	2.36	1.5
SE-8	SE-9	0.63	Prop.	10	PVC	3600	980	954.2	26	0.28	944.1	1.7	1.1	1.2	0.75	0.75	1.2
SE-9	SE-7	0.63	Prop.	12	PVC	3200	964	944.1	20	0.22	937.1	2.2	1.4	1.7	1.08	1.08	1.7
SE-7	**SE-10**	**2.23**	**Ex.**	**18**	**PVC**	**685**	**958**	**937.1**	**21**	**0.19**	**935.8**	**6.2**	**4.0**	**4.6**	**2.97**	**2.97**	**1.3**
SE-10	SE-11	2.23	Prop.	18	PVC	1000	966	935.8	30	0.44	931.4	6.2	4.0	7.0	4.52	4.00	1.8
SE-11	SE-12	2.56	Prop.	18	PVC	2200	946	931.4	15	0.20	927.0	6.2	4.0	4.7	3.04	3.04	1.2
SE-13	SE-14	0.43	Prop.	10	PVC	1500	960	939.7	20	0.28	935.5	1.7	1.1	1.2	0.75	0.75	1.7
SE-14	SE-15	1.41	Prop.	15	PVC	2500	950	935.5	14	0.15	931.8	4.1	2.6	2.5	1.62	1.62	1.2
SE-15	SE-12	1.65	Prop.	18	PVC	4000	944	931.8	12	0.12	927.0	6.2	4.0	3.6	2.36	2.36	1.4
SE-16	SE-17	0.10	Prop.	8	PVC	1400	948	937.6	10	0.40	932.0	1.4	0.9	0.8	0.50	0.50	4.7
SE-17	SE-12	0.40	Prop.	10	PVC	1800	940	932.0	8	0.28	927.0	1.7	1.1	1.2	0.75	0.75	1.9
SE-12	SE-18	4.35	Prop.	30	PVC	3000	941	927.0	14	0.08	917.2	23.3	15.1	11.6	7.52	7.52	1.7
SE-18	NE-1	4.37	Prop.	30	PVC	3200	940	917.2	23	0.08	914.7	23.3	15.1	11.6	7.52	7.52	1.7
SE-19	SE-20	0.27	Prop.	8	PVC	3000	1000	975.0	25	0.45	961.5	1.4	0.9	0.8	0.53	0.53	2.0
SE-21	SE-20	0.69	Prop.	12	PVC	1200	988	964.1	24	0.22	961.5	2.2	1.4	1.7	1.08	1.08	1.6
SE-20	SE-22	0.90	Prop.	12	PVC	3000	994	961.5	33	0.40	949.5	2.2	1.4	2.3	1.46	1.40	1.6
SE-23	**SE-22**	**0.96**	**Ex.**	**15**	**PVC**	**2550**	**966**	**958.5**	**8**	**0.35**	**949.5**	**4.1**	**2.6**	**3.8**	**2.49**	**2.49**	**2.6**
SE-22	**SE-24**	**1.71**	**Ex.**	**15**	**PVC**	**1700**	**974**	**949.5**	**25**	**0.42**	**942.4**	**4.1**	**2.6**	**4.2**	**2.71**	**2.60**	**1.5**
SE-24	**MCES LS**	**2.20**	**Ex.**	**15**	**PVC**	**2550**	**970**	**942.4**	**28**	**0.44**	**931.2**	**4.1**	**2.6**	**4.3**	**2.77**	**2.60**	**1.2**

APPENDIX A - ULTIMATE TRUNK SYSTEM DESIGN

From Point	To Point	Design Flow	Existing/ Proposed	Pipe Size	Pipe Material	Length	Upstream			Average Slope	Down-stream Elev	Capacity					Capacity to Design Flow Ratio
							Rim Elev	Invert Elev	Manhole Depth			Inlet Control		Outlet Control		Actual Capacity	
		(mgd)		(in)		(ft)	(ft)	(ft)	(ft)	(%)	(ft)	(cfs)	(mgd)	(cfs)	(mgd)	(mgd)	
SE-25	SE-26	0.50	Prop.	10	PVC	2500	978	964.7	13	0.28	957.7	1.7	1.1	1.2	0.75	0.75	1.5
SE-26	SE-27	0.72	Prop.	12	PVC	3500	980	957.7	22	0.22	950.0	2.2	1.4	1.7	1.08	1.08	1.5
SE-28	SE-29	0.15	Prop.	8	PVC	1000	988	976.1	12	0.40	972.1	1.4	0.9	0.8	0.50	0.50	3.3
SE-29	**SE-30**	**0.54**	**Ex.**	**8**	**PVC**	**965**	**998**	**972.1**	**26**	**0.84**	**964.0**	**1.4**	**0.9**	**1.1**	**0.72**	**0.72**	**1.3**
SE-30	**SE-27**	**0.54**	**Ex.**	**8**	**PVC**	**1670**	**1001**	**964.0**	**37**	**0.43**	**956.9**	**1.4**	**0.9**	**0.8**	**0.51**	**0.51**	**1.0**
SE-27	**SE-31**	**1.17**	**Ex.**	**15**	**PVC**	**985**	**978**	**950.0**	**28**	**0.17**	**948.3**	**4.1**	**2.6**	**2.7**	**1.74**	**1.74**	**1.5**
SE-31	**SE-32**	**1.21**	**Ex.**	**15**	**PVC**	**1740**	**964**	**948.3**	**16**	**0.19**	**945.0**	**4.1**	**2.6**	**2.8**	**1.82**	**1.82**	**1.5**
SE-33	SE-32	0.15	Prop.	10	PVC	2300	988	969.0	19	1.04	945.0	1.7	1.1	2.2	1.45	1.10	7.5
SE-32	**SE-34 (LS)**	**1.34**	**Ex.**	**15**	**PVC**	**380**	**963**	**945.0**	**18**	**0.16**	**944.4**	**4.1**	**2.6**	**2.6**	**1.66**	**1.66**	**1.2**
SE-34 (LS)	**SE-35**	**1.34**	**Ex. FM**	**10 eqvt**	**HDPE**	**2300**	**966**	**(938.5 LS)**	**(27 LS)**	**---**	**970**	**---**	**---**	**---**	**---**	**1.7**	**1.3**
SE-35	MCES LS	1.34	Prop.	15	PVC	1300	980	957.2	23	2.00	931.2	4.1	2.6	9.2	5.92	2.60	1.9
MCES LS	ECI[2]	3.22	Prop. FM	12	HDPE	1800	957	(925 LS)	(32 LS)	---	975	---	---	---	---	2.5	0.8

(Note: The above FM already exists as a 6-inch PVC FM that will need to be upsized. The 12-inch proposed FM sizing is based on providing the ECI's actual current capacity of 2.1 mgd.)

[1] Potential (future) intercommunity connection to Maple Grove

[2] The capacity of this connection to the Elm Creek Interceptor is 2.1 mgd. Additional diversion of flow from the Southeast District to the NE District may ultimately be required.

APPENDIX A - ULTIMATE TRUNK SYSTEM DESIGN

From Point	To Point	Design Flow	Existing/ Proposed	Pipe Size	Pipe Material	Length	Upstream			Average Slope	Down-stream Elev	Capacity					Capacity to Design Flow Ratio
							Rim Elev	Invert Elev	Manhole Depth			Inlet Control		Outlet Control		Actual Capacity	
		(mgd)		(in)		(ft)	(ft)	(ft)	(ft)	(%)	(ft)	(cfs)	(mgd)	(cfs)	(mgd)	(mgd)	
SW DISTRICT																	
SW-2	SW-3	0.32	Prop.	12	PVC	2000	1068	1034.5	34	0.22	1030.1	2.2	1.4	1.7	1.08	1.08	3.4
SW-3	SW-4	0.87	Prop.	15	PVC	2400	1050	1030.1	20	0.15	1026.5	4.1	2.6	2.5	1.62	1.62	1.9
SW-6	SW-7 (LS)	0.58	Prop.	8	PVC	2000	1005	988.0	17	1.40	960.0	1.4	0.9	1.4	0.93	0.90	1.5
SW-7 (LS)	SW-8	0.74	Prop. FM	8	HDPE	3000	975	(950 LS)	(25 LS)	---	1031.5	---	---	---	---	1.1	1.5
SW-8	SW-4	0.87	Prop.	12	PVC	2000	1060	1031.5	29	0.25	1026.5	2.2	1.4	1.8	1.15	1.15	1.3
SW-1	SW-4[3]	0.13	Prop.	18	PVC	1800	1060	1030.1	30	0.20	1026.5	6.2	4.0	4.7	3.04	3.04	22.7
SW-4	SW-5 (LS)	1.80	Prop.	24	PVC	1500	1054	1026.5	28	0.10	1025.0	13.0	8.4	7.2	4.64	4.64	2.6
SW-5 (LS)	TBD[4]	1.80	Prop. FM	16	HDPE	(Unknown)	1045	(1015 LS)	(30 LS)	---	(Unknown)	---	---	---	---	4.5	2.5

[3] Reflects sizing to accommodate the future expansion area to the north

[4] To be determined (actual routing/WWTP destination will be determined through future study)

APPENDIX B: LOCAL SURFACE WATER MANAGEMENT PLAN

Local Surface Water Management Plan

2018 Update

City of Corcoran, Minnesota

8200 County Road 116
Corcoran, MN 55340

(763) 420-2288
ci.corcoran.mn.us

City of Corcoran, Minnesota
Local Surface Water Management Plan – 2018 Update
Adopted December 27, 2018

COUNCIL:
Ron Thomas, Mayor
Jonathan Bottema
Brian Dejewski
Mike Keefe
Tonya LaFave

CHARTER COMMISSION:
Tom Cossette
Brian Lother
George Gmach
Ken Kluck
Dorothy Theis
Rich Asleson
Jennifer Russell

PARKS AND TRAILS COMMISSION:
Tom Anderson, Chair
Trish Krueger, Vice Chair
Val Nybo
Debbie Regan
Sharon Meister
Judith Strehler
Chad Robran

PLANNING COMMISSION:
Dean Jacobs, Chair
Alan Schultz, Vice Chair
Jennifer Russell
Dorothy Theis
Meredith Wu

STAFF (PARTIAL LIST):
Brad Martens, City Administrator
Matt Gottschalk, Director of Public Safety
Kevin Mattson, Public Works Director

WENCK ASSOCIATES, INC.
Diane Spector, Project Manager
Susan Nelson
Kent Torve, P.E.
Wenck File 2294-01

WENCK
Responsive partner. Exceptional outcomes.

Prepared by:
WENCK Associates, Inc.
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
763-479-4200
www.wenck.com

Table of Contents

Table of Contents (cont.)

TABLES

FIGURES

APPENDICES

Acronyms and Terms

BMP	Best Management Practice
BWSR	Board of Water and Soil Resources
Commission	Elm Creek Watershed Management Commission
DNR	Minnesota Department of Natural Resources
ECWMC	Elm Creek Watershed Management Commission
EPA	(USEPA) United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
HCWI	Hennepin County Wetlands Inventory
LGU	Local Government Unit (the city, county, or other entity responsible for local administration of the Wetland Conservation Act)
Local Plan	Local Surface Water Management Plan
MBS	Minnesota Biological Survey
MNDNR	Minnesota Department of Natural Resources
MNRAM	Minnesota Rapid Assessment Method (for evaluating wetland functions)
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
OHWL	Ordinary High Water Level
SWA	Subwatershed Assessment (Rush Creek Headwaters Subwatershed Assessment)
SWPPP	Stormwater Pollution Prevention Plan/Program
TCMA	Twin Cities Metropolitan Area
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
VOC	Volatile Organic Compounds
WCA	Wetland Conservation Act
WMP	Watershed Management Plan (Third Generation Watershed Management Plan of the Elm Creek Watershed Management Commission)
WRAPS	Watershed Restoration and Protection Strategy
WWTF	Wastewater Treatment Facility

Executive Summary

The City of Corcoran is rich with lakes, wetlands, and streams, and it is committed to protecting and restoring these important resources. To support that commitment and meet the requirements of the Elm Creek Watershed Management Commission, the Metropolitan Council, Minnesota Statutes 103B.235 and Minnesota Rules 8410, Corcoran updated its Local Surface Water Management Plan (Local Plan) to assess the current condition of its surface waters, identify existing or potential problems related to surface water management, and develop and implement solutions.

Regulatory Setting

The City of Corcoran is situated almost entirely in the Elm Creek Watershed, a drainage basin that also includes parts of Rogers, Dayton, Champlin, Maple Grove, Plymouth, and Medina (Figure 2-3). As a member of the Elm Creek Watershed Management Commission (Commission) Corcoran and other cities together manage the watershed's surface water resources.

One of the duties of the Commission is to prepare Watershed Management Plans (WMPs) that set goals, policies, rules, and standards for surface water management. The most recent WMP, the Third Generation Watershed Management Plan, was approved in 2015. According to Minnesota law, Corcoran must then update its Local Plan to ensure that the City's approach to managing surface water resources is consistent with that of the Commission. This Local Plan satisfies that requirement.

Other regulations also influence or dictate the City's responsibilities regarding surface water management. They include the Municipal Separate Storm Sewer System (MS4) permit program, a federal and state initiative that requires the City to develop and implement a Stormwater Pollution Prevention Plan; the Minnesota Wetland Conservation Act; the Minnesota Buffer Law; and various Total Maximum Daily Load (TMDL) studies that aim to improve surface water quality by reducing the amount of pollution reaching our lakes, wetlands, and streams.

Current Conditions

An inventory of Corcoran's land and water resources finds a mosaic of farms, businesses, homesteads, and residential developments in a historical setting of maple-basswood forest and wet prairie. Land use has changed significantly since the time before European settlement. Logging and farming began the transition, and the many drainage ditches and tiles in the City hint at the effort needed to convert characteristically wet soils into ones better suited for agriculture.

Today Corcoran's agricultural tradition remains strong, especially in the north and west parts of the City. Urban residential and commercial development is increasing from the east and south and is expected to continue. Urban services such as piped sewer and water already serve parts of southeast Corcoran and are anticipated for more of the region delineated by the Metropolitan Urban Service Area (MUSA). Development within the MUSA and elsewhere offers opportunities to install urban stormwater Best Management Practices (BMPs), such as catch basins and stormwater treatment ponds, to prevent pollutants from being carried by stormwater runoff to surface waters.

Both urban and rural BMPs will be important to improve surface water quality in Corcoran. Much of the North Fork of Rush Creek and part of the South Fork have been designated as impaired by the Minnesota Pollution Control Agency (MPCA), meaning that water quality does not meet one or more state standards. The Elm Creek Watershed-wide TMDL Study and Watershed Restoration and Protection Strategy (WRAPS) identify measures that could correct the impairments. So do similar studies completed to correct impairments in the Pioneer-Sarah Creek Watershed, which includes a small area in southwest Corcoran. Applying the Commission's strict rules for stormwater treatment as land is converted from agricultural to other uses is expected to yield benefits throughout the City. Additional projects are planned to reduce surface water pollution from targeted areas.

Corcoran's interest in preserving natural resources is not limited to its waters. Remnant native plant communities persist, and the City's Parks and Trails Plan identifies search areas for greenway corridors and open spaces that coincide with ecologically significant communities in upland and wetland areas. Such areas provide habitat for many species and help protect water quality by limiting impervious surfaces and maintaining vegetation that infiltrates stormwater runoff.

Problems and Solutions

Some of the problems related to surface water management are described in the previous paragraphs. Additional issues and their possible solutions are identified in the WMP or by City staff, and all are discussed in the Local Plan. Selected issues are summarized below.

- Ordinance adoption and review: The City must adopt a manure management ordinance and will review its Wetland and Shoreland ordinances for consistency with watershed rules and other regulations.
- Impaired waters projects: To help improve water quality in Rush Creek and elsewhere, the City will apply the Commission's strict development standards as land is converted from agricultural to non-agricultural use. In addition, the City will connect sanitary sewer at Maple Hill Estates to a regional treatment system, continue septic system education through its Stormwater Pollution Prevention Plan, and implement the recommendations from the Rush Creek Headwaters Subwatershed Assessment, as development and funding allow.
- Operation, maintenance, and inspection of privately-owned stormwater BMPs: Among other measures, the City will continue inspecting BMPs in accordance with the City's Stormwater Pollution Prevention Plan.
- Wetland improvements: The City will work with the Commission and other cities on potential wetland improvements north of the Ravinia development in Corcoran and south of the Laurel Creek development in Rogers.

The City has prepared implementation and capital improvement plans that project expenses and possible funding sources through 2025. The Local Plan can be amended if needed to update these plans or other contents, with review by the Commission or the Metropolitan Council, if required.

1.0 Introduction

1.1 PURPOSE AND OUTLINE

Corcoran's surface waters – its lakes, wetlands, and streams – are central to the City's identity. The City's logo bears this out: Its focal point is a medallion depicting waterfowl in an open-water wetland, an aquatic ecosystem joining farmsteads and suburban homesteads alike.

Corcoran is committed to protecting and restoring its surface waters and connected groundwaters. This Local Surface Water Management Plan (Local Plan) continues the City's work to assess the current condition of these resources, identify existing or potential problems related to surface water management, and develop and implement solutions.

The contents of this Local Plan follow that order and provide the minimum contents required by the Elm Creek Watershed Management Commission's Third Generation Watershed Management Plan (the WMP), Minnesota Statutes 103B.235 and Minnesota Rules 8410. Beyond the minimum required contents, much optional information is included to maximize the usefulness of this Local Plan.

In Chapter 2 the City begins its assessment of current conditions by reviewing regulations that affect surface water management. State, regional, and local regulations are discussed, concluding with water resource management-related agreements the City has with the Elm Creek Watershed Management Commission (the Commission) and the Rockford School District. A discussion of drainage ditch authority is also included in the final section of Chapter 2.

In Chapter 3 Corcoran continues assessing current conditions by reviewing and updating its inventory of land and water resources. A discussion of the City's physical environment includes its climate, geology, soils, topography, drainage, and land use. Updated maps predict greater development in some parts of Corcoran with preservation of agricultural and rural land uses in much of the City. Urban stormwater management practices will likely be adopted where development is expected, but other practices, such as stream bank erosion control and nutrient management, would likely be more appropriate in areas outside the developed sections of the City.

Chapter 3 also includes discussions of Corcoran's biological environment and water resources. Changes in the City's biological environment – its plant, wildlife, and human communities – reflect a history of agricultural, commercial, and residential development that has created a mosaic of farms, businesses, residential developments, and historical plant communities. The City's biological environment is closely tied to the health of its surface water resources, principally Rush Creek and its tributaries and the many wetlands found throughout Corcoran. Total Maximum Daily Load (TMDL) studies have found lowered water quality in both the north and south branches of Rush Creek, and the City expects to undertake a variety of projects to correct these impairments. Because surface water quality and groundwater quality are linked, efforts to protect one will protect the other, an

important consideration in a City where groundwater will continue to be the primary source of drinking water.

Water quality improvement is among the known or potential problems discussed in Chapter 4. Others include adopting a manure management ordinance and reviewing the Shoreland and Wetland ordinances for consistency with Commission standards. Maintenance of privately-owned stormwater ponds and related Best Management Practices will continue on course to meet Commission expectations. Chloride management (road salt application) will receive greater attention, and issues of localized flooding and drainage will be addressed in part by developing a right-of-way policy. Wetland improvements will also be discussed, as will stormwater permit compliance and preparations for extreme flooding.

Corcoran's plan to implement and fund the projects and practices in this Local Plan are presented in Chapter 5. Funding is a critical component of implementation and is the primary factor underlying the success of this Local Plan. Grants and cost-sharing opportunities will be explored in addition to tax assessments as means of paying for further studies and projects.

Plan administration, including how to amend the plan, is discussed in Chapter 6. As required, a summary of the Local Plan is included as a chapter in Corcoran's 2040 Comprehensive Plan. The next required revision of the Local Plan will be due when the 2050 Comprehensive Plan is due. Corcoran can revise its Local Plan any time before then, but it may need Commission and Metropolitan Council review and approval.

1.2 REQUIRED CONTENTS

Some contents of the Local Plan are required by the Commission or by state law, specifically Minnesota Statutes 103B.235 and Minnesota Rules 8410 (see also Chapter 2). For ease of review, minimum required contents are listed in Table 1.1, along with their location in this Local Plan. In keeping with state regulations, throughout the Local Plan each required component will be discussed in the degree of detail required by the WMP. In some cases, information from the WMP will be incorporated by reference to satisfy that requirement.

Other contents are optional but recommended. The Metropolitan Council's Local Planning Handbook suggests adding certain information to enhance the Local Plan, and many of their recommendations are included. These optional contents are not listed in Table 1-1.

Table 1-1. Required components of the Local Plan.

Required Component[1]	Location in Local Plan
1. Executive summary.	Page VII.
2. Summary of water resource management-related agreements.	Section 2.10.
3. Amendment procedures.	Section 7.3.
4. Existing and proposed physical environment and land use, including drainage areas and volumes, rates, and paths of stormwater runoff.	Chapter 3.
5. Existing and potential water resource-related problems, including a list or map of impaired waters.	Section 3.4.2, Figure 3-16, Section 4.4
6. An implementation program describing prioritized solutions to problems identified in item D. The program shall: a. Describe areas and elevations for stormwater storage adequate to meet performance standards or official controls in the WMP; b. Define water quality protection methods that would be adequate to meet performance standards or official controls, and identify regulated areas; c. Clearly define the roles and responsibilities of the City from that of the Commission for carrying out implementation components; d. Include a table briefly describing each component of the implementation program, including a schedule, estimated cost, funding sources, and annual budget totals. e. Include a table describing a yearly capital improvement program through 2025, including schedule, estimated cost, and funding source(s). f. Analyze Corcoran's ability to finance the recommended actions.	Chapter 5
7. An explanation of how the goals, policies, rules, and standards in the WMP will be implemented in Corcoran, including any changes to local ordinances, policies, and practices, specifically addressing adoption and enforcement of a manure management ordinance.	Sections 2.9.5, 4.3.
8. An explanation of how Corcoran will act to achieve the load reductions and other actions identified in and agreed to in Total Maximum Daily Load (TMDL) Implementation Plans and Watershed Restoration and Protection Studies (WRAPS). This includes identifying known upcoming projects that will provide opportunities to include load and volume reduction BMPs.	Section 4.4.

Required Component[1]	Location in Local Plan
9. An explanation of how the City will, through executed and recorded maintenance and inspection agreements, inspect or cause to be inspected and documented at least every five years, privately-owned Best Management Practices (BMPs) installed to meet WMP goals, policies, rules and standards, and the actions Corcoran will take to ensure the BMPs are maintained and operated as designed.	Section 4.5.

[1] Most entries are nearly verbatim from Minnesota Rules 8410.0160, Subp. 3, Minnesota Statutes 103B.235, or the Commission's Third Generation Watershed Management Plan (WMP). Requirements from state regulations and the WMP may be combined in a single entry.

2.0 Regulatory Setting

2.1 WATERSHED MANAGEMENT PLANS

According to state law, the Local Plan is required "to bring local water management into conformance with the watershed plan" (Minn. Stat. 103B.235, Minn. Rules 8410). For Corcoran, the relevant watershed plan is the Elm Creek Watershed Management Commission's Third Generation Watershed Management Plan (WMP). The Commission approved the WMP in October 2015, requiring the City to update its Local Plan to conform to new watershed goals, policies, rules, and standards. References to various requirements of the WMP occur throughout this Local Plan.

2.2 METROPOLITAN LAND PLANNING ACT

Another state law, the Metropolitan Land Planning Act, requires that the Local Plan be included as a chapter in the City's decennial Comprehensive Plan (Minn. Stat. 473.859, subd. 2). A related, amended regulation, Minn. Rules 8410, altered the timing of Local Plan development to better coincide with the 10-year schedule to update Comprehensive Plans. Even so, Local Plans are approved separately from the Comprehensive Plan, and the former can be updated or amended more frequently than once every 10 years. Recognizing the potential for differences in timing, the amended Rule states that the Local Plan must be updated no more than two years before the Comprehensive Plan is submitted for approval by the Metropolitan Council. For this Local Plan, the range of acceptable dates is between January 1, 2016, and December 31, 2018. A summary of the Local Plan will be included as a chapter in Corcoran's Comprehensive Plan; the full Local Plan will be attached as an appendix.

2.3 MINNESOTA WETLAND CONSERVATION ACT

Minnesota's Wetland Conservation Act (WCA) was passed in 1991 and has been amended several times since then (Minn. Stat. 103G.222-.2373, Minn. Rules 8420). With the goal of no net loss of wetlands, the WCA prohibits draining, filling, and excavating wetlands unless an exemption applies or the wetland is replaced by restoring or creating another wetland of equal value (BWSR 2004). This applies to all wetlands except public waters wetlands, which are in the jurisdiction of the Minnesota Department of Natural Resources. Local Government Units (LGUs), typically cities, counties, soil and water conservation districts or watershed districts, are responsible for administering WCA during development review or other consultation. On behalf of the Commission, technical staff from the Hennepin County Department of Environment and Energy have served as the LGU for Corcoran. Corcoran is preparing to assume the role of WCA LGU starting January 1, 2019.

2.4 MINNESOTA PUBLIC WATERS

Public Waters are the lakes, wetlands, and watercourses within the regulatory jurisdiction of MNDNR Waters. Minnesota Statutes 103G.005 defines public waters (basins and watercourses) separately from public waters wetlands, and the MNDNR maintains maps and lists of all water bodies that fall within its jurisdiction. The Public Waters Work Permit Program issues both general and individual permits for development activities below the ordinary high water level (OHW) of all public waters. Permits from other agencies may also

be necessary. Not all activities require a permit; more information is available from the MNDNR.

2.5 MINNESOTA BUFFER LEGISLATION

Minnesota's Buffer Law establishes minimum widths and other buffer requirements on public waters and drainage systems (Minn. Stat. 103B, 103E, 103F). The purpose of the law is to protect state waters from erosion and runoff pollution; to stabilize soils, shores, and banks; and to protect or provide riparian corridors. Waters subject to the law are shown in Figure 2-1, which is based on the MNDNR's Buffer Protection Map. Some land uses, such as grazing and haying, are allowed in a buffer if a cover of continuous perennial vegetation is maintained. There are several exceptions to the law, and alternative water quality practices may be allowed in place of maintaining a buffer. In Corcoran, Hennepin County administers the law on behalf of the Board of Water and Soil Resources (BWSR). More information is available from BWSR.

2.6 MS4 PERMIT PROGRAM

State law also designates Corcoran as a regulated Municipal Separate Storm Sewer System, or MS4. This federal program is administered by the Minnesota Pollution Control Agency (MPCA). As a regulated MS4, Corcoran must apply for coverage under five-year permits that require the City to develop a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP lays out the City's plans for education, public participation, illicit (non-stormwater) discharges, control of runoff from construction sites, and other measures to manage and improve stormwater quality and quantity. Many elements of the SWPPP can be used to address problems identified in this Local Plan.

2.7 TMDL STUDIES AND WRAPS REPORTS

Total Maximum Daily Load (TMDL) studies and corresponding Watershed Restoration and Protection Strategies (WRAPS) reports focus on water bodies that are impaired – in other words, those that don't meet one or more state water quality standards. These studies are initiated and supervised by the MPCA, but the agency may enlist the help of other organizations, such as Three Rivers Park District or the Commission, to prepare them.

The purpose of a TMDL study is to identify how much of a pollutant – phosphorus, for example – can enter a lake or stream and still allow the water body to meet water quality standards. The TMDL and WRAPS reports identify pollutants and their sources and develop implementation plans to correct the impairment(s). Often this results in cities having to undertake one or more water quality improvement projects to meet TMDL goals for pollutant load reductions. Progress in meeting those goals is reported through the MS4 annual report, part of the MPCA's permitting program described above.

Three TMDLs and WRAPS reports affecting Corcoran are discussed on the following pages.

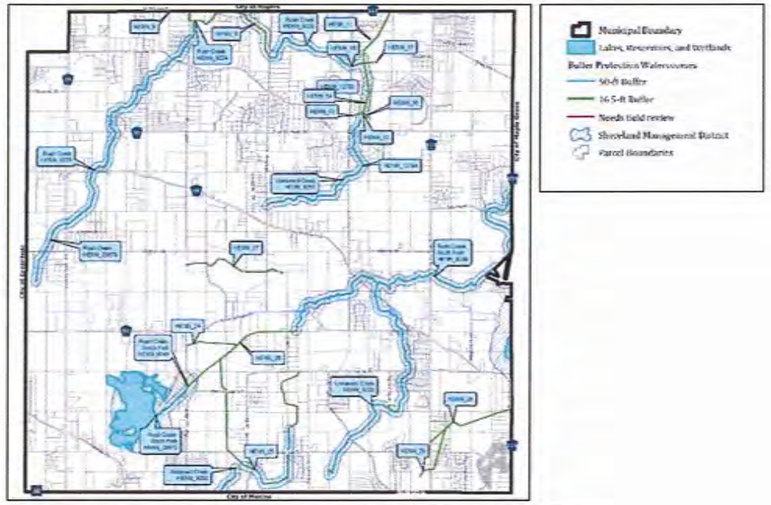


Figure 2-1. Buffer Protection Watercourses according to the Minnesota Buffer Law.
Source: 2040 Comprehensive Plan.

2.7.1 Lake Sarah Nutrient TMDL (2011)

Lake Sarah in the Pioneer-Sarah Creek watershed is impaired by excess nutrients, especially phosphorus, that cause algae blooms. To address the impairment, this TMDL study required southwest Corcoran to reduce its phosphorus export to Lake Sarah by 109 pounds per year. See Figure 2-2 for a map of the watershed.

The TMDL implementation plan offers several recommendations for Corcoran to meet its load reduction goal. They include managing manure, placing filter strips on edges of fields, and filtering commercial runoff to reduce phosphorus export by 267 pounds per year. Results of the Rush Creek Headwaters Subwatershed Study, an effort that began in 2017, may identify specific projects that can be implemented not only in the headwaters area but throughout Corcoran to meet TMDL goals.

Until such projects are identified, the City has chosen to apply the Commission's strict development standards as land in southwest Corcoran is converted from agricultural to non-agricultural use. The Pioneer-Sarah Creek watershed and Three Rivers Park district continue to monitor the water quality in Lake Sarah, and their adaptive management approach will evaluate the success of all practices to reduce phosphorus export to the lake.

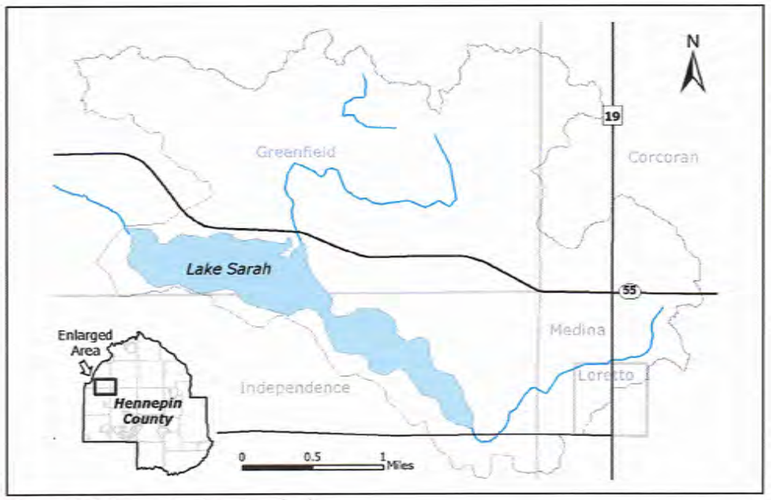


Figure 2-2. Lake Sarah watershed.
Source: Lake Sarah Nutrient TMDL, January 2011, prepared by Three Rivers Park District.

2.7.2 Elm Creek Watershed-Wide TMDL and WRAPS (2017)

The Elm Creek system, which includes Elm, Rush and Diamond Creeks and several lakes, has multiple impairments. Fish, Rice, Diamond, Goose, and Henry Lakes have excess

nutrients (phosphorus), while sections of Elm, Rush, and Diamond Creeks have low dissolved oxygen, excess bacteria, excess suspended solids, and/or excess phosphorus and therefore do not support healthy communities of fish or macroinvertebrates. See Figure 2-3 for a map of the watershed.

To address multiple impairments, the TMDL sets multiple goals for Corcoran and other cities to reduce the amount of phosphorus, sediment, and bacteria reaching water bodies. The TMDL and WRAPS reports recommend several strategies to meet these goals. They include reducing phosphorus in the effluent from the wastewater treatment plant at Maple Hill Estates, applying the watershed's strict development standards as land is converted from agricultural to non-agricultural use, developing a manure management ordinance for non-production animals, supporting enforcement of MNDNR buffer rules, and conducting subwatershed assessments in areas where models and monitoring indicate that nutrient and sediment are exported at higher-than-average rates.

One such study, the Rush Creek Headwaters Subwatershed Assessment, began in summer 2017. The project is funded with a Clean Water Fund Grant administered by BWSR ($50,280), with a local match provided by the Commission (approximately $12,000) and the City ($500). See Chapter 4, Section 4.4.5, for more information about that project.

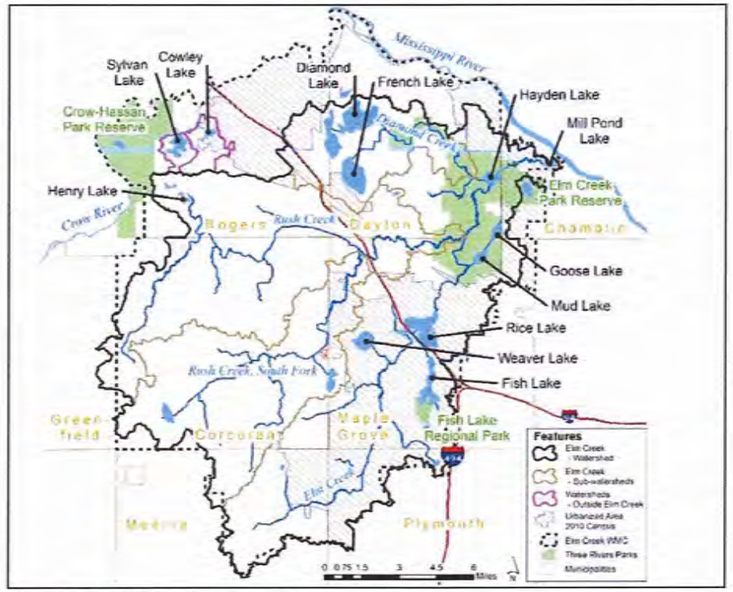


Figure 2-3. Elm Creek watershed.
Source: Elm Creek Watershed Management Commission Total Maximum Daily Load, December 2016.

2.7.3 Pioneer-Sarah Creek Watershed TMDL and WRAPS (2017)

This TMDL addresses nutrient impairments in six lakes and bacterial impairments in four stream reaches in the watershed. Two of the six lake impairments – Peter Lake and Spurzem Lake – affect Corcoran. The City is not assigned a load reduction for Peter Lake, but it has been assigned a phosphorus load reduction of 7.5 pounds per year for Spurzem Lake. The City also may bear some responsibility for addressing stream bacteria impairments caused by failing septic systems. See Figure 2-4 for a map of the watershed.

To help correct these impairments, the WRAPS report recommends that Corcoran conduct a rural subwatershed assessment to identify five to ten practices that could be implemented through 2027. The City also share responsibility for meeting watershed-wide goals to reduce all pollutants, including nutrients, bacteria, sediment and chlorides from road salts. Strategies for this watershed-wide goal include improving fertilizer and manure application, identifying and upgrading failing septic systems, and improving urban and suburban stormwater management by applying the Commission's strict development standards for new developments and redevelopments. More strategies are outlined in the WRAPS report.

Corcoran's approach to meeting all TMDL load reductions is discussed further in Chapter 4.

2.8 TWIN CITIES METROPOLITAN AREA CHLORIDE MANAGEMENT PLAN

The Minnesota Pollution Control Agency and representatives from across the Twin Cities Metropolitan Area (TCMA) worked together to assess the extent of chloride pollution in lakes, streams, wetlands, and groundwater, to identify sources, and to develop a management plan. According to the Management Plan (MPCA 2016b), high chloride concentrations have been found in water bodies throughout the TCMA. In some places, the chloride concentration exceeds the state water quality standard and is toxic to aquatic life. Many other problems are associated with high chloride levels, including contamination of groundwater and drinking water, damage to plants, corrosion of roads, bridges, and other infrastructure, and corrosion of vehicles. Because removing chloride from water is prohibitively expensive, the Management Plan focuses on prevention by reducing chloride use.

Winter deicing salts are a primary source of chlorides, and several strategies are suggested to safely minimize their use. For municipalities, strategies include creating a chloride management plan and tracking chloride use, practices that could be incorporated into the City's MS4 permit program (Section 2.6).

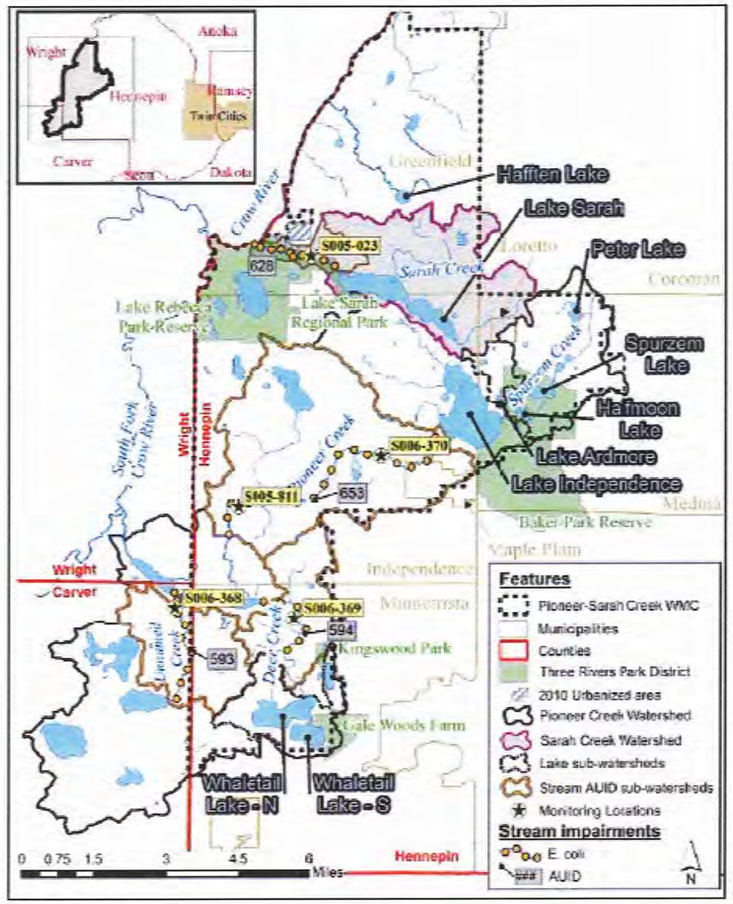


Figure 2-4. Pioneer-Sarah Creek watershed.
Source: Pioneer-Sarah Creek Watershed Total Maximum Daily Load, January 2017.

2.9 LOCAL REGULATIONS

Several local ordinances address surface water management. Discussed below are ordinances addressing wetland protection, shoreland and floodplain protection, stormwater management (MS4 permit requirements) and development review.

2.9.1 Wetland Protection

2.9.1.1 Wetland Overlay District

Wetland protection in Corcoran is achieved primarily by reviewing development applications for compliance with the City's zoning code, particularly Section 1050.010, Wetland Overlay District. Subdivision 5 of that section establishes requirements for wetland buffer strips and setbacks. Table 2-1, reproduced from City code, shows that buffer requirements are different for wetlands of high, medium, and low quality.

Table 2-1. Wetland buffers and setback requirements in Corcoran's zoning code.

Requirement	High	Medium	Low
Wetland buffer average width	50′	25′	15′
Wetland buffer width (minimum)	40′	20′	10′
Wetland buffer width (maximum)*	60′	40′	20′
Structure setback from buffer**	15′	15′	15′
Total buffer and setback (average)	65′	40′	30′

*Buffer widths in excess of the listed maximums shall not be used in calculating average buffer width.

**These setbacks shall take precedence over other setbacks required in . . . [City code]. These setbacks apply to structures only – a 5-foot setback is required for roads and parking lots. Trails that serve an interpretive function may be exempt from buffer and setback requirements.

Wetland quality is defined in Section 1020 of the zoning code and is summarized below.

- **High**: These wetlands are largely unaltered and have special or unusual qualities that should be protected. They may provide habitat for rare, threatened, or endangered species and are ranked high for wetland function when evaluated using the Minnesota Rapid Assessment Method for Evaluating Wetland Functions (MNRAM).
- **Medium**: These wetlands are somewhat altered and are ranked medium for wetland function when evaluated using MNRAM.
- **Low**: These wetlands are substantially altered by human activities and are ranked low for wetland function when evaluated using MNRAM.

City code allows exemptions to the requirements for buffers and setbacks, and alternative widths and setbacks may be permitted if "extraordinary measures" are taken to protect the wetland, such as by adding "redundant protections to normal required Best Management Practices."

2.9.1.2 Comparison to WMP Rules and Standards

In the WMP, rules and standards for wetland buffers and setbacks do not depend on wetland quality. According to Appendix C, Rule I, paragraph 5 of the WMP (attached to this document also as Appendix C), buffer strips around any wetland (and any lake or watercourse other than Elm, Rush, North Fork Rush, and Diamond Creeks) must be an

average 25 feet wide and a minimum 10 feet wide. The rule also recommends all structures have a 15-foot setback from the buffer strip.

Corcoran's requirements generally meet or exceed the WMP requirements. The exceptions are the average and maximum buffer widths for low-quality wetlands (Table 2-2). The average buffer width is set at 15 feet in City code, compared to 25 feet in the WMP. Also, the maximum buffer width is set at 20 feet in City code, less than the 25-foot average buffer width in the WMP.

Table 2-2. Comparison of required buffer widths for low-quality[1] wetlands.[2]

Requirement	Corcoran code	Watershed standard
Wetland buffer average width	15′	25′
Wetland buffer maximum width	20′	No maximum[3]

[1] Low-quality wetlands are defined in City code as being substantially altered by human activities.
[2] Corcoran City Code defers to the stricter standard.
[3] The maximum buffer width in Corcoran City Code is used only to calculate the average. It does not impose an upper limit on buffer width.

Section 1010.030, Subd. 2, of the zoning code defers to the stricter standard or requirement where such differences occur. As part of a larger discussion of its wetland ordinance, Corcoran will review wetland buffer widths for consistency with Commission rules and standards. Corcoran will work to complete the ordinance changes within the legally required timeframe. In the interim, all city approvals require compliance with the more restrictive watershed standard.

2.9.2 Shoreland and Floodplain Regulations

2.9.2.1 Overlay Districts

Two sections of the City's zoning code address shorelands and floodplains: the Shoreland Overlay District, Section 1050.020, and the Floodplain Overlay District, Section 1050.030.

Shoreland Overlay District. The Shoreland Overlay District Ordinance (Shoreland Ordinance) regulates the use and development of public waters shorelands, defined by the MNDNR as the area within 1,000 feet of the ordinary high water level (OHWL) of a lake or wetland or the area within 300 feet of the OHWL of a river, along with the associated floodplain.

The public waters in the jurisdiction of the Shoreland Ordinance are listed in the ordinance and mapped on the City's Official Zoning Map (Figure 2-5). The list in the ordinance will be updated for consistency with the zoning map and to clarify that the ordinance applies only to those waters.

The Shoreland Ordinance also includes required buffer widths for streams and lakes in its jurisdiction. They are in Table 2-2, along with the buffer widths required by the WMP and the state Buffer Law.

Table 2-3. Shoreland buffer widths.

Requirement	Corcoran Shoreland Overlay		WMP Rule[3]		MN Buffer Law[4]
	Streams[1]	Lakes[2]	Streams	Lakes	Public Waters
Average buffer width	25′	50′	50′	25′	50′
Minimum buffer width	20′	40′	25′	10′	30′
Structure setback	50′	15′	15′ (recommended)		--

[1] Applies to Rush Creek, North Fork Rush Creek, Spurzem Creek, and two tributaries. See Fig. 2-4.
[2] Buffer widths are from the Wetland Overlay for a high-quality water body. See also Table 2-1.
[3] Applies to Rush Creek and North Fork Rush Creek; lake buffers also apply to wetlands and other watercourses.
[4] Applies to public waters on the MNDNR's buffer map. Required buffer width for public drainage ways (ditches, e.g.) is 16.5 ft.

In one interpretation of City code, lake buffer requirements depend on a lake's classification. Like wetlands, lakes can be classified by their quality, with high quality lakes – those that are mostly unaltered – having the widest buffer requirements. The City's wetland buffer requirements then apply also to lakes. Table 2-2 shows this interpretation.

The original intention of the Shoreland Ordinance may have been to classify lakes not by their quality but by their place in the MNDNR's Shoreland Management Lake Classification System. That system classifies lakes as Natural Environment, Recreational Development, or General Development, with different development standards, such as lot sizes and setbacks, applying to each. City staff will discuss the different interpretations of City Code and revise the language for clarity, as needed. The Shoreland Ordinance will be reviewed for consistency with Commission requirements the Minnesota Buffer Law (Section 2.5). Corcoran will work to complete the ordinance changes within the legally required timeframe.

Floodplain Overlay District. The Floodplain Overlay District, Section 1050.030 of the zoning code, regulates development in flood hazard areas. These regulations detail the permitted land uses and development standards that apply to parcels in floodplains, areas that include both the floodway (a stream channel and immediately adjacent land) and the flood fringe (the area from the floodway to the edge of the floodplain). Floodplain maps are produced and updated periodically by the Federal Emergency Management Agency (FEMA). The last updates, in 2016, can be viewed by visiting the website for Hennepin County's Natural Resources Interactive Maps.

As might be expected, placement of hazardous or erodible materials in the floodplain is regulated. In both the floodway and the flood fringe, deposits of fill, dredge spoil, or similar materials must be protected from erosion, and storage of any material that is flammable, explosive, or otherwise injurious to human, animal, or plant life in a time of flooding is prohibited.

Corcoran's floodplain regulations differ from Commission standards in one respect. In the WMP, Rule F in Appendix C states that compensatory storage is required if fill is placed in a floodplain. Corcoran will seek to add this requirement to its Floodplain Ordinance, in consultation with FEMA.

2.9.3 Stormwater Management

In keeping with its MS4 permit, Corcoran has adopted several ordinances addressing stormwater runoff. Generally, they fall into three areas of concern: illicit (non-stormwater) discharges into the storm drainage system, erosion at construction sites, and post-construction stormwater management, such as operation and maintenance of stormwater ponds, catch basins, and other structures that prevent or mitigate surface water pollution. Each of these areas is summarized below.

2.9.3.1 Illicit Discharge Detection and Elimination

Corcoran's illicit discharge ordinance is Title V, Chapter 50: Stormwater Illicit Discharge and Illicit Connections to the Storm Sewer System. This ordinance prohibits non-stormwater discharges, such as septic waste, yard waste, chemicals, and automotive fluids, from entering the City's storm drainage system. The ordinance also sets enforcement response procedures and establishes penalties for violations.

2.9.3.2 Construction Site Erosion Control

Regulations regarding erosion, sediment, and waste control at construction sites are found in several ordinances but primarily in Title IX, Section 950: Erosion Control. This ordinance requires that an erosion control plan be submitted to the City Engineer before any earth-disturbing activity begins. The ordinance specifies what must be included in the plan, and it also states that the plan must comply with the required measures in the MPCA's construction site permit. Enforcement mechanisms include stop-work orders, inspections, and draw-downs of financial guarantees.

2.9.3.3 Post-construction Stormwater Management

Post-construction stormwater management is addressed through City ordinances and Public Works practices. The Erosion Control ordinance (Title IX, Chapter 950) requires that an erosion control plan include the locations of all temporary and permanent erosion and sediment control practices. Also, the City's Zoning Ordinance (Title X, Section 1070) lists several stormwater management practices that must be included in a grading and stormwater drainage plan. Finally, regular inspections of all stormwater ponds, outfalls, and pollution control devices are completed at the frequency required by the City's MS4 permit.

Each of these stormwater management ordinances and practices complies with the requirements of the MS4 permit program (Section 2.6). The City intends to remain compliant with all MS4 requirements under successive five-year permit terms

2.9.4 Development Review

Before the WMP was adopted by the Commission, the Second Generation WMP was amended to update rules and standards regarding new development and redevelopment. The updated rules and standards are attached in Appendix C of this document. The following paragraphs summarize the amended rules for five aspects of development review: project size threshold, infiltration, rate control, water quality, and buffers. Corcoran's Plan Review Checklist requires approval from the Commission, thereby meeting all rules and standards for development review.

2.9.4.1 Project Review Size Thresholds

When development or redevelopment projects are planned, the Commission or the City, or both, may require a plan review to ensure that proper methods are in place to control erosion, protect surface water quality, and manage stormwater quantity. The project size – the area of disturbance – determines whether the plans must be reviewed.

The Commission's new threshold for project reviews is one acre of disturbance. Any development or redevelopment project greater than that size must submit plans to the Commission for review by its technical staff. (Other aspects of the project may also trigger Commission review. See Appendix C.)

The amended rules also allow Corcoran to review projects less than five acres if a Memorandum of Understanding (MOU) is established between the City and the Commission. The MOU requires Corcoran to "have in place the necessary local ordinances, policies, practices, and expertise" to complete the reviews. This option will be discussed by City staff in coming years.

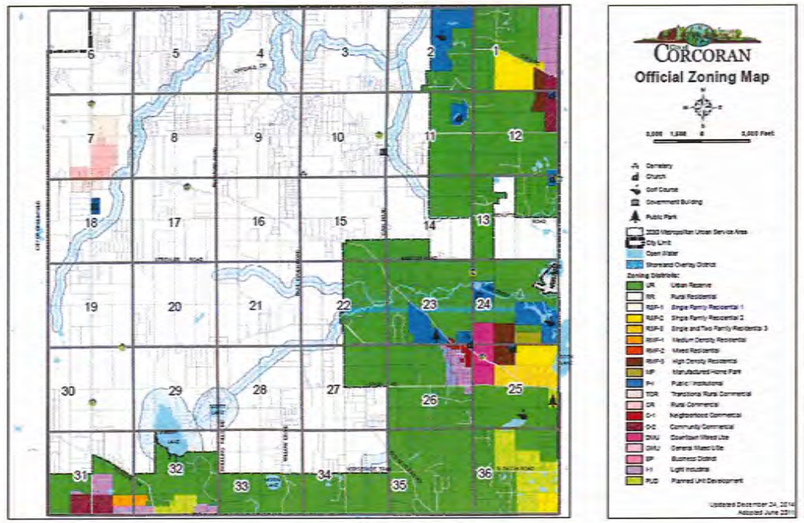


Figure 2-5. Official Zoning Map showing Shoreland Overlay District.
Source: City of Corcoran.

2.9.4.2 Infiltration

Infiltration of stormwater into soils or subsurface media minimizes erosion by reducing the volume of runoff. Infiltration also helps filter pollutants before they reach surface waters and improves clean groundwater recharge. The Commission now *requires* (not just *promotes*) infiltration of 1.1 inches of stormwater runoff in 48 hours from new impervious surfaces created by development or redevelopment. This infiltration volume better aligns with the requirements of other watershed organizations, the MPCA's Minimal Impact Design Standards, and the MPCA's construction permit.

If infiltration is not feasible – where soils are less permeable, for example – the new rules require runoff to be filtered before it leaves the site. As in the past, several practices can be used as credit against the infiltration requirement. These include rerouting stormwater runoff from sidewalks, rooftops, and other impervious surfaces, amending soils to improve their permeability, and preserving existing native vegetation.

2.9.4.3 Rate Control

The Commission requires that the runoff rate for a proposed development not exceed the rates for 2-year, 10-year, and 100-year storm events, using rainfall amounts for the project location that are presented in NOAA Atlas 14, Volume 8, or a succeeding Volume.

2.9.4.4 Water Quality

Both the old and new standards for water quality compare pre-development to post-development conditions with respect to pollutant export, also called pollutant loading. Previously, the Commission required no net increase in pollutant loading from the pre-development condition. Now, the Commission requires either of two practices, whichever represents the lesser pollutant load.

- No net increase in Total Phosphorus (TP) or Total Suspended Solids (TSS) from the pre-development condition, OR
- The pollutant load achieved by abstracting (retaining on site) 1.1 inches of runoff from new impervious surface.

With respect to the second bullet point, only true abstraction, such as infiltration, allows applicants to omit modeling for water quality review. Filtration and credits for other practices do not allow applicants to omit modeling results from their applications.

2.9.4.5 Buffers

The Commission revised its buffer requirements to offer greater flexibility when establishing buffers. Along Elm, Rush and Diamond Creeks, the required buffer width was 50 feet for new developments or redevelopments. Now, the *average* buffer width along these creeks is 50 feet, and the minimum is 25 feet.

Around lakes, wetlands, county ditches, and streams that are part of the Public Waters Inventory, the required buffer for new development or redevelopment is an average 25 feet and a minimum 10 feet.

Buffer requirements are compared in Sections 2.9.1 and 2.9.2. Corcoran's ordinances defer to the strictest requirement.

2.9.5 Manure Management

Corcoran regulates manure management in two sections of code. Section 81.11, Keeping of Farm Animals and Non-Traditional Farm Animals, specifies the number of animal units allowed on parcels of various sizes and regulates how close manure, bedding compost, or other wastes can be placed next to a lot line or residence. The ordinance also specifies how often manure must be removed from smaller parcels and what is required for animal enclosure and sheltering.

In addition, Corcoran's Shoreland Overlay District Ordinance (Shoreland Ordinance, 1050.020, Subd. 12, part B) states the following:

1. New feedlots must not be located in the shoreland of watercourses or in bluff impact zones, and must meet a minimum setback of 300 feet from the ordinary high water level of all public waters basins; and

2. Modifications or expansions to existing feedlots that are located within 300 feet of the ordinary high water level or within a bluff impact zone are allowed if they do not further encroach into the existing ordinary high water level setback.

2.9.5.1 Comparison to Commission Policy

In September 2018, the Commission adopted a Recommended Livestock Management Policy "for new facilities or the expansion of existing facilities based on the City's Conditional Use Permit (CUP) provisions for livestock." The Commission's letter of conveyance, the policy itself, and three exhibits (example ordinances) are in Appendix E.

Paragraph 3 of the policy prohibits feedlots and manure storage areas "within the shoreland of any lake, perennial stream, intermittent stream, or protected wetland without a CUP [Conditional Use Permit] or in areas like ditches that drain directly to wetlands, lakes or streams."

Minnesota statute defines shoreland as "land located within . . . 1,000 feet from the ordinary high water level of a lake, pond or flowage; and 300 feet from a river or stream, or the landward extent of a flood plain designated by ordinance on a river or stream," (Minn. Stat. 6120.2500, Subp.15).

In keeping with the Commission's policy, Corcoran's Shoreland Ordinance prohibits the placement of new feedlots within 300 feet of a stream, with or without a CUP. The current Shoreland Ordinance does not, however, prohibit new feedlots within 1,000 feet from a lake or pond without a CUP. Corcoran will work to adopt new or revised policies or ordinances within the legally required timeframe.

2.9.5.2 Comparison to Minnesota Feedlot Rules

Minnesota's Feedlot Rules (Minn. R. 7001.0020, 7002.0210 to 7002.0280, Minn. R. ch. 7020) govern many aspects of operating a feedlot. The following are portions of the Rules that directly affect water quality.

a. Manure stockpiling sites must be located and constructed such that manure-contaminated runoff from the site does not discharge to waters of the state. (Minn. R. 7020.2125, Subp. 1.A.)

b. A short-term stockpile must not be located
   - within 300 feet of flow distance and at least 50 feet of horizontal distance to waters of the state, sinkholes, rock outcroppings, open tile intakes and . . . uncultivated wetlands. . .." (Minn. R. 7020.2125 Subp. 2.C.(1))
   - within 300 feet of flow distance to any road ditch that flows to the features identified above. (Minn R. 7020.2125 Subp. 2.C.(2))

As explained in section 2.9.5.1, Corcoran's Shoreland Ordinance prohibits placement of new feedlots within 300 feet of the ordinary high water level of all public waters basins. The Ordinance also restricts modifications to or expansions of existing feedlots that are located within 300 feet of the ordinary high water level. This would accomplish the intent of the Feedlot Rules above, with the exception of horizontal flow distance and proximity to ditches. Corcoran will review its Shoreland Ordinance for consistency with these sections of Minnesota Feedlot Rules and will work to amend them within the legally required timeframe.

The Commission also reviewed Corcoran's ordinance 81.11, Keeping of Farm Animals and Non-Traditional Farm Animals, for consistency with Minnesota Feedlot Rules. The Commission submitted the following comments.

a. *Comment:* "For 81.11 subpart 2: Minimum of 2 acres per one animal unit for the parcel – this should specify how much of that must be pasture or area for the animal(s) to inhabit. Subpart 6 says for humane treatment but does not specify the area that entails."

   Response: City Code 81.11, subpart 2, states that a "minimum of 2 acres is required to allow one Animal Unit Equivalent to be kept." Corcoran staff has reviewed the Minnesota Feedlot Rules and believes this subpart of City Code is consistent with those Rules.

b. *Comment:* "81.11 subpart 7: does not specify any setback from water or restricting animals from public lakes (MR 7020.2015 subpart 2)."

   Response: Minnesota Rules 7020.2015, subpart 2, states that for a non-CAFO (Concentrated Animal Feeding Operation), "the feedlot must be fenced to prohibit entry to, and must not be allowed to enter, a lake classified by the Minnesota Department of Natural Resources as a natural environment lake, recreational development lake, or a general development lake, as defined in part 6120.3000." This Rule would apply to Jubert Lake in Corcoran and Cook Lake in Maple Grove, the latter having shoreland in Corcoran. Both are classified as natural environment lakes. City staff will work to revise Section 81.11 or the Shoreland Ordinance within the legally required timeframe.

c. *Comment:* "81.11, subpart 8: does not specify away from water. MR 7020.2125 has specifications about keeping manure stockpiles away from wells, septic fields, open tile intakes, on slopes greater than 2% unless there are BMPs installed and never more than 6%, or within 300' flow distance and 50' horizontal distance of all waters of the state."

   As stated above, Corcoran will review its Shoreland Ordinance for consistency with Minnesota Rules involving flow distance and horizontal distance from waters of the state, open tile intakes, and uncultivated wetlands. The City will work to comply with

MR 7020.2125 and amend its ordinances as needed in the legally required timeframe.

d. *Comment:* "81.11 subpart. 2 should include the type of land use, such as upland vs wetland etc."

   Again, City Code 81.11, subpart 2, states that a "minimum of 2 acres is required to allow one Animal Unit Equivalent to be kept." Corcoran staff has reviewed the Minnesota Feedlot Rules and believes this subpart of City Code is consistent with those Rules.

2.10 WATER RESOURCE MANAGEMENT AGREEMENTS

2.10.1 Elm Creek WMC Joint Powers Agreement

Corcoran is a member of the Elm Creek Watershed Management Commission. As stated on its website, the Commission is a joint powers organization whose seven member cities – Champlin, Dayton, Maple Grove, Medina, Plymouth, and Rogers, in addition to Corcoran – together manage the watershed's surface water resources.

According to the Joint Powers Agreement with the WMC, member cities agree to 1) provide a forum for exchanging information about land use management, techniques, and control; 2) provide a forum to resolve intergovernmental disputes related to managing and protecting the watershed; and 3) cooperate as a united group with all other levels of government to facilitate natural resource protection and management in the watershed. The Joint Powers Agreement is in Appendix A.

2.10.2 Elm Creek Watershed Management Commission LGU Agreement

The Commission has also been the Local Government Unit (LGU) responsible for administering the Minnesota Wetland Conservation Act in Corcoran. This responsibility is expected to be transferred back to the City no later than 2019. The LGU agreement is in Appendix B.

2.10.3 Rockford School District

The athletic fields west of City Park (Figure 2-6) have been leased from the Rockford School District but will be purchased by Corcoran in 2018. Public Works staff will continue to perform routine task to maintain the grounds, such as mowing, weed whipping, aerating, and fertilizing the fields, removing refuse, and grading the parking lot. In keeping with the City's MS4 permit, Corcoran staff follow good housekeeping practices as they complete these tasks to prevent surface water pollution.

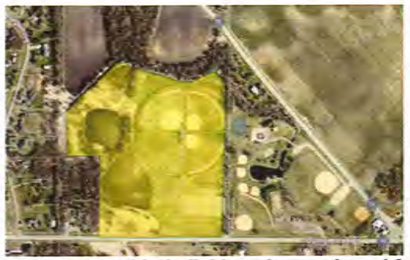


Figure 2-6. Athletic fields to be purchased from Rockford School District (District 883).
Source: Hennepin County Natural Resources Interactive Map (Hennepin County 2017). The approximate location of the athletic fields (yellow shading) is added.

2.10.4 Drainage Ditches

As stated in Section 2.4.3 of the WMP, Hennepin County exercises authority over several County ditches in the watershed under Minn. Stat. 103E. They are shown in purple in Figure 3-2. The Commission's goal is to continue the County's jurisdiction over those ditches but to "periodically review the advantages and disadvantages" of the arrangement and reconsider jurisdiction if requested.

Because County ditches are considered a public drainage system, they are subject to Minnesota's Buffer Law. (See also Section 2.5.) According to that legislation, a continuous buffer with a minimum width of 16.5 feet is required along these ditches. Alternative practices may be accepted if they provide equivalent protection. Private ditches are not included in the public drainage system and are not subject to the buffer legislation unless they appear on the MNDNR's buffer map. Private ditches would also not be subject to Commission buffer rules unless they have been delineated as wetlands. If a private ditch is subject to both the Buffer Law and Commission buffer rules, the stricter requirement would apply.

Given the many miles of drainage ditches in Corcoran, sedimentation and clean-out are common concerns. Maintenance of jurisdictional ditches should be completed in coordination with the WCA LGU and County. Maintenance of other ditches will follow Corcoran's ditch maintenance policy, which will require consultation with the WCA LGU.

3.0 Land and Water Resource Inventory

3.1 OVERVIEW

This land and water resource inventory updates the City's physical environment, including land use (Section 3.2); biological environment (Section 3.3); and water resources (Section 3.4). It incorporates by reference much of the information provided in the WMP's Inventory and Condition Assessment, complementing it where possible with information specific to Corcoran.

3.2 PHYSICAL ENVIRONMENT

3.2.1 Climate

Typical of the Midwest, Corcoran has a continental climate characterized by cold winters and warm summers. Temperature and precipitation data reported in the WMP are incorporated here by reference. In summary, the average temperature calculated for the years 1981-2010 ranges from a low of 15.6 °F in January to a high of 73.8 °F in July, as reported by the Minnesota State Climatology Office and the National Climatic Data Center. Average values can obscure extremes that are common in the state, however. The lowest temperature in winter can be well below zero, and the highest temperature in summer can approach or even exceed 100 °F. In a single year, it is common to have a range of 100-120 degrees between the lowest and highest temperatures.

Like temperature, precipitation also varies within and among years. According to the National Weather Service, average monthly rainfall for 1981-2010 at nearby Rockford, Minnesota, is 29.46 inches, and the annual average snowfall is 39.9 inches. The amount of precipitation varies from month to month. June and August tend to be the rainiest, and December and January the snowiest.

Future climate is expected to be warmer and wetter, following a trend that began in the early 1980s. A report of historical climatology in Minneapolis-St. Paul by the Great Lakes Sciences + Integrated Assessments Center (GLISA, undated) predicts an increase both in average temperature and in the number of days with a high temperature above 90 °F. At the same time, total precipitation is expected to increase, and "heavy precipitation events" will become more likely.

3.2.2 Geology and Soils

The discussions of geology, geomorphology, and soils from Sections 2.1.4 and 2.1.5 of the WMP are incorporated here by reference. In summary, Corcoran's soils are formed from glacial till, a mixture of rocks, boulders, and soil that was scraped up and deposited by the advance and retreat of glaciers. In western Hennepin County, deposits of glacial till range from 50 to 200 feet deep over a sedimentary bedrock of siltstone and shale (Ojakangas 2009, Balaban 1989).

Soils in Corcoran have moderate to slow infiltration rates. A map of hydrologic soil groups from the WMP is shown here as Figure 3-1. Hydrologic soil groups are assigned letters A through D to represent their infiltration rates. Group A soils, such as sandy loams, have

high infiltration rates, are well drained, and have a low potential for runoff. At the other end of the range, group D soils, such as clay loams, have slow infiltration rates, are poorly drained, and have a high potential for runoff. Soil groups denoted by a letter combination (C/D, for example), have dual properties. The first letter represents conditions in drained areas, the second in undrained areas.

Soil textures, infiltration rates, and runoff potential can determine where stormwater management practices or land uses would be suitable. As cautioned in the WMP, the map in Figure 3-1 is intended only to provide general information about soil conditions. Site-specific soil data can be obtained from the Hennepin County Soil Survey or the interactive Web Soil Survey available from the USDA's Natural Resources Conservation Service (NRCS).

3.2.3 Topography and Drainage

Deposits of glacial till create a gently to moderately hilly topography in Corcoran. Small lakes and many wetlands, drainage ditches, and streams receive and convey runoff. The Elm Creek and Rush Creek subwatersheds drain most of the City, with a small area in the northwest drained by the Crow River and another small area in the southwest drained by the Lake Sarah subwatershed. See Figure 3-2 for a map of major lakes, streams and ditches and Figure 3-3 for a map of subwatersheds. For details about the watershed's topography and drainage, see Section 2.1.2 in the WMP, incorporated here by reference.

3.2.4 Land Use

Corcoran's 2010 land use is shown in Figure 3-4. Two types of land use are predominant: Agriculture and Undeveloped, the latter including both undevelopable land – wetlands, for example – and vacant developable land. Commercial and industrial development is clustered in smaller areas, the largest occurring in the southeast area of the City in what is recognized as Downtown Corcoran. Farmsteads and single-family residences are scattered throughout the City.

Future land use predicted in the City's 2040 Comprehensive Plan retains much of Corcoran's rural character. Figure 3-5 shows that Rural/Ag Residential land use persists in much of the City, with development predicted to increase in the east, south and southwest. Increases in low-density residential, light industrial, commercial, and mixed land uses are among the changes expected by 2040.

These development predictions are used to delineate the Metropolitan Urban Service Area, or MUSA, The MUSA is the area in the seven-county metro area where regional services, such as sewer, water, and transportation, are provided or planned. The MUSA boundary also indicates where there may be opportunities for urban stormwater improvement.

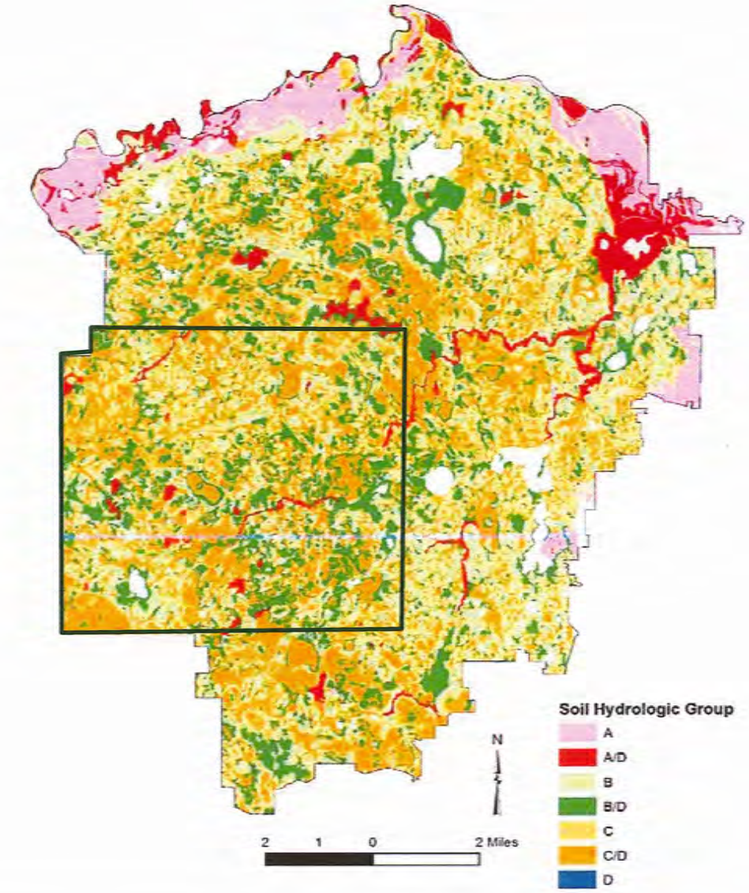


Figure 3-1. Soils by hydrologic soil group classification.
Source: USDA NRCS SSURGO. Corcoran's approximate boundary (blue line) is added. *From* Third Generation Watershed Management Plan (ECWMC 2015).

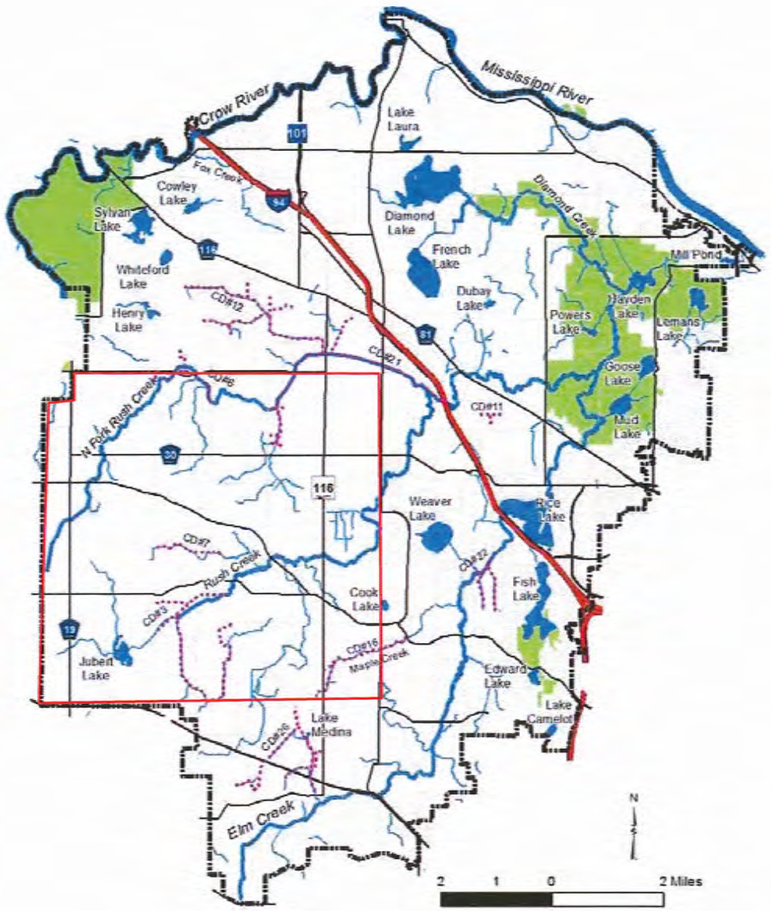


Figure 3-2. Major lakes, streams, and county ditches in the Elm Creek watershed.
Source: Minnesota DNR. Ditches: Hennepin County Environment and Energy. Corcoran's boundary (red line) is added. *From* Third Generation Watershed Management Plan (ECWMC 2015).

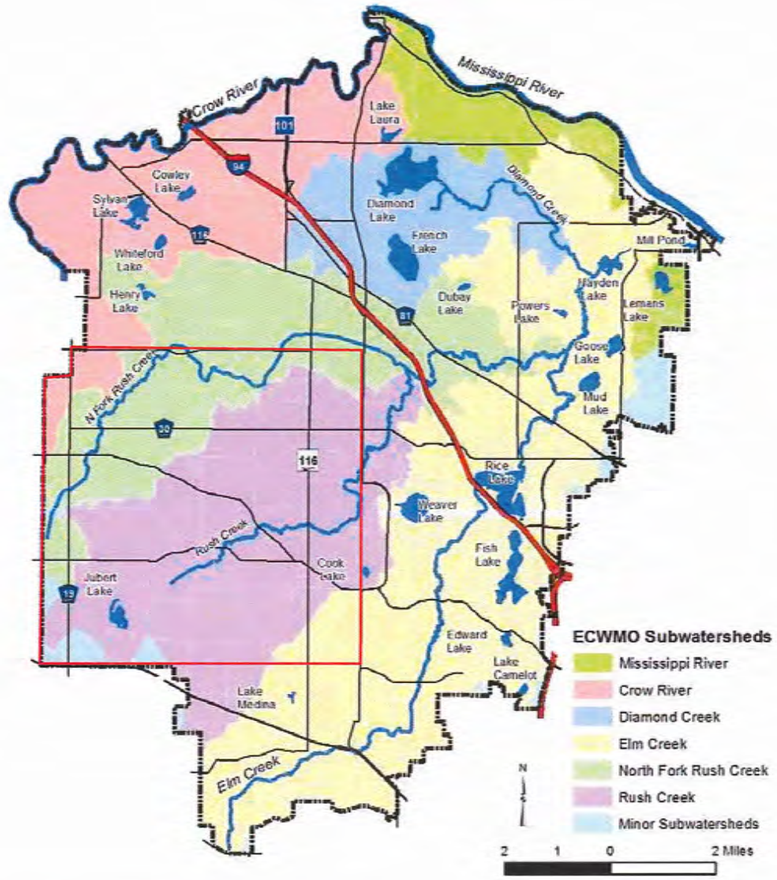


Figure 3-3. Elm Creek watershed drainage system.
Source: MNDNR. Corcoran's approximate boundary (red line) is added. The light blue area in southwest Corcoran is part of the Lake Sarah subwatershed. *From* Third Generation Watershed Management Plan (ECWMC 2015).

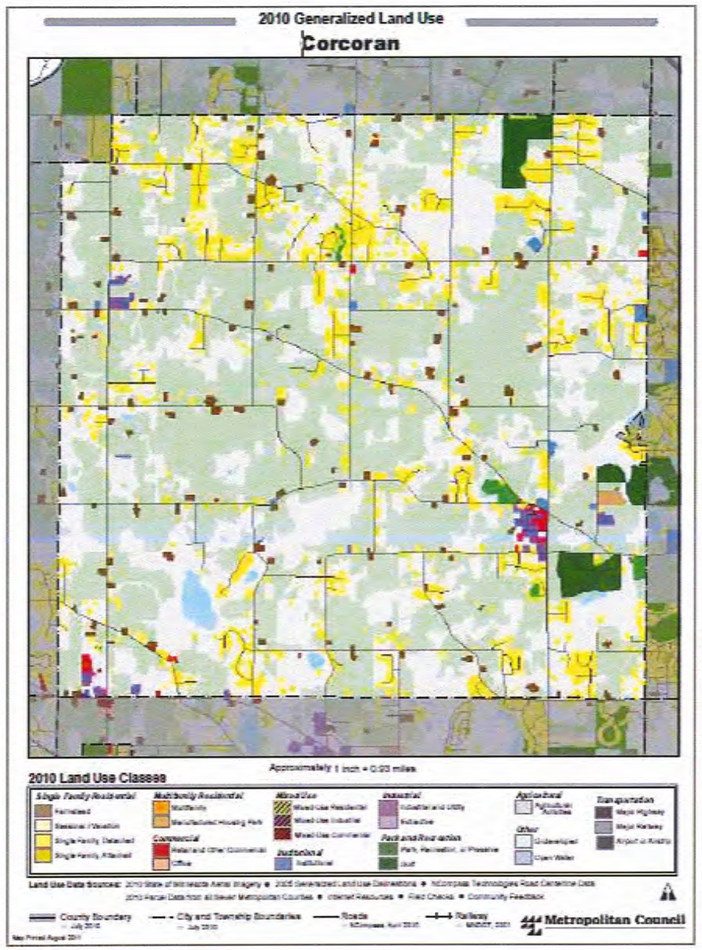


Figure 3-4. 2010 land use.
Source: Metropolitan Council Map Gallery (2017).

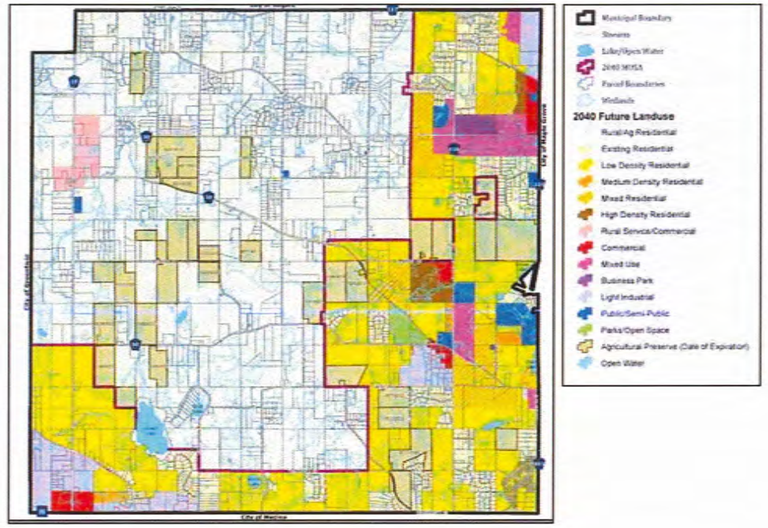


Figure 3-5. 2040 planned land use.
Source: 2040 Comprehensive Plan.

3.3 BIOLOGICAL ENVIRONMENT

Corcoran's native plant communities, fish, wildlife, and parks are parts of its biological environment, and each is discussed in this section. Humans are also part of the biological environment, but here the impact of human activities is addressed only indirectly in terms of land use and cover.

3.3.1 Plant Communities

Before European settlement, the area that is now Corcoran was covered mostly by Maple-Basswood forest and wet prairie. Figure 3-6 shows the types and extent of native plant communities in the watershed.

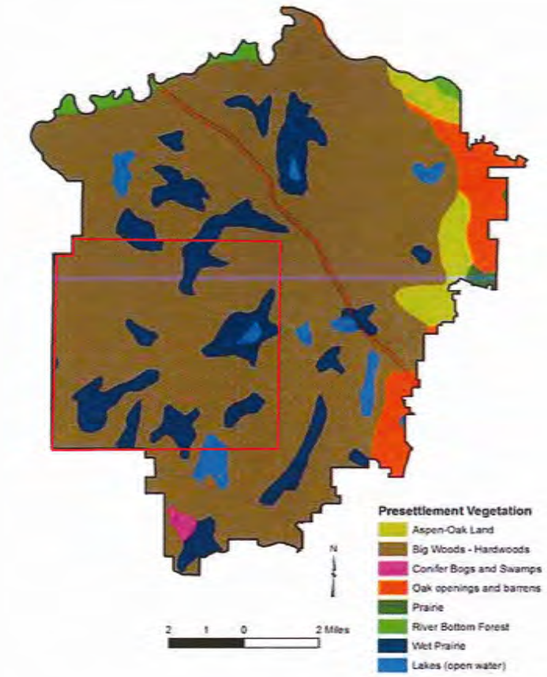


Figure 3-6. Pre-settlement vegetation in the Elm Creek watershed.
Source: MNDNR. Corcoran's approximate boundary (red line) is added. *From* Third Generation Watershed Management Plan (ECWMC 2015).

Since European settlement, land cover in Corcoran has changed significantly. Although pockets of original vegetation persist throughout the City, most native plant communities have been removed to permit other land uses. Figures 3-7 and 3-8 show recent land use and cover in the watershed. Figure 3-9 shows remaining sites of ecological diversity.

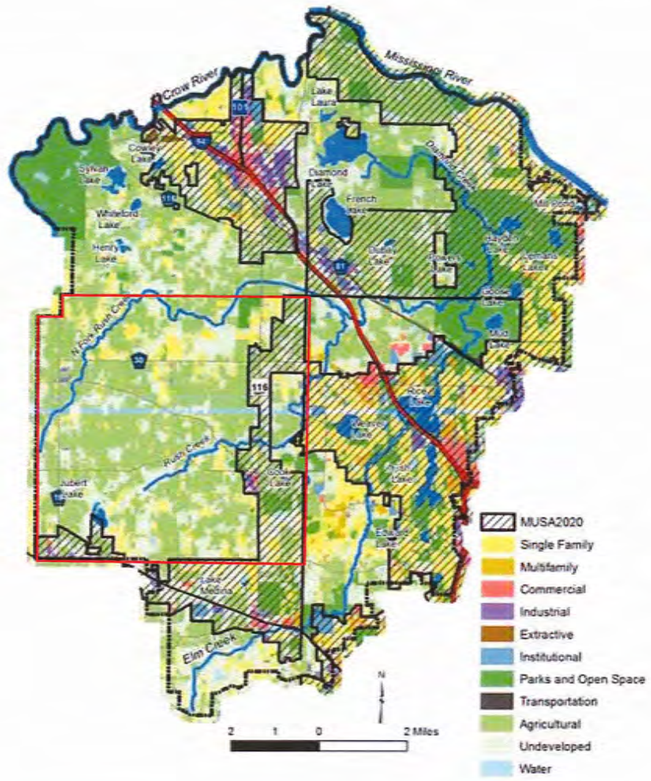


Figure 3-7. 2010 land use in the Elm Creek watershed.
Source: Metropolitan Council. Corcoran's approximate boundary (red line) is added. *From* Third Generation Watershed Management Plan (ECWMC 2015).

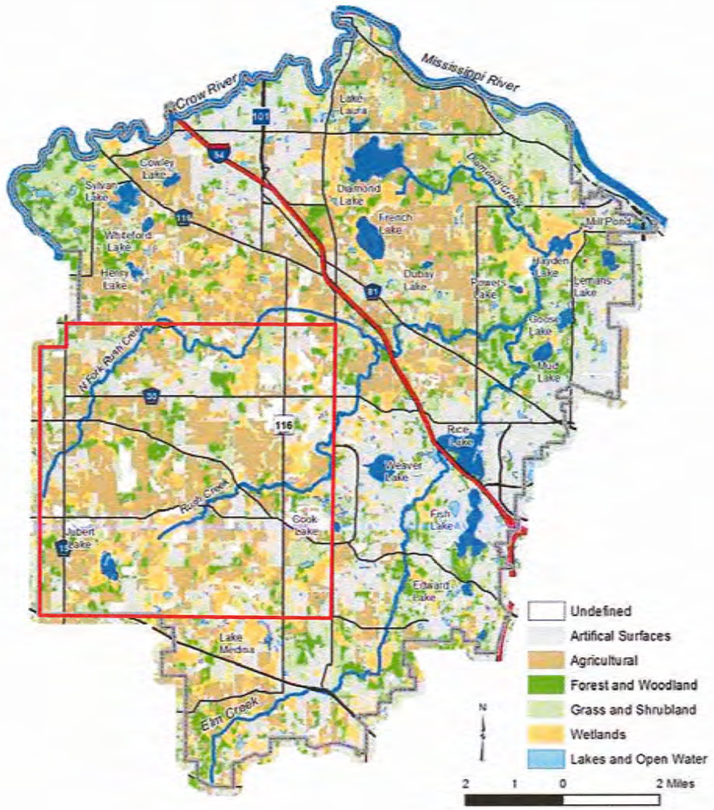


Figure 3-8. Minnesota Land Cover Classification System (MLCCS) land cover types in the Elm Creek watershed.
Source: MNDNR. Corcoran's approximate boundary (red line) is added. *From* Third Generation Watershed Management Plan (ECWMC 2015).

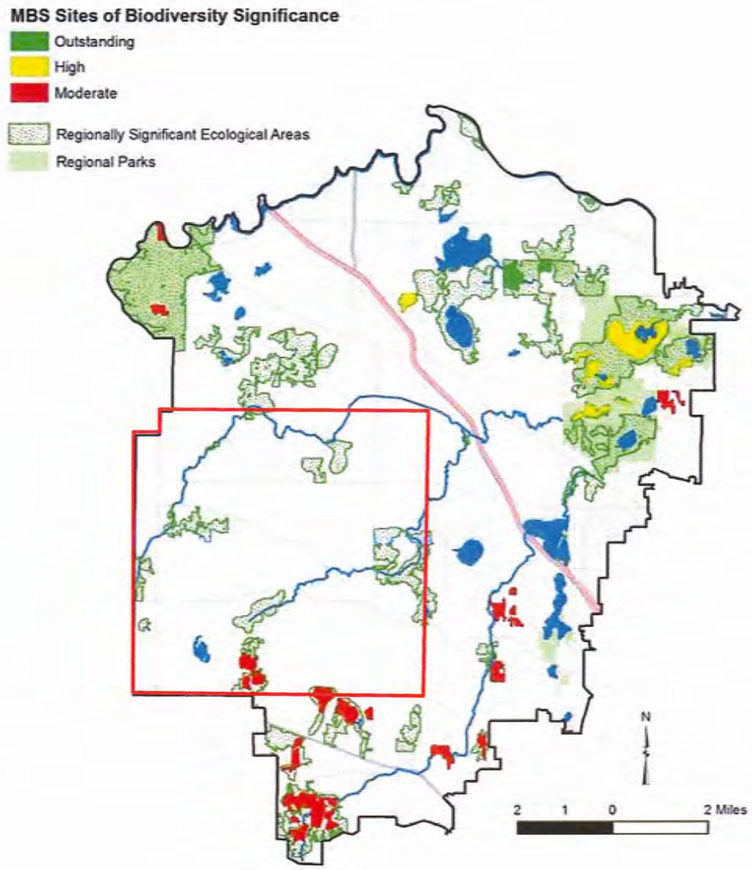


Figure 3-9. Sites of ecological diversity in the Elm Creek watershed.
Source: MNDNR. Corcoran's approximate boundary (red line) is added. *From* Third Generation Watershed Management Plan (ECWMC 2015).

As shown in Figure 3-10, there are several Regionally Significant Natural Areas and sites of moderate biodiversity significance in Corcoran. More-detailed views of such areas can be generated using Hennepin County's Natural Resources Interactive Maps (Hennepin County 2017). Figure 3-11 shows these areas in northeast Corcoran; similar maps can be generated for other parts of the City.

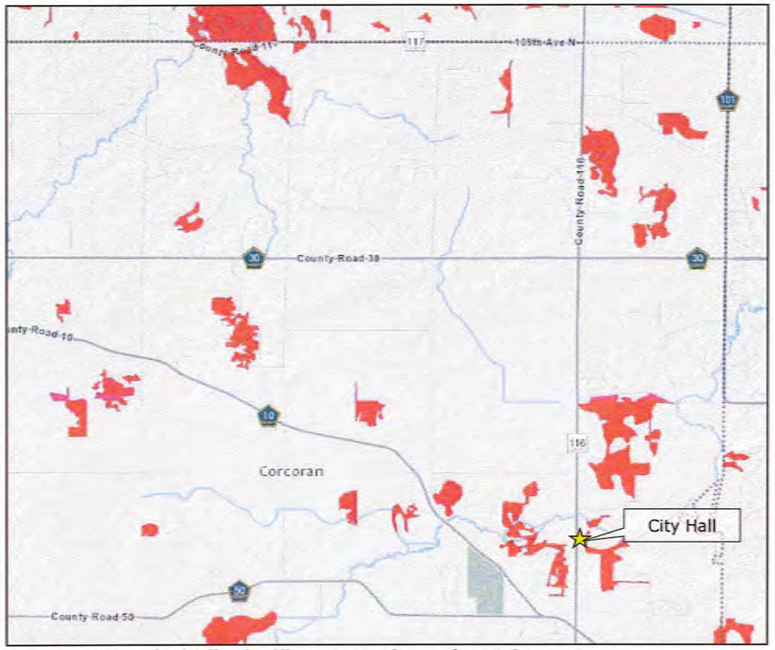


Figure 3-10. Ecologically significant areas in northeast Corcoran.
Source: Hennepin County Natural Resources Interactive Map (Hennepin County 2017). The approximate location of City Hall is added.

Using the same tool, map users can zoom in to see named vegetative communities on or near particular parcels. Figure 3-11 is a closer view of the land around City Hall, where there are maple-basswood forest and mixed hardwood swamp communities. Other ecologically significant areas in the City include cattail marshes, aspen forests, and willow swamps.

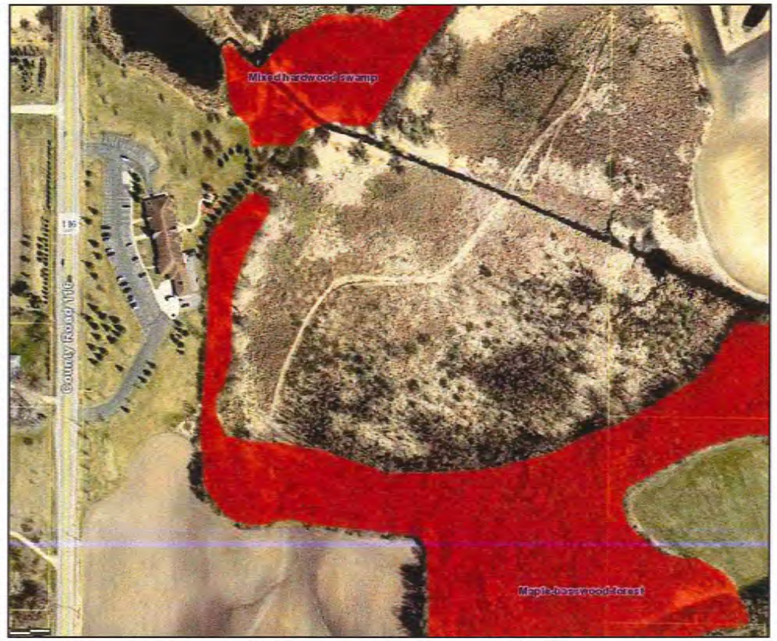


Figure 3-11. Ecologically significant communities near City Hall.
Source: Hennepin County Natural Resources Interactive Map (Hennepin County 2017).

Figure 3-12 shows part of a map of natural communities and rare species prepared by the Minnesota Biological Survey for Hennepin, Carver, and Scott Counties (MNDNR 1998). Township Section numbers 1, 6, 31, and 36 in Corcoran are marked on the map, with section numbers running in reverse directions from row to row.

Remnants of two native plant communities are marked on the map. The small area labeled "TM" in section 33 is a tamarack swamp, a type of wet forest that in the metro area approaches its southern-most limit in the state (MNDNR 2017a). The area labeled "WM," straddling sections 34 and 35 and extending into Medina, is wet meadow. That area corresponds to wet meadow and willow swamp communities on the Hennepin County natural resources maps.

Black diamonds in Figure 3-12 mark locations where rare species of animals have been sighted, based on museum records or 1996-1997 field surveys. Which species they represent is not indicated, although several possibilities are listed in the map legend. Rare, threatened, and endangered species are discussed further in Section 3.3.2.

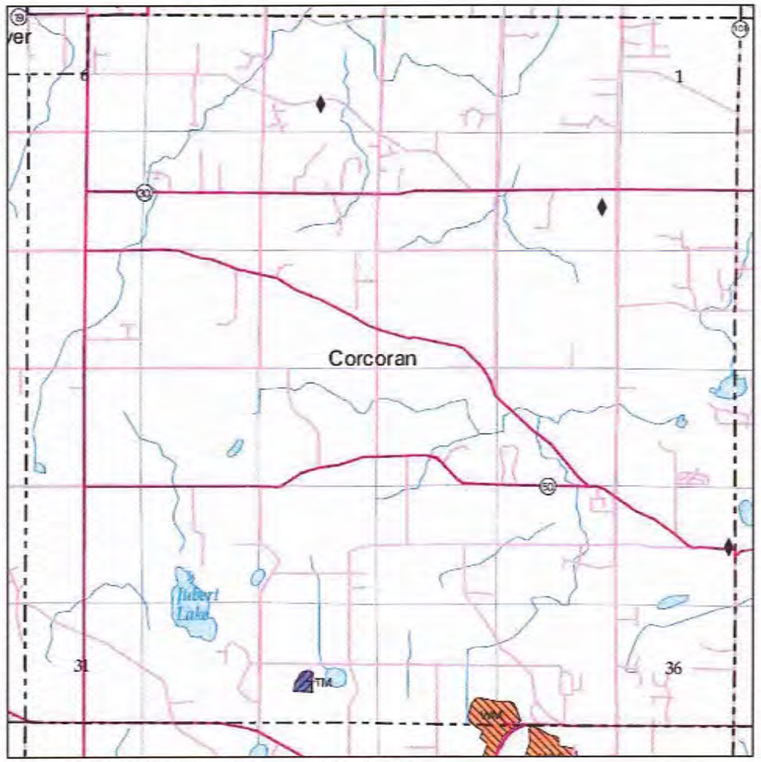


Figure 3-12. MBS Natural Communities in Corcoran.
Source: Minnesota Biological Survey (MNDNR 1998).

3.3.2 Fish and Wildlife

The fish and wildlife section in the WMP discusses lakes; streams; rare, threatened, and endangered species; and aquatic invasive species. That discussion is incorporated here by reference and continued below.

Lakes. Jubert Lake in southwest Corcoran (Figure 3-12) is the City's largest and perhaps most fishable lake, although there is no public access. The MNDNR's LakeFinder web pages (MNDNR 2017b) report black bullhead, bluegill, brown bullhead, hybrid sunfish, largemouth bass, and walleye in the lake. Although the lake was monitored as recently as 2009, the

Minnesota Pollution Control Agency (MPCA) considers the data insufficient to determine the condition of the lake for aquatic consumption or recreation (MPCA 2017a).

Streams. Most of Corcoran is drained by Rush Creek and its tributaries into Elm Creek and eventually the Mississippi River. Southwest Corcoran drains to Lake Sarah. Both the North Fork and part of the South Fork of Rush Creek are impaired, meaning they do not meet one or more water quality standards. More information about these impairments is in Sections 3.4.2 and 4.4.

Rare, threatened, and endangered species. Tables of rare plant and animal species from the WMP are reproduced below as Tables 3-1 and 3-2. The tables are based on a 2013 query to the MNDNR's Natural Heritage Information System. In response to the query, the MNDNR issued a public report that lists endangered or threatened species or species of special concern that are known from museum records or field observations to exist within one mile of the watershed. The "last observed" dates in the tables apply to the watershed as a whole.

The report also shows that rare species have been documented in Corcoran, although not recently. The Blanding's Turtle was found here in 1983 and 1986 and the Loggerhead Shrike, a rare bird, in 1994. More recently there have been several anecdotal reports of Trumpeter Swans and Bald Eagles. Other rare species may also exist in the City but have not been reported or documented.

In a letter accompanying its report, the MNDNR stated that a Blanding's Turtle Priority Protection Area has been established in the northwest part of the watershed. The proximity of this area suggests that among all the species in Table 3-1, the Blanding's Turtle may be the one most likely to persist in Corcoran.

Table 3-1. Rare animal species observed in the Elm Creek watershed.

Scientific Name	Name	Last observed	Federal status	State status
Ammodramus henslowii	Henslow's Sparrow	1997	None	Endangered
Bartramia longicauda	Upland Sandpiper	1983	None	Watchlist
Botaurus lentiginosus	American Bittern	1992	None	Watchlist
Cygnus buccinator	Trumpeter Swan	2011	None	Special Concern
Empidonax virescens	Acadian Flycatcher	1997	None	Special Concern
Emydoidea blandingii	Blanding's Turtle	2008	None	Threatened
Gallinula galeata	Common Gallinule	1991	None	Special Concern
Haliaeetus leucocephalus	Bald Eagle	1998	None	Watchlist
Lanius ludovicianus	Loggerhead Shrike	1994	None	Endangered
Notropis anogenus	Pugnose shiner	1948	None	Threatened
Pituophis catenifer	Gopher snake	1992	None	Special concern
Ligumia recta	Black sandshell	2007	None	Special concern

Note: Current as of 2013. Not based on a comprehensive survey of the state or the watershed. Absence of observation does not mean other species are not present. Some species may have multiple observations.
Source: Natural Heritage and Nongame Research Program of the Division of Ecological and Water Resources, Minnesota Department of Natural Resources (MNDNR).

Table 3-2. Rare plant species observed in the Elm Creek watershed.

Scientific Name	Name	Last observed	Federal status	State status
Panax quinquefolius	American Ginseng	1997	None	Special concern

Note: Current as of 2013. Not based on a comprehensive survey of the state or the watershed. Absence of observation does not mean other species are not present. Some species may have multiple observations.
Source: Natural Heritage and Nongame Research Program of the Division of Ecological and Water Resources, Minnesota Department of Natural Resources (MNDNR).

Aquatic invasive species. No aquatic invasive species (AIS) are documented in Corcoran's waters, according to the MNDNR's infested waters list and map (MNDNR 2017d). Several nearby waters are infested, however. Weaver Lake to the east and Lake Sarah to the southwest are infested with Eurasian water milfoil, and Lake Independence, also to the southwest, is infested with both Eurasian water milfoil and zebra mussels. It is the aim of boat inspections and "clean, drain, dry" education programs to prevent the spread of these and other invasive species to other waters, including those in Corcoran.

3.3.3 Parks and Trails

Corcoran's City Park and multi-use fields are a hub of recreational activity year-round. Baseball and soccer fields, volleyball and tennis courts, play areas, and a picnic shelter are popular from spring through fall, and ice skating rinks and a warming shelter provide recreation in winter. Municipal operations at these parks are consistent with the requirements of the City's MS4 permit to prevent pollution of surface waters by stormwater runoff.

The Lake Independence Regional Trail along County Road 19 connects Crow-Hassan Park Reserve to Baker Park Reserve (Figure 3-13). The regional trail and the park reserves are part of Three Rivers Park District. A new trail head near the intersection of County Road 19 and County Road 10 serves as a rest stop and access point for trail users.

Corcoran's 2040 Parks and Trails Plan (Figure 3-14) proposes several search areas for additional trails, trail heads and athletic parks as well as greenway corridors, neighborhood parks and open space/nature parks. The greenway corridors and many of the open space search areas occur along or near creeks or wetlands and in ecologically significant areas. Potentially, parks, trails or preserves placed in these areas help protect water quality by limiting impervious surfaces and maintaining vegetation to filter stormwater runoff.

3.4 WATER RESOURCES

A discussion of the watershed's lakes, streams, wetlands, ditches, public waters, floodplains, and groundwater is included in the Inventory and Condition Assessment in the WMP, and it is incorporated here by reference. The following sections provide further information specific to Corcoran. Figure 3-15 is a map of the watershed's major lakes, streams, and ditches from the 2040 Comprehensive Plan.

Figure 3-13. Lake Independence Regional Trail.
Source: Three Rivers Park District. Corcoran's approximate boundary (green line) and labels for the park reserves and trail head are added.

3.4.1 Lakes

Jubert Lake is the only lake in Corcoran included in the WMP. It is classified by the MNDNR as a Natural Environment lake, as opposed to one designated for Recreational Development or General Development. According to the MNDNR's Shoreland Management system, each of these classifications has a different development standard. Natural Environment lakes have less than three dwellings per mile of shoreline, whereas Recreational Development and General Development lakes are allowed greater density (MNDNR 2017c). As stated previously, Jubert Lake does not have a public access.

The MPCA's water quality summary for Jubert Lake reports that monitoring data is insufficient to determine the condition of the lake for recreation or fish consumption (MPCA 2017a). Additional data collection is planned as part of the Rush Creek Headwaters Subwatershed Assessment, discussed further in Section 4.4.5.

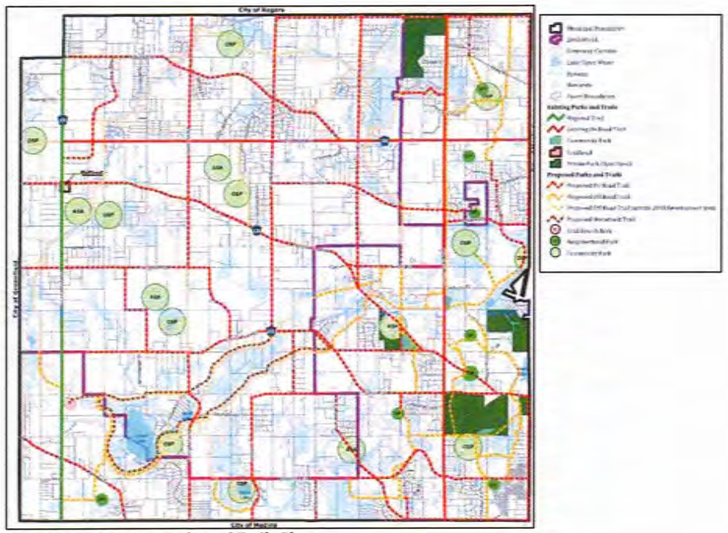


Figure 3-14. Corcoran Parks and Trails Plan.
Source: 2040 Comprehensive Plan.

3.4.2 Streams

As explained previously, most of Corcoran is drained by Rush Creek, its tributaries, and a system of ditches that empty into Elm Creek and then the Mississippi River. The North Fork and part of the South Fork of Rush Creek have been designated as impaired by the MPCA because water quality falls below one or more standards. Figure 3-16 is a map of impaired waters generated from the MPCA's Impaired Waters Viewer (MPCA 2017b).

According to the MPCA, the North Fork of Rush Creek "may not support a thriving community of fish and other aquatic organisms, as indicated by fish population assessments and insufficient dissolved oxygen." The same is true for the impaired section of the South Fork. The MPCA has also issued a fish consumption advisory for Rush Creek because of potentially high levels of mercury in fish tissue (MPCA 2017b).

The Elm Creek Watershed Total Maximum Daily Load (TMDL) Study and its implementation plan, called a Watershed Restoration and Protection Strategy (WRAPS), address all the impairments in the watershed, including those in Rush Creek. They also set goals for pollution reduction and recommend strategies to meet those goals. The Elm Creek TMDL and WRAPS reports and their implementation in Corcoran are discussed further in sections 2.7.2 and 4.4.

3.4.3 Wetlands

The National Wetland Inventory (NWI) has been updated for most of Minnesota, replacing data gathered in the late 1970s and early 1980s with data collected from 2010 to 2017.

The NWI update for east central Minnesota, including Hennepin County, is complete, and new maps are available through the MNDNR (2016). Figure 3-17 is a map of NWI wetlands in Corcoran. The Cowardin Class in the title of the legend refers to a system of classification that defines wetland types by the nature of the substrate or the type of dominant vegetation (Cowardin et al. 1979).

Wetlands can also be viewed using the Hennepin County Natural Resources Interactive Map. The interactive map is best used by selecting an individual parcel and choosing the wetlands map layer from the menu of available choices. For example, Figure 3-18 shows a map of wetlands in and around Corcoran City Park.

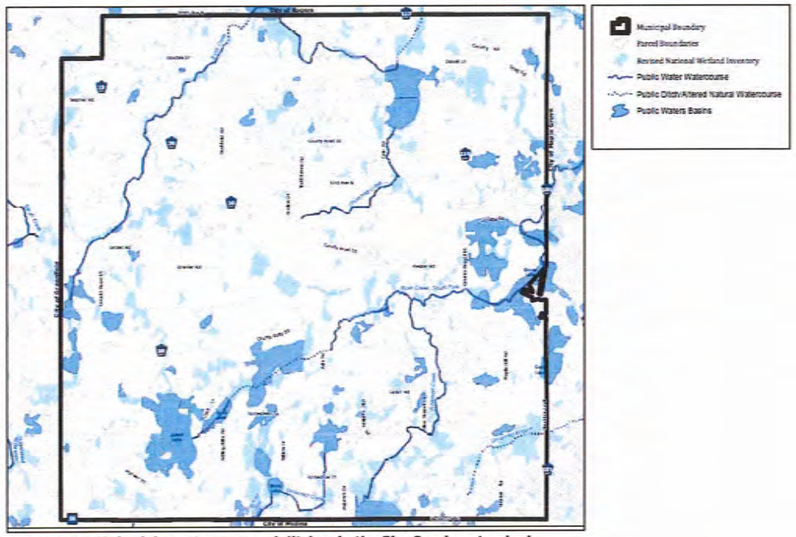


Figure 3-15. Major lakes, streams, and ditches in the Elm Creek watershed.
Source: 2040 Comprehensive Plan.

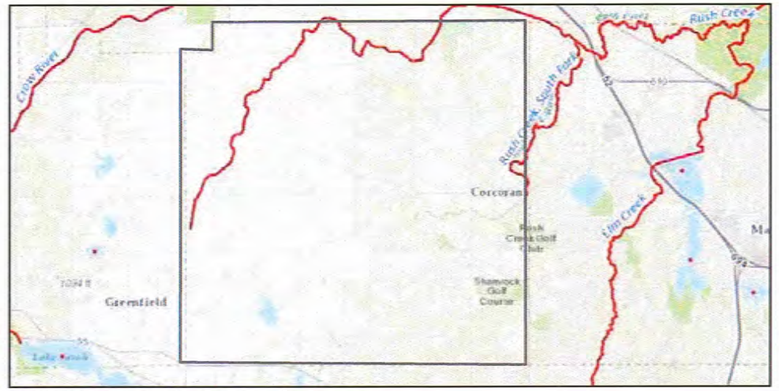


Figure 3-16. Impaired waters in Corcoran.
Source: MPCA Impaired Waters Viewer (MPCA 2017). Impaired streams are red. Impaired lakes are marked with red dots. Corcoran's approximate boundary (black line) is added.

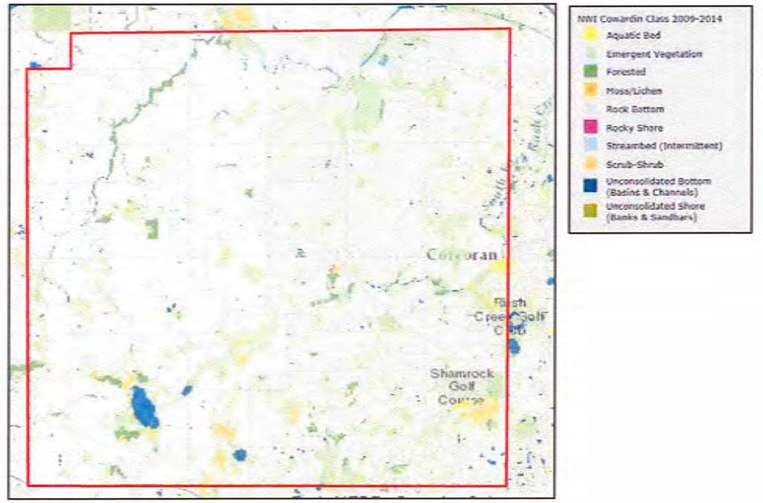


Figure 3-17. National Wetland Inventory for Corcoran.
Source: MNDNR (2016). Corcoran's approximate boundary (red line) is added.

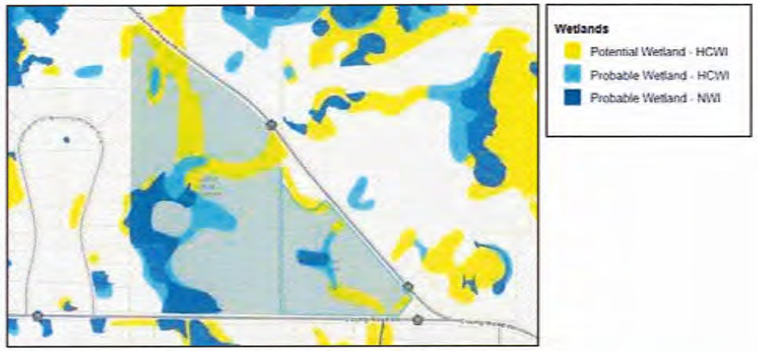


Figure 3-18. Wetlands in and near Corcoran City Park.
Source: Hennepin County Natural Resources Interactive Map. HCWI is Hennepin County Wetlands Inventory. NWI is National Wetlands Inventory.

3.4.4 Groundwater

Most residences and businesses in Corcoran obtain water from private groundwater wells. The exception is the Ravinia residential development in southeast Corcoran, which is served by a municipal water supply purchased from Maple Grove. Establishments in Downtown Corcoran began using water from Maple Grove beginning in 2017, and residential developments planned for that area will do the same.

Because groundwater provides most drinking water in Corcoran, and because groundwater can feed lakes and streams and therefore affect surface water quality, protecting groundwater from contamination is important. Potential contaminants come from many sources. Some, such as iron, manganese, and arsenic, occur naturally in soils and rocks and can be dissolved in groundwater. Others, such as nitrates, phosphorus, and petrochemicals, are produced and released from either natural sources or human activities, the latter including leaking belowground storage tanks, malfunctioning septic systems, improper hazardous waste disposal, and chemical spills.

Whether and how quickly contaminants reach groundwater depends on the nature of the contaminants and groundwater sensitivity. Generally, the most sensitive areas are where water tables or aquifers are closer to the surface and where soils or rock formations are more porous or fractured, respectively. As shown in Figure 3-19, groundwater sensitivity in Corcoran ranges from low to very high, with the most susceptible areas tending to occur near lakes, streams, and wetlands.

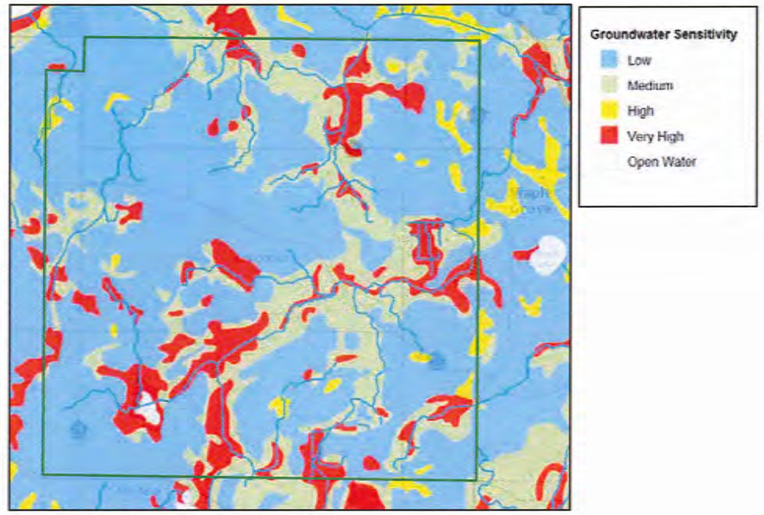


Figure 3-19. Groundwater sensitivity.
Source: Hennepin County (2017), based on Balaban (1989). Corcoran's approximate boundary (green line) is added.

As explained in the WMP, potential sources of groundwater contamination can be viewed using "What's in my Neighborhood," an MPCA tool that maps potential sources of surface water or groundwater contamination. Figure 3-20 is a map of Corcoran showing where feedlots, hazardous waste generators, aboveground and belowground storage tanks, and other sources may affect surface water or groundwater quality. More information about any source is available by visiting the website and clicking on the symbol for a source. These sources are considered for high-priority inspections in the City's Stormwater Pollution Prevention Plan (SWPPP). This is discussed further in chapter 4.

Although there is no report of groundwater quality specific to the City, there are reports of groundwater quality for the state and the Twin Cities Metropolitan Area (TCMA). A recent report from the MPCA analyzed the condition of the state's groundwater from 2007-2011, emphasizing water quality "in heavily-used aquifers for water-supply that are vulnerable to human-caused contamination" (MPCA 2013). Some of the findings from that report are summarized here.

- Nitrate concentrations are higher in groundwater below agricultural and urban land compared to undeveloped land. The highest concentrations were found in shallow groundwater beneath agricultural land. Although some concentrations exceeded the EPA limit for drinking water, in general the concentration of nitrates in groundwater has not changed over the last 15 years. A map of nitrate concentrations in ambient

groundwater shows that only a low level (0-1 milligrams per liter) was found in western Hennepin County.

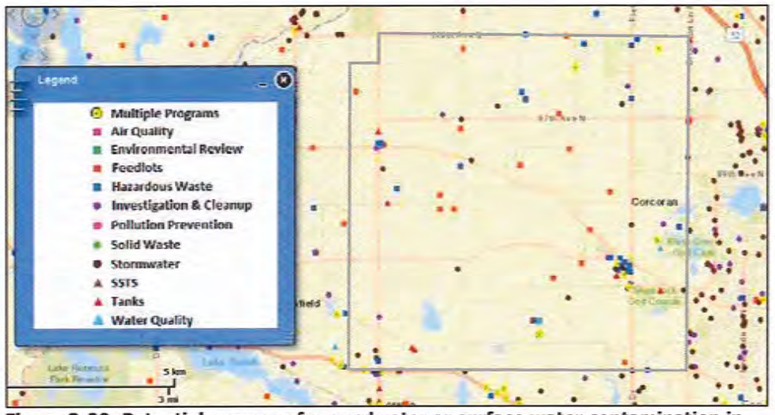


Figure 3-20. Potential sources of groundwater or surface water contamination in Corcoran.

Source: MPCA. Corcoran's approximate boundary (gray line) is added.

- Chloride concentrations are high and increasing in groundwater below urban areas compared to undeveloped areas. This is attributed to the use of winter deicing salts. Nearly a third of the monitoring wells in shallow sand-and-gravel aquifers in the TCMA had chloride concentrations greater than the chronic water quality standard to protect aquatic life. Two deep wells had increasing chloride levels, as well. If this trend continues, the MPCA predicts that more wells will be contaminated. According to a map in the MPCA report, bedrock aquifers in western Hennepin County currently have a low concentration of chloride.

- Concentrations of Volatile Organic Compounds (VOCs) were low except where there have been known petroleum or chemical spills. VOCS are a group of petroleum-based or synthesized compounds used in many products, including gasoline, solvents, refrigerants, and household chemicals. A map of VOCs in Minnesota groundwater shows that none of the tested compounds were detected in western Hennepin County.

- Analysis of a smaller data set of Contaminants of Emerging Concern (CECs), such as fire retardants, insect repellants, and medications, found that although CECs were detected in a third of the monitoring wells, "no concentrations exceeded any applicable human-health guidance set by the state of Minnesota." According to a map of CEC detections, groundwater in western Hennepin County was not tested for these contaminants.

One of the recommendations in the MPCA's *Groundwater Protection Recommendations Report* (MPCA 2016a) is to recognize the interaction between groundwater and surface water. By urging proper operation and maintenance of wells and septic systems, monitoring applications of winter deicing chemicals, and adopting many other Best Management Practices in its Stormwater Pollution Prevention Plan (SWPPP), Corcoran is taking important steps to protect its groundwater. More information about the city's SWPPP is presented in Chapter 4.

3.5 DRAINAGE AREAS, VOLUMES, RATES AND PATHS OF STORMWATER RUNOFF

Corcoran's 2009 Local Plan (Bonestroo 2009) included a HydroCAD model developed in 2007 for the entire watershed. Additional modeling was completed in 2009 to include the northwest and southwest corners of the City, areas that were excluded from the 2007 model.

The 2009 update is the last city-wide model developed for Corcoran. In 2017 the Rush Creek Headwaters Subwatershed Assessment modeled part of Corcoran to estimate precipitation runoff and sediment and nutrient export. The output is intended to identify locations where particular stormwater BMPs would be most effective at improving surface water quality.

The 2017 modeling focused on an area of Corcoran that has seen little if any change in land use since 2009. In fact, except for a residential development in the southeast part of the City, land use patterns have remained largely unchanged. Therefore, the 2009 HydroCAD model still represents accurate drainage areas, volumes, rates and paths of stormwater runoff in Corcoran. That model is incorporated here by reference.

4.0 Water Resource-Related Issues and Actions

4.1 OVERVIEW

This chapter discusses known or potential water resource management-related issues and their possible solutions. The issues discussed here are carried forward from the 2009 Local Plan, identified by the land and water resource inventory in Chapter 3, required by the Watershed, or raised by City staff, Commission or Council members or the public.

4.2 WATER RESOURCE MANAGEMENT-RELATED ISSUES

Known and potential water resource management-related issues and their possible solutions are summarized in Table 4-1. The issues and their solutions are discussed further after the table.

Table 4-1. Water resource management-related issues and solutions.

No.	Issue	Identified In/By	Solution(s)
1	Manure management ordinance and other changes to local ordinances, policies, and practices to implement WMP requirements.	WMP	Adopt a manure management ordinance. Review Wetland Overlay and Shoreland Overlay ordinances for possible revision.
2	Impaired waters	WMP, Elm Creek TMDL, Lake Sarah TMDL, Pioneer-Sarah Creek Watershed TMDL	Identify projects offering load and volume reduction opportunities; apply strict development standards; address effluent from Maple Hill Estates; continue septic system education; apply recommendations from subwatershed study.
3	Operation, maintenance, and inspection of privately-owned stormwater BMPs.	WMP	Continue requiring easements for all stormwater BMPs. Continue inspection program established in City's Stormwater Pollution Prevention Plan.
4	Chloride management	Chapter 3 of this Local Plan; Twin Cities Metro-Area Chloride Management Plan.	Adopt and/or continue using BMPs related to application of deicing salts.
5	Localized flooding and drainage issues	City staff	Develop right-of-way policy by 2020.
6	Species in Corcoran that are endangered, threatened or of special concern	WMP, 2009 Local Plan	Upon sighting a rare species, contact or advise resident to contact the MNDNR.
7	Extreme flooding (public safety aspects)	City staff	
8	MS4 Permit reapplication, SWPPP revision	Five-year permit terms renew in 2018, 2023	Work with MPCA to submit permit application and revised SWPPP.
9	Wetland improvements	WMP, City staff, Lennar	Work with the Commission and other member cities on High Priority Wetland Improvements identified in the WMP (ECWMC 2015). Investigate a potential stormwater pond retrofit in Downtown Corcoran.
10	LGU review: Administration of Wetland Conservation Act rules.	Commission	Starting 1/1/2019, assume LGU role or enter a new contract with the Commission to provide that service.
11	Lion's Park ditch maintenance and restoration	City staff	Remove deadfall and sediment, revegetate banks.

4.3 MANURE MANAGEMENT AND OTHER ORDINANCES

The WMP requires the city to explain how its goals, policies, rules, and standards will be implemented in Corcoran, including changes to City ordinances, policies and practices that will be adopted to meet WMP requirements. Specifically, the WMP requires the City to adopt and enforce a manure management ordinance.

4.3.1 Manure Management Ordinance

As explained further in section 2.5.9 of this Local Plan, Corcoran intends to review City Code section 81.11, Keeping of Farm Animals and Non-Traditional Farm Animals, and section 1050.020, Subd. 12, Part B, Shoreland Overlay District, for consistency with the Commission's Recommended Livestock Management Policy and Minnesota Feedlot Rules. The City will work to amend its ordinances as needed within the legally required timeframe.

4.3.2 Other Ordinances, Policies and Practices

Updating this Local Plan provides an opportunity to review all the City's ordinances, policies and practices related to stormwater management and revise any that are out of step with new rules and standards. Corcoran's regulations for wetland protection, shoreland and floodplain overlay districts, stormwater management, and development review are evaluated in Section 2.9, Local Regulations. Based on that evaluation, the City will review and perhaps revise the following ordinances:

- Wetland Overlay District, 1050.010
- Shoreland Overlay District, 1050.020

- Other ordinances as necessary

In each ordinance the City's requirements are generally in line with those in the WMP and other regulations. Where there are differences, City Code states that the strictest requirement applies. Nevertheless, the City intends to review these ordinances for consistency with other rules, standards, and regulations.

4.4 IMPAIRED WATERS

As explained in Section 2.7, Corcoran has or will have load reductions under three Total Maximum Daily Load (TMDL) studies and Watershed Restoration and Protection Studies (WRAPS): the Lake Sarah Nutrient TMDL (2011), the Elm Creek Watershed-wide TMDL (2017) and the Pioneer-Sarah Creek Watershed TMDL (2017). Table 4-2 lists the impaired waters for which Corcoran shares responsibility for reducing pollutant loads. As explained further below, the City plans several strategies to meet load reduction goals.

Table 4-2. Impaired waters.

Water body	AUID[1]	Affected use(s)[2]	Pollutant/stressor
Rush Creek (North Fork)	07010206-528	AQL, AQR	Dissolved oxygen, fecal coliform bacteria, fish and macroinvertebrate bioassessments[3]
Rush Creek, South Fork	07010206-732	AQL, AQR	Fecal coliform bacteria, fish and macroinvertebrate bioassessments[3], chlorides
Lake Sarah	27-0191-01 (west bay), 27-0191-02 (east bay)	AQC, AQR	Nutrients, mercury in fish tissue
Peter Lake – North Bay	27-0147-02	AQR	Nutrients (phosphorus)
Spurzem Lake	27-0149	AQR	Nutrients (phosphorus)
Pioneer-Sarah Creek Watershed	All	AQR	Fecal coliform bacteria, nutrients (phosphorus)

[1] Assessment Unit ID number
[2] AQL = aquatic life; AQR = aquatic recreation; AQC = aquatic consumption
[3] Fish and macroinvertebrate bioassessments evaluate the biological health of a water body. When they are listed in this column, it means that biological health is lower than expected if the water body were not polluted or if other stressors were not present.

4.4.1 Identify Projects Offering Load and Volume Reduction

The WMP requires the City to identify "known upcoming projects including street or highway reconstruction projects that will provide opportunities to include load and volume reduction BMPs [Best Management Practices]."

Corcoran anticipates several such opportunities to incorporate stormwater BMPs. The City Council has expressed a continuing desire to pave a gravel collector road in Corcoran. When that happens, plans will include BMPs for stormwater treatment and volume management. Other opportunities are development-driven. For example, extension of Gleason Road (Parkway) from County Road 101 to County Road 116 at 66th Avenue has been planned as

part of the Ravinia development in southeast Corcoran. Extending the road would provide an opportunity to install stormwater ponds or other BMPs during construction. In addition, construction of new roads in developments yet to be planned could also incorporate stormwater BMPs, as could projects that widen or replace existing roads. Wherever Commission rules and standards apply, the City will incorporate BMPs for required load and volume reduction.

4.4.2 Apply Strict Development Standards

Conversion of land from agricultural to non-agricultural use provides an opportunity to apply the Commission's updated standards for infiltration, water quality and buffers. Applying these standards throughout the City will help meet load reduction requirements for each of its TMDLs. This will be an ongoing effort as development occurs.

4.4.3 Address Effluent From Maple Hill Estates

The Elm Creek TMDL identified the wastewater treatment facility (WWTF) at Maple Hill Estates, a mobile home community, as the only permitted wastewater source discharging to the watershed. The WWTF releases effluent to an impoundment and then a wetland that is tributary to the South Fork of Rush Creek. The TMDL calls for reducing total phosphorus in the effluent by 60 percent (from 2.5 milligrams per liter to 1 milligram per liter) or connecting the system to the Metropolitan Council's regional interceptor sewer.

After weighing these options, the City, the Maple Hill Estates community, and the Metropolitan Council agreed to connect the WWTF to the regional interceptor. In August 2017, the Metropolitan Council awarded a grant of approximately $235,000 to pay half of its Sewer Availability Charge (SAC). Maple Hill Estates will be responsible for the remaining amount. The mobile home community will also pay to connect its system to intermediate City infrastructure and decommission its wastewater treatment plant. Construction is expected to begin in 2018.

Closing the Maple Hill Estates WWTF improves water quality beyond what is required by the Elm Creek TMDL. Discharges of phosphorus, sediment and bacteria from the facility would be eliminated, not just reduced, resulting in much greater benefit. An analysis of data in the 2017 Discharge Monitoring Reports (DMRs, Appendix D) shows that closing the facility would eliminate annual discharges of approximately 160 pounds of phosphorus and more than 900 pounds of total suspended solids (sediment). Discharges of bacteria would also be eliminated. One of the strategies in the Elm Creek WRAPS to correct the bacteria impairment in the South Fork of Rush Creek and other stream reaches is to reduce untreated, emergency releases of sanitary waste from the Maple Hill WWTF (ECWMC 2016). Closing the facility will not just reduce the releases; it will eliminate them entirely, both during emergencies and during normal operations.

4.4.4 Continue Septic System Education

The Pioneer-Sarah Creek Watershed TMDL and WRAPS reports discuss impairments caused by excess phosphorus and bacteria. The bacteria impairment can be addressed at least in part by finding and repairing failing septic systems. The WRAPS report assigns Hennepin County the primary responsibility to identify failing systems, but County Ordinance 19 does not permit pro-active inspections. According to the ordinance (Hennepin County 2014), County inspections are performed during construction, when an additional bedroom is added to a residence, when the County receives a complaint or in other circumstances, but not as

a matter of routine. Therefore, in practice, the primary responsibility to care for an existing septic system lies with the owner.

Corcoran's continuing goal is to assist owners of septic systems by providing information about system operation and maintenance. Although all businesses in Downtown Corcoran will connect to sanitary sewer and water by 2019, other businesses and most residences will continue to rely on septic systems for sanitary waste disposal. Because this is an important issue throughout the City, Corcoran chose septic system care as a high-priority education topic in its Stormwater Pollution Prevention Plan (SWPPP). Through its education program, the City reaches residents and business owners in many ways.

- Articles are published regularly in the City's quarterly newsletter.
- Information about septic system care is added to new-resident packets.
- Flyers or brochures are available at City Hall.
- Information and links are provided on the City's web site.

Septic system care will remain a high-priority topic for education in the City's SWPPP. The City annually evaluates the success of its education program and adapts its practices as needed to improve outreach.

4.4.5 Implement Subwatershed Assessment Recommendations

Rush Creek, also known as the North Fork of Rush Creek, is impaired for aquatic life and aquatic recreation because it has low dissolved oxygen, excess bacteria and sediment, and high levels of nutrients, especially phosphorus (MPCA 2017b). Sections of the South Fork of Rush Creek are also impaired.

According to the Elm Creek Watershed WRAPS (ECWMC and MPCA 2016), one strategy to address the impairments is to complete subwatershed assessments, which are detailed evaluations of smaller drainage areas (subwatersheds) where nutrients and sediment may be carried in runoff at higher-than-average rates. The subwatershed assessments use fine-scale models to evaluate specific field-scale best management practices (BMPs) to reduce nutrient and sediment loads. Once potential BMP locations are identified, project costs and potential pollutant reductions can be evaluated to help determine which practices will be most cost-effective at improving water quality.

With that goal in mind, the Rush Creek Headwaters Subwatershed Assessment (SWA) was launched in 2017 with funding from a Clean Water Grant, the Elm Creek Watershed, and the City. The SWA focuses on a 20-square-mile area that in Corcoran includes the drainage area for the North Fork of Rush Creek and Jubert Lake (Figure 4-1). At an open house in December 2017, several water quality-related problems, primarily drainage issues, became known. The results of the SWA will identify potential BMPs and problem areas for closer investigation. The City and the Commission will then work with willing landowners on water quality improvement projects. Grant funding may cover most or all the cost of one or more of these projects.

Additional subwatershed assessments are planned after the Rush Creek Headwaters SWA is complete and as funding becomes available. In the future, projects throughout the City – in both agricultural and developed areas – will be considered during any subwatershed assessment, whether the project location is in the study area or elsewhere.

Figure 4-1. Study area for the Rush Creek Headwaters SWA.
Source: Rush Creek Headwaters Subwatershed Assessment flyer, Elm Creek Watershed Management Commission.

4.5 PRIVATELY-OWNED BMPS

The WMP requires Corcoran to describe how it will, through "executed and recorded maintenance and inspection agreements," ensure that privately-owned Best Management Practices (BMPs) are inspected and documented at least every five years. Corcoran must also explain how it will ensure that such BMPs are maintained and operated as designed.

Corcoran satisfies these requirements through City Code, developer agreements, and MS4 Permit inspection schedules. City Code Section 960.020 (Development Contract), lists surface water facilities, such as pipes, ponds, and rain gardens, among the basic improvements that must be included in a development. Furthermore, it states that the

facilities must be designed and constructed in accordance with the City's Design Standards and that the facilities are subject to inspection by the City Engineer.

The City also uses Stormwater Maintenance Agreements to ensure proper operation of stormwater improvements. These agreements require the developer to inspect the improvements during construction on a schedule acceptable to the City. All inspections are documented and submitted to the City. At any point, if the City believes the developer is not maintaining the improvements as agreed, the City may complete the maintenance and assess the developer for any expenses.

For both residential and non-residential projects, the City retains drainage and utility easements over the BMPs and inspects them on a schedule that is consistent with its MS4 permit requirements.

4.6 CHLORIDE MANAGEMENT

Corcoran recognizes the importance of minimizing the use of deicing salts. Safely reducing the amount of salt applied to roads, sidewalks and other paved surfaces saves money and protects both infrastructure and surface water quality. Since 2006, Corcoran's snow plows have used computers to set application rates and monitor how much salt is applied. Corcoran's goal is to continue adopting technological improvements and other best management practices to minimize its use of chlorides.

4.7 LOCAL FLOODING AND DRAINAGE ISSUES

Localized flooding and drainage issues remain a concern in various parts of the City. Problems include blocked conveyances (ditches) and flood fringe impacts along Rush Creek or its tributaries after heavy rainfall or rapid snow melt.

Depending on the problem, Corcoran staff will continue to respond with one or more of the following actions:

- Assistance: For judicial ditches, coordinate maintenance with the WCA LGU and Hennepin County or the appropriate ditch authority. For all other ditches, City staff will meet with the property owner and provide assistance consistent with the City's ditch maintenance policy.
- Education: Using the City newsletter, inform residents and businesses about best practices for ditch maintenance and about Corcoran's illicit discharge ordinance.
- Prevention: Work with Commission staff during development review to ensure that adequate stormwater drainage is planned.
- Inspection: Inspect construction sites during development to ensure that stormwater management practices are in place and operating as intended.
- Other action: Otherwise respond to the problem, as allowed.

To assist in responding to complaints, Corcoran plans to develop a right-of-way policy regarding drainage and culverts. The policy is expected to be in place by 2020.

4.8 RARE SPECIES

The WMP reports several rare plant and animal species in the Elm Creek watershed. See Section 3.3.2. According to the MNDNR, most have not been observed since the 1980s or 1990s. Only two species have been documented in Corcoran: Blanding's Turtle (1983, 1985) and Loggerhead Shrike (1994), a rare bird. There are, however, more-recent, informal reports of other rare species in Corcoran, such as Trumpeter Swans and Bald Eagles. Anyone reporting a rare species will be advised to contact the MNDNR. The City may also direct interested residents, businesses, and visitors to the MNDNR's Rare Species Guide, a web-based resource that offers more information about rare species and how to report them.

4.9 EXTREME FLOODING

Natural disasters leading to heavy flooding and damage have received more attention and required more emergency planning in recent years. The humanitarian impacts of numerous tornadoes, severe storms and hurricanes are compounded by damage to stormwater and other infrastructure. Recognizing this impact, Hennepin County, Corcoran, and neighboring cities are expanding their efforts to prepare for extreme weather events.

Typically, disaster response involves law enforcement officers and firefighters, but Public Works staff also have important roles to play during and after extreme events. In November 2017, Corcoran Public Works met with other cities and with Hennepin County Emergency Management staff in a first-ever meeting to discuss their responses to small- and large-scale events. Continued discussions among and between municipal and county staff will continue, and Corcoran will review its Emergency Operation Plan to ensure that Public Works procedures are included in responses to extreme weather events.

4.10 MS4 PERMIT RENEWAL

Under the authority of the federal Clean Water Act and the National Pollutant Discharge Elimination System (NPDES), the MPCA requires Corcoran to obtain a Municipal Separate Storm Sewer System (MS4) permit. The permit requires Corcoran to develop and implement a Stormwater Pollution Prevention Plan (SWPPP) aimed at preventing pollution of surface waters by stormwater runoff. The permit term is five years. Expiration dates during the period of this Local Plan are in 2018 and 2023. In each of those years, the City will reapply for the permit and update its SWPPP.

4.11 WETLAND IMPROVEMENTS

Four potential wetland improvements may be accomplished during the term of this Local Plan. Three are situated in or near the Ravinia development in southeast Corcoran, one is in Downtown Corcoran, and one is associated with the Stone's Throw (now Laurel Creek) development along County Road 101 south of I-94.

The following wetland improvements are planned in or near the Ravinia development (Figure 4.2):

- DNR #27-0437 is a public waters wetland north of the Ravinia development. This project is listed in the Commission's CIP with an estimated total cost of $75,000. According to the CIP, extending stormwater detention in the basin is expected to provide several benefits, including better channel protection, expanded flood storage and improved water quality. The cost would be funded according to the Commission's cost-sharing policy in effect at the time of implementation. The Commission would also pursue grant funding for the project. In the Commission's CIP, the project is slated for 2020-2024.

- The Southeast Corcoran Wetland Restoration project focuses on the larger wetland south and east of DNR #27-0437. The goal of restoration is to improve the wetland for biotic diversity, stormwater retention, and water quality. Public education is planned through newsletter articles, website postings, signage or other means. The cost is estimated at $400,000. Corcoran has asked the Commission to add the project to its CIP for completion in 2022.

- Restoration of Wetland #9 in the Ravinia development is led by Lennar, the developer, to improve habitat and stormwater management. Lennar has allocated $350,000 to the restoration. Corcoran is responsible for project coordination and modeling through 2025.

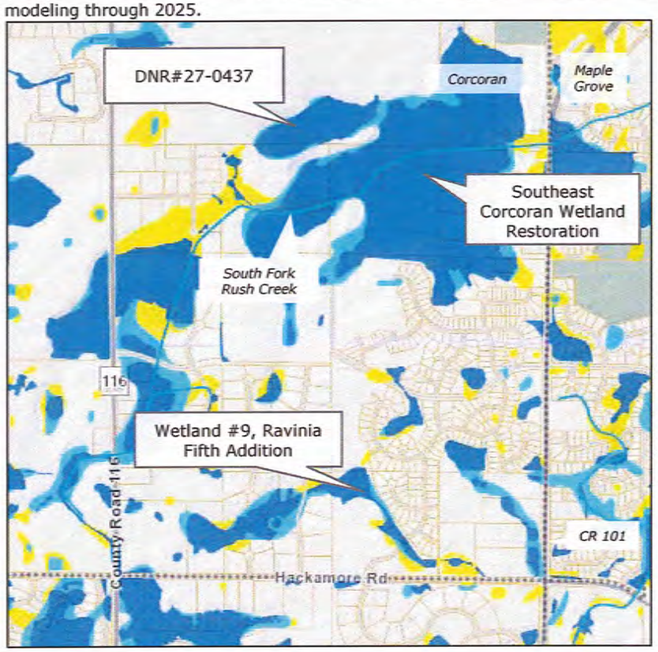


Figure 4-2. Potential wetland restoration projects in or near the Ravinia development.
Source: Hennepin County Natural Resources Interactive Map. Blue and yellow areas are potential or probable wetlands in the Hennepin County and National Wetland Inventories. Labels are added.

Farther north, Stone's Throw Wetland takes its name from the development once planned for the area south of I-94 between County Roads 101 and 116. Although the project was canceled, the name of the wetland has persisted. Construction of another development,

Laurel Creek, has started in the same area. A ditched section of the North Fork of Rush Creek (County Ditch #6) runs through the wetland and is impaired by excess bacteria and low dissolved oxygen. Most of the wetland is in Rogers, but a small area extends into northeast Corcoran (Figure 4-3).

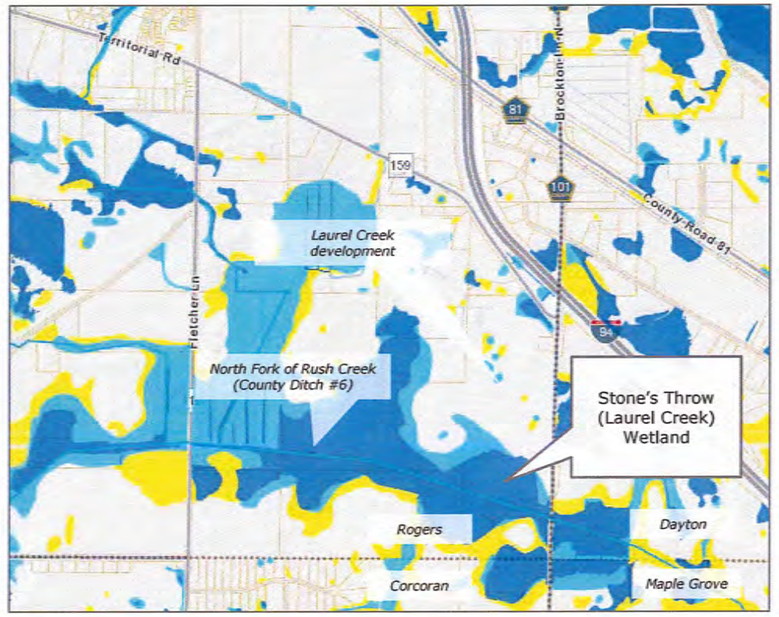


Figure 4-3. Stone's Throw (Laurel Creek) wetland.
Source: Hennepin County Natural Resources Interactive Map. Blue and yellow areas are potential or probable wetlands in the Hennepin County and National Wetland Inventories. Labels are added.

In addition to being included in the Commission's CIP, Stone's Throw wetland restoration is also listed in the Elm Creek WRAPS as a protective strategy for Rush Creek. Corcoran and Rogers are listed as sharing primary responsibility for completing the project within five years of WRAPS approval, which occurred in December 2016. The cost of restoring this 135-acre wetland was estimated at $450,000.

In April 2017, Corcoran and Rogers staff met to discuss the project. They agreed to meet again after the Rush Creek Headwaters SWA is completed (see Section 4.4.5). Results of the SWA may suggest alternative projects to improve water quality in this part of Rush Creek.

4.12 DOWNTOWN REGIONAL STORMWATER IMPROVEMENT PROJECT

A stormwater improvement project is planned for the area in Downtown Corcoran shown in Figure 4-4. Stormwater runoff from commercial land uses drains into the pond and eventually into County Ditch #16, which is tributary to the South Fork of Rush Creek. A first step in this project will be to determine when it was last maintained and to move forward with a stormwater retrofit. The project is on the Commission's list of Capital Improvement Projects, approved for completion in 2019 with a 25% match. The total cost is estimated to be $50,000.

Figure 4-4. Site of potential retrofit in Downtown Corcoran.
Source: Hennepin County Natural Resources Interactive Map. The blue polygon is added to represent the approximate location of the retrofit. The label for County Ditch #16 is also added.

Additional wetland restoration projects may occur on private land where property owners have decided not to replace failing drain tile. These land owners may be interested in restoring land to wetland and applying for wetland banking credits. Corcoran can assist them by discussing the process and directing them to additional resources from the Board of Water and Soil Resources (BWSR).

4.13 LGU SERVICES

As explained in Section 2.3, administration of Wetland Conservation Act (WCA) rules is the responsibility of Local Government Units (LGUs). Typically the LGU is a city, watershed district, county, or Soil and Water Conservation District. The LGU for Corcoran has been the Commission and its technical staff from the Hennepin County Department of Environment and Energy. The agreement for those services is in Appendix B.

In 2017, the Commission requested that its member cities assume the LGU role or the Commission would charge for those services. Corcoran is preparing to assume the LGU role starting January 1, 2019.

4.14 LION'S PARK DITCH MAINTENANCE

A drainage ditch North of the Ravinia development in southeast Corcoran and south of Lion's Park, known locally as the Lion's Park ditch, drains through a culvert across County Road 101 into a wetland in Maple Grove (Figure 4-5). Ditch maintenance is necessary because of urbanization of the watershed and overgrowth of trees that caused soil erosion and sedimentation. In 2017 Corcoran acquired an easement over the ditch and Public Works staff began removing deadfall, felling trees, and removing sediment. Revegetation of the banks will begin in spring 2018.

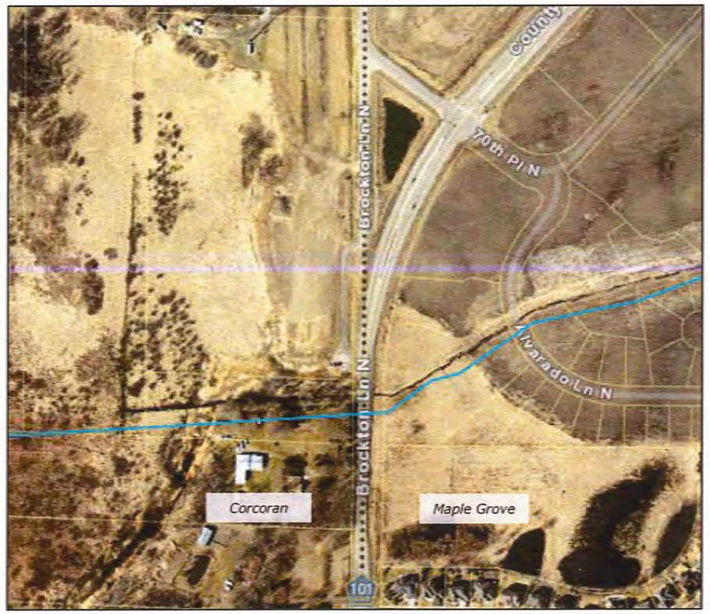


Figure 4-5. Lion's Park ditch.
Source: Hennepin County Natural Resources Interactive Map. The blue line marks the approximate location of the ditch. Labels are added.

5.0 Implementation and Capital Improvement Program

5.1 OVERVIEW

Minnesota Statutes 103B.235 and Minnesota Rules 8410.0160 require the City to develop an implementation program for the issues and actions identified in Chapter 4. The program must extend through the life of this Local Plan (through 2025) and must not "jeopardize achievement" of the goals in the WMP. In addition, according to Minnesota Rule 8410.0160, the program must

(1) include areas and elevations for storm water storage adequate to meet performance standards or official controls established in the organization plan;

(2) define water quality protection methods adequate to meet performance standards or official controls in the organization plan and identify regulated areas;

(3) clearly define the responsibilities of the local government unit from that of an organization for carrying out the implementation components;

(4) describe official controls and any changes to official controls relative to requirements of the organization's plan;

(5) include a table that briefly describes each component of the implementation program and clearly details the schedule, estimated cost, and funding sources for each component including annual budget totals; and

(6) include a table for a capital improvement program that sets forth, by year, details of each contemplated capital improvement that includes the schedule, estimated cost, and funding source.

Requirements (1)-(4) were largely addressed in earlier chapters, as explained below.

(1) Areas and elevations for storm water storage that are adequate to meet Commission rules and standards are identified during development review. See Chapter 2, Section 2.9.4.

(2) Water quality protection methods are defined and regulated areas are identified in various parts of this Local Plan.

- Water-resource-related ordinances are discussed in Section 4.3.
- Methods to meet TMDL goals are discussed in Sections 2.7 and 4.4.
- Methods to ensure that privately-owned BMPs are inspected, maintained, and operating as intended are discussed in Section 4.5.
- Responses to localized flooding and drainage issues are discussed in Section 4.7.

- The City's MS4 program is discussed in Sections 2.6 and 4.10, and elements of the MS4 program are included in the discussions about local regulations (Section 2.9.3), groundwater (3.4.4), privately-owned BMPs (Section 4.5) and local flooding and drainage issues (Section 4.7).
- Potential wetland improvements are discussed in Section 4.11.
- Development rules and standards are discussed with local regulations (Section 2.9).

(3) Corcoran's responsibilities apart from those of the Commission or any other organization are discussed with water resource management-related agreements in Section 2.10. They are also discussed throughout Chapter 4 and are summarized in Table 5-1.

(4) Official controls, such as municipal ordinances and rules, are discussed in Sections 2.9 and 4.3. Ordinance adoption and review are also included in Table 5-1.

The following sections meet requirements (5) and (6) above to provide tables for an implementation program and capital improvement plan.

5.2 IMPLEMENTATION PROGRAM

In compliance with Minnesota Rules 8410.0160, Table 5-1 briefly describes each element of Corcoran's implementation program and offers a prioritized schedule, estimated costs, funding sources and an annual budget total. The table includes only those tasks that are new to Corcoran. It does *not* include tasks already in practice, such as inspecting stormwater BMPs, implementing the City's existing SWPPP, continuing septic system education, and submitting development applications for review by the Commission.

Because the tasks for 2018 are known with greater certainty, more detail is provided for that year. Tasks are less certain after 2018, so later years are grouped, costs are approximated or given in ranges, and potential funding sources are less specific.

Table 5-1. Implementation program.

Program Element	Estimated cost	Funding source(s)	Responsibility	Priority
2018				
Complete Lion's Park ditch maintenance and restoration.	$15,000	Developer	Corcoran	Medium
Connect Maple Hill Estates WWTF to regional sewer interceptor.	$650,000	Met Council grant, Maple Hill Estates	Corcoran, Met Council, Maple Hill Estates	High
Review Rush Creek SWA, promote potential project(s) with landowner(s).	$2,500	City budget	Corcoran	Medium
Review applicable BMPs related to application of deicing methods.	$1,000	City budget	Corcoran	Medium
Direct residents, developers, and business owners to information about rare species, if requested.	$100	City budget	Corcoran	As opportunity arises

Program Element	Estimated cost	Funding source(s)	Responsibility	Priority
Continue reviewing Emergency Operations Plan.	$2,000	City budget	Corcoran	Medium
Support Laurel Creek (Stone's Throw) wetland improvement.	$500	City budget	Rogers	As opportunity arises
Develop Southeast Corcoran Wetland Restoration project (north of Ravinia development).	$5,000	Developer	Corcoran	Medium
Apply for watershed CIP funding for Downtown regional stormwater improvement/retrofit.	$2,000	City budget	Corcoran	High
Plan for 2019 LGU services.	$500	City budget	Corcoran	High
Restore Wetland #9 in Ravinia Fifth Addition.	$1,000	Developer	Developer, Corcoran	High
Annual total	**$679,600**			
2019				
Reapply for MS4 permit and update SWPPP.	$5,000	City budget	Corcoran	High
Review ordinances for consistency with manure management requirements.	$4,000	City budget	Corcoran	High
Review Wetland Overlay and Shoreland Overlay ordinances for potential revision regarding buffers.	$4,000	City budget	Corcoran	High
Install stormwater BMPs with road paving project – Gleason Parkway Extension	$250,000	Developer	Corcoran, developer	As opportunity arises
Develop right-of-way policy to aid response to local flooding and drainage issues.	$5,000	City budget	Corcoran	High
Complete Downtown regional stormwater improvement project	$50,000	City and Commission cost share, possibly grant funding	Corcoran, Commission, possibly grantor	High
Continue promoting SWA project(s) with landowner(s)	$2,500	City budget	Corcoran	Medium
Continue planning emergency operations	$2,000	City budget	Corcoran	Medium
Incorporate wetland LGU cost	$15,000-$20,000	City budget	Corcoran	High
Coordinate to restore Wetland #9 in Ravinia Fifth Addition	$1,000	City budget	Corcoran	As opportunity arises
Annual total	**$338,500 – $343,500**			

Program Element	Estimated cost	Funding source(s)	Responsibility	Priority
2020-2021				
Explore next SWA Study	$2,000-$3,000	City budget	Corcoran, Commission	Medium
Continue promoting SWA project(s) with landowner(s	$2,500	City budget	Corcoran	Medium
Continue implementing BMPs as roads are improved	$250,000	Developer	Corcoran	As opportunity arises
Continue planning emergency operations	$2,000	City budget	Corcoran	Medium
Incorporate wetland LGU cost	$15,000-$20,000/year	City budget	Corcoran	High
Coordinate to restore Wetland #9 in Ravinia Fifth Addition	$1,000/year	City budget	Corcoran	As opportunity arises
Biennial total	**$288,500 – $298,500**			
2022-2023				
MS4 Permit reapplication (2023)	$5,000	City budget	Corcoran	High
Southeast Corcoran Wetland Restoration project (2022)	$400,000	Developer, Commission, grant, possibly City	Corcoran, Commission, Developer	As opportunity arises
Continue planning emergency operations	$2,000	City budget	Corcoran	Medium
Incorporate wetland LGU cost	$15,000-$20,000/year	City budget	Corcoran	High
Coordinate to restore Wetland #9 in Ravinia Fifth Addition	$1,000/year	City budget	Corcoran	As opportunity arises
Biennial total	**$439,000 – $449,000**			
2024-2025				
Priority stormwater project TBD (SWA project, development partner project, e.g.)	$100,000	TBD – City budget, grant funding developer funding	TBD – Corcoran, Commission, developer, other.	As opportunity arises
Continue planning emergency operations	$2,000	City budget	Corcoran	Medium
Incorporate wetland LGU cost	$15,000-$20,000/year	City budget	Corcoran	High
Coordinate to restore Wetland #9 in Ravinia Fifth Addition	$1,000/year	City budget	Corcoran	As opportunity arises
Biennial total	**$134,000 - $144,000**			
2026-2027				
Priority stormwater project TBD (SWA, development project, etc.)	$100,000	TBD – City budget, grant funding developer funding	TBD – Corcoran, Commission, developer, other.	As opportunity arises

Program Element	Estimated cost	Funding source(s)	Responsibility	Priority
Continue planning emergency operations	$2,000	City budget	Corcoran	Medium
Incorporate wetland LGU cost	$15,000-$20,000/year	City budget	Corcoran	High
Biennial total	**$132,000-$142,000**			

5.3 CAPITAL IMPROVEMENT PLAN

Capital improvements are commonly defined as projects that exceed a threshold for size or total expense. Below those thresholds, an improvement is considered a non-capital or operating expense. Examples of capital improvements include real estate acquisitions, equipment purchases, special studies, and building or renovation projects.

In Corcoran, a capital improvement is defined as a maintenance, operations or improvement project that typically costs more than $10,000 and lasts more than five years. Staff time and special studies are not included.

A Capital Improvement Plan (CIP) projects expenses for capital improvements over several years. For this Local Plan, the CIP must be a table that "sets forth, by year, details of each contemplated capital improvement that includes the schedule, estimated cost, and funding source." (Minn. Rule 8410.0160.) The CIP for this Local Plan extends through 2025.

Table 5-2 presents Corcoran's CIP for surface water management. Like the table for the Implementation Program, later years are grouped and estimated costs and funding sources become less certain beyond 2018.

Table 5-2. Capital improvement plan.

Improvement	Year	Estimated cost	Funding source(s)
Lion's Park ditch maintenance and restoration	2018	$15,000	City budget
Maple Hill Estates sanitary connection to regional interceptor	2018	$600,000	Met Council grant, Maple Hill Estates
Stormwater BMP installation with road project (Gleason Parkway extension, e.g.)	2019	$250,000	Developer
Downtown regional stormwater improvement project	2019	$50,000	City budget, Commission cost share, possibly grant funding
Stormwater BMP installation with road project	2020-2021	$250,000	Developer
Southeast Corcoran Wetland Restoration (north of Ravinia development)	2022-2023	$400,000	Developer, Commission, grant, possibly City
Priority stormwater project (from SWA study, development project, etc.)	2024-2025	$100,000	TBD – Corcoran, Commission, developer, other.

5.4 FINANCIAL ANALYSIS

Corcoran's ability to pay for many of the recommended actions in this Local Plan depends largely on the availability of grant funding, the pace of development, and the willingness of residents to pay for stormwater-related projects.

Grant funding or cost sharing, or both, is critical for several projects.

- Maple Hill Estates WWTF connection to regional interceptor: A Metropolitan Council Grant of approximately $235,000 has been awarded to help pay the Sewer Access Charge. (Section 4.4.3.)
- Downtown stormwater improvement and retrofit: With an estimated cost of $50,000, the project is contingent on financial assistance from the Commission. Corcoran will apply to the Commission to have the project placed on its Capital Improvement Plan. If approved, Commission funding would provide approximately 25% of the project cost. (Section 4.11).
- Implementation of projects stemming from subwatershed assessments, such as the Rush Creek Headwaters Subwatershed Assessment, will likely depend on grant funding or cost sharing. (Section 4.4.5.)

Developments such as Ravinia in southeast Corcoran create opportunities to install stormwater BMPs with road construction or improvements. Extension of Gleason Road (Parkway) south of the Ravinia development is one example. Because these projects are funded by developers, the pace of development determines whether and when they occur.

Several projects and activities depend on City funding. Corcoran does not have a stormwater fee. Although this would provide additional revenue and a dedicated fund for stormwater-related projects, it is unlikely that residents would support such a fee. Therefore, at least for the foreseeable future, the cost of stormwater management will be paid from the overall City budget, where it competes with other spending priorities in an annual budgeting process.

6.0 Goals and Policies

6.1 SUMMARY

Corcoran's goals and policies for stormwater management are developed to reflect and support the City's commitments to surface water quality. These commitments are documented primarily in the City's Stormwater Pollution Prevention Plan (SWPPP) and its Local Surface Water Management Plan (Local Plan), but they also reflect the goals and policies of the Elm Creek Watershed Commission (Commission) and those of other organizations and agencies that set laws, rules and standards or offer guidance regarding surface water protection and improvement.

The Commission's Third Generation Watershed Management Plan (WMP) identifies several goal areas and associated policies. Because the WMP guides much of the Local Plan content, and because the issues and goals identified in the WMP reflect similarly important issues in Corcoran, the City has developed policies within the same goal areas:

- Water quantity
- Water quality
- Groundwater
- Wetlands
- Drainage Systems

The following sections address each goal area separately.

6.2 WATER QUANTITY

Corcoran supports the goals of the Commission to manage the quantity of stormwater runoff. In keeping with Commission goals, the City adopts the following policies.

Policy 1: As land is developed or redeveloped, abide by the Commission's Rules and Standards regarding water quantity.

Policy 2: For landlocked depressions that do not have a defined outlet and do not typically overflow, allow a positive outlet only if the plan is approved by the Commission.

Policy 3: As appropriate, remove or support removal of unattached deadfall in Rush Creek and its tributaries. For deadfall attached to the land, advise landowners to remove deadfall and contact the Commission for mediation, if necessary.

Policy 4: As needed, review ordinances and policies for consistency with Commission goals and policies for water quantity. These includes ordinances and policies related to shorelands and floodplains.

6.3 WATER QUALITY

Corcoran recognizes the importance of maintaining and improving water quality in its lakes, wetlands, and streams. To support Commission goals, Corcoran adopts the following policies.

Policy 1: As land is developed or redeveloped, abide by the Commission's Rules and Standards regarding water quality.

Policy 2: Continue reviewing, updating and implementing components of the City's Stormwater Pollution Prevention Plan (SWPPP).

Policy 3: Participate in Municipal Separate Storm Sewer System (MS4) permit renewals and revise the City's SWPPP as needed.

Policy 4: Participate in the development and implementation of TMDL and WRAPS studies by attending meetings, providing feedback and helping identify projects that may offer water quality benefits.

Policy 5: As feasible, support or assist the Commission or other agencies with water quality monitoring.

Policy 6: As feasible, support studies that identify water quality problems and solutions. This includes but is not limited to Subwatershed Assessments.

Policy 7: Work with the Commission and other organizations and agencies, as appropriate, to pursue grant funding and other funding to support the development and implementation of water quality improvement projects.

Policy 8: As needed, review City ordinances and policies for consistency with Commission goals and policies for water quality. These include ordinances and/or policies regarding manure management.

6.4 GROUNDWATER

Many of the City's residents and business owners rely on individual wells for water supply, and this will likely continue for the foreseeable future. To support groundwater recharge and protection, the City adopts the following policies.

Policy 1: As land is developed or redeveloped, abide by the Commission's Rules and Standards regarding groundwater quality, particularly those requiring abstraction and/or infiltration of runoff.

Policy 2: Participate in the Commission's efforts to identify appropriate, cost-effective Best Management Practices regarding abstraction/infiltration and groundwater recharge.

Policy 3: Participate in the Commission's efforts to educate the community about groundwater and its connection to stormwater runoff and surface water quality.

6.5 WETLANDS

Corcoran recognizes the importance of protecting its many wetlands. Minnesota's Wetland Conservation Act (WCA) establishes rules regarding wetland management, and it requires the appointment of a Local Government Unit (LGU) to administer them. In recognition and support of wetland management goals and requirements, Corcoran adopts the following policies.

Policy 1: As land is developed or redeveloped, abide by wetland buffer standards and established by local ordinance, Commission Rules and Standards, and state law.

Policy 2: For development or redevelopment projects that may affect wetlands, continue to require wetland function and values assessments to determine wetland impact.

Policy 3: As needed, review City ordinances and policies for consistency with Commission Rules and Standards and state law regarding wetland buffers.

Policy 4: As needed, review and revise the LGU agreement. This may include developing or updating an LGU contract or assuming the LGU role.

6.6 DRAINAGE SYSTEMS

In Corcoran, stormwater drainage is accomplished primarily through public and private ditches. County ditches have been under the authority of Hennepin County, but if requested, the Commission will review and reconsider the appointment of ditch authority. To support that goal, the City adopts the following policy.

Policy 1: Participate in Commission review of ditch authority.

6.7 CITY OPERATIONS AND PROGRAMMING

City operations and programs regarding stormwater management are documented primarily in its SWPPP and its Local Surface Water Management Plan (Local Plan), the latter reflecting many of the goals and policies of the Commission's WMP, including its goals for operations and programming. In support of those goals, the City adopts the following policies.

Policy 1: Participate in Technical Advisory Committee meetings and Regular meetings of the Elm Creek Watershed Commission.

Policy 2: Continue the City's stormwater education program, concentrating on high-priority topics identified in its SWPPP. Accept educational assistance from the Commission as it becomes available.

Policy 3: As feasible, support and assist the Commission's monitoring program to assess water quality, water quantity, and biotic integrity and to evaluate progress in meeting TMDL goals.

Policy 4: Participate in developing Commission Rules and Standards regarding stormwater management, and, as needed, review and revise local ordinances and policies for consistency with the Commission.

Policy 5: As needed, request technical or financial assistance, or both, from the Commission to support stormwater management or water quality improvement projects.

7.0 Administration

7.1 LOCAL PLAN APPROVAL

The City of Corcoran submitted this Local Plan for review and comment by the Elm Creek Watershed Management Commission and the Metropolitan Council. Following their approval, the Local Plan was approved by the Corcoran City Council on December 27, 2018.

The City acknowledges that after the Local Plan is approved by the Commission, the City must "adopt and implement its plan within 120 days and shall amend its official controls accordingly within 180 days." (Minn. Stat. 103B.235.) Official controls are defined by statute as

> ordinances and rules which control the physical development of a city, county or town or any part thereof or any detail thereof and implement the general objectives of the comprehensive plan. Official controls may include ordinances establishing zoning, subdivision controls, site plan regulations, sanitary codes, building codes and official maps. (Minn. Stat. 473.852, Subd. 9.)

With respect to this Local Plan, "official controls" includes the manure management, Wetland Overlay, and Shoreland Overlay ordinances discussed in Section 4.3.

7.2 INCLUSION IN COMPREHENSIVE PLAN

A summary of this Local Plan is included as a chapter in Corcoran's 2040 Comprehensive Plan. If the Local Plan is amended in such a way that it changes the summary, that chapter in the Comprehensive Plan will also be amended.

7.3 AMENDMENTS TO PLAN

Corcoran's Implementation Program and Capital Improvement Plan connect its Local Plan to the Commission's WMP, so changes in either part of the Local Plan may necessitate review by the Commission or the Metropolitan Council, or both.

In any of the bulleted circumstances below, Corcoran staff or its Commission representative will contact the Commission with pertinent information. If the Commission asks the Metropolitan Council for help responding to a change in the Local Plan, Corcoran will work with appropriate staff to provide any additional information requested. When agreement is reached regarding a change, Corcoran will amend its plan, if needed, by preparing replacement pages that show deleted text as stricken and new text as underlined, with new numbering if necessary and with the effective date of the amendment included.

- Any change to the Implementation Program (Chapter 5, Table 5-1) that
  - affects the year of implementation;
  - affects the funding source, if Commission assistance has been requested;
  - affects the cost estimate, if Commission assistance has been requested;
  - adds, eliminates, or substantially changes the scope of a program element; or
  - extends the duration of the Implementation Program, up to the year the Local Plan must be revised for inclusion in the next Comprehensive Plan.

- Any change to the Capital Improvement Plan (Chapter 5, Table 5-2) that
  - affects the schedule of the improvement;
  - affects the estimated cost of the improvement, if Commission assistance is requested;
  - affects the funding source, if Commission assistance is requested;
  - adds, eliminates, or substantially changes the nature of the improvement; or
  - extends the duration of the Capital Improvement Plan, up to the year the Local Plan must be revised for inclusion in the next Comprehensive Plan.

7.4 LOCAL PLAN REVISIONS

Minnesota Rules 8410 were amended in 2015 to change several aspects of plan development. One change affects the timing of Local Plan revisions. According to the amended rule, Corcoran's Local Plan must be revised at least once every ten years, in alignment with updates to its Comprehensive Plan. The Local Plan must be updated no more than two years before the Comprehensive Plan is updated, and it must be included as a chapter in the Comprehensive Plan. Corcoran can revise its Local Plan more frequently if it wishes. Regardless of the timing of the revision, the Local Plan must be distributed for comment and approved by the Commission before the City adopts it.

8.0 References

Balaban, N.H. 1989. C-04 Geologic atlas of Hennepin County, Minnesota. Minnesota Geological Survey. Retrieved from the University of Minnesota Digital Conservancy, http://hdl.handle.net/11299/58491. Plate 7: Sensitivity of Ground-Water Systems to Pollution, by James Piegat.

Board of Water and Soil Resources (BWSR). 2004. Wetland Conservation Act Manual. Available at https://www.leg.state.mn.us/docs/2007/other/070605.pdf.

Bonestroo. 2009. Local Surface Water Management Plan, City of Corcoran.

Cowardin, L., Carter, V., Golet, F.G., and LaRoe, E.T. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. Available at https://www.fws.gov/wetlands/documents/classification-of-wetlands-and-deepwater-habitats-of-the-united-states.pdf.

Elm Creek Watershed Management Commission (ECWMC). 2015. Third Generation Watershed Management Plan. Available at http://www.elmcreekwatershed.org/third-generation-plan.html.

Elm Creek Watershed Management Commission (ECWMC) and Minnesota Pollution Control Agency (MPCA). 2016. Elm Creek Watershed (Upper Mississippi River Basin) Watershed Restoration and Protection Strategy. Available at https://www.pca.state.mn.us/sites/default/files/wq-ws4-27a.pdf.

Great Lakes Integrated Sciences + Assessment (GLISA). Undated. Historical Climatology: Minneapolis-St. Paul, Minnesota. University of Michigan Climate Center and Michigan State University. Accessed at http://glisa.umich.edu/media/files/Minn-StPaulMN_Climatology.pdf.

Hennepin County. 2014. Ordinance 19: Subsurface Sewage Treatment System Standards. Adopted by the Hennepin County Board of Commissioners September 28, 1999. Amended February 25, 2014. Available at http://www.hennepin.us/your-government/ordinances/ordinance-19.

Hennepin County. 2017. Natural Resources Interactive Maps. Accessed in 2017 at https://gis.hennepin.us/naturalresources/map/.

Metropolitan Council. 2017. Map Gallery. Accessed 2017 at https://metrocouncil.org/Data-and-Maps/Maps/Map-Gallery.aspx.

Minnesota Department of Natural Resources (MNDNR). 1998. Natural Communities and Rare Species of Carver, Hennepin, and Scott Counties, Minnesota. Minnesota County Biological Survey Map Series No. 18. http://files.dnr.state.mn.us/eco/mcbs/maps/carver_hennepin_scott.pdf

Minnesota Department of Natural Resources (MNDNR). 2016. National Wetlands Inventory Update. Online map accessed August 2017 from http://www.dnr.state.mn.us/eco/wetlands/nwi_proj.html.

Minnesota Department of Natural Resources (MNDNR). 2017a. Ecological System Summaries and Class Factsheets – Wetland Forests. FPs63 Southern Rich Conifer Swamp Factsheet. Accessed July 2017 at http://www.dnr.state.mn.us/npc/wetforest.html.

Minnesota Department of Natural Resources (MNDNR). 2017b. LakeFinder web pages. Accessed July 2017 at http://www.dnr.state.mn.us/lakefind/index.html.

Minnesota Department of Natural Resources (MNDNR). 2017c. Shoreland Management Lake Classifications. Accessed August 2017 at http://www.dnr.state.mn.us/waters/watermgmt_section/shoreland/lake_shoreland_classifications.html.

Minnesota Department of Natural Resources (MNDNR). 2017d. Infested Waters List. Accessed August 2017 at http://www.dnr.state.mn.us/invasives/ais/infested.html.

Minnesota Pollution Control Agency (MPCA). 2013. The Condition of Minnesota's Groundwater, 2007-2011. Available at https://www.pca.state.mn.us/sites/default/files/wq-am1-06.pdf.

Minnesota Pollution Control Agency (MPCA). 2016a. Groundwater Protection Recommendations Report. Available at https://www.pca.state.mn.us/sites/default/files/lrwq-gw-1sy16.pdf.

Minnesota Pollution Control Agency (MPCA). 2016b. Twin Cities Metropolitan Area Chloride Management Plan. February 2016. Available at https://www.pca.state.mn.us/sites/default/files/wq-iw11-06ff.pdf.

Minnesota Pollution Control Agency (MPCA). 2017a. Surface water data for Jubert Lake. Accessed July 2017 at https://cf.pca.state.mn.us/water/watershedweb/wdip/waterunit.cfm?wid=27-0165-00.

Minnesota Pollution Control Agency (MPCA). 2017b. Impaired Waters Viewer. Accessed August 2017 at https://www.pca.state.mn.us/water/impaired-waters-viewer-iwav.

Minnesota Pollution Control Agency (MPCA). 2017c. "What's in my Neighborhood?" Accessed July 2017 at pca.state.mn.us/udgx680.

Ojakangas, R.W. 2009. Roadside Geology of Minnesota. Mountain Press Publishing Company, Missoula, Montana.

Wenck Associates, Inc. 2018. Rush Creek Headwaters Subwatershed Assessment. Prepared for the Elm Creek Watershed Management Commission.

Appendix A

Joint Powers Agreement with the Elm Creek Watershed Management Commission

AMENDED AND RESTATED
JOINT POWERS AGREEMENT ESTABLISHING
THE ELM CREEK. WATERSHED MANAGEMENT COMMISSION

RECITALS

WHEREAS, on May 12, 1993, pursuant to statutory authority, the Cities of Champlin, Corcoran, Dayton, Greenfield, Maple Grove, Medina, Plymouth and Rogers, the Town of Hassan, and the Hennepin Conservation District adopted a "Joint Powers Agreement for the Establishment of the Elm Creek Watershed Management Commission to Plan, Protect and Manage the Elm Creek Watershed and Adjacent Minor Watersheds" (the "Joint Powers Agreement"); and

WHEREAS, in 2001 the City of Greenfield withdrew from the Agreement; and

WHEREAS, the Cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth and Rogers, and the Town of Hassan, wish to amend and restate the Agreement's terms in this document.

NOW, THEREFORE, pursuant to the authority conferred upon the parties by Minn. Stat §§ 471.59 and 103B.201, et seq., the parties to this Agreement do mutually agree as follows:

SECTION ONE
DEFINITIONS

For purposes of this Agreement, each of the following terms, when used herein with an initial capital letter, will have the meaning ascribed to it as follows:

"Agreement" means the Joint Powers Agreement, as amended and restated in this document.

"Board" means the Board of Commissioners of the Commission.

"BWSR" means the Minnesota Board of Water and Soil Resources.

"Commissioner" means an individual appointed by a governmental unit to serve on the Board. The term Commissioner shall include both the representative and alternate representative appointed to serve on the Board.

"Elm Creek Watershed" or "Watershed" means the area within the mapped area delineated on the map filed with BWSR, as may be amended. A complete legal description defining the boundary of the Elm Creek Watershed is attached hereto and made apart hereof.

"Governmental Unit" means any signatory city or township.

"Member" means a governmental unit that enters into this Agreement.

"Watershed Management Organization ("WMO") means the organization created by this Agreement, the full name of which is "Elm Creek Watershed Management Commission." The Commission shall be a public agency of its respective governmental units.

SECTION TWO
ESTABLISHMENT

The parties create and establish the Elm Creek Watershed Management Commission. The Commission membership shall include the Cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth and Rogers, and the Town of Hassan. In addition to other powers identified in this Agreement, the Commission shall have all of the authority for a joint powers watershed management organization identified in Minn. Stat. § I03B.211.

SECTION THREE
PURPOSE STATEMENT

The purpose of this Agreement is to establish an organization within the Elm Creek Watershed to (a) protect, preserve, and use natural surface and groundwater storage and retention systems, (b) minimize public capital expenditures needed to correct flooding and water quality problems, (c) identify and plan for means to effectively protect and improve surface and groundwater quality, (d) establish more uniform local policies and official controls for surface and groundwater management, (e) prevent erosion of soil into surface water systems, (f) promote groundwater recharge, (g) protect and enhance fish and wildlife habitat and water recreational facilities, and (h) secure the other benefits associated with the proper management of surface and ground water, as identified in Minn. Stat. § 103B.201, including but not limited to aesthetic values when owned by the public or constituting public resources, as defined in Minn. Stat. Ch. 116B.

The Commission's Members agree to (a) provide a forum for exchanging information in the management of land use and land use techniques and control, (b) provide a forum for resolution of intergovernmental disputes relating to management and protection of the Elm Creek Watershed; and (c) cooperate on a united basis on behalf of all units of government within the Elm Creek Watershed with all other levels of government for the purpose of facilitating natural resource protection and management in the Watershed.

SECTION FOUR
BOARD OF COMMISSIONERS

4.1. Appointment. The governing body of the Commission shall be its Board. Each Member shall be entitled to appoint one representative to serve on the Board and one alternate who may sit when the representative is not in attendance, and said representative or alternative representative shall be called a "Commissioner."

4.2. Term. Each Member shall determine the term length for its Commissioner's appointment to the Board. Each Member agrees that it will not remove from the Board its appointed Commissioner before the expiration of his/her term except for just cause. The Commission and its Members shall fill all Board vacancies pursuant to Minn, Stat. §

103B.227, subd. 1 and 2, as may be amended from time to time.

4.3.Compensation. Commissioners shall serve without compensation from the Commission, but this shall not prevent a Member from providing compensation to its Commissioner for serving on the Board.

4.4. Officers. By the first meeting in March of each year, the Commission shall elect from its membership a chairperson, a vice-chairperson, a treasurer and a secretary and such other officers as it deems necessary to reasonably carry out the purposes of this Agreement. Except for the position of chairperson, any Commissioner may be elected to more than one office. All officers shall hold office for terms of one year and until their successors have been elected by the Commission, An officer may be reelected to the same office for unlimited terms. A vacancy in an office shall be filled from the Board membership by election for the remainder of the unexpired term of such office. The officers' duties include the following:

A. Chairperson. The Chairperson shall preside at all Board meetings and shall have all the same privileges of discussion, making motions and voting, as do other Commissioners. The Chairperson may delegate certain responsibilities to the Executive Secretary as necessary to carry out the duties of the office.

B. Vice-Chairperson. The Vice-Chairperson shall, in the absence or disability of the Chairperson, perform the duties and exercise the powers of the Chairperson.

C. Treasurer. The Treasurer shall have the custody of the funds and securities of the Commission and shall keep full and accurate accounts of receipts and disbursements in books belonging to the Commission and shall deposit all monies and other valuable effects in the name and to the credit of the Commission in such depository as may be designated by the Commission. He/she shall disburse funds of the Commission as approved by the Commission and shall render to the Commission at regular meetings, or as the Board may request, an account of all his/her transactions as Treasurer and of the financial condition of the Commission. The Treasurer may delegate certain duties to the Executive Secretary as necessary to carry out the duties of the office.

D. Secretary. The Secretary shall attend all Board meetings, shall act as clerk of such meetings, and shall record all votes and the minutes of all proceedings. He/she shall give notice of all Board meetings. The Secretary may delegate certain duties to the Executive Secretary as necessary to carry out the duties of the office.

E. Executive Secretary. The Commission may appoint an Executive Secretary to coordinate activities of the Commission, accept delegated duties by the Commission officers, and accept business duties not assigned to officers. All notices to the Commission shall be delivered or served at the office of the Executive Secretary.

4.5, Quorum and Voting. A minimum of four (4) Commissioners with voting privileges shall constitute a quorum. Once a quorum is present, a majority vote is required for approval on an action, unless as provided otherwise in this Agreement.

4.6.Meetings. The Board shall schedule meetings at least quarterly (every three months) on a uniform day and place selected by the Commission. Written notice of the location and time of all Commission meetings shall

be sent to all Commission representatives and alternate representatives and to the Clerk of each Member. Special meetings may be held at the call of the Chairperson or by any three Commissioners by giving not less than 72 hours written notice of the time, place and purpose of such meeting.

SECTION FIVE
COMMISSION POWERS AND DUTIES

5.1. Watershed Management Plan. The Commission shall develop a watershed management plan including a capital improvement program in conformance with Minn. Stat. § 103B.231. The Commission shall adopt the plan within 120 days after BWSR's approval of the plan. After adoption, the Commission shall implement the watershed management plan and enforce the regulations set out in the plan. A copy of the adopted plan shall be filed with the clerk of each Member governmental unit,

5.2.Local Water Management Plans. The Commission shall review Members' local water management plans as required by Minn. Stat. § 103B.235, subd. 3.

5.3.Review Services.

A. Where the Commission is authorized or requested to review and make recommendations on any matter, the Commission shall act on such matter in compliance with Minn. Stat. § 15.99,

B. The Commission may charge a reasonable fee for such review services. The Commission's standard fee schedule, as amended from time to time, will be a part of the Commission's Rules.

C. The Commission may charge an additional fee when it determines that a particular project will require extraordinary and substantial review services. Before undertaking such review services, the Commission shall provide the party to be charged the additional fee with written notice of the services to be performed and the additional fee therefor, Unless said party objects within 5 business days of receipt of such written notice to the amount of the additional fee to be charged, such review services shall be performed and the party shall be responsible for the cost thereof. If said party objects to the proposed additional fee for such services within 5 business days and the party and the Commission are unable to agree on a reasonable alternative amount for review services, such extraordinary and substantial review services shall not be undertaken by the Commission.

D. Upon request of any Member, the Commission shall review and evaluate any dispute between the Member and other unit(s) of government regarding land use and natural resource protection and management.

E. Where the Commission makes recommendations on any matter to a Member, a Member not acting in accordance with such recommendation shall submit a written statement of its reasons for doing otherwise to the

Commission within ten days of its decision to act contrary to the Commission's recommendation. The Commission shall review the written statement and, if determined insufficient by the Commission, request written clarification within an additional ten days.

5.4 Public Participation.

A. Technical Advisory Committee. A Technical Advisory Committee ("TAC") to the Commission is hereby created, TAC members and one or more alternate members shall be appointed by the governing body of each Member. TAC members may be, but need not be, Commissioners. TAC members shall serve at the pleasure of the governing body of each Member which appoints them and are not required to meet statutory qualifications for Commissioners. TAC members may attend and participate in all meetings of the Commission. TAC members shall not have the authority to make motions or vote on matters before the Commission, but shall otherwise have the rights of a Commissioner to question, discuss, debate and comment on all matters before the Commission.

B. Citizen Advisory Committee. If a need is determined by the Commission, the Commission will establish a Citizen Advisory Committee to the Commission,

5.5. Rules. The Commission shall adopt rules for (a) conducting its business, including but not limited to additional duties of the Commission's officers, (b) the scope of responsibilities of the Technical Advisory Committee and the Citizen Advisory Committee, if one is established, and (c) preparing the annual work plan.

5.6. Contracts. The Commission may make such contracts, and enter into any such agreements, as it deems necessary to make effective any power granted to it by this Agreement. No Commissioner shall receive a direct financial benefit from any contract made by the Commission. Every contract for the purchase or sale of merchandise, materials or equipment by the Commission shall be let in accordance with the Uniform Municipal Contracting Law (Minn. Stat. § 471.345) and the Joint Exercise of Powers statute (Minn. Stat. § 471.59). In accordance with Minn. Stat. § 471.59, subd. 3, contracts let and purchases made under this Agreement shall conform to the statutory requirements applicable to the Member cities with a population over 2,500.

5.7. Employment. The Commission may contract for services, may use staff of other governmental agencies, may use staff of the Members and may employ such other persons as it deems necessary. Where staff services of a Member are utilized, such services shall not reduce the financial contribution of such Member to the Commission's operating fund unless utilization of staff service is substantial and the Commission so authorizes.

5.8. Public/Private Organizations. The Commission may cooperate or contract with the State of Minnesota or any subdivision thereof or federal agency or private or public organization to accomplish the purposes for which it

is organized.

5.9. Annual Financial, Activity and Audit Reports; Newsletter. The Commission shall submit to its Members and BWSR a financial report, an activity report and an audit report for the preceding fiscal year, in compliance with state law. The Commission shall publish and distribute an annual newsletter in compliance with state law, The Commission shall transmit to the clerk of each Member copies of the reports/newsletter in a format ready for publication. Each Member shall publish/distribute the reports/newsletter as it deems necessary. All of the Commission's books, reports and records shall be available for and open to examination by any Member at all reasonable times.

5.10. Gifts, Grant, Loans. The Commission may, within the scope of this Agreement, accept gifts, apply for and use grants or loans of money or other property from the United States, the State of Minnesota, a unit of government or other governmental unit or organization, or any person or entity for the purposes described herein; may enter into any reasonable agreement required in connection therewith; may comply with any laws or regulations applicable thereto; and may hold, use and dispose of such money or property in accordance with the terms of the gift, grant, loan or agreement relating thereto.

5.11. Boundary Chance in the Elm Creek Watershed.

A. Enlargement. Proceedings for the enlargement of the Elm Creek Watershed shall be initiated by a request from affected Member(s) to the Commission, or as mandated by law. Such request should include a map and legal description of the affected area. In reviewing such a request, the Commission should consider, among other things, (a) whether the affected area is contiguous to the existing Elm Creek Watershed, (b) whether the affected area can be feasibly administered by the Commission; and (c) the reasons why it would be conducive to the public health and welfare to add the area to the existing Elm Creek Watershed. Upon deliberation, if it appears to the Commission that the enlargement of the Watershed as requested would be for the public welfare and public interest and the purpose of resource management would be served, or that in fact the enlargement is mandated by law, the Commission shall by its findings and order enlarge the Elm Creek Watershed and file a copy of said findings and order with the appropriate governmental offices.

B. Transfer of Territory. Proceedings to transfer territory that is within the Elm Creek Watershed to the jurisdiction of another watershed management organization or a watershed district shall be initiated by a request from affected Member(s) to the Commission, or as mandated by law. Such request should include a map and legal description of the affected area. Upon deliberation, if it appears to the Commission that the transfer of territory as requested would be for the public welfare and public interest and the purpose of resource management would be

served, the Commission shall by its findings and order change the Elm Creek Watershed boundaries accordingly and file a copy of said findings and order with the appropriate governmental offices.

5.12. Subdistricts. The Commission may define and designate drainage subdistricts within the Watershed and shall have authority to separate the Watershed into such different subdistricts and to allocate capital improvement costs to a subdistrict area if that subdistrict is the only area that materially benefits from the capital improvement.

5.13. Monitor Water Quality. The Commission will continue to monitor waterbodies and streams, to evaluate the success of its program to control non-point sources of pollution, and use the results of the water quality monitoring program to determine the progress towards these goals.

5,14. Ratification. The Commission may, and where required by this Agreement shall, refer matters to the governing bodies of the Members for ratification. Within 60 days, the governing bodies of the Members shall take action upon any matter referred for ratification.

5.15.Statutory Powers. The Commission may exercise all other powers necessary and incidental to the implementation of the purposes and powers set forth herein and as outlined and authorized by Minn, Stat. §§ I03B.201, et seq.

SECTION SIX
FINANCIAL MATTERS

6.1. Depositories/Disbursements. The Commission may collect and receive money and services subject to the provisions of this Agreement from the parties and from any other sources approved by the Commission and it may incur expenses and make expenditures and disbursements necessary and incidental to the effectuation of the purposes of this Agreement. The Board shall designate a national, state, or private bank or banks as a depository of Commission funds. Funds may be expended by the Commission in accordance with procedures established herein. Orders, checks and drafts shall be signed by two officers,

6.2. General Administration. Each voting Member agrees to contribute each year to a general fund to be used for general administration purposes including, but not limited to, salaries, rent, supplies, development on an overall plan, insurance, bonds, and to purchase and maintain devices to measure hydrological and water quality data. The funds may also be used for normal maintenance of facilities and capital improvements. The annual contribution by each voting Member shall be based on its share of the taxable market value of all real property within the Watershed to the total area in the Watershed.

6.3.Budget Approval and Appeal Process. On or before June 15 of each year, the Board shall adopt an operating budget for the following calendar year for the purpose of providing funds to operate the Commission's

business in accordance with its annual work plan. The operating budget shall never be greater than the equivalent of 0.02418% of total market value on all real property within the Watershed. Budget approval shall require a majority vote of all Commissioners eligible to vote. The Commission shall certify the budget on or before July 1 to the clerk of each Member governmental unit together with a statement of the proportion of the budget to be provided by each Member. The schedule of payments by the Members shall be determined by the Board in such a manner as to provide for an orderly collection of the funds needed.

The governing body of each Member agrees to review the budget, and the Board shall upon notice from any Member received prior to August 15, hear objections to the budget, and may, upon notice to all Members and after a hearing, modify or amend the budget (except the fee due cannot be increased), and then give notice to the Members of any and all modifications or amendments. Each Member agrees to provide the funds required by the budget and said determination shall be conclusive if no Member enters objections in writing on or before August 15. If objections are submitted to the Board, each Member agrees to provide the funds approved by the Board, after the Board has conducted the aforementioned hearing. Modifications or amendments to the original budget require a favorable vote by a majority of all Commissioners eligible to vote.

6.4. Supplemental Budget. Upon notice and hearing, the Board by a majority vote of all Commissioners eligible to vote may adopt a supplemental budget requiring additional payments by the Members within 60 days of its adoption. The operating budget, including any supplemental budget, shall never be greater than the equivalent of 0.02418% of total market value on all real property within the Watershed.

SECTION SEVEN
CAPITAL IMPROVEMENT PROGRAM

7.1. Assessments. If a capital improvement ordered by the Commission may result in payment from any Member, or if a capital improvement ordered by the Commission may result in a levy by a Member against privately or publicly owned land within the Watershed, said capital improvement shall follow the statutory procedure outlined in Minn. Stat. Ch. 429, except as herein modified.

7.2. Preliminary Reports/Public Hearings. For those improvements initiated by the Commission or so designated in the Commission's watershed management plan to be constructed by the Board, the Board shall secure from its engineers or some other competent person a preliminary report advising it whether the proposed improvement is feasible and as to whether it shall best be made as proposed or in connection with some other improvement and the estimated cost of the improvement as recommended,

The Board shall then hold a public hearing on the proposed improvement after mailed notice to the clerk of each Member governmental unit within the Watershed. The Commission shall not be required to mail or publish notice except by said notice to the clerk. Said notice shall be mailed not less than 45 days before the hearing, shall state the time and place of the hearing, the general nature of the improvement, the estimated total cost and the estimated cost to each Member governmental unit. The Board may adjourn said hearing to obtain further information, may continue said hearing pending action of the Member governmental units or may take such other action as it deems necessary to carry out the purpose of this Commission.

A resolution setting forth the order for a capital improvement project shall require a favorable vote by at least two-thirds of all Commissioners eligible to vote. In all cases other than to order a capital improvement project, a majority vote of all Commissioners eligible to vote shall be sufficient to adopt an action. The order shall describe the improvement, shall allocate in percentages the cost between the Member governmental units, shall designate the engineers to prepare plans and specifications, and shall designate the Member who will contract for the improvement.

After the Board has ordered the improvement or if the hearing is continued while the Member governmental units act on said proposal, it shall forward said preliminary report to all Member governmental units with an estimated time schedule for the construction of said improvement. The Board shall allow an adequate amount of time, and in no event less than 45 days, for each Member governmental unit to conduct hearings, in accordance with the provisions of the aforestated Chapter 429 or the charter requirements of any Member city, or to ascertain the method of financing which said Member governmental unit will utilize to pay its proportionate share of the costs of the improvement, Each Member governmental unit shall ascertain within a period of 90 days the method it shall use to pay its proportionate share of the costs.

If the Commission proposes to use Hennepin County's bonding authority as set forth in Minn. Stat. § I03B.251, or if the Commission proposes to certify all or any part of a capital improvement to Hennepin County for payment, then and in that event all proceedings shall be carried out in accordance with the provisions set forth in said Section 103B.251.

The Board shall not order and no engineer shall prepare plans and specifications before the Board has adopted a resolution ordering the improvement. The Board may direct one of its Members to prepare plans and specifications and order the advertising for bids upon receipt of notice from each Member governmental unit who will be assessed that it has completed its hearing or determined its method of payment or upon expiration of 90 days after the mailing of the preliminary report to the Members.

7.3. Appeals/Arbitration. Any Member governmental unit being aggrieved by the Board's determination as to the cost allocation of said capital improvement shall have 30 days after the Commission resolution ordering the improvement to appeal said determination. Said appeal shall be in writing and shall be addressed to the Board asking for arbitration. The determination of the Member's appeal shall be referred to a Board of Arbitration. The Board of Arbitration shall consist of three persons; one to be appointed by the Board of Commissioners, one to be appointed by the appealing Member governmental unit, and the third to be appointed by the two so selected. In the event the two persons so selected do no appoint the third person within 15 days after their appointment, then the Chief Judge of the Hennepin County District Court shall have jurisdiction to appoint, upon application of either or both of the two earlier selected, the third person to the Board of Arbitration. The third person selected shall not be a resident of any Member governmental unit and if appointed by the Chief Judge said person shall be a person knowledgeable in the subject matter. The arbitrators' expenses and fees, together with the other expenses, not including attorney fees, incurred in the conduct of the arbitration shall be divided equally between the Commission and the appealing Member. Arbitration shall be conducted in accordance with the Uniform Arbitration Act, Minn. Stat. Ch. 572.

7.4. Contracts for Capital Improvements. All contracts which are to be let as a result of the Board ordering a capital improvement, and for which two or more Member governmental units shall be responsible for the costs, shall be let in accordance with the provisions of Minn. Stat. § 429.041. The bidding and contracting of said work shall be let by any one of the Member governmental units, as ordered by the Board, after compliance with the statutory requirements. Contracts and bidding procedures shall comply with the legal requirements applicable to statutory cities.

The Commission shall not have the authority to contract in its own name for any improvement work for which a special assessment will be levied against any private or public property under the provisions of Chapter 429 or under the provisions of any Member city charter. These contracts shall be awarded by action of the governing body of a Member and shall be in the name of a Member governmental unit. This section does not preclude the Commission from proceeding under Minn. Stat. § 103B.251.

7.5.Contracts with Other Governmental Bodies. The Commission may exercise the powers set forth in Section 7.4 but said contracts for a capital improvement shall require a majority vote of all Commissioners eligible to vote,

7.6. Supervision. All improvement contracts shall be supervised by the entity awarding the contract. The Commission staff shall also be authorized to observe and review the work in progress and the Members agree to cooperate with the Commission staff in accomplishing its purposes. Representatives of the WMO shall have the right to enter upon the place or places where the improvement work is in progress for the purpose of making reasonable tests

and inspections. The Commission staff shall report and advise and recommend to the Board on the progress of the work.

7.7. Land Acquisition. The Commission shall not have the power of eminent domain. The Member governmental units agree that any and all easements or interests in land which are necessary will be negotiated or condemned in accordance with Minn. Stat. Ch. 117 by the unit wherein said lands are located, and each Member agrees to acquire the necessary easements or right-of-way or partial or complete interest in land upon order of the Board of Commissioners to accomplish the purposes of the improvement. All reasonable costs of said acquisition shall be considered as a cost of the improvement. If a Member government unit determines it is in the best interests of that Member to acquire additional lands, in conjunction with the taking of lands for storm and surface drainage or storage, or some other purpose, the costs of said acquisition will not be included in the improvement costs of the ordered project. The Board in determining the amount of the improvement costs to be assessed to each Member governmental unit may take into consideration the land use for which the additional lands are being acquired and may credit the acquiring municipality for said land acquisition to the extent that it benefits the other Members to this Agreement. Any credits may be applied to the cost allocation of the improvement project under consideration or the Board if feasible and necessary may defer said credits to a future project.

If any Member unit refuses to negotiate or condemn lands as ordered by the Board, any other Member may negotiate or condemn outside its corporate limits in accordance with Minn. Stat. Ch. 117. All Members agree that they will not condemn or negotiate for land acquisition to pond or drain storm and surface waters within another Member's corporate boundaries within the Watershed except upon order of the Board of Commissioners.

7.8. Capital Improvement Fund.

A. The Commission shall establish an improvement fund for each capital improvement project. Each Member agrees to contribute to said fund its proportionate share of the engineering, construction, legal and administrative costs as determined by the amount to be assessed against each Member as a cost of the improvement. The Board shall submit in writing a statement to each Member, setting forth in detail the expenses incurred by the Commission for each project,

Each Member agrees to pay its proportionate share of the cost of the improvement in accordance with the determination of the Board under Section 7.2. The Board, in its discretion, may require Members to make advance payments based upon estimated costs, subject to adjustment to reflect actual costs, or may bill the Members as costs are actually incurred. Members agree to pay billings within 30 days of receipt. The Board or the Member awarding the

contract shall advise other contributing Members of the tentative time schedule of the work and the estimated times when the contribution shall be necessary.

B. Notwithstanding the provisions of Section 7,8.A,, the Commission may fund all or part of the cost of a capital improvement contained in the capital improvement program of the plan in accordance with Minn. Stat. § 103B.251, The Commission and Hennepin County may establish a maintenance fund to be used for normal and routine maintenance of an improvement constructed in whole or in part with money provided by Hennepin County pursuant to Minn. Stat. § 103B.251. The levy and collection of an ad valorem tax levy for an improvement, payment of bonds, or maintenance shall be by Hennepin County based upon a tax levy resolution adopted by a majority vote of all eligible Members of the Board and remitted to the County on or before the date prescribed by law each year. If it is determined to levy for maintenance, the Commission shall be required to follow the hearing process established by Minn. Stat. Ch. 103D. Mailed notice shall also be sent to the clerk of each Member governmental unit at least 30 days before the hearing.

7.9. Capital Improvement Cost Allocation.

A. All costs of improvements designated in the Board's adopted watershed management plan for construction by the Board, which the Board determines will benefit only one Member, shall be paid for entirely by that Member.

B. All costs of improvements designated in the Board's adopted watershed management plan for construction by the Board, which the Board determines benefit more than one Member, shall he apportioned by the Board by the following bases:

(1) A negotiated amount to be arrived at by the Members who have lands in the subdistrict responsible for the capital improvement.

OR

(2) Based on each Member's share of the taxable market value of all real property within the Watershed to the total area within the Watershed.

OR

(3) Capital costs allocated under option (2) above may be varied by the Commission by a favorable vote by at least two-thirds of all Commissioners eligible to vote if (a) any Member community receives a direct benefit from the capital improvement which benefit can be defined as a lateral as well as a trunk benefit, or (b) the capital improvement provides a direct benefit to one or more Members which benefit is so disproportionate as to require in a sense of fairness a modification in the formula,

C. If the project is constructed and financed pursuant to Minn, Stat, § 103B.251, the Members understand and agree that said costs will be levied on all taxable property in the watershed as set forth in the statute.

D. Credits to any Member for lands acquired by said Member to pond or store storm and surface

water shall be allowed against costs as set forth in Section 7.7.

SECTION EIGHT
WITHDRAWAL FROM AGREEMENT

Withdrawal of any Member may be accomplished by filing written notice with the Commission and the other Members 60 days before the effective date of withdrawal. No Member may withdraw from this Agreement until the withdrawing Member has met its full financial obligations for the year of withdrawal and prior years,

SECTION NINE
DISSOLUTION OF COMMISSION

9.1. This Agreement may be terminated upon the unanimous consent of the parties. If the Agreement is to be terminated, a notice of the intent to dissolve the Commission shall be sent to Hennepin County and BWSR, at least 90 days before the date of dissolution,

9.2. In addition to the manner provided in Section 9.1 for termination, any Member may petition the Commission's Board to dissolve the Commission. Upon 90 days notice in writing to the clerk of each member governmental unit and to Hennepin County and BWSR, the Board shall hold a hearing and upon a majority vote of all Commissioners eligible to vote, the Board may by Resolution recommend that the Commission be dissolved, Said Resolution shall be submitted to each Member governmental unit and if ratified by three-fourths of the governing bodies of all eligible Members within 60 days, said Board shall dissolve the Commission allowing a reasonable time to complete work in progress and to dispose of personal property owned by the Commission.

9.3. Winding Up. Upon dissolution, all personal property of the Commission shall be sold and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the Members, Such distribution of Commission assets shall be made in approximate proportion to the total contributions to the Commission for such costs made by each Member. All payments due and owing for operating costs under Section 6.2, or other unfilled financial obligations, shall continue to be the lawful obligation of the Members. In no event may this Agreement be terminated until all of the planning and plan implementation provisions of the Act, which are required of a watershed management organization, have been completed.

SECTION TEN
MISCELLANEOUS PROVISIONS

10.1. Eminent Domain. The Commission shall not have the power of eminent domain and shall not own any interest in real property. All interests in lands shall be held in the name of the Member wherein said lands are located.

10.2. Special Assessments. The Commission shall not have the power to levy a special assessment upon any privately or publicly owned land. All such assessments shall be levied by the Member wherein said lands are located. The Commission shall have the power to require any Member to contribute the costs allocated or assessed according to the other provisions of this agreement.

10.3. Member's Construction Projects that Will Affect Elm Creek. Each Member agrees that it will not directly or indirectly collect or divert any additional surface water to or from Elm Creek or its tributaries without approval from the Commission. Such approval may be granted by the Commission for a Member to proceed with the construction or reconstruction of improvements within the individual corporate Member's boundaries and at said Member's sole cost upon a finding (a) that there is an adequate outlet, (b) that said construction is in conformance with the overall plan, and (c) that the construction will not adversely affect other Members.

10.4. Member Vote Suspension for Failure to Contribute. Any Member who is more than 60 days in default in contributing its proportionate share to the general fund shall have the vote of its Board representative suspended pending the payment of its proportionate share. Any Member who is more than 60 days in default in contributing its proportionate share of the cost of any improvement to the contracting Member shall upon request of the contracting Member have the vote of its Board representative suspended, pending the payment of its proportionate share. Any Member whose Board representative vote is under suspension shall not be considered as an eligible Member as such membership affects the number of votes required to proceed on any matter under consideration by the Board.

10.5. Amendment. The Commission may recommend changes and amendments to this Agreement to the Members. Amendments shall be acted upon by the Members within 90 days of referral. Amendments shall be evidenced by appropriate resolutions of the Members filed with the Commission and shall, if no effective date is contained in the amendment, become effective as of the date all such filings have been completed.

10.6.Termination of Prior Agreement. By executing this document, the parties hereby agree to terminate the prior joint powers agreement, adopted May 12, 1993.

10.7. Counterparts. This Agreement and any amendment may be executed in several counterparts and all so executed shall constitute one Agreement or amendment, binding on all of the parties hereto notwithstanding that all of the parties are not signatory to the original or the same counterpart.

10.8.Effective Date. This Agreement shall be in full force and effect when all governmental units delineated in Section 2 have executed this Agreement. All Members need not sign the same copy.

10.9. Duration. This agreement shall have an unlimited duration.

10.10. Statutory References. All statutory references include all future amendments.

CITY OF CHAMPLIN

By: _____
Its Mayor

Attest: _____
Its City Clerk

Dated: 11/10/2003

CITY OF CORCORAN

By: _____
Its Mayor

Attest: _____
Its City Clerk

Dated: November 13, 2003

CITY OF DAYTON

By: _____
Its Mayor

Attest: _____
Its City Clerk

Dated: 4-14-04

CITY OF MAPLE GROVE

By: _____
Its Mayor

Attest: _____
Its City Clerk

Dated: Dec. 15th, 2003

CITY OF MEDINA

By: _____
Its Mayor

Attest: _____
Its City Clerk

Dated: 11-18-2003

CITY OF PLYMOUTH

By: _____
Its Mayor

Attest: _____
Its City Clerk

Dated: 11-25-03

CITY OF ROGERS

By: _____
Its Mayor

Attest: _____
Its City Clerk

Dated: 5-25-04

TOWN OF HASSAN

By: _____
Chair of Town Board

Attest: _____
Its Town Clerk

Dated: Dec. 7, 2003

Appendix B

LGU Agreement with the Elm Creek Watershed Management Commission

RESOLUTION 1993 - 124

DESIGNATING THE LOCAL GOVERNMENT UNIT (LGU) FOR WETLAND ALTERATIONS AS REQUIRED BY THE WETLAND CONSERVATION ACT OF 1991

WHEREAS, the Wetland Conservation Act of 1991 was adopted by the Minnesota State Legislature, which required the Board of Water & Soil Resources (BWSR) to promulgate interim and permanent rules and regulations pertaining to wetland alterations; and

WHEREAS, the City of Corcoran designated the Elm Creek Watershed Management Commission to serve as its Local Government Unit (LGU) under the interim rules, which will be used until December 31, 1993; and

WHEREAS, the Act and the permanent rules require that each governmental unit (city or town) within the seven county metropolitan area indicate its willingness to serve as the LGU under the permanent rules or designate the water management organization to administer the rules; and

WHEREAS, the City Council of the City of Corcoran deems that it is in the City's best interest to appoint the Elm Creek Watershed Management Commission to serve as its LGU for wetland alterations within the City under the permanent rules; and

WHEREAS, the Elm Creek Watershed Management Commission has agreed to perform the tasks and responsibilities of the LGU for any member city which does not desire or agree to serve as the LGU for administration of the Act within its boundaries.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Corcoran to designate the Elm Creek Watershed Management Commission as the Local Government Unit to oversee wetland alterations within the watershed boundaries within the City under the permanent rules established by BWSR to administer the Wetland Conservation Act of 1991.

Moved by member Gmach, seconded by member Kluck

The following voted in favor of said resolution: Mayor Larkin, Council members Gmach, Kluck, Schleif.

The following voted against the same: None.

Whereupon said Resolution was declared carried.
Dated this 30th day of December, 1993.

Mayor

ATTEST:

City Administrator

Elm Creek
Watershed Management Commission

Rules and Standards

Adopted: October 8, 2014

Effective: January 1, 2015

Revised: October 14, 2015

ELM CREEK
WATERSHED MANAGEMENT COMMISSION
RULES AND STANDARDS

POLICY STATEMENT

The Elm Creek Watershed Management Commission is a Joint Powers Association of the State under the Minnesota Watershed Act, and a watershed management organization as defined in the Metropolitan Surface Water Management Act. These acts provide the Commission with power to accomplish its statutory purpose: the conservation, protection, and management of water resources in the boundaries of the watershed through sound scientific principles. The Commission has adopted a water resources management plan pursuant to the Acts. These Rules implement the plan's principles and objectives.

Land alteration and utilization can affect the rate and volume and degrade the quality of surface water runoff. Sedimentation from ongoing erosion and construction activities can reduce hydraulic capacity of waterbodies and degrade water quality. Water quality problems already exist in many waterbodies in the watershed. Most of these waterbodies have been designated by the State of Minnesota as Impaired Waters, and do not meet state water quality standards.

Activities that increase the rate or volume of stormwater runoff will aggravate existing flooding problems and contribute to new ones. Activities that degrade runoff quality will cause quality problems in receiving water. Activities that fill floodplain or wetland areas will reduce flood storage and hydraulic capacity of waterbodies, and will degrade water quality by eliminating the filtering capacity of such areas.

These Rules and Standards protect the public health, welfare, and natural resources of the watershed by regulating the alteration of land and waters in the watershed to 1) reduce the severity and frequency of high water, 2) preserve floodplain and wetland storage capacity, 3) improve the chemical and physical quality of surface waters, 4) reduce sedimentation, 5) preserve the hydraulic and navigational capacities of waterbodies, 6) promote and preserve natural infiltration areas, and 7) preserve natural shoreline features. In addition to protecting natural resources, these Rules and Standards are intended to minimize future public expenditures on problems caused by land and water alterations.

RELATIONSHIP WITH MUNICIPALITIES AND COUNTY

The Commission recognizes that the control and determination of appropriate land use is the responsibility of the municipalities. The Commission will review projects involving land-disturbing activities in accordance with these Rules and Standards. The Commission intends to be active in the regulatory process to ensure that water resources are managed in accordance with its goals and policies.

The Commission desires to provide technical advice to the municipalities in the preparation of local stormwater management plans and the review of projects that may affect water resources prior to investment of significant public or private funds.

RULE A. DEFINITIONS

For the purposes of these Rules, unless the context otherwise requires, the following words and terms shall have the meanings set forth below. References in these Rules to specific sections of the Minnesota Statutes or Rules include amendments, revisions or recodifications of such sections. The words "shall" and "must" are mandatory; the word "may" is permissive.

100 Year Event. The rainfall depth with a 1 percent chance of occurring in a given year.

Abstraction. Removal of stormwater from runoff, by such methods as infiltration, evaporation, transpiration by vegetation, and capture and reuse, such as capturing runoff for use as irrigation water.

Agricultural Activity. The use of land for the production of agronomic, horticultural or silvicultural crops, including dairy animals, food animals, nursery stock, sod, fruits, vegetables, flowers, cover crops, grains, Christmas trees, and for grazing.

Alteration or Alter. When used in connection with public waters or wetlands, any activity that will change or diminish the course, current, or cross-section of public waters or wetlands.

Applicant. Any person or political subdivision that submits an application to the Commission for a project review under these Rules.

Best Management Practices (BMPs). Techniques proven to be effective in controlling runoff, erosion and sedimentation including those documented in the Minnesota Construction Site Erosion and Sediment Control Planning Handbook (BWSR 1988), Protecting Water Quality in Urban Areas (MPCA 2000), and the Minnesota Stormwater Manual (MPCA 2005) as revised.

Biofiltration. Using living material to capture and/or biologically degrade or process pollutants prior to discharging stormwater, such as directing runoff through a vegetated buffer or to a rain garden or vegetated basin with an underdrain.

Bioretention. A terrestrial-based (upland, as opposed to wetland) water quality and water quantity control process. Bioretention employs a simplistic, site-integrated design that provides opportunity for runoff infiltration, filtration, storage and water uptake by vegetation.

Buffer Strip. An area of natural, unmaintained, vegetated ground cover abutting or surrounding a watercourse or wetland.

BWSR. The Minnesota Board of Water and Soil Resources.

Commission. The Elm Creek Watershed Management Commission.

Commissioners. The Board of Commissioners of the Elm Creek Watershed Management Commission.

Compensatory Storage. Excavated volume of material below the floodplain elevation required to offset floodplain fill.

County. Hennepin County, Minnesota.

Dead Storage. The permanent pool volume of a water basin or the volume below the runout elevation of a water basin.

Detention Basin. Any natural or manmade depression for the temporary storage of runoff.

Development. Any proposal to subdivide land, any land-disturbing activity or creation of impervious surface.

Directly Connected Impervious Surface. Any hard surface (rooftop, driveway, sidewalk, roadway, etc.) from which runoff is not subject to loss beyond initial abstraction before being routed to the downstream collection and conveyance system.

Disturbance. See Land Disturbing Activity.

Drain or Drainage. Any method for removing or diverting water from waterbodies, including excavation of an open ditch, installation of subsurface drainage tile, filling, diking, or pumping.

Erosion. The wearing away of the ground surface as a result of wind, flowing water, ice movement, or land disturbing activities.

Erosion and Sediment Control Plan. A plan of BMPs or equivalent measures designed to control runoff and erosion and to retain or control sediment on land during the period of land disturbing activities in accordance with the standards set forth in these Rules.

Excavation. The artificial removal of soil or other earth material.

Fill. The deposit of soil or other material by artificial means.

Filtration. A process by which stormwater runoff is captured, temporarily stored, and routed through a filter bed to improve water quality and slow down stormwater runoff.

Floodplain. The area adjacent to a waterbody that is inundated during a 1% chance (100-year) flood as defined by the FEMA Flood Insurance Study for the member city or the Commission's flood study.

Impaired Water. A waterbody that does not meet state water quality standards and that has been included on the MPCA Section 303(d) list of Impaired Waters of the state.

Impervious Surface. A surface compacted or covered with material so as to be highly resistant to infiltration by runoff. Impervious surface shall include roads, driveways and parking areas,

whether or not paved, sidewalks greater than 3 feet wide, patios, tennis and basketball courts, swimming pools, covered decks and other structures. Open decks with joints at least ¼ inch wide, areas beneath overhangs less than 2 feet wide, and sidewalks 3 feet or less wide shall not constitute impervious surfaces under these Rules.

Infiltration. The passage of water into the ground through the soil.

Infiltration Area. Natural or constructed depression located in permeable soils that capture, store and infiltrate the volume of stormwater runoff associated with a particular design event.

Interested Party. A person or political subdivision with an interest in the pending subject matter.

Land Disturbing Activity. Any change of the land surface to include removing vegetative cover, excavation, fill, grading, and the construction of any structure that may cause or contribute to erosion or the movement of sediment into waterbodies. The use of land for agricultural activities, or improvements such as mill and overlay or concrete rehabilitation projects that do not disturb the underlying soil shall not constitute a land disturbing activity under these Rules.

Landlocked Basin. A basin that is 1 acre or more in size and does not have a natural outlet at or below the 1% chance (100-year) flood elevation as determined by the 1% chance (100-year), 10-day runoff event.

Low Floor. The finished surface of the lowest floor of a structure.

Member City. Any city wholly or partly within the Commission's boundary that has executed the Joint Powers Agreement.

MnDOT. The Minnesota Department of Transportation.

MPCA. The Minnesota Pollution Control Agency.

Municipality. Any city wholly or partly within the Commission's boundary.

NPDES. National Pollutant Discharge Elimination System.

NURP. The Nationwide Urban Runoff Program developed by the Environmental Protection Agency to study stormwater runoff from urban development.

Ordinary High Water Level (OHW). The elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the OHW level is the elevation of the top of the bank of the channel. An OHW established for a waterbody by the Minnesota Department of Natural Resources will constitute the OHW under this definition.

Owner. The owner of a parcel of land or the purchaser under a contract for deed.

Parcel. A parcel of land designated by plat, metes, and bounds, registered land survey, auditor's subdivision, or other accepted means and separated from other parcels or portions by its designation.

Person. Any individual, trustee, partnership, unincorporated association, limited liability company or corporation.

Political Subdivision. A municipality, county or other political division, agency or subdivision of the state.

Project. A space, parcel, or parcels of real property owned by one or more than one person which is being or is capable of being developed or redeveloped as a single project.

Public Health and General Welfare. Defined in Minnesota Statutes, Section 103D.011, Subdivisions 23 and 24.

Public Waters. Any waters as defined in Minnesota Statutes, Section 103G.005, Subdivision 15.

Public Waters Wetland. Any wetland as defined in Minnesota Statutes, Section 103G.005, Subdivision 15a.

Redevelopment. Any proposal to re-subdivide land, or any land-disturbing activity or addition of impervious surface to a developed site.

Runoff. Rainfall, snowmelt or irrigation water flowing over the ground surface.

Sediment. Soil or other surficial material transported by surface water as a product of erosion.

Sedimentation. The process or action of depositing sediment.

Shoreland Protection Zone. Land located within a floodplain or within 1,000 feet of the OHW of a public water or public waters wetland or 300 feet of a public waters watercourse.

Site. A space, parcel, or parcels of real property owned by one or more than one person which is being or is capable of being developed or redeveloped as a single project.

Standard. A required level of quantity, quality, or value.

Stormwater Management Plan. A plan for the permanent management and control of runoff prepared and implemented in accordance with the standards set forth in these Rules.

Structure. Anything manufactured, constructed or erected which is normally attached to or positioned on land, including portable structures, earthen structures, walls, roads, water and storage systems, drainage facilities and parking lots.

Subdivision or Subdivide. The separation of a parcel of land into two or more parcels.

TMDL. A Total Maximum Daily Load is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. "TMDL" can also refer to a study that calculates that load, or to the allocation of that allowable load to its various sources. An Implementation Plan may be part of the TMDL study or it may be a separate document that sets forth the steps that will be taken to achieve the TMDL.

Volume Management. The retention and abstraction of a certain volume of stormwater runoff onsite through techniques such as infiltration, evapotranspiration, and capture and reuse.

Water Basin. An enclosed natural depression with definable banks capable of containing water that may be partly filled with public waters.

Waterbody. All water basins, watercourses and wetlands as defined in these Rules.

Watercourse. Any natural or improved stream, river, creek, ditch, channel, culvert, drain, gully, swale, or wash in which waters flow continuously or intermittently in a definite direction.

Water Resources Management Plan. The watershed management plan for the Commission adopted and implemented in accordance with Minnesota Statutes, Section 103B.231.

Watershed. Region draining to a specific watercourse or water basin.

Wetland. Land transitional between terrestrial and aquatic systems as defined in Minnesota Statutes, Section 103G.005, Subdivision 19.

Wetland Conservation Act (WCA). Minnesota Wetland Conservation Act of 1991 as amended.

RULE B. PROCEDURAL REQUIREMENTS

1. **APPLICATION REQUIRED**. Any person or political subdivision undertaking an activity for which a project review is required by these Rules shall first submit to the Commission a project review application, design data, plans, specifications, fees, and such other information and exhibits as may be required by these Rules. Applications shall be signed by the owner, or the owner's authorized agent, except for activities of a political subdivision which may be signed by either the owner or the general contractor. All project review applications must be authorized by the municipality where the proposed project is located.

2. **FORMS**. Project review applications shall be submitted on forms provided by the Commission. Forms are available at the Commission office or Web site.

3. **ACTION BY COMMISSION**. The Commission shall act within 60 days after receipt of a complete application, including all required information, exhibits and fees. If a state or federal law or court order requires a process to occur before the Commission acts on an application, or if an application requires prior approval of a state or federal agency, the deadline for the Commission to act is extended to 60 days after completion of the required process or the required prior approval is granted. The Commission may extend the initial 60-day period by providing written notice of the extension to the applicant. The extension may not exceed 60 days unless approved by the applicant.

4. **SUBMITTAL**. A complete project review application with all required information and exhibits shall be filed with the Commission at least 14 calendar days prior to the scheduled meeting date of the Commission. Late or incomplete submittals will be scheduled to a subsequent meeting date.

5. **CONDITIONS**. A project review may be approved subject to reasonable conditions to assure compliance with these Rules. The conditions may include a requirement that the applicant and owner enter into an agreement with the member city in a form acceptable to the Commission to a) specify responsibility for the construction and future maintenance of approved structures or facilities, b) document other continuing obligations of the applicant or owner, c) grant reasonable access to the proper authorities for inspection, monitoring and enforcement purposes, d) affirm that the Commission or other political subdivisions can require or perform necessary repairs or reconstruction of such structures or facilities, e) require indemnification of the Commission for claims arising from issuance of the approved project review or construction and use of the approved structures or facilities, and f) reimburse the reasonable costs incurred to enforce the agreement. Project reviews and agreements may be filed for record to provide notice of the conditions and continuing obligations.

6. **ISSUANCE OF PROJECT REVIEWS**. The Commission will issue a project review approval only after the applicant has satisfied all requirements of these Rules and paid all required fees.

7. **VALIDITY**. Issuance of a project review approval based on plans, specifications, or other data shall not prevent the Commission from thereafter requiring the correction of errors in the approved plans, specifications and data, or from preventing any activity being carried on thereunder in violation of these Rules.

8. **MODIFICATIONS**. The applicant shall not modify the approved activity or plans and specifications on file with the Commission without the prior approval of the Commission.

9. **INSPECTION AND MONITORING**. With permission of the property owner and under the authority of the member city, the Commission may perform such field inspections and monitoring of the approved activity as the Commission deems necessary to determine compliance with the conditions of the project review and these Rules. Any portion of the activity not in compliance shall be promptly corrected. In applying for a project review, the applicant consents to entry upon the land for field inspections and monitoring, or for performing any work necessary to bring the activity into compliance.

10. **SUSPENSION OR REVOCATION**. The Commission may suspend or revoke a project review approved under these Rules whenever the project review approval is issued in error or on the basis of incorrect information supplied, or in violation of any provision of these Rules, or if the preliminary and final project approvals received from the municipality or county are not consistent with the conditions of the approved project review.

11. **EXPIRATION OF COMMISSION APPROVALS.** An approved project review shall expire and become null and void if the approved activity is not commenced within one year from date of approval, or if the approved activity is suspended or abandoned for a period of one year from the date the activity originally commenced. With the approval of the affected member city, applicants may apply for an extension of that period if the city review process is extended beyond the usual review period. Before an activity delayed for one year or more can recommence, the project approval must be renewed. Any applicant may apply for an extension of time to commence the approved activity under an unexpired project review approval.

    An application for renewal or extension must be in writing, and state the reasons for the renewal or extension. Any plan changes and required fees must be included with the application. There must be no unpaid fees or other outstanding violations of the approval being renewed or extended. An application for extension must be received by the Commission at least 30 days prior to the approval's expiration. The Commission shall consider the application for renewal or extension on the basis of the Rules in effect on the date the application is being considered. The Commission may extend the time for commencing the approved activity for a period not exceeding one year upon finding that circumstances beyond the control of the applicant have prevented action from being taken.

12. **SEVERABILITY**. If any provision of these Rules is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of these Rules shall not be affected thereby.

RULE C. GENERAL STANDARDS

1. **POLICY**. It is the policy of the Commission to protect the water resources of the watershed by requiring that all activities within the watershed comply with minimum standards for the protection of water quality and the environment.

2. **REGULATION.**

    a) All land disturbing activities, whether requiring a project review under these Rules or otherwise, shall be undertaken in conformance with BMPs.

    b) Project reviews are required of any land disturbing activity meeting the review thresholds set forth in Rule D Section 2.

    c) In areas that drain to Impaired Waters, TMDL Implementation Plans may include site-specific requirements for any land-disturbing activities that are in addition to these rules and standards.

    d) No person shall conduct land-disturbing activities without protecting adjacent property and waterbodies from erosion, sedimentation, flooding, or other damage.

    e) Development shall be planned and conducted to minimize the extent of disturbed area, runoff velocities, and erosion potential, and to reduce and delay runoff volumes. Disturbed areas shall be stabilized and protected as soon as possible and facilities or methods used to retain sediment on-site.

    f) Existing natural watercourses and vegetated soil surfaces shall be used to convey, store, filter, and retain runoff before discharge into public waters or a stormwater conveyance system.

    g) Runoff from roof gutter systems shall discharge onto lawns or other pervious surfaces to promote infiltration where possible.

    h) Use of fertilizers and pesticides in the shoreland protection zone shall be so done as to minimize runoff into public waters by the use of earth material, vegetation, or both. No phosphorus fertilizer shall be used unless a soil nutrient analysis shows a need for phosphorus or in the establishment of new turf.

    i) When development density, topographic features, and soil and vegetation conditions are not sufficient to adequately handle runoff using natural features and vegetation, various types of constructed facilities such as diversions, settling basins, skimming devices, dikes, waterways, and ponds may be used. The Commission encourages designs using surface drainage, vegetation and infiltration rather than buried pipes and man-made materials and facilities.

j) Whenever the Commission determines that any land disturbing activity has become a hazard to any person or endangers the property of another, adversely affects water quality or any waterbody, increases flooding, or otherwise violates these Rules, the Commission shall notify the member city where the problem occurs and the member city shall require the owner of the land upon which the land disturbing activity is located, or other person or agent in control of such land, to repair or eliminate such condition within the time period specified therein. The owner of the land upon which a land disturbing activity is located shall be responsible for the cleanup and any damages from sediment that has eroded from such land. The Commission may require the owner to submit a project review application under these Rules before undertaking any repairs or restoration.

RULE D. STORMWATER MANAGEMENT

1. POLICY. It is the policy of the Commission to control excessive rates and volumes of runoff by:

a) Requiring that peak runoff rates not exceed existing conditions or the capacity of downstream conveyance facilities or contribute to flooding or streambank erosion.

b) Managing subwatershed discharge rates and flood storage volumes to be consistent with the goals of the Commission's water resources management plan and the local water resources management plans.

c) Controlling runoff rates by the use of on-site or if feasible regional detention or infiltration facilities.

d) Reviewing stormwater management structures based on the 1% (100-year) critical storm event for the drainage area.

e) Routing runoff to water treatment ponds or other acceptable facilities before discharging into waterbodies.

f) Promoting the use of natural resources for storing runoff and improving water quality and other amenities where appropriate.

g) Promoting natural infiltration of runoff.

2. REGULATION. No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for the following types of projects without first submitting to and obtaining approval of a project review from the Commission or the city in which the project is located that incorporates a stormwater management plan for the activity, development or redevelopment:

a) Plans of any land development or site development that disturbs more than 1 acre of land.

b) Linear projects that create one acre or more of new impervious surface must meet all Commission requirements for the net new impervious surface. Sidewalks and trails that

do not exceed twelve feet (12'0") in width, are not constructed with other improvements, and have a minimum of five feet (5'0") of vegetated buffer on both sides are exempt from Commission requirements

c) Plans of any land development or individual site development adjacent to or containing a lake, wetland, or a natural or altered watercourse as listed in the Hennepin County wetland inventory or the final inventory of Protected Waters and Wetlands for Hennepin County, as prepared by the DNR.

d) Any culvert installation or replacement, bridge construction, stream cross-section alteration, or activity requiring a DNR Waters Permit on Elm, Rush, North Fork Rush, or Diamond Creeks or their tributaries.

e) Plans for any land development or site development within the 1% chance (100-year) floodplain as defined by the Flood Insurance Study for the member city or the Commission's flood study.

f) Plans of any land development or site development regardless of size, if such review is requested by a member city.

g) Land disturbing activity that drains to more than one watershed, for that portion of the site draining into the Elm Creek Watershed.

3. CRITERIA. Stormwater management plans shall comply with the following criteria regarding runoff rate restrictions, volume control requirements, and water quality requirements.

a) A hydrograph method based on sound hydrologic theory will be used to analyze runoff for the design or analysis of flows, volumes, water quality, and water levels.

b) *Runoff rates* for the proposed activity shall not exceed existing runoff rates for the 2-year, 10-year, and 100-year critical storm events and rainfall distribution for the project location as set forth in NOAA Atlas 14 Volume 8, published June 2013, or its successor, using the online NOAA Precipitation Frequency Data Server or a similar data source. Applicant must document the location and event depths used. If an approved local water management plan requires more restrictive rate control, then the more restrictive rate shall govern. Runoff rates may be restricted to less than the existing rates when necessary for the public health and general welfare of the watershed.

i) If detention basins are used to control rate of runoff they shall be designed to provide:

(1) An outlet structure to control the 2-year, 10-year, and 100-year critical storm events to predevelopment runoff rates. Said outlet structure will be required to control critical storm events to less than predevelopment runoff rates if downstream facilities have insufficient capacity to handle the increased flow.

(2) Alternative to (1), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required rate control. This means that no rate control may be required for an

individual development provided there is a regional facility designed and constructed to accommodate the flow from this property.

(3) An identified overflow spillway sufficiently stabilized to convey a 1% (100-year) critical storm event.

(4) A normal water elevation above the OHW of adjacent waterbodies.

(5) Access for future maintenance.

(6) An outlet skimmer to prevent migration of floatables and oils for at least the two year storm event.

(7) The low floor elevation shall be at minimum two feet above the critical event 100-year elevation and at minimum one foot above the emergency overflow elevation of nearby waterbodies and stormwater ponds.

ii) Regional detention basins may be used to manage peak flow rates and meet water quality objectives when feasible.

iii) Analysis of flood levels, storage volumes and flow rates for waterbodies and detention basins shall be based on the range of rainfall and snow melt duration producing the critical flood levels and discharges, whichever is most critical.

iv) Landlocked water basins may be provided with outlets that:

(1) Retain a hydrologic regime complying with floodplain and wetland alterations.

(2) Provide sufficient storage below the outlet run-out elevation to retain back-to-back 100-year, 24-hour rainfalls and runoff above the highest anticipated groundwater elevation and prevent damage to property adjacent to the basin.

(3) Do not create adverse downstream flooding or water quality conditions.

c) Stormwater runoff volume must be *infiltrated/abstracted* onsite in the amount equivalent to one point one inch (1.1") of runoff generated from new impervious surface.

i) Applicant must minimize the creation of new impervious surface, reduce existing impervious surfaces where possible, and minimize the amount of directly connected impervious surface.

ii) When using infiltration for volume reduction, runoff must be infiltrated within 48 hours. Infiltration volumes and facility sizes shall be calculated based on the measured infiltration rate determined by a double-ring infiltrometer test(s) conducted to the requirements of ASTM Standard D3385 at the proposed bottom elevation of the infiltration area. Other testing methods may be used with the approval of the Commission's Engineer. The measured infiltration rate shall be divided by the appropriate correction factor selected from the Minnesota Stormwater Manual. This site investigation must be conducted by a licensed soil scientist or engineer.

iii) A post-construction percolation test must be performed on each infiltration practice and must demonstrate that the constructed infiltration rate meets or exceeds the design infiltration rate prior to project acceptance by the city.

iv) Infiltration areas will be limited to the horizontal areas subject to prolonged wetting.

v) Areas of permanent pools tend to lose infiltration capacity over time and will not be accepted as an infiltration practice.

vi) Stormwater runoff must be pretreated to remove solids before discharging to infiltration areas to maintain the long term viability of the infiltration areas.

vii) Design and placement of infiltration BMPs shall be done in accordance with the Minnesota Department of Health guidance "Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas," as amended.

viii) Constructed bioretention and infiltration practices such as rain gardens, infiltration trenches, and infiltration benches shall not be used in:

(1) Fueling and vehicle maintenance areas;

(2) Areas with less than 3 feet separation from the bottom of the infiltration system to the elevation of seasonal high groundwater;

(3) Areas with runoff from industrial, commercial and institutional parking lots and roads and residential arterial roads with less than 5 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater;

(4) Areas within 400 feet of a community water well, within 100 feet of a private well, or within a delineated 1-year time of travel zone in a wellhead protection area;

(5) Sites documented to contain contaminated soils or groundwater.

ix) Credit towards compliance with the abstraction requirement in (c) may be achieved by:

(1) Meeting post construction soil quality and amendment depth requirements. Areas that will be subjected to clearing, grading, or compaction that will not be covered by impervious surface, incorporated into a drainage facility, or engineered as structural fill or slope may be included in the credit calculation if they meet post construction soil quality and amendment depth requirements. Soil amendment areas become part of the site's storm drainage system, and must be protected by a utility and drainage easement and be included in the site's utility maintenance agreement. The applicant may compute a credit of 0.5 inches over the soil amendment area and apply that toward the abstraction volume requirement.

(a) A minimum 8-inch depth of compost amended soil or imported topsoil shall be placed in all areas of the project site being considered for the abstraction

credit. Before the soil is placed, the subsoil must be scarified (loosened) at least 4 inches deep, with some incorporation of the amended soil into the existing subsoil to avoid stratified layers.

(b) Soil amendment may be achieved by either mixing 2 inches of approved compost into the 8 inches of soil depth, or by mixing a custom-calculated amount of compost to achieve 8 inches of uncompacted soil depth with a minimum organic content of five percent.

(c) The amended areas must pass a 12-inch probe test during the site final inspection, in accordance with the Commission's testing procedure. Once amended, soil areas must be protected from recompaction.

(2) Preserving undisturbed forest or grassland conservation areas. Conservation areas must remain undisturbed during construction and must be protected by a permanent conservation easement prescribing allowable uses and activities on the parcel and preventing future development. A long-term vegetation management plan describing methods of maintaining the conservation area in a natural vegetative condition must be submitted with the stormwater management plan. The applicant may compute a credit of 0.5 inches over the conservation area and apply that toward the abstraction volume requirement.

(3) Providing wetland buffers in excess of minimum requirements. Areas eligible for credit must meet all wetland buffer requirements, must be monumented and shown on the construction plans. The applicant may compute a credit of 0.5 inches over the excess buffer area and apply that toward the abstraction volume requirement.

(4) Disconnecting impervious surface by redirecting runoff across a pervious surface or into an engineered bioinfiltration facility. Impervious disconnection must be designed to prevent any reconnection of runoff with the storm drain system. The applicant may subtract the disconnected impervious surface area from the total impervious surface area used to compute the required abstraction volume.

x) Alternative to (c), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required volume management. This means that no volume management may be required for an individual development provided there is a regional facility designed and constructed to accommodate the volume from this property.

d) Where infiltration is not advisable or infeasible due to site conditions, *biofiltration* must be provided for that part of the abstraction volume that is not abstracted by other BMPs. Where biofiltration is infeasible, at a minimum filtration through a medium that incorporates organic material, iron fillings, or other material to reduce soluble phosphorus must be provided.

e) There shall be *no net increase in total phosphorus (TP) or total suspended solids (TSS)* from pre-development land cover to post-development land cove. Pre-development land cover is defined as the predominant land cover over the previous 10 years. The TP and TSS export coefficients to be used to calculate predevelopment and post-development land use loadings are set forth in Commission project review guidance.

i) Full infiltration of one point one (1.1) inches of runoff from all impervious surface will satisfy (e).

ii) If it is not feasible to achieve the full 1.1 inch infiltration requirement, a combination of BMPs may be used to achieve the no-net-increase requirement.

iii) If permanent sedimentation and water quality ponds are used they shall be designed to the Wet Pond Design Standards set forth on Appendix A to these Rules and provide:

(1) Water quality features consistent with NURP criteria and best management practices.

(2) A permanent wet pool with dead storage of at least the runoff from a 2.5-inch storm event.

iv) Alternative to (e), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required treatment. This means that no treatment may be required for an individual development provided there is a regional facility designed and constructed to accommodate the flow from this property.

4. WAIVERS.

a) The Commission may waive the on-site runoff rate, volume and water quality control design criteria as noted above, if a municipality has an off-site stormwater facility that provides equivalent control and treatment of runoff that conforms to Commission standards.

b) The design criteria for infiltration may be waived for sites with total impervious surface of less than one acre if infiltration BMPs have been incorporated to the maximum extent possible.

5. EXHIBITS. The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format). All plans must be signed by a licensed professional engineer registered in Minnesota.

a) Property lines and delineation of lands under ownership of the applicant.

b) Delineation of the subwatershed contributing runoff from off-site, proposed and existing subwatersheds on-site, emergency overflows and watercourses.

c) Proposed and existing stormwater facilities location, alignment and elevation.

d) Delineation of existing on-site wetland, marsh, shoreland and floodplain areas.

e) Where infiltration or filtration is used as a stormwater management practice, identification, description, results of double-ring infiltrometer tests, and permeability and approximate delineation of site soils and seasonal high groundwater elevation in both existing and proposed as-developed condition.

f) Existing and proposed ordinary high and 1% chance (100-year) water elevations on-site.

g) Existing and proposed site contour elevations at 2-foot intervals, referenced to NAVD (1988 datum). If NAVD 1988 is not used, applicant must specify the datum used and the appropriate conversion factor.

h) Construction plans and specifications of all proposed stormwater management facilities, including design details for outlet controls.

i) Runoff volume and rate analysis for the 2-year, 10-year, and 100-year critical storm events, existing and proposed.

j) Pre-construction and post-construction annual runoff volume (ac-ft), annual total phosphorus (lbs/yr), and annual total suspended solids (lb/yr).

k) All hydrologic, water quality and hydraulic computations made in designing the proposed stormwater management facilities.

l) A narrative describing the pre-and post-construction drainage conditions and the post-construction BMPs incorporated in the plans.

m) Applications requesting a soil management credit must include a Soil Management Plan (SMP) that shall include an 11" x 17" or larger site map indicating areas where soils will be amended, and calculations for soil volumes to be stockpiled and amounts and specifications of amendment or topsoil to be imported to achieve specified minimum organic matter content.

n) Delineation of any ponding, flowage or drainage easements, or other property interests, to be dedicated for stormwater management purposes.

6. **MAINTENANCE**. All stormwater management structures and facilities shall be maintained in perpetuity to assure that the structures and facilities function as originally designed. The owner of any water quality treatment device if not a governmental unit shall provide to the member city, in a form acceptable to the Commission, a recordable agreement detailing an operations and maintenance plan that assures that the structure(s) will be operated and maintained as designed.

7. **EASEMENTS**. The member city shall obtain from the applicant, in form acceptable to the Commission, recordable temporary and perpetual easements for ponding, flowage and drainage purposes over hydrologic features such as waterbodies, wetlands, buffers, floodplain, and stormwater basins and other permanent BMPs. The easements shall include the right of reasonable access for inspection, monitoring, maintenance and enforcement purposes.

8. **COVENANTS**. The Commission may require as a condition of project review approval that the member city shall require that the land be subjected to restrictive covenants or a conservation easement, in form acceptable to the Commission, to prevent the future expansion of impervious surface and the loss of infiltration capacity.

RULE E. EROSION AND SEDIMENT CONTROL

1. **POLICY**. It is the policy of the Commission to control runoff and erosion and to retain or control sediment on land during land disturbing activities by requiring the preparation and implementation of erosion and sediment control plans.

2. **REGULATION**. No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for which a project review is required under Rule D without first submitting to and obtaining approval of a project review from the Commission that incorporates an erosion and sediment control plan for the activity, development or redevelopment.

3. **CRITERIA**. Erosion and sediment control plans shall comply with the following criteria:

a) Erosion and sediment control measures shall be consistent with best management practices as demonstrated in the most current version of the MPCA manual "Protecting Water Quality in Urban Areas," and shall be sufficient to retain sediment on-site.

b) Erosion and sediment controls shall meet the standards for the General Permit Authorization to Discharge Storm Water Associated with Construction Activity Under the National Pollutant Discharge Elimination System/State Disposal System Permit Program Permit MN R100001 (NPDES General Construction Permit) issued by the Minnesota Pollution Control Agency, except where more specific requirements are required.

c) All erosion and sediment controls shall be installed before commencing the land disturbing activity, and shall not be removed until completion.

d) The activity shall be phased when possible to minimize disturbed areas subject to erosion at any one time.

4. **EXHIBITS**. The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format). Erosion and sediment control plans must be prepared by a qualified professional.

a) An existing and proposed topographic map showing contours on and adjacent to the land, property lines, all hydrologic features, the proposed land disturbing activities, and the locations of all runoff, erosion and sediment controls and soil stabilization measures.

b) Plans and specifications for all proposed runoff, erosion and sediment controls, and temporary and permanent soil stabilization measures.

c) Detailed schedules for implementation of the land disturbing activity, the erosion and sediment controls, and soil stabilization measures.

d) Detailed description of the methods to be employed for monitoring, maintaining and removing the erosion and sediment controls, and soil stabilization measures.

e) Soil borings if requested by the Commission.

5. MAINTENANCE. The project review applicant shall be responsible for proper operation and maintenance of all erosion and sediment controls and soil stabilization measures, in conformance with best management practices and the NPDES permit. The project review applicant shall, at a minimum, inspect and maintain all erosion and sediment controls and soil stabilization measures daily during construction, weekly thereafter, and after every rainfall event exceeding 0.5 inches, until vegetative cover is established.

RULE F. FLOODPLAIN ALTERATION

1. POLICY. It is the policy of the Commission to prevent and control flooding damage by:

a) Preserving existing water storage capacity below the 100-year critical flood elevation on all waterbodies in the watershed to minimize the frequency and severity of high water.

b) Minimizing development in the floodplain that will unduly restrict flood flows or aggravate known high water problems.

c) Requiring compensatory storage for floodplain fill.

2. REGULATION. No person or political subdivision shall alter or fill land below the 100-year critical flood elevation of any public waters watercourse, public waters wetland, or other wetland without first obtaining an approved project review from the Commission.

3. CRITERIA.

a) Floodplain alteration or filling shall not cause a net decrease in flood storage capacity below the projected 1% (100-year) critical flood elevation or alter the timing of flooding unless it is shown that the proposed alteration or filling, together with the alteration or filling of all other land on the affected reach of the waterbody to the same degree of encroachment as proposed by the applicant, will not cause high water or aggravate flooding on other land and will not unduly restrict flood flows.

b) All new structures shall be constructed with the low floor at the elevation required in the municipality's ordinance, however, in no case shall the low floor be less than two feet above the regulatory elevation.

4. EXHIBITS. The following exhibits shall accompany the project review` application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format):

a) Site plan showing boundary lines, delineation and existing elevation contours of the work area, ordinary high water level, and 1% (100-year) critical flood elevation. All elevations shall be referenced to the NAVD 1988 datum. If NAVD 1988 is not used, applicant must specify the datum used and the appropriate conversion factor.

b) Grading plan showing any proposed elevation changes.

c) Preliminary plat of any proposed subdivision.

d) Determination by a registered professional engineer of the 100-year critical flood elevation before and after the proposed activity.

e) Computation of the change in flood storage capacity as a result of the proposed alteration or fill.

f) Erosion and sediment control plan which complies with these Rules.

g) Soil boring logs and report if available.

5. EXCEPTIONS. If a municipality has adopted a floodplain ordinance that prescribes an allowable degree of floodplain encroachment, the applicable ordinance shall govern the allowable degree of encroachment and no project review will be required under this Floodplain Alteration Rule.

RULE G. WETLAND ALTERATION

1. POLICY. It is the policy of the Commission to preserve and protect wetlands for their water quality, stormwater storage, habitat, aesthetic, and other attributes by:

a) Achieving no net loss in the quantity, quality and biological diversity of wetlands in the watershed.

b) Increasing the quantity, quality and biological diversity of wetlands in the watershed by restoring or enhancing diminished or drained wetlands.

c) Enforcing mitigation of direct or indirect impacts from activities that destroy or diminish the quantity, quality and biological diversity of watershed wetlands.

d) Replacing affected wetlands where sequencing demonstrates that avoidance is not feasible.

2. REGULATION. No person or political subdivision shall drain, fill, excavate or otherwise alter a wetland without first obtaining the approval of a wetland replacement plan from the local government unit with jurisdiction over the activity. Mitigation of wetland impacts will be considered in the following sequence: 1) mitigated by enhancing the impacted wetland; 2) mitigated within the subcatchment of the impacted wetland; 3)

mitigated in the drainage area of the impacted wetland; 4) mitigated in the watershed of the impacted wetland; 5) mitigated through purchase of wetland bank credits.

3. **CRITERIA**.

a) Any drainage, filling, excavation or other alteration of a wetland shall be conducted in compliance with Minnesota Statutes, section 103G.245, the Wetland Conservation Act, and regulations adopted thereunder.

b) A wetland may be used for stormwater storage and treatment only if pre-treatment is provided and the use will not adversely affect the function and public value of the wetland as determined by the local government unit.

c) Other activities which would change the character of a wetland shall not diminish the quantity, quality or biological diversity of the wetland.

4. **LOCAL GOVERNMENT UNIT**. The Commission will serve as the local government unit (LGU) for administration of the Wetland Conservation Act (WCA) for those cities that have designated the Commission to serve in that capacity. If a member city has not designated the Commission as the LGU for the administration of the WCA, they shall be responsible for administering the WCA. MnDOT serves as the LGU on its right of way.

RULE H. BRIDGE AND CULVERT CROSSINGS

1. **POLICY**. It is the policy of the Commission to maintain channel profile stability and conveyance capacity by regulating crossings of watercourses for driveways, roads and utilities.

2. **REGULATION**. No person or political subdivision shall construct or improve a road, driveway or utility crossing across any public waters watercourse or county ditch without first submitting to the Commission and receiving approval of a project review.

3. **CRITERIA**. Crossings shall:

a) Retain adequate hydraulic capacity to pass the 100-year flow and maintain the 100-year flow profile, if available.

b) Mimic the existing base flow (1-year, 2-year) conditions.

c) Not adversely affect water quality.

d) Represent the "minimal impact" solution to a specific need with respect to all reasonable alternatives.

e) Allow for future erosion, scour, and sedimentation maintenance considerations.

f) If the project proposes changing the FEMA FIS profile, a FEMA map revision must be obtained.

g) If the project requires a DNR Work in Public Waters permit, the conditions of that permit must be satisfied.

4. **EXHIBITS**. The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format):

a) Construction plans and specifications.

b) Analysis prepared by a registered professional engineer showing the effect of the project on hydraulic capacity and water quality.

c) An erosion and sediment control plan that complies with these Rules.

5. **MAINTENANCE**.

a) The maintenance, reconstruction and stabilization of any public crossing shall be the responsibility of the political subdivision with jurisdiction over the crossing.

b) The maintenance, reconstruction and stabilization of any private crossing shall be the responsibility of the owner of the crossing.

c) If a crossing over any public waters watercourse is determined by the Commission to be causing significant erosion, the Commission may notify the member city where said crossing is located and the member city may order the owner of the crossing to make necessary repairs or modifications to the crossing and outlet channel.

RULE I. BUFFER STRIPS

1. **POLICY**. It is the policy of the Commission to maintain the water quality and ecological functions provided by watercourses, lakes and wetlands by requiring the development of vegetated buffers around watercourses, lakes and wetlands where development and redevelopment occurs, and to encourage the installation of vegetated buffers around all watercourses and wetlands. Vegetative buffers reduce the impact of surrounding development and land use on watercourse, lake and wetland functions by stabilizing soil to prevent erosion, filtering sediment from runoff, and moderating water level fluctuations during storms. Buffers provide essential habitat for wildlife. Requiring buffers recognizes that watercourse, lake and wetland quality and function are related to the surrounding upland.

2. **REGULATION**. No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for which a project review is required under Rule D on land that contains or is adjacent to a watercourse, lake or wetland without first submitting to and obtaining approval of a project review from the Commission that incorporates a vegetated buffer strip between the development or redevelopment and the watercourse or wetland.

3. **GENERAL PROVISIONS**.

a) This Rule shall apply to all lands containing or abutting watercourses, lakes or wetlands that are subject to a project review under these Rules. Watercourses, lakes and wetlands shall be subject to the requirements established herein, and other applicable federal, state and local ordinances and regulations. If a municipality has a buffer strip requirement that has been reviewed and approved by the Commission, the municipal regulation shall have precedence over the Commission's Rules.

b) An applicant shall determine whether any watercourse, lake or wetland exists, and shall delineate the boundary for any wetland on the land. An applicant shall not be required to delineate wetlands on adjacent property, but must review available information to estimate the wetland boundary.

c) Documentation identifying the presence of any watercourse, lake or wetland on the applicant's land, including wetland delineation and buffer strip vegetation evaluation, must be provided to the Commission with a project review application.

d) Wetland and buffer strip identifications and delineations shall be prepared in accordance with state and federal regulations.

4. **CRITERIA**. The following standards apply to all lands that contain or abut a watercourse, lake or wetland:

a) BMPs shall be followed to avoid erosion and sedimentation during land disturbing activities.

b) When a buffer strip is required the applicant shall, as a condition to issuance of an approved project review:

i) Submit to the member city, in a form acceptable to the Commission, a recordable conservation easement for protection of approved buffer strips. The easement shall describe the boundaries of the watercourse or wetland and buffer strips, identify the monuments and monument locations, and prohibit any of the alterations set forth in Paragraph 5(e) below and the removal of the buffer strip monuments within the buffer strip or the watercourse or wetland.

ii) Submit to the member city, in a form acceptable to the Commission, an executed buffer maintenance plan and agreement for the first two growing seasons following establishment, and providing an escrow or an alternate surety to assure successful vegetation establishment.

iii) Install the wetland monumentation required by Paragraph 7 below.

c) All open areas within the buffer strip shall be seeded or planted in accordance with Paragraph 8 below. All seeding or planting shall be completed prior to removal of any erosion and sediment control measures. If construction is completed after the end of the growing season, erosion and sediment control measures shall be left in place and all disturbed areas shall be mulched for protection over the winter season.

5. **BUFFER STRIPS.**

a) A buffer strip shall be maintained around the perimeter of all watercourses, lakes or wetlands. The buffer strip provisions of this Rule shall not apply to any parcel of record as of the date of this Rule until such parcel is developed or redeveloped or unless required by a previous project review. The Commission does, however, strongly encourage the installation of buffer strips on all parcels in the watershed.

b) Buffer strips on Elm Creek, Rush Creek, North Fork Rush Creek, and Diamond Creek shall be an average of 50 feet wide and a minimum of 25 feet wide, measured from the top of bank. Buffer strips on other watercourses, lakes, and wetlands shall be an average 25 feet wide and a minimum of 10 feet wide. It is recommended that all structures have a minimum 15 foot setback from the buffer strip.

c) Buffer strips shall apply whether or not the watercourse or wetland is on the same parcel as a proposed development.

d) Buffer areas disturbed by grading operations must be finish graded to a slope of 6:1 or less or an increase in width of five (5) feet for each one (1) foot decrease in horizontal width (i.e., a 25 required foot buffer width at a 5:1 slope must be 30 feet wide, 4:1 must be 35 feet wide, and 3:1 must be 40 feet wide.)

e) Buffer strip vegetation shall be established and maintained in accordance with Paragraph 8 below. Buffer strips shall be identified within each parcel by permanent monumentation in accordance with Paragraph 7 below.

f) Subject to Paragraph 5(g) below, alterations including building, storage, paving, mowing, plowing, introduction of noxious vegetation, cutting, dredging, filling, mining, dumping, grazing livestock, agricultural production, yard waste disposal or fertilizer application, are prohibited within any buffer strip. Noxious vegetation shall be removed to meet state standards. Alterations would not include plantings that enhance the natural vegetation or selective clearing or pruning of trees or vegetation that are dead, diseased or pose similar hazards.

g) The following activities shall be permitted within any buffer strip, and shall not constitute prohibited alterations under Paragraph 5(f) above:

i) Use and maintenance of an unimproved access strip through the buffer, not more than 20 feet in width, for recreational access to the watercourse, lake or wetland and the exercise of riparian rights.

ii) Placement, maintenance, repair or replacement of utility and drainage systems that exist on creation of the buffer strip or are required to comply with any subdivision approval or building permit obtained from the municipality or county, so long as any adverse impacts of utility or drainage systems on the function of the buffer strip have been avoided or minimized to the extent possible.

iii) Construction, maintenance, repair, reconstruction, or replacement of existing and future public roads crossing the buffer strip, so long as any adverse impacts of the road on the function of the buffer strip have been avoided or minimized to the extent possible.

6. ALTERNATE WETLAND PROTECTION METHODS.

a) Should application of the buffer standards in Paragraph 5 above render a parcel of record as of the date of this Rule unbuildable based on current city ordinances, the Watershed engineer may allow alternative methods to protect the wetland. Such methods must include a buffer strip no less than ten feet wide, supplemented by redirection of drainage to a wider area of buffer, or to a Best Management Practice such as a rain garden or vegetated swale.

b) The use of alternative wetland protection methods will be evaluated as part of the review of a stormwater management plan under these Rules. Alternative wetland protection methods must be in keeping with the spirit and intent of this Rule.

7. MONUMENTATION. A monument shall be required at each parcel line where it crosses a buffer strip and shall have a maximum spacing of 200 feet along the edge of the buffer strip. Additional monuments shall be placed as necessary to accurately define the edge of the buffer strip. A monument shall consist of a post and a buffer strip sign meeting Commission standards. The signs shall include warnings about mowing, disturbing or developing the buffer strip.

8. VEGETATION.

a) Where acceptable natural vegetation exists in buffer strip areas, the retention of such vegetation in an undisturbed state is required unless an applicant receives approval to replace such vegetation. A buffer strip has acceptable natural vegetation if it:

i) Has a continuous, dense layer of native vegetation that has been uncultivated or unbroken for at least 5 consecutive years; or

ii) Has an overstory of native trees and/or shrubs that has been uncultivated or unbroken for at least 5 consecutive years; or

iii) Contains a mixture of the plant communities described in Subparagraphs 8(a)(i) and (ii) above that has been uncultivated or unbroken for at least 5 years.

b) Notwithstanding the performance standards set forth in Paragraph 8(a), the Commission may determine existing buffer strip vegetation to be unacceptable if:

i) It contains undesirable plant species including but not limited to common buckthorn, reed canary grass, or species on the Minnesota State Noxious Weeds List; or

ii) It has topography that tends to channelize the flow of runoff; or

iii) For some other reason it is unlikely to retain nutrients and sediment.

iv) Where buffer strips are not vegetated or have been cultivated or otherwise disturbed within 5 years of the project review application, such areas shall be replanted and maintained with native vegetation. The buffer strip plantings must be identified on the project review application. Acceptable buffer strip design and planting methods are detailed in the reference document "Restoring and Managing Native Wetland and Upland Vegetation" (Jacobson 2006, prepared for BWSR and MnDOT).

c) Buffer strip vegetation shall be established and maintained in accordance with the requirements found in this Paragraph. During the first two full growing seasons, the owner must replant any buffer strip vegetation that does not survive. The owner shall be responsible for reseeding and/or replanting if the buffer strip changes at any time through human intervention or activities. At a minimum the buffer strip must be maintained as a "no mow" area.

9. ENCROACHMENT.

a) Buffer strips must be kept free of all materials, equipment and structures, including fences and play equipment. Buffer strips must not be grazed, cropped, logged or mown except as approved by the Commission. The topography of the buffer strips shall not be altered by any means, including paving, plowing, cutting, dredging, filling, mining, or dumping.

b) Variances.

i) Only variances meeting the standards and criteria set forth in Rule K shall be granted.

ii) Variances shall not be granted that would circumvent the intent and purposes of this Rule.

RULE J. FEES

1. POLICY. The Commission finds that it is in the public interest to require applicants to pay the cost of administering and reviewing project review applications, and inspecting approved activities to assure compliance with these Rules, rather than using the Commission's annual administrative levy for such purposes. The Commission shall by resolution establish a schedule of fees that may be amended from time to time to reflect the cost of providing each service.

2. APPLICATION. Each application for the issuance, transfer or renewal of a project review recommendation under these Rules shall be accompanied by an application fee to defray the cost of processing the application.

3. REVIEW. A project review applicant under these Rules shall pay a fee for the cost of the review and analysis of the proposed activity, including services of engineering, legal, and

other consultants. The review fee shall be payable upon the submission of the project review application.

4. **WETLAND MITIGATION PLAN**. A project review applicant under these rules shall pay a fee for the cost of the review and analysis of a proposed activity involving a wetland mitigation plan in a municipality where the Commission is the LGU. The fee is to cover the costs of engineering, legal, and other consultants, and shall be payable upon the submission of the project review application. Should the cost of said wetland mitigation plan review exceed the review fee, the application shall deposit such additional sums as are needed to pay such costs. Failure to pay such costs is grounds to deny the application or suspend review.

5. **WETLAND MITIGATION PLAN MONITORING**. A project review applicant under these rules in a municipality where the Commission is the LGU shall deposit an escrow to cover the cost of Commission monitoring and annual monitoring plan review for the five-year period. If the escrow amount is insufficient to cover the costs the Commission may require additional funds from the applicant.

6. **WETLAND MITIGATION SECURITY DEPOSIT**. A project review applicant under these rules in a municipality where the Commission is the LGU shall provide a security to assure that the replacement plan is followed. The amount of the security shall be calculated on a case-by-case basis based on the estimated cost of construction, follow up and contingency. The security may also include an amount determined by the Commission to be sufficient to protect the public in the event the replacement plan does not succeed.

7. **DEPOSITS**. The Commission will maintain an accounting for all deposits made under this Rule. No interest will be paid to applicants for funds held in deposit.

RULE K. VARIANCES

1. **WHEN AUTHORIZED**. The Commission may grant variances from the literal provisions of these Rules. A variance shall only be granted when in harmony with the general purpose and intent of the Rules in cases where strict enforcement of the Rules will cause practical difficulties or particular hardship, and when the terms of the variance are consistent with the Commission's water resources management plan and Minnesota Statutes, chapter 103D.

2. **HARDSHIP**. "Hardship" as used in connection with the granting of a variance means the land in question cannot be put to a reasonable use if used under the conditions allowed by these Rules; the plight of the applicant is due to circumstances unique to the land and not created by the applicant; and the variance, if granted, will not adversely affect the essential character of the locality and other adjacent land. Economic considerations alone shall not constitute a hardship if a reasonable use for the land exists under the terms of these Rules. Conditions may be imposed in the granting of a variance to insure

compliance and to protect adjacent land and the public health and general welfare of the Commission.

3. **PROCEDURE**. An application for a variance shall describe the practical difficulty or particular hardship claimed as the basis for the variance. The application shall be accompanied with such surveys, plans, data and other information as may be required by the Commission to consider the application.

4. **VIOLATION**. A violation of any condition imposed in the granting of a variance shall be a violation of these Rules and shall automatically terminate the variance.

RULE L. ENFORCEMENT

1. **ADMINISTRATION**. These Rules shall be administered by the Commission. The Commission shall consider applications required under these Rules and determine whether such applications should be approved, approved with conditions, or denied. Such determination shall be communicated to the member city in which the project lies and to the applicant.

2. **IMPLEMENTATION BY MEMBER CITIES**. It shall be the duty of each city to enforce and implement such determinations by the Commission under the various permitting processes and regulations of the city. Each city shall make such amendments to its official controls, regulations, and permitting processes as are necessary to provide it with the authority to enforce and implement the determinations of the Commission.

3. **FAILURE BY CITY TO IMPLEMENT**. Upon a determination by the Commission that a city has not enforced or implemented a decision of the Commission in the administration of these Rules, the Commission shall notify the city of such determination and direct that appropriate action be taken by the city. If the city does not take such action, the Commission may take such legal steps as are available to it to effect such enforcement or implementation.

RULE M. AMENDMENT OF THESE RULES

1. **AMENDMENT.** These rules may be amended from time to time by the Commission. Proposed amendments shall be reviewed by the member cities prior to adoption unless the Commission determines that said amendment is of a minor or technical nature. Minor or technical amendments include recodifying or streamlining the rules, clarifying policies, or other actions that do not adversely affect a member city or impact the Commission's or member cities' ability to meet their water management plan goals.

2. **PROCEDURE.** Proposed major amendments to these rules shall be first considered by the Commission and then forwarded to the member cities for a 45-day comment period. Following that comment period, the Commission shall consider the proposed amendment and the comments received for approval. All amendments shall be made by resolution.

ELM CREEK WATERSHED MANAGEMENT COMMISSION
RULES APPENDIX A
WET POND DESIGN STANDARDS

Permanent Pool Depth	Average 4', maximum 10'
Permanent Pond Surface Area	Greater of 2% of watershed's impervious area and 1% of the watershed
Permanent Pool Length to Width Ratio	3:1 or greater with an irregularly shaped shoreline
Side Slopes	10:1 for 10-foot bench centered on the normal water elevation and between 3:1 and 20:1 elsewhere
Side Slope Stabilization	Native seed with mix 33-261 (MnDOT 310), 34-271 (BWSR W2) or equivalent between NWL and HWL, provide 10' buffer where possible with mix 35-221 (MnDOT 330 (dry)) or mix 35-241 (MnDOT 350 (mesic))
Floatable Removal	Skimming device discharging at no greater than 0.5 fps during the 2-year event or a submerged outlet with a minimum 0.5 feet from the normal water level to the crown of the outlet pipe
Sediment Accumulation Area	Provide maintenance pads to remove sediment deltas at inlets
Permanent Pool Volume	A 4-foot mean depth and equal to 2.5-inch rain over the watershed
Source	Protecting Water Quality in Urban Areas (MPCA 2000)

SUMMARY

Elm Creek Watershed Management Commission
Management Rules and Standards*

	Standard	Purpose	Applicability
Project Reviews Required	A Stormwater Management Plan consistent with all applicable management rules and standards* must be reviewed and approved prior to commencement of land disturbing activities.	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes; improve water quality; protect water resources; and promote natural infiltration of runoff.	All development or redevelopment projects of the following types: • Projects disturbing more than one acre of land • Projects within the 100-year floodplain • Projects adjacent to or within a lake, wetland, or watercourse • Any land disturbing activity requested by a member city to be reviewed regardless of project size • Linear projects creating more than one acre of new impervious surface
Rate Control	Peak runoff rates may not exceed existing rates for the 2-year, 10-year, and 100-year critical storm event; or the capacity of downstream conveyance facilities; or contribute to flooding	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes	All projects disturbing more than one acre of land. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Volume Manage-ment	1.1 inch of impervious surface runoff must be abstracted on site within 48 hours	To control excessive rates and volumes of runoff; manage discharge rates and flood storage volumes; protect stream channels from erosion; and promote natural infiltration of runoff.	All projects disturbing more than one acre of land. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Erosion and Sediment Control	Erosion control plan using Best Management Practices (BMPs) and consistent with the NPDES General Construction Permit is required	To control erosion and sediment so as to protect conveyance systems and water quality	All projects requiring a project review
Floodplain Alteration	Compensating storage is required to mitigate floodplain fill	To prevent and control flooding damage	All development or redevelopment projects within the 100-year floodplain regardless of project size
Water Quality	No net increase in total phosphorus and total suspended sediment annual load	To protect water quality	All projects disturbing more than one acre of land. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Buffer Strips	Vegetated buffer strips average 50 foot, minimum 25 foot wide adjacent to Elm, Diamond, Rush, and North Fork Rush Creeks; average 25 foot, minimum 10 foot wide adjacent to lakes, wetlands and other watercourses	To protect water quality; reduce erosion and sedimentation; reduce pollutants from runoff and debris; and provide habitat	All projects requiring a project review that contain or abut a wetland or watercourse
Wetland	Wetlands may not be drained, filled, excavated, or otherwise altered without an approved wetland replacement plan from the local government unit (LGU) with jurisdiction	To preserve and protect wetlands for their water quality, stormwater storage, habitat, aesthetic, and other attributes	All land disturbing activity impacting a wetland as defined by the Wetland Conservation Act (WCA)

*Important Note: Approved TMDL Implementation Plans may have additional site-specific requirements.

Appendix D

Maple Hill Estates Discharge Monitoring Reports

Maple Hill Estates
2017 DMR Data - Total Phosphorus (TP)

Main Discharge Station (Station SD001); average wet weather flow rate = 0.03 (mgd?)

Month	Total P, mg/l, avg	Total P, kg/d, avg	Flow, mgd, avg	Flow, total, Mgal
February	2.1	0.21	0.026	0.738
March	2.1	0.23	0.026	0.82
April	1.9	0.19	0.026	0.79
May	1.5	0.14	0.026	0.817
June	2.4	0.25	0.027	0.805
July	1.9	0.18	0.026	0.818
August	1.9	0.18	0.026	0.812
Average	**1.97**	**0.20**		**0.80**

Assume 0.20 kg P/day x 365 days = 73 kg P/year
73 kg P/year x 2.2 lb/kg = 161 pounds P/year

Assume 800,000 gal/month
800,000 gallons/month x 3.8 liters/gallon = 3,040,000 liters/month
3,040,000 liters/month x 1.97 mg P/liter = 5,988,800 mg P/month = 6.0 kg P/month
6.0 kg P/month x 2.2 lb/kg = 13.2 lb P/month x 12 months = 158 pounds P/month

Influent Waste Stream (Station WS001); average wet weather flow rate = 0.03 (mgd?)

Month	Total P, mg/l, avg
February	5.7
March	4.7
April	3.8
May	3.8
June	4.6
July	5.5
August	11

Maple Hill Estates
2017 DMR Data - Total Suspended Solids (TSS)

Main Discharge Station (Station SD001); average wet weather flow rate = 0.03 (mgd?)

Month	TSS, kg/day, avg	TSS, mg/L, avg
February	1	9.5
March	2.3	22
April	0.7	6.5
May	1.5	15
June	0.9	8.5
July	1.2	13
August	1	1
Average	**1.23**	**10.79**

Influent Waste Stream (Station WS001); average wet weather flow rate = 0.03 (mgd?)

Month
February
March
April
May
June
July
August

Assume 1.23 kg TSS/day x 365 days = 449 kg TSS/year
449 kg TSS/year x 2.2 lb/kg = 987 pounds TSS/year

Assume 800,000 gal/month (from TP worksheet)
800,000 gallons/month x 3.8 liters/gallon = 3,040,000 liters/month
3,040,000 liters/month x 10.79 mg TSS/liter = 32,801,600 mg TSS/month = 32.8 kg TSS/month
32.8 kg TSS/month x 2.2 lb/kg = 72 lb TSS/month x 12 months = 866 pounds TSS/month

Average of 987 and 866 = 926 pounds TSS/month

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20080001, SD 001	Main Discharge	0.03	2017	February	2/28/2017	Flow	Null	Null	0.026	mgd	CalMoAvg	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: (07010206) Mississippi River - Twin Cities HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
									0.028	mgd	CalMoMax	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: (07010206) Mississippi River - Twin Cities HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
									0.738	Mgal	CalMoTot	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: (07010206) Mississippi River - Twin Cities HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
						Phosphorus, Total (as P)	Null	Null	0.21	kg/d	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: (07010206) Mississippi River - Twin Cities HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
									2.1	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: (07010206) Mississippi River - Twin Cities HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
						Solids, Total Suspended (TSS)	3.4	Null	1	kg/d	CalMoAvg	

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	February	2/28/2017	Solids, Total Suspended (TSS)	5.1	Null	1.3	kg/d	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
							30	Null	9.5	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
							45	Null	13	mg/L	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
				March	3/31/2017	Flow	Null	Null	0.028	mgd	CalMoAvg	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
									0.028	mgd	CalMoMax	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
									0.82	Mgal	CalMoTot	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	March	3/31/2017	Phosphorus, Total (as P)	Null	Null	0.23	kg/d	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
									2.1	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
						Solids, Total Suspended (TSS)	3.4	Null	2.3	kg/d	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
							5.1	Null	3.8	kg/d	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
							30	Null	22	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
							45	Null	36	mg/L	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	April	4/30/2017	Flow	Null	Null	0.026	mgd	CalMoAvg	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
									0.028	mgd	CalMoMax	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
									0.79	Mgal	CalMoTot	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
						Phosphorus, Total (as P)	Null	Null	0.19	kg/d	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
									1.9	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
						Solids, Total Suspended (TSS)	3.4	Null	0.7	kg/d	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	April	4/30/2017	Solids, Total Suspended (TSS)	5.1	Null	0.7	kg/d	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
							30	Null	6.5	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
							45	Null	7	mg/L	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
				May	5/31/2017	Flow	Null	Null	0.026	mgd	CalMoAvg	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
									0.028	mgd	CalMoMax	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
									0.817	Mgal	CalMoTot	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	May	5/31/2017	Phosphorus, Total (as P)	Null	Null	0.14	kg/d	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
									1.5	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
						Solids, Total Suspended (TSS)	3.4	Null	1.5	kg/d	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
							5.1	Null	2	kg/d	MxCalWkA	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
							30	Null	15	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
							45	Null	20	mg/L	MxCalWkA	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	June	6/30/2017	Flow	Null	Null	0.027	mgd	CalMoAvg	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
									0.029	mgd	CalMoMax	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
									0.805	Mgal	CalMoTot	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
						Phosphorus, Total (as P)	Null	Null	0.25	kg/d	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
									2.4	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
						Solids, Total Suspended (TSS)	3.4	Null	0.9	kg/d	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	June	6/30/2017	Solids, Total Suspended (TSS)	5.1	Null	0.9	kg/d	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
							30	Null	8.5	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
							45	Null	9	mg/L	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
				July	7/31/2017	Flow	Null	Null	0.026	mgd	CalMoAvg	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
									0.026	mgd	CalMoMax	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
									0.818	Mgal	CalMoTot	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	July	7/31/2017	Phosphorus, Total (as P)	Null	Null	0.18	kg/d	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
									1.9	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
						Solids, Total Suspended (TSS)	3.4	Null	1.2	kg/d	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
							5.1	Null	1.4	kg/d	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
							30	Null	13	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
							45	Null	15	mg/L	MxCalWkA_	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	August	8/31/2017	Flow	Null	Null	0.026	mgd	CalMoAvg	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
									0.028	mgd	CalMoMax	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
									0.812	Mgal	CalMoTot	Parameter: 50050 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
						Phosphorus, Total (as P)	Null	Null	0.18	kg/d	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
									1.9	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
						Solids, Total Suspended (TSS)	3.4	Null	1	kg/d	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, SD 001	Main Discharge	0.03	2017	August	8/31/2017	Solids, Total Suspended (TSS)	5.1	Null	0.9	kg/d	MxCalWkA...	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
							30	Null	10	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
							45	Null	9	mg/L	MxCalWkA...	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52647354 Station Latitude: 45.09584643 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
Maple Hill Estates, MN0031127, IND20090001, WS 001	Influent Waste Stream	0.03	2017	February	2/28/2017	Phosphorus, Total (as P)	Null	Null	5.7	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
						Solids, Total Suspended (TSS)	Null	Null	212	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017
									213	mg/L	CalMoMax	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 2/28/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, WS 001	Influent Waste Stream	0.03	2017									
				March	3/31/2017	Phosphorus, Total (as P)	Null	Null	4.7	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
						Solids, Total Suspended (TSS)	Null	Null	158	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
									163	mg/L	CalMoMax	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 3/31/2017
				April	4/30/2017	Phosphorus, Total (as P)	Null	Null	3.8	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
						Solids, Total Suspended (TSS)	Null	Null	131	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017
									138	mg/L	CalMoMax	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 4/30/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, WS 001	Influent Waste Stream	0.03	2017									
				May	5/31/2017	Phosphorus, Total (as P)	Null	Null	3.8	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
						Solids, Total Suspended (TSS)	Null	Null	165	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
									220	mg/L	CalMoMax	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 5/31/2017
				June	6/30/2017	Phosphorus, Total (as P)	Null	Null	4.6	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
						Solids, Total Suspended (TSS)	Null	Null	159	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017
									172	mg/L	CalMoMax	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 6/30/2017

DMR Bulk Export

Station	Station Description	Avg Wet Weather Flow Rate	Year of Mon End Date	Month of Mon End Date	Mon End Date	Parameter	Limit	Non-detect	Rpt Value	Units	Limit Type	
Maple Hill Estates, MN0031127, IND20090001, WS 001	Influent Waste Stream	0.03	2017	July	7/31/2017	Phosphorus, Total (as P)	Null	Null	5.5	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
						Solids, Total Suspended (TSS)	Null	Null	187	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
									190	mg/L	CalMoMax	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 7/31/2017
				August	8/31/2017	Phosphorus, Total (as P)	Null	Null	11	mg/L	CalMoAvg	Parameter: 00665 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
						Solids, Total Suspended (TSS)	Null	Null	597	mg/L	CalMoAvg	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017
									1012	mg/L	CalMoMax	Parameter: 00530 EPA Class: EPA Minor NPDES sds: NPDES/SDS Waste Type: Domestic Preferred Flow: 0.03 No discharge flag: N Watershed: Mississippi River - Twin Cities (07010206) HUC 08: 07010206 HUC 12: South Fork Rush Creek HUC 12: 070102060101 Station Longitude: -93.52644591 Station Latitude: 45.09564705 Monitoring Months: YYYYYYYYYYYY Monitoring End Date: 8/31/2017

Appendix E

Recommended Livestock Management Policy of the Elm Creek Watershed Management Commission

elm creek
Watershed Management Commission

ADMINISTRATIVE OFFICE
3235 Fernbrook Lane
Plymouth, MN 55447
PH: 763.553.1144
FAX: 763.553.9326
email: judie@jass.biz
www.elmcreekwatershed.org

TECHNICAL OFFICE
Hennepin County
Dept. of Environment and Energy
701 Fourth Ave S Suite 700
Minneapolis, MN 55415-1600
PH: 612.348.7338
FAX: 612.348.8532
email: james.kujawa@hennepin.us

October 1, 2018

Member Cities
Elm Creek Watershed Management Commission (via email)
Hennepin County Minnesota

Re: Elm Creek Watershed Management Commission
Livestock Management Policy

Dear Members:

At its September 13, 2018 regular meeting, the Elm Creek Watershed Management Commission approved a Livestock Management Policy. Development of a model ordinance to regulate the placement of new small nonfood animal operations was listed as a primary goal in the Commission's Third Generation Watershed Management Plan's Implementation Plan.

The Livestock Management Policy is attached, along with the Exhibits referenced in item 5 of the policy. This document should be approved at your next City Council meeting and integrated into your city's policies and ordinances.

Questions regarding the policy should be directed to Hennepin County Rural Conservationist, Kirsten Barta, (o) 612-543-3373 (c) 612-382-3956 (e) Kirsten.barta@hennepin.us.

Regards,

Judie A. Anderson
Administrator

JAA:tim
Attachments

Cc w/encls. via email: Commissioners
TAC Members
Staff

Z:\Elm Creek\Livestock Management Policy\L_conveying approved policy to cities.doc

Elm Creek Watershed Management Commission
Recommended Livestock Management Policy

1. The primary goal of this policy is to improve water quality by reducing phosphorus runoff from livestock-associated facilities.

2. This policy applies to new facilities or the expansion of existing facilities based on the City's Conditional Use Permit (CUP) provisions for livestock.

3. Feedlots and manure storage areas are prohibited within the shoreland of any lake, perennial stream, intermittent stream, or protected wetland without a CUP or in areas like ditches that drain directly to wetlands, lakes or streams.

a. In the case of feedlots and manure storage areas for which a CUP is required, the CUP shall only be issued if a Nutrient and Management Plan (NMP) specific to that operation, and which has been prepared and implemented within the timeframe specified by the City, is in place.

b. The NMP must meet the standards of the University of Minnesota Extension Service or the United States Department of Agriculture Natural Resources and Conservation Services (NRCS).

4. Definitions.

a. Animal Density. Allowable animal density shall be based on the net area of the parcel that can be grazed in its entirety. This area excludes wetlands, woodland, farmsteads, feedlots, parking lots, and other areas where grazing cannot or should not occur.

b. Animal Feedlot. A lot or building or combination of lots and buildings intended for the confined feeding, breeding, raising or holding of animals and specifically designed as a confinement area in which manure may accumulate, or where the concentration of animals is such that a vegetative cover cannot be maintained within the enclosure. Open lots used for the feeding and rearing of poultry (poultry ranges) shall be considered to be animal feedlots. Manure storage areas off the site of the feedlot are considered as feedlots.

c. Animal Unit. The definition of "animal unit" shall be determined by the City. The City may also refer to Minnesota Rules part 7020.0300.

d. Conditional use. Land use or development as defined by ordinance that would not be appropriate generally but may be allowed with appropriate restrictions as provided by official controls upon a finding that certain conditions as detailed in the zoning ordinance exist, the use or development conforms to the comprehensive land use plan of the community, and the use is compatible with the existing neighborhood.

e. Manure storage facility. Any site or area specifically designed and/or constructed for the purpose of storage or holding of animal waste and manure. This includes any storage facility previously designed and installed meeting the NRCS Technical Guidelines current at the time of installation, any commercial-prefabricated storage facility, concrete slabs, earthen dugouts, dikes or any other area intended for the storage of animal manure, no matter how small that accumulation may be or how long the manure may be stored.

f. Pasture - Areas where grass or other growing plants are used for grazing and where the concentration of animals is such that a vegetative cover is maintained during the growing season except in the immediate vicinity of temporary supplemental feeding or watering devices. Those areas of supplemental feeding or watering devices within a pasture do not constitute a feedlot.

g. Shoreland. Land located within 1,000 feet from the ordinary high water level of a lake, pond, or flowage; 300 feet from a river or stream; or the landward extent of a floodplain designated by ordinance on a river or stream, whichever is greater.

5. Exhibits.

The following documents are attached and may be reviewed for content.

a. Exhibit A. 80.10 Manure Management Policy, City of Medina

b. Exhibit B. Manure Management-Related Ordinances, City of Medina.

c. Exhibit C. Ordinance 2016-02 Amending City Code Section 152.071(G) as it pertains to livestock and domestic farm animals, City of Greenfield.

EXHIBIT A

City of Medina Policy, Procedure and Program Manual

80.10 – Manure Management Policy

Purpose:
To prevent large manure stockpiles from becoming a public nuisance and to proactively protect the natural environment and neighboring properties pursuant to City Code Section 825.15: *"No... air pollution, liquid, solid wastes...or other such adverse influences shall be permitted in any district that will in any way have an objectionable effect upon any property."*

Policy:
1) The City shall require manure best management practices (BMPs) on the approval of conditional use permits (CUP) or other land use applications which indicates the stabling or housing of animals. The required BMPs shall be based on resources available from the University of Minnesota Extension Service and Minnesota Pollution Control Agency.

2) The City shall inspect the manure management practices of the following properties a minimum of one time per year:
   a) A property for which a CUP has been approved subject to clause (1) of this policy;
   b) A property on which a commercial horse facility is operated;
   c) A property which, because of past concerns or violations, the City determines should require annual inspections.

3) Owners of property which are inspected annually shall maintain records of manure disposal and provide such documentation upon request.

4) The City may require the implementation of manure BMPs on a property which is not subject to a CUP under clause (1) of this policy.

5) The City shall take necessary enforcement actions as provided by ordinance or procedure should a property be determined to be in violation of the manure BMPs required as part of an approved CUP, or are otherwise determined to constitute a public nuisance. These actions may include, but are not limited to, the following: corrective orders, misdemeanor citation, or revocation of conditional use permit approval. If violations are not corrected within a timely matter, and the City determines that the violation threatens the public health or safety, the City Council take necessary actions to abate the nuisance and certify the costs to the subject property pursuant to City Code section 330.25.

80.10 Manure Management Policy *Approved July 1, 2008*

Exhibit B

Manure Management-Related Ordinances – City of Medina

1) Animal Density standards (2 grazable acres for first animal unit and 1 grazable acre per animal unit thereafter). The density standards allow additional animals with a CUP if best management practices are followed.

2) Commercial horse facilities are held to the following standard by CUP: the subject site shall construct a concrete manure containment or composting area, the design of which shall be consistent with the recommendations of the University of Minnesota Extension Service. Owners of a feed lot shall provide a schedule for removal of manure or compost from affected sites, subject to the approval by the City.

EXHIBIT C

CITY OF GREENFIELD
ORDINANCE NO. 2016-02

AN ORDINANCE AMENDING CITY CODE SECTION 152.071 AS IT RELATES TO PERFORMANCE STANDARDS FOR RESIDENTIAL DISTRICTS

The City Council of the City of Greenfield, Minnesota does ordain:

That Section 152.071(G) Livestock and domestic farm animals, be amended as follows:

(G) Livestock and domestic farm animals.

(1) Applicability. Provisions of the ordinance codified herein that apply to the owner of animals apply equally to any person having the custody or possession of that animal.

(2) Definitions. For the purpose of this section, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

(a) ANIMAL UNIT. A unit of measure comparing the size of domestic farm animals as follows:

Animal	Animal Unit
One cow, llama, horse, ostrich or similar animal	1.0
One hog, sheep, goat, alpaca or similar animal	.5
One domestic fowl or similar animal	.05

(b) DOMESTIC FARM ANIMAL/LIVESTOCK. Cattle, hogs, horses, bees, sheep, goats, chickens and other animals and fowl commonly kept for food production.

(c) AT-LARGE. Off the premises of the owner or person responsible for the livestock.

(3) General provisions. The following shall apply to §152.056 Agricultural Preserve and §152.055 Rural Residential Zoning Districts:

(a) Where the principal use is a single-family dwelling, livestock at a maximum density of 1 animal units per the first 1-1/2 acres of land and 1 additional animal unit per each additional acre of land thereafter. Property owners shall be responsible for management and proper disposal of animal waste. This shall include:

1. All regulations imposed by the Minnesota Pollution Control Agency (MPCA) relating to the keeping of livestock or domestic farm animals shall be adhered to, and such regulations shall be considered the minimum safeguard necessary to prevent pollution of natural sensitive areas or the creation of a health hazard;

2. Land application of manure will need to be compliant with the Minn. Rules 7020.2225;

~~3. Keeping from wells and septic systems. Keeping animal waste storage or composting of areas a minimum of 75 feet away from wells and primary and secondary septic systems; and~~

3. Structures or buildings used to house animals shall meet all applicable setback requirements for accessory structures as stated in City Code Chapter 152.

4. Concrete manure containment areas or composting areas must be constructed, the design of which shall be consistent the recommendations of the University of Minnesota Extension Service, and setbacks in compliance with those stated for accessory structures in City Code Chapter 152.

(a) The site shall install runoff retention and vegetative infiltration systems, consistent with the recommendations of the University of Minnesota Extension Service, down slope from the manure containment area.

(b) Diligent effort shall be made to prevent the cribbing of trees in or near pastures, and efforts to maintain grass in the pastures by limiting use thereof as appropriate and by providing supplemental feed to prevent over grazing by instituting a pasture management program in accordance with the recommendation of the University of Minnesota Extension Service.

5. Violations.

a. Complaint process. Any resident who believes there is property located within the corporate limits of the city which had excessive odors or other nuisances related to manure in violation of this section, shall make a ~~written complaint signed, dated and filed~~ complaint with the City Administrator-Clerk or Minnesota Pollution Control Agency.

b. ~~Notice of violations. The Mayor or his or her authorized designee shall make an inspection within 3 days of a complaint location to determine if a violation of this section has occurred. Written notification in the form of a destruction order shall be forwarded to the property owner. The written notice shall be sent by certified mail, return receipt requested. Within 10 days after the mailing of the notice, the property owner shall remove the manure. The city may cause the manure to be removed following the 10 day period.~~

c. ~~Appeals. The property owner may appeal by filing written notice of objection with the City Administrator-Clerk within the 5 days of the notice. It is the property owner's responsibility to demonstrate that the matter in question is not in violation of this section and should not be subject to destruction under this section.~~

~~d. Liability. Property owners shall be liable for all costs of removal of noxious manure. The city shall bill the property owner for employees hourly rate, equipment and supplies that may be used. The City Council shall assess the property owner any amount unpaid 90 days after the date of the invoice.~~

Passed by the City Council this 3rd day of May, 2016.

_____
Mayor Brad Johnson

_____
Attest: Bonnie Ritter, City Administrator-Clerk

Published in the official newspaper on 19th day of May, 2016.
Effective the 20th day of May, 2016.

ELM CREEK LIVESTOCK MANAGEMENT POLICY
EXHIBIT C
ADOPTED SEPTEMBER 12, 2018

WENCK

Responsive partner.
Exceptional outcomes.

Toll Free: 800-472-2232 Email: wenckmp@wenck.com Web: wenck.com

APPENDIX C: LOCAL WATER SUPPLY PLAN

CITY OF CORCORAN

Draft Local Water Supply Plan
Third Generation for 2016-2018

October 12, 2017

Formerly called Water Emergency & Water Conservation Plan

DEPARTMENT OF NATURAL RESOURCES

Cover photo by Molly Shodeen

DEPARTMENT OF NATURAL RESOURCES

For more information on this Water Supply Plan Template, please contact the DNR Division of Ecological and Water Resources at (651) 259-5034 or (651) 259-5100.

This information is available in an alternative format upon request.

Equal opportunity to participate in and benefit from programs of the Minnesota Department of Natural Resources is available to all individuals regardless of race, color, creed, religion, national origin, sex, marital status, public assistance status, age, sexual orientation, disability or activity on behalf of a local human rights commission. Discrimination inquiries should be sent to Minnesota DNR, 500 Lafayette Road, St. Paul, MN 55155-4049; or the Equal Opportunity Office, Department of the Interior, Washington, DC 20240.

Table of contents

DEPARTMENT OF NATURAL RESOURCES – DIVISION OF ECOLOGICAL AND WATER RESOURCES AND METROPOLITAN COUNCIL

INTRODUCTION TO WATER SUPPLY PLANS (WSP)

Who needs to complete a Water Supply Plan

Public water suppliers serving more than 1,000 people, large private water suppliers in designated Groundwater Management Areas, and all water suppliers in the Twin Cities metropolitan area are required to prepare and submit a water supply plan.

The goal of the WSP is to help water suppliers: 1) implement long term water sustainability and conservation measures; and 2) develop critical emergency preparedness measures. Your community needs to know what measures will be implemented in case of a water crisis. A lot of emergencies can be avoided or mitigated if long term sustainability measures are implemented.

Groundwater Management Areas (GWMA)

The DNR has designated three areas of the state as Groundwater Management Areas (GWMAs) to focus groundwater management efforts in specific geographies where there is an added risk of overuse or water quality degradation. A plan directing the DNRs actions within each GWMA has been prepared. Although there are no specific additional requirements with respect to the water supply planning for communities within designated GWMAs, communities should be aware of the issues and actions planned if they are within the boundary of one of the GWMAs. The three GWMAs are the North and East Metro GWMA (Twin Cities Metro), the Bonanza Valley GWMA and the Straight River GWMA (near Park Rapids). Additional information and maps are included in the DNR Groundwater Management Areas webpage.

Benefits of completing a WSP

Completing a WSP using this template, fulfills a water supplier's statutory obligations under M.S. M.S.103G.291 to complete a water supply plan. For water suppliers in the metropolitan area, the WSP will help local governmental units to fulfill their requirements under M.S. 473.859 to complete a local comprehensive plan. Additional benefits of completing WSP template:

- The standardized format allows for quicker and easier review and approval
- Help water suppliers prepare for droughts and water emergencies.
- Create eligibility for funding requests to the Minnesota Department of Health (MDH) for the Drinking Water Revolving Fund.
- Allow water suppliers to submit requests for new wells or expanded capacity of existing wells.
- Simplify the development of county comprehensive water plans and watershed plans.
- Fulfill the contingency plan provisions required in the MDH wellhead protection and surface water protection plans.
- Fulfill the demand reduction requirements of Minnesota Statutes, section 103G.291 subd 3 and 4.

- Upon implementation, contribute to maintaining aquifer levels, reducing potential well interference and water use conflicts, and reducing the need to drill new wells or expand system capacity.
- Enable DNR to compile and analyze water use and conservation data to help guide decisions.
- Conserve Minnesota's water resources

If your community needs assistance completing the Water Supply Plan, assistance is available from your area hydrologist or groundwater specialist, the MN Rural Waters Association circuit rider program, or in the metropolitan area from Metropolitan Council staff. Many private consultants are also available.

WSP Approval Process

10 Basic Steps for completing a 10-Year Water Supply Plan

1. Download the DNR/Metropolitan Council Water Supply Plan Template from the DNR Water Supply Plan webpage.
2. Save the document with a file name with this naming convention: WSP_cityname_permitnumber_date.doc.
3. The template is a form that should be completed electronically.
4. Compile the required water use data (Part 1) and emergency procedures information (Part 2)
5. The Water Conservation section (Part 3) may need discussion with the water department, council, or planning commission, if your community does not already have an active water conservation program.
6. Communities in the seven-county Twin Cities metropolitan area should complete all the information discussed in Part 4. The Metropolitan Council has additional guidance information on their Water Supply webpage. All out-state water suppliers ***do not*** need to complete the content addressed in Part 4.
7. Use the Plan instructions and Checklist document from the DNR Water Supply Plan webpage to insure all data is complete and attachments are included. This will allow for a quicker approval process.
8. Plans should be submitted electronically using the MPARS website – no paper documents are required.
9. DNR hydrologist will review plans (in cooperation with Metropolitan Council in Metro area) and approve the plan or make recommendations.
10. Once approved, communities should complete a Certification of Adoption form, and send a copy to the DNR.

Complete Table 1 with information about the public water supply system covered by this WSP.

Table 1. General information regarding this WSP

Requested Information	Description
DNR Water Appropriation Permit Number(s)	**See Maple Grove WSP**
Ownership	☒ Public or ☐ Private
Metropolitan Council Area	☒ Yes or ☐ No (and county name)
Street Address	**8200 County Road 116**
City, State, Zip	**Corcoran, MN 55428**
Contact Person Name	Kevin Mattson
Title	Public Works Director
Phone Number	763-400-7028
MDH Supplier Classification	Municipal

PART 1. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and availability. Information summarized in Part 1 can be used to develop Emergency Preparedness Procedures (Part 2) and the Water Conservation Plan (Part 3). This data is also needed to track progress for water efficiency measures.

A. Analysis of Water Demand

Complete Table 2 showing the past 10 years of water demand data.

- Some of this information may be in your Wellhead Protection Plan.
- If you do not have this information, do your best, call your engineer for assistance or if necessary leave blank.

If your customer categories are different than the ones listed in Table 2, please describe the differences below:

Table 2. Historic water demand (see definitions in the glossary after Part 4 of this template)

Year	Pop. Served	Total Connections	Residential Water Delivered (MG)	C/I/I Water Delivered (MG)	Water used for Non-essential	Wholesale Deliveries (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)	Water Supplier Services	Percent Unmetered/ Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per capita Demand (GPCD)
2005															
2006															
2007															
2008															
2009															
2010															
2011															
2012															
2013															
2014															
2015	48	17	2.038	-	-	-	2.038	4.900	-	58.4%	.013	See Maple Grove Meter MH Records	See Maple Grove Meter MH Records	280	280
2016	162	58	4.606	-	-	-	4.606	12.674	-	63.7%	.035	See Maple Grove Meter MH Records	See Maple Grove Meter MH Records	214	214
Avg. 2010-2015			3.321				3.321	8.787		61.0%	.024			247	247

MG – Million Gallons **MGD** – Million Gallons per Day **GPCD** – Gallons per Capita per Day

See Glossary for definitions. A list of Acronyms and Initialisms can be found after the Glossary.

Complete Table 3 by listing the top 10 water users by volume, from largest to smallest. For each user, include information about the category of use (residential, commercial, industrial, institutional, or wholesale), the amount of water used in gallons per year, the percent of total water delivered, and the status of water conservation measures.

Table 3. Large volume users

Customer	Use Category (Residential, Industrial, Commercial, Institutional, Wholesale)	Amount Used (Gallons per Year)	Percent of Total Annual Water Delivered	Implementing Water Conservation Measures? (Yes/No/Unknown)
1.	RESIDENTIAL 6507 CARRIAGE WAY	384,582	7.85%	NO
2.	RESIDENTIAL 6483 CARRIAGE WAY	135,487	2.77%	NO
3.	RESIDENTIAL 19323 PENNY ROYAL CT	133,870	2.73%	NO
4.	RESIDENTIAL 6480 CARRIAGE WAY	133,080	2.72%	NO
5.	RESIDENTIAL 6564 CARRIAGE WAY	129,210	2.64%	NO
6.	RESIDENTIAL 19327 SORREL CT	125,555	2.56%	NO
7.	HOA IRRIGATION 6504 CARRIAGE WAY	119,675	2.44%	YES – IRRIGATION SUPPLIED FROM STORMWATER PONDS WITH BACKUP SUPPLY VIA CITY SYSTEM
8.	RESIDENTIAL 6648 CARRIAGE WAY	118,801	2.42%	NO
9.	RESIDENTIAL 6636 CARRIAGE WAY	111,455	2.27%	NO
10.	RESIDENTIAL 6624 CARRIAGE WAY	101,788	2.08%	NO

B. Treatment and Storage Capacity

Complete Table 4 with a description of where water is treated, the year treatment facilities were constructed, water treatment capacity, the treatment methods (i.e. chemical addition, reverse osmosis, coagulation, sedimentation, etc.) and treatment types used (i.e. fluoridation, softening, chlorination, Fe/MN removal, coagulation, etc.). Also describe the annual amount and method of disposal of treatment residuals. Add rows to the table as needed.

Table 4. Water treatment capacity and treatment processes

Treatment Site ID (Plant Name or Well ID)	Year Constructed	Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Volume of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
Insert Facility ID here							
Add rows as needed							
Total	NA		NA	NA		NA	

See the City of Maple Grove WSP as they are the water supplier for the City of Corcoran.

Complete Table 5 with information about storage structures. Describe the type (i.e. elevated, ground, etc.), the storage capacity of each type of structure, the year each structure was constructed, and the primary material for each structure. Add rows to the table as needed.

Table 5. Storage capacity, as of the end of the last calendar year

Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
Insert name of structure here	Elevated storage			
Insert name of structure here	Ground storage			
Add rows as needed	Other -			
Total	NA	NA	NA	

See the City of Maple Grove WSP as they are the water supplier for the City of Corcoran.

Treatment and storage capacity versus demand

It is recommended that total storage equal or exceed the average daily demand.

Discuss the difference between current storage and treatment capacity versus the water supplier's projected average water demand over the next 10 years (see Table 7 for projected water demand):

See the City of Maple Grove WSP as they are the water supplier for the City of Corcoran.

The City of Corcoran is served wholesale concept via the City of Maple Grove. There is adequate capacity remaining as the agreement from Maple Grove to supply an average daily demand of 1.75 MDG with a maximum daily demand of 5.0 MGD. This is sufficient for the projected growth for the foreseeable future.

C. Water Sources

Complete Table 6 by listing all types of water sources that supply water to the system, including groundwater, surface water, interconnections with other water suppliers, or others. Provide the name of each source (aquifer name, river or lake name, name of interconnecting water supplier) and the Minnesota unique well number or intake ID, as appropriate. Report the year the source was installed or established and the current capacity. Provide information about the depth of all wells. Describe the status of the source (active, inactive, emergency only, retail/wholesale interconnection) and if the source facilities have a dedicated emergency power source. Add rows to the table as needed for each installation.

Include copies of well records and maintenance summary for each well that has occurred since your last approved plan in **Appendix 1.**

Table 6. Water sources and status

Resource Type (Groundwater, Surface water, Interconnection)	Resource Name	MN Unique Well # or Intake ID	Year Installed	Capacity (Gallons per Minute)	Well Depth (Feet)	Status of Normal and Emergency Operations (active, inactive, emergency only, retail/wholesale interconnection))	Does this Source have a Dedicated Emergency Power Source? (Yes or No)
Connection	City of Maple Grove	See Maple Grove WSP	2012	See Maple Grove WSP	See Maple Grove WSP	Normal	See Maple Grove WSP
Connection	City of Maple Grove	See Maple Grove WSP	2014	See Maple Grove WSP	See Maple Grove WSP	Emergency	See Maple Grove WSP
Connection	City of Medina	See Medina WSP	2017	See Medina WSP	See Medina WSP	Emergency	See Medina WSP

Limits on Emergency Interconnections

Discuss any limitations on the use of the water sources (e.g. not to be operated simultaneously, limitations due to blending, aquifer recovery issues etc.) and the use of interconnections, including capacity limits or timing constraints (i.e. only 200 gallons per minute are available from the City of Prior Lake, and it is estimated to take 6 hours to establish the emergency connection). If there are no limitations, list none.

There are no current limitations on the use of emergency connections. It is estimated to take 1 hour to establish the emergency connection to the Cities of Maple Grove or Medina.

D. Future Demand Projections – *Key Metropolitan Council Benchmark*

Water Use Trends

Use the data in Table 2 to describe trends in 1) population served; 2) total per capita water demand; 3) average daily demand; 4) maximum daily demand. Then explain the causes for upward or downward trends. For example, over the ten years has the average daily demand trended up or down? Why is this occurring?

The City of Corcoran has very limited data in terms of water usage with the first water connection installed in 2015. We expect that our future demands will increase as development occurs within the city. The agreement with the City of Maple Grove provides up to 1.75 MGD and a maximum day demand of 5.0 MGD.

Use the water use trend information discussed above to complete Table 7 with projected annual demand for the next ten years. Communities in the seven-county Twin Cities metropolitan area must also include projections for 2030 and 2040 as part of their local comprehensive planning.

Projected demand should be consistent with trends evident in the historical data in Table 2, as discussed above. Projected demand should also reflect state demographer population projections and/or other planning projections.

Table 7. Projected annual water demand

Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD)
2017	5675	162	193	.031	.081
2018	6020	507	174	.088	.229
2019	6365	852	157	.134	.348
2020	6700	1197	141	.169	.439
2021	6920	1417	127	.180	.468
2022	7140	1637	114	.187	.485
2023	7360	1857	103	.191	.497
2024	7580	2077	93	.193	.502
2025	7800	2297	84	.193	.502
2026	8020	2517	76	.191	.497
2030	8900	3400	76	.258	.672
2040	11300	5800	76	.441	1.146

GPCD – Gallons per Capita per Day **MGD** – Million Gallons per Day

Projection Method

Describe the method used to project water demand, including assumptions for population and business growth and how water conservation and efficiency programs affect projected water demand:

The populations projections used for the future water demand were based on population forecasts published by the Metropolitan Council. To estimate the population growth between 2020 and 2030 a linear growth pattern was applied. It was assumed that every new resident to Corcoran will be added to the water supply area so the population served was increased incrementally with the added population.

The residential projected per capita water usage was determined by looking at what the residential water use has been over the last year. The 2016 rate was 214 gpcpd which was or starting point. The city estimates that the residential per capita growth will reduce by 10% annually over the next 10 years and then slow down.

E. Resource Sustainability

Monitoring – *Key DNR Benchmark*

Complete Table 8 by inserting information about source water quality and quantity monitoring efforts. The list should include all production wells, observation wells, and source water intakes or reservoirs. Groundwater level data for DNR's statewide network of observation wells are available online through the DNR's Cooperative Groundwater Monitoring (CGM) webpage.

See the City of Maple Grove WSP as they are the water supplier for the City of Corcoran.

Table 8. Information about source water quality and quantity monitoring

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
	☐ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☐ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☐ monthly ☐ quarterly ☐ annually	☐ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
	☐ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☐ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☐ monthly ☐ quarterly ☐ annually	☐ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
	☐ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☐ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☐ monthly ☐ quarterly ☐ annually	☐ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
Add rows to the table as needed	☐ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☐ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☐ monthly ☐ quarterly ☐ annually	☐ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge

Water Level Data

A water level monitoring plan that includes monitoring locations and a schedule for water level readings must be submitted as **Appendix 2.** If one does not already exist, it needs to be prepared and submitted with the WSP. Ideally, all production and observation wells are monitored at least monthly.

Complete Table 9 to summarize water level data for each well being monitored. Provide the name of the aquifer and a brief description of how much water levels vary over the season (the difference between the highest and lowest water levels measured during the year) and the long-term trends for each well. If water levels are not measured and recorded on a routine basis, then provide the static water level when each well was constructed and the most recent water level measured during the same season the well was constructed. Also include all water level data taken during any well and pump maintenance. Add rows to the table as needed.

Groundwater hydrographs illustrate the historical record of aquifer water levels measured within a well and can indicate water level trends over time. For each well in your system, provide a hydrograph for the life of the well, or for as many years as water levels have been measured. Include the hydrographs in **Appendix 3**. An example of a hydrograph can be found on the DNR's Groundwater Hydrograph webpage. Hydrographs for DNR Observation wells can be found in the CGM discussed above.

Table 9. Water level data

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)	Long-term Trend in water level data	Water level measured during well/pumping maintenance
			☐ Falling ☐ Stable ☐ Rising	MM/DD/YY:____ MM/DD/YY:____ MM/DD/YY:____
			☐ Falling ☐ Stable ☐ Rising	MM/DD/YY:____ MM/DD/YY:____ MM/DD/YY:____
			☐ Falling ☐ Stable ☐ Rising	MM/DD/YY:____ MM/DD/YY:____ MM/DD/YY:____
			☐ Falling ☐ Stable ☐ Rising	MM/DD/YY:____ MM/DD/YY:____ MM/DD/YY:____

Potential Water Supply Issues & Natural Resource Impacts – *Key DNR & Metropolitan Council Benchmark*

Complete Table 10 by listing the types of natural resources that are or could potentially be impacted by permitted water withdrawals in the future. You do not need to identify every single water resource in your entire community. The goal is to help you triage the most important water resources and/or the water resources that may be impacted by your water supply system – perhaps during a drought or when the population has grown significantly in ten years. This is emerging science, so do the best you can with available data. For identified resources, provide the name of specific resources that may be impacted. Identify what the greatest risks to the resource are and how the risks are being assessed. Identify any resource protection thresholds – formal or informal – that have been established to identify when actions should be taken to mitigate impacts. Provide information about the potential mitigation actions that may be taken, if a resource protection threshold is crossed. Add additional rows to the table as needed. See the glossary at the end of the template for definitions.

Some of this baseline data should have been in your earlier water supply plans or county comprehensive water plans. When filling out this table, think of what are the water supply risks, identify the resources, determine the threshold and then determine what your community will do to mitigate the impacts.

Your DNR area hydrologist is available to assist with this table.

For communities in the seven-county Twin Cities metropolitan area, the Master Water Supply Plan *Appendix 1 (Water Supply Profiles)*, provides information about potential water supply issues and natural resource impacts for your community.

Steps for completing Table 10

1. ***Identify the potential for natural resource impacts/issues within the community***
   First, review available information to identify resources that may be impacted by the operation of your water supply system (such as pumping).
   Potential Sources of Information:
   - County Geologic Atlas
   - Local studies
   - Metropolitan Council System Statement (for metro communities)
   - Metropolitan Council Master Water Supply Plan (for metro communities)

   ACTION: Check the resource type(s) that may be impacted in the column "Resource Type"

2. ***Identify where your water supply system is most likely to impact those resources (and vice versa).***
   Potential Sources of Information:
   - Drinking Water Supply Management Areas
   - Geologic Atlas - Sensitivity
   - If no WHPA or other information exists, consider rivers, lakes, wetlands and significant within 1.5 miles of wells; and calcareous fens and trout streams within 5 miles of wells

   ACTION: Focus the rest of your work in these areas.

3. ***Within focus areas, identify specific features of value to the community***
   You know your community best. What resources are important to pay attention to? It may be useful to check in with your community's planning and zoning staff and others.

   Potential Sources of Information:
   - Park plans
   - Local studies
   - Natural resource inventories
   - Tourist attractions/recreational areas/valued community resource

   ACTION: Identify specific features that the community prioritizes in the "Resource Name" column (for example: North Lake, Long River, Brook Trout Stream, or Green Fen). If, based on a review of available information, no features are likely to be at risk, note "None".

4. ***Identify what impact(s) the resource is at risk for***
   Potential Sources of Information:
   - Wellhead Protection Plan
   - Water Appropriation Permit
   - County Geologic Atlas
   - MDH or PCA reports of the area
   - Metropolitan Council System Statement (for metro communities)
   - Metropolitan Council Master Water Supply Plan (for metro communities)

   ACTION: Check the risk type in the column "Risk". If, based on a review of available information, no risk is identified, note "None anticipated".

5. ***Describe how the risk was assessed***
   Potential Sources of Information:
   - Local studies
   - Monitoring data (community, WMO, DNR, etc.)
   - Aquifer testing
   - County Geologic Atlas or other hydrogeologic studies
   - Regional or state studies, such as DNR's report 'Definitions and Thresholds for Negative Impacts to Surface Waters'
   - Well boring logs

   ACTION: Identify the method(s) used to identify the risk to the resource in the "Risk Assessed Through" column

6. ***Describe protection threshold/goals***
   What is the goal, if any, for protecting these resources? For example, is there a lower limit on acceptable flow in a river or stream? Water quality outside of an accepted range? A lower limit on acceptable aquifer level decline at one or more monitoring wells? Withdrawals that exceed some percent of the total amount available from a source? Or a lower limit on acceptable changes to a protected habitat?

   Potential Sources of Information:
   - County Comprehensive Water Plans
   - Watershed Plans or One Watershed/One Plan
   - Groundwater or Aquifer Plans
   - Metropolitan Master Plans
   - DNR Thresholds study
   - Community parks, open space, and natural resource plans

   ACTION: Describe resource protection goals in the "Describe Resource Protection Threshold" column or reference an existing plan/document/webpage

7. ***If a goal/threshold should trigger action, describe the plan that will be implemented.***
   Identify specific action, mitigation measures or management plan that the water supplier will implement, or refer to a partner's plan that includes actions to be taken.

Potential Sources of Information:

- County Comprehensive Water Plans
- Watershed Plans or One Watershed/One Plan
- Groundwater or Aquifer Plans
- Metropolitan Master Plans
- Studies such as DNR Thresholds study

ACTION: Describe the mitigation measure or management plan in the "Mitigation Measure or Management Plan" column.

8. ***Describe work to evaluate these risks going forward.***
For example, what is the plan to regularly check in to stay current on plans or new data?

Identify specific action that the water supplier will take to identify the creation of or change to goals/thresholds, or refer to a partner's plan that includes actions to be taken.

Potential Sources of Information:

- County Comprehensive Water Plans
- Watershed Plans or One Watershed/One Plan
- Groundwater or Aquifer Plans
- Metropolitan Master Plans
- Studies such as DNR Thresholds study

ACTION: Describe what will be done to evaluate risks going forward, including any changes to goals or protection thresholds in the "Describe how Changes to Goals are monitored" column.

Table 10. Natural resource impacts (*List specific resources in Appendix 12)

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
☐ River or stream		☐ None anticipated ☐ Flow/water level decline ☐ Degrading water quality trends ☐ Impacts on endangered, threatened, or special concern species habitat ☐ Other: _____	☐ Geologic atlas or other mapping ☐ Modeling ☐ Modeling ☐ Monitoring ☐ Aquifer testing ☐WRAPS or other watershed report ☐Proximity (<1.5 miles) ☐ Other: _____	☐ Not applicable ☐ Additional data is needed to establish ☐ See report: _____ ☐ No data available ☐ Other: _____	☐Not applicable ☐ Change groundwater pumping ☐ Increase conservation ☐ Other: _____	☐Not applicable ☐ Newly collected data will be analyzed ☐ Regular check-in with these partners: _____ ☐ Other: _____
☐ Calcareous fen		☐ None anticipated ☐ Flow/water level decline ☐ Degrading water quality trends ☐ Impacts on endangered, threatened, or special concern species habitat ☐ Other: _____	☐ Geologic atlas or other mapping ☐ Modeling ☐ Modeling ☐ Monitoring ☐ Aquifer testing ☐WRAPS or other watershed Report ☐Proximity (<5 miles) ☐ Other: _____ ☐ Other: ___	☐ Not applicable ☐ Additional data is needed to establish ☐ See report: _____ ☐ Other: _____	☐Not applicable ☐ Change groundwater pumping ☐ Increase conservation ☐ Other: _____	☐Not applicable ☐ Newly collected data will be analyzed ☐ Regular check-in with these partners: _____ ☐ Other: _____

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
☐ Lake		☐ None anticipated ☐ Flow/water level decline ☐ Degrading water quality trends ☐ Impacts on endangered, threatened, or special concern species habitat ☐ Other: _____	☐ Geologic atlas or other mapping ☐ Modeling ☐ Modeling ☐ Monitoring ☐ Aquifer testing ☐WRAPS or other watershed report ☐Proximity (<1.5 miles) ☐ Other: _____ ☐ Other: ___	☐ Not applicable ☐ Additional data is needed to establish ☐ See report: _____ ☐ Other: _____	☐Not applicable ☐ Change groundwater pumping ☐ Increase conservation ☐ Other: _____	☐Not applicable ☐ Newly collected data will be analyzed ☐ Regular check-in with these partners: _____ ☐ Other: _____
☐ Wetland		☐ None anticipated ☐ Flow/water level decline ☐ Degrading water quality trends ☐ Impacts on endangered, threatened, or special concern species habitat ☐ Other: _____	☐ Geologic atlas or other mapping ☐ Modeling ☐ Modeling ☐ Monitoring ☐ Aquifer testing ☐WRAPS or other watershed report ☐Proximity (<1.5 miles) ☐ Other: _____	☐ Not applicable ☐ Additional data is needed to establish ☐ See report: _____ ☐ Other: _____	☐Not applicable ☐ Change groundwater pumping ☐ Increase conservation ☐ Other: _____	☐Not applicable ☐ Newly collected data will be analyzed ☐ Regular check-in with these partners: _____ ☐ Other: _____

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
☐ Trout stream		☐ None anticipated ☐ Flow/water level decline ☐ Degrading water quality trends ☐ Impacts on endangered, threatened, or special concern species habitat ☐ Other: _____	☐ Geologic atlas or other mapping ☐ Modeling ☐ Monitoring ☐ Aquifer testing ☐WRAPS or other watershed report ☐Proximity (< 5 miles) ☐ Other: _____	☐ Not applicable ☐ Additional data is needed to establish ☐ See report: _____ ☐ Other: _____	☐Not applicable ☐ Change groundwater pumping ☐ Increase conservation ☐ Other: _____	☐Not applicable ☐ Newly collected data will be analyzed ☐ Regular check-in with these partners: _____ ☐ Other: _____
☐ Aquifer		☐ None anticipated ☐ Flow/water level decline ☐ Degrading water quality trends ☐ Impacts on endangered, threatened, or special concern species habitat ☐ Other: _____	☐ Geologic atlas or other mapping ☐ Modeling ☐ Monitoring ☐ Aquifer testing ☐Proximity (obwell < 5 miles) ☐ Other: _____	☐ Not applicable ☐ Additional data is needed to establish ☐ See report: _____ ☐ Other: _____	☐Not applicable ☐ Change groundwater pumping ☐ Increase conservation ☐ Other: _____	☐Not applicable ☐ Newly collected data will be analyzed ☐ Regular check-in with these partners: _____ ☐ Other: _____

Wellhead Protection (WHP) and Source Water Protection (SWP) Plans
Complete Table 11 to provide status information about WHP and SWP plans.

The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health's (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.

Table 11. Status of Wellhead Protection and Source Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	☐ In Process ☐ Completed ☐ Not Applicable		
SWP	☐ In Process ☐ Completed ☐ Not Applicable		

WHP – Wellhead Protection Plan **SWP** – Source Water Protection Plan

See the City of Maple Grove WSP as they are the water supplier for the City of Corcoran.

F. Capital Improvement Plan (CIP)

Please note that any wells that received approval under a ten-year permit, but that were not built, are now expired and must submit a water appropriations permit.

Adequacy of Water Supply System

Complete Table 12 with information about the adequacy of wells and/or intakes, storage facilities, treatment facilities, and distribution systems to sustain current and projected demands. List planned capital improvements for any system components, in chronological order. Communities in the seven-county Twin Cities metropolitan area should also include information about plans through 2040.

The assessment can be the general status by category; it is not necessary to identify every single well, storage facility, treatment facility, lift station, and mile of pipe.

Please attach your latest Capital Improvement Plan as **Appendix 4**.

Table 12. Adequacy of Water Supply System

System Component	Planned action	Anticipated Construction Year	Notes
Wells/Intakes	☒ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		
Water Storage Facilities	☐ No action planned - adequate ☐ Repair/replacement ☒ Expansion/addition	2030	SE Water Tower dependent on future growth
Water Treatment Facilities	☒ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		

System Component	Planned action	Anticipated Construction Year	Notes
Distribution Systems (Pipes, valves, etc.)	☐ No action planned - adequate ☐ Repair/replacement ☒ Expansion/addition	2018	Construction of trunk watermain to loop the distribution system in SE Corcoran. Future expansion expected to be driven by development.
Pressure Zones	☒ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		
Other:	☐ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		

Proposed Future Water Sources

Complete Table 13 to identify new water source installation planned over the next ten years. Add rows to the table as needed.

Table 13. Proposed future installations/sources

Source	Installation Location (approximate)	Resource Name	Proposed Pumping Capacity (gpm)	Planned Installation Year	Planned Partnerships
Connection	Northeast	City of Maple Grove	TBD	2018	N/A

Water Source Alternatives - *Key Metropolitan Council Benchmark*

Do you anticipate the need for alternative water sources in the next 10 years? Yes ☐ No ☒

For metro communities, will you need alternative water sources by the year 2040? Yes ☐ No ☒

If you answered yes for either question, then complete table 14. If no, insert NA.

Complete Table 14 by checking the box next to alternative approaches that your community is considering, including approximate locations (if known), the estimated amount of future demand that could be met through the approach, the estimated timeframe to implement the approach, potential partnerships, and the major benefits and challenges of the approach. Add rows to the table as needed.

For communities in the seven-county Twin Cities metropolitan area, these alternatives should include approaches the community is considering to meet projected 2040 water demand.

Table 14. Alternative water sources

Alternative Source Considered	Source and/or Installation Location (approximate)	Estimated Amount of Future Demand (%)	Timeframe to Implement (YYYY)	Potential Partners	Benefits	Challenges
☐ Groundwater						
☐ Surface Water						
☐ Reclaimed stormwater						
☐ Reclaimed wastewater						
☐ Interconnection to another supplier						

PART 2. EMERGENCY PREPAREDNESS PROCEDURES

The emergency preparedness procedures outlined in this plan are intended to comply with the contingency plan provisions required by MDH in the WHP and SWP. Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failings, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. Municipalities that already have written procedures dealing with water emergencies should review the following information and update existing procedures to address these water supply protection measures.

A. Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (Public Law 107-188, Title IV- Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan. MDH recommends that Emergency Response Plans are updated annually.

Do you have an Emergency Response Plan? Yes ☐ No ☒

Have you updated the Emergency Response Plan in the last year? Yes ☐ No ☒

When did you last update your Emergency Response Plan? Under the threshold requirements of 3,300 people served.

Complete Table 15 by inserting the noted information regarding your completed Emergency Response Plan.

Table 15. Emergency Response Plan contact information

Emergency Response Plan Role	Contact Person	Contact Phone Number	Contact Email
Emergency Response Lead	KEVIN MATTSON	612-710-0705	KMATTSON@CI.CORCORAN.MN.US
Alternate Emergency Response Lead	PAT MEISTER	763-400-7037	PMEISTER@CI.CORCORAN.MN.US

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? Yes ☐ No ☒

At a minimum, a water supplier should prepare and maintain an emergency contact list of contractors and suppliers.

Emergency contact list included in Appendix 5.

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280. Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and conservation plans that have been approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Telephone List

Prepare and attach a list of emergency contacts, including the MN Duty Officer (1-800-422-0798), as **Appendix 5.** An Emergency Contact List template is available at the MnDNR Water Supply Plans webpage.

The list should include key utility and community personnel, contacts in adjacent water suppliers, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list and date it. Thereafter, update on a regular basis (once a year is recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the Emergency Manager for that community. Responsibilities and services for each contact should be defined.

Current Water Sources and Service Area

Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

Do records and maps exist? Yes ☒ No ☐

Can staff access records and maps from a central secured location in the event of an emergency?

Yes ☒ No ☐

Does the appropriate staff know where the materials are located?

Yes ☒ No ☐

Procedure for Augmenting Water Supplies

Complete Tables 16 – 17 by listing all available sources of water that can be used to augment or replace existing sources in an emergency. Add rows to the tables as needed.

In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Municipalities are encouraged to execute cooperative agreements for potential emergency water services and copies should be included in **Appendix 6**. Outstate Communities may consider using nearby high capacity wells (industry, golf course) as emergency water sources.

WSP should include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MDH are required for interconnections or the reuse of water.

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use	List of services, equipment, supplies available to respond
City of Medina	N/A	UNDER REVIEW	NO FORMAL AGREEMENT IN PLACE

GPM – Gallons per minute MGD – million gallons per day

Table 17. Utilizing surface water as an alternative source

Surface Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use
N/A				

If not covered above, describe additional emergency measures for providing water (obtaining bottled water, or steps to obtain National Guard services, etc.)

The city would coordinate with local agencies to assist in providing temporary potable water to residents until a permanent source can be established.

Allocation and Demand Reduction Procedures

Complete Table 18 by adding information about how decisions will be made to allocate water and reduce demand during an emergency. Provide information for each customer category, including its priority ranking, average day demand, and demand reduction potential for each customer category. Modify the customer categories as needed, and add additional lines if necessary.

Water use categories should be prioritized in a way that is consistent with Minnesota Statutes 103G.261 (#1 is highest priority) as follows:

1. Water use for human needs such as cooking, cleaning, drinking, washing and waste disposal; use for on-farm livestock watering; and use for power production that meets contingency requirements.
2. Water use involving consumption of less than 10,000 gallons per day (usually from private wells or surface water intakes)
3. Water use for agricultural irrigation and processing of agricultural products involving consumption of more than 10,000 gallons per day (usually from private high-capacity wells or surface water intakes)
4. Water use for power production above the use provided for in the contingency plan.
5. All other water use involving consumption of more than 10,000 gallons per day.
6. Nonessential uses – car washes, golf courses, etc.

Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Lower priority uses will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. Water use for lawn sprinkling, vehicle washing, golf courses, and recreation are legislatively considered non-essential.

Table 18. Water use priorities

Customer Category	Allocation Priority	Average Daily Demand (GDP)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	214	171
Institutional	NA	NA	NA
Commercial	3	NA	NA
Industrial	3	NA	NA
Irrigation	6	NA	NA
Wholesale	6	NA	NA
Non-Essential	6	NA	NA
TOTAL	NA	NA	NA

GPD – Gallons per Day

Tip: Calculating Emergency Demand Reduction Potential

The emergency demand reduction potential for all uses will typically equal the difference between maximum use (summer demand) and base use (winter demand). In extreme emergency situations, lower priority water uses must be restricted or eliminated to protect priority domestic water requirements. Emergency demand reduction potential should be based on average day demands for customer categories within each priority class. Use the tables in Part 3 on water conservation to help you determine strategies.

Complete Table 19 by selecting the triggers and actions during water supply disruption conditions.

Table 19. Emergency demand reduction conditions, triggers and actions (Select all that may apply and describe)

Emergency Triggers	Short-term Actions	Long-term Actions
☒ Contamination ☒ Loss of production ☒ Infrastructure failure ☐ Executive order by Governor ☐ Other: _____	☒ Supply augmentation through City of Medina ☒ Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☐ Water allocation through____ ☒ Meet with large water users to discuss their contingency plan.	☒ Supply augmentation through City of Medina ☒ Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☐ Water allocation through____ ☒ Meet with large water users to discuss their contingency plan.

Notification Procedures

Complete Table 20 by selecting trigger for informing customers regarding conservation requests, water use restrictions, and suspensions; notification frequencies; and partners that may assist in the notification process. Add rows to the table as needed.

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
☒ Short-term demand reduction declared (< 1 year)	☒ Website ☐ Email list serve ☒ Social media (e.g. Twitter, Facebook) ☒ Direct customer mailing, ☒ Press release (TV, radio, newspaper), ☒ Meeting with large water users (> 10% of total city use) ☒ Other: Post on City Notice Board	☐ Daily ☐ Weekly ☒ Monthly ☐ Annually	
☒ Long-term Ongoing demand reduction declared	☒ Website ☐ Email list serve ☒ Social media (e.g. Twitter, Facebook) ☒ Direct customer mailing, ☒ Press release (TV, radio, newspaper), ☒ Meeting with large water users (> 10% of total city use) ☒ Other: Post on City Notice Board	☐ Daily ☐ Weekly ☒ Monthly ☐ Annually	

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
☒ Governor's critical water deficiency declared	☒ Website ☐ Email list serve ☒ Social media (e.g. Twitter, Facebook) ☒ Direct customer mailing, ☒ Press release (TV, radio, newspaper), ☒ Meeting with large water users (> 10% of total city use) ☒ Other: Post on City Notice Board	☐ Daily ☐ Weekly ☒ Monthly ☐ Annually	

Enforcement

Prior to a water emergency, municipal water suppliers must adopt regulations that restrict water use and outline the enforcement response plan. The enforcement response plan must outline how conditions will be monitored to know when enforcement actions are triggered, what enforcement tools will be used, who will be responsible for enforcement, and what timelines for corrective actions will be expected.

Affected operations, communications, and enforcement staff must then be trained to rapidly implement those provisions during emergency conditions.

Important Note:

Disregard of critical water deficiency orders, even though total appropriation remains less than permitted, is adequate grounds for immediate modification of a public water supply authority's water use permit (2013 MN Statutes 103G.291)

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) Yes ☒ No ☐

If yes, attach the official control document to this WSP as **Appendix 7**.

If no, the municipality must adopt such an official control within 6 months of submitting this WSP and submit it to the DNR as an amendment to this WSP.

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? Yes ☒ No ☐

If yes, cite the regulatory authority reference: Per city ordinance the Mayor, Engineer, Public Works Superintendent, and Administrator.

If no, who has authority to implement water use restrictions in an emergency?

PART 3. WATER CONSERVATION PLAN

Minnesotans have historically benefited from the state's abundant water supplies, reducing the need for conservation. There are however, limits to the available supplies of water and increasing threats to the quality of our drinking water. Causes of water supply limitation may include: population increases, economic trends, uneven statewide availability of groundwater, climatic changes, and degraded water quality. Examples of threats to drinking water quality include: the presence of contaminant plumes from past land use activities, exceedances of water quality standards from natural and human sources, contaminants of emerging concern, and increasing pollutant trends from nonpoint sources.

There are many incentives for conserving water; conservation:

- reduces the potential for pumping-induced transfer of contaminants into the deeper aquifers, which can add treatment costs
- reduces the need for capital projects to expand system capacity
- reduces the likelihood of water use conflicts, like well interference, aquatic habitat loss, and declining lake levels
- conserves energy, because less energy is needed to extract, treat and distribute water (and less energy production also conserves water since water is used to produce energy)
- maintains water supplies that can then be available during times of drought

It is therefore imperative that water suppliers implement water conservation plans. The first step in water conservation is identifying opportunities for behavioral or engineering changes that could be made to reduce water use by conducting a thorough analysis of:

- Water use by customer
- Extraction, treatment, distribution and irrigation system efficiencies
- Industrial processing system efficiencies
- Regulatory and barriers to conservation
- Cultural barriers to conservation
- Water reuse opportunities

Once accurate data is compiled, water suppliers can set achievable goals for reducing water use. A successful water conservation plan follows a logical sequence of events. The plan should address both conservation on the supply side (leak detection and repairs, metering), as well as on the demand side (reductions in usage). Implementation should be conducted in phases, starting with the most obvious and lowest-cost options. In some cases, one of the early steps will be reviewing regulatory constraints to water conservation, such as lawn irrigation requirements. Outside funding and grants may be available

for implementation of projects. Engage water system operators and maintenance staff and customers in brainstorming opportunities to reduce water use. Ask the question: "How can I help save water?"

Progress since 2006

Is this your community's first Water Supply Plan? Yes ☒ No ☐

If yes, describe conservation practices that you are already implementing, such as: pricing, system improvements, education, regulation, appliance retrofitting, enforcement, etc.

The city ordinance mandates for the purposes of water conservation that the city implement a tiered rate structure policy. The rates are re-evaluated annually and adjusted as necessary.

Seek opportunities to negotiate the use of rain sensors for irrigation systems within new developments.

The City is prepared to enforce the city ordinance of water use restrictions.

If no, complete Table 21 to summarize conservation actions taken since the adoption of the 2006 water supply plan.

Table 21. Implementation of previous ten-year Conservation Plan

2006 Plan Commitments	Action Taken?
Change water rates structure to provide conservation pricing	☐ Yes ☐ No
Water supply system improvements (e.g. leak repairs, valve replacements, etc.)	☐ Yes ☐ No
Educational efforts	☐ Yes ☐ No
New water conservation ordinances	☐ Yes ☐ No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.	☐ Yes ☐ No
Enforcement	☐ Yes ☐ No
Describe other	☐ Yes ☐ No

What are the results you have seen from the actions in Table 21 and how were results measured?

A. Triggers for Allocation and Demand Reduction Actions

Complete table 22 by checking each trigger below, as appropriate, and the actions to be taken at various levels or stages of severity. Add in additional rows to the table as needed.

Table 22. Short and long-term demand reduction conditions, triggers and actions

Objective	Triggers	Actions
Protect surface water flows	☐ Low stream flow conditions ☐ Reports of declining wetland and lake levels ☐ Other: _____	☐ Increase promotion of conservation measures ☐ Other: _____
Short-term demand reduction (less than 1 year	☐ Extremely high seasonal water demand (more than double winter demand) ☒ Loss of treatment capacity ☒ Lack of water in storage ☒ State drought plan ☐ Well interference ☐ Other: _____	☒ Adopt (if not already) and enforce the critical water deficiency ordinance to restrict or prohibit lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☒ Supply augmentation through various interconnects the city has dependent on location of required demand reduction. ☐ Water allocation through____ ☒ Meet with large water users to discuss user's contingency plan.
Long-term demand reduction (>1 year)	☒ Per capita demand increasing ☒ Total demand increase (higher population or more industry). ☐ Other: _____	☐ Develop a critical water deficiency ordinance that is or can be quickly adopted to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☒ Enact a water waste ordinance that targets overwatering (causing water to flow off the landscape into streets, parking lots, or similar), watering impervious surfaces (streets, driveways or other hardscape areas), and negligence of known leaks, breaks, or malfunctions. ☒ Meet with large water users to discuss user's contingency plan. ☒ Enhanced monitoring and reporting: audits, meters, billing, etc.
Governor's "Critical Water Deficiency Order" declared	☒ If enacted.	☒ Enforce by city ordinance

B. Conservation Objectives and Strategies – *Key benchmark for DNR*

This section establishes water conservation objectives and strategies for eight major areas of water use.

Objective 1: Reduce Unaccounted (Non-Revenue) Water loss to Less than 10%

The Minnesota Rural Water Association, the Metropolitan Council and the Department of Natural Resources recommend that all water uses be metered. Metering can help identify high use locations and times, along with leaks within buildings that have multiple meters.

It is difficult to quantify specific unmetered water use such as that associated with firefighting and system flushing or system leaks. Typically, water suppliers subtract metered water use from total water pumped to calculate unaccounted or non-revenue water loss.

Is your five-year average (2005-2014) unaccounted Water Use in Table 2 higher than 10%?

Yes ☒ No ☐

What is your leak detection monitoring schedule? (e.g. Monitor 1/3rd of the city lines per year)

The 2-year average water volume loss was 61.0%. The results are likely skewed from the significant infrastructure improvements that have occurred since 2015 because of above normal unmetered flushing and construction related testing requirements. The City will monitor the system and staff expects that the percentage will decrease as the system begins to operate under "normal" conditions.

Water Audits - are designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. The American Water Works Association (AWWA) has a recommended water audit methodology which is presented in AWWA's M36 Manual of Water Supply Practices: Water Audits and Loss Control Programs. AWWA also provides a free spreadsheet-based water audit tool that water suppliers can use to conduct their own water audits. This free water audit tool can be found on AWWA's Water Loss Control webpage. Another resource for water audit and water loss control information is Minnesota Rural Water Association.

What is the date of your most recent water audit? N/A

Frequency of water audits: ☐ **yearly** ☒ **other (specify frequency) As Needed**
Leak detection and survey: ☐ **every year** ☐ **every other year** ☒ **periodic as needed**
Year last leak detection survey completed: N/A – None have been completed as infrastructure is less than 5 years old. Tests will be performed as needed.

If Table 2 shows annual water losses over 10% or an increasing trend over time, describe what actions will be taken to reach the <10% loss objective and within what timeframe

The City plans to monitor the discrepancy between water delivered and purchased from Maple Grove and adjust the action plan based on future information. It is anticipated that this percentage decreases after most of the construction is completed. The infrastructure has undergone industry standard testing requirements for leakage prior to acceptance.

Metering -AWWA recommends that every water supplier install meters to account for all water taken into its system, along with all water distributed from its system at each customer's point of service. An effective metering program relies upon periodic performance testing, repair, maintenance or replacement of all meters. Drinking Water Revolving Loan Funds are available for purchase of new meters when new plants are built. AWWA also recommends that water suppliers conduct regular water

audits to account for unmetered unbilled consumption, metered unbilled consumption and source water and customer metering inaccuracies. Some cities install separate meters for interior and exterior water use, but some research suggests that this may not result in water conservation.

Complete Table 23 by adding the requested information regarding the number, types, testing and maintenance of customer meters.

Table 23. Information about customer meters

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years
Residential	58	58	58	15	2 / 15+
Irrigation meters					___/___
Institutional					___/___
Commercial					___/___
Industrial					___/___
Public facilities					___/___
Other					___/___
TOTALS	58	58	58	NA	NA

For unmetered systems, describe any plans to install meters or replace current meters with advanced technology meters. Provide an estimate of the cost to implement the plan and the projected water savings from implementing the plan.

N/A

Table 24. Water source meters

	Number of Meters	Meter testing schedule (years)	Number of Automated Meter Readers	Average age/meter replacement schedule (years
Water source (wells/intakes)				___/___
Treatment plant				___/___

See the City of Maple Grove WSP as they are the water supplier for the City of Corcoran.

Objective 2: Achieve Less than 75 Residential Gallons per Capita Demand (GPCD)

The 2002 average residential per capita demand in the Twin Cities Metropolitan area was 75 gallons per capita per day.

Is your average 2010-2015 residential per capita water demand in Table 2 more than 75? Yes ☒ No ☐

What was your 2010 – 2015 five-year average residential per capita water demand? 247 g/person/day

Describe the water use trend over that timeframe:

The residential water use is high in Corcoran with a 2-Year average of 247 g/person/day, however, staff anticipates that indicator will decrease as the water distribution system underwent a rapid construction expansion likely accounting for a significant portion of the unmetered water usage loss. The difference between 2015 and 2016 has decreased from 280 gpcpd to 214 gpcpd or 23.6%.

The City is facing on-going development and market pressures and we anticipate continued growth of water users over the next 10 years. Many new homes will be constructed with sod and residential irrigation systems and City staff has noticed overwatering issues. The City recognizes that education on this topic will be key to effective management of water supply moving forward.

Complete Table 25 by checking which strategies you will use to continue reducing residential per capita demand and project a likely timeframe for completing each checked strategy (Select all that apply and add rows for additional strategies):

Table 25. Strategies and timeframe to reduce residential per capita demand

Strategy to reduce residential per capita demand	Timeframe for completing work
☐ Revise city ordinances/codes to encourage or require water efficient landscaping.	
☒ Revise city ordinance/codes to permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use. Check with plumbing authority to see if internal buildings reuse is permitted	5 years
☐ Revise ordinances to limit irrigation. Describe the restricted irrigation plan:	
☐ Revise outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements.	
☐ Make water system infrastructure improvements	
☐ Offer free or reduced cost water use audits) for residential customers.	
☒ Implement a notification system to inform customers when water availability conditions change.	Include on water bills
☐ Provide rebates or incentives for installing water efficient appliances and/or fixtures indoors (e.g., low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet aerators, water softeners, etc.)	
☐ Provide rebates or incentives to reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
☐ Identify supplemental Water Resources	
☒ Conduct audience-appropriate water conservation education and outreach.	3 years – specifically educate residential customers on impacts of irrigation usage
☐ Describe other plans	

Objective 3: Achieve at least 1.5% annual reduction in non-residential per capita water use (For each of the next ten years, or a 15% total reduction over ten years.) This includes commercial, institutional, industrial and agricultural water users.

Complete Table 26 by checking which strategies you will used to continue reducing non-residential customer use demand and project a likely timeframe for completing each checked strategy (add rows for additional strategies).

Where possible, substitute recycled water used in one process for reuse in another. (For example, spent rinse water can often be reused in a cooling tower.) Keep in mind the true cost of water is the amount on the water bill PLUS the expenses to heat, cool, treat, pump, and dispose of/discharge the water. Don't just calculate the initial investment. Many conservation retrofits that appear to be prohibitively expensive are actually very cost-effective when amortized over the life of the equipment. Often reducing water use also saves electrical and other utility costs. Note: as of 2015, water reuse, and is not allowed by the state plumbing code, M.R. 4715 (a variance is needed). However, several state agencies are addressing this issue.

Table 26. Strategies and timeframe to reduce institutional, commercial industrial, and agricultural and non-revenue use demand

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
☐ Conduct a facility water use audit for both indoor and outdoor use, including system components	
☒ Install enhanced meters capable of automated readings to detect spikes in consumption	On-going
☐ Compare facility water use to related industry benchmarks, if available (e.g., meat processing, dairy, fruit and vegetable, beverage, textiles, paper/pulp, metals, technology, petroleum refining etc.)	
☐ Install water conservation fixtures and appliances or change processes to conserve water	
☐ Repair leaking system components (e.g., pipes, valves)	
☐ Investigate the reuse of reclaimed water (e.g., stormwater, wastewater effluent, process wastewater, etc.)	
☐ Reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
☐ Train employees how to conserve water	
☒ Implement a notification system to inform non-residential customers when water availability conditions change.	Include on water bills
☐ Nonpotable rainwater catchment systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, industrial processes, water features, vehicle washing facilities, cooling tower makeup, and similar uses shall be approved by the commissioner. Plumbing code 4714.1702, Published October 31, 2016	
☐ Describe other plans:	

Objective 4: Achieve a Decreasing Trend in Total Per Capita Demand

Include as **Appendix 8** one graph showing total per capita water demand for each customer category (i.e., residential, institutional, commercial, industrial) from 2005-2014 and add the calculated/estimated linear trend for the next 10 years.

Describe the trend for each customer category; explain the reason(s) for the trends, and where trends are increasing.

Residential: The City has seen a decrease in the residential water use per capita over the last 2 years. The usage is high as the system is new and undergoing significant construction expansion. We anticipate that the numbers will continue to decline towards the residential per capita usage of 75 gpcpd with a 23.6% decrease from 2015 to 2016.

Objective 5: Reduce Ratio of Maximum day (peak day) to the Average Day Demand to Less Than 2.6

Is the ratio of average 2015-2016 maximum day demand to average 2015-2016 average day demand reported in Table 2 more than 2.6? Yes ☐ No ☐

Calculate a ten-year average (2005 – 2014) of the ratio of maximum day demand to average day demand: The city's current software capabilities do not track the maximum daily demand. The City of Maple Grove operates a meter manhole that should contain the necessary data, but it was not available to include at the time of the draft report.

The position of the DNR has been that a peak day/average day ratio that is above 2.6 for in summer indicates that the water being used for irrigation by the residents in a community is too large and that efforts should be made to reduce the peak day use by the community.

It should be noted that by reducing the peak day use, communities can also reduce the amount of infrastructure that is required to meet the peak day use. This infrastructure includes new wells, new water towers which can be costly items.

Objective 6: Implement Demand Reduction Measures

Water Conservation Program

Municipal water suppliers serving over 1,000 people are required to adopt demand reduction measures that include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction. These measures must achieve demand reduction in ways that reduce water demand, water losses, peak water demands, and nonessential water uses. These measures must be approved before a community may request well construction approval from the Department of Health or before requesting an increase in water appropriations permit volume (Minnesota Statutes, section 103G.291, subd. 3 and 4). Rates should be adjusted on a regular basis to ensure that revenue of

the system is adequate under reduced demand scenarios. If a municipal water supplier intends to use a Uniform Rate Structure, a community-wide Water Conservation Program that will achieve demand reduction must be provided.

Current Water Rates

Include a copy of the actual rate structure in **Appendix 9** or list current water rates including base/service fees and volume charges below.

Volume included in base rate or service charge: 0 gallons or ____ cubic feet ___ other

Frequency of billing: ☒ Monthly ☐ Bimonthly ☐ Quarterly ☐ Other: _____

Water Rate Evaluation Frequency: ☒ every year ☐ every ___ years ☐ no schedule

Date of last rate change: January 2017

Table 27. Rate structures for each customer category (Select all that apply and add additional rows as needed)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
Residential	☒ Monthly billing ☒ Increasing block rates (volume tiered rates) ☐ Seasonal rates ☐ Time of use rates ☒ Water bills reported in gallons ☐ Individualized goal rates ☐ Excess use rates ☐ Drought surcharge ☐ Use water bill to provide comparisons ☐ Service charge not based on water volume ☐ Other (describe)	☐ Uniform ☐ Odd/even day watering	☐ Service charge based on water volume ☐ Declining block ☐ Flat ☐ Other (describe)
Commercial/ Industrial/ Institutional	☒ Monthly billing ☒ Increasing block rates (volume tiered rates) ☐ Seasonal rates ☐ Time of use rates ☒ Water bills reported in gallons ☐ Individualized goal rates ☐ Excess use rates ☐ Drought surcharge ☐ Use water bill to provide comparisons ☐ Service charge not based on water volume ☐ Other (describe)	☐ Uniform	☐ Service charge based on water volume ☐ Declining block ☐ Flat ☐ Other (describe)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
☐ Other			

*** Rate Structures components that may promote water conservation:**

- **Monthly billing:** is encouraged to help people see their water usage so they can consider changing behavior.
- **Increasing block rates (also known as a tiered residential rate structure):** Typically, these have at least three tiers: should have at least three tiers.
  - The first tier is for the winter average water use.
  - The second tier is the year-round average use, which is lower than typical summer use. This rate should be set to cover the full cost of service.
  - The third tier should be above the average annual use and should be priced high enough to encourage conservation, as should any higher tiers. For this to be effective, the difference in block rates should be significant.
- **Seasonal rate:** higher rates in summer to reduce peak demands
- **Time of Use rates:** lower rates for off peak water use
- **Bill water use in gallons:** this allows customers to compare their use to average rates
- **Individualized goal rates:** typically used for industry, business or other large water users to promote water conservation if they keep within agreed upon goals. **Excess Use rates**: if water use goes above an agreed upon amount this higher rate is charged
- **Drought surcharge:** an extra fee is charged for guaranteed water use during drought
- **Use water bill to provide comparisons**: simple graphics comparing individual use over time or compare individual use to others.
- **Service charge or base fee that does not include a water volume** – a base charge or fee to cover universal city expenses that are not customer dependent and/or to provide minimal water at a lower rate (e.g., an amount less than the average residential per capita demand for the water supplier for the last 5 years)
- **Emergency rates** -A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

****Conservation Neutral****

- **Uniform rate:** rate per unit used is the same regardless of the volume used
- **Odd/even day watering** –This approach reduces peak demand on a daily basis for system operation, but it does not reduce overall water use.

***** Non-Conserving *****

- **Service charge or base fee with water volume:** an amount of water larger than the average residential per capita demand for the water supplier for the last 5 years
- **Declining block rate:** the rate per unit used decreases as water use increases.
- **Flat rate:** one fee regardless of how much water is used (usually unmetered).

Provide justification for any conservation neutral or non-conserving rate structures. If intending to adopt a conservation rate structure, include the timeframe to do so:

Objective 7: Additional strategies to Reduce Water Use and Support Wellhead Protection Planning

Development and redevelopment projects can provide additional water conservation opportunities, such as the actions listed below. If a Uniform Rate Structure is in place, the water supplier must provide a Water Conservation Program that includes at least two of the actions listed below. Check those actions that you intent to implement within the next 10 years.

Table 28. Additional strategies to Reduce Water Use & Support Wellhead Protection

☐	Participate in the GreenStep Cities Program, including implementation of at least one of the 20 "Best Practices" for water
☒	Prepare a master plan for smart growth (compact urban growth that avoids sprawl)
☒	Prepare a comprehensive open space plan (areas for parks, green spaces, natural areas)
☐	Adopt a water use restriction ordinance (lawn irrigation, car washing, pools, etc.)
☐	Adopt an outdoor lawn irrigation ordinance
☐	Adopt a private well ordinance (private wells in a city must comply with water restrictions)
☐	Implement a stormwater management program
☐	Adopt non-zoning wetlands ordinance (can further protect wetlands beyond state/federal laws- for vernal pools, buffer areas, restrictions on filling or alterations)
☐	Adopt a water offset program (primarily for new development or expansion)
☐	Implement a water conservation outreach program
☐	Hire a water conservation coordinator (part-time)
☐	Implement a rebate program for water efficient appliances, fixtures, or outdoor water management
☐	Other

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

The City of Corcoran will continue to monitor water usage rates. The city will continue to collect information and data before and after any implementation action is taken to help understand the impacts.

Tip: The process to monitor demand reduction and/or a rate structure includes:

a) The DNR Hydrologist will call or visit the community the first 1-3 years after the water supply plan is completed.
b) They will discuss what activities the community is doing to conserve water and if they feel their actions are successful. The Water Supply Plan, Part 3 tables and responses will guide the discussion. For example, they will discuss efforts to reduce unaccounted for water loss if that is a problem, or go through Tables 33, 34 and 35 to discuss new initiatives.
c) The city representative and the hydrologist will discuss total per capita water use, residential per capita water use, and business/industry use. They will note trends.
d) They will also discuss options for improvement and/or collect case studies of success stories to share with other communities. One option may be to change the rate structure, but there are many other paths to successful water conservation.
e) If appropriate, they will cooperatively develop a simple work plan for the next few years, targeting a couple areas where the city might focus efforts.

C. Regulation

Complete Table 29 by selecting which regulations are used to reduce demand and improve water efficiencies. Add additional rows as needed.

Copies of adopted regulations or proposed restrictions or should be included in **Appendix 10** (a list with hyperlinks is acceptable).

Table 29. Regulations for short-term reductions in demand and long-term improvements in water efficiencies

Regulations Utilized	When is it applied (in effect)?
☒ Rainfall sensors required on landscape irrigation systems Negotiated in Development Agreements.	☒ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
☐ Water efficient plumbing fixtures required	☐ New development ☐ Replacement ☐ Rebate Programs
☒ Critical/Emergency Water Deficiency ordinance	☒ Only during declared Emergencies
☐ Watering restriction requirements (time of day, allowable days, etc.)	☐ Odd/even ☐ 2 days/week ☐ Only during declared Emergencies
☐ Water waste prohibited (for example, having a fine for irrigators spraying on the street)	☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
☐ Limitations on turf areas (requiring lots to have 10% - 25% of the space in natural areas)	☐ New development ☐ Shoreland/zoning ☐ Other
☐ Soil preparation requirement s (after construction, requiring topsoil to be applied to promote good root growth)	☐ New Development ☐ Construction Projects ☐ Other
☐ Tree ratios (requiring a certain number of trees per square foot of lawn)	☐ New development ☐ Shoreland/zoning ☐ Other
☐ Permit to fill swimming pool and/or requiring pools to be covered (to prevent evaporation)	☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
☐ Ordinances that permit stormwater irrigation, reuse of water, or other alternative water use (Note: be sure to check current plumbing codes for updates)	☐ Describe

D. Retrofitting Programs

Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use, as well as energy costs. It is recommended that municipal water suppliers develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and appliances. Some water suppliers have developed partnerships with organizations having similar conservation goals, such as electric or gas suppliers, to develop cooperative rebate and retrofit programs.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

Retrofitting Programs

Complete Table 30 by checking which water uses are targeted, the outreach methods used, the measures used to identify success, and any participating partners.

Table 30. Retrofitting programs (Select all that apply)

Water Use Targets	Outreach Methods	Partners
☐ Low flush toilets, ☐ Toilet leak tablets, ☐ Low flow showerheads, ☐ Faucet aerators;	☐ Education about ☐ Free distribution of ☐ Rebate for ☐ Other	☐ Gas company ☐ Electric company ☐ Watershed organization
☐ Water conserving washing machines, ☐ Dish washers, ☐ Water softeners;	☐ Education about ☐ Free distribution of ☐ Rebate for ☐ Other	☐ Gas company ☐ Electric company ☐ Watershed organization
☐ Rain gardens, ☐ Rain barrels, ☐ Native/drought tolerant landscaping, etc.	☐ Education about ☐ Free distribution of ☐ Rebate for ☐ Other	☐ Gas company ☐ Electric company ☐ Watershed organization

Briefly discuss measures of success from the above table (e.g. number of items distributed, dollar value of rebates, gallons of water conserved, etc.):

Presently none apply.

E. Education and Information Programs

Customer education should take place in three different circumstances. First, customers should be provided information on how to conserve water and improve water use efficiencies. Second, information should be provided at appropriate times to address peak demands. Third, emergency notices and educational materials about how to reduce water use should be available for quick distribution during an emergency.

Proposed Education Programs

Complete Table 31 by selecting which methods are used to provide water conservation and information, including the frequency of program components. Select all that apply and add additional lines as needed.

Table 31. Current and Proposed Education Programs

Education Methods	General summary of topics	#/Year	Frequency
Billing inserts or tips printed on the actual bill	Water conservation/irrigation use	As Needed	☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Consumer Confidence Reports	Water quality information for the water supplied from the City of Maple Grove	1	☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Social media distribution (e.g., emails, Facebook, Twitter)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Paid advertisements (e.g., billboards, print media, TV, radio, web sites, etc.)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Presentations to community groups			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Staff training			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Facility tours			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Displays and exhibits			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Marketing rebate programs (e.g., indoor fixtures & appliances and outdoor practices)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Community news letters	Ordinance updates as well as conservation info/tips for residents	4	☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies

Education Methods	General summary of topics	#/Year	Frequency
Direct mailings (water audit/retrofit kits, showerheads, brochures)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Information kiosk at utility and public buildings			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Public service announcements			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Cable TV Programs			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Demonstration projects (landscaping or plumbing)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
K-12 education programs (Project Wet, Drinking Water Institute, presentations)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Community events (children's water festivals, environmental fairs)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Community education classes			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Water week promotions			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Website (include address:)	Water quality info, water conservation, consumer confidence reports, flushing schedules	Variable	☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Targeted efforts (large volume users, users with large increases)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Notices of ordinances	Critical Water Deficiency Ordinance	Variable	☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies

Education Methods	General summary of topics	#/Year	Frequency
Emergency conservation notices	As required.		☐ Ongoing ☐ Seasonal ☒ Only during declared emergencies
Other:			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies

Briefly discuss what future education and information activities your community is considering in the future:

Providing educational information regarding water conservations tips to the website and social media.

PART 4. ITEMS FOR METROPOLITAN AREA COMMUNITIES

Minnesota Statute 473.859 requires WSPs to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process.

Much of the information in Parts 1-3 addresses water demand for the next 10 years. However, additional information is needed to address water demand through 2040, which will make the WSP consistent with the Metropolitan Land Use Planning Act, upon which the local comprehensive plans are based.

This Part 4 provides guidance to complete the WSP in a way that addresses plans for water supply through 2040.

A. Water Demand Projections through 2040

Complete Table 7 in Part 1D by filling in information about long-term water demand projections through 2040. Total Community Population projections should be consistent with the community's system statement, which can be found on the Metropolitan Council's website and which was sent to the community in September 2015.

Projected Average Day, Maximum Day, and Annual Water Demands may either be calculated using the method outlined in *Appendix 2* of the *2015 Master Water Supply Plan* or by a method developed by the individual water supplier.

B. Potential Water Supply Issues

Complete Table 10 in Part 1E by providing information about the potential water supply issues in your community, including those that might occur due to 2040 projected water use.

The Master Water Supply Plan provides information about potential issues for your community in *Appendix 1 (Water Supply Profiles).* This resource may be useful in completing Table 10.

You may document results of local work done to evaluate impact of planned uses by attaching a feasibility assessment or providing a citation and link to where the plan is available electronically.

C. Proposed Alternative Approaches to Meet Extended Water Demand Projections

Complete Table 12 in Part 1F with information about potential water supply infrastructure impacts (such as replacements, expansions or additions to wells/intakes, water storage and treatment capacity, distribution systems, and emergency interconnections) of extended plans for development and redevelopment, in 10-year increments through 2040. It may be useful to refer to information in the community's local Land Use Plan, if available.

Complete Table 14 in Part 1F by checking each approach your community is considering to meet future demand. For each approach your community is considering, provide information about the amount of

future water demand to be met using that approach, the timeframe to implement the approach, potential partners, and current understanding of the key benefits and challenges of the approach.

As challenges are being discussed, consider the need for: evaluation of geologic conditions (mapping, aquifer tests, modeling), identification of areas where domestic wells could be impacted, measurement and analysis of water levels & pumping rates, triggers & associated actions to protect water levels, etc.

D. Value-Added Water Supply Planning Efforts (Optional)

The following information is not required to be completed as part of the local water supply plan, but completing this can help strengthen source water protection throughout the region and help Metropolitan Council and partners in the region to better support local efforts.

Source Water Protection Strategies

Does a Drinking Water Supply Management Area for a neighboring public water supplier overlap your community? Yes ☐ No ☐

If you answered no, skip this section. If you answered yes, please complete Table 32 with information about new water demand or land use planning-related local controls that are being considered to provide additional protection in this area.

Table 32. Local controls and schedule to protect Drinking Water Supply Management Areas

Local Control	Schedule to Implement	Potential Partners
☐ None at this time		
☐ Comprehensive planning that guides development in vulnerable drinking water supply management areas		
☐ Zoning overlay		
☐ Other:		

Technical assistance

From your community's perspective, what are the most important topics for the Metropolitan Council to address, guided by the region's Metropolitan Area Water Supply Advisory Committee and Technical Advisory Committee, as part of its ongoing water supply planning role?

- ☐ Coordination of state, regional and local water supply planning roles
- ☐ Regional water use goals
- ☐ Water use reporting standards
- ☐ Regional and sub-regional partnership opportunities
- ☐ Identifying and prioritizing data gaps and input for regional and sub-regional analyses
- ☐ Others: _____

GLOSSARY

Agricultural/Irrigation Water Use - Water used for crop and non-crop irrigation, livestock watering, chemigation, golf course irrigation, landscape and athletic field irrigation.

Average Daily Demand - The total water pumped during the year divided by 365 days.

Calcareous Fen - Calcareous fens are rare and distinctive wetlands dependent on a constant supply of cold groundwater. Because they are dependent on groundwater and are one of the rarest natural communities in the United States, they are a protected resource in MN. Approximately 200 have been located in Minnesota. They may not be filled, drained or otherwise degraded.

Commercial/Institutional Water Use - Water used by motels, hotels, restaurants, office buildings, commercial facilities and institutions (both civilian and military). Consider maintaining separate institutional water use records for emergency planning and allocation purposes. Water used by multi-family dwellings, apartment buildings, senior housing complexes, and mobile home parks should be reported as Residential Water Use.

Commercial/Institutional/Industrial (C/I/I) Water Sold - The sum of water delivered for commercial/institutional or industrial purposes.

Conservation Rate Structure - A rate structure that encourages conservation and may include increasing block rates, seasonal rates, time of use rates, individualized goal rates, or excess use rates. If a conservation rate is applied to multifamily dwellings, the rate structure must consider each residential unit as an individual user. A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

Date of Maximum Daily Demand - The date of the maximum (highest) water demand. Typically this is a day in July or August.

Declining Rate Structure - Under a declining block rate structure, a consumer pays less per additional unit of water as usage increases. This rate structure does not promote water conservation.

Distribution System - Water distribution systems consist of an interconnected series of pipes, valves, storage facilities (water tanks, water towers, reservoirs), water purification facilities, pumping stations, flushing hydrants, and components that convey drinking water and meeting fire protection needs for cities, homes, schools, hospitals, businesses, industries and other facilities.

Flat Rate Structure - Flat fee rates do not vary by customer characteristics or water usage. This rate structure does not promote water conservation.

Industrial Water Use - Water used for thermonuclear power (electric utility generation) and other industrial use such as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

Low Flow Fixtures/Appliances - Plumbing fixtures and appliances that significantly reduce the amount of water released per use are labeled "low flow". These fixtures and appliances use just enough water to be effective, saving excess, clean drinking water that usually goes down the drain.

Maximum Daily Demand - The maximum (highest) amount of water used in one day.

Metered Residential Connections - The number of residential connections to the water system that have meters. For multifamily dwellings, report each residential unit as an individual user.

Percent Unmetered/Unaccounted For - Unaccounted for water use is the volume of water withdrawn from all sources minus the volume of water delivered. This value represents water "lost" by miscalculated water use due to inaccurate meters, water lost through leaks, or water that is used but unmetered or otherwise undocumented. Water used for public services such as hydrant flushing, ice skating rinks, and public swimming pools should be reported under the category "Water Supplier Services".

Population Served - The number of people who are served by the community's public water supply system. This includes the number of people in the community who are connected to the public water supply system, as well as people in neighboring communities who use water supplied by the community's public water supply system. It should not include residents in the community who have private wells or get their water from neighboring water supply.

Residential Connections - The total number of residential connections to the water system. For multifamily dwellings, report each residential unit as an individual user.

Residential Per Capita Demand - The total residential water delivered during the year divided by the population served divided by 365 days.

Residential Water Use - Water used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Should include all water delivered to single family private residences, multi-family dwellings, apartment buildings, senior housing complexes, mobile home parks, etc.

Smart Meter - Smart meters can be used by municipalities or by individual homeowners. Smart metering generally indicates the presence of one or more of the following:

- Smart irrigation water meters are controllers that look at factors such as weather, soil, slope, etc. and adjust watering time up or down based on data. Smart controllers in a typical summer will reduce water use by 30%-50%. Just changing the spray nozzle to new efficient models can reduce water use by 40%.
- Smart Meters on customer premises that measure consumption during specific time periods and communicate it to the utility, often on a daily basis.
- A communication channel that permits the utility, at a minimum, to obtain meter reads on demand, to ascertain whether water has recently been flowing through the meter and onto the premises, and to issue commands to the meter to perform specific tasks such as disconnecting or restricting water flow.

Total Connections - The number of connections to the public water supply system.

Total Per Capita Demand - The total amount of water withdrawn from all water supply sources during the year divided by the population served divided by 365 days.

Total Water Pumped - The cumulative amount of water withdrawn from all water supply sources during the year.

Total Water Delivered - The sum of residential, commercial, industrial, institutional, water supplier services, wholesale and other water delivered.

Ultimate (Full Build-Out) - Time period representing the community's estimated total amount and location of potential development, or when the community is fully built out at the final planned density.

Unaccounted (Non-revenue) Loss - See definitions for "percent unmetered/unaccounted for loss".

Uniform Rate Structure - A uniform rate structure charges the same price-per-unit for water usage beyond the fixed customer charge, which covers some fixed costs. The rate sends a price signal to the customer because the water bill will vary by usage. Uniform rates by class charge the same price-per-unit for all customers within a customer class (e.g. residential or non-residential). This price structure is generally considered less effective in encouraging water conservation.

Water Supplier Services - Water used for public services such as hydrant flushing, ice skating rinks, public swimming pools, city park irrigation, back-flushing at water treatment facilities, and/or other uses.

Water Used for Nonessential Purposes - Water used for lawn irrigation, golf course and park irrigation, car washes, ornamental fountains, and other non-essential uses.

Wholesale Deliveries - The amount of water delivered in bulk to other public water suppliers.

Acronyms and Initialisms

AWWA – American Water Works Association
C/I/I – Commercial/Institutional/Industrial
CIP – Capital Improvement Plan
GIS – Geographic Information System
GPCD – Gallons per capita per day
GWMA – Groundwater Management Area – North and East Metro, Straight River, Bonanza,
MDH – Minnesota Department of Health
MGD – Million gallons per day
MG – Million gallons
MGL – Maximum Contaminant Level
MnTAP – Minnesota Technical Assistance Program (University of Minnesota)
MPARS – MN/DNR Permitting and Reporting System (new electronic permitting system)
MRWA – Minnesota Rural Waters Association
SWP – Source Water Protection
WHP – Wellhead Protection

APPENDICES TO BE SUBMITTED BY THE WATER SUPPLIER

Appendix 1: Well records and maintenance summaries
Go to Part 1C for information on what to include in appendix

Appendix 2: Water level monitoring plan
Go to Part 1E for information on what to include in appendix

Appendix 3: Water level graphs for each water supply well
Go to Part 1E for information on what to include in appendix

Appendix 4: Capital Improvement Plan
Go to Part 1E for information on what to include in appendix

Appendix 5: Emergency Telephone List
Go to Part 2C for information on what to include in appendix

Appendix 6: Cooperative Agreements for Emergency Services
Go to Part 2C for information on what to include in appendix

Appendix 7: Municipal Critical Water Deficiency Ordinance
Go to Part 2C for information on what to include in appendix

Appendix 8: Graph of Ten Years of Annual Per Capita Water Demand for Each Customer Category
Go to Objective 4 in Part 3B for information on what to include in appendix

Appendix 9: Water Rate Structure
Go to Objective 6 in Part 3B for information on what to include in appendix

Appendix 10: Ordinances or Regulations Related to Water Use
Go to Objective 7 in Part 3B for information on what to include in appendix

Appendix 11: Implementation Checklist
Provide a table that summarizes all the actions that the public water supplier is doing, or proposes to do, with estimated implementation dates.

Appendix 12: Sources of Information for Table 10
Provide links or references to the information used to complete Table 10. If the file size is reasonable, provide source information as attachments to the plan.

Appendix 5
Water Supply Plan
Emergency Telephone List

Emergency Response Team	Name	Work Telephone	Alternate Telephone
Emergency Response Lead	Kevin Mattson	763-400-7028	612-710-0705
Alternate Emergency Response Lead	Pat Meister	763-400-7037	763-286-6740
Public Communications	Brad Martens	763-400-7030	

State and Local Emergency Response Contacts	Name	Work Telephone	Alternate Telephone
State Incident Duty Officer	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
County Emergency Director	Hennepin County Emergency Management	612-596-0250	
National Guard	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
Mayor/Board Chair	Ron Thomas	763-400-7020	
Fire Chief	Loretto FD – Jeff Leuer	763-479-3036	
Sheriff	Hennepin County Sheriff	612-348-3744	
Police Chief	Matt Gottschalk	763-400-7001	
Ambulance	North Memorial Ambulance Service	763-520-5200	
Hospital	Hennepin County Medical Center	612-873-3000	

State and Local Agencies	Name	Work Telephone	Alternate Telephone
MDH District Engineer	Isaac Bradlich	651-201-3971	
MDH	Drinking Water Protection	651-201-4700	
State Testing Laboratory	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
DNR Area Hydrologist	Mark Bushinski	651-259-5879	

Utilities	Name	Work Telephone	Alternate Telephone
Electric Company	Wright-Hennepin Electric	763-477-3000	
Gas Company	CenterPoint Energy	612-321-4939	
Gopher State One Call	Utility Locations	800-252-1166	651-454-0002
Highway Department	Hennepin County	612-596-0300	

Mutual Aid Agreements	Name	Work Telephone	Alternate Telephone
Neighboring Water System	Maple Grove	763-494-6370	
Emergency Water Connection	Medina	763-473-4643	

Technical/Contracted Services/Supplies	Name	Work Telephone	Alternate Telephone
MRWA Technical Services	MN Rural Water Association	800-367-6792	
Backhoe	Corcoran Public Works	763-420-2652	
Meter Repair	Corcoran Public Works	763-420-2652	
Engineering firm	Wenck Associates – Kent Torve	612-209-7919	763-479-4200

Communications	Name	Work Telephone	Alternate Telephone
News Paper	Crow River News	763-425-3323	

2017 FEE SCHEDULE	FEE
WATER AND SANITARY SEWER FEE SCHEDULE	
Water rates - residential (monthly use) per 1,000 gallons	
Tier 1: 0 gallons to 4,999 gallons	1.68
Tier 2: 5,000 gallons to 8,999 gallons	2.02
Tier 3: 9,000 gallons to 19,999 gallons	2.52
Tier 4: 20,000 gallons and over	3.36
Water rates - non residential (monthly use) per 1,000 gallons	
Tier 1: 1,000 gallons +	2.02
Water base fees - payable by each user for each month	
Residential	12.36
Non residential	12.36
Sewer rates - residential (monthly use) per 1,000 gallons	
Tier 1: All homes billed 8,000 gallons at per 1,000 gallon rate	2.42
Sewer rates - non residential (monthly use) per 1,000 gallons	
Tier 1: 1,000 gallons +	2.42
Sewer base fees - payable by each user for each month	
Residential	25.75
Non residential	25.75
Late/Past Due Payments	
Late Payment Penalty	10% of unpaid bill
Water Disconnect	65.00
Water Reconnect	65.00
Trunk Line Availability Charge (TLAC)	
Water Trunk Line Availability Charge (TLAC) - per acre	5,500.00
Sewer Trunk Line Availability Charge (TLAC) - per acre	3,700.00
Connection Fees - City of Corcoran	
Water Connection Fee (per unit) - Single Family	1,093.00
Water Connection Fee (per unit) - Multi-Family	874.00
Water Connection Fee (per unit) - Non-Residential	1,093.00
Sewer Connection Fee (per unit) - Single Family	1,093.00
Sewer Connection Fee (per unit) - Multi-Family	874.00
Sewer Connection Fee (per unit) - Non-Residential	1,093.00
Connection Fees - City of Maple Grove (Per Maple Grove Fee Schedule)	
Water Connection Fee (per unit) - Residential/individual laundry facilities	2,350.00
Water Connection Fee (per unit) - Residential/ no individual laundry facilities	1,880.00
Water Connection Fee (per unit) - Commercial/Industrial/Mixed	9,400.00
Water Connection Fee (per unit) - Parks	1,175.00
Water Connection Fee (per unit) - Institutional	9,400.00
Connection Fees - Metropolitan Council	
Sewer Access Charge (SAC)	2,485.00
Meter Fees	
Meter - standard	Cost plus 10%
Meter - larger than standard	Cost plus 10%
Meter Inspection	65.00

CHAPTER 51: REGULATING PUBLIC SANITARY SEWER AND WATER WITHIN THE CITY OF CORCORAN

51.010: PURPOSE

Subdivision 1. **Purpose.**
The City sanitary sewer and water supply systems represent significant public investments and their operation in an efficient and sanitary manner is essential to protect public health, safety and welfare, to safeguard municipal finances and to support development and economic vitality within the community. It is the purpose of this ordinance to protect the integrity, the financial stability and adequacy of the City sanitary sewer and water supply systems by regulating the construction, maintenance and use of those systems, and restricting the installation and use of private water supply wells and individual sewage treatment systems when necessary or appropriate. Priority for extending service is new development and the existing downtown commercial district. It is not the intention of the City to extend service and require connection of existing residential or agricultural properties unless requested as referenced in this ordinance.

51.015: DEFINITIONS

Subdivision 1. **Definitions.** The following terms shall have the meanings given to them unless another meaning is clear from the context:

1.1 **Account.** A record of utility services used by each property and the periodic charges for those utility services.

1.2 **Available (Access to Sewer/Water Line).** A trunk or lateral sewer or water line is deemed available to a property when (i) that line is either abutting the property or may be accessed by the property by utility or road easement/ROW, and (ii) the City has included the property within a defined service area approved for immediate utility service.

1.3 **City.** The City of Corcoran, County of Hennepin, State of Minnesota.

1.4 **City Utility System.** Facilities used for providing public utility service owned or operated by City or agency thereof, including sewer, storm sewer and water service.

1.5 **Commercial.** Defined as non-residential and non-agricultural use, which is typically commercial, industrial, or retail; operations.

1.6 **Connection Charge.** Connection charges are paid to the City by benefitting property owners to cover the City's costs of connection to and administration and operation of the City utility. Connection charges are set by the City Council.

1.7 **Fee Schedule.** A schedule of all utility rates and charges set by City ordinance.

1.8 **Residential.** Single and multi-family use.

1.9 **SAC (Metropolitan Council Sewer Availability Charge).** The Sewer Availability Charge (SAC) is a one-time fee by Metropolitan Council Environmental Services for each new connection to or increase in capacity demand on the Metropolitan Disposal System. The City may pass the SAC charge, along with possible local fees, to benefitting property owners. SAC charge units will be based on the assumed generation of 274 daily gallons of waste water flow per unit. Single family residential units will pay one SAC charge unit and other properties will pay a number of units based on estimated daily flow calculations (but in no case less than one unit). The City may periodically revise the SAC charge calculation and unit charge.

1.10 **Trunk Line Availability Charges (TLAC).** Trunk Line Availability Charges ("TLAC") are fees charged to all properties for which a water or sanitary sewer trunk line is available. Separate TLAC will be charged for each of water and sewer trunk lines. The TLAC are charged in recognition of the current benefit to properties for which a trunk line is available, regardless whether the property is connected to the trunk line (whether directly or via a lateral). The City will set and may periodically revise the TLAC.

1.11 **Unimproved Land.** Land that does not have certain basic services necessary to utilize it for other purposes. These include electricity, telephone, street access, or water available.

1.12 **Water and Sanitary Sewer Systems.** Water and sanitary sewer transmission pipes, lines, fixtures, meters and all necessary equipment and appurtenances owned or operated by the City utility system for the purpose of providing water and sewer services for public or private use.

51.020: UTILITY CONNECTION, PERMISSIVE OR MANDATORY

Subdivision 1. **Mandatory Connection.**

1.1 As defined in Chapter 51.010 Subdivision 1.2, all new residential and commercial construction to which utility service is available shall connect to the line at the time of construction.

1.2 When a trunk or lateral water or sewer line is available to an existing commercial property (with a structure), as defined in Chapter 51.010 Subdivision 1.2, all such commercial properties shall connect to the line upon the earlier of (i) reconstruction (other than overlay or maintenance) of an adjacent roadway under which the line lies, or (ii) within one year following availability.

Subdivision 2. **Permissive Connection.**

2.1 The City may extend a trunk or lateral sewer or water line to serve an existing residential neighborhood or commercial district upon petition by property owners within

the neighborhood or district. The City may consider the following information in approving or denying the petition: comprehensive cost of the project; cost to individual properties; demonstrated need for the project; existing site conditions of the proposed project; geographic scope of the project area, and any other information the City deems relevant.

2.2 If as a result of a property owner petition, the City makes a water or sewer trunk or lateral line available to existing residential or commercial properties, as defined in Chapter 51.010 Subdivision 1.2, the City shall have the discretion and authority to either require connection to the trunk or lateral line upon construction of the trunk or lateral line, or to defer connection of individual properties on a case-by-case basis.

51.030: CHARGES, RATES AND BILLING

Subdivision 1. **Availability and Connection Charges.**

1.1 **Trunk Line Availability Charges (TLAC).** TLAC shall be charged to and collected from benefitting properties property as follows:

1.1.1 **New Construction.** TLAC shall be charged and collected upon approval of the final plat for new construction. New development of residential or commercial property shall be charged one (1) TLAC per acre of pre-developable area.

1.1.2 **Existing Construction.** In the event service is extended to existing construction as defined in Chapter 51.020 Subdivision 2.1, TLAC shall be charged to each benefitting, residential or commercial property when the trunk or lateral line is made available to the property. TLAC shall be collected within 30 days notice from the City or; at the discretion of the City, collection may be deferred and financed for a period not to exceed 20 years. In the event the City allows deferral of collection, the deferred charge shall bear interest at a rate 1% above the City's cost of borrowing in the year the deferral was approved. Existing developed residential property, commercial property, and unimproved land will be charged one (1) TLAC regardless of acreage.

1.1.3 **Additional New Construction Without Platting.** In the event of new construction on unimproved land or as a result of teardown on existing platted lots, TLAC shall be collected from each individual or entity requesting or receiving a connection to the City water system. Credit will be given for any prior TLAC paid on behalf of the platted lot.

1.2 **Connection Charge.** Connection charges shall be paid by all benefitting properties at the time of (a) building permit for new construction, or (b) issuance of connection permit for existing residential and commercial.

1.3 **SAC (Metropolitan Council Sewer Availability Charge).** SAC shall be charged and collected at time of building permit issuance.

1.4 **Deferrals.** Property owners may apply to the City, pursuant to Minn. Stat. §435.193-195 for a deferral of payment for sewer and water charges assessed to their property. The City shall have full discretion to consider and approve or deny the request for deferral. Interest shall be assessed upon and accrue against all deferred charges.

Subdivision 2. **Utility Usage Charges.**

2.1 **Charge for Water Usage.** Utility customers shall be billed for water based on metered usage in per thousand gallon units.

2.2 **Charge for Sanitary Sewer System Usage.** Utility customers shall be billed for sanitary sewer based on metered usage of water in per thousand gallon units.

2.3 **Administrative Base Charge.** In addition to metered usage charges, utility customers shall be billed a minimum administrative base charge for water and sanitary sewer service. The administrative base charge shall be paid at the same time and in the same manner as metered usage payments.

2.4 **Water Treatment Surcharge.** Utility customers shall be billed for a water treatment surcharge in an amount set by the City Council and adopted by ordinance. This surcharge shall be paid at the same time and in the same manner as usage charge payments. The water treatment surcharge shall be used to offset the costs of water treatment performed by the City of Maple Grove.

2.5 **Fee Schedule.** A utility fee schedule shall be prepared annually by the City Administrator and presented to the City Council for approval and adoption in ordinance form. The charge schedule shall be comprehensive and list all utility charges, including incentive-based water conservation incentive charges.

2.6 **Frequency of Charges.** Utility customers shall be invoiced monthly for utility services. Utility customers shall pay utility invoices upon the terms established by the City and as stated in the invoice. The City may contract with third party vendors to perform billing services.

2.7 **Designation of Billing Address.** All bills and notices pertaining to water and sanitary sewer systems sent by the City shall be sent to the house or street number of the property. If an owner or agent desires that personal notice be sent to a different address, that person shall file an application therefore with the City. Any error or change in any address shall be promptly reported to the City.

2.8 **Late Charges; Delinquent Bills.** A late charge, in an amount established in ordinance, shall be charged if bills are not paid by the due date established in that bill. If a bill is not paid within 30 days of the date that it becomes due, it shall be deemed delinquent. When a bill becomes delinquent, the City shall notify the property owner, in writing, of the same. An additional late charge shall be added on each monthly calculation date upon which a delinquent bill, including any previous late charges, remains unpaid.

2.9 **Assessing Delinquent Charges.** The City maintains the authority to certify delinquent charges to the Hennepin County Auditor for collection with taxes and to shut off water to property in certain cases where delinquencies are greater than 80 days. It shall be the practice of the City to certify delinquent payments annually, but this may be done on a more frequent basis at the discretion of the City Council. Before certification for collection, or shut off, the City shall notify the property owner of the date and time of the meeting to address the delinquency. The City Council shall have final authority over actions related to delinquent payments or shut off for a property.

2.10 **Errors in Billing.** The City Administrator shall be authorized to make adjustments in water charges when, in the opinion of the City Administrator, the amount billed to a utility customer was erroneous due to an inaccurate or defective meter, or due to other mistake.

51.040 CONSTRUCTION, MAINTENANCE, OWNERSHIP

Subdivision 1. **Authority to Conduct Services**

1.1 **Permit Required for Connection Work.** No person shall open, connect with, use, alter, or disturb any public water line or public sewer line or appurtenance thereof without first obtaining a written permit from the City pursuant to this section.

1.2 **Persons Authorized to Work on City Water and Sewer System.** Only a duly authorized employee of the City or City contractors, are permitted to do any work on City water lines, or water meters connected to the City water system, .

1.3 **Damaging or Tampering Prohibited.** No person shall maliciously, willfully, or negligently break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance, or equipment which is part of the municipal water line infrastructure.

1.4 **Inspections.** The Building Inspector and any other duly authorized City employee, bearing proper credentials and identification, shall be permitted to enter upon all properties for the purposes of inspection, observation, measurement, sampling, and testing in accordance with the provisions of this section.

Subdivision 2. **Water System.**

2.1 **Water Quality.** The City purchases all utility system water from the City of Maple Grove, which has the authority to establish and control water quality standards as well as ordinances and rules applicable to the preservation and use of the water it supplies to the City. The use and supply of water furnished by Maple Grove shall at all times be governed by the applicable Maple Grove ordinances and rules in effect for the preservation, use and protection of its water supply. The City hereby adopts the applicable City of Maple Grove preservation, use and protection ordinances and rules by reference, and shall enforce said ordinances and rules hereunder. The City reserves the right to adopt additional ordinances and rules affecting the preservation, use and protection of its utility system water.

2.2 **Maintenance and Repair of Water Mains.** The City shall be responsible for maintenance and repair of the water line infrastructure including the water shutoff valve out to the lateral connection. Maintenance and repair of water lines located on private property from the water shutoff valve to the home is the responsibility of the property owner. If a property owner fails to make the necessary repairs to the water line within 30 days after the owner is notified to do so by the City, in writing, the City may cause the repairs to be completed and charged to the property owner for all costs associated with the repair. In cases where an emergency is declared, the City shall cause repairs to the water system to be made immediately, which may include turning off the water to the property immediately.

2.3 **Water Meters.**

2.3.1 **Water Meter Required.** No person except authorized City employees shall use water from the City water supply system or permit water to be drawn therefrom, unless the water is metered by passing through a meter supplied or approved by the City.

2.3.2 **Tampering Prohibited.** No person shall connect, disconnect, disassemble, alter, cause to be altered, tamper, obstruct, or interfere with any City water meter, unless authorized by the City.

2.3.3 **Bypassing Meters or Taking Water.** No person shall bypass or tamper with any water meter for any reason.

2.3.4 **Ownership of Meters.** Water meters shall be and remain the property of the City. Meters may be removed, replaced, or changed by the City whenever the City deems it necessary.

2.3.5 **City Access to Read, Repair, and Replace Meters, Conduct Inspections.** Authorized City employees shall have access at reasonable hours of the day to all parts of every building and premises connected with the City water supply system to read, repair, and replace meters and conduct inspections. Before entering private property to do so, the City shall solicit the written consent of the property owner. If a property owner refuses to give consent or fails to respond, the City may pursue legal options to enter the property.

2.3.6 **Cost of Inspection.** City staff will set and impose a cost for inspecting a meter that is reported to be malfunctioning or defective. This cost shall be reimbursed to the property owner should the meter require replacement or repair.

2.3.7 **Cost of Repair.** The City shall be responsible for the repair and replacement of water meters unless a meter is damaged by a property owner intentionally or the damage is due to carelessness on the part of the property owner. In such instances, the property owner shall be responsible for the costs of repair and/or replacement.

2.3.8 **Meter Accuracy.** The City may charge a fee as established annually for investigating and testing meter accuracy. If the meter is determined to be faulty, the charge will be refunded.

2.4 **Water System Mapping.** The City shall maintain a comprehensive water system map detailing the following information: The number and line locations, the type and diameter of pipe, and the location of access points. The City shall maintain a program of regular inspection and maintenance performed on its water system lines. The City shall also maintain a program for lift station inspection and maintenance.

2.5 **Water Use Conservation.** The City reserves the right to impose water use restrictions pursuant to conservation efforts as required by regulatory authorities. The City may adopt administrative policies and procedures related to and regulating water conservation practices.

2.6 **Fire Hydrants.** Fire hydrants located within the limits of the City of Corcoran shall be the property of the City. Only persons authorized by the City shall be allowed to open and operate any fire hydrant in the City for any purpose. Temporary access to hydrants may be granted by the City to previously unauthorized persons via a permit issued by the City. Payment for water used, except for that used in firefighting, shall be made in accordance with adopted ordinance.

2.7 **City Not Liable for Damages Resulting from Interruption of Service.** The City shall not be liable for any damages which result from any stoppage or slowing of the supply or flow of water as a result of breaks in mains, service pipes, fixtures, or by reason of obstruction or the breakdown of machinery. The City shall also not be liable for any damages which result from such stoppage or slowing that is the result of any necessary repair, or any other interruption in service.

2.8 **Cross Connections Prohibited.** No City water pipe shall be connected with any pump, well, or tank that is connected with any other source of water supply. When such a connection is found, the City shall notify the owner of the property on which the connection is found and order that the cross connection be disconnected. If this is not accomplished immediately, the water supply to the property may be turned off at the direction of the City Council. Before any new connection to the water system is permitted, the City shall ascertain that no cross-connection will exist when the connection is made.

2.9 **Abandoned Services.**

2.9.1 **Disconnection Required.** All service installations connected to the water system that have been abandoned or have become useless for further service shall be disconnected at the main by the City. All pipe and appurtenances removed shall be the property of the City.

2.9.2 **Change to New Water Service.** When a new primary structure is erected on the site of an old structure, and it is desired to increase or alter the old water service, no connections with the City mains shall be permitted until all the old service is removed and the main plugged. If there is an existing water service to an accessory structure, it may remain in use.

2.10 **Irrigation Systems.** All irrigation systems connected to the municipal system shall be installed per plumbing code and have a rain detection device so as to prevent irrigation during rain events.

2.11 **Emergency Water Restrictions.** The authorized staff to act in a water emergency include the Mayor, Engineer, Public Works Superintendent and Administrator. When any two of the authorized staff determine pressure or quantities are (or may become) inadequate, a water emergency may be declared by posted notice and typical City communication methods (website, etc.).

2.11.1 Council will review the water emergency restrictions at the next regular Council meeting and confirm or remove the restriction.

Subdivision 3. **Sewer System.**

3.1 **Maintenance and Repair of Sewer System.** The property owner shall be responsible for maintaining and repairing the sanitary sewer line from the structure to the connection with the public sewer main. The City shall be responsible for maintaining and repairing the remainder of the sanitary sewer infrastructure. If a property owner fails to make the necessary repairs to the sewer line infrastructure within 30 days after the owner is notified to do so by the City, in writing, the City may cause the repairs to be completed and charged to the property owner for all costs associated with the repair. In cases where an emergency is declared, the City shall cause repairs to the sewer system to be made immediately.

3.2 **Sewer Mapping.** The City shall maintain a comprehensive sanitary sewer system map detailing the following information: The number and location of manholes, the number and location of service connections, line locations, the type and diameter of pipe, and the location of lift stations. The City shall maintain a program of regular inspection and maintenance performed on sanitary sewer lines. The City shall also maintain a program for lift station inspection and maintenance.

3.3 **Damaging or Tampering Prohibited.** No person shall maliciously, willfully, or negligently break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance, or equipment which is part of the sanitary sewer system.

3.4 **Inspections.** Every person owning real estate that discharges into the City sanitary sewer system shall allow the Building Inspector, any duly authorized City employee, designated representative of the City, or a licensed plumber bearing proper credentials and identification, to enter the property for the purposes of inspection, observation, measurement, sampling, and testing in accordance with the provisions of this section. This includes to confirm that there is no sump pump or other prohibited discharge into the sanitary sewer system. Any person refusing to allow their property to be inspected shall immediately become subject to a surcharge in an amount established by the fee schedule. Any property found to be discharging storm water into the sanitary sewer system, either directly or indirectly shall make the necessary changes and furnish proof of the changes to the City within six months of the inspection. A surcharge in an amount established by the fee schedule shall be imposed on the property owner's sanitary sewer utility bill for properties in violation of this ordinance and continue until the property is found to be in compliance.

3.4.1 If a person does not wish to allow the City to enter a building to conduct the required activity, he or she may retain a licensed plumber to conduct the activity. The private inspector must have credentials that are acceptable to the City. The private inspector shall provide the City with the relevant samples, tests, reports, drawings, photos, or any other information that is being requested.

3.5 **City Not Liable for Damages Resulting Interruption of Service.** The City shall not be liable for any damages which result from the backup of sewer lines as a result of breaks in mains, service pipes, fixtures, or by reason of obstruction or the breakdown of machinery. The City shall also not be liable for any damages which result from such stoppage or slowing or backup that is the result of any necessary repair, or any other interruption in service.

3.6 **Discharge to Public Sewer.** No person shall discharge or cause to be discharged any prohibited waste discharges as defined in the Metropolitan Council's waste discharge rules (WDR), February 2013 or latest version. This includes harmful wastes, whether liquid, solid, or gas, capable of causing obstruction to the flow in the sewer system, damage, or hazard to sewer structures, equipment, or personnel. No person shall discharge or cause to be discharged any storm water, surface water, groundwater, runoff, subsurface drainage, cooling water, or industrial processed waters to any City sanitary sewer, or otherwise interfere with the proper operation of the City sewer system. This includes sump discharges.

3.6.1 **Industrial and Commercial Strength.** Industrial users discharging wastewater into public sewers shall apply for an industrial discharge permit according to the WDR (February 2013 or latest version), unless MCES determines that the wastewater has an insignificant impact on public sewers.

3.7 **Abandoned Services.**

3.7.1 **Disconnection Required.** All service installations connected to the sanitary sewer system that have been abandoned or have become useless for further service shall be disconnected at the main by the City. All pipe and appurtenances removed shall be the property of the City.

3.7.2 **Change to New Sanitary Sewer Service.** When a new structure is erected on the site of an old structure, and it is desired to increase or alter the old sanitary sewer, no connections with the City mains shall be permitted until all the old service is removed and the main plugged.

51.050 ADMINISTRATION AND ENFORCEMENT

Subdivision 1.

1.1 **Duties, Responsibilities, and Authority of City Administrator.** The City Administrator shall be responsible for the implementation of this section and shall report annually to the City Council, as a part of the annual City budget process. At that time, the City Administrator shall inform the City Council of the status of the condition of the infrastructure, replacement requirements, and the financial condition and performance of the utility enterprise fund.

Subdivision 2. **Penalties.**

2.1 Any person who violates any of the provisions of this ordinance shall be guilty of a misdemeanor. Each day that any violation is continued shall constitute a separate offense.

Subdivision 3. **Liability for Damages.**

3.1 A person who violates any of the provisions of this ordinance is liable to the City for any expense, loss, or damage incurred by the City by reason of such violation.

Subdivision 4. **DelinquentAccounts.**
Delinquent accounts shall be subject to the following procedures:

4.1 **Penalties.** A late payment penalty of ten percent shall be assessed on all accounts with a past due balance.

4.2 **Shut-off for non-payment.** Water shall not be shut-off until notice and an opportunity for a hearing before the city council has been provided to the occupant and owner of the premises involved.

4.2.1 If any bill is not paid by 30 days after the due date listed on the bill, the city shall send a letter by first class mail demanding payment within 30 days of the date of the letter.

4.2.2 If any bill is not paid by 60 days after the due date listed on the bill, the city shall send a second letter by first class mail stating that if payment is not made within 20 days of the date of the letter, water service to the premises will be shut-off for nonpayment.

4.2.3 The first and second letters shall contain the title, address and telephone number of the official in charge of billing.

4.2.4 The city clerk shall have the authority to adjust the customer's bill or enter into a mutually agreeable payment plan.

4.2.5 The letters shall also state that any occupant or owner has the right to a hearing before the water service is shut-off. The owner or occupant may be represented in person and by counsel or any other person of owner's choosing. The owner or occupant may present orally or in writing their complaint to the city council.

4.2.6 If an occupant or owner requests a hearing, the water shall not be shut-off until the hearing process is complete.

4.2.7 If a customer fails to pay a bill when due and fails to request a hearing under this part, service will be shut-off at the time specified in the notice. Any residential property for which water service has been terminated under this subdivision shall be deemed uninhabitable under City code.

4.3 **Certification for collection with taxes.**

4.3.1 Unpaid charges on water, sewer, and other utility services shall not be certified to the county auditor until notice for a hearing has been provided to the owner of the premises involved. The notice shall be sent by first class mail and shall state that if payment is not made by September 25, the entire amount unpaid plus a penalty of ten percent will be certified to the county auditor for collection as other taxes are collected. The notice shall also state that the occupant may, before such certification date, attend or schedule a hearing on the matter to object to certification of unpaid utility charges.

4.3.2 The owner of the property shall have the option of paying the balance due on the account by September 25. After this date, the certified roll will be finalized. After the date the certified roll is finalized, payments will still be accepted but will include the ten percent penalty.

(Ord. 277, passed 7-24-14)

Appendix 11

Implementation Checklist

Activity Implemented	Activity or Action Plan	Timeframe
Actions to reduce residential per capita demand		
	Revise city ordinance/codes to permit water reuse options	5 Years
	Implement notification system to inform customers when water availability conditions change	On-going
	Conduct water conservation education and outreach	Develop program within 3 years
Actions to reduce total water demand		
	Phase in enhanced meters capable of automated readings to detect spikes in consumption	Phase in as C/I/I meters
	Implement C/I/I notification system to inform non-residential customers when water availability conditions change	On-going
	Prepare a comprehensive open space plan (area for parks, green spaces, natural areas)	On-going

APPENDIX D: CAPITAL IMPROVEMENT PLAN

CAPITAL IMPROVEMENT PLAN AND DEBT SERVICE STUDY

The City annually reviews its capital vehicle, equipment, facilities, and improvement project needs and prepares a multi-year plan. The Capital Improvement Plan (CIP) provides details on costs by year and proposed funding sources. The debt service study, included in the Plan, provides information on current debt service and future estimated debt service based on the CIP.

The plan for future capital acquisition and improvements provides an important input into preparing the financial plans included within the Plan. The financial plans are inclusive of all sources and uses of funds, both operating and non-operating. Table 2 provides a summary of the City's capital acquisition and improvement plans.

Overview of Plan

The majority of the on-going costs included in the CIP are for on-going annual vehicle, equipment, and facilities needs. The four key categories of spending shown in the CIP are as follows:

1. Equipment, Vehicles, and Facilities

Over the next five years (2017 to 2023) the City anticipates spending an average of about $310,000 per year on equipment, facilities, and vehicles capital needs. Current plans anticipate the City issuing equipment certificates in 2018 to fund the planned expenditures.

2. Water Improvements

Water improvements are included in the CIP for the downtown area and for the County Road 116 (Western Loop) trunk line project.

3. Sanitary Improvements

There are no projects currently anticipated.

4. Street Improvements

The CIP includes street improvements for Hackamore Road (CR116/CSAH101). The City's share of the Hackamore Road improvements (project is a cooperative project with other jurisdictions) will be funded from a payment from the benefiting residential developer and special assessments to other benefiting properties. The CIP does not anticipate any property tax levy support for street improvements.

4. Facility and Parks

The CIP includes a planned project for park facility acquisition in year 2019. The specific timing is unknown at this time and year 2019 is a placeholder date. The project is shown to be funded from bond proceeds, with issuance in estimated to be in 2019.

Source of Funding

The source of funding for the CIP includes cash balance (from existing fund balance or current tax levy), bond proceeds, developer payments, and proceeds from sale of assets.

Debt Service

The City anticipates the issuance of bonds to finance certain capital improvements. Table 3 provides a summary of future estimated debt service payments (principal and interest) by year and related funding sources.

The annual debt service on the future proposed bonds is also included in the financial plans for the debt service fund and utility fund. The preliminary estimates for debt service are based on bonds to be paid as follows:

- Equipment certificates paid over 10 years
- General obligation bonds for street and utility improvements paid over 10 years
- General obligation bonds for park facility acquisition paid over 15 years

The final sizing, structuring, and interest rates will depend on project specifics and market conditions at time of issuance. The amounts shown in this Plan are preliminary and for planning purposes only.

TABLE 2
(Page 1 of 3)
City of Corcoran
Capital Improvement Plan

	2017	2018	2019	2020	2021	2022	2023	Total
Equipment, Vehicle, and Facilities								
Use of Funds								
Police Department	52,500	127,000	53,500	119,500	92,500	128,500	61,500	635,000
Public Works		315,000	140,000	300,000	200,000	30,000	300,000	1,285,000
Technology								-
Administration		165,000	80,000	5,000	5,000	5,000	5,000	265,000
Total	52,500	607,000	273,500	424,500	297,500	163,500	366,500	2,185,000
Source of Funds								
Bond proceeds		559,329						559,329
Sale of assets	4,000	33,000	19,500	50,000	40,000	5,000	50,000	201,500
Developer Escrow/Prepayments								-
Cash from fund	48,500	14,671	254,000	374,500	257,500	158,500	316,500	1,424,171
Tax increment funds								-
Total	52,500	607,000	273,500	424,500	297,500	163,500	366,500	2,185,000
			-		-			
Water Improvements								
Use of Funds								
SE Sewer Lift Station at Lions Park								-
SE Water along 101 and booster								-
CR 116 (Western Loop) Trunk Water			1,400,000					1,400,000
Total	-	-	1,400,000	-	-	-	-	1,400,000
Source of Funds								
Bond proceeds	-	-	1,400,000	-	-	-	-	1,400,000
Sale of assets								
Developer Escrow/Prepayments								-
Cash from fund								-
Tax increment funds								-
Total	-	-	1,400,000	-	-	-	-	1,400,000

TABLE 2
(Page 2 of 3)
City of Corcoran
Capital Improvement Plan

	2017	2018	2019	2020	2021	2022	2023	Total
Sewer Improvements								
Use of Funds								
SE Sewer Lift Station at Lions Park								-
SE Water along 101 and booster								-
CR 116 (Western Loop) Trunk Water								-
Total	-	-	-	-	-	-	-	-
Source of Funds								
Bond proceeds	-	-	-	-	-	-	-	-
Sale of assets								
Developer Escrow/Prepayments								-
Cash from fund								-
Tax increment funds								-
Total	-	-	-	-	-	-	-	-
Street Improvements								
Use of Funds								
Hackamore Road, CR 116, CSAH 101		2,200,000						2,200,000
CSAH 101 Turn Lanes								-
Downtown improvements								-
Total	-	2,200,000	-	-	-	-	-	2,200,000
								-
Source of Funds								
Bond proceeds	-	1,060,000	-	-	-	-	-	1,060,000
Sale of assets								
Developer Escrow/Prepayments		1,140,000						1,140,000
Cash from fund								-
Tax increment funds								-
Total	-	2,200,000	-	-	-	-	-	2,200,000

TABLE 2
(Page 3 of 3)

City of Corcoran
Capital Improvement Plan

	2017	2018	2019	2020	2021	2022	2023	Total
Facility and Parks								
Use of Funds								
Public works facility								-
Park facility acquisition			2,320,000					2,320,000
Total	-	-	2,320,000	-	-	-	-	2,320,000
Source of Funds								
Bond proceeds	-	-	2,320,000	-	-	-	-	2,320,000
Sale of assets								
Developer Escrow/Prepayments								-
Cash from fund								-
Tax increment funds								-
Total	-	-	2,320,000	-	-	-	-	2,320,000
Total Capital Improvement Plan								
Equipment, Vehicle, Facilities	52,500	607,000	273,500	424,500	297,500	163,500	366,500	2,185,000
Water Improvements	-	-	1,400,000	-	-	-	-	1,400,000
Sewer Improvements	-	-	-	-	-	-	-	-
Street Improvements	-	2,200,000	-	-	-	-	-	2,200,000
Facility and Parks	-	-	2,320,000	-	-	-	-	2,320,000
Total Use of Funds	52,500	2,807,000	3,993,500	424,500	297,500	163,500	366,500	8,105,000
Total Source of Funds								
Bond proceeds (includes use of premium)	-	1,619,329	3,720,000	-	-	-	-	5,339,329
Sale of assets	4,000	33,000	19,500	50,000	40,000	5,000	50,000	201,500
Developer Escrow/Prepayments	-	1,140,000	-	-	-	-	-	1,140,000
Cash from fund	48,500	14,671	254,000	374,500	257,500	158,500	316,500	1,424,171
Tax increment funds	-	-	-	-	-	-	-	-
Total Source of Funds	52,500	2,807,000	3,993,500	424,500	297,500	163,500	366,500	8,105,000

Notes:

1. Yr 2018 is the last year for issuance of bonds for equipment. The plan is to levy current taxes to support a transfer to the capital fund for equipment acquisition.
2. The CR116 (Western Loop) is shown in 2019; anticipate design/property acquisition in 2018 and construct 2019. Issuance of bonds in 2019.
3. The Hackamore St. project will be bonded and paid 100% by special assessments. Special assessments estimated to be collected over 4 years at 5% interest.
4. Bond proceeds as shown here does not include proceeds used to pay cost of issuance of the bonds.
5. The Park Facility acquisition is shown in Yr 2019. The Plan includes anticipated debt service levy in 2019 for the project. The actual timing is uncertain.

TABLE 3
(Pages 1 of 2)

City of Corcoran
Debt Service Study - Annual Principal and Interest by Calendar Payment Year and Source of Funds

	Fund Debt Service is Recorded	2017	2018	2019	2020	2021	2022	2023	2024	2025
EXISTING DEBT										
Existing Debt Service Expense as of 12/31/2016										
Northland Trust 2008 (Certificate)	Governmental DS Funds	99,888								
Carroll County 2004 (PD Facility)	Governmental DS Funds									
Bankwest 2010*	Governmental DS Funds	29,911	29,864							
Farmers 2010*	Governmental DS Funds	29,911	29,864							
**City plans to call the 2019 and 2020 maturities of the 2010 Bonds in 2018*			118,000							
G.O. 2012A Certificates	Governmental DS Funds	43,775	43,275	42,775	42,275	46,575	45,788			
G.O. 2012B CIP Bonds	Governmental DS Funds	176,488	160,038	218,138	220,588	237,788	234,788	236,738	238,588	240,338
G.O. 2014A Bonds (Equipment)	Governmental DS Funds	50,874	50,140	50,396	50,360	50,025	50,646	50,220	50,750	-
G.O. 2014B Bonds	Proprietary Funds	225,200	222,500	219,800	222,050	218,550	219,275	214,925	220,425	220,700
G.O. 2016A Bonds	Governmental DS Funds	74,350	306,980	301,980	301,930	296,830	296,680	301,380	300,930	295,430
Total Existing Debt		**730,396**	**960,660**	**833,089**	**837,203**	**849,768**	**847,176**	**803,263**	**810,693**	**756,468**
Source of Funds for Existing Debt Service										
Property Tax Levy		489,979	494,633	363,203	364,583	386,176	387,471	340,260	342,024	289,839
Use of fund balance or (increase) in fund balance		(159,827)	(20,549)	(9,590)	(9,656)	(10,684)	(15,745)	(8,398)	(8,482)	(5,997)
Water Revenues		170,145	227,089	221,771	224,225	218,356	219,851	213,353	217,124	213,223
Sewer Revenues		125,055	153,745	151,963	152,309	150,178	149,858	152,306	154,284	153,661
Other Revenues (unused discount)		4,350								
Special Assessments - Hackamore Rd										
Special Assessments - Downtown Project		100,694	105,742	105,742	105,742	105,742	105,742	105,742	105,742	105,742
Total Source of Funds for Existing Debt		**730,396**	**960,660**	**833,089**	**837,203**	**849,768**	**847,176**	**803,263**	**810,693**	**756,468**
FUTURE DEBT										
Estimated Future Debt Service										
G.O. 2018 Bonds	Governmental DS Funds		-	27,903	310,694	320,785	324,985	327,930	33,623	32,895
G.O. 2019A Bonds	Proprietary Funds			7,250	98,500	96,850	95,200	98,550	96,750	99,950
G.O. 2019B Bonds	Governmental DS Funds			47,000	119,750	118,250	116,750	120,175	172,700	179,250
Total New Debt		**-**	**-**	**82,153**	**528,944**	**535,885**	**536,935**	**546,655**	**303,073**	**312,095**
Source of Funds for Future Debt Service										
Property Tax Levy		-	-	171,285	156,933	160,057	163,070	218,372	224,642	288,302
Use of fund balance or (increase) in fund balance		-	-	(118,212)	(11,658)	(6,190)	(6,504)	(55,435)	(18,319)	(76,157)
Water Revenues			-	7,250	98,500	96,850	95,200	98,550	96,750	99,950
Sewer Revenues										
Other Revenues (unused discount)										
Special Assessments - Hackamore Rd				21,830	285,169	285,169	285,169	285,169	-	
Special Assessments - Downtown Project										
Total Source of Funds for Future Debt			**-**	**82,153**	**528,944**	**535,885**	**536,935**	**546,655**	**303,073**	**312,095**

TABLE 3
(Pages 2 of 2)

City of Corcoran
Debt Service Study - Annual Principal and Interest by Calendar Payment Year and Source of Funds

	Fund Debt Service is Recorded	2017	2018	2019	2020	2021	2022	2023	2024	2025
TOTAL COMBINED EXISTING AND FUTURE DEBT										
Total Combined Debt Service for Existing and Future Debt										
Governmental DS Funds	Governmental DS Funds	505,196	738,160	688,192	1,045,597	1,070,253	1,069,636	1,036,443	796,591	747,913
Proprietary Funds	Proprietary Funds	225,200	222,500	227,050	320,550	315,400	314,475	313,475	317,175	320,650
Total Debt Service (Existing and Future)		**730,396**	**960,660**	**915,242**	**1,366,147**	**1,385,653**	**1,384,111**	**1,349,918**	**1,113,766**	**1,068,563**
Total Combined Source of Funds for Existing and FutureDebt										
Property Tax Levy		489,979	494,633	534,488	521,516	546,233	550,541	558,632	566,666	578,141
Use of fund balance or (increase) in fund balance		(159,827)	(20,549)	(127,802)	(21,313)	(16,874)	(22,249)	(63,833)	(26,801)	(82,154)
Water Revenues		170,145	227,089	229,021	322,725	315,206	315,051	311,903	313,875	313,173
Sewer Revenues		125,055	153,745	151,963	152,309	150,178	149,858	152,306	154,284	153,661
Other Revenues (unused discount)		4,350	-	-	-	-	-	-	-	-
Special Assessments - Hackamore Rd		-	-	21,830	285,169	285,169	285,169	285,169	-	-
Special Assessments - Downtown Project		100,694	105,742	105,742	105,742	105,742	105,742	105,742	105,742	105,742
Total Source of Funds for Existing and and Future Debt		**730,396**	**960,660**	**915,242**	**1,366,147**	**1,385,653**	**1,384,111**	**1,349,918**	**1,113,766**	**1,068,563**

Notes:

1. Property tax levy amount included in this report is the projected amount of levy to be certified for debt service. The timing of the collection of the tax levy may occur in the calendar year prior to the payment of debt service depending on the payment dates for the Bonds. For example, a principal payment due on February 1 is paid from taxes collected in the year prior.
2. The financial plan provides that the City will no longer issue equipment certificates after the issuance of bonds in 2018. The financial plan provides a stratety for paying for annual equipment on a pay-go basis beginning with year 2021.

APPENDIX E: CITY ORDINANCE CHAPTER 51

CHAPTER 51: REGULATING PUBLIC SANITARY SEWER AND WATER WITHIN THE CITY OF CORCORAN

51.010: PURPOSE

Subdivision 1. **Purpose.**
The City sanitary sewer and water supply systems represent significant public investments and their operation in an efficient and sanitary manner is essential to protect public health, safety and welfare, to safeguard municipal finances and to support development and economic vitality within the community. It is the purpose of this ordinance to protect the integrity, the financial stability and adequacy of the City sanitary sewer and water supply systems by regulating the construction, maintenance and use of those systems, and restricting the installation and use of private water supply wells and individual sewage treatment systems when necessary or appropriate. Priority for extending service is new development and the existing downtown commercial district. It is not the intention of the City to extend service and require connection of existing residential or agricultural properties unless requested as referenced in this ordinance.

51.015: DEFINITIONS

Subdivision 1. **Definitions.** The following terms shall have the meanings given to them unless another meaning is clear from the context:

1.1 **Account.** A record of utility services used by each property and the periodic charges for those utility services.

1.2 **Available (Access to Sewer/Water Line).** A trunk or lateral sewer or water line is deemed available to a property when (i) that line is either abutting the property or may be accessed by the property by utility or road easement/ROW, and (ii) the City has included the property within a defined service area approved for immediate utility service.

1.3 **City.** The City of Corcoran, County of Hennepin, State of Minnesota.

1.4 **City Utility System.** Facilities used for providing public utility service owned or operated by City or agency thereof, including sewer, storm sewer and water service.

1.5 **Commercial.** Defined as non-residential and non-agricultural use, which is typically commercial, industrial, or retail; operations.

1.6 **Connection Charge.** Connection charges are paid to the City by benefitting property owners to cover the City's costs of connection to and administration and operation of the City utility. Connection charges are set by the City Council.

1.7 **Fee Schedule.** A schedule of all utility rates and charges set by City ordinance.

1.8 **Residential.** Single and multi-family use.

1.9 **SAC (Metropolitan Council Sewer Availability Charge).** The Sewer Availability Charge (SAC) is a one-time fee by Metropolitan Council Environmental Services for each new connection to or increase in capacity demand on the Metropolitan Disposal System. The City may pass the SAC charge, along with possible local fees, to benefitting property owners. SAC charge units will be based on the assumed generation of 274 daily gallons of waste water flow per unit. Single family residential units will pay one SAC charge unit and other properties will pay a number of units based on estimated daily flow calculations (but in no case less than one unit). The City may periodically revise the SAC charge calculation and unit charge.

1.10 **Trunk Line Availability Charges (TLAC).** Trunk Line Availability Charges ("TLAC") are fees charged to all properties for which a water or sanitary sewer trunk line is available. Separate TLAC will be charged for each of water and sewer trunk lines. The TLAC are charged in recognition of the current benefit to properties for which a trunk line is available, regardless whether the property is connected to the trunk line (whether directly or via a lateral). The City will set and may periodically revise the TLAC.

1.11 **Unimproved Land.** Land that does not have certain basic services necessary to utilize it for other purposes. These include electricity, telephone, street access, or water available.

1.12 **Water and Sanitary Sewer Systems.** Water and sanitary sewer transmission pipes, lines, fixtures, meters and all necessary equipment and appurtenances owned or operated by the City utility system for the purpose of providing water and sewer services for public or private use.

51.020: UTILITY CONNECTION, PERMISSIVE OR MANDATORY

Subdivision 1. **Mandatory Connection.**

1.1 As defined in Chapter 51.010 Subdivision 1.2, all new residential and commercial construction to which utility service is available shall connect to the line at the time of construction.

1.2 When a trunk or lateral water or sewer line is available to an existing commercial property (with a structure), as defined in Chapter 51.010 Subdivision 1.2, all such commercial properties shall connect to the line upon the earlier of (i) reconstruction (other than overlay or maintenance) of an adjacent roadway under which the line lies, or (ii) within one year following availability.

Subdivision 2. **Permissive Connection.**

2.1 The City may extend a trunk or lateral sewer or water line to serve an existing residential neighborhood or commercial district upon petition by property owners within

the neighborhood or district. The City may consider the following information in approving or denying the petition: comprehensive cost of the project; cost to individual properties; demonstrated need for the project; existing site conditions of the proposed project; geographic scope of the project area, and any other information the City deems relevant.

2.2 If as a result of a property owner petition, the City makes a water or sewer trunk or lateral line available to existing residential or commercial properties, as defined in Chapter 51.010 Subdivision 1.2, the City shall have the discretion and authority to either require connection to the trunk or lateral line upon construction of the trunk or lateral line, or to defer connection of individual properties on a case-by-case basis.

51.030: CHARGES, RATES AND BILLING

Subdivision 1. **Availability and Connection Charges.**

1.1 **Trunk Line Availability Charges (TLAC)**. TLAC shall be charged to and collected from benefitting properties property as follows:

1.1.1 **New Construction.** TLAC shall be charged and collected upon approval of the final plat for new construction. New development of residential or commercial property shall be charged one (1) TLAC per acre of pre-developable area.

1.1.2 **Existing Construction.** In the event service is extended to existing construction as defined in Chapter 51.020 Subdivision 2.1, TLAC shall be charged to each benefitting, residential or commercial property when the trunk or lateral line is made available to the property. TLAC shall be collected within 30 days notice from the City or; at the discretion of the City, collection may be deferred and financed for a period not to exceed 20 years. In the event the City allows deferral of collection, the deferred charge shall bear interest at a rate 1% above the City's cost of borrowing in the year the deferral was approved. Existing developed residential property, commercial property, and unimproved land will be charged one (1) TLAC regardless of acreage.

1.1.3 **Additional New Construction Without Platting.** In the event of new construction on unimproved land or as a result of teardown on existing platted lots, TLAC shall be collected from each individual or entity requesting or receiving a connection to the City water system. Credit will be given for any prior TLAC paid on behalf of the platted lot.

1.2 **Connection Charge.** Connection charges shall be paid by all benefitting properties at the time of (a) building permit for new construction, or (b) issuance of connection permit for existing residential and commercial.

1.3 **SAC (Metropolitan Council Sewer Availability Charge).** SAC shall be charged and collected at time of building permit issuance.

1.4 **Deferrals.** Property owners may apply to the City, pursuant to Minn. Stat. §435.193-195 for a deferral of payment for sewer and water charges assessed to their property. The City shall have full discretion to consider and approve or deny the request for deferral. Interest shall be assessed upon and accrue against all deferred charges.

Subdivision 2. **Utility Usage Charges.**

2.1 **Charge for Water Usage.** Utility customers shall be billed for water based on metered usage in per thousand gallon units.

2.2 **Charge for Sanitary Sewer System Usage.** Utility customers shall be billed for sanitary sewer based on metered usage of water in per thousand gallon units.

2.3 **Administrative Base Charge.** In addition to metered usage charges, utility customers shall be billed a minimum administrative base charge for water and sanitary sewer service. The administrative base charge shall be paid at the same time and in the same manner as metered usage payments.

2.4 **Water Treatment Surcharge.** Utility customers shall be billed for a water treatment surcharge in an amount set by the City Council and adopted by ordinance. This surcharge shall be paid at the same time and in the same manner as usage charge payments. The water treatment surcharge shall be used to offset the costs of water treatment performed by the City of Maple Grove.

2.5 **Fee Schedule.** A utility fee schedule shall be prepared annually by the City Administrator and presented to the City Council for approval and adoption in ordinance form. The charge schedule shall be comprehensive and list all utility charges, including incentive-based water conservation incentive charges.

2.6 **Frequency of Charges.** Utility customers shall be invoiced monthly for utility services. Utility customers shall pay utility invoices upon the terms established by the City and as stated in the invoice. The City may contract with third party vendors to perform billing services.

2.7 **Designation of Billing Address.** All bills and notices pertaining to water and sanitary sewer systems sent by the City shall be sent to the house or street number of the property. If an owner or agent desires that personal notice be sent to a different address, that person shall file an application therefore with the City. Any error or change in any address shall be promptly reported to the City.

2.8 **Late Charges; Delinquent Bills.** A late charge, in an amount established in ordinance, shall be charged if bills are not paid by the due date established in that bill. If a bill is not paid within 30 days of the date that it becomes due, it shall be deemed delinquent. When a bill becomes delinquent, the City shall notify the property owner, in writing, of the same. An additional late charge shall be added on each monthly calculation date upon which a delinquent bill, including any previous late charges, remains unpaid.

2.9 **Assessing Delinquent Charges.** The City maintains the authority to certify delinquent charges to the Hennepin County Auditor for collection with taxes and to shut off water to property in certain cases where delinquencies are greater than 80 days. It shall be the practice of the City to certify delinquent payments annually, but this may be done on a more frequent basis at the discretion of the City Council. Before certification for collection, or shut off, the City shall notify the property owner of the date and time of the meeting to address the delinquency. The City Council shall have final authority over actions related to delinquent payments or shut off for a property.

2.10 **Errors in Billing.** The City Administrator shall be authorized to make adjustments in water charges when, in the opinion of the City Administrator, the amount billed to a utility customer was erroneous due to an inaccurate or defective meter, or due to other mistake.

51.040 CONSTRUCTION, MAINTENANCE, OWNERSHIP

Subdivision 1. **Authority to Conduct Services**

1.1 **Permit Required for Connection Work.** No person shall open, connect with, use, alter, or disturb any public water line or public sewer line or appurtenance thereof without first obtaining a written permit from the City pursuant to this section.

1.2 **Persons Authorized to Work on City Water and Sewer System.** Only a duly authorized employee of the City or City contractors, are permitted to do any work on City water lines, or water meters connected to the City water system, .

1.3 **Damaging or Tampering Prohibited.** No person shall maliciously, willfully, or negligently break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance, or equipment which is part of the municipal water line infrastructure.

1.4 **Inspections.** The Building Inspector and any other duly authorized City employee, bearing proper credentials and identification, shall be permitted to enter upon all properties for the purposes of inspection, observation, measurement, sampling, and testing in accordance with the provisions of this section.

Subdivision 2. **Water System.**

2.1 **Water Quality.** The City purchases all utility system water from the City of Maple Grove, which has the authority to establish and control water quality standards as well as ordinances and rules applicable to the preservation and use of the water it supplies to the City. The use and supply of water furnished by Maple Grove shall at all times be governed by the applicable Maple Grove ordinances and rules in effect for the preservation, use and protection of its water supply. The City hereby adopts the applicable City of Maple Grove preservation, use and protection ordinances and rules by reference, and shall enforce said ordinances and rules hereunder. The City reserves the right to adopt additional ordinances and rules affecting the preservation, use and protection of its utility system water.

2.2 **Maintenance and Repair of Water Mains.** The City shall be responsible for maintenance and repair of the water line infrastructure including the water shutoff valve out to the lateral connection. Maintenance and repair of water lines located on private property from the water shutoff valve to the home is the responsibility of the property owner. If a property owner fails to make the necessary repairs to the water line within 30 days after the owner is notified to do so by the City, in writing, the City may cause the repairs to be completed and charged to the property owner for all costs associated with the repair. In cases where an emergency is declared, the City shall cause repairs to the water system to be made immediately, which may include turning off the water to the property immediately.

2.3 **Water Meters.**

2.3.1 **Water Meter Required.** No person except authorized City employees shall use water from the City water supply system or permit water to be drawn therefrom, unless the water is metered by passing through a meter supplied or approved by the City.

2.3.2 **Tampering Prohibited.** No person shall connect, disconnect, disassemble, alter, cause to be altered, tamper, obstruct, or interfere with any City water meter, unless authorized by the City.

2.3.3 **Bypassing Meters or Taking Water.** No person shall bypass or tamper with any water meter for any reason.

2.3.4 **Ownership of Meters.** Water meters shall be and remain the property of the City. Meters may be removed, replaced, or changed by the City whenever the City deems it necessary.

2.3.5 **City Access to Read, Repair, and Replace Meters, Conduct Inspections.** Authorized City employees shall have access at reasonable hours of the day to all parts of every building and premises connected with the City water supply system to read, repair, and replace meters and conduct inspections. Before entering private property to do so, the City shall solicit the written consent of the property owner. If a property owner refuses to give consent or fails to respond, the City may pursue legal options to enter the property.

2.3.6 **Cost of Inspection.** City staff will set and impose a cost for inspecting a meter that is reported to be malfunctioning or defective. This cost shall be reimbursed to the property owner should the meter require replacement or repair.

2.3.7 **Cost of Repair.** The City shall be responsible for the repair and replacement of water meters unless a meter is damaged by a property owner intentionally or the damage is due to carelessness on the part of the property owner. In such instances, the property owner shall be responsible for the costs of repair and/or replacement.

2.3.8 **Meter Accuracy.** The City may charge a fee as established annually for investigating and testing meter accuracy. If the meter is determined to be faulty, the charge will be refunded.

2.4 **Water System Mapping.** The City shall maintain a comprehensive water system map detailing the following information: The number and line locations, the type and diameter of pipe, and the location of access points. The City shall maintain a program of regular inspection and maintenance performed on its water system lines. The City shall also maintain a program for lift station inspection and maintenance.

2.5 **Water Use Conservation.** The City reserves the right to impose water use restrictions pursuant to conservation efforts as required by regulatory authorities. The City may adopt administrative policies and procedures related to and regulating water conservation practices.

2.6 **Fire Hydrants.** Fire hydrants located within the limits of the City of Corcoran shall be the property of the City. Only persons authorized by the City shall be allowed to open and operate any fire hydrant in the City for any purpose. Temporary access to hydrants may be granted by the City to previously unauthorized persons via a permit issued by the City. Payment for water used, except for that used in firefighting, shall be made in accordance with adopted ordinance.

2.7 **City Not Liable for Damages Resulting from Interruption of Service.** The City shall not be liable for any damages which result from any stoppage or slowing of the supply or flow of water as a result of breaks in mains, service pipes, fixtures, or by reason of obstruction or the breakdown of machinery. The City shall also not be liable for any damages which result from such stoppage or slowing that is the result of any necessary repair, or any other interruption in service.

2.8 **Cross Connections Prohibited.** No City water pipe shall be connected with any pump, well, or tank that is connected with any other source of water supply. When such a connection is found, the City shall notify the owner of the property on which the connection is found and order that the cross connection be disconnected. If this is not accomplished immediately, the water supply to the property may be turned off at the direction of the City Council. Before any new connection to the water system is permitted, the City shall ascertain that no cross-connection will exist when the connection is made.

2.9 **Abandoned Services.**

2.9.1 **Disconnection Required.** All service installations connected to the water system that have been abandoned or have become useless for further service shall be disconnected at the main by the City. All pipe and appurtenances removed shall be the property of the City.

2.9.2 **Change to New Water Service.** When a new primary structure is erected on the site of an old structure, and it is desired to increase or alter the old water service, no connections with the City mains shall be permitted until all the old service is removed and

the main plugged. If there is an existing water service to an accessory structure, it may remain in use.

2.10 **Irrigation Systems.** All irrigation systems connected to the municipal system shall be installed per plumbing code and have a rain detection device so as to prevent irrigation during rain events.

2.11 **Emergency Water Restrictions.** The authorized staff to act in a water emergency include the Mayor, Engineer, Public Works Superintendent and Administrator. When any two of the authorized staff determine pressure or quantities are (or may become) inadequate, a water emergency may be declared by posted notice and typical City communication methods (website, etc.).

2.11.1 Council will review the water emergency restrictions at the next regular Council meeting and confirm or remove the restriction.

Subdivision 3. **Sewer System.**

3.1 **Maintenance and Repair of Sewer System**. The property owner shall be responsible for maintaining and repairing the sanitary sewer line from the structure to the connection with the public sewer main. The City shall be responsible for maintaining and repairing the remainder of the sanitary sewer infrastructure. If a property owner fails to make the necessary repairs to the sewer line infrastructure within 30 days after the owner is notified to do so by the City, in writing, the City may cause the repairs to be completed and charged to the property owner for all costs associated with the repair. In cases where an emergency is declared, the City shall cause repairs to the sewer system to be made immediately.

3.2 **Sewer Mapping.** The City shall maintain a comprehensive sanitary sewer system map detailing the following information: The number and location of manholes, the number and location of service connections, line locations, the type and diameter of pipe, and the location of lift stations. The City shall maintain a program of regular inspection and maintenance performed on sanitary sewer lines. The City shall also maintain a program for lift station inspection and maintenance.

3.3 **Damaging or Tampering Prohibited.** No person shall maliciously, willfully, or negligently break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance, or equipment which is part of the sanitary sewer system.

3.4 **Inspections.** Every person owning real estate that discharges into the City sanitary sewer system shall allow the Building Inspector, any duly authorized City employee, designated representative of the City, or a licensed plumber bearing proper credentials and identification, to enter the property for the purposes of inspection, observation, measurement, sampling, and testing in accordance with the provisions of this section. This includes to confirm that there is no sump pump or other prohibited discharge into the sanitary sewer system. Any person refusing to allow their property to be inspected shall

immediately become subject to a surcharge in an amount established by the fee schedule. Any property found to be discharging storm water into the sanitary sewer system, either directly or indirectly shall make the necessary changes and furnish proof of the changes to the City within six months of the inspection. A surcharge in an amount established by the fee schedule shall be imposed on the property owner's sanitary sewer utility bill for properties in violation of this ordinance and continue until the property is found to be in compliance.

3.4.1 If a person does not wish to allow the City to enter a building to conduct the required activity, he or she may retain a licensed plumber to conduct the activity. The private inspector must have credentials that are acceptable to the City. The private inspector shall provide the City with the relevant samples, tests, reports, drawings, photos, or any other information that is being requested.

3.5 **City Not Liable for Damages Resulting Interruption of Service.** The City shall not be liable for any damages which result from the backup of sewer lines as a result of breaks in mains, service pipes, fixtures, or by reason of obstruction or the breakdown of machinery. The City shall also not be liable for any damages which result from such stoppage or slowing or backup that is the result of any necessary repair, or any other interruption in service.

3.6 **Discharge to Public Sewer.** No person shall discharge or cause to be discharged any prohibited waste discharges as defined in the Metropolitan Council's waste discharge rules (WDR), February 2013 or latest version. This includes harmful wastes, whether liquid, solid, or gas, capable of causing obstruction to the flow in the sewer system, damage, or hazard to sewer structures, equipment, or personnel. No person shall discharge or cause to be discharged any storm water, surface water, groundwater, runoff, subsurface drainage, cooling water, or industrial processed waters to any City sanitary sewer, or otherwise interfere with the proper operation of the City sewer system. This includes sump discharges.

3.6.1 **Industrial and Commercial Strength.** Industrial users discharging wastewater into public sewers shall apply for an industrial discharge permit according to the WDR (February 2013 or latest version), unless MCES determines that the wastewater has an insignificant impact on public sewers.

3.7 **Abandoned Services.**

3.7.1 **Disconnection Required.** All service installations connected to the sanitary sewer system that have been abandoned or have become useless for further service shall be disconnected at the main by the City. All pipe and appurtenances removed shall be the property of the City.

3.7.2 **Change to New Sanitary Sewer Service.** When a new structure is erected on the site of an old structure, and it is desired to increase or alter the old sanitary sewer, no connections with the City mains shall be permitted until all the old service is removed and the main plugged.

51.050 ADMINISTRATION AND ENFORCEMENT

Subdivision 1.

1.1 **Duties, Responsibilities, and Authority of City Administrator.** The City Administrator shall be responsible for the implementation of this section and shall report annually to the City Council, as a part of the annual City budget process. At that time, the City Administrator shall inform the City Council of the status of the condition of the infrastructure, replacement requirements, and the financial condition and performance of the utility enterprise fund.

Subdivision 2. **Penalties.**

2.1 Any person who violates any of the provisions of this ordinance shall be guilty of a misdemeanor. Each day that any violation is continued shall constitute a separate offense.

Subdivision 3. **Liability for Damages.**

3.1 A person who violates any of the provisions of this ordinance is liable to the City for any expense, loss, or damage incurred by the City by reason of such violation.

Subdivision 4. **DelinquentAccounts.**
Delinquent accounts shall be subject to the following procedures:

4.1 **Penalties.** A late payment penalty of ten percent shall be assessed on all accounts with a past due balance.

4.2 **Shut-off for non-payment.** Water shall not be shut-off until notice and an opportunity for a hearing before the city council has been provided to the occupant and owner of the premises involved.

4.2.1 If any bill is not paid by 30 days after the due date listed on the bill, the city shall send a letter by first class mail demanding payment within 30 days of the date of the letter.

4.2.2 If any bill is not paid by 60 days after the due date listed on the bill, the city shall send a second letter by first class mail stating that if payment is not made within 20 days of the date of the letter, water service to the premises will be shut-off for nonpayment.

4.2.3 The first and second letters shall contain the title, address and telephone number of the official in charge of billing.

4.2.4 The city clerk shall have the authority to adjust the customer's bill or enter into a mutually agreeable payment plan.

4.2.5 The letters shall also state that any occupant or owner has the right to a hearing before the water service is shut-off. The owner or occupant may be represented in person and by counsel or any other person of owner's choosing. The owner or occupant may present orally or in writing their complaint to the city council.

4.2.6 If an occupant or owner requests a hearing, the water shall not be shut-off until the hearing process is complete.

4.2.7 If a customer fails to pay a bill when due and fails to request a hearing under this part, service will be shut-off at the time specified in the notice. Any residential property for which water service has been terminated under this subdivision shall be deemed uninhabitable under City code.

4.3 **Certification for collection with taxes.**

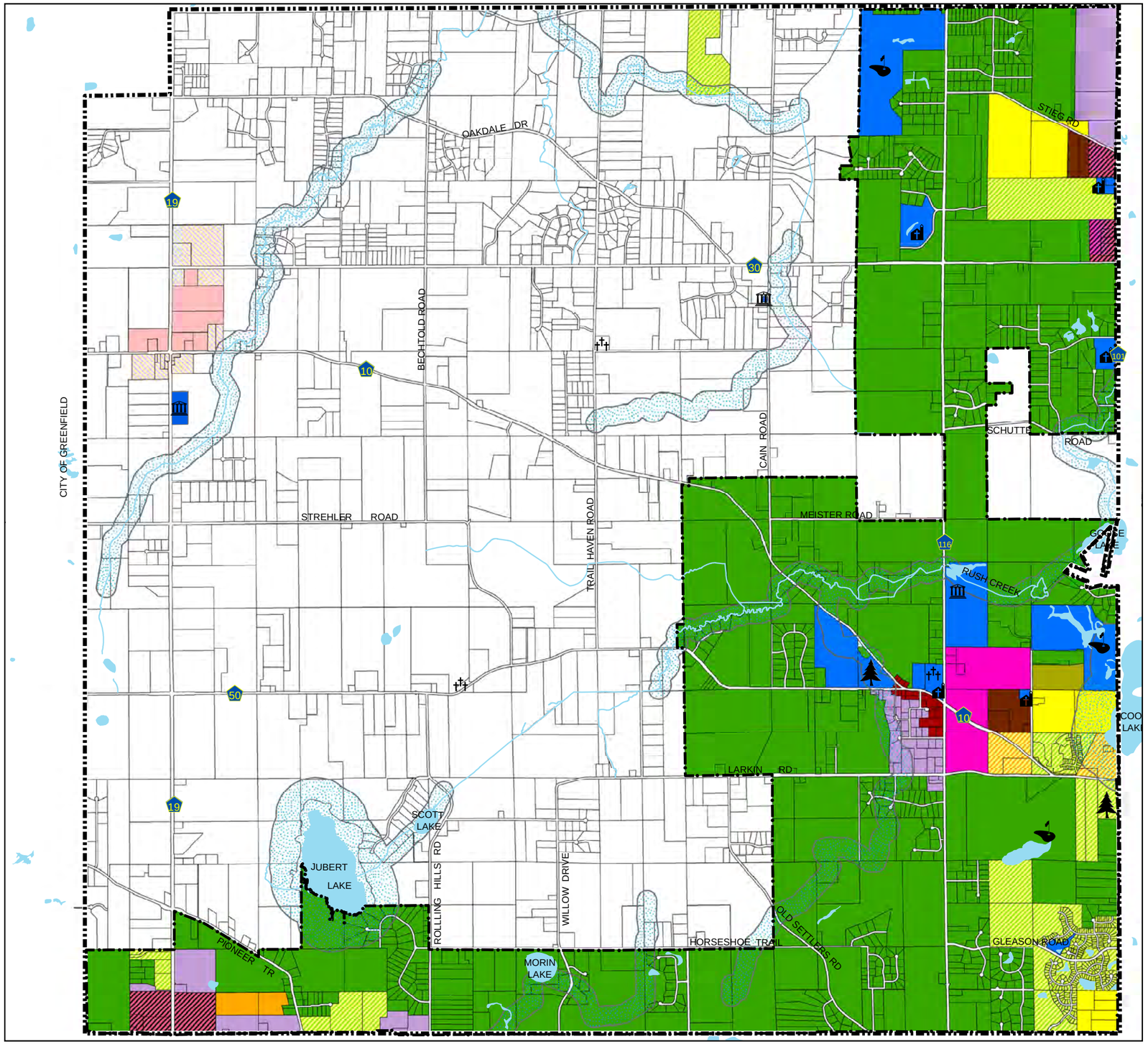
4.3.1 Unpaid charges on water, sewer, and other utility services shall not be certified to the county auditor until notice for a hearing has been provided to the owner of the premises involved. The notice shall be sent by first class mail and shall state that if payment is not made by September 25, the entire amount unpaid plus a penalty of ten percent will be certified to the county auditor for collection as other taxes are collected. The notice shall also state that the occupant may, before such certification date, attend or schedule a hearing on the matter to object to certification of unpaid utility charges.

4.3.2 The owner of the property shall have the option of paying the balance due on the account by September 25. After this date, the certified roll will be finalized. After the date the certified roll is finalized, payments will still be accepted but will include the ten percent penalty.

(Ord. 277, passed 7-24-14)


SW
W
NW
S
SE
NE
E
Nova Totius
TERRARUM
ORBIS
TABULA

APPENDIX F: OFFICIAL ZONING MAP



CITY OF CORCORAN

Official Zoning Map

Zoning Districts:

UR	Urban Reserve
RR	Rural Residential
RSF-1	Single Family Residential 1
RSF-2	Single Family Residential 2
RSF-3	Single and Two Family Residential 3
RMF-1	Medium Density Residential
RMF-2	Mixed Residential
RMF-3	High Density Residential
MP	Manufactured Home Park
P-I	Public / Institutional
TCR	Transitional Rural Commercial
CR	Rural Commercial
C-1	Neighborhood Commercial
C-2	Community Commercial
DMU	Downtown Mixed Use
GMU	General Mixed Use
BP	Business District
I-1	Light Industrial
PUD	Planned Unit Development

- Cemetery
- Church
- Golf Course
- Government Building
- Public Park
- 2030 Metropolitan Urban Service Area
- City Limit
- Open Water
- Shoreland Overlay District

3,000 1,500 0 3,000 Feet

N

Updated November 2018
Adopted June 2011