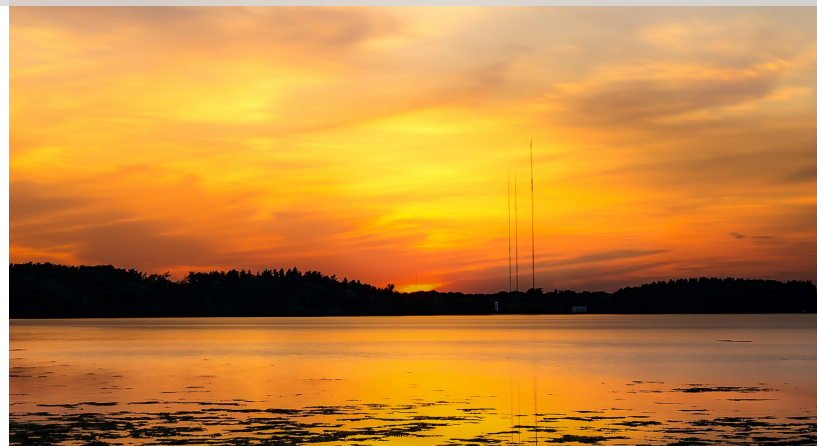





2040 COMPREHENSIVE PLAN

CITY OF VADNAIS HEIGHTS





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01

INTRODUCTION

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Background

The Metropolitan Land Planning Act (§473) requires the Metropolitan Council to create regional plans and policies to guide growth and manage regional systems for transportation, aviation, water resources, and regional parks. The law also requires local governments to update their comprehensive plans at least once every ten years.

Under the law, the Metropolitan Council reviews local comprehensive plans to ensure they are in accordance with the overall framework provided by the regional plans. The review helps determine how a community's planned actions relate to the interests of the whole region over the long term. It helps ensure that costly public infrastructure, like roads and sewers, are built in an economical and coordinated fashion, so that user fees and tax dollars are spent wisely.

The planning cycle begins with the release of data from the decennial U.S. Census. The Census provides a starting point for the Metropolitan Council to develop forecasts of regional and local changes in population and the number of households and jobs to the year 2040.

The Metropolitan Council uses this information to update its regional system plans to accommodate the forecasted changes. In May 2014, the Council adopted the overall development framework, **Thrive MSP 2040**. Between December 2014 and April 2015, the Council adopted updated system plans for regional parks, transportation, and water resources, as well as a policy plan for housing. In September 2015, the Council issued System Statements to each of the region's 188 local jurisdictions to show how they are affected by changes in the system plans.

Purpose

The **2040 Comprehensive Plan** serves the following purposes for the City and the community:

- A long-term strategy for the growth of the city
- An aid to short-term decisions about a variety of subjects
- A reference for development of application reviews
- A foundation for the zoning ordinance and map
- A guide to preparing the multi-year capital budget
- A basis for intergovernmental coordination
- Communication to and leadership for property owners



The **2040 Comprehensive Plan** includes the following elements:

- Land Use
- Housing
- Parks and Trails
- Economic Competitiveness
- Transportation
- Water Resources
- Implementation

The **2040 Comprehensive Plan** reflects the community values and goals that policymakers, residents and other stakeholders view and hold important. The goals and policies proposed in this plan have been established to provide direction toward these goals. The elements of the plan should be consistent and ongoing while the specifics should be amended to best suit community needs at the time.

Process

Descriptive data about the City of Vadnais Heights was gathered through a variety of sources. The data identified community assets, weaknesses, values, goals, and opportunities. A series of public meetings and open houses were held between May 2017 and December 2018 to review the various elements addressed within the Comprehensive Plan. An interactive page on the City's website was developed to provide information and updates on the planning process. Stakeholders could also respond to a survey containing community opinion questions and map areas of concern. The Plan's goals and policies were developed from previous comprehensive plans, the 2016 community survey, Commission and Council discussions, comments from the public and affected jurisdictions, and public hearings prior to review and acceptance by the Metropolitan Council.

Community Profile

Geographic Setting

Vadnais Heights is located in the northeast section of Ramsey County, approximately eight miles north of downtown Saint Paul and sixteen miles northeast of downtown Minneapolis. The community is bordered by the Cities of Shoreview to the west; North Oaks, White Bear Lake, White Bear Township and Gem Lake to the north and east; and Maplewood and Little Canada to the south.

According to the United States Census Bureau, the city has a total area of 8.2 square miles or 5,254 acres. The major roadways serving the area include Interstate Highway 35E, Interstate Highway 694, U.S. Highway 61, and Ramsey County Highways 96 and 49. The City contains two railroads and is located approximately seventeen miles northeast of the Minneapolis-Saint Paul International Airport.



Growth and Development

Since its incorporation in 1957, Vadnais Heights has grown from a small, agricultural community to a thriving, diverse second-ring suburb of Saint Paul. The community takes pride in its lakes, parks, wetlands, and recreation areas. The community has a wide range of housing, including starter homes, townhomes, executive housing, apartments, and senior housing. The City has also developed a solid industrial and commercial tax base, including manufacturing, retail services, hotels, and medical clinics.

School System

The primary school district for Vadnais Heights is Independent School District #624 (White Bear Lake Area). Independent School District #621 (Mounds View) provides for students in the northwest part of the city. Vadnais Heights Elementary School, a facility of the White Bear Lake School District, the Academy for Sciences and Agriculture (AFSA) High School, a public charter school that specializes in food sciences and other areas of agriculture, WELS North, a facility within the Northeast Metro Intermediate School District 916 for students between 18-21 years old with learning and physical disabilities, and Gentry Academy, an accredited private school for students in grades 5-12, are located within the city. Other elementary schools, middle schools and high schools are located in surrounding communities.

In close proximity to Vadnais Heights is a wide range of other educational opportunities available from public and private institutions, including Century College, the University of Minnesota, and several other higher education institutions.

Health Care Facilities

Several health care providers and facilities serve Vadnais Heights and the surrounding communities. St. John's Health East, a hospital and clinic, is located 1.5 miles southeast in Maplewood and several other hospitals are located nearby in downtown Saint Paul. Allina Clinic, HealthEast Clinic, The Urgency Room, Summit Orthopedics, Twin Cities Orthopedics, and Midwest ENT Specialists are located within the city.

Parks and Recreation

The City of Vadnais Heights has approximately 200 acres of parkland at 14 city owned and maintained sites, including numerous soccer and ballfields, trails, playgrounds, tennis, volleyball courts, picnic facilities, outdoor skating rinks and other athletic fields are located throughout the parks system.

The City maintains a trail network of 13 miles of local trails that connect residential and commercial uses and provide a recreational amenity to its residents. In addition to local trails existing and planned regional trails run through the City. The Saint Paul Regional Water Services owns the majority of the land within the Vadnais-Snail Lakes Regional Park in the



western portion of the City. Ramsey County, through a lease arrangement, has developed much of this 250-acre facility into a passive park consisting of trails for walking, biking, and cross-country skiing, picnic grounds, fishing areas, and other relaxed recreation activities.

The Vadnais Sports Center, owned and operated by Ramsey County, includes an indoor multi-purpose athletic field, two ice rinks, and 100-meter track.

The City hosts several community events throughout the year, including concerts in the parks, holiday events, and Heritage Days in August.

Municipal Organization

The City of Vadnais Heights is a statutory city with a Mayor elected to a two-year term, and four City Councilmembers elected at-large to alternating four-year terms. Commissions comprised of appointed residents advise the City Council on land use, health and public safety, and parks, trails, and recreation matters. Professionals within the Administration, Finance, Public Works, and Community Development departments manage the City's services and implement the policies developed by the City Council.

The Ramsey County Sheriff's Office provides contracted law enforcement services in an arrangement with several other neighboring communities. The Vadnais Heights Fire Department provides fire protection, fire safety, and emergency medical response to residents and business, as well as surrounding communities through a mutual aid agreement. Allina Medical Transportation provides contracted ambulance services.

Charitable and Professional Organizations

The Vadnais Heights Lions Club and Foundation is all-volunteer organization that supports a number of initiatives and community events. In addition to managing the Vadnais Heights Community Food Program, they support Heritage Days and several other community events.

The Vadnais Heights Area Community Foundation was created in 1979 to strengthen the community through private donations and serves the broader areas included within the White Bear Lake and Mounds View School Districts. The Foundation's priorities are education, arts and culture, and health and human services. Grants are provided to support various educational opportunities to enhance the community.

The Vadnais Heights Economic Development Corporation (VHEDC) is a private, non-profit organization established to further economic development in the City of Vadnais Heights and the surrounding areas. The VHEDC is independent of the City, but works together with businesses and the City to grow and improve the business climate. The VHEDC is comprised of business



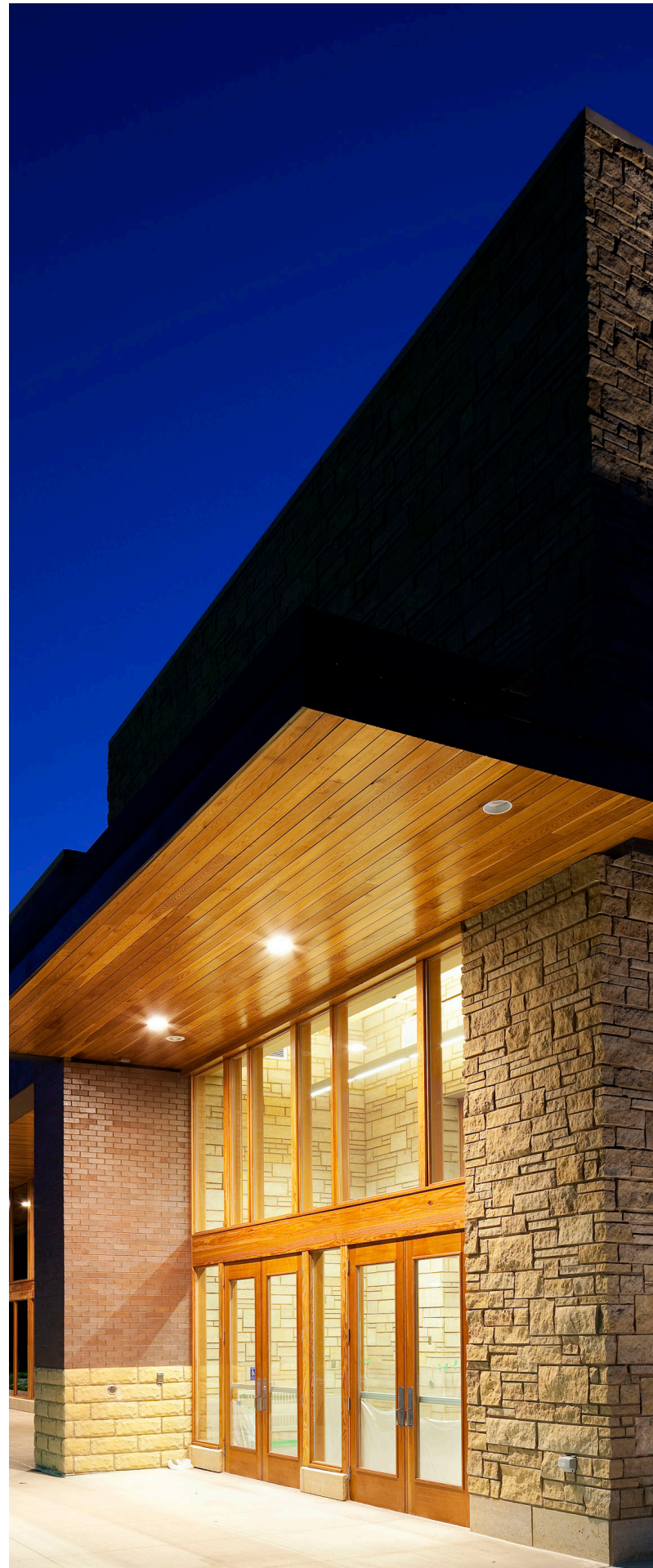
people, citizens, and city representatives who are interested in creating new job opportunities, retaining existing jobs, and expanding the tax base of the surrounding area.

The city and its residents and businesses benefit greatly from these organizations and their partnerships enhance the quality of life for the entire community.

Community Survey

A community survey of 400 random residents was conducted by phone in 2016. Responses were gathered on a number of topics, including: general perception of the community; development issues; home improvements and remodeling; tax climate; city service evaluations; water issues; public safety issues and services; park and recreational facilities; evaluations of city government and staff; commuting and transit needs; city festivals; communication channels; and the Vadnais Heights Area Community Foundation. The Plan references applicable responses to elements and issues addressed by the survey.

As part of this Comprehensive Plan process, an additional online survey and public input database was available for residents and businesses to provide input on local plans and any infrastructure improvements desired.





02

LAND USE

Overview

Vadnais Heights has grown from a low-density, semi-rural township into a diverse moderately-dense suburb. The City is now nearly fully developed with residential neighborhoods, commercial and industrial centers, and office parks, while retaining access to the extensive natural areas. Residential neighborhoods are generally dominated by single-family detached units, but also include many townhouse and apartment developments of varying sizes. The wide selection of housing types creates diverse neighborhoods and allows residents to live in semi-rural to suburban settings. Many neighborhoods within the City have been able to retain their original natural characteristics, while others are undergoing a change.

The primary commercial center in Vadnais Heights is focused around the interchange of I-35E and County Road E. This area, known as City Center, is the visual, social, and civic center of the City and has been planned to include retail and service businesses, office buildings, City Hall, Fire Station, hotels, and restaurants with a high level of private and public landscaping. City Center is largely developed now, but still holds further opportunities for development and redevelopment.

Smaller commercial areas are located along County Highway 96 and on Rice Street (County Highway 49). There are also several automobile dealerships and related business along the U.S. Highway 61 corridor on the eastern edge of the City. These commercial areas are continually being evaluated for potential development or redevelopment.

The County Road E corridor east of City Center connects to U.S. Highway 61 and continues through the Cities of Gem Lake and White Bear Lake. The corridor in Vadnais Heights includes a mix of commercial, office, retail, residential, and recreational uses. The southwest corner of the County Road E/U.S. Highway 61 intersection is a gateway to the community and has been recently redeveloped to include a mix of uses that provided synergy and reinvestment to the area.

Industrial uses are concentrated in the southeast and northeast portions of the City and have easy access to major highways. A 70-acre business park is located at County Highway 96 and McMenemy Road.



Lakes and wetlands shaped the development pattern in Vadnais Heights and increase the scenic value of the City, but also present challenges to growth and development. East Vadnais Lake and Sucker Lake serve as reservoirs and are part of the Saint Paul Regional Water Service (SPRWS) that supplies water for the City of Saint Paul and several other municipalities in the area. Through an agreement with Ramsey County, the forests around the lake serve as regional public park that provides public open space, trails, fishing, and natural views to park-goers. Throughout the rest of the City, wetlands, lakes, and ponds can be found in nearly every neighborhood. The City actively promotes protection of water resources in cooperation with other government agencies.

Vadnais Heights has developed in an auto-dependent style with historic rural township lanes, suburban curvilinear roads, and the Ramsey County road systems. Regardless, the City has built a network of sidewalks and trails and desires to keep improving the existing infrastructure and further develop other modes of transportation within the City.

Community Designation

The Metropolitan Council has identified community designations to guide regional growth and development to areas that have urban infrastructure in place and the capacity to accommodate development and redevelopment. The community designation establishes land use expectations, including overall densities and development patterns for different community designations and to outline the respective roles of the individual communities.

The City of Vadnais Heights has been identified as “Suburban,” which is defined as follows:

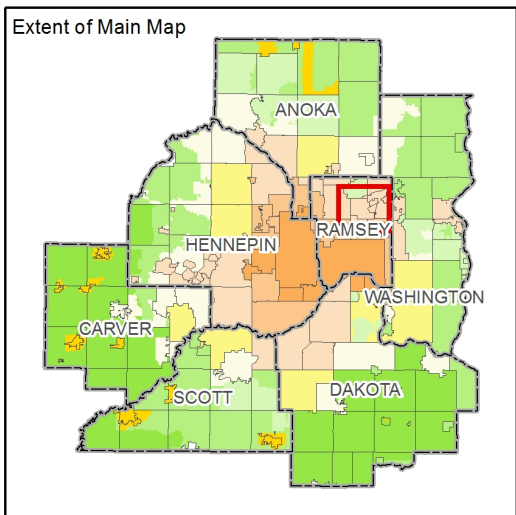
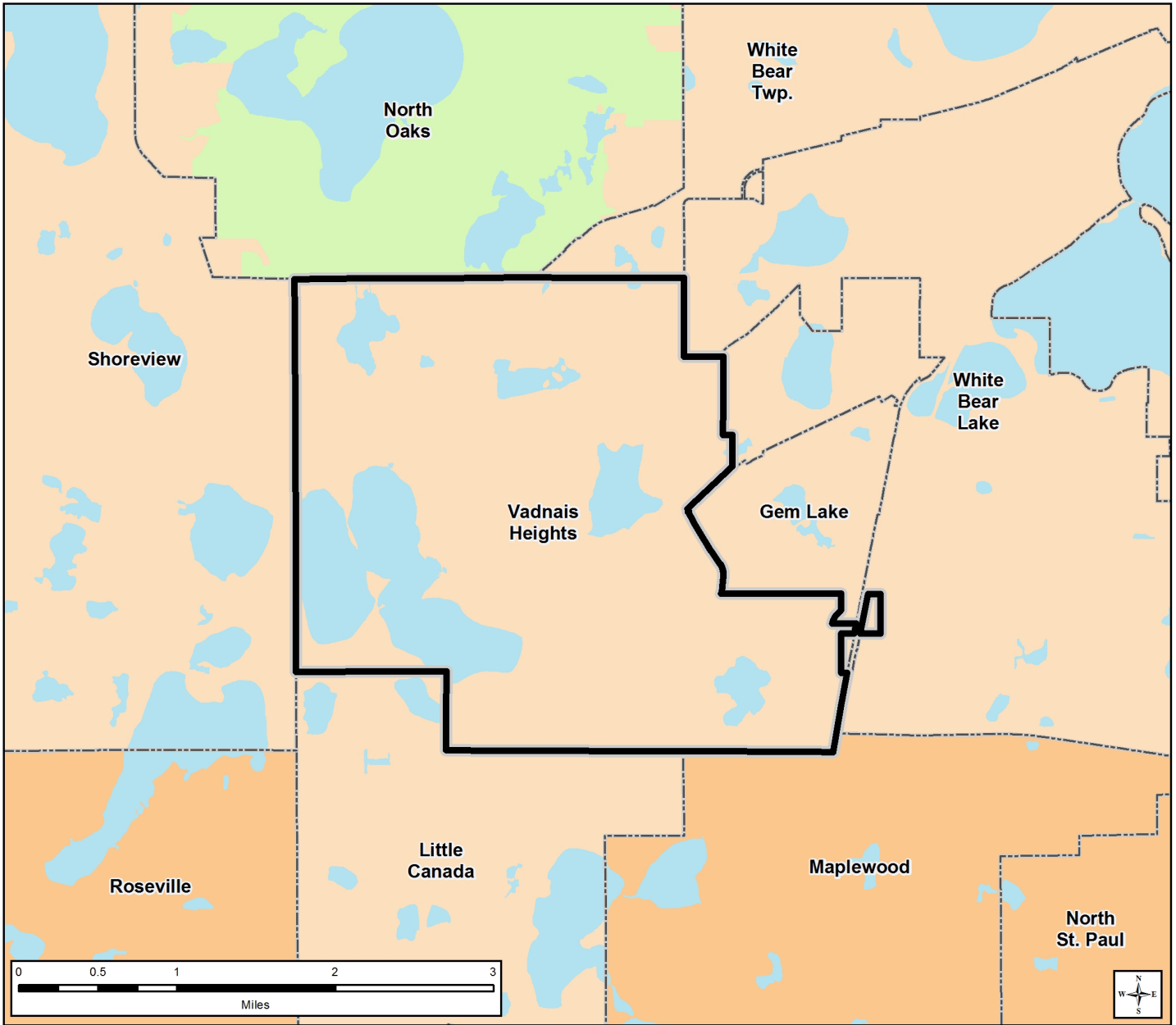
Suburban: These cities are characterized by low-density development, single-use zoning designations, and larger, multi-tenant commercial and shopping centers. These areas will be challenged by shifting redevelopment patterns around emerging transitways and increasingly mixed-use areas and desires.

Suburban communities experienced growth and expansion largely during the 1980s and early 1990s.



Community Designations

City of Vadnais Heights, Ramsey County



Community Designations

- Outside Council planning authority
- Agricultural
- Rural Residential
- Diversified Rural
- Rural Center
- Emerging Suburban Edge
- Suburban Edge
- Suburban
- Urban
- Urban Center

- County Boundaries
- City and Township Boundaries
- Lakes and Major Rivers

The Metropolitan Council expects the following from a community with the Suburban designation:

Orderly and Efficient Land Use

- Plan for forecasted population and household growth at overall average densities of at least five units per acre, and target opportunities for more intensive development near regional transit investments at densities and in a manner articulated in the 2040 Transportation Policy Plan.
- Identify areas for redevelopment; particularly areas that are well-served by transportation options and nearby amenities and that contribute to better proximity between jobs and housing.
- In collaboration with other regional partners, lead major redevelopment efforts.
- Lead detailed land use planning efforts around regional transit stations and other regional investments.
- Plan for and program local infrastructure needs (for example, roads, sidewalks, sewer, water, and surface water), including those needed to accommodate future growth and implement local comprehensive plans.



Natural Resources Protection

- Integrate natural resource conservation and restoration strategies into the comprehensive plan.
- Identify lands for reclamation, including contaminated land, for redevelopment and the restoration of natural features and functions.
- Integrate Natural resources restoration and protection strategies into local development ordinances.
- Develop programs that encourage the implementation of natural resource conservation and restorations



Water Sustainability

- Implement best management practices to control and treat stormwater as redevelopment opportunities arise.
- Explore alternative water supply sources to ensure adequate water resources beyond 2040

Housing Affordability and Choice

- Designate land in the comprehensive plan to support household growth forecasts and address the community's share of the region's affordable housing need through development and redevelopment at a range of densities.
- Plan for a mix of housing affordability in station areas along transitways.

- Use state, regional, and federal sources of funding, and/or financing and development tools allowed by state law to facilitate the development of new lifecycle and affordable housing.
- Plan for affordable housing that meets the needs of multigenerational households.

Access, Mobility, and Transportation Choice

- Develop comprehensive plans that focus growth in and around regional transit stations and near high-frequency transit services, commensurate with planned levels of transit service and the station typologies (for example, land use mix, density levels) identified in the 2040 Transportation Policy Plan.
- Develop local policies, plans, and practices that improve pedestrian and bicycle corridors. Seek opportunities to improve local street and pedestrian connections to improve access for local trips.
- Seek opportunities to improve local street and pedestrian connections to improve access for local trips.
- Consider implementation of travel demand management (TDM) policies and ordinances that encourage use of travel options and decrease reliance on single-occupancy vehicle travel.
- Engage private sector stakeholders who depend on or are affected by the local transportation system to address local business needs such as routing, delivery, and potential land use conflicts.
- Adopt development standards that improve the user experience, circulation, and access for bicyclists and pedestrians.
- Adopt Complete Streets policies that improve safety and mobility for all road users.



Economic Competitiveness

- Identify appropriate areas for business and industrial expansion, considering access by rail, truck, plane, and barge.
- Support the cleanup and reuse of contaminated land by utilizing regional, county, and local funding programs and financing tools.
- Preserve, remediate contamination, and repurpose the industrial base for higher-intensity employment and new industries.
- Protect sites for highway-, river-, and rail-dependent manufacturing and freight transportation needs from incompatible uses and identify local land supply and transportation needs for effective use of those sites.
- Plan for land uses that support the growth of businesses that export goods and services outside the region, important regional economic clusters, and living wage jobs.



- Conduct small area planning efforts to preserve locations for employment, manage growth, and minimize land use conflicts.

Building Resilience

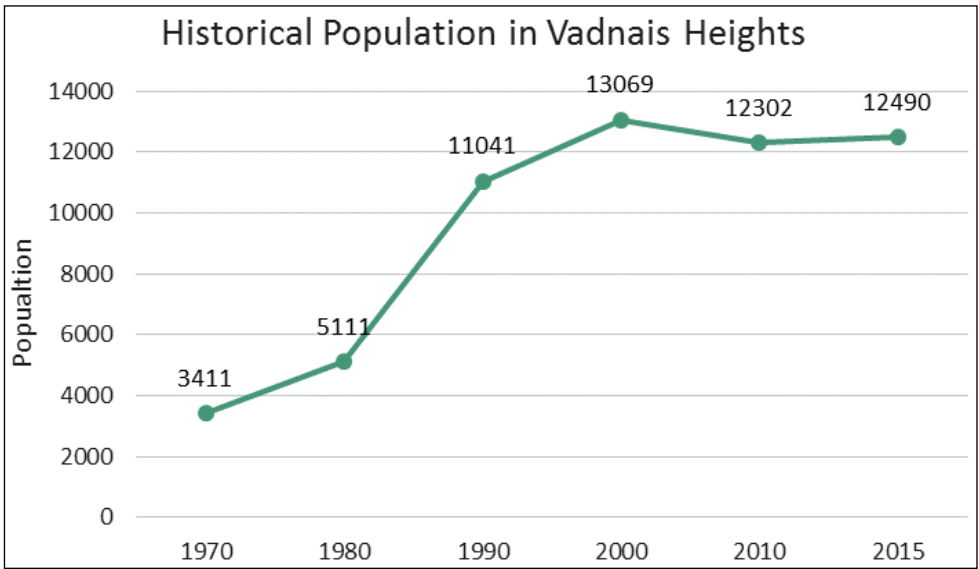
- Identify and address potential vulnerabilities in local infrastructure as a result of increased frequency and severity of storms and heat waves.
- Participate in federal, state, and local utility programs that incentivize the implementation of wind and solar power generation.
- Consider making a property-assessed clean energy (PACE) program available for conservation and renewable energy.
- Consider promoting the development or use of community solar gardens (CSGs) by public and private entities to enable fuller and more economic use of the community’s solar resource, including participating as subscribers, assisting in marketing CSG opportunities for economic development, or providing sites for gardens.
- Adopt local policies and ordinances that encourage land development that supports travel demand management (TDM) and use of travel options.
- Consider development standards that increase vegetative cover and increase the solar reflective quality of surfaces.
- Participate in urban forestry assistance programs as available.

This plan strives to address and accomplish these goals as set by the Metropolitan Council.

Demographics

Population

This section summarizes important demographic conditions that have a major impact on Vadnais Heights and the infrastructure and amenities as it plans for its future. These trends provide a foundation for subsequent components of the Plan.

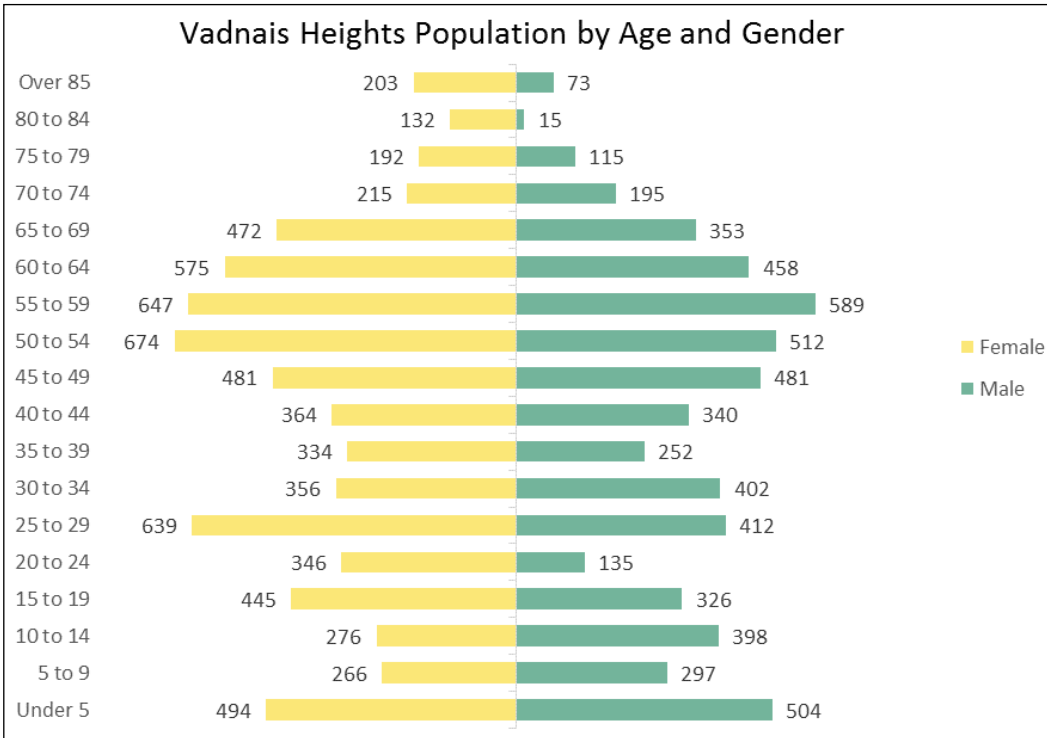


Source: U.S. Census Bureau Decennial or American Community Survey

Vadnais Heights has experienced significant growth over the past several decades with the most significant population projections between 1980 and 1990 during which time the population increased by 116%.

Age Distribution of Population

The population of the City of Vadnais Heights is unevenly distributed throughout the age groups. Careful consideration should be provided to accommodate needs of the various age cohorts, specifically the larger aging groups and young families. The aging population will likely require more advanced services and specific housing needs such as supportive housing options. Young families value park, trail and educational amenities.

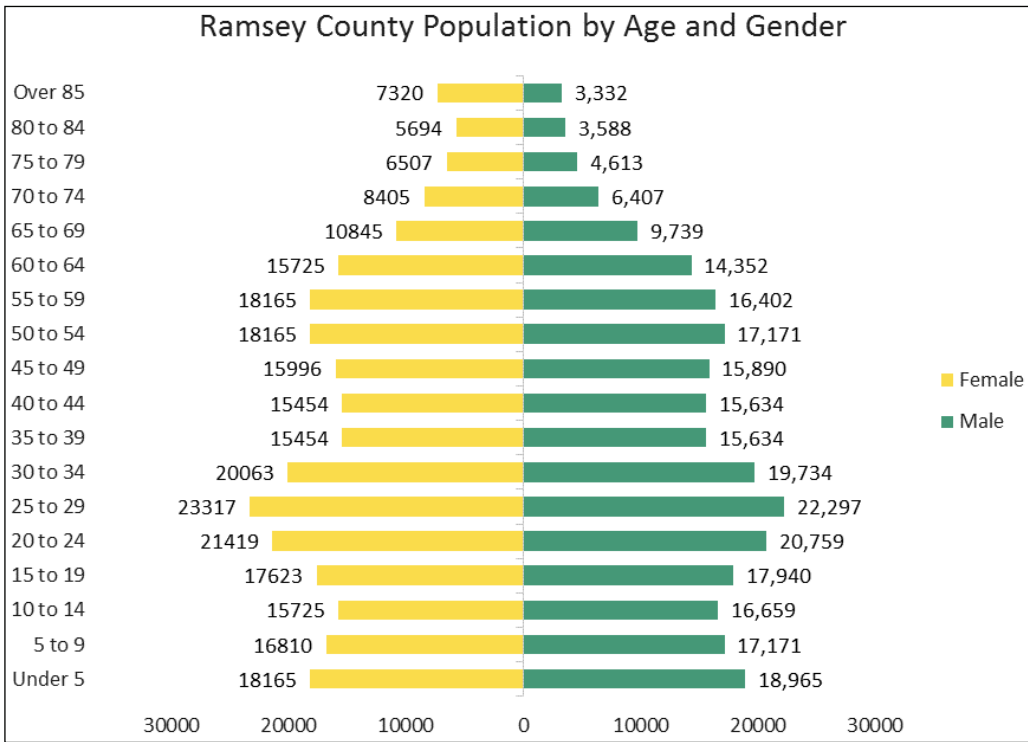


Source: U.S. Census Bureau Decennial or American Community Survey

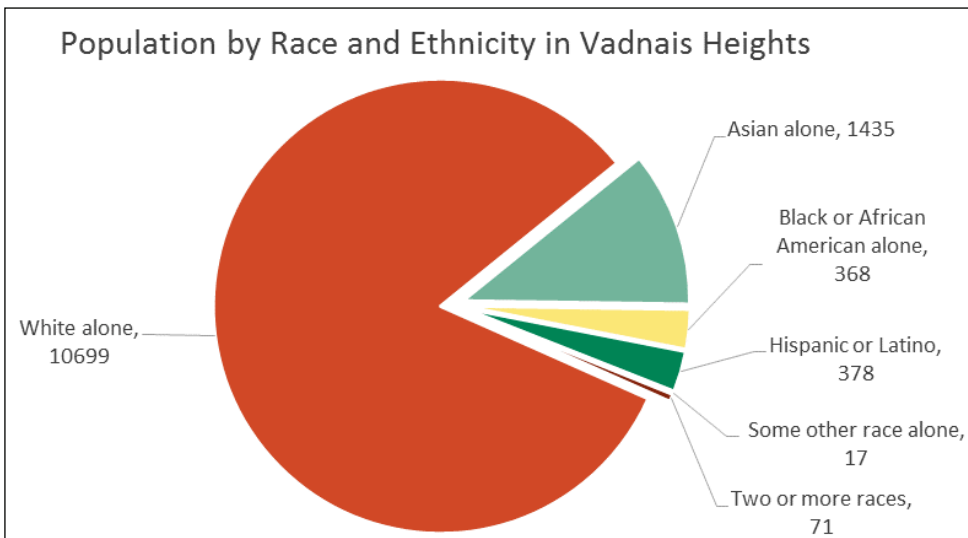
The population of Vadnais Heights trends to be an older middle-aged population with the two largest aggregate cohorts being the 55 to 59 with 1,236 members and the 50-54 cohort with 1,186 members. The City has a larger amount of women than men; 7,111 women make up 54.8% of the population, while 5,857 men make up 45.2% of the population. Anomalies within the age-sex cohort break down include the 25 to 29 year old women. With 639 women between the ages of 25 to 29, there are 227 more women in this cohort than there are males. The population pyramid sees a solid base, however with the fifth largest cohort being the under 5 cohort.

When comparing the distribution of age and sex with the County, there are some minor discrepancies. The most significant difference would be the large population within Ramsey County in the 20 – 34 age range, which is partially a result of the several higher education institutions located in St. Paul.

It is also common for young unmarried individuals to live in a metropolitan center before moving to the suburbs later in life.



Race/Ethnicity of Population



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

In the last five years, there have been considerable demographic shifts within Vadnais Heights. Those that are Black or African American alone or two or more races both left the City with a reduction of 41.6% and 67.0% respectively within the total population of peoples of those races. Contrasting this, there was a large influx of those of Asian descent, seeing a near doubling of the population with a 97.1% increase. Within the three other groups (Hispanic or Latino, some other race, and white alone), there was little change of note.

Table 1 - Distribution of Race in Vadnais Heights

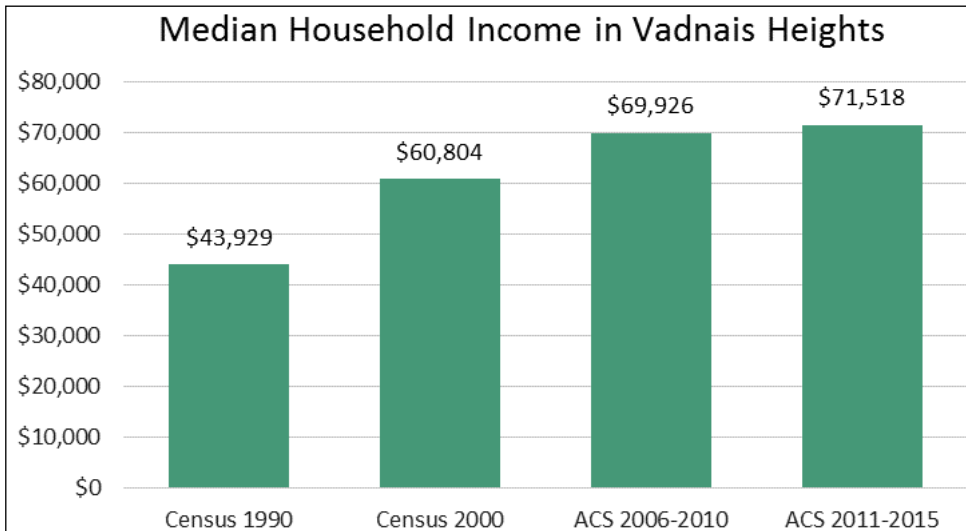
Category	2010	2015	Percent Change
Asian alone	728	1,435	97.1%
Black or African American alone	630	368	-41.6%
Hispanic or Latino	359	378	5.3%
Some other race alone	0	17	-
Two or more races	215	71	-67.0%
White alone	10,349	10,699	3.4%

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

Income

Income influences many community development issues from housing affordability to retail purchasing capacity. Income and access to services are considered important measures of quality of life for individuals and families. The ability to rent or own a home and maintain it is also an important measure of how well citizens of a locality are thriving. Though these measures are not the only factors in quality of life, they merit assessment and have an impact on investment in services and infrastructure by public and private sources.

Median Household Income in Vadnais Heights



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

Median income in Vadnais Heights has seen increases throughout the last 25 years. While median income grew quickly from \$43,929 to \$60,804 between 1990 and 2000, less growth occurred between 2000 and 2010 where median income increased to \$69,926. This growth rate has slowed still into 2015 with median income being \$71,518.

Occupations

Occupations in Vadnais Heights are fairly well distributed amongst various industries and not dependent upon any one business or industry. Manufacturing accounts for the most employees followed by retail trade. More detailed information is included in the Economic Competitiveness Chapter.

Vadnais Heights wants to create a commercial and industrial presence that enhances the City and improves the quality of life for residents. To achieve this goal, the City plans to encourage entrepreneurship while still embracing responsible larger corporations. I.C. System Inc. is the largest employer within the City of Vadnais Heights; other major employers are included in the table below.

Table 2 - Vadnais Heights Major Employers	
Employer	# of Employees
I C Systems Inc.	564
Walmart Supercenter	410
HB Fuller Co	400
Buerkle Automotive	250
Short Elliot Hendrickson Inc.	200
Siemens Industry Inc.	150
Target	150
Keller Williams Realty	140
Dynamic Air Inc	125
Posi Flate	125
MGC Diagnostics Corp.	121
Medical Graphics Corps.	120
Reell Precision Mfg. Inc.	120
Northern Air Corp.	110
United Development Ctr.	110
Aspect Automation	100
Merrick	100
Results Realtor Group	100
Sak's Sports Bar	100
Tru Green	100

Source: March 2015 Vadnais Heights Business Inventory

Forecasts

As of 2015, approximately 12,490 people lived in Vadnais Heights in roughly 5,233 households. Past and projected City populations, households, and employment are:

Table 3 - Forecasted Population, Housing, & Employment					
	2010	2015*	2020	2030	2040
Population	12,302	12,490	13,200	13,800	14,100
Households	5,066	5,233	5,700	6,100	6,300
Employment	6,678	8,096	8,900	10,100	11,200

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

* Metropolitan Estimates

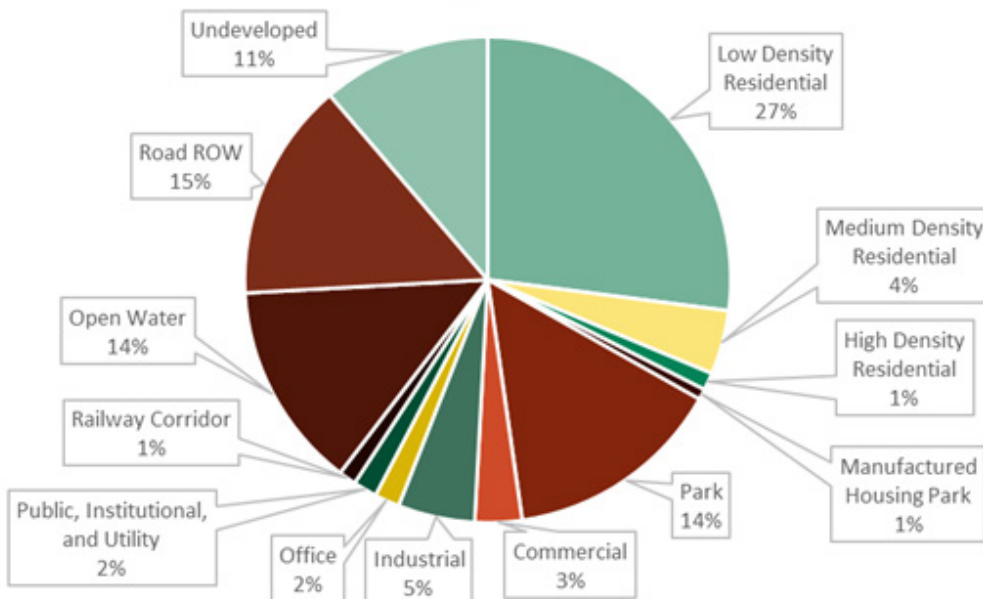
Existing Land Use

Vadnais Heights is nearly fully developed; as a result, there is only a small amount of undeveloped land within the City that is buildable. Residential land uses make up 33.2% of all land in Vadnais Heights. The Metropolitan Council has identified some land on residential lots abutting wetlands as undeveloped; these areas are likely to remain undeveloped in perpetuity and Met Council data has been revised to reflect this reality. Land dedicated as parkland make up 13.9% of the City. Land inundated with water make up 13.8% of the City and land dedicated as road right-of-way accounts for 14.6% of land within the City of Vadnais Heights. These four categories make up the largest uses of land in Vadnais Heights. There is a considerable amount of commercial, industrial, and office use as well in the City, which make up 9.9% of the total area.

Table 4 - Existing Land Use Characteristics

Land Use	Acres	Percent of Total
Low Density Residential	1,426.4	27.0%
Medium Density Residential	225.2	4.3%
High Density Residential	61.4	1.2%
Manufactured Housing Park	37.3	0.7%
Park/Open Space	767.6	14.5%
Commercial	165.1	3.1%
Industrial	270.3	5.1%
Office-Business	87.8	1.7%
Public, Institutional and Utility	83.4	1.6%
Railway Corridor	61.1	1.2%
Open Water	725.5	13.8%
Road RoW	770.9	14.6%
Undeveloped	593.8	11.3%
Total	5,271.8	100.0%

Existing Land Use





Existing Land Use (2017)

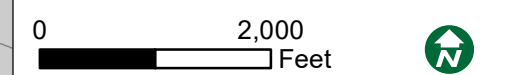
2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

Legend

- Vadnais Heights City Limits
- City/Township Boundaries
- Railroad
- Streams
- National Wetland Inventory

Land Use Categories

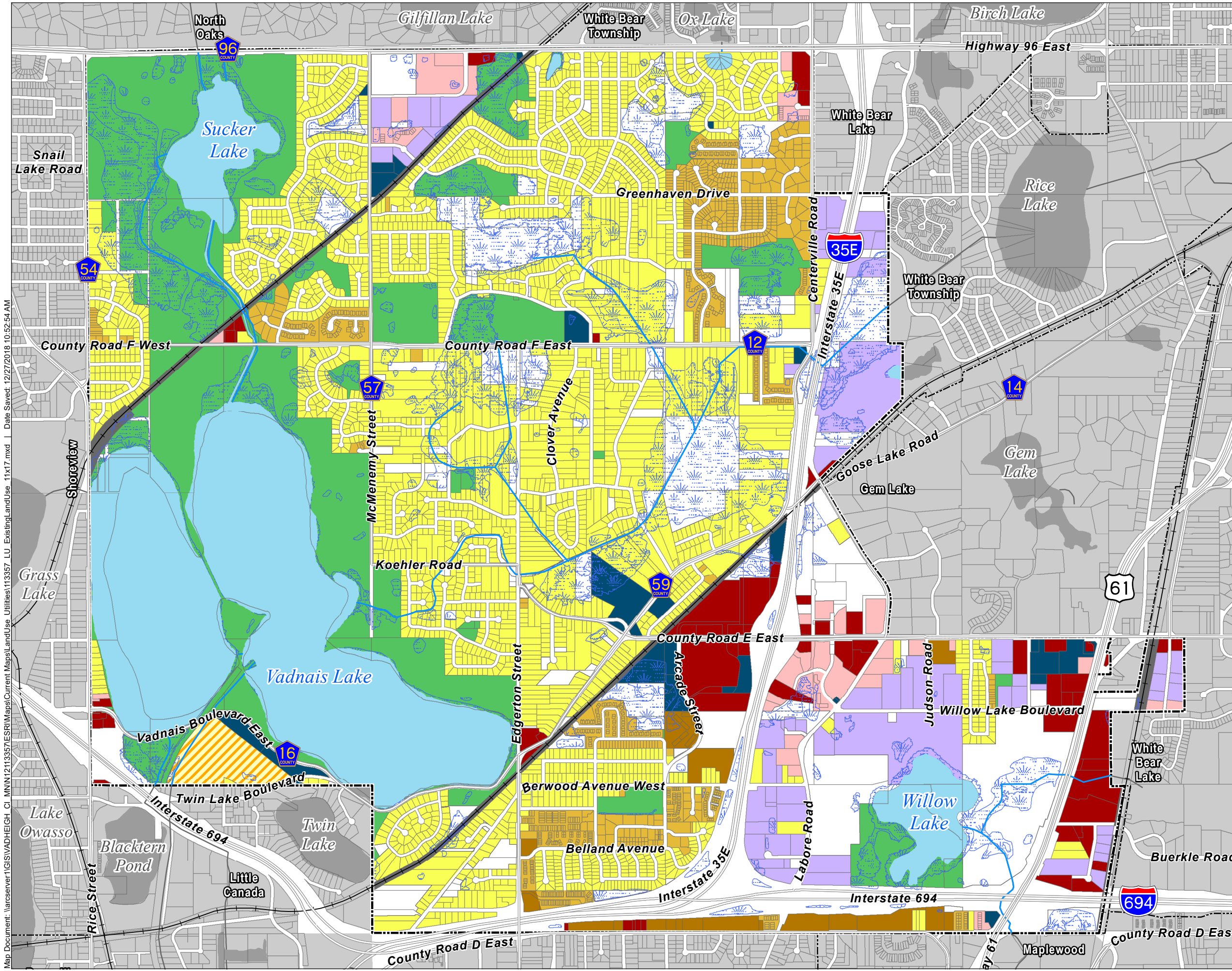
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Manufactured Housing Park
- Commercial
- Industrial
- Office-Business
- Public, Institutional, and Utility
- Park/Open Space
- Open Water
- Railway Corridor
- Undeveloped



Source: MnGeo, City of Vadnais Heights, Ramsey County



December 2018



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As a suburban land use classification, the City of Vadnais Heights has a goal of at least five units per acre in density after subtracting out major road areas, wetlands, steep slopes and remnant parcels. Currently, areas planned for residential uses have developed at a density of 3.28 units/acre.

Land Use:	Single Family Number of Units	Multi-Family Number of Units	Gross Residential Density	Net Residential Acres	Net Density Units/Acre
Low Density Residential	3,037		1,946	1,423	2.13
Medium Density Residential		1,793	225	225	7.97
High Density Residential		777	61	61	12.74
Total	3,37	2,570	2,232	1,709	3.28

Source: Metropolitan Council Generalized Land Use Historical Data Set

The Land Use districts within the City of Vadnais Heights identifies densities for residential development. The designated future land uses have corresponding zoning districts.

- The Residence One (R-1) District provides for low density single family detached dwelling units, and directly related complementary uses, and corresponds to the Residential “2-4 dwelling units/acre” Land Use Plan designation.
- The Residence Two (R-2) and Residence Three (R-3) Districts establish standards for medium and moderately high density residential development, respectively, achieved through a variety of housing types. These are indicated on the Land Use Plan as “4-8 units/acre” and “8+ units/acre.”
- The Residence Four (R-4) District allows medium-density manufactured home communities and also falls under the 4-8 units/acre designation.

Additionally, the City Code includes Planned Unit Developments (PUD) regulations that allow for a varied and compatible development of property by encouraging reasonable flexibility from applicable standards, including at higher densities than would be allowed under the underlying zoning district and/or future land use designation. The City has utilized PUDs and PUD Overlays for many residential and commercial developments, which is a trend that is likely to continue into the future given the limited amount of land available for new development and potential redevelopment opportunities.

These zoning districts have a relationship to the future land use designation. Table 6 shows the range of units per acre that can be developed under the future land use categories guidance.

	Units/Acres (Min)	Units/Acres (Max)
Low Density Residential	2.5	5
Medium Density Residential	5	9
High Density Residential	9	22
Manufactured Housing Park	6	9
City Center	12	30
Mixed Use	8	30

Source: City of Vadnais Heights Zoning Code

The Zoning Ordinance provides a maximum impervious surface coverage for commercial and industrial development. The Metropolitan Council has provided estimates for the number of employees per square feet in various employment types; rates range from 556 square feet per job at the low end (medical clinics) to 2,500 square feet per job at the high end (hotels). Using the City’s impervious surface allowance as guidance, an estimate of jobs/square foot can be estimated to project future employment based on future land use designations and planned development.

Table 7 - Commercial/Industrial Allowed Lot Coverage	
	Max Impervious Surface Coverage
C-1 (Commercial One)	85%
C-1A (Commercial One-A)	85%
C-2 (Commercial Two)	90%
C-2A (Commercial Two-A)	90%
C-3 (Commercial Three)	90%
O (Office District)	90%
OB (Office-Business District)	Not Specified
I (Industrial District)	90%
CC (City Center)	Not Specified

Source: City of Vadnais Heights Zoning Code

Future Land Use

The 2040 Future Land Use Map shows the desired land use for all property in the City of Vadnais Heights. The planned future land uses shown on this map reflect previous community planning efforts as well as desired updates identified as part of the 2040 Comprehensive Plan Update process.

Table 8 - Future Land Use Characteristics		
Land Use	Acres	Percent of Total
Low Density Residential	1514.3	28.7%
Medium Density Residential	331.9	6.3%
High Density Residential	91.2	1.7%
Mixed Use	19.9	0.4%
Manufactured Housing Park	39.0	0.7%
Park/Open Space	810.2	15.4%
Commercial	23.7	0.4%
Highway Commercial	72.8	1.4%
City Center	143.8	2.7%
Industrial	441.1	8.4%
Office-Business	124.6	2.4%
Public, Institutional or Utility	79.1	1.5%
Railway	51.3	1.0%
Open Water	725.6	13.8%
Road Right-of-Way	808.0	15.3%
Total	5,276.2	100.0%

Future Land Use (2040)

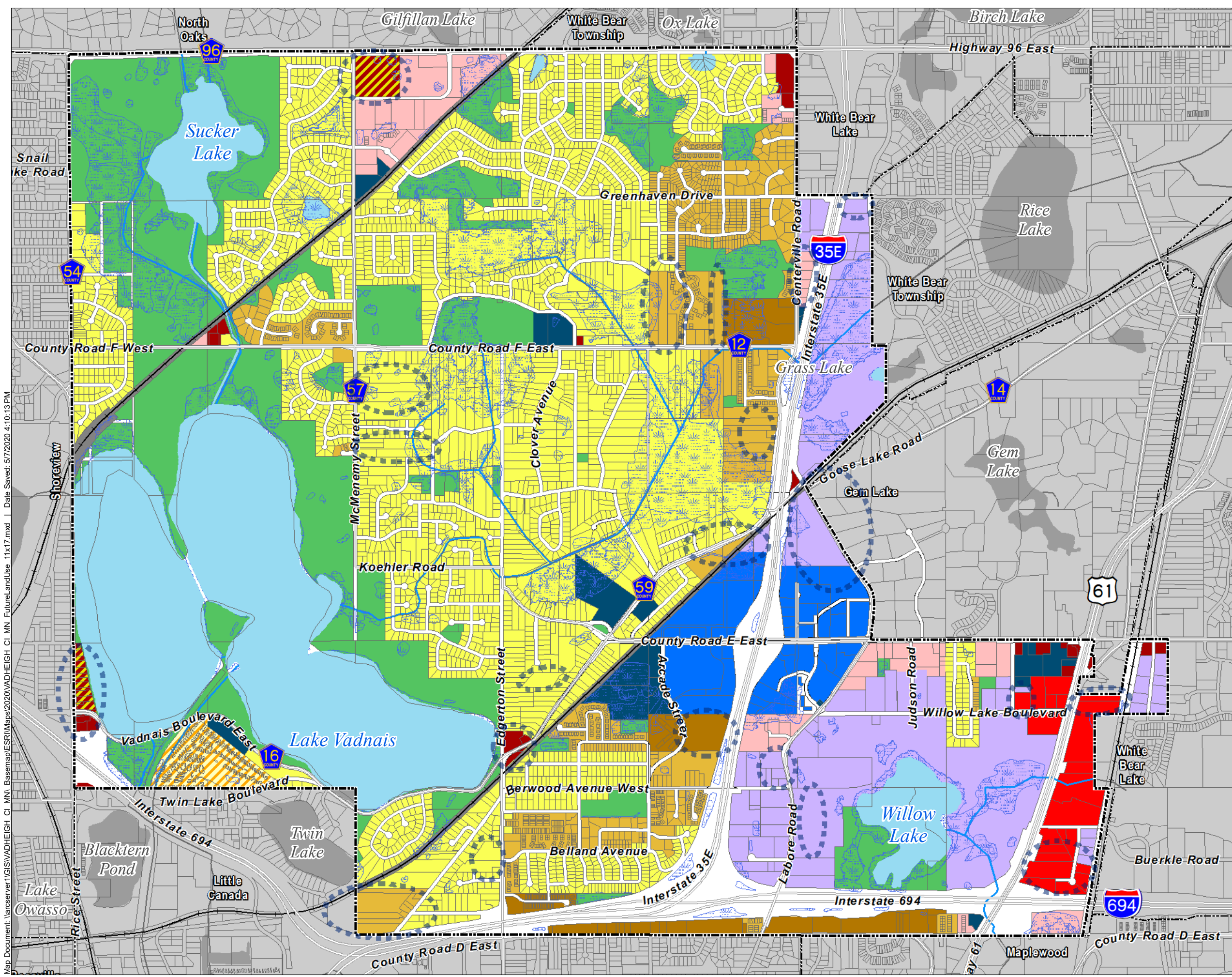
2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

Legend

- Vadnais Heights City Limits
- City/Township Boundaries
- Potential Redevelopment/Infill Area
- Streams
- Railroad
- National Wetland Inventory
- Low Density Residential
- Manufactured Housing Park
- Medium Density Residential
- High Density Residential
- Mixed Use
- Office-Business
- Commercial
- Highway Commercial
- Industrial
- Open Water
- Park/Open Space
- Public, Institutional or Utility
- Railway
- City Center Land Use Plan
- Right of Way

0 2,000 Feet

Source: MnGeo, City of Vadnais Heights, Ramsey County



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Land Use Categories:

The following land use descriptions will be used for planning purposes and guiding future land use.

Category	Land Uses	Zoning Districts
Low-Density Residential	Single-family and two-family dwellings. The density range from two and a half to five housing units per acre net of wetlands and street rights-of-way. The R-1 District has minimum lot width of 85 feet, minimum lot depth of 120 feet, and minimum lot size of 10,200 square feet.	R-1 District
Medium Density Residential	Single-family and two-family dwellings, townhouses and other forms of housing having an individual exterior entrance for each housing unit. The density range should be 5 to 9 units per net acre. The minimum lot area for single-family detached units is 9,000 square feet, 6,000 square feet for duplexes and 4,750 square feet for 3-8 unit dwellings or townhomes.	R-2 District
High Density Residential	All forms of detached and attached housing that include 9 or more dwelling units per acre, typically at most 22 units per acre.	R-3 District
Manufactured Housing	Manufactured homes and supporting uses for residents are allowed only within the R-4 District. There is one manufactured home park located just south of East/West Vadnais Lake in the southwestern corner of the City. Manufactured homes are developed at a density ranging from 6 to 9 dwelling units per acre.	R-4 District
Mixed Use	Variety of land uses, including residential, commercial, and office (vertical or horizontal) Consideration given to allow flexibility for development that incorporates a variety of uses featuring innovative, high-quality design, preservation of natural resources, and efficient use of land. Residential density in this district is anticipated to be at least 8 units per acre and has a maximum of 30 units per acre.	Planned Unit District
Commercial	Business providing retail trade or service for individuals of businesses.	C-1 District C-1A District C-2 District C-2A District
Highway Commercial	A wide range of general retail businesses, vehicle sales, hospitality businesses and office buildings. Uses are concentrated along U.S. Highway 61.	C-3 District
City Center	Retail and service businesses; office buildings; hotels; restaurants; office-warehouse buildings; high-density housing, City Hall and the South Fire Station. Residential density in this area is anticipated to be at least 12 units per acre. (and a maximum of 30). This district allows for a mix of uses even within a parcel, with it common for multi-family residential uses to be located above the first floor.	City Center (CC) District
Office-Business	Office, small businesses and light industrial land uses in a high-quality master-planned setting.	Office District (O) Office-Business District (OB)
Industrial	Light industrial buildings, office-showroom buildings and manufacturing-related warehousing.	Industrial (I) Office-Business (OB)
Public, Institutional or Utility	City buildings and facilities; schools; places of worship; utilities.	Various Districts
Park/Open Space	Public parks and public open space for environmental protection.	Various Districts

Density Calculations

Based on the above future land use plan and land use calculations, residential and commercial land use requirements have been calculated to help Vadnais Heights plan for and meet Metropolitan Council projections for population, households, and employment.

Table 9 - Future Needed Residential											
Category	Density Range (unit/acre)		Existing Proportion	Planned Proportion	Units Needed	Minimum Density Range	Mean Density Range	Maximum Density Range	Undeveloped Acres Guided For Land Uses	Range of Acreages Needed for Redevelopment to Meet Demand	
				<i>based on area</i>	<i>based on housing needs and proportion planned</i>					Additional / Surplus	
	Minimum	Maximum								Minimum	Mean
Low Density	2.5	5	68.26%	15%	160	64	42.7	32	47	17.1	4.3
Medium Density	5	9	20.36%	20%	213	42.7	30.5	23.7	29.7	13	0.8
High Density	9	22	9.05%	45%	480	53.4	31	21.8	18.5	34.9	12.5
Manufactured	6	9	2.33%	0%	0	0	0	0	0.1	0.1	0.1
City Center	12	30		17%	181	15.1	8.6	6	19	3.9	10.3
Mixed Use	8	30		3%	32	4	1.7	1.1	0.1	3.9	1.6
Total				100%	1067	179.2	114.5	84.7	114.9	64.9	0.2

A red number represents a surplus of available acres and the acreage needed to meet anticipated demand.

Metropolitan Council projects 1067 new housing units will be needed within the City of Vadnais Heights throughout this planning period. The table above shows these housing units will be allocated between the respective land use categories on 179.2 acres of land (if developed at the low end of the density range).

This would mean development would occur at 5.95 dwelling units per acre, above the 5 dwelling units per acre goal for a suburban designated community. The City of Vadnais Heights, based on the density ranges and available developable land and housing projections for the community, will be challenged to meet the housing demand of the community based on available developable land alone. If development occurs near the maximum density range as is expected, it is more likely that the City of Vadnais Heights will be able to meet housing demands without significant redevelopment. Metropolitan Council guidance recommends municipalities use the low end of the density range and available developable land to assure the community is able to meet housing projections with the guided land use. A surplus of acres needed in any land use category indicates that there is an excess of undeveloped and developable acres to meet projected housing needs.

The City Center and Mixed Use districts may, but does not need to develop for both commercial and residential purposes. These areas may develop with a commercial business on the first floor and residences above. It is not anticipated that all properties will be developed with both residential and commercial uses. It is estimated that 75% of the area within both the City Center and Mixed Use district will develop for residential and commercial property, meaning, 50% of properties will be developed for a single-use residential or commercial purposes, and 50% will be developed with multiple uses on a single parcel. The 'Undeveloped Acres Guided For Land Uses' in the table above accounts for the parcels that are not anticipated to be developed for residential purposes in the City Center and Land Use district.

Based on the projected units needed in the respective residential land use categories, the table below identifies the acreages of redevelopment that will occur during this planning period in order to meet demand.

Table 10 - Redevelopment Needs		
Land Use Category	Minimum Density Range Redevelopment Acreages Needed to Meet Demand	Mean Density Range Redevelopment Acreages Needed to Meet Demand
Low Density	17.1	4.3*
Medium Density	13.0	0.8
High Density	34.9	12.5
Manufactured Housing	0.1*	0.1*
City Center	3.9*	10.3*
Mixed Use	3.9	1.6

*Indicates a surplus of available acres and no needed redevelopment to meet projections. Note that City Center will include land uses other than residential. Employment tables also utilize the developable acres within City Center

Commercial/Industrial/Office

The Metropolitan Council projects an increase in 3,104 jobs in Vadnais Heights within this planning horizon. When planning for future land use, it is hard to know how many jobs a site can support. Industry averages can vary significantly based on the type of employment center. Published averages for the respective land use categories and anticipated job type distribution is found in the table below and reveals anticipated acres needed to meet employment projections.

Table 11 - Commercial/Industrial/Office Employment Calculations			
	Estimated Employees per Acre	Jobs Projected in Land Use Districts	Acres Needed to Meet Jobs Projection
Commercial	15	310	20.7
Industrial	20	1,552	69.8
City Center	30	621	25.9
Office-Business	35	621	17.7
Total		3,104	174.1

Based on the guided land use and available developable acres, Vadnais Heights will be able to accommodate most of the anticipated job growth within undeveloped areas that are guided for more intense land uses during the planning horizon. Redevelopment of employment centers can supplement the vacant unimproved properties that will support job growth within the City of Vadnais Heights.

Table 12 - Commercial/Industrial/Office Redevelopment Acreages			
	Developable Acres Needed to Meet Jobs Projection*	Undeveloped Acres Guided For Land Uses	Redevelopment Acreages Needed to Meet Employment Projections*
Commercial	20.7	5.6	15.1
Industrial	69.8	135.0	65.2**
Office/Business	25.9	25.3	0.6
City Center	17.7	14.6	3.1
Total	174.1	180.5	15.1

*Based on 2030 Plan jobs/acre estimates **Indicates a surplus.

Table 12 shows a large excess of industrial guided land. Large swaths of vacant developable property surrounding Willow Lake are guided for industrial use. These large parcels are owned by H B Fuller Company and it is uncertain that this land will be developed during this planning period.

Staged Development or Redevelopment

Development and redevelopment within the City of Vadnais Heights will occur throughout the 20-year planning horizon. Metropolitan Council guidance recommends meeting the housing, population and employment projections through the low-end of the range for jobs and homes in the respective land use district. Recent trends have shown actual homes and jobs per acre exceeding the low-end of the range noted.

The number of jobs per acre is calculated by using the allowable impervious surface coverage in the respective districts and published estimates of employment levels given the land use district. The jobs through allowable impervious surface estimate takes into account parking. The amount of developable acres in Vadnais Heights is known. Redevelopment will occur to meet the needs of the residents within the City of Vadnais Heights. Staged development for both residential and commercial uses are estimated in the tables below. Actual development is reliant upon market factors.

Table 13 - Staged Development or Redevelopment - Residential Units

Residential Land Uses	Average Density Range Housing Units/Acre		Existing Developable Acres (2015)	2016 - 2020		2021 - 2030		2031 - 2040		Available Developable Acres 2040
	Min	Max		Units	Acres	Units	Acres	Units	Acres	
Low Density	2.5	5	47	70	18.7	60	16.0	30	8.0	4.3
Medium Density	5	9	29.7	93	13.3	80	11.4	40	5.7	-0.8
High Density	9	22	18.5	210	13.6	180	11.6	90	5.8	-12.5
Manufactured Housing	6	9	0.1	0	0.0	0	0.0	0	0.0	0.1
City Center	12	30	19.0	79	3.8	68	3.2	34	1.6	10.3
Mixed Use	8	30	0.1	14	0.7	12	0.6	6	0.3	-1.6

A negative number in the table above indicates that there is not enough available vacant land to meet forecasts and some redevelopment may be needed to meet demand. Several land use categories are projected to have zero undeveloped and developable land at the end of this planning period and are likely to need to redevelop land to accommodate the City’s needs.

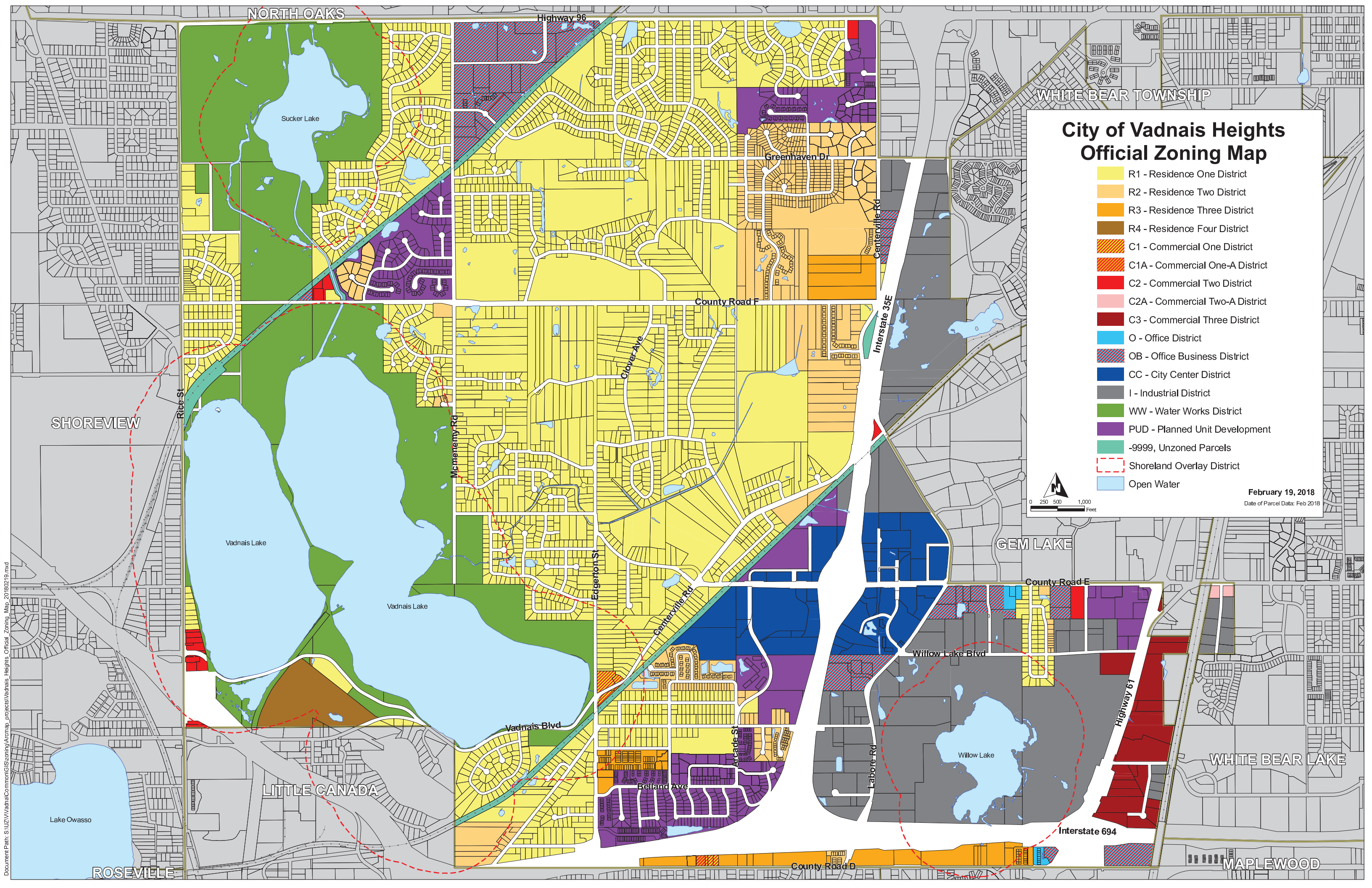
Table 14 - Staged Development or Redevelopment - Jobs and Acres

Commercial or Industrial Land Uses	Estimated Employment /Acre	Existing Developable (2015)	2016 - 2020		2021 - 2030		2031 - 2040	
			Jobs	Acres	Jobs	Acres	Jobs	Acres
Commercial	15	12	26	5.6	102	6.8	153	10.2
Industrial	20	8	12	135	1061	53.1	1584	79.2
City Center	35	16	32	25.3	464	13.3	692	19.8
Office/Business	30	20	30	14.6	251	8.4	375	12.5

Community Zoning

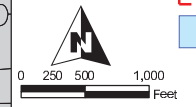
State law requires consistency between a community’s comprehensive plan and official controls. Whenever the City makes a change to its Comprehensive Plan, the City will review its official controls, including the Zoning Ordinance, to identify possible inconsistencies between the adopted plan and official controls. An inconsistency would be any official control that is in direct conflict with the goals and policies of the Comprehensive Plan.

To maintain consistency between the 2040 Land Use Plan and Zoning Map, the City will consider rezoning properties as part of potential future development/redevelopment projects.



City of Vadnais Heights Official Zoning Map

- R1 - Residence One District
- R2 - Residence Two District
- R3 - Residence Three District
- R4 - Residence Four District
- C1 - Commercial One District
- C1A - Commercial One-A District
- C2 - Commercial Two District
- C2A - Commercial Two-A District
- C3 - Commercial Three District
- O - Office District
- OB - Office Business District
- CC - City Center District
- I - Industrial District
- WW - Water Works District
- PUD - Planned Unit Development
- 9999, Unzoned Parcels
- Shoreland Overlay District
- Open Water



February 19, 2018
Date of Parcel Data: Feb 2018

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Natural Resources

Wetlands and Watercourses

Natural resources are beneficial to the social, environmental, and economic vitality of a community. To ensure their quality and benefits, it is essential to plan and manage natural resource areas as we do residential and commercial areas. Vadnais Heights is blessed with an abundance of natural beauty and environmentally-sensitive areas. The natural areas such as lakes, wetlands, and forests provide a home to diverse animal and plant wildlife. At the same time, these areas are able to be utilized by residents and visitors for their aesthetic benefits and provide recreational opportunities. Protecting these natural resources is of key importance to the City. Preserving these areas for future generations and conserving the natural elements that increase the quality of life for Vadnais Heights' residents is important to the City.

Wetlands are essential to healthy ecosystems. These and surrounding areas will be given special consideration in development projects. Traditionally, wetlands and lakes have only been seen as restrictions to development. In the past years, this view has shifted in the public eye, which has helped to protect these natural resources. Wetlands and storm ponds help mitigate surface water run-off that could be otherwise damaging to the built environment and provide habitats for many species. Along with this, many of these smaller permeable areas serve as the primary source that refill aquifers. In this same function, wetlands are able to remove certain contaminants from surface water to be able to use them to meet the region's needs.

There are a total of 1,564.6 acres wetlands in Vadnais Heights as detailed by the National Wetland Inventory, which make up approximately 16.7% of the City. Three regulatory bodies have jurisdiction over wetlands, local watershed agencies, the Army Corps of Engineers and the Minnesota Department of Natural Resources (DNR), and each regulates them differently. Many of these are lowland areas within the City that hold surface water, which ensures that the held water is dispersed in a manageable way.


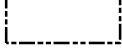
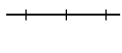





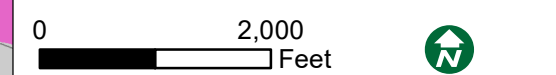
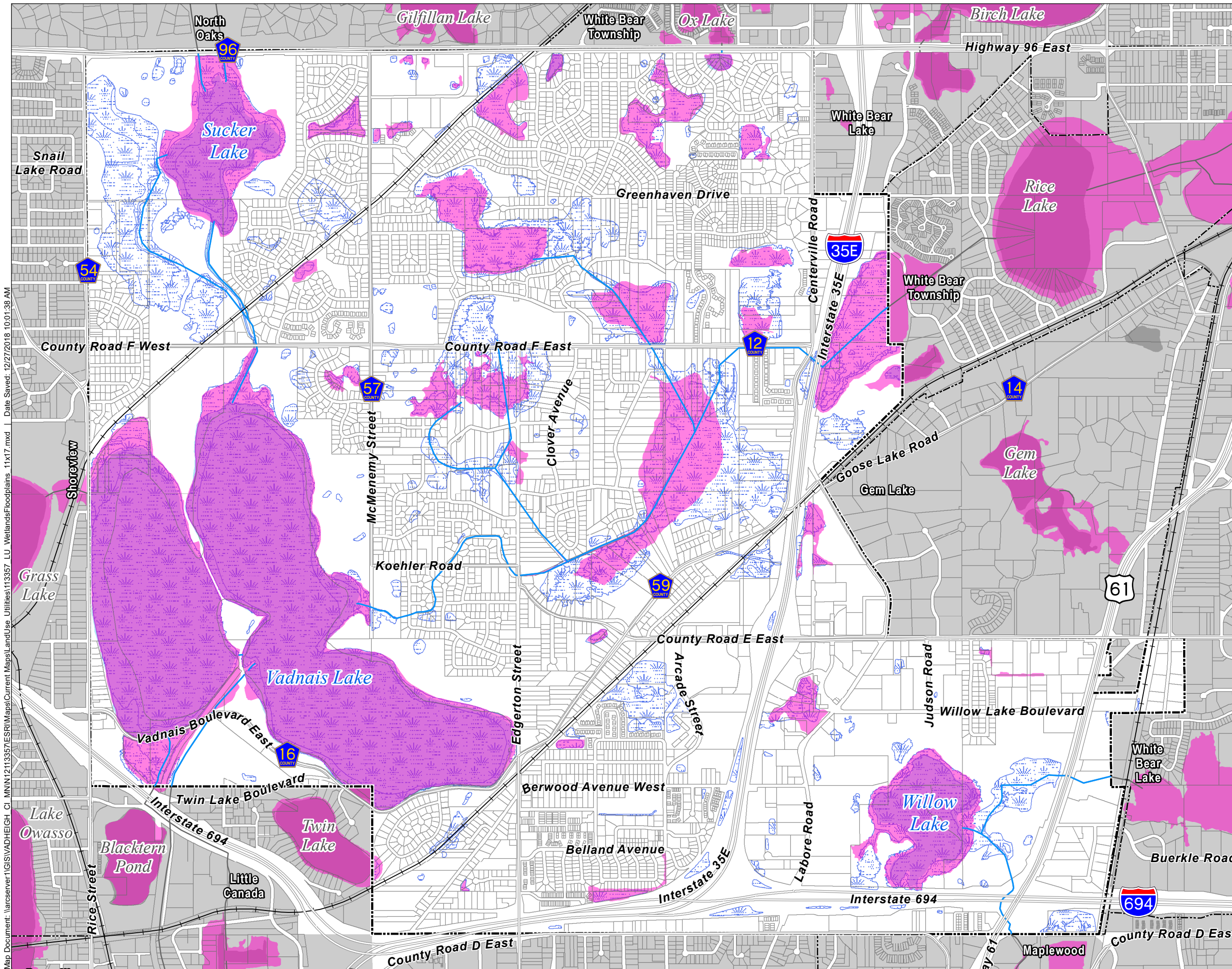
The City is located within two watershed management districts. The Ramsey-Washington Metro Watershed District (RWMWD) includes Willow Lake in the southeastern corner of the City, an area totaling approximately 1,200 acres. The second is the Vadnais Lake Area Water Management Organization (VLAWMO), which includes Vadnais and Sucker Lakes and totals about 4,000 acres within the City. These watershed agencies serve the community by protecting water resources, providing administrative programs that include education, cost-sharing, and regulatory oversight within their jurisdiction. The Water Management Overlay District established by the City and the guidelines outlined in the City's Surface Water Management Plan (adopted in 1990 and updated in 2018) help protect the wetland and surface water resources in the City, while balancing the need for expanding development and economic opportunities. The City has limited control over some of the water resources within its borders. Vadnais and Sucker Lakes are part of the Saint Paul Regional Water Service, so the water is closely monitored as well as the tributaries to these lakes. Willow Lake is maintained by the Willow Lake Natural Preserve Foundation. While the City is involved with the foundation, Ramsey County and H.B. Fuller own the land around the lake with restricted public access. In 2010, the City adopted a new Stormwater Management Ordinance that complies with the guidelines set by the Minnesota Pollution Control Agency and the local Watershed District and Water Management Organization. The City also established a Water Management Overlay Zoning District, the details for which can be found in the Zoning Ordinance.



Wetlands, Lakes, Floodplains

2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

- Legend**
-  Vadnais Heights City Limits
 -  City/Township Boundaries
 -  Railroad
 -  Streams
 -  National Wetland Inventory
 -  100-Year Flood Hazard Zone



Source: MnGeo, City of Vadnais Heights, Ramsey County



December 2018

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Major Vegetation and Open Space Areas

The existing forested areas and open spaces in Vadnais Heights are an asset to the City, providing shelter and allowing for recreational use. These groves that are scattered throughout the City provide scenic beauty, shelter for homes and residents alike, and allow for areas that would be harsh from wind and sun to be able to be used for recreational purposes. Vegetative areas within Vadnais Heights tend to vary greatly in size. Major vegetative areas are largely located around wetlands, where the natural topographical elements have largely been preserved. Examples of these are the forests and natural areas that found around Vadnais, Sucker, and Willow lakes. Many of these assets are publicly owned, and therefore are not under any pressure or threat of development.

Soils

The soils that have been deemed best for development are in the southeast of the City near where the business park has been developed around I-35E and to the east.

The chemical and mechanical properties of soil are the determinants of what makes for a soil that is able to support development and it is important to understand soil types and associations. A soil association is a geographic pattern of defined and named soils. The soils in an association may be similar or contain marked differences, but the pattern in which the soils occur is relatively uniform.

Associations are what make up the majority of the soils, but other soils can be found within a soil that is a certain association. For more specific information than what is located within this document, refer to the *Ramsey County Soil Survey*. Before beginning any development proper measures and tests should be taken to assure the quality and type of soil. This document is not meant to detail specific areas where soil associations are dominant, but provide a guide to those that are abundant in Vadnais Heights. Below is a description of the soil associations found in the Vadnais Heights area.

Wadena-Hubbard: This soil association is found in areas which are nearly level to rolling and well drained. The soils are dark colored and have sand or silt loam surfaces. They overlie neutral or calcareous outwash sands or gravels at a depth of two to six feet. These soils are medium to low in fertility. Wind erosion and droughtiness are problems on the more sandy areas.



Milava-Santiago: These soils are found in hilly to gently rolling areas of well to moderately well drained soils with light colored, silt loam, or loam surfaces. The soils have developed from acidic, stony, sandy loam glacial till. Typically, there is a silty covering about 18 inches thick in the Santiago areas. Fertility and water erosion control are potential management problems.

Plainfield-Grauby-Zimmerman: This soil association is found in areas which are nearly level or gently rolling areas with deep sands. The soils are well drained, pale and dark grayish brown, medium to very strongly acidic, with sand and loamy sand surfaces. They have low moisture holding capacities.

Geology

The Twin Cities metropolitan area, including the City of Vadnais Heights, lies atop Paleozoic sedimentary rocks arranged in the form of a structural basin that forms an effective trap and reservoir for groundwater. Sandstone, shale, limestone, and dolomite are the major rock types within the area. The metropolitan area is covered by an extensive system of valleys that were eroded by pre-glacial rivers. In Vadnais Heights, Vadnais Lake is part of a long chain of lakes created by one of these valleys.

Topography

Overall, Vadnais Heights is relatively flat with gently rolling hills. The exception within the City is the area between Willow Lake and County Road E. Here there is a change from 980 feet above sea level to 880 feet above sea level within approximately one half mile between Willow Lake and the County Road E/State Highway 61 intersection.

As mentioned previously, there are numerous areas within Vadnais Heights that can be considered lowlands, generally concentrated around wetlands and areas where surface water collects. There are three areas of low-lying land in Vadnais Heights that are worth identifying:

- Surrounding Willow Lake
- Located coincidentally with the wetland areas in the central portion of the City
- Surrounding Sucker and Vadnais Lake

Most of the drainage within the City trends towards Vadnais Lake or its tributaries. Within the south and southeastern portions of the City, drainage goes into the Kohlman-Phalen Chain of Lakes located in Maplewood, Little Canada, and St. Paul.

Significant Plant and Animal Species

The large proportion of land in the community that has remained in its natural state, particularly wetland areas, provides good habitat for a variety of plant and animal species. Vadnais Heights is home to several species of plants and animals that are threatened or of *special concern* based on state standards. A State designated *threatened* species is one that is likely to become endangered within the foreseeable future. A species of *special concern* as designated by the State is one that is not *endangered* or *threatened* but is extremely uncommon in Minnesota or has unique or highly specific habitat requirements and thus deserves careful monitoring of its status. Species which also are classified as *special concern* are: (1) species on the periphery of their range but not listed as *endangered* or *threatened*, (2) species that were once *endangered* or *threatened* but now have increasing or stable populations, and/or (3) species whose breeding biology is affected by human activities.

Within Vadnais Heights, there is one plant species that falls into the classifications described above. This plant is White Wild Indigo, designated as special concern by the State of Minnesota. Most of the indigo plants are located between County Road D and the south lane of I-694. This plant was so designated due to the rapid loss of prairie habitat in which it tends to grow.

Vadnais Heights is home to two important animal species. The first is Blanding's Turtle, which is designated as *threatened* by the State of Minnesota. Individual turtles have been sighted at numerous locations within Vadnais Heights including near Vadnais Lake, along U.S. Highway 61 and near South Oak Drive. Blanding's Turtle has become threatened since a great deal of its wetland habitat has been destroyed due to development and agriculture. In addition, its life history, including late maturation and a high mortality rate of eggs and juveniles, makes it susceptible to human disturbances. A second animal species that is important to note is the Red-Shouldered Hawk, which is designated as *special concern*. A nest was identified in a tree near Clover Avenue and an adult hawk was seen flying in the central part of the City. Fragmented habitat and pesticide contamination have been the primary contributors to the decline in the population of this species.

Natural Communities

The presence of important natural communities is also important to consider. Natural communities are functional units of the landscape that are characterized and defined by their most prominent habitat features, a combination of vegetation, hydrology, landform, soil, and natural disturbance cycles. Although natural communities have no legal protection in Minnesota, the Natural Heritage program has evaluated and ranked community types according to their relative rarity and endangerment throughout their range.

A number of significant natural communities occur in Vadnais Heights. The first of these is an Alder Swamp located in the Sucker Lake Natural Area. This natural community has been ranked by the State as a “5” which means that it is considered secure under present conditions. A ranking of “1” is used for natural communities that are considered to be in greatest need of conservation action in the State. An Alder Swamp is identified as a wetland with a canopy of all shrubs including speckled alder. Frequently, willows, poison sumac, and bog birch also are present in Alder Swamps.

Sucker Lake Natural Area is home to two more significant natural communities. The first is an undisturbed Willow Swamp, ranked “4” which notably has almost no exotic species present. A Willow Swamp is a wetland that is dominated by various species of willows. The second natural community located near Sucker Lake is a Rich Fen, which is dominated by herbs and small scattered shrubs. Rich Fens generally occur in conifer-hardwood forests and deciduous forest-woodland zones. The ground layer of a Rich Fen is frequently dominated by wiregrass sedge, brown sedge, livid sedge, or bog reed-grass. This natural community is ranked as a “3” which means that, according to the Minnesota DNR, it is in greater need of conservation as compared to other natural communities located within Vadnais Heights. Climate change is an important factor in the future (and threat to) these areas as well, especially fens associated with coniferous forests.

Aggregate Resources

It is unlikely that the small deposits of aggregate resources present within the City will be mined in the future

Historic Resources

Europeans first settled Vadnais Heights in the 1840’s when French Canadians moved into the area from Saint Paul. Twenty years later, by the end of 1860 there were seven households in Vadnais Heights: six French Canadian families, two Austrian families, and one French Canadian Bachelor.

Farmers originally settled the area. The names of the first settlers are still known today and honored, those being Vadnais, Bibeau, Garceau, LaBarre, and Morrisette all of which are were families that settled their farms in the area. Industrialization came to the City in the early twentieth century. A notable company that established in 1914 was the Citizen’s Ice and Fuel Company of St. Paul. Located near Vadnais Lake, the company removed approximately 8,000 blocks of ice per day during the winter to provide the area with cooling throughout the summer. The City incorporated in 1957 and has transitioned from a rural truck farming area into a diverse suburban community.

The history of the community has been recorded in three recognized documents:

- Reflections from the Lake by Rose Ellen Soler (with research by the Vadnais Heights Historical Commission), 2006, 284 pages.
- Vadnais Heights Historical Tour, an eight page pamphlet including a route map, decryptions, and illustrations.
- Vadnais Heights, a History 1845 – 1976 (The Bicentennial Committee).

The City believes that in order to preserve the history of the community, the following structures and sites must be recognized and protected.

David Garceau House

Located at 3447 Centerville Road, this structure is the oldest home in Vadnais Heights. It is located just east of the former CH Market. This building is the former home of David Garceau, a descendant of one of the City’s founding families.

Vadnais Market

This building is located just west of the David Garceau Home on Centerville Road, and could be considered one of the City’s first “mixed-use” developments before that planning nomenclature became popular. The building included a small grocery and liquor store, fuel and auto repair shop, hardware store, and rental housing units on the upper floor. This facility was owned and operated for many years by descendants of the Garceau family, until 2004 when it was sold to the Don Rubbelke family. The City later purchased the property in 2015.



Historic Marker

During the Vadnais Heights Bicentennial Celebration, a monument was dedicated to the Bibeau, Garceau, and Vadnais families, which were the first settlers in the Vadnais Heights area. These three families established farms adjacent to each other near the present day junction of Centerville Road, Edgerton Street, and Vadnais Boulevard. This historical monument is located on the southwest corner of Vadnais Lake Park where the three streets come together.

Saint Paul Water Utility Pump House

This pump house, built between Vadnais and Sucker Lakes, is representative of the building style utilized by the St. Paul Water Utility late 1800s. A number of similar structures were built to house mechanical equipment use to move water through the lake system and into the pipes.

Vadnais-Snail Lake Park Reserve Structures

The Vadnais-Snail Lake Park Reserve contains a number of historic structures including picnic shelters and walls. These structures were built with deferral funds in the 1930s. These structures contribute to the historic nature of this park and are still utilized.

Lake Vadnais Church

Lake Vadnais Church is located in the southwestern corner of Vadnais Heights, just north of I-694 on Twin Lake Boulevard. The church, completed in full use since it was built and continues to provide a full schedule of services for all age groups. An education annex was built in the 1960s.

Other Historical Features

The history of Vadnais Heights is preserved through a number of other methods. For example, Community Park is named after the Vadnais Heights Community Club that preceded the formation of the City. In addition, a number of streets are named after former residents such as Tessier Trail, Belland Avenue, Stockdale Drive, Garceau Lane, Monn Avenue, and Vadnais Boulevard, or natural features such as Lambert Creek.

Resilience

Resiliency in planning and development helps to ensure the prosperity, livability, equity, and sustainability of a community for future generations. Resilience planning focuses on all aspects of community, ensuring the economy, the environment, and social/living conditions are vibrant and upheld through adversity.

The Metropolitan Land Planning Act (Minnesota Statutes 473.859, Subd. 2) requires local comprehensive plans to include for the protection and development of access to direct sunlight for solar energy systems.

The following uses are permitted in all zoning districts located within Vadnais Heights: “Public utility uses, public parks, provision of underground utilities, and the use of solar energy systems including solar collectors for the use of the particular site, storage facilities, and distribution components for space heating and cooling and domestic water heating.”

Along with this the City allows variances for lack of solar access, in accordance with the applicable standards and procedures within the Zoning Ordinance. According to the Metropolitan Council, Vadnais Heights has the following solar potential, detailed in the table below. These calculations assume a 10% conversion efficiency and current (2016/17) solar technologies. The average home in Minnesota consumes between 9 and 10 Mwh/year (Solar Energy Industries Association; US Energy Information Administration). Using only Vadnais Heights’s rooftop generation potential, between 88,645 and 98,495 homes could be powered by solar energy annually.

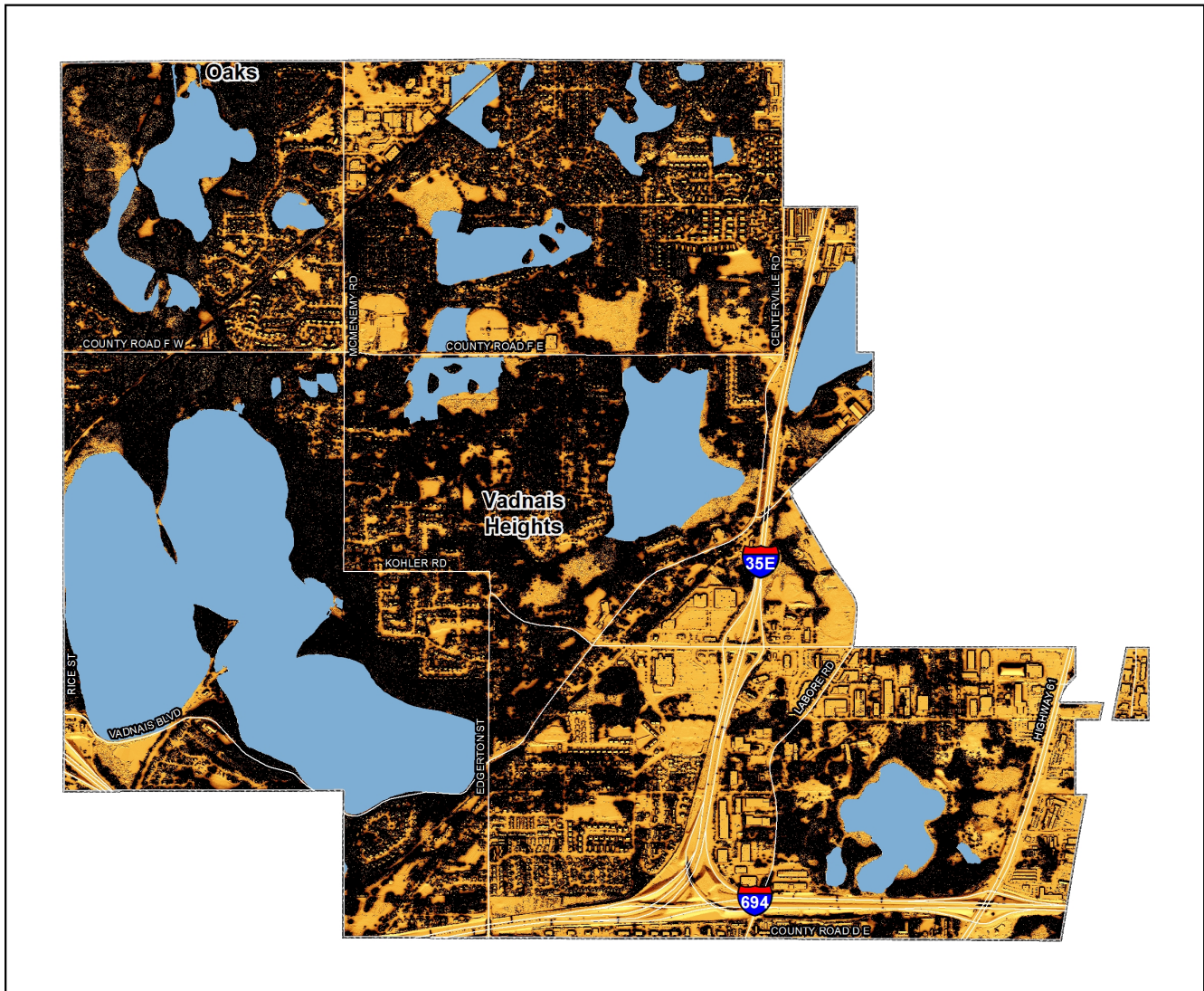
Table 15 - Solar Resource Calculations			
Gross Potential (Mwh/yr)	Rooftop Potential (Mwh/yr)	Gross Generation Potential (Mwh/yr2)	Rooftop Generation Potential (Mwh/yr2)
8,024,666	839,937	802,466	83,993

Source: Metropolitan Council Solar Resource Calculation

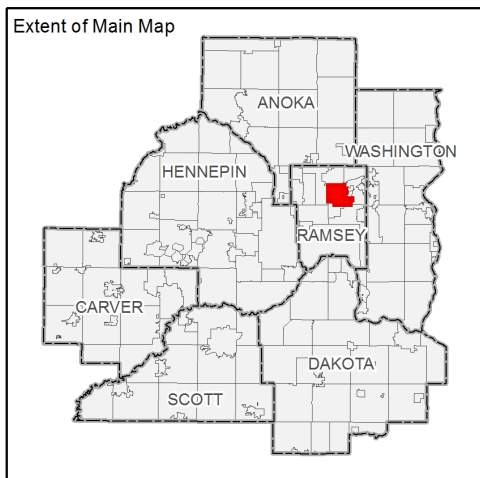
These calculations done by the Metropolitan Council are not necessarily an absolute number. Due to limitations in data and maps, some areas may be left out from gross and rooftop potential.

These numbers should be interpreted as a baseline, if more accurate numbers are desired, the Metropolitan Council advice a more extensive, community-specific analysis of solar development potential for both solar gardens and rooftop or accessory use installations. On average, communities would be able to expect between 30% and 60% of total energy used to be able to be generated by solar rooftops. The rooftop potential estimated here does not consider ownership, financial barriers, or building-specific structural limitations.

Gross Solar Potential City of Vadnais Heights, Ramsey County



1/10/2017



Gross Solar Potential (Watt-hours per Year)

- High : 1270157
- Low : 900001
- Solar Potential under 900,000 watt-hours per year
- County Boundaries
- City and Township Boundaries
- Wetlands and Open Water Features

Source: University of Minnesota U-Spatial Statewide Solar Raster.

Goals and Policies

GOAL: Complete the build-out and build-up of the community by planning for growth that accommodates local goals including housing choice, commercial-industrial growth and open space protection, all within the context of the regional planning framework.

POLICIES:

- Regulate land consistently with the Future Land Use Map and the policies of this Plan.
- Forecast and monitor growth in population, households and employment.
- Adopt, implement, and update the Future Land Use Map as the general land use pattern of future physical growth.
- Provide, maintain, and enforce standards for development that will enhance public health and safety and promote a high standard of living.
- Promote an open and ongoing relationship among all units of government- City, School Districts, Ramsey County, Metropolitan Council, State of Minnesota and nearby communities- in all matters related to planning and the provision of public services.
- Engage in a long-term process of enhancing public spaces across the community, that work in tandem with regional plans of the same nature.
- Protect and preserve Vadnais Heights' environmental and historical resources.

GOAL: Continue the development and enhancement of City Center as the attractive, multiple-use economic and civic hub of the community.

POLICIES:

- Continue to make investments in public infrastructure and aesthetic improvements in City Center to encourage private sector reinvestment to maintain and enhance the area's vitality.
- Work with property owners of vacant parcels to identify and overcome the constraints for future development that is consistent with the City's land use vision.
- Plan for connecting City Center to County Road E/US Highway 61 Corridor.
- Review and update the City Center Plan to address current and future market factors.

GOAL: Engage in a long-term process of enhancing public spaces across the community.

POLICIES:

- Improve landscaping in medians and boulevards.
- Coordinate with Ramsey County on improved boulevard treatments for locations along County Roads.
- Continue to build tasteful monuments that proudly announce arrival into Vadnais Heights at key perimeter locations.
- Promote community unity and spirit and enhance character and identity.

GOAL: Reduce land use conflicts through redevelopment of blighted, vacant or underutilized properties, enhanced buffering or screening, and improved building and site design.

POLICIES:

- Promote redevelopment that enhances, not detracts, the surrounding development pattern.
- Achieve new investment on sites where the existing land use is no longer consistent with the intent of the Comprehensive Plan in terms of use, economic viability or physical quality.
- Continue to apply the site design provisions of the Zoning Ordinance, particularly those addressing setbacks, landscaping, lighting, trash handling and loading docks.
- Provide building design guidelines regarding scale and materials for new infill developments and building expansions.
- Consider negotiating the selective acquisition of private property to create redevelopment opportunities.
- Prepare specific plans for neighborhoods or districts where a need for additional guidance is identified.

GOAL: Use the Comprehensive Plan as a basis for reviewing development applications, as a guide for neighborhood or district plans, and as the foundation for amending the City’s zoning and subdivision ordinances.

POLICIES:

- Make land use and development decisions in a reasonable, predictable manner based on approved plans, policies, and ordinances.
- Continue to monitor the pattern of land use and the City’s progress toward achieving the regional growth forecast.
- Continue to coordinate the review of all private sector development applications and public improvement projects with the Vadnais Lake Area Watershed Management Organization or the Ramsey-Washington Metro Watershed District.
- Continue to allow for solar energy instruments to be used within the city and ensure that new developments and redevelopments allocate the necessary amount to be in compliance with state law.





03

HOUSING

Background

Housing is the predominate land use within Vадnais Heights and the City strives to provide for a variety of housing types and cost to increase accessibility to housing.

Existing Housing

General Housing Conditions

Making up approximately 33.8% of the land use within Vадnais Heights, residential development and growth has to be a priority for the City in the pursuit of developing a well-maintained and functional community.

Housing statistics come from 2015 estimates, tenure, and affordability levels. Vадnais Heights currently contains 5,373 housing units, 76.8% of which are single family and 19.7% of which are multi-family. Of the housing units in Vадnais Heights, 81.1% of units are owner-occupied. 71.5% of housing is affordable to households with income at or below 80% Area Median Income (AMI), 33.1% of housing is affordable to households with income at or below 50% AMI, and 9.2% of housing is affordable to households with income at or below 30% AMI.

Table 16 - Existing Housing Conditions

Total of Housing Units	5,373
Housing Units affordable to households with incomes at or below 30% Area Median Income (AMI)	495
Housing Units affordable to households with incomes between 31 and 50% Area Median Income (AMI)	1,285
Housing Units affordable to households with incomes between 51 and 80% Area Median Income (AMI)	2,061
Housing Units – Owner Occupied	4,357
Housing Units – Rental	1,016
Single Family Homes	4,124
Multi-family Homes	1,059
Publicly Subsidized- Senior Housing	0
Publicly Subsidized – Housing for People with Disabilities	0
Publicly Subsidized – All Other Publicly Subsidized Units	147

Source: Metropolitan Council, U.S. Census Bureau, American Community Survey

Housing cost burden within the City affects approximately 16.4% of households within Vадnais Heights. Of households facing housing cost burden with incomes below AMI, 204 (3.9%) are between 51 and 80% AMI, 261 (5.0%) are between 31 and 50% AMI, and 391 (7.5%) are below 30% AMI. Identifying this data is key to being able to properly plan for development and ensure that the vision of the City is achieved. Residents in Vадnais Heights should be able to sustain themselves and their families without having to worry about experiencing a cost burden from basic needs. Due to this reality, monitoring and addressing housing affordability is important and is expected to continue to be so in the future.

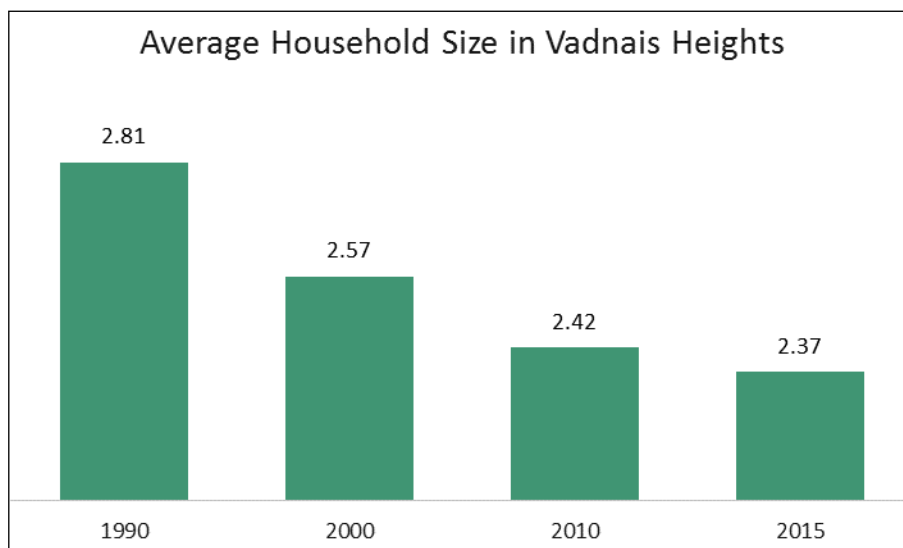
Table 17 - Households Experiencing Cost Burden

Existing households experiencing housing cost burden with incomes below 30% AMI	391
Existing households experiencing housing cost burden with incomes between 31 and 50% AMI	261
Existing households experiencing housing cost burden with incomes between 51 and 80% AMI	204

Source: Metropolitan Council, Existing Housing Assessment, U.S. Department of Housing and Urban Development

Household Size

The average household size in 2015 in Vadnais Heights was 2.37 persons. This has steadily declined since 1990. The average household size in 2010 was 2.42, 2.57 in 2000, and 2.81 in 1990.

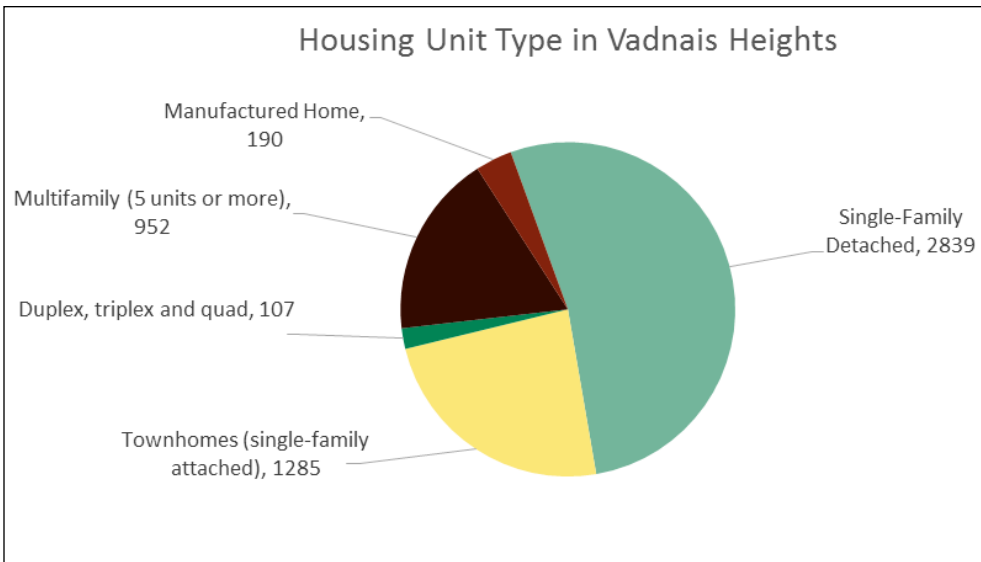


Source: U.S. Census Bureau Decennial Census and Metropolitan Council Annual Estimates

Housing Types

Of the 5,373 housing units in Vadnais Heights, the dominant type is undoubtedly single-family detached units that make up over half the housing stock at 52.8% and consist of 2,839 units. Following this there is a sizeable amount of single-family attached units, or townhomes, within the City as well with 1,285 units, which make up 23.9% of housing stock. The other notable housing units in Vadnais Heights are multifamily, five units or more, of which there are 952 units, or 17.7% of the housing stock. There are also smaller forms of multifamily housing units, such as duplexes, triplexes, and quads, as well as manufactured housing, but these only make up approximately 5.5% of housing stock.

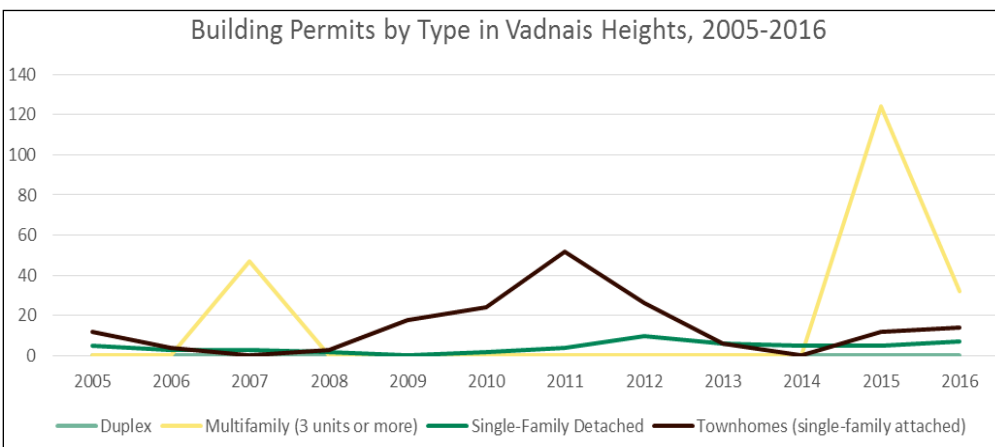
There has been only minor change in the housing stock in Vadnais Heights between 2010 and 2015. The largest change was in multi-family housing which increased by 7.4% with an increase from 886 to 952 units. When the housing market slowed and crashed in 2008, housing development slowed in Vadnais Heights accordingly, seeing less than 8% increases in units in every type of housing, and a loss in the number of manufactured housing.



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

Table 18 - Housing Units by Type					
Housing Unit Type	2000	2010	2015	Percent Change 2000-2010	Percent Change 2010-2015
Single Detached	2,767	2,815	2,839	1.7%	0.9%
Single Attached	1,178	1,243	1,285	5.5%	3.4%
Du/Tri/Quadplex	156	107	107	-31.4%	0.0%
Multifamily	766	886	952	15.7%	7.4%
Manufactured Home	261	192	190	-26.4%	-1.0%
Other	0	0	5,373	0.0%	0.0%
Total Units	5,128	5,243	10,746		

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



Source: Metropolitan Council Commercial, Industrial, and Public and Institutional Building Permits Survey

Variety in housing styles is the key to creating an affordable housing economy and Vadnais Heights strives to create this economy for its residents. As the City developed, residential development was largely focused on single-family detached units. However, in the last ten years, multi-family unit construction has outpaced single-family and townhome construction.

Table 19 - New Housing Units Permitted

	2000-2004	2005-2009	2010-2014	2015
Multifamily (3 units or more)	8	47	0	124
Single-Family Detached	92	13	27	12
Townhomes (single-family attached)	58	37	108	5

Source: Metropolitan Council Commercial, Industrial and Public and Institutional Building Permits Survey

In 1957, with a population of about 2,000, residents voted to incorporate as the Village of Vadnais Heights. In 1974, an act of the Minnesota State Legislature turned the village into a full-fledged city. The City of Vadnais Heights was largely developed between 1970 and 1990. Of the 5,621 housing units, 4,636 have been built post 1970 (82.5%). Homes constructed prior to 1970 are generally considered more susceptible to I/I. These homes and utility connections have been evaluated for I/I susceptibility and repair.

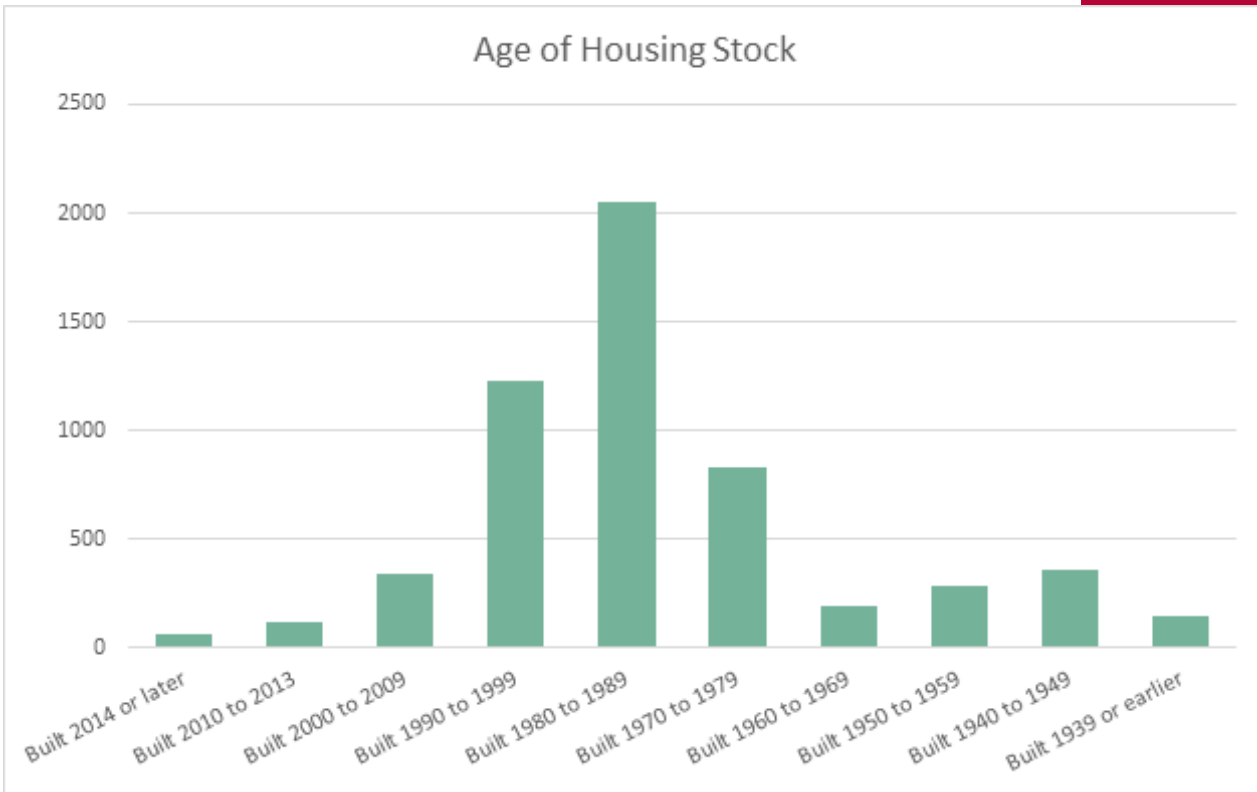
While the City has been proactive in encouraging development of varied housing types, much of what has been developed since 2003 has not been what is considered “affordable.”

Table 20 - Affordability of New Units

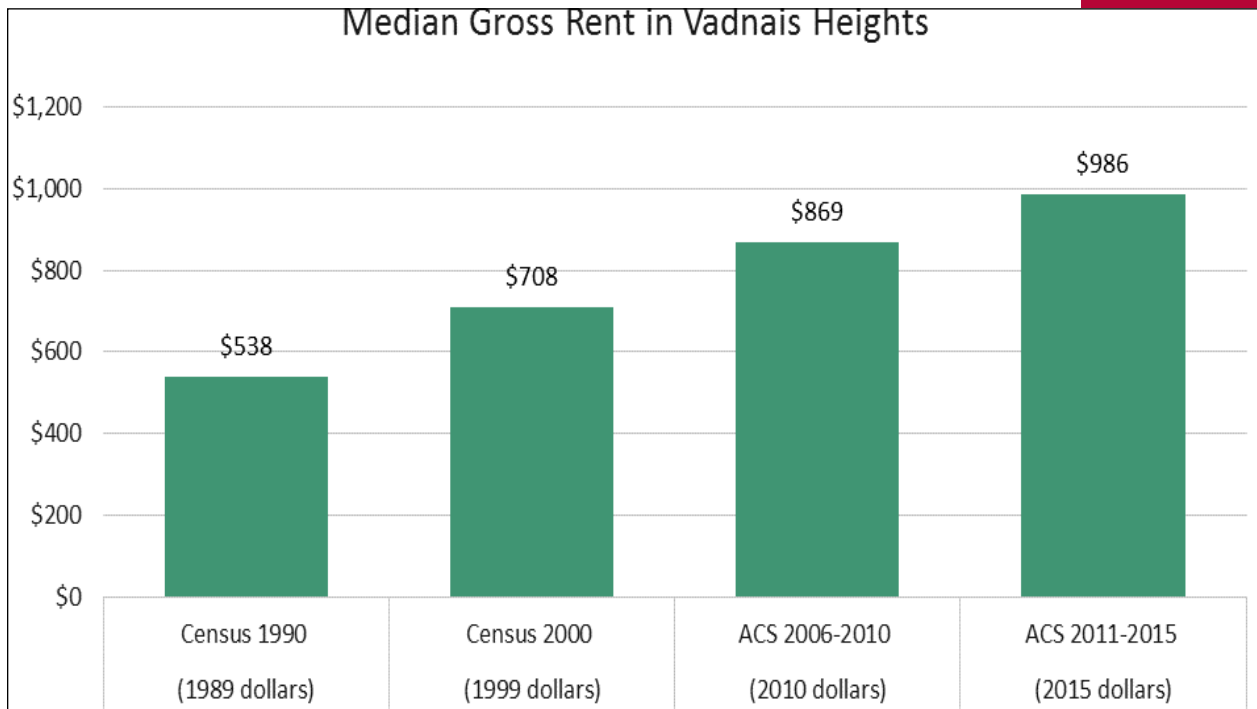
	Owner-occupied		Rental-occupied	
	Affordable	Over Affordability Threshold	Affordable	Over Affordability Threshold
2003	8	25	0	0
2004	1	5	0	0
2005	5	12	0	0
2006	0	7	0	0
2007	0	3	47	0
2008	0	5	0	0
2009	0	0	0	18
2010	1	1	0	24
2011	0	14	0	42
2012	0	36	0	0
2013	0	6	0	6
2014	0	5	0	0
2015	0	17	0	124
Totals	15	136	47	214

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

Housing costs influence the ability of young adults, families, and seniors to remain in the community. It can also affect the ability of local employers to find workers. Housing costs are influenced by a variety of factors, including land costs, labor and materials, community regulations, and interest rates. Housing costs are typically the single largest expenditure for individuals. It is therefore assumed for homeowners, that a home is the single most valuable asset. It is a benefit to a community to have a housing stock that matches the ability of residents to afford the associated costs.



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



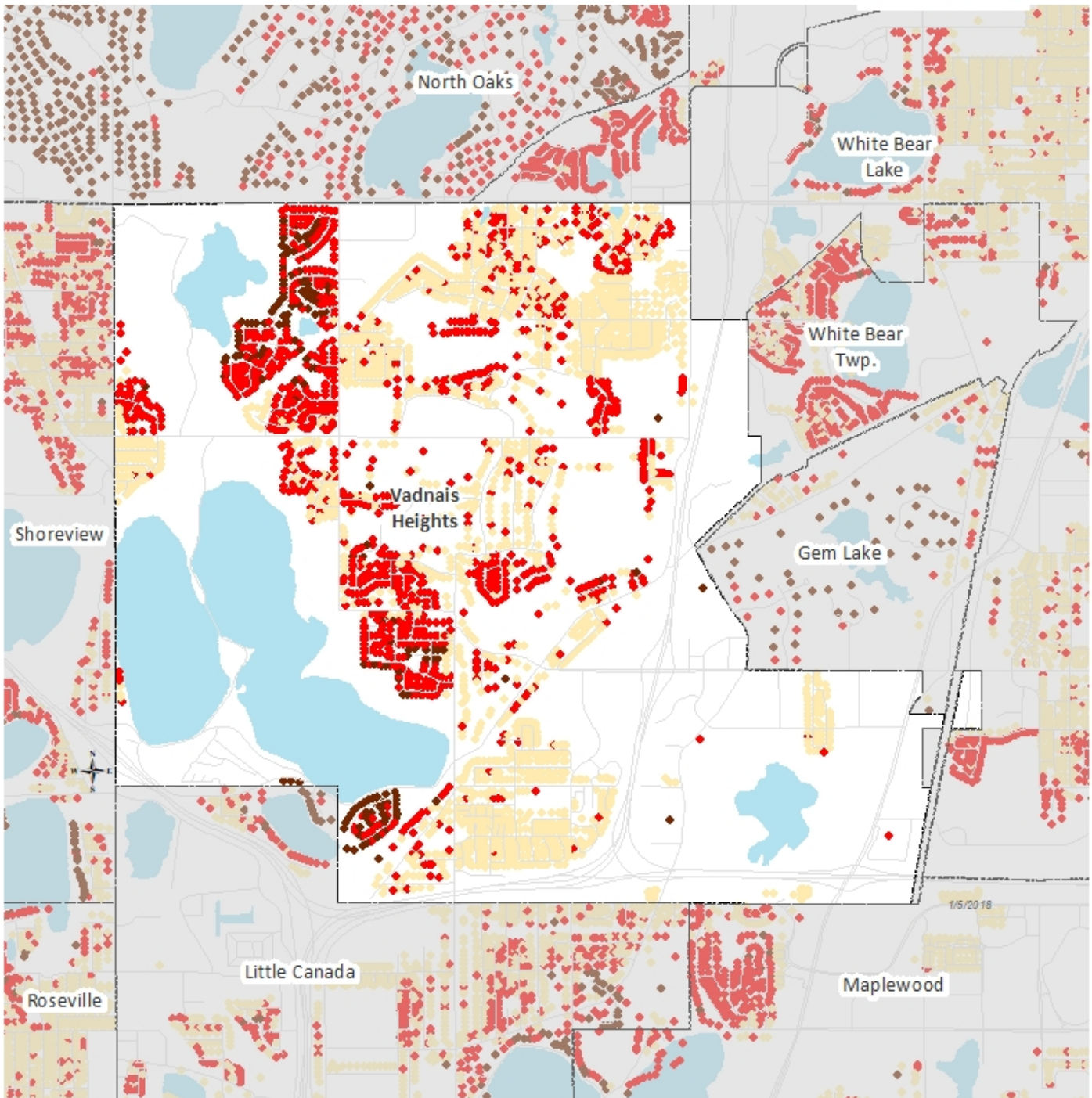
Source: U.S. Census Bureau Decennial Census and American Community Survey

Housing Values

The following exhibit details estimated Owner-occupied housing values within Vadnais Heights. Housing values in the City of Vadnais Heights are similar in value to surrounding jurisdictions.

Owner-Occupied Housing by Estimated Market Value

Vadnais Heights



- County Boundaries
- City and Township Boundaries
- Streets
- Lakes and Rivers

Owner-Occupied Housing Estimated Market Value, 2016

- \$243,500 or Less
- \$243,501 to \$350,000
- \$350,001 to \$450,000
- Over \$450,000

1 in = 0.59 miles



Source: MetroGIS Regional Parcel Dataset, 2016 estimated market values for taxes payable in 2017.

Note: Estimated Market Value includes only homesteaded units with a building on the parcel.

Existing Housing Needs

A majority of homes within the City of Vadnais Heights were built between 1970 and 1999. Reinvestment in these homes may be necessary to maintain livable conditions. Average household size in the City of Vadnais Heights has been decreasing since 1990. Homes are being developed to accommodate the new normal for average household population within the City of Vadnais Heights.

Projected Housing Needs

The City of Vadnais Heights will need to develop additional housing options to meet the needs of the community over the next 20 years. These housing units will be developed in stages as shown in the stages land use planning tables on the previous chapter.

Table 21 - Forecasted Housing					
	2010	2015*	2020	2030	2040
Households	5,066	5,233	5,700	6,100	6,300

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

Housing development within the City of Vadnais Heights will be mindful of population trends and develop housing to meet the needs of the population. A large cohort of the population is at or nearing the age of retirement. Life-cycle housing options will be considered to accommodate the population.

Table 22 - Affordable Housing Allocation	
At or below 30 AMI	57
From 31 to 50 AMI	38
From 51 to 80 AMI	39
Total Number	134

Source: Metropolitan Council

Affordable Housing Allocation

The Affordable Housing Allocation reflects the region's forecasted population that will need affordable housing. According to the Metropolitan Council's affordable housing allocation, Vadnais Heights's share of affordable housing need is 134 unit out of the total 37,900 units that will be needed in the region. Affordable Housing has been allocated based on a percentage of Area Median Income (AMI).

Vadnais Heights will work with developers and various housing agencies to achieve the affordable housing goals that have been set by the Metropolitan Council. The City will also identify available grant dollars and other tools to attempt to meet the affordable housing allocation.

The Metropolitan Council use three values to determine if sufficient land is guided to create opportunities for affordable housing: land use minimum density, number of acres expected to develop between 2021-2030, and the percent of land expected to develop as residential. To assist the Metropolitan Council in the determination of available housing at high densities, the following provides the percentage of developable land at densities above 8 units per acre.

- City Center 25.3 Developable acres divided by total developable (301.2) = 8.4 %
- Mixed Use 0.1 developable acres divided by total developable (301.2) = 0.03%
- Total residential developable 120.7 acres divided by total developable 301.2 = 40%

Housing Implementation Plan

Table 23 - Housing Implementation Plan				
Housing Goal/Need	Policy	Fiscal	Partnerships	Programs
Continue to provide a range of housing choices in terms of style, size, location, tenure and cost.	Promote a balanced housing supply with housing available for people at all income levels.		Department of Housing and Urban Development	Section 8 Family Homeless Prevention & Assistance Program (FHPAP) MHFA Rental Assistance Ramsey County Housing Assistance
	Promote a variety of housing types for people in all stages of the life-cycle.			
	Build a community of well-maintained housing and neighborhoods, including ownership and rental housing.			Land Use Planning and Zoning; Code Enforcement
	Create housing that respects the natural environment of the community while striving to accommodate the need for a variety of housing types and costs.	Conservation Easement Credit	MnDNR Army Corps of Engineers	Transfer of Development Rights
	Advocate for a high proportion of upper-cost, owner-occupied housing units on the remaining undeveloped or redeveloped low/medium density residential sites.			Land Use Planning and Zoning MHFA Loan Program
	Partner with residents and organizations to provide housing assistance and cost burden relieving opportunities.			
	Work with regional governmental agencies to ensure efficient and cohesive design.			
Protect residential property values by encouraging reinvestment	Consider initiating local programs including rehabilitation loans or grants for owner-occupied housing in targeted neighborhoods.	Rehab Loans	Fannie Mae / Freddy Mac Housing Resource Center	Minnesota Housing Fix-up Loan Minnesota Housing Rehabilitation Loan
	Encourage energy efficiency and upgrades to appliances when appropriate.	Energy Conservation	Neighborhood Energy Connection (NEC)	Energy Conservation Deferred Loan Program
	Partner with Ramsey County and other housing agencies to promote existing housing rehabilitation assistance and first-time homebuyer programs.		Ramsey County Minnesota Housing Finance Agency	Ramsey County Rehabilitation Deferred Loan Program FirstHOME Buyer Assistance Program Home Improvement and Suburban Weatherization Programs
	Consider implementing a proactive residential property maintenance inspection and enforcement program.			

The City does not administer any programs listed in the table. However, the City encourages eligible residents to utilize these programs for qualifying projects. In addition, several housing implementation policies involve land use planning and zoning programs. The City will continue to update and implement land use and zoning regulations to encourage a strong housing stock that supports reinvestment in existing homes and new development.



04

PARKS &
TRAILS

City Park System

The Public Works Department is responsible for maintaining the parks system and the Parks and the Administration Department provides programming and special events. The Parks, Recreation, and Trails Commission is composed of volunteers that offers guidance and recommendations to the City Council.

Existing City Park Facilities

According to the Community Survey conducted in 2016, over 66% of households surveyed visited/used the existing park facilities and positive ratings by users ranged between 92-100%. The City manages approximately 194 acres of parkland spread across 14 parks.

Table 24 - City of Vadnais Heights Parks

Park	Ball Field(s)	Soccer/football field(s)	Basketball Hoop(s)	Tennis Court(s)	Hockey Rink/Open Skating	Warming House	Play Equipment	Picnic Tables	Picnic Shelter	Seasonal Restroom(s)	Trails	Passive/Wetland Acres	Active Use Acres	Total Park Acreage	Classification
Bear	X	X	X				X	X		X	X	1.5	3	4.5	NP
Berwood	X	X	X	X			X	X		X	X	2	9	11	NP
Bridgewood			X	X			X	X		X	X	27.7	2.6	30.3	NP
Community	X	X			X	X	X	X	X	X	X	14.7	20.3	35	CP
Elmwood							X	X	X			0	0.7	0.7	MP
Greenhaven							X	X				0	0.7	0.7	MP
Heritage								X			X	18.2	10	28.2	NP
Kohler Meadows	X	X	X	X			X	X	X	X	X	3.9	25	28.9	CP
Lily Pond	X	X					X	X		X	X	4.9	4.7	9.5	NP
Morningside		X						X		X		13.9	1.4	15.3	NP
Oak Creek							X	X				0	2.3	2.3	MP
Vadnais Heights Elementary School	X	X	X				X			X		2.7	2	4.7	NP
Westfield	X	X	X	X	X	X	X	X		X	X	14	6.7	20.7	NP
Wolters							X	X			X	0	1.9	1.9	NP

City parks are classified as follows:

Table 25 - Park Classification				
Classification	General Description	Location Criteria	Size Criteria	Quantity
Mini Park (MP)	Used to address limited, isolated, or unique recreational needs	Less than 1/4-mile distance in residential setting	2,500 SF – 1 acre	3
Neighborhood Park (NP)	Serves as the recreational and social focus of the neighborhood, including active and passive recreation	1/4 to 1/2-mile distance and uninterrupted by non-residential roads and other physical barriers	5 – 10 acres	9
Community Park (CP)	Serves to meet community-based recreational needs, including natural preservation areas	1/2 to 3-mile distance serving two or more neighborhoods	30 – 50 acres	2

A community needs a mix of these park classifications to ensure residents have access to a wide range of recreational opportunities. The city’s parks are spread out across the community.



Planned/Potential City Park Facilities

Vadnais Heights is nearly developed, so only a small amount of additional park acreage would be expected over the next 20 years. As a result, no additional park locations are identified or planned during this planning period. It is anticipated that park dedication fees, in lieu of land dedication, will be collected from most future subdivisions to assist in maintaining and enhancing the existing park system. However, land dedication may be considered for large subdivisions that create an immediate need for recreation space in the new development.

Twin Lake Access

As part of the John Mitchell Preserve residential subdivision platting process, a 2.62-acre piece of land that connects Vadnais Boulevard to Twin Lake was dedicated to the City. The property is heavily wooded and contains slopes in certain areas that may make it challenging to construct an improved trail/park facility through it. The vast majority of Twin Lake is within the City of Little Canada. However, the City of Vadnais Heights owns the only public access point to the lake, which could be utilized to address public safety access concerns and provide additional recreational opportunities.

Ramsey County Parks System

The Ramsey County Parks system encompasses over 6,500 acres, consisting of the following:

- Regional parks – 6
- Regional trail corridors – 6
- County parks – 9
- Protected open space sites – 9
- Indoor ice arenas – 11 (13 ice sheets)
- Golf courses – 5
- Nature Center – 1
- Waterpark – 1

Vadnais-Snail Lakes Regional Park

Official designation of regional parks requires Metropolitan Council approval. Regional parks most notably contain a diversity of nature-based resources, either naturally occurring or human-built, and are typically 200-500 acres in size. Regional parks accommodate a variety of passive and active recreation activities. The Regional Parks System includes 62 regional parks, park reserves, and special recreation features, including more than 340 miles of regional trails. The System is a partnership between the Metropolitan Council and 10 implementing agencies who own and operate the various units, including Ramsey County.



Vadnais-Snail Lakes Regional Park encompasses approximately 1,000 acres in Vadnais Heights and Shoreview and is comprised of the following five segments:

- Sucker Lake – 273 acres
- Vadnais Lakes – 303 acres
- Grass Lake – 271 acres
- Snail Lake Corridor – 142 acres
- Snail Lake – 30 acres

The Ramsey County System Plan contains information on the existing and planned recreational development for each segment. The segments contain pedestrian/bicycle and cross-county ski trails, picnic areas and shelters, shoreline fishing areas, restrooms, play areas, and trailhead parking areas. Planned improvements to the segments includes shoreline stabilization, trail improvements and connections, additional play areas, and general safety and accessibility improvements.

Both segments are designated as Environmental Natural Areas, excluding the picnic areas. The Sucker Lake segment has high-quality fen, which provides habitat for several orchid species. The Regional Park itself contains a mixture of coniferous plantations, oak woods, oak savannahs and extensive wetlands. Invasive species are widespread, including buckthorn and garlic mustard. The Park also hosts a diverse variety of wildlife, including waterfowl nesting and migration areas. Other wildlife includes nesting songbirds, raptors, wild turkeys, white-tailed deer, coyotes, red fox, and raccoons. The Ramsey County Cooperative Deer Plan manages the deer population using special hunts, in partnership with the cities of Shoreview and Vadnais Heights.

St. Paul Regional Water Services (SPRWS) operates and maintains an augmentation system that pumps water from the Mississippi River through Sucker and East Vadnais Lake to a water filtration plant that distributes potable water to several municipalities. Both segments are owned by SPRWS and are developed and operated by Ramsey County under a joint powers agreement. As a result, all future developments to the park by Ramsey County require coordination, especially those that could affect the integrity of the water supply.



Willow Lake Protection Open Space Site

The Ramsey County System Plan classifies protection open space as “outstanding landscape amenities, critical natural systems and vulnerable natural resources that contribute to public health, outdoor recreation, aesthetic enjoyment and ecosystem stability.” Ramsey County has nine protection open space sites under their jurisdiction totaling 636 acres.

The Willow Lake Protection Open Space Site encompasses 77 acres, including most of the 40-acre lake and surrounding wetland. The remaining natural area is owned by H.B Fuller Company, which includes 54 acres of land designated as a nature preserve. Both properties have been combined to form the Willow Lake Nature Preserve in order to focus on natural resource management and preservation. The area contains high-quality natural environments, including the lake, wetland, oak woods, prairie and a sedge meadow. H.B. Fuller constructed a fishing pier and boathouse on the north side of the lake and hiking trails and a boardwalk have been developed. Access is currently limited to their guests and employees, with limited and controlled public access provided through the high-quality environmental education opportunities for specific public audiences.

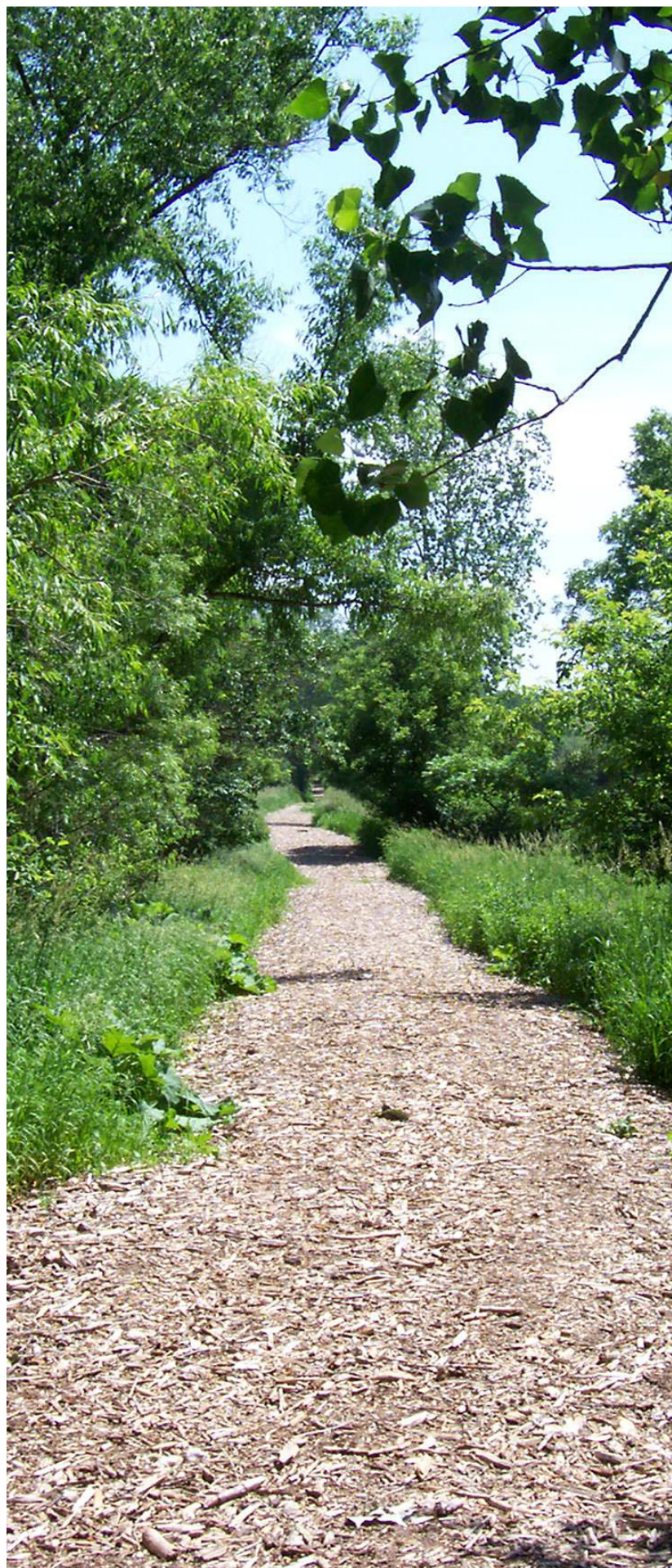
Trail Facilities

Vadnais Heights has made significant strides in developing and improving trail facilities over the past thirty years. Great interest in trails was shown in the City’s 1988 community survey, which led to the appointment of a trails task force in the early 1990’s. The task force recommended the first comprehensive trails plan for the community, which was incorporated into the 1990 Comprehensive Plan and includes trails in the City’s major parks and along collector or arterial roads.

According to the Community Survey conducted in 2016, if trails and sidewalks in their neighborhood were connected, 71% of respondents reported that they are at least “somewhat more likely” to walk or bicycle to their destination. A majority of survey respondents also would support the use of tax dollars towards the expansion and connection of trails and sidewalks in the community.

Existing Trail Facilities

The City of Vadnais Heights maintains an approximately 13-mile network of trail facilities throughout the community that connect destinations and promote recreational opportunities.



Off-street Trails

Off-street trails are a desired amenity for any community that typically provide for two-way bicycle use that is protected from automobile traffic and may be used by pedestrians, skaters, people using wheelchairs, and other non-motorized users. These facilities usually connect destinations including parks, natural resource areas, and regional trails with limited conflicts with motorized vehicles that increases the users' feeling of safety. Where possible, an off-street trail should be 8 to 12-feet-wide with an additional two-foot buffer on each side and include signage and markings separating bicycle and pedestrian areas. Post-development off-street trail construction is often costly and controversial, therefore the City should consider leveraging available grant funds and advocate for new trail connections as part of future local and county street improvement projects.

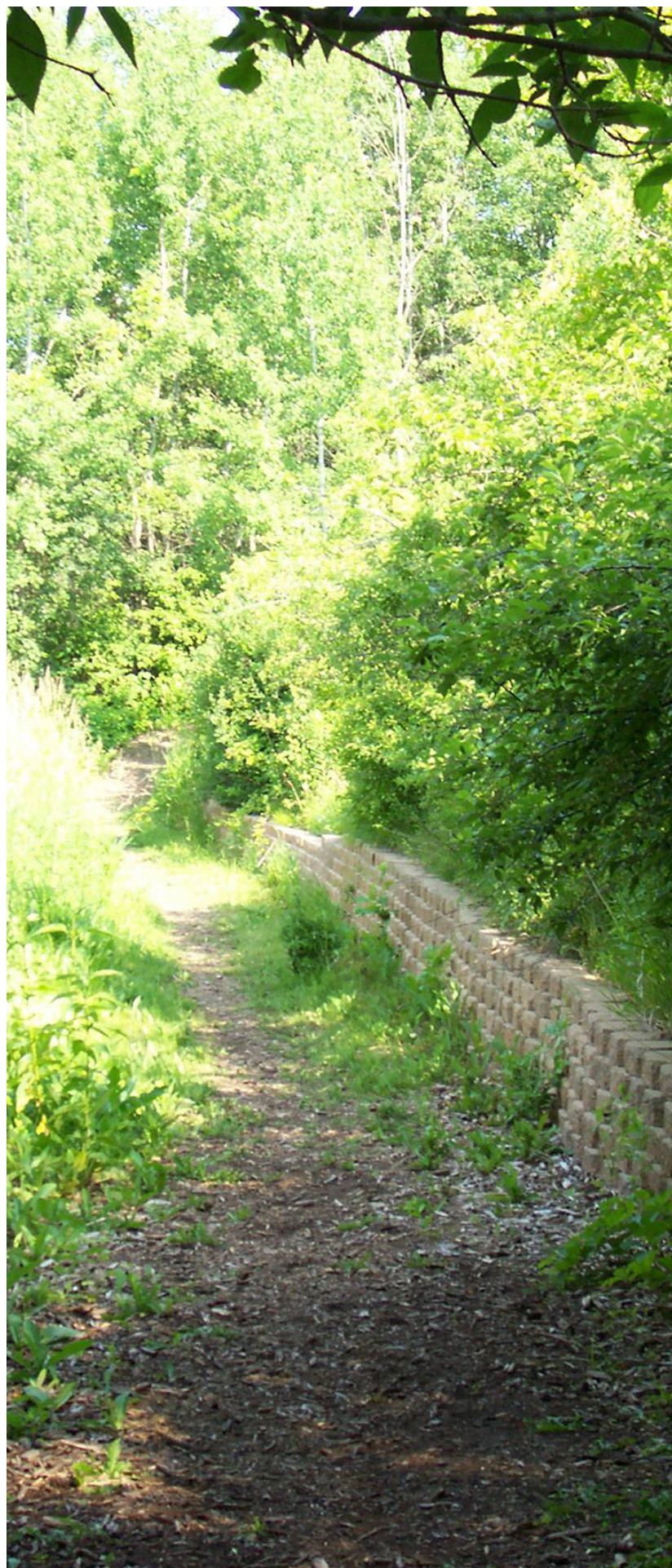
Off-street trail facilities are provided in the following areas outside of park areas:

- West side of Centerville Road from County Road E/ Koehler Road to County Highway 96
- North side of County Road F from Rice Street to McMenemy Street/Kohler Meadows Park
- West side of McMenemy Street from County Road F to County Highway 96
- East side of Rice Street from Suzanne Avenue to County Road F
- South side of County Highway 96 from McMenemy Street to Centerville Road (Highway 96 Regional Trail)
- West side of Arcade Street/South side of Belland Avenue to Edgerton Street
- South side of Monn Avenue from Greenbrier Street to Edgerton Street
- South side of Vadnais Boulevard along the Mitchell Preserve Subdivision

Many existing park facilities include internal off-street trails, which are typically asphalt but are constructed with wood chips in natural areas. Their main purpose is to provide movement within each park and link to the existing trail network.

Paved Shoulders

When designed and located appropriately, paved shoulders can provide a minimum level of access to bicyclists and pedestrians in low demand areas where there is not enough right-of-way for an off-street trail facility. An area of at least 4 to 6-feet-wide is needed for bicycle accessibility and raised striping, rumble strips, and buffer areas are recommended design features to



increase safety. Even with adequate safety measures in place, these facilities may still not support a safe and comfortable walking environment for certain users.

The streets under Ramsey County jurisdiction already have paved shoulders within Vadnais Heights that extend into the surrounding communities. The City should consider advocating for conversion of the existing facilities to off-street trails as part of future street improvement projects, to the extent practical, and advocate for additional safety measures to be added, such as in-street pedestrian signs and removable trail delineators.

Sidewalks

Sidewalks in residential neighborhoods are not common in Vadnais Heights. Due to low traffic volumes, this may be adequate on calm residential streets, but is a major impediment to walking on busier streets with heavier traffic. Generally, standard sidewalks are designed for pedestrians only and must meet width and ramping standards for accessibility. If there is a demand for bicycling on a sidewalk, then the proper facility is likely an off-street trail or dedicated bike lane. A planted buffer between the street and sidewalk is preferred to accommodate utilities, landscaping, and snow storage. If traffic volumes are low enough, a sidewalk on one side of the street may be adequate. Installing sidewalks post-development can be complicated and controversial, but the city will continue to evaluate the need for sidewalks as part of future residential and commercial developments.

High traffic areas within the City that have sidewalks separated from the street by curb and gutter include the City Center District and along the south side of County Road E.



Parks and Trails

2040 Comprehensive Plan

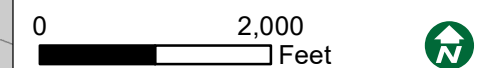
City of Vadnais Heights, Minnesota

Legend

- Existing Regional Trail
- Planned Regional Trail
- Regional Trail Search Corridor
- Concrete Sidewalk
- Sidewalk or Off-Road Path
- Paved Shoulder
- Planned Sidewalk/Off-Road Path
- Railroad
- Streams
- Vadnais Heights City Limits
- City/Township Boundaries
- National Wetland Inventory

Parks and Trails

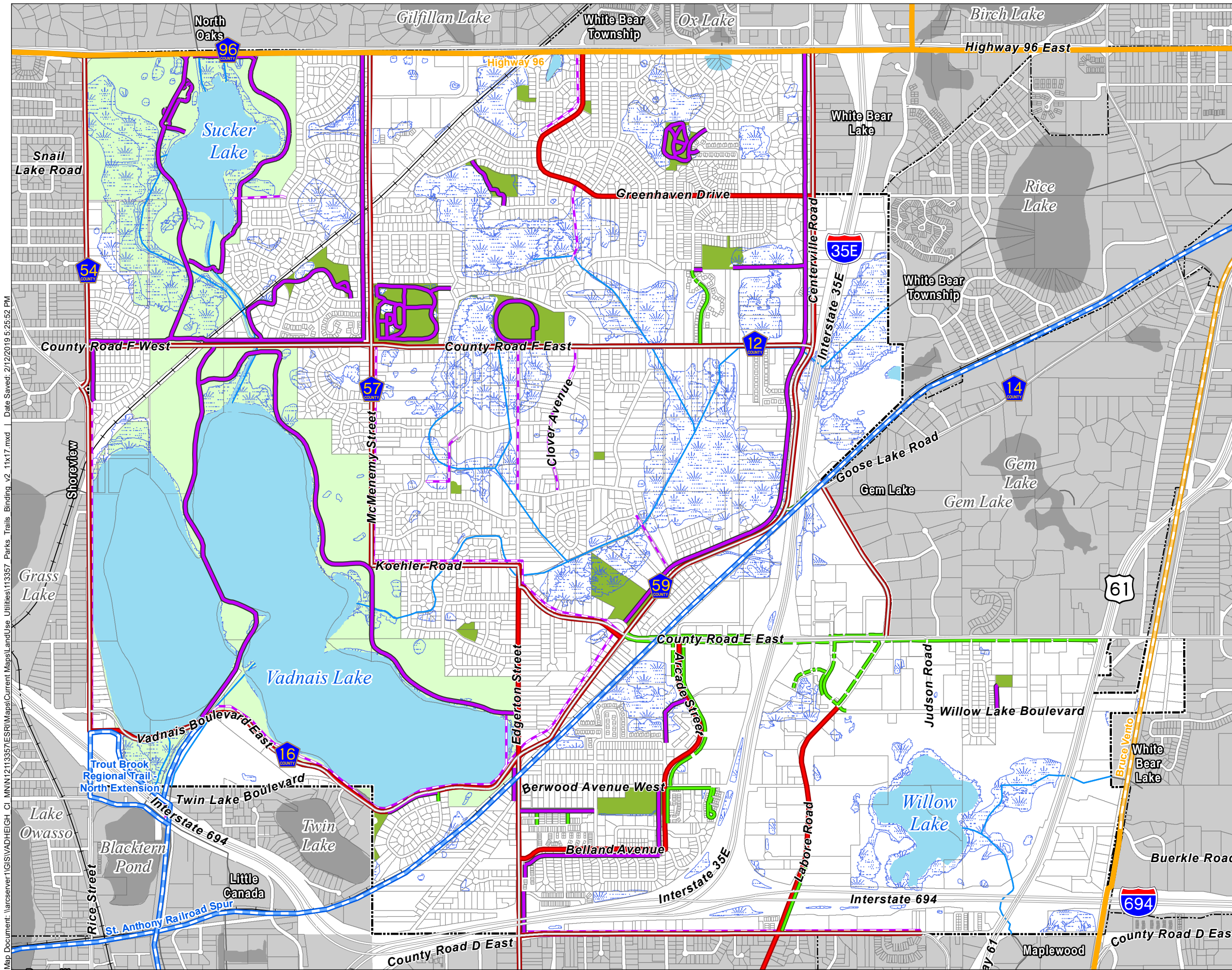
- Existing City Park
- Existing Regional Park



Source: MnGeo, City of Vadnais Heights, Ramsey County



February 2019



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Planned/Potential Trail Facilities

Based on community feedback and Commission and City Council discussions, the planned/potential improvements for trail facilities are detailed below and are not listed in any order of priority:

Table 26 - Trail Facilities

Planned/Proposed Trail Connection	Segment	Existing Facility	Proposed Facility	Facility Jurisdiction
Vadnais Boulevard	Rice Street to Edgerton Street	Paved Shoulder	Off-street Trail	County
Edgerton Street	Centerville Road to SPRWS Trailhead	Paved Shoulder	Off-street Trail	City
Koehler Road	Centerville Road to Edgerton Street	Paved Shoulder	Off-street Trail	County
Koehler Road	Edgerton Street to McMenemy Street	Paved Shoulder	Off-street Trail	County
McMenemy Street	Koehler Road to County Road F	Paved Shoulder	Off-street Trail	County
Clover Avenue	Stockdale Road to County Road F	None	Sidewalk	City
Edgerton Avenue ROW	Stockdale Road to County Road F	Undeveloped	Off-street Trail	City
City ROW	Centerville Road to Pennington Place	Undeveloped	Off-street Trail	City
City ROW	Kaitlin Drive to Marigold Avenue	Undeveloped	Off-street Trail	City
Greenhaven Drive	Willow Grove Lane to Highway 96	Paved Shoulder	Sidewalk	City
Rice Street	Interstate 694 to Suzanne Avenue	Paved Shoulder	Off-street Trail	County
County Road D	Edgerton Street to County Road D Circle	Paved Shoulder	Off-street Trail	County
Centerville Road	County Road E to Edgerton Street	Paved Shoulder	Off-street Trail	County
Trout Brook Regional Trail	Little Canada to SPRWS Property	None	Bridge over I-694	County/State
Sucker Lake Trail Connection	Meadowood Lane to Sucker Lake Trail	Gated, Undeveloped	Off-street Trail (unpaved)	County
Tessier Trail	Tessier Trail to Bear Park	None	Off-street Trail	City
Bear Avenue North	Bear Avenue North to Bear Park	None	Off-street Trail	City

Study and implementation of some planned/potential trail improvements will require collaboration with, and support from, Ramsey County and Active Living Ramsey Communities. Ramsey County has their own capital improvements program for future street and trail improvements, as well as the Connected Ramsey Communities Network in the Ramsey County-wide Pedestrian and Bicycle Plan.

Regional Trail Corridors

According to the Metropolitan Council, regional trails are classified as either a “destination or greenway trail” or as “linking trails.” Destination or greenway trails typically follow along routes with high-quality natural resources that make the trail itself a destination. Linking trails are predominantly intended to provide connections between various Regional Parks System facilities, most notably regional parks or park preserves.

Highway 96 Regional Trail

County Highway 96 runs approximately eight miles east/west and connects Interstate 35W to U.S. Highway 61, through the communities of New Brighton, Arden Hills, Shoreview, Vadnais Heights, White Bear Township, and White Bear Lake. In addition, the corridor connects to Long Lake

Regional Park, Rice Creek North Regional Trail, Lexington Parkway Regional Trail Search Corridor, Vadnais-Snail Lakes Regional Park, Birch Lake Regional Trail and Bruce Vento Regional Trail.

The corridor runs along the northern boundary of Vadnais Heights. Currently, the corridor has an off-street, bituminous trail on the south side of the roadway through the entire portion of Vadnais Heights.

Trout Brook Extension Regional Trail Search Corridor

The Trout Brook Regional Trail is currently a 1.6-mile trail extending from Lake McCarron's County Park in Roseville south to the Gateway section of the Willard Munger State Trail in Saint Paul. The regional trail search corridor extends the Trout Brook Regional Trail north through Roseville, Little Canada, Shoreview, and Vadnais Heights to connect to the Vadnais-Snail Lakes Regional Park.

Ramsey County is preparing a master plan amendment for the regional trail to accommodate the planned trail extension. The alignment options to cross Interstate 694 include a pedestrian bridge over the highway with a trail connection through SPRWS land near the manufactured housing park or using the new Rice Street Bridge.

Saint Anthony Railroad Spur Regional Trail Search Corridor

The regional trail search corridor travels through the existing Minnesota Northern Railroad corridor in Roseville, Little Canada, Vadnais Heights, Gem Lake, and White Bear Township to connect the Northeast Diagonal Regional Trail in Saint Anthony to the Bruce Vento Regional Trail in White Bear Township. The railroad corridor is currently active, so trail planning would not take place until there is a change in the status of rail operations. Any future planning process to analyze potential trail alignments would be undertaken by Ramsey County.

Community Recreational Facilities

Vadnais Heights Elementary School

The City has an agreement with ISD #624 that allows limited public use of the school's gymnasium in exchange for maintenance of the ball fields/open space. The City has been in discussions with the School District on improvements to the surface parking lot next to the gymnasium, which may include a portion of city-owned property.

AFSA High School

The City has an agreement with the school that allows limited public use of the gymnasium in exchange for use of certain sports fields in City parks. The city owns an



approximately 5-acre piece of property to directly to the east of the school property along Vadnais Boulevard that, if available in the future, could allow for the school to expand its current facilities.

Vadnais Sports Center

The Vadnais Sports Center was built in 2010 and is now owned and operated by Ramsey County. The facility contains two NHL-sized ice rinks (85'x200) with seating for 1,900 spectators. A 100,000-square-foot sports dome that was open year-round had existed on the site since its development. However, the dome collapsed for a second time in 2018 due to winter weather conditions and Ramsey County is currently evaluating several options for the future use of this portion of the property. An enclosed walkway provides a connection to adjacent restaurant and retail uses. The facility also hosts a variety of open programs, such as walking, open hockey, open skating, free weights, softball and batting practice. Several organizations also run sports teams and leagues out of the facility.

Goals and Policies

GOAL: Continue to plan for and operate park facilities and recreational programming that meets the needs of current and future residents.

POLICIES:

- Maintain and improve the City's existing park facilities in accordance with the Capital Improvements Program.
- Program recreational programs that meet the needs of the demographics of the community and take advantage of the existing and shared resources within the City.
- Consider public land dedication, where practical, as part of any future residential subdivisions.
- Study the city-owned Twin Lake Access property for future park and/or trail improvements, in cooperation with the neighboring residents, the City of Little Canada, and Ramsey County.
- Advocate for a reasonable development scenario to rebuild the former sports dome or comparable facility on the Vadnais Sports Center property, in cooperation with Ramsey County, to serve the diverse recreational needs of various community organizations and partners.

GOAL: Continue to improve facilities for walking and bicycling.

POLICIES:

- Continue to build a system of concrete sidewalks, asphalt off-road paths and paved shoulders along the major streets of the community.
- Continue to maintain and enhance the pedestrian paths in City parks.
- Promote regional trail corridor connections through the community.
- Consider installing wayfinding signage on local and regional trails.
- Consider requiring sidewalk connections as part of future large residential subdivisions.
- Work with Ramsey County to implement trail improvements on existing County Roads, which may or may not be associated with a roadway improvement project.
- Participate as a member of the Active Living Ramsey Communities partnership.
- Collaborate with Ramsey County and other municipalities to implement the Ramsey County-wide Pedestrian and Bicycle Plan and complete the Connected Ramsey Communities Network.



05

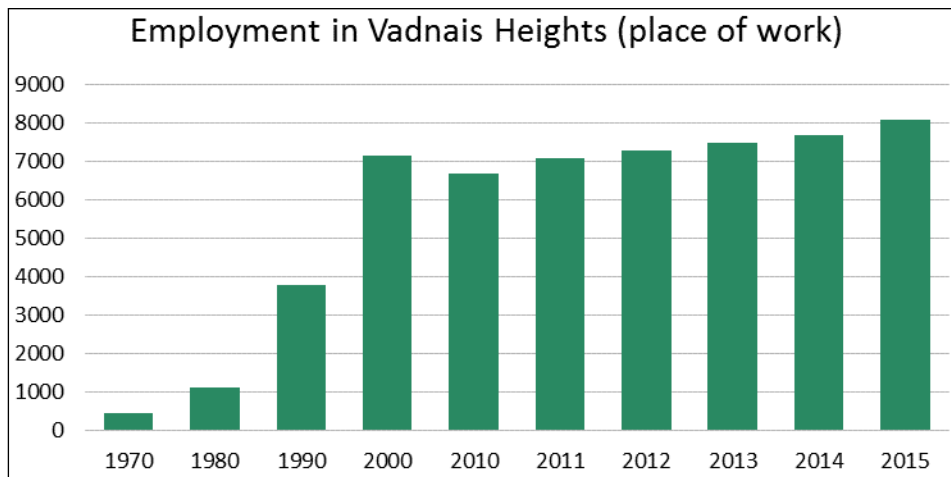
ECONOMIC COMPETITIVENESS

Background

Vadnais Heights is located in the northeast section of Ramsey County, approximately eight miles from downtown Saint Paul and sixteen miles from downtown Minneapolis. Being located so close to the core metropolitan areas provides a home for those that work in the center cities and a place of employment for those in the City and surrounding areas.

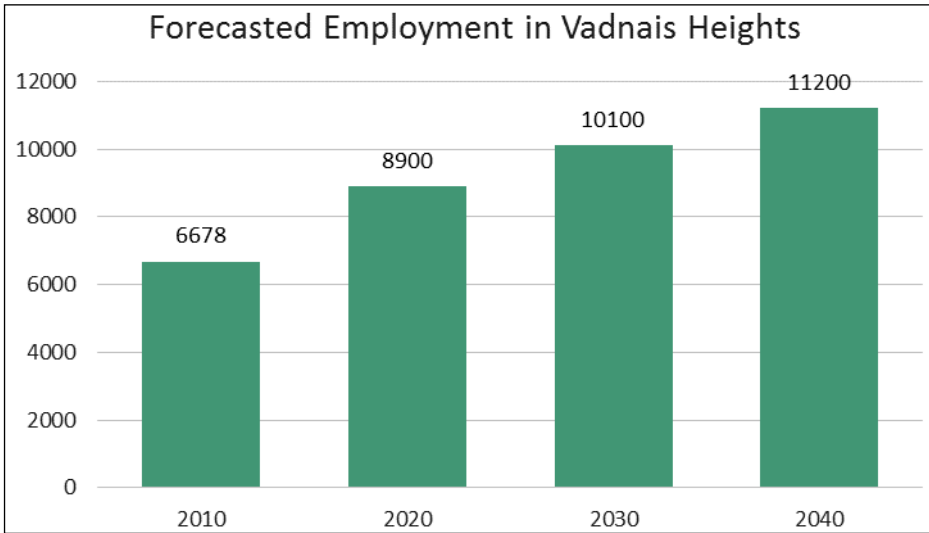
Vadnais Heights has a strong and diversified economic base with excellent access to major roadways, including Interstate Highways 35E and 694, as well as County Highway 96 and U.S. Highway 61. Employment and business development has grown recently in Vadnais Heights to support over 8,000 jobs. The City on occasion will provide financial assistance to encourage development that meets mutually-beneficial goals that stimulate job creation and/or redevelopment.

The City of Vadnais Heights is home to the Vadnais Heights Economic Development Corporation (VHEDC). VHEDC is a private, not for profit organization that seeks to create further economic development in Vadnais Heights. VHEDC is made up of local business leaders who strive to create new job opportunities, retain existing jobs, and expand the tax base of the area.



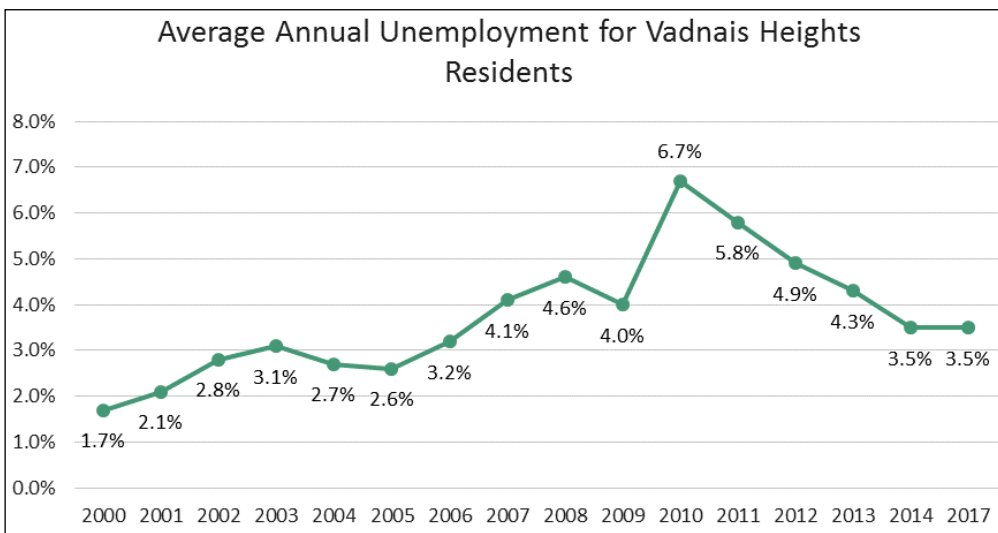
Source: Quarterly Census of Employment and Wages, Minnesota Department of Employment and Economic Development, 2nd quarter data; Metropolitan Council

The City of Vadnais Heights has seen steady growth in employment for the last five years and seeks to continue this trend in the future. The total workforce of age 16 and older in Vadnais Heights is 7,283 people, and the area supports 8,096 jobs.



Source: Quarterly Census of Employment and Wages, Minnesota Department of Employment and Economic Development, 2nd quarter data; Metropolitan Council Forecasts

The amount of jobs in Vadnais Heights is projected to grow by 67% in the next 20 years. Therefore, the City must plan accordingly to maintain a healthy economy that enables this growth.



Source: Local Area Unemployment Statistics, Minnesota Department of Employment and Economic Development. Current year data average monthly data year-to-date.

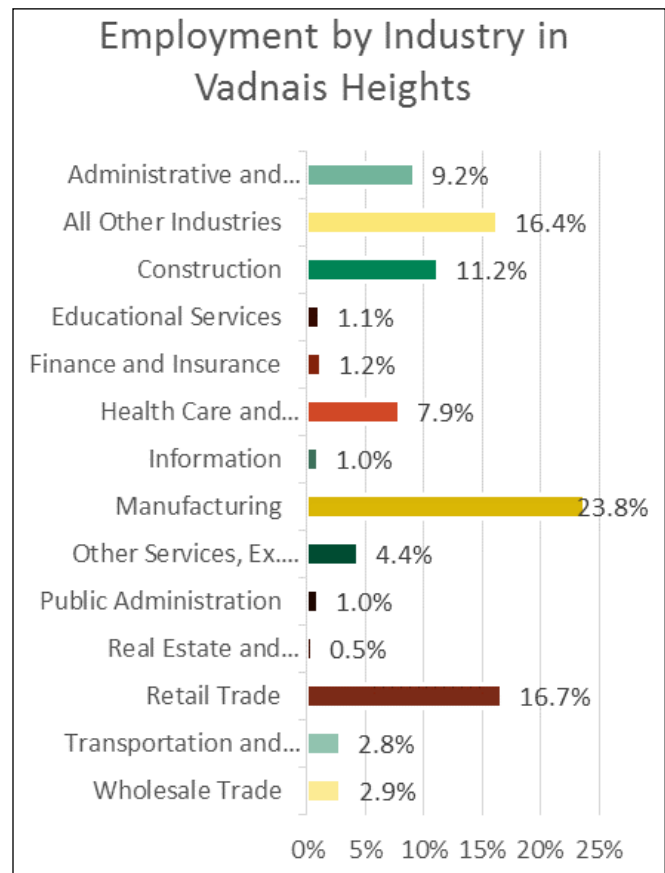
Vadnais Heights saw a rise of unemployment during the Great Recession, but has been able to recover presently with an unemployment rate of 3.5%

Table 27 - Employment by Industry

Industry	Employees
Administrative and Waste Services	755
All Other Industries	1335
Construction	915
Educational Services	89
Finance and Insurance	95
Health Care and Social Assistance	647
Information	80
Manufacturing	1940
Other Services, Ex. Public Admin	359
Public Administration	78
Real Estate and Rental and Leasing	39
Retail Trade	1364
Transportation and Warehousing	229
Wholesale Trade	238

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.

The largest industry in Vadnais Heights is manufacturing, making up 24% of employment. Following this is retail trade at 16.5%, construction at 10.4%, administrative and waste services at 9.5%, and all other industries at 8.8%. The large amount of manufacturing in Vadnais Heights is due to several businesses located in the southeast section of the City.



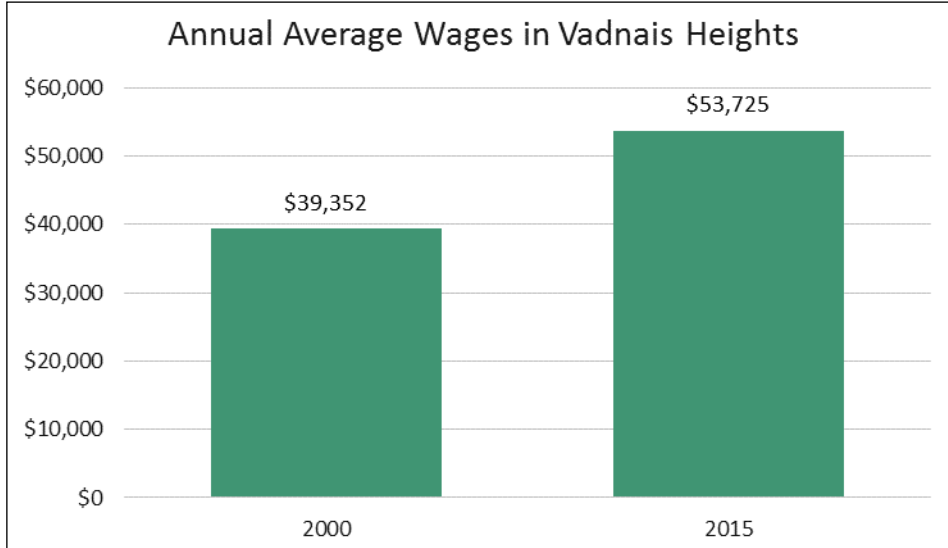
Source: Quarterly Census of Employment and Wages, Minnesota Department of Employment and Economic Development, 2nd quarter data; Metropolitan Council staff have estimated some data points.

Table 28 - Employment by Industry

Industry	Employees in 2010	Employees in 2016	Actual Change	Percent Change
Administrative and Waste Services	827	755	-72	-9.5%
All Other Industries	2011	1335	-676	-50.6%
Construction	0	915	915	100.0%
Educational Services	0	89	89	100.0%
Finance and Insurance	142	95	-47	-49.5%
Health Care and Social Assistance	0	647	647	100.0%
Information	0	80	80	100.0%
Manufacturing	1657	1940	283	14.6%
Other Services, Ex. Public Admin	201	359	158	44.0%
Public Administration	68	78	10	12.8%
Real Estate and Rental and Leasing	0	39	39	100.0%
Retail Trade	1316	1364	48	3.5%
Transportation and Warehousing	163	229	66	28.8%
Wholesale Trade	293	238	-55	-23.1%

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.

From 2010 to 2015, Vadnais Heights saw the most growth in jobs within construction, followed by health care and social assistance, manufacturing, and then other services. Change in industries may be somewhat skewed by differences in how the Census Bureau defines employment industries between censuses. In total, all industries increased by approximately 2,335 jobs. There was however, jobs lost in the all other industries category, administrative and waster services, whole sale trade, and finance and insurance.



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

Wages in Vadnais Heights rose by approximately 36.5% over the last 15 years. However, that increase was less than both Ramsey County and the Twin Cities region as a whole, which saw increases of 47.7% and 46.2% respectively.

Table 29 - Top ten workplaces of people who live in Vadnais Heights

Workplaces	Workers
St. Paul	1,130
Minneapolis	866
Maplewood	376
Roseville	326
Vadnais Heights	315
White Bear Lake	288
Shoreview	178
Arden Hills	142
Fridley	139
Bloomington	136
Other	1,989

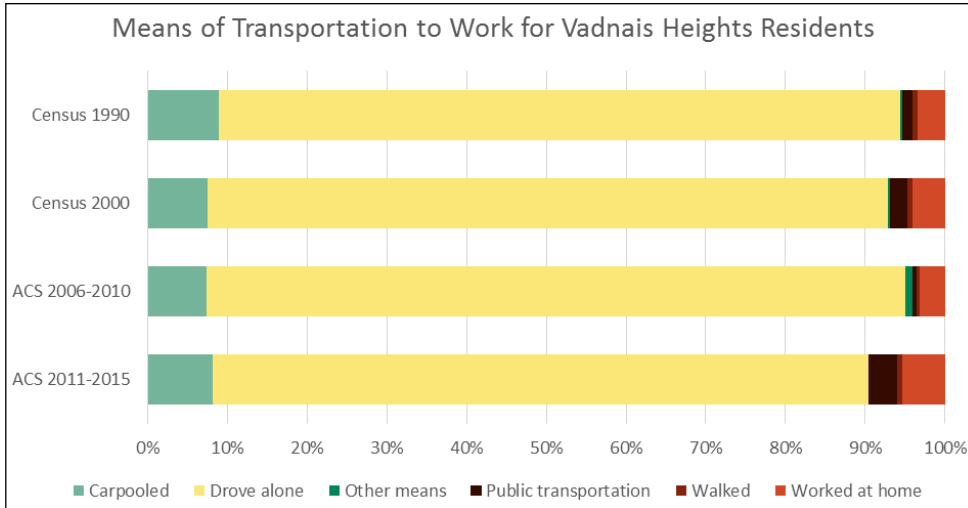
Source: U.S. Census Bureau Local Employment-Household Dynamics.

Table 30 - Top ten residences of people who work in Vadnais Heights

Residence	Workers
St. Paul	852
White Bear Lake	430
Minneapolis	417
Vadnais Heights	315
Maplewood	283
Woodbury	245
Hugo	239
Blaine	222
Lino Lakes	219
White Bear Township	217
Other	3,772

Source: U.S. Census Bureau Local Employment-Household Dynamics.

There is a total of 7,211 individuals that commute to the City of Vadnais Heights from other municipalities for employment. Concurrent with this, there are nearly 5,885 people that live in Vadnais Heights, but leave the City for their employment. Most residents of Vadnais Heights are working in St. Paul or Minneapolis, with others spread across Ramsey, Anoka, and Hennepin County. Census data states that a mere 315 people that live in Vadnais Heights, work within the City.

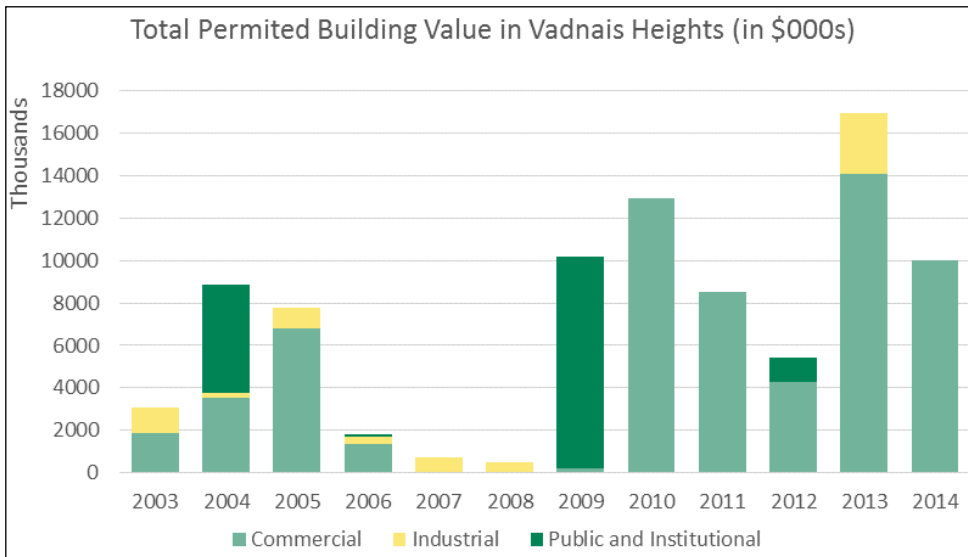


Source: U.S. Census Bureau Decennial Census and American Community Survey.

According to the 2015 American Community Survey (ACS), 82% of workers are traveling to work by vehicle, down from ACS 2010. The largest increase in means of transportation to work for Vadnais Heights residents from 2010 to 2015 was an increase by four percentage points for those that used public transportation. Those that carpool, walk to work, and work at home also saw increases from the ACS 2010. Residents of Vadnais Heights have an average travel time to work of 24.9 minutes, up 1.4 minutes from the American Community Survey in 2010. As of February in 2017, ESRI Business Analyst estimated an employee to residential population ratio of 0.71:1. The City wants to create a community that allows residents the opportunity to work where they live and will encourage housing and industry that will support this goal. This will require creating a variety of high-quality and diverse housing opportunities for households with various incomes.

Land use within the Vadnais Heights is varied and diversified. Being located along Interstates 694 and 35-E, U.S. Highway 61 and major local roads such as County Road E, the City has access to major roadways that are able to support industrial and commercial areas.

The major areas of business in the area are the Highway 61 Corridor, the Southeast Industrial District, the Highway 96 Corridor, the County Road E Corridor, and the Vadnais City Center. There are multiple sites of vacant land and potential areas for redevelopment that the City is eager to pursue.



Source: Metropolitan Council Commercial, Industrial, and Public and Institutional Building Permits Survey

Construction in the City has been primarily commercial for the past 11 years with approximately \$63.5 million in total permit value. Approximately \$16.4 million has been invested in public and institutional uses in the same period, and around \$6.8 million was invested in industrial development.

During this 20-year planning period, the City of Vadnais Heights will be looking to develop 138.6 acres for the industrial uses, 5.6 acres for commercial uses, and 25.6 acres for mixed-use purposes within the City Center District.

In order to support emerging business opportunities, the City will look to develop more housing that suits the demand of the residents of Vadnais Heights. In order to fill this need the City will look to develop high quality housing options in undeveloped areas guided for residential housing and strategic housing redevelopment opportunities to meet the future needs of the community.

Through various resources, the City of Vadnais Heights has obtained information on residents and believe that this information is important to future planning in the City.

ESRI Business Analysts has developed what it calls Tapestry Segmentation. This system identifies socio-economic groups within a ZIP codes and the characteristics that are and preferences of the people included in these groups. The top three groups within Vadnais Heights are Savvy Suburbanites, Comfortable Empty Nesters, and In Style.

- ‘Savvy Suburbanites’ are generally well educated, successful, and in their 40s or 50. They are actively engaged in their homes and property, but enjoy the amenities that the City has to offer.
- ‘Comfortable Empty Nesters’ are generally older than Savvy Suburbanites and are likely to live in the suburb that they grew up in. They are usually financially sound, though not as well off as Savvy Suburbanite, and somewhere between the end of child rearing and retirement age.
- The ‘In Style’ group are generally younger than the previous two groups, planning for retirement instead of approaching it, and favor the amenities of the City over suburban life. Usually well connected, professional couples, which are likely to not have children.

All three of these groups have median ages between 41.1 and 46.8 and have a diversity index from 30.6 to 36.9. General preferences for all groups in housing is single family with values starting at \$187,000 to \$311,000. All of these groups have a majority of occupations that tend to be in management, office and administrative support, and sales. Finally, the population growth of these groups is relatively low ranging from 0.4% to 0.6% with the maximum on the scale being 3%. These groups should be relatively stable for the length of this plan, but further out these groups are likely to shrink in their size and dominance of the region.

Worth noting from this information too, is that the studies are done in Zip Codes. As such, the southeastern business area east of I-35-E has other dominant groups. These groups are the Parks and Rec, the Midlife Constants, and again Comfortable Empty Nesters. Generally, these groups are slightly younger, and have lower median incomes. These groups are generally more interested in suburban or rural life, than the amenities of the City.

Goals and Policies

GOAL: Maintain City Center as the center of social, commercial and community life.

POLICIES:

- Continue to work with VHEDC and the City Center Task Force to identify partnerships to enhance the aesthetic appearance of the area.
- Attract commercial development that will serve the needs of the community and complement the existing mix of businesses (e.g. restaurants, retail, entertainment, etc.)
- Increase walkability in the area with additional wayfinding signs and pedestrian and cyclist-friendly improvements.
- Analyze and evaluate the existing and future parking situation and create a plan for improving parking management by balancing parking space supply with demand.
- Work with property owners to envision creative land uses for excess off-street parking areas in the future, due to changing retail environments or transportation methods.
- Consider completing a small area plan and/or market analysis to determine appropriate uses in the City Center Northeast Quadrant.

GOAL: Maintain and enhance commercial/industrial property values.

POLICIES:

- Maintain and improve the appearance of the community by promoting cleanup efforts and redevelopment as well as appropriate types of land uses, landscaping and screening, and preserving existing natural resources and local character.
- Address blighted areas and implement measures to prevent further properties from becoming blighted.
- Provide information to businesses on common property maintenance issues and the applicable standards in an effort to avoid Code violations.

GOAL: Attract and maintain businesses and developments that will offer a variety of jobs, especially higher paying jobs.

POLICIES:

- Consider revising the Business Subsidy Policy to establish thresholds and priorities for assisting existing businesses expand or attracting new businesses.
- Look for people or organizations with connections to the community to bring in new business opportunities
- Identify additional industrial lands near key transportation corridors for both immediate and long-term growth and development.
- Develop a land use pattern that provides room for industry and business, and takes into consideration their utility needs.
- Continue support for programs and initiatives that foster entrepreneurship (e.g. promote City business incubators and encourage entrepreneurship among all segments of the population, including minorities, women, youth)
- Work closely with the VHEDC and other partner entities to support local businesses with a proactive business retention and development strategy.
- Partner with the local organizations to promote food security and public health by encouraging and supporting locally-based food production and distribution, the farmers market and community gardens.
- Analyze opportunities to upgrade the fiber-optic network city-wide.

GOAL: Promote the City’s economic development strengths and opportunities, in cooperation with VHEDC and other partners.

POLICIES:

- Work with VHEDC to identify key employment industry sectors already within the community to promote, such as manufacturing, hospitality, and health care.
- Identify other sectors that complement existing employment industry sectors and promote opportunities for synergy.
- Utilize the City’s website to provide information on projects, funding/grant sources, and partnership opportunities to continue to support economic development in the community.
- Study establishing a hotel occupancy tax to fund future marketing efforts.

Toolkit

Tax Increment Financing (TIF)

Redeveloping blighted and underutilized areas is vital to maintaining long-term economic competitiveness for the City of Vadnais Heights. Vadnais Heights has utilized TIF for housing and redevelopment projects in the past to accomplish many goals of the City. In addition, its prudent use has strengthened the diversity of housing options, land uses and tax base, increased employment opportunities, and been used to clean up contaminated sites. These efforts can be quantitatively represented by the market value increases that have been seen in the different TIF districts.

Revenue from TIF districts is a financial asset of the City of Vadnais Heights. Revenue gained through TIF must be used primarily to address blight, contamination, housing or redevelopment needs for parcels within the TIF district within a specific period. The revenue is first used to pay debt service on outstanding bonds, interfund loans and developer pay-as-you-go notes (PAYGO). Some remaining funds can be used to participate in other eligible development projects and City initiatives.

The use of TIF funding has been an asset to both the City and those districts that have seen its use. The City will continue to encourage the use of TIF to increase the prosperity of the districts, to provide funding for redevelopment to address blight, and to encourage development for beneficial uses within the City.

Tax Abatement

The City of Vadnais Heights plans to implement/continue the use of tax abatement programs to incentivize development. Through tax abatement developments are able to keep a portion of real estate taxes abated for a certain period on new developments. Tax abatement allows for the City to further incentivize developers when TIF is not an option.

The City of Vadnais Heights has a policy to report consistent and comprehensive financial statements when entering into agreements for tax abatement. This policy is to help users better understand how the tax abatements affect a government's future ability to raise resources and meet its financial obligations and the impact tax abatements have on the City's financial position and economic condition.

The City sees tax abatements as an opportunity to incentivize development in critical areas where otherwise it may not be viable or may not occur. The City will continue to use tax abatement as appropriate to provide a transparent process and to better inform the public about the economic condition of the City.

Project Partners

Vadnais Heights Economic Development Corporation (VHEDC)

The VHEDC's role and responsibilities are previously noted in this chapter. The City will continue to collaborate with VHEDC to implement the goals and policies of this Plan and other initiatives that support a vibrant business community and strong economic development climate.

Funding Sources

Minnesota Department of Employment and Economic Development (DEED)

DEED is a state entity that monitors and collects information on employment and economic forces within the state. In addition, DEED offers a multitude of different programs to fund and incentivize business development and growth. Some programs are available to a majority of businesses, while other have more specific goals, such as furthering businesses that are start-ups or founded by certain groups such as minorities and women. The different options that DEED offers include the following:

Angel Loan Fund

The Angel Loan Fund (ALF) is a program supported by DEED with the express purpose of supporting entrepreneurial growth through attractive funding for early-stage business. The program grants up to 10% of the total amount of equity investment received in the business' approved funding round, subsequent to ALF approval.

Emerging Entrepreneurs Loan Program

The Emerging Entrepreneurs Loan Program (ELP) is designed to support the development and growth of businesses owned and operated by minorities, low-income persons, women, veterans and/or persons with disabilities.

The programs majorly runs through various non-profit partners that may have their own requirements and restrictions on who is qualified to receive a loan. Loan sizes will also vary.

Minnesota Job Creation Fund

The Minnesota Job Creation Fund is a program that provide incentives to new and existing businesses that meet certain standards for job creation and capital investment targets. The main industries that are targeted for this fund are those in the manufacturing, warehousing, distribution, and technology related fields. In order for a business to apply for this funding, they must be given a resolution in support by the City.

Minnesota Investment Fund

The Minnesota Investment Fund is a program designed to award local municipalities who provide loans to assist expanding businesses. The goal of this fund it to create new jobs and retain high-quality jobs on a statewide basis. Industrial, manufacturing, and technology-related industries are all considered a focus due to their positive impacts on the local and state tax base and their ability to improve economic vitality on a statewide level.

Minnesota Job Skills Partnership

The Minnesota Job Skills Partnership (MJSP) is a program that has been developed to work with businesses and educational institutions to train or re-train workers, expand work opportunities, and keep high-quality jobs within Minnesota. Educational institutions that partner with businesses can be granted up to \$400,000 to develop new-job training or re-training for existing employees.

Ramsey County

Ramsey County Business Loan Program

Ramsey County has a Business Loan Program that provides loans to for-profit start-ups or expanding businesses. These loans are restricted to businesses that fall within the commercial, industrial, or service industries. Conditions for qualification include creating at least five new positions, enter a hiring agreement to consider applicants from a job ready pool provided by the county, and obtain at least 60% of financing from other sources with 5% equity for expansions and 20% equity for start-ups. Benefits to qualified businesses include that gap financing can be used with private and public funds the rates and terms with the county will be more flexible than the market, and there are lower application fees.

Economic Gardening Program

The Economic Gardening Program created by Ramsey County focuses on cultivating home-grown businesses by providing high-end, high-speed business growth resources to non-competing second stage businesses who want to grow.



06

TRANSPORTATION



Overview

The purpose of this chapter is to provide guidance for the development and maintenance of a multimodal transportation system to serve the City’s existing and planned growth through 2040.

The City of Vadnais Heights is near full development and has nearly all of the miles of minor arterial and collector roads that it will need through 2040. The city encompasses just over eight square miles, and is located entirely within the Metropolitan Urban Services Area (MUSA). Located within Ramsey County, it is identified as a Suburban community by the Metropolitan Council.

The major roadways through the City are Interstate 694, Interstate 35E, and U.S. Highway 61. However, certain road improvements will be needed at the city and county levels during the next twenty years, along with improvements to transit service and the networks of sidewalks and off-street trails. Long-term, there may be a regional transit way and possibly one or two regional trail projects that would benefit Vadnais Heights.

Existing Roadway Conditions

Existing Traffic Volumes and Crash Data

The most basic characteristic of a given roadway is the volume of traffic that it carries. Existing traffic volumes on roadways within Vadnais Heights are presented in the Existing Traffic Volume and Crash Data map. This is the most current MnDOT data for traffic on these roads.

The most recent crash data for roadways also is summarized in the Existing Traffic Volume and Crash Data map. The highest volumes of crashes in the City are located in the following locations:

- U.S. Highway 61 and Buerkle Road
- Centerville Road and County Highway 96 East
- U.S. Highway 61 and County Road E East
- Rice Street and Vadnais Boulevard
- Rice Street and Gramsie Road

Jurisdictional and Functional Classification

Roadways are classified based on which level of government owns and has jurisdiction over them. In the case of Vadnais Heights, roadways are under the jurisdiction of MnDOT, Ramsey County, or the City of Vadnais Heights. The Existing Roadway Jurisdiction map depicts the existing roadway jurisdictional classification system in Vadnais Heights. Major roads are also summarized in Table 31.



Regional Location Map




2040 Comprehensive Plan

City of Vadnais Heights, Minnesota

Legend

-  Vadnais Heights City Limits
-  City/Township Boundaries
-  Metro Counties

Highways

-  Interstate
-  US Highway
-  MN Highway

0 1.5 Miles

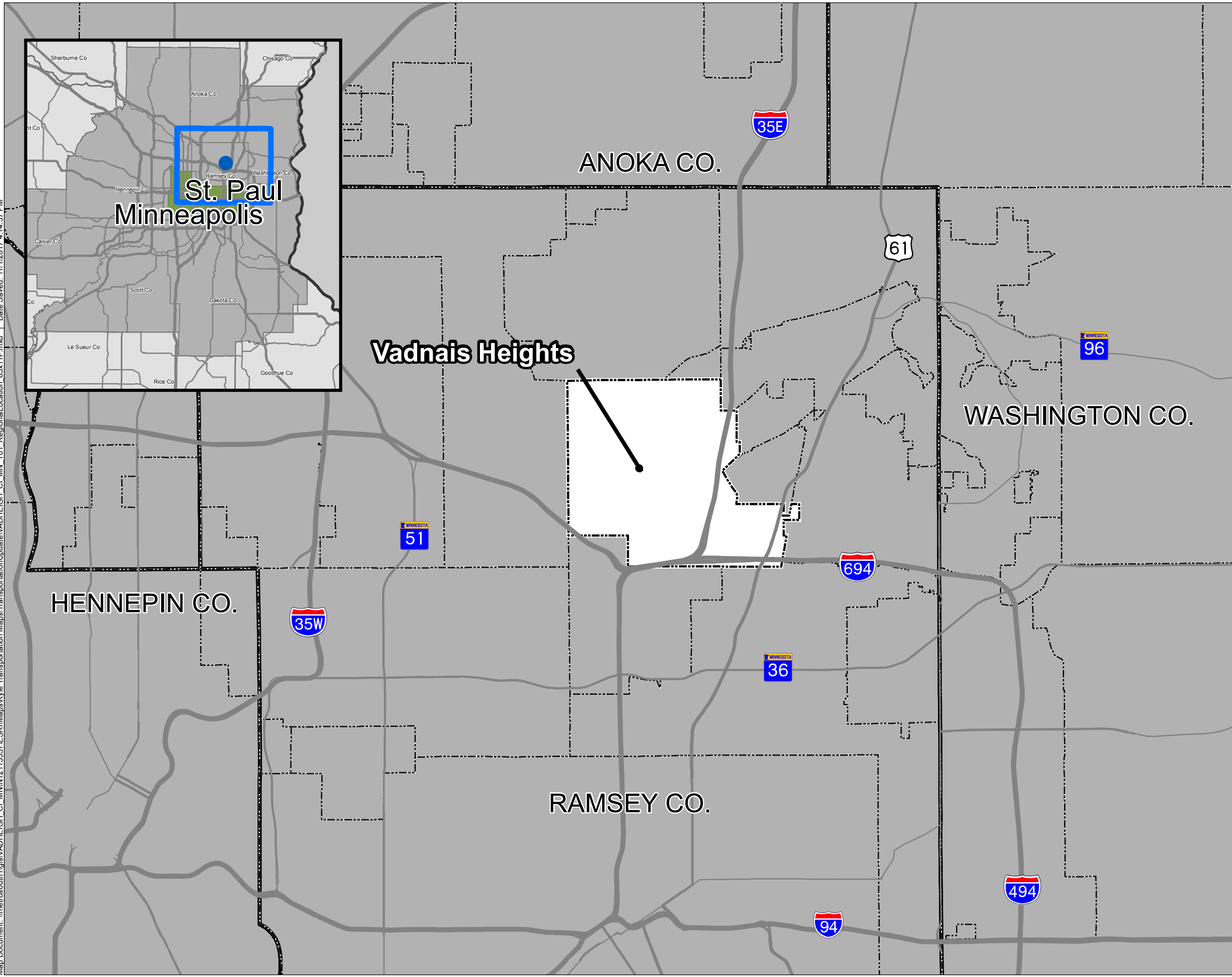


Source: MnGeo, City of Vadnais Heights, Ramsey County



December 2018

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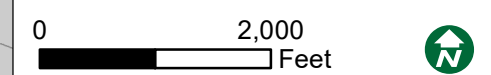


Existing Traffic Volume & Crash Data

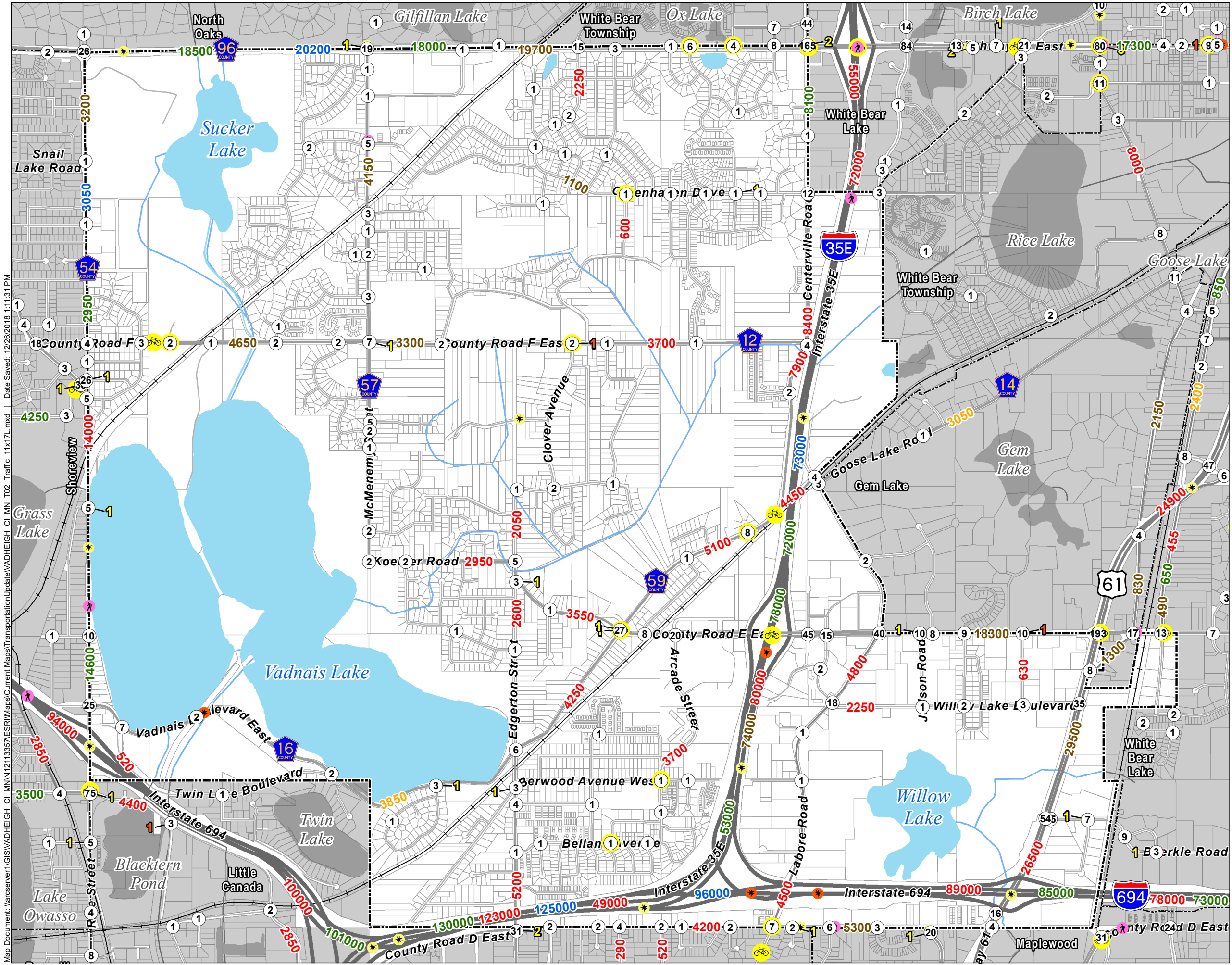
2040 Comprehensive Plan
City of Vadna Heights, Minnesota

Legend

- Average Annual Daily Traffic (AADT)**
- #### 2016
 - #### 2015
 - #### 2014
 - #### 2013
 - #### 2012
- Non-Motorized Crashes (2006 - 2015)**
- Pedestrian
 - Bicycle
- Intersection Summary (2006-2015)**
- # Total Crashes
- Severity Summary (Quantity)**
- # Incapacitating Injuries
 - # Fatalities
- Non-Intersection Crashes (2006-2015)**
- * Incapacitating Injury
 - * Fatal Injury
- Map Features:**
- Vadna Heights City Limits
 - City/Township Boundaries
 - Lakes
 - Streams



Source: MnGeo, City of Vadna Heights, Ramsey County



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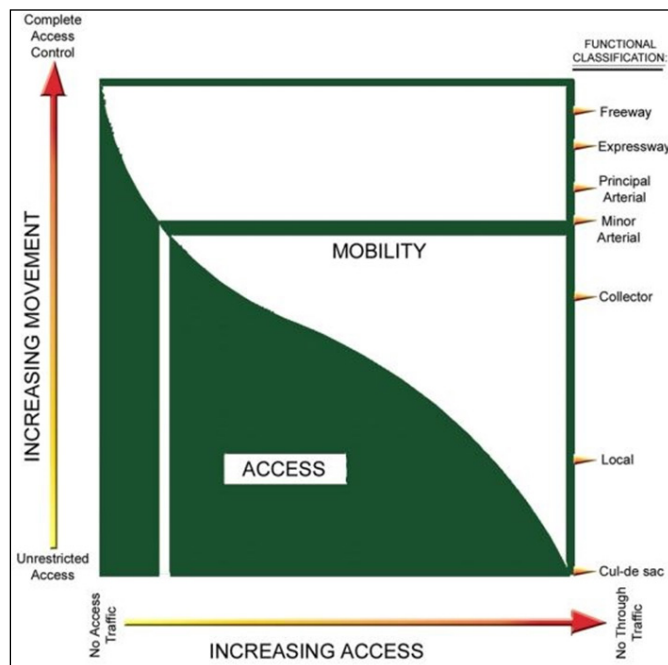
Table 31 - Existing Functional Classification, Jurisdiction, and Traffic by Road, 2015

Classification	Jurisdiction	Lanes	Average Daily Traffic
<i>Principal Arterials</i>			
Interstate 35E	State	4-10	75,000
Interstate 694	State	4-10	110,000
<i>A-Minor Arterials</i>			
Centerville Road (CSAH 59)	County	2-3	4,300
County Highway 96	State	4	20,000
County Road D (CSAH 19) (Labore Road to U.S. Highway 61)	County	2-3	4,200
County Road E (CSAH 15)	County	4	21,000
County Road F (CSAH 12)	County	2	3,700
Koehler Road (CSAH 14)	County	2-3	3,500
Labore Road (CSAH 108)	County	2-3	4,700 (south of County Road E)
McMenemy Road (CSAH 57)	County	2	3,200
Rice Street (CSAH 49)	County	2-4	15,400
Rice Street north of CSAH 49 (CSAH 54)	County	2	4,000
U.S. Highway 61	State	4	26,500
Vadnais Boulevard (CSAH 16)	County	2-4	3,900
<i>Major Collectors</i>			
Edgerton Street (CSAH 58) (Vadnais Boulevard to County Road D)	County	2-3	2,600
<i>Minor Collectors</i>			
Arcade Street	City	2-3	3,700
Belland Avenue	City	2	1,800
Buerkle Road	City	2	7,100
Greenhaven Drive	City	2	2,000
Willow Lake Boulevard (Labore Road to Highway 61)	City	2	2,600

The functional classification system is a roadway network that distributes traffic from neighborhood streets to collector roadways, then to minor arterials, and ultimately the Metropolitan Highway System. Roads are categorized based on the degree to which they provide access to adjacent land uses and lower level roadways versus providing higher-speed mobility for “through” traffic. Functional classification is a cornerstone of transportation planning. Within this approach, roads are located and designed to perform their designated function.

The current roadway functional classification for Vadnais Heights as identified by the Metropolitan Council is presented in the Existing Functional Classification map. The roadway system presently consists of six functional roadway classifications:

- Principal arterial
- “A” minor arterial
- “B” minor arterial
- Major collector
- Minor collector
- Local street















Existing Roadway Jurisdiction

2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

Legend

Jurisdictional Classifications

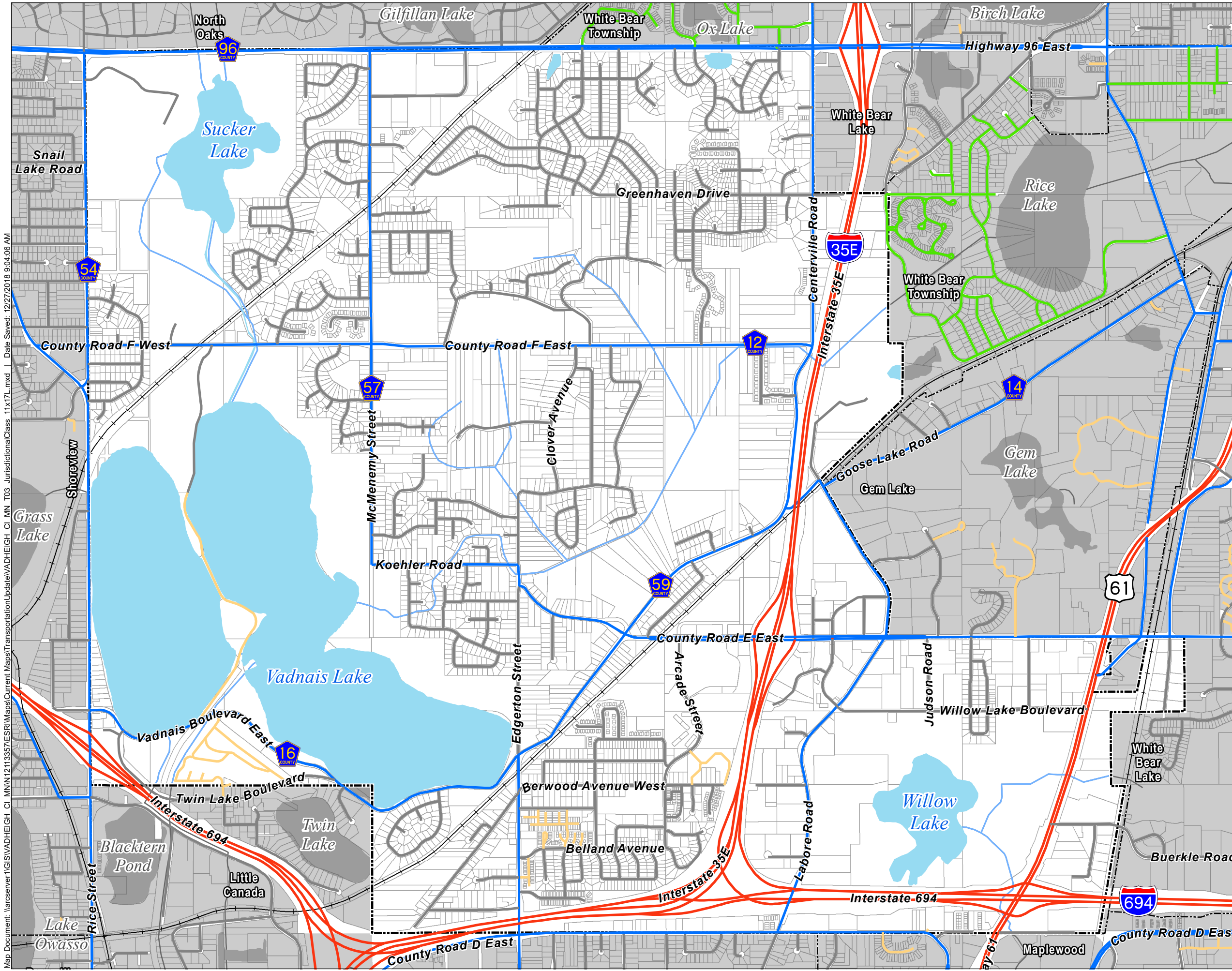
-  MnDOT
-  Ramsey County
-  Township Road
-  Municipal Street
-  Private Road
-  Vadnais Heights City Limits
-  City/Township Boundaries
-  Lakes
-  Streams
-  Parcels
-  Railroad

0 2,000 Feet 

Source: MnGeo, City of Vadnais Heights, Ramsey County



December 2018









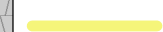
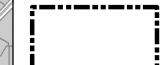




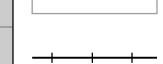
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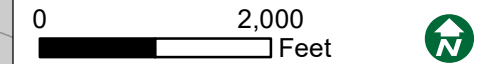
Existing Roadway Functional Class

2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

Legend

Functional Classifications

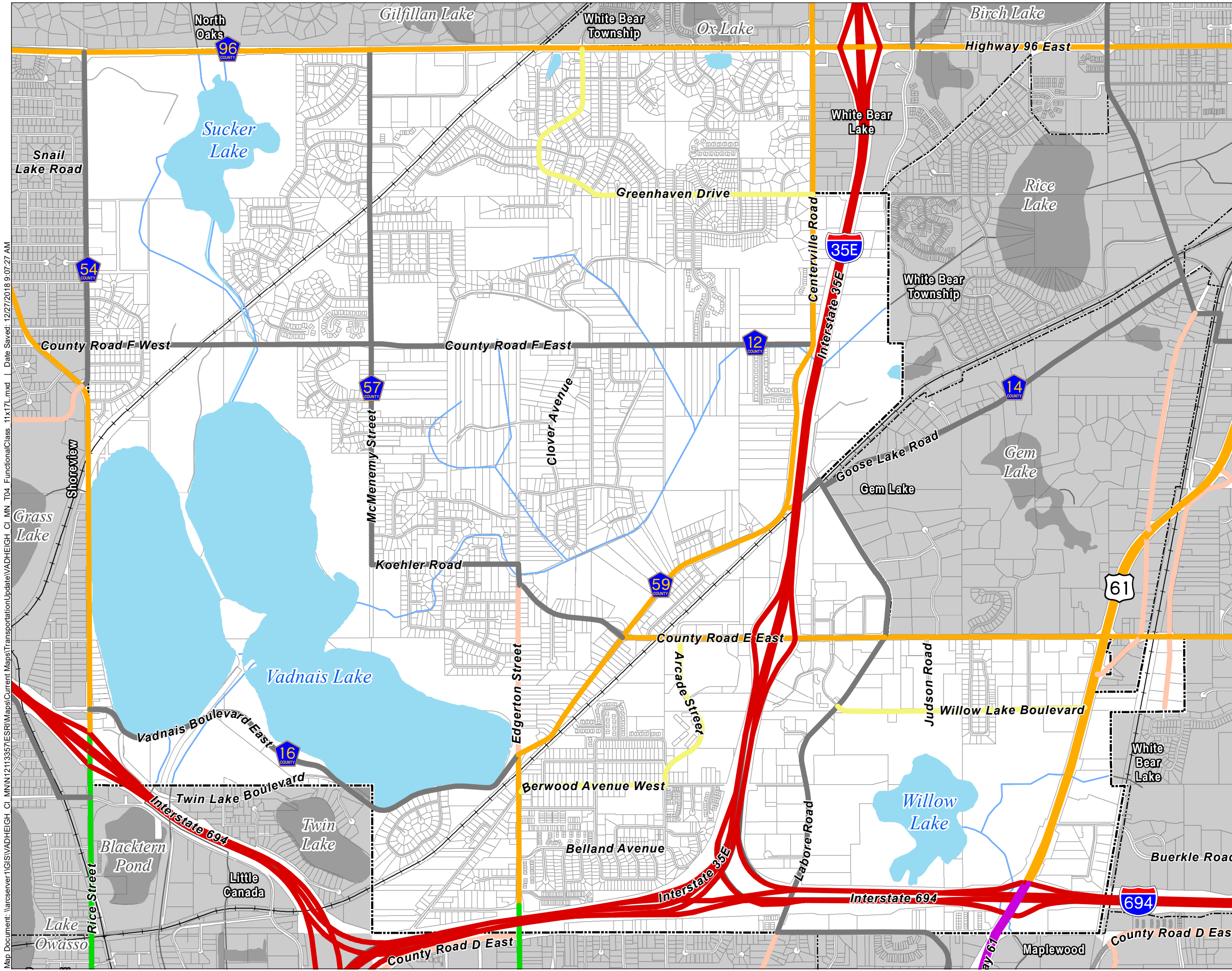
-  Principal Arterial
-  A Minor Augmentor Arterial
-  A Minor Reliever Arterial
-  A Minor Expander Arterial
-  Other Arterial
-  Major Collector
-  Minor Collector
-  Vadnais Heights City Limits
-  City/Township Boundaries
-  Open Water
-  Streams
-  Parcels
-  Railroad



Source: MnGeo, City of Vadnais Heights, Ramsey County



December 2018



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The Metropolitan Council has defined four sub-categories of “A” minor arterials: reliever, expander, connector, and augmentor. These sub-categories have to do primarily with Metropolitan Council’s allocation of federal funding roadway improvements, but do not translate into specific design characteristics or requirements.

For arterial roadways, the Metropolitan Council has designation authority. Local agencies may request that their roadways become arterials (or are downgraded from arterial to collector), but such designations or re-designations must be approved by the Metropolitan Council. The agency that has jurisdiction over a given roadway (e.g. Ramsey County or the City of Vadnais Heights) has the authority to designate collector status.

Principal Arterials

Principal arterials are the highest roadway classification and make up the Metropolitan Highway System. The primary function of these roadways is to provide mobility for regional trips, and they do not provide a land access function. They are intended to interconnect regional business concentrations in the metropolitan area, including the central business districts of Minneapolis and St. Paul. These roads also connect the Twin Cities with important locations outside the metropolitan area. Principal arterials are generally constructed as limited access freeways, but may also be multiple-lane divided highways.

In Vadnais Heights, the principal arterials are:

- Interstate 694
- Interstate 35E

Table 32 - Existing Functional Classification, Extent, and Lanes of Principal Arterials			
Classification	From:	To:	Lanes
Interstate 694	Rice Street	Highway 61	4 to 6
Interstate 35E	County Highway 96	Southern city boundary	4 to 6

“A” Minor Arterials

These roads connect important locations within the City of Vadnais Heights to access points of the Metropolitan Highway System and with important locations outside the City. These arterials are also intended to carry short to medium trips that would otherwise use principal arterials. While “A” minor arterial roadways provide more access than principal arterials, their primary function is still to provide mobility rather than access to lower level roadways or adjacent land uses.

Metropolitan Council has defined four sub-categories of “A” minor arterials: reliever, expander, connector, and augmentor. These sub-categories are primarily used by the Metropolitan Council to allocate federal funding for roadway improvements. The different types do not have separate, specific design

characteristics or requirements. However, they have somewhat different functions in the roadway network, and are typically found in certain areas within the region.

- **Relievers** provide supplementary capacity for congested parallel principal arterials. They are typically found in urban and suburban communities.
- **Augmentors** supplement the principal arterial system in more densely developed or redeveloping areas. They are typically found in urban communities.
- **Expanders** supplement the principal arterial system in less densely developed or redeveloping areas. They are typically found in urban and suburban communities.
- **Connectors** provide safe, direct connections between rural centers and to principal arterials in rural areas without adding continuous general purpose lane capacity. They are typically found in rural communities.

The “A” Minor network in Vadnais Heights is primarily Augmentors, supplementing other “A” Minor arterials and principal arterials.

Table 33 - Existing Functional Classification, Extent, and Lanes of “A” Minor Arterials

Classification	From:	To:	Lanes
Centerville Road (CSAH 59)	Edgerton Street	Highway 96	2 to 3
County Highway 96	Rice Street	Centerville Road	4
County Road E (CSAH 15)	Centerville Road	Hoffman Road	4
Rice Street (CSAH 49)	County Highway 96	I-694	2 to 4
U.S. Highway 61	County Road E	I-694	4

Other Arterials

Like “A” Minor Arterials, these roadways also serve more of a mobility function than access function. However, they may not have as much regional importance as “A” Minor Arterials and are not eligible for federal roadway improvement funding.

Table 34 - Existing Functional Classification, Extent, and Lanes of Other Arterials

Classification	From:	To:	Lanes
County Road D (CSAH 19)	Edgerton Street	Highway 61	2 to 3
County Road F (CSAH 12)	Rice Street	Centerville Road	2
Koehler Road (CSAH 14)	McMenemy Street	Centerville Road	2 to 3
Labore Road (CSAH 108)	Goose Lake Road	County Road D	2 to 3
McMenemy Street (CSAH 57)	County Highway 96	Koehler Road	2
Vadnais Boulevard (CSAH 16)	Rice Street	Edgerton Street	2 to 4

Major and Minor Collectors

Collector roadways provide a balance of the mobility and land-use access functions discussed above. They generally serve trips that are entirely within the City and connect neighborhoods and smaller commercial areas to the arterial network. Minor collectors generally are shorter in length, with lower volumes and lower speeds than major Collectors. Current collector roadways are identified in Table 35

Table 35 - Major and Minor Collector Roadways

Roadway	From	To	Number of Travel Lanes (Total)
Major Collectors			
Edgerton Street (Vadnais Blvd to Co. Rd. D)	Stockdale Road	County Road D	2
Minor Collectors			
Greenhaven Drive	County Highway 96 East	Centerville Road	2
Arcade Street	Centerville Road	Belmar Drive	2
Belland Avenue	Edgerton Street	Arcade Street South	2
Willow Lake Boulevard	Labore Road	U.S. Highway 61	2

Summary of Relevant Transportation Studies

A summary of transportation studies relevant to the City of Vadnais Heights' roadway system is provided below.

MnDOT Studies

Rice Street/I-694 Interchange Analysis and Design

Ramsey County identified the I-694 and Rice Street as critical for reconstruction due to the bottleneck nature of the interchanges and the approximately seven hours per day of congestion that occurs. The study was conducted by Ramsey County and the goals of the project were to improve traffic operations along Rice Street through the interchange area, prioritize the most vulnerable users to ensure that all users have equitable safety and mobility through the interchange, and improve economic development opportunities in underutilized sites.

The study drafted four different proposals for the site, and eventually alternative 4D-1, an offset single point urban interchange with three roundabouts, was decided to be the best option. This option was seen by the study as the best way to manage the projected traffic into 2040 and it had the lowest overall cost of all alternatives. The City of Vadnais Heights granted municipal consent for this project in February 2018. Construction is anticipated to begin in 2019 and be completed by 2020.

I-694 Non-Motorized Crossing Study

In 2016, the I-694 Non-Motorized Crossing Study was completed by MnDOT and Ramsey County. The purpose of the study was to identify pedestrian and bicycle mobility needs across I-694 within Ramsey County. The study focused on 18 different intersections along I-694, five of which fall on the border of Vadnais Heights:

- I-694 and Rice Street interchange
- Trout Brook Regional Trail North extension across I-694
- I-694 and U.S Highway 61
- Bicycle Railing additions on the Edgerton and Labore Bridges
- Connection from Centerville Road/Vadnais Boulevard to Highway 96.

The Highway 61 crossing was ruled as a bad option due to the high speeds along the highway and the easier alternative of extending the Bruce Vento Regional Trail. The other four options were defined as future network needs.

The Rice Street interchange was noted as an issue due to both the congestion and the fact that the current bridge does not have pedestrian or cyclist lanes. It was noted to be a project that Ramsey County was pursuing funding for and as seen above in this section, has progressed and plans have been developed that include pedestrian and bicycle accommodations across I-694.

The Trout Brook Regional Trail was recommended to extend across I-694. At the time of the study, the Metropolitan Council's Trail Master Plan was not finalized and as such, the extension was seen as a long-term plan. The trail extension will be under the jurisdiction of Ramsey County. The addition of bicycle railings on the Edgerton and Labore Bridges would retrofit the existing bridges to include a 42" railing on the east side of both bridges to improve safety for bicyclists riding in the southbound shoulders. This would be under the jurisdiction of MnDOT.

The connection from Centerville Road/Vadnais Boulevard to County Highway 96 was recommended to make on-street bike connections between the two points. Edgerton Road, a Tier 1 RBTN, extends down to I-694 with largely bikeable shoulders, but it terminates before reaching Highway 96. The extension from County Highway 96 via Centerville Road is also included as a Tier 1 RBTN alignment, thereby connecting Edgerton to County Highway 96. The study suggests an alternate route be made available and acknowledge through wayfinding signs that follows up Edgerton Street north of Centerville Road, onto Koehler Road and McMenemy Street. This would create a more direct north-south connection across the City.

Ramsey County Studies

I-694/Rice Street Interchange

This project was worked on jointly with MnDOT. For more information refer to the first point under the MnDOT studies category.

Countywide Bicycle & Pedestrian Plan

Through 2014 and into 2015 Active Living Ramsey Communities led a planning effort to identify a countywide approach for increasing activity through biking and walking. This plan was not focused on specific purposes, but rather developing tools and analyzing the conditions throughout the communities in Ramsey County.

Within the study, it was found that Vadnais Heights makes up 1.57% of the average walk mode share and 0.31% of the average bike mode share when walking and biking are used as modes of transportation. There is a larger amount of recreational use in Vadnais Heights in both running and biking. These uses are generally focused around Vadnais Lake, Edgerton Road, Centerville Road, and County Highway 96.

The study recognized the Berwood Park area as a place of active concentration of people in Vadnais Heights. The other important fact that the study reported was that over two-thirds of all pedestrian crashes in Vadnais Heights resulted in a fatal or serious injury.

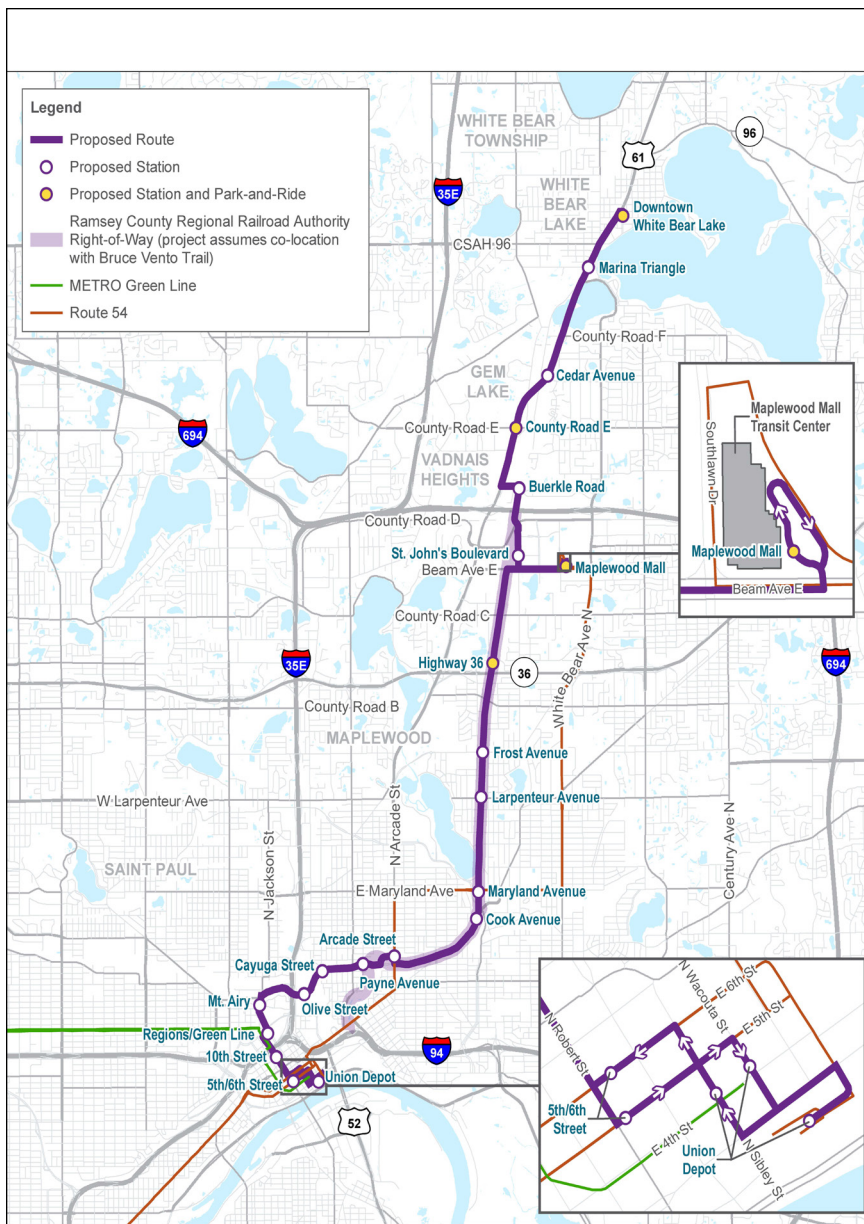
Rush Line Corridor

The Rush Line Corridor extends 80 miles north-south between downtown St. Paul and Hinckley, roughly following Interstate 35/35E and U.S. Highway 61. This corridor has been identified by the Metropolitan Council, MnDOT, the Rush Line Corridor Task Force, and corridor counties for transportation improvements based on current and future population, employment and travel demand.

Starting in late 2014, a pre-project development (PPD) study was undertaken to analyze bus and rail transit alternatives within the 30-mile corridor between Forest Lake and Union Depot in St. Paul. The study was a joint local and regional planning effort conducted by the Rush Line Corridor Task Force and led by the Ramsey County Regional Railroad Authority (RCRRA).

The Locally Preferred Alternative Selection Report was released in September 2017. The Locally Preferred Alternative (LPA) is Dedicated Bus Rapid Transit (BRT) from Union Depot in downtown St. Paul to White Bear Lake. The route will generally run along Phalen Boulevard, RCRRA right-of-way (Bruce Vento Trail), and U.S. Highway 61. In summary, the LPA includes multiple characteristics listed in the aside table.

The LPA includes a proposed station at County Road E/U.S. Highway 61. The station area includes land within Vadnais Heights and Gem Lake, but no definite location has been determined. The next phase in the planning process is the Environmental Analysis Phase, which began in 2018. As part of that process, a second station affecting Vadnais Heights was added for consideration at Buerkle Road and the terminus of the Bruce Vento Trail, along the



Length: Approximately 14 miles
Percent Dedicated Guideway: 85%-90%
Number of Stations: 20 (including Maplewood Mall Transit Center and Union Depot)
Schedule: 5 AM – 12 AM, 7 days/week; starts at 6 AM on Sundays
Frequency: every 10 minutes during rush hour; 15 minutes non-rush hour
Capital Costs: \$420M (2021\$); + \$55M for other transit routes to use the guideway
Annual Operating and Maintenance Budget: \$7.9-\$8.0M (2015\$)
Travel Time (minutes, one way): White Bear Lake to Maplewood Mall – 14 min.; Maplewood Mall to Robert/5th – 30 min.; Robert/5th to Union Depot – 6 min.
Average Daily Ridership (2040): 5,700-9,600; ridership range reflects other routes using guideway
Number of Residents in Station Areas: 40,600 (2010); 60,200 (2040)
Number of Jobs in Station Areas: 68,300 (2010); 106,700 (2040)
Number of People Living Below Poverty in Station Areas: 11,700 (2014)

Roadway System Plan

Future Roadway Network

The roadway network assumed for the 2040 analysis includes the existing network, plus projects that have been programmed and/or planned. The roadway projects that will enhance the existing network that are anticipated to be in place as part of the 2040 network include:

- I-694/Rice Street Interchange
- MnDOT CIP 6281-50: Landscape from Little Canada Road in Little Canada to Ramsey County Road J in White Bear Township on I-35E. Projected for 2018

At present, there are no programmed projects to expand the capacity of the overall major roadway network serving the Vadnais Heights area by 2040. As such, the future roadway network being used to forecast traffic volumes for 2040 looks largely the same as it does today. There also are no anticipated road widenings that would add lanes.

Forecasting Future Traffic

As part of the support for regional, county, and local transportation planning, the Metropolitan Council has developed and maintained a regional travel demand model. This model forecasts 2040 traffic volumes on major roadways throughout the Twin Cities region, based on expected population and job growth, observed travel behavior, and other factors.

The regional model was designed primarily to produce calibrated results for regional corridors, rather than sub-regional roadways. As a result, many counties and cities have elected to run their own version of the model, to refine the analysis and results to provide more locally relevant forecasts. The consultant staff for this plan update calibrated the model for the minor arterial and collector network in Vadnais Heights. The model information included in this plan is derived from this modified version of the regional model.

Forecasts of population, households, and employment are incorporated into the model at the level of Transportation Analysis Zones (TAZs). The TAZs for the City of Vadnais Heights, as defined in the regional model, are presented on the Transportation Analysis Zones map.

The anticipated land use patterns discussed in the land use chapter of this comprehensive plan were assumed for the 2040 transportation projections.

Table 36 - 2040 Vadnais Heights TAZ Data

TAZ	Year	Population	Households	Retail Jobs	Non-Retail Jobs	Total Jobs
1759	2014	1569	586	0	0	136
	2020	1457	614	0	0	144
	2030	1453	635	0	0	150
	2040	1437	633	0	0	150
1760	2014	930	348	0	0	66
	2020	900	378	0	0	71
	2030	943	404	0	0	78
	2040	959	413	0	0	82
1761	2014	0	0	0	0	7
	2020	0	0	0	0	8
	2030	0	0	0	0	8
	2040	0	0	0	0	8
1762	2014	919	355	0	0	82
	2020	925	391	0	0	88
	2030	1008	431	0	0	95
	2040	1060	456	0	0	98
1763	2014	2118	1012	0	0	1189
	2020	2564	1161	0	0	1203
	2030	2699	1266	0	0	1268
	2040	2772	1320	0	0	1277
1764	2014	1709	645	0	0	134
	2020	1648	747	0	0	135
	2030	1765	828	0	0	143
	2040	1846	879	0	0	144
1765	2014	3757	1625	0	0	1422
	2020	4052	1708	0	0	1539
	2030	4062	1771	0	0	1609
	2040	4032	1777	0	0	1612
1782	2014	3	2	0	0	221
	2020	9	4	0	0	313
	2030	16	8	0	0	468
	2040	14	7	0	0	658

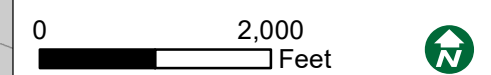
TAZ	Year	Population	Households	Retail Jobs	Non-Retail Jobs	Total Jobs
1794	2014	3	1	0	0	145
	2020	8	4	0	0	208
	2030	41	20	0	0	319
	2040	112	53	0	0	461
1795	2014	240	84	0	0	3977
	2020	202	87	0	0	4220
	2030	198	90	0	0	4545
	2040	195	90	0	0	4712
1796	2014	4	3	0	0	171
	2020	8	3	0	0	228
	2030	7	3	0	0	325
	2040	7	3	0	0	443
1797	2014	1	1	0	0	515
	2020	2	1	0	0	719
	2030	2	1	0	0	1046
	2040	2	1	0	0	1431
1808	2014	0	0	0	0	0
	2020	0	0	0	0	0
	2030	0	0	0	0	21
	2040	0	0	0	0	96
1810	2014	731	289	0	0	26
	2020	782	311	0	0	30
	2030	831	335	0	0	30
	2040	867	350	0	0	30
1811	2014	502	277	0	0	0
	2020	744	295	0	0	0
	2030	774	313	0	0	1
	2040	793	320	0	0	1



Transportation Analysis Zones (TAZ)

2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

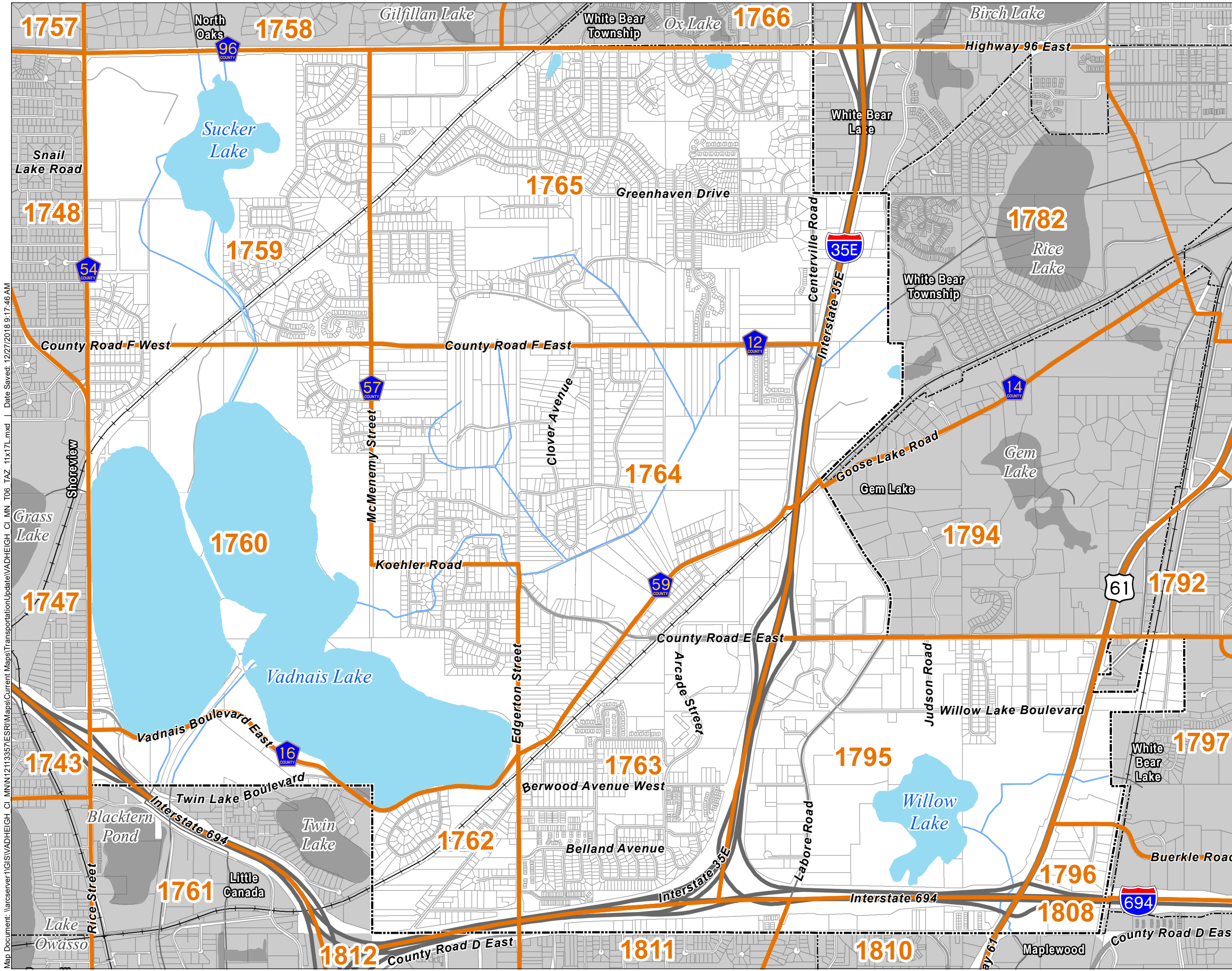
- Legend**
- Vadnais Heights City Limits
 - City/Township Boundaries
 - Lakes
 - Streams
 - Parcels
 - Railroad
 - TAZ Boundary
 - TAZ ID



Source: MnGeo, City of Vadnais Heights, Ramsey County



December 2018



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2040 Traffic Forecasts

Traffic projections for the year 2040 are from the locally calibrated version of the transportation model. They were made based on modifications to the regional Metropolitan Council model. Factors considered in developing the model included:

- Historic trend analysis for volumes
- Assessment of anticipated local and regional development patterns and associated TAZ information
- Discussion and coordination with local, county, and regional staff regarding future plans and the update of the regional travel demand model
- Review of other studies and plans for consistency

The 2040 traffic projections are presented on the Projected Traffic Volumes map. These reflect forecasted 2040 traffic volumes on roadways that are currently funded through a capital improvement plan.

Comparing this with existing volumes on the Existing Traffic Volume and Crash Data map, it is apparent that these new volumes represent a moderate increase over existing levels, consistent with planned growth.

Future Capacity Deficiencies

All roads are designed to handle a defined level of traffic volume. Once the road begins to approach or exceed capacity, traffic movements become more difficult and there may be congestion. It is at that point when it is determined whether there needs to be a capacity increase in the transportation system – through the addition of new travel lanes, new roads, intersection or interchange redesign, or other capacity-increasing improvements. Alternative strategies may also focus on travel demand management, including encouraging off-peak travel, transit usage, non-motorized trips, and other strategies.

A planning-level analysis was performed to identify roadway segments where capacity problems are anticipated to occur by 2040. Based on the projected 2040 traffic volumes and the assumed 2040 roadway network, an analysis of anticipated future congestion conditions was performed. This analysis used the volume-to-capacity method. The volumes were taken from the 2040 projections discussed under the previous heading.

Table 37 - Typical Traffic Capacity by Roadway Type/Configuration	
Roadway Design	Planning Level Daily Capacity
Local	
Gravel Roadway	Up to 500
Local 2-Lane	Up to 1,000
Collector and Arterial	
Urban 2-Lane	7,500 – 12,000
Urban 3-Lane or 2-Lane Divided	12,000 – 18,000
Urban 4-Lane Undivided	Up to 20,000
Urban 4-Lane Divided	28,000 to 40,000
4-Lane Freeway	Up to 70,000

Existing Traffic Volume & Crash Data

2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

Legend

- Average Annual Daily Traffic (AADT)**
- #### 2016
 - #### 2015
 - #### 2014
 - #### 2013
 - #### 2012

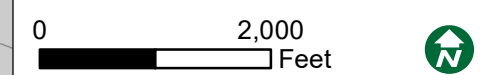
- Non-Motorized Crashes (2006 - 2015)**
- Pedestrian
 - Bicycle

- Intersection Summary (2006-2015)**
- # Total Crashes

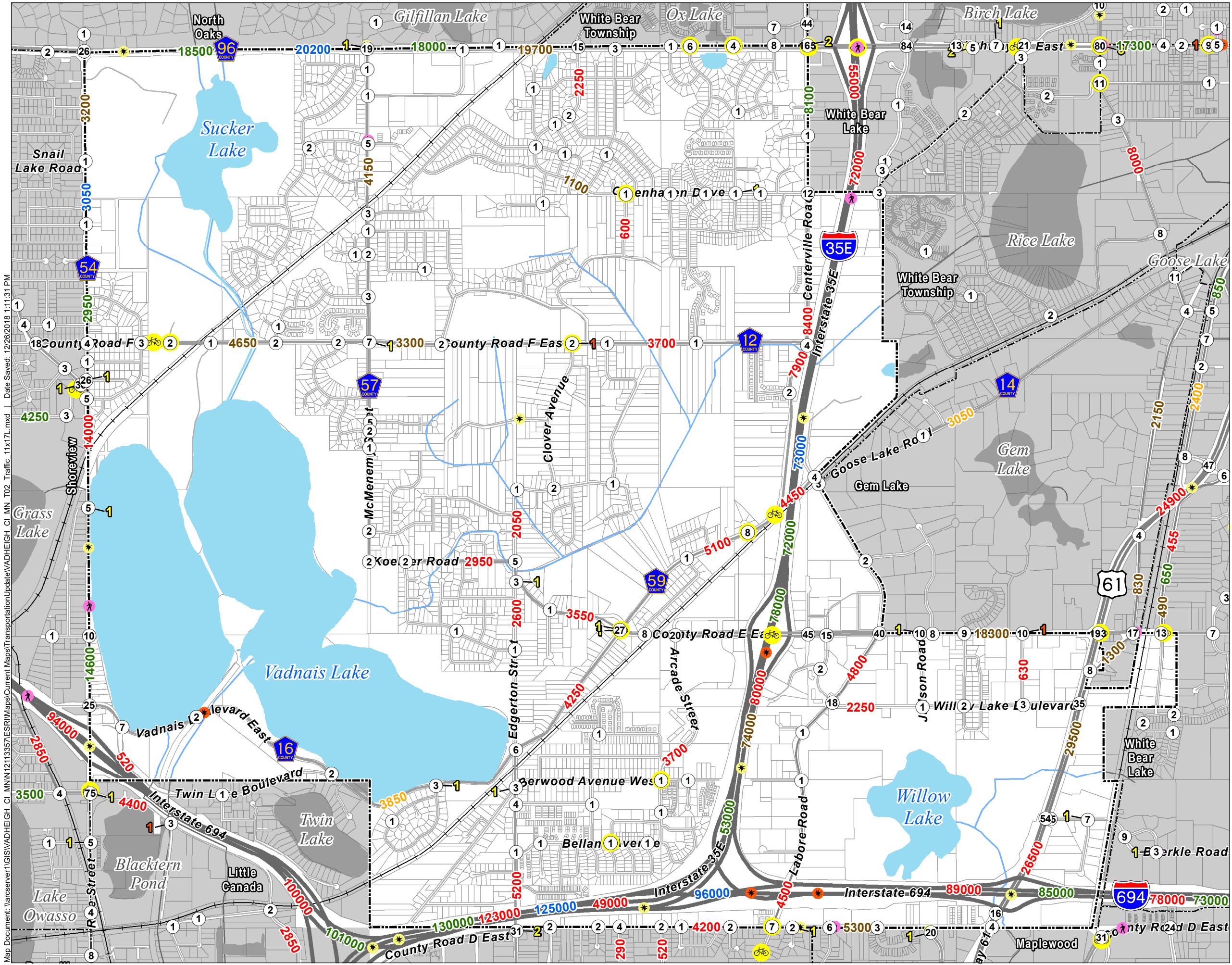
- Severity Summary (Quantity)**
- # Incapacitating Injuries
 - # Fatalities

- Non-Intersection Crashes (2006-2015)**
- * Incapacitating Injury
 - * Fatal Injury

- Vadnais Heights City Limits
- City/Township Boundaries
- Lakes
- Streams



Source: MnGeo, City of Vadnais Heights, Ramsey County



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The results of the volume to capacity analysis are shown on the 2040 Volume to Capacity map. The roadway segments where projected volumes exceed planning-level capacity are summarized in the table below. Most of the over-capacity segments are on the regional highway network.

Table 38 - Projected 2040 Roadway Capacity Deficiencies

Roadway Segment	Volume to Capacity Ratio
I-35E – between County Road E East and County Highway 96	1.23
I-35E/I-694 – combined section south of the city between splits	1.02
I-694 – between I-35E and U.S. Highway 61	1.46
Rice Street – between I-694 and County Road F East	1.11

As can be seen on the 2040 Volume to Capacity map, there are some additional roadway segments which are “approaching capacity,” defined as having a volume-to-capacity ratio of 0.85 – 0.99. These are locations that should be monitored in the coming years to determine if problem conditions develop and next steps should be implemented including more detailed analysis. These roadway segments include the following:

- I-35E between I-694 and County Road E East
- Centerville Road between CSAH 12/County Road F East and Greenhaven Drive
- County Road E East between I-35E and Highway 61
- Highway 61 between I-694 and County Road E East

Recommended Roadway System Improvements and Studies

Roadway Segments

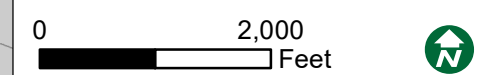
- As shown in the volume to capacity analysis, several major roadways passing through Vadnais Heights are expected to be near or over capacity by 2040. Most of these are county or regional roads, which will require coordination with Ramsey County and MnDOT. This Plan updated some modeling done at the County for areas that are anticipating increased density. At this time, there is not the expectation of any major roadway capacity increasing improvements in Vadnais Heights, beyond those that are already committed. The expectation is that future congestion will be mitigated by operational and intersection improvements, expansion of alternative modes such as transit and bicycle/pedestrian, and travel demand management. However, Vadnais Heights will work with Ramsey County, MnDOT and other partners to further assess the need and potential for capacity increasing projects in the area.
- Improvements to County Roads: Vadnais Heights will continue to work with Ramsey County to selectively rebuild minor arterial roads to include new surface and curb-and-gutter as needs dictate and feasibility allows. In particular, the entire length of County Road D in Vadnais Heights should be rebuilt with wide paved shoulders and a concrete sidewalk along (at least) the northern side of the road.

2040 Volume to Capacity

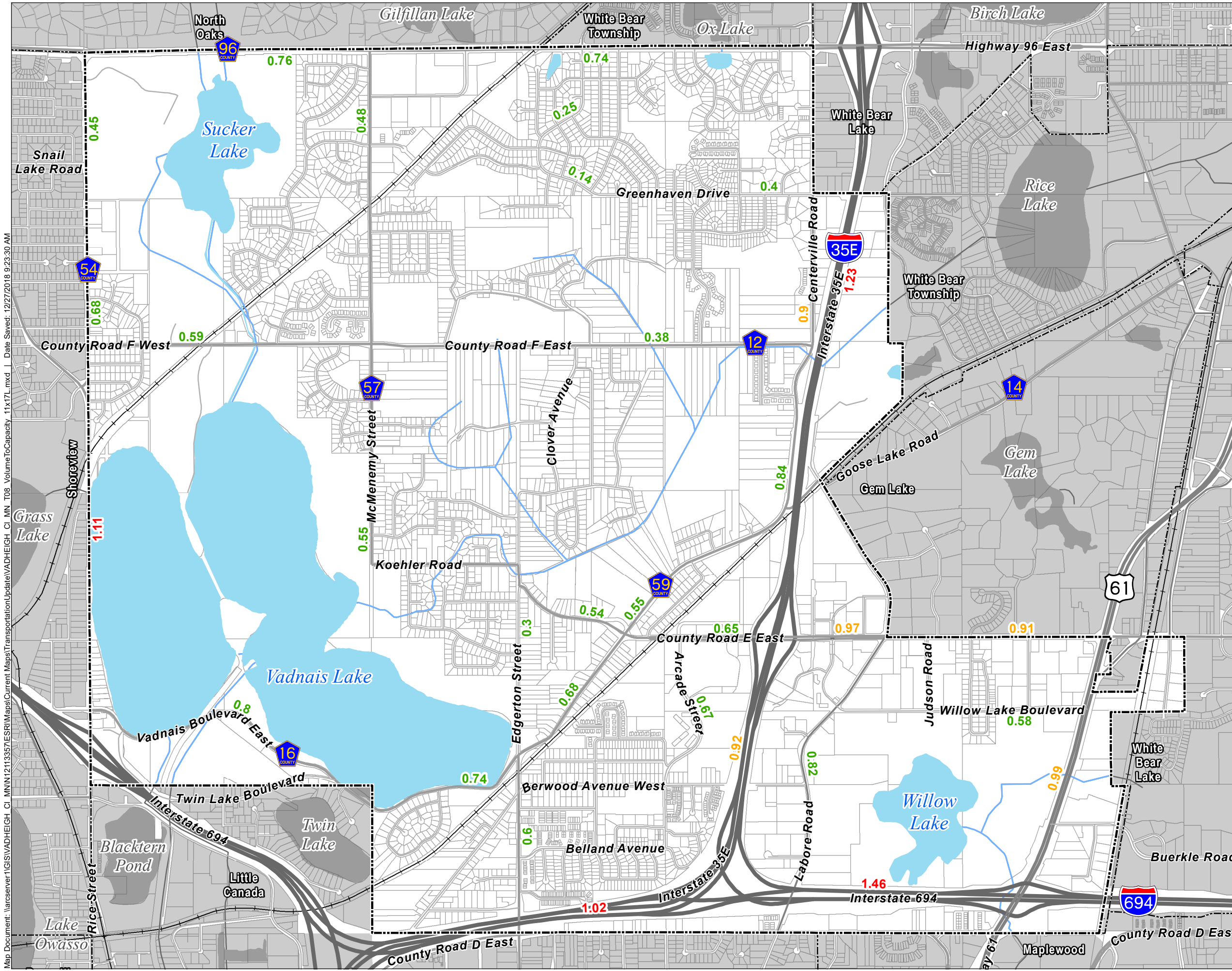
2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

- Legend**
- Vadnais Heights City Limits
 - City/Township Boundaries
 - Lakes
 - Streams
 - Parcels
 - Railroad

- Projected Volume-to-Capacity Ratio**
- 0.00 - 0.849 Under Capacity
 - 0.85 - 0.99 Approaching Capacity
 - 0.99 - 1.46 At/Over Capacity



Source: MnGeo, City of Vadnais Heights, Ramsey County



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- Improvements to Local and County Roads: Vadnais Heights will continue its systematic process of resurfacing local streets to extend their lives and to maintain safe and comfortable driving conditions.
- Certain older local streets may be rebuilt with better subgrade plus curb-and-gutter to provide acceptable long-term driving conditions and control runoff as needs dictate and feasibility allows.

Other recommended road improvements are summarized in Table 39.

Table 39 - Desired Road Improvements		
Roadway	Segment	Action/Comment
Tessier Trail	Northern terminus to Colleen Drive	Extend through the adjacent residential plat
North Oak Drive	Eastern terminus to County Road F	Connection to County Road F through city-owned property

In previous plans, both the City of Vadnais Heights and White Bear Township have included the extension of Labore Road to White Bear Parkway as a desired future road improvement. The Township has maintained this desire in their 2040 Comprehensive Plan; however, after discussion by the City Council as part of this planning process, it has been removed from the list above. The Council based their decision on the numerous constraints to constructing the road extension, including limited assessable properties, potential wetland impacts, and right-of-way acquisition. In general, the cost of the potential connection seems to outweigh the potential economic and transportation benefits at this time. Removing the road extension from the Plan is not meant to completely rule out its eventual construction, but it is no longer as high of a priority to the City of Vadnais Heights as in previous planning documents. However, any significant future development occurring on the Northeast Quadrant of the City Center District may trigger the need to complete a feasibility study for the potential connection.

Future Functional Classification

Re-designations of roadways involving the “A” minor arterial functional classification (e.g. from collector to arterial, from arterial to collector, or changing designations within arterial) is under the authority of the Metropolitan Council. For collector roadways, the functional class designation is under the authority of the agency that owns the given road. Design standards for the existing or future roads in Vadnais Heights are established by the unit of government that has jurisdiction. The City of Vadnais Heights has ownership of and control over all Local and Minor Collectors and one of the Major Collector roads. At this time, the City of Vadnais Heights does not anticipate any changes to the functional classification of roadways within the city.

Future Jurisdictional Classification

There are no identified changes to the Jurisdictional Classification or any roadway within the City of Vadnais Heights. All roadways are anticipated to remain under the respective local, county, state or federal ownership.

Access Management

Access management refers to balancing the need for connections to local land uses (access) with the need for network-level movement (mobility) on the overall roadway system. Arterials generally have limited access in the form of driveways and low volume side streets because their role in the network is to support relatively long, high speed traffic movements; collectors allow a greater degree of access given their combined mobility/access function, and local streets have relatively few limits on access.

Appropriate access control preserves the capacity on arterial and collector streets, and improves safety by separating local turning movements from higher-speed “through” traffic. Moreover, it concentrates higher volume traffic linkages at intersections controlled with traffic signals, roundabouts, or other measures.

MnDOT and Ramsey County Roadways in Vadnais Heights are identified in the Existing Traffic Volume and Crash Data map. For MnDOT roadways, MnDOT access management guidelines apply. Similarly, for County roadways, Ramsey County’s access management guidelines apply. MnDOT and Ramsey County guidelines. Guidelines for City of Vadnais Heights roadways include:

- Residential, commercial, and industrial uses must all have direct access to a proper street.
- Access to commercial and office activities shall be allowed only on arterial or collector streets, or a street specifically designed for such development. Commercial developments of a small scale are encouraged to develop a common access drive. A turning lane and its appropriate right-of-way must be provided if the City Council determines that one is needed.
- Access to industrial development shall be allowed only on arterial or collector streets, or a street specifically designed for such development. Industrial developments of a small scale are encouraged to develop a common access drive and parking facilities. Incentives, such as reduction in setback and/or parking requirements, may be provided at the discretion of the City Council. A turning lane and its appropriate right-of-way must be provided if the City Council determines that one is needed.

Geometric Design Standards

Vadnais Heights City Code requires the following for the design and construction of streets.

Minimum Construction Requirements

“Unless otherwise required by the Council, all street and parking lot, base and pavement thickness shall be designed in accordance with the current State of Minnesota Department of Transportation Road Design Manual for flexible pavements. The designed thickness of the surfacing elements shall be in accordance with the flexible pavement design standards for road classification as follows:

Classification Pavement Design; Axle Load

- Local Streets 7 Ton Minimum
- Collector/Commercial Streets 9 Ton
- Parking Lots 7 Ton Minimum, unless otherwise specified by City Engineer

Minimum Construction Requirements

Grading: All streets shall be graded for the full width of the right-of-way and in such a manner as to provide a minimum finished surface width of thirty-two (32) feet from back of curb to back of curb. All streets shall be undercut below the established grade for the width of the finished surface to a depth adequate to accommodate the sub-base, base, and bituminous surfacing.

Subgrade: The subgrade of the streets shall be so constructed so as to satisfactorily sustain the street in a stable condition. Any unsuitable or undesirable materials shall be removed.

Sub-Base and Base: All streets shall be constructed having a gravel base of six (6) inch minimum thickness conforming to M.H.D. Spec. #3138, Class 5. The design thicknesses of the sub-base and base for streets and parking lots shall be in accordance with the State of Minnesota Department of Transportation Road Design Manual for flexible pavements.

Bituminous Surfacing: All City streets shall be surfaced with a plant-mix bituminous mat having a minimum thickness of three (3) inches conforming to M.H.D. Spec. #2331 and #2341. A job mix design utilizing the planned aggregate source shall be submitted to the Engineer for approval. The design thicknesses of the bituminous surface for streets and parking lots shall be in accordance with the State of Minnesota Department of Transportation Road Design Manual for flexible pavements. One and one-half (1-1/2) inches of bituminous surfacing shall be installed the year of construction and one and one-half (1-1/2) inches the following year, providing the street has gone through one freeze-thaw cycle.

Table 40 - Vadnais Heights Roadway Design Standards

	Right-of-Way Width*	Road Width	Through Lanes	Curb and Gutter	On-Street Parking	Design Speed	Sidewalks	Planting strip
A-Minor Arterial	100 to 150	Varies	2 to 4	Some locations	No	45 to 60 mph	Some locations	Varies
B-Minor Arterial	80 to 120	Varies	2 to 4	None	Varies	35 to 50 mph	None	None
Major Collector	66 to 80	32 to 36	2	None	Yes	30 to 40	None	None
Local	50 to 65	28 to 32	Most not striped	Most locations	Both sides	30 mph	None	None

* Road width may be increased to accommodate striped bicycling lanes

Transit

Transit service is an important element of a multimodal network in a developed community like Vadnais Heights. Transit access provides an alternative to driving for a range of potential riders, including commuters, youth, seniors, people with disabilities, and others. It also helps reduce traffic congestion and emissions generated by single occupant vehicles, by replacing some automobile trips with transit trips. Furthermore, it supports the development of higher intensity mixed use districts within walking distance of transit stops and stations, particularly along fixed route transit service. Currently, around three percent of commuters in Vadnais Heights use transit to travel to work, according to the 2012-2016 American Community Survey.

The City is already served by several bus routes, along select corridors. Additionally, it has been involved in a multi-year planning effort to bring bus rapid transit to the community.

Transit Market Area

Transit Market Areas are used by the Metropolitan Council to determine appropriate levels of transit service within a given area. They are defined based on the following primary factors:

- Density of population and jobs
- Interconnectedness of the local street system
- Number of autos owned by residents

In general, areas with high density of population and jobs, highly interconnected local streets, and relatively low auto ownership rates will have the greatest demand for transit services and facilities. Transit Market Areas are a tool used to guide transit-planning decisions. They help ensure that the types and levels of transit service provided, in particular fixed-route bus service, match the anticipated demand for a given community or area.

Based on this analysis, the Metropolitan Council categorizes the City of Vadnais Heights as Transit Market Area III. As identified in Appendix G of the Metropolitan Council’s 2040 Transportation Policy Plan (TPP), the characteristics of this category area are as follows:

Transit Market Area III has moderate density but tends to have a less traditional street grid that can limit the effectiveness of transit. It is typically Urban with large portions of Suburban and Suburban Edge communities. Transit service in this area is primarily commuter express bus service with some fixed-route local service providing basic coverage. General public dial-a-ride services are available where fixed-route service is not viable.

Also from Appendix G of the 2040 TPP (Table G-2), the typical transit service within this Market Area is summarized in the table below.

Table 41 - Transit Market Area Characteristics			
Transit Market Area	Transit Market Index Range	Propensity to Use Transit	Typical Transit Service
Market Area III	TMI between 64.0 and 128	Approximately ½ ridership potential of Market Area II, or ¼ of the highest potential for transit ridership.	Primary emphasis is on commuter express bus service. Suburban local routes providing basic coverage. General public dial-a-ride complements fixed route in some cases.

Existing Transit Service

The City of Vadnais Heights is already served by several bus routes, which provide local and express service, particularly along Rice Street, County Road D, Interstate 35E, Interstate 694 and portions of County Road E. This connects the city directly to Downtown Saint Paul and other metro area job centers and destinations. Commuter/express routes that operate non-stop along I-694 do not serve the City of Vadnais Heights (Route 860). I-35E is considered express bus corridor according to the 2040 TPP.

General Scheduled Local Bus Service

Local bus service is provided through Metro Transit. Service is offered on a daily schedule at established stops along the routes. Although the City has some input on transit service, the routes, schedules, and facilities are typically managed and maintained by Metro Transit.

Vadnais Heights is served by multiple bus routes as detailed below:

<p>Route 62, operated by Metro Transit, north/south along Rice Street from Shoreview to Signal Hills. This route runs on weekdays and Saturdays. The overall route runs on Sundays as well, but does not continue up to Vadnais Heights on that day.</p>	<p>Route 270, is an express bus route operated by Metro Transit. The route runs east/west along Rice Street from the 95 Avenue Park & Ride in Blaine to the Union Depot LRT stop in St. Paul. This route runs on weekdays and serves the city via connections to previously mentioned routes, but does not directly pass through Vadnais Heights. It is an express route operated by Metro Transit. The route runs east/west mainly along Highway 36 but starting in Mahtomedi, into Maplewood, and into downtown Minneapolis. This route runs on weekdays.</p>
<p>Route 223, operated by Metro Transit, runs east/west from Roseville, to Little Canada, to Maplewood. In Vadnais Heights, it runs near the city’s southern border along County Road D. This route runs on weekdays.</p>	
<p>Route 262, operated by Metro Transit, runs north/south along Rice Street from the 95 Avenue Park & Ride in Blaine to the Union Depot LRT stop in St. Paul. This route runs on weekdays.</p>	<p>Route 275, is an express bus route operated by Metro Transit. The route runs north/south along I-35 and I-35E from the Forest Lake Transit Center to St. Paul. This route runs on weekdays.</p>
<p>Route 265, an express bus route operated by Metro Transit. The route runs north/south along White Bear Avenue, Beam Avenue, and I-35E from the White Bear Lake, to Maplewood, and to St. Paul. This route runs on weekdays.</p>	

Commuter/express routes that operate non-stop along I-694 do not serve Vadnais Heights (Route 860).

High-Frequency Routes

High frequency transit service is typically defined as service that comes on a very frequent basis, to the extent that riders do not need to consult a schedule to ride – since they would never need to wait more than a few minutes before the next bus. Metro Transit has an established Hi Frequency network, which provide service every 15 minutes or better on weekdays and Saturdays.

Currently, there are no high frequency transit routes serving Vadnais Heights. The closest one is the A Line, which runs along Snelling Avenue between Roseville and Saint Paul on weekdays and Saturdays.

Peak Hour Commuter Bus Service

Peak hour commuter bus service is aimed specifically at providing an option for commuters during weekday rush hours. Express routes often have limited stops and more frequent service than they do the rest of the day, with a focus on getting passengers to job centers efficiently.

Routes 262, 265, 270, and 275 are all peak hour express commuter bus services serving Vadnais Heights.

Transitways

Transitways are dedicated transit routes with enhanced stations and amenities for passengers. This provides a higher level of service for riders than typical local bus service, and is expected to attract additional riders as a result.

Currently, there are no transitways serving Vadnais Heights, though there is a planned facility, described in this chapter.

Dial-a-Ride Service

Dial-a-ride service is provided as a supplement to regular local transit service, providing door-to-door service for passengers who require additional assistance. Passengers often must qualify, typically based on age or disability.

Vadnais Heights is serviced by Transit Link, the dial-a-ride service provided through the Metropolitan Council at the County level. Transit Link provides metro-wide transit connections and access to qualifying rides, such as last mile service, connections between transit stations, or to and from area not serviced by regular bus routes. Any member of the public may reserve a qualifying ride. Upon reservation, each trip is assessed to ensure it does not overlap with regular route bus services. Starting and ending destinations must be more than $\frac{1}{4}$ mile from regular route transit in winter months (November – March) and more than $\frac{1}{2}$ mile from regular route transit in summer months (April- October). Transit Link Service does not operate on Thanksgiving Day, Christmas Day, and New Year's Day.

Transit Link fares are determined by distance traveled and includes transfer to a regular service route, with some exceptions.

Ramsey County

Transit Link service in Ramsey County is split between two-service areas, one shared with Anoka County and one shared with Washington County. However, riders can still access stops and destinations throughout the metro area. All services are available Monday-Friday from 6:00am – 7:00pm and serve all Ramsey County cities and townships. Joint service with Anoka County serves Arden Hills, Falcon Heights, Lauderdale, Mounds View, New Brighton, Roseville, Saint Anthony, and Shoreview. Joint service with Washington County serves Gem Lake, Little Canada, Maplewood, North Oaks, North Saint Paul, Saint Paul, Vadnais Heights, White Bear Lake, and White Bear Township. Transfers between Transfer Link and regular service routes take place at one of the following transit hubs in Ramsey County: Little Canada Transit Center, Maplewood Mall Transit Center, and Sun Ray Transit Center. Service to Signal Hills Shopping Center in Dakota County is available as well as the following transit hubs in Washington County: Cottage Grove Park and Ride (rush hours only), Woodbury Lutheran Church (rush hours only), Woodbury Mall Theater (rush hours only), and St. Croix Rec Center.

Metro Mobility is also available to qualified individuals with disabilities on an on-call basis throughout the seven-county metropolitan area.

Transit Facilities and Transit Advantages

In addition to transit routes, there are a variety of structures and facilities that support transit service by improving service and making transit more accessible and convenient. One applicable to Vadnais Heights are summarized below.

- **Park and Ride**

Park and ride facilities provide an opportunity for transit passengers to drive to a transit stop and park their vehicle, then board transit. It effectively expands the service area for transit beyond the area that is walking distance from a stop. Park and rides may also have other features, such as bicycle parking, enhanced shelters, and expanded signage and wayfinding.

The Metropolitan Council operates a Park and Ride facility at the southwest quadrant of the County Road E/ Interstate 35E interchange that holds approximately 300 vehicles. The facility includes a passenger waiting shelter. Route 275, connecting Forest Lake to St. Paul, stops at this facility. This park and ride also features free electric car charging stations. I-35E is considered an express bus corridor according to the 2040 Transportation Policy Plan (TPP).

- **Transit Advantages**

Transit advantages are facilities that help increase the attractiveness of transit by providing them an option to being stuck in regular traffic. These are typically dedicated lanes or shoulders that are not open to all traffic, and may be bus only in some circumstances. only in some circumstances.

The existing southbound ramp from County Road E to I-35E includes a transit advantage ramp meter bypass. Recently, as a result of the I-35E MnPASS Extension Study, MnPASS lanes were added to both southbound and northbound sides on I-35E. During peak hours, transit, motorcycles, and vehicles with two or more occupants including children or infants (HOV 2+) may drive in the designated MnPASS Express Lanes for free. Solo motorists who have a MnPASS account and a MnPASS tag must pay a fee to drive in the MnPASS Express Lanes during peak-travel times.

Planned Improvements

As previously noted in this chapter, the City of Vadnais Heights has been involved in a multi-year planning effort for the Rush Line BRT Corridor. Service along the line is expected to begin in 2026.

Bicycling and Walking

A well-developed bicycle and pedestrian network, maintained throughout the year, provides a way for people of all ages and abilities to travel in a way that is safe, comfortable, accessible, and active. It connects people to community destinations, improves bicycle and pedestrian safety, increases multimodal opportunities, encourages active living, and provides a community amenity.

Pedestrian Facilities

Pedestrian travel provides an alternative to driving for short distance trips, and safe connections between other modes and final destinations for longer ones. It also can serve as an amenity for residents and visitors who are looking for a safe and active means of recreation, and for businesses districts looking for street life. Dedicated pedestrian facilities also help prevent fatalities resulting from pedestrians mixing with vehicle traffic.





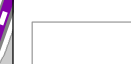
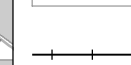
The current sidewalk system serving Vadnais Heights is depicted in Figure 39. Also depicted are the new sidewalk links that the City intends to build to extend and enhance the overall pedestrian network. At locations deemed appropriate, the City's standard practice is to provide sidewalks shall be at least six feet in width within an open space corridor of at least ten feet in width. These dimensions may vary depending on zoning or location.

Existing and Planned Transit Infrastructure

2040 Comprehensive Plan

City of Vadnais Heights, Minnesota

Legend

-  Vadnais Heights City Limits
-  City/Township Boundaries
-  Open Water
-  Streams
-  Parcels
-  Railroad

Planned Transit Stations



Park and Ride



Planned Alignments



Transit Routes

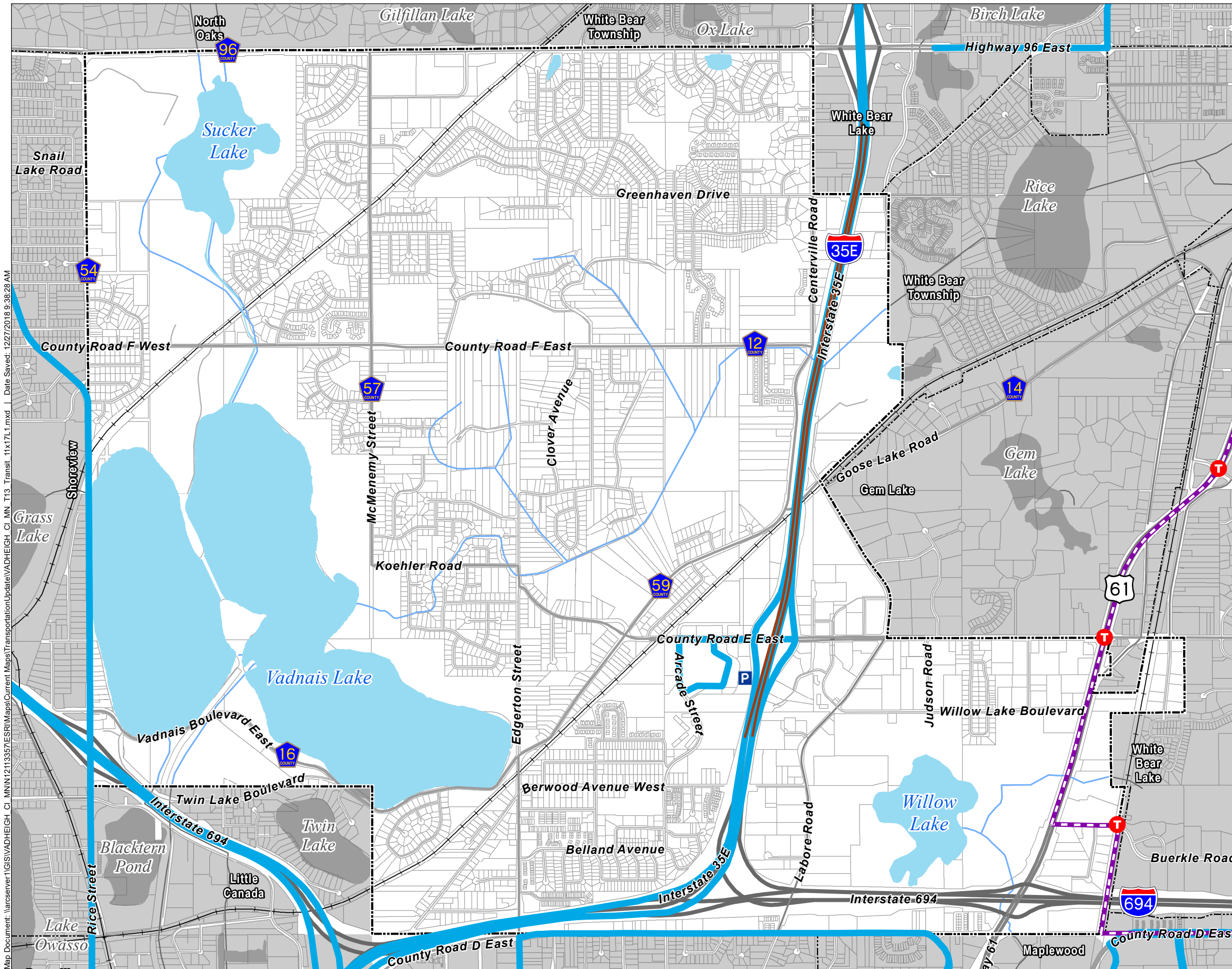


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Source: MnGeo, City of Vadnais Heights, Ramsey County

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Bicycle Facilities

Bicycle facilities provide additional opportunities for non-motorized connectivity and travel. Bicycle trips can be longer than pedestrian trips, which opens up possibilities of both replacing auto trips and connecting to a regional network. As traffic volumes grow, having an alternative means of travel can ease pressure on roads with limited capacity. Additionally, bicycle tourism has become increasingly popular in many communities, as a low-impact way to enjoy area attractions and support local businesses.

They can also be developed as a system that is similar to road functional class – with different facility types for different travel needs. Major categories of bicycle facilities in Vadnais Heights include:

Off-street trails

These trails link destinations and communities and may have a range of supporting amenities, including signage, parking, seating, and wayfinding. They may be located along major roadways, or in their own dedicated right-of-way (such as an abandoned rail corridor, as is the case with the Bruce Vento Trail). They are frequently located along higher volume and speed corridors where on-street bicycling would be less safe. Regional trails are developed and maintained at the county or regional level, and provide connections over longer distances and between cities. Local trails are maintained at the city level, and typically provide connectivity between local destinations and regional systems.

On-street bike lanes

On-street bicycle lanes (or bikeways) are typically developed by the county or municipality when funding or right-of-way constraints preclude off-street facilities – or where traffic volumes do not justify the additional investment. They can provide important local connections to the off-street system and local destinations.

Existing bicycle facilities in Vadnais Heights are depicted on the Existing and Planned Non-Motorized Facilities map.

Regional Trails

The Existing and Planned Non-Motorized Facilities map also shows existing and planned regional trails in Vadnais Heights. See the Parks chapter for a more detailed discussion on these facilities.

While they are planned as recreational corridors, trails can also serve a transportation purpose. This usage is explored more fully in the next section on the Regional Bicycle Transportation Network.



Regional Bicycle Transportation Network

The Metropolitan Council has reflected the need for a hierarchy of non-motorized transportation facilities through their designation of the Regional Bicycle Transportation Network (RBTN). The RBTN was developed by the Metropolitan Council through the Regional Bicycle System Study in 2014, and was incorporated into the 2040 Transportation Policy Plan. It is the Metropolitan Council's intent that the RBTN will "serve as the 'backbone' arterial system for biking in the region." The guiding principles for this network include:

- Overcome physical barriers and eliminate critical system gaps.
- Facilitate safe and continuous trips to regional destinations.
- Function as arteries to connect regional destinations and the transit system year round.
- Accommodate a broad range of cyclist abilities and preferences to attract a wide variety of users.
- Integrate and/or supplement existing and planned infrastructure.
- Provide improved opportunities to increase the share of trips made by bicycle.
- Connect to local, state, and national bikeway networks.
- Consider opportunities to enhance economic development.
- Be equitably distributed throughout the region.
- Follow spacing guidelines that reflect established development and transportation patterns.
- Consider priorities reflected in adopted plans.

The RBTN is subdivided into two tiers for planning and investment prioritization:

Tier 1 and Tier 2 Regional Bicycle Transportation Alignments reflect specific routes that have already been constructed and/or identified through local plans. Some may need little or no improvement, while others have not yet been developed. The Tier 1 subset reflects those that provide direct connections to and between regional destinations.

Tier 1 and Tier 2 Regional Bicycle Transportation Corridors are the highest priorities for regional planning and investment, with Tier 1 being the top ones. They were chosen to reflect areas where it would be possible to attract the most riders and thereby make the biggest difference in terms of mode shifts.

The planned RBTN in Vadnais Heights is shown in the exhibit on the following pages. At present, corridors are shown as broad lines on the map because the exact alignments have not yet been determined. Tier 1 alignments are Edgerton Street, Centerville Road, and Highway 96. There is also a Tier 1 corridor in the southeast of the City the lays south of Berwood Avenue and mostly east of I-35E. The Tier 1 corridor centerline in the southeast corner of the City runs parallel to 1-694 and along E County Road D. A Tier 2 corridor has been added in the updated 2040 TPP that is centered parallel to and 0.5-miles east of Rice Street up to CSAH 96 as an extension of an existing Tier 2 corridor.

Existing and Planned Non-Motorized Facilities

2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

Legend


- Vadnais Heights City Limits
- City/Township Boundaries
- Lakes
- Parcels
- Parks
- Streams
- Railroad

Non-Motorized Facilities & Points of Interest

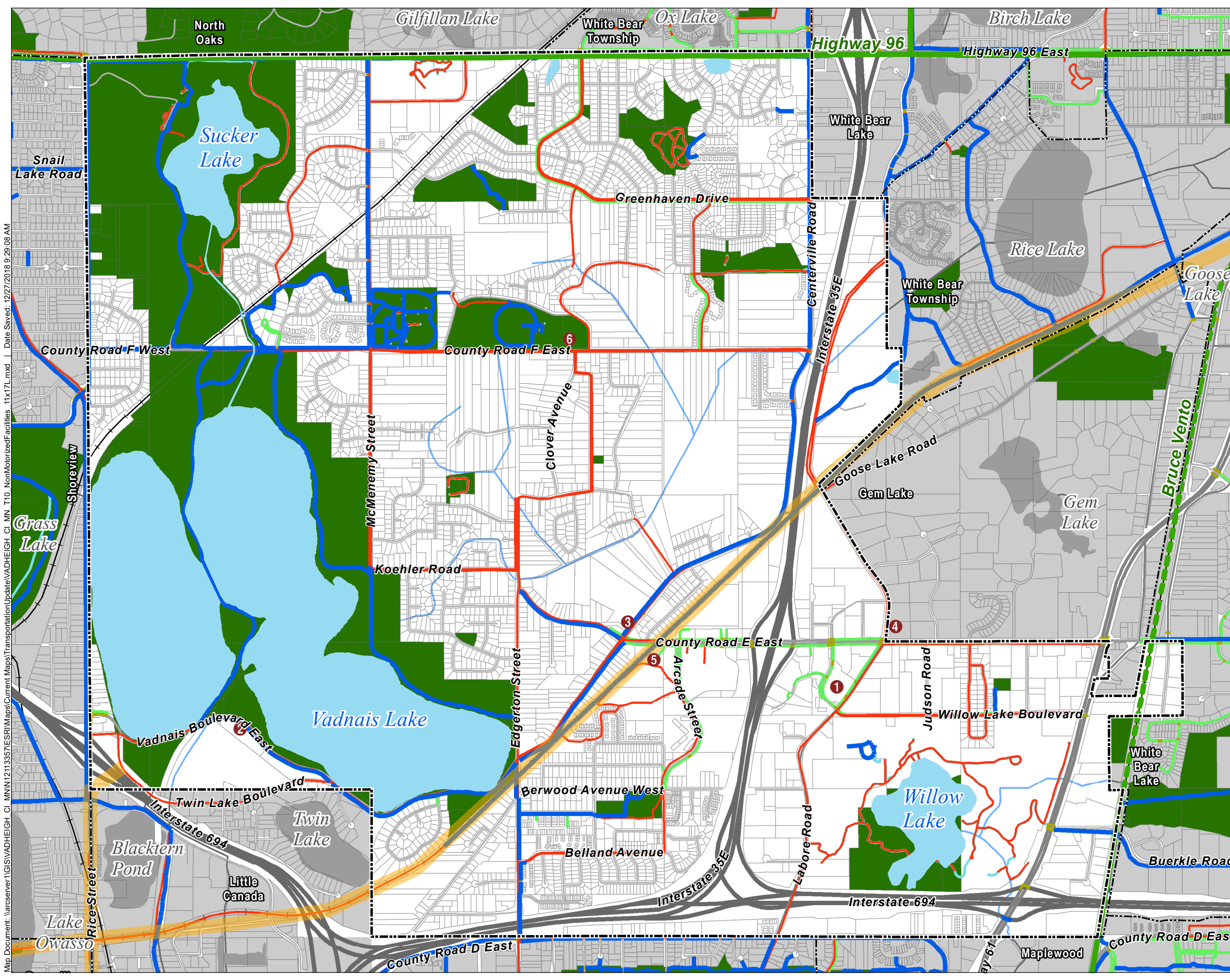
Points of Interest

School - WELS North	Schools - WBL Montessori
Schools - AFSA High	Vadnais Heights City Hall
Schools - Vadnais Heights Elementary	Vadnais Heights Commons

- Existing Regional Trail
- Planned Regional Trail
- Search Corridors
- Pedestrian & Bikeway Trail
- Crossing
- Bikeways
- Sidewalk
- Footpath

0 2,000 Feet 

Source: MnGeo, City of Vadnais Heights, Ramsey County








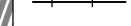









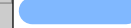


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Regional Bicycle Transportation Network (RBTN)

2040 Comprehensive Plan

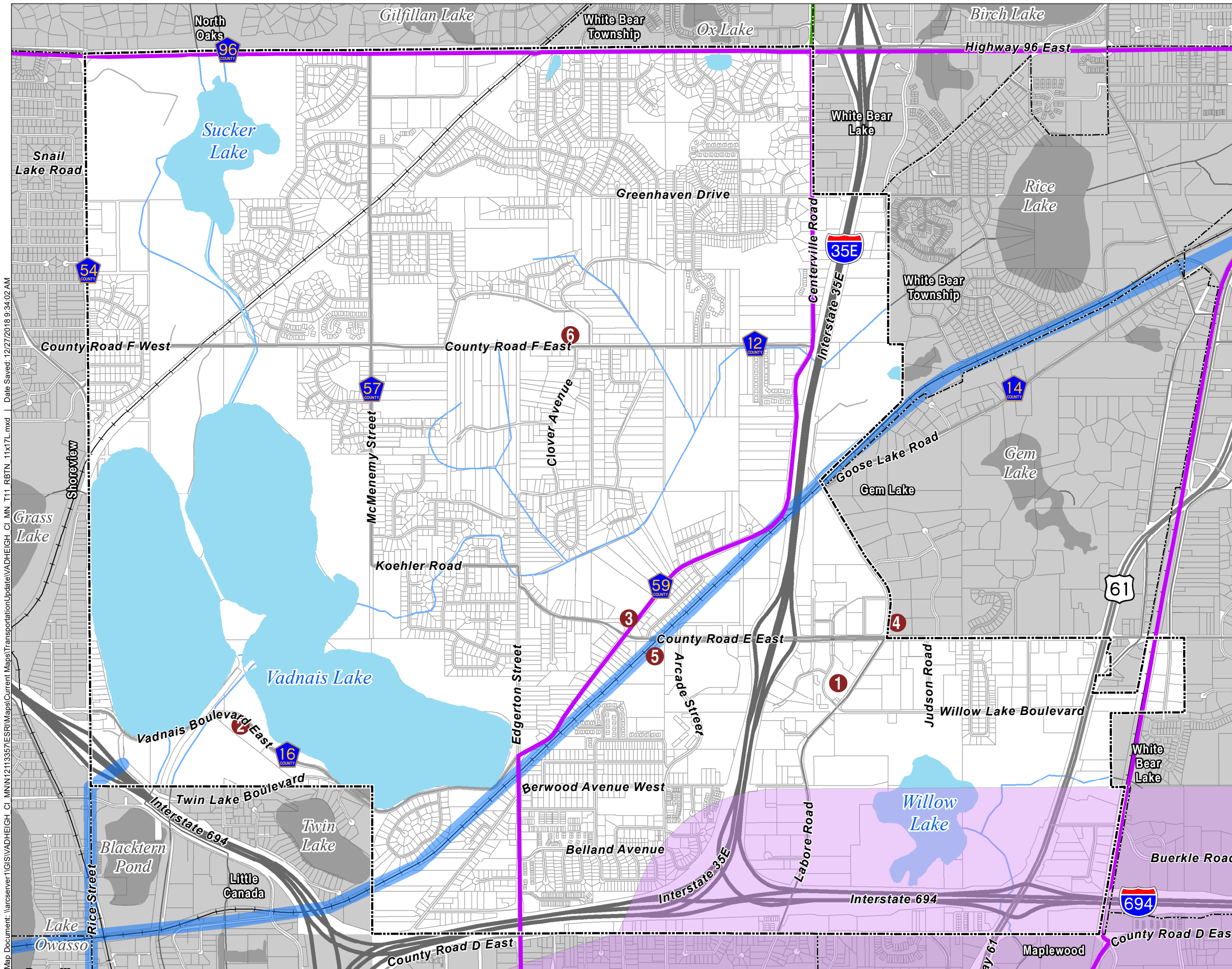
City of Vadnais Heights, Minnesota

Legend

-  Vadnais Heights City Limits
-  City/Township Boundaries
-  Lakes
-  Streams
-  Parcels
-  Railroad
-  School - WELS North
-  Schools - AFSA High
-  Schools - Vadnais Heights Elementary
-  Schools - WBL Montessori
-  Vadnais Heights City Hall
-  Vadnais Heights Commons
-  Tier 1 RBTN Alignment
-  Tier 2 RBTN Alignment
-  Regional Trail Search Corridor
-  Regional Trails - 2040 System Additions
-  Tier 1 RBTN Corridor
-  Tier 2 RBTN Corridor

0 2,000 Feet 

Source: MnGeo, City of Vadnais Heights, Ramsey County



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Ramsey County-wide Pedestrian and Bicycle Plan

Ramsey County municipalities came together to develop a countywide approach to increase physical activity through biking and walking. It empowers local communities with the tools and framework to create local pedestrian and bicycle networks with countywide and regional benefits. The plan includes a set of tools, analyses, and actions to engage communities in creating a place where people of all ages, abilities, and backgrounds can safely and comfortably walk and bike in their daily lives. It also provides resources and a guiding framework for developing a Connected Ramsey Communities Network where walking and biking are regular parts of people's daily lives throughout Ramsey County. This plan incorporates equity principles, tools, and performance measures with an emphasis on an All Abilities Transportation Network that serves all people throughout Ramsey County. Within Vadnais Heights, the plan identifies the need for bicycle facilities along County Road E, and recommends that the city and county work together to plan and implement this improvement.

Connected Ramsey Communities Network

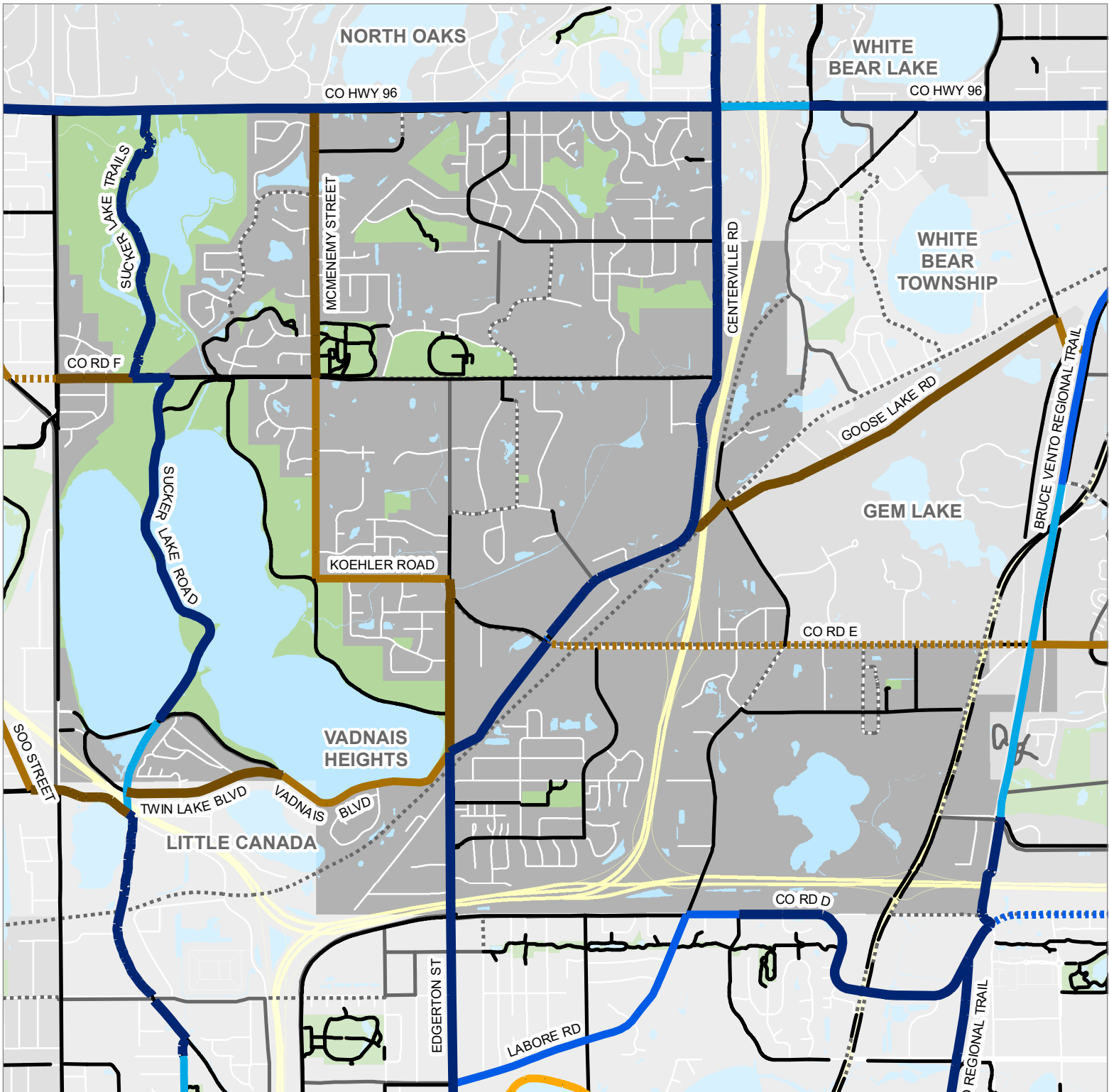
The Connected Ramsey Communities Network is a network of existing and future bikeways, designed to serve as a countywide backbone connecting local communities and the region. This network is built from local facilities and is guided by local and regional planning efforts. When fully developed, it will connect people with desirable destinations throughout the city and county with high-quality, long-distance, and connector routes. It serves as a guiding framework for planning, prioritizing, and designing local active transportation systems. The map, Connected Ramsey Communities Network- Vadnais Heights, shows the planned and existing Major Countywide Bicycle Corridors, Countywide Connectors, and local bikeways in Vadnais Heights. Connected Ramsey Communities Network- Ramsey County shows the entire network throughout the county. Within Vadnais Heights, the network designates the following alignments as Major Countywide Corridors and Countywide Connectors:

Major Countywide Corridors

- Sucker Lake Road and Sucker Lake Trails through Vadnais-Snail Lakes Regional Park (Existing and planned trails)
- Edgerton Street and Centerville Road (Existing trails and shoulders)

Countywide Connectors

- County Road E (Identified need)
- Edgerton Street, Koehler Road, and McMenemy Street (Existing shoulders)
- Vadnais Boulevard and Twin Lake Boulevard (Existing shoulders)



Connected Ramsey Communities Network

Major Countywide Corridors

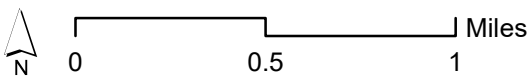
- Existing
- Planned Upgrade
- Planned
- ⋯ Identified Need

Countywide Connectors

- Existing
- Planned Upgrade
- Planned
- ⋯ Identified Need

Local Bikeways

- Existing
- Planned
- ⋯ Identified Need



Facility Improvements

As a suburb that developed from a farming community, gaps exist between sidewalk and trail connections within the city. The Parks and Trails Chapter provides information on recommended sidewalk and trail improvements, as prioritized by the City Council in 2017.

Upcoming Trends and Technology

The City of Vadnais Heights recognizes that a number of emerging trends in transportation technology are forthcoming and may have implications on future planning and development. Some of these emerging trends include autonomous vehicles (AV's), Mobility-as-a-Service (MaaS), logistics, and other communication and information technologies. As these trends and technology become accessible to the public, the City of Vadnais Heights will adapt to the shift in technology and develop smooth transitions.

Autonomous vehicles or AV's, which operate with little or no human action, have entered the market as prototypes by some automakers. Some of the components of AV's include autopilot, automatic parallel parking and other features. Research suggest that by 2040 autonomous vehicles may be the primary personal transportation mode. Furthermore, the shift towards AV's on roadways over non-autonomous vehicles will have direct impact on transportation-related fatalities, road design priorities, speed limit increases, and increased travel distances for work and play. The City of Vadnais Heights will create necessary ordinances and regulations that allow AV's to operate efficiently. Examples of changes include parking spaces in the central business district, dedicated parking and travel lanes on city streets, speed limit changes for AV's on arterials, and promotion of telecommuting and increased distance from home and work.

Mobility-as-a-Service (or MaaS) is a transportation trend already in progress through shared car services. Companies such as Uber and Lyft offer ride-sharing services and may reduce the need for personal car usage and ultimately car ownership. In addition, planning and designing for MaaS in urban settings will occur as is the practice for taxis and transit options. Furthermore, planning for parking and urban density will also need to be considered as the shift occurs. The City of Vadnais Heights will establish regulations and ordinances for MaaS by creating dedicated drop-off and pick-up lanes and parking and staging spaces for vehicles.

Upcoming trends and technology in logistics and communications such as e-shopping, telecommuting, electrification of vehicles, shared use of right-of-way, dock-less scooters/bicycles, and delivery methods will all have impacts on the transportation system. Increased volumes of freight vehicles may impact traffic volumes and capacity on existing city roadways. Therefore, considerations for freight planning and transportation in the City of Vadnais Heights might dictate suggested freight vehicle routes and shared-lanes on arterials.

Aviation

There are no public airports in or near Vadnais Heights, and the City is not in the sphere of influence of any public airport.

The airspace over Vadnais Heights is used by aircraft operating from metropolitan airports and other airports.

There are no existing or planned public aviation facilities in Vadnais Heights.

The Vadnais Heights zoning ordinance regulates the height of structures so they will not pose a hazard to air navigation including electronic interference. If needed, the City will notify the FAA as defined under code of federal regulations CFR – Part 77, using the FAA Form 7460-1, “Notice of Proposed Construction or Alternations.”

Structures that are 200 feet or higher above ground level may pose hazards to air navigation. Vadnais Heights has no existing structures of this height; does not permit such structures under its zoning ordinance, and has no plans to permit such structures in the future. Any applicant who proposes to construct such a structure is required to notify the City and the Commissioner of the Minnesota Department of Transportation at least 30 days in advance as required by law.

Freight

The figure on the following page shows the main facilities through Vadnais Heights that handle freight traffic.

There are two rail lines that run through the City of Vadnais Heights: the Canadian Pacific and the Minnesota Commercial Railway.

In addition to rail lines, freight travels through Vadnais Heights on trucks and semi-trailers on main arterial roads. Interstates 35E and 694 are Tier 1 freight corridors in the Regional Truck Freight Corridor Study (2017), indicating they are among the highest importance for the regional network. Highway 61 is classified as a Tier 3 corridor, playing a more supportive role. The approximate proportions of freight traffic on each of these routes are as follows:

- Interstate 694 – 8,200 vehicles per day, or 9% of total traffic
- Interstate 35E – 3,300 vehicles per day, or 4% of total traffic
- U.S. Highway 61 – 1,100 vehicles per day, or 4% of total traffic

Additionally, the 2040 Comprehensive plan supports regional and local goods movement by:

- Providing concentrations of industry and business.
- Building a system of minor arterial and collector roads to access locations of industry and business while supplementing the regional highway system.
- Protecting the function of the arterial and collector road systems by enforcing county and regional access management guidelines.

Canadian Pacific

Operated by the Soo Line Railroad Company until 1994, the Canadian Pacific Railway runs through the northwest section of Vadnais Heights.

Minnesota Commercial

The Minnesota Commercial Railway is used mostly for the transportation needs of manufacturers. Uses include warehouses, lumber transloads, steel transloads, and grain mills. The line runs through the center of Vadnais Heights, traveling from south of Vadnais Lake and leading up towards White Bear Lake.

Freight, Rail, and Heavy Commercial Corridors

2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

Legend

Vadnais Heights City Limits

City/Township Boundaries

Lakes

Streams

Parcels

Railroad

Class 1

Class 3

Truck Highway Corridors

Tier 1

Tier 2

Tier 3

Heavy Commercial Average Daily Traffic (HCAADT)

2012

2016

0 2,000 Feet



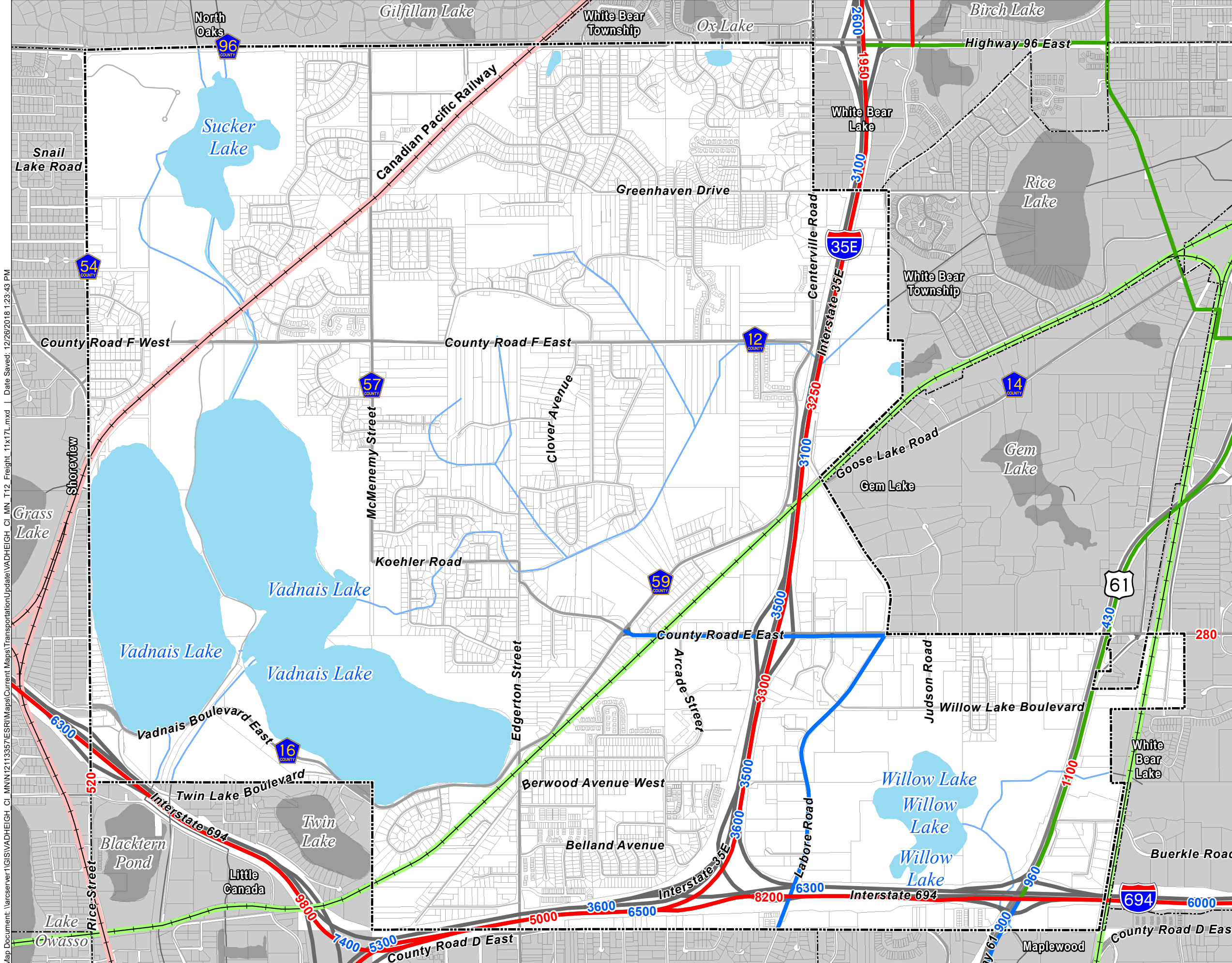
Source: MnGeo, City of Vadnais Heights, Ramsey County



Real People. Real Solutions.



December 2018



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Healthy Environment

Inspired by the Ramsey County Public Health Department and Active Living Ramsey Communities, the City of Vadnais Heights believes that it is the role of the City to increase quality of life for the citizens of the City. These issues include phenomena such as aging population, creating greater equity, and providing healthy options in all forms to its citizens. The City believes that many of these issues can be related to transportation. Those that do not have access to efficient transportation may have issues receiving the help they need, finding and keeping a job, and even having access to grocery stores for weekly shopping, something that 15.9% of adults wish they had greater access to according to Ramsey County.

Ramsey County breaks down the issues with transportation into three categories: active living, healthy food access, and equity.

Active Living

Vadnais Heights acknowledges the need for safer and higher quality trails for both pedestrians and cyclists of all ages and abilities. The City seeks to expand and connect the existing trail system and recognizes that not all trails are as safe as they could be. The City will actively pursue increasing visibility of pedestrians and cyclists to automotive users. The City also desires to make trails themselves more safe and will pursue increasing safety measures such as safety rails, increased lighting, and wayfinding signs.

Healthy Food Access

In Vadnais Heights the majority of grocery stores are located away from residential centers, with grocery stores being located on the east side of the City, and most of the residential properties being located in the west and center. The City will revisit the current codes to ensure that ride sharing and taxi services are allowed and will ensure that pedestrian and cyclist routes to sources of healthy foods are accessible and in good condition.

Equity

The City desires to increase the equity within transportation for its residents. The City is open and willing to support new innovative practices such as mobile food shelves, mobile food markets, and food delivery to those that may be unable to leave their homes.

Goals and Policies

GOAL: Maintain and improve the transportation system for drivers, transit riders, bicyclists and pedestrians.

POLICIES:

- Maintain the present road and trail system and continue to make surface improvements in conjunction with Ramsey County and the Minnesota Department of Transportation.
- Continue to support goods movement by maintaining industrial development districts and road access to those areas.
- Continue to annually improve part of the local street system.
- Continue to cooperate with and support the efforts of Ramsey County to protect or improve the traffic function of its County Roads.
- Enforce, to the degree feasible, the access management guidelines of Ramsey County when reviewing plats or site development proposals adjacent to County Roads.
- Promote transit-oriented development to increase the connectivity of people and goods and services.
- Study and implement policies concerning emerging trends and technologies in transportation, including autonomous vehicles, electric vehicles, shared use of right-of-way, and dockless scooters/bicycles.

GOAL: Work to reduce the total number of automobile trips on and their effect on Local, County or State roads.

POLICIES:

- Ensure local streets are interconnected to the extent feasible.
- Discourage cul-de-sac streets are used only to serve land otherwise inaccessible.
- Promote land uses in appropriate areas that can support public transit.
- Encourage multi-modal transportation improvements as a part of future roadway projects.

GOAL: Cooperate with regional transit planning agencies to study system improvements and supportive land use.

POLICIES:

- Support the implementation of transit along the Rush Line Corridor with appropriate land use, local road connections and local bicycling or walking connections.
- Continue to participate in area transit studies by serving on review committees and providing feedback.
- Promote development of transit routes and systems that connect residents to centers of employment and future transitway stations.

GOAL: Continue to improve facilities for walking and bicycling.

POLICIES:

- Continue to build a system of concrete sidewalks, asphalt off-road paths and paved shoulders along the major streets of the community.
- Continue to maintain and enhance the multi-modal paths in City parks.
- Promote regional trail corridor connections through the community.
- Work with Ramsey County to implement trail improvements on existing County Roads, which may or may not be associated with a roadway improvement project.



07

**WATER
RESOURCES**

Public Water Supply

The purpose of this element is to provide information regarding the City’s existing and future potable water network. This Plan provides a guide for the extension of municipal water to serve existing properties and future development. The Department of Natural Resources (DNR) also requires preparation of a Local Water Supply Plan that is included in this Appendix.

The City has adopted all appropriate water system documents, including an Emergency and Conservation Plan and a Wellhead Protection Plan. In addition, the City is actively involved with the DNR to address ongoing issues with lake levels at White Bear Lake. The City is committed to increased water conservation efforts in cooperation with other stakeholders and consultation with surrounding communities.

Existing Public Water Supply System

The City of Vadnais Heights owns and operates four wells that provide water to the system, two elevated storage facilities and an extensive distribution system of pipes ranging from four to twelve inches in diameter.

The four existing wells in the City are identified as follows:

Table 42- Municipal Water Wells	
Well	Pumping Capacity (Gallons per Minute)
1. International Drive north of Willow Lake Boulevard	1,000
2. Labore Road and Willow Lake Boulevard	1,500
3. Woodridge Drive north of Woodview Drive	1,000
4. Evergreen Drive south of Valley Oaks Road	800

Source: City of Vadnais Heights

Wells #2, #3, and #4 are used year-round. Well #1 is used seasonally during the summer months to meet increased water demand for outdoor uses. Treatment at these wells is provided with fluoride, chlorine, and poly phosphates. The City does not have, nor does it plan to construct, a separate water treatment facility.

The City owns and operates two water towers in the City:

Table 43 - Municipal Water Towers				
Tower	Location	Capacity (Gallons)	Year Built	Type of Structure
East	International Drive north of Willow Lake Boulevard	1,000,000	1980	Elevated hydropillar
West	Commerce Court east of McMenemy Road	1,000,000	1993	Elevated spheroid

Source: City of Vadnais Heights

The City’s water distribution system is approximately 300,000 feet in length. The City is served by one pressure zone. Wherever possible, the distribution system is looped to help provide for

Existing and Planned Trunk and Supply Water System

2040 Comprehensive Plan

City of Vadnais Heights, Minnesota

Legend

- Vadnais Heights City Limits
 - City/Township Boundaries
 - Parcels
 - Railroad
 - Streams
 - Well #1
 - Well #2
 - Well #3
 - Well #4
 - Water Tower
 - Extension Area
- Pipe Diameter (In.)**
- 4"
 - 6"
 - 8"
 - 10"
 - 12"
 - Unknown
 - Abandoned

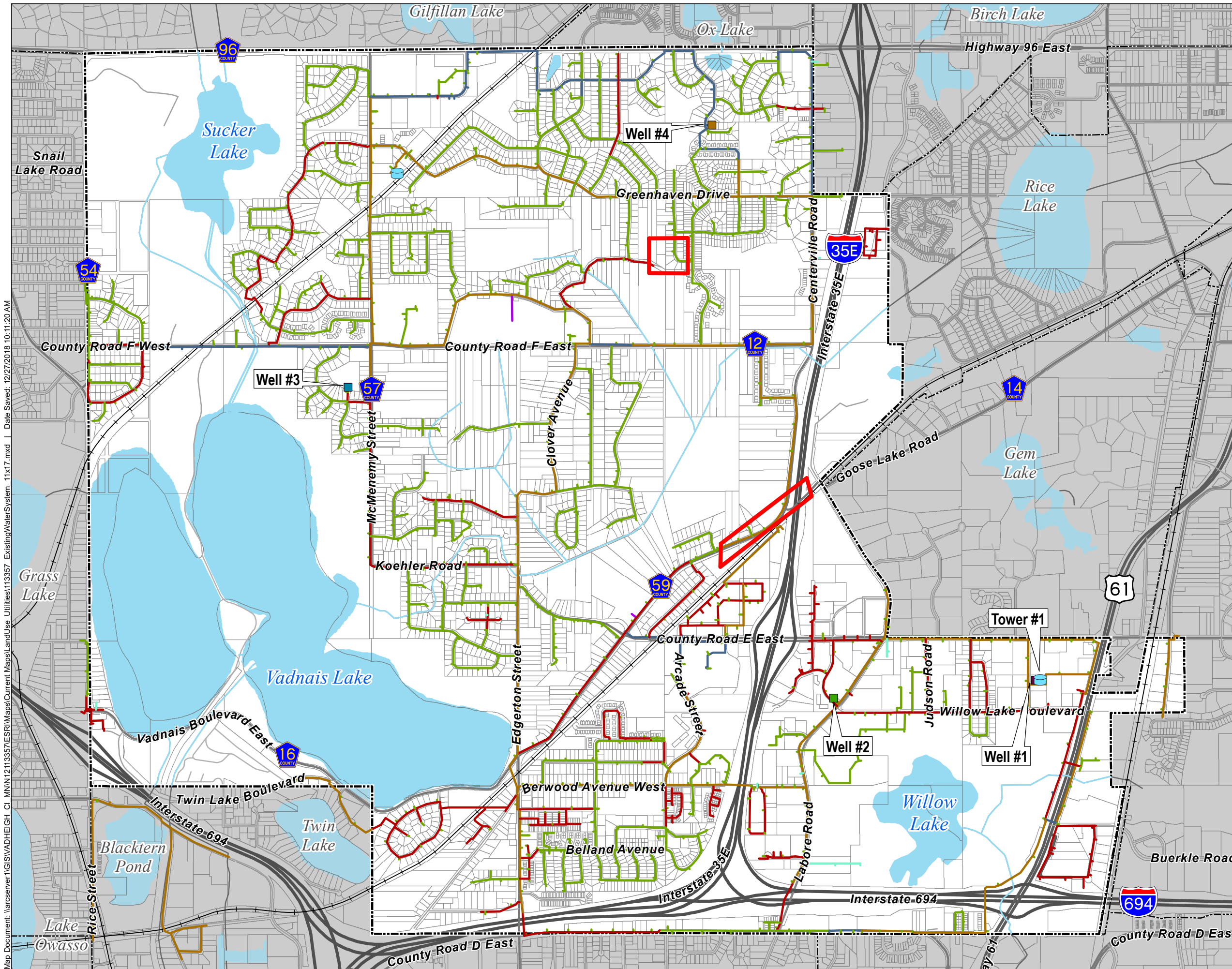
0 2,000
Feet



Source: MnGeo, City of Vadnais Heights,
Ramsey County



December 2018



uninterrupted service to customers should one particular pipe segment be out of service for repairs or maintenance. A computer model of the City's water main system has been created so that modifications or changes to the system can be tested prior to construction. Adequate fire flow is available for all properties served by the City's water system.

Quarter	Million Gallons Pumped
First	80.4
Second	129.1
Third	166.8
Fourth	86.1
TOTAL	462.4

Source: City of Vadnais Heights

Quarterly pumping figures can vary, particularly in the second and third quarters. The variables include temperature fluctuations and the amount of rain. The City's current DNR permit allows pumping of 579 million gallons per year.

The vast majority of water use is for residential service. The City has the appropriate City Code language in place for conservation of water wherever possible. This is particularly important for use of lawn water sprinkling. The City has an odd-even sprinkling restriction in place between June 1 and September 15. Further limitations on residential lawn sprinkling may be considered in the future.

In 2018-2019, the City underwent a conversion to radio reads on water meters serving private properties. The previous system was antiquated and did not provide timely readings and the accuracy of the reads had deteriorated over time. The approximately \$1.5 million dollar investment to implement the latest technology allows for more timely and accurate reads and increased the level of service to residents and businesses.

Water Demand Forecast

The estimated demand for water in Vadnais Heights is shown by the following table, which is based on the forecast of households and jobs included in this Comprehensive Plan.

Year	Average Daily (MG)	Average Annual (MG)
2020	1.26	460
2030	1.24	452
2040	1.27	464

Source: City of Vadnais Heights

System Extensions

The City's existing water supply system is adequate to serve the existing and forecast growth of the community. However, the southwestern sector of the City has considered extending water main from Vadnais Boulevard to the existing water main in Rice Street owned by the City of Shoreview. This area could also

provide water main to the area currently used by the Five Star Estates Manufactured Home Park, which is currently served by a private community well system and a two-inch distribution system.

Service to other Communities

The City has an agreement to provide water service to numerous commercial properties in the City of White Bear Lake located on the east side of Centerville Road south of County Road 96. A similar agreement is in place to provide water service to certain residential areas in the City of Gem Lake along County Road E. Similar agreements exist with the Cities of Shoreview and White Bear Lake to provide water service to properties in Vadnais Heights, along Rice Street and White Bear Parkway, respectively.

Emergency Interconnections

The City has two emergency interconnections with adjacent communities:

1. Buerkle Road with the City of White Bear Lake.
2. Rice Street with the City of Shoreview.

Further emergency interconnections may be considered with White Bear Township and Little Canada, but there are no pressing needs at this time.

Water System Goals and Policies

GOAL: Maintain a safe, clean, and cost-effective water supply system.

POLICIES:

- Require testing and independent analysis.
- Conduct seasonal hydrant flushing.
- Implement seasonal sprinkling restrictions.
- Complete capital improvement projects to maintain infrastructure.
- Administer a tiered utility rate structure so that larger users pay appropriately higher water costs.
- Consider extension of water utilities to surrounding communities to service future development, as long as the system is capable and without compromising the ability to service Vadnais Heights' properties.

Surface Water Management

This section was adapted from the Executive Summary of the most recent Surface Water Management Plan, completed in 2018.

The City has been committed to addressing surface water management issues since well before the first storm water management plan was adopted in 1990. The purpose of the Surface Water Management Plan update is to meet regulatory requirements and to protect and improve surface and ground water resources within the City. Minnesota Statutes, Sections 103B.201 to 103B.255 and Minnesota Rule, Chapter 8410 comprise the State's Metropolitan Surface Water Management Program (MSWMP). These Statutes and Rules require the preparation of local (City) water management plans.

Existing Surface Water Management System

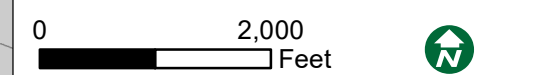
2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

Legend

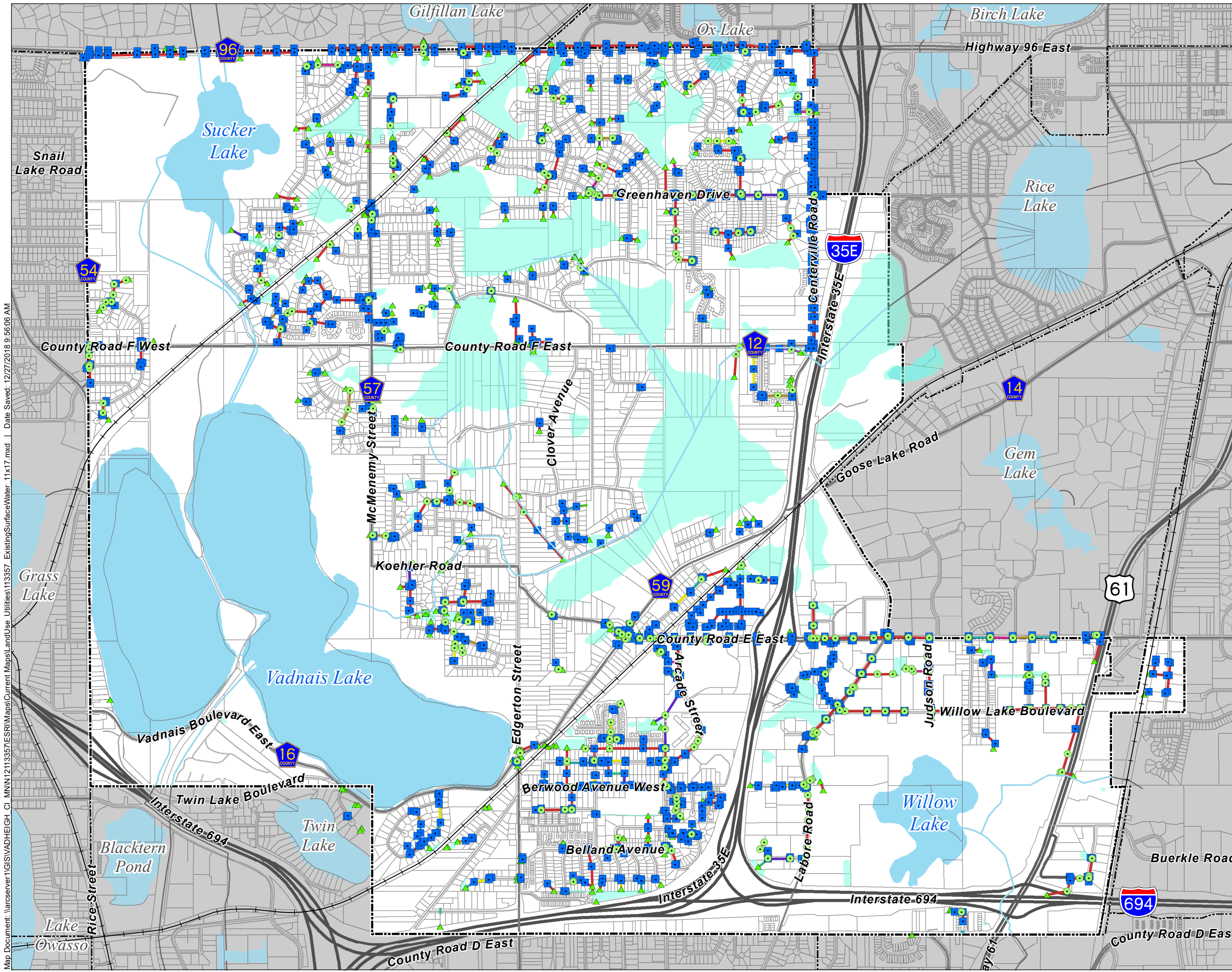
- Vadnais Heights City Limits
- City/Township Boundaries
- Parcels
- Railroad
- Streams
- Storm Manhole
- Storm Control Structures
- Storm Catch Basin
- Storm Apron
- Storm Ponds

Pipe Diameter (In.)

	Blank		24"
	6"		27"
	8"		30"
	12"		33"
	15"		36"
	18"		42"
	21"		48"
			Abandoned



Source: MnGeo, City of Vadnais Heights, Ramsey County



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The City is within the administrative boundaries of two watershed management organizations, the Vadnais Lake Area Watershed Management Organization (VLAWMO) and the Ramsey Washington Metro Watershed District (RWMWD), both of which have recently completed Watershed Management Plan updates.

The major waterbodies in the City include Vadnais Lake (East and West), Sucker Lake and Willow Lake. East Vadnais Lake and Sucker Lake are part of the St. Paul Regional Water Service (SPRWS) system supplying drinking water to customers in the St. Paul area. In VLAWMO, the City serves as the permitting authority and review agency for land development. VLAWMO does not operate a regulatory program for development, but does comment on development plans. They serve as the local government unit (LGU) for wetland impacts and administering the Wetland Conservation Act. In RWMWD, the watershed district operates a permitting program that regulates land development including stormwater management and WCA administration. Other agencies that have a role in management of water resources within the City include Ramsey County, the Minnesota Department of Natural Resources (MnDNR), Minnesota Pollution Control Agency (MPCA), the U.S. Army Corps of Engineers, and the Board of Water and Soil Resources (BWSR).

Storm Sewer System

The City owns and operates an extensive network of pipes and ponds. The pipes range in size from 12-36 inches in diameter. There are approximately 80 ponds and over 1,000 manholes and catch basins.

Existing Surface Water Management System

Proper management of surface water is paramount to Vadnais Heights, and the City has long been a steward of its surface water and recognized it as a natural amenity to the community.

Vadnais Heights has slight to moderate topographic relief variation. Throughout the City, there is a moderate amount of natural surface depressional storage. The soils within the City are varied with areas of clay or well drained sandy soils with numerous muck-filled depressions. The City's surficial geology consists of unconsolidated glacial deposits ranging from approximately 50 to 300 feet in depth beneath which lies the bedrock.

Land development is nearly complete, with only a few parcels throughout the City that remain undeveloped. Vadnais Heights has thirteen park areas throughout the City. Ramsey County Open Space and the St. Paul Regional Water Services property also provide large natural undeveloped areas. These areas provide important wildlife habitat as well as aesthetic benefits for the City.

Lakes within Vadnais Heights include Sucker Lake, East and West Vadnais Lake, and Willow Lake. All three lakes are DNR Public Waters. The east and west basins of Vadnais Lake are separated by a north-south causeway with no direct hydraulic interconnection. Lambert Creek/County Ditch 14 is the main outlet for stormwater runoff in the City and also transfers drainage from four other upstream communities into East Vadnais Lake. Also draining to Ditch 14 are four branch ditches that are located completely within, and drain only the City of Vadnais Heights. Willow Lake lies near the headwaters of a tributary area of the Kohlman-Phalen Lake system in RWMWD. The following table provides summary information on the lakes within the City.

Lake	Identification Number	Surface Area	Maximum Depth	Transparency*
East Vadnais Lake	62-0038-01	379 acres	58 feet	3 meters
West Vadnais Lake	62-0038-02	208 acres	9 feet	1 meter
Sucker Lake	62-0028-00	59 acres	24 feet	2 meters
Willow Lake	62-0040-00	30 acres	30 feet	1 meter

*Ten-year summer average (June-September) from 2006-2015

Source: MPCA Lake and Stream Water Quality Dashboard

Existing and Potential Water Resource Areas/ Challenges

The following water quantity/drainage issue areas are identified in the Surface Water Management Plan:

- Greenhaven Addition wetland complex, generally bounded by McMenemy Street, County Highway 96, Thornhill Lane and County Road F
- Lambert Creek/Ramsey County Road Ditch 14 in the vicinity of Pennington Place
- Branch Ditch #5A in the vicinity of Bear Avenue North
- Edgerton Street beneath the railroad trestle
- Branch Ditch #5A north of County Road F in Community Park

In addition to the drainage issues identified, there are four impaired waters in the City of Vadnais Heights as summarized in the table below. A water is considered impaired if it fails to meet one or more water quality standards set by the MPCA.

Water Body	AUID	Affected Designated Use	Pollutant or Stressor	TMDL Completion Date
East Vadnais Lake	62-0038-01	Aquatic Consumption	Mercury in fish tissue	2007
West Vadnais Lake	62-0038-02	Aquatic Recreation	Nutrient/eutrophication biological indicators	2024
Sucker Lake	62-0028-00	Aquatic Consumption	Mercury in fish tissue	2007
Lambert Creek	07010206-801	Aquatic Recreation	Fecal Coliform	2014
Gillfillan Lake	62-0027-00	Aquatic Recreation	Nutrient/eutrophication biological indicators	2014
Kohlman Lake	62-0006-00	Aquatic Life, Aquatic Recreation	Chloride, Nutrient/eutrophication biological indicators	2010

Source: MPCA Impaired Waters List (2016) and MPCA Draft Impaired Waters List (2018)

In addition to having water quality impairments, Vadnais Lakes and Sucker Lake are on the Minnesota DNR's Infested Waters List for Zebra Mussels (listed in 2007) and Eurasian watermilfoil (listed in 1989 and 1995, respectively). Invasive species are species that are not native to Minnesota and cause economic or environmental harm or harm to human health.

Potential water resource related issues the City faces are climate change and groundwater sustainability. The City recognizes the importance of resiliency. The City has amended their stormwater management standards to recognize the updated Atlas 14 depths and distributions and will endeavor to continue to adapt its policies and standards with the climate change trends. Vadnais Heights is located within the North and East Metro Groundwater Management Area, which has been studied by the MnDNR. Groundwater sustainability objectives have been established to help appropriation permit holders plan for their future water use.

Surface Water Management Goals and Policies

The Surface Water Management Plan (SMP), completed in 2018, and adopted by the City on October 16, 2018, includes identification and prioritization of capital improvements, administration, inspections, permitting, plan amendments, financing alternatives, public involvement and monitoring programs. The SWMP was approved by Vadnais Lake Area Water Management on June 27, 2018 and by Ramsey Washington Metro Watershed District on August 1, 2018. The goals and policies are to be used as a guide in the design and construction of private and public developments affecting water resources in the City.

GOAL: Provide for future development/redevelopment while minimizing surface water issues and enhancing the environment.

POLICIES: Maintain and improve the following in the community and other affected jurisdictions:

- Water quantity.
- Water quality.
- Erosion and sediment control.
- Wetlands.
- Public participation, information, and education.
- Maintenance and inspection.
- Recreation, fish and wildlife.
- Review and update Water Management Overlay Zoning District standards as needed.
- Analyze and consider appropriate measures to reduce salt use on local roadways.

GOAL: Implement the SWMP.

POLICIES:

- Conduct MS4 regulatory activities.
- Design stormwater treatment for future development/redevelopment projects.
- Cooperate with VLAWMO to complete SLMP's.
- Adopt Environmental Protection Ordinance.
- Adopt ISTS Ordinance.
- Clean and monitor culverts.
- Address ponding on Edgerton Street, in cooperation with Ramsey County.
- Implement any needed improvements to connect Grass and Vadnais Lakes, following an assessment.
- Restore and stabilize Lambert Creek.
- Prepare a feasibility study and identify internal load management strategies and implementation projects.
- Partner with VLAWMO, City of North Oaks, and SPRWS on a feasibility study regarding the effect on water quality due to possible increased pumping of water by SPRWS.
- Continue to implement a street sweeping program.
- Maintain city-owned BMP's.

Best Management Practices

The City follows “best management practices” in the maintenance of its portion of the watershed as described in the SWMP. These include:

- Public education and outreach.
- Public participation and involvement.
- Illicit discharge detection and elimination.
- Construction site stormwater runoff control.
- Post-construction stormwater management.
- Pollution prevention.

Land Use Plan Maps and Zoning Regulations

The City’s wetlands and lakes are designated “Wetland” or “Open Water” on the Land Use Plan map and designated Water Management Overlay District on the Zoning Map.

The boundaries of the wetlands shown on the Future Land Use Plan map of this Comprehensive Plan are approximate and are intended as a guide only. An up-to-date delineation by a wetland expert is required for site plan, excavation, subdivision or grading applications.

The Water Management Overlay Zoning District satisfies the Minnesota Department of Natural Resources requirements for flood-plain and shoreland ordinances as well as the requirements of the Minnesota Wetland Conservation Act.

Wastewater Management

The purpose of this chapter is to provide a summary of the existing and future sanitary sewer needs of the City, including its forecast population and employment. The updated plan provides a guide for the extension of sanitary sewer lines to ensure that all portions of the 2040 growth area can be adequately served. The City has a Sanitary Sewer Collection Plan that identifies the current network of pipes and manholes, including specific system details and background information.

Existing Sanitary Sewer System

The collection and treatment of sanitary wastewater is a primary function of the City and the Metropolitan Council Environmental Services (MCES). All properties served within Vadnais Heights ultimately flow to MCES interceptor laterals. The vast majority of the City’s collection system flows via gravity toward a 48-inch MCES interceptor that flows from north to south through the center of the City.

Since the City is nearly fully developed, the vast majority of properties are connected to the public sanitary sewer collection network. It is expected that all properties within the City will eventually be served by the system. The City operates one lift station that is located on Meadowood Lane, west of McMenemy Road. It serves approximately 200 homes. All other existing sanitary sewer flows via gravity.

Existing and Planned Sanitary Sewer System

2040 Comprehensive Plan
City of Vadnais Heights, Minnesota

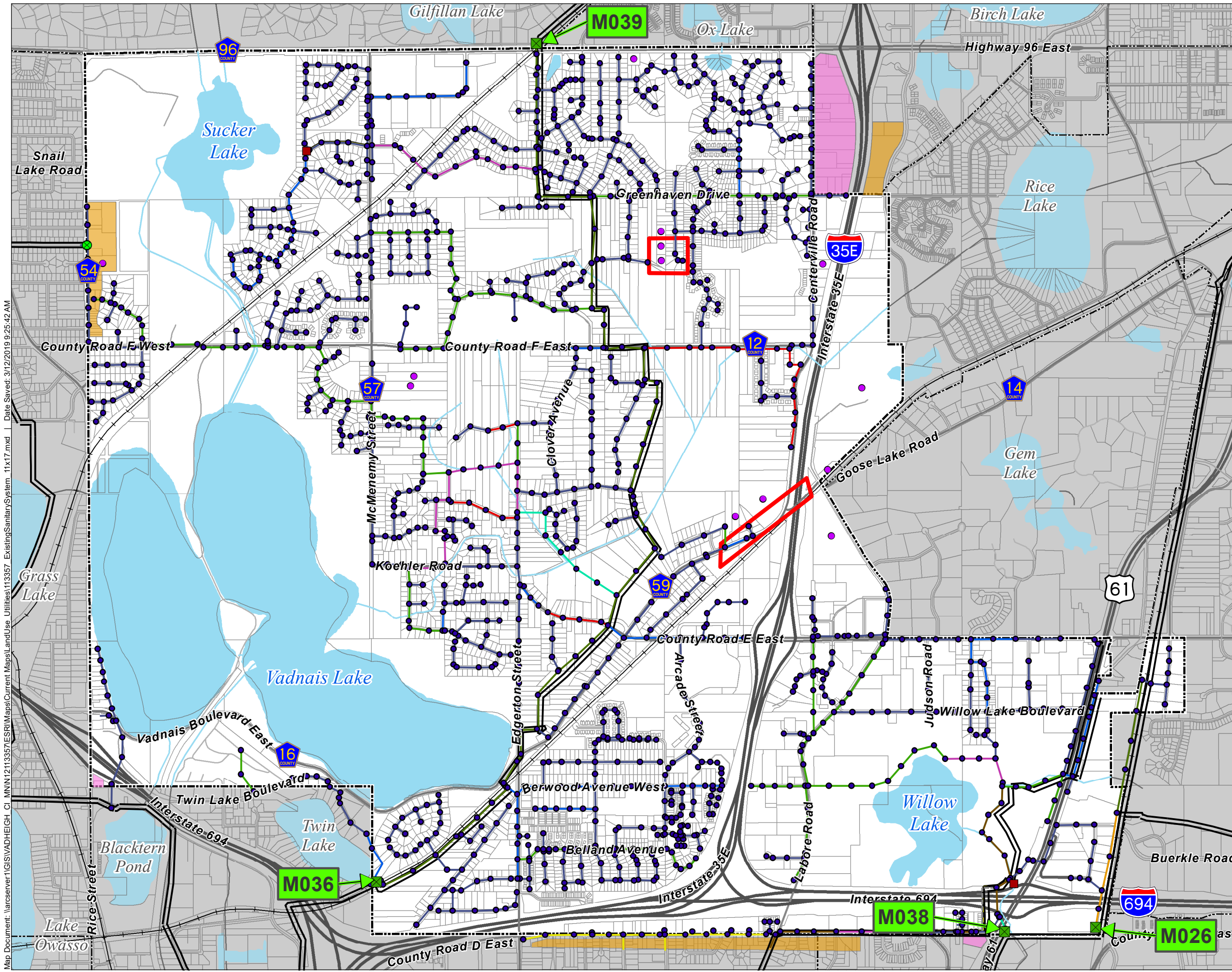
Legend

- Vadnais Heights City Limits
- City/Township Boundaries
- Railroad
- Streams
- Manhole
- Lift Station
- Meter Manhole
- MCES Meter
- Properties with SSTS Systems
- Extension Area
- Neighboring Community Properties Vadnais Serves
- Vadnais Property Served by Neighboring Community

Sanitary Pipe Diameter (In.)

- 6" (Green)
- 8" (Blue)
- 9" (Red)
- 10" (Light Blue)
- 12" (Light Green)
- 15" (Pink)
- 18" (Brown)
- 21" (Cyan)
- 24" (Purple)
- 36" (Orange)
- 42" (Dark Green)
- Unknown (Yellow)
- Abandoned Gravity Main (Dashed Grey)
- MCES Interceptor (Thick Black)
- 6" Forcemain (Thin Green)
- Abandoned Forcemain (Thin Grey)

0 2,000 Feet



Source: MnGeo, City of Vadnais Heights, Ramsey County

Map Document: \\arscserver1\GIS\WAD\HEIGH_CI_MNIN12113357\ESRI\MapServer\Current\Maps\LandUse_Utillites\113357_ExistingSanitarySystem_11x17.mxd | Date Saved: 3/12/2019 9:25:42 AM

The City owns and maintains approximately 54 miles of trunk and lateral sanitary sewer lines that traverse the community. The pipe sizes range from 8-21 inches in diameter. The total length of sanitary sewer system within the City is approximately 300,000 feet. The majority of pipe materials are either vitrified clay pipe (VCP) or polyvinylchloride plastic pipe (PVC).

Metropolitan Sewer Service

The City is served by the three regional sewer interceptor lines listed in the table below and two metershed districts. No new trunk systems are anticipated. Metershed M036 serves the entire City west of Interstate 35E, which is approximately three-fourths of the community. The remaining quarter of the City east of I-35E is served by metershed M038. The two interceptors serve the City with a total capacity of 2.5 million gallons per day.

Table 48 - Metropolitan Sewer Interceptors, Capacities & Flows, 2010				
Interceptor	Capacity (million gallons/day)	Meter	Meter ADF (Gross) 1-1-17 - 12-31-17 MGD	Metershed ADF (Net) 1-1-17 - 12-31-17 MGD
1-VH-422	14	M036	3.229	1.000
7122	10	M026	4.391	---*
1-VH-423	2.5	M038	0.244	0.244

* M026 metershed measures flow from White Bear Lake. A small area of southeast Vadnais Heights is also directed to M026 and the unmetereed flow is estimated. Source: Metropolitan Council

The 2017 sanitary sewer flow for residential properties was approximately 241,000,000 gallons. The total 2017 sewer flow for all properties was approximately 310,000,000 gallons.

The table below shows the forecast changes in demographics and sewage flow. The estimated total outflow when the City is fully developed (after year 2030) 446,000,000 gallons per year.

Table 49 - Demographic and Wastewater Flow Projections by Service Area						
	2020		2030		2040	
Households	5700		6100		6300	
Population	13300		13800		14100	
Employment	8400		10100		11200	
Range of Monthly Wastewater Flows (MDG)	Low	High	Low	High	Low	High
Service Area M036	0.6	0.674	0.661	0.741	0.688	0.769
Service Area M038	0.475	0.534	0.488	0.547	0.508	0.568
TOTAL (MDG)	1.075	1.208	1.149	1.288	1.196	1.337

Source: Metropolitan Council and the City of Vadnais Heights

Table 50- Growth Forecasts by Service Area						
Service Area	M036			M038		
Year	2020	2030	2040	2020	2030	2040
Population	7,420	7,939	8,109	5,880	5,861	5,991
Household	3,180	3,509	3,623	2,520	2,591	2,677
Employment	4,965	5,810	6,441	3,935	4,290	4,759

Inflow and Infiltration

Inflow and infiltration (I/I) are terms for the ways stormwater runoff and groundwater (clear water) make their way into the sanitary sewer system. With inflow, clear water enters the regional wastewater system through rain leaders, sump pumps, storm sewer cross connections, and foundation drains connected to sanitary sewer pipes. Inflow is greatest during major storm events and can more than triple wastewater volumes. Infiltration is a more gradual process, and occurs when water seeps into sanitary sewer pipes through cracks, leaky pipe joints and/or deteriorated manholes.

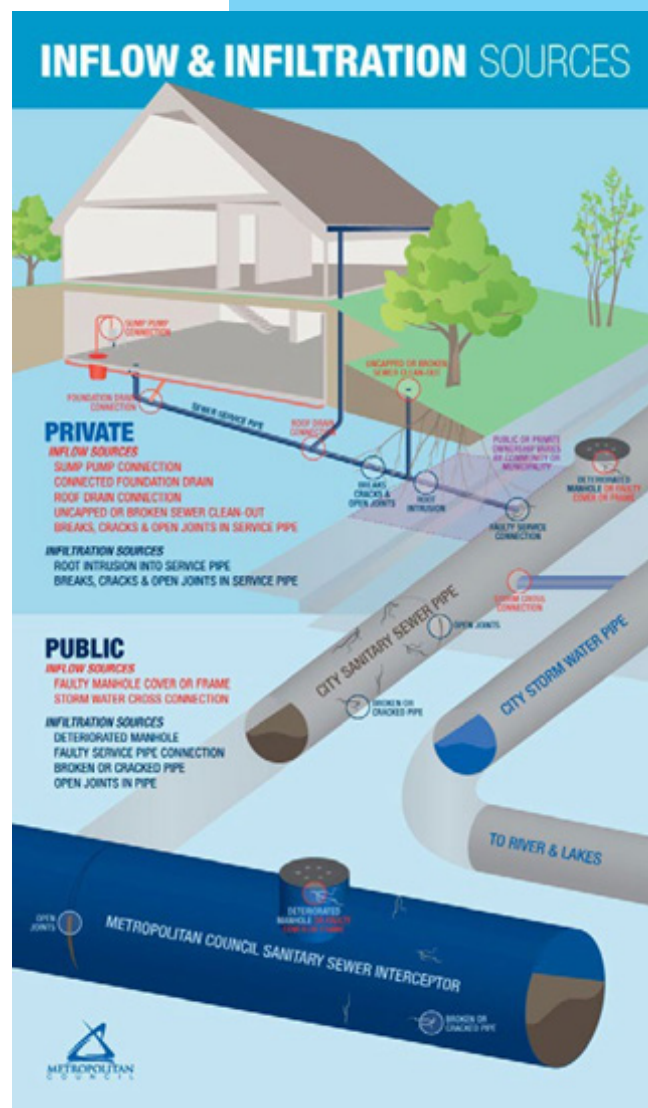
Excessive I/I in sewer systems create multiple problems:

- Expensive treatment of clear water
- Reduced interceptor capacity
- Water quality
- Less recharge to aquifers

The City is and will continue to address I/I matters to minimize unnecessary flow into the sanitary sewer system. In 2011, a residential sump pump inspection program was completed. All houses were either compliant or altered their plumbing to eliminate connections to sanitary sewer. Clearwater flow has not been measured or estimated beyond excessive flow monitoring performed by MCES. An analysis has not been completed to measure the amount of clear-flow generated from the municipal public and private sewer systems. Schedules and funding have yet to be determined, but such an analysis would be completed in conjunction with I/I reduction efforts.

The City has an annual sanitary sewer-televising program as part of street rehabilitation projects and any problems are addressed before street reconstruction. The City also undertakes an annual sewer-lining project in areas suspected to be have I/I potential and annually lines approximately 7,000-8,000 feet of sanitary sewer through a public bidding process.

The City continues to seek improvement in reducing potential I/I. A citywide sewer-televising project is under consideration for 2019. An additional program under consideration is facilitating private sanitary sewer service inspections and repairs. This either could take the form of a new utility program or included as part of annual street reconstruction program activities. Additional emphasis will certainly be placed on private connections when the public system relining process is nearing completion, which is 10+ years out. Schedules and funding remain to be determined, but it is expected that existing utility fees will be adequate as existing fund sources are reallocated to new improvement initiatives.



Private Sewage Treatment Systems

The City's records indicate that thirteen properties are currently served by private sub-surface sewage treatment systems (SSTS); all but one of these properties are residential. The only commercial property currently served by an SSTS is Structural Wood Corporation, located at the north end of Labore Road. It is anticipated that a lift station would be necessary to serve them and the flow would be minimal unless redevelopment of the surrounding properties occurs. There are no other known public or privately-owned Community Wastewater Treatment Systems.

The City Code contains regulations for private sewage treatment systems, which incorporates the provisions of Minnesota Administrative Rules Chapter 7080 (MPCA). The regulations include permissible system standards, prohibits installation of new private systems where public sewer is available, requires permitting for installation, alteration, repair, or extension, contractor licensing requirements, and penalties for non-compliance. Property owners are required to submit pumping reports for existing private systems to the City. Due to the low number of private systems in operation, the reporting and review process is sufficient to ensure property owners are performing the system maintenance. Once Ramsey County updates their ordinance, the City will consider any necessary amendments.

Inter-Jurisdictional Flows

The City has agreements with the Cities of Little Canada, Shoreview, Gem Lake, and White Bear Township to provide sanitary sewer service for properties in isolated areas, which are necessary due to topographic conditions and is the most efficient way to serve these properties. These agreements outline methods of payment for sanitary sewer flow. In most cases, the Metropolitan Council Environmental Services (MCES) makes a flow correction to account for services outside of the City.

There are 18 residential properties served by the City of Shoreview located along Rice Street, north of County Road F.

There are approximately 200 apartment units served by the City of Little Canada, located along portions of County Road D on the southern border of the City.

There are several commercial properties served by White Bear Township, located along White Bear Parkway just east of I-35E and south of Highway 96.

The City provides wastewater service to 13 commercial properties in the City of White Bear Lake, located on the east side of Centerville Road.

The North Oaks Country Club has expressed interest in connecting their clubhouse to City sanitary sewer, but no plan or agreements are in place.

Table 51 - Summary of Water Quality

MCES Me- tershed	Flow From	Flow to	Address	City	Water Billed By:	Sanitary Sewer Billed by:	Number of Units
M026	VH	WBT	4205 White Bear Parkway	VH	WBT	WBT	1
M026	VH	WBT	4215 White Bear Parkway	VH	WBT	WBT	1
M026	VH	WBT	4225 White Bear Parkway	VH	WBT	WBT	1
M026	VH	WBT	4255 White Bear Parkway	VH	WBT	WBT	1
M026	VH	WBT	4301 White Bear Parkway	VH	WBT	WBT	1
M035	VH	LC	669 County Rd D East	VH	VH	LC	24
M035	VH	LC	689 County Rd D East	VH	VH	LC	24
M035	VH	LC	745 County Rd D East	VH	VH	LC	8
M035	VH	LC	755 County Rd D East	VH	VH	LC	1
M035	VH	LC	777 County Rd D East	VH	VH	LC	1
M035	VH	LC	801 County Rd D East	VH	VH	LC	36
M035	VH	LC	831 County Rd D East	VH	VH	LC	24
M035	VH	LC	855 County Rd D East	VH	VH	LC	24
M035	VH	LC	869 County Rd D East	VH	VH	LC	24
M035	VH	LC	901 County Rd D East	VH	VH	LC	24
M035	VH	LC	915 County Rd D East	VH	VH	LC	24
M035	VH	LC	947 County Rd D East	VH	VH	LC	24
M035	VH	LC	961 County Rd D East	VH	VH	LC	24
M035	VH	LC	973 County Rd D East	VH	VH	LC	4
M035	VH	LC	983 County Rd D East	VH	VH	LC	1
M035	VH	LC	985 County Rd D East	VH	VH	LC	1
M035	VH	LC	987 County Rd D East	VH	VH	LC	1
M035	VH	LC	989 County Rd D East	VH	VH	LC	1
M035	VH	LC	991 County Rd D East	VH	VH	LC	1
M035	VH	LC	993 County Rd D East	VH	VH	LC	1
M035	VH	LC	995 County Rd D East	VH	VH	LC	1
M035	VH	LC	997 County Rd D East	VH	VH	LC	1
M035	VH	LC	999 County Rd D East	VH	VH	LC	1
M035	VH	LC	1001 County Rd D East	VH	VH	LC	1
M035	VH	LC	1003 County Rd D East	VH	VH	LC	1
M035	VH	LC	1005 County Rd D East	VH	VH	LC	1
M026	WBL	VH	4320 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4336 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4350 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4444 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4452 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4466 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4470 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4480 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4485 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4500 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4520 Centerville Rd	WBL	VH	VH	1
M026	WBL	VH	4540 Centerville Rd	WBL	VH	VH	1
M038	GL	VH	1201 Cty Rd E East	GL	VH	VH	1

Future Sanitary Sewer System

Localized improvements may be needed to accommodate foreseeable growth and redevelopment. Otherwise, the current system is adequately-sized to serve the City's current and forecast growth needs.

Sanitary Sewer Line Extensions

The City has identified two specific areas where sanitary sewer extension is necessary.

1. Commercial Property Along Labore Road: Sanitary sewer is available along Labore Road approximately 600 feet north of Goose Lake Road. Further extension to serve the commercial and industrial properties will require a lift station.
2. Residential Area East of North Oak Drive and North of County Road F: There are currently four residential properties that have on-site sanitary sewer systems in this area. In addition, there is city-owned undeveloped property located north of County Road F, commonly referred to as the Staeheli property that could be developed in the future. This area is not currently served by any public utilities and the existing roads are substandard.

Wastewater Management Goals and Policies

GOAL: Maintain and improve the wastewater system to serve existing and future development.

POLICIES: Maintain and improve the following in the community and other affected jurisdictions:

- Require properties to connect to the system when appropriate, as part of utility or road reconstruction projects, when feasible.
- Continue to implement the annual sanitary sewer televising program and address any issues as part of street reconstruction projects.
- Continue to implement the annual sanitary sewer lining program in areas suspected to have I/I potential.
- Plan for localized improvements and expansions to accommodate foreseeable growth and redevelopment.
- Consider extension of wastewater utilities to surrounding communities to service future development, as long as the system is capable and without compromising the ability to service Vadnais Heights' properties.



08

IMPLEMENTATION

Plan Implementation Program

Implementation of the recommendations proposed in this Plan can be accomplished using a variety of tools. The City can regulate land, offer incentives for its development and undertake its own improvement projects. The Vadnais Heights 2040 Comprehensive Plan must respond to the changes that occur in the community and real estate market that affect residents and businesses. This chapter describes how the plan's usefulness will be monitored and how it may be amended.

Implementation Objectives

- **Official Controls:** Amend the Zoning Ordinance and Map for consistency with the goals and objectives of the Plan.
- **Review and Amendments:** Periodically review and amend the Plan as necessary, at least once every ten years.
- **Consistency with the Plan:** Try to align all major City actions, spending and ordinances with the Plan.
- **Housing Implementation Program:** Adopt official controls, fiscal tools, or incentives contained in the Plan.
- **Public Improvements:** Continue to improve roads, utilities, parks, public buildings and certain public spaces through a multi-year capital improvements program and partnerships with benefitting landowners.

Official Controls

Zoning Ordinance and Map

The Zoning Ordinance is contained within the City Code and the location of specific districts are shown on the Zoning Map, which are discussed in the Land Use chapter. The City anticipates only minor amendments to the Zoning Ordinance text in order to implement the Plan. However, Zoning Map amendments will be undertaken as needed when land use changes consistent with the Plan are proposed.

Subdivision Ordinance

The Subdivision Ordinance is contained within the City Code and includes regulations and procedures to establish a pattern for future development in the City. In order to promote orderly and equitable development of the City, the Subdivision and Zoning Ordinances should be aligned. The City does not anticipate any significant amendments to the Subdivision Ordinance in order to implement this Plan.



Table 52 - Zoning Districts

District	Purpose
Residence One (R-1)	Provide for low density single-family detached and two-family dwelling uses and directly related complementary uses.
Residence Two (R-2)	Provide for moderate density residential development through any of a variety of housing types.
Residence Three (R-3)	Provide for medium- to high-density housing in multiple-family structures and directly related complementary uses.
Residence Four (R-4)	Provide for the creation of medium-density manufactured home communities.
Commercial One (C-1)	Provide for the establishment of local centers for convenient retail or service outlets which deal directly with the customer for whom the goods or services are furnished. These centers are to provide services and goods primarily for the surrounding neighborhoods and are not intended to draw customers from the entire community.
Commercial One-A (C-1A)	Provide for the establishment of local centers for convenient retail or service outlets which deal directly with the customer for whom the goods or services are furnished. The uses allowed in this district are to provide services and goods primarily at the neighborhood scale, and secondarily at the city market scale in areas adjacent to Interstate 694.
Commercial Two (C-2)	Provide for low-intensity retail or service outlets which deal directly with the customer for whom the goods or services are furnished. The uses allowed in this district are to provide goods and services on a community market scale and located in areas which are well served by collector or arterial street facilities.
Commercial Two-A (C-2A)	Provide for low-intensity retail or service outlets which deal directly with the customer for whom the goods or services are furnished. The uses allowed in this district are to provide goods and services on a community market scale and located in areas which are well served by collector or arterial street facilities.
Commercial Three (C-3)	Provide for the establishment of businesses with need for great amounts of outdoor storage of vehicles as well as those which generate great amounts of vehicular traffic.
Office (O)	Provide for large-scale office and related service commercial development that may be incompatible with other land use categories. The office district may serve to complement commercial and industrial land uses or it can stand by itself in the form of an office park or large individual concern engaged in office-oriented activity.
Office-Business (O-B)	Provide for large-scale office buildings, related service businesses, and other businesses and light industries that complement the appearance of the office environment.
Industrial (I)	Provide for light manufacturing, warehousing, and supportive uses in a functional, attractive manner which does not unduly affect the development or use of nearby properties.
City Center (CC)	Intended to help implement the goals and policies of the city comprehensive plan and the city center plan, including subsequent updates to both plans. District regulations are designed to provide flexibility for development that ensure the ability to require that development plans meet the spirit of the city center plan and city comprehensive plan. It is the intent of these regulations to provide a framework for creative development, uses and relationships and to encourage innovative and unique places. The zoning district regulations are used in combination with the goals and objectives of the city center plan.
Planned Unit Development (PUD)	As an alternative to conventional zoning and development approaches and processes, the planned unit development zoning district (PUD) procedures are here set forth in order that the public health, safety, morals, and general welfare be furthered in an era of increasing urbanization; to encourage innovations in residential, commercial, and industrial development and renewal; so that greater opportunities for better housing and recreation, shops and industrial plants conveniently located to each other may extend to all citizens and residents of the city; to reflect changes in the technology of land development; to encourage a more creative approach in the utilization of land in order to accomplish a more efficient, aesthetic, and desirable development which may be characterized by special features of the geography, topography, size or shape of a particular property; and to provide a compatible and stable environment in harmony with that of the surrounding area.
Water Management Overlay	Intended to satisfy state department of natural resources (DNR) requirements for floodplain and shore land ordinances and state wetland conservation requirements (WCA), as well as to protect the city's wetlands and water resources. To maintain the city's eligibility in the National Flood Insurance Program, this division is adopted to comply with the rules and regulations of the National Flood Insurance Program codified as 44 CFR 59—78, as amended.
Water Works (WW)	Promote the public health, safety and welfare by providing for the preservation, protection, proper maintenance, and use of the property owned by the St. Paul Waterworks.

Development Application Reviews

In order to provide reasonable and equitable decisions on land use and development matters, the City will strive to review applications as expeditiously as possible while allowing the necessary public comments. Staff will continue to make applicants aware early in the process of the requirements of all applicable ordinances and plans to streamline the review process.

At the same time, staff will strive to work with applicants to ensure that the goals and policies of the Plan are implemented. This may involve interpreting objectives or guidelines that are not clear-cut and specific, and persuading developers to amend their designs to satisfy community goals not expressly stated in the Zoning Ordinance but contained in the Plan. When reviewing development or rezoning applications, or when preparing district or neighborhood plans, City staff and officials will consult the policies of the Plan.

Reviews and Amendments

Formal Review

At least once every five years, the City should conduct a formal review of the entire Plan to identify any necessary amendments required to respond to policy changes, development patterns, or market factors that affect land use in the community.

At least once every ten years, the City is required to complete a full review and updated of the Plan, as required by the Minnesota Land Planning Act and the Metropolitan Council.

Plan Amendments

The City may propose amendments to the Plan as circumstances warrant. The public, potentially including nearby Cities and Townships, should be notified of these major proposed changes and allowed an opportunity to review and comment on the proposed amendment. The City will consider neighborhood opinion in evaluating how a proposed change would meet the criteria listed on the next page. The City may consider soliciting public opinion through direct mail survey forms, neighborhood meetings or Planning Commission public hearings. It is appropriate that some parts of the plan are rarely amended while others are highly subject to examination.



Amendment Criteria

Generally, these criteria should be considered when reviewing amendments to the Plan:

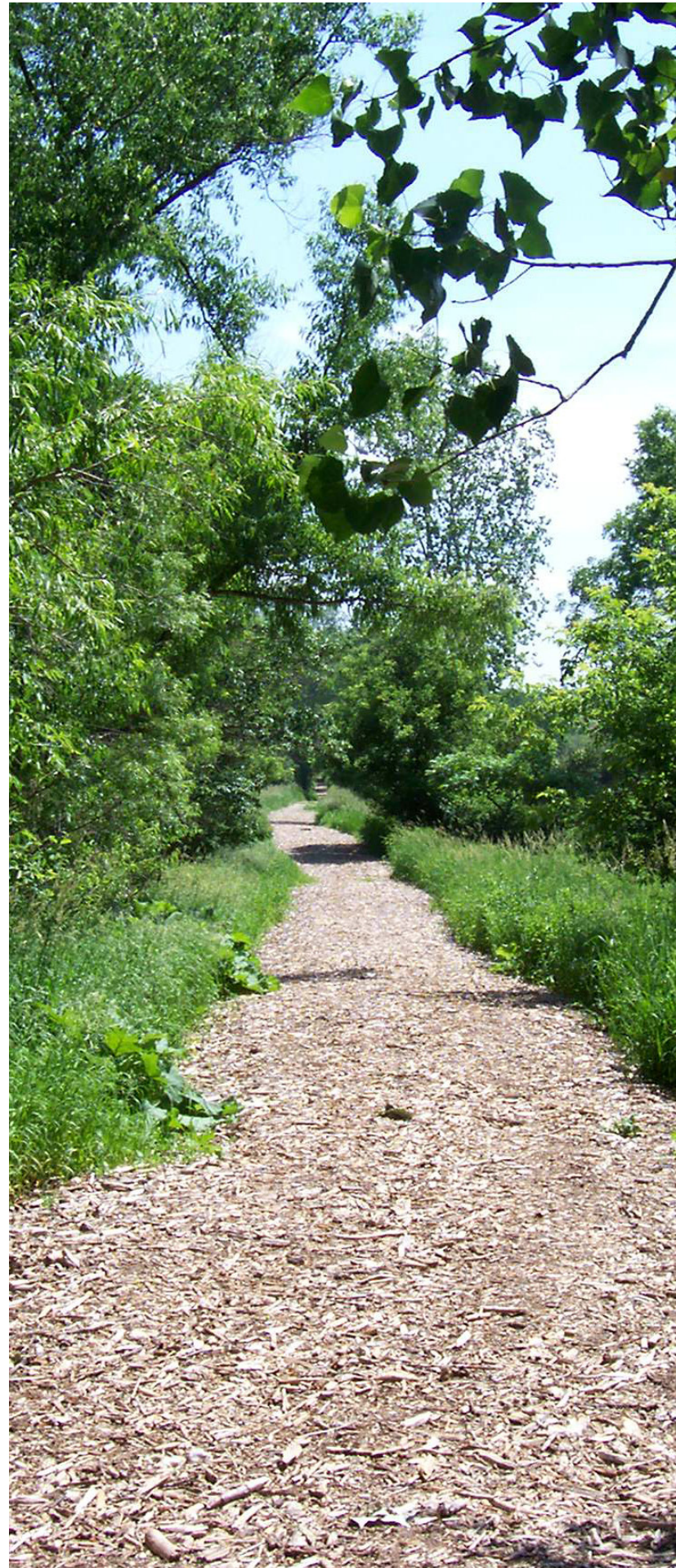
- The amendment is consistent with the goals and objectives or other elements of the Plan.
- The amendment does not create an adverse impact on public facilities and services that cannot be mitigated. Public facilities and services include roads, sewers, water supply, drainage, schools, police, fire and parks.
- Development resulting from the amendment does not create an undue impact on surrounding properties. Such development should be consistent with the physical character of the surrounding neighborhood or would upgrade and improve its viability.
- The amendment allows a more viable transition to the planned uses on adjacent properties than the current land use.
- The amendment does not have a significant adverse impact on the natural environment including trees, slopes and groundwater, or the impact could be mitigated by improvements on the site or in the same vicinity.
- There is a change in City policies or neighborhood characteristics that would justify a change.
- The amendment corrects an error made in the original plan.
- There is a community or regional need identified in the Plan for the proposed land use or service.
- The amendment helps the City meet its life-cycle and affordable housing objectives.
- The amendment does not adversely affect any landmarks or other historically significant structures or properties unless mitigated through relocation, commemoration or dedication.

Consistency with the Plan

The City's actions will be consistent with the policies of the Comprehensive Plan. Those actions include, but are not limited to:

- Review of development applications
- Capital Improvements Program
- Neighborhood and District/Small Area Plans
- Plans of other agencies as they affect Vadnais Heights
- Official Maps
- Zoning Ordinance and Zoning Map
- Subdivision Ordinance

If major City actions are inconsistent with the Comprehensive Plan, the City should consider amending the plan or adjusting its actions.



Housing Implementation Plan

Applicable official controls, fiscal tools or incentives to carry out the housing plan described in the Land Use Plan and Housing chapters of the Plan may include, but are not limited to:

- Planning land for a wide range of housing types and densities.
- Zoning to implement the Future Land Use Plan Map and policies, including higher allowable densities or the use of flexible design mechanisms such as the planned-unit development provisions of the Zoning Ordinance.
- Site redevelopment assistance through tax increment financing, local tax abatement or revenue bonds.
- Rent assistance through the federal Section 8 program available through either the Metropolitan Council HRA.
- Housing rehabilitation loans funded by local Community Development Block Grant funds, Ramsey County Community and Economic Development, the Greater Metropolitan Housing Corporation, or the Minnesota Housing Finance Agency (Minnesota Housing).
- First-time homebuyer assistance funded by Ramsey County Community and Economic Development, the Greater Metropolitan Housing Corporation or Minnesota Housing. Rental housing development programs sponsored by the Ramsey County CED, the Minnesota Housing Finance Agency or the Greater Metropolitan Housing Corporation.
- Cooperating with a non-profit housing development corporation to develop or preserve affordable housing opportunities.

The City will continue to review land use policy and zoning changes concerning housing as the need arises in the future or at the request of a property owner or developer. However, no major changes to re-guide existing land uses for housing are included in the Plan. The City has approved amendments to the Zoning Code that allow a wider range of multi-family housing options within the City Center District, recognizing the need to encourage a wider range of housing options in an area with development and redevelopment potential in the future. In addition, the City has approved proposals for multi-family residential developments at densities higher than the allowable thresholds included in the previous Plan, which the Planned Unit Development process allows. The City has also utilized tax increment financing to assist with affordable, workforce and senior multi-family residential developments in areas guided for high-density residential uses and will continue to consider future requests, at the discretion of the City Council, in compliance with the applicable state statutes. Tax abatement and revenue bonds are not housing subsidies the City has utilized in the past, but could be considered on future projects if necessary, but not likely. The City itself does not administer rental assistance, housing rehabilitation loans, first-time homebuyer assistance, or rental housing development programs. Information concerning these programs is listed on the City's website.

In addition to the tools listed in the Housing implementation Plan, the following are widely accepted funding tools to address housing needs that the City can consider utilizing as needed:

Local Sources:

- Creation/use of a local Housing and Redevelopment Authority (HRA), Community Development Agency (CDA), Economic Development Authority (EDA)
- Housing Bonds
- Tax Abatement
- Tax Increment Financing



The City has an EDA and will continue to consider tax abatement and tax increment financing for qualifying projects, in accordance with the Business Subsidy Policy. Any proposed project requesting tax increment financing, tax abatement, or housing bonds must qualify under the statutory requirements and be consistent with the City’s subsidy goals and policies. Tax abatement and housing bonds are unlikely tools to be utilized in the future. However, the City does have pooled tax increment financing funds that could be utilized for qualifying housing projects that include an affordable component.

The City will work with the appropriate agencies to pursue funding for qualifying projects. The City has received funding under the LCDA program for past projects and will continue to analyze future opportunities to leverage redevelopment efforts in compliance with the Plan’s goals and policies. In addition, the City will continue to collaborate with Ramsey County to provide assistance for qualifying projects under the CDBG and HOME programs. Consolidated request for proposals and land banks are not intended to be utilized in the future.

The City will continue to implement existing policies and programs and will consider investing and/or participating in others if necessary in the future. The City has purchased property to facilitate housing redevelopment and will consider future opportunities to assemble property and collaborate with housing developers. Zoning and subdivision ordinances be reviewed to ensure the regulations and processes encourage development and redevelopment of a variety of housing options in the community. In addition, the City will continue to administer the rental licensing and inspection program to maintain standards that promote increased property values and reinvestment in the existing housing stock. In addition, the City will consider adopting a Fair Housing Policy that encourages a wide range of housing options are available in the community.

The City supports utilization of these programs to further local and regional housing preservation strategies. The City does not administer any of these programs and doing so would require an investment in staffing to implement and manage them, as well as identifying a funding source(s). As a result, it is unlikely that the City will utilize these housing tools in the future.

Public Improvements

The most recently adopted Capital Improvement Program (CIP) for the City of Vadnais Heights is shown in Appendix C. The Comprehensive Plan will be used as a guide in setting priorities in the periodic updates of the CIP.

Implementation Matrix

This implementation schedule lists all the policies to be implemented to satisfy the goals of the Plan. The proposed timelines include the following assumptions:

- Ongoing: Continually monitored and implemented appropriately
- Short-term: Implemented within 5 years
- Long-term: Implemented within 10 years and beyond

Federal and Regional Sources
Consolidated Request for Proposals
Land Bank Twin Cities
Livable Communities Demonstration Account (LCDA)
Community Development Block Grants
HOME Investment Partnerships Program (HOME)

Local Policies and Strategies
Effective Referrals
Fair Housing Policy
First time homebuyer, down payment assistance, and foreclosure assistance programs
Participation in housing-related organizations, partnerships, and initiatives
Site assembly
Zoning and subdivision ordinances

Preservation Strategies
Project based rental assistance
Low income housing tax credit programs
Public housing
Housing improvement areas
Community land trusts
Low-interest rehab programs
Manufactured home parks
Private unsubsidized affordable

Chapter	Policy	Timeline
Land Use	Regulate land consistently with the Future Land Use Plan Map and the policies of this Plan	Ongoing
	Forecast and monitor growth in population, households and employment.	Short-term
	Adopt, implement, and update the Future Land Use Map as the general land use pattern of future physical growth.	Short-term
	Provide, maintain, and enforce standards for development that will enhance public health and safety and promote a high standard of living.	Ongoing
	Promote an open and ongoing relationship among all units of government- City, School Districts, Ramsey County, Metropolitan Council, State of Minnesota and nearby communities- in all matters related to planning and the provision of public services.	Ongoing
	Engage in a long-term process of enhancing public spaces across the community, that work in tandem with regional plans of the same nature.	Ongoing
	Protect and preserve Vadnais Heights' environmental and historical resources.	Ongoing
	Continue to make investments in public infrastructure and aesthetic improvements in City Center to encourage private sector reinvestment to maintain and enhance the area's vitality.	Ongoing
	Work with property owners of vacant parcels to identify and overcome the constraints for future development that is consistent with the City's land use vision.	Ongoing
	Plan for connecting City Center to County Road E/US Highway 61 Corridor.	Long-term
	Review and update the City Center Plan to address current and future market factors.	Short-term
	Improve landscaping in medians and boulevards.	Ongoing
	Coordinate with Ramsey County on improved boulevard treatments for locations along County Roads.	Ongoing
	Continue to build tasteful monuments that proudly announce arrival into Vadnais Heights at key perimeter locations.	Ongoing
	Promote community unity and spirit and enhance character and identity.	Ongoing
	Promote redevelopment that enhances, not detracts, the surrounding development pattern.	Ongoing
	Achieve new investment on sites where the existing land use is no longer consistent with the intent of the Comprehensive Plan in terms of use, economic viability or physical quality.	Ongoing
	Continue to apply the site design provisions of the Zoning Ordinance, particularly those addressing setbacks, landscaping, lighting, trash handling and loading docks.	Ongoing
	Provide building design guidelines regarding scale and materials for new infill developments and building expansions.	Ongoing
	Consider negotiating the selective acquisition of private property to create redevelopment opportunities.	Ongoing
Prepare specific plans for neighborhoods or districts where a need for additional guidance is identified.	Short-term	

Chapter	Policy	Timeline
Housing	Promote a balanced housing supply with housing available for people at all income levels.	Ongoing
	Promote a variety of housing types for people in all stages of the life-cycle.	Ongoing
	Build a community of well-maintained housing and neighborhoods, including ownership and rental housing.	Ongoing
	Create housing that respects the natural environment of the community while striving to accommodate the need for a variety of housing types and costs.	Ongoing
	Advocate for a high proportion of upper-cost, owner-occupied housing units on the remaining undeveloped or redeveloped low/medium density residential sites.	Ongoing
	Partner with residents and organizations to provide housing assistance and cost burden relieving opportunities.	Ongoing
	Work with regional governmental agencies to ensure efficient and cohesive design.	Ongoing
	Consider initiating local programs including rehabilitation loans or grants for owner-occupied housing in targeted neighborhoods.	Short-term
	Partner with Ramsey County and other housing agencies to promote existing housing rehabilitation assistance and first-time homebuyer programs.	Ongoing
	Consider implementing a proactive residential property maintenance inspection and enforcement program.	Short-term

Chapter	Policy	Timeline
Parks and Trails	Maintain and improve the City’s existing park facilities in accordance with the Capital Improvements Program.	Ongoing
	Program recreational programs that meet the needs of the demographics of the community and take advantage of the existing and shared resources within the City.	Ongoing
	Consider public land dedication, where practical, as part of any future residential subdivisions.	Ongoing
	Advocate for a reasonable development scenario to rebuild the former sports dome or comparable facility on the Vadnais Sports Center property, in cooperation with Ramsey County, to serve the diverse recreational needs of various community organizations and partners	Short-term
	Study the city-owned Twin Lake Access property for future park and/or trail improvements, in cooperation with the neighboring residents, the City of Little Canada, and Ramsey County.	Long-term
	Continue to build a system of concrete sidewalks, asphalt off-road paths and paved shoulders along the major streets of the community.	Ongoing
	Continue to maintain and enhance the pedestrian paths in City parks.	Ongoing
	Promote regional trail corridor connections through the community.	Ongoing
	Consider installing wayfinding signage on local and regional trails.	Short-term
	Consider requiring sidewalk connections as part of future large residential subdivisions.	Ongoing
	Work with Ramsey County to implement trail improvements on existing County Roads, which may or may not be associated with a roadway improvement project.	Ongoing
	Participate as a member of the Active Living Ramsey County partnership.	Ongoing
	Collaborate with Ramsey County and other municipalities to implement the Ramsey County-wide Pedestrian and Bicycle Plan and complete the Connected Ramsey Communities Network.	Long-Term

Chapter	Policy	Timeline
Economic Competitiveness	Continue to work with VHEDC and the City Center Task Force to identify partnerships to enhance the aesthetic appearance of the area.	Short-term
	Attract commercial development that will serve the needs of the community and complement the existing mix of businesses (e.g. restaurants, retail, entertainment, etc.)	Ongoing
	Increase walkability in the area with additional wayfinding signs and pedestrian and cyclist-friendly improvements.	Short-Term
	Analyze and evaluate the existing and future parking situation and create a plan for improving parking management by balancing parking space supply with demand.	Long-Term
	Work with property owners to envision creative land uses for excess off-street parking areas in the future, due to changing retail environments or transportation methods.	Long-Term
	Consider completing a small area plan and/or market analysis to determine appropriate uses in the City Center Northeast Quadrant.	Short-term
	Maintain and improve the appearance of the community by promoting cleanup efforts and redevelopment as well as appropriate types of land uses, landscaping and screening, and preserving existing natural resources and local character.	Ongoing
	Address blighted areas and implement measures to prevent further properties from becoming blighted.	Short-term
	Provide information to businesses on common property maintenance issues and the applicable standards in an effort to avoid Code violations.	Short-term
	Consider revising the Business Subsidy Policy to establish thresholds and priorities for assisting existing businesses expand or attracting new businesses.	Short-term
	Look for people or organizations with connections to the community to bring in new business opportunities.	Ongoing
	Identify additional industrial lands near key transportation corridors for both immediate and long-term growth and development.	Ongoing
	Develop a land use pattern that provides room for industry and business, and takes into consideration their utility needs.	Ongoing
	Continue support for programs and initiatives that foster entrepreneurship (e.g. promote City business incubators and encourage entrepreneurship among all segments of the population, including minorities, women, youth)	Ongoing
	Work closely with the VHEDC and other partner entities to support local businesses with a proactive business retention and development strategy.	Ongoing
	Partner with the local organizations to promote food security and public health by encouraging and supporting locally-based food production and distribution, the farmers market and community gardens.	Ongoing
	Analyze opportunities to upgrade the fiber-optic network city-wide.	Short-Term
	Work with VHEDC to identify key employment industry sectors already within the community to promote, such as manufacturing, hospitality, and health care.	Ongoing
	Identify other sectors that complement existing employment industry sectors and promote opportunities for synergy.	Ongoing
	Utilize the City's website to provide information on projects, funding/grant sources, and partnership opportunities to continue to support economic development in the community.	Ongoing
Study establishing a hotel occupancy tax to fund future marketing efforts.	Ongoing	

Chapter	Policy	Timeline
Transportation	Maintain the present road and trail system and continue to make surface improvements in conjunction with Ramsey County and the Minnesota Department of Transportation.	Ongoing
	Continue to support goods movement by maintaining industrial development districts and road access to those areas.	Ongoing
	Continue to annually improve part of the local street system.	Short-term
	Continue to cooperate with and support the efforts of Ramsey County to protect or improve the traffic function of its County Roads.	Ongoing
	Enforce, to the degree feasible, the access management guidelines of Ramsey County when reviewing plats or site development proposals adjacent to County Roads.	Ongoing
	Promote transit-oriented development to increase the connectivity of people and goods and services.	Ongoing
	Study and implement policies concerning emerging trends and technologies in transportation, including autonomous vehicles, electric scooters, shared use of right-of-way, and dockless scooters/bicycles.	Long-Term
	Ensure local streets are interconnected to the extent feasible.	Ongoing
	Discourage cul-de-sac streets are used only to serve land otherwise inaccessible.	Ongoing
	Promote land uses in appropriate areas that can support public transit.	Ongoing
	Study and implement policies concerning emerging trends and technologies in transportation, including autonomous vehicles, electric scooters, shared use of right-of-way, and dockless scooters/bicycles.	Long-term
	Encourage multi-modal transportation improvements as a part of future roadway projects.	Ongoing
	Support the implementation of transit along the Rush Line Corridor with appropriate land use, local road connections and local bicycling or walking connections.	Ongoing
	Continue to participate in area transit studies by serving on review committees and providing feedback.	Ongoing
	Promote development of transit routes and systems that connect residents to centers of employment and future transitway stations.	Long-Term
	Continue to build a system of concrete sidewalks, asphalt off-road paths and paved shoulders along the major streets of the community.	Ongoing
	Continue to maintain and enhance the multi-modal paths in City parks.	Ongoing
	Promote regional trail corridor connections through the community.	Ongoing
Work with Ramsey County to implement trail improvements on existing County Roads, which may or may not be associated with a roadway improvement project.	Ongoing	

Chapter	Policy	Timeline
Water Resources	Require testing and independent analysis.	Short-term
	Conduct seasonal hydrant flushing.	Ongoing
	Implement seasonal sprinkling restrictions.	Ongoing
	Complete capital improvement projects to maintain infrastructure.	Ongoing
	Administer a tiered utility rate structure so that larger users pay appropriately higher water costs.	Ongoing
	Consider extension of water utilities to surrounding communities to service future development, as long as the system is capable and without compromising the ability to serve Vadnais Heights' properties.	Ongoing
	Maintain and improve the following in the community and other affected jurisdictions.	Short-term
	Conduct MS4 regulatory activities.	Ongoing
	Design stormwater treatment for future development/ redevelopment projects.	Short-term
	Cooperate with VLAWMO to complete SLMP's.	Short-term
	Adopt Environmental Protection Ordinance.	Short-term
	Adopt ISTS Ordinance.	Ongoing
	Clean and monitor culverts.	Ongoing
	Address ponding on Edgerton Street, in cooperation with Ramsey County.	Ongoing
	Implement any needed improvements to connect Grass and Vadnais Lakes, following an assessment.	Ongoing
	Restore and stabilize Lambert Creek.	Ongoing
	Prepare a feasibility study and identify internal load management strategies and implementation projects.	Ongoing
	Partner with VLAWMO, City of North Oaks, and SPRWS on a feasibility study regarding the effect on water quality due to possible increased pumping of water by SPRWS.	Ongoing
	Continue to implement a street sweeping program.	Ongoing
	Maintain city-owned BMP's.	Ongoing
	Require properties to connect to the system when appropriate, as part of utility or road reconstruction projects, when feasible.	Ongoing
	Continue to implement the annual sanitary sewer televising program and address any issues as part of street reconstruction projects.	Ongoing
	Continue to implement the annual sanitary sewer lining program in areas suspected to have I/I potential.	Ongoing
	Plan for localized improvements and expansions to accommodate foreseeable growth and redevelopment.	Ongoing
Consider extension of wastewater utilities to surrounding communities to service future development, as long as the system is capable and without compromising the ability to serve Vadnais Heights' properties.	Ongoing	



APPENDICES

- A. Affected Jurisdiction Comments
- B. Capital Improvement Plan (2019-2023)
- C. Local Water Supply Plan
- D. Local Surface Water Management Plan



APPENDIX A

Affected Jurisdiction Comments

Nolan W. Wall, AICP
Planning/Community Development Director

651.204.6027 Phone
651.204.6100 Fax
nolan.wall@cityvadnaisheights.com



The City of Vadnais Heights
800 East County Road E
Vadnais Heights, MN 55127

June 15, 2018

ATTN: City of Vadnais Heights Affected Jurisdictions

RE: DRAFT 2040 Comprehensive Plan Update

To Whom It May Concern:

The City of Vadnais Heights has completed its DRAFT 2040 Comprehensive Plan Update. Your agency is on the list of affected jurisdictions the Metropolitan Council provided to review the DRAFT Plan.

Per Minnesota Statute 473.858 Subd. 2 and the Metropolitan Council, the City of Vadnais Heights is distributing the DRAFT 2040 Comprehensive Plan Update for your review and comment. The document can be found here:

<http://cityvadnaisheights.com/CivicAlerts.aspx?AID=121>

It is respectfully requested that you review the proposed 2040 Comprehensive Plan Update and send any comments or indication of no comment to nolan.wall@cityvadnaisheights.com no later than December 15, 2018. With regard to review of the DRAFT Plan, we ask that you provide feedback as timely as possible within the requested six-month comment period, hopefully within three months to afford time to make any necessary amendments prior to submission to the Metropolitan Council by December 2018.

In the event that there are questions regarding the DRAFT Plan, or if additional information is needed, please contact me at nolan.wall@cityvadnaisheights.com or (651) 204-6027. Please forward this request to the appropriate representative within your organization.

On behalf of the City of Vadnais Heights, we would like to thank you in advance for your assistance and prompt response.

Sincerely,

The City of Vadnais Heights

A handwritten signature in black ink, appearing to read "Nolan Wall".

Nolan Wall, AICP
Planning/Community Development Director

Enclosure: Comment Form

cc/ec: Corrin Wendell (Corrin.Wendell@metc.state.mn.us)

City of Vadnais Heights
ATTN: Nolan Wall, Planning/Community Development Director
800 East County Road E
Vadnais Heights, MN 55127
Email: nolan.wall@cityvadnaisheights.com

RE: DRAFT 2040 Comprehensive Plan Update

Please be advised that the City Engineer - Justin Gese SEH has received notice of the DRAFT 2040 Comprehensive Plan Update from the City of Vadnais Heights and has the following comments:

- We have reviewed the DRAFT Plan Update, do not have any comments, and are therefore waiving further review.
- We have reviewed the DRAFT Plan Update and offer the following comments (attach additional sheets if necessary):

I have only reviewed this plan for roadway and utility purposes

1) Roadway jurisdiction map to be revised such that Hoffman Rd and all of Scheuneman Road is City of Gem Lake

2) Both Public Water Supply and Waste Water Management sections should include some language that there are plans for future service to City of Gem Lake and not just the individual development on CR E. Per the previous comp plans from the City of Gem Lake, there are future plans for service to the City from VH for both utilities.

Name: Justin Gese

Title: City Engineer

Agency: SEH

Date: 10/22/18

City of Vadnais Heights
ATTN: Nolan Wall, Planning/Community Development Director
800 East County Road E
Vadnais Heights, MN 55127
Email: nolan.wall@cityvadnaisheights.com

RE: DRAFT 2040 Comprehensive Plan Update

Please be advised that the City of Little Canada has received notice of the DRAFT 2040 Comprehensive Plan Update from the City of Vadnais Heights and has the following comments:

- We have reviewed the DRAFT Plan Update, do not have any comments, and are therefore waiving further review.
- We have reviewed the DRAFT Plan Update and offer the following comments (attach additional sheets if necessary):

Name: Jessica Jagoe

Title: Associate Planner

Agency: City of Little Canada

Date: 9/11/18

From: [Michael Martin](#)
To: [Nolan Wall](#)
Subject: RE: DRAFT 2040 Comprehensive Plan Update - Affected Jurisdiction Review
Date: Tuesday, September 25, 2018 12:00:36 PM
Attachments: [image001.png](#)
[image448a3d.PNG](#)

Hi Nolan,

Maplewood has reviewed Vadnais Heights' 2040 Comprehensive Plan and does not have any comments.

Thanks!



Michael Martin | 651-249-2303

From: Nolan Wall [mailto:Nolan.Wall@cityvadnaisheights.com]
Sent: Tuesday, August 28, 2018 10:33 AM
To: Nolan Wall <Nolan.Wall@cityvadnaisheights.com>
Subject: FW: DRAFT 2040 Comprehensive Plan Update - Affected Jurisdiction Review

Affected Jurisdictional Partners –

I'm following-up on my email below from earlier this summer concerning the required affected jurisdiction review process.

We are hoping to get any comments back by the end of September, if possible. I know that everyone is busy with other more pressing priorities, but if you could find the time to coordinate review of the DRAFT Plan and respond over the next month, it would be greatly appreciated.

We have already reviewed and commented on several local/county plans and were impressed by the time and effort devoted to the planning process. We look forward to reviewing the rest of the plans over the next few months as well.

If you have any questions, please let me know.

Thanks in advance for your time,

Nolan

City of Vadnais Heights
ATTN: Nolan Wall, Planning/Community Development Director
800 East County Road E
Vadnais Heights, MN 55127
Email: nolan.wall@cityvadnaisheights.com

RE: DRAFT 2040 *Comprehensive Plan* Update

Please be advised that the City of North Oaks has received notice of the DRAFT 2040 *Comprehensive Plan* Update from the City of Vadnais Heights and has the following comments:

- We have reviewed the DRAFT Plan Update, do not have any comments, and are therefore waiving further review.
- We have reviewed the DRAFT Plan Update and offer the following comments (attach additional sheets if necessary):

- 1) We acknowledged the possibility of the North Oaks Golf Club connecting to Vadnais Heights sewer system so I'm glad you have mentioned that as well.
- 2) It's nice to see someone acknowledge that Autonomous Vehicles (AV) will need parking spaces.
- 3) I'm also impressed with your acknowledgement of the effects of AV's on freight. If Av's live up to their promise a large percentage of freight trips will logically move to the evening and early morning hours. This will not require large changes in the road system but will probably require changes in how companies do business and the hours that they are open. Noise issues will become more prominent locally.
- 4) It's good to see all the sewer and water interconnections you have with adjacent communities. I don't see any logical interconnections with the systems in North Oaks.

Name: Mike Robertson

Title: City Administrator

Agency: City of North Oaks, MN

Date: 10/19/18

City Council:
Sandy Martin, Mayor
Sue Denkinger
Emy Johnson
Terry Quigley
Cory Springhorn



City of Shoreview
4600 Victoria Street North
Shoreview MN 55126
651-490-4600 phone
651-490-4699 fax
www.shoreviewmn.gov

October 24, 2018

Mr. Nolan Wall
City of Vadnais Heights
800 East County Road E
Vadnais Heights, MN 55127

RE: Vadnais Heights - 2040 Comprehensive Plan

Dear Mr. Wall:

Thank you for providing your draft 2040 Comprehensive Plan to the City of Shoreview for review. The document has been reviewed and offers the following comments.

The City supports the future land use designations along the Rice Street Corridor, specifically the mixed use designation near the I694/Rice Street interchange. This future land use compliments the recent redevelopment that has occurred near this interchange in the City of Shoreview.

The City supports improving trail connections from Rice Street to the regional Vadnais-Snail Lake Park.

The City appreciates the opportunity to review and comment on this Plan. If you have any questions pertaining to this matter, please contact me. I can be reached at 651-490-4682 or via email at kcastle@shoreviewmn.gov.

Sincerely,

Kathleen Castle
City Planner

City of Vadnais Heights
ATTN: Nolan Wall, Planning/Community Development Director
800 East County Road E
Vadnais Heights, MN 55127
Email: nolan.wall@cityvadnaisheights.com

RE: DRAFT 2040 Comprehensive Plan Update

Please be advised that the Saint Paul Regional Water Services has received notice of the DRAFT 2040 Comprehensive Plan Update from the City of Vadnais Heights and has the following comments:

- We have reviewed the DRAFT Plan Update, do not have any comments, and are therefore waiving further review.
- We have reviewed the DRAFT Plan Update and offer the following comments (attach additional sheets if necessary):

1. It's good that the city plan includes BMPs to address storm water treatment and surface water management. The BMPs may need to be updated on an ongoing effort to address emerging challenges to treat potential pollution of the environment and watershed in the future.

2. The plan does not include long-term investments in the watershed protection, wastewater and storm water treatment systems through comprehensive planning approach to achieve strategic and holistic clean water management. If feasible, long-term investments in the watershed protection, wastewater and storm water treatment systems should be included in the plan.

3. It will be beneficial for the city to incorporate green infrastructure in future development area or retrofits developed areas for storm water treatment and control to minimize storm water runoff, mitigate open water contamination, reduce potential sources of storm water pollution and ensure groundwater sustainability through diverting water to flow back into the ground.

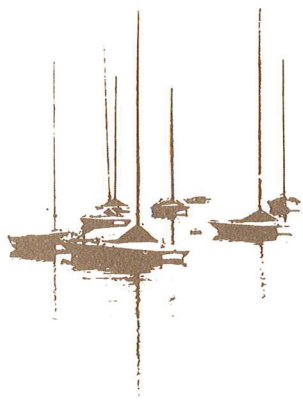
- Green infrastructure is a cost-effective, resilient approach to managing wet weather impacts that provides many community benefits. While single-purpose gray storm water infrastructure of conventional piped drainage and water treatment systems is designed to move urban storm water away from the built environment.
- Green infrastructure reduces and treats storm water at its source while delivering environmental, social, and economic benefits. When rain falls in natural, undeveloped areas, the water is absorbed and filtered by soil and plants. Storm water runoff is cleaner and less of a problem. Green infrastructure uses vegetation, soils, and other elements and practices to restore some of the natural processes required to manage water and create healthier urban environments. At the city scale, green infrastructure is a patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water.
- Example of Green Infrastructures: Porous/Permeable Pavement, Vegetated Swales/Dry Swales, Stream Buffer Restoration, Bioretention Basins, Downspout Disconnections, Rainwater Harvesting, Rain Gardens, Green Roofs, Green Streets and Alley, Green Parking, Urban Tree Canopy, Stormwater Planter and etc.
- It will be beneficial to reduce the existing storm water discharges from already developed areas through retrofits and/or redevelopment on public and/or private land.

Name: Che Fei Chen

Title: Water Quality Supervisor

Agency: Saint Paul Regional Water Services

Date: 8/29/2018



City of White Bear Lake

4701 Highway 61 • White Bear Lake, Minnesota 55110

Phone (651) 429-8526 • Fax (651) 429-8500

www.whitebearlake.org

December 13, 2018

Nolan Wall, AICP
Community Development Director
City of Vadnais Heights
800 East County Road E
Vadnais Heights, MN 55128

RE: **Affected Jurisdiction Review/DRAFT City of Vadnais Heights 2040 Comprehensive Plan**

Dear Nolan:

Please accept these comments on behalf of the City of White Bear Lake in accordance with the required review process by affected jurisdictions, per Minnesota Statute 473.858 Subd. 2 and the Metropolitan Council.

Congratulations on preparing a thorough and detailed planning document that will help guide Vadnais Heights achieve its guiding principles in the years to come. The City of White Bear Lake does not have any formal comments that we find necessary to address in the Final Plan.

We apologize for the delay in turning our review around for your consideration. We implemented a new effort to include our Planning Commission in the review of Adjacent Jurisdiction Plans and fear it may have only complicated the process.

Sincerely,

The City of White Bear Lake

Anne Kane, AICP
Community Development Director

AEK/dm

City of Vadnais Heights
ATTN: Nolan Wall, Planning/Community Development Director
800 East County Road E
Vadnais Heights, MN 55127
Email: nolan.wall@cityvadnaisheights.com

RE: DRAFT 2040 Comprehensive Plan Update

Please be advised that the White Bear Township
has received notice of the DRAFT 2040 Comprehensive Plan Update from the City of Vadnais Heights
and has the following comments:

- We have reviewed the DRAFT Plan Update, do not have any comments, and are therefore waiving further review.
- We have reviewed the DRAFT Plan Update and offer the following comments (attach additional sheets if necessary):

The Town of White Bear continues to show the "Labore Road" extension from White Bear Township to Vadnais Heights. This connection was included in the 2030 Vadnais Heights Comp. Plan but has been removed from the 2040 Plan. The Town continues to see this roadway connection as important for long range planning purposes. White Bear Township would like to see the 2040 Comp Plan include this roadway connection included on the Desired Road Improvements Table on Page 91 and referenced within the Comp Plan.

Name: Tom Riedesel

Title: Planner

Agency: White Bear Township

Date: October 24, 2018

October 19, 2018

Nolan Wall
800 East County Road E
Vadnais Heights, MN 55127

Thank you for allowing time in your comprehensive planning process for review. Ramsey County staff appreciated the opportunity to look for alignment with Vadnais Heights. Local comprehensive plans are important tools to make sure natural and financial resources are planned as effectively and responsibly as possible. We understand and value the work that was put into each comprehensive plan across the county.

Over the last few months county staff from a variety of departments reviewed each local comprehensive plan within Ramsey County. We have the following comments on Vadnais Heights Draft 2040 Comprehensive Plan:

Affordable Housing Goals:

- Ramsey County administers a variety of HUD-funded housing programs through our Community & Economic Development department that can help Vadnais Heights achieve the Metropolitan Council's allocated housing need. These programs include:
 - o The FirstHOME buyer assistance program which helps first-time buyers with low to moderate income who are purchasing homes in suburban Ramsey County.
 - o Home Improvement & Suburban Weatherization programs which offers deferred loans for energy conservation and rehabilitation.
 - o Ramsey County also uses federal HOME funds to provide affordable units within new multi-family development.
- For more information on these programs please contact our housing specialist, Marylou.egan@co.ramsey.mn.us

Healthy Aging:

- As the population of the county ages, Ramsey County has increased its focus on the public health of the aging population. Julia Wolfe is Ramsey County's Healthy Aging Coordinator within the Healthy Communities division of our Public Health department. The position focuses on how government can better respond to this demographic shift in planning and programming. Please consider her a resource for your city. Julia.wolfe@co.ramsey.mn.us

Solar Energy:

- Ramsey County seeks to be a strong partner alongside state, regional and local agencies in the planning and implementation of solar energy. We appreciate that Vadnais Heights mentions solar energy in their work plan, but believes further work can be done to plan for renewable energy within the city. Please consider our environmental health division a resource as you move forward on this work, mary.tkach@co.ramsey.mn.us

Nolan Wall
October 19, 2018
Page 2

Transportation and Land Use:

- Vadnais Heights is a valued and important partner in the development of the Rush Line bus rapid transit corridor. Ramsey County's new multimodal division within the Public Works department is committed to the ongoing station area planning around the future County Road E Station. We look forward to continued conversations regarding parking accessibility and land use. For further conversation please contact the Rush Line project manager, andrew.gitzlaff@co.ramsey.mn.us

Active Living:

- Please see the separate and attached comments from our Active Living coordinator, Connie Bernardy.

Again, thank you for allowing time and space for Ramsey County staff to review the Vadnais Heights Draft 2040 Comprehensive Plan. We aim to create stronger, reciprocal relationships with cities, townships, watershed districts and school districts and we believe this is one step towards that. Please consider county staff as resources as Vadnais Heights plans and implements their comprehensive plan.

Sincerely,

Max Holdhusen, Senior Policy Analyst
Ramsey County
County Manager's Office

Dear Nolan Wall,

I want to thank you and the City of Vadnais Heights for your partnership in our active living work and creating the Ramsey County-wide Pedestrian and Bicycle Plan and Connected Ramsey Communities Network. It was great to connect with you again about Vadnais Heights's comprehensive plan to include language in the plan about:

- Active Living
- Ramsey County-wide Pedestrian and Bicycle Plan
- Connected Ramsey Communities Network

I have attached the Active Living portion of Ramsey County's comments for the City of Vadnais Heights. The rest of Ramsey County's comments will be sent separate from this document. Please note, when you are signing off on Ramsey County's comments, Active Living Ramsey Communities is a part of the comments that need to be reviewed. The 2040 Comp Plans will be the second time in a row where all the municipalities in Ramsey County include active living and active transportation plans and concepts in their comp plans. Thank you for your partnership in this important work.

We captured all the language that relates to active living, non-motorized transportation, active transportation, biking, and walking in Vadnais Heights's plan. This will be included in an inventory of all the comp plan language throughout Ramsey County, related to this work. Thanks for incorporating language about Active Living Ramsey Communities and referencing the County-wide Pedestrian and Bicycle Plan. We provided language for Vadnais Heights to easily include in the comprehensive plan. Based on Vadnais Heights's plan we drafted language for you to simply copy and add, or replace in your plan.

Here is a brief explanation of how to incorporate the suggested changes into your comprehensive plan.

Chapter	Page	Plan Language	Action	Action Details	Suggested Language
Comprehensive plan chapter	Plan page number	Existing active transportation or active living language in Vadnais Heights's plan	Suggested action regarding the plan language: 1. No change 2. Add 3. Enhance 4. Question	Simple action steps to incorporate the suggested language: 1. Keep language the same. 2. Copy and add the new language or map. 3. Copy and replace to enhance language already in plan. 4. Answer question	Specific language to incorporate into the plan regarding: 1. Active Living 2. Ramsey County-wide Pedestrian and Bicycle Plan 3. Connected Ramsey Communities Network

We are requesting municipalities to fill out the two green municipal response columns.

Municipal Response	
Municipal Action Taken	Municipal Comments/Questions/Suggestions
Action taken regarding suggested comprehensive plan language: <ol style="list-style-type: none"> 1. No change (original language) 2. Added 3. Enhanced 4. Modified (please explain here) 5. Answered question (please provide answer here) 6. Maps included 	Please provide any additional input here (optional)

I attached the countywide Connected Ramsey Communities Network located in the City of Vadnais Heights for the use in you comp plan. I also attached a copy of the entire Connected Ramsey Communities Network for you to include as well. **Please note, the countywide Connected Ramsey Communities Network map is likely to change slightly as we review each city, so we'll need to send out a final updated Connected Ramsey Communities map at the end of the review process for you to include in your 2040 comp plan.** It is important to let me know if Vadnais Heights has any existing bicycle or pedestrian facilities or planned improvements that are not included in the attached Connected Ramsey Communities Network map or need to be changed. We want to ensure that our pedestrian and bicycle system GIS data and maps stay up-to-date with all current municipal information. I really enjoyed reading Vadnais Heights's Comprehensive Plan Transportation and Parks Chapter. You have done excellent planning working. If there is anything else we can do to help you or you have any questions or suggestions on how to improve this process, please let me know. We are using this process with the other municipalities, so your feedback is helpful.

Thanks again for your involvement. We are proud to partner with you and the City of Vadnais Heights as we work together to improve health by creating and promoting environments where people can be physically active in their daily routine. Be sure to call if I can be of assistance or answer any questions.

Sincerely,



Connie Bernardy
 Active Living Ramsey Communities Director
 2015 North Van Dyke Street
 Vadnais Heights, MN 55109-3796
 Phone: (651) 363-3763/Fax: (651) 748-2508
connie.bernardy@co.ramsey.mn.us

City of Vadnais Heights
ATTN: Nolan Wall, Planning/Community Development Director
800 East County Road E
Vadnais Heights, MN 55127
Email: nolan.wall@cityvadnaisheights.com

RE: DRAFT 2040 Comprehensive Plan Update

Please be advised that the Mounds View Public Schools has received notice of the DRAFT 2040 Comprehensive Plan Update from the City of Vadnais Heights and has the following comments:

- We have reviewed the DRAFT Plan Update, do not have any comments, and are therefore waiving further review.
- We have reviewed the DRAFT Plan Update and offer the following comments (attach additional sheets if necessary):

The Mounds View Public Schools has an interest in the Comprehensive Plan as it impacts enrollment and quality of life/programming in our district. We would city planners to consider this fact as they do their planning work both now and in the future.

Name: John Ward

Title: Assistant Superintendent

Agency: Mounds View Public Schools

Date: August 28, 2018

City of Vadnais Heights
ATTN: Nolan Wall, Planning/Community Development Director
800 East County Road E
Vadnais Heights, MN 55127
Email: nolan.wall@cityvadnaisheights.com

RE: DRAFT 2040 *Comprehensive Plan* Update

Please be advised that the Vadnais Lake Area Water Management Organization (VLAWMO) has received notice of the DRAFT 2040 *Comprehensive Plan* Update from the City of Vadnais Heights and has the following comments:

- We have reviewed the DRAFT Plan Update, do not have any comments, and are therefore waiving further review.
- We have reviewed the DRAFT Plan Update and offer the following comments (attach additional sheets if necessary):

Please see the attached word document, as well as the 2040 VH Comp Plan document with embedded comments for consideration.

As always, thank you for the opportunity to comment.

Name: Tyler Thompson

Title: GIS Watershed Technician

Agency: VLAWMO

Date: 11/19/18

Vadnais Heights 2040 Comprehensive Plan, VLAWMO Comments

November 2018

P. 29: Correct name to Vadnais Lake Area Water Management Organization (instead of Watershed Org)
-DT

P. 29: Water sources change to water resources -DT

P. 29: Coordinating delivery services sounds like the water utility. Delete or rephrase. -DT

P. 29: Providing programs...and regulatory programs (change programs to oversight) -DT

P. 29: The Water Management Overlay...help protect the wetland and surface water resources
Maybe add a caveat here that the City works to help protect while balancing the need for expanding development and economic opportunity. From the projected plans for 2040, it looks like wetlands and other areas are planned to be developed as much as possible, including high-density development over existing wetlands. The remaining natural areas in 2040 are largely owned by other entities. -DT

P. 31: First paragraph: shelter for homes and residents alike, and allow for recreational use . -DT

P. 31: Soils: Soils are best understood when labeled with their appropriate soil association.
Delete and substitute: It is important to understand soil types and associations. -DT

P. 31: The soils in an association may be very alike or entirely different. Change to: may be similar or contain marked differences. -DT

P. 31: Soils: the pattern in which the soils occur is relatively uniform. (I don't understand what this means. Is there a better way to state?) -DT

P. 31: Soil within VH can be placed into three soil associations: [state here]
Also the sentences that follows this one duplicates information from the previous paragraph. Delete or combine with previous. -DT

P. 31: For more specific information refer to... -DT
Also include web address or location where information can be obtained.

-Land Use, top of page 33: *The large proportion of land in the community which has remained in its natural state, particularly wetland areas, provides excellent habitat for a variety of plant and animal species.*

more on this: There are very few open areas that have remained in their natural state. They have been conserved, but most areas are degraded, especially wetlands, due to surrounding development input and use. Filling has occurred in many areas, and a good deal of native diversity has been lost. Most wetlands have been degraded by storm sewer input and retrofitting over the years, and take much more water than existed in their natural state, from storm water than has been routed to them.

Many wetlands in VH have been ditched at one time or another and connected to drain to an outlet. However, VH is a rare municipality with a great deal of open space that has been set aside and conserved for use, habitat, and recreation. **Consider changes:** ~~The~~ **A large proportion of land in the community which has remained in its natural state has been conserved, particularly wetland areas, and provides excellent good habitat for a variety of plant and animal species.** -TT

A large proportion of land in the community has been conserved, particularly wetland areas, and provide good habitat for a variety of plant and animal species.

Can we mention sedimentation due to a decrease in perennial, native vegetation after "due to surrounding development" in the above paragraph? With increased sedimentation comes large stands of cattails and phragmites, which aren't as conducive to quality habitat. -NV

Pg 32 last paragraph

"Two regulatory bodies exist that have jurisdiction over wetlands, the Army Corps of Engineers and the MNDNR....."

Comment: Should this say three regulatory agencies?

DNR has jurisdiction of public water wetlands up to the OHW

CORPS has jurisdiction of a wetland if it is a navigable water of the state

Local watershed/WCA has jurisdiction if not one of the above scenario's

-I was thinking this as well- TT

Pg 33:

Red-shouldered hawk has been heard in the June of 2017 just behind City Hall. A sighting posted on the Ebird website reports one seen on Kaitlin Drive on October 14, 2018, north of the Community Park. More specifics for when a nest was identified and when a sighting was made in the central part of the city would support the text in this section. -NV

Pg 34:

A showy lady's slipper has also been identified in Sucker Lake park, but we don't have photo documentation. It may be notable in the plan as an "uncommon" species and the as the State flower. This may be something the DNR can verify on a professional level or may be able to be photographed in 2019. Increasing amounts of buckthorn in the park may harm this flower, as well as changes in their wetland habitat. The DNR says that protecting the native habitat is the best management strategy. -NV

The U of M Bell Museum Biodiversity Atlas indicates a few other State threatened/concern species that are documented in the park: Threatened: Toothcup *Rotala ramosior*, Tubercled Rein Orchid (*Platanthera flava* var. *herbiola*) Special concern: Slender/Autum Fimbry *Fimbristylis autumnalis*, Small Green Wood Orchid *Platanthera clavellata*.

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDLYT0B030>

P. 34: Last paragraph before Historic Resources, discussing Sucker Lake Natural Area:

Climate change is an important factor in the future (and threat to) these areas as well, especially fens associated with coniferous forests this far S in the state. -DT

Pg. 10. Were there water issues that came up in the survey that we should be aware of? SMc

Pg. 121. These two maps (Wetland [pg., 22] and Water Management Overlay District [pg. 30]) do not seem to be consistent. Are the regulations different depending on what designations are in effect? SMC

Pg. 116: *"Lambert Creek also runs through. Lambert Creek is the City and is the main collector."*

Lambert Creek/County Ditch 14 is the main outlet for stormwater runoff in the City, and also transfers drainage from 4 other upstream municipalities into East Vadnais Lake. Also draining to Ditch 14 are 4 branch ditches that are located completely within, and drain only the City of Vadnais Heights (Branches #2, #3, #4 and #5/5A). **Consider changing language to reflect this?** -TT

Existing and Potential Water Resource Areas/Challenges (3rd & 4th bullets)

- **County Road Ditch 14** in the vicinity of Pennington Place
Consider changing to "Ramsey County Ditch 14" -TT
- **Branch #5B** in the vicinity of Bear Avenue North
Consider changing to "Branch #5A" -TT

Pg. 117: *Potential water resource related issues the City faces are climate change and groundwater sustainability.*

High water levels, stormwater drainage, and surface water quality are also issues; **consider including these in the language.** -TT

Pg. 118: *flood plain*

Consider changing to "floodplain" -TT

From: [Scheffing, Karen \(DOT\)](#)
To: [Nolan Wall](#)
Subject: CPA18-089 Vadnais Heights 2040 Comp plan update.
Date: Tuesday, November 13, 2018 10:05:18 AM

Nolan

Thank you for the opportunity to review the City of Vadnais Heights' 2040 Comprehensive plan update. MnDOT has reviewed this document and has no comments. Please contact me if you have any questions.

Thanks
Karen

City of Vadnais Heights
ATTN: Nolan Wall, Planning/Community Development Director
800 East County Road E
Vadnais Heights, MN 55127
Email: nolan.wall@cityvadnaisheights.com

RE: DRAFT 2040 Comprehensive Plan Update

Please be advised that the MN DNR has received notice of the DRAFT 2040 Comprehensive Plan Update from the City of Vadnais Heights and has the following comments:

- We have reviewed the DRAFT Plan Update and offer the following comments (attach additional sheets if necessary):

The mission of the Minnesota Department of Natural Resources is to work with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life. With these things in mind, we appreciate the opportunity to provide comments on Vadnais Height's draft 2040 comprehensive plan. Your attention to Natural Resources in the plan is commendable and your plan reflects that "Protecting these natural resources is of key importance to the City. Preserving these areas for future generations and conserving the natural elements that increase the quality of life for Vadnais Heights' residents is important to the City."

The following comments outline other ways to further these goals:

Development / Transportation Policies to Protect Wildlife. As noted in your plan, Vadnais Heights is home to a wide variety of wildlife. Consider adding policies that take wildlife into consideration as transportation and redevelopment projects occur. Animals such as frogs and turtles need to travel between wetlands and uplands throughout their life cycle. Consult DNR's Best Practices for protection of species and Roadways and Turtles Flyer for self-mitigating measures to incorporate into design and construction plans. You have mentioned one measure – the use of "smart salting" practices to reduce impacts to downstream aquatic species.

Examples of more specific measures include:

- Preventing entrapment and death of small animals especially reptiles and amphibians, by specifying biodegradable erosion control netting ('bio-netting' or 'natural netting' types (category 3N or 4N)), and specifically not allow plastic mesh netting. (p. 25)
- Providing wider culverts or other passageways under paths, driveways and roads while still considering impacts to the floodplain.
- Including a passage bench under bridge water crossings. (p. 17) because typical bridge riprap can be a barrier to animal movement along streambanks.
- Curb and storm water inlet designs that don't inadvertently direct small mammals and reptiles into the storm sewer. (p. 24). Installing "surmountable curbs" (Type D or S curbs) allows animals (e.g., turtles) to climb over and exit roadways. Traditional curbs/gutters tend to trap animals on the roadway. Another option is to install/create curb breaks every, say, 100 feet (especially important near wetlands).
- Fencing could be installed near wetlands to help keep turtles off the road (fences that have a j-hook at each end are more effective than those that don't).



Community Forestry. The loss of tree canopy due to threats such as emerald ash borer and oak wilt has negative impacts on every city's health and environment, and a planned community forest can provide numerous community benefits. The first step to achieving a resilient community forest is conducting a tree inventory. The second step is developing a community forestry management plan that includes strategies for managing trees, especially ash, and encouraging a diverse tree canopy on private and public lands. It would be worth mentioning if Vadnais Heights has developed a forestry management plan, and its plans for implementation, as part of a strategy to meet environmental goals and policies.

Significant Plant and Animal Species. We greatly appreciate the rare species description on p. 33, however the specific location descriptions should be removed. Consider adding information on the Rusty Patch Bumblebee. We encourage you to consult U.S. Fish and Wildlife's website for information on this federally-listed endangered species. <https://www.fws.gov/midwest/endangered/insects/rpbb/>. It may be worth mentioning that the area west of Sucker Lake is rated "Outstanding" by the Minnesota Biological Survey for biodiversity significance –a rarely occurring rating within the seven-county metro area.

Specific Comments/Clarifications:

- The Existing Land Use map does not show the Ramsey County Willow Lake as parks/open space.
- Consider a minor tweak to the Major Vegetation and Open Space Areas description on p. 31. While the publicly owned assets are protected from development, many of the resources within are water dependent and can be impacted by external activities such as storm water drainage.
- The Geology description may benefit from a discussion of what how that geology impacts groundwater. The DNR's analysis Pollution Sensitivity of Near-Surface Materials may be helpful. This description would reinforce the groundwater impacts concept outlined in the Amendments criteria.

Name: Martha Vickery

Date: 12/5/18

Title: _Regional Coordinator Lands and Minerals Division, Central Region____

Agency: Department of Natural Resources

Signature: _____



APPENDIX B

Capital Improvement Plan (2019-2023)

City of Vadnais Heights, Minnesota		Proposed 2019	Proposed 2020	Proposed 2021	Proposed 2022	Proposed 2023
Capital Improvement Plan						
2019 through 2023						
December 4, 2018						
CAPITAL IMPROVEMENTS FUND (funded through tax levy)						
<i>Operating Equipment:</i>						
Replace vehicle #104 (2 1/2 ton plow truck)					200,000	
Replace Jetter Vac truck, #117		300,000				
Replace front end loader #121					100,000	
Replace 2 1/2 ton truck #105		200,000				
Replace #108 Bucket Truck				80,000		
Replace Dodge Dakota, #100 with shared staff vehicle		30,000				
Replace pavement roller, #126	10,000					
Replace trailer for pavement roller, #126	23,000					
Replace air compressor, #125				20,000		
New Tool Kat bobcat		55,000				
Replace Pelican street sweeper, #118					120,000	
Replace 3/4 ton truck with plow, #112						40,000
Replace 1 ton dump truck, #110						40,000
Replace 2 1/2 ton truck with plow, #104						200,000
Replace Dodge Dakota, #402						25,000
Replace Jacobsen 16' lawnmower				70,000		
Replace sidewalk trackless machine, #309		100,000				
Replace 1 ton dump truck, #313	35,000					
Replace John Deere tractor, #317		25,000				
Replace 3/4 ton truck with plow, #310	40,000					
Replace 3/4 ton truck with plow, #311		40,000				
Replace Fire Vehicle 2002 Ford F150 #U852 (moved from 2018)		51,609				
Replace Fire Vehicle 2001 Ford F550 #E813						402,029
Replace Fire Vehicle G824, 1990 Ford F350 grass fires	68,959					
Replace Fire Vehicle E811, 2007 Spartan/General engine						670,048
Fire Department radios replacement	50,000	50,000				
Replace SCBA, breathing apparatus					255,256	

City of Vadnais Heights, Minnesota								
Capital Improvement Plan								
2019 through 2023								
December 4, 2018								
		Proposed	Proposed	Proposed	Proposed	Proposed	Proposed	Proposed
		2019	2020	2021	2022	2023		
CAPITAL IMPROVEMENTS FUND (funded through tax levy) continued								
<i>Buildings Maintenance:</i>								
Commons ballroom lights conversion to LED		75,000						
City hall planter		40,000						
Upgrade HVAC controls at city hall and north service center		40,000						
City hall concrete sidewalk repairs				20,000				
<i>Infrastructure Maintenance:</i>								
Conversion of street lights to LED		30,000	30,000	30,000				
General trails maintenance		45,000	40,000					
Annual totals		456,959	921,609	220,000	675,256	1,377,077		
PARK DEDICATION FUND (funded by developers)								
Greenhaven Park play structure replacement			50,000					
Kohler Meadows Park play structure replacement		130,000						
Westfield Park rink and lights replacement				100,000				
Bear Park play structure replacement		65,000						
Annual totals		195,000	50,000	100,000	-	-		
WATER UTILITY FUND (funded by water utility customers)								
Water tower #2 painting - 800,000 total			800,000					
Well house #1 roof and light improvements			40,000					
Well house #2 roof and light improvements				40,000				
Well house #3 roof and light improvements					40,000			
Well house #4 roof and light improvements						40,000		
Annual totals		-	840,000	40,000	40,000	40,000	40,000	40,000

City of Vadnais Heights, Minnesota									
Capital Improvement Plan									
2019 through 2023									
December 4, 2018									
		Proposed	Proposed	Proposed	Proposed	Proposed	Proposed	Proposed	Proposed
		2019	2020	2021	2022	2023			
MSA FUNDS (State construction funds)									
	Rice Street bridge replacement (estimated city share)	400,000							
	County Road D street (estimated City share)				300,000				
	Annual totals	400,000	-	-	300,000	-			
FRANCHISE FEES FOR STREETS MAINTENANCE									
	Street replacement program, annual - 600,000 total each year	300,000	300,000	300,000	300,000	300,000			
	Annual totals	300,000	300,000	300,000	300,000	300,000			
SPECIAL ASSESSMENTS FUNDS (collected from benefitting properties)									
	Street replacement program, annual - 600,000 total each year	300,000	300,000	300,000	300,000	300,000			
	Annual totals	300,000	300,000	300,000	300,000	300,000			
	Grand Totals	1,651,959	2,411,609	960,000	1,615,256	2,017,077			



APPENDIX C

Local Water Supply Plan

Local Water Supply Plan Template Third Generation for 2016-2018

Formerly called Water Emergency & Water Conservation Plan



Cover photo by Molly Shodeen



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.

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This information is available in an alternative format upon request.

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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 DNR's 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 webpage at <http://www.dnr.state.mn.us/gwmp/areas.html>

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 www.mndnr.gov/watersupplyplans
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 webpage <http://www.metrocouncil.org/Handbook/Plan-Elements/Water-Resources/Water-Supply.aspx>. All out-state water suppliers do *not* need to complete the content addressed in Part 4.
7. Use the Plan instructions and Checklist document to insure all data is complete and attachments are included. This will allow for a quicker approval process. www.mndnr.gov/watersupplyplans
8. Plans should be submitted electronically – no paper documents are required. <https://webapps11.dnr.state.mn.us/mpars/public/authentication/login>
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)	1980-6153
Ownership	<input checked="" type="checkbox"/> Public or <input type="checkbox"/> Private
Metropolitan Council Area	<input checked="" type="checkbox"/> Yes or <input type="checkbox"/> No (and county name) Ramsey County
Street Address	800 East County Road E
City, State, Zip	Vadnais Heights, MN 55127
Contact Person Name	Jesse Farrell
Title	Public Works Director/City Engineer
Phone Number	651-204-6050
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	12,552	3967	421.2	98.6			519.8	521.4		0	1.43	3.9	8/24/2005	91.9	114
2006	12,483	3994	433.6	82.9			516.5	528.2		2	1.45	5.2	8/30/2006	95.2	116
2007	12,515	4001	345.2	176.7			521.9	566.1		8	1.55	4.2	9/1/2007	75.6	124
2008	12,670		436.7	95.2			531.9	544		2	1.49	2.91	8/24/2008	94.4	118
2009	12,761		452.6	98.7			551.3	563.8		2	1.54	3.16	7/28/2009	97.2	121
2010	12,302		389.3	84.9			474.2	484.9		2	1.33	2.85	8/29/2010	86.7	108
2011	12,622		361	78.7			439.7	482.4		9	1.32	3.24	8/19/2011	78.4	105
2012	12,679		431.4	94.1			525.5	537.4		2	1.47	3.48	9/3/2012	93.2	116
2013	12,735	3732	442.3	24.5			476.92	484.4*	10.12	2	1.33	3.42	8/25/2013	95.2	104
2014	12,791	3739	389.3	21.8			417.48	412.4	6.38	-1	1.13	2.75	8/8/2014	83.4	88
2015	12,983	3720	388.7	21.8			416.62	449.4	6.12	7	1.23	2.16	7/26/2015	82.0	95
Avg. 2010-2015	12,685	3730	400.3	54.3			458.4	475.2	7.54	3	1.30	2.98		86.5	102.7

MG – Million Gallons MGD – Million Gallons per Day GPCD – Gallons per Capita per Day *Data obtained from payment to DNR, does not match MPARS

See Glossary for definitions

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 HB FULLER	INDUSTRIAL	6,416,900	1.43	NO
2 SHADOW LAWN	RESIDENTIAL	6,384,900	1.42	NO
3 VADNAIS SPORTS CENTER	INSTITUTIONAL	5,071,700	1.13	NO
4 WILLOW RIDGE APTS.	RESIDENTIAL	3,879,000	0.86	NO
5 AUTO NATION	COMMERCIAL	3,873,800	0.86	NO
6 HOLIDAY STATION (CENTERVILLE RD.)	COMMERCIAL	3,700,800	0.82	NO
7 BUERKLE HONDA	COMMERCIAL	3,615,300	0.80	NO
8 PERSAUD APTS.	RESIDENTIAL	3,613,300	0.80	NO
9 JIMMY'S	COMMERCIAL	3,395,900	0.76	NO
10 VADNAIS SQUARE	COMMERCIAL	3,316,600	0.74	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 Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
112222	1977	1000	Chemical addition	Chlorination, fluoridation, phosphate addition	NA	NA	NA
127265	1977	1250	Chemical addition	Chlorination, fluoridation, phosphate addition	NA	NA	NA

Treatment Site ID (Plant Name or Well ID)	Year Constructed	Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
224790	1972	950	Chemical addition	Chlorination, fluoridation, phosphate addition	NA	NA	NA
127271	1978	800	Chemical addition	Chlorination, fluoridation, phosphate addition	NA	NA	NA
Total	NA	4000	NA	NA	NA	NA	NA

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)
1	Elevated hydropillar storage	1980	Steel	1M
2	Elevated spheroid storage	1993	Steel	1M
3	Other -			
Total	NA	NA	NA	2M

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):

Storage capacity is sufficient for projected average water demand through 2040.

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)
Groundwater	Well 1	112222	1977	1000	490	Emergency Only	No
Groundwater	Well 2	127265	1977	1250	470	Active	No
Groundwater	Well 3	224790	1972	950	495	Active	No
Groundwater	Well 4	127271	1978	800	476	Active	No

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.

None

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?

From 2005-2015: 3% increase in population served, 20% decrease in total per capita water demand, 16% decrease in average daily demand, and 81% decrease in maximum daily demand. Between 2012 and 2013, a significant reduction in commercial/industrial use was observed (from 94.1 MG to 24.5 MG). Current City Staff were not aware of what occurred.

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)
2015	12,490	12,490	100	1.25	2.87
2016	12,652	12,652	100	1.27	2.91
2017	12,814	12,814	100	1.28	2.95
2018	12,976	12,976	100	1.30	2.98
2019	13,138	13,138	100	1.31	3.02
2020	13,300	13,300	95	1.26	2.91
2021	13,350	13,350	95	1.27	2.92
2022	13,400	13,400	95	1.27	2.93
2023	13,450	13,450	95	1.28	2.94
2024	13,500	13,500	95	1.28	2.95
2025	13,550	13,550	95	1.29	2.96
2030	13,800	13,800	90	1.24	2.86
2040	14,100	14,100	90	1.27	2.92

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 population projections were based upon the 2015 Metropolitan Council System Statement. A gradual reduction in per capita water demand is assumed over the next 20 years. This is due increased water efficient fixtures being installed over time and a general increase in water efficiency awareness. Max day demand projections are based on a ratio of average day and max day demands of 2.3 from 2010-2015.

E. Resource Sustainability

Monitoring – Key DNR Benchmark

Complete Table 8 by inserting information about source water quality and quantity monitoring efforts. List should include all production wells, observation wells, and source water intakes or reservoirs. Add rows to the table as needed. Find information on groundwater level monitoring program at:

http://www.dnr.state.mn.us/waters/groundwater_section/obwell/index.html

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
112222	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input checked="" type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input checked="" type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input checked="" type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
127265	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input checked="" type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input checked="" type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input checked="" type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
224790	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input checked="" type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input checked="" type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input checked="" type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
127271	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input checked="" type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input checked="" type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input checked="" type="checkbox"/> steel tape <input type="checkbox"/> 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.

Provide water level data graphs for each well in **Appendix 3** for the life of the well, or for as many years as water levels have been measured. See DNR website for Date Time Water Level http://www.dnr.state.mn.us/waters/groundwater_section/obwell/waterleveldata.html

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
112222	Jordan	In most years, the water levels in the well are higher in the summer than in the winter. Typical seasonal variation can be up to 5 feet. The long term trend since 1978 has been steady.	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY:____ MM/DD/YY:____ MM/DD/YY:____
127265	Jordan	In general, the water levels in the well are higher in the summer than in the winter. Typical seasonal variation can be up to 15 feet. The long term trend since 1978 has been steady.	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY:____ MM/DD/YY:____ MM/DD/YY:____
224790	Jordan	In general, the water levels in the well are higher in the summer than in the winter. Typical seasonal variation is only 2-3 feet. The long term trend since 1978 has been steady.	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY:____ MM/DD/YY:____ MM/DD/YY:____
127271	Jordan	In general, the water levels in the well are higher in the summer than in the winter. Typical seasonal variation is only 2-3 feet. The long term trend since 1978 has been steady.	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> 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 be impacted by permitted water withdrawals. If known, 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 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.

Table 10. Natural resource impacts

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
<input checked="" type="checkbox"/> River or stream	Lambert Creek, additional unnamed creeks.	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other:	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input checked="" type="checkbox"/> Other: Not currently being actively assessed.	A formal resource protection threshold has not been established. If water level declines with no clear explanation (draught) are observed, the resource will be studied further.	<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input checked="" type="checkbox"/> Other: Additional steps could be taken as deemed necessary.	The thresholds are not being actively monitored due to no interference with Vadnais Heights wells anticipated.
<input type="checkbox"/> Calcareous fen	None	<input type="checkbox"/> Flow/water level decline	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling		<input type="checkbox"/> Revise permit	

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
		<input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____		<input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	
<input checked="" type="checkbox"/> Lake	White Bear Lake, East Vadnais, West Vadnais, Sucker, Gilfillan, Willow, Birch, Basswood, Lambert	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input checked="" type="checkbox"/> Monitoring <input checked="" type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____	A formal resource protection standard for the lakes in the region have not been established with the exception of White Bear Lake. White Bear Lake is being closely monitored and court ordered groundwater pumping reduction procedures have been established based on water levels. A possible link between groundwater	<input type="checkbox"/> Revise permit <input checked="" type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other	White Bear Lake water levels are closely monitored by the DNR. The levels of East/West Vadnais Lake are monitored by SPRWS. The remaining lakes are not actively monitored.

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
				pumping and the water levels in East and West Vadnais Lake exists. However, East and West Vadnais Lake levels are controlled by the amount of water pumped into them by St. Paul Regional Water Services (SPRWS). The use of Vadnais Lake as a basin for SPRWS is expected to continue for the long term.		
<input checked="" type="checkbox"/> Wetland	Numerous unnamed wetlands exist in Vadnais Heights.	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input checked="" type="checkbox"/> Other: Not currently being actively assessed.	A formal resource protection threshold has not been established. If water level declines with no clear explanation (draught) are observed, the resource will be studied further.	<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input checked="" type="checkbox"/> Other Additional steps could be taken as deemed necessary.	The thresholds are not being actively monitored due to no interference with Vadnais Heights wells anticipated.

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
		<input type="checkbox"/> Other: -----				
<input type="checkbox"/> Trout stream	None	<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: -----	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	
<input checked="" type="checkbox"/> Aquifer	Quaternary, St. Peter, Prairie Du Chien	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: -----	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____	Generic thresholds for confined aquifers exist (i.e. percentage of water column above confining layer). No formal thresholds exist for Quaternary aquifer.	<input checked="" type="checkbox"/> Revise permit <input checked="" type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other	The water level in the Prairie Du Chien aquifer are monitored by Vadnais Heights. The water level has been fairly steady since 1978.
<input checked="" type="checkbox"/> Endangered, threatened, or special concern species	There are several potential endangered, threatened, or special	<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring	A formal resource protection threshold has not been established	<input type="checkbox"/> Revise permit <input checked="" type="checkbox"/> Change groundwater pumping	The thresholds are not being actively monitored

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
habitat, other natural resource impacts	concern species habitat, other natural resource impacts in the City of Vadnais Heights. These include, but are not limited to Blanding's Turtles, Dry Sand-Gravel Prairie, Rusty-patched Bumble Bee, Red-Shouldered Hawk, Tubercled Rein Orchid, White Wild Indigo, etc.	MCLs exceeded <input checked="" type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> Aquifer testing <input checked="" type="checkbox"/> Other: Not currently being actively assessed.	for the various species and habitats. If species, habitats or resources are observed to be changing and it is potentially related to water levels or groundwater pumping, the resource will be studied further.	<input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other	due to no interference with Vadnais Heights wells anticipated.

* Examples of thresholds: 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.

Wellhead Protection (WHP) and Surface 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 Surface Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	<input checked="" type="checkbox"/> In Process <input checked="" type="checkbox"/> Completed <input type="checkbox"/> Not Applicable		The Vadnais Heights Wellhead Protection Plan is currently being updated.
SWP	<input type="checkbox"/> In Process <input checked="" type="checkbox"/> Completed <input type="checkbox"/> Not Applicable		

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	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Water Storage Facilities	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Water Treatment Facilities	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Distribution Systems (pipes, valves, etc.)	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Pressure Zones	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		

System Component	Planned action	Anticipated Construction Year	Notes
Other:	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> 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
Groundwater					
Surface Water					
Interconnection to another supplier					

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
<input type="checkbox"/> Groundwater	NA					
<input type="checkbox"/> Surface Water	NA					
<input type="checkbox"/> Reclaimed stormwater	NA					
<input type="checkbox"/> Reclaimed wastewater	NA					
<input type="checkbox"/> Interconnection to another supplier	NA					

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. Federal 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.

Do you have a federal emergency response plan? Yes No

If yes, what was the date it was certified? February 17, 2000

Complete Table 15 by inserting the noted information regarding your completed Federal Emergency Response Plan.

Table 15. Emergency Preparedness Plan contact information

Emergency Response Plan Role	Contact Person	Contact Phone Number	Contact Email
Emergency Response Lead	JESSE FARELL	651-204-6050	JESSE.FARELL@CITYVADNAISHEIGHTS.COM
Alternate Emergency Response Lead	KEN LACASSE	651-204-6053	

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.

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**. A template is available at www.mndnr.gov/watersupplyplans

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 SHOREVIEW		THERE ARE VALVES ON EITHER SIDE SUCH THAT EACH CITY MUST AGREE TO TURN IT ON.	
CITY OF WHITE BEAR LAKE		THERE ARE VALVES ON EITHER SIDE SUCH THAT EACH CITY MUST AGREE TO TURN IT ON.	

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

If not covered above, describe additional emergency measures for providing water (obtaining bottled water, or steps to obtain National Guard services, etc.)

Additional emergency measures were not identified in the Wellhead Protection Plan; however, whatever steps that were necessary to provide drinking water to the residents would be taken. This could include bottled water, trucking water from nearby cities, or involving additional State or Federal agencies.

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 (GPD)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	1,064,932	64,932
Institutional	3	16,759	8,380
Commercial	2	46,107	23,000
Industrial	4	13,495	13,495
Irrigation	5		
Wholesale	--		
Non-Essential	6		
TOTAL	NA	NA	109,807

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
<input checked="" type="checkbox"/> Contamination <input type="checkbox"/> Loss of production <input checked="" type="checkbox"/> Infrastructure failure <input checked="" type="checkbox"/> Executive order by Governor <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Supply augmentation through emergency interconnects <input checked="" type="checkbox"/> 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. <input type="checkbox"/> Water allocation through____ <input type="checkbox"/> Meet with large water users to discuss their contingency plan.	<input type="checkbox"/> Supply augmentation through _____ <input checked="" type="checkbox"/> 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. <input type="checkbox"/> Water allocation through____ <input type="checkbox"/> 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
<input checked="" type="checkbox"/> Short-term demand reduction declared (< 1 year)	<input checked="" type="checkbox"/> Website <input type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Annually	
<input checked="" type="checkbox"/> Long-term Ongoing demand reduction declared	<input checked="" type="checkbox"/> Website <input type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input checked="" type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Annually	
<input checked="" type="checkbox"/> Governor’s critical water deficiency declared	<input checked="" type="checkbox"/> Website <input type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook)	<input checked="" type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Annually	

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
	<input type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input checked="" type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____		

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**.

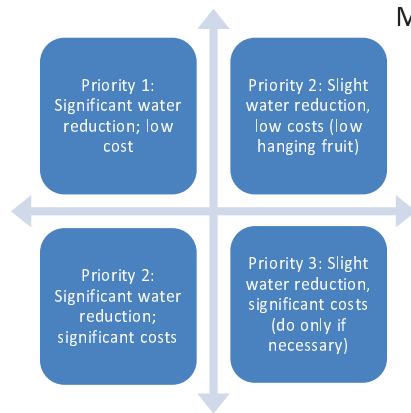
If no, the municipality must adopt such an official control within 6 months of submitting this WSP and submit it to the DNR as an amendment to this WSP.

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: *City Code 55.180(2). City 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 use 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.

--

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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Water supply system improvements (e.g. leak repairs, valve replacements, etc.)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Educational efforts	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
New water conservation ordinances	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Enforcement	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Describe other	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

What are the results you have seen from the actions in Table 21 and how were results measured?

<p>Enforcement of odd/even watering schedules. Both average daily and max daily demands have decreased.</p>
--

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	<input checked="" type="checkbox"/> Low stream flow conditions <input checked="" type="checkbox"/> Reports of declining wetland and lake levels <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Increase promotion of conservation measures <input checked="" type="checkbox"/> Other: Additional measures as needed to reduce water demand if required.
Short-term demand reduction (less than 1 year)	<input checked="" type="checkbox"/> Extremely high seasonal water demand (more than double winter demand) <input type="checkbox"/> Loss of treatment capacity <input type="checkbox"/> Lack of water in storage <input checked="" type="checkbox"/> State drought plan <input type="checkbox"/> Well interference <input type="checkbox"/> Other: _____	<input type="checkbox"/> 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. <input checked="" type="checkbox"/> Supply augmentation through emergency interconnects <input type="checkbox"/> Water allocation through _____ <input checked="" type="checkbox"/> Meet with large water users to discuss user's contingency plan.
Long-term demand reduction (>1 year)	<input checked="" type="checkbox"/> Per capita demand increasing <input type="checkbox"/> Total demand increase (higher population or more industry)Water level in well(s) below elevation of _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> 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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> Meet with large water users to discuss user's contingency plan. <input type="checkbox"/> Enhanced monitoring and reporting: audits, meters, billing, etc.
Governor's "Critical Water Deficiency Order" declared	<input type="checkbox"/> Describe	<input type="checkbox"/> Describe

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 Waters 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)

Leak detection is performed as needed. The last complete leak detection program was completed in 2016.

Water Audits - are intended to identify, quantify and verify water and revenue losses. The volume of unaccounted-for water should be evaluated each billing cycle. The American Water Works Association (AWWA) recommends that ten percent or less of pumped water is unaccounted-for water. Water audit procedures are available from the AWWA and MN Rural Water Association www.mrwa.com . Drinking Water Revolving Loan Funds are available for purchase of new meters when new plants are built.

What is the date of your most recent water audit? >10 years ago

Frequency of water audits: yearly other (specify frequency) _____

Leak detection and survey: every year every other year periodic as needed

Year last leak detection survey completed: Summer 2016

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

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. AWWA also recommends that water suppliers conduct regular water audits to ensure accountability. 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		3554	3554	NA	1 / 20
Irrigation meters		0	0		___ / ___
Institutional		14	14	10	1 / 20
Commercial		138	138	10	1 / 20
Industrial		28	28	10	1 / 20

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years)
Public facilities					___/___
Other					___/___
TOTALS				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.

The City of Vadnais Heights has nearly completed a meter replacement program (2018) where AMI meters have been installed.

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)	4	2	4	15/20
Treatment plant				___/___

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? 86.5 g/person/day

Describe the water use trend over that timeframe:

There has been a decrease of 6% in residential per capita water demand from 2010-2015.

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
<input type="checkbox"/> Revise city ordinances/codes to encourage or require water efficient landscaping.	

Strategy to reduce residential per capita demand	Timeframe for completing work
<input type="checkbox"/> 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	
<input type="checkbox"/> Revise ordinances to limit irrigation. Describe the restricted irrigation plan:	
<input type="checkbox"/> 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.	
<input checked="" type="checkbox"/> Make water system infrastructure improvements	July 2019. The City is in the final stages of a meter replacement program. The new meter are Advanced Metering Infrastructure (AMI). The AMI meters will allow customers to track their water use on a real time basis. AMI meters also allow for leak detection inside of homes. Additionally, AMI meters allow for water use patterns to be identified and the ability to target areas of efficiency.
<input type="checkbox"/> Offer free or reduced cost water use audits for residential customers.	
<input type="checkbox"/> Implement a notification system to inform customers when water availability conditions change.	
<input type="checkbox"/> 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.)	
<input type="checkbox"/> 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.)	
<input type="checkbox"/> Identify supplemental Water Resources	
<input checked="" type="checkbox"/> Conduct audience-appropriate water conservation education and outreach.	January 2020
<input type="checkbox"/> Describe other plans	

Objective 3: Achieve at least a 1.5% per year water reduction for Institutional, Industrial, Commercial, and Agricultural GPCD over the next 10 years or a 15% reduction in ten years.

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
<input type="checkbox"/> Conduct a facility water use audit for both indoor and outdoor use, including system components	
<input checked="" type="checkbox"/> Install enhanced meters capable of automated readings to detect spikes in consumption	2019
<input type="checkbox"/> 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.)	
<input type="checkbox"/> Install water conservation fixtures and appliances or change processes to conserve water	
<input checked="" type="checkbox"/> Repair leaking system components (e.g., pipes, valves)	2020
<input checked="" type="checkbox"/> Investigate the reuse of reclaimed water (e.g., stormwater, wastewater effluent, process wastewater, etc.)	2020
<input checked="" type="checkbox"/> Reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	2020
<input checked="" type="checkbox"/> Train employees how to conserve water	2020
<input type="checkbox"/> Implement a notification system to inform non-residential customers when water availability conditions change.	
<input checked="" type="checkbox"/> 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. Proposed plumbing code 4714.1702.1 http://www.dli.mn.gov/PDF/docket/4714rule.pdf	2020
<input type="checkbox"/> 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.

From 2010-2015: C/I/I water use decreased by 289%, residential water use is unchanged, and water supplier services decreased by 65%*. A significant reduction in commercial/industrial water use was observed between 2012 and 2013. Current City Staff was not aware of the cause of this change. It is likely that a significant water user relocated or change their process.

*Water supplier services data was only available from 2013-2015, so this value is based on changes over that time frame.

Objective 5: Reduce Peak Day Demand so that the Ratio of Average Maximum day to the Average Day is less than 2.6

Is the ratio of average 2005-2014 maximum day demand to average 2005-2014 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: **2.44**

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 a Conservation Water Rate Structure and/or a Uniform Rate Structure with a Water Conservation Program

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: 1000 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: December 2015

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	<input type="checkbox"/> Monthly billing <input type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input checked="" type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input type="checkbox"/> Use water bill to provide comparisons <input type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform <input checked="" type="checkbox"/> Odd/even day watering	<input checked="" type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
Commercial/ Industrial/ Institutional	<input type="checkbox"/> Monthly billing <input type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input checked="" type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input type="checkbox"/> Use water bill to provide comparisons <input type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform	<input checked="" type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
<input type="checkbox"/> 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

<input type="checkbox"/>	Participate in the GreenStep Cities Program, including implementation of at least one of the 20 “Best Practices” for water
<input type="checkbox"/>	Prepare a master plan for smart growth (compact urban growth that avoids sprawl)
<input type="checkbox"/>	Prepare a comprehensive open space plan (areas for parks, green spaces, natural areas)
<input type="checkbox"/>	Adopt a water use restriction ordinance (lawn irrigation, car washing, pools, etc.)
<input type="checkbox"/>	Adopt an outdoor lawn irrigation ordinance
<input type="checkbox"/>	Adopt a private well ordinance (private wells in a city must comply with water restrictions)
<input type="checkbox"/>	Implement a stormwater management program
<input type="checkbox"/>	Adopt non-zoning wetlands ordinance (can further protect wetlands beyond state/federal laws-for vernal pools, buffer areas, restrictions on filling or alterations)
<input type="checkbox"/>	Adopt a water offset program (primarily for new development or expansion)
<input type="checkbox"/>	Implement a water conservation outreach program
<input type="checkbox"/>	Hire a water conservation coordinator (part-time)

<input type="checkbox"/>	Implement a rebate program for water efficient appliances, fixtures, or outdoor water management
<input type="checkbox"/>	Other

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

Steady or declining per capita water use.

Tip: The process to monitor demand reduction and/or a rate structure includes:

- The DNR Hydrologist will call or visit the community the first 1-3 years after the water supply plan is completed.
- 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.
- 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.
- 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.
- 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.

A. 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)?
<input type="checkbox"/> Rainfall sensors required on landscape irrigation systems	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Water efficient plumbing fixtures required	<input type="checkbox"/> New development <input type="checkbox"/> Replacement <input type="checkbox"/> Rebate Programs
<input type="checkbox"/> Critical/Emergency Water Deficiency ordinance	<input type="checkbox"/> Only during declared Emergencies
<input checked="" type="checkbox"/> Watering restriction requirements (time of day, allowable days, etc.)	<input checked="" type="checkbox"/> Odd/even <input type="checkbox"/> 2 days/week <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Water waste prohibited (for example, having a fine for irrigators spraying on the street)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Limitations on turf areas (requiring lots to have 10% - 25% of the space in natural areas)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning

Regulations Utilized	When is it applied (in effect)?
	<input type="checkbox"/> Other
<input type="checkbox"/> Soil preparation requirements (after construction, requiring topsoil to be applied to promote good root growth)	<input type="checkbox"/> New Development <input type="checkbox"/> Construction Projects <input type="checkbox"/> Other
<input type="checkbox"/> Tree ratios (requiring a certain number of trees per square foot of lawn)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other
<input type="checkbox"/> Permit to fill swimming pool and/or requiring pools to be covered (to prevent evaporation)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Ordinances that permit stormwater irrigation, reuse of water, or other alternative water use (Note: be sure to check current plumbing codes for updates)	<input type="checkbox"/> Describe

B. 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
<input type="checkbox"/> Low flush toilets, <input type="checkbox"/> Toilet leak tablets, <input type="checkbox"/> Low flow showerheads, <input type="checkbox"/> Faucet aerators;	<input type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input type="checkbox"/> Water conserving washing machines, <input type="checkbox"/> Dish washers, <input type="checkbox"/> Water softeners;	<input type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization

Water Use Targets	Outreach Methods	Partners
<input type="checkbox"/> Rain gardens, <input checked="" type="checkbox"/> Rain barrels, <input type="checkbox"/> Native/drought tolerant landscaping, etc.	<input checked="" type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input checked="" type="checkbox"/> 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.):

Success would be measured by the reduction in per capita water demand.

C. 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		4	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Consumer Confidence Reports		1	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Social media distribution (e.g., emails, Facebook, Twitter)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Paid advertisements (e.g., billboards, print media, TV, radio, web sites, etc.)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Presentations to community groups			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Staff training			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Facility tours			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Displays and exhibits			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Marketing rebate programs (e.g., indoor fixtures & appliances and outdoor practices)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community news letters		4	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Direct mailings (water audit/retrofit kits, showerheads, brochures)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal

Education Methods	General summary of topics	#/Year	Frequency
			<input type="checkbox"/> Only during declared emergencies
Information kiosk at utility and public buildings			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Public service announcements			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Cable TV Programs			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Demonstration projects (landscaping or plumbing)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
K-12 education programs (Project Wet, Drinking Water Institute, presentations)			<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community events (children’s water festivals, environmental fairs)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community education classes			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Water week promotions			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Website (include address: www.ci.vadnais-heights.mn.us)	Water saving tips		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Targeted efforts (large volume users, users with large increases)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Notices of ordinances			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Emergency conservation notices			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal

Education Methods	General summary of topics	#/Year	Frequency
			<input checked="" type="checkbox"/> Only during declared emergencies
Other:			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Briefly discuss what future education and information activities your community is considering in the future:

Considering K-12 educational outreach programs to provide area students with conservation tips and information on the need for conservation efforts.

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
<input type="checkbox"/> None at this time		
<input type="checkbox"/> Comprehensive planning that guides development in vulnerable drinking water supply management areas		
<input type="checkbox"/> Zoning overlay		
<input type="checkbox"/> 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 (2)*
- Regional water use goals (1)*
- Water use reporting standards (5)*
- Regional and sub-regional partnership opportunities (3)*
- Identifying and prioritizing data gaps and input for regional and sub-regional analyses (4)*
- Others: Not changing our water system to accommodate White Bear Lake levels. (1)*

*Ranked as 1-Most Important to 5-Least Important

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 – see Part 1C

Appendix 2: Water level monitoring plan – see Part 1E

Appendix 3: Water level graphs for each water supply well - see Part 1E

Appendix 4: Capital Improvement Plan - see Part 1E

Appendix 5: Emergency Telephone List – see Part 2C

Appendix 6: Cooperative Agreements for Emergency Services – see Part 2C

Appendix 7: Municipal Critical Water Deficiency Ordinance – see Part 2C

Appendix 8: Graph showing annual per capita water demand for each customer category during the last ten-years – see Part 3 Objective 4

Appendix 9: Water Rate Structure – see Part 3 Objective 6

Appendix 10: Adopted or proposed regulations to reduce demand or improve water efficiency – see Part 3 Objective 7

Appendix 11: Implementation Checklist – summary of all the actions that a community is doing, or proposes to do, including estimated implementation dates – see www.mndnr.gov/watersupplyplans

Appendix 1

The Vadnais Heights wells are rehabilitated on 5 year schedule. This includes pulling the pumps, inspecting and repairing the pump, motor, and pump column. The following table identifies the well rehabilitation schedule.

Well	Rehabbed
Well 1	2015
Well 2	2014
Well 3	2012
Well 4	2013

In addition to the Wells, Vadnais Heights performs regular inspection and maintenance on other water infrastructure including valves and hydrants. Most of the watermain in Vadnais Heights is new enough to not need replacement at this time.

Appendix 2

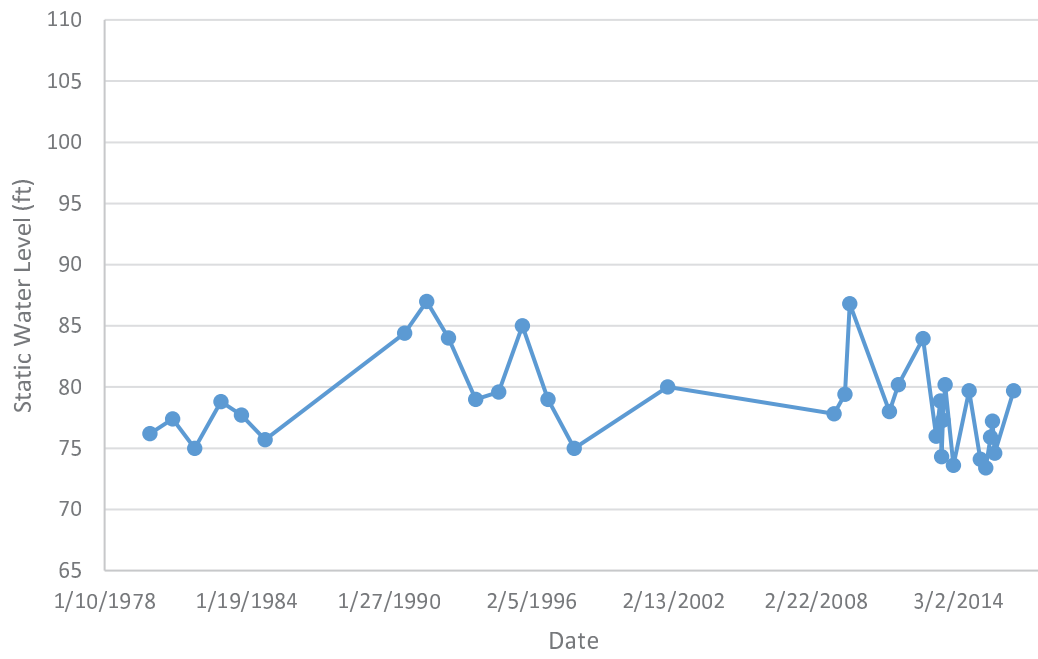
Vadnais Heights Well Water Level Monitoring Plan

MN Unique Well #	Well Type	Monitoring Frequency	Monitoring Method
112222 (Well 1)	Emergency Backup Well	Continuous	Transducer/Data Logger
127265 (Well 2)	Production Well	Annually	Steel Tape
224790 (Well 3)	Production Well	Annually	Steel Tape
127271 (Well 4)	Production Well	Annually	Steel Tape

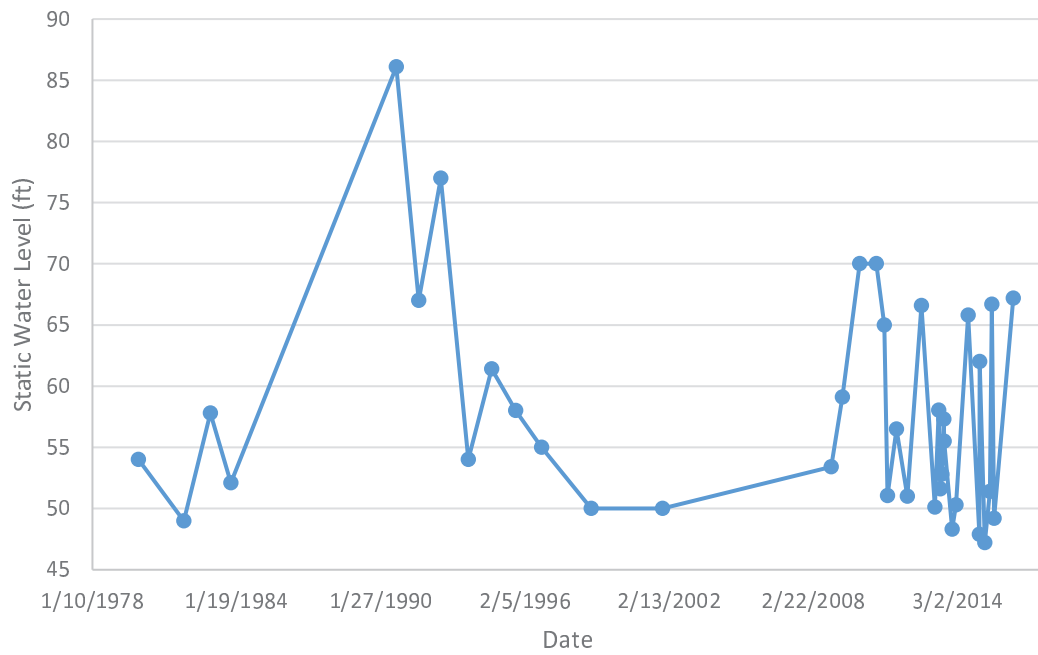
A transducer that continuously records water level will be installed in Well 1. The water level in the remaining wells will be measured using a steel tape.

Appendix 3

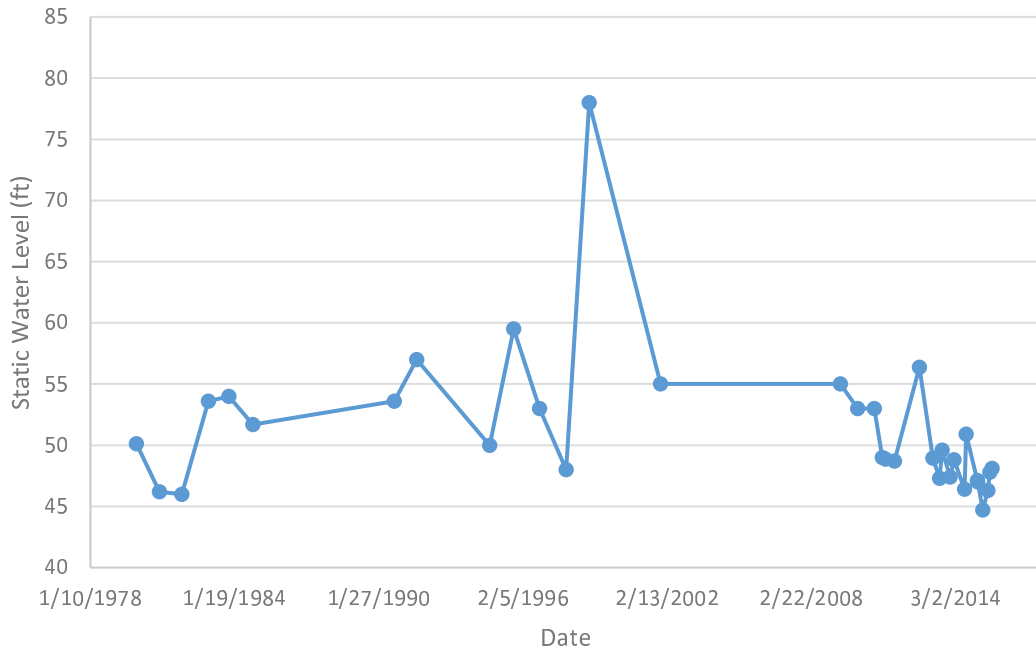
112222 (Well 1)



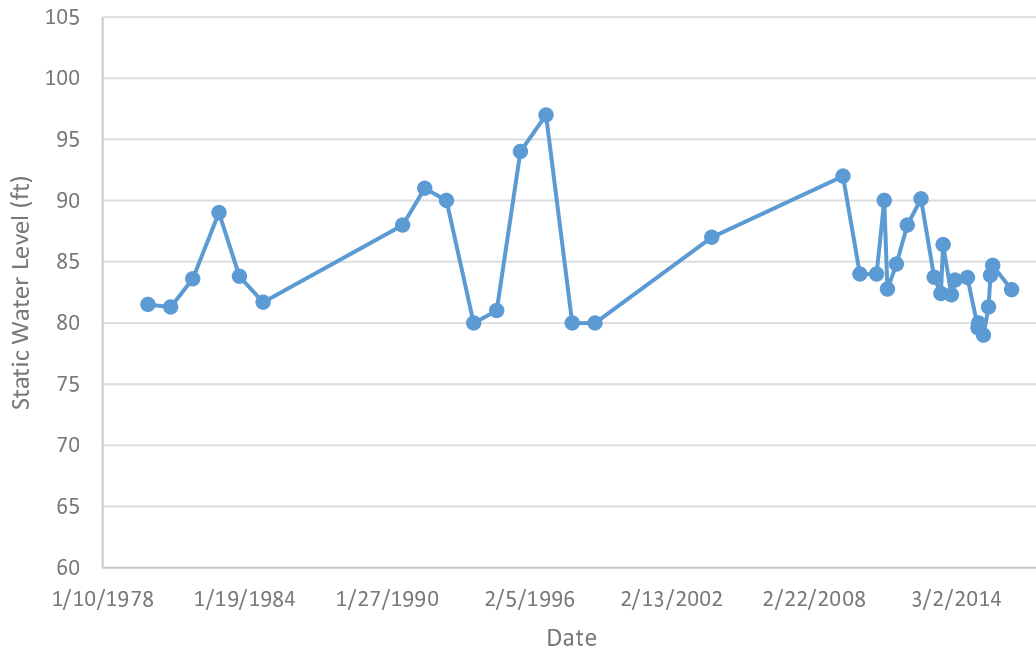
127265 (Well 2)



224790 (Well 3)



127271 (Well 4)



Appendix 4

City of Vadnais Heights, Minnesota
 Capital Improvement Plan
 2017 through 2021
 December 7, 2016

	Proposed 2017	Proposed 2018	Proposed 2019	Proposed 2020	Proposed 2021
CAPITAL IMPROVEMENTS FUND (funded through tax levy)					
<i>Operating Equipment:</i>					
1 ton dump truck Chevy C3500 (replace #313)		30,000			
Replace vehicle #115, Ford 350 dump (1 ton dump)				35,000	
Replace vehicle #116, Sterling dump (2 1/2 ton dump)		150,000			
Z Master mowers replacement	defer	18,000	18,000		
John Deere tractor replacement		25,000			
Jacobsen mower/snowblower #322 replacement	defer	45,000	25,000		
Replace Toro cart sprayer, #321		40,000			
Replace 3/4 ton with plow, #310			35,000		
Replace 3/4 ton with plow, #311		100,000			
Replace sidewalk trackless machine, #309					
Replace 2000 Ford F150 #U855	46,305	79,008			
Replace 2002 Ford F150 #U852					
Replace 2001 Ford F550 #E813			191,442		
Replace 3/4 ton truck #100				20,000	
Replace 1 ton truck #113	70,000				
Replace front end loader #121				100,000	
Replace 2 1/2 ton truck #105				150,000	
Replace asphalt patching trailer					
Replace Fire Vehicle T822, 1995 Peterbuilt Tanker		15,000			703,550
Replace Fire Vehicle U851, 1997 Peterbuilt Heavy Rescue					
Replace #325 sidewalk snow machine for city hall area				435,531	
Replace #125 Air Compressor	defer	8,000			
Replace #108 Bucket Truck					20,000
Replace Jacobsen 16' lawnmower					80,000
Brine Tanks for pickups		20,000			70,000
Pavement roller and trailer	defer	20,000			
<i>Buildings Maintenance:</i>					
Re-tile city hall lobby floor	defer	60,000			
Replace city hall planter		20,000			
Replace city hall roof		100,000			

	Proposed 2017	Proposed 2018	Proposed 2019	Proposed 2020	Proposed 2021
CAPITAL IMPROVEMENTS FUND (funded through tax levy) continued					
<i>Infrastructure Maintenance:</i>					
Street maintenance	110,000	110,000	110,000	110,000	110,000
Residential street light replacement		30,000	30,000	30,000	30,000
Community Park trail improvements	defer	50,000			
Lily Pond Park trail improvements	defer	25,000			
Bear Park trail improvements	defer	25,000			
Street replacement program, annual - 550,000/600,000 total each year	50,000				
Annual totals	276,305	970,008	409,442	880,531	1,013,550
PARK DEDICATION FUND (funded by developers)					
Lily Pond play structure replacement	60,000				
Greenhaven Park play structure replacement		50,000			
Community Park concession stand refurbishment			30,000		
Bear Park play structure replacement			130,000		
Kohler Meadows Park play structure replacement					
Annual totals	60,000	50,000	160,000	30,000	-
WATER UTILITY FUND (funded by water utility customers)					
Water tower #2 painting - 800,000 total		650,000			
Emergency backup water supply connections with Little Canada	30,000		15,000		
Paint well house interiors		15,000			
Annual totals	30,000	665,000	15,000	15,000	15,000
SEWER UTILITY FUND (funded by sewer utility customers)					
Sewer lift station refurbishment		20,000			
Annual totals	-	20,000	-	-	-

City of Vadnais Heights, Minnesota
 Capital Improvement Plan
 2017 through 2021
 December 7, 2016

	Proposed 2017	Proposed 2018	Proposed 2019	Proposed 2020	Proposed 2021
STORM SEWER UTILITY FUND (funded by storm sewer utility customers)					
Pond dredging		25,000			
Annual totals	-	25,000	-	-	-
MSA FUNDS (State construction funds)					
Rice Street bridge replacement (estimated city share)			400,000		
County Road D street replacement			300,000		
Annual totals	-	-	700,000	-	-
SPECIAL ASSESSMENTS FUNDS (collected from benefitting properties)					
Street replacement program, annual - 550,000/600,000 total each year	225,000	225,000	250,000	250,000	250,000
Annual totals	225,000	225,000	250,000	250,000	250,000
TAX INCREMENT FUNDS (non-committed funds in pooled districts)					
Street replacement program, annual - 550,000/600,000 total each year	275,000	325,000	350,000	350,000	350,000
Water tower #2 painting - 800,000 total		150,000			
Annual totals	275,000	475,000	350,000	350,000	350,000
Grand Totals	866,305	2,430,008	1,884,442	1,525,531	1,628,550

Appendix 5

Appendix 5
Vadnais Heights
Emergency Telephone List

Emergency Response Team	Name	Work Telephone	Alternate Telephone
Emergency Response Lead	Jesse Farrell	651-204-6050	
Alternate Emergency Response Lead	Ken LaCasse	651-204-6053	
Water Operator			
Alternate Water Operator			
Public Communications			

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	Judson Freed	651-266-1014	651-325-5760
National Guard	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
Mayor/Board Chair			
Fire Chief	Edward Leier	651-204-6032	
Sheriff	Matt Bostrom	651-266-9333	
Police Chief			
Ambulance	Allina Health EMS	651-222-0555	
Hospital			
Doctor or Medical Facility			

State and Local Agencies	Name	Work Telephone	Alternate Telephone
MDH District Engineer			
MDH	Drinking Water Protection	651-201-4700	
State Testing Laboratory	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
MPCA		651-296-6300	800/657-3864
DNR Area Hydrologist	Jen Sorensen	651-259-5754	
County Water Planner			

Utilities	Name	Work Telephone	Alternate Telephone
Electric Company	Xcel Energy	800/895-2999	
Gas Company	Xcel Energy	800/895-2999	
Telephone Company	Century Link	952-556-5679	
Gopher State One Call	Utility Locations	800-252-1166	651-454-0002
Highway Department	Virgil G. Hawkins	763-682-7383	

Mutual Aid Agreements	Name	Work Telephone	Alternate Telephone
Neighboring Water System			
Emergency Water Connection			
Materials			

Technical/Contracted Services/Supplies	Name	Work Telephone	Alternate Telephone
MRWA Technical Services	MN Rural Water Association	800-367-6792	
Well Driller/Repair			
Pump Repair			
Electrician			
Plumber			
Backhoe			
Chemical Feed			

Meter Repair			
Generator			
Valves			
Pipe & Fittings			
Water Storage			
Laboratory			
Engineering firm	SEH, Inc.	651-490-2000	

Communications	Name	Work Telephone	Alternate Telephone
News Paper			
Radio Station			
School Superintendent			
Property & Casualty Insurance			

Critical Water Users	Name	Work Telephone	Alternate Telephone
Hospital Critical Use:			
Nursing Home Critical Use:			
Public Shelter Critical Use:			

Appendix 6

**CITY OF WHITE BEAR LAKE
CITY OF VADNAIS HEIGHTS
MUNICIPAL WATER SYSTEM
INTERCONNECTION AGREEMENT**

I. **PARTIES** – This agreement is dated the 9th day of JUNE, 2014⁵, and is entered into, pursuant to the provisions of the Minnesota Joint Powers Act (MSA 471.59), by and between the City of White Bear Lake (herein “White Bear Lake”), a municipal corporation and political subdivision of the State of Minnesota and the City of Vadnais Heights (herein “Vadnais Heights”), a municipal corporation and political subdivision of the State of Minnesota.

II. **RECITALS** – White Bear Lake and Vadnais Heights share a common street, Buerkle Road, that leads into and out of both cities. Each City’s municipal water system is located within Buerkle Road, but is separated by railroad tracks. Each City has determined that in the event of certain emergencies, it would be mutually beneficial to have an interconnection between their municipal water systems.

III. **PURPOSE** – The purpose of this agreement is to define the scope of each party’s authority and responsibility in relationship to the construction, maintenance, and use of an interconnection between each party’s municipal water system.

IV. **TERMS** – Now, therefore pursuant to the statutory authority granted to each party and in consideration of the undertakings herein expressed, the parties agree as follows:


- (A) **Project** – A eight-inch interconnection will be constructed by the City of White Bear Lake connecting the two City water systems located within Buerkle Road. The project includes the placement of a casing beneath the railroad tracks and the installation of a control valve on each system. White Bear Lake will prepare the plans and specifications for the project and be the lead agency selecting the contractor by seeking bids. White Bear Lake shall perform the necessary inspection of the improvements. Vadnais Heights agrees to share in 50% of the project cost, including plan and specification preparation, permit costs, construction and field staking and inspection costs.
- (B) **Maintenance** – Each City shall be responsible for maintenance of the water main within their City border. Any work necessary on the water main within the casing pipe shall be completed by Vadnais Heights and the cost equally divided between the two cities.
- (C) **Use of Interconnection** – The interconnection shall only be used by a party if a water main break results in a loss of adequate pressure in the party’s municipal water system, or if a party’s water system becomes polluted or otherwise unusable, or if a fire fighting emergency exists and adequate pressure is not available in a party’s water system.
- (D) **Notice** – Prior to the use of the interconnection, the party requesting use must give notice to the other party’s Director of Public Works. The notice shall indicate the reason for the intended use. Actual notice must be given during normal business hours and

reasonable efforts to notify must be made during non-business hours. Unless usage of a party's water supply continues beyond a 48-hour period, neither party shall charge for the use of its water supply. Where a water use charge is imposed, it shall be at a rate equal to the prevailing rate for usage by single family residential users in the City which supplies the water and in an amount agreed to by the White Bear Lake Director of Public Works and the Vadnais Heights Director of Public Service, or at a rate initially agreed upon at the time of usage request.

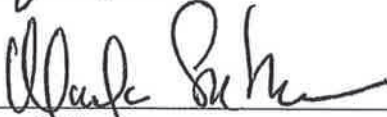
- (E) Water Standards – Each party shall exercise reasonable care to prevent toxic or harmful substances from contaminating the water supply of either party. On a yearly basis, each party shall supply the other with copies of yearly analytical test data from the Minnesota Department of Health, Division of Environmental Health. In addition, on a yearly basis, each party shall supply test results from a recognized testing lab, whose analyses were performed by the EPA or other recognized standard procedures. Test results shall be provided for hardness, manganese, iron, and volatile organics.
- (F) Terms of Agreement – This agreement shall become effective upon its approval of an appropriate resolution for each party and shall continue in force and effect for an indefinite term, provided that either party may terminate the agreement by giving the other party one year written notice. If termination occurs, the interconnection shall belong to the party in which the assets are located.

IN WITNESS WHEREOF, the parties have hereunto set their hands.

CITY OF WHITE BEAR LAKE



Jo Emerson, Mayor




Mark Sather, City Manager

Pursuant to City Council
authorization granted on
the 9th day of June, 2014/15

CITY OF VADNAIS HEIGHTS



Marc Johannsen, Mayor



Kevin Watson, City Administrator

Pursuant to City Council
authorization granted on
the 17th day of September, 2014

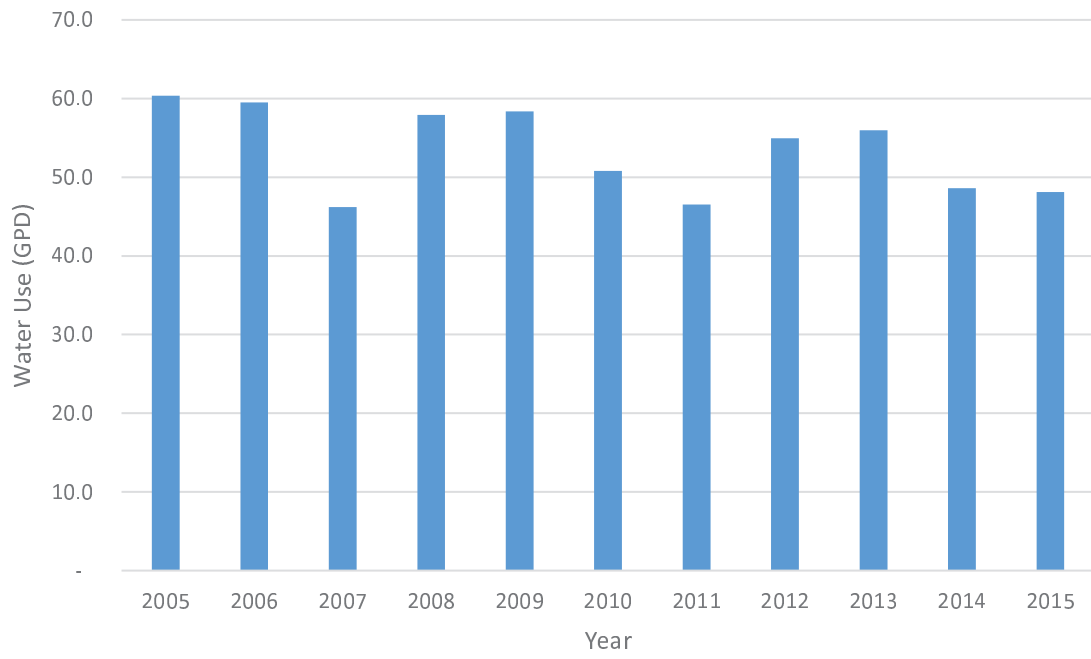
Appendix 7

Municipal Critical Water Deficiency Ordinance

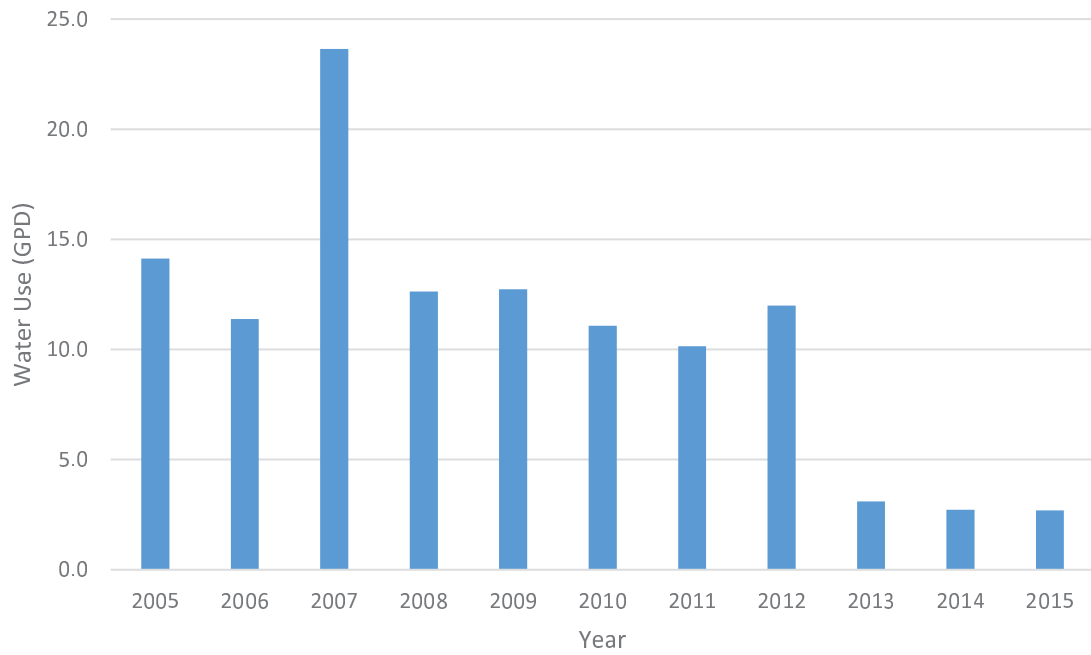
The City of Vadnais Heights does not currently have a Municipal Critical Water Deficiency Ordinance. A Municipal Critical Water Deficiency Ordinance will be adopted within 6 months of submitting this revised Water Supply Plan.

Appendix 8

Residential Per Capita Water Use



C/I/I Per Capita Water Use



Appendix 9



CITY OF VADNAIS HEIGHTS FEE SCHEDULE 2016

APPLICATION/FEE/PERMIT TYPE	FEE	ADDITIONAL COMMENTS	DEPARTMENT
Sewer Rates			
Base Charge; Residential	\$21.40	Per quarter per unit	
Residential Usage Charge	\$3.04	Per 1,000 gallons of water usage per quarter. If water usage is unavailable, 18,000 gallons will be the sewer charge basis. Minimum basis for charge is 6,000 gallons regardless of water usage. The charge for the 3rd quarter may be adjusted to address irrigation water use.	
Hotel Usage Charge	\$3.04	Per 1,000 gallons of water used per quarter	
Residential Base Charge - City Water Available, Not Connected	\$94.00	Per Quarter	
Residential Base Charge - City Water Unavailable	\$80.00	Per Quarter	
Commercial Base Charge - No City Water Connection	\$128.00	Per Quarter	
Commercial Properties:			
Base Charge	\$30.40	Per Quarter	
Usage Charge			
0 - 25,000 gallons of water usage	\$3.91	Per 1,000 gallons per quarter	
Over 25,000 gallons of water usage	\$5.50	Per 1,000 gallons per quarter	
Surface Water Rates			
Residential Single Unit Properties	\$10.70	Per unit per quarter	
Commercial, Multi Dwelling Unit Residential Properties	variable, 2.0% increase	Amount varies based on number of units and impervious land	
Illegal Sump Pump Surcharge	\$260.00	Per quarter until legal discharge is verified	
Collection Fees			
Returned Check/Failed Auto Deposit Fee	\$30.00		
Late Payment Fee	\$5.00 or 15% (higher calculated amount)	Assessed quarterly on delinquent account balance	
Pre-certification Processing Fee	\$35.00		
After the due date of the 2nd quarterly billing (approximately August 9, 2016) all accounts delinquent for more than one quarter, owing an amount greater than the 2nd quarter billing, or an amount greater than \$150.00, are subject to the annual certification process. Details regarding the process will be mailed to affected property owners of record. Accounts included in the process will be charged a non-refundable pre-certification processing fee of \$35.00. Accounts that remain unpaid after the stated final due date will be certified to Ramsey County for collection with 2017 property taxes. Quarterly late payment fees will continue through May 10, 2017 and will be certified with the delinquent amount owed.			

Appendix 10

No new regulations have been adopted or proposed to reduce demand or improve water efficiency.

Appendix 11

Activity Implemented	Activity or Action Item	Time Frame
Actions to Reduce Residential Per Capita Demand		
X	Complete installation of Advanced Metering Infrastructure water meters which will allow water usage to be tracked on a real-time basis to inform water users. This will allow the City to focus conservation efforts on high water users.	2019
	Conduct audience appropriate water conservation education and outreach.	2020
Actions to Reduce Total Water Demand		
	Investigate reuse of reclaimed water.	2020
X	Make water system infrastructure improvements	Ongoing
	Reduce outdoor water use (turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	2020
	Promote rain catchment systems (to the extent allowed by plumbing code)	2020
	Create a retrofitting program including rebates or incentives to reduce outdoor water use (turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	2020
	Implement a K-12 water conservation outreach program	2020
X	Perform water audits to track water usage and loss	Ongoing



APPENDIX D

Local Surface Water Management Plan



Surface Water Management Plan

Third Generation

City of Vadnais Heights, Minnesota

City Project No. 2017-8
SEH No. VADNA 140953 4.00

July 18, 2018



Building a Better World
for All of Us®

Engineers | Architects | Planners | Scientists

Third Generation
Surface Water Management Plan
City of Vadnais Heights, Minnesota

City Project No. 2017-8
SEH No. VADNA 140953

July 18, 2018

Prepared by:

Short Elliott Hendrickson Inc.

3535 Vadnais Center Drive

St. Paul, MN 55110-5196

651.490.2000

Executive Summary

Introduction

This document was prepared by SEH staff through discussion with Vadnais Heights City Engineer Mark Graham. The City of Vadnais Heights (City) is an established suburban community in the northern Minneapolis/St. Paul metropolitan area. The City has been committed to surface water management issues since well before the first storm water management plan was adopted in 1990. The purpose of this plan update is to meet regulatory requirements and to protect and improve surface and ground water resources within the City. Minnesota Statutes, Sections 103B.201 to 103B.255 and Minnesota Rule, Chapter 8410 comprise the State's Metropolitan Surface Water Management Program (MSWMP). These Statutes and Rules require the preparation of watershed plans by watershed management organizations (WMOs) and the preparation of local (City) water management plans.

In July 2015, the Minnesota Rules, Chapter 8410 was amended which made significant changes in the timing of local water management plan revisions. Local water management plans must be revised once every ten years in alignment with the local comprehensive plan schedule. Therefore, all cities and towns in the seven-county metropolitan area must complete and adopt their local water plan between January 1, 2017 and December 31, 2018. The City is within the administrative boundaries of two watershed management organizations, the Vadnais Lake Area Watershed Management Organization (VLAWMO) and the Ramsey Washington Metro Watershed District (RWMWD), both of which have recently completed Watershed Management Plan updates.

The major waterbodies in the City include Vadnais Lake (East and West), Sucker Lake and Willow Lake. East Vadnais Lake and Sucker Lake are part of the St. Paul Regional Water Service (SPRWS) system supplying drinking water to customers in the St. Paul area. In VLAWMO, the City serves as the permitting authority and review agency for land development. VLAWMO does not operate a regulatory program for development, but does comment on development plans. They serve as the local government unit (LGU) for wetland impacts and administering the Wetland Conservation Act. In RWMWD, the watershed district operates a permitting program that regulates land development including stormwater management and WCA administration. Other agencies that have a role in management of water resources within the City include Ramsey County, the Minnesota Department of Natural Resources (MnDNR), Minnesota Pollution Control Agency (MPCA), the U.S. Army Corps of Engineers, and the Board of Water and Soil Resources (BWSR).

Physical Environment

Vadnais Heights has slight to moderate topographic relief variation. Throughout the City, there is a moderate amount of natural surface depressional storage. The soils within the City are varied with areas of clay or well drained sandy soils with numerous muck filled depressions. The City's surficial geology consists of unconsolidated glacial deposits ranging from approximately 50 to 300 feet in depth beneath which lies the bedrock. The climate within the Vadnais Heights area is described as a humid continental climate with moderate precipitation, wide daily temperature variations, warm humid summers and cold winters.

Land development is nearly complete, with only a few parcels throughout the City that remain undeveloped. Vadnais Heights has thirteen park areas throughout the City. Ramsey County Open Space and the St. Paul Regional Water Services property also provide large natural undeveloped areas. These areas provide important wildlife habitat as well as aesthetic benefits for the City.

Vadnais Heights is completely within the Metropolitan Urban Service Area (MUSA,) and therefore served by interceptor sanitary sewers. Sanitary sewer and water mains are available for nearly the entire City. Vadnais Heights has an independent municipal water supply system which includes four municipal wells and two

elevated storage reservoirs. The City drainage system is served by curb-gutter-catch basin and storm sewer laterals with the major drainage conveyance method being ditches to and through wetlands. The City's stormwater system is designed to accommodate a 10-year, 24-hour rain event.

Vadnais Heights is served by several major ditches that generally flow from north to south through the City. The major Ditch is Ditch #14, which crosses beneath Interstate 35E and County Road F. Ditch #14 ultimately outlets into East Vadnais Lake and is under the jurisdiction and responsibility of VLAWMO. The City has several smaller ditches which outlet into Ditch #14. These smaller ditches are referred to as branch ditches and include Branch Ditch #2, 3, 4, 5, 5A, and 5B. All of these branch ditches are under the jurisdiction and responsibility of the City. All of these ditches are shown on Figures 4 and 6.

In spring 2018, VLAWMO funded and used state correctional forces to clean logs and debris from Ditch #14. VLAWMO is also working with a consultant to survey Ditch #14 and review historical data to determine if any localized dredging or improvements are warranted. It is recognized that localized improvements may affect other portions of flow in Ditch #14 or adjoining property. It will be important to consider all upstream and downstream impacts as projects are considered.

In winter 2017, the City funded and completed an excavation project to clear a portion of Branch Ditch #5A from County Road F to Bear Avenue North. This work required DNR approval as it cleared sediment and cattails from a large wetland complex. Other branch ditches flow through a combination of open land, wooded areas, and wetlands. It is likely that similar work completed on part of Branch Ditch #5A will be needed in the future. Surveying work and study with a consultant is ongoing to determine where work is needed.

Lakes within Vadnais Heights include Sucker Lake, East and West Vadnais Lake, and Willow Lake. All three lakes are DNR Public Waters. The east and west basins of Vadnais Lake are separated by a north-south causeway with no direct hydraulic interconnection. Lambert Creek also runs through Vadnais Heights. Lambert Creek is the main collector for Vadnais Heights and contributes about 1/3 of the lakes phosphorus loading to Vadnais Lake. VLAWMO plans to develop Sustainable Lake Management Programs (SLMP) for East Vadnais, Sucker, and West Vadnais Lakes to be completed by 2026. Willow Lake lies near the headwaters of a tributary area of the Kohlman-Phalen Lake system in RWMWD but is not currently monitored by RWMWD or Ramsey County. The following table provides summary information on the lakes within the City.

Summary of Lake Information

Lake	Identification Number	Surface Area (ac)	Maximum Depth (ft)	Transparency ¹ (meters)
East Vadnais	62-0038-01	379	58	3
West Vadnais	62-0038-02	208	9	1
Sucker	62-0028-00	59	24	2
Willow	62-0040-00	30	8	1

¹ Ten year summer average (June-September) from 2006 to 2015

Source: [MPCA Lake and Stream Water Quality Dashboard](#)

Goals and Policies

The Vadnais Heights' goals and policies provide for future development and redevelopment while minimizing surface water problems and enhancing the environment. The goals and policies are to be used as a guide in the design and construction of private and public developments impacting water resources in the City. A **goal** is a desired end toward which surface water management efforts are directed. The City's goals are summarized in the following table.

Executive Summary (Continued)

Summary of Goals

Goal No.	Goal Category	Goal Statement
1	Water Quantity	Control flooding and minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of runoff.
2	Water Quality	To maintain or enhance the water quality of lakes, wetlands, and water courses consistent with intended use and classification.
3	Erosion and Sediment Control	Minimize soil erosion through proper planning, enforcement and education.
4	Wetlands	Manage wetlands to achieve no net loss of acreage and increase the wetland values in the City, where feasible.
5	Public Participation, Information and Education	Increase public participation and knowledge in management of the water resources. Educate public in limitations of the stormwater system during significant rain events.
6	Maintenance and Inspection	Preserve the function of water resource facilities through routine inspection and regular maintenance activities.
7	Recreation, Fish and Wildlife	Manage water recreation activities and improve fish and wildlife habitat, where feasible.
8	Groundwater	Prevent contamination of the aquifers and promote groundwater recharge.
9	Finance	Establish funding sources to finance water resources management and maintenance activities.
10	Regulatory Responsibility	Accept regulatory authority as the City while recognizing the role of other local, state and federal entities.

Existing and Potential Water Resource Related Issues

Local water management plans need to include an assessment of both existing and potential water resource-related problems/issues. Four water quantity/drainage issue areas have been identified including:

- the Greenhaven Addition wetland complex, generally bounded by McMenemy Street, T.H. 96, Thornhill Lane and County Road F,
- the wetland south of County Rd F, between McMenemy Street and Clover Avenue,
- County Road Ditch 14 in the vicinity of Pennington Place,
- Branch #5B in the vicinity of Bear Avenue North, and
- Edgerton Street beneath the railroad trestle.

In addition to the drainage issues identified, there are four impaired waters in or near the City of Vadnais Heights as summarized in the following table. A water is considered impaired if it fails to meet one or more water quality standards set by the MPCA.

VLAWMO measures chloride levels in all lakes under their jurisdiction annually, publishes data on their website and reports information to the MPCA. The MPCA collects information from multiple sources and makes recommendations for impairment determinations to the Federal EPA. All information in this table is considered “draft” until the EPA makes a final decision on a bi-annual basis. As of this writing, the EPA has not finalized their impaired waters list, so it remains in “draft” form.

Summary of Water Quality

Water Body	AUID	Affected Designated Use	Pollutant or Stressor	TMDL Completion Date
East Vadnais Lake	62-0038-01	Aquatic Consumption	Mercury in fish tissue	2007
West Vadnais Lake	62-0038-02	Aquatic Recreation	Nutrient/ eutrophication biological indicators	2024
Sucker Lake	62-0028-00	Aquatic Consumption	Mercury in fish tissue	2007
Lambert Creek	07010206-801	Aquatic Recreation	Fecal Coliform	2014
Gilfillan Lake	62-0027-00	Aquatic Recreation	Nutrient/ eutrophication biological indicators	2014
Kohlman Lake	62-0006-00	Aquatic Life, Aquatic Recreation	Chloride, Nutrient/ eutrophication biological indicators	2010

Source: [MPCA 2016 Impaired Waters List](#), [MPCA 2018 Draft Impaired Waters List](#)

In addition to having water quality impairments, Vadnais Lakes and Sucker Lake are on the Minnesota DNR's Infested Waters List for Zebra Mussels (Listed in 2007) and Eurasian watermilfoil (Listed in 1989 and 1995, respectively). Invasive species are species that are not native to Minnesota and cause economic or environmental harm or harm to human health. The MnDNR is leading the State's efforts to curb the spread and minimize harmful effects of nonnative species.

Potential water resource related issues the City faces are climate change and groundwater sustainability. The City recognizes the importance of resiliency. In a water resources context, resiliency can be attributed to the ability to adapt to the climate-related variability and reduce the vulnerability of the community to extreme events. The City has, for example, amended their stormwater management standards to recognize the updated Atlas 14 depths and distributions and will endeavor to continue to adapt its policies and standards with the climate change trends. Vadnais Heights is located within the North and East Metro Groundwater Management Area, which has been studied by the MnDNR. Groundwater sustainability objectives have been established to help appropriation permit holders plan for their future water use. The City recognizes the importance of groundwater sustainability and will work with the DNR and other governing agencies to plan for change and avoid disruption.

Implementation Priorities

The implementation plan includes identification and prioritization of capital improvements, administration, inspections, permitting, plan amendments, financing alternatives, public involvement and monitoring programs. Prioritization of improvements is based on a review of all recommended actions. Planning-level estimates of capital expenditures have been made. Future anticipated projects are limited at this time, as the City is nearly entirely developed and no significant changes are anticipated. However, development or redevelopment may alter or create new projects. The activities have been distributed throughout a 10-year implementation plan extending through 2027.

Executive Summary (Continued)

The City will work with its watershed district partners and various State and Federal agencies on these projects. Whether or not the City is a financial participant in all of these projects will be determined as the scope of the work is established. The Implementation Plan is summarized in the following table.

Implementation Plan

Item	Project Name	Description	Year				
			2018	2019	2020	2021	2022
1	Vadnais Heights SWMP	Update SWMP	\$10,000				
2	MS4 Regulatory Activities	MS4 Inspections, Annual Report, Program Maintenance, Ordinance Updates, Distribution of Education Materials	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
3	Storm Water Treatment for Future Development and Redevelopment Projects	Design of regional treatment systems for proposed development and redevelopment within Vadnais Heights, as necessary					\$10,000
4	Cooperate with VLAWMO to complete SLMP's	VLAWMO has identified completion of SLMP's for East Vadnais, West Vadnais and Sucker Lakes in Vadnais Heights		\$20,000			
5	Adopt Environmental Protection Ordinance	Adopt ordinance that addresses fertilizer control, aquatic vegetation in ditches and wetlands, weeds and noxious growth, chemical application control, hazardous waste disposal, spill containment plans, etc.	\$2,000				
6	Adopt ISTS Ordinance	Adopt an ISTS management program and ordinance once revisions are implemented by Ramsey County ordinances		\$1,000			
7	Culvert Cleaning and Monitoring	Increase efforts to clean culverts and public ditches.	\$100,000	\$50,000	\$50,000	\$10,000	\$10,000
8	Ponding on Edgerton	Work with the County to address ponding on Edgerton beneath railroad trestle south of Centerville Road, as feasible					\$20,000
9	Grass Lake and Vadnais Lake Connection	Following an assessment of the connection between Grass Lake and Vadnais Lake, implement any needed improvements		\$20,000			
10	Lambert Creek Restoration	Implement restoration and stabilization projects based on cost-benefits and opportunistic partnerships	\$5,000	\$5,000			
11	West Vadnais Feasibility Study	Help prepare a feasibility study and identify internal load management strategies and implement projects		\$10,000			
12	Sucker Lake, East Vadnais Lake, and West Vadnais Lake Pumping Study	Partner with the City of North Oaks, the SPRWS, and VLAWMO on a feasibility study regarding the effect on water quality due to possible increased pumping of water by the SPRWS				\$10,000	
13	Street Sweeping	Sweep City owned streets	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
14	BMP Maintenance	Maintain City owned BMPs on a routine or as needed basis	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000

Implementation Plan Continued

Item	Project Name	Description	Year					
			2023	2024	2025	2026	2027	
1	Vadnais Heights SWMP	Update SWMP	\$5,000					\$10,000
2	MS4 Regulatory Activities	MS4 Inspections, Annual Report, Program Maintenance, Ordinance Updates, Distribution of Education Materials	\$3,000	\$3,000	\$3,000	\$3,000		\$3,000
3	Storm Water Treatment for Future Development and Redevelopment Projects	Design of regional treatment systems for proposed development and redevelopment within Vadnais Heights						\$10,000
4	Cooperate with VLAWMO to complete SLMP's	VLAWMO has identified completion of SLMP's for East Vadnais, West Vadnais and Sucker Lakes in Vadnais Heights	\$5,000					
5	Adopt Environmental Protection Ordinance	Adopt ordinance that addresses fertilizer control, aquatic vegetation in ditches and wetlands, weeds and noxious growth, chemical application control, hazardous waste disposal, spill containment plans, etc.	\$2,000					
6	Adopt ISTS Ordinance	Adopt an ISTS management program and ordinance once revisions are implemented by Ramsey County ordinances.						
7	Culvert Cleaning and Monitoring	Increase efforts to clean culverts and public ditches.	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
8	Ponding on Edgerton	Work with the County to address ponding on Edgerton beneath railroad trestle south of Centerville Road, as feasible						
9	Grass Lake and Vadnais Lake Connection	Following an assessment of the connection between Grass Lake and Vadnais Lake, implement any needed improvements						
10	Lambert Creek Restoration	Implement restoration and stabilization projects based on cost-benefits and opportunistic partnerships						\$5,000
11	West Vadnais Feasibility Study	Help prepare a feasibility study and identify internal load management strategies and implement projects						
12	Sucker Lake, East Vadnais Lake, and West Vadnais Lake Pumping Study	Partner with the City of North Oaks, the SPRWS, and VLAWMO on a feasibility study regarding the effect on water quality due to possible increased pumping of water by the SPRWS						
13	Street Sweeping	Sweep City owned streets	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
14	BMP Maintenance	Maintain City owned BMPs on a routine or as needed basis	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000

For the plan to remain dynamic, an avenue must be available to implement new information, ideas, methods, standards and management practices. Amendment proposals can be requested any time by any person or persons either residing or having business within the City. The five step amendment procedure includes:

- Request for Amendments
- Staff Review
- Council Consideration
- Public Hearing, Council and Watershed Management Organization Approval, and
- Council adoption

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Surface Water Management Plan

Third Generation

Prepared for City of Vadnais Heights

1.0 Introduction

The intent of this Surface Water Management Plan (SWMP) is to gather all essential information and planning data into a single document. This document describes the existing environment, establishes specific policy and management methods for protection and future enhancement of the City's water and wetland resources, while recognizing the need for proper land utilization and growth. The Plan has been prepared in conformance with the criteria set forth in State Statutes, Minnesota Rules 8410, the Vadnais Lake Area Water Management Organization (VLAWMO), the Ramsey Washington Metro Watershed District (RWMWD) plans and by Metropolitan Council. The criteria, as a minimum, establish the degree of performance necessary to achieve improvement in water quality and quantity management. These criteria are not intended to dictate or preempt the design process, but rather provide guidelines towards development that will help the City and watershed meet their surface water management goals.

1.1 Purpose and Need

The City of Vadnais Heights has been committed to surface water management issues since well before the first storm water management plan was adopted in 1990. The City has worked cooperatively with the St. Paul Regional Water Services to protect the water quality in Vadnais Lake, has an effective erosion and sediment control program and has had programs in place for preservation of wetlands, shoreland management, and management of floodplain areas for several years.

The purpose of this plan is to meet regulatory requirements and to protect and improve surface and ground water resources within the City. There are two primary programs that establish the regulatory need to update the City's Surface Water Management Plan (SWMP). Minnesota Statutes, Sections 103B.201 to 103B.255 and Minnesota Rule, Chapter 8410 comprise the State's Metropolitan Surface Water Management Program (MSWMP). These Statutes and Rules require the preparation of watershed plans by watershed management organizations (WMOs) and the preparation of local (City) water management plans. The purpose of the program and the objectives of the plan are:

103B.201 Metropolitan Water Management Program Purpose.

The purposes of the water management programs required by sections 103B.205 to 103B.255 are to:

- (1) protect, preserve and use natural surface and groundwater storage and retention systems;*
- (2) minimize public capital expenditures needed to correct flooding and water quality problems;*
- (3) identify and plan for means to effectively protect and improve surface and groundwater quality;*
- (4) establish more uniform local policies and official controls for surface and groundwater management;*

In July 2015, Minnesota Rules, Chapter 8410 was amended which made significant changes in the timing of local water management plan revisions. Local water management plans must be revised once every ten years in alignment with the local comprehensive plan schedule. The current round of local comprehensive plan updates are due by December 31, 2018. Therefore, all cities and towns in the seven-county metropolitan area must complete and adopt their local water plan between January 1, 2017 and December 31, 2018. Upon adoption by Council, this 2017 SWMP can be incorporated by reference into the City's overall 2040 Comprehensive Plan.

The second regulatory program, very much related to the goals, policies and standards of this Plan, is the National Pollutant Discharge Elimination System (NPDES) Phase II Storm Water Permit Program for Municipally Separate Storm Sewer Systems (MS4s) that is administered in the State by the Minnesota Pollution Control Agency (MPCA). The goals, policies and standards of this plan were developed to be consistent with the requirements of the City's NPDES MS4 permit and associated Surface Water Pollution Prevention Plan (SWPPP) as well as the respective WMO plans. The implementation program included in this plan and the SWPPP are intended to be a coordinated effort to realize combined efficiencies.

The City covers about 5,200 acres or 8.1 square miles of surface area and has many lakes and wetlands, providing great aesthetic and environmental value. The City is largely developed with little remaining land for development. The City is within the administrative boundaries of two watershed management organizations, about 4,000 acres of the City are in the Vadnais Lake Area Watershed Management Organization (VLAWMO) and about 1,200 acres are in the Ramsey Washington Metro Watershed District (RWMWD). Much of the City

was constructed in areas that were formerly wetlands or lakes, so there are high water tables in many areas.

The RWMWD completed an updated Watershed Management Plan in 2016. The updated Watershed Management Plan was approved by the Board of Water and Soil Resources (BWSR) in March 2017 and by the RWMWD Board of Managers in summer 2017. The current VLAWMO plan was adopted in July 2016.

Vadnais Heights is required to prepare a Local Water Resource Management Plan that is consistent with the requirements of the two watershed plans. In addition, the plan is subject to review by Metropolitan Council. In 1995, State Statutes were revised to provide Metropolitan Council with review and approval authority of Local Water Resource Management Plans. The authority is related to Metropolitan Council's role in the review and approval of Comprehensive Plans. In 1997, Metropolitan Council adopted the Local Planning Handbook. The handbook includes specific requirements for Local Water Resource Management Plans, and was updated to include additional requirements in January 2016. Upon adoption by Council, this Plan will become part of the City's overall Comprehensive Plan.

1.2 Background

The City of Vadnais Heights (City) is an established suburban community in the northern Minneapolis/St. Paul metropolitan area. The City is located in northeastern Ramsey County and is bounded to the west by Shoreview, to the north by North Oaks and White Bear Township, to the east by White Bear Lake and Gem Lake, and to the south by Maplewood and Little Canada. Vadnais Heights is generally bounded to the east by State Trunk Highway 61, to the north by County Road 96, to the south by County Road D and to the west by Rice Street. Figure 1 illustrates the geographic location of Vadnais Heights within the seven county metropolitan area.

First settled in 1840s, the area known as Vadnais Heights became part of White Bear Township in 1858, when Minnesota became a state. In 1957, with a population of about 2,000, residents voted to incorporate as the Village of Vadnais Heights. In 1974, an act of the Minnesota State Legislature turned the village into a full-fledged city. Today, the City of Vadnais Heights is a vibrant community with strong neighborhoods, thriving businesses, beautiful woods, lakes, wetlands, and trails. Approximately 13,000 people call Vadnais Heights "home".

Vadnais Heights has many lakes and wetlands, providing great aesthetic and environmental value. The major waterbodies in the City include Vadnais Lake (East and West), Sucker Lake, and Willow Lake. East Vadnais Lake and Sucker Lake are part of the St. Paul Regional Water Service (SPRWS) system supplying drinking water to customers in the St. Paul area. Figure 2 illustrates the watershed hydrologic boundaries, which vary in some areas from the administrative boundaries of the respective watershed organizations.

Land development is nearly complete, with only a few parcels throughout the City that remain undeveloped. Most of these undeveloped areas are located along the I-35E corridor. Retail space and office/warehouse type development is anticipated for these areas. Large continuous tracks of land are not generally available for residential development.

1.3 Water Resource Management Roles and Responsibilities

Several entities will have administrative responsibilities within the planning area. For a local water management effort to be successful, each entity's commitment and role must be clearly

understood. Those currently having some level of administrative responsibility include the City, WMOs, Ramsey County, MnDNR, MPCA, the U.S. Army Corps of Engineers, and BWSR.

Many of the waters and wetlands are designated by the MnDNR as State Protected Wetlands and Waters or are incorporated into the City's Official Zoning Map. Other wetlands are identified as waters of the United States. Alteration of these areas would fall under the jurisdiction of the Army Corps of Engineers and the WMOs/WDs. Extensive permitting is often required before alteration of wetlands or surface waters can take place. The Clean Water Act is the main basis for the required protection of wetlands in the United States, and one goal of this legislation is to have no net impact on wetlands.

1.3.1 City of Vadnais Heights

The City of Vadnais Heights is responsible for issuing building permits for all land alteration thereby enforcing the policies and standards of this plan. The City is responsible for inspecting the construction sites within its boundaries which may impact water quantity and quality. The City is also responsible primarily for the maintenance and repair of ditches within their own boundaries. The City is working to clarify and memorialize ditch responsibilities with Ramsey County and the Minnesota Department of Transportation (MNDot). The City's administrative responsibilities include, but are not limited to, the following:

- Local water resources management;
- Comprehensive plan update(s);
- Land use regulations;
- Ordinance review and amendment;
- Local plat review and amendments;
- Building permits;
- Sediment and erosion control (subdivision ordinance);
- Groundwater Wellhead Protection Plans;
- Participation and cooperation with the programs of the WMOs, DNR and Ramsey County, such as the RWMWD Public Works Forum and VLAWMO Technical Committee;
- Hydrologic model update with comprehensive plan changes;
- Financing alternatives;
- Capital improvements; and
- Conveyance system/pond maintenance.

1.3.2 Watershed Management Organizations

1.3.2.1 Vadnais Lake Area Watershed Management Organization (VLAWMO)

VLAWMO was organized in 1983 using a Joint Powers Agreement (JPA) developed under authority conferred by Minnesota Statutes, Sections 471.59 and 103B.201. VLAWMO does not operate a regulatory program for development review. All member cities or townships are MS4s with approved permits to discharge stormwater, and they, as MS4s, will be responsible for ensuring that development, redevelopment and construction meets NPDES requirements. Each member city is responsible for using permits for stormwater construction activities. Each member city or township is required to operate a permitting program and have local controls consistent with VLAWMO water management policy. VLAWMO is the LGU administering the

Wetland Conservation Act (WCA) and has been since 1991. Core activities of VLAWMO include:

- Water Quality Monitoring
- Watershed Studies and Lake Management Plans
- Education and Outreach
- Capital Improvement Projects
- Operations and Maintenance of Capital projects

1.3.2.2 Ramsey Washington Metro Watershed District (RWMWD)

The southeastern portion of the City lies within the jurisdictional boundaries of the RWMWD as shown in Figure 2. Per the authorities given in Minnesota Statutes 103D, RWMWD has adopted rules, last revised in 2015, to regulate the use and development of land within its jurisdiction. To ensure District rules are followed, the RWMWD maintains a permit program. The RWMWD issues permits for stormwater construction activities on behalf of each member City. The RWMWD is also the Local Government Unit (LGU) responsible for administering the Wetland Conservation Act (WCA) within the watershed. Major responsibilities of the RWMWD include:

- Implementation of the District's Rules, Regulations, and Permitting Program
- Wetland and Natural Resource Management
- Projects and Studies
- Maintenance of District Facilities and MS4 Permit Responsibilities
- Monitoring
- Reporting and Evaluation
- Assistance to Local Governmental Units
- Collaboration with Other Agencies and Organizations
- WRAPS and TMDL Implementation

1.3.3 Ramsey County

Ramsey County's responsibilities directly related to water resources include groundwater management through preparing and adopting groundwater plans and adopting and implementing the county's MS4 SWPPP. Ramsey Conservation District prepared the county's groundwater plan, which remains in draft form, in 2010.

1.3.4 St. Paul Regional Water Services

VLAWMO has designated water bodies that convey water directly to the St. Paul Regional Water Service system as SPRWS Protected Waters. The SPRWS supply system consists of impoundment reservoirs that are supplied by diversions from the Mississippi River to Pleasant Lake, and by runoff from within VLAWMO watershed. Within VLAWMO, the system consists primarily of four reservoirs: Charley Lake, Pleasant Lake, Sucker Lake, and the final impoundment, East Vadnais Lake, at which point the water is conveyed to the filtration plant. Additionally, SPRWS exercises water elevation and flow control over feeder lakes to the three reservoir lakes. These feeder lakes are Charley, Deep, and Wilkinson. Any alterations to these water bodies and adjacent lands receive the greatest protection from VLAWMO. All waters directly connected to this supply system are considered high priority wetland protection areas.

In 1999, the St Paul Water Utility (now the SPRWS) prepared a report entitled *Vadnais Watershed Emergency Management Study* (SEH, 1999). The goal of the plan was to provide a comprehensive look at features, risks and possible mitigation actions relating to how an emergency situation could be ideally dealt with before contaminating the SPRWS's supply.

The plan recommends urgent and timely protection for Sucker Lake, Sucker Creek, Vadnais Lake (east basin), Vadnais Lake (west basin), and Lambert Creek. In addition, similar protection status is recommended to the Sucker Creek Wetland, Lamberts Lake and Grass Lake east of I-35E. Potential threats to the supply system include spills, hazardous materials emergencies, fixed tank leaks, and construction accidents.

1.3.5 State and Federal Agencies

1.3.5.1 Metropolitan Council

The Metropolitan Council provides regional planning and wastewater services (collection and treatment) for the seven county metropolitan area. The Metropolitan Council provides review and comment on watershed management plans, local water management plans, and local comprehensive (land use) plans; conducts lake monitoring (including the Citizen Assisted Monitoring Program); and conducts river and stream monitoring.

1.3.5.2 Minnesota Department of Natural Resources

The Minnesota Department of Natural Resources (MDNR) is responsible for the administration of surface waters through multiple programs, including the Public Waters Work Permit Program, Water Use (Appropriations) Permit Program, Aquatic Plant Management Program and Floodplain and Shoreland Management Programs.

The MDNR's Public Waters Work Permit Program (Minnesota Statutes 103G) requires an MDNR permit for any work below the Ordinary High Water (OHW) level or any work that will alter or diminish the course, current, or cross-section of any protected water, including lakes, wetlands and streams. The program prohibits most filling of protected waters and public waters wetlands for the purpose of creating upland areas. The MDNR Public Waters Inventory in the City are shown in Figure 5.

The MDNR regulates surface water and groundwater usage rate and volume as part of its charge to conserve and use the waters of the state. Water appropriations are regulated under Minnesota Rule 6115.0620. Generally, all appropriations of more than 10,000 gallons per day, or one million gallons per year, including construction dewatering, flood control, emptying storm water ponds for maintenance, and storm water use for irrigation, need to be approved under a MDNR Water Appropriation.

The FEMA designated Special Flood Hazard Areas, as shown in Figure 10, are managed by the City with assistance from the MDNR through the Floodplain Management Program. The City regulates permitted land use in floodplains through local zoning ordinances that must meet minimum federal and state regulations. Shoreland management is similar in that the DNR provides technical assistance to local governmental units in the adoption and administration of their shoreland controls.

1.3.5.3 Minnesota Board of Water and Soil Resources

BWSR oversees the state's watershed management organizations (joint powers, county and watershed district organizations), oversees the state's Soil and Water Conservation Districts (SWCDs), and administers the rules for the WCA and metropolitan area watershed management. BWSR, in cooperation with the MDNR and soil and water conservation

districts, administers the statewide buffer rule (MN Statutes 103F.48) which establishes minimum buffer requirements for certain public waters. BWSR also administers the Clean Water Fund (CWF) grant program, funded by the Clean Water Land and Legacy amendment passed in 2008. The purpose of the CWF is to protect, enhance, and restore water quality in lakes, rivers, and streams and to protect groundwater and drinking water sources from degradation. Applicants eligible for CWF grants include counties, watershed districts, watershed management organizations, soil and water conservation districts, and cities working under a current BWSR-approved and locally adopted local water management plan.

1.3.5.4 Minnesota Pollution Control Agency

The MPCA administers the State Discharge System/National Pollutant Discharge Elimination System (NPDES) Permit program (point source discharges of wastewater), the NPDES General Stormwater Permit for Construction Activity, the NPDES General Industrial Stormwater Permit Program, the NPDES Storm Water Permit program, and the individual sewage treatment system regulations (7080 Rules). The MPCA also reports the state's "impaired waters" to the U.S. Environmental Protection Agency.

The federal Clean Water Act (CWA) established the National Pollutant Discharge Elimination System (NPDES) to regulate point sources of pollution, with the MPCA as the delegated permitting authority. In 2013, the MPCA reissued the MS4 General Permit, which replaced the Phase II permit. The permit focus shifts from permit program development to increasing emphasis on measured progress and beginning some of the implementation measures. Some of the requirements of the reissued MS4 permit include:

- More stringent construction related erosion control
- Post-construction controls to reduce volume, total phosphorus, and total suspended solids
- Documented enforcement response procedures
- Submittal of additional information on all stormwater ponds and outfalls
- Inventories of municipal facilities that could contribute pollutants to stormwater discharges

Vadnais Heights is required to maintain an MS4 permit from the MPCA. As part of the permit program, each member city must annually submit an MS4 report to the MPCA. The City's SWPPP is provided in Appendix D of this plan.

1.3.5.4.1 *Impaired waters and Total Maximum Daily Loads (TMDLs)*

In administering the CWA in Minnesota, the MPCA also maintains a list of impaired waters. The CWA requires the development of a total maximum daily load (TMDL) study for impaired waterbodies. A TMDL is a threshold calculation of the amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL establishes the pollutant loading capacity within a waterbody and develops an allocation scheme amongst the various contributors, which include point sources, non-point sources, and natural background levels, as well as a margin of safety. As a part of the allocation scheme, a waste load allocation (WLA) is developed to determine allowable pollutant loadings from individual point sources (including loads from storm sewer networks). A load allocation (LA) establishes allowable pollutant loadings from non-point sources and natural background levels in a waterbody.

1.3.5.5 Minnesota Department of Health

The MDH is the official state agency responsible for addressing all public health matters, including drinking water protection. The MDH administers the Well Management Program, the Wellhead Protection Program, and the Safe Drinking Water Act rules. Through its Well Management Program, the MDH administers and enforces the Minnesota Water Well Code, which regulates activities such as well abandonment and installation of new wells. The MDH also administers the Wellhead Protection Program, which is aimed at preventing contaminants from entering public water supply wells.

1.3.5.6 United States Army Corps of Engineers

The USACE administers several regulatory permit programs, including Section 10 of the Rivers and Harbors Act permit program and the Section 404 permit program. The USACE updated Section 10 of the Rivers and Harbors Act Permit and the Section 404 Permit in March 2012 to streamline the requirements of the Clean Water Act (CWA). The updated permits provide expedited review of projects that have minimal impact on the aquatic environment. These projects may include linear transportation projects, bank stabilization activities, residential development, commercial and industrial development, aids to navigation, and some maintenance activities.

Through Section 10 of the Rivers and Harbors Act, the USACE is responsible for administering this program, which regulates the placement of structures and/or work in, or affecting, navigable waters of the United States.

The Federal Clean Water Act requires that anyone who discharges dredged or fill material into U.S. waters, including wetlands, must first obtain a Section 404 Permit from the USACE. Examples of activities that require a Section 404 Permit include: construction of boat ramps, placement of riprap for erosion protection, placing fill in a wetland, building a wetland, construction of dams or dikes, stream channelization, and stream diversion. When Section 404 Permit applications are submitted to the USACE, the applications are typically posted for the U.S. Fish and Wildlife Service, the U.S. Forest Service, the U.S. EPA, and other federal agencies to review and provide comments. The USACE evaluates permit requests for the potential impact to various functions and values of the wetland.

2.0 Physical Environment

2.1 Geology

Glaciers primarily created the unconsolidated surficial deposits in the City of Vadnais Heights. Generally, these Quaternary deposits consist of lake or stream sediments, glacial till or organic deposits. The oldest surficial geology units are from the Superior glacial lobe. These units include coarse melt water stream sediment on the surface and a buried unit up to 40 feet beneath till of more recent glaciation. The stream sediment consists of medium to coarse sand and gravel with cobbles and boulders. In Vadnais Heights, these deposits are generally located in the northwestern and eastern areas of the City.

The next set of surficial geology units was deposited from the Grantsburg sublobe glaciation that advanced through the area 16,000 to 12,000 years ago. These deposits consist of glacial till and lake sediment. The till is comprised of loam-textured, loamy sand to clay. It is gray, but oxidizes to yellow-brown, and is commonly banded with reddish-brown Superior lobe till or sand. Some deposits of the till are overlain by up to 20 feet of lake sediments. The glacial lake sediments are classified as clayey or sandy. The clayey lake sediment consists of clay and silt with fine sand with rare dropstones. Locally, it may be rhythmically bedded (silt-clay-

silt-clay). The sandy lake sediments consist of fine to medium sand with silt and clay and scattered dropstones. The till and lake sediments are located throughout the City.

The youngest surficial geology unit is organic sediment that was deposited during the last 10,000 years. The deposit includes peat, shallow lakes and marshes. Some of these deposits may now be excavated and have been artificially filled. Organic sediments are scattered throughout Vadnais Heights.

Depth to bedrock ranges from 50 feet in the center of the City to greater than 300 feet in the northwestern corner of the city. Generally, a ridge of buried bedrock, trending north to south, exists in the central portion of Vadnais Heights. Three types of uppermost bedrock are present beneath the glacial deposits. Maps detailing the bedrock hydrogeology of Minnesota, addressing rock formations and aquifers may be obtained from the Minnesota Geological Survey.

2.2 Topography

Vadnais Heights has slight to moderate topographic variation on relief. Throughout the City, there is a moderate amount of natural surface depressional storage. Most of the City drains southwesterly to Vadnais Lake. This watershed is at the downstream end of the surface water system used by the City of St. Paul for potable water supply. The south and southeast portions of the City drain to the south, into the Kohlman-Phalen Lake chain in Maplewood, Little Canada, and St. Paul.

Topographic maps are available at 10-foot contour intervals from the U.S. Geological Survey (USGS) and at 2-foot contour intervals from the [MnDNR MnTOPO webpage](#).

2.3 Soils

The physical geography of the City is dominated by the Eastern St. Croix Moraine. The Twin Cities Formation is the geomorphic region covering most of Vadnais Heights. This region is characterized by steep hills interspersed with deep depressions occupied with small lakes or peat. Soils are mostly well drained loam or sandy loam.

The Anoka Sand Plain extends into western Vadnais Heights. This geomorphic region is an outwash plain and is predominantly well drained sandy soils with numerous peat filled depressions. Infiltration capacities of soils affect the amount of direct runoff resulting from rainfall. The higher the infiltration rate for a given soil, the lower the runoff potential. Conversely, soils with low infiltration rates produce high runoff volumes and high peak discharge rates.

Four general hydrologic groups for soils have been established by the Soil Conservation Service. These groups are:

- Group A - Low runoff potential, high infiltration
- Group B - Moderate infiltration
- Group C - Slow infiltration rate
- Group D - Very slow infiltration rate, high runoff potential

The hydrologic grouping symbols (A-D) and land use data are used with the Soil Conservation Service (SCS) methods to estimate the runoff that will occur over a given area for a particular rainfall amount. Figure 3 illustrates the hydrologic soil conditions in the City.

Slope can be a restrictive characteristic of a soil as erosion is less a problem on level sites than in steep areas. The Soil Survey Manual categorizes each soil by its slope range. Other erosion factors are soil type, vegetation, rainfall intensity and land use. Limited land grading is anticipated within Vadnais Heights in the future, and therefore encountering erodible or restrictive soils will become less frequent. However, special attention to erosion control measures and establishment of interim cover during construction must be considered in areas of steep slopes, in areas with highly erodible soils, and in areas with prolonged land disturbance.

2.4 Climate and Precipitation

The climate within the Vadnais Heights area is described as a humid continental climate with moderate precipitation, wide daily temperature variations, warm humid summers and cold winters. The total average annual precipitation is approximately 32 inches. The average annual snowfall is approximately 50 inches, which is equivalent to roughly five inches of water. Rainfall data for Vadnais Heights is shown in Table 1. The table indicates climatological information from [NOAA Atlas 14 Point Precipitation Frequency Estimates](#).

Table 1
Precipitation Data for Minneapolis – St. Paul Metropolitan Area

Return Frequency	24-hr	12-hr	6-hr	3-hr	2-hr	1-hr	30-min	15-min
1-year	2.4	2.1	1.9	1.6	1.4	1.2	0.9	0.6
2-year	2.8	2.5	2.2	1.9	1.7	1.4	1.1	0.8
5-year	3.5	3.2	2.8	2.4	2.1	1.7	1.3	1.0
10-year	4.2	3.8	3.3	2.9	2.6	2.1	1.6	1.1
25-year	5.3	4.9	4.3	3.6	3.2	2.6	1.9	1.3
50-year	6.2	5.8	5.2	4.3	3.8	3.0	2.2	1.5
100-year	7.3	6.8	6.1	5.1	4.4	3.4	2.4	1.7

Source: NOAA Atlas 14 Point Precipitation Frequency Estimates

2.5 Land Use

Land use data, together with soil information, is used to determine runoff coefficients for estimating watershed response. The hard or impervious surface area associated with each land use affects the amount of runoff that can be expected from an area. The existing land use of Vadnais Heights, summarized in Figure 7, indicates several major land use types.

Future land use projections help to indicate which areas will be available for water resource enhancement and where improvements should be implemented first. Figure 8 illustrates anticipated land use patterns. The area near the intersection of County Road E and I-35E is experiencing the greatest change in land use. Other scattered small parcels will develop into future residential or office/retail/commercial properties.

Vadnais Heights has thirteen park areas throughout the City. In addition, many platted outlots or natural areas have been provided through development projects. Ramsey County Open Space and the St. Paul Regional Water Services property also provide large undeveloped areas. Many of the platted outlots are marginal lands for development. Most contain wetlands or are used for storm water detention. These areas provide important wildlife habitat as well as aesthetic benefits for the City.

2.6 Public Utilities

Development is often restricted by the extent and availability of public utilities in certain areas. Vadnais Heights is completely within the Metropolitan Urban Service Area (MUSA), and therefore served by interceptor sanitary sewers. Sanitary sewer and water mains are available for nearly the entire City. Development which has occurred in the City in the last 20-years is served by curb-gutter-catch basin and storm sewer laterals with the major drainage conveyance method being ditches. The City's stormwater system is designed for the 10-year, 24-hour event. Emergency overflows have been provided where practical. Figure 4 illustrates the City's stormwater system.

The sanitary sewer trunk system was evaluated in 2000. There is sufficient capacity in the trunk system to convey existing and ultimate flows to the Metropolitan Council Environmental Services (MCES) interceptor system. There are 29 municipal sanitary subdistricts. Ultimate flows extend through the year 2020. The City sanitary sewer system has one lift station, located west of McMenemy Street on Meadowood Lane. This lift station serves approximately 200 homes. The remainder of the City's sanitary sewer system relies on gravity flow.

Vadnais Heights operates its own municipal water supply. The City's water distribution system has adequate capacity to meet the City's future maximum daily demand. The water distribution system serves most of the City. A few residences are served by Shoreview and White Bear Lake. The system includes four municipal wells and two elevated storage reservoirs. The 2016 population served by the water system is 13,100 people. There are a limited number of private wells or community wells that serve some residential areas. The City has implemented a tiered billing rate as well as an odd-even sprinkling restriction program.

2.7 Pollutant Sources

Information on pollutant sources is available from the MPCA. This detailed information has not been included here as it is subject to frequent change and may be obtained by contacting the MPCA or by visiting the [MPCA's website](#). The MPCA will identify leaking underground storage tank (LUST) sites and maintain a list of registered aboveground storage tanks (ASTs) and underground storage tanks (USTs) within the City. The MPCA also has information on permitted wastewater discharges and hazardous waste sites. Ramsey County has information on abandoned wells within the City of Vadnais Heights.

Additional pollutant source information is also available from Ramsey County. Counties maintain maps and databases that display MPCA-reported LUSTs, MPCA-reported spills, MPCA-registered ASTs and USTs.

2.8 Surface Water Resources

Vadnais Heights is served by several major ditches that generally flow from north to south through the City. The major Ditch is Ditch #14, which crosses beneath Interstate 35E and County Road F. Ditch #14 ultimately outlets into East Vadnais Lake and is under the jurisdiction and responsibility of VLAWMO. The City has several smaller ditches which outlet into Ditch #14. These smaller ditches are referred to as branch ditches and include Branch Ditch #2, 3, 4, 5, 5A, and 5B. All of these branch ditches are under the jurisdiction and responsibility of the City. All of these ditches are shown on Figures 4 and 6.

In spring 2018, VLAWMO funded and used state correctional forces to clean logs and debris from Ditch #14. VLAWMO is also working with a consultant to survey Ditch #14 and review historical data to determine if any localized dredging or improvements are warranted. It is

recognized that localized improvements may affect other portions of flow in Ditch #14 or adjoining property. It will be important to consider all upstream and downstream impacts as projects are considered.

In winter 2017, the City funded and completed an excavation project to clear a portion of Branch Ditch #5A from County Road F to Bear Avenue North. This work required DNR approval as it cleared sediment and cattails from a large wetland complex. Other branch ditches flow through a combination of open land, wooded areas, and wetlands. It is likely that similar work completed on part of Branch Ditch #5A will be needed in the future. Surveying work and study with a consultant is ongoing to determine where work is needed.

Lakes within Vadnais Heights include Sucker Lake, East and West Vadnais Lake, and Willow Lake. Lambert Creek also runs through Vadnais Heights. The City's surface water features are shown in Figure 6. Public access on Vadnais and Sucker Lakes is under the control of the St. Paul Regional Water Services and is limited to selected areas used for shoreline fishing. The control of Willow Lake is maintained by the Willow Lake Natural Preserve Foundation which is made up of representatives of Ramsey County Park and Recreation Department, City of Vadnais Heights and H.B. Fuller Company. Actual land ownership is split between Ramsey County Open Space and H.B. Fuller Company with access limited only to employees of the Company.

All three lakes are DNR Public Waters. The east and west basins of Vadnais Lake are separated by a north-south causeway with no direct hydraulic interconnection. The east basin is kept by the SPRWS at about 1 to 1.5 feet higher than the west basin. The west basin has a gated-connection to Grass Lake to the west. The control structure is just south of the railroad crossing along the west side of Rice Street.

Lake water quality in Vadnais Lake is the primary concern of the SPRWS and VLAWMO. High phosphorus loadings have caused accelerated weed and algae growth resulting in a taste and odor problems for the potable water supply. Lambert Creek is the main collector for Vadnais Heights and contributes about 1/3 of the lakes phosphorus loading. Approximately 6 percent of the water in Vadnais Lake comes from the Lambert Lake tributary. In the early 1990's, hydrologic and water quality studies of the Lambert Lake tributaries both in and upstream of Vadnais Heights were prepared by the St. Paul Regional Water Services. The intent of the project(s) was to reduce phosphorus export by up to 50 percent. The strategy was to install adjustable weirs to raise water levels, slow down the water and retain sediment and phosphorus. Such a weir was constructed at the upstream Grass Lake outlet lying directly east of I-35E at County Road F.

In early 2000's a distribution weir was constructed along the north end of the Lambert Lake basin. Additionally, the existing county ditch was reconstructed along the west side of the basin. The purpose of this project was to reduce the flow velocities and to assure an even distribution across the weir which allows particle settlement within the pond. This reduces phosphorus loading from Lambert Lake to Vadnais Lake.

VLAWMO plans to develop Sustainable Lake Management Programs (SLMP) for the lakes within its jurisdiction. The VLAWMO Implementation Plan includes SLMP's for East Vadnais, Sucker, and West Vadnais Lakes within Vadnais Heights. These plans are expected to be completed by 2026. The VLAWMO Watershed Management Plan states that the SLMP's will include the following information:

- Aquatic plan coverage and management

- Exotic species issues and management
- Shoreline condition and management
- Nutrient dynamics and management
- Storm water runoff and phosphorus contributions and management
- Roles and responsibilities for management
- Implementation schedule and plan
- Shortage of potential recreational opportunities (pier, public access, etc...)

Willow Lake lies near the headwaters of a tributary area of the Kohlman-Phalen Lake system. Currently, Willow Lake has a water quality of classification of 'stable'. Willow Lake has been monitored intermittently since 1981 but is not currently monitored by RWMWD or Ramsey County. The water quality goals of Willow Lake are consistent with the MPCA's shallow lake eutrophication standard for North Central Hardwoods Forest Ecoregion.

The Department of Natural Resources database of fisheries shows that several lakes in VLAWMO have been assigned ecological classes. Limnologic parameters were used to determine ecological classes. The classifications provide information used by the fisheries staff to manage these water resources. Table 2 provides the summary information on lakes within the City.

Table 2
Summary of Lake Information

Lake	Identification Number	Surface Area (ac)	Maximum Depth (ft)	Transparency ¹ (meters)
East Vadnais	62-0038-01	379	58	3
West Vadnais	62-0038-02	208	9	1
Sucker	62-0028-00	59	24	2
Willow	62-0040-00	30	8	1

¹ Ten year summer average (June-September) from 2006 to 2015

Source: [MPCA Lake and Stream Water Quality Dashboard](#)

2.9 Groundwater Resources

Vadnais Heights completed a Public Water Supply and Emergency Conservation Plan in 2000. The plan includes strategies to be implemented in the event the water supply is threatened by contamination, drought or other catastrophe.

Ramsey County has published [The Ramsey County Groundwater Quality Protection Plan](#). This publication contains a comprehensive topographic and geologic overview that describes the groundwater aquifers of the County, identifies groundwater contaminated areas and predicts areas of sensitivity to groundwater contamination. The Plan includes well-head protection areas and model ordinances that can be adopted by communities to help reduce contaminating events and minimize impact to groundwater resources.

According to the Ramsey County Geologic Atlas published by the Minnesota Geological Survey in 1992, the entire corridor from Pleasant Lake to Vadnais Lake (east basin) and the Lambert Creek corridor to Vadnais Lake (east basin) is rated very high in sensitivity. This map was drawn utilizing soils porosity and permeability data, depth to the water table, and thickness of any geologic deposits underlying the surficial soils layer.

This means that in a period of hours to months pollutants discharged on the land surface would reach the surficial water table system in these areas. Figure 9 depicts well locations and wellhead protection areas.

3.0 Goals and Policies

The Vadnais Heights' goals and policies are consistent with the goals of both the Ramsey Washington Metro Watershed District (RWMWD) and the Vadnais Lake Area Water Management Organization (VLAWMO,) while meeting the specific and changing needs of the City. The goals of this plan were established in accordance with the guidelines set forth in Minnesota Statutes 103B.

These goals and policies provide for future development and redevelopment while minimizing surface water problems and enhancing the environment. The goals and policies are to be used as a guide in the design and construction of private and public developments impacting water resources in the City.

A **goal** is a desired end toward which surface water management efforts are directed. This section identifies goals for water resources planning and management functions throughout the City. The goals of this plan were established in accordance with the purposes of the water management programs required by Sections 103B.201 to 103B.251 and in conformance with the goals of the WMOs having jurisdiction in Vadnais Heights, including the RWMWD and the VLAWMO.

Each goal has several corresponding **policies** that form the governing principals that will be followed to achieve the goals. The ten goals and the corresponding policies is presented in more detail in the following pages. Plan **standards** (or storm water Development Criteria) are an extension of the goals and policies that provide detailed criteria on storm water management practices. Recommended surface water management design standards for development and redevelopment projects are provided in the Appendix B of this Plan. The goals are summarized in Table 3.

**Table 3
Summary of Goals**

Goal No.	Goal Category	Goal Statement
1	Water Quantity	Control flooding and minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of runoff.
2	Water Quality	To maintain or enhance the water quality of lakes, wetlands, and water courses consistent with intended use and classification.
3	Erosion and Sediment Control	Minimize soil erosion through proper planning, enforcement and education.
4	Wetlands	Manage wetlands to achieve no net loss of acreage and increase the wetland values in the City, where feasible.
5	Public Participation, Information and Education	Increase public participation and knowledge in management of the water resources. Educate public in limitations of storm water system during significant rain events.
6	Maintenance and Inspection	Preserve the function of water resource facilities through routine inspection and regular maintenance activities.

7	Recreation, Fish and Wildlife	Manage water recreation activities and improve fish and wildlife habitat, where feasible.
8	Groundwater	Prevent contamination of the aquifers and promote groundwater recharge.
9	Finance	Establish funding sources to finance water resources management activities.
10	Regulatory Responsibility	Shift regulatory authority to the City while recognizing the role of other local, state and federal entities.

3.1 Goal 1 – Water Quantity

Storm water management deals with just one component of the hydrologic cycle - surface runoff. Large amounts of energy are directed towards alleviating significant negative impacts of surface runoff and flooding on the cultural, water, and natural resources. The approach to water quantity management relates directly to water quality, wetland management, erosion control, and land development strategies. By doing a better job at managing the quantity of runoff, the other goals of this plan can be easily met. Table 4 is a summary of the Water Quantity goals and policies.

**Table 4
Water Quantity Policies**

Goal Statement: Control flooding and minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of runoff.	
Policy No.	Goal 1: Water Quantity – Policies
1	The storage capacity of the existing drainage system shall be optimized.
2	Regional detention areas shall be used to reduce flooding, to control discharge rates, and to provide necessary storage volumes
3	The minimum building elevation (lowest floor) for all new structures must be at least 2 feet above the established 100-year levels.
4	Emergency overflows or outlets to City drainage systems shall be provided to any area currently without an overflow or outlet if feasible and if the available storm water storage volume is inadequate to prevent flooding of structures.
5	Increased volumes of runoff due to developments should be minimized by limiting impervious cover and encouraging infiltration of storm water where soil conditions are appropriate.
6	The use of low impact development techniques and materials is encouraged to reduce rates and volumes of runoff.
7	All developments shall, to an extent determined by the City, provide land, funding, or a combination of both for developing regional detention sites to achieve the rate and volume controls indicated in this plan.
8	All hydrologic studies shall be based on ultimate development of the entire tributary drainage area.
9	The WMO's shall have jurisdiction over intercommunity flow issues.
10	VLA WMO has authority to manage the public ditches such as County Ditch #13, Lambert Creek (#14), and branch ditches, 1, 1A, 2, 3, 4, 5, and 5A. The primary purpose of the ditch system has changed to serve as a conveyance system for urban storm water runoff. VLA WMO shall manage the drainage systems under the Surface Water Management Act and determine whether ditch maintenance activities have the potential of adversely impacting any goal of the organization.

11	The City shall routinely maintain the control structures and keep pipes and ditches clear to allow runoff to be conveyed through the waterways.
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3.2 Goal 2 - Water Quality

The City of Vadnais Heights seeks to maintain and improve the water quality in its lakes, streams and wetlands. Water quality is often directly related to the level of available nutrients in a water body. While nutrients comprise only one category of substances that can affect water quality, nutrients (principally phosphorous) must be controlled to achieve the water quality goals of this Plan. Phosphorous is most often the limiting factor for plant growth, and increases in available phosphorous allow plant species to dominate the lakeshore, open water, or marsh.

There are several key activities that can be followed to minimize the delivery of phosphorus into the City's water bodies. These activities include better management of construction site erosion control measures, reducing the level of impervious cover, reducing the extent of managed lawn areas and replacing them with native vegetation, reducing stream bank erosion and using more open channel drainage systems with natural vegetative cover.

3.2.1 Housekeeping Practices

3.2.1.1 Street Sweeping

Source control practices are activities that minimize the amount of pollutants available to enter the runoff. Street sweeping activities are presently performed one time in the spring on all City streets. County Roads are swept by Ramsey County. Sweeping is also performed by private property owners. The City will review the street sweeping program for additional opportunities to provide sweepings more frequently in vulnerable areas as identified by VLAWMO, RWMWD, and the City. The City has eliminated nearly all use of sand for snow/ice control operations, which has significantly reduced the amount of foreign materials to be picked up. Therefore mid- to late-winter sweepings are not warranted. The City may consider upgrading their street sweeping equipment when possible to regenerative air vacuum sweeping equipment.

3.2.1.2 Leaves and Grass Clippings

Leaves and grass clippings that make their way to lakes are as damaging to waterbodies as fertilizers, pesticides, and motor oils, according to the Minneapolis Chain of Lakes Clean Water Partnership. Once in the lakes, these organic materials decay, releasing phosphorus. The excess phosphorus increases algae growth, inhibiting the growth of other aquatic plants. When algae die and decay, they exert a biological oxygen demand (BOD) on the lake, depleting available oxygen for fish. To protect the water quality of surface waters, the City has prohibited the intentional disposal "of grass, leaves, dirt, or landscape material into a water resource, buffer, street, road, alley, catch basin, culvert, curb, gutter, inlet, ditch, natural watercourse, flood control channel, canal, storm drain or any fabricated natural conveyance" per City Code Chapter 66 Subp. 66.030(1)(b).

3.2.1.3 Structural Practices

Onsite treatment devices such as swales, ponds, and other structures will be constructed when reasonable. Infiltration and other runoff reduction techniques onsite are preferred to provide treatment at the source area and mimic natural hydrology. The City of Vadnais Heights will require that treatment devices be implemented in development or redevelopment

activities. Regular maintenance of the structures will be addressed as needed. See Appendix B for more detailed design standards of structural practices.

3.2.1.4 Individual Sewage Treatment System

The Individual Sewage Treatment System (ISTS) Act was signed into state law on May 10, 1994 (Anon. 1994) to reduce contamination of surface and ground water caused by inadequate septic systems. The law includes requirements for minimum sewage treatment standards, new construction, replacement of ISTS, disclosure of sewage-system information to property buyers and a mandatory licensing program for all ISTS professionals, including designers, site evaluators, installers, inspectors and pumpers. The City has few on site sewer treatment systems, mostly serving residential properties not adjacent to City sewer.

3.2.1.5 St. Paul Water Utility System

The St. Paul Water Utility System draws nearly all of its surface water supply from Vadnais Lake within VLAWMO. The St. Paul Water Utility (SPWU) provides drinking water to approximately 417,000 customers in multiple cities, including the City of Saint Paul. The watershed shall be protected to insure that contamination does not reach the SPWU system. The lakes and streams within the direct chain which supply water to the utility system are designated by VLAWMO as SPWU protected waters should be considered for additional protection. The City will coordinate all reviews with the management classification assigned by VLAWMO.

**Table 5
Water Quality Policies**

Goal Statement: To maintain or enhance the water quality of lakes, wetlands, and water courses consistent with intended use and classification.	
Policy No.	Goal 2: Water Quality – Policies
1	Proposed developments shall identify all reasonable steps to avoid water quality impacts and mitigate with appropriate best management practices (BMPs), to minimize the water quality impacts of receiving waters.
2	The City shall maintain a response plan to minimize the impact of hazardous spills.
3	The City will support Watershed Management Organization information and education efforts to reduce nutrient loadings to lakes, creeks and wetlands and to reduce the impacts of animal waste.
4	The City will promote the reduction or minimization of hard surface (impervious) areas through the implementation and enforcement of City ordinances and standards.
5	Wetlands and regional detention areas shall be consistent with the use and function classification.
6	The City encourages the use of low impact development techniques to reduce water quality impacts.
7	New, private, on-site wastewater systems shall be in accordance with the Minnesota Pollution Control Agency's Individual Sewage Treatment System (ISTS) regulations, as amended.
8	All construction plans developed for the maintenance and/or improvement of water quality shall require a City-approved detailed maintenance plan.
9	Multi-staged-outlet control structures for ponds shall be used wherever practical to maximize detention time and enhance sediment removal and nutrient assimilation.
10	Storm sewers shall be directed to a treatment facility into on-site detention basins or other stormwater treatment system. Storm water treatments shall be consistent with the goal to achieve phosphorus concentrations.

11	The City is committed to obtaining the goal of no adverse impacts for area water resources.
12	The City shall reduce chloride use in winter street maintenance by improving snow plowing efficiency by the use of brine, calibration of equipment to limit salt use to match need, and providing additional training and technology for public works staff regarding best practices for snow plowing.

3.3 Goal 3 – Erosion and Sediment Control

Soil erosion can cause problems for drainage way conveyance systems and ponds. Deposition of eroded material can reduce the effectiveness of these systems and require additional maintenance activities. Soil erosion also can create pond and drainage way performance and maintenance issues.

Ponds and drainage facilities are impacted by erosion and sediment from a variety of sources including construction sites and snow and ice control operations in the winter. The coarse sediment accumulates in ditches and ponds where runoff velocities are low. Usually a delta appears at a storm sewer outfall which is a visible indication of the effectiveness of erosion and sediment control measures and road maintenance activities of the past winter. As the sediment builds up over time, it reduces the runoff carrying capacity of the drainage system and the pollutant removal capabilities of ponds by reducing the storage volume below the run out elevation. Extending the life and effectiveness of facilities involves source control and elimination of the material that causes the problem. See Table 5 for a summary of the Erosion and Sediment Control goals and policies. Specific requirements for Erosion and Sediment Control are located in Chapter 66 of the City Code.

**Table 6
Erosion and Sediment Control Policies**

Goal Statement: Minimize soil erosion through enforcement and education.	
Policy No.	Goal 3: Erosion and Sediment Control – Policies
1	Erosion control plans shall be prepared, reviewed and enforced by the City for all grading activities.
2	Erosion control measures shall be incorporated into all grading plans consistent with MPCA's "Protecting Water Quality in Urban Areas", the Ramsey County Soil Erosion and Sediment Control Handbook, the MPCA Stormwater Manual, and the MPCA's NPDES General Construction Stormwater Permit.
3	The City will provide erosion and sediment control regulation and enforcement for disturbed areas not covered by the watershed management organizations.
4	All erosion and sediment control measures specified in the erosion control plan will be installed prior to obtaining a grading permit.
5	Streets and property adjacent to construction areas shall be kept free of sediment carried by construction traffic at site entrances and access points, and from site runoff and wind erosion consistent the standards of this plan.
6	All existing storm drain inlets and conveyance systems shall be adequately protected from erosion and sedimentation.
7	Establishment of temporary and permanent vegetation shall meet the standards of this plan so as to minimize the time that a construction area remains in the exposed condition

3.4 Goal 4 – Wetland Management

Wetland functions and values include storm water detention, wildlife habitat, water quality treatment, and open space. The City requires the treatment of runoff prior to discharge to wetlands and the creation and maintenance of wetland buffers. In 2010, the City adopted City Code Chapter 66, Storm Water Management, which set forth minimum requirements for stormwater management to diminish threats to public health, safety, public and private property and natural resources. All requirements set forth by VLAWMO and RWMWD will be met. The existing condition and values of the wetland should be considered when implementing these controls. Wetlands are presently regulated by:

- Minnesota Department of Natural Resources (MnDNR)
- U.S. Army Corps of Engineers (USACE)
- Minnesota Pollution Control Agency (MPCA)
- Ramsey Washington Metro Watershed District (RWMWD)
- Vadnais Lake Area Watershed Management Organization (VLAWMO)

The City of Vadnais Heights will support existing wetland regulation. The City also has a Water Management Overlay Ordinance (See Appendix C). This ordinance along with WMO, State and Federal authorities represents the City’s comprehensive approach to wetland management. The Minnesota Wetland Conservation Act will be administered by the RWMWD and VLAWMO. The City of Vadnais Heights reserves the right to make additional stricter requirements to protect wetlands and other environmentally sensitive areas.

3.4.1 Designation of Wetlands

To best manage the water resources of the City, a designation system that relates wetland use and function to maintenance and protection levels is needed. Many wetlands in Vadnais Heights are protected by the DNR. VLAWMO and RWMWD are the local government units that have jurisdiction over wetlands in Vadnais Heights. Both VLAWMO and RWMD have Comprehensive Wetland Management plans that include an inventory of wetlands in the respective WMOs, and classify the wetlands based on management and priorities. Please refer to the VLAWMO and the RWMWD Plans for the complete details regarding the comprehensive management of wetlands. Figure 12 shows the RWMWD and VLAWMO wetland classifications in the City.

**Table 7
Wetland Management Policies**

Goal Statement: Manage wetlands to achieve no net loss of acreage and increase the wetland values in the City, where feasible.	
Policy No.	Goal 4: Wetlands – Policies
1	The Minnesota Wetland Conservation Act will be administered by the Watershed Management Organization(s).
2	The City will require treatment of storm water runoff prior to discharge to wetlands based on the wetland designation.
3	The City will support the maintenance of a natural buffer around natural wetlands where practical as specified in the Water Management Overlay Ordinance.
4	The City will support the restoration of disturbed wetlands within the City.
5	The City will manage local storm water systems to minimize negative impacts to wetland and lake functions, values, and biological diversity.

6	The City will strive to preserve wetlands which provide a habitat for fish spawning and wildlife, and wetlands which have rare and endangered species of plants or animals.
7	The artificial water level fluctuation (bounce) in wetlands resulting from storm water runoff shall be managed in accordance with the City's wetland classifications.
8	Pretreatment of storm water runoff discharged directly into "wetland" designated areas having no existing direct discharges of storm water shall be provided where feasible.
9	Wetland designated areas may be used to provide temporary storage of peak flows of storm water runoff, but outflow rates and elevations should be controlled to avoid water elevations that may permanently affect the character of the resource.
10	Storm water shall be treated prior to discharging to a wetland.

3.5 Goal 5 – Public Participation, Information, and Education

Public involvement is a strategy that recognizes people want to be involved in decisions that affect any facet of their life. It creates and implements opportunities for the public to participate in the processes that lead to decision-making. Public Education and Involvement is one of the six minimum control measures in the MS4 Permit.

The City has identified six actions to successful public involvement:

1. Prioritize communications. Commitment to truly involving the public requires allocation of resources to provide the development and utilization of effective communication skills (i.e., public speaking and conflict management).
2. Acquire knowledge and skill to effectively work with the public. Achieving public involvement is dependent upon the application of the most appropriate methodology that will facilitate maximum participation of the people affected. Different methods are effective with different groups depending on the circumstances. Thus, holding a meeting and/or mailing a newsletter may be insufficient in some cases.
3. Accurately identify all segments of the public. Promote the self-identification of "potentially affected individuals."
4. Develop an awareness of public issues. Analyze the motivations, fears, concerns and desires of the people affected. Such awareness allows for the responsive structuring of information and helps determine which public involvement techniques will be most productive.
5. Involve the public in the process. Conduct the initiative/project in full view of the public. Actively provide people opportunities to participate in that process and give their input. This may be done by City Council or neighborhood meetings.
6. Share consideration which determine the course of action. Recap the goals and desired outcomes and communicate the considerations that determine the recommended course of action. It is essential the public witness that the issues raised from their participation are reflected in these considerations and have received thoughtful and respectful analysis.

The City's web site is an alternative medium to provide municipal information to both residents and those people who live outside Vadnais Heights. An electronic version of the water resources management plan will ultimately be accessible on the web. Electronic access to the text and mapping helps create a better understanding of surface water management among a wide audience from engineers and planners, to developers and citizens, to scientists and educators.

The City and its WMO partners will make an ongoing effort on both a local and regional level toward educating the public by supporting distribution of information to its residents on responsible practices they should employ to protect water resources within the community. The program should also educate residents on the proper use of fertilizer and to use fertilizer having no phosphorus content. Educational information shall also be provided regarding the proper use of a wide range of lawn chemicals.

**Table 8
Public Participation, Information, and Education Policies**

Goal Statement: To increase public participation and knowledge in management of the water resources of the community.	
Policy No.	Goal 5: Public Participation, Information and Education – Policies
1	The City shall support the RWMWD and VLAWMO in their public information efforts and will make publication schedules available to the WMOs.
2	The City will continue to use a variety of media, including newsletters, local cable television and the City's Website, to inform the community about water resource issues.
3	Work with existing public and private resources to increase public participation in water resources management.
4	The City will initiate a public education program including alternative landscapes, phosphorus free fertilizer, aquatic plant management, etc.
5	The City will continue to conduct a public annual stormwater meeting as described in the City's SWPPP for the MS4 NPDES permit. The City will engage the WMOs for support of elements of the SWPPP.

3.6 Goal 6 - Maintenance and Inspections

There are four basic steps to developing an effective storm drainage maintenance program:

1. Evaluate Problems, Needs, and Opportunities
2. Definition of Goals and Objectives
3. Establishment of Policies, Programs, and Priorities
4. Development of Criteria and Standards for Evaluating Performance and Assessing the Degree of Attainment of goals

Each of these four elements is covered by this water resource management plan. However, to be effective, three needs must be met; 1) the need for good management; 2) the need for good data; and 3) the need for sound financing. Many well-conceived maintenance plans are never fully implemented because of the lack of funding. Goal 9 is directed towards adequate financial support of this water resources management plan.

Inspections help to identify potential problems before they become major problems. Routine maintenance reduces the long-term costs related to drainage system maintenance, while achieving water quantity and water quality goals. The City is required by its MS4 program to inspect 20% of its outfalls on an annual basis, and 100% of the storm sewer structures. The application of development standards ensures consistency in the work produced and the documentation of the constructed systems. Appropriate land use controls can be used to maximize the preservation of the natural drainage systems and to control increases in runoff rate, volume and pollutant loading. Maintenance of public and private ponds within the City of

Vadnais Heights will be performed in accordance with specific agreements and/or on an as needed basis.

The primary responsibility for maintenance and inspection is at the local level.

**Table 9
Maintenance and Inspection Policies**

Goal Statement: Preserve the function of water resource facilities through routine inspection and regular maintenance activities.	
Policy No.	Goal 6: Maintenance and Inspection – Policies
1	The City will develop and implement an annual inspection and maintenance plan for drainage systems, detention ponds and water quality facilities.
2	The City will require maintenance of privately-constructed water quality drainage facilities.
3	The City will require appropriate maintenance-related access easements for public and private water resource facilities.
4	The City shall inspect the portion of each public ditch within its corporate boundary and remove any obstructions from any city structures and culverts as feasible.
5	The WMOs shall be responsible for managing the public ditches within their legal authority to serve as stormwater conveyance. The City will work in partnership with the WMOs to achieve maintenance goals.
6	The City will sweep the streets once annually in the spring. Future purchases of street sweeping units will give consideration to regenerative sweepers which have the greatest ability to pick up fine sediment and associated nutrients from the streets within the community. All streets will be swept as early as is practical and feasible, and the streets within the watershed of protected class wetlands will be given first priority.

3.7 Goal 7 – Recreation, Fish, and Wildlife

Fish and wildlife habitat are impacted by development activities. These include direct impacts such as conversion of land use and indirect impacts such as disturbing wildlife corridors or degradation of existing downstream water resources because of impacts to storm water runoff. The impacts can be due to temporary disturbance associated with construction activities or permanent disturbance such as land use conversion.

Wildlife generally needs a variety of habitats during their individual life cycles. The ability to connect larger areas and types of habitat is more beneficial than having a number of isolated pockets. In other words, protecting the upland area adjacent to a wetland is generally more advantageous than having the same size upland and wetland areas completely separated. Methods of maximizing the benefit of natural areas by connecting the habitat types include the maintenance of vegetative buffers and wildlife corridors.

Open space land uses such as parks and existing ordinances as well as large wetland complexes serve as wildlife corridors. The preservation of these corridors and development of buffer areas shall be encouraged through the City's land use planning and administration activities.

**Table 10
Recreation, Fish, and Wildlife Policies**

Goal Statement: Improve fish and wildlife habitat and water resource-based recreational opportunities where feasible.	
Policy No.	Goal 7: Recreation, Fish and Wildlife – Policies
1	Preserve wetlands and water bodies which provide habitat for fish, waterfowl, and other wildlife.
2	Protect natural areas and wildlife habitat intended for preservation during construction with appropriate BMPs.
3	Preserve aquatic and upland vegetative buffers around ponds and wetlands to provide habitat for wildlife.
4	The City will support programs for controlling exotic and invasive species of plants and animals.
5	Where feasible, the fluctuation in water elevations of a wetland/pond shall be minimized to prevent adverse habitat changes.

3.8 Goal 8 – Groundwater Protection

The Ramsey County Groundwater Quality Protection Plan is available as a guide for protecting the groundwater resources of the City of Vadnais Heights. The adoption of the Groundwater Protection Plan and its programs and activities is at the discretion of the City. The groundwater plan does not have the ability to require local governments to adopt groundwater protection recommendations.

Because the Ramsey County Groundwater Plan has not been adopted, a preliminary groundwater framework is established within this plan to enable the City of Vadnais Heights to review groundwater issues and how they interact with surface water issues. The framework will also ensure that the plan is consistent with existing and proposed groundwater rules, regulations, and statutes.

Any plans relating to groundwater protection prepared by the City of Vadnais Heights must comply with Minnesota Statutes, Chapter 103H - "Groundwater Protection"; Minnesota Rules, Chapter 4720 – "Public Waters Supplies"; Minnesota Rules, Chapter 4717.7810 – "Health Risk Limits", and any other local, state, or federal rules regulations, or statutes which may apply, but which are not specifically listed here by reference.

The City will strive to reduce the use of salt during snow plowing operations to only use what is needed. Efforts to use brine as a pre-wetting activity will continue. Public works staff will continue to implement best practices to limit salt overspread or waste.

**Table 11
Groundwater Protection Policies**

Goal Statement: Prevent contamination of the aquifers and promote groundwater recharge.	
Policy No.	Goal 8: Groundwater – Policies
1	The City will develop and implement controls to identify and protect wellhead or recharge areas from contamination.

2	The disposal of any solid or liquid wastes shall be controlled as necessary to ensure that underground waters of the watershed are maintained.
3	The City will promote proper well abandonment.
4	The City will consider alternatives to conventional storm water detention to enhance groundwater recharge through infiltration.
5	Green areas and open space within all proposed developments shall be maximized to promote infiltration.
6	Identified recharge areas shall be protected from adverse development and from potential contamination.

3.9 Goal 9 – Finance

Paying for water management projects has become more complex in recent years. In the past, special assessments against benefited properties financed most of the necessary improvements. However, the financial options have broadened considerably. The question is, which method(s) best suit the needs of the City. Information on funding sources for water resources management is discussed more in Section 5.2 Funding Sources.

**Table 12
Finance Policies**

Goal Statement: Establish funding sources to finance water resources management activities.	
Policy No.	Goal 9: Finance – Policies
1	The City shall identify and implement possible funding sources for water resources management.
2	The City will pursue grants, donations, and in-kind contributions to help fund water resources management.
3	The City shall assist citizens and businesses in their efforts to improve water quality, decrease water quantity and/or upgrade wetlands.
4	The City shall encourage the WMOs to finance inter-community issues and projects.
5	Project cost allocation shall be determined on a project by project basis and may consider contributing area, tax value, percent of runoff, total pollutant loading or other units of measure as a basis for determining cost splits.
6	Private development will generally be responsible for funding all on-site facilities design for on-site runoff and/or pollutant loading, and may contribute for construction, expansion and/or maintenance of off-site conveyance or ponding systems.

3.10 Goal 10 – Regulatory Responsibility

The City of Vadnais Heights has several codes and ordinances that relate to surface water management illustrated in Table No. 14. The table indicates if subjects are adequately addressed and if modifications to existing regulations are required. [City code chapters](#) are available online.

**Table 13
Codes and Ordinances**

	Covered by Existing Code or Ordinance	Not Covered Ordinance Required	Modification Required
Shoreland Management Regulations	Chapter 19		
Flood Plain Management Regulations	Chapter 19		
Wetland Protection Regulations	Chapter 19		
Individual Sewage Treatment System	Chapter 64		X
Erosion and Sediment Control Regulations	Chapter 66		
Public Utility Regulations	Chapters 55, 59 – 64		
Environmental Protection Regulations	Chapter 66		
Surface Water Management Regulations	Chapter 66, Chapter 65		

The following is a summary new ordinances or modifications of existing codes that the City will seek to implement. All new and revised ordinances will be forwarded to the Water Management Organizations for review and comment.

- Environmental Protection: Regulations of this type would address things as fertilizer control, aquatic vegetation in ditches and wetlands, weeds and noxious growth, chemical application control, hazardous waste disposal, spill containment plans, etc.
- Individual Sewage Treatment Systems (ISTS): The City must prepare an ISTS management program, after revisions are implemented by Ramsey County ordinances. The City needs to develop an ISTS ordinance, and the plan needs to discuss how the City intends to track the status of ISTS in the City, insuring that systems are pumped and maintained according to the City's ISTS ordinance. The Council has developed a computer software package that can easily be adapted by the City to perform the necessary tracking and notifications functions.

**Table 14
Regulatory Responsibility Policies**

Goal Statement: The City shall have primary responsibility for managing water resources within the City.	
Policy No.	Goal 10: Regulatory Responsibility – Policies
1	This plan and all subsequent amendments are intended to be consistent with all other regulatory agencies.
2	The programs and standards of this plan shall be implemented as soon as practical.
3	This plan shall be amended as necessary to remain current.
4	The City is responsible for establishing and implementing a permitting program for all activities relating to drainage, erosion control, and water resources management.
5	The WMO's shall be responsible for administration of the Wetland Conservation Act.

6	The Minnesota Department of Natural Resources and the U.S. Army Corps of Engineers have regulatory authority relating to waters and wetlands identified on their respective inventories.
7	The City will consider amendments to existing ordinances which present barriers to utilizing Low Impact Development techniques and other creative approaches to on-site storm water treatment.
8	The WMO's shall have jurisdiction over inter-community flow issues.

4.0 Existing and Potential Water Resource Related Issues

As required by the new Minnesota Rules Chapter 8410, adopted in July 2015 and Minn. Stat. 103B.235, local water management plans need to include an assessment of both existing and potential water resource-related problems/issues. This section outlines the existing issues the City has identified and emerging or potential future issues.

4.1 Existing Water Resource Related Issues

4.1.1 Greenhaven Addition Wetland Complex

The Greenhaven Addition is a residential area of 375 acres that ultimately all discharges to a wetland complex through thirteen different storm sewer systems. There is only one outlet to the wetland. The HWL of the wetland is high and encroaching into backyards near non-residential structures.

4.1.2 Wetland South of County Road F

There is a large wetland located in central Vadnais Heights located just east of Kohler Meadows Park. There are a number of culvert crossings that exist under County Road F that essentially equalize the large wetland. This wetland drains through a single culvert under Bear Avenue N. There is a home owner to the north of this area that have complained of their sump pump running constantly for years due to HWL bounce. The City has investigated this area with surveying and a drone to better understand the wetland area and any potential drainage constraints. The City will work with the appropriate WMO's, State and Federal Jurisdiction to reestablish ditch outlets. Excavation work to reestablish a ditch thru the wetland between County Road F and Bear Avenue North was completed in January 3 2018.

4.1.3 County Road Ditch 14 and Branch 5B

The City will continue to seek ways to improve flow and remove debris. Surveying work is being accomplished in Winter 2018 by VLAWMO.

4.1.4 Ponding Beneath the Edgerton Street Railroad Overpass

The City will continue to work with Ramsey County to address situation, which has existed for 50+ years. A low point in the County Road is served by storm sewer. However, it is overwhelmed during large rain events. There are no adjacent sites for ponding.

4.1.5 Water Quality

The City of Vadnais Heights seeks to maintain and improve the water quality in its lakes, streams and wetlands. The MPCA maintains a list of impaired waters that do not meet standards. A body of water is considered impaired if it fails to meet one or more water quality standards. Impaired water bodies in or near the City of Vadnais Heights are shown in Figure 11.

VLAWMO measures chloride levels in all lakes under their jurisdiction annually, publishes data on their website and reports information to the MPCA. The MPCA collects information from multiple sources and makes recommendations for impairment determinations to the Federal EPA. All information is considered “draft” until the EPA makes a final decision on a bi-annual basis. As of this writing, the EPA has not finalized their impaired waters list, so information remains in “draft” form.

4.1.5.1 East Vadnais Lake Mercury Impairment

East Vadnais Lake (AUID 62-0038-01) has concentrations of mercury in fish tissue that exceed the water quality standard. East Vadnais Lake is part of a statewide Mercury reduction plan, approved in March 2007. Since then, the MPCA has worked with stakeholders representing a broad range of interests to identify strategies and timelines that would be included in an implementation plan. The stakeholders' recommendations, completed in June 2008, are contained on the Plan to reduce mercury releases by 2025 [webpage](#).

4.1.5.2 West Vadnais Lake Nutrient Impairment

West Vadnais Lake (AUID 62-0038-02) is currently on the state impaired waters list for high levels of nutrient/eutrophication biological indicators. West Vadnais Lake has been on the impaired waters list since 2014. A TMDL to address this impairment has a project target start year of 2020 with a projected target completion year of 2024.

4.1.5.3 Sucker Lake

Sucker Lake (AUID 62-0028-00) has concentrations of mercury in fish tissue that exceed the water quality standard. Sucker Lake is part of a statewide Mercury reduction plan, approved in March 2007. Since then, the MPCA has worked with stakeholders representing a broad range of interests to identify strategies and timelines that would be included in an implementation plan. The stakeholders' recommendations, completed in June 2008, are contained on the Plan to reduce mercury releases by 2025 [webpage](#).

4.1.5.4 Lambert Creek E. Coli Impairment

Lambert Creek (AUID 07010206-801) is currently on the state impaired waters list for high levels of E. coli. Lambert Creek is part of the Vadnais Lake Area WMO Total Maximum Daily Load (TMDL) and Protection Study, approved in April 2014. VLAWMO has implemented a bacterial source study (E. coli host: human, animal or avian) to better assess where efforts should be placed to reduce E.coli levels in the creek. VLAWMO intends to work with MS4s to actively implement best management practices along the creek and in relevant drainage areas. More information can be found on the TMDL [webpage](#).

4.1.5.5 Gilfillan Lake

Gilfillan Lake (AUID 62-0027-00) is currently on the state impaired waters list for high levels of nutrient/eutrophication biological indicators. Gilfillan Lake is part of the Vadnais Lake Area WMO Total Maximum Daily Load (TMDL) and Protection Study, approved in April 2014. The TMDL and Protection Study outlines several priority load reduction strategies to improve the water quality of Gilfillan Lake. More information can be found on the TMDL [webpage](#).

4.1.5.6 Kohlman Lake

Kohlman Lake (AUID 62-0006-00) is currently on the state impaired waters list for high levels of Chloride and nutrient/eutrophication biological indicators. Kohlman Lake is part of the Kohlman Lake Total Maximum Daily Load Report prepared for Ramsey Washington Metro

Watershed District. The study details load reductions and MS4 responsibilities to improve the water quality of Kohlman Lake. More information can be found on the TMDL [webpage](#).

4.1.6 Housekeeping

Street sweeping activities are presently performed one time in the spring on all City streets. County Roads are swept by Ramsey County. Sweeping is also performed by private property owners. The City has difficulty identifying disposal sites for debris collected during street sweeping activities, as it is considered a hazardous waste by the MPCA.

4.1.7 High Groundwater

The City has many residents with high groundwater issues causing frequent use of sump pumps and structure flooding. New and reconstructed structures shall have adequate freeboard in compliance with floodplain ordinance.

4.1.8 Invasive Species

Invasive species are species that are not native to Minnesota and cause economic or environmental harm or harm to human health. Minnesota's natural resources are threatened by a number of invasive species such as zebra mussels, Eurasian watermilfoil, common buckthorn, and emerald ash borer. Invasive species can occur on land or in the water. The MnDNR is the heading the State's efforts to curb the spread and minimize harmful effects of nonnative species.

Vadnais Lakes and Sucker Lake are on the Minnesota DNR's Infested Waters List for Zebra Mussels (Listed in 2007) and Eurasian watermilfoil (Listed in 1989 and 1995, respectively). Willow Lake is not on the Infested Waters list. To help stop the spread of invasive species the MnDNR recommends the following activities regardless of whether a water body is infested or not:

- Clean all aquatic plants, zebra mussels, and other invasive species from boats, trailers, and water-related equipment.
- Drain water from your boat, ballast tanks, motor, live well and bait container. Remove drain plugs and keep drain plugs out while transporting equipment.
- Dispose of unwanted bait in the trash. To keep live bait, drain the water and refill the bait container with bottled or tap water.

4.2 Potential Water Resource Related Issues

4.2.1 Potential Augmentation for White Bear Lake

Water levels in White Bear Lake were at historically low levels in 2012. To help restore water levels, the concept of augmenting White Bear Lake water levels with water from East Vadnais Lake has been explored. East Vadnais Lake is part of the St. Paul Regional Water Services (SPRWS) chain of lakes. To provide drinking water to its customers, SPRWS pumps water from the Mississippi River to Lake Charley, where it flows by gravity through a series of lakes, ultimately ending up in East Vadnais Lake. SPRWS add coagulants and aerates the water prior to East Vadnais Lake to improve its overall quality as drinking water. The water is pumped from East Vadnais Lake to the SPRWS McCarrons drinking water treatment plant in St. Paul. SPRWS pumps approximately 12 billion gallons of water through the chain of lakes annually.

The potential White Bear Lake augmentation systems involves constructing a pumping station on the shore of Vadnais Lake and pumping the water 5 miles northeast to White Bear Lake. The pumping station would include a mechanical filtration system to remove Zebra mussels. The proposed augmentation system would pump up to 2 billion gallons of water per year from East Vadnais Lake.

The potential augmentation system is not anticipated to significantly impact the water quality or levels of water in East Vadnais Lake. This is because it is already part of an engineered system. SPRWS has the ability to adjust coagulant dosages, aeration levels, and pumping volumes to maintain water quality and water levels.

4.2.2 Climate Change

Minnesota experiences a wide variation in climate conditions (droughts and floods, heat and cold), however, even with these wide variations, climatologists have found four significant climate trends in the Upper Midwest (Minnesota Weather Almanac, Seeley, 2006):

- Warmer winters
- Higher Minimum temperatures
- Higher dew points
- Changes in precipitation trends

The City recognizes the importance of resiliency, and in a water resources context resiliency can be attributed to the ability to adapt to the climate-related variability and reduce the vulnerability of the community to extreme events. The City has amended their stormwater management standards to recognize the updated Atlas 14 depths and distributions and will endeavor to continue to adapt its policies and standards with the climate change trends. However, the fact that the City is largely developed means that the existing storm sewer network will need to serve future precipitation events.

4.2.3 Groundwater Sustainability

Minnesota's groundwater resources are vital to its ecological health, economic prosperity and quality of life. But in some parts of the state, our underground supplies of water are under increasing demands for irrigation, industry and domestic needs, putting them at risk of overuse and degradation. A statewide analysis of groundwater resources identified the north and east metro region of the Twin Cities as an area where such concerns exist. Now identified as the North and East Metro Groundwater Management Area, all of Washington and Ramsey Counties, and parts of Anoka and Hennepin Counties have been studied by the MnDNR. Sustainability objectives have been established to help appropriation permit holders plan for their future water use. They are:

- Identify and embrace water conservation best practices
- Protect surface waters
- Preserve water quality
- Improve appropriations permitting
- Protect water availability

While conditions do not add up to a crisis yet, warning signs have become evident. The City recognizes the importance of groundwater sustainability and will work with the DNR and other governing agencies to plan for change and avoid disruption.

4.3 Resolved Water Resource Related Issues

4.3.1 Pond Cleanouts

The City has completed several pond cleanouts associated with the City's MS4 inspections. These cleanouts have added capacity to the City's storm sewer system and prevented future issues related to underperforming ponds.

4.3.2 Culvert Cleaning and Ditch Maintenance

The City has made a concerted effort to identify and clean out culverts and ditches in key locations. This work will help maintain flow during higher precipitation events. Many culverts have been found to have little or no slope indicative of the abutting terrain.

5.0 Implementation

The Implementation Section is intended to provide guidance in carrying out the plan objectives. The implementation program summarizes the schedule for and cost of recommended actions. Lastly, procedures for amending the plan are discussed.

5.1 Implementation Priorities

The implementation plan includes identification and prioritization of capital improvements, administration, inspections, permitting, plan amendments, financing alternatives, public involvement and monitoring programs. Prioritization of improvements is based on a review of all recommended actions. Planning-level estimates of capital expenditures have been made. Future anticipated projects are limited at this time, as the City is nearly entirely developed and no significant changes are anticipated. However, development or redevelopment may alter or create new projects. The activities have been distributed throughout a 10-year implementation plan extending through 2027. The Implementation Plan is summarized in Table 16.

The Implementation Plan is not a hard and fast commitment to complete each and every activity in the time frame suggested. Rather, it is a suggested course of action that will accomplish the major goal of this plan, to accommodate growth in the community while protecting the environment.

The Implementation Plan should be reviewed on an annual basis. At that time, each proposed improvement is to be reconsidered, City budgets adjusted, and additional improvements added to the program.

5.2 Funding Sources

The financial goal of this Plan is to establish equitable funding sources to pay for water resources management activities. For the activities called out in this Plan, planning-level estimates of capital expenditures have been made. The major categories of funding sources are (1) Ad Valorem Taxes; (2) Special Assessments; (3) System Development Charges (Building Permits, Land Development Fees); (4) User charges (Storm Water Utility Fee); and (5) Grants, as summarized below.

- (1) Ad Valorem Tax. General taxation is the most common revenue source used to finance government services, including minor maintenance measures for drainage

and water quality facilities. Using property tax has the effect of spreading the cost over the entire tax base of a community. A special tax district can also be used to raise revenue. The special tax district is similar to the administrative structure under general taxation except that all or part of the community may be placed in the tax district. The principle is to better correlate improvement costs to benefited or contributing properties.

- (2) **Special Assessments.** Municipalities are familiar with the use of special assessments to finance special services from maintenance to construction of capital improvements. The assessments are levied against properties benefiting from the special services. The philosophy of this method is that the benefited properties pay in relation to benefits received. The benefit is the increase in the market value of the properties.
- (3) **System Development Charges.** Fees charged to new development that generates runoff can be charged to finance infrastructure needed to serve the development. This is a useful tool in communities that are rapidly developing.
- (4) **User Charges.** A utility is a service charge or fee based on usage, similar to the fees charged for sanitary sewer or potable water supply. The fee is typically charged against improved parcels based on the concept of contributors (or users) pay. The rate structure is based on the land use type, density, and parcel size to reflect the typical runoff contributed by a given parcel. In some cases parcels may be eligible for a credit to reduce their fee.
- (5) **Grants.** State grants are available for surface water management and non-point source pollution. However, it is generally not a good financial practice to rely on grants for a service program. This source of revenue is not dependable and requires constant speculation as to its availability. Grants are useful but should only be used to supplement a planned local revenue source. Some of the agencies and programs that may have available grant funds include:
 - (a) Environmental Protection Agency
 - (b) Watershed Districts
 - (c) U. S. Fish and Wildlife Service
 - (d) Minnesota Department of Natural Resources
 - (e) Metropolitan Council
 - (f) Ramsey Conservation District
 - (g) Minnesota Board of Water and Soil Resources
 - (h) Minnesota Pollution Control Agency

Table 11 illustrates the advantages and disadvantages of the different financing methods.

**Table 15
Advantages and Disadvantages of Funding Alternatives**

Funding Method	Advantages	Disadvantages
Ad Valorem Tax	<ul style="list-style-type: none"> • Administrative structure for collection in place. • Simple and accepted source of revenue. 	<ul style="list-style-type: none"> • No incentive to reduce runoff or pollution. • No relationship to level of benefits received.

	<ul style="list-style-type: none"> • Allows for a larger revenue base. • Through tax districts contributors pay. 	<ul style="list-style-type: none"> • Discontinuous source of revenue. • Limitations on amount of expenditures due to budget constraints. • Competition with other City services (i.e., police, fire).
Special Assessments	<ul style="list-style-type: none"> • Only benefited properties pay. • Revenues from assessment are applied to a specific project cost. No competition with general services. • Benefits directly related to cost for service. • Assessment can be deferred in hardship cases. 	<ul style="list-style-type: none"> • Rigid procedural requirements. • Runoff contributions cannot be assessed. • Difficult to determine and prove benefit. • May place an unfair burden on some segments of the population.
Development Charges	<ul style="list-style-type: none"> • New development generating runoff pays for runoff management. • Administrative structure for reviewing plans and collecting fees is in place. • Systems can be tailored to the specific needs through regulatory changes. • Revenues are applied to water management. No competition with general services. 	<ul style="list-style-type: none"> • Only address problems within the vicinity of the new development, not usually existing developments. • Only address prevention not correction of major problems. • Limited usefulness as a financing mechanism. • Limited new development pressure within existing City limits.
User Charges	<ul style="list-style-type: none"> • Properties causing or contributing to the need for runoff management pay relative to their contribution to the problem. • Self-financing system not in competition with general services funds. • Existing and new developments both pay. • Flexibility in the system. • Continuous source of revenues • Specific dedicated fund. • Administrative structure for collection already in place. 	<ul style="list-style-type: none"> • Some initial costs in development of rate formula and philosophy. • May require an expanded administrative structure.
Grants	<ul style="list-style-type: none"> • Reduce cost burden to residents in the community. 	<ul style="list-style-type: none"> • Undependable source of revenue. • Increase administrative costs for securing and managing the funds. • Most often grants require cost sharing and thus additional funding source. This results in double administrative costs due to several funding sources. • Limited availability on an irregular schedule. • Requires considerable lead time from application to receiving funds.

Stormwater Utility Fees	<ul style="list-style-type: none"> • Allowed by state law • Provides fair and equitable cost participation by all properties • Provides steady income for projects • Avoids need to determine benefits through assessment process 	<ul style="list-style-type: none"> • Some properties provide more on site storage than others
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The City adopted a Storm Sewer Utility Fee in 1994 to pay for the maintenance, operation, and improvement of the City's storm sewer system. Fees collected from this utility will be the primary fund for the implementation of the activities outlined in this report. The City will also explore options for using a combination of all available funding sources in order to fund surface water management activities outside of the Storm Sewer Utility Fees. The charges and fees will be reviewed and adjusted annually to ensure adequate funding for the activities set forth in this plan and those required by law. Additionally, the City may request assistance from other agencies and municipalities accordingly.

The City will work with its watershed district partners and various State and Federal agencies on these projects. Whether or not the City is a financial participant in all of these projects will be determined as the scope of the work is established.

Table 16 Implementation Plan

Item	Project Name	Description	Year				
			2018	2019	2020	2021	2022
1	Vadnais Heights SWMP	Update SWMP	\$10,000				
2	MS4 Regulatory Activities	MS4 Inspections, Annual Report, Program Maintenance, Ordinance Updates, Distribution of Education Materials	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
3	Storm Water Treatment for Future Development and Redevelopment Projects	Design of regional treatment systems for proposed development and redevelopment within Vadnais Heights, as necessary					\$10,000
4	Cooperate with VLAWMO to complete SLMP's	VLAWMO has identified completion of SLMP's for East Vadnais, West Vadnais and Sucker Lakes in Vadnais Heights		\$20,000			
5	Adopt Environmental Protection Ordinance	Adopt ordinance that addresses fertilizer control, aquatic vegetation in ditches and wetlands, weeds and noxious growth, chemical application control, hazardous waste disposal, spill containment plans, etc.	\$2,000				
6	Adopt ISTS Ordinance	Adopt an ISTS management program and ordinance once revisions are implemented by Ramsey County ordinances		\$1,000			
7	Culvert Cleaning and Monitoring	Increase efforts to clean culverts and public ditches.	\$100,000	\$50,000	\$50,000	\$10,000	\$10,000
8	Ponding on Edgerton	Work with the County to address ponding on Edgerton beneath railroad trestle south of Centerville Road, as feasible					\$20,000
9	Grass Lake and Vadnais Lake Connection	Following an assessment of the connection between Grass Lake and Vadnais Lake, implement any needed improvements		\$20,000			
10	Lambert Creek Restoration	Implement restoration and stabilization projects based on cost-benefits and opportunistic partnerships	\$5,000	\$5,000			
11	West Vadnais Feasibility Study	Help prepare a feasibility study and identify internal load management strategies and implement projects		\$10,000			
12	Sucker Lake, East Vadnais Lake, and West Vadnais Lake Pumping Study	Partner with the City of North Oaks, the SPRWS, and VLAWMO on a feasibility study regarding the effect on water quality due to possible increased pumping of water by the SPRWS				\$10,000	
13	Street Sweeping	Sweep City owned streets	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
14	BMP Maintenance	Maintain City owned BMPs on a routine or as needed basis	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000

Table 16 (Continued) Implementation Plan

Item	Project Name	Description	Year				
			2023	2024	2025	2026	2027
1	Vadnais Heights SWMP	Update SWMP	\$5,000				\$10,000
2	MS4 Regulatory Activities	MS4 Inspections, Annual Report, Program Maintenance, Ordinance Updates, Distribution of Education Materials	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
3	Storm Water Treatment for Future Development and Redevelopment Projects	Design of regional treatment systems for proposed development and redevelopment within Vadnais Heights					\$10,000
4	Cooperate with VLAWMO to complete SLMP's	VLAWMO has identified completion of SLMP's for East Vadnais, West Vadnais and Sucker Lakes in Vadnais Heights	\$5,000				
5	Adopt Environmental Protection Ordinance	Adopt ordinance that addresses fertilizer control, aquatic vegetation in ditches and wetlands, weeds and noxious growth, chemical application control, hazardous waste disposal, spill containment plans, etc.	\$2,000				
6	Adopt ISTS Ordinance	Adopt an ISTS management program and ordinance once revisions are implemented by Ramsey County ordinances.					
7	Culvert Cleaning and Monitoring	Increase efforts to clean culverts and public ditches.	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
8	Ponding on Edgerton	Work with the County to address ponding on Edgerton beneath railroad trestle south of Centerville Road, as feasible					
9	Grass Lake and Vadnais Lake Connection	Following an assessment of the connection between Grass Lake and Vadnais Lake, implement any needed improvements					
10	Lambert Creek Restoration	Implement restoration and stabilization projects based on cost-benefits and opportunistic partnerships					\$5,000
11	West Vadnais Feasibility Study	Help prepare a feasibility study and identify internal load management strategies and implement projects					
12	Sucker Lake, East Vadnais Lake, and West Vadnais Lake Pumping Study	Partner with the City of North Oaks, the SPRWS, and VLAWMO on a feasibility study regarding the effect on water quality due to possible increased pumping of water by the SPRWS					
13	Street Sweeping	Sweep City owned streets	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
14	BMP Maintenance	Maintain City owned BMPs on a routine or as needed basis	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000

5.3 Amendment Procedures

The Vadnais Heights Local Water Management Plan is intended to extend through the year 2027. For the plan to remain dynamic, an avenue must be available to implement new information, ideas, methods, standards and management practices. Amendment proposals can be requested any time by any person or persons either residing or having business within the City.

5.3.1 Request for Amendments

Written requests for plan amendments are submitted to the City Administrator. The request shall outline the need for the amendment as well as additional materials that the City will need to consider before making its decision.

5.3.2 Staff Review

A decision is made as to the validity of the request. Three options exist; 1) reject the amendment, 2) accept the amendment as a minor issue, with minor issues collectively added to the plan at a later date, or 3) accept the amendment as a major issue, with major issues requiring an immediate amendment. In acting on an amendment request, staff shall recommend to City Council whether or not a public hearing is warranted.

5.3.3 Council Consideration

The amendment and the need for a public hearing shall be considered at a regular or special Council meeting. Staff recommendations should also be considered before decisions on appropriate action are made.

5.3.4 Public Hearing, Council and Watershed Management Organization Approval

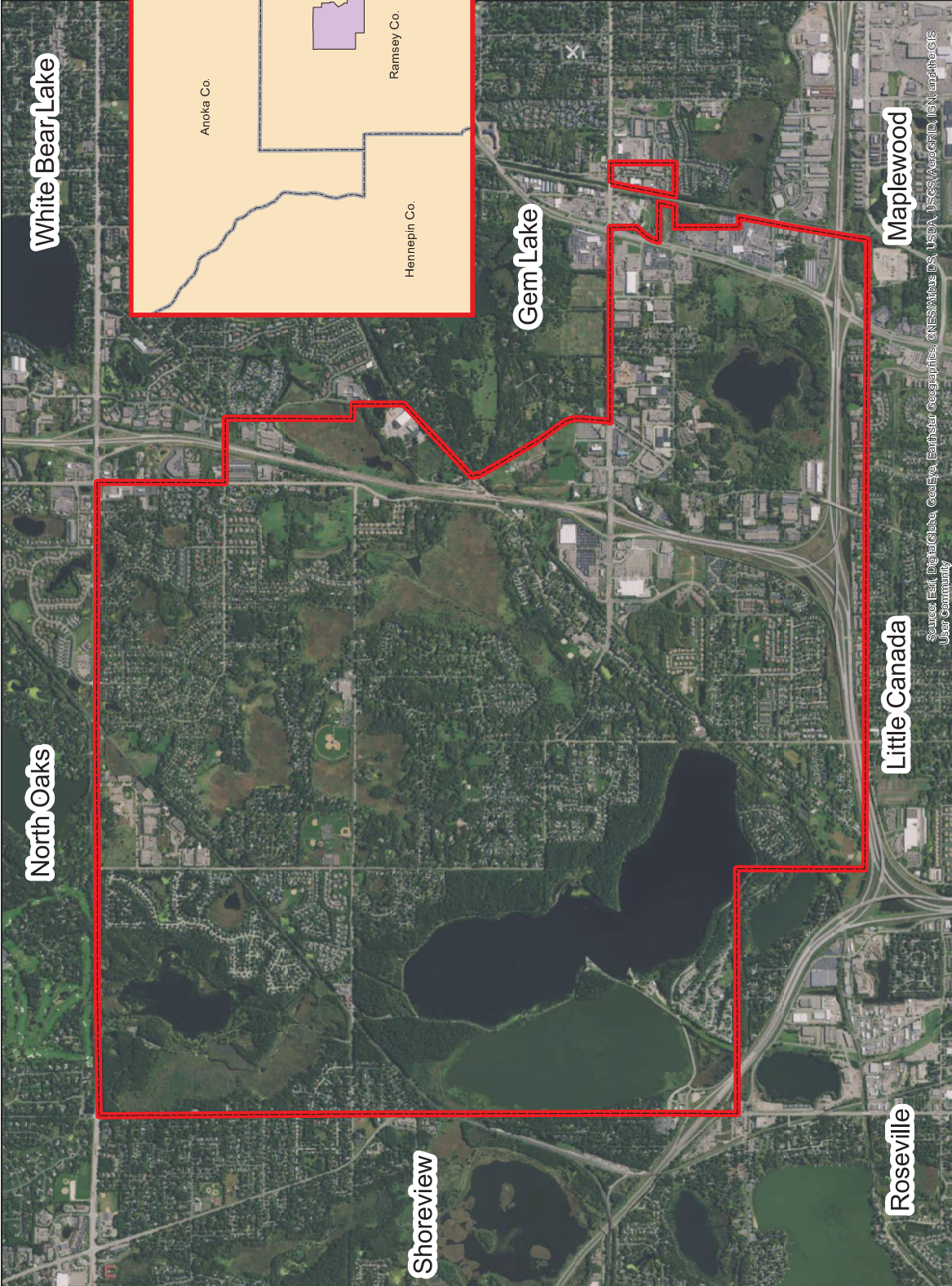
This step allows the public input based on the public sentiment. Council shall determine when the public hearing should occur in the process. Based on the public hearing, Council could approve the amendments, and, if necessary, refer the amendments to the Watershed Management Organization Board or comment and approval.

5.3.5 Council adoption

Final action on an amendment following approval by the Watershed Management Organization, is Council adoption. However, prior to the adoption, an additional public hearing could be held to review the plan changes and notify the appropriate stakeholders.

List of Figures

- Figure 1 – Location Map
- Figure 2 – Subwatershed and Drainage Areas
- Figure 3 – Hydrologic Soil Group
- Figure 4 – Storm Water System
- Figure 5 – Public Waters Inventory
- Figure 6 – Surface Water Features
- Figure 7 – Existing Land Use
- Figure 8 – Proposed Land Use
- Figure 9 – Well Locations and Wellhead Protection Areas
- Figure 10 – Flood Hazard Areas
- Figure 11 – Impaired Water Bodies
- Figure 12 – Wetland Management Classification





Legend
 Municipal Boundary
 Drainage Areas

WD/WMO Jurisdictional Boundaries
 RAMSEY-WASHINGTON METRO
 VADNAIS LAKE AREA

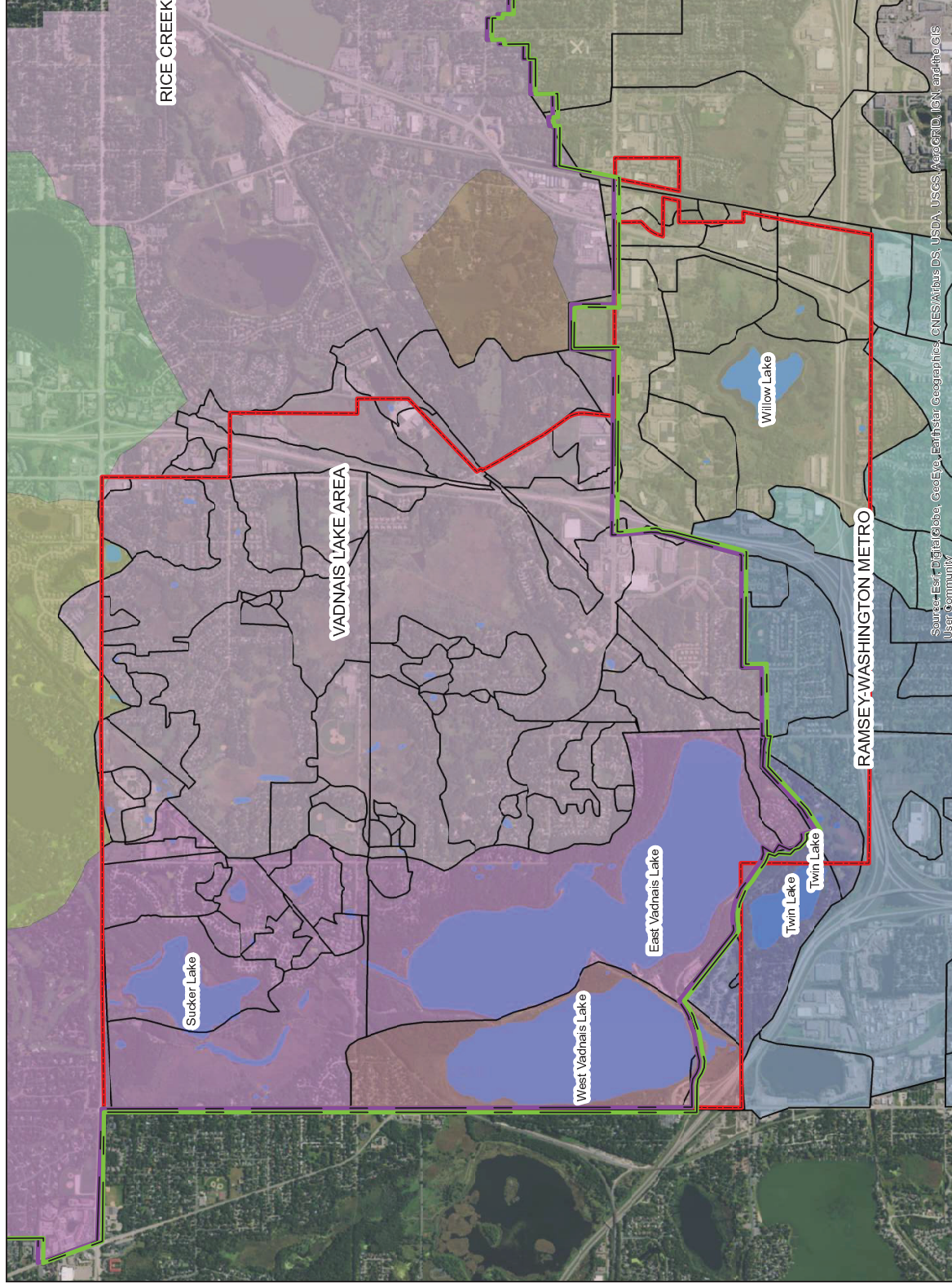
- Subwatershed Name**
- Birch Lake
 - East Vadnais
 - Gem Lake
 - Gervais Creek
 - Kohlman Lake
 - Lambert Creek
 - Tamarack/Wilkinson
 - Twin Lake
 - West Vadnais
 - Willow Creek



0 0.25 0.5 1 Miles

Source: Metropolitan Council, Minnesota Department of Natural Resources, and SEH.

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Subwatersheds and Drainage Areas

Local Water Resource Management Plan
 Vadnais Heights, Minnesota

Project: Vadna 14.0953
 Print Date: 5/22/2017
 Map by:
 Source:

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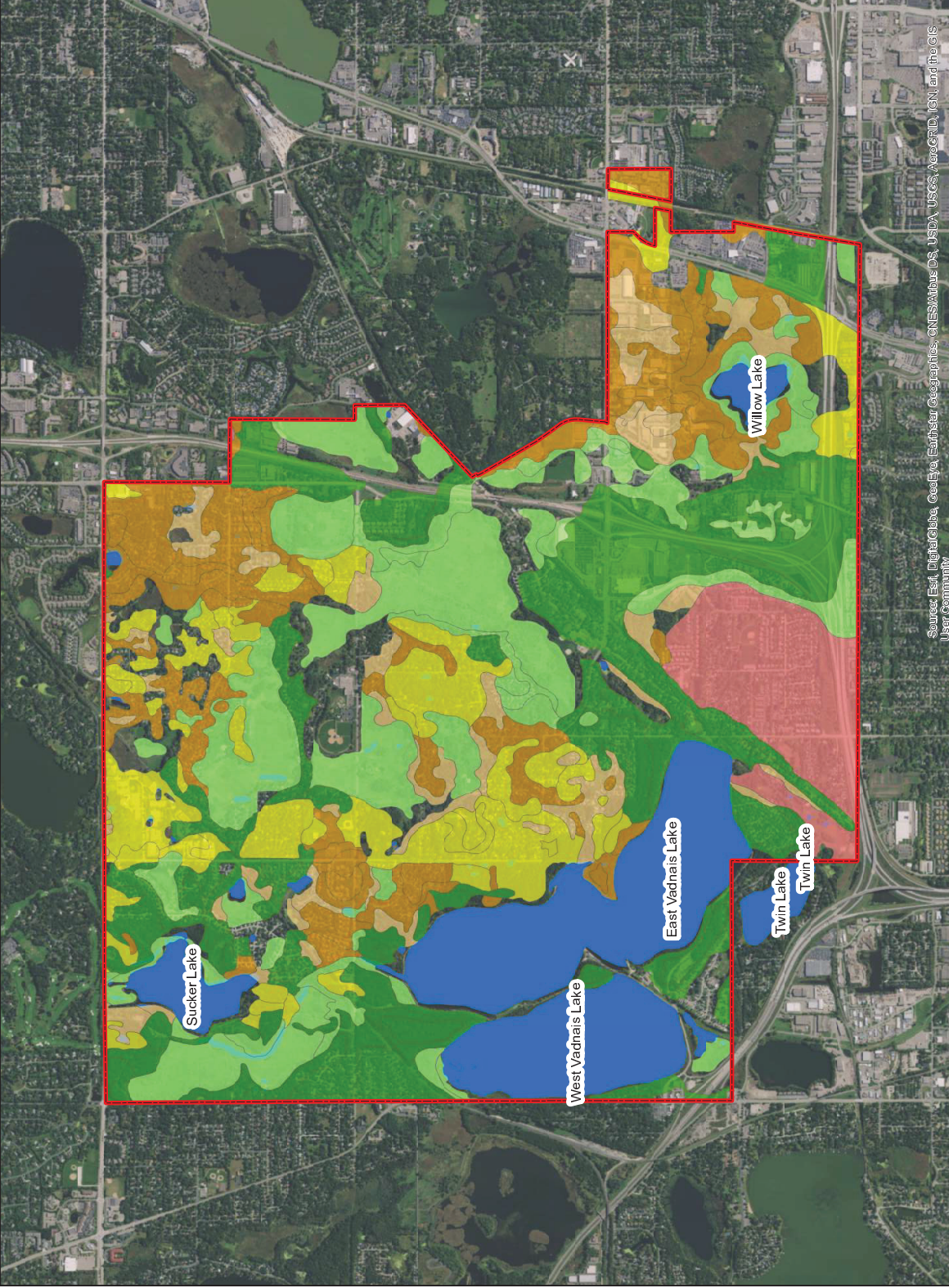


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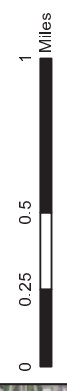
- Municipal Boundary

Hydrologic Soil Group

- A
- A/D
- B
- B/D
- C
- C/D
- Water



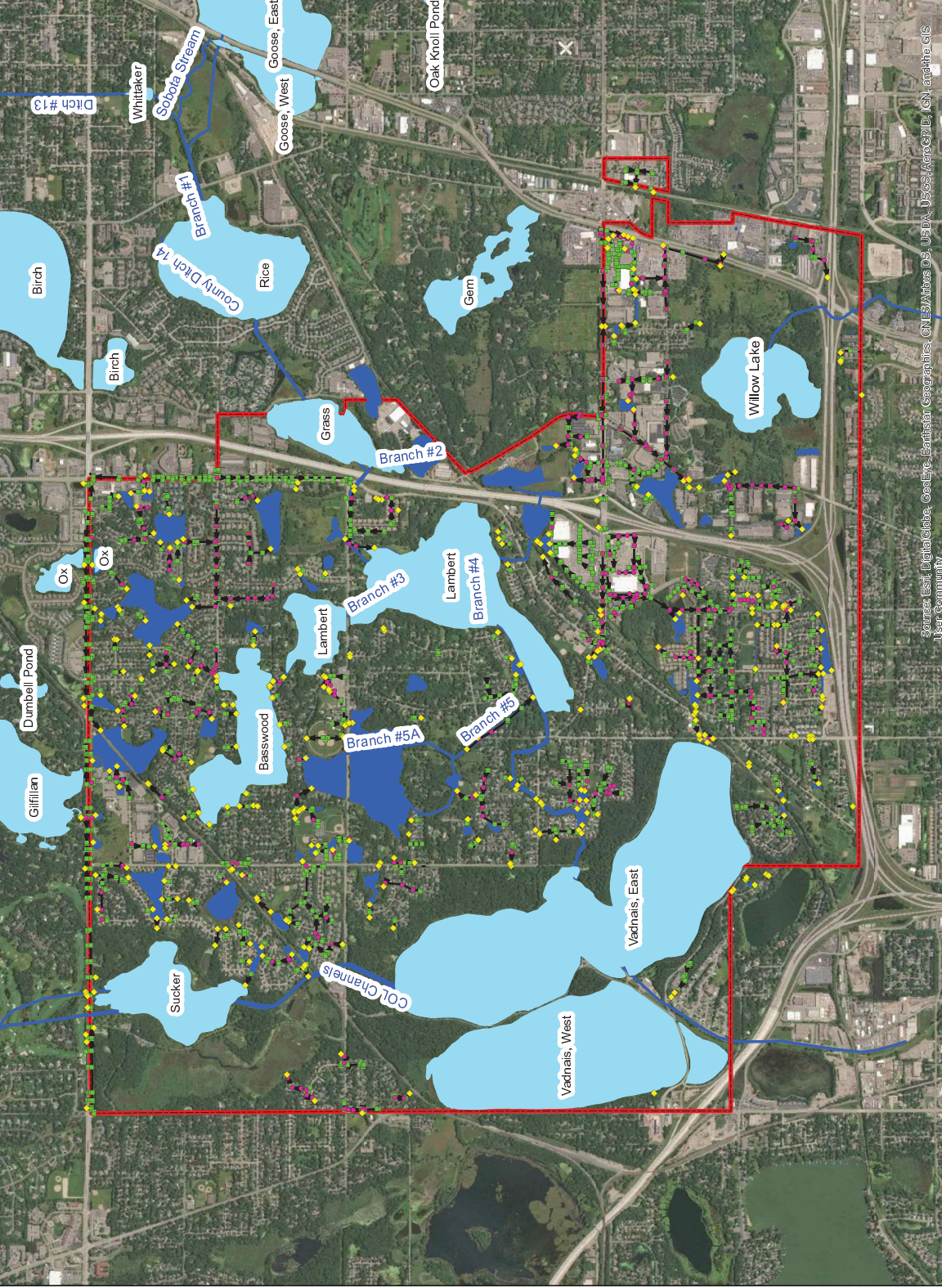
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Scale: 1:10000
MicroPlan Council, Minnesota Department of Natural Resources, and SEH.

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- Legend**
- Municipal Boundary
- Storm Infrastructure**
- Apron
 - Manhole
 - Catch Basin
 - Storm Line
 - Storm Ponds/Wetlands
 - Receiving Waters
 - Streams and Ditches

Source: Metropolitan Council, Minnesota Department of Natural Resources, and SEH.
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Storm Water System

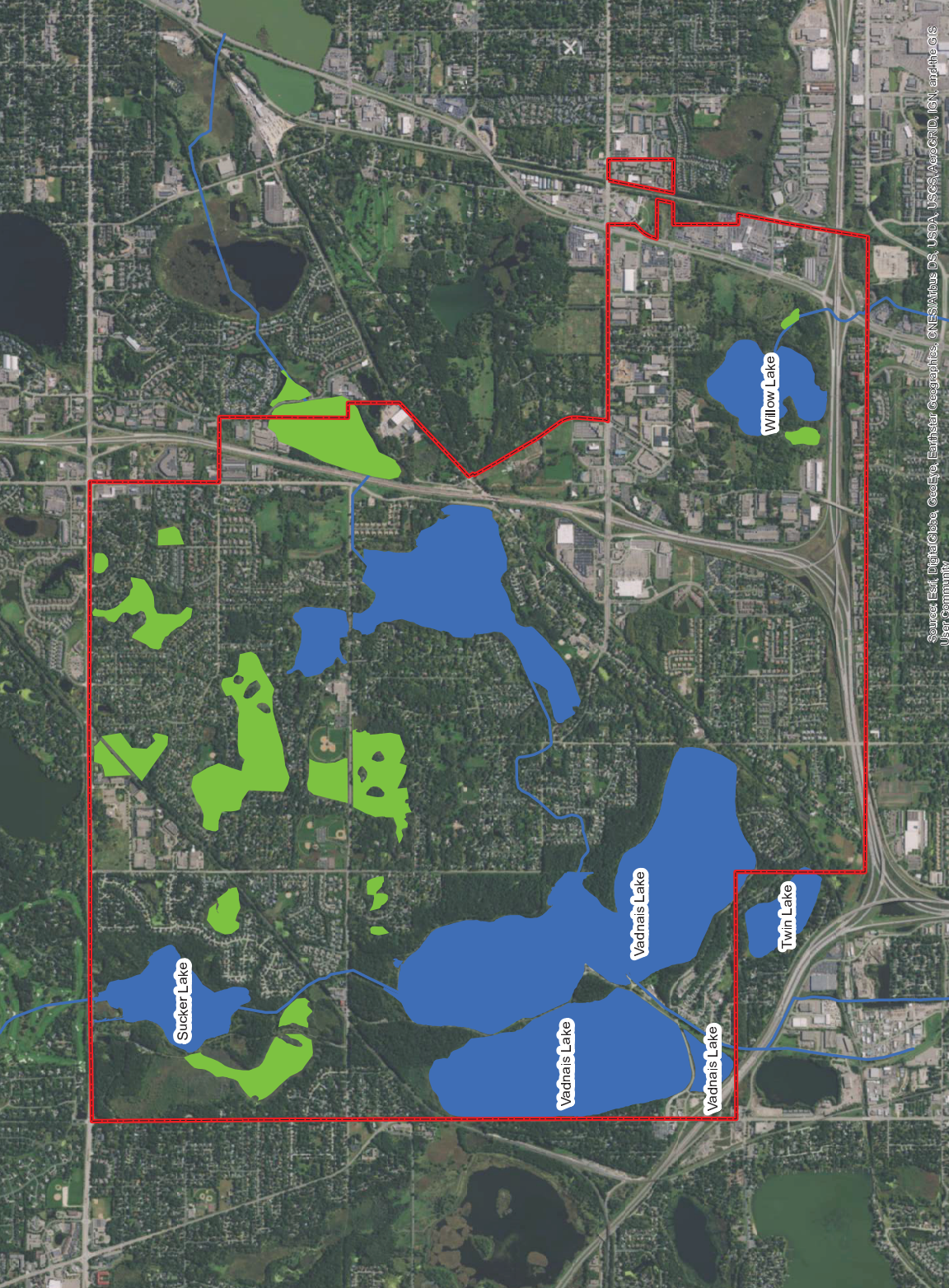
Figure 4

Local Water Resource Management Plan

Vadnais Heights, Minnesota

Project: Vadna 140953
 Print Date: 7/9/2018
 Map By: [Name]
 Source: [Source]

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Legend

- Municipal Boundary
- Public Waters**
- Public Water Basin
- Public Water Wetland
- Public Watercourses

Sources:
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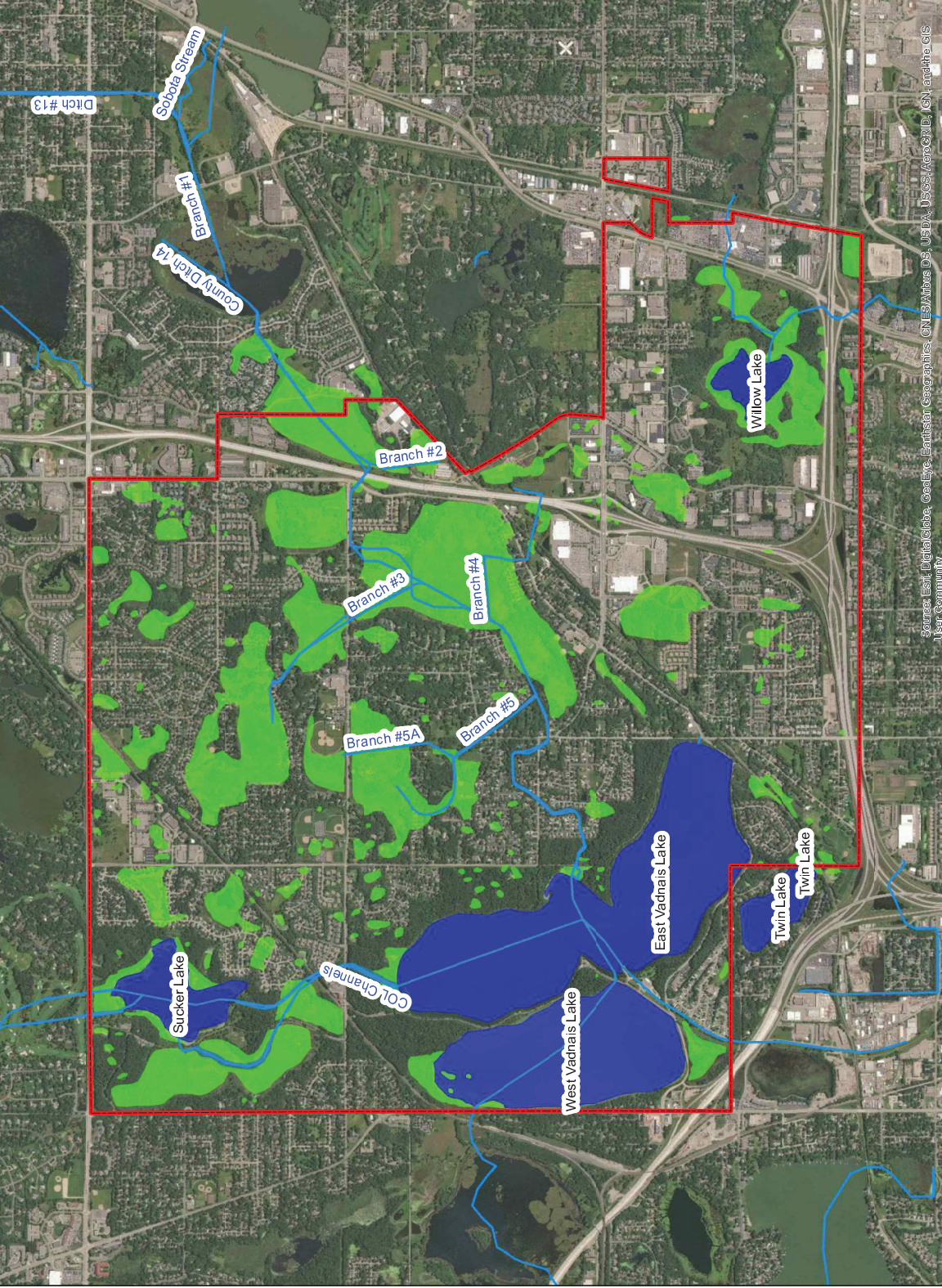
Local Water Resource Management Plan
 Vadnais Heights, Minnesota

Project: Vadna 14.0953
 Print Date: 5/2/2017

Map by:
 Source:

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 ST. PAUL, MN 55110
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- Legend**
- Municipal Boundary
- Surface Water Features**
- Streams and Ditches
 - Lacustrine
 - Riverine
 - Palustrine

Source: Metropolitan Council, Minnesota Department of Natural Resources, and SEH.
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Surface Water Features

Figure 6

Local Water Resource Management Plan
 Vadnais Heights, Minnesota

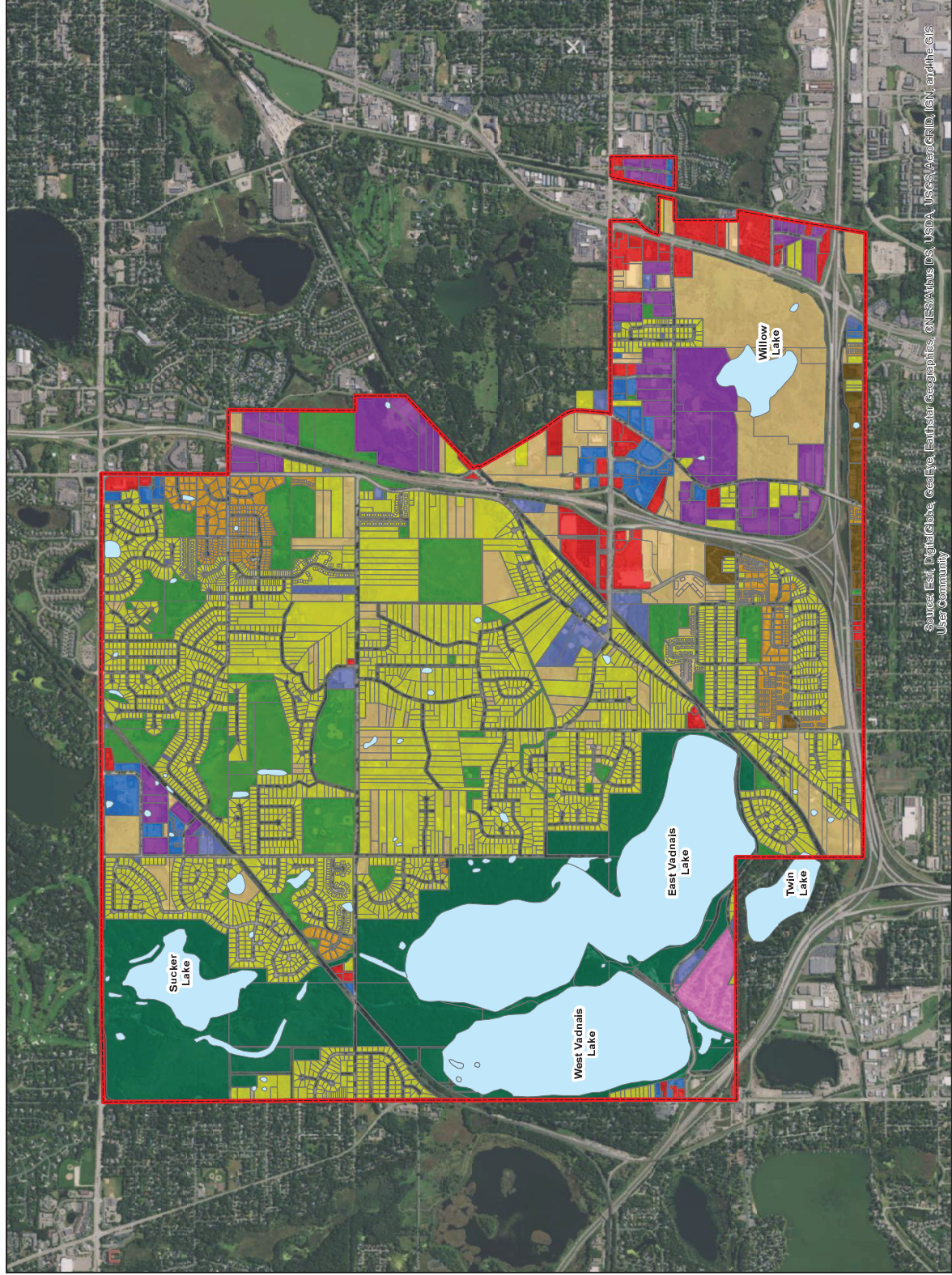
SEH
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 ST. PAUL, MN 55110
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 F: (651) 486-2150
 W: www.seh.com

Project: Vadna 140953
 Print Date: 7/9/2018
 Map By: [Name]
 Source: [Source]

- Legend**
- Municipal Boundary
 - Existing Land Use**
 - Low Density Residential
 - Medium Density Residential
 - High Density Residential
 - Manufactured Housing Park
 - Commercial
 - Office
 - Industrial
 - Public Institutional and Utility
 - Major Road Rights-of-Way
 - Park or Open Space
 - Regional Park
 - Undeveloped
 - Open Water



Source: Metrolink Council, Minnesota Department of Natural Resources, and SEH. This map features aerial photography and is not intended to be used as a survey instrument. The map is for informational purposes only and does not constitute a contract. The map is not intended to be used for any other purpose. The map is not intended to be used for any other purpose. The map is not intended to be used for any other purpose.



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Existing Land Use
Figure 7

Local Water Resource Management Plan
Vadnais Heights, Minnesota

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Project: Vadna 14.0953
Print Date: 5/22/2017
Map by: SEH
Source:



Legend

Municipal Boundary

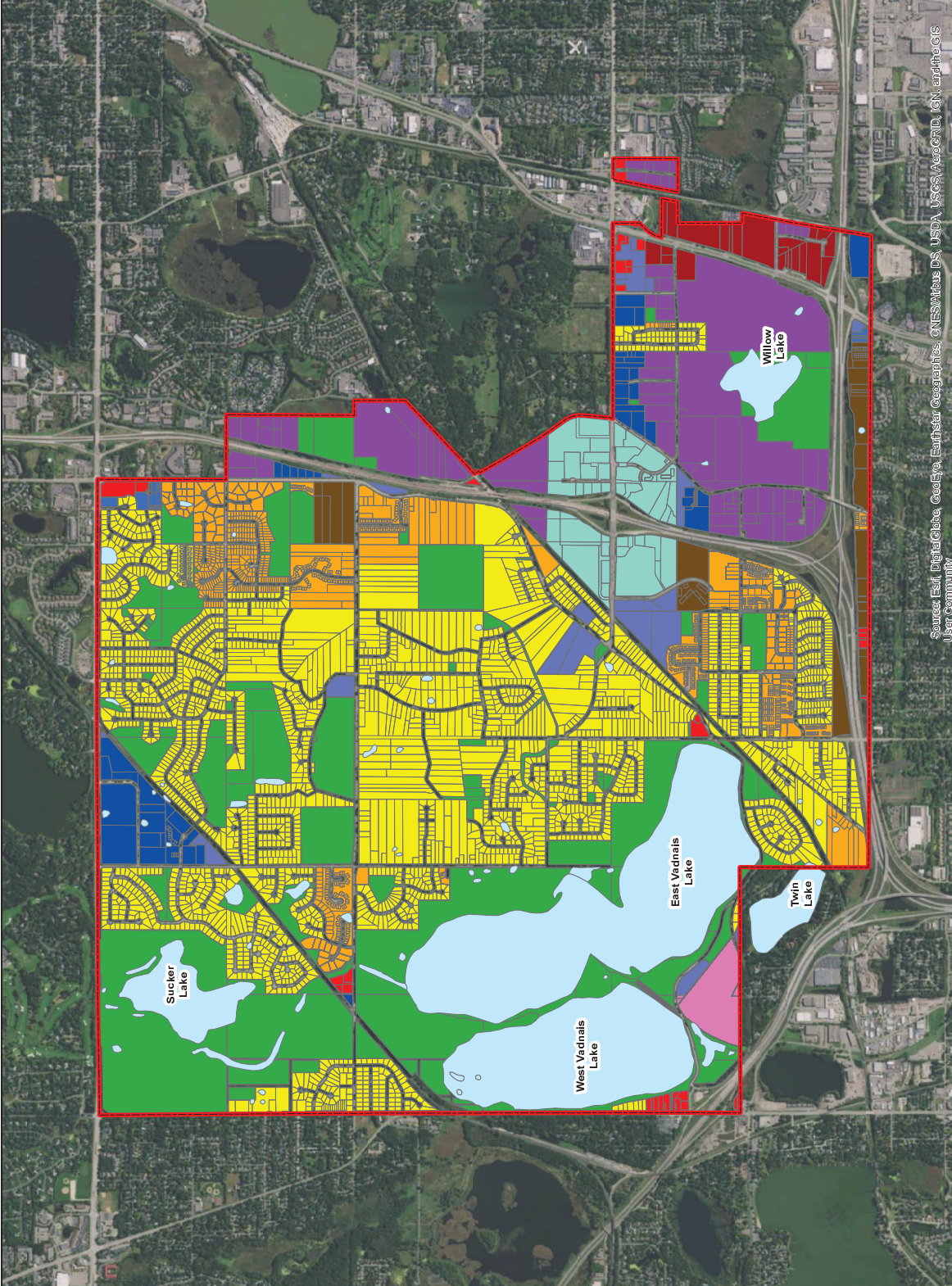
Proposed Land Use

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Manufactured Housing Park
- Commercial
- Auto-Related Commercial
- Office
- Office - Business
- Vadnais Center
- Industrial
- Public Institutional and Utility
- Major Road Rights-of-Way
- Park or Open Space
- Regional Park
- Undeveloped
- Open Water



Sources: Metropolitan Council, Minnesota Department of Natural Resources, and SEH.

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Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Proposed Land Use

Local Water Resource Management Plan
Vadnais Heights, Minnesota

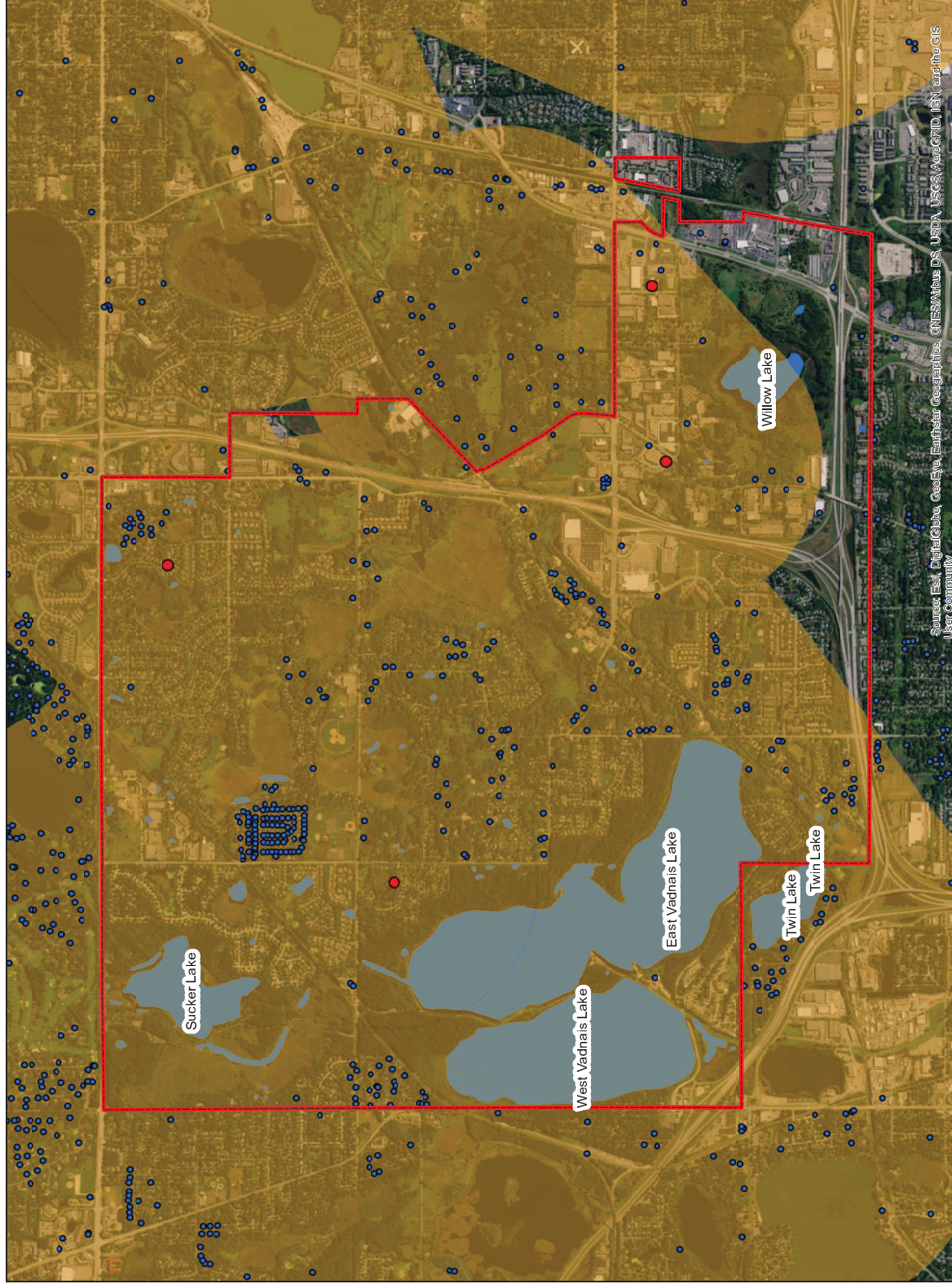
Project: Vacina 14.0953
Print Date: 5/22/2017
Map by: SEH
Source: SEH

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- Legend**
- Municipal Boundary
 - Well Locations and Wellhead Protection Areas**
 - Wellhead Protection Areas
 - Public Wells
 - Private Wells



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Wellhead Locations and Wellhead Protection Areas

Figure 9

Local Water Resource Management Plan
 Vadnais Heights, Minnesota

Project: Vadna 14.0953
 Print Date: 5/2/2017

Map by:
 Source:

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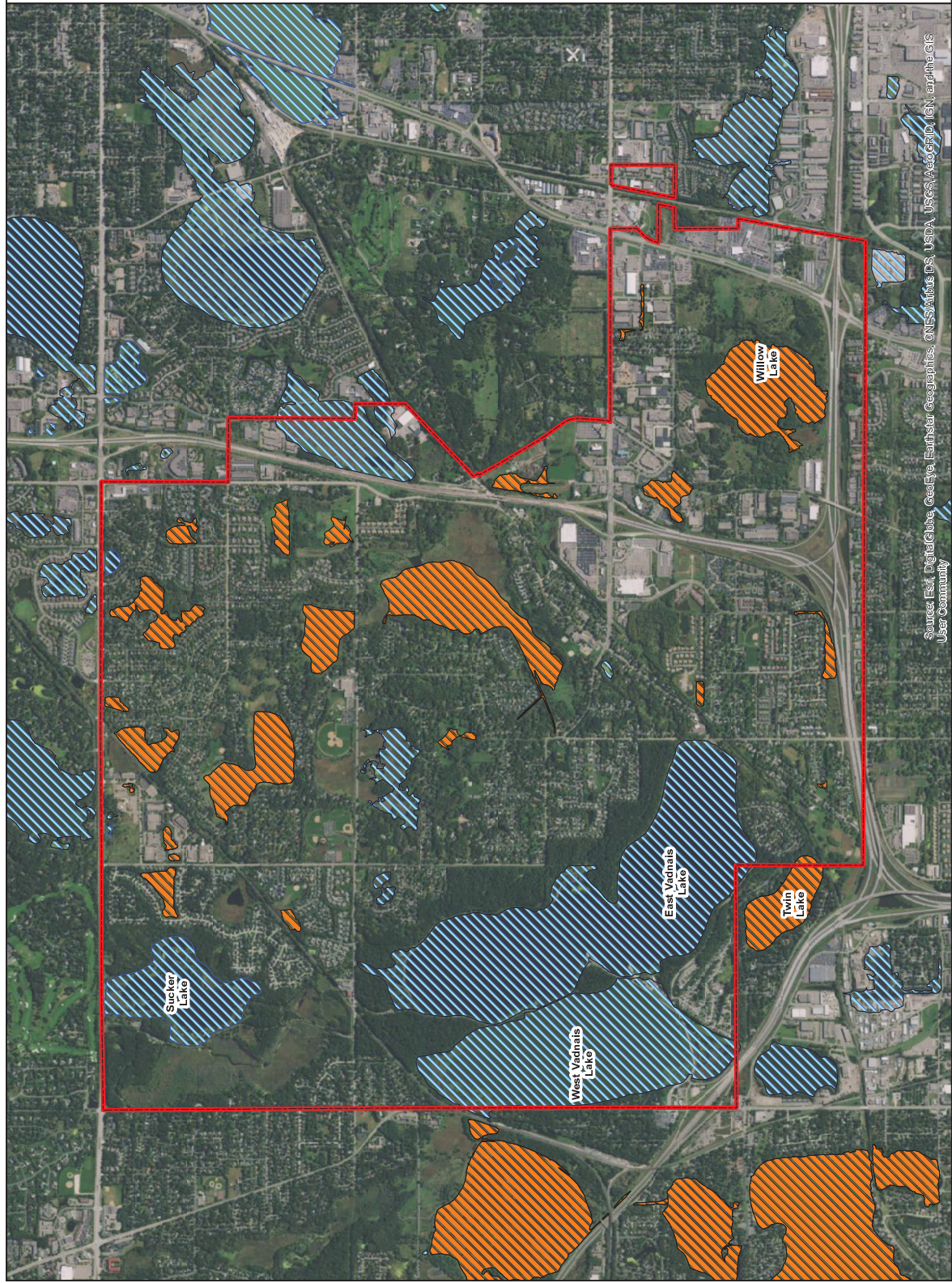


- Legend**
- Municipal Boundary
- Flood Zone**
- A
 - AE
 - AH
 - X



Source: Metropolitan Council, Minnesota Department of Natural Resources, and SEH.

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FEMA Special Flood Hazard Area

Figure 10

Local Water Resource Management Plan



Vadnais Heights, Minnesota

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Print Date: 5/12/2017

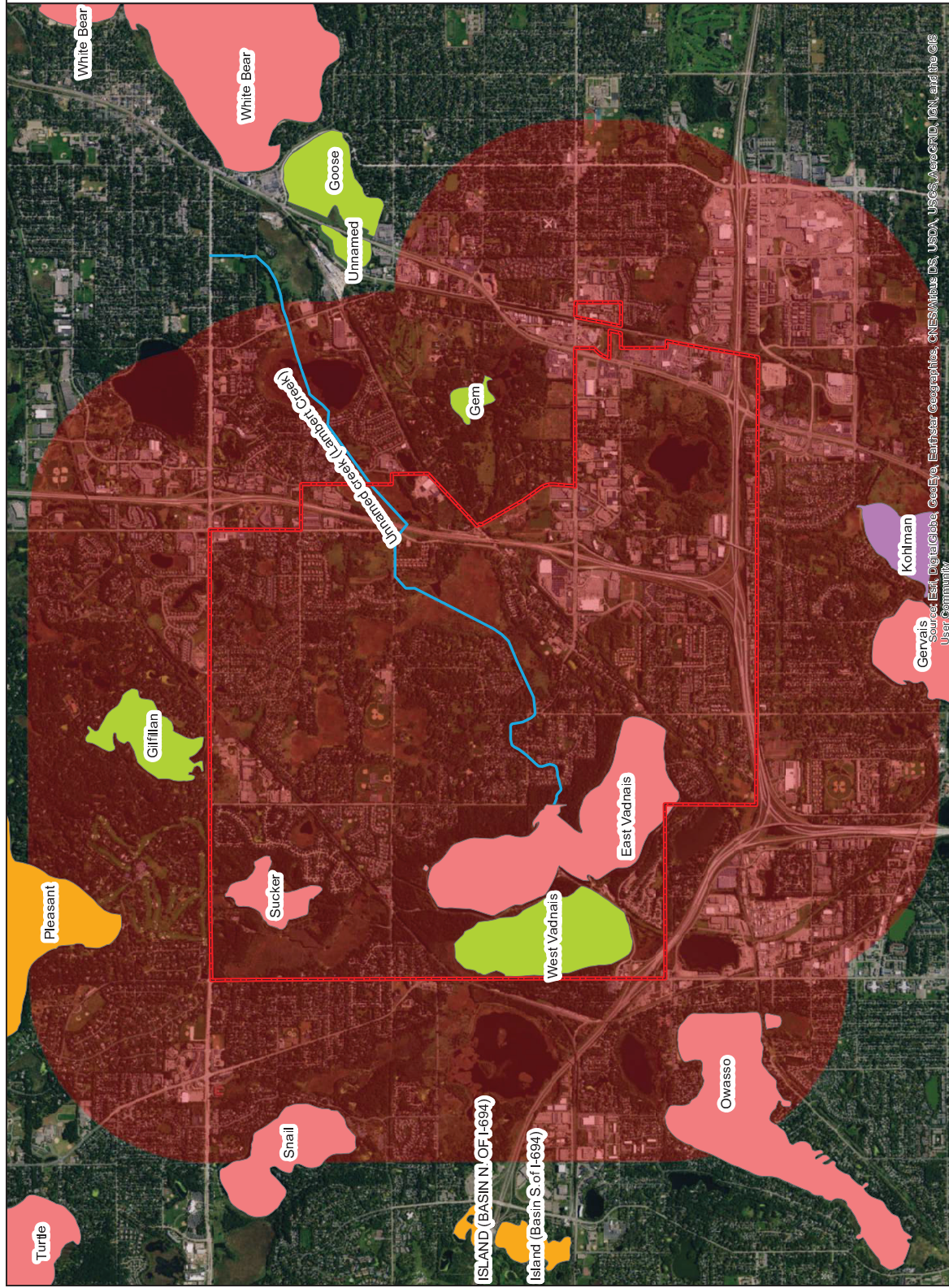
Map by: SEH
Source: SEH

Legend

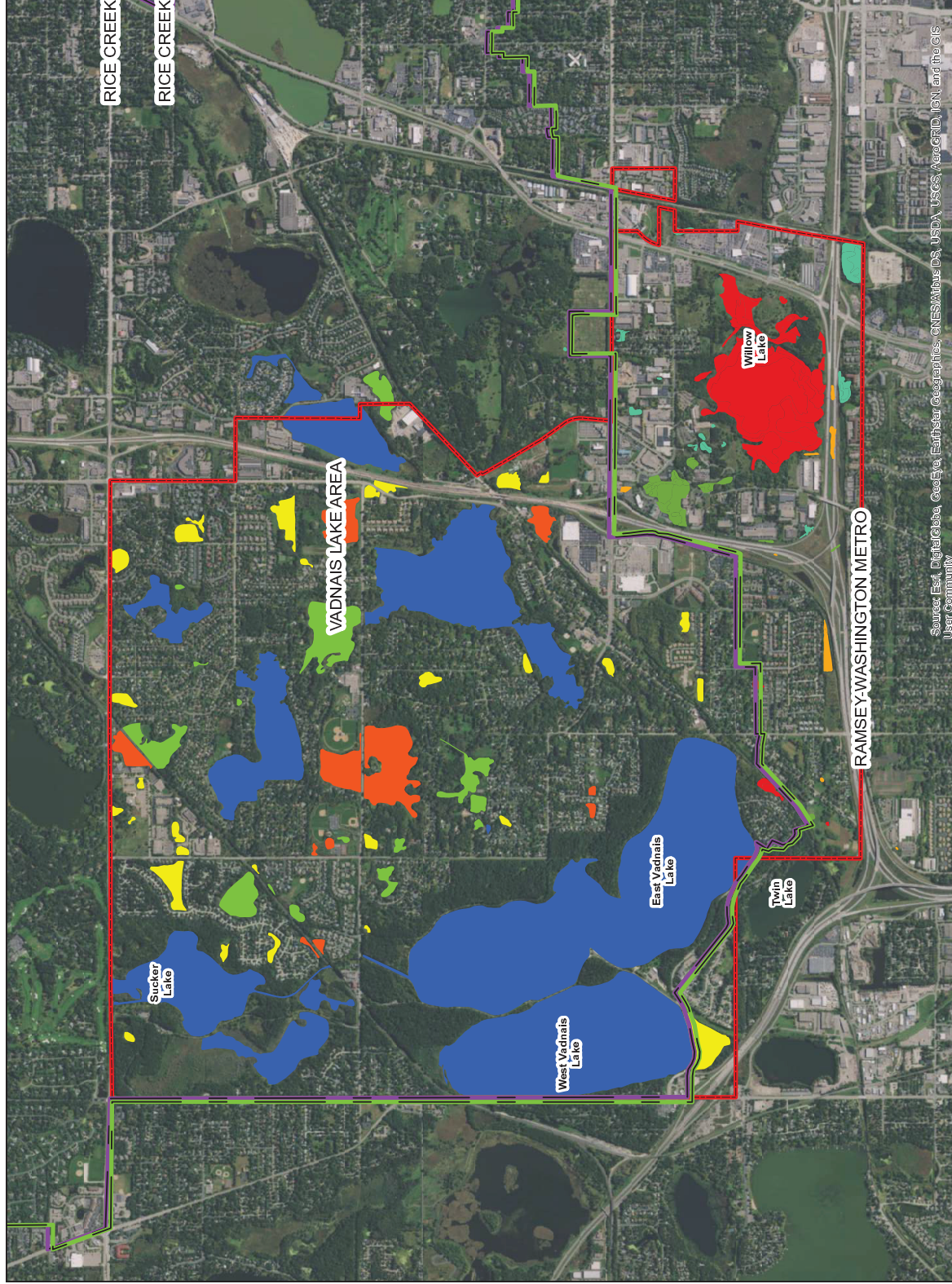
-  Municipal Boundary
-  One Mile Buffer

2016 Impaired Waters (Proposed)

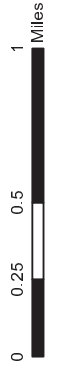
-  Cl⁻; Nutrients
-  Hg-Fish
-  Hg-Fish; Nutrients
-  Nutrients
-  Impaired Streams



Sources:
Metropolitan Council, Minnesota Department of Natural Resources, and SEH.
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- Legend**
- Municipal Boundary
- WD/WMO Jurisdictional Boundaries**
- RAMSEY-WASHINGTON METRO
 - VADNAIS LAKE AREA
- VLAWMO Management Class**
- Preserve
 - Manage 1
 - Manage 2
 - Manage 3
- RWMWD Management Class**
- Manage A
 - Manage B
 - Manage C
 - Water Quality Pond



Source: Metropolitan Council, Minnesota Department of Natural Resources, and SEH.

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Wetland Management Classification

Figure 12

Local Water Resource Management Plan

Vadnais Heights, Minnesota

Project: Vadna 14.0953
 Print Date: 5/22/2017
 Map by: [Name]
 Source: [Source]



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Appendix A

Acronyms and Glossary

APPENDIX A ACRONYMS AND GLOSSARY

Acronyms

AST	Above-ground Storage Tank
BMP	Best Management Practices
BWSR	Minnesota Board of Water and Soil Resources
DNR	Department of Natural Resources
EQB	Minnesota Environmental Quality Board
EQC	Environmental Quality Committee
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
GPS	Geographic Positioning System
IMP	Integrated Management Practice
LID	Low Impact Development
LUST	Leaking Underground Storage Tank
McRAM	Minnehaha Creek Routine Assessment Method
MnDOT	Minnesota Department of Transportation
MnRAM	Minnesota Routine Assessment Method
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
MSWMP	Metropolitan Surface Water Management Program
MUSA	Metropolitan Urban Services Area
NOI	Notice of Intent (for coverage under the NPDES Permit Program)
NPDES	National Pollutant Discharge Elimination System
NURP	Nationwide Urban Runoff Program
RWMWD	Ramsey Washington Metro Watershed District
SWCD	Soil and Water Conservation District
SWMP	Surface Water Management Plan
SWPPP	Storm Water Pollution Prevention Program
TP	Total Phosphorus
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VLAWMO	Vadnais Lake Watershed Management Organization
WD	Watershed District
WMO	Watershed Management Organization

Glossary

100-Year Flood or 100-Year Storm Event: The flood having a one-percent (1%) chance of being equaled or exceeded in any given year. A 100-year flood is synonymous with Base Flood, Regional or 1% Chance Flood.

Agricultural Land: Any land designated specifically for agricultural production. This may include row crops, pasture, hayland, orchards, or land used for horticultural purposes

Anaerobic: Conditions either in water or soil where there is a lack of oxygen.

Army Corps of Engineers (COE or USCOE): The United States Army Corps of Engineers is a regulatory agency involved in design, permitting and construction projects related to or impacting navigable waters of the United States including lakes, waterways and wetlands.

Aquatic Bench: A 10- to 15-foot bench around the inside perimeter of a permanent pool that is approximately one-foot deep. Normally vegetated with emergent plants, the bench augments pollutant removal, provides habitat, conceals trash and water level drops, and enhances safety.

Best Management Practice (BMP): A combination of land use, conservation practices, and management techniques, which when applied to a unit of land will result in the opportunity for a reasonable economic return with an acceptable level of water quality or water quantity improvements.

Bluff: A natural topographic feature such as a hill, cliff, or embankment having the following characteristics: (1) The slope rises at least 25 feet above the toe of the bluff; and (2) The grade of the slope from the toe of the bluff to a point 25 feet or more above the toe of the bluff averages 30 percent or greater; and (3) An area with an average slope of less than 18 percent over a distance for 50 feet or more shall not be considered part of the bluff.

Buffer: The use of land, topography, difference in elevation, space, fences, or vegetation to screen or partially screen a use or property from the vision of another use or property, and thus reduce undesirable influences such as: sight, noise, dust, and other external effects. Also defined as area immediately adjacent to a wetland that is unmowed and/or unmanaged. Buffers are ideally dominated by native vegetation and add to the ecological health of the wetland by adding habitat and assisting and filtering pollutants from surface water runoff.

Buffer Strip: An area of vegetated ground cover abutting a water body that is intended to sediment or other pollutants from runoff.

BWSR: Board of Water and Soil Resources. This is the lead regulatory agency that oversees the Wetland Conservation Act in the State of Minnesota.

Circular 39: Wetland classification system developed by United States Fish and Wildlife Service in 1956 that categorizes wetlands into eight types. This is the same classification system generally accepted by the State of Minnesota for wetland classification.

Comprehensive Plan: As defined in Minnesota Statutes 394.21, the policies, statements, goals and interrelated plans for private and public land and water use, transportation and community facilities that guide future development (and growth).

Cowardin Classification: Wetland classification system developed by the United States Fish and Wildlife Service in 1979. This system defines wetlands by a tiered system and is more detailed than the Circular 39 method. The Cowardin System is the classification System used in the National Wetlands Inventory.

Design Storm: A rainfall event of specified size and return frequency that is used to calculate the runoff volume and peak discharge rate to a BMP.

Detention: The temporary storage of runoff from rainfall and snowmelt events to control peak discharge rates and provide an opportunity for physical, chemical and biological treatment to occur.

Development: The construction, installation or alteration of any structure, the extraction, clearing or other alteration of terrestrial or aquatic vegetation, land or the course, current or cross section of any water body or water course or division of land into two (2) or more parcels. See also re-development, new development and existing development.

Drawdown: The gradual reduction in water level in a pond BMP due to the combined effect of infiltration and evaporation.

Draining: The removal of surface water or ground water from land.

Drop Structure: Placement of logs with a weir notch across a stream channel. Water flowing through the weir creates a plunge pool downstream of the structure and creates fish habitat.

Easement: A grant of one or more property rights by a property owner for use by the public, a corporation, or another person or entity.

Ecoregion: Areas of relative homogeneity characterized by distinctive regional ecological factors, including land use, soils, topography and potential natural vegetation. There are seven such Ecoregions in the state of Minnesota:

- NLF = Northern Lakes and Forests
- CHF = North Central Hardwood Forests
- NGP = Northern Glaciated Plains
- WCP = Western Corn Belt Plains
- RRV = Red River Valley
- DA = Driftless Area
- NMW = Northern Minnesota Wetlands

Exotic Species or Invasive Species: Non-native plants or wild animals that can naturalize, have high propagation potential, are highly competitive for limiting factors, and cause displacement of, or otherwise threaten, native plants or native animals in their natural communities.

End of Pipe Control: Water quality control technologies suited for the control of existing urban storm water at the point of storm sewer discharge to a receiving water. Due to typical space constraints, these technologies are usually designed to provide water quality control rather than quantity control.

Erosion: The wearing away of land surface and soil by the action of natural elements (wind and/or water).

Eutrophication: Process by which overabundance of nutrients in a waterbody lead to accelerated productivity and general decrease in water clarity and quality.

Exfiltration: The downward movement of runoff through the bottom of an infiltration BMP into the subsoil.

Existing Development: A property or parcel of land that has previously been subject to development, and that is not undeveloped property.

Extended Detention: A storm water design feature that provides for the gradual release of a volume of water (typically 0.25 to 1.0 inches per impervious acre) over a 12 to 48 hour time period. With proper design, the extended detention period allows for an increased settling of pollutants, and can protect channels from frequent flooding or scour.

Extended Detention (ED) Ponds: A conventional ED pond temporarily detains a portion of storm water runoff for a period of 12 to 48 hours after a storm using a fixed orifice. Such extended detention allows urban pollutants to settle out. ED ponds can be designed to be "dry" between storm events and thus do not have any permanent standing water or "wet" with a permanent pool of water. An enhanced ED pond is designed to prevent clogging and resuspension and provides greater flexibility in achieving target detention times. It may be equipped with plunge pools near the inlet, a micropool at the outlet, and utilize an adjustable reverse-sloped pipe at the ED control device. See also "wet pond" definition for diagram.

Extended Detention Wetland: A storm water wetland design alternative in which the total treatment volume is equally split between a shallow marsh and temporary detention of runoff above the marsh. After a storm, the normal pool of the shallow marsh may rise by up to two feet. The extra runoff is stored for up to 24 hours to allow pollutants to settle at, before being released downstream.

Finished Floor Elevation: The lowest elevation of the first floor or basement in a residential building or other structure that will or may be inhabited by a person or persons.

Filtration Basin: A treatment area designed to treat storm water by a process that physically removes particles from the water.

Flood: A temporary rise in stream flow or stage that results in inundation of the areas adjacent to the channel or water body.

Flood Frequency: The average frequency, statistically determined, for which it is expected that a specific flood stage or discharge may be equaled or exceeded.

Flood Fringe: That portion of the 100-year floodplain outside of the floodway.

Flood Obstruction: Any dam, well, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel rectification, culvert, building, wire, fence, stockpile, refuse, fill, structure or matter in, along, across or projecting into any channel, watercourse or regulatory flood hazard area which may impede, retard or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water, or that is placed where the flow of water, either in itself or by catching or collecting debris carried by such water, or that is placed where the flow of water might carry the same downstream to the damage of life or property.

Floodplain: Floodplains are lowland areas adjoining lakes, wetlands, and rivers that are susceptible to inundation of water during a flood. For regulatory purposes, the floodplain is the area covered by the 100-year flood and it is usually divided into districts called the floodway and flood fringe. Areas where floodway and flood fringe have not been determined are called approximate study areas or general floodplain.

Floodplain (General) Area: The general floodplain area is determined using the best available data, in lieu of performing a detailed engineering study. These data may be from soils mapping, experienced high water profiles, aerial photographs of previous floods, or other appropriate sources. There are no associated published 100-year flood elevations with general floodplain delineations, unlike detailed study areas. General floodplain area is synonymous with approximate study area and unnumbered A-Zone.

Floodplain Forest: Wooded area adjacent to stream or river that is periodically flooded. Within this plan, floodplain forests have been specifically identified as a separate wetland category due to their unique ecology and protection needs.

Flood Proofing: A combination of structural provisions, changes or adjustments to properties and structures subject to flooding primarily for the reduction or elimination of flood damages to properties, water and sanitary facilities, structures and contents of buildings in a flood hazard area in accordance with the Minnesota State Building Code.

Floodway: The floodway is the channel of a river or other watercourse and the adjacent land areas which must remain open in order to discharge the 100-year flood.

Forebay: An extra storage area provided near an inlet of a pond or BMP to trap incoming sediments, reducing the amount that accumulates in a pond or BMP.

Freeboard: A factor of safety usually expressed in feet above a certain flood level. Freeboard compensates for the many unknown factors (e.g., waves, ice, debris, etc.) that may increase flood levels beyond the calculated level.

Forbs: Vegetation that is not a tree, grass or shrub. Usually associated with flowering plants

Geographic Information System (GIS): Computer database of georeferenced information on the cities various resources.

Global Positioning System (GPS): Network of satellites used to map and identify locations on the earth. For this plan, the GPS unit used was a Trimble GeoXT, which is accurate to within three feet.

Hydric Soil: Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrophytic Vegetation: Macrophytic plant life growing in water, soil, or a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Hypereutropic: A very nutrient-rich lake characterized by frequent and severe nuisance algal blooms and low transparency.

Impervious Surface: The portion of the buildable parcel which has a covering which does not permit water to percolate into the natural soil. Impervious surface shall include, but not be limited to, buildings, all driveways and parking areas (whether paved or not), sidewalks, patios, swimming pools, tennis and basketball courts, covered decks, porches, and other structures. Open, uncovered decks are not considered impervious for the purposes of this ordinance. The use of patio blocks, paver bricks or class 5 gravel material are considered impervious surfaces as a majority of water runs-off the surface rather than being absorbed into natural soils underneath. Some exceptions to these conditions may include paver blocks or pavement systems engineered to be permeable with the underlying soils suitable for infiltration.

Infiltration Basin: An impoundment where incoming storm water runoff is stored until it gradually infiltrates into and through the soil of the basin floor.

Infiltration Trench: A conventional infiltration trench is a shallow, excavated trench that has been backfilled with stone to create an underground reservoir. Storm water runoff diverted into the trench gradually exfiltrates from the bottom of the trench into the subsoil and eventually into the water table. An enhanced infiltration trench has an extensive pretreatment system to remove sediment and oil. It requires an on-site geotechnical investigation to determine appropriate design and location.

Infrastructure: Public facilities and services, including transportation, storm water pipes, structures and ponds, water and sewer pipes and structures, telecommunications, recycling and solid waste disposal, parks and other public spaces, schools, police and fire protection, and health and welfare services.

Integrated Management Practice (IMP): A range of small-scale storm water controls or practices distributed throughout a site and intended to maintain flow patterns, filter pollutants and/or re-create or maintain existing site hydrology.

Invasive Species or Exotic Species: Non-native plants or wild animals that can naturalize, have high propagation potential, are highly competitive for limiting factors, and cause displacement of, or otherwise threaten, native plants or native animals in their natural communities.

Local Government Unit (LGU): Agency that has the primary responsibility of administering the Wetland Conservation Act. The City of Chanhassen acts as LGU for all wetlands within the City limits and shares responsibility for basins that border adjacent municipalities.

Lowest Floor: The lowest floor of a structure, including basement.

Low Impact Development (LID): An approach to storm water management intended to protect water resources, reduce storm sewer infrastructure costs and provide a more attractive storm water management system. LID practices include infiltration systems, bioretention areas, rain barrels, green roofs, porous pavements and a long list of additional innovative storm water treatment practices.

Mesotrophic: Describes a lake of moderate photosynthetic productivity.

MNRAM: The Minnesota Routine Assessment Methodology as referenced by Minnesota Rules 8420. MNRAM is the primary tool used to assess wetland functions and values on a qualitative basis. The MNRAM evaluates wetlands based on vegetation, wildlife habitat, water quality, flood and storm water attenuation, recreational opportunities, aesthetics, fishery habitat, groundwater interactions, and commercial use. The version referenced in this plan is Version 3.0.

Monotypic: Used to describe vegetation communities in which only one species is present. Most often used to describe areas that are entirely dominated by reed canary grass or cattails.

Navigable Waters. Waters defined by the United States, 33 Code of Federal Regulations Section 329.4 as those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

New Development: Development of a property or portion thereof that is currently undeveloped property.

NURP: Nationwide Urban Runoff Program, a study by the U.S. Environmental Protection Agency. A key component of this program was to assess the effectiveness of urban runoff detention/retention basins (e.g., ponds) in removing pollutants from storm water runoff.

Off-Line BMP: A water quality facility designed to treat a portion of storm water (usually 0.5 to 1.0 inches per impervious acre) which has been diverted from a stream or storm drain.

Off-Line Treatment: A BMP system that is located outside of the stream channel or drainage path. A flow diverter is used to divert runoff from the channel and into the BMP for subsequent treatment.

Ordinary High Water Level (OHWL or OHW): The boundary of public waters and wetlands, and shall be an 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 ordinary high water level is the elevation of the top of the bank of the channel. For reservoirs and flowage, the ordinary high water level is the operating elevation of the normal summer pool. In Chanhassen all of the lakes have an OHW established. For streams and waterways, the OHW is

micropools for pond BMPs, and plunge pools, grass filter strips and filter fabric for infiltration BMPs.

Sand Filter: A relatively new technique for treating storm water, whereby the first flush of runoff is diverted into a self-contained bed of sand. The runoff is then strained through the sand, collected in underground pipes and returned back to the stream or channel.

Sediment Forebay: Storm water design feature that employs the use of a small settling basin to settle out incoming sediments before they are delivered to a storm water BMP. Particularly use full in tandem with infiltration devices, wet ponds or marshes. See also Forebay.

Sequencing: The process used by the Local Government Unit to evaluate the necessity of an activity impacting a wetland. The party proposing the impact must demonstrate that the activity proposed complies with the following principles in descending order of priority.

1. Avoids direct or indirect impacts to the wetlands that may diminish or destroy them;
2. Minimizes the impact to the wetland by limiting the degree or magnitude of the wetland activity and its implementation;
3. Rectifies the impacts by repairing, rehabilitating, or restoring the affected wetland;
4. Reduces or eliminates the impact to the wetland over time by preservation and maintenance operations; and,
5. Replaces unavoidable wetland impacts to the wetland by restoring or, if wetland restoration opportunities are not reasonably available, creating substitute wetland areas having equal or greater public value as provided for under the Wetland Conservation Act.

Shoreland: Land located within the following distances from public waters: one thousand feet (1,000') from the ordinary high water level of a lake, pond, or flowage; and three hundred feet (300') from a river or stream, or the landward extent of a floodplain designated by ordinance on a river or stream, whichever is greater. The limits of shoreland may be reduced whenever the waters involved are bounded by topographic divides which extend landward from the waters for lesser distances and when approved by the Commissioner of the DNR.

Short Circuiting: The passage of runoff through a BMP in less than the theoretical or design treatment time. For example, a properly designed treatment pond will have the inlet and outlet pipes located as far apart (along the water flow path) as possible. A short circuiting pond would have the inlet very close to the outlet such that the water coming into the pond would leave the pond much sooner than if it were able to travel through the entire pond.

Storm Water Treatment: Detention, retention, filtering or infiltration of a given volume of storm water to remove pollutants.

Stream Buffer: A variable width strip of vegetated land adjacent to a stream that is preserved from a disturbance to protect water quality and aquatic and terrestrial habitats. See also buffer strip.

Structure: Anything manufactured, built, constructed, erected, or a portion thereof which is normally attached to or positioned on land, whether temporary or permanent in character, including

considered the top of bank. Areas below the OHW are under the jurisdiction of the Minnesota Department of Natural Resources and are not regulated by the Wetland Conservation Act.

Permanent Pool: A 3- to 10-foot deep pool in a storm water pond system that provides removal of urban pollutants through settling and biological uptake. (Also referred to as a wet pond).

Porous Pavement: An alternative to conventional pavement whereby runoff is diverted through a porous asphalt layer and into an underground stone reservoir. The stored runoff then gradually infiltrates into the subsoil.

Protected Water: Any water or wetland designated by the Minnesota Department of Natural Resources and identified by statute on the Protected Waters Inventory.

Public Waters: Those waters of the state identified as public waters or wetlands under Minnesota Statutes, Section 103G.005.

Reach: A hydraulic engineering term to describe a longitudinal segment of a stream or river influenced by the natural or man-made obstruction. In an urban area, the segment of a stream or river between two (2) consecutive bridge crossings would most typically constitute a reach.

Redevelopment: Any development including but not limited to rebuilding, renovation, revision, remodel, reconstruction or redesign of or at an existing development.

Regional Flood: A flood which is representative of large floods known to have occurred generally in Minnesota and reasonably characteristics of what can be expected to occur on an average frequency in the magnitude of the 100-year recurrence interval. Regional flood is synonymous with the term "base flood" used in the Flood Insurance Study.

Regulatory Flood Protection Elevation: A point not less than one-foot (1') above the water surface profile associated with the 100-year flood as determined by the use of the 100-year flood profile and surrounding technical data in the Flood Insurance Study plus any increase in flood heights attributable to encroachments on the floodplain. It is the elevation to which uses regulated by City ordinance are required to be elevated or flood proofed.

Retention: The permanent storage of runoff from rainfall and snowmelt events with volume reduction coming from infiltration, evaporation or emergency release.

Riprap: A combination of large stone, cobbles and boulders used to line channels, stabilize banks, reduce runoff velocities, or filter out sediment.

Runoff (Storm Water): The overland and near surface flow from storm water and snowmelt.

Runoff Conveyance: Methods for safely conveying runoff to a BMP to minimize disruption of the stream network, and promote infiltration or filtering of the runoff.

Runoff Pretreatment: Techniques to capture or trap coarse sediments before they enter a BMP to preserve storage volumes or prevent clogging within the BMP. Examples include forebays and

but not limited to buildings, fences, sheds, advertising signs, dog kennels, hard surface parking areas, boardwalks, playground equipment, concrete slabs.

Shoreland Wetland Protection Zone: The land located within 1,000 feet from the Ordinary High Water Elevation of a Protected Water, 500 feet from the Minnesota River or the landward extent of the designated floodplain, and 300 feet from any stream designated in the shoreline management ordinance.

Storm Water: (See Runoff)

Storm Water Treatment Pond: Any waterbody that has been specifically created to remove sediment and nutrients and “treat” surface water runoff. Storm water ponds that were created from existing wetland are still regulated as jurisdictional wetlands. Storm water ponds created from upland areas are not wetland and are exempt from regulatory jurisdiction.

Subwatershed: A subdivision based on hydrology corresponding to a smaller drainage area within a larger watershed.

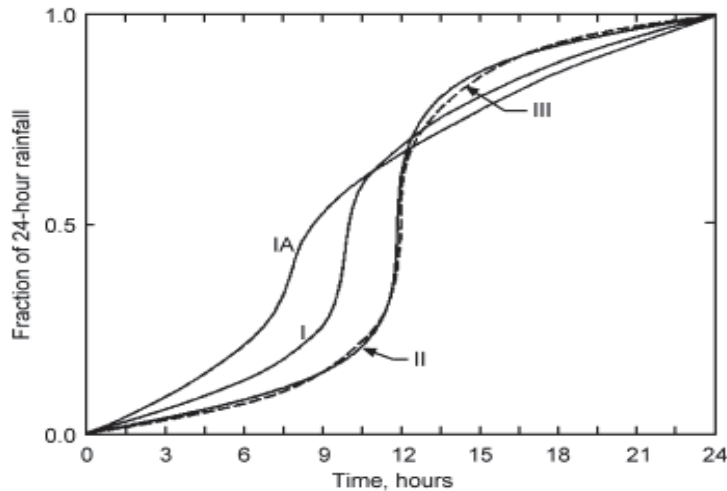
Technical Evaluation Panel (TEP): A panel of technical professionals from the Board of Water and Soil resources, Carver or Hennepin County Conservation Districts, and a Minnesota Department of Natural Resources representative. Additional members can also be invited, including the U.S. Army Corps of Engineers. The TEP provides decision making support for the LGU for many wetland and regulatory issues.

Ten-Day Snow Melt Runoff with Type “C” Distribution (100-Year/10-day runoff): A modeled runoff event that represents snowmelt conditions over a 10-day period for a return period snow depth of 100 years. The runoff event is simulated for a curve number (CN) of 100 which represents frozen soil conditions or where all surfaces are considered impervious. For some drainage basins the ten-day runoff event is the critical event for identifying the high water level of the basin or water body. The Type C distribution is similar in concept to the Type I and II distributions, and for this event, establishes the time distribution of runoff volume over the ten-day period.

Treatment Volume (V_t): The volume of storm water runoff that is treated within a BMP or IMP storm water treatment facility. Typically the volume is expressed in terms of inches of runoff per impervious acre.

Type I, IA, II and III Storm Distributions - NRCS: These storm types represent the time distribution of a 24-hour rainfall event for areas throughout the United States. The total storm depth is distributed according to the diagram in subpart A. Type II storms are more “flashy” (i.e., convective/thunderstorms) than a Type I or IA storm. Subpart B illustrates that all of Minnesota is within the Type II rainfall distribution area.

A. SCS 24-hour rainfall distributions (SCS, 1986):



B. Approximate geographic boundaries for SCS rainfall distributions (SCS, 1986):



Underdrain: Typically perforated plastic pipes installed on the bottom of a filtration or infiltration BMP, or sand filter. The under drain is used to collect and remove treated storm water that exceeds the water holding and/or infiltration capacity of the soil.

Upland: General term to describe any area that is not a wetland.

Vegetated Filter Strip: A vegetated section of land designed to accept runoff as overland sheet flow from upstream development. It may adopt any natural vegetated form, from grassy meadow to small

forest. The dense vegetative cover facilitates pollutant removal. A filter strip cannot treat high velocity flows; therefore, they have generally been recommended for use in agriculture and low-density development. A filter strip can also be an enhanced natural buffer, whereby the removal capability of the natural buffer is improved through engineering and maintenance activities such as land grading or the installation of a level spreader. A filter strip differs from a grassed swale in that a swale is a concave vegetated conveyance system, whereas a filter strip has a fairly level surface.

Watershed: A topographically defined area within which all runoff water drains to a point.

Watershed-to-Lake Ratio: The relative surface area of the contributing watershed to the surface area of the lake or water body. In terms of water quality, generally the smaller the watershed-to-lake ratio, the better the quality of the lake. For example a lake with a ratio of 2 to 1 means that the watershed is twice the size of the surface water itself (i.e., 100 acres contributing to a 50 acre lake).

Wetland: Transitional land between terrestrial and aquatic systems where the water table is at or near the surface or the land is covered by shallow water. For purposes of the plan, wetlands must have a predominance of hydric soil, be inundated or saturated to the surface or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soils; and under normal circumstances supports a prevalence of hydrophytic vegetation.

Wetland Conservation Act (WCA): In 1991 Minnesota adopted the initial Wetland Conservation Act (Minnesota Laws Chapter 354) to protect the states wetland resources. This act has been amended and updated periodically, but is used by reference to the current program, and any future amendments.

Wetland Delineation: The process and procedure by which an area is adjudged a wetland or non-wetland including a determination of the wetland boundary based on the point where the non-wetland areas shift to wetlands or aquatic habitats.

Wetland Mitigation: Wetlands created to replace wetland areas destroyed or impacted by land disturbances.

Wet Pond: A conventional wet pond has a permanent pool of water for treating incoming storm water runoff and a live storage component for flood storage and additional water quality treatment detention (see typical cross section in Appendix D).

Appendix B

Development Standards

APPENDIX B DEVELOPMENT STANDARDS

These development standards are intended to be used by developers and/or project proposers in design and layout of their site plans and storm water management features. These standards do not replace or supersede City ordinances, watershed district regulations, state and federal rules or permits required for the project.

All plans shall be submitted to the City Engineer for review and all applicable permits must be obtained prior to commencing construction. For all newly constructed storm water facilities (ponds, retention areas, infiltration basins, storm sewer, etc.) or existing facilities that are modified, as-built plans shall be prepared by the developer. As-built plans shall be signed and certified by a licensed professional engineer in the State of Minnesota and record drawings shall be provided to the City.

A maintenance agreement may also be required by the City and/or watershed district to establish the long-term responsibilities for monitoring and maintaining the practices installed. An example agreement for ponds is provided at the end of this appendix. The agreement may be modified to address a wide range of BMPs (infiltration systems, retention areas, grit chambers, etc.) with the addition of maintenance activities and schedules specific to the selected BMP. Recommended maintenance activities may be found at number of sources including the Stormwater Manager's Research Center website <http://www.stormwatercenter.net>.

DESIGN STANDARDS

I. General Criteria

- A. Any grading, filling development or redevelopment activity that disturbs 10,000 sq. ft. or more of land or that creates 10,000 sq. ft. or more of new impervious surface shall meet the design standards of this Plan.
- B. Redevelopment Projects in the Vadnais Lake Area Watershed Management Organization that create more than 10,000 sq. ft. of new impervious, but that remove and replace or modify more than 10,000 sq. ft. of existing impervious surface, must incorporate water quality improvements into the project plans to the extent practical.
- C. Any work within a wetland, surface water or FEMA designated floodplain shall obtain permits from the City, watershed district, DNR and Corps of Engineers, if applicable to the specific project, prior to commencing and construction, grading, clearing or filling activity.
- D. The City uses the most current NPDES permit, Minnesota Stormwater Manual and National Weather Service's Atlas 14 data as our design standards.

II. Water Quality Treatment and Volume Control Requirements

- A. For projects in the Ramsey-Washington-Metro Watershed District:
 - 1. Infiltration or filtration BMPs sufficient to satisfy the requirements of the District's Volume Control Worksheet shall be provided. The worksheet requires volume reduction practices on-site that runoff rainfall over the impervious areas of the project.
 - 2. For projects that meet the volume control requirements of the RWMWD, the water quality treatment requirements in Item C below are considered to be achieved.

- B. For projects in the Vadnais Lake Area Watershed Management Organization that create 10,000 sq. ft. or more of impervious area.
 - 1. And that are located on hydrologic group A and/or B soils, the project must incorporate volume control practices into the design that infiltrate at least 1.1 inch of runoff from the new impervious surfaces.
 - 2. And that are located on hydrologic group C and/or D soils, the project shall incorporate low-impact development BMPs to minimize impacts.
 - 3. As an alternative to the standards in 1 and 2, the developer may submit a request for volume control credits for review and approval. The credit request shall provide calculations and documentation that the credits area consistent with the process presented in Section 4 of the VLAWMO Plan. Credit categories include:
 - a) Rooftop disconnect;
 - b) Non-rooftop disconnect;
 - c) Buffers;
 - d) Grass channels;
 - e) Soil amendments;
 - f) Forest/Prairie restoration;
 - g) Natural area restoration;
 - h) Green rooftop; and
 - i) Permeable paver/pavements.

- C. For projects or portions of projects not subject to item A or B, water quality treatment shall be provided that achieve 90% removal of TSS and 60% removal of TP on an annual basis using a standard NURP particle size distribution in the analysis. A permanent pool dead storage volume of at least the runoff from a 2.5 rainfall over the area tributary to the pond shall be provided. The runoff volume shall be determined by evaluating separate subcatchment areas for the pervious and impervious surfaces under assumed fully developed watershed conditions.

III. Rate Control Requirements

- A. No increase in peak discharge may result from a proposed project for the 2-year, 10-year and 100-year storm events. Variances *may* be allowed if computations

can be provided which demonstrate no adverse downstream effects will result from the proposed system. If the methodology is inconsistent with City standards, and the results are significantly different from the City's, then the City results shall control. Cumulative storm depths for the required events are:

1. 2-Year = 2.8 inches
2. 10-Year = 4.2 inches
3. 100-Year = 7.3 inches

IV. Floodplain Management and Storage

- A. Flood storage volume must be maintained such that any loss of storage in a FEMA- designated floodplain has no significant net downstream effect.

Category	Wetland Management Classification*			
	High Priority Protection	Moderate Management	Light Management	Utilize Basins
Storm Bounce	Existing	Existing plus 0.5 feet	Existing plus 1.0 feet	Existing plus 2.0 feet
Discharge Rate	Existing	Existing	Existing or Less	Existing or Less
Inundation Period for 1 or 2-year Precipitation Event	Existing	Existing plus 1 day	Existing plus 2 days	Existing plus 7 days
Inundation Period for 10-year Precipitation Event	Existing	Existing plus 7 days	Existing plus 14 days	Existing plus 21 days
Run-out Control Elevation	No change	No change	0 to 1.0 feet above existing run out	0 to 4.0 feet above existing run out
Run-out Control Elevation (landlocked)	Above delineated wetland, and in conformance with Strategy 1.D; Landlocked Basin Standards	Above delineated wetland, and in conformance with Strategy 1.D; Landlocked Basin Standards	Above delineated wetland, and in conformance with Strategy 1.D; Landlocked Basin Standards	Above delineated wetland, and in conformance with Strategy 1.D; Landlocked Basin Standards

*As shown on Figure 2-4 (Adapted from the State of Minnesota's Storm Water Advisory

Group's Storm Water and Wetlands Planning and Evaluation Guidelines for Addressing Potential Impact of Urban Storm Water and Snow-Melt Runoff on Wetland, June 1997)

B. Buffer Requirements.

1. Ramsey-Washington Metro Watershed District:

Wetland Class	Average Buffer Width (feet)	Minimum Buffer Width (feet)
<i>A</i>	75	37.5
<i>B</i>	50	25
<i>C</i>	25	12.5

2. Vadnais Lake Area Water Management Organization (VLAWMO):

Management Class	Base Buffer Width, feet	Minimum Applied Buffer Width, feet
<i>Manage 3/storm ponds</i>	20	16
<i>Manage 2</i>	30	24
<i>Manage 1</i>	40	34
<i>Preserve</i>	75	67

VIII. Storm Water Facility Design Criteria

- A. All hydrologic data and computations shall be based on NRCS (formerly SCS) methodology. Computer modeling may be completed using HydroCAD, TR20/TR55, SWMM or comparable City- approved modeling software.
- B. An emergency overflow spillway shall be identified and designed to convey storm flows from events greater than the 100-year event.

Appendix C

City Ordinances

STORM WATER MANAGEMENT
Chapter 66

66. Storm Water Management

66.010 Generally.

- (1) The purpose of this chapter is to set forth minimum requirements for storm water management to diminish threats to public health, safety, public and private property and natural resources of the City of Vadnais Heights (City) by establishing standards that will:
 - (a) Protect life and property from dangers associated with flooding;
 - (b) Protect public and private property from damage resulting from runoff or erosion;
 - (c) Ensure site design minimizes the generation of storm water and maximizes pervious areas for storm water treatment;
 - (d) Promote regional storm water management by watershed;
 - (e) Protect, maintain and/or restore water quality from nutrients, pathogens, toxics and debris;
 - (f) Promote infiltration and groundwater recharge;
 - (g) Storm water management must comply with requirements of the Minnesota Pollution Control Agency (MPCA) General Permit for Construction Activities and City or watershed guidelines for total maximum daily waste load allocations.
 - (h) Meet requirements set forth by the Vadnais Lakes Area Watershed Management Organization (VLAWMO) or Ramsey-Washington Metro Watershed District (RWMWD) depending on the appropriate boundaries.
- (2) No person shall develop any land for residential, commercial, industrial, or institutional uses without having provided the storm water management measures set forth herein to control or manage runoff from such development. All water entering the storm drain system generated on any developed or undeveloped lands, unless explicitly exempted by the city, shall be protected from illegal disposal/discharge and illegal connections.
- (3) Appropriation of water from public water basins within the City shall be below the Minnesota Department of Natural Resources threshold of 10,000 gallons per day and 1 million gallons per year.

66.020 Definitions. Unless specifically defined below, the words or phrases used in this chapter shall have the same meaning as they have in common usage. When not inconsistent with the context, words used in the present tense include the future tense, words in the plural number include the singular number, and words in the singular number include the plural number. The words "shall" and "must" are always mandatory and not merely directive.

- (1) Applicant. Any person that applies for a building permit, subdivision approval, or a permit to allow land-disturbing activities. Applicant also means that person's agents, employees, and others acting under this person's direction.
- (2) Best Management Practices (BMP's). Erosion and sediment control and water quality management practices that are the most effective and practicable means of controlling, preventing, and minimizing the degradation of surface water, including construction-phasing, minimizing the length of time soil areas are exposed, prohibitions, and other management practices published by State, watershed, or designated area-wide planning agencies.

- (3) Buffer. A protective vegetated zone located adjacent to a natural resource, such as a water of the state, that is subject to direct or indirect human alteration. Such a buffer strip is an integral part of protecting an aquatic ecosystem through filtering, pollutants and providing adjacent habitat. The width of a buffer strip is the width along each bank of a stream. Therefore, a 30-foot wide stream with 100-foot buffer strips has a total width of 230 feet. Acceptable buffer vegetation includes preserving existing predevelopment vegetation and/or planting locally distributed native Minnesota trees, shrubs and grassy vegetation. Alteration of buffers is strictly limited. Buffer areas should be designated with permanent markers.
- (4) Developer. A person, firm, corporation, sole proprietorship, partnership, state agency, or political subdivision thereof engaged in a land disturbance activity.
- (5) Discharge. The release, conveyance, channeling, runoff, or drainage of storm water, including snowmelt, from a construction site.
- (6) Energy Dissipation. The methods employed at pipe outlets to prevent erosion. Examples include, but are not limited to; aprons, riprap, splash pads and gabions that are designed to prevent erosion.
- (7) Erosion. Any process that wears away the surface of the land by the action of water, wind, ice, or gravity.
- (8) Erosion Control. Refers to methods employed to prevent erosion. Examples include, but are not limited to, soil stabilization practices, horizontal slope grading, temporary or permanent cover, and construction phasing.
- (9) Erosion and Sediment Practice Specifications or Practice. The management procedures, techniques, and methods to control soil erosion and sedimentation as officially adopted by the state, county, city or local watershed group, whichever is most stringent.
- (10) Exposed Soil Areas. All areas of the construction site where the vegetation (trees, shrubs, brush, grasses, etc.) or impervious surface has been removed, thus rendering the soil more prone to erosion. This includes topsoil stockpile areas; borrow areas and disposal areas within the construction site. It does not include stockpiles or surcharge areas of gravel, concrete or bituminous. Once soil is exposed it is considered "exposed soil," until it meets the definition of "final stabilization."
- (11) Filter Strips. A vegetated section of land designed to treat runoff as overland sheet flow. They may be designed in any natural vegetated form from a grassy meadow to a small forest. Their dense vegetated cover facilitates pollutant removal and infiltration.
- (12) Final Stabilization. That all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 75 percent of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures have been employed. Simply sowing grass seed is not considered final stabilization.
- (13) Hydric Soils. Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper strata.
- (14) Hydrophytic Vegetation. Macrophytic (large enough to be observed by the naked eye) plant life growing in water, soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.
- (15) Illicit Discharges. Any discharge to a municipal separate storm sewer that is not composed entirely of storm water.
- (16) Impervious Surface. A constructed hard surface that either prevents or retards the entry of water into the soil, and causes water to run off the surface in greater quantities and at an increased rate of flow than existed prior to development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, or gravel roads.

- (17) Land Disturbance Activity. Any land change that may result in soil erosion from water or wind and the movement of sediments into or upon waters or lands within the City's boundaries or jurisdiction, including clearing and grubbing, grading, excavating, transporting and filling of land. Within the context of this rule, land disturbance activity does not mean:
- (a) Individual home gardens, minor landscaping, repairs, and maintenance work.
 - (b) Construction, installation, and maintenance of fences, signs, posts, poles, and electric, telephone, cable television, utility lines or individual service connections to these utilities, which result in creating under 5,000 square feet of exposed soil.
 - (c) Tilling, planting, or harvesting of agricultural, horticultural, or silvicultural (forestry) crops.
 - (d) Emergency work to protect life, limb, or property and emergency repairs, unless the land disturbing activity would have otherwise required an approved erosion and sediment control plans, but for the emergency. If such a plan would have been required, then the disturbed land area shall be shaped and stabilized in accordance with the city's requirements immediately after the emergency has been addressed.
- (18) National Pollutant Discharge Elimination System (NPDES). Permit program as authorized by the Clean Water Act.
- (19) Native Vegetation. The presettlement group of plant species native to the local region, that were not introduced as a result of European settlement or subsequent human introduction.
- (20) Ordinary High Water Mark. The boundary elevation where the vegetation changes from predominately aquatic to terrestrial. This elevation delineates 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. Water often reaches this elevation in spring. For rivers and streams the ordinary high water mark is usually the top of the bank. It is less well defined for lakes and wetlands. Minnesota Statute 103G.005, subdivision 14 provides that, "'Ordinary high water level" means the boundary of waterbasins, watercourses, public waters, and public waters wetlands, and:
- (a) The ordinary high water level is an elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial;
 - (b) For watercourses, the ordinary high water level is the elevation of the top of the bank of the channel; and
 - (c) For reservoirs and flowages, the ordinary high water level is the operating elevation of the normal summer pool."
- The term "ordinary high water mark" is further defined in Minnesota Rule 6120.2500, subpart 11. The Minnesota Department of Natural Resources' area hydrologist determines ordinary high water marks.
- (21) Paved Surface. A constructed hard, smooth surface made of asphalt, concrete or other pavement material. Examples include, but are not limited to, roads, sidewalks, driveways and parking lots.
- (22) Permanent Cover. "Final stabilization." Examples include grass, gravel, asphalt, and concrete.
- (23) Person. An individual, corporation, association, organization, entity, or other responsible party.
- (24) Receiving Waters. The water where the discharge is released.

- (25) Sanitary Waste Facility. All property, real or personal, including negative and positive easements and water and air rights, which is or may be needed or useful for the processing or disposal of waste, except property for the collection of the waste and property used primarily for the manufacture of scrap metal or paper. Waste facilities include, but is not limited to, transfer stations, processing facilities and disposal sites and facilities.
- (26) Sediment. The by-product of an erosion process; solid material both mineral and organic, that is in suspension, is being transported, or has been moved by water, wind, or ice, and has come to rest on the earth's surface either above or below water level.
- (27) Sedimentation. The process or action of depositing sediment.
- (28) Sediment Control. The methods employed to prevent sediment from leaving a disturbed site. Sediment control practices may include silt fences, sediment traps, earth dikes, drainage swales, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, and temporary or permanent sedimentation basins.
- (29) Soil. The unconsolidated mineral and organic material on the immediate surface of the earth. For the purposes of this Code, stockpile of gravel, aggregate, concrete or bituminous materials are not considered "soil" stockpiles.
- (30) Stabilized. The exposed ground surface after sod, erosion control blanket, riprap, or other material that prevents erosion has covered it.
- (31) Storm Water. Under Minnesota Rule 7077.0105, subpart 4(1)(b) storm water, "means precipitation runoff, storm water runoff, snow melt runoff, and any other surface runoff and drainage." Storm water does not include construction site dewatering.
- (32) Storm Water Pollution Control Plan (SWPCP). A joint storm water and erosion and sediment control plan that is a document containing the requirements of Section 4 of the NPDES permit, that when implemented will decrease soil erosion on a parcel of land and off-site nonpoint pollution. It involves both temporary and permanent controls.
- (33) Structure. Anything manufactured, constructed or erected, which is normally attached to or positioned on land, including portable structures, earthen structures, roads, parking lots, and paved storage areas.
- (34) Subdivision. The division of a parcel of land into two or more lots or parcels, any of which resultant parcel is less than five acres in area, for the purpose of transfer of ownership or building development, including the location and dedication of necessary streets to serve such lots.
- (35) Temporary Protection. Short-term methods employed to prevent erosion. Examples of such protection include, but are not limited to, straw, mulch, erosion control blankets, wood chips, and erosion netting.
- (36) Vegetated or Grassy Swales. A vegetated earthen channel that conveys storm water, while treating the storm water by biofiltration. Such swales remove pollutants by both filtration and infiltration.
- (37) Waters of the State. As defined in Minnesota Statutes § 115.01, subdivision 22 the term "waters of the state" means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof."
- (38) Wet Detention/Retention Facility. A permanent manmade structure, containing a permanent pool of water, used for the temporary storage of runoff.
- (39) Wetlands. Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by water as determined by Minnesota Rules 8420. Constructed wetlands designed for wastewater treatment are not waters of the state. Wetlands must have the following attributes:

- (a) A predominance of hydric soils;
- (b) Inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil condition; and
- (c) Under normal circumstances, support a prevalence of such vegetation.

66.030 Storm Water and Urban Runoff Control.

(1) Illegal Disposal/Dumping.

- (a) No person shall throw, deposit, place, leave, maintain, or keep any substance upon any street, alley, sidewalk, storm drain, inlet, catch basin conduit or drainage structure, business place, or upon any public or private plot of land, so that the substance might be or become a pollutant, except in containers, recycling bags, or other lawfully established waste disposal facility.
- (b) No person shall intentionally dispose of grass, leaves, dirt, or landscape material into a water resource, buffer, street, road, alley, catch basin, culvert, curb, gutter, inlet, ditch, natural watercourse, flood control channel, canal, storm drain or any fabricated natural conveyance.

(2) Illicit Discharges and Connections.

- (a) No person shall cause any illicit discharge to enter the storm sewer system or any surface water unless such discharge:
 - (1) Consists of non-storm water that is authorized by an NPDES point source permit obtained from the MPCA; or
 - (2) Is associated with fire fighting activities or other activities necessary to protect public health and safety; or
 - (3) Is one of the following exempt discharges: water line flushing or other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, groundwater infiltration to storm drains, uncontaminated pumped groundwater, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, non-commercial washing of vehicles, natural riparian habitat or wetland flows, dechlorinated swimming pools and any other water source not containing pollutant.
- (b) Dye testing is an allowable discharge, but requires a verbal notification to the city prior to the time of the test.
- (c) No person shall use any illicit connection to convey non-storm water to the city's storm sewer system.
- (d) The construction, use, maintenance or continued existence of illicit connections to the storm sewer system is prohibited. This prohibition expressly includes, without limitation; illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.
- (e) A person is considered to be in violation of this chapter if the person connects a line conveying sewage to the storm sewer system, or allows such a connection to continue.

(3) Maintenance Requirements. Any owner or occupant of property within the city shall comply with the following maintenance requirements:

- (a) No person shall leave, deposit, discharge, dump, or otherwise expose any foreign object, chemical or septic waste in an area where discharge to streets or storm sewer system may occur. This section shall apply to both actual and potential discharges.

- (1) Septic systems must be maintained to prevent failure.
 - (2) No part of any individual septic system requiring on-land or in ground disposal of waste shall be located closer than 150 feet from the ordinary high water level in the case of DNR protected waters, or 25 feet from the wetland boundary in the case of all other water bodies, unless it is proven by the applicant that no effluent will immediately or gradually reach the water bodies because of existing physical characteristics of the site or the system.
 - (3) Recreational vehicle sewage shall be disposed of at a proper sanitary waste facility. Waste should not be discharged in an area where drainage to streets or storm sewer systems may occur.
 - (4) For recreational pools, water shall be allowed to sit seven days without the addition of chlorine to allow for chlorine to evaporate before discharge.
- (b) Runoff of water from residential property shall be minimized to the maximum extent practicable. Runoff of water from the washing down of paved areas in commercial or industrial property is prohibited unless necessary for health or safety purposes and not in violation of any other provisions in city codes.
 - (c) Mobile washing companies (carpet cleaning, mobile vehicle washing, etc.) shall dispose of wastewater to the sanitary sewer. Wastewater shall not be discharged where drainage to streets or storm sewer systems may occur.
 - (d) Storage of materials, machinery, and equipment shall meet the following requirements:
 - (1) Objects, such as motor vehicle parts, containing grease, oil or other hazardous substances, and unsealed receptacles containing hazardous materials, shall not be stored in areas susceptible to runoff.
 - (2) Any machinery or equipment that is to be repaired or maintained in areas susceptible to runoff shall be placed in a confined area to contain leaks, spills, or discharges.
 - (e) Debris and residue shall be removed, as noted below:
 - (1) All motor vehicle parking lots and private streets shall be swept, at a minimum of once a year in the spring to remove debris. Such debris shall be collected and properly disposed.
 - (2) Fuel and chemical residue or other types of potentially harmful material, such as animal waste, garbage or batteries shall be removed as soon as possible and disposed of properly. Hazardous waste must be disposed of at an appropriate disposal site and shall not be placed in a trash container.
- (4) Industrial or Construction Activity Discharges. Any person subject to an industrial or construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the city prior to the allowing of discharges to the storm sewer system. All facilities that have storm water discharges associated with industrial activity, including construction activity, must adhere to the following guidelines:
- (a) The owner or operator of a commercial or industrial establishment shall provide, at their own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the storm sewer system or watercourses through the use of structural and non-structural BMPs.
 - (b) Any person responsible for a property or premise, which is, the source of an illicit discharge, shall be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of

pollutants to the storm sewer system. These BMPs shall be part of a SWPPP as necessary for compliance with requirements of the NPDES permit.

- (5) Construction and Building Site Activity. Construction sites and landscaping projects are especially susceptible to erosion and pollution. For this reason, construction site operators must control waste such as discarded building materials, concrete truck washout, chemicals, petroleum products, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality. The developer shall be held responsible for adherence to these required prevention and control measures:
- (a) A designated area shall be provided on site for concrete truck washout. The area shall be constructed so as to contain washout material and be located at least 50 feet away from any storm drain inlet or receiving water during construction. Upon completion of construction activities, the concrete washout material will be removed and properly disposed of prior to the area being restored.
 - (b) The guidelines below must be followed concerning debris storage and disposal:
 - (1) Daily cleanup of construction site shall be performed to ensure that all litter is contained in an appropriate enclosure or container so as not to accumulate on the ground.
 - (2) Operators must keep solid waste materials in either a container or an enclosed waste collection area.
 - (3) Empty/unused chemical containers must be disposed of in accordance with label instructions and all State and Federal requirements.
 - (4) Potentially hazardous waste must be separated from non-hazardous waste.
 - (5) Recycling of waste materials is encouraged when possible.
 - (6) All construction site wastes must be disposed of at authorized disposal facilities.
 - (c) Rock construction entrances shall be constructed at all city-approved entrances. Construction accesses not approved by the city should be adequately blocked to prevent unwanted traffic.
 - (1) Site access roads shall be graded or otherwise protected with silt fences, diversion channels, or dikes and pipes to prevent sediment from exiting the site via the access roads.
 - (2) Individual lots shall each be required to install and maintain a rock construction entrance throughout building construction until a dust free access has been installed. Silt fence shall be placed and maintained as appropriate. At the completion of turf establishment, all silt fence shall be removed.
 - (d) Sanitary waste facilities shall be provided on site and be located as far from storm sewer inlets and receiving waters as practical on the construction site.
 - (e) Chemicals, paint, petroleum, fertilizer, and pesticides must be stored in a covered enclosure and as far from receiving waters as practical on the construction site.
- (6) Notification of Spills. Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation, has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into the storm sewer system, or water of the state, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the city no later than 24 hours on the next business day.

- (7) Access to Buildings for Inspection, Monitoring and/or Dye Testing.
 - (a) The city shall be permitted to enter and inspect all buildings under this chapter as often as may be necessary to determine compliance with this Code.
 - (b) Facility operators shall allow the city ready access to all parts of the premises for the purposes of inspection, sampling, dye testing, examination and copying of records that relate to the discharge of storm water.
 - (c) The city shall have the right to set up at any building such devices as are necessary to conduct monitoring, sampling and/or dye testing of the facility's storm water discharge.
 - (d) The city has the right to require the discharger to install monitoring equipment as necessary.
 - (e) Unreasonable delays in allowing the city access to a facility is a violation of this chapter.
 - (f) If the city has been refused access to any part of the premises from which storm water is discharged, and is able to demonstrate probable cause to believe that there may be a violation of this section, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this chapter or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the city may seek issuance of a search warrant from any court of competent jurisdiction.
- (8) Suspension of Storm Sewer System Access.
 - (a) Suspension due to illicit discharges in emergency situations. The city may, without prior notice, suspend storm sewer system discharge access to a person or property when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the storm sewer system or waters of the state. If the violator fails to comply with a suspension order issued in an emergency, the city may take such steps as deemed necessary to prevent or minimize damage to the storm sewer system or waters of the state, or to minimize danger to persons.
 - (b) Suspension due to the detection of illicit discharge. Any person discharging to the storm sewer system in violation of this chapter may have their storm sewer system access terminated if such termination would abate or reduce an illicit discharge. A person commits an offense if the person reinstates storm sewer system access to premises terminated pursuant to this section, without the prior approval of the city.

66.040 Post Construction Storm Water Management. The purpose of this section is to comply with the state's goal of obtaining a pollutant loading water quality model that will provide, at minimum, changes in average annual flow volume, total suspended solids, and phosphorus. This modeling will be based on two time periods: from 1988 to the present (2010), and from the present to 2040 or ultimate development, whichever will occur first.

- (1) The applicant shall consider reducing the need for storm water management performance standards by incorporating the use of natural topography and land cover. It shall also:
 - (a) Minimize impact to significant natural features.
 - (b) Review the site for wetlands, wooded areas of significance, rare and endangered species habitat or areas designated by the County Biological Survey, city or watershed district that are deemed to be important and require special protection. These areas should not be developed without all appropriate approvals from the regulating agencies.
 - (c) Minimize impervious surface coverage to the maximum extent practicable.

- (d) In designated shoreland areas, the development shall meet the impervious surface requirements of the shoreland ordinance regardless of conveyance systems.
- (e) Have a proposed design, suggested location and phased implementation of effective, practicable storm water management measures for plans designed, engineered and implemented to achieve the following results:
 - (1) Meet or exceed NPDES permit regulations as outlined by the MPCA General Permit for Construction Activities.
 - (2) Oil and grease control. For all storm water plans for commercial or industrial developments and all other uses where the potential for pollution by oil or grease, or both, exists, the first one-half inch of runoff will be treated using the best oil and grease removal technology available. This requirement may be waived by the city when the applicant can demonstrate that installation of such practices is not necessary.
 - (3) Runoff rate control for all storm water facilities shall be designed, installed and maintained to effectively accomplish that there is no increase to the peak storm water runoff rate from the site, under predevelopment conditions, for anything less than a 24 hour precipitation event with a return frequency of 1, 2, 10 and 100 years. The project must comply with the requirements of the MPCA's General Permit for Construction Activities.
 - (4) Volume control for storm water runoff retention shall be achieved onsite in the amount equivalent to the runoff generated from one-half inch of water over the impervious surfaces of the project or as specified by the appropriate watershed.
- (2) Outlets. Discharges from new construction sites must have a stable outlet capable of carrying designed flow at a non-erosive velocity. Outlet design must consider flow capacity and flow duration for a 2-year event. This requirement applies to both the site outlet and the ultimate outlet to the storm sewer system or waterbody. Measures to trap floatables for energy dissipation must also be constructed.
- (3) Minimize Impervious Surface Area and Maximize Infiltration. Where directed by the city and based on site feasibility, projects shall use existing natural drainage ways and vegetated soil surfaces to convey, store, filter, and retain storm water runoff before discharge into public waters or a storm sewer system. Permanent pool areas of wet ponds tend to lose infiltration capacity and will not be accepted as an infiltration practice. The applicant shall attempt to limit the impervious surface of the developed site or subdivision by incorporating the following design considerations, consistent with zoning, subdivision, and PUD requirements:
 - (a) Natural vegetation preserved wherever practical.
 - (b) Minimizing street widths that meet City standards and project needs.
 - (c) Reducing parking lot space.
 - (d) Sidewalk locations.
 - (e) Reducing setbacks and driveways.
 - (f) Maximizing open space while incorporating smaller lot sizes to conserve natural areas and reduce the amount of storm water runoff generated at the site.
 - (g) Using landscaping and soils to treat and infiltrate storm water runoff.
 - (h) Reduce curb and gutter where practicable, and use vegetated swales or equivalent.
 - (i) Look for vegetated areas that can filter sheet flow, removing sediment and other pollutants, and increasing the time of concentration.

- (j) Disconnect impervious areas by allowing runoff from small impervious areas to be directed to pervious areas where it can be infiltrated or filtered.
- (k) Runoff from downspouts, driveways and other impervious areas shall be directed to pervious surfaces, where feasible, or unless the applicant can demonstrate that the practice is likely to result in groundwater contamination.
- (l) Increase buffers around streams, steep slopes, and wetlands to protect from flood damage and provide additional water quality treatment.
- (m) Use shared parking facilities consistent with zoning requirements.
- (n) Install semi-permeable/permeable or porous paving in areas where appropriate.
- (4) Pond Requirements. For all projects creating more than one acre of impervious surface, ponding shall be required. At a minimum all pond design specifications shall conform to the city's engineering design standards and the current requirements found in the NPDES construction permit.
- (5) Regional Ponding. If the city determines the site is not suitable for on-site ponding, off-site storm water management and associated fees may be established, provided that provisions are made to manage storm water by an off-site facility, and provided that all of the following conditions for the off-site facility are met:
 - (a) The facility is in place or the city has knowledge of future regional ponding on site;
 - (b) The facility is designed and adequately sized to provide a level of storm water control that at least meets the ordinance standards;
 - (c) The city is satisfied that the facility has a legally obligated entity responsible for its long-term operation and maintenance.
 - (d) The appropriate watershed approves the ponding area.
- (6) Accepted Alternative Storm Water Treatments. Alternative storm water treatments, including but not limited to rain gardens and infiltration basins, may be installed and shall be reviewed and approved by the city.
- (7) Maintenance of Private Storm Water Facilities. All private storm water facilities shall be maintained by the owner in proper condition consistent with the performance standards for which they were originally designed.
 - (a) All settled materials from sumps, grit chambers, and other devices, including settled solids, shall be removed and properly disposed of on an annual basis. One- to five-year waivers from this requirement may be granted by the city when the owner presents evidence that the facility has additional capacity to remove settled solids in accordance with the original design capacity.
 - (b) Ponds shall be inspected at least once every five years to determine if settled materials should be removed. Settled materials shall be removed and properly disposed of when the pond is no longer functioning at the original design capacity.
 - (c) When requested by the city, a maintenance plan must be provided that defines who will conduct the maintenance, the type of maintenance and the maintenance intervals of a private storm water facility before the facility is approved.
 - (d) All storm water facilities must be designed to minimize the need for maintenance, to provide easy vehicle and personnel access for maintenance purposes, and be structurally sound. It shall be the responsibility of the applicant to obtain any necessary easements or other property interests to allow access to the facilities for inspection or maintenance.
 - (e) The city shall have the right to request and review inspection and maintenance records and shall have the right to perform an inspection of storm water facilities at any time if the city has probable cause to believe that the facilities are not being properly maintained or inspected.

66.050 Enforcement.

(1) Notice of Violation.

- (a) Upon discovering that a person or property owner has violated a prohibition or failed to meet a requirement of this section, the city engineer, code enforcement officer or designee shall serve a notice upon the owner of the property upon which the nuisance exists. Such notice shall be given by certified mail at the last known address as shown on the property tax records of Ramsey County. Such notice shall advise that a nuisance exists and require the property owner to abate the nuisance within a reasonable time, as established by the city engineer, code enforcement officer or designee and stated in the notice. Such time shall not be less than 14 days. Such notice may require without limitation:
- (1) The performance of monitoring, analyses, and reporting;
 - (2) The elimination of illicit connections or discharges;
 - (3) That violating discharges, practices, or operations shall cease and desist;
 - (4) The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property; and
 - (5) Payment of a fine to cover administrative and remediation costs; and
 - (6) The implementation of source control or treatment BMPs.
- (b) Such notice shall also advise the property owner of the right to request a hearing before the city council or designee to contest the contents of the notice.
- (c) If requested by the person upon whom the notice is served under subsection (1) of this section, a hearing before the city council or designee shall be held at which the person may contest the contents of the notice. The request for such a hearing must be made within five days after receipt of the notice provided for in subsection (1) of this section. After such hearing and as directed by the city council, the city administrator or designee may affirm the notice, modify the notice or quash the notice.
- (d) If the property owner does not abate the nuisance as required by the notice provided for in subsection (1) of this section and has not requested a hearing before the city council or designee under subsection (1)(b) of this section, authorized agents of the city shall abate the nuisance. The cost of such abatement shall be collected as a special assessment against the property upon which the nuisance was located.
- (e) If the property owner requests a hearing before the city council or designee under subsection (1)(b) of this section, no abatement actions shall be taken until the hearing is held. If after the hearing the city council or designee affirms or modifies the notice and the nuisance is not abated as provided in the notice as affirmed or modified, authorized agents of the city shall abate the nuisance. The cost of such abatement shall be collected as a special assessment against the property upon which the nuisance was located.
- (f) Nothing in this section prevents abatement by the city of a public nuisance without notice and hearing in the case of an emergency in which there is an immediate and direct threat to the public health or safety. The expense of such an emergency abatement shall be collected as a special assessment against the property upon which the nuisance was located. The city shall make every available effort to contact the property owner and afford them the opportunity to make emergency repairs immediately.

(Source: Ord. 621, 5-18-2010)

ZONING CODE
Chapter 19

19. Water Management Overlay District

- 19.010 Purpose and Intent. This Chapter is intended to satisfy Minnesota Department of Natural Resources (DNR) requirements for floodplain and shore land ordinances, Minnesota Wetland Conservation Act (WCA) and to protect the City's wetlands and water resources.

In order to maintain the City's eligibility in the National Flood Insurance Program, this Chapter is adopted to comply with the rules and regulations of the National Flood Insurance Program codified as 44 Code of Federal Regulations Parts 59-78 as amended.

- 19.020 Findings of Fact. The City has many lakes and wetlands, providing aesthetic and environmental value. Two major lakes in the City, Sucker Lake and Vadnais Lake, are part of the St. Paul Water Utility water supply system. There are over one hundred wetlands throughout the City. All of the lakes and wetlands within the City are subject to the regulatory jurisdiction of the United States Army Corps of Engineers. Many of the same lakes and wetlands are also protected by the requirements of the DNR and the WCA.

The lakes, wetlands and watercourses within the City provide flood protection for adjacent and downstream properties. Wetlands improve the quality of surface water by capturing pollutant loadings, enhancing ground water recharge and providing diverse wildlife habitat.

- 19.030 Statutory Authorization. Local government units are required to adopt floodplain and shore land management ordinances in Minnesota Statutes 103F.101 to 103F.155, 103F.201 to 103F.221 and Chapter 462.

The Laws of Minnesota for 1991, Chapter 354 established the Wetland Conservation Act with the goal to achieve a net gain in Minnesota wetlands. The Act's regulatory provisions are administered within the metropolitan area by a City Council, Town Board or Watershed Management Organization (WMO) under Minnesota Rules Chapter 8420.

The City SURFACE WATER MANAGEMENT PLAN (SWMP) is a comprehensive planning tool that specifically identifies goals and policies for Water Management. Standards for flood control, erosion and sediment control, water quality enhancement, and the preservation of natural features have been identified. The plan also includes floodplain delineation, necessary freeboard requirements and recommended building elevations. The SWMP is hereby adopted by reference and incorporated in its entirety, including all amendments, into this Chapter.

- 19.040 Warning and Disclaimer of Liability. This Chapter does not imply that areas outside of the Water Management Overlay District or land uses permitted within that District will be free from flooding or flood damages. The Chapter does not create liability on the part of the City or its officers or employees for any flood damage that may result from reliance on this Chapter or any administrative decision made under it.

- 19.050 Interpretation. In their interpretation and application, the provisions of this code shall be held to be minimum requirements and shall be liberally construed in favor of the governing body and shall not be deemed a limitation or appeal of any other powers granted by State Statutes.

- (1) The approximate boundaries of the Water Management Overlay District are indicated on the Official Zoning Map of the city of Vadnais Heights. However, the exact determination of the boundaries will be made by the Water Management Administrator.
- (2) Persons contesting the location of the District boundaries shall be given a reasonable opportunity to present their case to the City Council and to submit technical evidence.
- (3) The Official Zoning Map together with all materials attached thereto is hereby adopted by reference and declared to be part of this Chapter. The attached material shall include the Flood Insurance Study for Ramsey County, Minnesota (All Jurisdictions) and Flood Insurance Rate Map panels therein numbered 27123C0030G, 27123C0035G, 27123C0036G, 27123C0037G, 27123C0041G and 27123C0042G, all dated June 4, 2010 and prepared by the Federal Emergency Management Agency. The Official Zoning Map shall be on file in the Office of the (City Administrator/County Auditor) and the (Zoning Administrator).
- (4) Abrogation and Greater Restrictions: It is not intended by this Chapter to repeal, abrogate, or impair any existing easements, or deeds restrictions. However, where this Chapter imposes greater restrictions, the provisions of this Chapter shall prevail. All other sections of this Code inconsistent with this Chapter are subordinate to the extent of any inconsistency.

19.060 Establishment of Zoning Districts. The Water Management Overlay District is divided into the following subdistricts; the Wetland Protection Area, the Floodplain Area and the Shore Land Area. The Official Zoning Map is hereby adopted by reference and declared to be a part of this Chapter. The Official Zoning Map shall be on file in the office of the City and the Water Management Administrator. The Water Management Administrator shall maintain necessary records to display the Water Management Overlay District.

- (1) Annexation. The Flood Insurance Rate Map panels adopted by reference into Section 19.050(3) above may include floodplain areas that lie outside of the corporate boundaries of the City of Vadnais Heights at the time of adoption of this Chapter. If any of these floodplain land areas are annexed into the City of Vadnais Heights after the date of adoption, the newly annexed floodplain lands shall be subject to the provisions of this Chapter upon the date of annexation into the City of Vadnais Heights.

19.070 Definitions. Terms and phrases used in this Chapter shall have the meanings defined in the City Surface Water Management Plan (SWMP). If not specifically defined within this Chapter or the SWMP, words shall be interpreted so as to give them the same meaning as they have in common usage and so as to give this Chapter its most reasonable application.

- (1) Accessory Use or Structure - a use or structure on the same lot with, and of a nature customarily incidental and subordinate to, the principal use or structure.
- (2) Basement - means any area of a structure, including crawl spaces, having its floor or base subgrade (below ground level) on all four sides, regardless of the depth of excavation below ground level.
- (3) Equal Degree of Encroachment - a method of determining the location of floodway boundaries so that floodplain lands on both sides of a stream are capable of conveying a proportionate share of flood flows.
- (4) Flood Fringe - that portion of the floodplain outside of the floodway.
- (5) Floodplain - the channel or beds proper and the areas adjoining a wetland, lake or watercourse which have been or hereafter may be covered by the regional flood.
- (6) Floodplain Area – defined as lands with a Zone AE or Zone A designation on the Flood Insurance Rate Map adopted in Section 19.050(3).

- (7) Flood Proofing – a combination of structural provisions, changes, or adjustments to properties and structures subject to flooding, primarily for the reduction or elimination of flood damages.
- (8) Floodway – the bed of a wetland or lake and the channel of a watercourse and those portions of the adjoining floodplain which are reasonably required to carry or store the regional flood discharge.
- (9) Historic Structure – A building or dwelling that has been designated by proper authorities as being important or potentially important in history. For the purpose of this Chapter, historic structure shall be as defined in 44 Code of Federal Regulations Part 59.
- (10) Lowest Floor – the lowest floor of the lowest enclosed area (including basement).
- (11) Manufactured Home – a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term “manufactured home” does not include the term “recreational vehicle.”
- (12) Obstruction - any dam, wall, wharf, embankment, levee, dike, pile, abutment, projection, excavation, dredged spoil, channel modification, culvert, building, wire, fence, stockpile, refuse, fill, structure, stockpile of sand or gravel or other material, or matter in, along, across, or projecting into any channel, watercourse, lake bed, or regulatory floodplain which may impede, retard, or change the direction of flow, either in itself or by catching or collecting debris carried by floodwater.
- (13) Principal Use or Structure - means all uses or structures that are not accessory uses or structures.
- (14) Recreational Vehicle – a vehicle used for private enjoyment when one is not working that may or may not be self propelled.
- (15) Regional Flood - a flood which is representative of large floods known to have occurred generally in Minnesota and reasonably characteristics of what can be expected to occur on an average frequency in magnitude of the 100-year recurrence interval. Regional flood is synonymous with the term "base flood" used in the Flood Insurance Rate Map.
- (16) Regulatory Flood Protection Elevation - The RFPE shall be an elevation no lower than one foot above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the floodplain that result from designation of a floodway. The City shall establish minimum building elevations in the floodplain to the nearest one-tenth of a foot. In approximate Zone A areas on the Flood Insurance Rate Map, the City shall use the SWMP.
- (17) Structure - anything constructed or erected on the ground or attached to the ground or on-site utilities, including, but not limited to, buildings, factories, sheds, detached garages, cabins, manufactured homes, travel trailers/vehicles not meeting the exemption criteria specified in Section 19.190 of this Chapter and other similar items.
- (18) Substantial Damage – means damage of any origin sustained by a structure where the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.
- (19) Substantial Improvement - within any consecutive 365-day period, any reconstruction, rehabilitation (including normal maintenance and repair), repair after damage, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the “start of construction” of the improvement. This term includes structures that have incurred “substantial damage,” regardless of the actual repair work performed. The term does not, however, include either:
 - (a) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the

local code enforcement official and which are the minimum necessary to assure safe living conditions.

- (b) Any alteration of an “historic structure,” provided that the alteration will not preclude the structure’s continued designation as an “historic structure.” For the purpose of this Chapter, “historic structure” shall be as defined in 44 Code of Federal Regulations, Part 59.
- (20) The Shore Land Area - shall be defined as all area within a 1000-foot horizontal separation from the ordinary high water mark of a public water. The public waters of the City of Vadnais Heights have been classified consistent with the criteria found in Minnesota Regulations 6120.3300 and the Protected Waters Inventory Map for Ramsey County, Minnesota. The shore land area applies to the water bodies listed below, as shown on the Official Zoning Map.

Natural Environment Lakes	Protected Waters Inventory I.D. #
Sucker Lake	28P
Twin Lake	39P
Recreational Development Lakes	Protected Waters Inventory I.D.#
Vadnais Lake	38P
Willow Lake	40P

- (21) Wetland Protection Area - includes that property with the characteristics of a wetland as defined in Minnesota Statutes, Section 103G.005, subdivisions 18 and 19.

19.080 Modification. The Water Management Overlay District may not be modified unless it can be shown that the original description is in error or that conditions have changed so that the area no longer fits the definitions applied in 19.070.

19.090 Permitted Uses.

- (1) Wetland Protection Area. The following are permitted uses in a Wetland Protection Area to the extent that they are not prohibited by any other section, and that a certification is obtained from the City of Vadnais Heights, acting as the Local Government Unit (LGU) having regulatory control under the Wetland Conservation Act, prior to the commencement of any work.
 - (a) Emergencies. Emergency work may be performed when necessary to preserve life or property. Prior to the commencement of emergency work, a person shall first report the pertinent facts relating to the need for such work to the Water Management Administrator. The Water Management Administrator shall review such pertinent facts and determine whether an emergency exists. Upon finding that an emergency exists, the Water Management Administrator shall, by written memorandum, authorize the commencement of this emergency exception. A person performing emergency work shall, within ten (10) days following the commencement of such work, apply for the issuance of a Special Use Permit. Upon the issuance thereof, the permittee shall be required to perform such work as is determined to be reasonably necessary to correct any impairment to the wetland occasioned by such emergency work.

- (b) Activities necessary to repair and maintain existing public or private drainage systems as long as wetlands that have been in existence for more than 20 years are not drained.
 - (c) Activities in a wetland restored for conservation purposes under a contract or easement providing the landowner with the right to drain the restored wetland.
 - (d) Activities in a wetland created solely as a result of beaver dam construction; blockage of culverts through roadways maintained by a public or private entity; actions by public entities that were taken for a purpose other than creating the wetland; or any combination thereof.
 - (e) Placement, maintenance, repair, enhancement, or replacement of utility or utility-type service, including the transmission, distribution, or furnishing, at wholesale or retail, of natural or manufactured gas, electricity, telephone, or radio service or communications if the impacts of the proposed project on the hydrologic and biological characteristics of the wetland have been avoided and minimized to the extent possible and the proposed project significantly modifies or alters less than one-half acre of wetlands.
 - (f) Activities associated with routine maintenance of utility and pipeline rights-of-way, provided the activities do not result in additional intrusion into the wetland.
 - (g) Alteration of a wetland associated with the operation, maintenance, or repair of an interstate pipeline.
 - (h) Activities associated with routine maintenance of existing public highways, roads, streets, and bridges, provided the activities do not result in the draining or filling, wholly or partially, of a wetland.
 - (i) Emergency repair and normal maintenance and repair of existing public works, provided the activity does not result in additional intrusion of the public works into the wetland and do not result in the draining or filling, wholly or partially, of a wetland.
 - (j) Normal maintenance and minor repair of structures causing no additional intrusion of an existing structure into the wetland, and maintenance and repair of private crossings that do not result in the draining or filling, wholly or partially, of a wetland.
 - (k) Normal agricultural practices to control pests or weeds, defined by rule as either noxious or secondary weeds, in accordance with applicable requirements under state and federal law, including established best management practices.
 - (l) Excavation and filling in accordance with 19.130.
- (2) Floodplain Area. The Floodplain Area is divided into Floodway and Flood Fringe Districts in (a) and (b) below. The permitted uses in both the Floodway and Flood Fringe Districts are listed in (c) below. Additional permitted uses for only the Flood Fringe District are listed in (d) below. The permitted uses listed in (c) and (d) below are only allowable in the Floodplain Area if they are not prohibited by any other chapters or state and federal laws, and the appropriate permits are issued.
- (a) Floodway District: The Floodway District shall include those areas designated as Zone AE and Zone A on the Flood Insurance Rate Map panels adopted in Section 19.050 (3) that are below the ordinary high water level as defined in Minnesota Statutes, Section 103G.005, subdivision 14.
 - (b) Flood Fringe District: The Flood Fringe District shall include those areas designated as Zone AE and Zone A on the Flood Insurance Rate map panels adopted in Section 19.050 (3) that are below the 100-year flood elevation but above the ordinary high water level as defined in Minnesota Statutes, Section 103G.005, subdivision 14.

- (c) The following uses shall be permitted uses in both the Floodway and Flood Fringe Districts.
 - (i) Agriculture, general farming, pasture, grazing, outdoor plant nurseries, horticulture, tree farms, truck farming, forestry, sod farming, and wild crop harvesting.
 - (ii) Boat launching ramps, swimming areas, parks, wildlife and nature preserves, and fishing areas.
 - (iii) Residential lawns, gardens and play areas.
- (d) The following are permitted uses in the Flood Fringe District.
 - (i) Private or public recreational uses such as golf courses, tennis courts, driving ranges, picnic grounds, game farms, fish hatcheries, and single- or multiple-purpose recreational trails.
 - (ii) Related accessory structures to general farming and greenhouses.
 - (iii) Industrial-commercial loading areas and parking areas.
 - (iv) Paved areas that do not directly discharge storm water runoff into a Wetland Protection Area.
 - (v) Levees, dikes or floodwalls.
 - (vi) Additions to, modification of or reconstruction of all legally established nonconformities pursuant to Section 19.140.
 - (vii) Fill or storage of materials or equipment associated with the uses in (i) through (vi) above.
 - (viii) Redevelopment of a parcel to allow new principal structures.
- (3) Shore Land Area. The permitted uses in the Shore Land Management Areas are those uses allowed and regulated by the applicable zoning district underlying the Water Management Overlay District.

19.100 Standards in Wetland Protection Areas. Approval for work within a Wetland Protection Area shall not be issued unless the City finds and determines that the proposed development complies with the following standards:

- (1) Sequencing Procedure. All proposed activities must follow the sequencing procedure, as identified in the Wetland Conservation Act (Minnesota Statutes, Chapter 354 and Minnesota Rules, Chapter 8420 including subsequent amendments) and summarized in paragraphs 1 through 3, if alterations to a Wetland Protection Area are proposed.
 - (a) AVOIDANCE. The applicant must demonstrate that the proposed activity results from the least environmentally damaging practical alternative.
 - (i) Evaluation of such alternatives must consider whether the proposed activity requires or is dependent upon water or wetland proximity. If the proposed activity does not require water or wetland proximity, it is presumed that other practical alternatives are available.
 - (ii) Any practical alternative which does not involve filling is presumed to have less adverse impact upon the aquatic system.
 - (iii) The avoidance determination process cannot consider compensatory wetland replacement.
 - (b) MINIMIZATION. Appropriate and practical steps must be taken to decrease to the least possible amount the adverse wetland impacts through project modifications.
 - (c) WETLAND REPLACEMENT. Appropriate and practical wetland replacement is required for unavoidable adverse impacts which remain after all avoidance and minimization actions have been implemented. Wetland replacement shall be provided in accordance with MR 8429.530 to 8420.630 at a minimum ratio of two acres of replaced wetland area for each acre of wetland impacted. Replacement of impacted wetland area must be performed within the limits of the City or

Watershed Management Organization as defined by Minnesota Statutes 103B.205 Subd. 13. Wetland replacement will include the following actions in descending order of acceptance.

- (i) Restoration of existing previously degraded (filled or drained) wetlands within the same watershed as the proposed project.
 - (ii) Creation of on-site man-made wetlands within the proposed project site or contiguous to the proposed project site where practical.
 - (iii) Replacement banking in accordance with the requirements of the state wetland bank established by the WCA (Minnesota Statutes, Chapter 354 and Minnesota Rules, Chapter 8420, including subsequent amendments).
- (2) Anyone building in the Wetland Protection Area shall provide plans certified by a registered Professional Engineer, Registered Architect, or Registered Land Surveyor demonstrating that the finished fill and building elevations will be accomplished as required in Section 19.110. Construction shall be certified by said professional that work was completed as required by this Chapter.
 - (3) Development shall maximize the incorporation of natural features into the development's site design.
 - (4) Development shall not substantially reduce the natural water retention and discharge capacity of any watercourse or wetland nor increase the rate and/or volume of water runoff discharging from such locations beyond the rates and volumes indicated in the SWMP.
 - (5) The location of natural features and the site's topography shall be considered in the designing and siting of all physical improvements.
 - (6) The soil and subsoil conditions shall be suitable for excavation and site preparation, and the drainage shall be designed to prevent erosion and environmentally deleterious surface runoff of water.
 - (7) Development shall minimize the disturbance of the natural vegetation from an area within a horizontal distance of 15 feet from a Wetland Protection Area, and no structure, paved surface, or grading will be allowed within this area unless a variance has been granted pursuant to City Code. For any new development, plat, lot split, site plan approval, or building permit, a drainage easement shall be dedicated to the City over the entire Wetland Protection Area on the lot.

19.110 Standards in Floodplain Areas. Approval for work within a Floodplain Area shall not be issued unless the City finds and determines that the proposed development complies with the following standards:

- (1) Standards in Floodplain Areas (both Floodway and Flood Fringe):
 - (a) Minimum Lot Area. 16,000 square feet (7,000 square feet of ground surface above the 100-year elevation)
 - (b) No use shall be permitted which will adversely affect the capacity of channels or floodways or any tributary to the main stream, drainage ditch or other watercourse of the drainage system.
 - (c) The use shall not obstruct flood flows or increase flood elevations consistent with Section 19.160.
 - (d) Public Utilities. All public utilities and facilities such as gas, electrical, sewer, and water supply systems to be located in the Floodplain Area shall be flood proofed in accordance with the State Building Code or elevated to above the regulatory flood protection elevation.
 - (e) Public Transportation Facilities. Railroad tracks, roads, and bridges to be located within the Floodplain Area shall comply with the applicable provisions of this Chapter. Elevation to the regulatory flood protection elevation shall be provided

where failure or interruption of these transportation facilities would result in danger to the public health or safety or where such facilities are essential to the orderly functioning of the area. Minor or auxiliary roads or railroads may be constructed at a lower elevation where failure or interruption of transportation services would not endanger the public health or safety.

(2) Standards for Floodway Uses:

- (a) The use shall have a low flood damage potential.
- (b) The use shall not involve a structure, an addition or modification to an existing structure, fill, obstruction, excavation or storage of materials or equipment.

(3) Standards for Flood Fringe Uses:

- (a) Fill, dredge spoil and all other similar materials deposited or stored in the flood fringe shall be protected from erosion by vegetative cover, mulching, riprap or other acceptable method. The Federal Emergency Management Agency (FEMA) has established criteria for removing the special flood hazard area designation for certain structures properly elevated on fill above the 100-year flood elevation - FEMA's requirements may incorporate specific fill compaction and side slope protection standards for multi-structure or multi-lot developments. These standards should be investigated prior to the initiation of site preparation if a change of special flood hazard area designation will be requested.
- (b) Structural works for flood control that will change the course, current or cross section of protected wetlands or public waters shall be subject to the provisions of Minnesota Statute, Chapter 103G.
- (c) The lowest floor (including basement) of any accessory structure, or redevelopment of a parcel permitted or any modification, addition to or repair of a nonconforming structure subject to the elevation on fill provisions of Section 19.140 (1) (b) - (f) shall be constructed on fill no lower than Regulatory Flood Protection Elevation as established in Section 19.070(14) of this Chapter. The fill shall extend at this elevation fifteen (15) feet beyond the perimeter of the structure or addition to the structure in all directions.
- (d) Accessory structures shall not be designed for human habitation and shall be constructed and placed on the building site so as to offer the minimum obstruction to the flow of flood waters.
- (e) Accessory structures shall be elevated on fill or structurally dry flood proofed in accordance with the FP-1 or FP-2 flood proofing classifications in the State Building Code. As an alternative, an accessory structure may be flood proofed to the FP-3 or FP-4 flood proofing classification in the State Building Code provided the accessory structure constitutes a minimal investment, does not exceed 500 square feet in size, and for a detached garage, the detached garage must be used solely for parking of vehicles and limited storage. All flood proofed accessory structures must meet the following additional standards, as appropriate:
 - (i) The structure must be adequately anchored to prevent flotation, collapse or lateral movement of the structure and shall be designed to equalize hydrostatic flood forces on exterior walls; and
 - (ii) Any mechanical and utility equipment in a structure must be elevated to or above the RFPE or properly flood proofed.
 - (iii) To allow for the equalization of hydrostatic pressure, there must be a minimum of two "automatic" openings in the outside walls of the structure having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding. There must be openings on at least two sides of the structure and the bottom of all openings must

be no higher than one foot above the lowest adjacent grade to the structure. Using human intervention to open a garage door prior to flooding will not satisfy this requirement for automatic openings.

- (f) The storage or processing of materials that are, in time of flooding, flammable, explosive, or potentially injurious to human, animal, or plant life is prohibited. Storage of other materials and equipment may be allowed if elevated on fill to the RFPE.
- (g) Basement construction shall not be allowed below the Regulatory Flood Protection Elevation.
- (h) All manufactured homes must be securely anchored to an adequately anchored foundation system that resists flotation, collapse and lateral movement. Methods of anchoring may include, but are not to be limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state or local anchoring requirements for resisting wind forces.
- (i) Structural alterations to the inside dimensions of a nonconforming structure are subject to the provisions of Sections 19.140 (1) (b) and (f) of this Chapter.
- (j) Recreational vehicles are subject to Sections 19.190 – 19.196 of this Chapter.
- (k) Commercial Uses - accessory land uses, such as yards, railroad tracks, and parking lots may be at elevations lower than the regulatory flood protection elevation. However, a permit for such facilities to be used by the employees or the general public shall not be granted in the absence of a flood warning system that provides adequate time for evacuation if the area would be inundated to a depth and velocity such that when multiplying the depth (in feet) times velocity (in feet per second) the product number exceeds four (4) upon occurrence of the regional flood.
- (l) Manufacturing and Industrial Uses - measures shall be taken to minimize interference with normal plant operations especially along streams having protracted flood durations. Certain accessory land uses such as yards and parking lots may be at lower elevations subject to requirements set out in Section 19.110(3)(k) above. In considering permit applications, due consideration shall be given to needs of an industry whose business requires that it be located in floodplain areas.
- (m) All building sites shall have road access no lower than one foot below the 100-year flood elevation. If a variance to this requirement is granted, the City Council shall specify limitations on the period of use or occupancy of the structure for times of flooding and only after determining that adequate flood warning time and local flood emergency response procedures exist.
- (n) On-site Sewage Treatment and Water Supply Systems. Where public utilities are not provided: (i) On-site water supply systems must be designed to minimize or eliminate infiltration of flood waters into the systems; and (ii) New or replacement on-site sewage treatment systems must be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and they shall not be subject to impairment or contamination during times of flooding. Any sewage treatment system designed in accordance with the State's current statewide standards for on-site sewage treatment systems shall be determined to be in compliance with this Section.

19.120 Standards in Shore Land Areas. Approval for work within a Shore Land Area shall not be issued unless the City finds and determines that the proposed development complies with the following standards:

- (1) Lot Area and Width Standards.

(a)	Single Family Homes Unsewered	Riparian Area	Lot Width	Non-Riparian Area	Lot Width
	Natural Environment (Sucker and Willow Lakes)	80,000 sq.ft.	200 ft.	80,000 sq.ft.	200 ft.
	Recreational Development (Vadnais and Twin Lakes)	40,000 sq.ft.	150 ft.	40,000 sq.ft.	150 ft.
(b)	Single Family Homes Sewered Areas	Riparian Area	Lot Width	Non-Riparian Area	Lot Width
	Natural Environment (Sucker and Willow Lakes)	40,000 sq.ft.	125 ft.	20,000 sq.ft.	125 ft.
	Recreational Development (Vadnais and Twin Lakes)	20,000 sq.ft.	75 ft.	15,000 sq.ft.	75 ft.
	(c) Other permitted uses: To be dictated by building area, parking requirements, lot dimensions, and setbacks.				

(2) Structure and On-site Sewage System Setbacks (in feet) from Ordinary High Water Level.

(a)	Lake Classification	Unsewered	Sewered	System
	Natural Environment (Sucker and Willow Lakes)	150	150	150
	Recreational Development (Vadnais and Twin Lakes)	100	75	75
	(b) Other permitted uses: To be dictated by building area, parking requirements, lot dimensions, and setbacks.			

(3) Coverage. Not more than 15% or one acre, whichever is greater, of the lot, parcel, or tract of land shall be covered by structures or impervious surfaces, without providing on-site detention or water quality enhancement.

- (a) All roads and parking areas shall meet the setback requirements established for structures.
- (b) In no instance shall impervious surfaces be placed less than 50 feet from the ordinary high water mark.

- (c) Native species of vegetation shall be used to screen parking areas when viewed from the water.
- (d) The removal of natural vegetation shall be restricted to prevent erosion into protected waters, to assimilate nutrients in the soil, and to preserve shore land aesthetics. Removal of natural vegetation, grading and filling in the Shore Land Area, except for uses permitted in the underlying Zoning District and developed as approved by the City, shall be subject to the following provisions:
 - (i) Clear cutting of natural vegetation is prohibited.
 - (ii) Selective removal of natural vegetation along waterfront properties may be allowed, provided that sufficient vegetation cover remains to screen cars, dwellings and other structures when viewed from the water.
 - (iii) Native species of vegetation shall be restored during and after all construction projects to retard surface runoff and soil erosion.
 - (iv) Any grading, filling or excavation in the Shore Land Area which will change or diminish the course, current or cross-section of protected waters or wetlands, shall be approved by the Commissioner of the Minnesota Department of Natural Resources.
- (e) All structures in residential districts, except churches and nonresidential agricultural structures shall not exceed 28 feet in height.

19.130 Excavation and Filling.

- (1) Excavation and/or filling, obstructions and any structures in the floodplain may be allowed only when appropriate State and Federal permits have been obtained and when local review requirements have been fulfilled.
- (2) The maximum extent of excavation and/or filling which may be permitted in the Water Management Overlay District shall be determined by specific permitted uses and standards for each area, and flood storage needs and water quality improvement requirements of the City.
- (3) Only fill substantially free of chemical pollutants and organic wastes, as determined by the Water Management Administrator, may be used.
- (4) Excavation may be allowed only when it will not result in the permanent draining of the wetland, and must be accomplished in the following manner;
 - (a) Excavation for pretreatment of storm water runoff shall be limited to the minimum area necessary for removal of nutrients and associated sediment.
 - (b) Excavation activities or related storm water discharges shall not significantly change or diminish the course, current, cross-section, water volume or habitat characteristics of protected waters or wetlands.
 - (c) The size of the excavated area shall be limited to the absolute minimum, unless the work is part of an approved mitigation plan.
 - (d) Excavated material shall be disposed of in areas lying outside of a Wetland Protection Area and shall not result in a significant change in current flow, or in substantial destruction of vegetation, fish spawning areas, or water pollution.
 - (e) Work in the wetland will not be performed during the breeding season of waterfowl or fish spawning season.

19.140 Nonconforming Uses.

- (1) A structure or the use of a structure or premises which was lawful before the passage or amendment of this Chapter but which is not in conformity with the provisions of this Chapter may be continued subject to the following conditions:
 - (a) No such use shall be expanded, changed, enlarged, or altered in a way which increases its nonconformity.

- (b) Any alteration to a nonconforming structure or nonconforming use which would result in increasing the flood damage potential of that flood structure or use shall be protected to the Regulatory Flood Protection Elevation (100-year elevation) in accordance with any of the flood proofing techniques (i.e., FP-1 through FP-4 flood proofing classifications) allowable in the State Building Code, except as further restricted in (c) and (f) below. A structural addition to the outside dimensions of a nonconforming structure must be elevated on fill in accordance with Section 19.110 (3) (c) of this Chapter.
 - (c) The cost of all structural alterations or additions to any nonconforming structure over the life of the structure shall not exceed 50 percent of the market value of the structure unless the conditions of this Chapter are satisfied. The cost of all structural alterations and additions must include all costs such as construction materials and a reasonable cost placed on all manpower or labor. If the cost of all previous and proposed alterations and additions exceeds 50 percent of the market value of the structure, then the structure must meet the elevation on fill requirements included in Section 19.110 (3) (c) of this Chapter.
 - (d) If any nonconforming use is discontinued for 12 consecutive months, any future use of the building premises shall conform to the elevation on fill requirements of Section 19.110 (3) (c) of this Chapter. The assessor shall notify the Water Management Administrator in writing of instances of nonconforming uses which have been discontinued for a period of 12 months.
 - (e) If any nonconforming use or structure is substantially damaged, as defined in 19.070 (16) of this Chapter, it shall not be reconstructed except in conformity with the elevation on fill requirements of Section 19.110 (3) (c) of this Chapter.
 - (f) If a substantial improvement occurs, as defined in Section 19.070 (19) of this Chapter, from any combination of a building addition to the outside dimensions of the existing building or a rehabilitation, reconstruction, alteration, or other improvement to the inside dimensions of an existing nonconforming building, then the building addition and the existing nonconforming building must meet the elevation on fill requirements of Section 19.110 (3) (c) of this Chapter.
 - (g) Historical structures, as defined in 19.070(9) of this Chapter, shall be subject to the provisions of Sections 19.140 (1) (a) – (f) of this Chapter.
- (2) Substandard Lots. Lots of record in the Office of the County Recorder prior to the date of enactment of this Chapter which do not meet the requirements of Section 19.100, may be allowed as building sites provided:
- (a) such use is permitted in the Zoning District,
 - (b) the lot is in separate ownership from abutting lands, and
 - (c) all other dimensional requirements are complied with insofar as practical.
- (3) Exceptions to Structure Setback Requirements.
- (a) Setback requirements from the ordinary high water mark shall not apply to boathouses, piers and docks. Boathouses may be allowed provided they are not used for habitation and do not contain sanitary facilities.
 - (b) In those cases where there are existing adjacent structures which have a setback of less than 50 feet, the setback for new structures shall be equal to the average of the setbacks for the existing adjacent structures. In those cases where there is only one existing adjacent structure which has a setback of less than fifty (50) feet, the setback for the new structure shall be equal to the average of the setback of the existing adjacent structure and the required 50-foot lakeside setback.
 - (c) Accessory structures may be located in the front yard of lakeshore properties upon approval of a riparian lot variance.

- (4) Special Use Permit. A special use permit will be considered for specific property which has been platted or assessed for public improvements. Granting of the special use permit shall be subject to obtaining all applicable federal, State and local permits. For DNR purposes, a special use permit is synonymous with conditional use permit.

19.150 Administration.

- (1) Water Management Administrator. The City Engineer shall act as the Water Management Administrator. The Administrator shall review all development proposals to determine whether the proposed use lies within a Floodplain Area, Shore Land Area or Wetland Protection Area. No development shall be permitted unless it complies with all provisions of the Chapter.
- (2) Interpretation of Area Boundaries. Where interpretation is needed as to the exact location of the boundaries of the Floodplain Area, Shore Land Area or Wetland Protection Area as shown on the Official Zoning Map, the Water Management Administrator shall make the necessary interpretation. The interpretation shall be based on the 100-year flood profile information adopted in Section 19.050(3), the ground elevations that existed on the site at the time the Council adopted its initial floodplain ordinance or on the date of the first National Flood Insurance Program map showing the area in the floodplain if earlier, or as contained in the SWMP, as appropriate, field investigations to determine elevations, vegetation and soil types, contour maps and state and federal wetland maps. The Water Management Administrator shall utilize persons with the appropriate expertise in making such field determinations.
- (3) Records, Maps, and Data. The Water Management Administrator shall assemble and maintain such necessary records, maps, and data deemed appropriate to determine Floodplain, Shore Land and Wetland Protection Areas. These maps shall include the SWMP maps, National Wetland Inventory Maps, Flood Insurance Rate Maps and Soil Survey Manual.
- (4) Permit Required. A permit issued by the Water Management Administrator or other designated city officials shall be secured prior to the construction, addition, modification, rehabilitation (including normal maintenance and repair), or alteration of any building or structure; prior to the use or change of use of a building, structure, or land; prior to the construction of a dam, fence, or on-site septic system, prior to the change or extension of a nonconforming use; prior to the repair of a structure that has been damaged, fire, tornado, or any other source; and prior to excavation or the placement of an obstruction within the floodplain.
- (5) Notifications for Watercourse Alterations. The Zoning Administrator shall notify, in riverine situations, adjacent communities and the Commissioner of the Department of Natural Resources prior to the community authorizing any alteration or relocation of a watercourse. If the applicant has applied for a permit to work in the beds of public waters pursuant to Minnesota Statute, Chapter 103G, this shall suffice as adequate notice to the Commissioner of Natural Resources. A copy of said notification shall also be submitted to the Chicago Regional Office of the Federal Emergency Management Agency (FEMA).
- (6) Notification to FEMA When Physical Changes Increase or Decrease the 100-year Flood Elevation. As soon as is practicable, but not later than six (6) months after the date such supporting information becomes available, the Zoning Administrator shall notify the Chicago Regional Office of FEMA of the changes by submitting a copy of said technical or scientific data.

19.160 Review. Applications for work within the Water Management Overlay District shall be reviewed and processed in the following manner.

- (1) Once the application is approved by all governmental agencies having such authority, the Water Management Administrator shall forward the copies of the application to appropriate staff for review and comment.
- (2) The application, together with City staff and agency reviews shall be forwarded to the Planning Commission for its review recommendations.
- (3) An application fee in an amount established by the City shall be filed with the Water Management Administrator.
- (4) Upon receipt of an application for development within the Water Management Overlay District, the applicant shall be required to furnish the following information:
 - (a) plan (surface view) showing two-foot contours of the ground;
 - (b) pertinent structures, fill or storage elevations;
 - (c) size, location, elevation, and spatial arrangement of all proposed and existing structures on the site;
 - (d) location and elevations of streets;
 - (e) photographs showing existing land uses and vegetation upstream and downstream;
 - (f) soil type data;
 - (g) water table information;
 - (h) erosion control elements;
 - (i) delineation of Floodplain, Shore Land and/or Wetland Protection Areas;
 - (j) in place utilities;
 - (k) hydrologic analysis consistent with the SWMP;
 - (l) water quality enhancement feature design.
- (5) If a proposed activity is either partially or wholly within a floodplain area, and based upon the review of a development plan, the following determinations shall be made.
 - (a) Peak discharge of the regional flood (100-year frequency event).
 - (b) Water surface elevation and/or profile of the regional flood based upon a hydraulic analysis for the Floodplain Area if this information is not already available in the Flood Insurance Study for Ramsey County, Minnesota as adopted by reference in Section 19.050 (3) of this Chapter.
 - (c) Area of Floodplain necessary to store or convey the regional flood without increasing flood stages.
 - (d) Rate of storm water runoff, before and after the development or construction of the proposed usage, to display that the rate of such runoff is not greater than the rates of the SWMP.
 - (e) Design or plan of catch basins, pumps, settling ponds and similar water purification and filtering processes to ensure the maintenance or enhancement of runoff water quality standards for the area.
 - (f) Based upon the technical evaluation by the Water Management Administrator, the City shall amend the City's Flood Insurance Rate Map according to Federal Emergency Management Agency procedures.
 - (g) The City shall notify and supply the Department of Natural Resources (DNR) with plans and information on the following:
 - (i) Copies of all variance requests or public hearings for a Special Use Permit and ordinance amendments in a Water Management Overlay District shall be submitted to the Commissioner of the DNR at least ten (10) days prior to such hearing.
 - (ii) A copy of the final decision granting variances or Special Use Permits shall be submitted to the Commissioner of the DNR within ten (10) days after the meeting.

- (iii) All preliminary plats within the Water Management Overlay District Area shall be submitted to the Commissioner of the DNR within ten (10) days after the meeting.
- (iv) All approved final plats shall be submitted to the Commissioner of the DNR ten (10) days after the meeting.
- (v) All PUD Detailed Development Plans shall be forwarded to and approved by the Commissioner of the DNR prior to approval by the City Council. PUD Development Plans must be in accordance with City Zoning Code 20, Planned Unit District requirements and standards.
- (vi) All amendments to Chapter 19 must be approved by the Commissioner of the DNR prior to approval by the City Council.
- (h) Record of First Floor Elevation. The Water Management Administrator shall maintain a record of the elevation of the lowest slab floor (including basement) and lowest opening (door or window) of all new and reconstructed structures and alterations or additions to existing structures in the Floodplain Area. The Administrator shall also maintain a record of the elevation to which structures or alterations and additions to structures are flood proofed.
- (i) Certificate of Zoning Compliance for a New, Altered, or Nonconforming Use. It shall be unlawful to use, occupy, or permit the use or occupancy of any building or premises or part thereof hereafter created, erected, changed, converted, altered or enlarged in its use or structure until a Certificate of Zoning Compliance shall have been issued by the Water Management Administrator stating that the use of the building or land conforms to the requirements of this Chapter.
- (j) Variances. The City Council may authorize, upon appeal in specific cases, such relief or variance from the terms of this Chapter as will not be contrary to the public interest and only for those circumstances such as hardship, practical difficulties or circumstances unique to the property under consideration, as provided for in the respective enabling legislation for planning and zoning for cities or counties as appropriate. In the granting of such variance, the City Council shall clearly identify in writing the specific conditions that existed consistent with the criteria specified in this Chapter, any other zoning regulations in the Community, and in the respective enabling legislation which justified the granting of the variance. No variance shall have the effect of allowing uses prohibited in that area, permitting a lower degree of flood protection than the Regulatory Flood Protection Elevation for the particular area, or permitting standards lower than those required by State law. The following additional variance criteria of the Federal Emergency Management Agency must be satisfied:
 - (i) Variances shall not be issued within any designated regulatory floodway if any increase in flood levels during the base flood discharge would result.
 - (ii) Variances shall only be issued upon (1) a showing of good and sufficient cause, (2) a determination that failure to grant the variance would result in exceptional hardship to the applicant, and (3) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.
 - (iii) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
- (k) Flood Insurance Notice and Record Keeping. The Water Management Administrator shall notify the applicant for a variance that:
 - (i) the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance, and

- (ii) Such construction below the 100-year (regional flood) level increases risks to life and property. Such notification shall be maintained with a record of all variance actions. A community shall maintain a record of all variance actions, including justification for their issuance, and report such variances issued in its annual or biennial report submitted to the Administrator of the National Flood Insurance Program.

19.170 Penalties for Violation.

- (1) Violation of the provisions of this Chapter or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with grants of Variances or Conditional Uses) shall constitute a misdemeanor and shall be punishable as defined by law.
- (2) Nothing herein contained shall prevent the City from taking such other lawful action as is necessary to prevent or remedy any violation. Such actions may include but are not limited to:
 - (a) In responding to a suspected violation, the Water Management Administrator and Local Government may utilize the full array of enforcement actions available to it including but not limited to prosecution and fines, injunctions, after-the-fact permits, orders for corrective measures or a request to the National Flood Insurance Program for denial of flood insurance availability to the guilty party. The community must act in good faith to enforce these official controls and to correct violations to the extent possible so as not to jeopardize its eligibility in the National Flood Insurance Program.
 - (b) When a violation is either discovered by or brought to the attention of the Water Management Administrator, the Water Management Administrator shall immediately investigate the situation and document the nature and extent of the violation of the official control. As soon as is reasonably possible, this information will be submitted to the appropriate Department of Natural Resources' and Federal Emergency Management Agency Regional Office along with the Community's plan of action to correct the violation to the degree possible.
 - (c) The Water Management Administrator shall notify the suspected party of the requirements of this Chapter and all other Official Controls and the nature and extent of the suspected violation of these controls. If the structure and/or use is under construction or development, the Water Management Administrator may order the construction or development immediately halted until a proper permit or approval is granted by the Community. If the construction or development is already completed, then the Water Management Administrator may either 1) issue an order identifying the corrective actions that must be made within a specified time period to bring the use or structure into compliance with the official controls, or 2) notify the responsible party to apply for an after-the-fact permit/development approval within a specified period of time not to exceed 30 days.
 - (d) If the responsible party does not appropriately respond to the Water Management Administrator within the specified period of time, each additional day that lapses shall constitute an additional violation of this Chapter and shall be prosecuted accordingly. The Water Management Administrator shall also upon the lapse of the specified response period notify the landowner to restore the land to the condition which existed prior to the violation of this Chapter.

19.180 Amendments.

- (1) The Water Management Overlay designation on the Official Zoning Map shall not be removed from an area unless it can be shown that the designation is in error or that the

area has been filled to or above the elevation of the regulatory flood protection elevation and is contiguous to lands outside the floodplain. Special exceptions to this rule may be permitted by the Commissioner of Natural Resources if they determine that, through other measures, lands are adequately protected for the intended use.

- (2) All amendments to this Chapter, including amendments to the Official Flood Insurance Rate Maps, must be submitted to and approved by the Commissioner of Natural Resources prior to adoption. Changes in the Official Flood Insurance Rate Maps also require prior approval by the Federal Insurance Arbitration.
- (3) All Amendments made to the SWMP shall be included, in their entirety, in this Chapter, by reference.

19.190 Recreational Vehicles. Recreational vehicles that do not meet the exemption criteria specified in this Chapter shall be subject to the provisions of this Chapter and as specifically spelled out in Sections below.

- (1) Exemption. Recreational vehicles are exempt from the provisions of this Chapter if they are placed in any of the areas listed in Section 19.192 below and further they meet the following criteria:
 - (a) Have current licenses required for highway use.
 - (b) Are highway ready meaning on wheels or the internal jacking system, are attached to the site only by quick disconnect type utilities commonly used in campgrounds and recreational vehicle parks and the recreational vehicle has no permanent structural type additions attached to it.
 - (c) The recreational vehicle and associated use must be permissible in any pre-existing, underlying zoning use district.

19.192 Areas Exempted for Placement of Recreational Vehicles:

- (1) Individual lots or parcels of record.
- (2) Existing commercial recreational vehicle parks or campgrounds.
- (3) Existing condominium type associations.

19.194 Loss of Exemption. Recreational vehicles exempted in Section 19.190 lose this exemption when development occurs on the parcel exceeding 500 dollars for a structural addition to the recreational vehicle or exceeding \$500 for an accessory structure such as a garage or storage building. The recreational vehicle and all additions and accessory structures will then be treated as a new structure and shall be subject to the elevation on fill requirements of Section 19.110 (3) (c) and the use of land restrictions specified in this Chapter. There shall be no development or improvement on the parcel or attachment to the recreational vehicle that hinders the removal of the recreational vehicle to a flood free location should flooding occur.

19.196 Restrictions. New commercial recreational vehicle parks or campgrounds and new residential type subdivisions and condominium associations and expansion of any existing similar use exceeding five (5) units or dwelling sites shall be subject to the following:

- (1) Any new or replacement recreational vehicle will be allowed in the Flood Fringe Districts provided said recreational and its contents are placed on fill above the Regulatory Flood Protection Elevation determined in accordance with the provisions of this Chapter and proper elevated road access to the site exists in accordance with this Chapter. No fill placed in the flood fringe to meet the requirements of this Chapter shall increase flood stages of the 100-year or regional flood.
- (2) All new or replacement recreational vehicles not meeting the criteria of (a) above may, as an alternative, be allowed if in accordance with the following provisions. The applicant must submit an emergency plan for the safe evacuation of all vehicles and people during

the 100-year flood. Said plan shall be prepared by a registered engineer or other qualified individual and shall demonstrate that adequate time and personnel exist to carry out the evacuation, and shall demonstrate the provisions of Sections 19.190 (1) (a) and (b) and 19.194 of this Chapter will be met. All attendant sewage and water facilities for new or replacement recreational vehicles must be protected or constructed so as to not be impaired or contaminated during times of flooding in accordance with this Chapter.

19.200 Subdivisions.

- (1) Review Criteria. No land shall be subdivided which is unsuitable for the reason of flooding, inadequate drainage, water supply or sewage treatment facilities. All lots within Floodplain Areas shall be able to contain a building site outside of the Floodplain Area. All subdivisions shall have water and sewage treatment facilities that comply with the provisions of this Chapter and have road access both to the subdivision and to the individual building sites no lower than one foot below the 100-year flood elevation. For all subdivisions in the floodplain, the Floodway and Flood Fringe District boundaries, the regulatory flood protection elevation and the required elevation of all access roads shall be clearly labeled on all required subdivision drawings and platting documents.
- (2) Procedures for determining the 100-year Flood Elevation and Floodway and Flood Fringe Boundaries. In the Floodplain Area, applicants shall provide the information required in Section 19.160 to determine the water surface elevation and/or profile of the regional flood if such information is not available in the Flood Insurance Study for Ramsey County, Minnesota (All Jurisdictions) as adopted by reference in Section 19.050 (3) of this Chapter. Floodway and Flood Fringe Boundaries shall be determined in accordance with Section 19.090 (2) (a) and (b) of this Chapter.
- (3) Removal of Special Flood Hazard Area Designation. The Federal Emergency Management Agency (FEMA) has established criteria for removing the special flood hazard area designation for certain structures properly elevated on fill above the 100-year flood elevation. FEMA's requirements incorporate specific fill compaction and side slope protection standards for multi-structure or multi-lot developments. These standards should be investigated prior to the initiation of site preparation if a change of special flood hazard area designation will be requested.

19.210 Manufactured Homes. New manufactured home parks and expansions to existing manufactured home parks shall be subject to the provisions placed on subdivisions by Section 19.200 of this Chapter.

The placement of new or replacement manufactured homes in existing manufactured home parks located in Floodplain Areas will be treated as a new structure and may be placed only if elevated in compliance with Section 19.110 (3) (c) of this Chapter. If vehicular road access for pre-existing manufactured home parks is not provided in accordance with Section 19.110 (3) (m), then replacement manufactured homes will not be allowed until the property owner(s) develops a flood warning emergency plan acceptable to the City Council.

19.220 Compliance. No new structure or land shall hereafter be used and no structure shall be constructed, located, extended, converted, or structurally altered without full compliance with the terms of this Chapter and other applicable regulations which apply to uses within the jurisdiction of this Chapter. Within Floodplain Areas, all uses not listed as permitted uses in Section 19.090 (2) shall be prohibited.

19.230 Severability. If any section, clause, provision, or portion of this Chapter is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this Chapter shall not be affected thereby.

(Source: Ord. 114; Ord. 155; Ord. 286; Ord. 291; Ord. 341; Ord. 345; Ord. 424; Ord. 435; Ord. 517; Ord. 547, Ord. 622; 5-18-2010)

Appendix D

MS4 SWPPP

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4)
STORMWATER MANAGEMENT PROGRAM**

I. PURPOSE AND NEED

This document establishes the procedures the City of Vadnais Heights Public Works Department shall use to meet the requirements of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) permit required by the Minnesota Pollution Control Agency (MPCA). The MPCA is enforcing its requirements to ensure cities manage, control and enforce measures to protect downstream waters from pollution. The City has created a Stormwater Pollution Prevention Plan (SWPPP) based upon this concept of reducing pollution in stormwater as required by the MPCA. The MS4 Permit was reissued on August 1, 2013, and requires the procedures described in this document to be included in the City's MS4 Program.

II. PROCEDURES

This section identifies each of the areas required to be addressed within the permit. Each area will have a brief summary of the required measures corresponding to the City's MS4 SWPPP Application for Reauthorization which was approved by the MPCA and became effective on May 29, 2014. Appendices have been included with the procedures, enforcement response procedures (ERP), minimum control measures (MCM), best management practices (BMP) checklists and any other detailed information associated with the respective area. Each area also includes any ordinances or other policies that are pertinent that section of the permit. The City shall maintain records for at least three (3) years beyond the term of the permit.

A. Partnerships

This section of the permit identifies the partnerships that the City has or may have in completing one or more of the requirements. The City of Vadnais Heights has partnerships with:

- Vadnais Lake Area Water Management Organization
- Ramsey-Washington Metro Watershed District

These entities take a primary role on the public education and outreach activities of the permit, play a role in the development review coordination and permitting and provide an opportunity for public works department staff to get information and training on a regular basis through a public works forum. The Vadnais Lake Area Water Management Organization (VLAWMO) is not a regulated MS4. The Ramsey-Washington Metro Watershed District (RWMWD) is a regulated MS4.

B. Description of Regulatory Mechanisms, Enforcement Response Procedures and Minimum Control Measures

B.1 Public Education and Outreach

The City is required to provide an education and outreach program through a series of MCMs that focus on illicit discharge recognition and reporting and other high priority stormwater

related issues. These measures are included in Appendix A with B.2 Public Participation and Involvement because it is closely related to those measures.

B.2 Public Participation and Involvement

The City is required to provide a public participation and involvement program to solicit input on the City's SWPPP. These MCMs are included in Appendix A with B.1 Public Education and Outreach because it is closely related to those measures.

B.3 Illicit Discharges

The City is required to implement and enforce a program containing ordinances, policies, ERPs and MCMs that effectively prohibits non-stormwater (illicit) discharges in the City's small MS4 system, except those that are authorized. The City shall enforce illicit discharge code infractions via City Ordinance 66.030, available online, on the City's website. Procedures the City follows to implement this program are included in Appendix B.

B.4 Construction Site Stormwater Runoff Control

The City is required to implement and enforce a program containing ordinances, policies, ERPs and MCMs that prevent soils from leaving construction sites through erosion or sedimentation. The City shall enforce construction site stormwater code infractions via City Ordinances 66.030 and 66.040, available online, on the City's website. Procedures the City follows to implement this program are included in Appendix C.

B.5. Post-construction Stormwater Management

The City is required to implement and enforce a program containing ordinances, policies, ERPs and MCMs that address post-construction stormwater management activities. The City shall enforce post-construction stormwater code infractions via City Ordinance 66.040, available online, on the City's website. Procedures the City follows to implement this program are included in Appendix D.

B.6 Storm Sewer System Map and (Water Body) Inventory

The City is required to own and actively maintain a storm sewer system map and water body inventory. The City actively manages their mapping inventory by updating the information electronically every three to five years using ArcView/GPS. An example of the map booklet created from the GIS-based tool is included Appendix E.

The water body (Lake, pond, wetland) inventory was last updated in 2015 and is updated on a regular basis as new ponds are added to the system. An example of the data provided in the pond inventory submitted to MPCA is included in Appendix E.

B.7 Pollution Prevention/Good Housekeeping for Municipal Operations

The City is required to implement an operations and maintenance program that prevents or reduces the discharge of pollutants from the City's facilities to the waterbodies in the City. This includes best management practices such as staff training, street sweeping, stormwater asset inspections and follow-up improvements as necessary. More details of these tools are included Appendix F.

B.9 Annual Stormwater Pollution Prevention Plan (SWPPP) Assessment Checklist

Appendix G contains a checklist the City may use in assessing the SWPPP on annual basis, in addition to the Annual Report.

B.8 Compliance Schedule for an Approved Total Maximum Daily Load (TMDL) with an Applicable Waste Load Allocation (WLA)

The City must maintain a spreadsheet with all waterbodies that have approved TMDL study with a WLA. The most recent version of this list is included in Appendix H.

B.9 Alum or Ferric Chloride Phosphorous Treatment Systems

The City does not own or operate any Alum or Ferric Chloride phosphorus treatment systems.


III. RESPONSIBILITY AND AUTHORITY


The following are the primary City Employees responsible for maintaining this document and implementing the program.


Mark Graham
City Engineer / Public Service Director


Joseph Momsen
Public Service Supervisor

Appendix A - B.1 - Public Education and Outreach and B.2 - Public Participation and Involvement


	<p>City of Vadnais Heights</p>	<p>SOP - Water Quality Education Best Management Practices</p>
<p>Permit Section III.D.1. - Public Education and Outreach</p>		
<p>BMP Category: Partnerships</p>	<p>Measurable Goals and Timeline: Ongoing: Continue to participate in a partnership with the Vadnais Lake Area Water Management Organization (VLAWMO)</p>	
<p>Procedures:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Participate in monthly meetings <input type="checkbox"/> Continue to have a City Representative as a VLAWMO Board Member <input type="checkbox"/> Publish or distribute notice of community events on website 		
<p>BMP Category: Partnerships</p>	<p>Measurable Goals and Timeline: Ongoing: Continue to participate in a partnership with the Ramsey-Washington-Metro Watershed District (RWMWD)</p>	
<p>Procedures:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Participate in monthly meetings <input type="checkbox"/> Publish or distribute notice of community events on website 		

	<p>City of Vadnais Heights</p>	<p>SOP - Water Quality Education Best Management Practices</p>
<p>Permit Section III.D.1. - Public Education and Outreach</p>		
<p>BMP Category: City Website</p>	<p>Measurable Goals and Timeline: Ongoing: Review and update website regularly to appeal to community members, business owners, builders, and developers.</p>	
<p>Procedures:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide the latest information on stormwater related topics and rules and regulations <input type="checkbox"/> Notify community members of upcoming stormwater related events <input type="checkbox"/> Direct builders and developers to VLAWMO and RWMWD 		
<p>BMP Category: Utility Bill Insert</p>	<p>Measurable Goals and Timeline: Annually: Include stormwater related information with the City utility bill</p>	
<p>Procedures:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare or obtain stormwater related information to be included in the City utility bill. 		

	<p>City of Vadnais Heights</p>	<p>SOP - Water Quality Education Best Management Practices</p>
<p>Permit Section III.D.2. - Public Participation and Involvement</p>		
<p>Established BMP Category: Annual Public Meeting</p>		<p>Measurable Goals and Timeline: Once per year (May-June timeframe)</p>
<p>Procedures:</p> <p><u>April-May</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Schedule topic on City Council agenda for May or June meeting. <input type="checkbox"/> Send out a public meeting announcement about the presentation of the stormwater program report. <input type="checkbox"/> Ensure that the report to be presented in June is available for residents on the city webpage. <p><u>May- June</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Present annual storm water permit summary <input type="checkbox"/> Provide opportunity for resident to express concerns or views relating to the stormwater program <input type="checkbox"/> After meeting, update NPDES annual report to include any comments by commissioners or meeting attendees. 		
<p>Established BMP Category: Community Events / Workshops</p>		<p>Measurable Goals and Timeline: 4 times annually, (events) 8 times annually (workshops)</p>
<p>Procedures:</p> <p><u>Community Events</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> The City along with the Vadnais Lake Area Water Management Organization (VLAWMO) and the Ramsey Washington Metro Watershed District (RWMWD) supports a minimum of 4 of community events annually that address stormwater related topics for residents to participate in. <input type="checkbox"/> The City shall summarize events completed in the Annual Report each year. <p><u>Workshops</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> The City along with the Vadnais Lake Area Water Management Organization (VLAWMO) and the Ramsey Washington Metro Watershed District (RWMWD) supports a minimum of 4 of workshops annually that address stormwater related topics for residents to participate in. <input type="checkbox"/> The City shall summarize events completed in the Annual Report each year. 		

	City of Vadnais Heights	Form - Public Report/Input
Form of Input / Report: <input type="checkbox"/> Verbal <input type="checkbox"/> Email <input type="checkbox"/> Phone <input type="checkbox"/> Other:		
Name:	Date:	Time:
Address:	Phone:	
	Email:	
Summary of Input / Report:		
Type of Report: : <input type="checkbox"/> General Program / SWPPP <input type="checkbox"/> IDDE <input type="checkbox"/> Construction Site <input type="checkbox"/> Other:		
Location / Address of Reported Item (if applicable): Street / City / State / Zip		
Report Taken By:		
Follow Up / Inspection Action Taken:		
Modification made to SWPPP? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Description:		
Action Taken By:	Date:	
Type of Report Made Back to Citizen: <input type="checkbox"/> Verbal <input type="checkbox"/> Email <input type="checkbox"/> Phone Call <input type="checkbox"/> Other:		
Summary:		
Report Made By:	Date:	

Appendix B - B.3 Illicit Discharge Enforcement Response Procedures and Minimum Control Measures

	City of Vadnais Heights	ERP - IDDE Enforcement Response Procedures
Permit Section III.B. - Illicit Discharge Detection and Elimination (IDDE) Enforcement Response Procedures		
<p>Once an illicit discharge or connection to the storm drainage system has been discovered and reported to the City Engineer the following enforcement response procedures shall be followed:</p> <ol style="list-style-type: none">1) The City Engineer shall:<ol style="list-style-type: none">a. Oversee that the appropriate measures are taken to promptly eliminate the illicit discharge or connection.b. Evaluate the severity of the illicit discharge or connection.c. Work with the City Engineer to issue the appropriate Warning Notice / Notice of Violation.d. Oversee or direct the appropriate staff to oversee and verify compliance actions are completed.2) The violation, enforcement, and actions taken to resolve the violation shall be documented including:<ol style="list-style-type: none">a. Name of the person responsible for violating the terms and conditions of the Regulatory Mechanism(s)b. Date(s) and location(s) of the observed violation(s)c. Description of the violation(s), including reference(s) to relevant Regulatory Mechanism(s)d. Corrective action(s) (including completion schedule)e. Date(s) and type(s) of enforcement used to compel compliance (e.g., written notice, citation, stop work order, withholding of local authorizations, etc.)f. Referrals to other regulatory organizations (if any)g. Date(s) violation(s) resolved3) The City may utilize an Illicit Discharge and Connection Warning Notice / Notice of Violation Form. This form helps document and outlines the process, violation details, and follow-up actions required for a violation.		



City of Vadnais Heights

Form - IDDE Notice of Violation / Warning Notice

IDDE Warning Notice / Notice of Violation

Date: _____
Person(s) Name: _____
Phone Number: _____
Mailing Address: _____

City of Vadnais Heights
800 East County Road E
Vadnais Heights, MN 55337
(952) 895-4550

Discharge/Connection Address (if different than above)

Date(s) of Discharge or Identification of Connection: _____

Description/Observations: _____

You are hereby notified that the City of Vadnais Heights has sufficient information indicating that a potential violation of City Code has occurred and is hereby issuing this:

Warning Notice: You are hereby ordered to investigate and remedy the above stated conditions, at your expense. Written verification of the resolution shall be provided to the City within ___ days after this notice is received. Investigation and/or resolution of the matter in response to the Warning Notice in no way relieves the owner of liability for any discharges or violations occurring before or after receipt of the Warning Notice and does not limit the authority of the City to take action, including emergency action or any other enforcement action, without first issuing a Warning Notice.

Notice of Violation: You are hereby ordered to take the following remedial measures to restore compliance with City Code _____, at your expense. Written verification of the resolution shall be provided to the City within ___ days after this notice is received. Issuance of a notice of violation shall not be a bar against, or a prerequisite for, taking any other action against the violator(s).

Perform monitoring, analyses, and reporting, to include:

Eliminate violation, to include:

Abatement or remediation of violation and the restoration of any affected property, to include:

Implement source control or treatment BMP, to include:

Emergency Cease and Desist Order: You are hereby ordered to immediately comply with City Code _____, stop or eliminate the violation, and take such appropriate preventive action as may be needed to property address a continued or threatened violation, at your expense. Written statement detailing the causes of the violation and the measures taken to prevent future occurrence shall be submitted to the City within _____ days of receipt of the emergency cease and desist order. Issuance of an emergency cease and desist order shall not be a bar against, or a prerequisite for, taking any other action against the violator(s).

Suspension Order (due to Emergency Situations): You are hereby ordered to immediately comply with City Code _____ and suspend MS4 discharge access, at your expense. If necessary the City will take such steps as necessary to prevent or minimize damage to the MS4 or water of the United States, or minimize danger to persons. Issuance of suspension order (due to emergency) shall not be a bar against, or a prerequisite for, taking any other action against the violator(s).

- Suspension Order (due to detection of illicit discharge):** You are hereby notified that the City will terminate your MS4 access. You may petition the City for a reconsideration and hearing. Issuance of suspension order (due to detection of illicit discharge) shall not be a bar against, or a prerequisite for, taking any other action against the violator(s).

Please be advised:

Should the violator(s) fail to restore compliance within the established time schedule, the work will be done by a designated government agency or a contractor and the expense thereof shall be charged to the violator(s).

In addition to the other penalties, the City may recover engineering fees, court costs, court reporter's fees, attorney fees, and other expenses of litigation or enforcement by an appropriate action against the person or entity found to have violated the City ordinance or the orders, rules, regulations, and permits issued.

City of Vadnais Heights Authorizing Agent

Date

Illicit Discharge/Connection Follow-Up


Date Discharge/Connection Resolved: _____

Action(s) Taken:

I certify that the above Discharge/Connection and has been resolved.

City of Vadnais Heights Authorizing Agent

Date

	City of Vadnais Heights	Form - IDDE / Spill Investigation & Reporting	
Investigator/Discoverer:		Date:	Time:
Responsible Party:		Phone:	
		Email:	
Address / Location of Incident or Discharge:			
Description of Incident or Discharge:			
Potential Receiving Water(s):			
Nature of Discharge : (check all that apply) <input type="checkbox"/> Spill <input type="checkbox"/> Leak <input type="checkbox"/> Intermittent <input type="checkbox"/> Continuous <input type="checkbox"/> Pulsing/Irregular			
Characteristics of Discharge: (check all that apply)			
ODOR <input type="checkbox"/> None <input type="checkbox"/> Sewage <input type="checkbox"/> Rancid/Sour <input type="checkbox"/> Sulphur (Rotten Egg) <input type="checkbox"/> Gas/Petroleum <input type="checkbox"/> Cooking Oil <input type="checkbox"/> Other:	APPERANCE <input type="checkbox"/> Clear <input type="checkbox"/> Sheen <input type="checkbox"/> Cloudy <input type="checkbox"/> Color: <input type="checkbox"/> Other:	SOLIDS/FLOATABLES <input type="checkbox"/> None <input type="checkbox"/> Sewage <input type="checkbox"/> Paper <input type="checkbox"/> Garbage <input type="checkbox"/> Plastic <input type="checkbox"/> Other:	
Extent of Discharge: Horizontal: <input type="checkbox"/> 0 to 20 ft. <input type="checkbox"/> 20 to 50 ft. <input type="checkbox"/> 50 to 100 ft. <input type="checkbox"/> 100+ ft. <input type="checkbox"/> Reached MS4 system/Water of the State Vertical: <input type="checkbox"/> 0 to 6 in. <input type="checkbox"/> 6 to 18 in. <input type="checkbox"/> 18+ inches <input type="checkbox"/> Unknown <input type="checkbox"/> Located in Well Head Protection Area			
Other Information: (check all that apply) <input type="checkbox"/> Potential to Reach MS4 System or Surface Water <input type="checkbox"/> Fire Hazard <input type="checkbox"/> Combustible/Explosion Hazard <input type="checkbox"/> Hazard to Life/Limb, Injuries <input type="checkbox"/> Environmental Effect Expected <input type="checkbox"/> Equipment and Clean-up Consumables on Hand			
Product: <input type="checkbox"/> Fuel/Gasoline <input type="checkbox"/> Lubricant <input type="checkbox"/> Sediment <input type="checkbox"/> Food Based <input type="checkbox"/> Other:			
Severity : (check all that apply) <input type="checkbox"/> Minor Discharge - 5 gallons or less and easily contained. <input type="checkbox"/> Intermediate Discharge - 5+ gallons and has not/will not reach the MS4 system or surface waters. <input type="checkbox"/> Major Discharge - 5+ gallons and has/will reach the MS4 system/surface waters and may cause pollution of water of the state. (Will need to be reported to the State Duty Officer) <input type="checkbox"/> Emergency – Any discharge that threatens public safety or immediate health. (CALL 911)			
Reporting Agencies			
City Public Works: 651.204.6051		Emergency / Police: 911 State Duty Officer: 1-(800)-422-0798 MPCA: 1-(800)-657-3864	

Spill Response Procedure

The First Person on the scene shall:

1. Protect human health and safety, observing safety precautions associated with the spilled material.
2. Stop the source of discharge, if safe to do so.
3. Call 911 if threat to public safety or immediate health.
4. Contain the discharged material, if safe to do so.
(Dirt, sand, or any semi-impermeable material may be used to create a containment structure to prevent the discharge from flowing)
5. Call Public Works Department.
6. Recover discharged material, if safe to do so.
7. Remain onsite and assist with response, reporting, and cleanup as necessary.
8. Report the spill to the MN Duty Officer, if applicable.

The Emergency Response Personnel shall:

1. Direct the appropriate staff to respond / cleanup discharged material and dispose of properly, if safe to do so.
2. Oversee spill clean-up actions.
3. Report the spill to the MN Duty Officer, if applicable.

It is required to notify the State Duty Officer of the discharge of any substance or material which, if not recovered, may cause pollution of waters of the state. Recovery shall happen as rapidly and as thoroughly as possible and take immediately such other action as may be reasonably possible to minimize or abate pollution of waters of the state.

Clean-up Action(s) Taken:

Overseen By:

Date:

Completed By:

Recommended Enforcement Action:

Verbal Warning Written Warning Other:

IDDE Warning Notice / Notice if Violation Form

- Warning Notice Issued
- Notice of Violation Issued
- Emergency Ceases and Desist Order Issued
- Suspension Order Issued (due to Emergency Situations)
- Suspension Order Issued (due to Detection of Illicit Discharge)

Other Notes / Comments:



City of Vadnais Heights

SOP - Spill Response Procedures

Permit Section III.D.3.g. - Spill Response Procedures

Responsible Person: City Engineer or designated staff

Description: This procedure outlines the process for responding to spills and to prevent or reduce the chance of spills from reaching the MS4 system.

Procedures:

- 1) The first person on the scene shall:
 - a. Protect human health and safety, observing safety precautions associated with the spilled material.
 - b. Stop the source of discharge, if safe to do so.
 - c. Call 911 if there is a threat to public safety or immediate health.
 - d. Contain the discharged material, if safe to do so. (Dirt, sand, or any semi-impermeable material may be used to create a containment structure to prevent the discharge from flowing)
 - e. Notify the Public Works Department.
 - f. Recover discharged material, if safe to do so.
 - g. Remain onsite and assist with response, reporting, and cleanup as necessary.
 - h. Report the spill to the MN Duty Officer, if applicable (> 5 gallons).

- 2) The emergency response personnel shall take the following actions:
 - a. Direct the appropriate staff to respond / cleanup discharged material and dispose of properly, if safe to do so.
 - b. Oversee the spill clean-up actions.
 - c. Report the spill to the MN Duty Officer, if applicable.

- 3) Spills / Discharges overseen by the Public Works Department may be documented by completing the IDDE / Spill Investigation and Report Form.
 - a. A copy of the Spill Investigation and Report Form shall be forwarded to the City Engineer

It is required to notify the State Duty Officer of the discharge of any substance or material which, if not recovered, may cause pollution of waters of the state. Recovery shall happen as rapidly and as thoroughly as possible and take immediately such other action as may be reasonably possible to minimize or abate pollution of waters of the state.

MN Department of Safety Duty Officer: 1-800-422-0798

	City of Vadnais Heights	SOP - IDDE Inspections and Investigations
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Permit Section III.D.3. - IDDE Inspection Procedures

City staff inspects for sources of illicit discharges as follows:

- 1) City staff will incorporate additional inspections during regular inspections and maintenance of its MS4 system to look for signs of illicit discharges and connections. These are often completed during dry weather conditions. Any indication of a dry weather flow is investigated as a potential illicit discharge and/or illegal connection.
- 2) City staff will be watchful for signs of illicit discharges and/or connections during day to day operations. Signs of potential illicit discharges or connections are promptly investigated.
- 3) City staff will complete site specific inspections when reports of potential illicit discharge or connections are received.

Permit Section III.D.3. - IDDE Investigating, Locating, Eliminating Procedures

Any discovered or suspected illicit discharges or illegal connections shall be reported to the Streets Superintendent and are investigated by the Public Works Department.

The Public Services Supervisor shall take the following actions:

- 1) Direct appropriate staff to respond / investigate illicit discharges and/or connections as necessary.
- 2) Oversee the required actions as a result of the investigation.
- 3) Oversee / direct efforts to eliminate illicit discharges and/or connections.


The City may utilize the following tools to help locate the source of an illicit discharge or illegal connection:

- 1) Observations by City Staff, Police, Fire Fighters, Public Transportation, others.
- 2) Reports by Citizens.
- 3) Storm Sewer Systems (MS4) Map – suspected signs of illicit discharges are tracked upstream through the system until the source is identified.
- 4) Visual inspections.
- 5) Mobile cameras, sampling results, and other inspection tools.

Illicit discharges or illegal connections are eliminated promptly by following the procedures layout within the following forms / ordinances:

- 1) Illicit Discharge and Connection Ordinance
- 2) IDDE / Spill Investigating and Report Form
- 3) Illicit Discharge and Connection Ordinance Warning Notice / Notice of Violation

The City may utilizes an IDDE / Spill Investigating and Report Form which outlines the process and helps document the investigations, discoveries, and actions taken to eliminate illicit discharges and connections.

	City of Vadnais Heights		SOP - IDDE Priority Areas
Permit Section III.D.3.f. - IDDE Priority Areas			
Responsible Person: Public Services Supervisor and City Engineer			
Description: The City has identified the areas listed below as PRIORITY AREAS likely to have Illicit Discharges.			
City staff pays particularly close attention and completes additional inspections for illicit discharges and connections while completing regular inspection and maintenance on the MS4 system and during day to day operations in these areas.			
Priority Areas Based On:			
LAND USE* ➤ Industrial ➤ Commercial	BUSINESS ACTIVITIES ➤ Restaurants	PAST DISCHARGES	SIGNIFICANT MATERIALS ➤ Properties with industrial permits
*A Land Use Map is available online on the City's website, under Planning and Zoning			

Appendix C - B.4 Construction Site Stormwater Runoff Control Enforcement Response Procedures and Minimum Control Measures

**Permit Section III.B. - Construction Site Stormwater Management
Enforcement Response Procedures**

Once a construction site stormwater management violation has been identified the following enforcement response procedures shall be followed:


- 1) Report violation to the City Engineer.
 - a. The City Engineer or designated staff will follow up with a site inspection and communication with the site owner or contractor.
 - b. If the designated staff determines that the owner or contractor has not responded adequately to correct identified site deficiencies or has demonstrated a general lack of compliance at the site, the designated staff will refer the matter to the City Engineer.
- 2) The City Engineer shall:
 - a. Oversee that the appropriate measures are taken to promptly eliminate the violation/deficiency.
 - b. Oversee or direct the appropriate staff to oversee and verify compliance actions are completed.
 - c. Evaluate the severity of the violation.
 - d. Issue the appropriate Verbal Notice / Warning Notice / Notice of Violation.
- 3) The violation, enforcement, and actions taken to resolve the violation shall be documented including:
 - a. Name of the person responsible for violating the terms and conditions of the Regulatory Mechanism(s)
 - b. Date(s) and location(s) of the observed violation(s)
 - c. Description of the violation(s), including reference(s) to relevant Regulatory Mechanism(s)
 - d. Corrective action(s) (including completion schedule)
 - e. Date(s) and type(s) of enforcement used to compel compliance (e.g., completion of work and reimbursement of costs from site's erosion control escrow, written notice, citation, stop work order, withholding of local authorizations, etc.)
 - f. Referrals to other regulatory organizations (if any)
 - g. Date(s) violation(s) resolved
- 4) The City may utilize a Construction Site Stormwater Management Warning Notice / Notice of Violation Form. This form helps document and outlines the process, violations details, and follow-up actions of a violation.

Permit Section III.D.4.d. - Site Inspection Procedures

The following procedures shall be followed when completing construction site inspections within the City of Vadnais Heights:

- 1) Upon site plan review and permit approvals by the City: The City Engineer shall take the following actions:
 - a. Identify and notify the appropriate entities for completing site inspections during construction.
 - b. Oversee site inspection process.
 - c. Implement the City's Construction Site Stormwater Management Enforcement Response Procedures, when necessary.

- 2) The entities responsible for completing site inspections shall complete the following actions:
 - a. Rate the site for priority of inspection based on topography, soil characteristics, type of receiving water, other site specific and local characteristics.
 - b. Highest priority sites will be inspected on a weekly basis; medium priority sites every two weeks; lower priority sites on a monthly basis. Inspection frequency may be adjusted due to the frequency of rainfall events or other observed site conditions.
 - c. Complete site inspections necessary to observe compliance with the approved SWPPP and site plans.
 - d. Document Site inspections to include at a minimum:
 - i. Date and time of inspection.
 - ii. Name of inspector.
 - iii. Project name and location.
 - iv. Type of inspection (routine, rain event, compliance report, etc.)
 - v. Weather and site conditions.
 - vi. Findings of inspection & locations of non-compliance / violations.
 - vii. Corrective actions taken.
 - viii. Recommended amendments to SWPPP, when applicable.
 - e. Notify the City Engineer of sites having a history of unresolved violations or major deficiencies.
 - f. Inspector may utilize site inspection checklists, documentation standards, and procedures.

	<h2 style="margin:0;">City of Vadnais Heights</h2>	<h2 style="margin:0;">Form - Construction Site Inspection Checklist</h2>				
Inspector:	Date:	Time:				
Project Name:	Permit No:					
Project Location:						
Weather Conditions during time of inspection:						
Type of Inspection: (check all that apply) <input type="checkbox"/> Routine <input type="checkbox"/> After Rainfall <input type="checkbox"/> Complaint <input type="checkbox"/> Violation Follow Up <input type="checkbox"/> Final						
Last Precipitation Date:		Amount:				
Erosion & Sediment Control BMPs	Installed			Maintenance or Corrections Needed:		Notes:
	Yes	No	NA	Yes	No	
Stabilization of slopes and disturbed areas not actively being worked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Protection of natural resources areas (e.g. streams, wetlands)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Perimeter controls adequately installed and maintained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Discharge points and receiving waters free of sediment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Protection of inlets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Construction entrance/exit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Trash/litter from work areas placed in covered dumpster	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Washout facilities clearly marked and maintained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vehicle fueling/maintenance areas clearly marked and maintained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Potential stormwater contaminants stored inside or under cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Portable toilets are secure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Non-stormwater discharges (e.g. dewatering) are properly controlled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Copy of SWPPP updated and present on site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Enforcement Actions						
Corrective actions required? <input type="checkbox"/> Yes <input type="checkbox"/> No						
If yes: <input type="checkbox"/> Verbal Notice <input type="checkbox"/> Warning Notice <input type="checkbox"/> Notice of Violation <input type="checkbox"/> Other:						
Notes:						

Appendix D - B.5 Post-Construction Stormwater Management Enforcement Response Procedures and Minimum Control Measures



**City of Vadnais
Heights**

**ERP - Post-Construction
Stormwater Management**

**Permit Section III.B. - Post-Construction Stormwater Management
Enforcement Response Procedures**

Upon receipt of a proposed site plan submittal package, which includes post-construction stormwater management facilities, to the City of Vadnais Heights the following procedures shall be followed to verify compliance with the City Post-Construction Stormwater Management regulatory mechanism:

- 1) The City shall follow its established site plan review process which includes a review and approval of the post-construction stormwater management practices.
 - a. The City Engineer shall withhold permit approvals until post-construction management facilities have been planned and designed for which meet the City's requirements.
 - b. The City may obtain a development review memorandum from the City's designated Engineering Consultant.
- 2) The City shall follow its established construction site inspection process which includes inspections of the post-construction stormwater practices during construction.
 - a. The City Engineer shall withhold final acceptance of the post-construction stormwater management facilities until the following have been completed:
 - Maintenance agreement has been signed and approved.
 - As-built drawings have been submitted to the City.
 - Documentation certifying that the facilities have been construction in accordance with design specifications has been provided to the City.
 - A final inspection has been completed with City staff or City representative.
- 3) Upon completion of construction and City approval of the post-construction stormwater facilities: The City Engineer shall be responsible for overseeing the following:
 - a. Direct appropriate staff to complete inspections of the post-construction stormwater facilities if known or suspected violations are occurring, meaning the facility is not performing as originally designed.
 - b. Oversee appropriate actions are taken as outlined within the City's ordinances, Design Policies, and Maintenance Agreements to correct the violation.
 - c. Oversee or direct the appropriate staff to oversee/complete the required actions to correct the violation and restore the post-construction stormwater facilities.
- 4) The violation, enforcement, and actions taken to resolve the violation shall be documented including:
 - a. Name of the person responsible for violating the terms and conditions of the Regulatory Mechanism(s)
 - b. Date(s) and location(s) of the observed violation(s)
 - c. Description of the violation(s), including reference(s) to relevant Regulatory Mechanism(s)
 - d. Corrective action(s) (including completion schedule)
 - e. Date(s) and type(s) of enforcement used to compel compliance (e.g., written notice, citation, stop work order, withholding of local authorizations, etc.)
 - f. Referrals to other regulatory organizations (if any)
 - g. Date(s) violation(s) resolved




City of Vadnais Heights

SOP - Site Plan Review Procedures

Permit Section III.D.4.b./III.D.5.b. - Site Plan Review Procedures

Upon receipt of a proposed site plan submittal package to the City of Vadnais Heights, the following procedures shall be followed:

- 1) Proposed site plan submittal information shall be directed to the City Engineer.
- 2) The City Engineer shall take the following actions:
 - a. Forward the information to the appropriate entities for review and approval. This may include, but not limited to one or all of the following reviewers:
 - i. City Engineering Consultant
 - ii. Review by the City Engineer
 - iii. Other City Departments as needed (Natural Resources, Planning, etc.)
 - b. Oversee the review process and compile comments.
 - c. Notify owner of approval, disapproval, or required resubmittal of site plan information based on the comments.
 - d. Ensure appropriate City permits are obtained or applied for prior to final approval.
 - e. If applicable, notify the applicant of the need to apply for and obtain coverage under the MPCA NPDES Construction Stormwater Permit.
- 3) The reviewing entities shall complete the following actions:
 - a. Review submitted information against the City's Site Plan Review Checklist which reflects concurrence with current ordinances, policies and design standards.
 - b. Provide written comments and recommendations of approval, disapproval and/or required resubmittal of site plan information. City Engineer or designee shall ensure delivery to plan submitter.
 - c. Utilize site plan review checklist/form and a comment letter describing compliance or non-compliance. The City's Engineering Consultant may use the form and/or provide a review memorandum addressed to the City Engineer that addresses the items noted in the form.
 - d. Repeat process until the plan is approved and permits can be approved.

		City of Vadnais Heights	Form – Site Plan Review Checklist										
Project / Site Information													
Project Name / Owner:													
Project Location:													
Disturbed Acres:													
Existing Impervious:													
Proposed Impervious:													
Net Increase / (Decrease):													
City Project Number:													
Review Tracking													
Initial Submittal Date:		Reviewed By / Date:											
Review Comments / Findings:			Notified Owner:										
Re-Submittal Date:		Reviewed By / Date:											
Review Comments / Findings:			Notified Owner:										
Construction Site – Erosion/Sediment Control (All projects)													
Site plans and project documentation must incorporate erosion and sediment controls and waste controls.													
<table border="1"> <thead> <tr> <th colspan="3">Incorporated</th> <th rowspan="2">Comments:</th> </tr> <tr> <th>Yes</th> <th>No</th> <th>NA</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td> Do the plans include provisions in accordance with City Code and Engineering Standards: <ul style="list-style-type: none"> • Perimeter controls, construction entrance/exit, inlet protection • Sediment Tracking Cleanup, Waste Controls • Temporary Sediment Basins – Water Quality Treatment (if required) • Dewatering • Final stabilization • Maintenance of BMPs and site Inspections/rainfall record keeping </td> </tr> </tbody> </table>			Incorporated			Comments:	Yes	No	NA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the plans include provisions in accordance with City Code and Engineering Standards: <ul style="list-style-type: none"> • Perimeter controls, construction entrance/exit, inlet protection • Sediment Tracking Cleanup, Waste Controls • Temporary Sediment Basins – Water Quality Treatment (if required) • Dewatering • Final stabilization • Maintenance of BMPs and site Inspections/rainfall record keeping
Incorporated			Comments:										
Yes	No	NA											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the plans include provisions in accordance with City Code and Engineering Standards: <ul style="list-style-type: none"> • Perimeter controls, construction entrance/exit, inlet protection • Sediment Tracking Cleanup, Waste Controls • Temporary Sediment Basins – Water Quality Treatment (if required) • Dewatering • Final stabilization • Maintenance of BMPs and site Inspections/rainfall record keeping 										

SWPPP Submittal (Required for projects disturbing 1 acre or more)			
Incorporated			Comments:
Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared/included?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has the City notified the owner of the NPDES Permit Requirements?
Post-Construction Stormwater Management Requirements			
Incorporated			Comments:
Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the plans address the water quality treatment in accordance with the provisions in City Code and Engineering Standards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the volume control / infiltration / filtration practices meet the provisions of City Code and Engineering Standards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does the project meet the water quantity / food control requirements of City Code and Engineering Standards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does the project meet the rate control requirements of City Code and Engineering Standards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the plans meet the special waters and wetland provisions in City Code and Engineering Standards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the plans and supporting documentation include design computations consistent with City Code and Engineering Standards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the plans address the additional pond and infiltration system design criteria in City Code and Engineering Standards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the plans include the stormwater plan submittals in City Code and Engineering Standards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the plans include provisions of the City's Wellhead Protection Plans (including but not limited to) City Code and Engineering Standards?
Additional Review Comments / Findings:			



City of Vadnais Heights

**SOP - Site Plan
Mitigation
Procedures**

Permit Section III.D.5. - Site Plan Mitigation Procedures

The MS4 Permit requires the City to establish mitigation provisions for circumstances where the City or other owners and operators of a construction activity cannot cost effectively meet the conditions for post- construction stormwater management (volume control requirements or TSS and/or TP requirements) established in the City’s WRMP on the site of the original construction activity. If during the development review process, the City determines that this is the case, the City may require the owner to identify locations where mitigation projects can be completed.

Mitigation project areas will be evaluated and selected in the following order of preference:

- 1) Locations that yield benefits to the same receiving water that receives runoff from the original construction activity.
- 2) Locations within the same Department of Natural Resource (DNR) catchment area as the original construction activity.
- 3) Locations in the next adjacent DNR catchment area up-stream.
- 4) Locations anywhere within the City of Vadnais Heights.

Mitigation projects must involve the creation of new structural stormwater BMPs or the retrofit of existing structural stormwater BMPs, or the use of a properly designed regional structural stormwater BMP. Routine maintenance of structural stormwater BMPs already required by the NPDES permit cannot be used to meet mitigation requirements. Mitigation projects shall be completed within 24 months after the start of the original construction activity.

The City will determine, and document, who is responsible for long-term maintenance on all mitigation projects. The City will not accept payment from the owner and/or operator of a construction activity for mitigation purposes in lieu of the owner or operator of that construction activity meeting the City Standards for post-construction stormwater management.

Appendix E - B.6 Storm Sewer System Map and Inventory

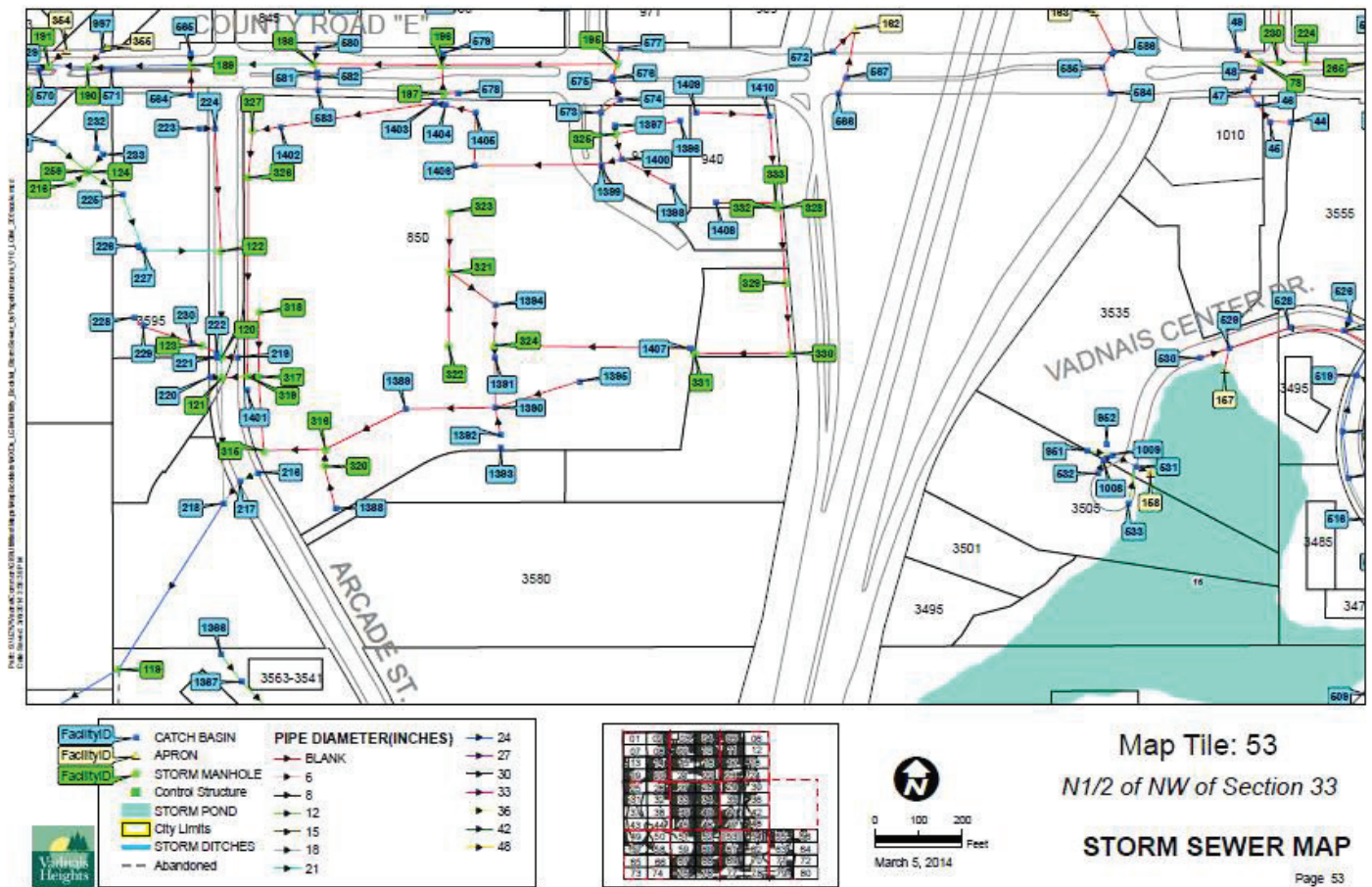


City of Vadnais Heights

Storm Sewer System Map and Inventory

Permit Section III.C. - Storm Sewer System Map and Inventory

The City of Vadnais Heights maintains a storm sewer system map and inventory as required by the permit. An example sheet from the City wide GIS mapping data and map book and 2015 MS4 Pond, Wetland, and Lake Inventory Form is included.





Minnesota Pollution
Control Agency

520 Lafayette Road North
St. Paul, MN 55155-4194


MS4 Pond, Wetland, and Lake Inventory Form

Municipal Separate Storm Sewer System (MS4) Program

Doc Type: Plans/Specifications/Maps

Name of MS4 Permittee	Date form completed	Unique ID Number	Type of Feature (Pond, Wetland or Lake)	Feature Common Name (if Applicable)	Y Coordinate (Latitude) Decimal Degrees	X Coordinate (Longitude) Decimal Degrees
City of Vadnais Heights	3/30/2015	L1	Lake	Sucker Lake	45.0743174709365	-93.0971117613046
City of Vadnais Heights	3/30/2015	L2	Lake	Twin Lake	45.0392063535708	-93.0866769543451
City of Vadnais Heights	3/30/2015	L3	Lake	Vadnais Lake	45.0485351713731	-93.0881612267597
City of Vadnais Heights	3/30/2015	L4	Lake	Vadnais Lake	45.0519342966127	-93.0872899686193
City of Vadnais Heights	3/30/2015	L5	Lake	Willow Lake	45.041937301766	-93.0484225845254
City of Vadnais Heights	3/30/2015	P1	Pond		45.0786126508477	-93.062223113613
City of Vadnais Heights	3/30/2015	P2	Pond		45.076583432313	-93.0833901244766
City of Vadnais Heights	3/30/2015	P3	Pond		45.0760536321133	-93.0809646474885
City of Vadnais Heights	3/30/2015	P4	Pond		45.0755812461676	-93.0803478829572
City of Vadnais Heights	3/30/2015	P5	Pond		45.075334080755	-93.0814733568931
City of Vadnais Heights	3/30/2015	P6	Pond		45.0752246944935	-93.0850891312942
City of Vadnais Heights	3/30/2015	P7	Pond		45.0751359549259	-93.0647114131196
City of Vadnais Heights	3/30/2015	P8	Pond		45.0742965852191	-93.0580900636314
City of Vadnais Heights	3/30/2015	P9	Pond		45.0695313584976	-93.1022044272313
City of Vadnais Heights	3/30/2015	P10	Pond		45.07150517688	-93.0891190164949
City of Vadnais Heights	3/30/2015	P11	Pond		45.0713304183162	-93.0818564662122
City of Vadnais Heights	3/30/2015	P12	Pond		45.0788456241813	-93.0966550393199
City of Vadnais Heights	3/30/2015	P13	Pond		45.0715644364959	-93.0605133600285
City of Vadnais Heights	3/30/2015	P14	Pond		45.0706795656389	-93.093114283178
City of Vadnais Heights	3/30/2015	P15	Pond		45.0705131442608	-93.1054519779824
City of Vadnais Heights	3/30/2015	P16	Pond		45.0695146469478	-93.0800871680699
City of Vadnais Heights	3/30/2015	P17	Pond		45.0699635061313	-93.1047207192279
City of Vadnais Heights	3/30/2015	P18	Pond		45.0699189559716	-93.1054821881745
City of Vadnais Heights	3/30/2015	P19	Pond		45.0679203973985	-93.0886537477588
City of Vadnais Heights	3/30/2015	P20	Pond		45.0677840929264	-93.0976960315803
City of Vadnais Heights	3/30/2015	P21	Pond		45.0651832690158	-93.0908690078156
City of Vadnais Heights	3/30/2015	P22	Pond		45.0632220956204	-93.0954840075737
City of Vadnais Heights	3/30/2015	P23	Pond		45.0787674258527	-93.0826578062239
City of Vadnais Heights	3/30/2015	P24	Pond		45.0637763753593	-93.0776609713249
City of Vadnais Heights	3/30/2015	P25	Pond		45.0629479266122	-93.0506354648459
City of Vadnais Heights	3/30/2015	P26	Pond		45.0625248225044	-93.0854308721677
City of Vadnais Heights	3/30/2015	P27	Pond		45.0622820330416	-93.0858568887492
City of Vadnais Heights	3/30/2015	P28	Pond		45.0622510684043	-93.0775511215753
City of Vadnais Heights	3/30/2015	P29	Pond		45.0620958575736	-93.0939808835251

Appendix F - B.7 Pollution Prevention/Municipal Good Housekeeping for Municipal Operations

	<p align="center">City of Vadnais Heights</p>	<p align="center">Form - Facilities Inventory and Municipal Operations BMPs</p>
<p align="center">Permit Section III.D.6.b. - Facilities Inventory and Municipal Operations</p>		
<p>Facility/Municipal Operation</p>	<p>BMP(s)</p>	
Bear Park (465 Bear Ave S)	Stormwater pond, well vegetated cover, well vegetated buffer	
Berwood Park (780 Berwood Ave)	Stormwater pond, vegetated swale, well vegetated cover, well vegetated buffer	
Bridgewood Park (4224 Bridgewood Terrace)	Well vegetated cover, well vegetated buffer	
Community Park (641 E County Rd F)	Stormwater pond, well vegetated cover, well vegetated buffer	
Kohler Meadows Park (365 E County Rd F)	Stormwater pond, well vegetated cover, well vegetated buffer	
Elmwood Park (3892 Elmwood Ave)	Well vegetated cover, well vegetated buffer	
Greenhaven Park (4470 Greenhaven Park)	Well vegetated cover, well vegetated buffer	
Heritage Park (4345 Heritage Court)	Stormwater pond, well vegetated cover, well vegetated buffer	
Lily Pond Park (325 Lily Pond Park)	Well vegetated cover, well vegetated buffer	
Morningside Park (4485 Morningside Drive)	Stormwater pond, well vegetated cover, well vegetated buffer	
Oak Creek Park (485 Oak Creek Drive)	Well vegetated cover, dense vegetated buffer	
Westfield Park (520 Westfield Lane)	Stormwater pond, well vegetated cover, well vegetated buffer	
Wolters Park (1351 Willow Lake Boulevard)	Well vegetated cover, well vegetated buffer	
City Hall (800 E County Rd E)	Well vegetated cover, dense vegetated buffer	
Fire Station #1 (3595 Arcade St)	Well vegetated cover, dense vegetated buffer	
Fire Station #2 (665 E County Rd F)	Stormwater pond, well vegetated cover, well vegetated buffer	
Public Works (4105 Clover Ave)	Stormwater pond, well vegetated cover, well vegetated buffer	
Public Works Storage (3770 Centerville Rd)	Stormwater pond, well vegetated cover, well vegetated buffer	
Commons Rental Hall (655 E County Rd F)	Stormwater pond, well vegetated cover, well vegetated buffer	
East Water Tower (390 Commerce Court)	Stormwater pond, well vegetated cover, well vegetated buffer	
West Water Tower (3520 International Dr)	Stormwater pond, well vegetated cover, well vegetated buffer	
City Parking Lots	Limit salt and sand use, street sweeping as needed	
Waste disposal and storage	Covered trash facilities, timely collection and removal	
Temporary and permanent stockpiles		
Vehicle fueling		
Street and parking lot sweeping		
Spill prevention plans	Proper procedures included in employee training	
Cleaning of maintenance equipment		
Use, storage, disposal of significant materials		
Landscaping, park, lawn maintenance	Proper procedures included in employee training	
Road maintenance	Regular street sweeping, catch basin cleaning and repair	
Right-of-way maintenance	Proper procedures included in employee training	
Application of herbicides, pesticides, and fertilizers	Proper application included in employee training	
Snow removal practices	Thoughtful stockpiling, waste collection following thaw	



City of Vadnais Heights

SOP - Pond Assessment Procedures and Schedule

Permit Section III.D.6.d. - Pond Assessment Procedures and Schedule

The following pond assessment procedures and schedule shall be followed to determine the Total Suspended Solids (TSS) and Total Phosphorous (TP) treatment effectiveness of City owned and operated ponds construction for the collection and treatment of stormwater.

Assessment Procedure:

The City shall assess at least one (1) pond annually. At the initiation of a pond assessment, the City shall evaluate the City owned and operated stormwater treatment ponds to determine the highest priority pond for clean out or maintenance. Prioritization may be based on the following factors:

- Age of pond.
- Value of sediment removal – an analysis of how much phosphorus is removed per dollar spent
- Contributing drainage area characteristics. (Size, land use, upland treatment, etc.)
- Known concerns based on inspections.
- Type and location of receiving water.
- Sensitivity of receiving water.

Schedule, Measurable Goals, and Priority:

The City reviews potential pond maintenance needs and opportunities on an annual basis. Based on that review and the availability of funds, the City implements projects on an annual basis. The City adjusts the number of pond maintenance work based on available budget, staff availability, and other factors that may affect the process.




**City of Vadnais
Heights**

**SOP – Inspections of
BMPs, Outfalls,
Stockpiles and Storage
Areas**

Permit Section III.D.6.e. - Inspection Procedures and Schedules

1. Vadnais Heights Public Works staff will conduct annual inspections of structural stormwater BMPs (sump manholes, hydrodynamic separators, grit chambers, etc.) to determine structural integrity, proper function and any maintenance needs.
 - a. Inspections of structural stormwater BMPs will be conducted annually unless the City determines if either of the following conditions apply: 1) Complaints received or patterns of maintenance indicate a greater frequency is necessary, or 2) Maintenance or sediment removal is not required after completion of the first two annual inspections; in which case the frequency of inspections will be once every two (2) years.
 - b. The City will document any changes in the inspection frequency.
2. Within the 5-year term of this permit, Vadnais Heights will conduct at least one inspection of all ponds and outfalls (excluding underground outfalls) in order to determine structural integrity, proper function, and maintenance needs. This will result in the City inspecting an average of at least 20% of the ponds and outfall annually.
3. Vadnais Heights will conduct quarterly inspections of stockpiles, and storage and material handling areas (as inventoried in the Facility Inventory - Permit Part III.D.6.a), to determine maintenance needs and proper function of BMPs.
4. The City will record system inspections using paper forms and electronically using spreadsheets.

	<h2 style="margin: 0;">City of Vadnais Heights</h2>	<h2 style="margin: 0;">Form - Structural BMP Inspection Report</h2>		
Inspector(s): _____		Date: _____	Time: _____	
Inspection of: <input type="checkbox"/> Stormwater Pond <input type="checkbox"/> Outfall <input type="checkbox"/> Stockpile <input type="checkbox"/> Structural Stormwater BMP				
Unique ID: _____				
Location: _____				
Inspection Findings				
Inspection Item	Condition			Comments
Access	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Inlet Structure(s)	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Outlet Structure(s)	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Erosion	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Sedimentation	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Vegetation	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Illicit Discharge	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Animal Impact	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Human Impact	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Other: _____	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Other: _____	<input type="checkbox"/> Good	<input type="checkbox"/> No	<input type="checkbox"/> Needs Maintenance	
Inspection Notes: 				
Sketch of Feature: 				
Maintenance Records				
Maintenance Request	Condition		Comments	
Maintenance Notes: 				

Permit Section III.D.6.g. – Municipal Operations: Employee Training

IDDE Inspection, detection, and reporting

- Attendees: Public Works and Parks Employees
- Topics:
 - Illicit discharge recognition
 - Conditions which cause illicit discharges
 - Reporting illicit discharges
 - City's IDDE procedures & policies

Pollution Prevention / Good Housekeeping for Municipal Operations

- Attendees: Public Works and Parks Employees
- Topics:
 - Requirements of job duties related to the City's SWPPP
 - Reporting and assessment activities
 - Address importance of water quality
 - City's procedures & policies related to SWPPP

Identify training schedule / frequency

- New / seasonal employee initial training:
 - New permanent and seasonal staff within public works will receive training in water quality related procedures as soon as possible after their start date.
- Existing employee recurring training interval:
 - Existing employees will be trained annually during a spring program related to water quality topics.

Procedure for documenting employee trainings

- Attendance for permanent staff at the annual water quality training will be tracked with a sign-in sheet. Employees that miss the annual training will be required to attend a comparable training as soon as possible.
- The City Engineer shall save a copy of each sign-in sheet electronically in Permitrack.

	City of Vadnais Heights	Form - MS4 Training Documentation Sign-In Sheet
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Training Information

Date:	Trainer:
Training Event:	
Topics Covered:	

Attendees

Name	Position
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	



Appendix G - B.8 Annual Stormwater Pollution Prevention Plan Checklist

	City of Vadnais Heights	Form - Annual SWPPP Assessment Checklist								
Reviewer:		Date:								
MCM 1 – Public Education and Outreach										
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have the High Priority stormwater education topics been reviewed and updated if necessary?									
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the Education and Outreach Implementation Plan been reviewed and updated if necessary?									
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have the Public Education and Outreach Activities been reviewed and documented? Check all of the activities that have been implemented and documented: <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Distribution of Education Materials</td> <td><input type="checkbox"/> Website</td> </tr> <tr> <td><input type="checkbox"/> Newsletter Articles</td> <td><input type="checkbox"/> Meetings, Presentations, Trainings</td> </tr> <tr> <td><input type="checkbox"/> Local Cable Access Channel</td> <td><input type="checkbox"/> Collaborative Support</td> </tr> <tr> <td><input type="checkbox"/> Storm Drain Stenciling</td> <td><input type="checkbox"/> Public Service/Radio Announcements</td> </tr> </table>		<input type="checkbox"/> Distribution of Education Materials	<input type="checkbox"/> Website	<input type="checkbox"/> Newsletter Articles	<input type="checkbox"/> Meetings, Presentations, Trainings	<input type="checkbox"/> Local Cable Access Channel	<input type="checkbox"/> Collaborative Support	<input type="checkbox"/> Storm Drain Stenciling	<input type="checkbox"/> Public Service/Radio Announcements
<input type="checkbox"/> Distribution of Education Materials	<input type="checkbox"/> Website									
<input type="checkbox"/> Newsletter Articles	<input type="checkbox"/> Meetings, Presentations, Trainings									
<input type="checkbox"/> Local Cable Access Channel	<input type="checkbox"/> Collaborative Support									
<input type="checkbox"/> Storm Drain Stenciling	<input type="checkbox"/> Public Service/Radio Announcements									
MCM 1: Actions completed / required based on annual assessment:										
MCM 2 – Public Participation / Involvement										
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has an opportunity been provided and documented for the public to provide input? <input type="checkbox"/> Public Meeting <input type="checkbox"/> Other:									
<input type="checkbox"/> Yes <input type="checkbox"/> No	Are SWPPP documents available for the public to access? <input type="checkbox"/> Website <input type="checkbox"/> Paper copies as requested <input type="checkbox"/> Other:									
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the City's Public input procedures, templates, and checklists been reviewed and updates as necessary? <input type="checkbox"/> Public Input Procedures <input type="checkbox"/> Public Report / Input Form									
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the City considered and documented public input on the SWPPP and MS4 program, reports of illicit discharges, reports of non-compliance or other stormwater related information on construction activity, and reports of other stormwater related issues and/or topics when received.									
MCM 2: Actions completed / required based on annual assessment:										

MCM 3 – IDDE	
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the City's storm sewer system map been reviewed and updated as necessary?
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the City's IDDE ordinance been reviewed and updated as necessary?
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has field staff received IDDE training and has the training been documented?
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have Priority Areas likely to have illicit discharges been reviewed and updated as necessary?
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have the following procedures, templates, and checklists been reviewed and updated as necessary and have these actions been documented? <input type="checkbox"/> IDDE Procedures for investigating, locating, & eliminating illicit discharges and connections. <input type="checkbox"/> IDDE Procedures for spill response. <input type="checkbox"/> IDDE investigating and reporting form.
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the City's IDDE enforcement response procedures and notices been reviewed and updated as necessary? <input type="checkbox"/> IDDE enforcement response procedures. <input type="checkbox"/> IDDE warning notice & notice of violation
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have inspections, reports, discoveries, sources, and corrective actions pertaining to illicit discharges and connections been documented?
MCM 3: Actions completed / required based on annual assessment:	
MCM 4 – Construction Site Stormwater	
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the City's construction site runoff control regulatory mechanisms been reviewed and updated as necessary?
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have site plan reviews been documented and have site plan review procedures, templates, and checklists been reviewed and updated as necessary? <input type="checkbox"/> Site Plan Review Procedures <input type="checkbox"/> Site Plan Review Checklist
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have site inspections and follow-up actions been documented and have the site inspection procedures, templates, and checklists been reviewed and updated as necessary? <input type="checkbox"/> Site Inspection Procedures <input type="checkbox"/> Site Inspection Checklist
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have violations and follow-up actions been documented and have the construction site runoff control enforcement response procedures and notices been reviewed and updated as necessary? <input type="checkbox"/> Construction Site Stormwater Runoff Control enforcement response procedures. <input type="checkbox"/> Construction Site Stormwater Runoff Control warning notice & notice of violation.
MCM 4: Actions completed / required based on annual assessment:	

MCM 5 – Post-Construction Stormwater Management	
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the City’s post-construction stormwater management regulatory mechanisms been reviewed and updated as necessary?
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have site plan reviews been documented and have site plan review procedures, templates, and checklists been reviewed and updated as necessary? <input type="checkbox"/> Site Plan Review Procedures <input type="checkbox"/> Site Plan Review Checklist
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have violations and follow-up actions been documented and have the post-construction stormwater management enforcement response procedures been reviewed and updated as necessary? <input type="checkbox"/> Post-construction Stormwater Management enforcement response procedures.
<input type="checkbox"/> Yes <input type="checkbox"/> No	Were any mitigation projects approved, implemented and documented?
MCM 5: Actions completed / required based on annual assessment:	
MCM 6 – Pollution Prevention/Good Housekeeping for Municipal Operations	
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has the City’s facilities inventory been reviewed and updated?
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have BMPs been reviewed and implemented for inventoried facilities, municipal operations, and MS4 discharges to Source Water Protection Areas?
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have the pond assessment procedures and schedule been reviewed and updated as necessary? The City completes a pond assessment each via its SWAMP program when deciding which ponds to clean out. <input type="checkbox"/> A pond assessment was completed this year. <input type="checkbox"/> A pond assessment was not completed this year. The last pond assessment was completed in:
<input type="checkbox"/> Yes <input type="checkbox"/> No	Have structural BMP, pond, outfall, stockpiles, and storage and material handling area inspections and maintenance been completed and documented and have inspection and maintenance templates and checklists been reviewed and updated as necessary? <input type="checkbox"/> Structural BMP Inspection Checklist
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has appropriate staff training been completed and documented?
MCM 6: Actions completed / required based on annual assessment:	

Appendix H - B.9 - Compliance Schedule for an Approved Total Maximum Daily Load (TMDL) with an Applicable Waste Load Allocation (WLA)

 <p>Minnesota Pollution Control Agency 520 Lafayette Road North St. Paul, MN 55155-4194</p>		<p align="center"> Master List MS4 Permit TMDLs Spreadsheet Municipal Separate Storm Sewer Systems (MS4) Program Total Maximum Daily Load (TMDL) <i>Doc. Type: Agency Generated</i> </p>									
<p>Instructions: Use the Sort & Filter feature in Excel (Under the Home tab, in the Editing section for Excel 2010, click Sort & Filter and Sort A to Z) with the TMDL project name column highlighted to arrange by TMDL Project.</p>											
<p>Permittee name Vadnais Heights City</p>	<p>Preferred ID MS400057</p>	<p>TMDL project name Kohlman Lake TMDL</p>	<p>Waterbody ID 62-0006</p>	<p>Type of WLA Individual</p>	<p>Numeric WLA 0.77</p>	<p>Unit lbs/122 days</p>	<p>Percent reduction 22%</p>	<p>Flow condition N/A</p>	<p>Waterbody name Kohlman Lake</p>	<p>Pollutant of concern Phosphorus</p>	<p>Date approved 3/23/2010</p>

Date Obtained from MPCA Website: 2016-04-05



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