2040 Comprehensive Plan

DEEPHAVEN, MINNESOTA

2040 Comprehensive Plan
Deephaven, Minnesota

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I. INTRODUCTION

In 1995, the Minnesota State Legislature amended the Metropolitan Land Planning Act (MLPA) to require review of local comprehensive plans every ten years. The purpose of the amendment was to ensure that local fiscal devices and local controls are consistent with the plan, and to respond to changes in the regional system plans assembled by the Metropolitan Council.

In 1990 and 2000, the City of Deephaven complied with the 1976 Metropolitan Land Planning Act by preparing updated comprehensive plans and submitting them to the Metropolitan Council for review and approval. Since 2000, the plan update has been used to guide local decisions and it has served as a foundation for local zoning controls. Because of requirements of state law, changes in the community, and changes in the State and regional economy, the City is preparing this comprehensive plan as an update.

The Deephaven Comprehensive Plans completed in 1990 and 2000 contained four primary sections – **Planning Framework**, **Land Use**, **Public Facilities** and **Implementation**. For continuity purposes, this plan update will retain these same primary sections.

The following summarizes the four major elements of the comprehensive plan update.

PLANNING FRAMEWORK

In order to assemble the Land Use, Public Facilities and Implementation sections of the plan, it is first necessary to have an understanding of historical and future trends in population, economic activity and housing. It is also necessary to formulate a set of goals and policies that provide overall direction for preparation of the plan. The Planning Framework has two primary components:

Population, Household, and Employment Trends

What changes in Deephaven have occurred over the past ten years? How will these changes, coupled with regional, State and National trends affect Deephaven over the next decade? The Population, Economic Activity and Housing section provides information in response to these questions.

Goals and Policies

What is Deephaven's vision for the future? Formulating clear, concise goals supported by a series of policies is the means to address this issue.

LAND USE SECTION

Deephaven's current and future land use will be addressed by focusing on the following issues:

A. Protection Element

How can the City regulate the use and development of land and water in regard to:

- Natural water courses
- Wetlands
- Lakes
- Slopes and erosion
- Woodlands

B. Land Use Element

This element will include an analysis of the existing and proposed location, intensity, and extent of the use of land and water for residential, commercial, industrial and other public and private purposes.

C. Housing Element

This element will include an analysis of opportunities to meet existing and projected local housing needs, including the availability of land for future development.

PUBLIC FACILITIES SECTION

The Public Facilities Section considers the community's needs related to sanitary sewers, storm sewers, water, transportation and parks and open space. It explores the character, location, timing, sequence, function, use and capacity of existing and future public facilities. Specifically, it addresses existing and potential effects that projected growth and development may have on the following:

A. Transportation - A description, designation and scheduling of the location, function, and capacity of existing and proposed local public and private transportation services and facilities.

B. Public Utilities (Sanitary Sewer, Storm Sewer, and Water) - A description, designation, and scheduling of areas served or to be served by public sewer and water systems.

C. Parks and Open Space - A description, designation, and scheduling of improvements to existing and proposed parks and recreational open spaces within the City.

IMPLEMENTATION

Achieving the land use pattern and public facilities infrastructure addressed in the Land Use and Public Facilities Sections of the plan requires the delineation of specific implementation techniques. The goals and policies offered in the Planning Framework will be realized if they are supported by the following:

A. ***Controls -*** A description of necessary ordinance modifications including a schedule for the preparation, adoption, and administration of such controls.

B. ***Capital Improvements Program -*** Addressing transportation, sewers and water, parks and open space facilities.

C. ***Housing Implementation Program -*** Controls designed to help implement the housing element of the land use plan.

II. PLANNING FRAMEWORK

This section contains historical information and projections on demographic, social and economic characteristics. Unless otherwise noted, this data has been taken from the U.S. Census Bureau. Available data from the U.S. Census Bureau was taken from both the 2010 Census and 2010 American Community Survey.

Population, Household and Employment Trends

With a population decrease of 5.5%, down from a population of 3,854 in 2000, the City of Deephaven experienced slight decline over the past decade. The population is nearly the same as it was in the 1990 census, with a population 3,653 residents at that time. Table 1-1 compares the population of Deephaven with that of the State, County and Metropolitan Area.

(TABLE 1-1) - Population Trends 2000-2010

Category	2000	2010	00-10 Change
Minnesota	4,934,000	5,303,925	7.5%
Metropolitan Area	2,968,806	3,229,878	8.8%
Hennepin County	1,116,200	1,152,425	3.2%
City of Deephaven	3,854	3,642	-5.5%

Source: U. S. Census Bureau

Projections

The number of total households decreased from 1,373 in 2000 to 1,337 in 2010. Household size showed a slight decrease from 2.80 persons per household in 2000 to 2.72 persons per household in 2010. According to the Metropolitan Council, the number of households in Deephaven is expected to grow modestly in the foreseeable future while the population will slightly decline, reflecting a smaller average household size. Household size is expected to decrease from 2.72 persons per household in 2010 to 2.47 persons by the year 2040.

According to Metropolitan Council projections, employment opportunities in the City are expected to increase significantly (31%) in the next thirty years.

(TABLE 1-2) - Population, Household and Employment Projections

	2010	2020	2030	2040
Population	3642	3560	3490	3470
Households	1337	1360	1380	1400
Employment	688	830	880	900

Source: Metropolitan Council

Household Composition

Household composition has remained stable over the past decade (see Tables 1-3.1 and 1-3.2). While the total number of households has declined since 2000, married couples continue to occupy the largest percentage of households within the city.

(TABLE 1-3.1) - Household Composition

Household Type	2000	% of Total Households	2010	% of Total Households	Percent Change from 2000
Married Couples	985	71.7%	953	71.3%	-3.2%
Other Families	114	8.3%	105	7.9%	-7.9%
Non-Family	274	20.0%	279	20.9%	1.8%
TOTAL	**1,373**	**100.0%**	**1,337**	**100.0%**	**-2.6%**

(TABLE 1-3.2) - Other Families by Household Type

	2000	2010	Percent Change
Female Headed Household	81	73	-9.9%
Male Headed Household	33	32	-3.0%
Total	**114**	**105**	**-7.9%**

Source: U.S. Census Bureau

Age Trends

The population of Minnesota is aging, and Deephaven is no exception. According to the Minnesota State Demographic Center:

- The number of Minnesotans turning 65 from 2010 to 2020 (about 285,000) will be greater than the past four decades combined.
- Around 2020, Minnesota's 65+ population is expected to eclipse the 5-17 K-12 population, for the first time in history.
- The total number of older adults (65+) is anticipated to double between 2010 and 2030, according to projections. By then, more than 1 in 5 Minnesotans will be an older adult, including all the Baby Boomers.

  Deephaven's aging trends are similar in that the city saw growth in all 45+ age groups, and declines in all but one age group from 0 to 45 years. In 2000, the median age within the city was 40.5 years old, whereas in 2010, the median age was 46.1 years old.

(TABLE 1-4) - Age Distribution 2000-2010

Age	2000	% of Total Population	Percent Change from 1990	2010	% of Total Population	percent change from 2000
Under 5 yrs.	262	6.8%	-4.0%	196	5.4%	-25.2%
5 to 9	350	9.1%	24.1%	273	7.5%	-22.0%
10 to 14	376	9.8%	43.0%	314	8.6%	-16.5%
15 to 24	329	8.5%	-12.3%	387	10.6%	17.6%
25 to 34	238	6.2%	-47.5%	173	4.8%	-27.3%
35 to 44	732	19.0%	5.6%	412	11.3%	-43.7%
45 to 54	724	18.8%	19.1%	770	21.1%	6.4%
55 to 64	426	11.1%	17.7%	595	16.3%	39.7%
65 to 74	244	6.3%	9.4%	321	8.8%	31.6%
75 to 84	143	3.7%	57.1%	153	4.2%	7.0%
85 and older	29	0.8%	-3.3%	48	1.3%	65.5%
Total Population	**3,853**	**100.0%**	**5.5%**	**3642**	**100.0%**	**-5.5%**

Source: U.S. Census Bureau

Racial Demographics

Deephaven's racial demographics have remained stable over the last 10 years, with the majority white population slightly increasing from 97.3% in 2000 to 97.6% in 2010. During the same period, Hennepin County's non-white population increased from 19.5% of the total population in 2000 to 25.6% in 2010.

(TABLE 1-5) - 2010 Minority Population

Category	Hennepin County	Percent of Total Population	City of Deephaven	Percent of Total Population
White	856,834	74.35%	3,553	97.6%
Black or African American	136,262	11.82%	14	0.4%
Native American	10,591	0.92%	5	0.1%
Asian/Pacific	72,411	6.28%	33	0.9%
Other	38,878	3.37%	12	0.3%
Two or More Races	37,449	3.25%	25	0.7%

TOTAL	**1,152,425**	**100%**	**3,642**	100.0%

Source: U.S. Census Bureau

Economic Activity

Income

The City of Deephaven has a significantly higher per capita income than the Nation, State, Metropolitan Area and County (see Table 1-7). In 2010, Deephaven's per capita income of $73,669 was 205% that of Hennepin County's per capita income. During the period from 2000 to 2010, Deephaven's per capita income grew at a rate of 20.53%, which was comparable to that of the other jurisdictions mentioned above.

Household incomes are also heavily weighted towards the top end of the income spectrum (Table 1-8), with 63.1% of the households having incomes over $100,000 annually. Further, 41.8% of households have annual incomes of $150,000 or more, and 28.4% of households have annual incomes over $200,000.

Median household income for the City increased from $101,278 in 2000 to $124,205 in 2010. The 2010 household income is significantly higher than that of Hennepin County's median household income of $61,328.

(TABLE 1-6) - Comparative Per Capita Incomes 2000-2010

	2000	**2010**	**Percent Change**
United States	$21,587	$27,334	21.03%
State of Minnesota	$23,198	$29,582	21.58%
Metropolitan Area	$26,347	$32,852	19.80%
Hennepin County	$28,789	$35,902	19.81%
City of Deephaven	$58,544	$73,669	20.53%

Source: U.S. Census Bureau

(TABLE 1-7) - Household Income Distribution 2010

Category	**Percentage of Households in 2000**	**Percentage of Households in 2010**
Under $10,000	3.00%	2.90%

$10,000 to $14,999	0.40%	0.80%
$15,000 to $24,999	2.60%	3.00%
$25,000 to $34,999	5.40%	2.20%
$35,000 to $49,999	11.50%	4.70%
$50,000 to $74,999	13.20%	11.10%
$75,000 to $99,999	13.10%	12.30%
$100,000 or more	50.80%	63.10%
TOTAL	100%	100.00%
Median Household Income	$101,278	$124,205

Source: U.S. Census Bureau

Employment

Of those Deephaven residents that are employed, 62.6% fall within four categories; Professional Services, F.I.R.E. (Finance, Insurance, Real Estate), Educational Services/Health Care, and Manufacturing.

(TABLE 1-8) - Deephaven Employment 2010

Agriculture, forestry, fishing and hunting, and mining	10
Construction	175
Manufacturing	288
Wholesale trade	122
Retail trade	155
Transportation and warehousing, and utilities	31
Information	33
Finance and insurance, and real estate and rental and leasing	254
Professional, scientific, and management, and administrative and waste management services	295
Educational services, and health care and social assistance	349
Arts, entertainment, and recreation, and accommodation and food services	78
Other services, except public administration	61
Public administration	42

Civilian employed population 16 years and over	1,893

Source: U.S Census Bureau

Education

Deephaven's population is well educated as 62.8% of the adult population has attained a bachelor's degree or higher. By comparison, only 44.1% of Hennepin County has attained the equivalent level of education.

(TABLE 1-9) - Education Attainment – Population 25 years and over

	Hennepin County *% of Total*	**City of Deephaven** *% of Total*
Less than 9th Grade	3.4%	0.4%
9th to 12th Grade, no Diploma	4.4%	1.2%
High School Graduate	19.8%	11.9%
Some College, No Degree	20.5%	17.8%
Associate Degree	7.8%	6.0%
Bachelor's Degree or Higher	44.1%	62.8%

Source: U.S. Census Bureau

Housing

In 2010, the City had a total housing stock of 1,423 units. This is an increase of 14 units over the number of units reported in the 2000.

In 2010, the City had 102 renter occupied single family units, which is an increase of 79% of the single family rental units in 2000, when there were 57 renter occupied units. At 92.4% of all housing units, owner-occupied units continue make up the vast majority of housing units within the city.

(TABLE 1-10) – Occupancy and Owner Status

Status	**Units**	**Percent**
Occupied	1337	94%
Vacant	86	4%
Total housing	1423	100%

Source: U.S. Census Bureau

Status	**Units**	**Percent**
Owned	1,235	92.4%
Rented	102	7.6%

TOTAL	1,337	100.0%

Source: U.S. Census Bureau

Housing Age and Condition

Almost 21% of the City's existing single-family housing stock was built before 1940 (see Table 1-12). During the 1950s another 19.8% of the existing housing stock was built. In total, 48.2% of the city's housing stock was built before 1960.

(TABLE 1-11) - Single Family Housing Age

YEAR STRUCTURE BUILT	
Built 2000 or later	2.1%
Built 1990 to 1999	8.8%
Built 1980 to 1989	12.3%
Built 1970 to 1979	16.5%
Built 1960 to 1969	12.1%
Built 1950 to 1959	19.8%
Built 1940 to 1949	7.7%
Built 1939 or earlier	20.7%

Source: U.S. Census Bureau

Housing Values

In 2010, the median value for Deephaven's owner occupied housing was $598,400, which is 106% higher than the median value of $290,800 in 2000. For comparison, Hennepin County's median owner occupied housing value of $247,900 in 2010 is an increase of 73% over the 2000 median home value of $143,000. Table 1-18 looks at the Census breakdown of the value of homes in Deephaven and compares them from 2000 to 2010.

(TABLE 1-12) – Housing Value

Housing Value	2000	Percent of Total 2000	2010	Percent of Total 2010
Owner-occupied units	**1314**	**100%**	**1361**	**100%**
Less than $100,000	**32**	**1.1%**	**11**	**0.8%**
$100,000 to $149,999	**159**	**12.1%**	**10**	**0.7%**
$150,000 to $199,999	**177**	**13.5%**	**31**	**2.3%**
$200,000 to $299,999	**316**	**24.0%**	**95**	**7.0%**
$300,000 to $499,999	**377**	**28.7%**	**406**	**29.8%**

$500,000 to $999,999	**157**	**11.9%**	**546**	**40.1%**
$1,000,000 or more	**96**	**7.3%**	**262**	**19.3%**
Median (dollars)	**$290,800**		**$598,400**	

Building Permit Activity

Between January 1, 2010 and January 1, 2017, the City of Deephaven issued 74 building permits for new home construction. Of those permits, 58% had values for structures that exceeded $500,000. Twenty four houses (32%) had construction values exceeding $700,000, and eleven houses (15%) had construction values exceeding $1,000,000.

For the sake of comparison, between January 2000 and February 2007, the City of Deephaven issued 59 building permits for new home construction. Of those permits, approximately 30% had values for structures that exceeded $500,000.

Protection Element/Goals and Policies

GOALS

1. Protect natural resources which serve vital functions in the city, such as drainage ways, wetlands, and other environmental features.

2. Maintain natural features and major assets such as lakes, woodlands, drainage ways, slopes and wetlands.

Natural Watercourses

POLICIES

1. Natural drainage patterns shall be preserved whenever feasible. Existing watercourses or drainage ways shall be maintained to handle storm water runoff.

2. Subdivision regulations shall require protection of drainage ways or watercourses as part of the development plan through easements or land dedication.

Wetlands

POLICIES

1. Alteration of any wetland identified on the City's current official wetland map dated July 1971, which will inhibit its role in the hydrologic or ecological role in the hydrologic or ecological systems shall be prohibited.

2. Subdivision regulation shall require the protection of wetlands as part of public or private development.

Lakes

POLICIES

1. Continue to maintain or exceed Department of Natural Resources shoreline standards through locally adopted shoreland ordinance requirements.

2. Incorporate Lake Minnetonka Conservation District (LMCD), Riley Purgatory Creek Watershed District and Minnehaha Creek Watershed District standards regarding storm water runoff into City ordinances.

3. Prepare a Stormwater Management Plan consistent with the Minnehaha Creek Watershed District's and Riley-Purgatory-Bluff Creek Watershed District's Chapter 509 Plan.

Slopes

POLICIES

1. No structure will be allowed on slopes which are susceptible to severe erosion (>30%): These slopes shall be maintained in a natural state and regulations shall require preservation of vegetative cover to minimize erosion problems.

2. Development controls shall be adopted to minimize erosion on slopes that are subject to moderate erosion (12 - 30%). Controls will require replacement of all vegetative cover on these slopes to minimize erosion problems.

3. During construction, the soil shall be left bare for the shortest time possible and techniques shall be employed to trap sediment.

4. Shoreline protection and stabilization will be the individual property owner's responsibility.

Woodlands

POLICIES

1. During public or private construction, the removal of trees, shrubs and groundcover should be minimized. Trees to be saved should be protected by fencing.

Aggregate Resources

POLICIES

1. There are no aggregate deposits of significant commercial potential in the City. Due to the fact the city is fully developed, there is no need to review the City ordinances to address aggregate mining.

Housing Element/Goals and Policies

GOALS

1. Encourage safe, healthy and quality housing that respects the natural environment of the community.

2. Encourage the development of housing for the elderly in the south shore area.

3. Encourage residents to maintain and/or improve older homes which will promote diversity of housing in Deephaven.

POLICIES

1. Deephaven may continue to place an emphasis on the maintenance of the community's varied housing stock. The City may consider alternatives including but not limited to housing maintenance codes, rental unit inspection, added maintenance enforcement and/or point of sale inspection.

2. The City of Deephaven may adopt land use regulations that allow the development of a variety of housing types and costs and that allow flexibility in design and site planning.

Land Use Element/Goals and Policies

GOALS

1. Residential: Maintain neighborhoods characterized by larger single family lots supplemented with some housing diversity.

2. Commercial:
   A. TH 7 and Vine Hill: an upgraded commercial area limited in size to its current boundaries, characterized by attractive landscaping and building design.

   B. Chowen's Corner: a commercial area of limited size offering low traffic-generating specialty shops and offices which are characterized by attractive landscaping and building design.

   C. Highway 101 Commercial Area: an upgraded commercial area, free of all non-conforming uses, characterized by attractive landscaping, screening of abutting residential areas and attractive building design.

POLICIES

1. Residential: Continue the present policy of allowing residential development on substandard sized lots, which existed prior to the Zoning Ordinance dated July, 1971.

2. Commercial:

   A. Establish specific aesthetic standards for building architectural design, landscaping, parking, access, buffering, and signs.

   B. Allow only uses in the zoning ordinance which are compatible with the identified goals for Chowen's Corner, especially with regard to building size and traffic generation.

   C. Encourage reinvestment in the present commercial zoning district.

   D. Examine the use of tax increment financing and other development tools to promote continued commercial development and create incentives for better utilization of existing commercial structures.

   E. Along TH 7 and Vine Hill Road, allow commercial development consistent with adopted goals and existing zoning.

Parks and Open Space Element/Goals and Policies

GOAL:

1. Establish a park, recreation and open space system that conserves natural resources, protects environmentally sensitive areas, and fulfills the recreational needs of the citizens of Deephaven.

POLICIES:

1. Develop and maintain a park system and open space plan which complement the development pattern of the City of Deephaven.

2. Provide open space areas which assist in the conservation and protection of ecologically sensitive areas.

3. Provide a balanced park system which includes neighborhood parks, community parks, special use facilities, schools, and open space areas.

4. Encourage citizen participation in the planning and development of park and open space areas.

5. Continue to seek assistance from citizens and community groups in the planning and development of recreation areas.

6. Encourage a cooperative effort between the school district and the city in the acquisition, development and usage of recreational facilities.

7. Provide park and open space areas that emphasize accessibility.

8. Continue to improve and upgrade the Deephaven park system to keep pace with the changing needs of the community's population.

Solar Element/Goals and Policies

GOAL:

1. Encourage the use of solar energy systems for the purposes of space heating and cooling and hot water heating in new residential developments.

POLICIES:

1. The City will review its Code and consider appropriate amendments to allow swimming pools be heated using solar or some other form of renewable energy resource, where possible.

2. Within Planned Unit Developments, the City will consider varying setback requirements in residential zoning districts as a means of protecting solar access.

III. LAND USE SECTION

As described in the Introduction, the Land Use Section will contain three primary elements: the Protection Element, Land Use Element, and Housing Element. These elements will describe the present and projected picture of Deephaven's overall land use.

Existing Use of Land

Deephaven has evolved from a haven for summer lakeside homes into a group of distinct year-round residential neighborhoods, which account for 88% of the area's land use. Commercial development exists at two locations and constitutes slightly more than 1% of the land area. Parks, Institutional, City Property, and Multi-family account for the remaining land use categories. (See Attachment C).

Regional Growth Policy

According to the Metropolitan Council's Projections, between 2010 and 2040, Deephaven is expected to see a modest population decline of 5% from 3,642 residents to an estimated 3,470 residents. Over that same time period, the number of households is expected to expand slightly, from 1,337 to 1,400. This implies that Deephaven will have a minor future impact on metropolitan-wide systems such as transportation, sewers, and parks, principally due to the fact that the community will experience limited future growth.

Protection Element

This element of the Land Use Section identifies and assesses some of the more critical environmental features and historic sites. Effective protection of these areas requires more than identification, it requires an understanding of their importance. Municipal planning has changed significantly in recent years, and one phase of local planning which has gained considerably more recognition is the preservation of what is often referred to as "sensitive lands" and historic sites. "Sensitive lands" includes certain soil types, woodlands, floodplains, natural water courses, wetlands, and steep slopes; and the emphasis has been on developing standards which will allow these areas to perform their natural functions. The misuse of sensitive land can result in both destruction of private property and increased public cost related to construction of corrective measures. (The topic of soils is not addressed in this plan since there are no environmental constraints on the soil of the few acres of remaining undeveloped land).

Historic sites are locations and/or buildings whose past significance or current uniqueness demand their preservation as a part of community continuity and character. The failure to recognize and preserve historic sites can lead to a more sterile environment in which little identity can be found.

Historic Sites Inventory

Deephaven was once a place of Indian culture, and later, the site of unusual summer homes and hotels. Most historical evidence has been lost over the years due to development and redevelopment that has occurred. For example, the Chimo site was

once the location of an historic structure, but the current structure is not recognized by either the state or national historic preservation societies. The Minnesota State Historical Society has confirmed that there are no recognized sites of architectural or historical significance in Deephaven. Indian burial mounds existing within the community are required to be preserved by State law. The fact that Deephaven doesn't have sites currently listed on the National Register doesn't mean that there are no historic sites in the community. For example, the Cottagewood Store is considered locally historic.

Historic Sites Plan

Places and structures, that are not now "historic", may eventually be considered significant. If sites of historic interest are identified in the future, the City should take appropriate steps to ensure preservation

Environmental Features

Because of the extent of the existing development pattern, preservation of environmental resources may be less a concern in Deephaven than in less developed communities. Despite this fact, environmental features should be protected during development of the remaining vacant land within the community and during potential future redevelopment.

Natural Watercourses Inventory

Watercourses (creeks, streams) are not only attractive recreation areas, but they also function as natural storm sewers and provide habitat for wildlife. Although there are no streams or creeks as such in Deephaven, there are a few significant drainage ways. These areas provide valuable collection and filtration systems for storm water runoff.

The two main drainage ways in Deephaven are:

1. The headwaters of Purgatory Creek which begins near Spring Creek Drive in the plat known as The Thicket. The water flows northeasterly to the city of Minnetonka and, eventually, Purgatory Creek.

2. Heathcote Farm Park drains through channels and culverts to ponds at the Heathcote Road cul-de-sac, and down to the railroad tracks. These waters also flow southeasterly from here to Purgatory Creek.

In addition, less well defined water flows in the following areas:

1. Runoff from the Grace Church parking lot and surrounding areas runs west to the marshy area east of Lake Louise.

2. The ditch, south of the LRT, carries storm water runoff.

Natural Watercourses Plan

Natural drainage ways that are identified on the map should be preserved in their natural state to help maintain high quality storm water runoff standards, while minimizing public investment in storm sewers.

Preservation of natural watercourses is an essential part of any program to minimize public investment in storm sewers and improve the quality of storm water runoff. However, the conservation efforts must extend beyond the streams and creeks themselves, and consideration must be given to the entire watershed, including wetlands, lakes, and ground water resources. The City has prepared a Local Stormwater Management Plan that will serve as a policy document and detailed plan to enhance overall water quality. The plan will conform to the guidelines established by the Minnehaha Creek and Riley-Purgatory- Bluff Creek watershed districts.

Wetlands Inventory

Wetlands are low lying areas, which are normally covered with shallow or intermittent waters. Swamps, marshes, bogs, and other low lying areas are all wetlands, and may occur as part of a river, stream, drainage ways, or as a freestanding low area. Wetlands that provide desirable open space and wildlife habitat also provide a natural filtering system and storage basin to absorb and hold storm water runoff. They reduce soil erosion and flood potential.

Both the State and Federal governments heavily regulate wetlands. In Minnesota, agencies regulating wetlands include the Army Corps of Engineers, the Board of Soil and Water Resources (BWSR), the Department of Natural Resources (DNR), the watershed districts and municipalities. In general, wetlands or wetland alterations exceeding a total area of 400 square feet are subject to a variety of regulations. In most urban areas, any alteration of wetlands must be replaced at an acre ratio of 2 to 1. As a matter of practice, the City of Deephaven rarely permits the alteration of wetland areas and reserves the right to permit such alterations on a case by case basis. Restrictions generally apply to all of the following wetland categories:

Type 1. SEASONALLY FLOODED BASIN OR FOREST: The soil is covered with water or is waterlogged during variable seasonal periods but usually is well-drained during much of the growing season.

Type 2. INLAND FRESH MEADOW: The soil is usually waterlogged within a few inches of the surface throughout the growing season.

Type 3. INLAND SHALLOW FRESH MARSHES: These principal production areas for waterfowl are often found bordering deep water marshes, or as seep areas on irrigated lands.

Type 4. INLAND DEEP FRESH MARSHES: Six inches to 3 feet of water bear water lilies, duck and pond weeds and cottontail.

Type 5. INLAND FRESH OPEN WATER: Less than 10 feet of water may sustain permanent populations of fish and migratory waterfowl.

Type 6. SHRUB SWAMPS: Waterlogged areas along sluggish streams and floodplains, supporting dogwood, willow, alders and many forms of wildlife.

There are an abundance of wetlands in Deephaven. Some are found along the edges of the lakes, while others are in upland depression areas where they serve as retention and sedimentation ponds. Areas that are protected by the present wetland ordinance are identified on the Natural Watercourses/Wetlands map.

Wetlands Plan

1. The present wetland ordinance does allow some dredging or filling, however, specific standards for such activity are not stated. Alteration of all wetlands should comply with the requirements of all applicable State, Federal, regional and local agencies.

2. Because of fluctuating water levels, buildings should be a minimum of 2 feet above the known or projected high water mark of wetland areas.

Lakes Inventory

Lakes are a source of concern when altered by surrounding development. High levels of precipitation can inundate abutting land, while adjacent streets and parking lots may produce runoff containing polluting substances. Thus, all discharge into and withdrawal from lakes should be carefully regulated and monitored.

l. Since Deephaven's character and unique value derive largely from its setting on the shores of Lake Minnetonka, and from several smaller lakes in the community, the following specific concerns and issues are raised:

a. Runoff from streets and parking lots introduces contaminants into lakes and drainage ways.

b. There is the possibility of inundating abutting land areas with water during floods.

c. Water courses could be used for roads, driveways, and utilities without proper precautions.

2. The three agencies concerned with water quality in the Deephaven area are the Lake Minnetonka Conservation District (LMCD), the Department of Natural Resources (DNR) and the watershed districts. These organizations and the standards and regulations which they promulgate are described below.

The Lake Minnetonka Conservation District (LMCD) has regulations regarding docks, and policy statements regarding stormwater runoff and quality.

The Department of Natural Resources (DNR) regulates shoreland throughout the State. Its lake protection classifications apply to the 3 lakes in Deephaven. Lake Minnetonka is classified in the most densely developed, multiple use category of lake (General Development), while Shavers Lake, and Lake Marion are classified in the more moderately developed category of Recreational Development.

In 1993 the City of Deephaven adopted a new Shoreland Management ordinance which regulates development within 1000 feet of any of the classified lakes. The ordinance also contains lot size restrictions, setback provisions and limits amounts of impervious cover. Deephaven's ordinance was approved by the DNR and is somewhat more restrictive than the statewide standards.

The Minnehaha Creek Watershed District (MCWD) and the Riley Purgatory Creek Watershed District (RPCWD) have review powers over many aspects of lake protection. Their jurisdiction in Deephaven includes attention to policy statements and regulations concerning the following:

- flood plains
- stream and lake crossing
- dredging in or dredging related to water areas
- other work in beds and levels of water areas
- municipal drainage plans
- land use and soil characteristics
- withdrawal of waters
- placement of structures on lots riparian to public waters
- erosion and sediment control

Lakes Plan

1. The city has adopted a Shoreland Management Ordinance that exceeds the minimum requirements of the DNR's Shoreland Regulations, in terms of minimum required lake setback and maximum permitted impervious surface.

2. The city is currently working with and will continue to work with the MCWD and the RPCWD to implement their policy statements, and regulations.

3. The city should work with the cities of Woodland and Minnetonka in regard to water quality and drainage conditions for Shaver's Lake.

Woodlands Inventory

A woodland differs from a forest because of its smaller land area. Woodlands are the basis of much of what is "scenic" in landscape and function as windbreaks, water and air filters, and temperature moderators. Deephaven's Woodlands cover a majority of the total land in the community and therefore contribute greatly to the character of the community.

While larger tracts of trees are sometimes protected by Federal and State preserves, significant amounts of woodland areas are subject to the potential threat of urban development. Other threats to woodlands that are more significant for Deephaven are disease and natural disaster. Communities have had some success controlling Dutch Elm Disease and Oak Wilt by developing effective sanitation programs. Sanitation programs typically require semi-annual inspections to identify diseased trees.

Woodlands Plan

Total preservation of woodlands or forests may not be desired or in the best public interest. However, a choice need not be made between total preservation or nothing at all. Care and attention to proper preservation and use of woodland areas should include the following steps:

1. Controls for New Development:
   Encourage minimal tree removal, and maximization of replanting when affected by public or private development.

2. General Controls:
   Prohibit clear cutting based on slope and soil conditions.

3. Disease Control and Replanting:
   Diseased trees will be removed from public property by the city, and the city will require homeowners to remove diseased trees from private property.

Slopes Inventory

Regulating development on hillsides is a concern in the Lake Minnetonka area because of the varied topography. Slopes, if abused through ill-considered development practices, could be stripped of their natural protective functions. As people seek out choice residential sites and as some lots are further subdivided, there will be increasing pressure for hillside development. The slope, soil, vegetation and underlying geological formation of the hillsides determine the stability and susceptibility of the soil to erosion. Removal of vegetation from slopes alters the soil stability and increases erosion and siltation. Although there are no severe problems in Deephaven, measures should be taken to avoid them in the future.

Four major areas where severe slopes occur in Deephaven are:

1. The northwestern part of the community around Lake Louise and down Northome Parkway

2. The Heathcote area

3. Following the eastern shore of Lake Minnetonka and inland approximately 1.4 miles from Carson’s, St. Louis, and Robinson's Bay.

4. The area to the south of Carson’s Bay

Slopes Plan

In Deephaven, because of the presence of slopes and susceptibility of these areas to erosion, steep slopes should be identified. Since poorly designed or constructed developments on hillsides frequently result in a substantial cost to the public, adoption of development standards is necessary.

Slopes of 18% or more are susceptible to erosion. Slopes that are prone to severe erosion (30%) should be protected as permanent open space. Those slopes that are subject to moderate erosion (18% to 30%) can be developed if there is proper enforcement of appropriate standards. Preservation of erodible slopes is important, not only from an environmental and economic standpoint, but also for aesthetic reasons.

Slopes shall be protected by providing that:

1. There shall be no alterations of slopes greater than 30%.

2. Structures should be allowed on slopes that are susceptible to erosion only if proper precautions are observed.

3. Vegetative cover should be preserved to minimize erosion problems.

4. Shoreline properties with banks that have a 12% slope should require permits for construction.

5. Development controls have been adopted to minimize erosion and slippage.

6. Soil should be exposed for the shortest possible time and sediment trapped during construction.

7. Shoreline protection and stabilization should be the individual property owner's responsibility and not the City of Deephaven's.

Land Use Element

This element of the land use section examines the existing and projected use of residential and commercial land. With the exception of parks and public uses, residential and commercial uses are the only two general land use categories used in the comprehensive plan. Although some small industrial uses currently exist, they are not in conformance with existing zoning requirements and the plan does not designate future industrial uses.

As can be seen on the Existing Land Use Map, Deephaven is predominately residential in nature with very little land devoted to commercial use. The City's land use plan establishes land use districts that are compatible with the goals and policies found earlier in this document.

A review of the residential and commercial land use categories includes, 1) inventory/observations, 2) plan recommendations, and 3) proposed land use district standards

Residential Inventory/Observations

Deephaven is characterized by single-family neighborhoods with orientation to Lake Minnetonka, wetlands and other natural features. Housing types vary from converted summer homes, to new subdivisions and large estates. An inventory of residential land use in Deephaven indicates the following general conditions:

1. Due to the lack of vacant residential land, increasing pressure may occur for re-subdivision of existing neighborhood areas. The City first experienced this trend in lakeshore areas. In a number of instances, smaller homes were acquired and demolished to allow the construction of larger homes.

   This activity impacts both the neighborhood and the community's housing stock. Large housing may be out of character with the surrounding neighborhood. Additionally, the demolition of existing homes and the combination of lots to form larger building parcels reduces the quantity of more affordable homes in the community.

2. In the neighborhoods of Deephaven Park and Cottagewood:

   a) Various lots are non-conforming due to size since many of the original lots were platted at 7,500 - 10,000 square feet

   b) The City receives frequent variance requests because of lot widths and required setbacks.

Residential Plan

The focus of Deephaven's residential plan is to maintain the single-family character of the community while providing for needed residential diversity by:

1. adopting planned unit development (P.U.D.) standards that allow flexibility for preserving environmental assets and provide a variety of housing types
2. encouraging re-investment in single family housing
3. Support programs that enable seniors to remain in their homes i.e. HOME, Rake-a-Thon programs.

Residential Land Use Districts

In order to implement the plan, three residential land use districts will continue to be used. They include:

RESIDENTIAL LOW DENSITY (RL)

The residential low density (RL) designation identifies areas that have been developed at
the lowest residential densities in the community. Guidelines and criteria for the RL residential areas include:

RL Guidelines and Criteria

- Units Per Acre: .75
- Type of Development: Single-family detached dwellings
- Minimum Lot Area: 60,000 square feet

RESIDENTIAL MEDIUM LOW DENSITY (RML)

The residential medium low density (RML) designation of the Plan identifies areas to be developed at low residential densities in Deephaven. The following are guidelines and criteria for development within the RML areas.

RML Guidelines and Criteria:

- Units Per Acre: Up to one
- Type of Development: Single-family detached dwellings
- Minimum Lot Area: 40,000 square feet

RESIDENTIAL MEDIUM DENSITY (RM)

Development in the medium range of residential single-family land use is identified by the RM designation.

RM Guidelines and Criteria:

- Units Per Acre: Two
- Type of Dwelling Unit: Single-family detached.
- Minimum Lot Area: 20,000 square feet

RESIDENTIAL MEDIUM DENSITY PUD (RM-PUD)

Development in the medium range of residential single-family land use is identified by the RM-PUD designation.

RM Guidelines and Criteria:

- Units Per Acre: Six to Eight
- Type of Dwelling Unit: Single-family attached.
- Minimum Lot Area: Variable
- Facilities: Local private recreational facilities provided by the developer during the first stage of occupancy.

MULTIFAMILY MEDIUM DENSITY PUD (MF-PUD)

Development in the medium range of residential multi-family land use is identified by the RM-PUD designation.

MF Guidelines and Criteria:

- Units Per Acre: Six

- Type of Dwelling Unit: Multi-family attached.
- Minimum Lot Area: 14
- Facilities: Local private recreational facilities provided by the developer during the first stage of occupancy.

Commercial Inventory/Observations

Commercial areas in Deephaven provide a limited range of commercial goods and services. The largest commercial area in the community is Deephaven's "downtown" area, Chowen's Corner. Chowen's Corner consists mainly of specialty shops, service businesses and offices. Smaller commercial areas occur along TH 7 at Vine Hill Road and along TH 101.

1. Chowen's Corner

Chowen's Corner has seen gradual improvement via new commercial tenants. In general, the area is active and most of the buildings are currently occupied. Specific observations on the area include:

a. Small pockets of older commercial development lack design controls, landscaping, and aesthetic amenities, although some natural foliage and fencing exist. Signage in the area needs further coordination.

b. There is no major or anchor tenant in the existing commercial area.

c. Fragmented development has caused a lack of continuity and relationship among existing buildings. Although some common building forms exist, there is no consistent style or theme such as the use of awnings, complimentary signage, etc.

d. There is limited potential for expansion of this area due to the surrounding residential area and an existing church to the south. The commercial real estate market does not warrant expansion of the area.

2. Highway 101 Commercial Area

The commercial area along the west side of County Road 101 currently contains two general areas, one with commercial structures and the other with residential development. There are two commercial structures located directly adjacent to County Road 101. One is a multi-tenant, brick office building with extensive landscaping. The other is a concrete masonry building housing an automotive service center. There are single family homes located directly north of the multi-tenant office building and a twenty-eight unit townhouse development known as Deephaven Cove. (Deephaven Cove was approved under the Planned Unit Development regulations adopted by the city and replaced a number of smaller commercial structures which had housed several non-conforming uses.)

3. Vine Hill and Highway 7 Commercial Area

Characteristics of this commercial area include:

a. The major portion of this commercial area is in Shorewood where uses range from storage garages to a gas station.

b. Small, miscellaneous commercial uses in Deephaven include:
   - insurance office
   - real estate office
   - automotive and muffler shop

c. There is no area for commercial expansion at Vine Hill Road and TH 7 in Deephaven

Commercial Plan

In Deephaven, the primary concern in planning for commercial areas involves maintaining and enhancing existing areas rather than planning for development of new areas. The City intends to continue its conscious effort to improve existing areas. Specific efforts to upgrade each of the City's commercial areas are as follows:

1. Chowen's Corner

Chowen's Corner serves as Deephaven's downtown area. As such, it contributes to the local economy by providing jobs and tax base while helping to shape the City's identity. Since the area is important to the community, it is necessary to continue to pursue measures that will help the area to remain strong and viable. The intent of these measures is to create incentives that will increase the chances of investment and improvement in vacant land, unoccupied buildings, and existing retail facilities. Over the course of the next 10 to 15 years, the function of Chowen's Corner is expected to remain essentially unchanged. The area is not likely to have an anchor tenant and commercial and retail uses are likely to provide convenience goods and services rather than major purchase items.

Further recommendations for Chowen's Corner include the following: Examine the use of tax increment financing and other redevelopment tools to promote continued improvement of existing commercial properties in the area.

2. Highway 101 Commercial Area

The TH 101 commercial area is surrounded by residential land uses. The area presently contains only two commercial properties: an office/retail building and an automotive repair shop. Short and long term recommendations for the area include the following:

a) Prohibit any further expansion of existing non-conforming uses. Enforce existing zoning provisions and require any new businesses to comply with all zoning requirements.

b) Maintain zoning to support the existing commercial uses in the area.

c) Maintain a buffer between the commercial area and the adjacent residential neighborhood.

3. Vine Hill Road and Highway 7 Commercial Area
Any future building development or redevelopment in the Vine Hill Road/TH 7 area should include quality building materials and appropriate landscaping treatments.

Commercial Land Use District

In order to implement the plan, the following commercial districts will continue to be used in the zoning ordinance.

LIMITED COMMERCIAL (C1)
Provides a high quality, restricted commercial use area providing retail sales and services directly oriented to the residents of Deephaven and surrounding communities. Development should conform to the highest standards of architectural design and landscaping treatment.

Type of Development: Retail stores, professional offices, and low intensity customer service businesses.

GENERAL COMMERCIAL (C2)
Provides a high quality commercial use area including goods and services oriented to the general public. Development should conform to the highest standards of architectural design and landscaping treatment.

Type of Development: Retail stores, professional offices, and minor automobile service.

Housing Element

Because Deephaven is fully developed, the mix of housing will not change significantly over the next two decades. A few new single-family building sites will become available due to minor subdivisions of existing larger lots. As a result, the focus of the community's future housing efforts will be on maintenance of the existing housing stock, on allowing infill development where it complies with zoning regulations, and supporting the development of additional housing choices in the greater Lake Minnetonka area.

Household Characteristics

According to the decennial census, the City of Deephaven has experienced a slight decrease in the number of households from 1,373 in 2000 to 1,337 in 2010. Household size decreased from 2.8 persons per household in 2000 to 2.7 persons per household in 2010. Since 2010 however, the 2015 American Community Survey estimates show an uptick in both household numbers (1352) and household size (2.8).

Housing Composition

According to Census numbers, in 2010, the City had a total housing stock of 1,423 units. This number does not take into account the 78 multi-family rental units at Deephaven Woods Senior Living which were constructed in 2014. Accounting for those units, the City has 1,501 housing units. This represents a 6.5% increase in the number of units identified on the 2000 census.

The vast majority of units (93.6%) within the city are single-family detached housing units. There are also 16 attached single-family units, 1 duplex, and the 78 multi-family units mentioned above. Using the numbers provide by the Census, of the total housing units, 92.3% are owner-occupied. (Factoring in the Deephaven Woods units, the owner-occupied percentage drops to 82.3%.)

Contract Rent

Table 1-19 compares Deephaven's contract rent with that of the County. The table shows that Deephaven's rental distribution is towards the higher cost rental units. This can partially be accounted for by the fact that the only rental units in Deephaven captured by Census data are single family houses. Other rental units within Deephaven (although not captured by the Census data) are senior, assisted living units which are costly due to the additional services provided for the residents.

(TABLE 1-19) - 2010 Contract Rent

	City of Deephaven			Hennepin County	
Less than $200	0	0%	**Less than $200**	4,319	3%
$200 to $299	0	0%	**$200 to $299**	6,992	4%
$300 to $499	0	0%	**$300 to $499**	8,653	5%
$500 to $749	0	0%	**$500 to $749**	39,565	25%
$750 to $999	0	0%	**$750 to $999**	46,365	29%
$1,000 to $1,499	11	34%	**$1,000 to $1,499**	39,595	25%
$1,500 or more	21	66%	**$1,500 or more**	15,482	10%
Total	32	100%	**Total**	160,971	100%
Median rent	1750	(X)	**Median rent**	853	(X)

Source: U.S. Census

Housing Needs

Forecasts prepared by the Metropolitan Council predict that Deephaven will add 63 households between 2010 and 2040. As mentioned above, the city has 1,423 single family housing units available which is more than enough to accommodate growth projections. An additional 78 units of multi-family senior assisted living are also part of the city's housing inventory that could accommodate the household projections.

Additional households will be added through subdivisions of existing lots and construction on currently vacant lots. An increase in property values within the city has made these last two scenarios more likely, with the city recently seeing construction on several of the few remaining vacant lots within the city.

While the city expanded its multi-family housing stock with the addition of Deephaven Woods Senior Living's 78 units, current conditions make further significant changes in housing composition unlikely. This is due to the lack of land available for new types of residential development.

The city's older housing stock is gradually being replaced by new housing, particularly on lakeshore lots, but also within the neighborhood interiors. 133 new homes have been built within the city since 2000 representing 9.3% of the total housing units.

Future Housing Demand

A number of current trends are likely to impact future housing demand in the City of Deephaven. These trends include:

Life Cycle Evolution: As people move through the different stages of life they develop different housing needs. This process is known as life-cycle housing. A young person getting out of school usually can't afford a home and begins by renting. As people grow older, they establish a family and buy their first home, typically either a town home or a small starter home. As families grow and household income increases, they move up into a larger home. Once the children leave the house, many families downsize and move back to smaller homes, frequently attached, with less maintenance needs. Finally they reach retirement and possibly desire or need an assisted living housing type.

Deephaven accommodates some of the housing styles in the life-cycle chain. The community has a supply of older, smaller, more affordable homes and a much larger supply of move-up housing that is higher value, single-family detached homes. Deephaven has also added several dozen units of assisted living housing for seniors. Because of limited vacant land supply, the community is unable to offer housing that appeals to other segments of the life-cycle evolution.

The Baby Boom Generation: The baby boom generation was born between 1940 and 1960. This large population cohort is a driving force in the economy and is expected to continue to be so for at least the next ten years. Their housing needs are changing as well. Those who are in the 40's age group are living in the largest home of the life cycle chain and will be seeking to downsize in the next 10 to 20 years. Those residents who are in their 50's are looking to downsize in the next 10 or so years while those in their 60's are driving the demand for one level townhome and senior housing today.

As this generation moves into the next cycle of housing, they leave behind the larger single-family homes. The population cohort that followed the baby boom era is much smaller and when the baby boomers all begin to downsize at once in the next 10 or 20 years, regionally, there will be an excess supply of larger single family homes.

Amenities in and around Deephaven are expected to help sustain the demand for larger single-family homes despite an abundant regional supply of such housing.

Rental Housing

Deephaven has two primary forms of rental housing: senior assisted living, and single family rental. Current census estimates show 102 units of single-family rental, and 78 units of multi-family senior assisted living rental. The single-family rental housing is market-driven and likely to fluctuate based on economic conditions. Multi-family housing availability is likely to remain substantially unchanged for the foreseeable future.

The rental housing stock in the City of Deephaven, as well as throughout much of the metro area, is an aging housing stock and is need of continual maintenance

Housing Plan

The City of Deephaven recognizes that the community will have a number of housing needs over the next 10 to 20 years. The development pattern of the community and the form of the existing housing stock make it practically impossible to significantly change the current composition of housing stock within the boundaries of the city. Therefore, future housing efforts will be focused both outside and within the limits of the City of Deephaven.

Livable Communities Program

Deephaven currently does not participate in the Livable Communities Program. The City will continue to monitor the program and will periodically assess participation in the program. The City does provide information on financial resources and economic assistance that may be available through the County HRA or Minnesota Housing Finance Agency.

Housing Maintenance code/Code Enforcement

The City currently enforces building and zoning codes as measures to require and encourage property maintenance. The City will consider the need for broader housing maintenance codes for rental housing. If a housing maintenance codes are considered, the process should include members of the real estate, home building, remodeling and property management community in addition to city staff and decision makers.

Rehabilitation/Renovation Programs

A number of programs are currently available for housing rehabilitation and renovation. As a communities housing stock ages, it is increasingly important to provide low to moderate income residents with the resources needed to be able to put a new roof on, replace old windows, replace deteriorated siding, replace outdated mechanics and other maintenance issues facing older homes. In addition to housing rehabilitation, many homes need renovation to meet the needs of changing household demographics. Older homes often fit the bill for first time home buyers and this sometimes mean a transition from an elderly single person to a young family having children. Housing needs and tastes between these generations are different and can be accommodated through remodeling and renovation.

Affordable Housing

The Metropolitan Council has forecast affordable housing needs for all cities and townships within the Twin Cities Metropolitan Area for the period from 2021-2030. Based on a portion of the total housing need for the metro area, the affordable housing allocation for the City of Deephaven is calculated at 10 affordable housing units, including 5 units at 30%-50% Area Median Income (AMI) and 5 units at or below 30% AMI.

The City of Deephaven acknowledges the Metropolitan Council's desire to help create more affordable housing, and the city is supportive of these goals. The city would be open-minded to any viable affordable housing proposal that met these goals. However, guiding land at 8 to 12 dwelling units per acre is as likely to undermine the affordable housing goal as to enhance it.

Deephaven has few viable parcels within the city to accommodate the appropriate density, particularly since the city is not served by public water. Due to housing demand in the area, if such housing density were guided, the likely outcome for such a property would be high density/high income housing. This would undermine goals of the Metropolitan Council while simultaneously removing one of the few viable parcels within the city from ever being developed as affordable housing.

The City of Deephaven recognizes that not guiding land at the requested densities to meet the allocation of affordable housing will forfeit the city's participation in Livable Communities Act programs.

Infrastructure Improvements

An important part of maintaining strong neighborhoods and strong housing opportunities is ensuring quality infrastructure including streets, and utilities. Old streets that are poorly maintained show a lack of investment into the community while maintaining streets will (in some cases) encourage upkeep of housing. The City should continue to implement a street maintenance program throughout the community.

IV. PUBLIC FACILITIES SECTION

Sanitary sewer, storm sewer, water, transportation, and parks comprise the major categories of public facilities which will be addressed in this section. Since Deephaven is approaching full development, existing utilities (except water), roads and parks are accessible to all areas of the community. This situation results in planning that is oriented toward maintaining and improving existing facilities rather than planning for the accommodation of future growth.

UTILITIES ELEMENT

Utilities Inventory

Sanitary Sewer

1. Availability - The existing local system was constructed in 1971 and full service is available to the entire community.

2. Capacity – Sanitary sewer service to the City of Deephaven is supplied by the Metropolitan Council Environmental Services. Effluent from Deephaven is treated at the Blue Lake Waste Water Treatment Plant located in Shakopee. Since Deephaven is projected to add only 63 households through 2040, the current system has the capacity to accommodate both existing and future growth.

Water

1. Deephaven does not currently have a municipal water system. Water is provided from private wells with the exception of four localized areas. The City of Minnetonka is currently providing municipal water to residents in the Jericho Road area, some businesses in the Chowen's Corner area and to the Deephaven Education Center. The City of Shorewood is currently providing water to residents of the Amesbury North area.

2. The quality of private well water is generally acceptable except that it has a high iron content and, in some cases, a high arsenic content.

3. Well pollution and ground water contamination has not been a problem in Deephaven. As a result, the City intends to continue relying on private wells for potable water for the foreseeable future. The city has undertaken a comprehensive feasibility study to establish an overall municipal system and has found such a system is not warranted at this time.

Storm Sewer

1. With the exception of the Amesbury neighborhood and portions of Rutledge Road, Deephaven does not have a comprehensive storm sewer system. The majority of the storm water drainage is handled via overland flows or through catch basins that convey storm water via underground pipe to ~~that are collected in~~ various drainage ways and wetland areas.

2. In a few locations, the lack of a comprehensive storm sewer system has presented some problems during rapid spring runoff and during heavy rain storms. Areas where drainage problems have occurred include:

A. Thorpe Field - Portions of the park serve as a ponding basin for drainage from surrounding residential areas. The pond is incorporated into the park as an amenity.

B. Rutledge Road and Montgomerie Avenue - Problems in this area of west central Deephaven are the result of inadequate storm drainage facilities.

C. Chowen's Corner Area – Excessive runoff from the parking lots and other hardcover within the business district are the result of a storm sewer system that cannot adequately handle larger volumes of storm water runoff.

D. Lake Avenue – There are drainage problems along Lake Avenue west of Northome Avenue due to an inadequate storm water and drainage system.

E. Cottagewood Road and Park Place – Inadequately sized storm sewer and catch basin system adds to runoff problems in the immediate area.

F. East Easton Road – The lack of a storm sewer system in this area has created runoff problems on several properties.

G. West Easton Road – A private lot stores the majority of the runoff from Easton Road & Deephaven Avenue. Potential solutions exist to extend a storm water main from Rutledge Road.

H. Lakeview Avenue & Northern Road – There is insufficient street grade at the intersection of these two street to direct storm water into the existing storm drain near the intersection.

I. Honeysuckle Lane – The storm water system consists of old water heater shells. The water heater shells have deteriorated causing periodic ponding.

J. Amesbury Pond – Constructed in the cul-de-sac at the end of Old Kent Road to serve as a storm water retention pond, there is no natural outlet to the pond and there is some concern regarding the excessively high level of the pond during excessive rain event.

K. Summerville Road – The drainage for the southern half of Summerville road is channeled through an undersized storm water pipe, which outlets into the lake. Storm water can periodically pond on a neighboring property until the water can eventually drain through the pipe.

L. Cottonwood Lane – Low lying properties fill with excess water runoff during heavy rains, much of the runoff attributable to the redevelopment of new homes along Park Place. There is no existing storm sewer infrastructure nearby.

3. Lack of curbs and gutters along existing streets has minimized the need for storm sewers.

Utilities Plan

Sanitary Sewer

1. Deephaven is completely sewered and all households, population and employment are service by the Blue Lake Wastewater Treatment Plant. Being fully developed, the city does not need to consider any expansion or phasing of new facilities.

2. Projected sewer flows are expected to remain relatively stable since the sewered population is not anticipated to increase over the next twenty years and the expected increase in sewered households and employment over the same period will be very small. The project flows are as follows:

Year	**2020**	**2030**	**2040**
Sewered Population	3,560	3,490	3,470
Unsewered Population	0	0	0
Sewered Households	1,360	1,380	1,400
Unsewered Households	0	0	0
Sewered Employment	830	880	900
Unsewered Employment	0	0	0

Source: Metropolitan Council

3. Deephaven is eligible to receive Metropolitan Area Grant Funds to minimize infiltration/inflow (I/I) into the exiting sanitary sewer system. The City enacted a sump pump inspection ordinance and is involved on an annual basis in maintaining and repairing manholes. The City will continue to monitor infiltration/inflow into the existing sanitary sewer system.

Water

1. Pollution of private wells has not been a major problem in Deephaven. Accordingly, there are no immediate plans to implement a municipal water system.

2. The City should continue to encourage residents to test the water quality of their wells on a periodic basis. In 1996, the City completed a feasibility study for implementing a municipal water supply system. When it is determined that a municipal water system is needed, the study recommended an independent city system with augmented fire flow from the City of Minnetonka. The City system would include a 300,000 gallon storage tank, an 800 gallon per minute production well and a corresponding water treatment facility. The estimated cost of the system at that time was approximately $17 million. If the City implements a municipal water system, it will assemble a water supply plan consistent with State statutes.

Storm Sewer

1. The City of Deephaven has assembled a comprehensive storm water management plan in conformance with plans and policies adopted by the Minnehaha and Riley/Purgatory Creek watershed districts. The plan fully complies with the requirements of the watershed districts as well as those of the Metropolitan Council.

2. Continue to pursue cost effective solutions for existing drainage problem areas.

3. Require that new developments as well as substantial redevelopment efforts maintain the same rate of runoff after development that existed in the pre-development or pre-redevelopment condition.

4. Continue to require stormwater mitigation for private properties that exceed impervious surface limitations; ongoing maintenance of mitigation should be monitored via maintenance agreements.

TRANSPORTION ELEMENT

Inventory

Thoroughfares

1. The current roadway system has been established in Deephaven and due to the extent of existing development, major changes to the system are neither warranted nor would they be economically feasible. Higher traffic volumes and traffic congestion occurs in two primary areas: Vine Hill Road/TH 7 and Chowen's Corner.

   All roads within Deephaven are part of an overall system of functional classification. Trunk Highway 7 is a principal arterial and Minnetonka Boulevard and Vine Hill Road are collectors. All remaining streets are classified as local streets.

2. The Metropolitan Council utilizes Traffic Assignment Zones (TAZ) to analyze the impacts of future growth on the metropolitan roadway system. Traffic assignment zones are shown on the following table and accompanying map.

Deephaven TAZ Information

	TAZ	2010	2020	2030	2040
Population	967	139	159	159	154
	968	453	442	425	421
	969	685	651	635	639
	970	1422	1351	1297	1283
	977	943	956	975	971
Households	967	56	58	59	57
	968	175	177	176	178
	969	247	252	254	260
	970	521	523	527	537
	977	338	350	365	368
Employment	967	24	23	23	22
	968	94	139	139	136
	969	70	94	94	91
	970	295	266	290	305
	977	205	310	335	346

3. *Roads* - the following is a description of intermediate arterials and collectors in Deephaven.

   A. TH 7 (Principal Arterial) and Vine Hill Road (Collector) - The Minnesota Department of Transportation reconstructed this intersection in 1996 and installed new traffic signal lights in 2018 . The 1996 project involved the acquisition of additional right-of-way and removal of some existing structures. The project improved the function of this intersection that includes Deephaven on the north and the City of Shorewood on the south.

   B. Minnetonka Boulevard (Collector) - Most of Minnetonka Boulevard is constructed to rural standards with ditch drainage. A major reconstruction of Minnetonka Boulevard has been scheduled for 2024.

   C. Chowen’s Corner - Streets in the Chowen’s Corner area were improved as part of a project completed in the early 1980's. Ingress and egress from various businesses in the area are well defined. Traffic volumes at the present time do not support a signalized intersection at the corner of Minnetonka Boulevard and Northome Road.

D. Local Streets - Bituminous overlays are being installed on an annual basis based upon an ongoing assessment of street conditions. Most of the local streets do not have curb and gutter. The development pattern in Deephaven has resulted in a number of streets which "dead end". As a result, some of the neighborhood areas lack an effective system for internal vehicular, pedestrian and bicycle circulation. Because of topography and shoreline areas, this street pattern is not expected to change in the future.

E. Private Roads - Deephaven has a number of private roads that in many cases are maintained by the City under contract with the homeowners association.

4. Bridges - Three bridges are located in Deephaven at Vine Hill Road, Carson's Bay, and Northome Avenue. The Carson's Bay Bridge (Minnetonka Boulevard) was re-constructed in 2004 and the Vine Hill Road Bridge in 2014. The Northome Avenue Bridge has been included on the list for state bridge bond funding in hopes of construction no later than 2021.

5. Airports - Mn/DOT has identified Lake Minnetonka as an area of seaplane operation. Within Deephaven, water towers, radio or television towers, electric transmission towers or other structures do not exceed 200 feet in height.

6. Transit - At the present time, bus service to Deephaven is provided by the Metro Transit. Route 671 passes through Deephaven along Minnetonka Boulevard. Additionally, Route 670 has Park and Ride access across TH 7 at Vine Hill Road and Route 614 has access along Highway 101. The city is also served by Metro Mobility and Transit Link (formerly Dial-A-Ride.)

   Deephaven is within the Metropolitan Transit Taxing District and included within Market Area IV. This market can support peak-period express bus services if a sufficient concentration of commuters likely to use transit service is located along a corridor. The low-density development and suburban form of development presents challenges to fixed-route transit.

Transportation Plan

Thoroughfares

1. Chowen's Corner - Continue maintenance of the street improvements that were installed in the early 1980's.

2. Local Streets

A. Continue the existing street reconstruction program based on an ongoing analysis of street conditions throughout the community.

B. As re-subdivisions of lots occur, encourage continuation of those existing streets that will allow more effective internal circulation within neighborhoods.

3. Bridges – Reconstruct Northome Bridge in 2021, or sooner if funding becomes available. Continue to rehabilitate the bridges when needed.

4. Transit - Continue to allow bus service to the community by the Metro Transit.

5. Airports - The City should continue to monitor seaplane operations and notify the FAA as defined under code of federal regulation CFR – Part 77, using the FAA Form 7460-1. Instructions can be found at www.faa.gov/arp/ace/part77.cfm.

PARK AND OPEN SPACE ELEMENT

The Park and Open Space Element of the Deephaven Comprehensive Plan serve as a guide for use by the Park Advisory Committee and City Council in making decisions that impact recreational opportunities within the community. Deephaven is fortunate to have abundant natural resources. Mature trees, wetlands and lakes provide the backdrop for recreational activities within the community.

Deephaven's overall goal for parks and open space addresses the existing natural setting. It speaks of an overall system that conserves natural resources, protects environmentally sensitive areas, and fulfills the needs of the people of Deephaven. The intent of this plan is to implement all aspects of this goal.

Recreation Supply

The City of Deephaven does not have federal, state or regional parks within its boundaries. With the exception of the Lake Minnetonka LRT Regional Trail, which is leased and managed by Three Rivers Park District, all park and recreation facilities are municipally owned.

For analysis purposes, Deephaven's park and recreation areas are included within one of the following categories:

- **Neighborhood Park** - Parks designed to serve neighborhood recreation needs. Such facilities should be located within walking distance of area residents and typically contain playground areas.

- **Community Park** - Larger recreation areas that serve the recreation needs of the entire community. Community parks typically contain larger scale active facilities as

well as more passive activities such as picnicking. Facilities within community parks frequently also fulfill neighborhood park needs.

- **Special Use Parks** - Parks that do not fit within either the neighborhood park category or the community park category due to their focus on a specific or unique use. Such parks may be associated with unusual natural features such as wetlands.

- **School Facilities** - Deephaven Elementary School provides recreational opportunities for community residents. School facilities are owned and maintained by the Minnetonka School District.

Utilizing the above categories, the following is an inventory of existing parks within the City of Deephaven:

SHUCK PARK
Type: Neighborhood Park
Size: 1 Acre
Existing Facilities: Play Area, Small Basketball Court, Tennis Courts (2), Picnic Area and Small Open Field Area

DONKEY PARK
Type: Neighborhood Park
Size: .3 Acre
Existing Facilities: A Picnic Area, bench and Small Open Field Areas
Comment: Donkey Park consists of two detached parcels of land. Both of the park areas are small and surrounded by local streets. As a result, the park may be more appropriate as a neighborhood open space rather than as an active park facility.

THORPE PARK
Type: Community Park
Size: 11 Acres
Existing Facilities: Off-Street Parking, Warming House, Lighted Hockey Rink, Open Skating Rinks, Picnic Areas, Paved Trails, Ball Fields (2), Basketball Court, Playground Structures (3), Flower Gardens, Pond and Tennis Courts (2)
Comment: Thorpe Park is Deephaven's primary community park. It is bordered on the east side by Minnetonka Boulevard and on the remaining three sides by residential development. As a result, Thorpe Park also serves as a neighborhood park for homes in the surrounding area.

VILLAGE HALL PARK
Type: Community Park
Size: 4.4 Acres
Existing Facilities: Tennis Courts (3), Gazebo, Picnic Areas, Small Ball Field, Modular Play Structure, Lighted Hockey Rink, Warming House, Off-Street Parking, Tennis Court and Open Field Areas

Comment: This park which lies adjacent to the Deephaven City Hall provides a variety of community recreational facilities. Because of its proximity to the Cottagewood neighborhood area and its accessibility via the Lake Minnetonka LRT Regional Trail, it also serves neighborhood park needs.

HARALSON PARK
Type: Special Use Park
Size: 5.8 Acres
Existing Facilities: Platform Tennis Courts (2)
Comment: This park caters to platform tennis enthusiasts and lies adjacent to Deephaven City Hall and to the Lake Minnetonka LRT Regional Trail.

PUMP PARK
Type: Special Use Park
Size: 0.2 Acres
Existing Facilities: Bench
Comment: This park is located within the Deephaven business district and provides residents the opportunity to sit and relax in a small scenic setting.

COTTAGEWOOD CHILDREN'S PARK
Type: Special Use
Size: .5 Acres
Existing Facilities: Gazebo, Play Area, Playground Structures (2), Fountain and Flower Gardens
Comment: Cottagewood Park is a special use children's play area adjacent to the locally historic Cottagewood Store. The park features walkways, flower gardens and a bronze fountain.

HILL PROPERTY
Type: Special Use
Size: .4 Acres
Existing Facilities: None, Open Space
Comment: The Hill property is a small, gently sloping parcel at the northwest corner of Minnetonka Boulevard and Northome Road. It has scattered tree cover and grass areas which are maintained by the City.

LAKE LOUISE SANCTUARY AND CLEVELAND PARK
Type: Special Use
Size: 26.5 Acres
Existing Facilities: Trail system that provides access around the wetland area.
Comment: This facility contains a large wetland area that was dedicated to the City of Deephaven. It is a natural area that affords vistas across both wetland vegetation and open water.

NORTHOME PARKWAY
Type: Special Use

Size: 8.8 Acres
Existing Facilities: Trail
Comment: Northome Parkway which is a portion of a former trolley line exists as a 100 foot wide trail corridor extending from Deephaven Boulevard to St. Louis Bay Park. The corridor provides a pedestrian link to Deephaven Beach from the surrounding neighborhood area.

HINELINE PROPERTY
Type: Special Use
Size: 3 Acres
Existing Facilities: None
Comment: The Hineline property is a wetland area in the east central portion of the city. It is a designated wetland area that, due to its size and proximity to surrounding residential uses, is not appropriate for use as a public recreational facility.

BURTON PARK/PRESERVE
Type: Special Use
Size: 10.1 Acres
Existing Facilities: Nature Preserve, Trails and fishing pier.
Comment: Burton Park is a natural area consisting of mixed woodland areas and open grass spaces. The park is separated from Minnetonka Boulevard by the railroad tracks but direct access occurs through the school property along Vine Hill Road. The park is used by the school for nature study and "orienteering" programs.

ROBINSON'S BAY BEACH
Type: Special Use
Existing Facilities: Small, Supervised Swimming Beach with Limited Parking

DEEPHAVEN BEACH AND PARK
Type: Special Use
Existing Facilities: Supervised Swimming Beach, Tennis Court, Trail Access, Limited Parking, Picnic Area and Swings

NOCOMO BEACH
Type: Special Use
Existing Facilities: Small, Unsupervised Swimming Beach and Limited Parking

ROCKY BEACH
Type: Special Use
Existing Facilities: Small Lake Access, Unsupervised Swimming Beach and limited Parking

SANDY BEACH
Type: Special Use
Existing Facilities: Small, Supervised Swimming Beach - No Parking

LINWOOD BEACH
Type: Special Use
Existing Facilities: Small, Unsupervised Swimming Beach - No Parking

CARSON BAY MARINA
Type: Special Use
Existing Facilities: Boat Launch, Boat Docks (40), Boat Moorings (25), Boat Slides (39), Canoe Racks (8) and Off-Street Parking
NOTE: The Carson's Bay Marina occupies a total of approximately 4 acres.

ST. LOUIS BAY MARINA
Type: Special Use
Existing Facilities: Boat Launch, Boat Docks (55), Boat Moorings (28), Boat Slides (68), Canoe Racks (32), Shore Space (17) and Off-Street Parking
NOTE: The St. Louis Bay Marina occupies a total of approximately 4 acres.

DEEPHAVEN SCHOOL
Type: Special Use
Size: 5.8 Acres (Recreation Portion Only)
Existing Facilities: Play Area, Basketball, Ball Fields (2), Soccer Field (East Side of Vine Hill Road) and Off-Street Parking

Recreation Need
The overall need for park and recreation facilities is derived either from existing deficiencies within a community's park system or from future population growth that creates a need for additional park facilities. Between now and the year 2040, Deephaven's population is projected to decrease slightly to approximately 3,470 people. As a result, new park needs will not be created. Therefore, an analysis of Deephaven's park needs should focus on the quantity and distribution of existing park facilities in order to determine if current deficiencies exist.

One measure of assessing park and recreation needs is through the application of population ratio standards. Such standards identify total amounts of park and recreation land recommended per 1000 residents. Ten acres of park and recreation land per 1000 population is a commonly used standard by many communities in the Twin Cities Metropolitan Area. Applying this standard to Deephaven's anticipated 2040 population, the City should have at least 39 acres of existing park and recreation land. At the present time, the total Deephaven park and recreation system contains approximately 76 acres.

Utilizing population ratio standards is only one general measure of the adequacy of a community's park and recreation system. A comprehensive analysis also requires a review of the accessibility of recreational facilities. Various types of parks and recreation facilities have recommended service areas. Neighborhood parks have a typical service area of 1/2 mile. The service area for community parks is from 1 to 2 miles. In

Deephaven, Village Hall Park and Thorpe Park serve as both neighborhood and community parks. As a result, all of the community is within the recommended service area for community parks and most of the community lies within 1/2 mile service area for a neighborhood park.

Since 99% of the land within the City of Deephaven is currently developed, providing additional park and recreation facilities is both an expensive and difficult task to accomplish. Based on application of typical standards, an assessment of park locations, and facilities surveys conducted by the Deephaven Park Advisory Committee, the City has an adequate supply of park land and general park facilities to meet both existing and future needs. Despite this conclusion, the park system needs additional improvements as outlined in the Park and Recreation Plan.

Deephaven's existing park system has a diverse range of facilities that are evenly distributed throughout the community. The purpose of the park and recreation plan recommendations is to build upon the strengths of the existing system to ensure that the city's parks continue to meet the recreational needs of Deephaven's residents. Based upon a review and analysis of each of Deephaven's existing park facilities, the following recommendations are offered:

General Recommendations

1. Continue the use of school recreational facilities as an integral part of Deephaven's overall park system. Collaboration with surrounding communities to fund the Minnetonka Community Services programs as well as participation in the Hopkins/Minnetonka Recreation programs provides expanded recreational opportunities for Deephaven residents.

2. Continue to work with the Cottagewood Garden Club in planting and maintaining flowerbeds within City parks.

3. Continue to monitor the park needs of the community. Provide park facilities that comply with the Americans with Disabilities Act (ADA).

4. Establish an annual and sufficient capital fund budget allocation for park improvements.

5. Continue routine maintenance efforts with attention focused on maintenance of major facilities in City parks. Items such as tennis courts, warming houses and gazebos represent significant investments and should be included within a plan for ongoing maintenance and renovation as necessary.

6. Investigate and analyze where adjacent privately held parcels may be incorporated into existing parkland and be prepared to consider their acquisition, should they become available.

7. Continue to evaluate and implement the recommendations of the 2016 Park and Recreation Plan, which describes specific uses and improvements at each City park and beach.

Existing Parks - Recommendations

The following recommendations are offered for existing parks within the City of Deephaven.

SHUCK PARK

Consider a modification of the existing playground equipment and the existing 1/2 basketball court.

THORPE PARK

Thorpe Park will continue to be Deephaven's "flagship" community park. It is not only the largest park in the city's system but it also offers the most diverse range of year-round activities. Recent improvements included the addition of an improved hockey rink and warming house, expansion of the existing basketball court and construction of a new picnic shelter to accommodate small groups. Efforts will be made to continually upgrade existing playground equipment. Landscaping improvements should continue in the park as well including the island area that has been designed to attract birds and the parking island.

VILLAGE HALL PARK

Upgrade existing playground equipment.

HILL PROPERTY

The Hill property is too small to serve as any type of active recreational facility. Due to its prominent location at the intersection of Minnetonka Boulevard and Northome Road, it has the potential to serve as a community entry feature. With the possible addition of a community sign and/or flower and shrub plantings, the property could be used to help instill a sense or arrival into both the City of Deephaven and specifically, the Chowen's Corner commercial area. It may be possible to enlist the support of a community service group to sponsor and maintain such an area.

LAKE LOUISE SANCTUARY AND CLEVELAND PARK

Maintaining the natural qualities that make this area a wetland sanctuary should be the prime consideration in any future plans for this park facility. The extension of the existing trail network, the installation of natural benches, and possible plantings of wildflowers and species that attract birds and butterflies are consistent with the natural theme of the area.

BURTON PARK/PRESERVE

The Burton Park/Preserve is another of Deephaven's existing natural areas. This park facility is used by both residents and by the Deephaven School in curriculum based nature study programs. Future improvements need to respect the natural setting of this

unique area. Existing soil erosion problems need to be corrected. Additionally, plant identification markers should be installed along trails.

Trail Plan

For the past ten years, Deephaven has been adding trails within parks and a feasibility study is currently underway on the development of a trail along Minnetonka Boulevard. The trail network envisioned has two components, pedestrian trails within existing parks such as those currently found at Northome Park, Burton Park, Thorpe Park, and Cleveland Park and multiple purpose trails which could accommodate pedestrians and bicycles such as the regional railroad right-of-way trail and a trail along Minnetonka Boulevard and Vine Hill Road.

The Vine Hill/Minnetonka Boulevard trail forms the spine of a system that connects to the Lake Minnetonka LRT Regional Trail that extends eastward through Minnetonka and into Hopkins and westward toward the City of Victoria. This trail segment that is leased and managed by Three Rivers Park District and has direct connections to Burton Park and City Hall Park.

V. IMPLEMENTATION

The Deephaven Comprehensive Plan contains a collection of goals, policies, and standards designed to set a direction for the community over the next ten to twenty years. Many communities prepare comprehensive plans to help address significant change. Since Deephaven is almost fully developed, major changes are not anticipated over the next couple of decades. Rather, the focus of the community will be on maintaining quality residential and commercial structures and in enhancing the natural environment.

Plan implementation in Deephaven includes administrative procedures, official controls, environmental protection, and a housing plan.

Administrative Procedures

As a regulatory entity, the City plays a major role in land development. Development decisions have a lasting effect on the image and identity of a community. Therefore, it is imperative that a city's policies, plans and ordinances reflect the collective vision of the community. In order to make the development process and application procedures more understandable to the general public, current procedures should be reviewed on an ongoing basis and revised where appropriate.

Official Controls

Deephaven's zoning, planned unit development and subdivision ordinances are the principal tools in implementing the policies outlined in the comprehensive plan. The zoning ordinance establishes minimum requirements and standards for the utilization of land and structures within the City. The existing zoning classifications are consistent with the land use plan element of the comprehensive plan. The city should review current performance standards addressing commercial development to ensure that they adequately address signage, lighting, landscaping, etc. There are no plans to change the official controls currently in place.

Environmental Protection

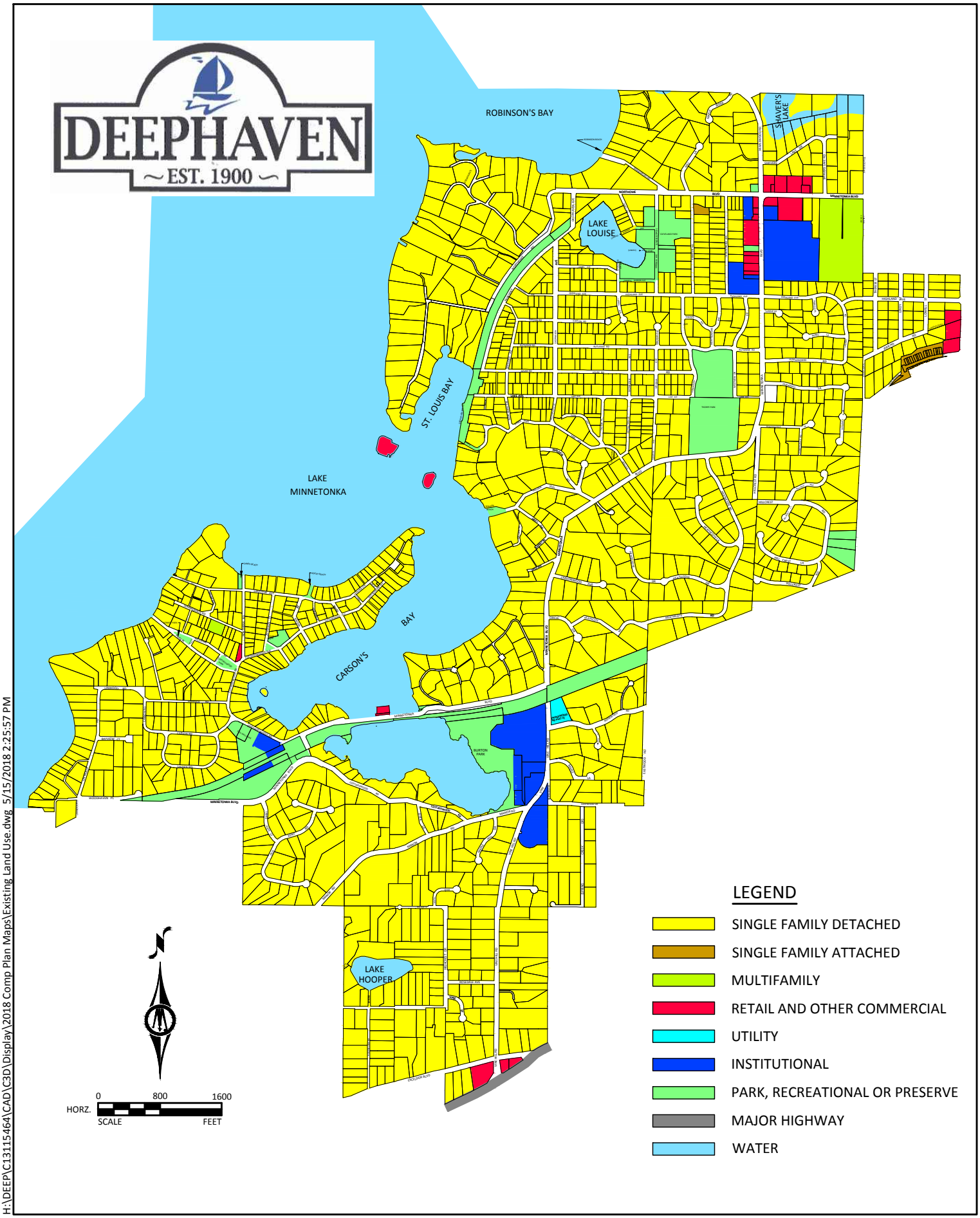
The image of a community is established by a number of factors. The strongest single element that shapes the form of Deephaven is the environment. Lake Minnetonka, wetlands, and mature trees are dominant natural elements. These elements are so strong that they often overshadow the man made components of the development pattern.

Because of the importance of Deephaven's natural environment, the City will need to continually monitor the adequacy and effectiveness of environmental protection ordinances. Recently enacted shoreland management provisions contain standards for shoreline development. At the State and National levels, wetland regulation has become more comprehensive in recent years. At the local level, Deephaven should examine its current ordinances to ensure that environmental protection regulations such as tree preservation and replacement are adequately addressed.

Housing

The City of Deephaven is approaching full development. As a result, the City has limited opportunities to accommodate new housing development.

It is important for any community to have a well-maintained housing stock. Deteriorating housing not only makes a community less aesthetically appealing but it can also undermine property values. At the present time, Deephaven's housing stock is well maintained. As housing within the community continues to age, the City will need to monitor maintenance of both rental and owner occupied housing and enact housing maintenance provisions if warranted.



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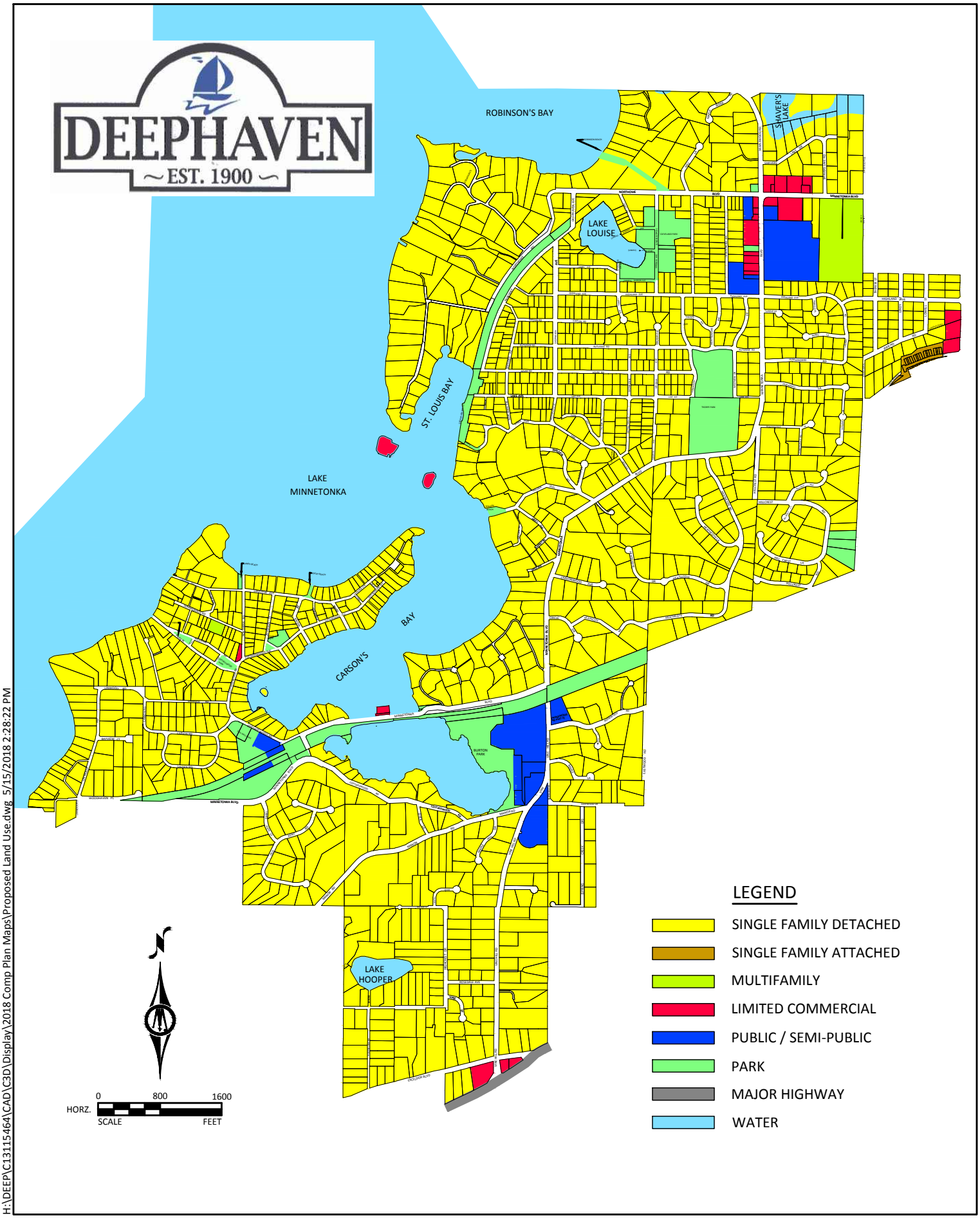

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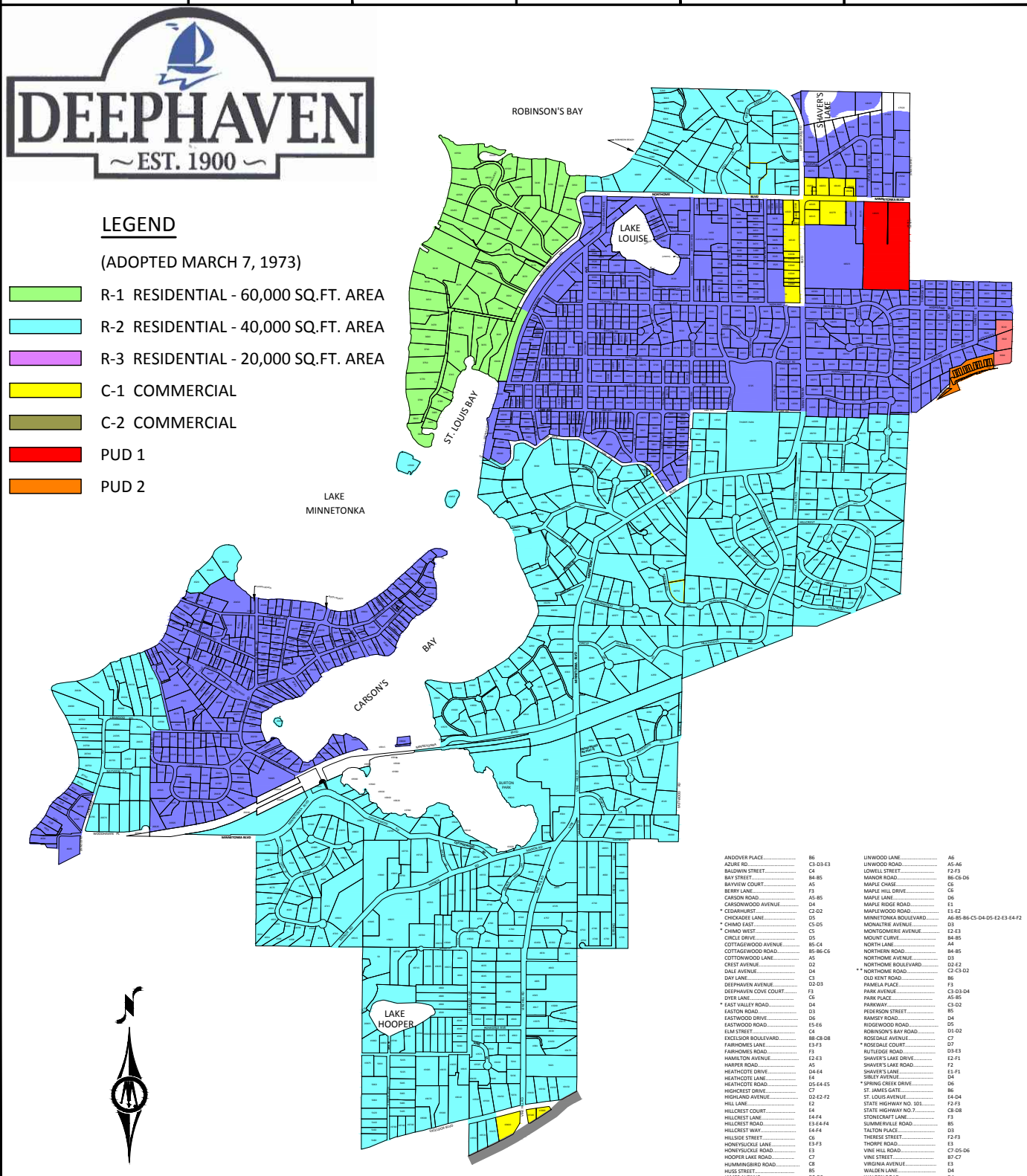
ATTACHMENT C

DEEPHAVEN
LAND USE TABLE

	Allowed Density Units / Acre		Existing (2020)	2025	2030	2035	2040	Change 2020-2040
SEWERED AREA								
Residential	**Minimum**	**Maximum**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**
Single-Family Detached	2.8	2.8	1138	1138	1138	1138	1138	0
Single-Family Attached			3	3	3	3	3	0
Multi-Family	14.1	14.1	14.7	14.7	14.7	14.7	14.7	0
C / I Land Uses	**Est. Employees / Acre**		**Acres**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**
Commercial	21.7		16.6	16.6	16.6	16.6	16.6	0
Public / Semi-Public	**Minimum**	**Maximum**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**
City Property / Parks	–	–	83.4	83.4	83.4	83.4	83.4	0
Utility/Institutional			37.7	37.7	37.7	37.7	37.7	0
Major Highway	–	–	3.6	3.6	3.6	3.6	3.6	0
Subtotal Sewered	–	–	1297	1297	1297	1297	1297	0
UNSEWERED AREA	**Minimum**	**Maximum**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**
Residential	–	–	0	0	0	0	0	0
Commercial	–	–	0	0	0	0	0	0
Public / Semi-Public	–	–	0	0	0	0	0	0
Subtotal Unsewered	–	–	0	0	0	0	0	0
UNDEVELOPED	**Minimum**	**Maximum**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**
Open Water **Lake Minnetonka, Streams**	–	–	1034	1034	1034	1034	1034	0
TOTAL	–	–	2331	2331	2331	2331	2331	0

Updated 05-8-18



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Attachment E

Zoning Districts

R-1 Residential District 1: single family detached dwellings on lots containing 60,000 square feet or more.

R-2 Residential District 2: single family detached dwellings on lots containing 40,000 square feet or more.

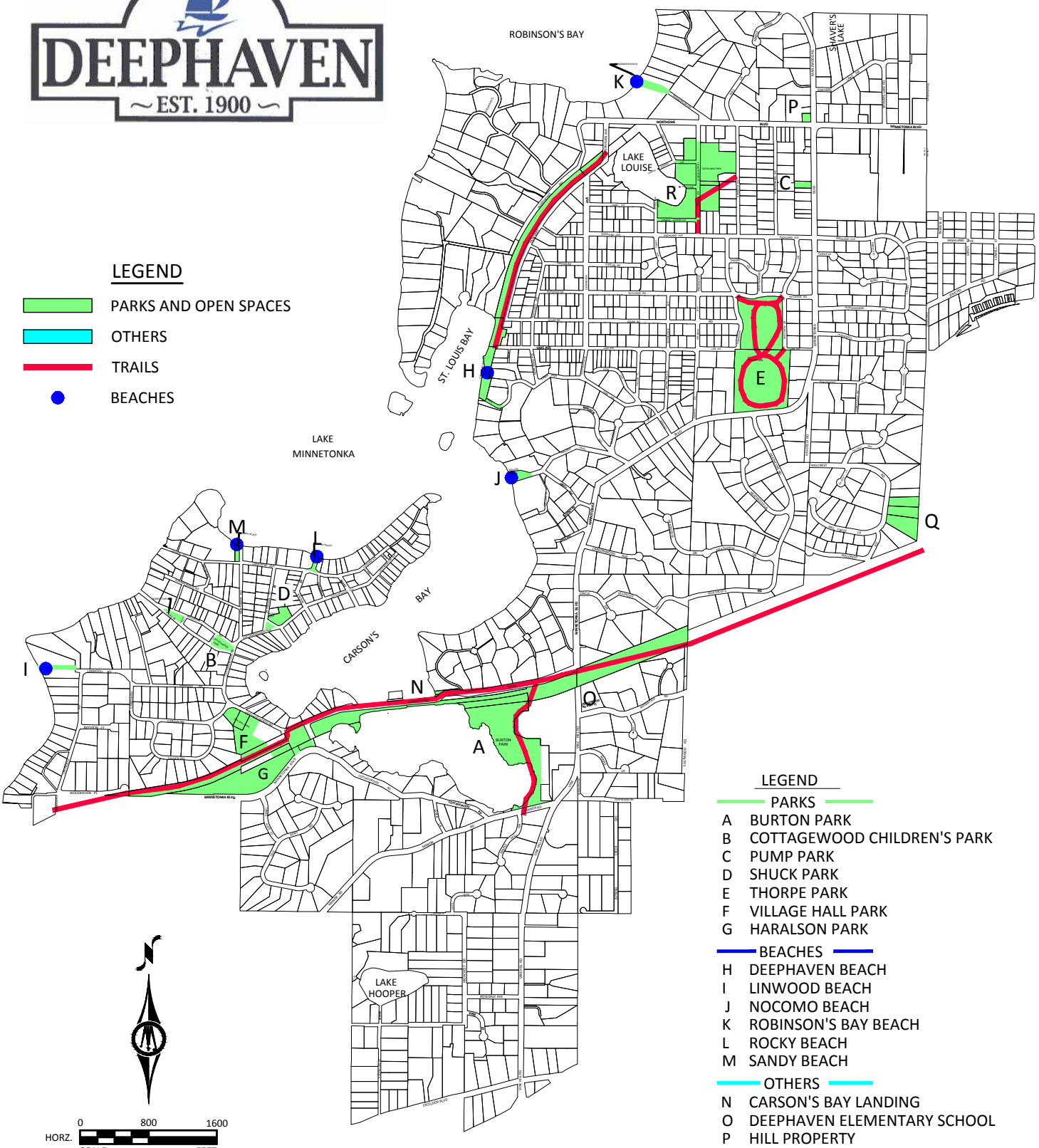
R-3 Residential District 3: single family detached dwellings on lots containing 20,000 square feet or more.

C-1 Commercial District 1: retail sales and service businesses directly oriented to the consumer.

C-2 Commercial District 2: sales and service businesses not directly oriented to the consumer.

PUD – Planned Unit Development District: 1 Lot 1 and Lot 2 of Deephaven Woods; Lot 1 shall consist of the existing church and associated uses. Lot 2 will be limited to a multiple unit, age restricted facility, components which include assisted living, independent living, care suites and memory care units not to exceed seventy-eight units within a two story structure. Developable lots within PUD 1 shall require a minimum parcel area of fourteen acres and a density not to exceed six units per acre.

PUD – Planned Unit Development District 2: Commonly known as the Sullivan property: Single family and multiple family dwellings and public uses on parcels containing a minimum of three acres, of the property owned at the adoption of this ordinance and a density not to exceed eight units per acre.



LEGEND

PARKS

- A BURTON PARK
- B COTTAGEWOOD CHILDREN'S PARK
- C PUMP PARK
- D SHUCK PARK
- E THORPE PARK
- F VILLAGE HALL PARK
- G HARALSON PARK

BEACHES

- H DEEPHAVEN BEACH
- I LINWOOD BEACH
- J NOCOMO BEACH
- K ROBINSON'S BAY BEACH
- L ROCKY BEACH
- M SANDY BEACH

OTHERS

- N CARSON'S BAY LANDING
- O DEEPHAVEN ELEMENTARY SCHOOL
- P HILL PROPERTY
- Q HINELINE PROPERTY
- R CLEVELAND PARK/LAKE LOUISE SANCTUARY TRAIL

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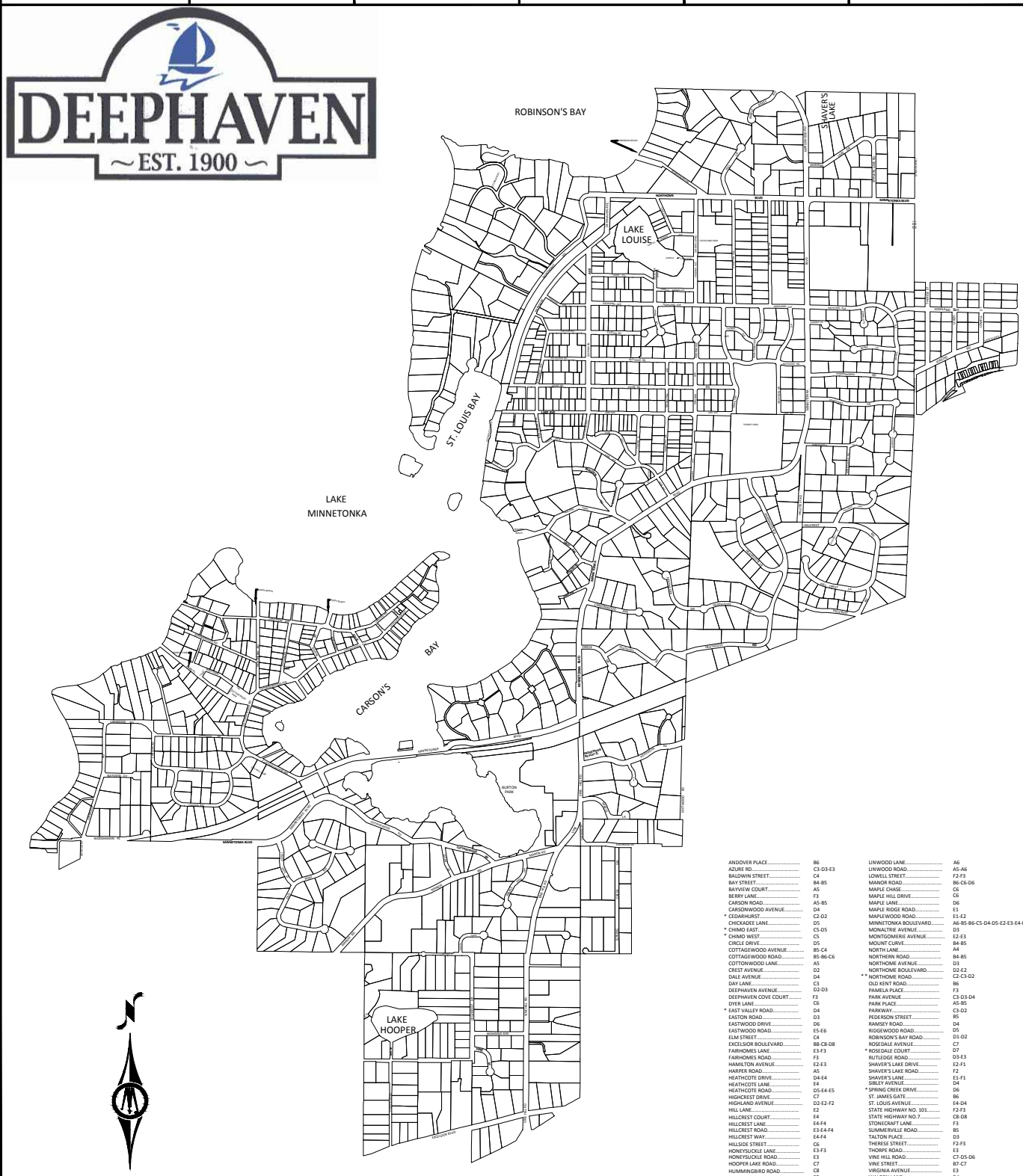

ANDOVER PLACE	B6	LINWOOD LANE	A6
AZURE RD.	C3-D3-E3	LINWOOD ROAD	A5-A6
BALDWIN STREET	C4	LOWELL STREET	F2-F3
BAY STREET	B4-B5	MANOR ROAD	B6-C6-D6
BAYVIEW COURT	A5	MAPLE CHASE	C6
BERRY LANE	F3	MAPLE HILL DRIVE	C6
CARSON ROAD	A5-B5	MAPLE LANE	D6
CARSONWOOD AVENUE	D4	MAPLE RIDGE ROAD	E1
* CEDARHURST	C2-D2	MAPLEWOOD ROAD	E1-E2
CHICKADEE LANE	D5	MINNETONKA BOULEVARD	A6-B5-B6-C5-D4-D5-E2-E3-E4-F2
* CHIMO EAST	C5-D5	MONALTRIE AVENUE	D3
* CHIMO WEST	C5	MONTGOMERIE AVENUE	E2-E3
CIRCLE DRIVE	D5	MOUNT CURVE	B4-B5
COTTAGEWOOD AVENUE	B5-C4	NORTH LANE	A4
COTTAGEWOOD ROAD	B5-B6-C6	NORTHERN ROAD	B4-B5
COTTONWOOD LANE	A5	NORTHOME AVENUE	D3
CREST AVENUE	D2	NORTHOME BOULEVARD	D2-E2
DALE AVENUE	D4	* * NORTHOME ROAD	C2-C3-D2
DAY LANE	C3	OLD KENT ROAD	B6
DEEPHAVEN AVENUE	D2-D3	PAMELA PLACE	F3
DEEPHAVEN COVE COURT	F3	PARK AVENUE	C3-D3-D4
DYER LANE	C6	PARK PLACE	A5-B5
* EAST VALLEY ROAD	D4	PARKWAY	C3-D2
EASTON ROAD	D3	PEDERSON STREET	B5
EASTWOOD DRIVE	D6	RAMSEY ROAD	D4
EASTWOOD ROAD	E5-E6	RIDGEWOOD ROAD	D5
ELM STREET	C4	ROBINSON'S BAY ROAD	D1-D2
EXCELSIOR BOULEVARD	B8-C8-D8	ROSEDALE AVENUE	C7
FAIRHOMES LANE	E3-F3	* ROSEDALE COURT	D7
FAIRHOMES ROAD	F3	RUTLEDGE ROAD	D3-E3
HAMILTON AVENUE	E2-E3	SHAVER'S LAKE DRIVE	E2-F1
HARPER ROAD	A5	SHAVER'S LAKE ROAD	F2
HEATHCOTE DRIVE	D4-E4	SHAVER'S LANE	E1-F1
HEATHCOTE LANE	E4	SIBLEY AVENUE	D4
HEATHCOTE ROAD	D5-E4-E5	* SPRING CREEK DRIVE	D6
HIGHCREST DRIVE	C7	ST. JAMES GATE	B6
HIGHLAND AVENUE	D2-E2-F2	ST. LOUIS AVENUE	E4-D4
HILL LANE	E2	STATE HIGHWAY NO. 101	F2-F3
HILLCREST COURT	E4	STATE HIGHWAY NO.7	C8-D8
HILLCREST LANE	E4-F4	STONECRAFT LANE	F3
HILLCREST ROAD	E3-E4-F4	SUMMERVILLE ROAD	B5
HILLCREST WAY	E4-F4	TALTON PLACE	D3
HILLSIDE STREET	C6	THERESE STREET	F2-F3
HONEYSUCKLE LANE	E3-F3	THORPE ROAD	E3
HONEYSUCKLE ROAD	E3	VINE HILL ROAD	C7-D5-D6
HOOPER LAKE ROAD	C7	VINE STREET	B7-C7
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HUSS STREET	B5	WALDEN LANE	D4
JAMES AVENUE	D2-D3	WALDEN ROAD	D4
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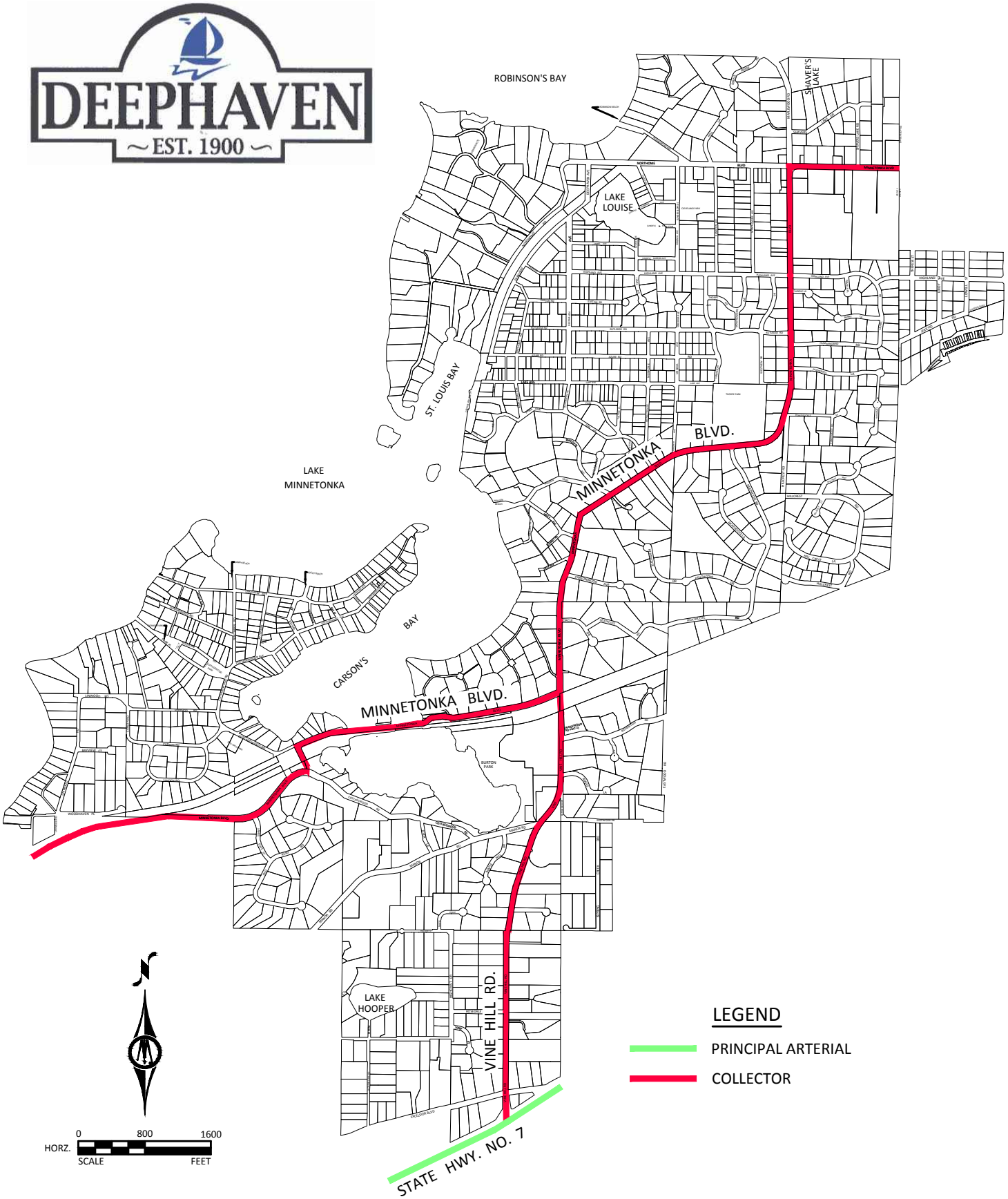
LAUREL DRIVE	F3	*WILLOW HAVEN	D6
LEROY STREET	F2-F3	WOODHAVEN PLACE	A6
LINDEN ROAD	A5-A6-B5-B6	*WYNDHILL CIRCLE	D5
LINWOOD CIRCLE	A6		

*PRIVATE ROAD
**SOUTH HALF PRIVATE ROAD



ATTACHMENT

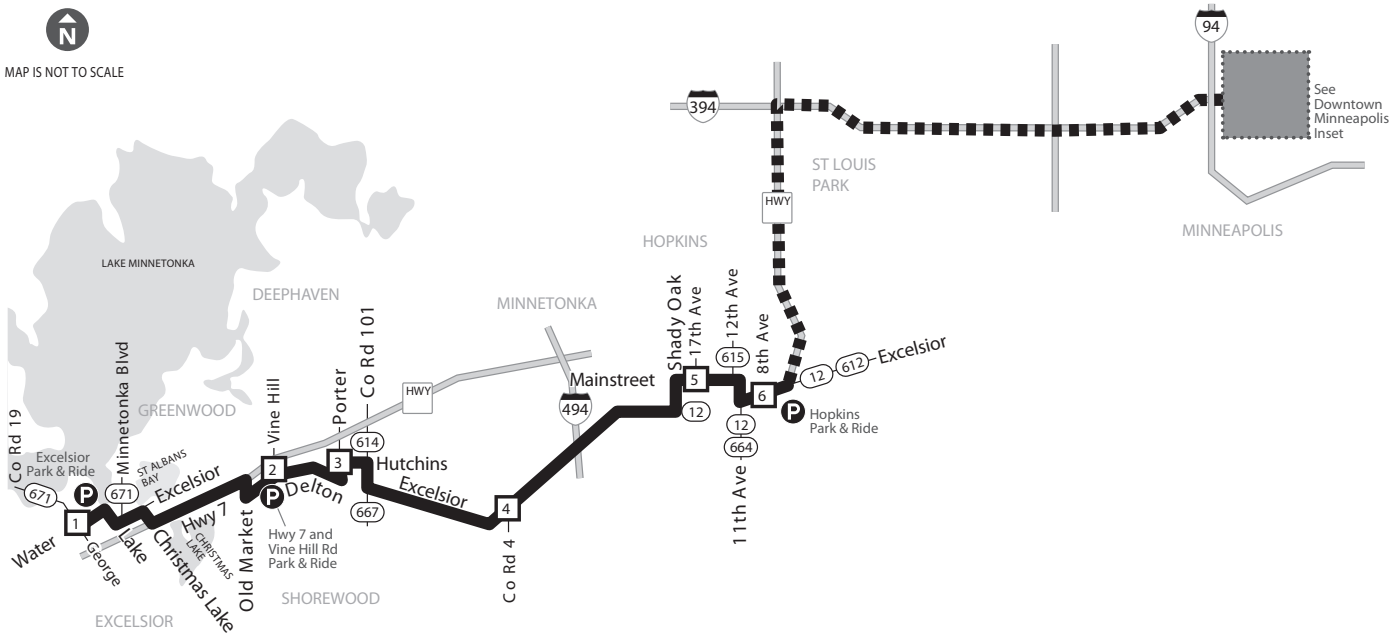
METRO TRANSIT ROUTES THAT SERVE DEEPHAVEN

670 Express Bus Route

METROPOLITAN COUNCIL

metrotransit.org
612-373-3333

Effective 12/2/17



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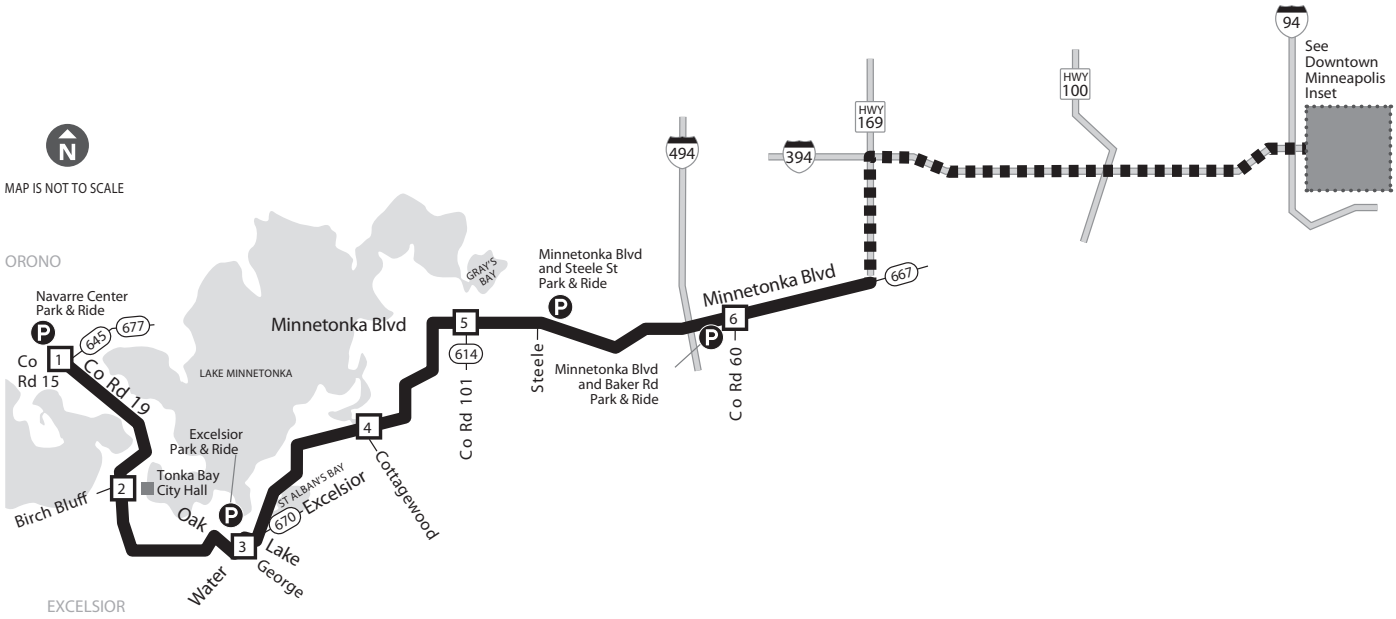

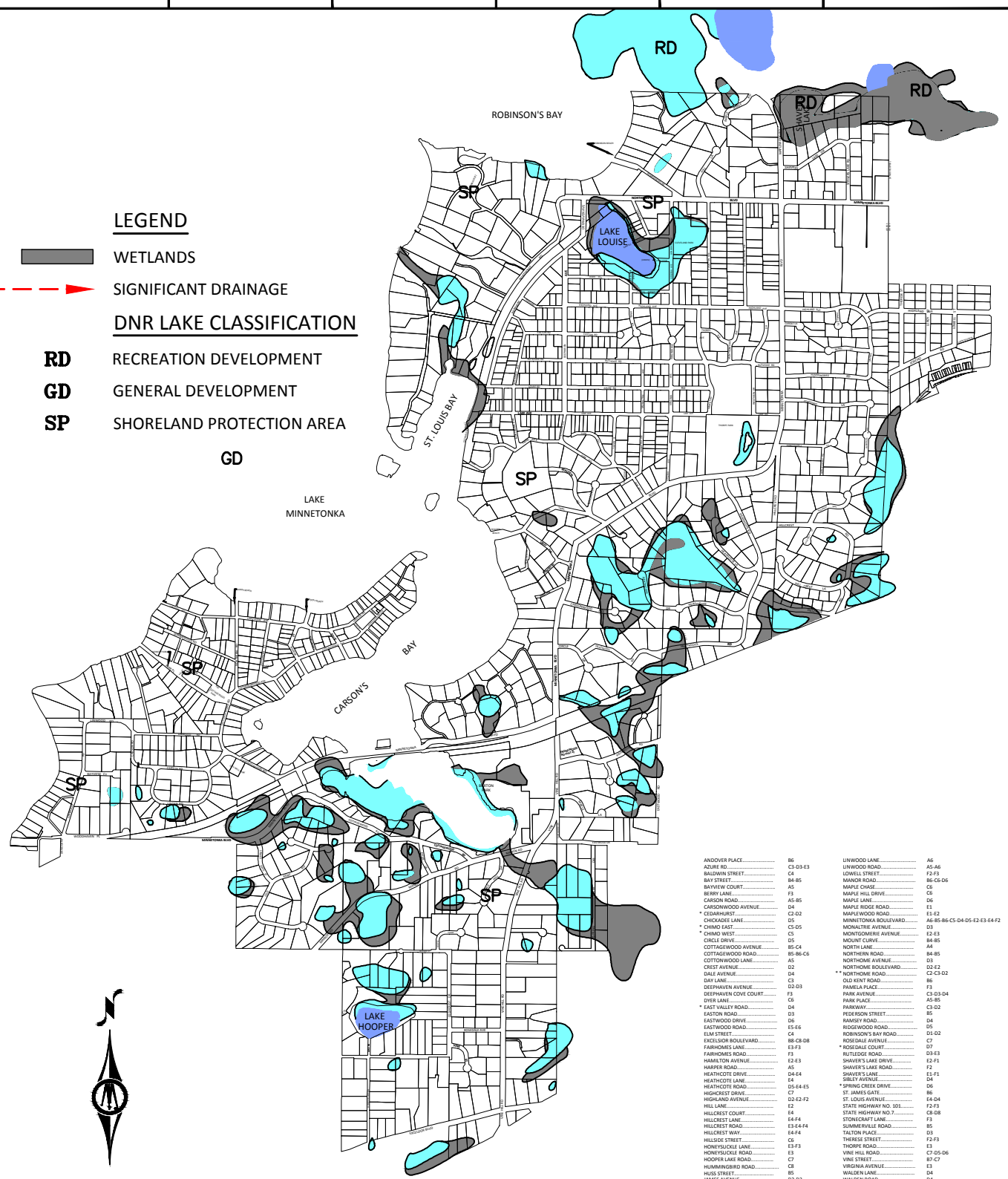

ANDOVER PLACE	B6
AZURE RD	C3-D3-E3
BALDWIN STREET	C4
BAY STREET	B4-B5
BAYVIEW COURT	A5
BERRY LANE	F3
CARLSON ROAD	A5-B5
CARSONWOOD AVENUE	D4
* CEDARHURST	C2-D2
CHICKADEE LANE	D5
* CHIMO EAST	C5-D5
* CHIMO WEST	C5
CIRCLE DRIVE	D5
COTTAGEWOOD AVENUE	B5-C4
COTTAGEWOOD ROAD	B5-B6-C6
COTTONWOOD LANE	A5
CREST AVENUE	D2
DALE AVENUE	D4
DAY LANE	C3
DEEPHAVEN AVENUE	D2-D3
DEEPHAVEN COVE COURT	F3
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HEATHCOTE ROAD	D5-E4-E5
HIGHCREST DRIVE	C7
HIGHLAND AVENUE	D2-E2-F2
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HILLCREST ROAD	E3-E4-F4
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LEROY STREET	F2-F3
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LINWOOD LANE	A6
LINWOOD ROAD	A5-A6
LOWELL STREET	F2-F3
MANOR ROAD	B6-C6-D6
MAPLE CHASE	C6
MAPLE HILL DRIVE	C6
MAPLE LANE	D6
MAPLE RIDGE ROAD	E1
MAPLEWOOD ROAD	E1-E2
MINNETONKA BOULEVARD	A6-B5-B6-C5-D4-D5-E2-E3-E4-F2
MONALTRIE AVENUE	D3
MONTGOMERIE AVENUE	E2-E3
MOUNT CURVE	B4-B5
NORTH LANE	A4
NORTHERN ROAD	B4-B5
NORTHOME AVENUE	D3
NORTHOME BOULEVARD	D2-E2
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OLD KENT ROAD	B6
PAMELA PLACE	F3
PARK AVENUE	C3-D3-D4
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*WYNDHILL CIRCLE	D5

*PRIVATE ROAD
**SOUTH HALF PRIVATE ROAD

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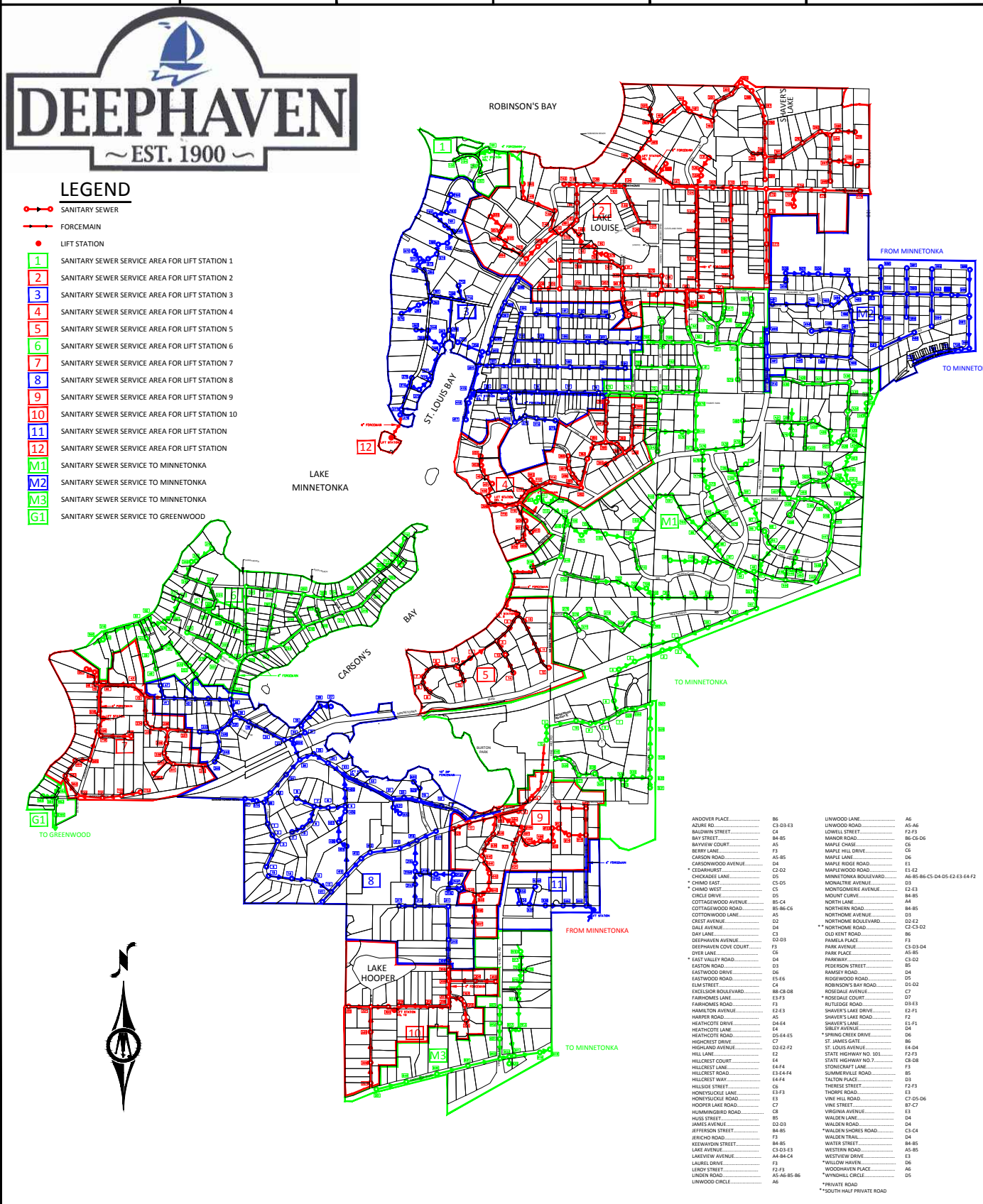

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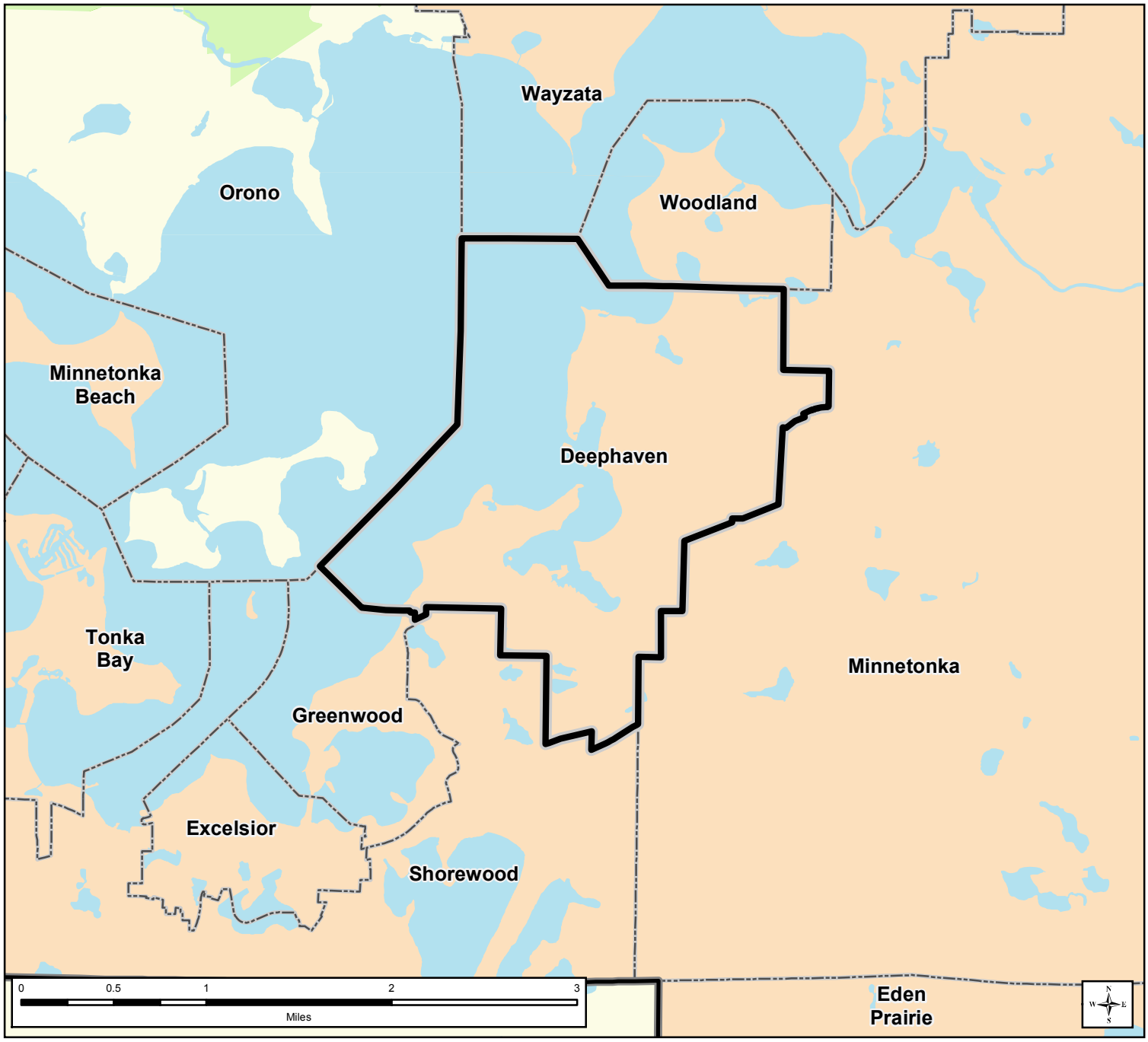
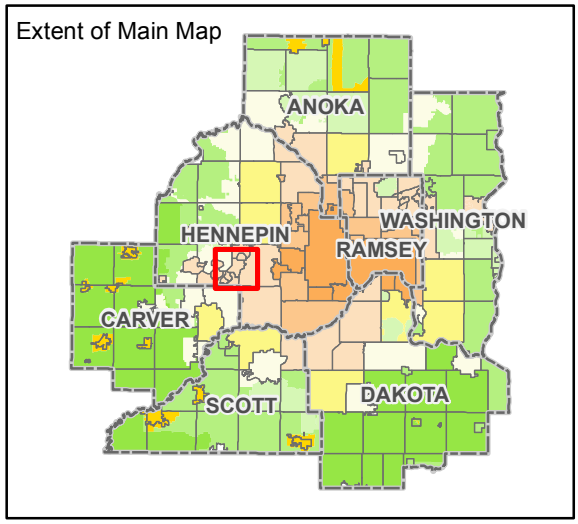
Community Designations
City of Deephaven, Hennepin County





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

BOLTON & MENK

Real People. Real Solutions.

SURFACE WATER MANAGEMENT PLAN
CITY OF DEEPHAVEN, MN

June 2018

Submitted by:
Bolton & Menk, Inc.
2638 Shadow Lane, Suite 200
Chaska, MN 55318
P: 952-448-8838

SURFACE WATER MANAGEMENT PLAN

For the

CITY OF DEEPHAVEN

Bolton & Menk, Inc.

June 2018

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

Robert E Bean Jr

6-13-2018
Date

Robert Bean, Jr
Minnesota Registration No. 40410

TABLE OF CONTENTS

Appendices

1. EXECUTIVE SUMMARY

1.1. Introduction

The City of Deephaven has prepared this Surface Water Management Plan (SWMP) to provide the City and its residents with direction concerning the administration and implementation of surface water management activities within the community. The SWMP inventories city land and water resources and presents water management policies and goals that address known surface water-related problems and concerns about future development activities. The SWMP also addresses the requirements of the various regulatory agencies involved in surface water management.

1.2. Surface Water Management Plan Content

The City of Deephaven's SWMP has been developed to meet the needs of the community and address the management planning requirements of the Metropolitan Surface Water Management Act. The SWMP has been prepared in general accordance with Minnesota Rules Chapter 8410 and follows the plan outline identified in the rules. The following paragraphs identify the major sections of the SWMP and where information can be located in the plan document.

SECTION 1 – EXECUTIVE SUMMARY

This section presents an introduction for the local water management plan, a summary of City objectives, regulatory requirements included in the plans preparation, and a general overview of the plan contents. This section also summarizes strategic recommendations for consideration by the City in implementing the SWMP.

SECTION 2 – SURFACE WATER MANAGEMENT PLAN PURPOSE

This section outlines the purpose of this plan.

SECTION 3 – WATER RESOURCE MANAGEMENT RESPONSIBILITIES AND RELATED AGREEMENTS

This section identifies any surface water-related agreements between the city and adjacent communities, organizations or government agencies.

SECTION 4 – LAND AND WATER RESOURCE INVENTORY

This section categorizes a wide range of information under the subsections entitled Physical Environment, Human Environment, Surface Water System and Groundwater Resource Data. The subsections provide information and references regarding water resource and physical factors within the City of Deephaven including the following:

- Precipitation data for hydrologic/hydraulic review and design.
- Topographic, geologic and groundwater information.
- Surface soils information
- Unique features and scenic areas.
- Land use and public utility services.
- Water-based recreational areas and land ownership.
- Surface water, wetlands, flood studies and water quality data.
- Groundwater resource data

SECTION 5 – ESTABLISHMENT OF GOALS AND POLICIES

This section outlines goals and policies addressing water resource management needs of the City and their relationship with Regional, State, and Federal goals and programs. Goals and policies relating to the following issues are presented:

- Water quality
- Water quantity
- Erosion and sedimentation
- Wetlands
- Public ditch systems
- Groundwater
- Recreation and ecological integrity
- Education and Public Involvement
- Monitoring, enforcement and expertise
- Low impact development, natural area preservation and water resource protection
- Municipal Housekeeping

SECTION 6 – ASSESSMENT OF ISSUES AND CORRECTIVE ACTIONS

This section provides an assessment of existing or potential water resource related issues within the City. This section also describes potential structural, nonstructural and programmatic solutions to the identified problems. Assessments of the following issues are included:

- Excessive nutrient levels and MCWD phosphorus reduction
- Construction site erosion and sediment control
- Increase in runoff discharge rates from new and redevelopment
- General Storm System Maintenance
- Street and Utility Improvement Project Coordination
- Stormwater Runoff Management and Treatment Project Opportunities

SECTION 7 – IMPLEMENTATION PRIORITIZATION & FINANCIAL CONSIDERATIONS

This section ranks the policy and corrective actions from Section 6 in an effort to associate a prioritization schedule with the items identified. The list is somewhat subjective and intended to be flexible with changing conditions and information. The section also includes the Capital Improvement Plan identifying specific projects, associated costs and potential funding sources.

SECTION 8 – AMENDMENT PROCEDURES

This section presents the expected longevity of the SWMP and the process for making amendments consistent with the MCWD Plan.

2. SURFACE WATER MANAGEMENT PLAN PURPOSE

This Surface Water Management Plan (SWMP) meets the requirements of Minnesota Statute 103B.235 and Minnesota Rule 8410. Minnesota Statute 103B.201 states that the purposes of the water management programs 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 uniform local policies and official controls for surface and groundwater management;
5. Prevent erosion of soil into surface water systems;
6. Promote runoff abstraction and groundwater recharge;
7. Protect and enhance fish and wildlife habitat and water recreational facilities; and
8. Secure the other benefits associated with the proper management of surface and groundwater.

The City of Deephaven is situated on Lake Minnetonka and is primarily within the Minnehaha Creek watershed; however, the eastern portion of the city drains to the east, ultimately to Purgatory Creek. **Figure 1** shows the City, adjacent communities and Lake Minnetonka.

3. WATER RESOURCES MANAGEMENT RESPONSIBILITIES AND RELATED AGREEMENTS

The City of Deephaven is responsible for construction, maintenance, and other projects in or along the City's storm water management systems (i.e., ponds, pipes, channels, etc.). With regards to land disturbance and stormwater management, the City of Deephaven must comply with the Minnehaha Creek Watershed District (MCWD) Rules, Riley-Purgatory-Bluff Creek Watershed District (RPBCWD) Rules, NPDES General Stormwater Permit for Construction Activity, NPDES Permit for Municipal Separate Storm Sewer Systems (MS4), and the NPDES Multi-Sector General Permit for Industrial Activity.

Water Resource Agreements

- With MCWD regarding Wetland Conservation Act (WCA) Representative.
- With RPBCWD regarding Wetland Conservation Act (WCA) Representative.
- With MCWD regarding land use or related project improvements permitting to meet District rules within City boundaries shall be performed by the District.
- With RPBCWD regarding land use or related project improvements permitting to meet District rules within City boundaries shall be performed by the District.

The regulations outlined in this plan do not supersede those put forth by MCWD, RPBCWD, or other Local, State, or Federal agencies. If a discrepancy exists between regulations contained in this plan and other agencies, the more restrictive requirement shall govern.

4. LAND AND WATER RESOURCE INVENTORY

4.1. Introduction

This section provides a generalized description and summary of factors affecting the water resources within the City of Deephaven. The subsections include Physical Environment, Human Environment, Surface Waters, and Groundwater. The Physical Environment subsection presents local information on precipitation, geology, topography, soils and unique features and the Human Environment subsection identifies local land use, public utility services and water based recreational areas. The Surface Waters subsection presents information on the City's drainage patterns, hydrologic systems, public waters and wetlands, floodplain areas and flood studies, shoreland management and water quality information, while the Groundwater subsection presents information pertaining to just that.

Much of the information contained within this section was compiled from available governmental sources. Whenever possible, the location of the information or additional resources have been identified or referenced.

4.2. Physical Environment

4.2.1. Location

The City of Deephaven occupies approximately 2.35 square miles in western Hennepin County, as shown in **Figure 1**. The communities adjacent to Deephaven are the Cities of Greenwood, Woodland, Shorewood and Minnetonka. This city is divided between the Watershed jurisdictions of the Minnehaha Creek Watershed District and the Riley-Purgatory-Bluff Creek Watershed District.

4.2.2. Climate and Precipitation

Deephaven has a Humid Continental Climate, typified by considerable seasonal temperature differences, hot and humid summers, and cold to extremely cold winters, and is located in USDA Plant Hardiness Zone 4b. Native vegetation has a seven month growing season (April to October) and crops have a five month growing season (May to September). Two-thirds of the precipitation occurs during the crop growing season, with a total of almost 31 inches annually. Refer to the links provided below for the 30-year average of temperature and precipitation data and the Point Precipitation Frequency Estimates provided by the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 for estimated precipitation amounts for specific frequencies, durations, and locations.

https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/climate-normals/1981-2010-normals-data

https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mn

4.2.3. Geology

The general geology of Hennepin County and the City of Deephaven has been compiled by the Minnesota Geological Survey in a document titled Geologic Atlas of Hennepin County Minnesota (N.H. Balaban, Editor, 1989). This document and its figures are readily available on the Hennepin County website.

The general surficial geology in the City consists of Glacial Till, Post Glacial Deposits and Des Moines Lobe Deposits. The southwest portion of the city is dominated by sandy-loamy tills, while the eastern portion consists of mostly peat and organic-rich post-glacial outwash deposits and the northern area is almost entirely sand/gravel outwash.

Bedrock is generally at a depth of 100 to 200 feet throughout the City, consisting almost entirely of a thin layer of St. Peter Sandstone. The upper half to two-thirds is fine- to medium-grained, friable quartz sandstone. The lower part of the St. Peter Sandstone contains multicolored beds of mudstone, siltstone, and shale with very coarse sandstone interlaced. Below the Sandstone lies the Prairie Du Chien Group, a Dolostone of varying thickness, on top of the subsequent Jordan Sandstone and St. Lawerence and Franconian Formation layers.

4.2.4. Topography

The City of Deephaven consists of gently to steeply rolling hills with wetlands and lakes prevalent in the low areas, many of which are landlocked basins. The city is divided between two watersheds with more than half of the surface area draining to Lake Minnetonka and the remainder draining southeast, ultimately discharging into Purgatory Creek. Surface elevations range from 1010 feet near the center of the city to 930 feet at Lake Minnetonka and 910 feet to the east.

4.2.5. Soils

The Natural Resource Conservation Service (formerly the Soil Conservation Service) prepared the Soil Survey for Hennepin County in 1974. This reference shows the location of specific soil types throughout the City of Deephaven and provides detailed data on the typical characteristics of each soil type (this information is readily viewable on the Hennepin County website).

The Lester and Malardi-Hawick Associations occupy the majority of the City. These soils are loams and sandy loams with a Type B moderate infiltration capacity. Low/wetland areas consist largely of Klossner-Houghton-Muskego mucks consisting of Type D soils with poor infiltration capacity, also known as hydric soils. These soils, as well as the locations of soils of varying infiltration potential (known as hydraulic characteristic *Type*), are important for stormwater-related planning purposes (**Figure 2**).

4.2.6. Fish and Wildlife Habitat

The existence and health of habitat generally determines the abundance and diversity of fish and wildlife within the City. Three distinct habitats affecting wildlife are prairie, forest and water area. The Watershed Plans contain an overview of the various ground covers, forests, plant species, and water bodies within the watershed and city that provide habitat to the numerous types of terrestrial and aquatic animal species.

Due to the rolling terrain, woodlands, wetlands, and lakes within the City of Deephaven there are conditions well suited for diverse types of natural habitat and wildlife. The City's wildlife is appreciated and protected as much as feasible.

The MDNR has prepared a Fish Population Assessment and fisheries lake survey for Lake Minnetonka (including Halsteds Bay, Priests Bay, Cooks Bay, Phelps Bay, Spring Park Bay, Harrisons Bay, West Arm, Black Lake, Seton Lake and Emerald Lake). The reports,

management plans, and lake depth maps are available from the MDNR Fisheries Division and are available for review at the City's Water Resource Library. The MNDR has not prepared any fish or wildlife management plans nor have they designated any waterfowl lakes within the City.

4.2.7. Unique Features and Scenic Areas

There are no locations within the City of Deephaven that have been identified by the MDNR Natural Heritage and Non-Game Research Program as having rare plant or animal species or other significant natural features relating to water resources (such as Outstanding Resource Value Waters).

4.2.8. Key Conservation Areas

The MCWD Lake Minnetonka Subwatershed Plan identifies one area of high or exceptional wildlife or vegetative diversity denoted as "Key Conservation Areas". The area is located around Lake Hooper. Conservation of this area will protect critical natural habitat and preserve local runoff and infiltration rates; the City will be available to work with the MCWD to establish appropriate requirements for protection of this area.

4.3. Human Environment

4.3.1. Land Use

The Existing Land Use and Future Land Use Maps are provided in Deephaven's Comprehensive Plan. Land cover consists of mostly urban development, with a few pockets of wetlands and forest. All land within Hennepin County was mapped using the Minnesota Land Cover Classification System (MLCCS). Refer to **Figure 3** for the portion of area in and around Deephaven. The MLCCS was developed by the Minnesota Department of Natural Resources (MnDNR), and categorizes all areas by type of land cover into two categories. Natural/Semi-natural areas consist of forests, grasslands, wetlands, etc, and Cultural areas consist of urban and agricultural areas. The two categories are further subdivided on the basis of plant types, soil hydrology, plant species, and amount of impervious surface. At this point the city has no goals or policies relating to these classifications. Additional information regarding land cover can be found in MCWD's or RPBCWD's Watershed Management Plan.

4.3.2. Public Utilities Services

The City of Deephaven has municipal sanitary sewer available to all properties within the city and is entirely within the Metropolitan Urban Service Area (MUSA). Through agreement, small areas of the city are served by municipal watermain from the City of Minnetonka but private wells are the primary source of drinking water throughout Deephaven.

The storm sewer system within the city is somewhat minimal and generally follows topographic drainage patterns and roadway corridors. Much of the storm sewer discharges into City wetlands, waterbodies, and lakes without prior treatment. Many of these low-area "discharge points" are landlocked basins with no outlet other than infiltration and evapotranspiration. Additional information on storm sewer systems and drainage features are presented in the Surface Waters subsection of this SWMP.

4.3.3. Public Areas for Water Based Recreation

Lake Minnetonka is a regional water resource and has many recreational uses including fishing, swimming, water skiing, and boating. In the winter the lake is used for cross-country skiing, snowmobiling, and ice fishing. Lake Minnetonka has public access from a boat launch in Deephaven at Carson's Bay, as well as one further north (Figure 5). In addition, there are many public beaches on the lake, as well as public locations for snowmobile access to Lake Minnetonka. Additional information on City parks, trails, and water based recreational areas is contained in the City's Comprehensive Plan.

4.3.4. Potential Pollutant Sources

Potential environmental hazards within the City include known and potential sources of soil and groundwater contamination listed by the Minnesota Pollution Control Agency (MPCA) and wells.

Known and Potential Sources of Soil and Groundwater Contamination: The MPCA maintains a database of sites with known or potential soil and groundwater contamination, including Superfund candidate sites, contaminated soil treatment facilities, leak sites, petroleum brownfields, state assessment sites, and voluntary investigation and cleanup sites. The database contains sites that have already been investigated and cleaned up, sites currently enrolled in MPCA cleanup programs, and sites suspected of contamination but found to be clean after investigation. A complete listing of sources and interactive map is provided at the following link:

https://www.pca.state.mn.us/data/contaminated-sites-data

Wells: When properly installed, wells pose no threat for potential contamination of groundwater. However, if improperly installed or abandoned, wells can provide a conduit for pollutants to enter groundwater. The County maintains an Index of known wells, some of which have been properly abandoned and sealed. However, those still in operation or abandoned but not properly sealed may allow for contamination of aquifers.

4.4. Surface Waters

The following section provides a detailed description of the surface waters within Deephaven. No surface waters have been appropriated for City needs.

4.4.1. Public Waters and Wetlands

The MDNR currently lists 5 protected waters, wetlands and water courses within the City of Deephaven of 2.5 acres or larger. Minnesota Chapter 103G provides specific criteria for protected status and the MDNR Protected Waters and Wetlands (PWI) maps identify the protected waters. In addition to the MDNR PWI Maps, National Wetlands Inventory (NWI) Maps have been prepared by the U.S. Fish and Wildlife Service, and Mosquito Wetland Inventory Maps have been prepared by The Metropolitan Mosquito Control District. These maps are available at the following links. Table 4.4.1 indicates the protected waters.

https://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html

https://www.fws.gov/wetlands/data/Mapper.html

https://www.mmcd.org/

Table 4.4.1: DNR Protected Waters and Wetlands Inventory

Waterbody Name	MDNR I.D.	Surface Area (acres)	Maximum Depth (ft)	DNR Management Classification
Lake Minnetonka	27-0133-00	14,004	113	General Development
Lake Louise	27-0870-00	7	N/A	N/A
Shavers Lake	27-0086-00	13	N/A	Recreational Development
Lake Marion	27-0087-00	12	N/A	Recreational Development
Lake Hooper	27-0876-00	4	N/A	N/A

The Minnehaha Creek Watershed District has completed a Functional Assessment of Wetlands (FAW), which includes those within the District in the City of Deephaven. The assessment identifies the locations of wetlands and provides a functional classification to all wetlands greater than ¼ acre in size. The categories are based on the function and value as determined in the field and include Preserve, Manage 1, Manage 2 and Manage 3. These categories are used to assist in managing water resources and applying buffer standards. The City will utilize the wetlands assessment as part of the site plan review process for individual projects, as well as for "global" planning activities. The City relies on the District for administration of its wetland protection rule, as well as the WCA requirements. Refer to the following link for more information on MCWD's FAW.

http://www.minnehahacreek.org/41-integration-past-planning-efforts/412-functional-assessment-wetlands

4.4.2. Flood Insurance Studies

The current Flood Insurance Study (FIS) applicable for the City is dated November 4, 2016. The FEMA Community Number for the City of Deephaven is 270158 and consists of multiple panels, all of which are viewable on FEMA's Map Service Center website. The FIRM identifies areas of the City as being within Zone AE, areas inundated during the 100-year flood event (1.0% chance of occurring any given year). The FIRM generally identifies flood levels but only the approximate extent of flooding since it is not based on accurate topography. The City currently uses the floodplain information to review development proposals based upon the extent of flood plains identified in the FIRM. For determination of specific flow rates and floodplain elevations, a detailed hydrologic/hydraulic analysis may be required utilizing survey-accurate topographic data. Refer to the following link for more information regarding the FEMA 100-year floodplain areas around the City.

https://msc.fema.gov/portal/advanceSearch#

4.4.3. Hydrologic/Hydraulic Analyses

The City of Deephaven has a patchy storm sewer system for conveyance of rainfall runoff. The existing system generally operates adequately removing stormwater from City property and roadways, although there are areas in need of improvement, as mentioned in the CIP portion of this document. The storm sewer system and subwatershed areas within the City are shown on **Figures 4 and 5**. The identification numbers indicated were selected randomly and correspond to the modeling performed, as described below.

As part of the original SWMP preparation, a limited hydrologic and hydraulic analysis was conducted for the subwatersheds of the city. This modeling utilized the HydroCAD modeling software to determine runoff from design events using the Soil Conservation Service (SCS) TR-20 methodology. It provides a technical planning tool to address risk, along with a mechanism to consider various stormwater-related alternatives. However, the results should not to be used for design-level detail. The analysis included subwatershed delineation from USGS topography, available 2' aerial contours, and field reconnaissance. The analysis determined subwatershed areas, hydrologic conditions, and peak discharge rates for the 1-year, 10-year and 100-year, 24-hour storm events (Table 4.4.3.1).

Table 4.4.3.1 – Subwatershed Hydrologic Runoff Characteristics

I.D.	Area (acres)	CN	Tc (min)	1-Year (2.35") (cfs)	10-Year (4.2") (cfs)	100-Year (6.0") (cfs)
CB1	182.3	70	30	43.1	218.9	437.6
CB2	58.1	71	52	10.5	49.8	98.5
CB3	36.4	73	30	12.3	51.1	96.9
CB4	32.5	71	40	7.1	33.7	66.4
CB5	31.5	75	24	15.3	56.0	102.9
CB6	31.2	75	30	13.0	48.1	88.6
P1	37.9	73	26	14.1	58.4	110.6
P10	109.1	73	51	25.1	105.2	201.0
P11	78.0	72	44	17.8	79.5	154.2
P1a	10.6	70	19	3.5	17.0	33.7
P2	7.2	72	12	3.9	16.2	30.6
P3	18.5	74	18	9.8	37.4	69.2
P3a	5.4	72	8	3.5	14.1	26.5
P4	32.5	72	40	8.0	35.5	68.8
P5	33.5	71	80	4.5	20.8	41.2
P6	21.7	69	30	4.5	24.6	50.2
P7	57.5	73	52	13.0	54.7	104.4
P8	66.8	71	45	13.4	63.7	125.7
P9	64.9	70	42	12.1	61.4	123.4
RB1	47.5	67	25	8.2	54.1	114.4
RB2	131.3	69	60	16.8	90.3	185.8

RB3	16.9	69	25	4.0	21.7	44.0
RB3w	96.7	72	40	23.7	105.7	204.7
RB4	69.2	81	40	39.0	112.8	191.7
SL10	34.0	67	30	5.2	34.2	72.8
SL11	24.7	68	15	7.1	40.4	82.5
SL4	65.1	75	30	27.0	100.5	184.8
SL5	34.6	75	36	12.6	47.1	87.0
SL6	15.2	71	14	6.8	30.3	58.5
SL7	21.1	77	16	15.8	51.6	91.2
SL8	95.9	73	41	25.9	108.1	206.1
SL9	12.6	70	15	4.8	23.0	45.3

Note: Precipitation depths based on Technical Paper 40 data.

The modeling done as part of this project primarily focused on runoff quantities based on land use and travel times. Many of the ponding areas (lakes, wetlands, etc.) have been modeled here and the results of the discharge from these ponding areas are indicated in the following table.

Table 4.4.3.2 – Pond/Lake/Wetland Discharge

I.D.	Drainage Area (acres)	1-Year (2.35") (cfs)	10-Year (4.2") (cfs)	100-Year (6.0") (cfs)	1-Year Discharge Volume (ac-ft)	10-Year Discharge Volume (ac-ft)	100-Year Discharge Volume (ac-ft)	100-Year HWL (feet)
CB2P	58.1	0.0	0.0	0.0	0.0	0.0	0.0	931.9
CB3P	36.4	0.0	0.0	0.0	0.0	0.0	0.0	932.5
CB4P	32.5	0.0	0.0	0.0	0.0	0.0	0.0	950.9
CB5P	31.5	0.0	0.0	0.0	0.0	0.0	0.0	968.8
CB6P	31.2	0.0	0.0	0.0	0.0	0.0	0.0	936.2
P11P	78.0	8.2	30.2	42.8	2.9	10.4	19.4	962.3
P2P	7.2	0.0	0.0	0.0	0.0	0.0	0.0	960.0
P3P	18.5	0.0	0.0	0.0	0.0	0.0	0.0	939.5
P4P	32.5	0.0	0.0	0.0	0.0	0.0	0.0	932.2
P5P	33.5	0.0	1.8	10.9	0.0	1.4	5.2	928.6
P6P	112.7	0.0	0.0	0.0	0.0	0.0	0.0	914.9
P7P	57.5	0.0	0.0	7.6	0.0	0.0	4.7	918.6
P8P	131.7	0.4	2.6	5.1	1.7	10.0	18.9	913.5
P9P	64.9	1.0	2.1	2.6	1.8	7.3	11.6	983.1
RB2P	131.3	0.4	2.0	3.2	1.4	8.3	13.8	932.4
RB3P	113.6	0.0	0.0	0.0	0.0	0.0	0.0	930.4

SL10P	34.0	0.0	0.0	0.0	0.0	0.0	0.0	934.0
SL5P	34.6	1.3	5.6	8.4	1.5	5.1	9.3	931.2
SL6P	15.2	0.0	0.0	0.0	0.0	0.0	0.0	935.8
SL9P	12.6	0.0	0.0	0.0	0.0	0.0	0.0	973.9

Note: Precipitation depths based on Technical Paper 40 data.

4.4.4. Flood Problem Areas

There are no known areas within the city that have historic flooding or surface water control problems. If problem areas are identified in the future, Section 6 of this plan will be revised to reflect such changes.

4.4.5. Surface Water Quality

4.4.5.1. Available Water Quality Data

MCWD monitors and collects water quality data in many of the lakes and streams in the District, and the data is publicly available through the Minnesota Pollution Control Agency's Lake and Stream Information Tool at the following link:

https://cf.pca.state.mn.us/water/watershedweb/wdip/index.cfm

4.4.5.2. Impaired Waters & TMDLs

The Federal Clean Water Act requires states to establish water quality standards, to test surface waters, and formally list those as "impaired" that do not meet the water quality standards. Subsequent sections present more detail on the impaired waters program and its relationship to Deephaven's stormwater management program. A Total Maximum Daily Load (TMDL) study is the next step for an impaired water, although it can be delayed years after identification of the impairment. The TMDL study can result in very specific water quality obligations for Cities. Once the TMDL Study is accepted by the MPCA, an Implementation Plan must be developed, and MS4 Cities must develop an approach to meet the obligations identified in the TMDL Study. Currently no water bodies located partially or entirely with the City boundary are listed as impaired.

4.4.6. Shoreland and Flood Plain Ordinances

The City of Deephaven has prepared and adopted a shoreland ordinance in accordance with MDNR requirements to provide for the protection of shorelands of public waters during development. The City's Shoreland Management District is an overlay zoning district existing within 1,000 feet or less of a MDNR protected water. The District applies restrictions above and beyond the underlying zoning district of the affected property based on the classification of the protected water body. The water body/shoreland classifications determined by the MDNR are shown in Table 4.4.6.

Table 4.4.6: MDNR Waterbody/Shoreland Classification

RECREATIONAL DEVELOPMENT LAKES
- Shavers Lake
- Lake Marion

GENERAL DEVELOPMENT LAKES
- Lake Minnetonka

NATURAL ENVIRONMENT LAKES
- N/A

The Shoreland Management District Ordinance (Section 1350) identifies allowable uses, lot areas, setbacks and impervious coverage limits for properties adjacent to the protected waters. In addition, the ordinance identifies other development criteria including allowable lowest floor elevations, shoreland alterations, bluff impact zones and agriculture use standards.

To maintain Deephaven's eligibility in the National Flood Insurance program and to minimize potential losses due to periodic flooding, the City has prepared and adopted a floodplain ordinance (Section 1360) in accordance with MDNR requirements. The floodplain zoning district is an overlay zoning district to existing land use regulations of the city. The ordinance adopts by reference the Food Insurance Rate Map (FIRM) developed by the Federal Emergency Management Agency (FEMA) and identifies permitted uses, standards, and evaluation criteria for improvements proposed in floodplains. Refer to the following link for more information regarding the Shoreland Management District and Floodplain ordinances.

https://www.cityofdeephaven.org/index.asp?SEC=BB6F25E2-8069-4532-B274-833A2B1308E0&Type=B_BASIC

4.5. Groundwater

4.5.1. Groundwater Appropriations

The City of Deephaven does not have any groundwater appropriations. The majority of water is obtained from private wells, with a small portion of the city served by Minnetonka municipal watermain through agreement; therefore, the City does not have a Wellhead Protection Plan.

5. ESTABLISHMENT OF GOALS AND POLICIES

The City of Deephaven has developed the goals and policies contained in this section to conform to the water resource purposes specified in Minnesota Statute Section 103B.201. They have been developed to avoid conflict with existing State, Regional, and County goals and policies, and to be generally consistent with the MCWD Plan. The City will regulate erosion control, floodplain alteration, and stormwater management for all land development within the City limits accordance with City Ordinance and NPDES Permitting. The City relies on the Watershed Districts to administer and enforce their Rules and the wetland requirements of the WCA.

Additionally, the City's revised MS4 Storm Water Pollution Prevention Plan (SWPPP) contains information related to the required Best Management Practices (BMPs) and how the City intends to meet the overall goals of the SWPPP, which are directly related to the goals and policies listed here.

The goals and policies developed by the City address:

- Water quality,
- Water quantity,
- Erosion and sediment control,
- Wetlands,
- Public ditch systems,
- Groundwater,
- Recreation, fish and wildlife and
- Education and public participation.

Outlined below are the goals and policies developed for each of the above items. The annual costs associated with policy making and upkeep is included within the City's general budget.

5.1. Water Quality

Goal:

To maintain or improve water quality of surface waters throughout the City by reducing sediment and nutrient loads from the city subwatersheds.

Policies:

1. As an MS4 community the City has developed a Storm Water Pollution Prevention Plan (SWPPP) outlining many of the municipal BMPs and associated actions being taken by the City. The SWPPP is referenced here and contains additional information on many of the following topics.

2. In the design and construction of new and redevelopment, treatment of stormwater runoff is required prior to discharge to a surface water or wetland. The City will continue to review and approve construction plans for conformance with the requirements of NPDES permitting. Additionally, if warranted, projects within the City are required to obtain a watershed district permit (MCWD or RPBCWD) and meet all requirements of the appropriate Rules.

3. The City will continually evaluate opportunities to reduce the phosphorus load to the area surface waters. Additionally, the City contributes runoff to multiple bays of Lake Minnetonka, none of these bays are currently on the State's 303(d) list of impaired waters; however, if any are added in the future the City will address any TMDL requirements at that time.

4. The City will make water resource protection a priority for city property, including: parks, open space, and other recreational areas. Areas are swept as needed and buffer establishment or other retrofit treatment techniques may be incorporated into future projects within these areas, when feasible.

5. The City annually inspects and maintains its public stormwater management facilities to ensure their continued effectiveness. When feasible, the City may require stormwater management techniques to be obtained within outlots; however, many facilities will remain private. The City will evaluate requiring the owner of private stormwater facilities intended to meet runoff requirements to execute a maintenance agreement with the City to ensure regular inspection and maintenance occurs.

6. The City will continue to sweep paved public streets within the community as outlined in the City's SWPPP and the Housekeeping section, section 5.11 below.

7. The City will develop and implement Best Management Practices (BMPs) at City public works facilities and City owned lands to retain and prevent pollutants in stormwater runoff from leaving the site.

8. The City requires the preparation and implementation of erosion and sediment control plans and best management practices for construction and land development activities in accordance with NPDES requirements.

9. The City will disperse public education information to foster responsible water quality management practices by City residents and businesses. The public information will include proper lawn fertilizing and other lawn chemical use, disposal of lawn waste, and disposal of solid, liquid, and household hazardous waste products.

5.2. Water Quantity

Goal:

To minimize downstream impacts by maintaining runoff discharge rates and promoting Low Impact Development (LID) techniques for runoff volume reduction/abstraction.

Policies:

1. The city will require that proposed stormwater discharge rates as a result of development be consistent with the requirements of NPDES Permitting.

2. The City will rely on MCWD and RPBCWD to administer their Rules regarding water quality and will require verification that Watershed permit requirements are being met.

3. The City will review downstream stormwater-related impacts (within the community) of development proposals and proactively address water resource-related concerns.

4. The City recognizes the potential environmental impacts associated with constructing new outlets to existing landlocked areas; therefore, the outletting of landlocked areas shall be done only as a last resort. The city has multiple landlocked areas and will address each on a case-by-case basis.

5. The design of new stormwater storage facilities and trunk lines will accommodate the 100-year storm event without causing flooding to building structures and maintaining required freeboard. Storm sewers will generally be designed to pass the10-year rainfall event under gravity flow conditions, but downstream restrictions may require a reduced-capacity design.

6. Stormwater facilities receiving discharges from adjacent communities will be designed to accommodate existing runoff rates and anticipated volumes.

7. Lowest floor elevations for new buildings shall be at or above the elevations as indicated in the City's floodplain and shoreland ordinances, as well as meet the requirements of the Watershed Districts' Rules. Wetlands or water bodies without regulatory floodplain elevations or defined ordinary high water levels, but with outlets, shall have low floor elevations 2 feet above the 100-year high water level and the emergency overflow elevation. Structures around landlocked basins shall have low floor elevations 2 feet above the back-to-back 100-year events.

8. The City will encourage the use of natural drainageways for conveying stormwater where the drainageway can accommodate or be improved to accommodate proposed flows and volumes.

9. Enhanced infiltration practices will be encouraged, where feasible, in areas where the present or future land use does not have a significant potential to contaminate groundwater.

10. Public stormwater facilities will be regularly inspected and maintained as necessary for adequate operations. For private stormwater facilities, the City will require a maintenance agreement with the development proposal identifying regular inspection and maintenance of stormwater facilities.

5.3. Erosion and Sedimentation

Goal:

To prevent erosion and sedimentation to the maximum extent practical through construction site permitting and inspection and good municipal housekeeping.

Policies:

1. The City requires the preparation and implementation of erosion and sediment control plans and best management practices for construction and land development activities in accordance with MPCA's NPDES permit requirements with the ultimate goal of eliminating sediment discharge from the site.

2. The City will enforce the erosion and sediment control plan and best management practices on construction sites through the review and inspection process. Areas adjacent to water bodies and wetlands may require additional BMPs due to their environmental sensitivity.

3. The City may prohibit work in areas having steep slopes and/or high erosion potential where the impacts of significant erosion cannot be protected against or mitigated. In addition, as part of the development proposal, the City may require restrictive easements on areas having steep slopes or high erosion potential.

10. The City will continue to sweep paved public streets as identified in the SWPPP. Areas with direct discharge into lakes, wetlands, and streams will be given first priority and areas requiring additional attention will be swept more on an as-needed basis.

5.4. Wetlands

Goal:
To protect wetland value and ensure conformance with the requirements of the Minnesota Wetlands Conservation Act (WCA), MCWD Rules, and other State and Federal regulations.

Policies:
1. The City defers the administrative responsibility to MCWD and RPBCWD for wetland management and conformance with their rules and the Wetland Conservation Act (WCA).

2. The City will notify parties proposing land disturbing activities (i.e. altering, dredging, filling, and draining) to verify with the Watershed Districts for requirements, as well as possible permit requirements from the MDNR and US Army Corps of Engineers (COE).

3. The City of Deephaven is completely developed, making wetland covenant or easement dedication somewhat difficult for existing platted properties. The City does not require any additional dedication above and beyond the requirements of the WCA or the MCWD.

4. The City will cooperate with interested private or governmental parties on wetland restoration projects and may participate in the State's wetland banking program.

5.5. Public Ditch Systems

Comment:
There are no known county or judicial public ditch systems within the City.

5.6. Groundwater

Goal:
To protect groundwater through prudent management of surface waters and areas of potential contamination.

Policies:
1. The City will cooperate with County and State agencies to inventory and seal abandoned wells and notify its residents of State standards on well abandonment (see Figure 13 for wellhead protection zone).

2. The City will require individual sewage treatment systems to be in conformance with the State of Minnesota's on-site sewage treatment system requirements.

3. The City will consider the significance of sensitive geologic areas when making land use decisions, when reviewing development proposals, or when proposing construction of stormwater facilities. Activities that may have significant contamination potential will be required to include groundwater protection measures.

4. The City will encourage the use of infiltration methods to promote groundwater recharge where groundwater will not be significantly impacted by the land use or stormwater runoff.

5.7. Recreation and Ecological Integrity

Goal:
To protect and enhance recreational facilities, fish and wildlife habitat, and overall ecological continuity.

Policies:
1. The City will support the efforts of Local, State, and Federal agencies promoting public enjoyment, and the protection of fish, wildlife, and recreational resource values in the City.

2. The City will protect wetlands in accordance with the goals and policies of this plan.

3. The City will guide future land planning and community development into giving higher consideration towards existing wooded and natural areas

4. The City will encourage its residents to retain existing wetlands, vegetation buffers, and open spaces for the benefit of wildlife habitat.

5.8. Education and Public Involvement

Goal:
To educate and inform the decision makers and general public on water resources management issues; and to increase public participation in water management activities.

Policies:
1. The City will continue to promote best management practices for its residents. The public education will include topics such as: fertilizer use and the limited need for phosphorus in fertilizer; lawn care and lawn chemical use; solid, liquid and household hazardous waste disposal; and natural water resource systems and protection methods.

2. The City will have various types of water resource protection information available at City Hall for review by its residents, as well as links to information on its website.

5.9. Training, Inspection and Enforcement

Staff training, inspection of City facilities, illicit discharges, and construction sites, and enforcement responses are done in accordance with the City's MS4 Permit requirements. Further information

regarding training, inspection and enforcement can be found in the City's SWPPP located at City Hall.

5.10. Low Impact Development, Natural Area Preservation & General Water Resource Protection

Goal:
To promote Low Impact Development (LID) techniques, preserve natural areas and protect surface water resources.

Policies:

1. The City is aware of the environmental benefits associated with LID and general natural area preservation and will work with development/redevelopment to implement these practices when feasible. These may include, but not be limited to:

    - Impervious area reduction
    - Impervious area disconnection
    - Decentralized stormwater management
    - Street width reduction
    - Rural street sections
    - Reduced setbacks
    - Ecological/pedestrian corridors
    - Natural space preservation and incorporation into site design
    - Site disturbance minimization
    - Pervious pavement
    - Green Roofs
    - Increased stormwater abstraction (infiltration, filtration, irrigation reuse, etc.)

2. The City currently does not plan to adjust its codes to address LID specifically; however, the codes will continue to be flexible and allow for variance to accommodate LID designs on a case-by-case basis.

3. The City is continually looking for ways to enhance protection of its surface water resources, including the integration of improvement techniques into parks, open space and other recreational areas.

5.11. Municipal Housekeeping

Goal:
To conduct activities and perform maintenance operations as necessary to maintain and improve the health of the surrounding surface waters through minimization of runoff pollutants. Additional information can be found in the City's MS4 Storm Water Pollution Prevention Plan (SWPPP).

Policies:

1. The City will continue to sweep all paved streets as outlined in the SWPPP.

2. The City will inspect its stormwater treatment systems per requirements outlined in the MS4 Permit.

3. The City requires Operation and Maintenance Plans for all stormwater management facilities used to meet governmental requirements. The plans are required to outline operation, maintenance, and inspection schedules and reporting requirements.

4. Stockpiles and materials handling areas are inspected per MS4 Permit requirements.

5. Inspection and maintenance records are kept and reported annually to the MPCA as part of the MS4 NPDES-required annual reporting process.

6. ASSESSMENT OF ISSUES AND CORRECTIVE ACTIONS

This section contains an assessment of existing and potential water resource related issues presently known within the City, as well as a description of structural, non-structural, or programmatic solutions that are proposed to address or correct the issues. These issues and concerns have been identified in the by City staff as part of the land and water resource data collected in the preparation of this SWMP. Many of the general issues addressed here are addressed by policies set forth in Section 5 of this plan, while site-specific issues have specific proposed solutions. The timeframes shown are for planning purposes only and may change as needs and funding scenarios change in the future.

6.1. Excessive Nutrient Levels and Phosphorus Reduction

Issue:

The City of Deephaven discharges stormwater runoff directly into the following bays of Lake Minnetonka: Carson's, Robinson and South Lower. Runoff carrying nutrients, primarily phosphorus, from developed and undeveloped land to these water bodies ultimately causes elevated nutrient concentration in the waters. High nutrient loads will lead to reduced clarity, excessive algal growth and overall decreased public value of the affected water bodies.

Corrective Action:

The City requires new and redevelopment to apply permanent stormwater treatment measures meeting the requirements of Watershed District and NPDES permitting. Also, in order to achieve the allocated phosphorus reduction, the City will employ a variety of techniques. These techniques will include the following:

- Evaluate municipal projects for incorporation of volume abstraction above and beyond MCWD and NPDES requirements
- Increased street sweeping frequency
- Natural area preservation
- Partnering with MCWD and RPBCWD for capital projects

Refer to the City's SWPPP for more information regarding pollutant removal practices and management.

Timeframe

Ongoing:	Site plan review for permit compliance.
Ongoing:	Evaluation of treatment opportunities to decrease pollutant loads

6.2. Construction Site Erosion and Sediment Control

Issue:

Sediment leaving construction sites pollutes, fills and degrades surface waters, wetlands and conveyance systems.

Corrective Action:

The City will continue to monitor appropriate use of sediment and erosion control practices, as required by NPDES permitting, through the review and inspection process currently in place.

Timeframe:
Ongoing: Plan review and construction site inspection.

6.3. Runoff discharge rates from new and redevelopment

Issue:
The increased percentage of impervious area typically seen with new and redevelopment will cause a corresponding increase in flowrate of the runoff leaving the area. These increased rates can be responsible for downstream erosion and flooding if not properly mitigated for.

Corrective Action:
The City requires new- and redevelopment to apply permanent stormwater rate attenuation measures meeting the requirements of MCWD and NPDES permitting. In addition, City Code requires stormwater management for any sites exceeding hard cover requirements to limit runoff to impervious surface allowed.

Timeframe:
Ongoing: site plan review for permit compliance.

6.4. General Storm System Maintenance

Issue:
The existing storm drainage system is performing adequately to convey runoff, although, system maintenance will be required annually.

Corrective Action:
Storm drainage system maintenance required includes pond assessment and cleaning, street sweeping, sewer televising, and GIS/mapping.

Timeframe:
Ongoing: storm system maintenance.

6.5. Street and Utility Improvement Projects

Issue:
The existing storm drainage system is performing adequately to convey runoff, although, system maintenance will be required annually.

Corrective Action:
As street, sanitary sewer, and water main improvement projects are scheduled, project areas will also be reviewed for potential stormwater management and treatment improvements that were not previously identified. Potential improvements include, but are not limited to, conveyance improvements, stormwater treatment devices, bioretention basins, wet retention ponds, slope stabilizations, and native vegetation restoration.

Timeframe:
Ongoing: storm system improvements.

6.6. Stormwater Runoff Management and Treatment Projects

Issue:

The existing storm drainage system is performing adequately to convey runoff, although, system maintenance will be required annually.

Corrective Action:

Correct flooding issues on City property as necessary to protect public safety and minimize potential for property damage. Also, collaborate as necessary with Watershed Districts and willing private landowners to install stormwater treatment measures (i.e. rain gardens, stormwater treatment devices, etc.) throughout the City to provide additional runoff storage capacity, reduce runoff rates and volumes, and/or reduce pollutant loads. Coordinate stormwater treatment improvements to treat stormwater from areas with inadequate or no treatment and improve the quality of runoff reaching area surface waters.

Timeframe:

Ongoing: storm system improvements.

6.7. Northome Road Drainage Improvements

Issue:

The existing storm sewer and catch basin near 19200 Northome Road does not adequately convey runoff from the area leading to excessive standing water on the street and adjacent properties.

Corrective Action:

Construct 50 feet of new storm water pipe under Northome Road and replace the existing catch basin.

Timeframe:

2018

6.8. Easton Road Drainage Improvements – Phase I

Issue:

Runoff from portions of Easton Road and from nearby lots drain to 19130 Easton Road causing significant flooding and erosion.

Corrective Action:

Extend a new storm water pipe from the existing storm water main on Rutledge Avenue through 19130 Rutledge Road to access this lot.

Timeframe:

2018

6.9. Minnetonka Boulevard Drainage Improvements

Issue:

Runoff from Minnetonka Blvd drains to an inlet south of 18995 Minnetonka Blvd, which drains east to the adjacent wetland. The outfall pipe is in poor condition and the drainage way to the wetland is severely eroded.

Corrective Action:
Install drop structure and approximately 200' of 24" pipe to locate outfall at elevation of drainage way. Re-grade drainage way to correct erosion and stabilize swale with Turf Reinforcement Mat and vegetation.

Timeframe:
2019

6.10. Honeysuckle Road Drainage Improvements

Issue:
Runoff from the west side of Honeysuckle Road drains to an inlet on the northeast corner of 3860 Honeysuckle Road and through a 12" pipe across the road and to a wetland east of the area. The existing pipe is in extremely poor condition, with a portion collapsed and blocked. Therefore, localized flooding occurs at even smaller rain events.

Corrective Action:
Install new inlet and approximately 300' of 12" RCP.

Timeframe:
2020

6.11. Walden Trail Drainage Improvements

Issue:
Runoff from the neighborhood east of Walden Trail drains to an inlet on the west side of 19275 Walden Trail and through a 12" pipe across the road to Lake Minnetonka. The existing pipe is in extremely poor condition, with a portion collapsed and blocked. Therefore, localized flooding occurs at even smaller rain events.

Corrective Action:
Install new inlet and approximately 50' of 12" RCP.

Timeframe:
2020

6.12. Heathcote Road Drainage Improvements

Issue:
Runoff from the north end of Heathcote Road drains to inlets near 3954 Heathcote Road and through an 18" pipe to a pond adjacent to Heathcote Lane. The existing pipe is in extremely poor condition, with a portion collapsed and blocked. Therefore, localized flooding occurs at even smaller rain events.

Corrective Action:
Install new inlets and approximately 200' of 18" RCP.

Timeframe:
2021

6.13. Cottagewood Road Drainage Improvements

Issue:
Significant storm water runoff ponds along the street in front of 20200 Cottagewood Road causing erosion of the street and icy conditions during the spring thaw.

Corrective Action:
Install new inlet and approximately 50' of 12" RCP.

Timeframe:
2021

6.14. Northome Avenue Drainage Improvements

Issue:
Due to increased precipitation rates and local lot improvements, runoff draining down Lake Avenue is causing localized flooding in the area adjacent to 3780 Northome Avenue.

Corrective Action:
Install a new inlet and new storm sewer, connecting to the existing system on Azure Road.

Timeframe:
2022

6.15. Summerville Road Drainage Improvements

Issue:
Runoff draining west on Summerville Road is routed through a 12" pipe to Lake Minnetonka. The existing pipe is in extremely poor condition, with a portion potentially blocked. Therefore, localized flooding occurs at even smaller rain events.

Corrective Action:
Install 100 feet of new storm water pipe.

Timeframe:
2024-2026

6.16. Easton Road Drainage Improvements – Phase II

Issue:
Due to increased precipitation rates and local lot improvements, runoff draining down Easton Road is causing localized flooding in the area adjacent to 19025 Easton Road.

Corrective Action:
Extend the existing storm sewer on Rutledge Road to Easton Road.

Timeframe:
2026-2028

6.17. Park Place and Cottagewood Road Drainage Improvements

Issue:

The storm sewer system in the neighborhood of the Park Place and Cottagewood Road intersection is in extremely poor condition. The sewer pipe is failing, causing fractures in the pavement and the system is inadequate to properly drain runoff from this area in its current condition.

Corrective Action:

Replace the existing storm water system in the neighborhood of the Park Place and Cottagewood Road intersection.

Timeframe:

2028-2030

7. IMPLEMENTATION PRIORITIZATION & FINANCIAL CONSIDERATIONS

7.1. Implementation Prioritization

Provided below is a generalized ranking of the *policies* and *corrective actions* identified in sections 5 and 6. The High, Medium, Low format has been selected over a numerical format to emphasize the need for flexibility and the inherent inexactness of trying to quantify something that is fairly subjective. This prioritization is meant as a guide for future planning, as well as the corrective actions and associated CIP table in section 7.3. Funding appropriations and projects may switch levels at anytime given new information/circumstances.

7.1.1. Goals and Policies Prioritization

All of the goals and associated policies identified in Section 5 are of high priority. Rather than restate each policy, the following policies are highlighted because they pertain to more recent developments. These policies are general in nature and not specific enough to be included in the capital improvement program identified in Table 7.1.3.

Table 7.1.1: Policy Prioritization

Policy Description	Ranking
Administer and maintain the City MS4 Storm Water Pollution Prevention Plan (SWPPP)	HIGH
Continued promotion of LID techniques, infiltration and general runoff volume reduction	HIGH
Maintain existing storm sewer system to provide adequate treatment and conveyance of runoff	HIGH
Evaluate street and utility improvement projects for potential stormwater management and treatment improvements	HIGH
Correct flooding issues on City property as necessary and collaborate with MCWD, RPBCWD and Private Landowners to install stormwater treatment measures	MED
Expand public education program to make wider use of City website	MED
Address Total Maximum Daily Load waste load allocations as they are developed	LOW

7.1.2. Issues and Corrective Action Prioritization

The following prioritization includes the construction-related projects identified as corrective actions in Section 6, and shown on Figure 15.

Table 7.1.2: Corrective Action Prioritization

Corrective Action Description	Ranking
Easton Road Drainage Improvements – Phase I	HIGH
Minnetonka Boulevard Drainage Improvements	HIGH
Heathcote Road Drainage Improvement	HIGH
Northome Avenue Drainage Improvements	HIGH
Summerville Road Drainage Improvements	HIGH
Easton Road Drainage Improvements – Phase II	HIGH
Park Place and Cottagewood Road Drainage Improvements	HIGH
Cottagewood Road Drainage Improvements	MED
Northome Road Drainage Improvements	MED
Walden Trail Drainage Improvements	MED
Honeysuckle Road Drainage Improvements	MED

7.2. Funding Sources

The City currently has a number of funding sources available to pay for the regulatory controls, management program, and capital improvements identified in this SWMP. They include general tax revenue, special assessments and the City's stormwater utility fee. While general tax revenues and the stormwater utility fee can likely fund the regulatory and management programs, as well as smaller projects, special assessments will generally be required to fund the larger capital improvements projects. The City stormwater utility fee is currently sufficient and generates approximately $123,000 annually for general maintenance and drainage-related improvement projects; funds periodically roll over from year to year providing additional funds for some years. The estimated costs associated with other regulatory controls have not been broken out as they are covered within the general budget and are performed on an as-needed basis. If projects identified can provide treatment beyond what is required by governmental agencies, MCWD and/or RPBCWD Cost-Share Grant funding may also be pursued.

7.3. Capital Improvement Plan

Capital improvements funded by the City will be at the direction of the City and based upon project feasibility, City priority, and availability of financial resources. Additionally, potential Stormwater Management projects will be evaluated as part of future Street and Utilities improvements, with funding provided from the stormwater utility fee for the stormwater management portions of any projects identified. Table 7.3.1 is the Capital Improvement Plan (CIP) for known drainage issues as discussed in Section 6.

Table 7.3: Capital Improvement Plan

I.D.	Project Description	Estimated Cost	Approximate Timeframe	Potential Funding Source
6.1	Excessive Nutrient Levels and Phosphorus Reduction	Unknown	Ongoing	SUF/Gen
6.2	Construction Site Erosion and Sediment Control	Unknown	Ongoing	SUF/Gen
6.3	Runoff discharge rates from new and redevelopment	Unknown	Ongoing	SUF/Gen
6.4	General Storm System Maintenance	Unknown	Ongoing	SUF/Gen
6.5	Street and Utility Improvement Projects	Unknown	Ongoing	SUF/Gen
6.6	Stormwater Runoff Management and Treatment Projects	Unknown	Ongoing	SUF/Gen
6.7	Northome Road Drainage Improvements	$12,000	2018	SUF/Gen
6.8	Easton Road Drainage Improvements – Phase I	$30,000	2018	SUF/Gen
6.9	Minnetonka Boulevard Drainage Improvements	$15,000	2019	SUF/Gen
6.10	Honeysuckle Road Drainage Improvements	$22,000	2020	SUF/Gen
6.11	Walden Trail Drainage Improvements	$22,000	2020	SUF/Gen
6.12	Heathcote Road Drainage Improvements	$30,000	2021	SUF/Gen
6.13	Cottagewood Road Drainage Improvements	$10,000	2021	SUF/Gen
6.14	Northome Avenue Drainage Improvements	$80,000	2022	SUF/Gen
6.15	Summerville Road Drainage Improvements	$80,000	2024	SUF/Gen
6.16	Easton Road Drainage Improvements – Phase II	$174,500	2026	SUF/Gen
6.17	Park Place and Cottagewood Road Drainage Improvements	$80,000	2028	SUF/Gen

The projects listed above should not required increased monetary expenditures from homeowners above the typically expected amounts. The scope of these projects is within the normal range of operating costs for the City.

8. AMENDMENT PROCEDURES

8.1. Review and Approval

It is the City's intention to have this SWMP reviewed and approved by the Minnehaha Creek Watershed District (MCWD) and Riley-Purgatory-Bluff Creek Watershed District (RPBCWD) in accordance with Minnesota Statutes, Section 103B.235. The plan will also be submitted to the Metropolitan Council for review and comment, with ultimate adoption as part of the Comprehensive Plan.

8.2. City Amendments

If the City proposes changes to this SWMP, the changes and their impacts will be determined by the City as either a "minor" change or a "major" change. The general descriptions of minor or major changes and the associated review and approval requirements are presented as follows:

Minor Changes would include small adjustments to subwatershed or subdistrict boundaries or other minor changes that would not significantly affect the rate or quality of stormwater runoff discharged across the municipal boundary or significantly affect high water levels within the City. Minor changes also include revisions made to the stormwater related Capital Improvements Program to best meet the City's water resource needs and financial considerations. For proposed minor changes, the City will prepare a document which defines the change and includes information on the scope and impacts of the change. The document will be forwarded to MCWD and/or RPBCWD for their records. The minor change will be implemented after the document is adopted by the City Council.

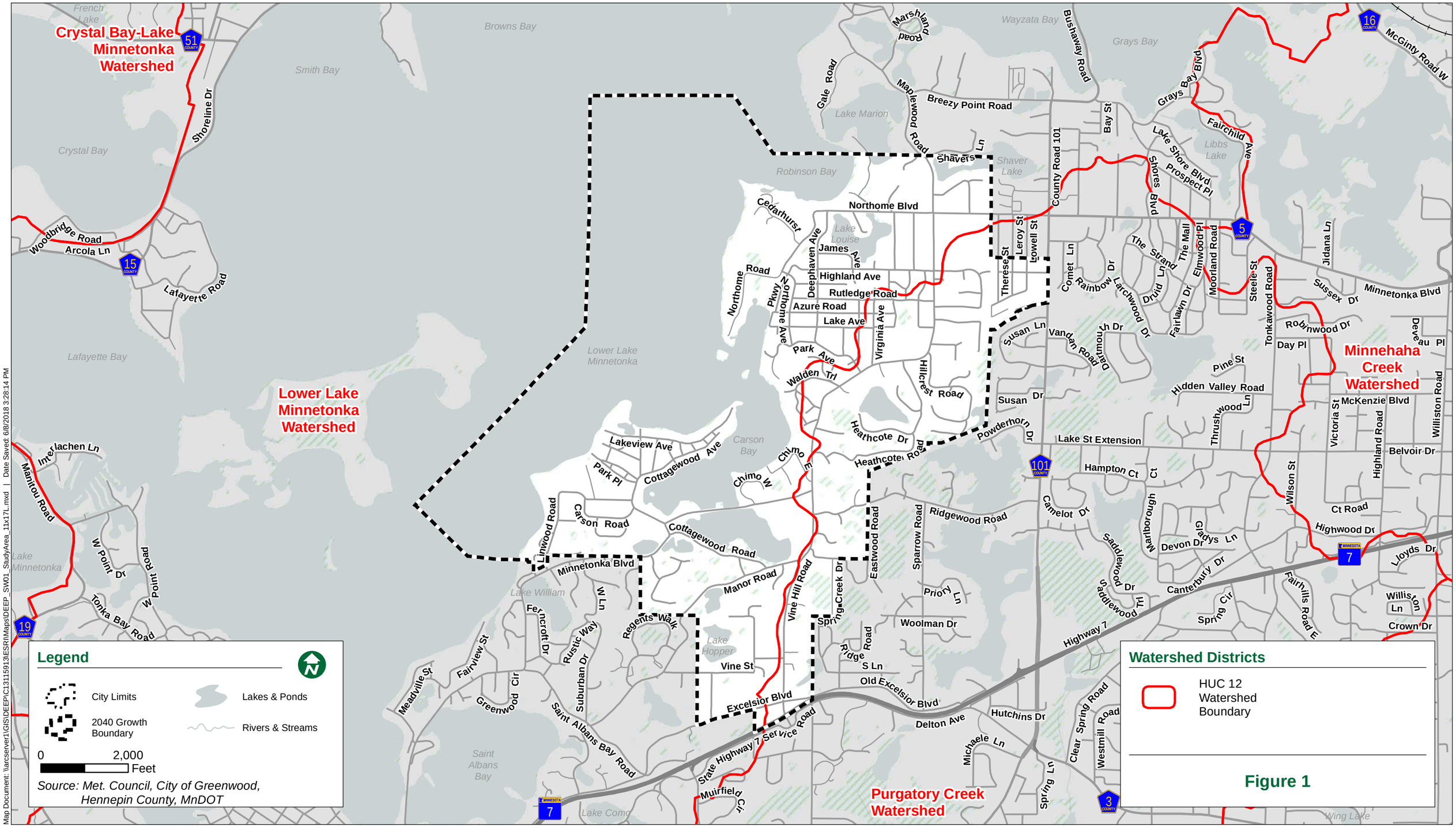
Major Changes are those that could have significant impacts on the rates, volumes, water qualities and water levels of stormwater runoff within the City or across its municipal boundaries. For proposed major changes, the City will prepare a document that defines the change and includes information on the scope and impacts of the change. The document will be forwarded to MCWD and/or RPBCWD for their review and approval. MCWD and/or RPBCWD shall have 60 days to comment on the proposed revisions. Failure to respond within 60 days will constitute approval. After WD approval, the City will adopt the amendment as part of the SWMP.

8.3. Plan Coordination

The City will meet with MCWD and RPBCWD annually to coordinate plan elements (i.e. improvement projects, education opportunities, potential partnerships, etc.). Annual meetings will be coordinated to account for the City, MCWD, and RPBCWD budgeting schedules.

APPENDIX A

Figures



Legend

- City Limits
- 2040 Growth Boundary
- Lakes & Ponds
- Rivers & Streams

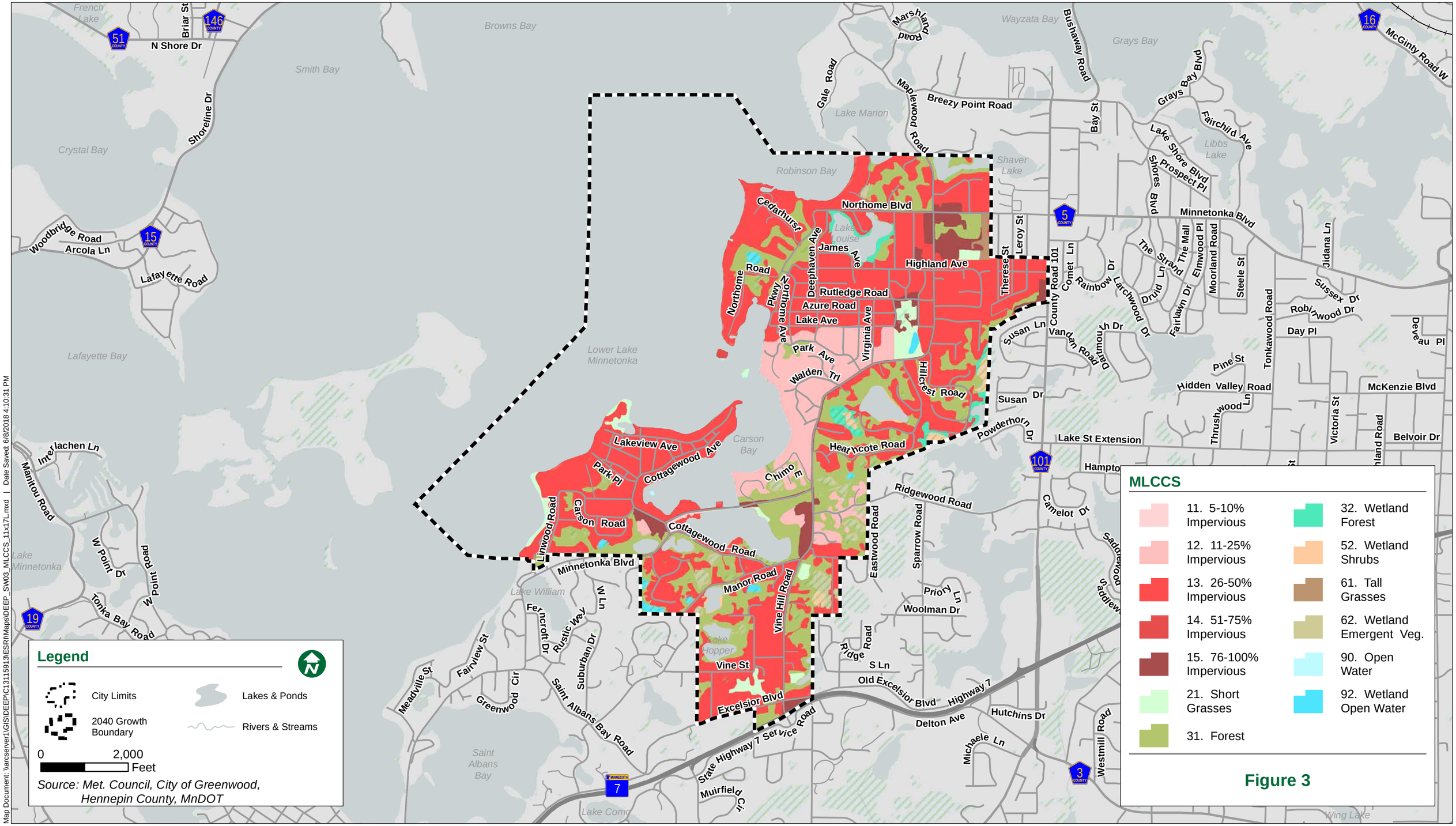
0 2,000 Feet

Source: Met. Council, City of Greenwood, Hennepin County, MnDOT

Soils By Drainage Class

- Unclassified
- A
- A/D
- B
- B/D
- C
- C/D

Figure 2



Legend

- City Limits
- 2040 Growth Boundary
- Lakes & Ponds
- Rivers & Streams

0 2,000 Feet

Source: Met. Council, City of Greenwood, Hennepin County, MnDOT

MLCCS

- 11. 5-10% Impervious
- 12. 11-25% Impervious
- 13. 26-50% Impervious
- 14. 51-75% Impervious
- 15. 76-100% Impervious
- 21. Short Grasses
- 31. Forest
- 32. Wetland Forest
- 52. Wetland Shrubs
- 61. Tall Grasses
- 62. Wetland Emergent Veg.
- 90. Open Water
- 92. Wetland Open Water

Figure 3

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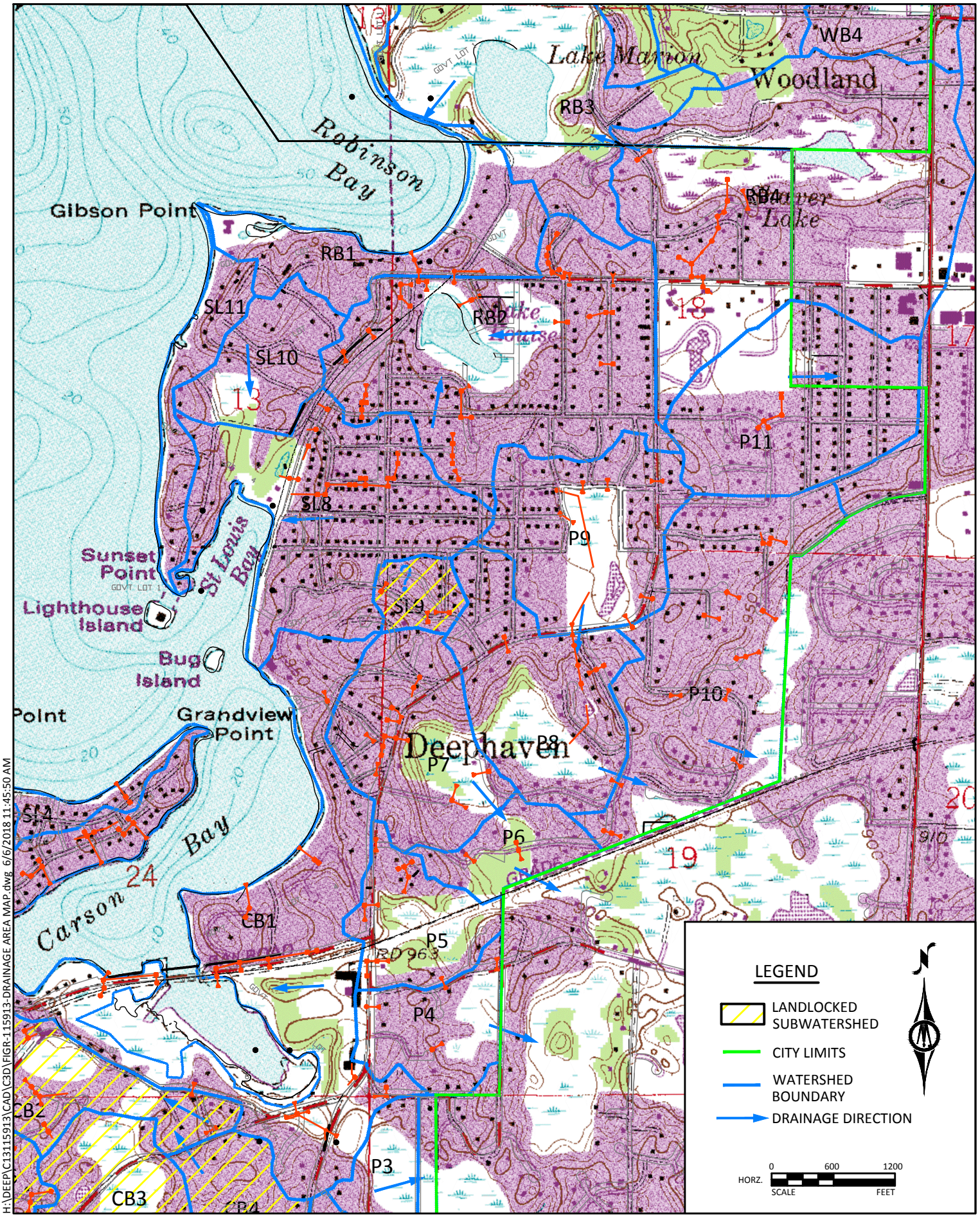

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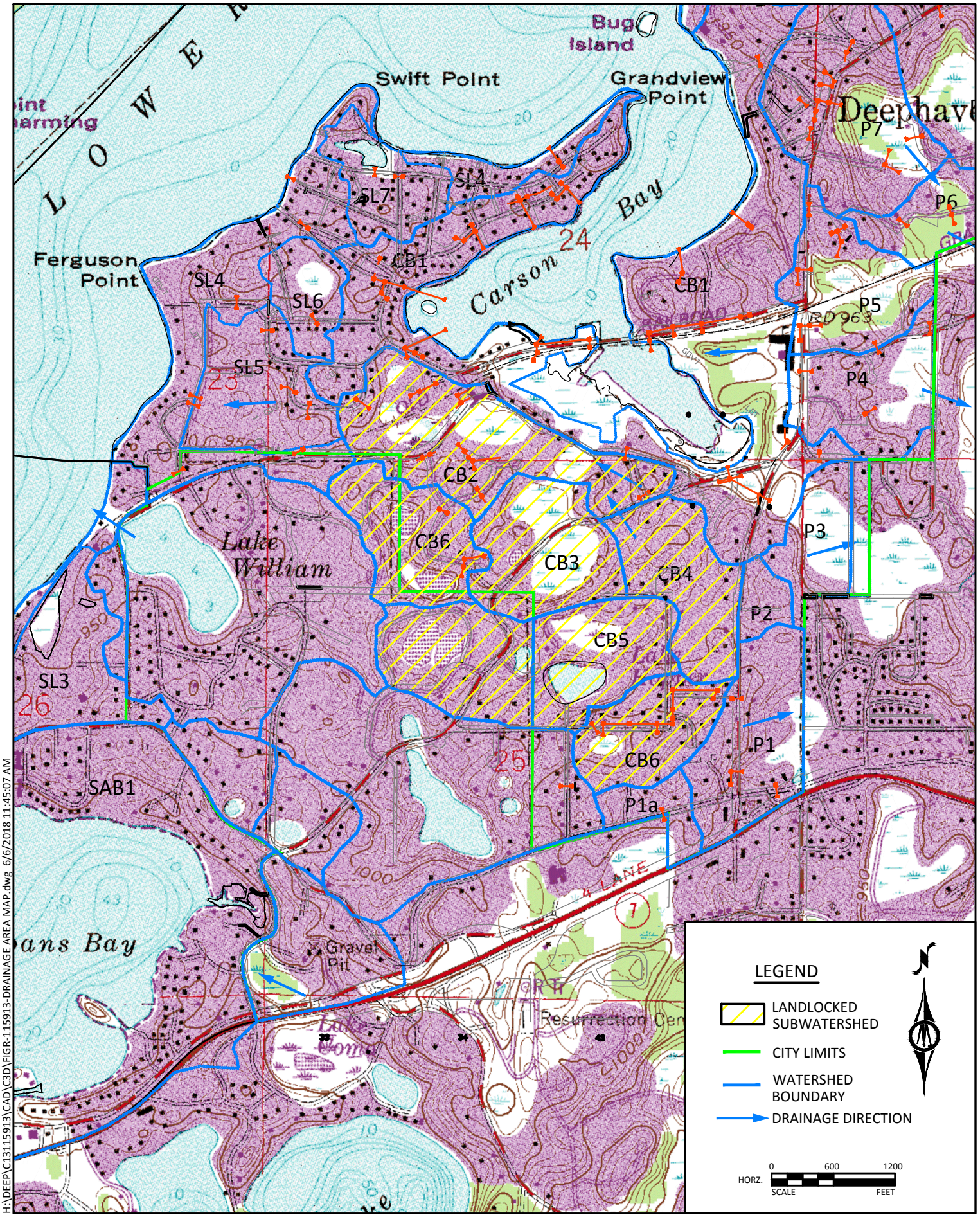

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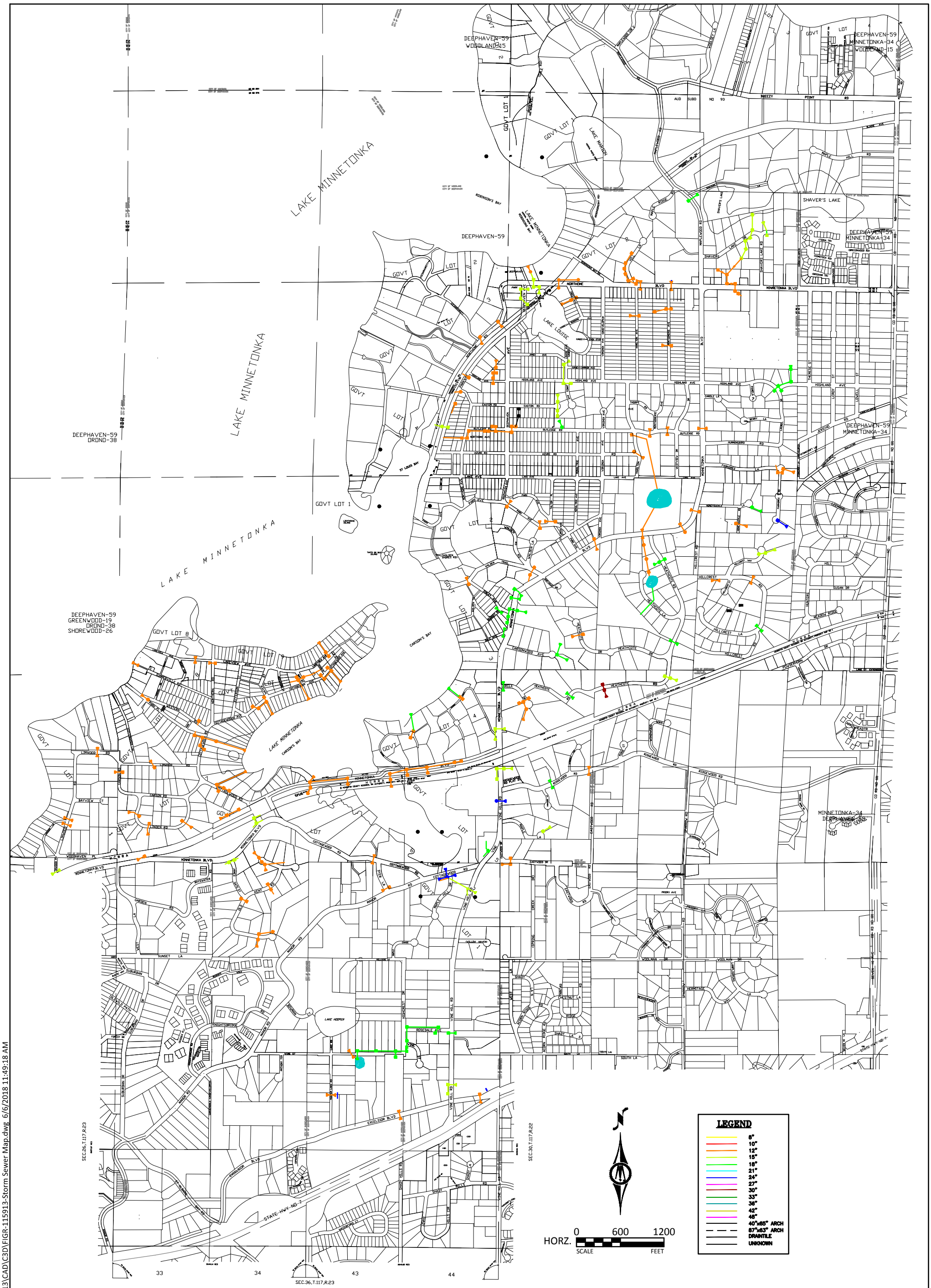

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APPENDIX B

Modeling Methodology

MODELING METHODOLOGY AND MAPPING

1. The general procedure used in the runoff modeling aspects of this analysis has been performed using the HydroCad modeling software. The typical analysis is based on Soil Conservation Service, Technical Release No. 20 (SCS TR-20). The SCS procedure is based on a standard synthetic rainfall hydrograph, which is modified by local parameters (i.e., rainfall, soil type, time to peak flow, etc.) and is widely accepted among drainage engineers across the United States.

2. For purposes of this report and using precipitation depths from Technical Paper 40, typical 24-hour rainfall events of 2.35", 4.20" and 6.00" have been chosen to analyze runoff/development interaction. These events are best described as those having probabilities of occurring once every 1, 10 and 100 years, respectively.

3. The probabilities of occurrence do not imply that a 2.35", 4.20" or 6.00" rainfall cannot occur multiple times within the same year; they simply say that a 2.35" rainfall will occur *on the average* once every year, a 4.20" rainfall will occur *on the average* once every 10 years and a 6.00" rainfall will occur *on the average* once every 100 years. In other words, the 1-year rainfall has a 100 percent chance of occurring in any given year. Similarly, the 10-year rainfall has a 10 percent chance of occurring in any given year and the 100-year rainfall has a 1 percent chance of occurring in any given year.

APPENDIX C

Modeling Results – Available Upon Request