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CHAPTER 1: INTRODUCTION

The context for this Comprehensive Plan is based on the reality that East Bethel is on the brink of significant change. Presented with a tremendous opportunity to proactively address new growth, the community and its leaders are committed to shaping the future of the community in a way that compliments the existing important features and characteristics the City has to offer, yet provide for a strong economic base and amenities residents and business owners desire.

A future City Center development, implementation of municipal water and sewer services, and other major growth opportunities have prompted residents and leaders within the community to develop a long-term “vision” for what the City of East Bethel should look like into the future, and how the community can best allow and manage development without jeopardizing the core values and important features the City has to offer. Examples of these features include:

- Significant parks and open spaces with a vast portion of the community consisting of natural wetlands.
- Rural setting with large residential lots.
- Undeveloped land attractive to new development opportunities.
- Strong community interest in helping to shape growth and create a sense of place and identity within the community.

The challenge becomes clear that in the face of new development opportunities and potential implementation of major infrastructure, the community must determine how it can best manage change while maintaining and preserving these and other unique features. The revised Comprehensive Plan lays out a number of strategies designed to assist the community in making decisions based on clear, thoughtful, and consistent policies and guidelines.

DEFINING A COMMUNITY

The City of East Bethel is currently classified as a “Diversified Rural” and “Rural Center” geographic planning area under the Metropolitan Council’s Thrive MSP 2040 plan. As mentioned above, the community is

pursuing a number of opportunities including the implementation of municipal sewer and water services, a City Center development, and other growth strategies that indicate East Bethel is transitioning into a “Rural Center.”

Diversified Rural communities, as defined by the Metropolitan Council, are considered to provide for the widest variety of farm and non-farm land uses of all community classifications within the seven-county metropolitan area. (These uses typically include a mixture of limited large-lot residential and clustered housing, with facilities and services, including agricultural, that require or are best suited to a rural location.) More specifically, Diversified Rural communities are expected to accommodate growth in a manner that does not exceed one unit per ten acres, and that does not require the provision of regional urban services. Further discussion and examples of Diversified Rural growth strategies are provided in subsequent and respective chapters.

Rural Centers are first considered “Rural Centers” that provide basic services to consumer and community activities. Typically, they are small towns established many years ago to serve the needs of farm areas. Rural Centers are located throughout the Rural Area and those interested in growing are considered “Rural Centers.” Growth strategies for Rural Centers include providing for the preservation of low densities in rural areas while accommodating orderly expansion (for example, maintaining one unit per ten acres in Diversified Rural Areas). Additional strategies call for improvements to regional infrastructure that would support growth at densities of three to five-plus units per acre, as well as acquiring and operating wastewater plants/services if doing so is cost effective and efficient. Further discussion that supports East Bethel transitioning into a Rural Center is provided in subsequent areas of this updated Comprehensive Plan.

HISTORY

The City of East Bethel was originally home to the Chippewa Nation. Settlement of this area by Europeans occurred first in the 1850s following the purchase of the Louisiana Territory by the United States in 1837. Settlers originated primarily from Sweden, Norway, England, Ireland, and New Brunswick. Most of the land was prairie and ready for cultivation and some farms were started as a result of land grants to Civil War veterans. Many early

settlers established homesteads near Cedar Creek; lumber for homes came from nearby virgin white cedar trees in Cedar Creek Swamp.

Bethel Township was organized in 1858 – the same year Minnesota became a state. The Township included all of what is now Linwood Township until 1871 when Linwood Township was organized. According to local history, the name of the City was inspired by the Bible and was suggested by early settler James Cooper. The Bethel Post Office was first established in 1863 but was later moved to a site along the newly constructed Great Northern Railroad. This site became part of the City of Bethel which incorporated prior to East Bethel's incorporation.

The unusually large size of East Bethel (nearly 48 square miles) originated with lobbying efforts of Minnesota settlers who lived just to the north of what was the original extent of Anoka County. These settlers, who usually conducted business in the County, lobbied the State legislature to include an additional two rows of sections in the County. Bethel Township was granted 12 additional sections, Linwood Township was shifted 2 miles to the north, and Columbus Township was given the southern 2 tiers of sections of Linwood Township. The balance of the additional land to the west became St. Francis Township.

Early roads in the Township followed native trails or the paths of animals. The problem of crossing swamps had been solved by laying trees and logs crossways and covering them with dirt. Such roads were called corduroys. Desiring an easier way of marketing their produce, residents of Bethel met with then Senator J.T. Elwell to plan a better and more direct route to Minneapolis. Working with townships to the south, Central Avenue was created in 1900-01, which later became State Highway 65. This road was graded in 1923-24, blacktopped in 1931, widened in 1951, paved in 1952, and became a divided highway in 1969-70.

Some of the most interesting history of East Bethel involves gangster activity. The Ma Barker gang lived in a house near Cedar Creek on Highway 65 for some time. They posed as painters wearing paint-splattered overalls and came and went at regular business hours. They left Bethel Township just prior to the FBI discovering their hideout. (They were later caught in Iowa.) There is also a cabin located on the south shore of Coon Lake where some claim John Dillinger hid out one winter.

The process of becoming a village took nearly two years. On May 8, 1957, residents presented a petition to incorporate the Township into East Bethel Village. The Anoka County Board of Commissioners approved the petition and a Township election resulted in a vote of 232 in favor and 161 in opposition to incorporation. However, four residents took the issue to court which resulted in the incorporation being declared invalid. The court found that the Township was neither suburban in character nor likely to be so in the near future (which were criteria for granting village status). Shortly after the beginning of the 1956 State Legislature, Senators Ralph Johnson and John Nordin, who represented the Township, introduced a bill recognizing the incorporation of the village. Only one legislator voted in opposition and the bill became law with the signature of Governor Freeman. East Bethel became a legal municipality with a unanimous vote for incorporation by the Town Council on April 27, 1959. The population at that time was 1,286.

Much of the information contained in this section of the Comprehensive Plan is taken from "*The History of Bethel Township and East Bethel Village That Became the City of East Bethel, From 1848 to 1974*," by Louise Lyon. This narrative (available at City Hall) includes detailed and local accounts of numerous township and personal histories.

POPULATION AND HOUSEHOLD GROWTH

General population growth, in addition to increases in mobility, has made the City an attractive and affordable area for new rural homesteads. Table II-1 indicates population changes, household growth, and changes in the average size of households between 1970 and estimates through the year 2004.

East Bethel first experienced large growth in new residents in the 1960s and a growth increase of 156 percent during the 1970s. Anoka County's growth during the 1960s leveled off in the mid 20 percent range by 1980 and remained there until 2000. Similar growth in the number of households is also evident. Overall the City has grown from just over 700 households in 1970 to an estimated 4,155 in 2016, an increase of 488 percent in 46 years.

The number of persons per household in East Bethel has dropped from 3.66 in 1970 to an estimated 2.84 in 2016. Anoka County has seen a more dramatic reduction in persons per household from 3.90 in 1970 to an estimated 2.72 in 2016. These tendencies indicate that although steady growth

in population continues, the density of residents per household is consistent with the national trend of smaller family size.

TABLE 1-1. POPULATION AND HOUSEHOLDS

<i>Population</i>	1970	1980	1990	2000	2010	2016
<i>East Bethel</i>	2,586	6,626	8,050	10,941	11,626	11,788
<i>% Increase</i>		156%	21%	36%	6%	1%
<i>Anoka Co.</i>	154,712	195,998	243,641	298,084	330,844	348,652
<i>% Increase</i>		27%	24%	22%	11%	5%

<i>Households</i>	1970	1980	1990	2000	2010	2016
<i>East Bethel</i>	706	1,955	2,542	3,607	4,060	4,155
<i>% Increase</i>		177%	30%	42%	13%	2%
<i>Anoka Co.</i>	39,688	60,716	82,437	106,428	121,227	128,135
<i>% Increase</i>		53%	36%	29%	14%	6%

<i>Persons per Household</i>	1970	1980	1990	2000	2010	2016
<i>East Bethel</i>	3.66	3.39	3.17	3.03	2.86	2.84
<i>Anoka Co.</i>	3.90	3.23	2.96	2.80	2.73	2.72

Source: U.S. Census; Metropolitan Council

TABLE 1-2. AGE OF POPULATION

	East Bethel	Percentage	Anoka County	Percentage
<i>Under 5 years</i>	774	6.7	21,540	6.4
<i>5 to 14 years</i>	1,383	11.9	47,538	14.0
<i>15 to 19 years</i>	771	6.6	22,635	6.7
<i>20 to 29 years</i>	1,274	11.0	41,064	12.1
<i>30 to 39 years</i>	1,617	13.9	45,364	13.4
<i>40 to 49 years</i>	1,678	14.4	50,782	15.0
<i>50 to 59 years</i>	2,459	21.2	52,391	15.5
<i>60 to 74 years</i>	1,405	12.1	42,711	12.6
<i>75 and older</i>	264	2.3	14,739	4.4

Source: Metropolitan Council – Community Housing Profiles

DEMOGRAPHICS

As indicated in Table II-2, the age breakdown of East Bethel’s residents is only slightly different than Anoka County. The greater presence of families is identified by more than double the number of children (ages 0 to 19) than

elderly (age 60 and higher) in East Bethel. The remaining percentages in the age groups are similar between the City and County statistics.

LOCAL ECONOMY

Employment in the City of East Bethel reflects the rural nature and small population base of the community. Table II-3 provides a summary of employment in the City and the County. The employment base is fairly diverse with construction the largest employment sector in the City. Total construction jobs increased from 23 percent in 1997 to about 26 percent in 2016. Wholesale and retail trade job percentages have decreased indicating a greater diversification of employment in the community.

TABLE 1-3. EMPLOYMENT

	East Bethel	Percent	Anoka Co.	Percent
<i>Administrative and Waste Services</i>	43	3.1	5,700	4.9
<i>Agriculture, Forestry, Fishing & Hunting</i>	24	1.7	465	0.4
<i>All Other Industries</i>	298	21.6	14,438	12.3
<i>Construction</i>	354	25.7	8,155	7.0
<i>Education Services</i>	219	15.9	10,193	8.7
<i>Finance and Insurance</i>	22	1.6	2,428	2.1
<i>Health Care and Social Assistance</i>	59	4.3	17,004	14.5
<i>Manufacturing</i>	85	6.2	22,959	19.6
<i>Other Services, Ex. Public Admin</i>	58	4.2	4,826	4.1
<i>Professional and Technical Services</i>	13	0.9	3,522	3.0
<i>Public Administration</i>	57	4.1	4,950	4.2
<i>Real Estate and Rental and Leasing</i>	0	0.0	1,376	1.2
<i>Retail Trade</i>	80	5.8	15,616	13.3
<i>Wholesale Trade</i>	65	4.7	5,612	4.8
Total	1,377	100.0	117,244	100.0

Source: U.S. Census; Metropolitan Council

GROWTH PROJECTIONS

The Metropolitan Council’s Thrive MSP 2040 plan, adopted in May 2014 forecasts growth in population, housing, and employment for East Bethel as identified in Table 1-4. The forecasts are used by the Council to plan its regional systems. These long-range forecasts take into consideration the

impacts of the City becoming a rural growth center with sewer development, as well as significant new proposed developments such as a city center. These estimates will need to be revisited as major projects are completed and development levels increase. As an example, the projected growth of a city center at full build-out could likely result in an additional 1,400 housing units and an increase in population of 2,950 persons.

TABLES 1-4

Forecast Year	Population	Households	Employment
2010	11,626	4,060	1,123
2020	12,400	4,700	1,700
2030	15,400	6,000	1,950
2040	18,400	7,400	2,200

Source: Metropolitan Council and City of East Bethel – assumes implementation of municipal services.

The projections in Table 1-4 were calculated by the Metropolitan Council in cooperation with the City of East Bethel. The total population is expected to reach more than 18,000 by the year 2040.

Household and population calculations correlate based on persons per household: 2010 calculations utilized an average of 2.8 persons per household. In 2020 the number changed to 2.7, and in 2030 it was 2.6.

The City of East Bethel believes these population estimates may be conservative given the potential growth and development opportunities municipal services will provide to the extent that at full build-out sometime beyond the year 2050, the total population of East Bethel could reach more than 40,000.

2040 PLAN VISION AND PUBLIC ENGAGEMENT

On January 12, 2017, the East Bethel held a public visioning session in two parts at the Senior Center. The afternoon session was focused towards the Chamber of Commerce and the evening session was focused towards the general public, but both sessions were open to the public and anyone could attend and participate. A number of interactive exercises were conducted and the results of these exercises were discussed with the City Council and the Planning Commission. From those discussions, the following Vision Statements were established to guide the development of the 2040 Comprehensive Plan.

East Bethel 2040 Comprehensive Plan Guiding Vision Statements	
1	East Bethel is uniquely distinguished by its vast and diverse natural spaces.
2	East Bethel is committed to the preservation of its open spaces, wildlife, and rural character. The community considers these qualities to be an integral part of the character of East Bethel.
3	East Bethel prioritizes improving access to civic, retail and medical services that serve the basic needs of the community.
4	East Bethel supports increasing development along its Highway 65 corridor, focusing on key locations and intersections that are feasible for development.

5	East Bethel values citizen engagement and is committed to fostering a culture of involvement.
6	East Bethel must be an attractive and viable community for all stages of an individual's life.
7	East Bethel is in favor of residential development that will support commercial development.

CHAPTER 2: HOUSING

East Bethel is a rural community where housing consists primarily of large-lot, single-family homes. The next most common form that housing takes is manufactured homes. There has been recent interest in the community for a more diverse housing stock, including areas of higher density per acre as part of the City Center development. This interest is consistent with East Bethel containing areas that are classified as rural centers, or areas of higher density commercial and residential land use. This chapter will examine the physical features of the housing stock in East Bethel as well as providing some insights into housing affordability and the general characteristics of the people who live in East Bethel's housing. This chapter will outline goals and policies to meet the community's housing vision for the future.

Housing was identified as an important feature in East Bethel's 2040 **vision statement**, which includes the following components related to housing:

- *East Bethel supports increasing development along its Highway 65 corridor, focusing on key locations and intersections that are feasible for development.*
- *East Bethel must be an attractive and viable community for all stages of an individual's life.*
- *East Bethel is in favor of residential development that will support commercial development.*

These community-driven housing themes shaped not only the vision and the tone of the conversations about the comprehensive plan, but also the Goals and Implementation Actions for housing that will be discussed later in the chapter.

THE HOUSING LANDSCAPE IN EAST BETHEL

East Bethel's housing development has been influenced by historical, mobility, and economic trends. Most of residential development has occurred in the last 45 years. As the Twin Cities suburbs have grown,

expansion of the regional highway system has improved access to employment centers and allowed the suburbs to keep expanding. Commuting longer distances to work is the trade-off for more rural, less densely populated communities. Development came to East Bethel later than to Anoka County as a whole. Eighty percent of the housing in East Bethel has been built since 1970 compared to 49 percent for Anoka County during the same time frame. Over 90 percent of the housing units in East Bethel are single family detached homes, with the other 10 percent of units being manufactured homes.

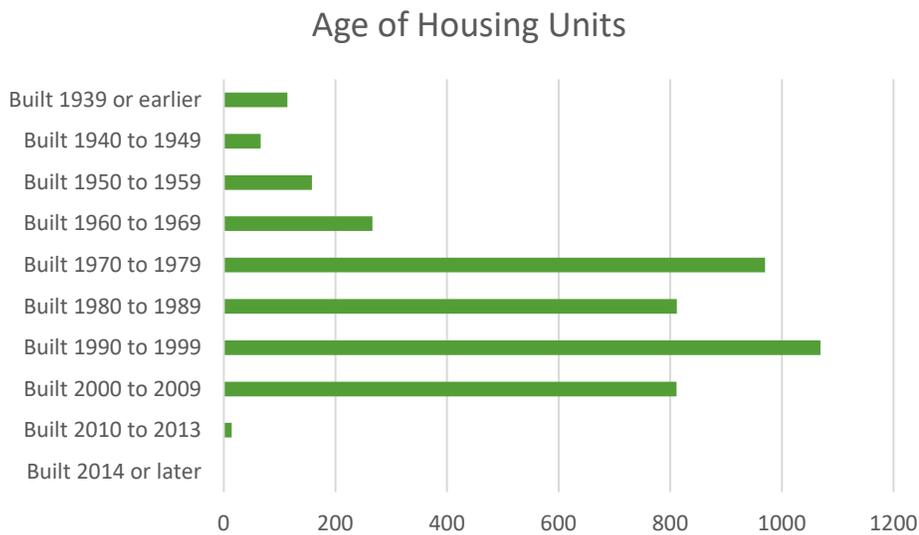


FIGURE 2-1. Source: ACS 2011-2015 estimates

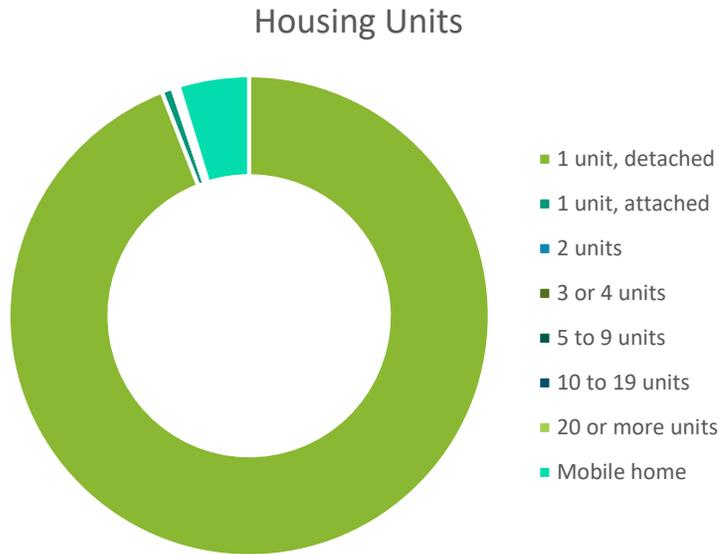


FIGURE 2-2. Source: ACS 2011-2015 estimates

Of the 4,129 occupied housing units in East Bethel, 94 percent are owner-occupied. The remaining share are homes that are occupied by renters. The population share living in renter-occupied housing units is six percent.

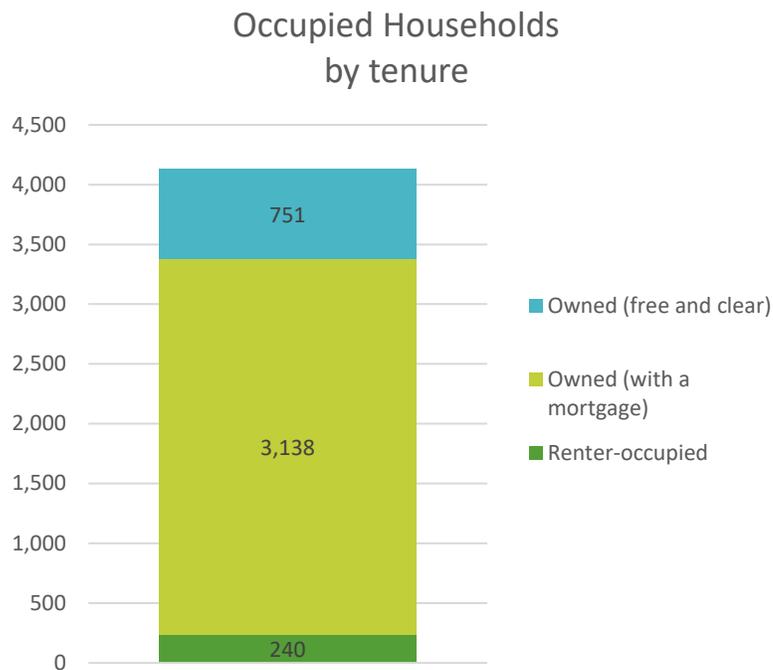


FIGURE 2-3. Source: ACS 2011-2015 estimates

The median value of an owner-occupied home in East Bethel is \$205,700, compared to the Anoka County median home value of \$187,600.

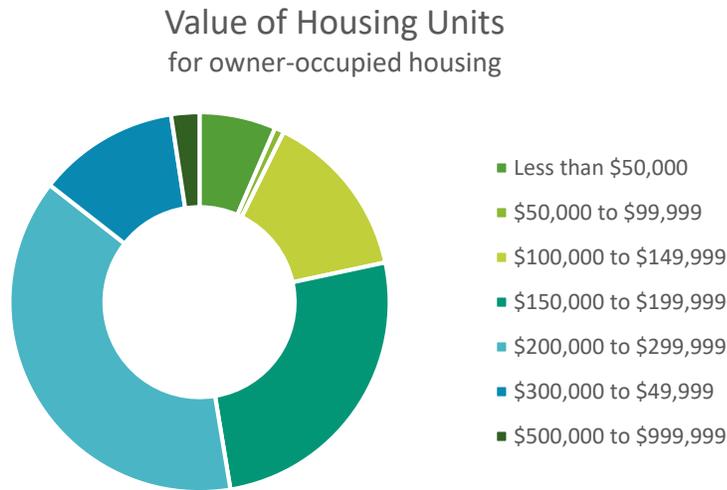


FIGURE 2-4. Source: ACS 2011-2015 estimates

HOUSING NEEDS AND AFFORDABILITY

The Metropolitan Council looks at housing affordability through the lens of area median income, or AMI. For a family of four, regional AMI in the Twin Cities is \$85,800. Households that qualify for affordable housing have an income at or below 80% of the regional AMI. Median household income in East Bethel is \$87,200 which is 102% of area median income for a household of four. The following charts present data on East Bethel’s existing housing stock in terms of affordability, and on East Bethel’s households and their cost burdened status.

Affordability	Owner Occupied ¹	Rental	Total ²
30% AMI and Below	13	321	334
30% to 50% AMI	103	591	694
50% to 80% AMI	1,742	571	2,313

Source 1: Anoka County 2015
Source 2: Metropolitan Council 2015 Housing Stock Estimates

TABLE 2-1. 2015 Affordable Housing Units

AMI Percentage	Cost Burdened Households ¹	Current Affordable Housing Units ²
30% AMI and Below	200	334
30% to 50% AMI	259	694
50% to 80% AMI	180	2,313
Total	639	3,341
<i>Source 1: U.S. Department of Housing and Urban Development 2009-2013 Comprehensive Housing Affordability Strategy</i>		
<i>Source 2: Metropolitan Council</i>		

TABLE 2-2. 2015 Cost Burdened Households & Existing Affordable Housing Units

Affordability	Income Limits
30% AMI and Below	\$26,000
30% to 50% AMI	\$43,300
50% to 80% AMI	\$65,800
<i>Source: Metropolitan Council</i>	

TABLE 2-3. 2015 Affordable Income Limits

Income Range	Households
\$24,999 and Below	275
\$25,000 - \$44,999	494
\$45,000-\$74,999	926
\$75,000 and Above	2,434
<i>Source: U.S. Census Bureau 2011-2015 American Community Survey</i>	

TABLE 2-4. 2015 Household Income

Discrepancies within the Affordable Housing Unit and Household Income Data

There are four sources of affordable housing and household income data: the U.S. Department of Housing and Urban Development (HUD) 2009-2013 Comprehensive Housing Affordability Strategy (CHAS), the U.S. Census Bureau 2011-2015 American Community Survey, the Metropolitan Council, and Hennepin County. The HUD CHAS says that it derives its information from the non-public American Community Survey data for the year 2013, while the remaining source information is for the year 2015.

While the Census Bureau does not report household incomes in the ranges identical to the affordable income limits of the Metropolitan Council, Table 2.4 represents an approximation of the number of East Bethel households that fall within the three AMI ranges.

Table 2.1 extrapolates the number of renter-occupied housing units in each affordability band by subtracting the number of owner-occupied housing units, as reported by Anoka County, from the total number of units existing in each affordability band, as reported by the Metropolitan Council. The percentage of housing units occupied by renters increases as AMI decreases. Ninety-six percent of units affordable to households with incomes at or below 30% AMI are occupied by renters. A sizeable portion of these rental units are likely mobile homes.

Existing Cost Burdened Household and the Existing Affordable Housing Stock

To assess how well East Bethel is providing affordable housing units for households at all levels of AMI, we can compare the current number of affordable housing units in each band with the number of households with incomes in each band. There are approximately 275 households with earnings at 30% AMI or less, and there are 334 existing housing units affordable to them. There are 494 households with earnings between 31% and 50% AMI, and there are 694 existing housing units affordable to them. There are 926 households making between 51% and 80% AMI, and there are 2,313 existing housing units affordable to them. At each income level, there are more than enough existing housing units for each household to find a housing unit that is affordable to them.

Table 2.2 shows that despite the availability of enough affordable housing at all levels, there are still some cost burdened households who are paying more than 30 percent of their income to housing costs. While the goal is for no households to experience cost burden, East Bethel is providing more than enough affordable housing options for all households. While theoretically almost all East Bethel households could own property that is affordable for their income level, people do not always purchase housing in direct proportion to the resources they have available. Some households in the highest income tier will buy low, while some households in the lowest income tier will buy beyond their means. There are currently no publicly subsidized housing units in East Bethel.

EXISTING HOUSING NEEDS

From this assessment of the physical and cost characteristics of the housing stock in East Bethel, combined with the demographic analysis of the community, there are some features of the housing landscape that are especially notable and worthy of special focus.

- **Homes in East Bethel, compared to other Anoka County communities, are less affordable to homebuyers and renters alike.** Both East Bethel’s median home value and the median gross rent is higher than the average for Anoka County. This likely makes the community less attractive to young families, younger or lower-income homebuyers, and populations looking to have the amenities and proximity of an urban suburb at a lower cost.
- **Fifteen percent of East Bethel’s households are cost-burdened.** Despite more affordable housing costs in the city, a significant portion of the city’s residents pay more than one-third of their income toward housing. The lowest-income households feel this cost burden the hardest. Maintaining a range of housing options to meet the needs of residents at all income levels is one of the city’s aspirations for this plan.
- **The housing stock in East Bethel is aging.** Despite being more affordable, the smaller-lot single family homes developed in the 1960s and 1970s may not be as attractive or suitable for modern households as they once were. Maintaining East Bethel’s existing housing stock will remain a significant challenge in order to continue to attract newcomers to the city.
- **The population of East Bethel is becoming older and more diverse.** As this inevitable trend plays out across the region in the decades to come, East Bethel must consider what initiatives to undertake if it wants to provide housing opportunities for people of all ages and in all stages of life.

PLANNING FOR HOUSING AFFORDABILITY

As demonstrated in the Land Use chapter of this Plan, East Bethel is guiding sufficient land at 12 units per acre or above in the decade from 2021 – 2030 to meet its affordable housing allocation of 214 units.

Affordable Housing Need Allocation	
At or below 30% AMI	109
From 31% to 50% AMI	68
From 51% to 80% AMI	37
Total Units	214

TABLE 2-5. Source: Metropolitan Council Existing Housing Assessment

Guiding land at these densities does not guarantee the development of affordable housing, nor does the goal of developing affordable housing fully encapsulate the community’s housing goals; therefore, the City will make every effort to encourage net densities at 12 du/ac or greater within the mixed use district, where deemed fit. Supplying, maintaining and supporting safe and affordable housing requires intentional goal setting and the aid of various programs, funds, resources and tools.

2030 MUSA	Net Acres	(Minimum) Units	(Midpoint) Units
Low Density Residential	66.08	149	207
Medium Density Residential	140.50	843	1,265
Mixed-Use (LDR)¹	344.24	775	1,076
Mixed-Use (HDR)²	31.65	380	664
2030 MUSA Total	582.47	2,147	3,212

¹ Mixed Use (LDR)'s 344.24 developable acres is 72.5% of the overall Mixed Use 471.49 developable acres

² Mixed Use (HDR)'s 31.65 developable acres is 7.5% of the overall Mixed Use 471.49 developable acres

TABLE 2-6.

Table 2.6 shows how much land will be within the Metropolitan Urban Service Area in 2030, and thus able to receive City sewer service. The table then shows estimates for how many housing units will be added to the MUSA at both the high and low ends of possible development densities. The extension of sanitary sewer service in East Bethel helps to manage growth within the City.

2040 MUSA	Net Acres	(Minimum) Units	(Midpoint) Units
Low Density Residential	27.23	61	85
Medium Density Residential	27.78	167	250

Mixed-Use (LDR)¹	270.44	609	845
Mixed-Use (HDR)²	24.87	298	522
2040 MUSA Total	350.32	1,135	1,702

¹ Mixed Use (LDR)'s 270.44 developable acres is 72.5% of the overall Mixed Use 369.28 developable acres

¹ Mixed Use (HDR)'s 24.87 developable acres is 7.5% of the overall Mixed Use 369.28 developable acres

TABLE 2-7.

AFFORDABLE HOUSING TOOLS

Programs

Numerous programs are available to help the City meet its housing goals and policies.

Minnesota Housing Consolidated Request for Proposals: The Minnesota Housing Finance Agency provides an annual request for proposal (RFP) wherein communities and affordable housing developers can apply for funding to construct affordable housing. East Bethel encourages developers to work in conjunction with the city apply to the Consolidated RFP to provide affordable housing for any future East Bethel residents in need. The RFP is a useful tool to support the development of rental housing units affordable at 50% AMI or below.

Community Development Block Grants (CDBG): The U.S. Department of Housing and Urban Development (HUD) provides CDBG funds to communities with over 45,000 residents for the use of providing and maintaining affordable housing. Anoka County HRA administers these CDBG funds for East Bethel. East Bethel encourages the Anoka County HRA to use CDBG funds to provide affordable housing for those East Bethel residents in need. CDBG is a useful tool to preserve both rental and ownership units affordable at 80% AMI and below.

HOME Funds: The HOME Investment Partnerships Program (HOME) is a flexible federal grant program that allows Anoka County to fund affordable housing activities for very low and low-income families or individuals, homeless families, and persons with special needs. East Bethel encourages the Anoka County HRA to use HOME funds to provide affordable housing for those East Bethel residents in need. HOME funds are a useful tool for both the preservation and development of both rental and ownership units affordable at 50% AMI and below.

Family Homeless Prevention & Assistance Program: The FHPAP is administered by the Minnesota Housing Finance Agency, with Anoka County as a grantee, to provide grants that encourage and support innovation in establishing a comprehensive service system and redesigning the existing homeless support system. Funds are used for

various activities aimed at preventing homelessness. East Bethel encourages Anoka County to use FHPAP funds to support East Bethel residents in need. FHPAP funds are a useful tool for the prevention of homelessness and the support of homeless individuals.

Neighborhood Stabilization Program (NSP) Grants: The NSP was established by HUD for the purpose of stabilizing communities that have suffered from foreclosures and abandonment. The focus of this program is the purchase, rehabilitation and resale of foreclosed and abandoned properties. The NSP operates under the Anoka County HRA, but was ended in 2016. East Bethel encourages the Anoka County HRA to use remaining NSP funds to purchase foreclosed or abandoned properties to provide affordable housing for those East Bethel residents in need. Further, East Bethel encourages Anoka County to pursue further funding to restart this program in the future.

Homebuyer Assistance Programs: Anoka County participates in the Minnesota Housing Finance Agency's "start-up" program which provides mortgage funding and limited down payment and/or closing cost assistance to qualified first-time homebuyers. East Bethel encourages Anoka County to use MHFA start-up money to provide assistance to East Bethel residents in need. Homebuyer assistance funds are a useful tool to preserve ownership units affordable at 80% AMI and below.

Repair and Rehabilitation Support: The Anoka County Community Action Program (ACCAP) provides home repair and rehabilitation assistance to East Bethel residents. East Bethel encourages ACCAP to continue its assistance program and that the Anoka County HRA continues to provide funding to ACCAP. Repair and rehabilitation support is a useful tool to preserve ownership units affordable at 80% AMI and below.

Foreclosure Prevention: The Anoka County Community Action Program (ACCAP) provides foreclosure counseling to East Bethel residents. Foreclosure prevention counseling is also offered through Minnesota Homeownership Center. East Bethel encourages ACCAP and Minnesota Homeownership Center to continue providing these services and that the Anoka County HRA continues to provide funding to ACCAP.

Foreclosure prevention funds are a useful tool to preserve ownership units affordable at 80% AMI and below.

Energy Assistance: The Anoka County Community Action Program (ACCAP) administers the energy assistance program for East Bethel residents. East Bethel encourages ACCAP to continue its energy assistance program and that the Anoka County HRA continues to provide funding to ACCAP. Energy assistance is a useful tool to preserve both rental and ownership units affordable at 80% AMI and below.

Rental Assistance: Anoka County offers some emergency funds to households or individuals in crisis. Metro HRA offers portable Section 8 vouchers on a limited basis that can be used on rental properties throughout the metro. The City will continue to try to connect residents to these resources when they are available. Rental assistance is a useful tool to preserve rental units affordable at 80% AMI and below.

Livable Communities Grants: East Bethel is a participating community in the Metropolitan Council's Livable Community Act (LCA) programs. These grants help to fund innovative development projects that provide unique amenities and serve populations with a diverse range of income levels. East Bethel will consider applying for livable communities grant on behalf of developers who provide affordable housing for households at or below 80% with the guaranteed length of affordability at least 20 years. LCA grants are a useful tool for the development of both rental and ownership units affordable at 80% AMI and below.

Local Fair Housing Policy:

The federal Fair Housing Act prohibits the consideration of race, color, religion, national origin, sex, disability, or family status in rental, sales, or lending decisions. Anoka County works with the Twin Cities Metro Area Fair Housing Implementation Council to stop discrimination and promote integration. Any East Bethel residents that feel they have been subjected to unfair housing practices should contact this organization. Anoka County HRA can continue the implementation of its fair housing policy.

East Bethel will consider adoption of a local fair housing policy if the City applies for and is awarded an LCA grant. East Bethel will adopt a fair housing policy within one year of being awarded an LCA grant.

Local fair housing policy is a useful tool for the preservation of both rental units affordable at 80% AMI and below.

Land Trusts: A land trust achieves affordable home ownership by the resident owning the house on a property, but the trust owns the land under the house therefore reducing the amount of the mortgage. The advantage of a land trust is that the trust can control the future sale of the property to ensure that affordability can be maintained and have the ability to scatter the land trust sites throughout the community. A land trust does not currently exist in within Anoka County. Should a land trust in Anoka County be created, East Bethel will consider applying for CDBG funds on behalf of the land trust if that is the best use of that year's CDBG funding and the land trust staff assists in the preparation of the application. A land trust can be a useful tool for both the development and preservation of ownership units affordable at 80% AMI and below.

Rental Licensing/Inspections: The City currently has a rental license program and a rental license ordinance. A rental inspection program protects the health, safety, and welfare of residents living in rental property, as well as to provide a mechanism for a city to maintain property values and ensure the quality of the community's housing supply.

Site Assembly and/or Acquisition: Cities have the authority to acquire properties for housing through a number of mechanisms including through transfer of tax-forfeit properties from Anoka County or through outright purchase. East Bethel will monitor and consider acquisition of properties that can be assembled and developed into a public good project, including the production of affordable housing or maintenance of existing affordable housing. Such a strategy could be used to allow the City to put out specific RFP requirements to developers in order to achieve a project that includes housing affordability, specifically that meet thresholds for 50 percent AMI and below for rental housing and 80 percent AMI and below for ownership.

Preservation of Existing Manufactured Home Parks: The City will actively support the creation of additional affordable housing units if manufactured housing units are removed from the City's housing stock as part of a redevelopment of an existing manufacturing home park. In

addition, the City will explore programs that may assist in the maintenance of existing manufactured homes.

Fiscal Devices

Fiscal devices, such as revenue bonds, tax increment financing, or tax abatement can be used to help ease the construction and availability of affordable housing.

Development Authorities: East Bethel has a housing and redevelopment authority (HRA) and collaborates with the Anoka County HRA to provide affordable housing and redevelopment services. The East Bethel HRA is encouraged to construct, finance and/or partner with private developers to provide more affordable housing opportunities in the community. East Bethel will consider partnering with developers to construct both rental and ownership housing units affordable at 50% AMI or below, where deemed fit. Development authorities are a useful tool to support the development of both rental and ownership housing units affordable at 50% AMI or below.

Housing Bonds: Minnesota State Statute allows HRAs the ability to issue housing bonds to provide affordable housing. East Bethel's HRA will consider issuing housing bonds to provide affordable housing at or below 50% AMI opportunities in the city. Housing bonds are a useful tool to support the development of both rental and ownership housing units affordable at 50% AMI or below.

Tax Abatement: Cities may issue bonds to be used to support the construction of affordable housing and use a portion of the property tax received (tax abatement) from the development to finance these bonds. This removes this property taxes revenue from paying for the services needed for this property, its residents and the community in general. East Bethel encourages interested developers to contact the City if interested in tax abatement as a financing option to fund affordable housing development. Tax abatement is a useful tool to support the development of both rental and ownership housing units affordable at 80% AMI or below.

Tax Increment Financing: Cities may create a housing district to create a tax increment financing (TIF) district. The TIF bonds issued on this district are to be used to support the construction of affordable housing and entire property taxes received above the original tax value (increment) from the development to finance these bonds. East Bethel encourages interested developers to contact the City if interested in TIF as a financing option to fund either rental or ownership affordable housing developments for residents with incomes of 50% AMI or less. TIF is a useful tool to support the development of both rental and ownership housing units affordable at 50% AMI or below.

Low Interest Loans: Usually through City programs, home owners and potential developers may apply for low interest or forgiveness loans to make improvements on properties. The loaned money is then provided to the Developer to complete projects, and the City pays the small interest payments on the loan. Low interest loans are a useful tool to support both the development and preservation of both rental and ownership housing units affordable at 80% AMI or below.

4(d) Tax Program: Rental properties may receive a property tax break provided that the property has income and rent restricted units serving households at 60% AMI and below. The City of East Bethel would consider using 4d tax incentives to further promote the preservation of affordable multifamily housing. 4(d) tax bond funds are a useful tool to support the development of rental housing units affordable at 50% AMI or below.

Official Controls

Official controls and land use regulation can be used to assist in the construction of affordable housing units. Controls and regulations can also be used to simplify the process of expanding local housing options also.

Fee Waivers or Adjustments: Cities may waive or reduce fees to reduce the cost of construction of affordable housing. Conversely, State rules require that the fee that a City charges be related to the cost of providing the services for which the fee is collected. This waiver or reduction could create a deficiency in the funding for services which would be required the use of general funds to resolve. Fee waivers or

adjustments are a useful tool to support the development of both rental and ownership housing units affordable at 80% AMI or below.

Zoning and Subdivision Policies: There are a number of zoning and subdivision policy considerations that could increase affordable housing development in East Bethel.

- The City has the ability to adjust its zoning and subdivision regulations through a planned unit development (PUD). Zoning and subdivision regulations are created in part to mitigate the impacts that a development may have on adjoining properties. When considering a PUD for affordable housing, the City should determine when the level of affordable housing and the guaranteed length of affordability provide a public benefit great enough to justify the potential impacts that would result from a deviation in the zoning or subdivision regulations. PUD is a useful tool to support the development of both rental and ownership housing units affordable at 80% AMI or below and to provide developments that exceed the minimums in design and land preservation.
- Accessory Dwelling Units (ADUs). Currently the city's zoning code does not allow for the construction of detached accessory dwelling units; however, accessory apartments are allowed within a residence, if the entrance is within the home and the home is owner occupied. As an increasingly popular way to increase housing density and opportunity in built-out communities, East Bethel may consider evaluating the potential for detached ADUs to be successful in the community and whether there are sufficient lots on which this type of development would be feasible before deciding whether to adopt an ADU ordinance. ADUs are a useful tool to support the development of rental housing units affordable at 80% AMI or below.

2040 HOUSING GOALS AND STRATEGIES

1. Provide for a variety of high quality, affordable housing.

2. Adopt or amend ordinances relating to the development, redevelopment, and the maintenance of housing to ensure affordable, high quality housing.
3. Develop and maintain development standards and housing policies that allow for low and moderate cost housing.
4. Review annually programs through Anoka County Redevelopment Authority and explore public and private partnerships that could potentially aid in the development of mixed-use housing/commercial developments.
5. Participate in the Livable Communities Act. The Metropolitan Council and the City would then work together to negotiate affordability and life-cycle housing goals for the community. The City shall partner with developers to apply for Livable Communities Demonstration Account (LCDA) and Local Housing Incentives Program (LHIA) funding from the Metropolitan Council.
6. Promote innovative subdivision design in the Mixed Use district.

Housing Goals	Affordable Housing Tools																			
	MN Housing Consolidated RFP	CDBG grants (Anoka Cty)	HOME funds (Anoka Cty)	Family Homeless Prevention & Assistance Program (Anoka Cty)	Neighborhood Stabilization Program (Anoka Cty)	Homebuyer assistance programs (Anoka Cty)	Repair & Rehab Support	Foreclosure prevention	Energy Assistance	Rental Assistance	Livable Communities grant (Met Council)	Local Fair Housing Policy	Land trusts	Development Authorities (Anoka Cty)	Housing Bonds (Anoka Cty)	Tax Abatement	Tax Increment Finance	Low Interest Loans	Fee waivers or adjustments	Zoning and subdivision policies
Provide for a variety of high quality, affordable housing.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	
Adopt or amend ordinances relating to the development, redevelopment, and the maintenance of housing to ensure affordable, high quality housing.							X					X		X			X			X
Develop and maintain development standards and housing policies that allow for low and moderate cost housing.		X		X			X		X			X		X			X	X		X
Review annually programs through Anoka County Redevelopment Authority and explore public and private partnerships that could potentially aid in the development of mixed-use housing/commercial developments.											X		X	X			X			X
Participate in the Livable Communities Act. The City shall partner with developers to apply for Livable Communities Demonstration Account (LCDA) and Local Housing Incentives Program (LHIA) funding.											X						X			X
Promote innovative subdivision design in the Mixed Use district.											X			X			X			X

CHAPTER 3: LAND USE PLAN

The City of East Bethel is bordered by the communities of Oak Grove, Ham Lake, Linwood Township, a portion of the City of Columbus Township, as well as a small portion of St. Francis and Bethel. While most of these communities are experiencing a continuing growth trend, East Bethel, located along State Trunk Highway 65 (TH65) (a major transportation corridor which runs north-south through Anoka County), is becoming an especially attractive area for new residential and business growth.

The full Land Use Plan is intended to guide the future development of the community. It is designed to protect, preserve, enhance, and build upon the physical features of both the built and natural environment. Developed through a combined effort of East Bethel residents, landowners, city officials, and business owners, the plan guides land uses through the year 2040. Many people will use the plan to learn about the community, its direction, and its vision. More importantly it will be used to assist and guide local decision-makers and City staff in the everyday business demanded of a growing rural community.

GOALS

The City has established the following goals to guide future land use.

- Strategically plan for growth areas while maintaining the “non-urbanized” character of the City.
- Identify and classify significant historic resources; enforce policies to protect and conserve historic and cultural resources.
- Encourage the use of solar energy systems for the purposes of space heating and cooling and hot water heating in new residential developments.

The implementation of the Comprehensive Plan does not end with adoption. The City's land use controls, including the Zoning and Subdivision Ordinances, will ensure day-to-day monitoring and enforcement of the policy plan. As part of the planning process, the City will evaluate its land use controls and consider amendments to existing ordinances that eliminate inconsistencies with the Comprehensive Plan. The City will also work to enhance performance standards, protect public and private investments, and conform to mandatory State and Federal regulations.

EXISTING LAND USE

Over the past decade, the City has experienced increased interest in commercial development along TH65. Since the 2008 Comprehensive Plan, additional service and retail uses have been developed. Public and institutional property occupies only about one percent of the City. Parks, private recreation, and open spaces, including Cedar Creek Natural History Area and the Sand Hill Crane Natural Area, account for approximately 14 percent of the gross acres in the City, nearly equal to the amount of existing residential areas. Vacant or rural areas account for roughly 47 percent of the gross acres in the community. Table 3-1 and Figure 3-1 illustrates generalized land uses in East Bethel prior to the adoption of the 2008 Comprehensive Plan and land uses.

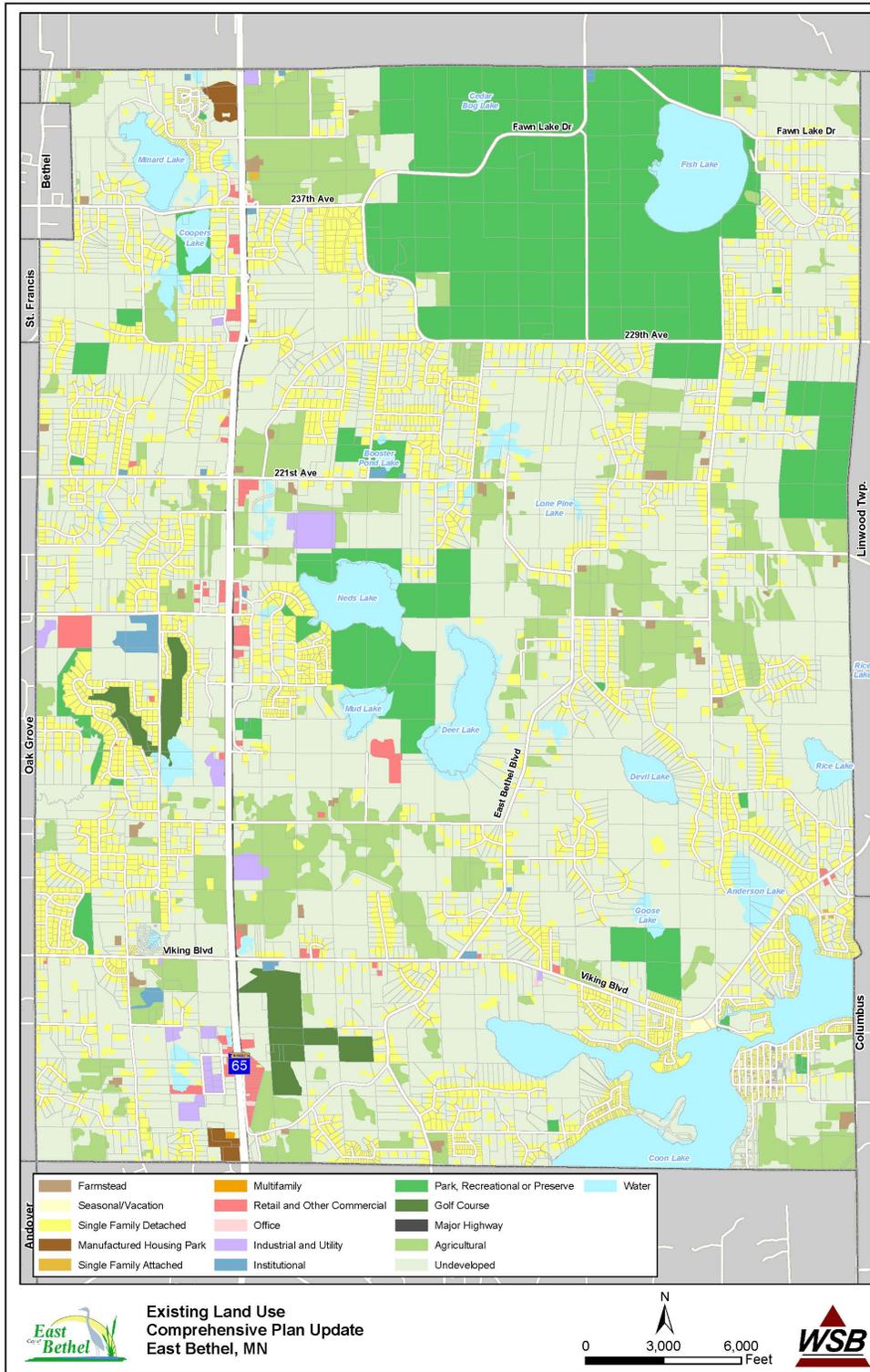
TABLE 3-1: EXISTING LAND USE TABLE

Land Use	Description	Acres	Percent of Total
Undeveloped Land	Land not currently used for any defined purpose that may or may not contain buildings or other structures or has no discernable use based upon the aerial photos or available data. Undeveloped may include non-protected wetlands or lands currently under development.	14,215	46.6%
Single Family Detached	Land meeting the general definition of single-family residential and detached from any other residential dwelling unit (i.e., with open space on all four sides, includes detached town homes).	5,418	17.8%
Park, Recreational or Preserve	Land used for park and recreational assembly (Ex: community level ball fields, regional or small urban parks - public or private, playgrounds, rest areas, and other venues - indoors or outdoors - for sporting events or like purposes). Also includes passive activity uses such as park preserves, wildlife refuges, habitat area, public plazas, river walk, DNR owned land, greenways, and other public or private preserved land.	4,083	13.4%
Agriculture	Land used for agricultural purposes. Includes discernable cultivation (Ex: ground tillage or crop rows) horticulture, floriculture (exotic flowers), viticulture (grapes) activities, pasture, and a broad range of other agricultural activities (Ex: horse boarding and training, kennels, sod farms, tree	3,323	10.9%

East Bethel 2040 Comprehensive Plan Chapter 3: Land Use Plan

Land Use	Description	Acres	Percent of Total
	farms, fish production and processing, storage areas or buildings).		
Open Water	A body of open water or flowing waterway inclusive within a discernable shoreline. This typically does not include wetlands or periodically flooded areas. Generally only features three acres or greater in size are to be delineated.	2,327	7.6%
Golf Course	Land used for golfing, including driving range and practice areas and in most cases includes all land belonging to a country club if the predominant land use is golf course.	321	1.1%
Major Highway	Major roadway strips of land or area, on which a vehicular rights-of-passage exists under the following conditions: all interstate highways; all 4-lane divided highways with rights-of-way of 200 feet or greater in width; or all 4-lane roads with a Metropolitan Council functional class designation of "Principal Arterial".	307	1.0%
Retail and Other Commercial	Land used for the provision of goods or services. This category is for general sales and services that comprise the vast majority of establishments typically associated with commercial land use. This category is used as the default for commercial/retail land uses.	231	0.8%
Industrial and Utility	Land containing manufacturing, transportation, construction companies, communications, utilities (including water towers) or wholesale trade. This category includes publicly owned industrial lands (e.g. waste water treatment plant, warehouses (including commercial warehouses), automotive junk yards, and some special horticultural uses (large greenhouses that do not sell to the public).	181	0.6%
Institutional	Land used primarily for religious, governmental, educational, social, cultural or major health care facilities - patients with overnight stays (Ex: hospitals, schools, places of worship, cemeteries, city halls, museums, and county and state fairgrounds).	96	0.3%
Multifamily	Land used exclusively for residential multiple-family dwellings containing a building or multiple buildings.	12	0.0%
Office	Land used predominantly for administrative, professional, or clerical services. Examples are, law offices, accounting firms, clinics (but not hospitals), and veterinarian clinic or hospital.	4	0.0%
TOTAL		30,519	

FIGURE 3-1 GENERALIZED LAND USE MAP PRE-2008



REGIONAL CONTEXT: COMMUNITY DESIGNATION

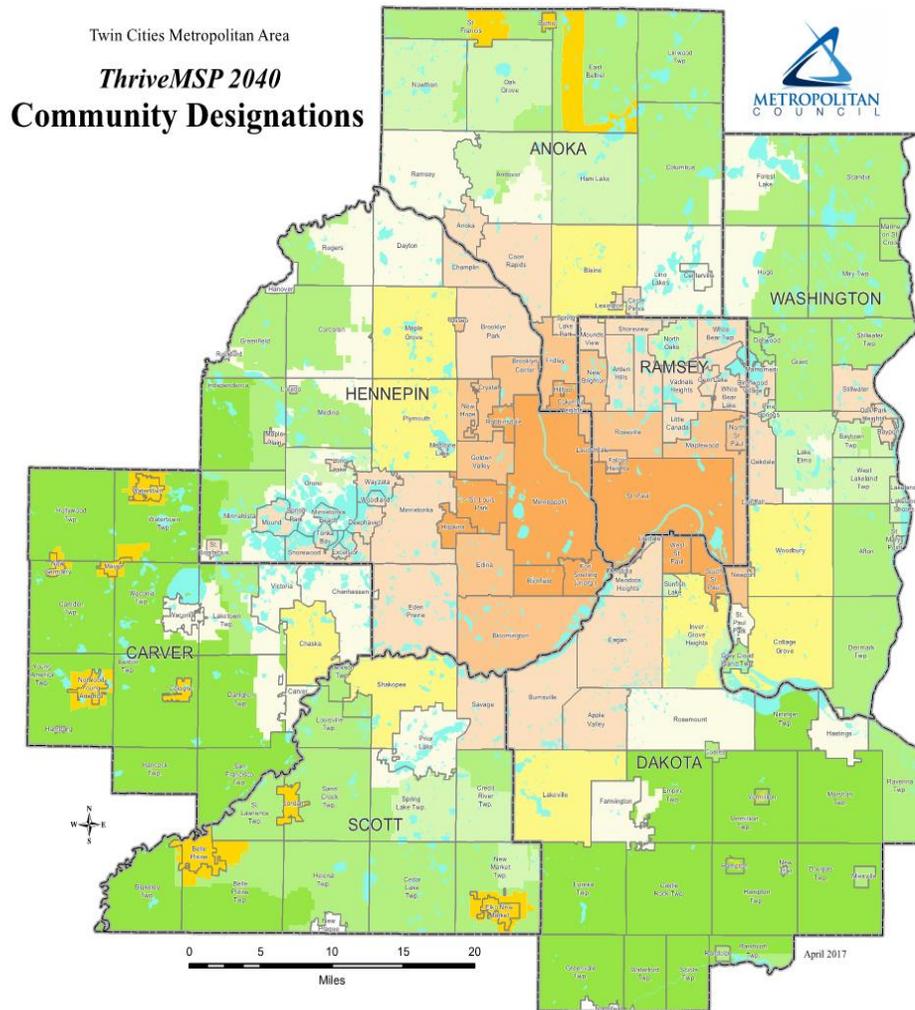
Comprehensive planning often involves planning for people and jobs that are not yet here. The Council develops population, housing and employment forecasts as a component of a city's System Statement to help set realistic goals and policies to plan for the future needs and trajectories of the community over the decades to come.

In *Thrive 2040*, the Metropolitan Council groups jurisdictions within the metro with similar characteristics based on urban or rural character for the application of the regional policies outlined in *Thrive*. East Bethel's "Diversified Rural" and "Rural Center" designations translate to specific expectations in terms of development density as a transition city between rural and agricultural communities. East Bethel's community designation relative to the designations of surrounding communities is shown in [FIGURES 3-2 AND 3-3](#).

Community Designation: The Metropolitan Council identifies East Bethel as a Diversified Rural and Rural Center community. Rural Centers are local commercial, employment, and residential activity centers serving rural areas in the region. These small towns are surrounded by agricultural lands and serve as centers of commerce to those surrounding farm lands and the accompanying population. Rural Center communities are expected to plan for forecasted population and household growth at average densities of at least 3-5 units per acre for new development and redevelopment. In addition, Rural Center communities should strive for higher-density commercial uses and compatible higher-density residential land uses in the commercial core of the community to ensure efficient uses of existing infrastructure investments.

Diversified Rural communities are home to a variety of farm and nonfarm land uses including very large-lot residential, clustered housing, hobby farms and agricultural uses. Diversified Rural communities are expected to plan for growth not to exceed forecasts and in patterns that do not exceed 4 units per 40 acres. In addition, Diversified Rural communities are expected to manage land uses to prevent the premature demand for extension of urban services, and so that existing service levels will meet service needs.

FIGURE 3-2: REGIONAL COMMUNITY DESIGNATION MAP



Community Designations

Urban Service Areas

- Urban Center
- Urban
- Suburban
- Suburban Edge
- Emerging Suburban Edge

Rural Service Areas

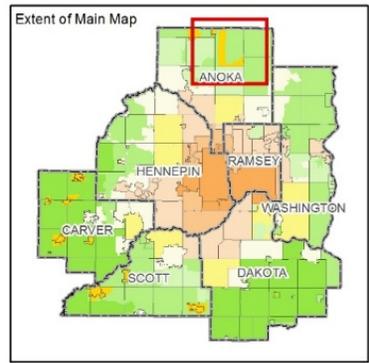
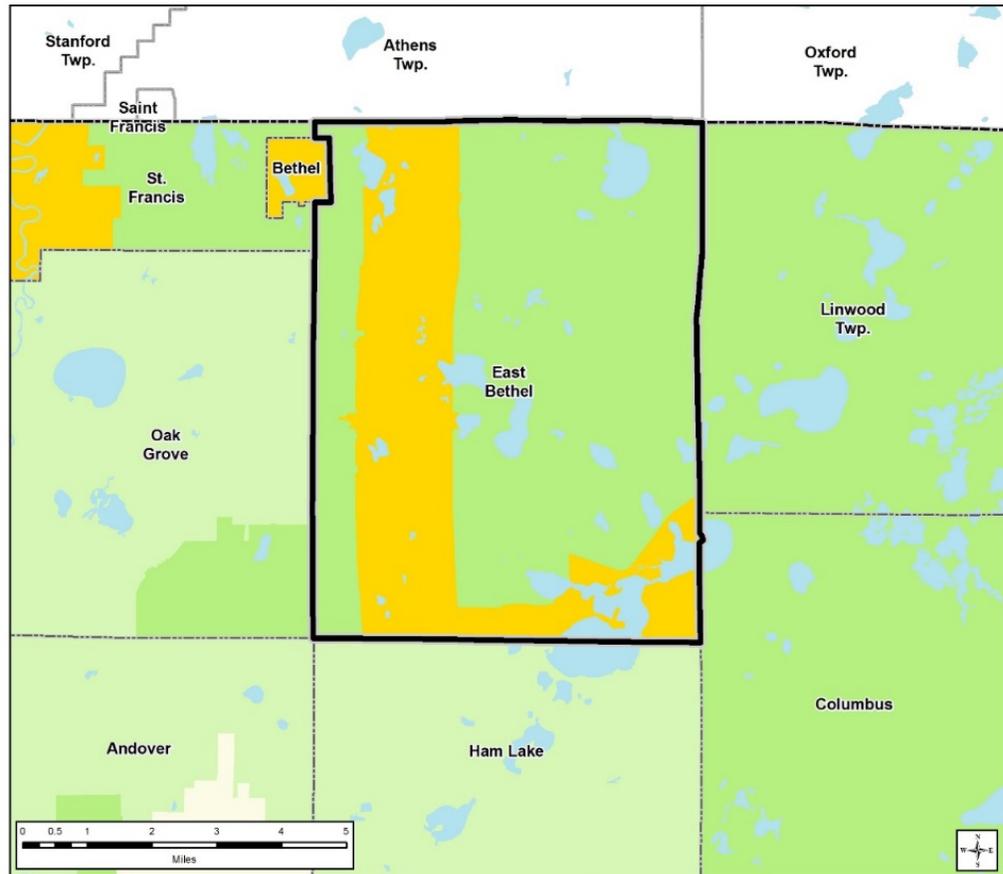
- Rural Center
- Diversified Rural
- Rural Residential
- Agricultural

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

Hanover, New Prague, Northfield, and Rockford are outside the Council's planning authority.

FIGURE 3-3: COMMUNITY DESIGNATION MAP

Community Designations
City of East Bethel, Anoka 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

Revised Community Designation

East Bethel is requesting to amendments to the Community Designation for East Bethel:

Remove the area in the southeast corner of the East Bethel outside of the MN Highway 65 corridor from the Rural Center designation. This area includes the existing small lots along Coon Lake and rural residential properties between the MN Highway 65 corridor and Coon Lake. The City finds that the rural residential properties in this location are no different than the Diversified Residential properties in the rest of community and therefore does not justify different treatment. This requested change is shown in [FIGURE 3-4](#).

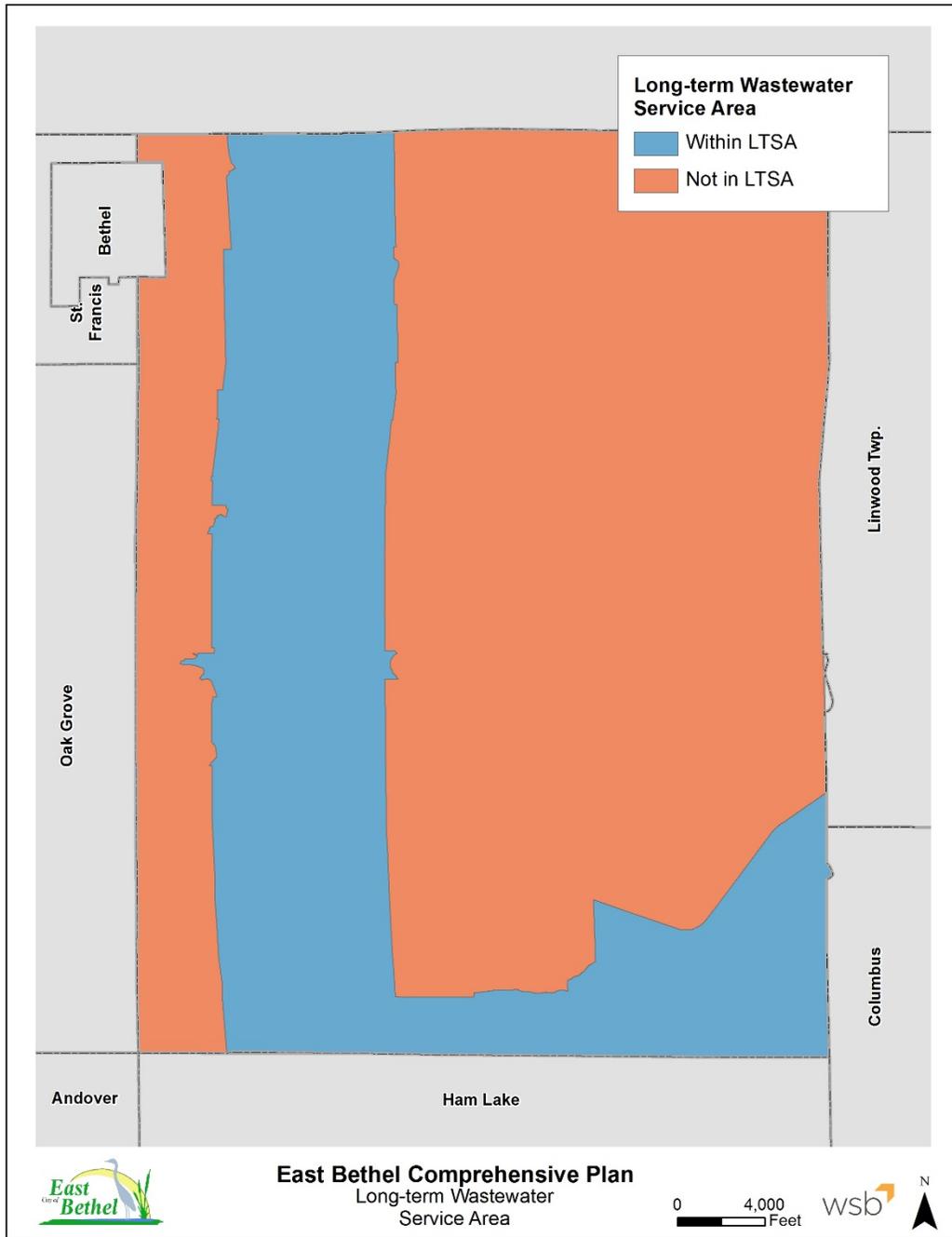
The City also finds that the small lots along Coon Lake within East Bethel are similar to the small lots within the City of Ham Lake and within the City of Columbus that are designated Rural Residential and Diversified Residential respectively. Further, the small lots within East Bethel on the southeast shore of Coon Lake could not be feasibly served with municipal utilities without those services being installed within either the City of Ham Lake or within the City of Columbus. The City commits to working with the Coon Lake property owners to communicate the importance of maintaining the individual septic systems near Coon Lake and has created a new Coon Lake land use category to allow the City to enact ordinances and regulations necessary for the unique characteristics of the lots around Coon Lake.

Should a public health issue arise around Coon Lake in the future that could not be solved by individual septic systems, it is unlikely that a single community will not have the jurisdiction to resolve the issue. The Metropolitan Council, Minnesota Department of Health, and/or Minnesota Department of Pollution Control Agency may need to be involved in coordinating a common and equitable solution for the three communities surrounding Coon Lake. Accordingly, the City acknowledges that the southeast corner of the city will remain within the Long-term Wastewater Service Area, as reflected in [FIGURE 3-5](#).

FIGURE 3-4: REVISED COMMUNITY DESIGNATION MAP



FIGURE 3-5: LONG-TERM WASTEWATER SERVICE AREA MAP



FUTURE LAND USE

Differences from the 2030 Comprehensive Plan

This 2040 Comprehensive Plan and the 2030 Comprehensive Plan treat the areas outside of the Minnesota Highway 65 corridor quite similarly with general large lot residential on individual wells and septic systems with large tracts of both public and privately owned open spaces. The areas within the Minnesota Highway 65 corridor and the area around Coon Lake are treated differently within this 2040 Comprehensive Plan than the 2030 Comprehensive Plan.

In the 2030 Comprehensive Plan, the residential districts with urban services and the Mixed Use district had a narrow density range of 3 to 6 units per acre. The residential districts with urban services and the Mixed Use district within this Plan have density ranges from 2.25 units per acre to 30.0 units per acre. Additionally, the 2040 population and household forecasts do not support the full development of the corridor and therefore there is a new Future Growth Area land use that allows for limited development on septic systems until population growth demands additional urban development.

In the 2030 Comprehensive Plan, the Coon Lake area was designated as Low/Medium Density Residential with a density range of 3 to 4 units per acre. In this plan, Coon Lake is its own land use designation intended to maintain its density or even decrease in density by combining lots through redevelopment.

2040 Land Use Designations

The Future Land Use Plan provides a guide for managing development pressure and growth by determining future land uses, development intensity, and areas for environmental protection. The Land Use Plan also ensures that adequate infrastructure is in place to accommodate new growth as it occurs. The City supports new development but wants to ensure that growth can be accommodated wisely and in an orderly fashion, while protecting the many natural resources that make East Bethel a unique community.

The 2040 future land use map creates the following land use districts:

Public – This category is intended to include locations of schools, public utilities, and ponds or wet areas associated with private developments. This category was added as a separate designation to differentiate these sites as providing a common amenity or service and to indicate that these sites are not intended to be developable within the 2040 planning horizon.

Low Density Residential	
Purpose	The primary use is detached single family homes suitable for family housing and the creation of neighborhoods. Secondary public, cultural, and institutional uses that support the family households are encouraged.
Location Criteria	Inside the MUSA.
Minimum Requirements for Development	Low Density Residential subdivisions are expected to be provided with the full urban infrastructure, such as sidewalks, neighborhood parks, and streets with good access and interconnectivity.
Utilities	Municipal water and sanitary sewer are required.
Typical Uses	Detached single family homes; conservation or cluster subdivisions; places of worship; elementary and secondary schools; public parks and open space; private recreation spaces.
Density	The Low Density Residential designation is anticipated for a range of densities between 2.25 and 4 dwelling units per acre.
Appropriate Zoning	R-1
Limited Secondary Zoning	R-2

Medium Density Residential	
Purpose	Within this category, the predominant housing types will be townhomes and lower density multifamily housing. Single family detached homes may be considered where conditions favor this style of development. It is expected that some housing under this land use category will meet the housing affordability needs of families, couples, seniors and other residents who choose to live in this community and either cannot or would not prefer to live in single family homes. This land use promotes housing affordability for households living at 51-80% AMI. Secondary public, cultural, and institutional uses that support the neighborhood are encouraged.
Location Criteria	Inside the MUSA.
Minimum Requirements for Development	Medium Density Residential subdivisions are expected to be provided with the full urban infrastructure, such as sidewalks, neighborhood parks, and streets with good access and interconnectivity.
Utilities	Municipal water and sanitary sewer are required.
Typical Uses	Townhomes, including single-story attached housing; duplexes; and multiplex buildings; group residential;

Medium Density Residential	
	residential with medical and/or assistive services; places of worship; elementary and secondary schools; public parks and open space; private recreation spaces.
Density	The Medium Density Residential designation is anticipated for a range of densities between 4.0 and 12.0 units per acre.
Appropriate Zoning	R-2
Limited Secondary Zoning	R-1

High Density Residential	
Purpose	High Density Residential land uses will lead to apartment-style housing that ensure that the life-cycle housing needs of the community are met. The residential housing that develops under this land use category may be senior housing developments to accommodate the aging members of the community. It may also meet affordable housing criteria, offering rental opportunities to graduates or younger community members who would otherwise look elsewhere for housing. For the Comprehensive Plan submitted in 2019 to the Metropolitan Council, there is no stand-alone High Density Residential land. The High Density Residential land use category describes how the high density residential within the Mixed Use land use designation can be developed. This initial lack of stand-alone High Density Residential land is not intended to indicate that stand-alone High Density Residential land could not be created through a Comprehensive Plan amendment.
Location Criteria	Inside the MUSA.
Minimum Requirements for Development	High Density Residential subdivisions are expected to be provided with the full urban infrastructure, such as sidewalks, neighborhood parks, and streets with good access and interconnectivity.
Utilities	Municipal water and sanitary sewer are required.
Typical Uses	Townhomes, including single-story attached housing; duplexes; and multiplex buildings; group residential; residential with medical and/or assistive services; places of worship; elementary and secondary schools; public parks and open space; private recreation spaces.
Density	The High Density Residential designation is anticipated for a range of densities between 12.0 and 30.0 units per acre.

High Density Residential	
Appropriate Zoning	B-3 Highway Commercial, <i>MXU Mixed Use</i>
Limited Secondary Zoning	R-2

Mixed Use	
Purpose	Mixed Use district is intended to provide development flexibility, allowing for both commercial and residential uses. For purposes of the household forecasts and the Housing Chapter, Mixed Use has a guideline of 72.5% Low Density Residential, 20% General Commercial, and 7.5% High Density Residential. The actual percentage will be determined at the time of preliminary plat approval and may include Medium Density Residential, Light Industrial and/or Public when deemed appropriate
Location Criteria	Inside the MUSA.
Minimum Requirements for Development	Mixed Use subdivisions are expected to be provided with the full urban infrastructure, such as sidewalks, neighborhood parks, and streets with good access and interconnectivity. Commercial and business development is most appropriate when adjacent to or visible from the Highway 65 corridor.
Utilities	Municipal water and sanitary sewer are required.
Typical Uses	Small-lot single family; Townhomes, including single-story attached housing; duplexes; and multiplex buildings; Apartment-style housing; group residential; residential with medical and/or assistive services; Retail, including grocery store; Office buildings or office complex; commercial complex; places of worship; elementary and secondary schools; public parks and open space; private recreation spaces. Light industrial uses may be deemed appropriate when adjacent to existing industrial or other high intensity businesses or adjacent to planned Light Industrial or Medium Density land uses.
Density	The Mixed Use Residential designation is anticipated for a range of densities between 2.25 and 30.0 units per acre.
Appropriate Zoning	CC City Center, <i>MXU Mixed Use</i> , R-1, R-2, B-2, B-3
Limited Secondary Zoning	LI Light Industrial, PUD

General Commercial

Purpose	Commercial development is encouraged within the half mile buffer along Highway 65.
Location Criteria	Inside the MUSA or an appropriately sized area with stable soils to support septic system if outside the MUSA.
Minimum Requirements for Development	Sufficient access from roadway; considers intersection spacing requirements; provision of turn lanes, if required; provision of cross-access agreements with neighboring commercial properties.
Utilities	Municipal water and sanitary sewer is required when inside the MUSA. Development outside the MUSA may be permitted when a Building Code compliant water supply and septic system can be installed.
Typical Uses	Retail commercial; retail center; office building or office complex; dining or entertainment establishment; indoor recreation center; residential with medical and/or assistive services;
Density	Floor area ratio (FAR) of 20% or greater when the net acreage is fully developed.
Appropriate Zoning	B-2 Central Business, B-3 Highway Commercial
Limited Secondary Zoning	B-1 Limited Business, LI Light Industrial

Light Industrial	
Purpose	This district supports activities and businesses related to manufacturing, assembly, or wholesaling that typically require less intensive land usage and <u>that may not</u> require outdoor storage. Light industrial businesses are expected to be constructed of quality building materials and for uses that do not generate the external noises, dust, smells, vibrations, or similar nuisances normally associated with medium or heavy industrial uses.
Location Criteria	Inside the MUSA or an appropriately sized area with stable soils to support septic system if outside the MUSA.
Minimum Requirements for Development	Sufficient access from roadway; considers intersection spacing requirements; provision of turn lanes, if required; provision of cross-access agreements with neighboring commercial properties.
Utilities	Municipal water and sanitary sewer is required when inside the MUSA. Development outside the MUSA may be permitted when a Building Code compliant water supply and septic system can be installed.

Light Industrial	
Typical Uses	Manufacture or wholesale facility; laboratory or research facility; general repair services; contractor offices; construction sales and service; industrial park; public or institutional uses
Density	Floor area ratio (FAR) of 10% or greater when the net acreage is fully developed.
Appropriate Zoning	LI Light Industrial
Limited Secondary Zoning	B-3 Highway Commercial, <i>MI Medium Industrial, MXU</i>

Medium Industrial	
Purpose	Medium industrial businesses normally generate noises, smells, vibrations, and/or truck traffic that can be disturbing to non-industrial land uses, and may include outdoor storage. Medium industrial land is discouraged next to residential developments. Topography, landscaping, less intense land uses, or other forms of buffering shall be used to transition between medium industrial property and residential, recreational, or institutional land uses.
Location Criteria	Inside the MUSA or an appropriately sized area with stable soils to support septic system if outside the MUSA.
Minimum Requirements for Development	Sufficient access from roadway; meets intersection spacing requirements; provision of turn lanes, if required; provision of cross-access agreements with neighboring commercial properties.
Utilities	Municipal water and sanitary sewer is required when inside the MUSA. Development outside the MUSA may be permitted when a Building Code compliant water supply and septic system can be installed.
Typical Uses	Manufacturing; assembly; industrial uses with outdoor storage; trucking centers
Density	A floor area ratio (FAR) of 5% is encouraged but can be waived when circumstances justify.
Appropriate Zoning	<i>MI Medium Industrial</i>
Limited Secondary Zoning	LI

Rural Residential

Purpose	These areas will retain a traditional rural atmosphere by retaining large lot sizes. This land will preserve valuable environmental resources and will not be developed at urban densities.
Location Criteria	Outside of the MUSA.
Minimum Requirements for Development	Public Right of Way to serve each developable parcel. Sufficient soils to support septic.
Utilities	Private well and septic system
Typical Uses	Recreation; public or private open space; environmental preserve; wetlands, woodlands, lakes, or steep slopes; large lot residential; places of worship; schools.
Density	The Rural Residential designation allows an overall average of 1 unit per 10 gross acres; however higher densities may be achieved by utilizing Met Councils Flexible Development Guidelines.
Appropriate Zoning	RR Rural Residential, R1
Limited Secondary Zoning	A Agricultural

Coon Lake	
Purpose	This neighborhood of East Bethel contains lots that are traditionally smaller in size than typical rural lots and are supported by private septic systems. A separate designation for this area is intended to address the unique challenges associated with many non-conforming lots in this neighborhood and to stabilize development in this area. Parcel assembly is encouraged in this district to facilitate a reduction in non-conformities.
Location Criteria	Outside of the MUSA. Only applies to homes within proximate distance of Coon Lake.
Minimum Requirements for Development	Sufficient land and soils to support septic system.
Utilities	Private well and septic system
Typical Uses	Single family residential; duplex or multiplex residential; limited business or retail; recreation; lake access
Density	The Coon Lake land use designation is anticipated for a range of densities between 1 unit per 10 gross acres and 7.5 units per acre. Encourage assembly of non-conforming lots for redevelopment when available and appropriate.
Appropriate Zoning	R1, <i>CL Coon Lake</i>

Coon Lake		
Limited Zoning	Secondary	RR Rural Residential

Future Growth Area		
Purpose		The plan identifies areas as Future Growth Area that are programmed to eventually be developed at higher intensities but are not planned for full development during the time frame of the 2040 Comprehensive Plan. As such, it is important to preserve these areas by using similar densities as Rural Residential land uses. This designation does not guarantee future urban development rights but rather allows the City to preserve a requisite amount of land as a developing area. Development in the Future Growth Area should be able to accommodate future subdivision in the event of MUSA expansion.
Location Criteria		Outside of the 2040 MUSA, and largely located within a ¾-mile buffer of the Highway 65 corridor.
Minimum Requirements for Development		Development should be designed so that it can be further subdivided in the event that the MUSA is expanded.
Utilities		Private well and septic system
Typical Uses		Single family homes; hobby farms; places of worship; public buildings; recreational open spaces; schools.
Density		1 unit per 10 gross acres. Commercial and industrial may develop in designated areas so long as they can be supported by a viable septic system.
Appropriate Zoning		RR, R1
Limited Zoning	Secondary	R-2, R-3, LI, MI

Agricultural		
Purpose		The purpose of this district is to allow agricultural activities that are compatible with adjacent rural residential land uses and which promote the rural atmosphere of the community until such time as the land may be developed for other appropriate rural uses.
Location Criteria		Outside of the 2040 MUSA
Min. Requirements		Public Right of Way to serve each developable parcel.
Utilities		Private well and septic system.
Typical Uses		Places of worship; Agricultural structures and/or buildings; Row crop and/or livestock farming.

Agricultural	
Density	1 unit per 40 gross acres.
Appropriate Zoning	A Agricultural
Limited Secondary Zoning	RR Rural Residential

Parks and Natural Areas	
Purpose	These areas are locations of significant natural or ecological value, or areas where public visitation, recreation and/or enjoyment of natural spaces is encouraged. The areas in this District are commonly owned by a public entity. East Bethel values its natural spaces and seeks to preserve them for future generations.
Location Criteria	Appropriate locations to support neighborhood recreational opportunities or to conserve and/or restore significant natural areas.
Minimum Requirements for Development	N/A
Utilities	Municipal water and sanitary sewer is not required but may be provided when available and feasible.
Typical Uses	Conservation land; parks; trail corridor; structures that support education, recreation or conservation.
Density	N/A
Appropriate Zoning	<i>Natural Area, Park/Open Space, P/I</i>
Limited Secondary Zoning	RR, A

Limited Business	
Purpose	The limited business (B-1) district is intended to provide for limited retail and service commercial activities in rural areas of the city. Uses are intended to accommodate and serve local neighborhood patrons.
Location Criteria	Outside of the MUSA
Minimum Requirements for Development	May not be located within 1 mile of another Limited Business district.
Utilities	Private well and septic.
Typical Uses	Restaurant; gas station; retail sales;
Density	Floor area ratio (FAR) of 15% or less.
Appropriate Zoning	B-1

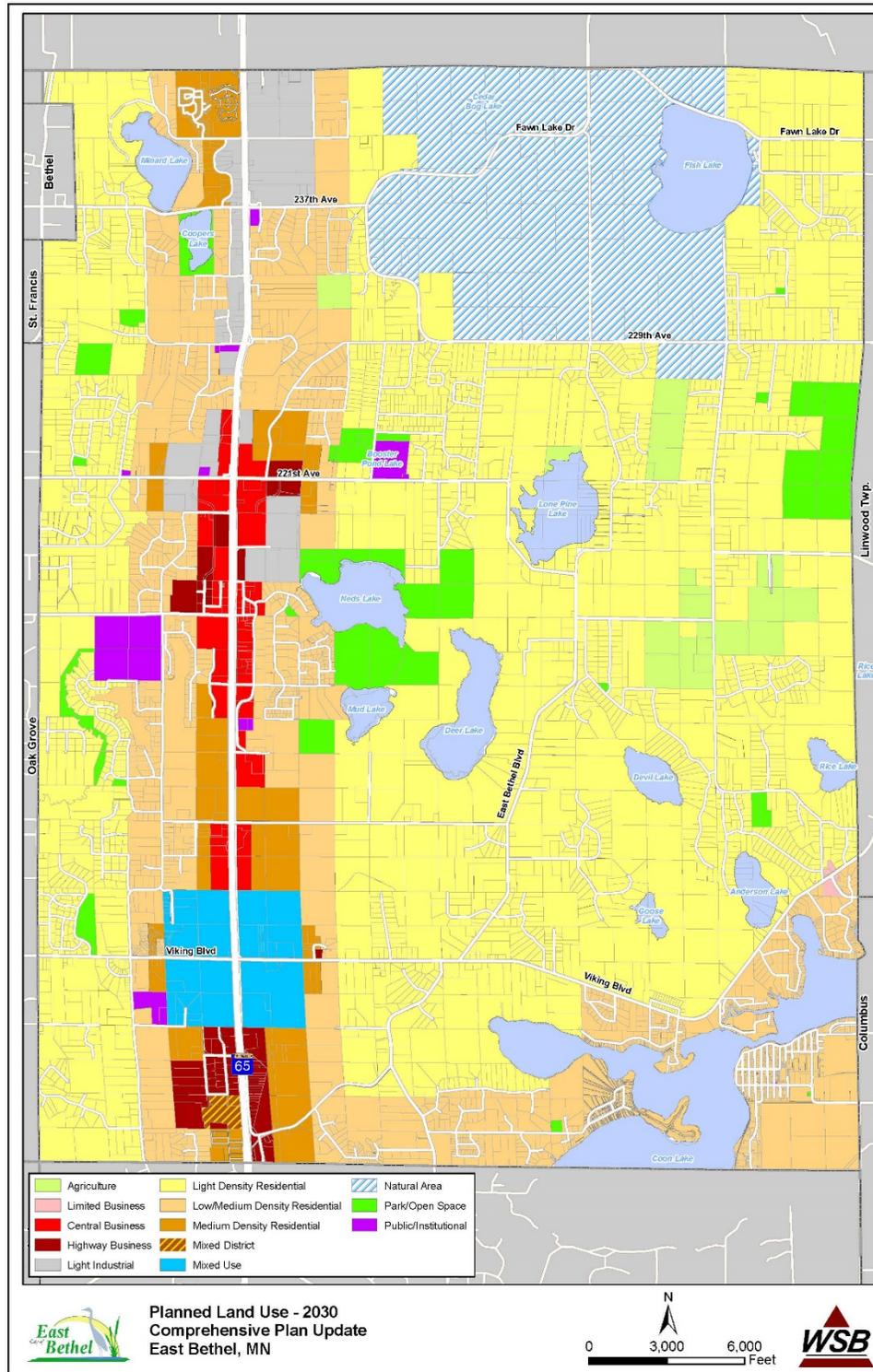
Limited Business		
Limited Zoning	Secondary	B-2, B-3

Public		
Purpose		The purpose of the public/institutional district is to provide areas that are primarily under ownership by units of government, public and private educational institutions, places of worship, hospitals, libraries, cultural facilities, and other similar non-profit institutions.
Location Criteria		Appropriate locations to provide service to residents and the East Bethel community.
Minimum Requirements for Development		N/A
Utilities		Municipal water and sanitary sewer is not required but may be provided when available and feasible.
Typical Uses		Government facilities, places of worship, educational facilities
Density		N/A
Appropriate Zoning		P/I Public Institutional
Limited Zoning	Secondary	<i>Parks/Open Space</i>

2030 COMPREHENSIVE PLAN

The City's 2030 Comprehensive Plan included a land use plan that established new commercial zoning districts and designations. It strategically planned for growth areas while maintain the "non-urbanized" character of the City. A map of the 2030 Land Use Plan is shown in [FIGURE 3-6](#) on the following page.

FIGURE 3-6: 2030 EXISTING LAND USE



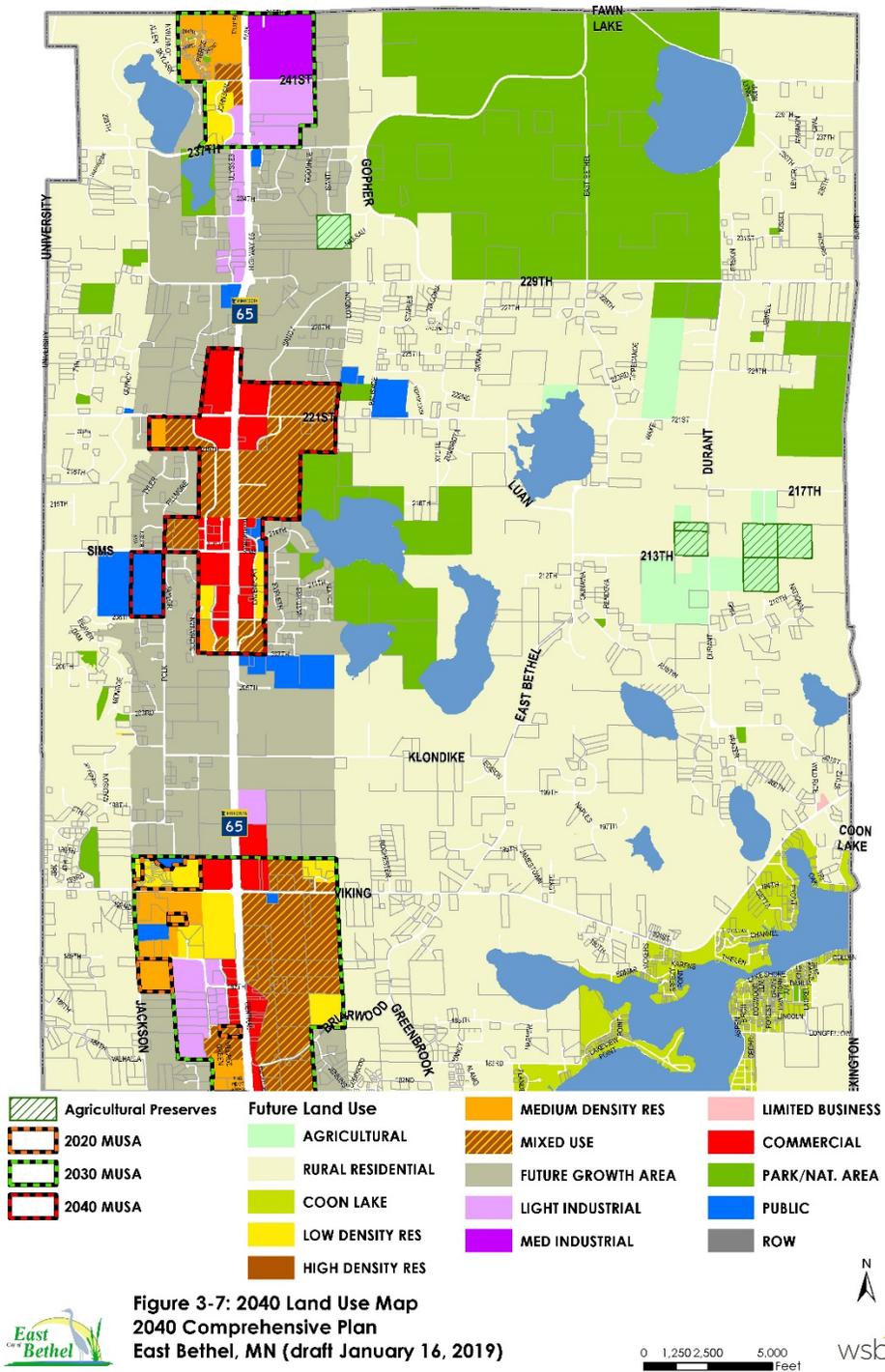
2040 COMPREHENSIVE PLAN

This plan updates the 2030 land use plan and replaces it with the 2040 Comprehensive Plan. The 2040 Planned Land Use map is shown in [FIGURE 3-7](#). The 2040 plan focuses on bringing areas within the Highway 65 corridor into the 2040 MUSA. The MUSA will actually be reduced in the 2040 land use plan to address the limited growth forecasts from the Metropolitan Council and discourage the premature installation of public infrastructure. The 2040 plan features some changes to the land use categories and definitions, which will be described in detail in this section of the plan, as well as some minor adjustments to land use guidance. Total guided land area by category is shown in [TABLE 3-2](#) below.

TABLE 3-2: 2040 PLANNED LAND USE GROSS ACREAGE TABLE BY CATEGORY

Land Use Category	LU Code	Gross Acres	Percent
ROW	ROW	3.2	0.0%
Limited Business	B-1	4.0	0.0%
Medium Industrial	MI	150.1	0.5%
Medium Density Residential	MDR	353.6	1.3%
High Density Residential	HDR	0.0	0.0%
Public	PUBLIC	370.2	1.3%
Commercial	COMM	467.6	1.7%
Agricultural	AG	584.6	2.1%
Low Density Residential	LDR	342.7	1.3%
Coon Lake	COON LAKE	699.5	2.6%
Light Industrial	LIGHT INDUSTRIAL	783.1	2.9%
Mixed Use	MXU	1,097.2	4.0%
Future Growth Area	URBAN RESERVE	3,687.6	13.4%
Park/Natural Area	PARK	3,900.4	14.2%
Rural Residential	RR	14,844.4	54.1%
		27,288.1	

FIGURE 3-7: 2040 PLANNED LAND USE



Expected Growth and Change from Forecasts

Future land use planning begins with incorporating forecasts of community growth and anticipating the needs that will arise as a result of this growth and change. The Metropolitan Council has developed growth forecasts for East Bethel by decade, addressing the projected population, number of households, and number of jobs. Meeting expected growth projections requires intentional land use planning. Metropolitan Council forecasts indicate that East Bethel will grow by over 6,500 people and just over 3,000 households by the year 2040.

TABLE 3-3: East Bethel forecast, 2010-2040. Source: 2010 U.S. Census and Metropolitan Council 2016 Estimates and Metropolitan Council Forecasts.

Forecast Year	Population	Households	Employment
2010	11,626	4,060	1,123
2016 (estimate)	11,788	4,155	1,377
2020	12,400	4,700	1,700
2030	15,400	6,000	1,950
2040	18,400	7,400	2,200
<i>Overall Change from 2016</i>	+6,612	+3,245	+823

Meeting Population Growth Expectations

Overall, the growth expectations for East Bethel through the year 2040 can be met through the identified net developable land. TABLE 3-4 below further breaks down the amount of net developable land by residential land use category. The table below shows the residential acreage associated with the parcels included in the likely redevelopment areas, as well as the land use density ranges associated with each of these residential categories.

East Bethel is well able to meet forecasted growth through development and has more land than necessary indicated as available for development. It is prudent to have excess land guided than is necessary because limiting the development potential of land could artificially drive up property cost. Additionally, the timeline of land availability is in continual flux, so allowing for some flexibility in how and where to meet growth requirements ensures that development potential is not dependent on the will of a single land owner.

TABLE 3-4: RESIDENTIAL GROWTH POTENTIAL BASED ON FUTURE LAND USE DESIGNATIONS AND REDEVELOPMENT AREAS.

Land Use Type	TOTAL Dev. Acres	Acres now- 2020	Acres 2021- 2030	Acres 2031- 2040	Density Range			Yield %	Min Units Now - 2020	Min Units 2021- 2030	Min Units 2031- 2040	TOTAL Minimum Units	Mid Units Now - 2020	Mid Units 2021- 2030	Mid Units 2031- 2040	TOTAL Midpoint Units	
					Min	Mid	Max										
2040 Future Land Use	Low Density Res	152.23	58.92	66.08	27.23	2.25	3.125	4	100%	48*	149	61	258	48*	207	85	340
	Medium Density Res	212.44	44.16	140.50	27.78	4	8	12	100%	130*	562	111	803	130*	1,124	222	1,476
	Mixed Use (LDR) ¹	614.68	0	344.24	270.44	2.25	3.125	4	100%	0	775	609	1,384	0	1,076	845	1,921
	Mixed Use (HDR) ²	63.59	7.07	31.65	24.87	12	21	30	100%	106*	380	298	784	106*	664	522	1,292
	Guided Total	1042.94	110.15	582.47	350.32					284	1,866	1,079	3,229	284	3,071	1,674	5,029

*City Council Approved Units

Community Designation Density (2021-2040)	5.09
Total expected housing units	4,745
Units considered affordable at <80%AMI	380

¹ Mixed Use (LDR)'s 614.68 developable acres is 72.5% of the overall Mixed Use 847.83 developable acres

² Mixed Use (HDR)'s 63.59 developable acres is 7.5% of the overall Mixed Use 847.83 developable acres

TABLE 3-5: POTENTIAL EMPLOYEE YIELD IN NON-RESIDENTIAL FUTURE LAND USE CATEGORIES

	TOTAL Dev. Acres	Acres now-2030	Acres 2031-2040	FAR	Square Footage			Employee per Square Foot	Employment Generated		Total Employment	
					2030	2040	Total		2030	2040	2030	2040
Light Industrial	178.05	178.05	0.00	10%	775,586	-	775,586	1,000	776	-		
Medium Industrial	143.08	143.08	0.00	5%	311,628	-	311,628	2,000	156	-		
Commercial	278.52	71.95	206.57	20%	626,828	1,799,638	2,426,466	400	1,567	4,499		
Mixed Use ¹	169.57	95.60	73.97	20%	832,867	644,427	1,477,294	400	2,082	1,611		
	769.22	488.68	280.54		2,546,909	2,444,065	4,990,974		4,581	6,110	5,958	12,068

¹ Mixed Use (Comm)'s 169.57 developable acres is 20% of the overall Mixed Use 847.83 developable acres

There is a difference between the Metropolitan Forecast shown in Table 3-3 and the potential households generated in the 2030 and 2040 MUSAs shown in TABLE 3-4 and the Employment shown in TABLE 3-5. Some reasons for these differences are as follows:

- **Minnesota Highway 65 Growth Strategy:** East Bethel's 2030 Comprehensive Plan was based on an urban growth corridor that stretched on for $\frac{3}{4}$ of a mile on both sides of Minnesota Highway 65 for the entire length of the City. That growth boundary mirrors the Rural Center Community Designation. The 2030 and 2040 MUSAs within this plan significantly reduce the amount of land that is developable within the corridor and therefore a significant amount of landowner's expectation for development and potential income therefrom will be delayed.
- **Planning based on Existing and Planned Transportation and Utility Improvements:** The Minnesota Department of Transportation (MnDOT) has plans for improvements for and access spacing limitations onto Minnesota Highway 65 and the Metropolitan Council has made investments to connect the northern and southern portions of the Minnesota Highway 65 corridor to the existing wastewater treatment plant. The 2030 and 2040 MUSAs were designed to complement the MnDOT investment and construct local infrastructure to support the Metropolitan Council investments.
- **Market Forces:** There are rational reasons to believe that the Metropolitan Council forecasts are the actual amount of growth that will occur but limiting the amount of land within the MUSA to the exact amount of land to meet only the amount of growth in the forecast can have negative factors on land markets. Not every land owner is ready to develop immediately because there may be investments made in their land or businesses that they want to see a return from. Additionally, there may be generational or inheritance issues that may encourage delaying in developing a property. Land prices can also be affected if land supply is too tight and properties may stay undeveloped as a result because it is uneconomical to develop at the restricted market land costs. The 2030 and 2040 MUSAs could generate about 80% more units than 2040 forecast predicts. East Bethel believes that this would be appropriate level to allow individuals to choose what

investments to make in their properties when they are ready to sell for development and have enough land available to maintain a reasonable amount of competition to generate reasonable land prices.

Growth Staging

The 2040 Comprehensive Plan extends sewers to the north, mid, and south MUSA areas. In order to plan for regional sewer system capacity, the Metropolitan Council requires that cities submit 10-year staging plans so that it can size the regional system to accommodate projected growth. In a city with large amounts of vacant land, this often results in the creation of growth staging areas that are left unsewered until a particular time period or a certain development stage is reached. The 2040 Comprehensive Plan provides access to sewers for the north, mid, and south MUSA areas as pictured in [FIGURE 3-7](#).

Land is available for development in East Bethel, but that development is limited by available infrastructure. The south MUSA area has infrastructure including a water tower, wells, and a water treatment center and is ready for development. The north MUSA area has lift stations, wells, and septic systems, but is missing a water tower. There are some investments needed to make this area able to be fully developed. The mid MUSA area is missing most infrastructure and would require heavy investment to become developable.

The proposed staging has the north and south MUSA areas being sewerred by 2030 and the mid MUSA area being sewerred by 2040, as revenue from the development of the north and south areas begins to be available to fund heavier infrastructure investments.

[FIGURE 3-8](#) outlines what property owners can do with their land, depending on whether it is in the 2030 MUSA or the 2040 MUSA. Property owners are restricted as to how they can subdivide and develop their land based on whether and when they will be sewerred. Instituting these development guidelines is a form of growth management that ensures that individual property owners are managing their land in a way that is consistent with the city's growth forecasts and goals.

The Metropolitan Council has a need for a forecast of development in ten-year increments, which are contained in [TABLE 3-6](#). Within the planning timeframe 2017-2040 the table assumes that the bulk (about 63 percent) of development would occur by 2030. This staging assumption is based on current market trends and known development interest and momentum in the City. Areas

staged for 2030-2040 development are areas that are not adjacent to existing development and will require the most significant infrastructure upgrades and connections to develop. The assumptions are that 63% of the total growth would occur by 2030, and 37% between 2030-2040.

TABLE 3-6: LAND USE STAGING IN THE 2030 AND 2040 MUSAS

Land Use Category	2020 MUSA Only (net acres)	2030 MUSA Only (net acres)	2040 MUSA Only (net acres)	Total MUSA Areas (net acres)
Medium Industrial	0.00	143.08	0.00	143.08
Medium Density Residential	44.16	140.50	27.78	212.44
Public	0.00	4.59	5.85	10.44
Commercial	0.00	71.95	206.58	278.52
Low Density Residential	58.92	66.08	27.23	152.25
Light Industrial	0.00	178.05	0.00	178.05
Mixed Use ¹	7.07	471.49	369.28	847.84
Park/Natural Area	0.00	2.15	0.00	2.15

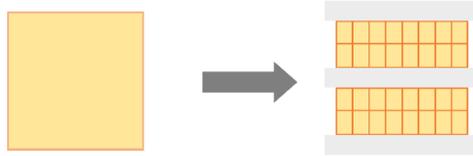
¹ The Mixed Use acreage is the total area of the Mixed Use (LDR) and Mixed Use (HDR) from Table 3-4 and the Mixed Use employment areas in Table 3-5.

It is important to note that it is difficult to provide an accurate forecast at the individual land use category level and individual category growth rates could vary significantly. However, the City of East Bethel will monitor the growth in aggregate to ensure that it remains within forecasted ranges or that the Metropolitan Council is alerted if aggregate growth begins to appear that might significantly exceed what is forecasted.

FIGURE 3-8

What Can I Do with My Land through 2030?

If your land is inside the **2030 Urban Service Boundary**:



- You may subdivide at densities allowed by the land use category
- You will pay the cost of the construction of utilities

If your land is inside the **2040 Urban Service Boundary**:

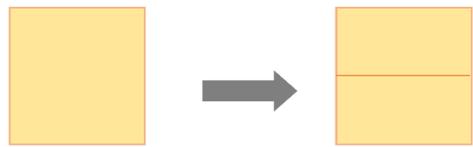


- You may subdivide an average of **1 unit per 10 acres**
- Served by individual well & septic

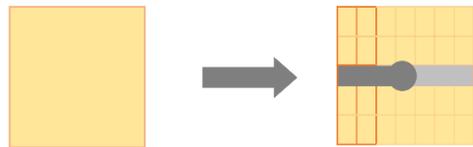


- You may subdivide at a density that can be supported by well & septic
- "Ghost plat" to show land can be subdivided at densities allowed by land use category

If your land is inside the **Future Growth Area**:



- You may subdivide an average of **1 unit per 10 acres**
- Served by individual well & septic



- You may subdivide at a density that can be supported by well & septic
- "Ghost plat" to show land can be subdivided at a minimum of 2.25 units per acre

If your land is **outside** of both the Urban Service Boundary and the Future Growth Area:



- You may subdivide an average of **1 unit per 10 acres**
- Served by individual well & septic

The **Urban Service Boundary** (also called the "MUSA") is the designated area in which the city commits to provide infrastructure services (sewer and water) by a certain year. The Metropolitan Council requires developing cities to define a 2030 and 2040 MUSA boundary.

RESILIENCE

As communities adjust to increasingly extreme weather events, stress on public facilities, and higher costs of services, there is growing need to not only plan for these events, but to also reduce the impacts through conscious climate adaptation and resilience planning. Moreover, resiliency also considers reducing greenhouse gas (GHG) emissions so that the extent of climate change does not exceed the capacity to adapt and become resilient.

As part of preparing for climate change, the City of East Bethel has adopted several best management practices for land development. These practices include:

- Encourage land development in concentrated areas and protect natural resources
- Established permanent buffers around wetlands
- Limit the amount of tree removal in land development
- Comprehensive stormwater management planning

Desired Goals and Policies

In addition to best management practices already in place, the City of East Bethel has established the following goals to be implemented as part of the 2040 Comprehensive Plan update:

1. Become a Green Step City - the Planning Commission met several times on this matter and has recommended that the City consider taking the steps necessary to become a Green Step City.
2. Enable solar garden development that enhances the community's and landowners' ability to limit non-rural housing or commercial development.
3. Resilience Goal - Encourage investment in electric grid infrastructure and solar development that makes electric service more reliable and resilient to weather-related disruptions.

Strategies and Evaluation

One of the ways to develop strategies for creating solar garden development is to utilize Gross and Rooftop Solar Resource Calculations. The gross solar

potential and gross solar rooftop potential are expressed in megawatt hours per year (Mwh/yr), and these estimates are based on the solar map (FIGURE 3-9) for the City of East Bethel. These values represent gross totals; in other words, they are not intended to demonstrate the amount of solar likely to develop within the community, but rather, the calculations estimate the total potential resource before removing areas unsuitable for solar development or factors related to solar energy efficiency. The gross solar generation potential and the gross solar rooftop generation potential for East Bethel are estimates of how much electricity could be generated using existing technology and assumptions on the efficiency of conversion. The conversion efficiency of 10% is based on benchmarking analyses for converting the Solar Suitability Map data to actual production, and solar industry standards used for site level solar assessment.

TABLE 3-7 shows the total generation potential for the City of East Bethel.

TABLE 3-7: SOLAR GENERATION POTENTIAL

Community	Gross Potential (Mwh/yr)	Rooftop Potential (Mwh/yr)	Gross Generation Potential (Mwh/yr) ¹	Rooftop Generation Potential (Mwh/yr) ¹
East Bethel	65,338,091	588,163	6,533,809	58,816

¹ In general, a conservative assumption for panel generation is to use 10% efficiency for conversion of total insolation into electric generation. These solar resource calculations provide an approximation of each community's solar resource. This baseline information can provide the opportunity for a more extensive, community-specific analysis of solar development potential for both solar gardens and rooftop or accessory use installations. For most communities, the rooftop generation potential is equivalent to between 30% and 60% of the community's total electric energy consumption. The rooftop generation potential does not consider ownership, financial barriers, or building-specific structural limitations.

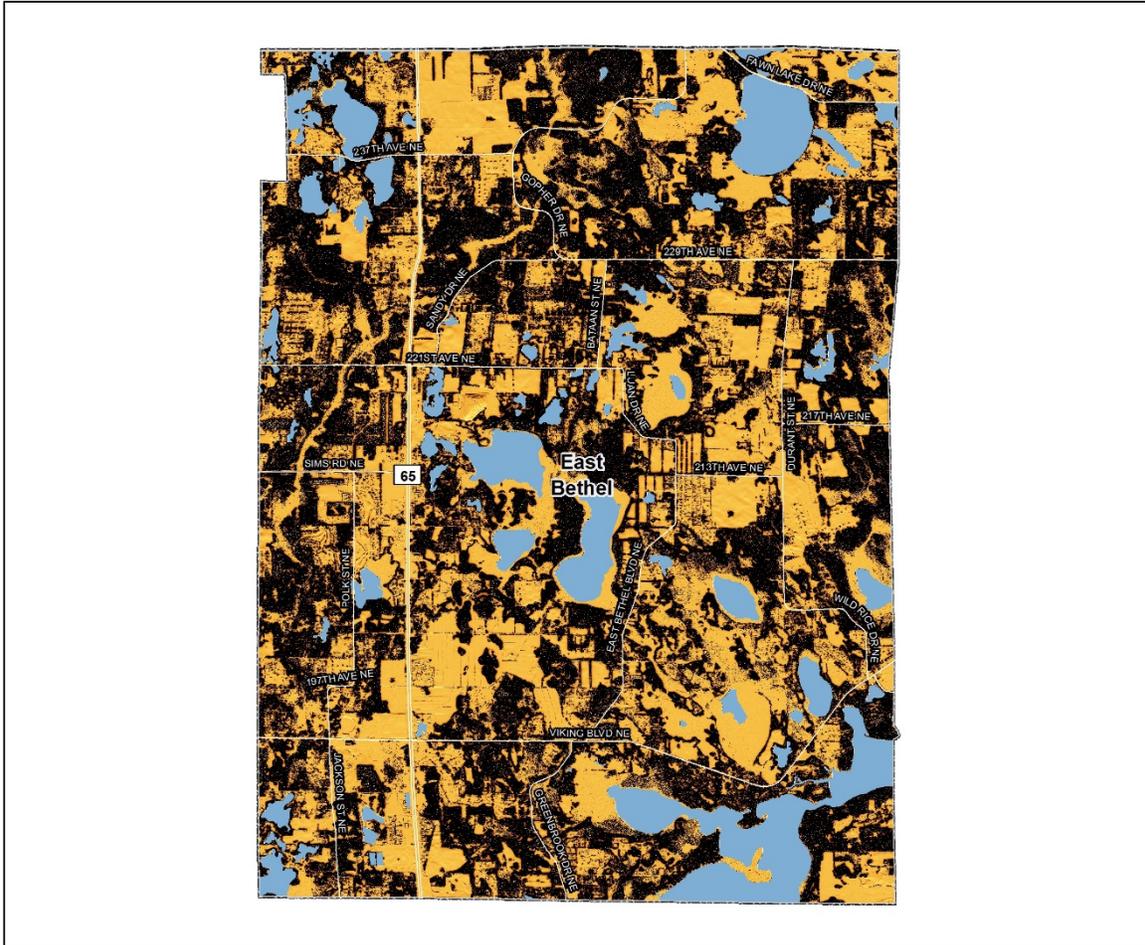
Partnering with Connexus energy, the City of East Bethel will utilize information from the Solar Table and Solar Suitability Map to identify those areas in the community that would work with Connexus Energy's "SolarWise program," a community based solar garden program.

SOLAR ACCESS PROTECTION

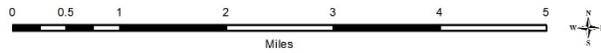
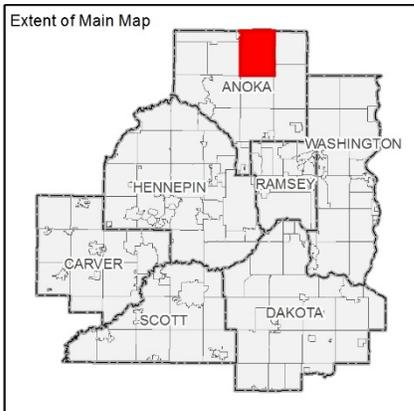
Metropolitan cities in Minnesota are required to include an element for protection and development of access to direct sunlight for solar energy systems in the Comprehensive Plan. A solar access protection element is included in the Comprehensive Plan to assure the availability of direct sunlight

FIGURE 3-9: GROSS SOLAR POTENTIAL

**Gross Solar Potential
City of East Bethel, Anoka County**



12/8/2016



**Gross Solar Potential
(Watt-hours per Year)**

- High : 1264088
- Low : 900001
- Solar Potential under 900,000 watt-hours per year
- County Boundaries
- City and Township Boundaries
- Wetlands and Open Water Features

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

to solar energy systems. Solar energy is an alternative means to energy. It has less impact on natural resources. Currently we need fossil fuels and nuclear power to heat or cool our homes and businesses. We also use this energy for fuel and automobiles. Increasing our usage of solar energy would decrease our reliance on fossil fuels and nuclear power. The purpose for including this section of the Comprehensive Plan is to ensure that direct sunlight access to solar panels is not subjected to shading from nearby trees, buildings, or other structures.

East Bethel will encourage the use of solar energy systems for the purposes of space heating and cooling and hot water heating in new residential developments.

1. The City will review its Zoning Ordinance and consider appropriate amendments to exempt active solar energy systems from lot coverage and setback provisions.
2. The City will review its Code and consider appropriate amendments to require swimming pools be heated using solar or some other form of renewable energy resource, where possible.
3. Within Planned Unit Developments, the City will consider varying setback requirements in residential zoning districts as a means of protecting solar access.

HISTORIC PRESERVATION

The Metropolitan Land Planning Act (Minnesota Statutes 473.859, Subd. 2) requires that local comprehensive plans include a historic preservation section. Historic assets also help to promote community pride and create a sense of community. The City of East Bethel will create an inventory of historically significant features, landmarks, and buildings, and evaluate tools for preserving these areas and structures. Where feasible, the City will assist with the acquisition of historically significant sites or structures in order to provide educational or recreational opportunities.

AGGREGATE RESOURCES

There are no deposits of significant commercial potential in the City of East Bethel. The City does, however, allow mining and excavation as a temporary use with approval of a Conditional Use Permit.

CHAPTER 4: PARKS, RECREATION, AND OPEN SPACE

East Bethel is home to several unique natural resource areas that form the basis of the parks, recreation, and open space plan. The City recognizes that its parks and trails system will be an important part of the community's life as it grows, and because of this, the City contracted with a consultant in 2007 to assist in the development of a Parks, Trails, and Open Space Comprehensive Plan. The plan recognized that the City has an abundance of high quality natural resources and the importance of creating a linked system of trails and greenways to connect the City's existing and future parks and greenways. The Parks, Trails, and Open Space Plan is a tool the City will utilize during the planning process of its parks and open spaces.

COON LAKE

Coon Lake is used recreationally with numerous access points available for launching boats and swimming. There are a number of houses on the lake, and it is home to many forms of wildlife including loons, ducks, geese, fish, beavers, and turtles.



The lake totals 1,259.2 acres with a littoral area of 1,098.2 acres. The maximum depth is 27 feet with a water clarity depth of 6.75 feet. The substrates that make up the bottom of the lake include sand, silt, and muck with an abundant aquatic plant population at a growth depth of 14 feet.

Species in the lake include a variety of fish such as: walleye, black bullhead, black crappie, bluegill, bowfin (dogfish), brown bullhead, common carp, hybrid sunfish, largemouth bass, northern pike, pumpkinseed sunfish, white sucker, yellow bullhead, and yellow perch. As of 2003, bluegills made up the most abundant species in the lake and their sizes ranged from 2.6 inches to 7.4 inches in length. The second most populated species in 2003 was the northern pike; their lengths ranged from 12.5 inches to 34.4 inches.

The average water level in Coon Lake is 902.69 feet with the highest recorded level at 905.11 feet and the lowest at 900.27 feet. The last recorded reading was in October 2017, at which time the lakes' Ordinary High Water level was at 904.75 feet.

In a recent study, the lake was found to have an infestation of Eurasian Watermilfoil, an incredibly invasive species of aquatic plant which takes firm hold in lakes without well-established populations of native plants. It is easily transferred from one lake to another by boats and trailers, and once embedded in a lake, it is very difficult to eliminate. Eurasian Watermilfoil negatively impacts recreation on lakes due to the increased difficulty of swimming, boating, and fishing.

CEDAR CREEK ECOSYSTEM AND SCIENTIFIC RESERVE

The three great ecosystems of North America meet in the vicinity of Cedar Creek – the western prairies, the northern evergreen forests, and the eastern deciduous forests. This makes Cedar Creek one of the ideal places in North America to preserve and study ecosystems. In addition, within its nine square miles, Cedar Creek contains rare ecosystems of conservational interest including spruce bogs, remnant northern cedar forests, and tracts of never-plowed savannas.



Cedar Creek Ecosystem and Scientific Reserve was established in 1942 and ranks among the world's top ecological research sites. The science of modern ecosystem ecology was conceived and developed at a small glacial lake on Cedar Creek grounds in the 1940s. In the 1960s, Cedar Creek scientists started one of the earliest and longest-running experiments on fire and fire suppression in forest ecosystems. Radio tracking of animals was invented at Cedar Creek in the 1970s. Today Cedar Creek's experiments on biological diversity are world known, focusing on understanding natural ecosystems and the services they provide to humanity and to the planet.

Cedar Creek scientists, students, and staff are dedicated to understanding how our planet's ecosystems work and how those ecosystems are changing under human pressures. Through research, education, community involvement, conservation, and preservation, Cedar Creek strives to bridge the gap between science, community, and government.

Cedar Creek Ecosystem and Scientific Reserve encompasses more than 3,000 acres and is the most significant open space in East Bethel. Considered to be the largest ecological research site in central Minnesota, it is home to natural habitats that represent the entire state, which is rare given its close proximity (roughly 30 minutes) from the Twin Cities metropolitan area.

Owned and operated by the University of Minnesota, in cooperation with the Minnesota Academy of Science, scientists from around the world work at Cedar Creek. Accomplishments include the invention of radio collars used for animal tracking, as well as long-term research on prescribed burning for savannas, which began in the early 1960s. In addition, insects that inhabit Cedar Creek

comprise one of the most intensely studied ecological communities anywhere, beginning in the 1980s, and play a part in establishing modern ecological theory.

Ongoing projects include studies of biodiversity, which is the number of different species living in one particular area, including the tiniest bacteria to the largest animals and most massive trees. Additionally, there are studies of long-term nitrogen deposition, nutrient networks, the effects of burning patterns and frequency on vegetation, and chronosequencing, which is a set of forested sites that share similar attributes but are of different ages that is used to study the time-dependent development of a forest. Also, large-scale experiments at Cedar Creek examine how environmental changes are affecting the globe. Future scientific opportunities include understanding how urbanization will change native plant and animal communities, how bacteria and other microbes in the soil interact with plants we see above ground, how grazers maintain prairies and savannas, and how habitat restoration improves conditions for wildlife.

The City of East Bethel, in collaboration with the University of Minnesota, has worked to provide hiking trails and cross-country ski trails through the Cedar Creek Ecosystem and Scientific Reserve. The trails are identified in the Proposed Trail Plan map provided later in this chapter.

The County, the City, the Minnesota Department of Natural Resources (DNR), and the Minnesota Pollution Control Agency (PCA) have developed a plan to combine this land and their respective resources to establish the *Sandhill Crane Natural Area*. The vision for this area focuses on low-impact recreation and public educational programs about this natural resource. An additional expanse of government-owned land (State and DNR), approximately 280 acres, is also located on the eastern edge of the City surrounding 224th Avenue.

SANDHILL CRANE NATURAL AREA

The Sandhill Crane Natural Area is located in East Bethel incorporating Neds, Mud, and Deer Lakes. The property is managed cooperatively between the following agencies: the Minnesota DNR, the Minnesota PCA, the City of East Bethel, and Anoka County. The Sandhill Crane Natural Area contains some of the most unique and unspoiled wild areas in Anoka County, as well as a few rare plant and animal species.



Main features of the area include 533 acres of public land with natural walking paths, 1.75 miles of lake shore, and important environmental elements including wetlands/marsh, oak forest, and rare plant and animal species.

The Sandhill Crane Natural Area exists to enhance, protect, and conserve the natural resources of the area. The planning concept seeks to provide a balance between providing facilities and amenities without compromising its natural character or threatening its wild habitat. Restoration of damaged or faltered ecosystems is a priority for the managing agencies. Providing protection to adjacent private high quality natural resource land is also a priority. This is being accomplished through cooperative agreements, conservation easements, and other land preservation means.

The master plan for Sandhill Crane Natural Area (Figure 4-1) proposes to provide low impact recreational activities. Small trailhead parking areas, soft-surfaced recreational trails, observation areas for wildlife viewing, and low-impact picnic areas are planned as illustrated in Figure 4-2.



Sandhill Crane Natural Area Master Plan

FIGURE 4-1. SANDHILL CRANE NATURAL AREA MASTER PLAN

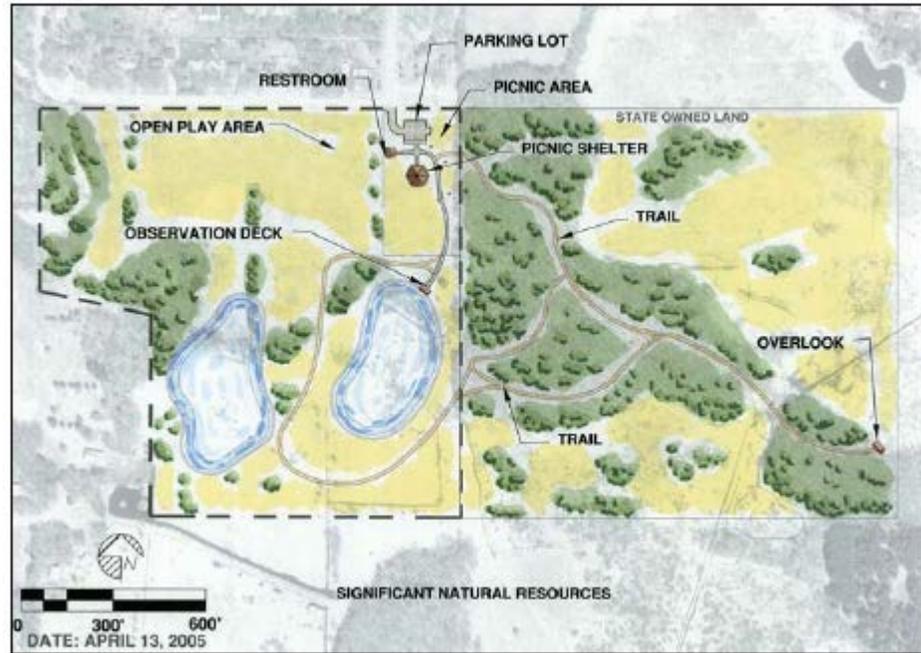


FIGURE 4-2. SANDHILL CRANE NATURAL AREA

HELEN ALLISON SAVANNA SCIENTIFIC AND NATURAL AREA

The Helen Allison Savanna Preserve is located adjacent to the southern most portion of the Cedar Creek Ecosystem and Scientific Reserve in East Bethel. It encompasses approximately 86 acres and was formed more than 16,000 years ago by glacial meltwater, on what is now known as the Anoka Sandplain. In 1960, The Nature Conservancy acquired the land as a result of a substantial donation by Helen Allison Irvine in an effort to protect the dwindling acreage of oak savanna.

Ms. Irvine was known as Minnesota's "Grass Lady," and wrote *The Key to Grasses of Minnesota*, a reference work on 180 species of grasses found in the state. Starting in 1962, about a third of the savanna is burned each year on a rotating basis. University of Minnesota botanist Dr. Donald Lawrence initiated the recovery of the old field area by hand seeding prairie species in the 1960s and 1970s. In 1979, the preserve was designated a Scientific and Natural Area by the State of Minnesota, following a thorough inventory of species.

Considered today to be an excellent example of oak savanna, it was previously a community of conifers (mostly spruce), which covered much of the land after the glaciers retreated approximately 1,000 to 1,500 years ago. With a warmer climate, birch replaced spruce, and later oak supplanted birch. Today, less than 65,000 acres of oak savanna remain in the Midwest – two-tenths of one percent of the pre-settlement savanna.

Oak savanna, which consists of oak trees scattered over prairie vegetation, occupies 54 acres of the preserve. Other areas include dune blowouts, wet meadows, willow and aspen thickets, and old fields. Helen Allison Savanna Preserve also harbors more than 200 species of vascular plants. Dominant trees and shrubs in the preserve include northern pin oak, bur oak, American hazelnut, choke cherry, and quaking aspen. Dominant grasses include big and little bluestem, Indian grass, and porcupine grass. Other common species include lead plant, steeple bush, silky prairie clover, rough blazing star, asters, and goldenrods. Another interesting prairie species is the rhombic-petaled evening primrose, a species of special concern in Minnesota.

A survey of avian life discovered 45 species of birds, including hawks, warblers, and waterfowl. The seldom-seen lark sparrow also nests on the preserve. Amphibians and reptiles making their home at the Savanna include the eastern

tiger salamander, spring peeper, gray tree frog, wood frog, and bullsnake (or gopher snake).

GORDIE MIKKELSON WILDLIFE MANAGEMENT AREA

Established officially in 1992, the Gordie Mikkelson Wildlife Management Area (WMA) is 816 acres; over 280 acres are located within the City of East Bethel. The WMA is primarily managed for woodland and wooded wetland wildlife like deer and turkey. It consists of 58 percent wetland and wooded wetland, 32 percent upland woodland, and 10 percent grassland/food plot. The Mikkelson WMA is located along the central, eastern border of East Bethel and the western border of Linwood Township.

Mikkelson WMA was acquired from a variety of previous landowners. A large portion was previously operated as a Camp Fire USA children's camp. Acquisition of new land is ongoing and the Mikkelson WMA is expected to continue to grow in size and species.

Hunting options include: deer, bear, small game, forest game birds, and pheasant. Wildlife viewing options include: wetland wildlife, prairie wildlife, and forest wildlife.

The area is comprised of primarily high-quality wetlands and is utilized by hunters, hikers, birdwatchers, and others who enjoy the natural habitat.

In 2004, Metro Wildlife Corridors, a program established in 2003 through a partnership between the DNR and six nonprofit conservation groups, added an additional 145 acres to the Mikkelson WMA. The state program aims at preserving wildlife habitat where it's most at risk, protecting, restoring, and managing a network of natural areas and wildlife habitat in the face of the metro region's rapid growth.

FISH LAKE

Fish Lake is encompassed by the Cedar Creek Ecosystem and Scientific Reserve. Fish Lake is a scenic lake closed to all motorized activities to allow for recreational activities including canoeing and kayaking. The lake is 332 acres in size and has a maximum depth of 13 feet. Average depth is 6.2 feet. A wildlife

lake survey was conducted on July 15, 2003 and at that time, maximum Secchi depth was 9 feet with an average Secchi depth of 5.4 feet. Aquatic plants were abundant with 98.6 percent of the sample points having vegetation, and 16 different species were found. *Najas flexilis* and *Potamogeton praelongus* were the most common submerged aquatic plants found.

Relative to other shallow lakes in the area and the state, Fish Lake is a high quality shallow lake as it has good water clarity and an abundant and diverse aquatic plant community. Winter fish kills occur frequently because of the natural shallow nature of the basin. These characteristics also make the lake ideal for wildlife utilization. The abundance of aquatic plants provides food and habitat for aquatic birds and waterfowl.

Fish Lake has been stocked with walleyes in the past; however, this lake does not have a sustainable walleye population because the lake does not have habitat characteristics of a walleye lake (water depths greater than 20 feet, gravel substrates, open water habitat). Green sunfish, bluegills, and black bullheads were the most common fish found during the last DNR fisheries assessment in 1998 and are fish typical of shallow lake systems. The lake does not have an official public access; although County Road 24 runs adjacent to the north end of the lake, and legal access is available from the road right-of-way.

The Cedar Creek minor watershed measures about 18,000 acres. Pre-settlement vegetation consists of mostly oak barrens on the uplands and a mix of wetland types in the many basins, including conifer and hardwood swamps, shrub swamps, marshes, and fens. Today the watershed is a mix of developed areas, natural areas, and farmland with some significant tracts of natural vegetation and wildlife habitat.

Fish Lake is largely surrounded by significant native plant communities mapped by the Minnesota County Biological Survey, including oak savanna, oak woodland, hardwood swamp, rich fen, wet meadow, and cattail marsh. These communities provide habitat for rare and uncommon animals, including sandhill cranes and Blanding's turtles. State-listed rare plants occurring in wetland communities adjacent to Fish Lake include the endangered twisted yelloweyed grass (*Xyris torta*) and the threatened lance-leaved violet (*Viola lanceolata*).

Fish Lake is near the top of the Cedar Creek watershed. The lake flows out through a wetland on the northwest side of the basin, through an intermittent stream, and into Cedar Creek. Total distance from the outlet of the lake to Cedar Creek is approximately three-quarters of a mile. Cedar Creek flows into the Rum River in the City of Anoka.

ADDITIONAL NATURAL FEATURES

Approximately 607 total acres of land around Neds, Mud, and Deer Lakes is government-owned. According to the Minnesota County Biological Survey of the DNR, this area is one of the few unique, undisturbed natural areas within the Twin Cities metropolitan area. It includes tamarack swamp, willow swamp, mixed hardwood swamp, wet meadows, and oak savanna. In addition, a wide variety of native plants and animals inhabit the area, including rare species such as Blanding's turtles, sandhill cranes, and lance-leaf violets.

RECREATIONAL AMENITIES

East Bethel has several diverse community-focused recreational facilities available to its residents. These facilities make it easy for residents to enjoy the community without having to travel long distances.

The City of East Bethel is also home to an ice arena that is owned by the City and used by community schools for recreational activities, including hockey and figure skating. The arena is located on HWY 65 at 207th Avenue NE.

Booster Park is the oldest and most popular park in the City. It is adjacent to City Hall and consists of 77 acres. It serves outdoor enthusiasts with nine baseball diamonds, two tennis courts, picnic facilities, playground equipment, and hiking trails. This park was upgraded in recent years to include additional active recreational opportunities such as a skate park, sliding hill, paved trail system, and a concession stand.

John Anderson Memorial Park is approximately 70 acres in size, much of which surrounds Cooper Lake in the northwest part of the City. John Anderson Park is located approximately one-half mile west of HWY 65 on 233rd Avenue NE. The City owns property that nearly surrounds Cooper Lake. Cooper Lake is approximately 48 acres in size and is classified as an "Environmental Lake" by the DNR. The park is approximately 70 acres in size and includes provisions for

passive recreational uses such as hiking, picnicking, or swimming. In 2007, the City Council authorized improvements in the park that included trails, a beach area, parking spaces, shelter facilities, and restroom facilities. In addition, the playground equipment has been updated and expanded, and a warming house has been constructed.

Bonde Park encompasses 14 acres of open space and includes two baseball and softball fields. Also included in Bonde Park facilities are a shelter, various types of playground equipment, and a picnic area. This park is located on the west side of Jackson Street and north of 229th Lane.

The City of East Bethel has two public golf courses located within its boundaries. Hidden Haven, on the western edge of the City, is an 18-hole course with a residential subdivision located along Jackson Street and Polk Street. The other is Viking Meadows, a 27-hole course located on the southeast corner of HWY 65 and Viking Boulevard. Several small neighborhood parks also exist in the City. Individual neighborhood communities and various volunteer organizations operate these parks. Local volunteers and organizations operate various athletic programs in the City.

The following table provides a list of parks within the City of East Bethel, including their addresses, acreage, and basic amenities.

TABLE 4-1. CITY OF EAST BETHEL PARKS LIST

Park Name	Address	Size- Acres	Current Facilities	Park Type	Potential Improvements – Short and Long-term
Anderson Lake Park	4348 Wild Rice Dr NE	4.15	Swing set – 4 seats Swing set – 2 seats, 1 ring and 1 bar 1 ball field Play set, plus swing and 4-seat bouncer Tennis court	Neighborhood	Replace/update play equipment and surface New ball field fence and backstop Resurface tennis court Add benches New park sign
Bonde Park	23040 Jackson St NE	13.22	2 ball fields 4 soccer fields Bleachers—2 aluminum with 5 benches each Swing set – 4 seats 1 shelter 1 climber 3 picnic tables Play set Trash cans	Neighborhood	Replace existing playground with expanded play ground and surface 2 new ball fields 1 large soccer field (irrigated) New shelter/pavilion New restrooms New parking lot and entry road Horse arena (by others)
Booster West Park	22266 Palisade St NE	35.00	Ball fields – 4-plex, irrigated 2 soccer fields, irrigated BMX Track Playground Skate park Concession stand w/ restroom Pavilion with picnic tables and trash cans	Community	Replace/update play equipment and surface Update all park fields and facilities New park sign
Booster East Park	22281 Palisade St NE	50.00	4 Ball fields Basketball court Horseshoe pits	Community	Replace/update play equipment and surface

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			2 tennis courts 3 pavilions with grills and picnic tables Restroom & warming house Trail		Add regulation/stadium type baseball field (replace 2 fields) Add concession building with restrooms Update all park facilities New park sign
Carlisle Park	23162 Kissel St NE	2.81	Play set 1 small ball field Swing set – 3 seats	Neighborhood	Replace/update play equipment and surface Add outdoor hockey rink New park sign
Cedar Creek Ecosystem and Scientific Reserve	Durant St NE	5,000	15 miles of hiking and cross country ski trails Trailhead	Open Space	Add: 1 mile walking trail 7 miles cross-country ski trails 7 miles horseback trails 800' boardwalk canoe launch 10-space parking lot New park sign
Coon Lake Beach Park	206 Forest Rd NE	.5	Play set Swing set – 4 seats Skate park 2 basketball courts	Neighborhood	Replace/update play equipment and surface Resurface basketball courts Replace skate park New park sign
Deer Haven Park	22600 Jewell St NE	4.73	Shelter Swing set – 4 seats Basketball hoop and glass backboard	Neighborhood	Replace/update play equipment and surface Resurface ½ court basketball New park sign
Eagle Ridge Park	22800 7 th St NE	40.00	Open space park. Boy scouts use for orienteering Informal trail system	Open Space	Expand parking lot to maximum 10 spaces New park sign

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Eveleth Park	21331 Eveleth St NE	2.80	Play set with slide and toy backhoe 1 ball field Swing set – 4 seats 1 trash can	Neighborhood	Replace/update play equipment and surface New ball field fence and backstop New park sign
Hidden Haven Park	750 203 rd Ln NE	4.81	Park sign (brick & cement) Play set Swing set – 4 seats Shelter 2 field hockey goals New walking path—will have exercise stations 1 barbeque grill 2 picnic tables 1 trash can	Neighborhood	Replace/update play equipment and surface New walking path with fitness stations New park sign
Fish Lake Trail	Durant St NE		Hiking trail Cross Country Ski Trails Pavilion	Trail	
John E. Anderson Memorial Park	1131 233rd Ave. NE	70.00	Beach (new) New play set New pavilion Trail 2 picnic tables 1 grill 2 benches 2 block restrooms Warming house 3 trash cans	Community	Replace/expand play equipment on east side of lake Repave ¼ mile trail West side of lake—add facilities to equal east side: play equipment, pavilion, trail, picnic tables and furnishings, restrooms, warming house, parking lot New signs for each park
Maynard Peterson Memorial Park	Laurel Road NE	2.76	Play set Parking lot Pavilion 1 ball field Bleachers – 1 aluminum with 5 benches	Neighborhood	Replace/update play equipment and surface Add restrooms New ball field fence and backstop New pavilion

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					Add 26-space parking lot
Norseland Manor Community Park	19521 5th St. NE	19.61	Play set and 1 rocking toy 1 ball field Climber (dome) Swing set – 5 seats Slide Sliding hill (new) 2 benches 2 picnic tables 1 trash can	Neighborhood	New ball field fence and backstop New pavilion New 26-space parking lot New warming house New park sign
Northern Boundaries – 7 th St Park	22191 7th St. NE	5.11	Play set Swing set – 4 seats 1 sliding hill 1 picnic table 1 trash can	Neighborhood	Replace/update play equipment and surface Add outdoor hockey rink Add 10-space parking lot New park sign
Oak Brook Acres Park	21071 Ghia St NE	10.00	Sliding hill	Community	Expand to 20 acres as surrounding areas develop and develop as community park New park sign
Rod and Norma Smith Park	3241 183rd Ave. NE	4.49	Swing set – 3 seats Play set Ball field Basketball – 1 hoop Shelter	Neighborhood	Resurface tennis court (concrete) Asphalt 10-space parking lot New park sign
Whispering Aspen Park	24225 Pierce Path NE	1.58	Older tennis courts Play set Community center	Neighborhood	Resurface tennis courts Add small parking lot New park sign
Whispering Oaks Park	20911 Okinawa St. NE	2.0	Shelter Play set Swing set – 4 seats 1 tennis court	Neighborhood	Resurface tennis court and replace fence Add half-court basketball

					New park sign
Future Parks					
Booster Park Expansion— “Booster South”	Potentially PIN 09332312 0001	40		Community	Facilities similar to Booster East or West, with soccer fields and hockey rink
Future Parks – City Center Area					
Community Park		30-50		Community	Per concept plan
4 Neighborhood Parks		20		Neighborhood	Per concept plan

TRAILS

Throughout the past several years, many additions, improvements, and recognition of trail corridors have occurred. The Parks and Recreation Department has worked cooperatively with the Anoka County Highway Department and local municipalities in establishing and developing the regional trail system. These coordinated efforts have allowed for creative ways to finance, develop, and construct trails.

The map on the following page, Figure 4-3, illustrates the proposed city trails and whether they are to be bituminous or natural.

ANOKA COUNTY REGIONAL TRAILS

The North Anoka County Regional Trail is a search corridor that proposes a route that crosses the northern section of the county from Sherburne County east to Washington County. The trail alignment is proposed to pass through Nowthen, Oak Grove, East Bethel, and Linwood Township. The plan is for the North Anoka County Regional Trail to connect to Lake George and Martin-Island-Linwood Lakes Regional Parks. The trail will connect with two north/south routes, those being Rum River and East Anoka County Regional Trails. The estimated cost of this new 17-22 mile long trail would be \$1.87 to 2.3 million. To date, only a small segment of the trail is complete – about one mile that runs through Lake George Regional Park. The County will work with the local agencies and the County Highway Department to develop the trail. This regional trail is a search corridor, which means that they do not have Met-Council-approved master plans that identify the trail alignments. Since alignments have not yet been approved they are not eligible for Regional Parks System funding for acquisition and development.

The East Anoka County Regional Trail is located in the northeast corner of the city and another very short segment in the southeast corner. There is a Met-Council approved master plan for the alignment, but there is no timeframe for the section that still needs to be built in East Bethel. The trail will be 27 miles long and will connect the north end of the county to the south end, starting in East Bethel and ending in Blaine. It will be linked to four (4) other regional trails and will have access to many city trails and parks. Figure 4-4 illustrates what is currently constructed on the East Anoka County Regional Trail.

Figures 4-5 and 4-6 illustrates the expansion areas for both the North and East Anoka County Regional Trails on a county and city basis.

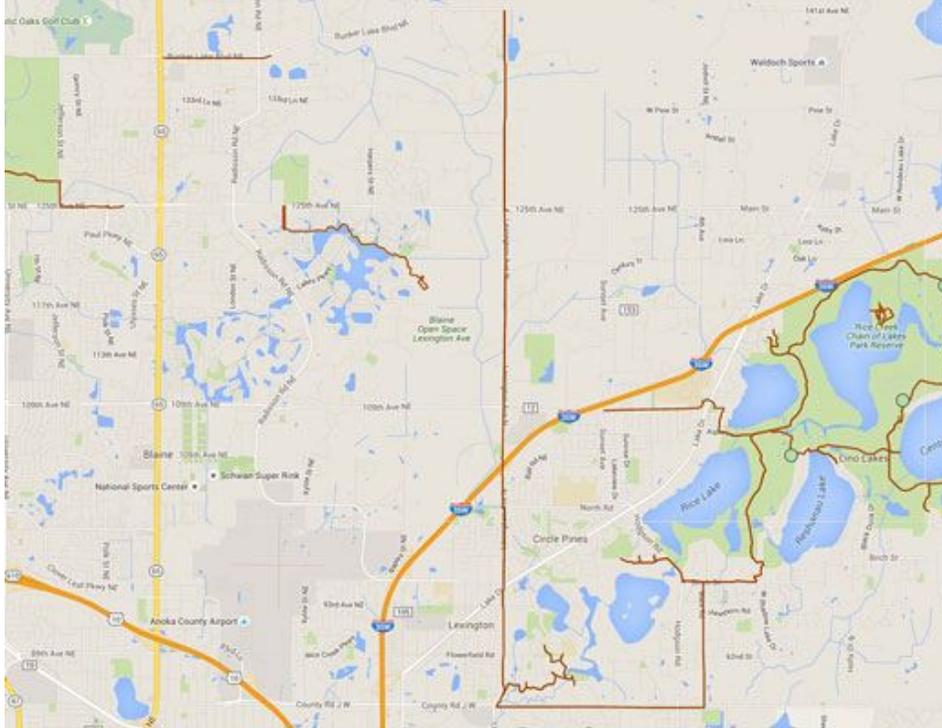


FIGURE 4-4: THE EAST ANOKA COUNTY REGIONAL TRAIL CURRENTLY, BEFORE THE EXPANSION NORTH INTO EAST BETHEL

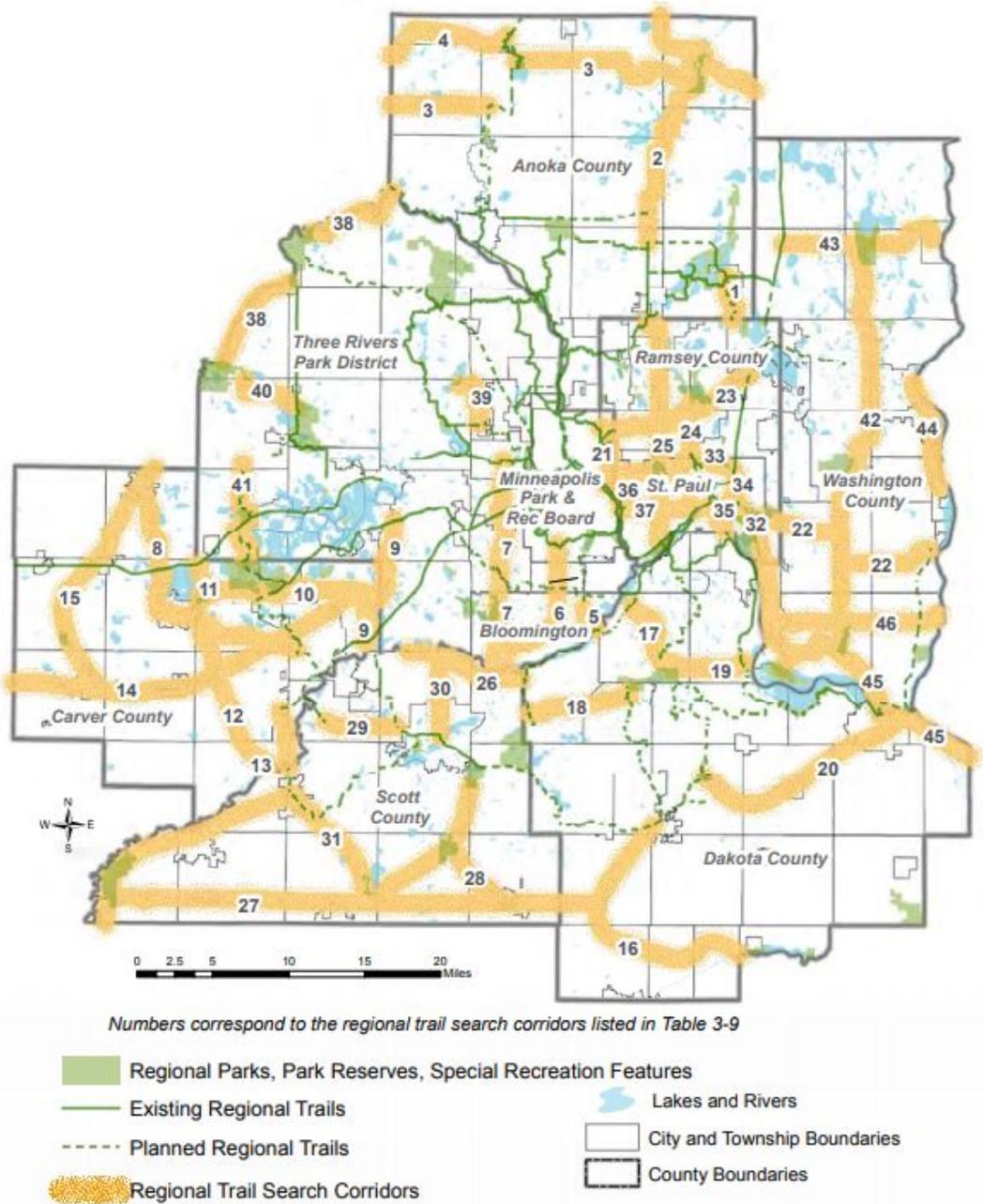


FIGURE 4-5: REGIONAL TRAIL SEARCH CORRIDORS IN ANOKA COUNTY

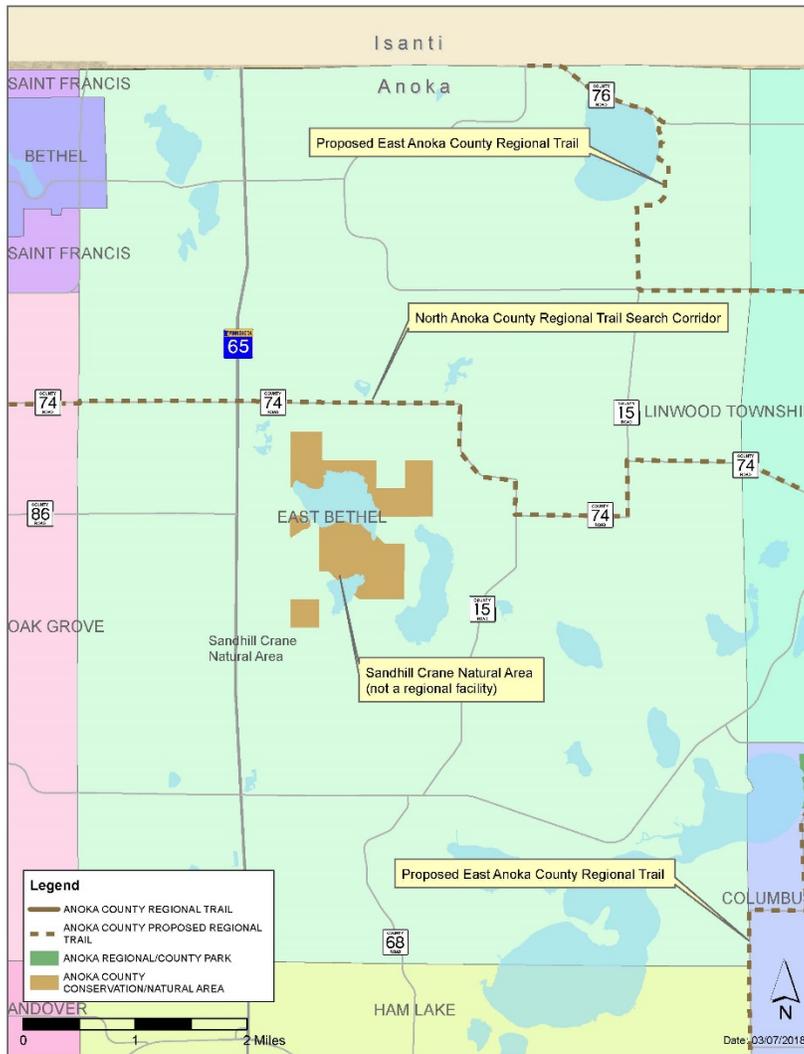


FIGURE 4-6: REGIONAL TRAIL SEARCH CORRIDORS IN EAST BETHEL

REGIONAL PERSPECTIVE

The Metropolitan Council’s *Thrive MSP 2040* identifies an urban area and a rural area each of which occupies approximately half of the region, which is illustrated in the regional growth map in Figure 4-7.

Conserving and restoring natural resources of regional or local importance contributes to a healthy natural environment and enhances our quality of life. Connecting regional and local features by natural-resource corridors helps sustain wildlife, plant habitats, and shape how development looks on the ground. The urban area is divided into two specific geographic planning areas: the Developing Communities and the Developed Communities. The rural area

is divided into four specific geographic planning areas: Rural Centers/Rural Growth Centers, the Diversified Rural Communities, the Rural Residential Areas, and the Agricultural Areas. Approximately 91-95 percent of new growth is forecast to be located in the urban area – in land-use patterns that make efficient use of regional infrastructure – with the remaining percent in the rural area.

One of the primary differences among these planning areas is the density at which they develop. The Council has established benchmarks indicating the overall densities for planned development patterns in each of the geographic planning areas. The Council negotiates a share of the regional forecasts with each community based on its geographic planning area designation(s), development trends, expected densities, available land, local interests, and Council policies.

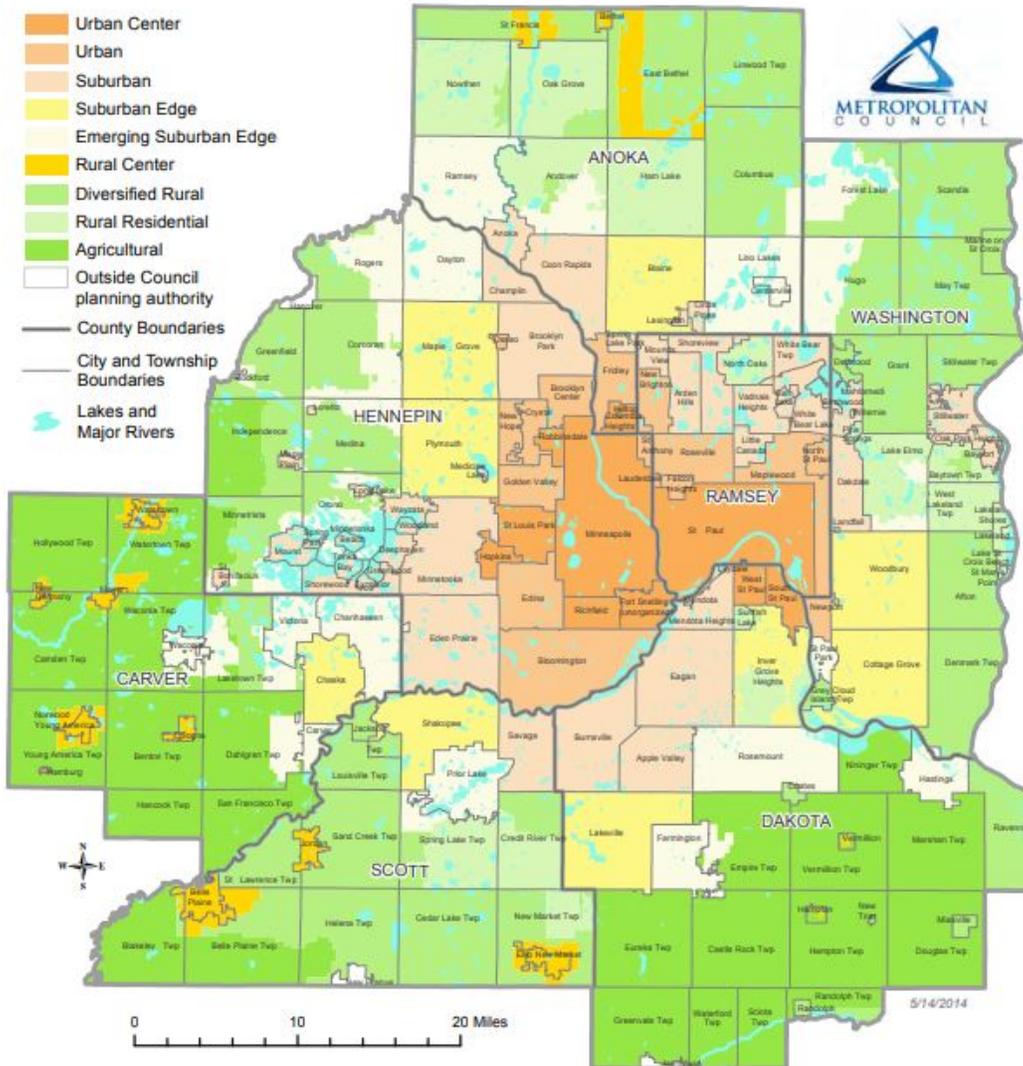


FIGURE 4-7. 2030 FRAMEWORK PLANNING AREAS

The cumulative results of the community-negotiated distribution of the forecasts among planning areas becomes the basis for determining the required land supply and for the Council’s plans for investments in regional systems such as highways and wastewater service. Decisions relating to transportation, sewers, housing, natural resources, and other land uses cannot be made in isolation from one another. Regional parks, transportation, and sewers help shape growth patterns; housing location and types affect mobility options and travel patterns. Unplanned growth can put a strain on natural areas – both regionally significant natural areas and locally designated natural areas, groundwater quality, and other resources. The *Thrive 2040* and the metropolitan system plans seek to carefully integrate growth, transportation,

housing, and natural resource policies to achieve regional goals in each area and avoid working at cross-purposes.

Utilizing the surface rights of underground utility corridors such as large sewers for trail purposes protects the utility for access/maintenance and provides a linear corridor for the trail.

The Metropolitan Council has identified the following policies as part of the Thrive 2040, Parks and Open Space Policy Plan, and community System Statements:

Conformance: A local comprehensive plan generally will conform to the metropolitan system plans if the local plan:

1. Accurately incorporates and integrates the components of the metropolitan system plans as required by Minn. Stat. 473.851 to 473.871.
2. Integrates public facilities plan components described in Minn. Stat. 473.859, subd. 3; integrates development policies and compatible land uses to accommodate forecasted growth at appropriate densities and to maximize the efficiency and effectiveness of the regional system.

Consistency: A local comprehensive plan generally will be consistent with Council policies and statutory requirements if the local plan:

1. Addresses community role strategies contained in the *Framework*, including conservation strategies to protect regional important natural resource areas and wildlife corridors.
2. Addresses the linkage of local land uses to local and regional park and open space systems.
3. Includes an implementation plan that describes public programs, fiscal devices, and other specific actions for sequencing and staging to implement the comprehensive plan and ensure conformance with regional system plans, described in Minn. Stat. 473.859, subd. 4.
4. Addresses official controls: includes a capital improvement program (sewers, parks, transportation, water supply, and open space) that accommodates planned growth and development.

Compatibility: A local comprehensive plan is compatible with adjacent and affected governmental units, based on comments or concerns or lack thereof, from these entities. In order to be determined compatible, a community must adequately document that it has addressed the concern(s) of all adjacent and affected governmental units.

PARK, RECREATION, AND OPEN SPACE GOAL AND POLICIES

The development of quality recreational and open space resources is a major effort in East Bethel. The City operates a park land fund which is designated for existing park improvements and for construction of new park facilities. Policies include requiring dedication of land and/or cash in lieu of land in conjunction with all new subdivisions of property. The City is also working with Anoka County and the Minnesota DNR to develop the Sandhill Crane Natural Area.

The City currently has a cooperative agreement with the University of Minnesota to allow East Bethel to offer hiking and cross-country ski trails to its residents inside the Cedar Creek Ecosystem and Scientific Reserve. In fact, there are multiple trail use interests in the community including bicycling, snowmobiling, and horseback riding. The physical size of the City and low density development, however, result in extraordinary costs per capita for trail construction and maintenance.

Anoka County has identified potential regional trail corridors along County Road 74 and CSAH 17. Future trail planning will focus on creating trails within park facilities, such as Booster Park and Sandhill Crane Natural Area, linking local facilities and neighborhoods, and creating linkage to regional trails. The City will also examine the feasibility of designating bicycle routes along improved shoulders of existing and future roadways.

Goal:

Create and protect an interconnected system of athletic areas, parks, trails, and green spaces throughout the City.

Policies:

1. Research amount of existing park area and current uses against future needs based on increasing populations.
2. Incorporate parks and open space into community center planning efforts and all development/redevelopment plans and designs.
3. Promote existing parks and pursue strategies to connect parks through trail systems; identify potential "corridors" for trails.
4. Coordinate planning activities with Anoka County based on park uses; pursue opportunities to incorporate sports-related and other community activities.

5. Protect and promote recreational activities within the community and identify opportunities to enhance infrastructure to support these activities such as snowmobile trails, lake activities, etc.
6. Design and maintain parks with proper lighting, shelter, and landscaping to ensure public and property safety.
7. Provide recreational facilities and programs to serve the varied recreational needs of all age groups within the City.
8. Encourage the acquisition of all forfeited and/or donated land in areas with potential recreational development opportunities.
9. Require dedication of park land or cash in lieu of land in conjunction with the subdivision of all properties.
10. Develop land use regulations compatible with adjacent parks, recreation areas, and natural features.
11. Identify the potential for trail and wildlife corridors in the City, and coordinate regional trail development opportunities with Anoka County and adjacent communities.
12. Provide convenient active and passive recreation opportunities to the residents of East Bethel. Enhance the existing park and recreation areas in the City.
13. Provide alternative forms of transportation that include walking trails, bicycle paths, and other surfaced media where motorized traffic is not permitted.

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CHAPTER 5: TRANSPORTATION

INTRODUCTION

The way in which a community's transportation system and local roadway network connects to other major transportation corridors and services throughout the region is critical to the economic vitality and quality of life not only within the community, but to the region as a whole. The integration of transportation plans and projects, with land use and future development, is key to developing a well-balanced, accessible and sustainable community.

While some roadways within the City of East Bethel currently do experience high levels of congestion over extended periods of time in comparison to other transportation corridors in the region, indicators do suggest that thoughtful planning for the future is becoming more and more necessary to avoid allowing development to occur that could potentially jeopardize the efficient operation of travel within and/or through the community. As an example, motorists traveling to and from the metro area along Trunk Highway 65 (TH 65) for work purposes, as well as weekend recreational travel heading north, experience varying degrees of congestion under current conditions. The City of East Bethel has identified key areas for study and improvement within its local and regional roadway network to ensure safety and mobility into the future.

REGIONAL PERSPECTIVE

The *2040 Transportation Policy Plan (TPP)* is the Metropolitan system plan for highways, transit, and aviation to which local comprehensive plans must conform. This system statement summarizes significant changes to these three systems, as well as other changes made to the Transportation Policy Plan since the last *2030 TPP* was adopted in 2010. The *TPP* incorporates the policy direction and the new 2040 social economic forecasts adopted by the Metropolitan Council in the *Thrive MSP 2040*, and extends the planning horizon from 2030 to 2040.

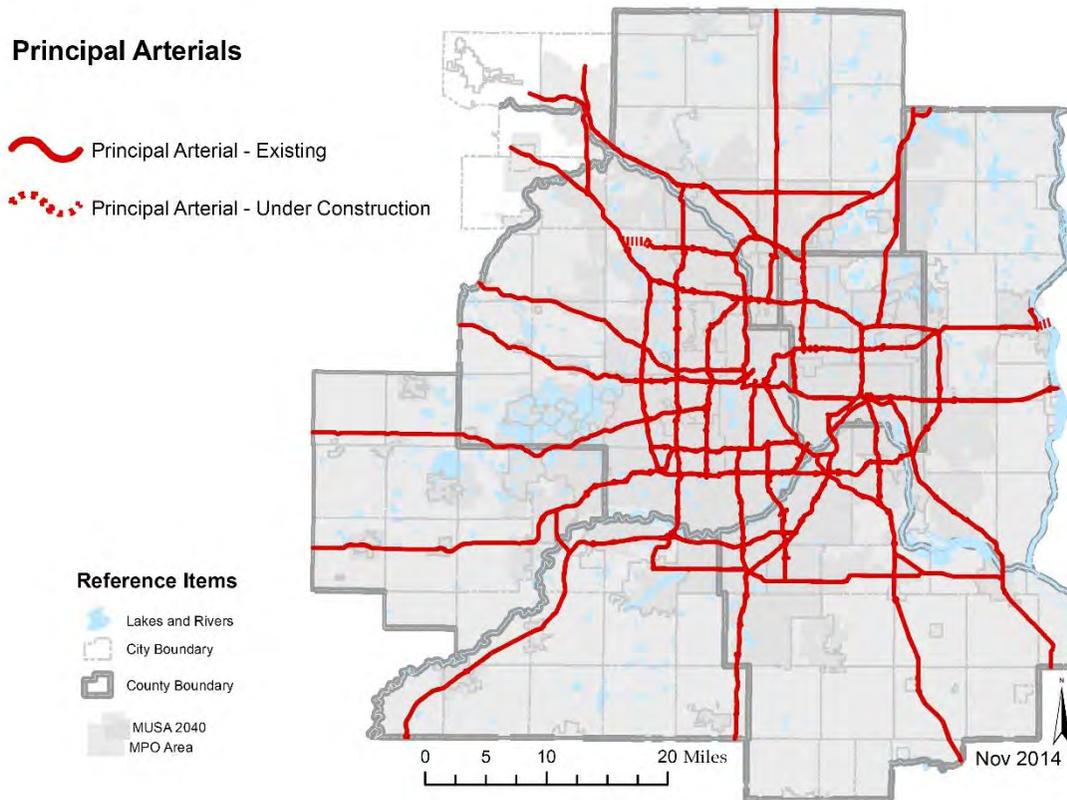
Federal Requirements

The *TPP* must respond to requirements outlined in state statute, as well as federal law, such as some new requirements included in the federal law known as the Moving Ahead for Progress in the 21st Century Act. Federal law requires the long-range plan to identify regionally significant transportation investments expected to be made over the next two decades, and to demonstrate that these planned investments can be afforded under the plan's financial assumptions.

Metropolitan Highway System

The Metropolitan Highway System is made up of principal arterials that are shown in Figure 1. No new highways have been added to this system in the 2040 TPP.

Figure 1: Principal Arterials



2040 TRANSPORTATION POLICY PLAN | METROPOLITAN COUNCIL

Figure 1-1



TH 65 in East Bethel is identified as a principal arterial. The TPP does not identify any specific regional mobility improvements for TH 65, although maintenance and preservation investments will be made on all highways.

LOCAL TRANSPORTATION PLAN

The intent of this Transportation Plan is to identify the general location and extent of the City of East Bethel's transportation needs for the future as an integral part of its planning and development process – particularly as it relates to the location of existing and future frontage roads and collector streets, based on proposed zoning and existing features including wetlands. Transportation needs involve both the City's roadways as well as recreation trail systems.

The primary purpose of the plan is to foresee, as accurately as possible, the inadequacies of the existing systems and to offer viable solutions or alternatives. Other objectives of the adopted plan are to ensure that the necessary right-of-way, easement, and access controls are provided or obtained along the roadway and trail routes. The plan acts as a guide with respect to the recommended standards and widths to use when programming improvements.

Once the Transportation Plan has been officially adopted by the City Council, it should be updated periodically. As the socioeconomic factors affecting travel change, and as more is learned about the impact of energy supplies on the use of streets, the plan should have a major review or update at least every ten years. The Transportation Plan should also reflect consistency and a coordinated planning effort with the functional classification, design standards, and access spacing guidelines with the Minnesota Department of Transportation (MnDOT) and Anoka County, who have roadway facilities within the City of East Bethel, as well as with the neighboring governmental jurisdictions of Isanti County, St. Francis, Bethel, Oak Grove, Ham Lake, Columbus, Linwood Township, and Athens Township.

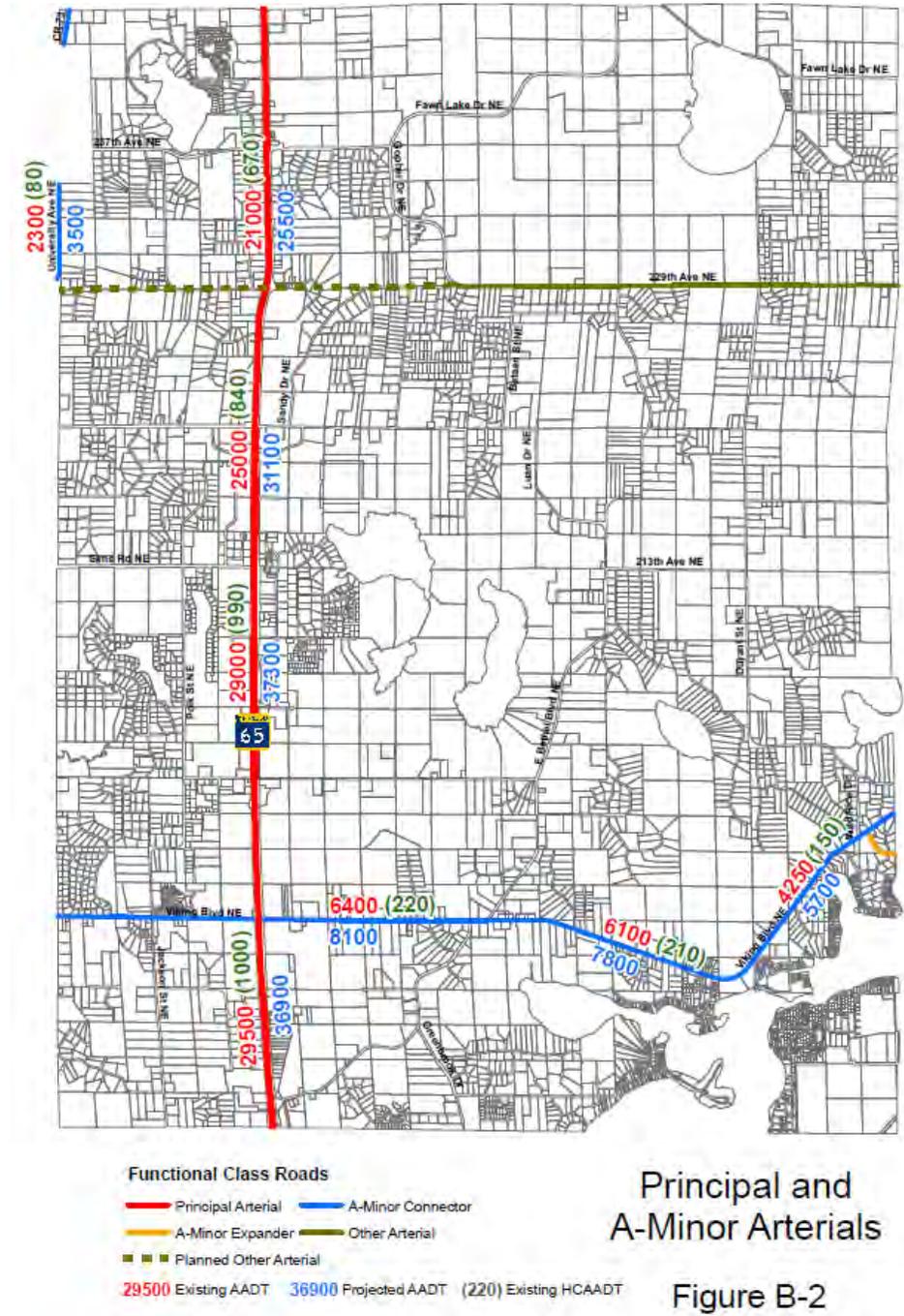
Existing Conditions

TH 65 serves as the principal arterial north-south corridor with some commercial, retail, and light industrial uses located adjacent to the roadway. County State Aid Highway 22 (Viking Boulevard) serves as an east-west A-Minor Connector route in the southern portion of the City. Figure 2 on the next page shows all of the Principal and A-Minor Arterials located in East Bethel. TH 65 has two through lanes in each direction and all other A-Minor Arterials in East Bethel have one through lane in each direction. Based on Figure 3 of the Anoka County 2040 Transportation Plan these roadways are not planned to be expanded during this planning period.

Other than TH 65, the existing streets and roadways in East Bethel are generally two-lane, two-way rural type facilities with travel lanes and shoulders of variable widths. Speeds on the through-routes are generally established by the State or County, while the City residential streets are posted by the City

to reflect safety and design constraints. Stop signs control the flow of traffic and define the through-streets on City and county streets while signals control the flow of traffic on TH 65.

FIGURE 2: PRINCIPAL AND A-MINOR ARTERIALS

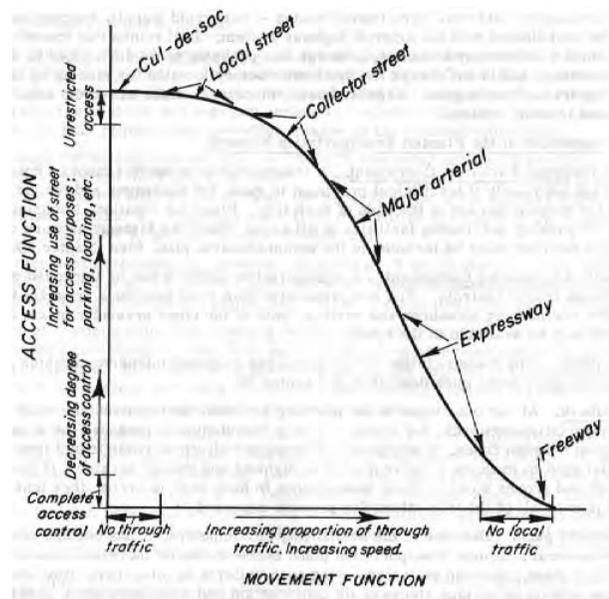


Roadway Functional Classification

Streets and highways are grouped into classes according to the character of service they are intended to provide. Essentially, there are two primary services to be provided by the transportation network. The first is to provide access to properties, while the second is to move traffic efficiently and safely.

The conflict of these two services or functions is evidenced by the undesirability of fast, through-traffic on local streets, and the equal undesirability of allowing private driveway access onto high speed arterials or freeways. The balance of these two service functions provides the basis for the functional classification of each street and highway. The relationship between the access function and the movement function with regards to the functional classification of streets is shown in Figure 3 below.

FIGURE 3: SCHEMATIC RELATIONSHIP BETWEEN ACCESS AND MOVEMENT FUNCTIONS OF STREETS



The functional classification needs to be determined before determining street widths, speed limits, intersection control, or other design features. It should be pointed out that while functionally different, streets and highways are usually thought of in terms of their design standards and visual appearance. However, the critical distinction that determines the functional classification is the degree of access control. For example, a rural two-lane highway with widely spaced access points or intersections can be functionally classified the same as an urban four-lane thoroughfare.

The City has adopted the Metropolitan Council's functional classification system. The functional classification system consists of four classes of roadways including principal arterials, minor arterials, collector streets, and local streets. The region has defined a sub-set of minor arterials as a means to supplement the Metropolitan highways and to establish priorities in federal funding. The roadways are the publicly provided elements of a land transportation system. The existing functional classifications for all arterials and collectors are shown in Figure 4 on the next page.

Principal Arterials

The Metropolitan highway system is made up of the principal arterials in the region. Principal arterials include all interstate freeways. Interstate freeways connect the region with other areas in the state and other states. They also connect the metro center to regional business concentrations. The emphasis is on mobility as opposed to land access. They connect only with other interstate freeways, other principal arterials, and select minor arterials and collectors. The interstate freeways provide for the longest trips in the region and express bus service.

Spacing will vary from 2 to 3 miles in the fully developed area, to 6 to 12 miles in the rural area, where only radials into the urban service area will exist. Other principal arterials are very similar to the interstate freeways but they are less likely to connect the region to other states. They will provide land access somewhat more frequently than interstate freeways.

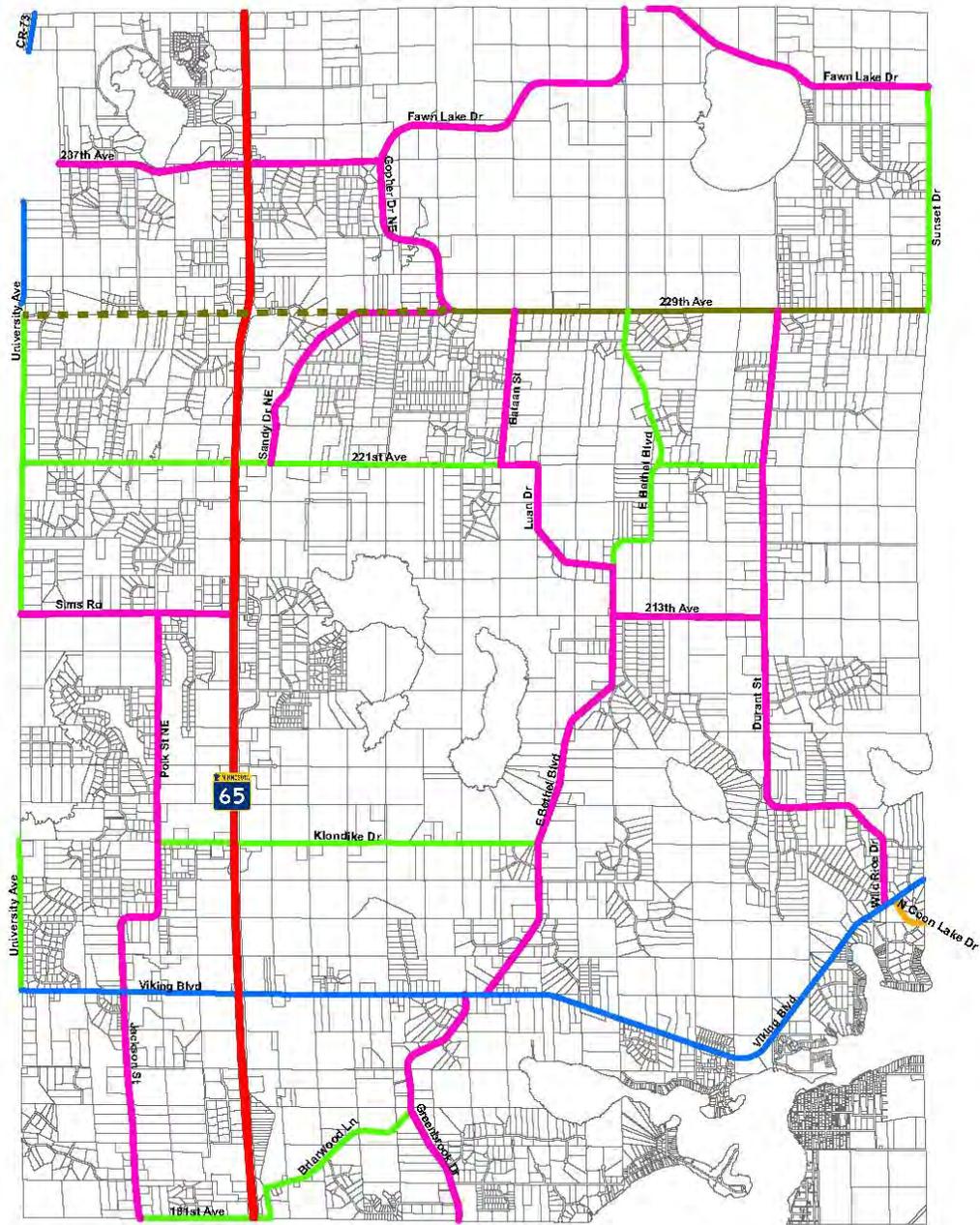
Minor Arterials

The minor arterial system connects the urban service area to cities and towns inside and outside the region. They provide supplementary connections between the two metro centers and the regional business concentrations. They connect major generators within the central business district and the regional business concentrations.

The emphasis of minor arterials is on mobility as opposed to access in the urban area; only concentrations of commercial or industrial land uses should have direct access to them. The minor arterial should connect to principal arterials, other minor arterials, and collectors. Connection to some local streets is acceptable. Minor arterials should service medium-to-short trips. Both local and limited-stop transit will use minor arterials.

The spacing of minor arterials in the metro centers and regional business concentrations will vary from one-fourth to three-fourths mile. Typically, in the fully developed area, spacing would range from one-half mile to one mile. In the developing area, one-to-two-mile spacing is adequate. The characteristics of the four types of "A" minor arterials are given in Table 1 which is included on page 8.

FIGURE 4: ARTERIALS AND COLLECTORS



Functional Class Roads

- Principal Arterial
- A-Minor Expander
- A-Minor Connector
- Minor Collector
- Other Arterial
- - - Planned Other Arterial
- Major Collector

TABLE 1: CHARACTERISTICS OF “A” MINOR ARTERIALS

CHARACTERISTICS	RELIEVERS	AUGMENTERS	EXPANDERS	CONNECTORS
Use	Provide direct relief for traffic on Metropolitan Principal Arterials	Augment the Principal Arterials within the Beltway	Provide connection between developing areas outside the Beltway, connect Principal Arterials	Provide connection between rural town centers in the urban reserve and rural area
Location	Developed and developing areas within the MUSA and 2040 Urban Reserve	Within the I-494/I-694 Beltway	Outside the I-494/I-694 Beltway with the 2020 MUSA or 2040 Urban Reserve	In or near the seven county area, one end may be in the urban area
Trip Length	Medium length trips less than eight miles	Medium to long trips	Medium to long trips	Medium to long trips
Problem Addressed	Relief of parallel congested Principal Arterials	Serve Principal Arterial function where Principal Arterials don't exist	Accommodate added urban development	Improve the safety and directness of routes without continuous lane adds

Collector Streets

The collector system provides connection between neighborhoods and from neighborhoods to minor business concentrations. It also provides supplementary interconnections. Mobility and land access are equally important. Direct land access should predominately be to development concentrations. Collection connections are predominately to minor arterials.

Typically, collectors serve short trips of one to four miles. Local transit service uses these streets. Spacing in the metro centers and regional business concentrations may vary between one-eighth to one-half mile. In the fully developed areas, collectors are needed one-fourth to three-fourths mile apart. In the developing areas, spacing may range from one-half to one mile.

Local Streets

Local streets connect blocks and land parcels. The primary emphasis is on land access. In most cases, local streets will connect to other local streets and collectors. In some cases, they will connect to minor arterials. Local streets serve short trips at low speeds. In the urban areas, local streets will occur every block. In the rural areas, one-mile spacing may be adequate.

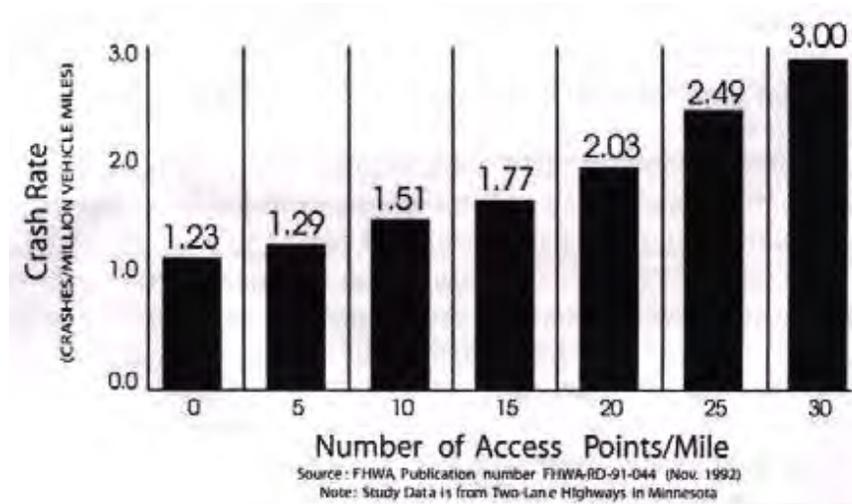
Access Management Guidelines

Access guidelines are important because they define a starting point for balancing property access, safety, and mobility concerns. Transportation agencies regularly receive requests for additional access (e.g., new public streets, commercial driveways, residential and field accesses), which are evaluated by numerous agencies and committees. Because of the number of individuals and agencies involved, it is easy to have inconsistent application of access policies. This can result in confusion between agencies, developers, and property owners, as well as long-term safety and mobility problems. Standard access guidelines can be used to improve communication, enhance safety, and maintain the capacity and mobility of important transportation corridors. In addition, access guidelines may be used to respond to access requests and to promote good access practices such as:

- Aligning access with other existing access points.
- Providing adequate spacing to separate and reduce conflicts.
- Encouraging indirect access rather than direct access on high-speed, high volume arterial routes.

Providing access management in some form, whether it is through grade-separated crossings, frontage roads, or right-in/right-out access, reduces the number of conflicts resulting in improved safety. A number of studies have demonstrated a direct relationship between the number of full access points and the rate of crashes. Figure 5 shown below illustrates this relationship.

FIGURE 5: ACCESS/CRASH RELATIONSHIP



Public road authorities have been directed by Minnesota State Statutes to provide “reasonable, convenient, and suitable” access to property unless these access rights have been purchased. Courts have interpreted this to:

- Allow restrictions of access to right-in/right-out.
- Allow direction of access to another public roadway that meets the definition of reasonable, convenient, and suitable.

In special circumstances, broader authority (police power) has been given to public agencies if the situation is deemed to jeopardize public safety. However, this is a very high standard to meet and is seldom used by public agencies. In addition to the above, land use authorities may exercise additional authority in limiting access through their development rules and regulations. Land use authorities can require:

- Dedication of public rights-of-way.
- Construction of public roadways.
- Mitigation measures of traffic and/or other impacts.
- Changes in and/or development of new access points.

These types of access controls are processed through local elected officials. Since stronger land use and access controls are available at the county and City level, and these units of government are usually involved at the planning stages, access guidelines and corridor management practices should be focused at this level.

Coordination of Jurisdictional Access Management Policies

The City of East Bethel exhibits an interjurisdictional network of state, county, and City roadways. Since MnDOT and Anoka County each retain access management authority over their particular roadway system, it is important the existing access policies of these entities be considered prior to the preparation of new access guidelines for East Bethel.

Anoka County has adopted minimum access spacing guidelines. The county's access spacing guidelines are presented in Table 2 on the next page. These access management guidelines are meant to promote coordination between land use and transportation strategies, the same issues that affect decisions on the City and county level. Establishing the appropriate spacing between public streets and private driveways is an important step toward maintaining the safety and mobility of the traveling public without sacrificing the accessibility needs of local residents. The access guidelines are based on functional classification rather than traffic volumes. Having access recommendations based on future functional classification enables cities/counties to protect access on roadways based on their intended long-term function.

Anoka County requires an access permit be approved prior to any new driveway connection to county roads. The county also requires shared driveways, where possible, to reduce the number of direct accesses to county roads. The county reviews access during the platting process to assure appropriate mobility and safety levels. Anoka County has a unique opportunity to properly plan for access along future collector and arterials before City urbanization and development occurs. Because the county does not have planning authority within the City, interagency support of access management strategies is crucial, especially within East Bethel. Anoka County and East Bethel should continue to work together in this regard.

In 2015 MnDOT assembled a Technical Advisory Committee (TAC) to review access along TH 65 from Bunker Lake Boulevard to 245th Avenue North. The TAC included staff members from Anoka County, East Bethel, Ham Lake, Metropolitan Council, MnDOT and FHWA. The goal of the TAC was to develop a Access Management Plan to serve as a guide for the County, Cities, MnDOT, Metropolitan Council, landowners, and developers on desired access changes and future access locations along the corridor. East Bethel will use the findings of the TAC as a tool to plan their local transportation system.

TABLE 2: ACCESS SPACING GUIDELINES

ROADWAY TYPE	ROUTE SPEED (MPH)	INTERSECTION SPACING (NOMINAL ⁽⁴⁾)		SIGNAL SPACING	PRIVATE ACCESS ⁽¹⁾	
		Full Movement Intersection	Conditional Secondary Intersection ⁽²⁾			
Principal Arterial	50 - 55	1 mi.	1/2 mi.	1 mi.	Subject to conditions for all roadway types and speeds	
	40 - 45	1/2 mi.	1/4 mi.	1/2 mi.		
	< 40	1/8 mi.	300 - 660 feet ⁽³⁾	1/4 mi.		
Arterial Expressway	50 - 55	1 mi.	1/2 mi.	1 mi.		
	40 - 45	1/2 mi.	1/4 mi.	1/2 mi.		
	<40	1/8 mi.	300 - 660 feet ⁽³⁾	1/4 mi.		
Minor Arterial	50 - 55	1/2 mi.	1/4 mi.	1/2 mi.		
	40 - 45	1/4 mi.	1/8 mi.	1/4 mi.		
	<40	1/8 mi.	300 - 660 feet ⁽³⁾	1/4 mi.		
Collector and Local	50 - 55	1/2 mi.	1/4 mi.	1/2 mi.		
	40 - 45	1/8 mi.	N/A	1/4 mi.		
	<40	1/8 mi.	300 - 660 feet ⁽³⁾	1/8 mi.		
Specific Access Plan		By adopted plan/agreement/covenant on land				

- (1) Private access refers to residential, commercial, industrial and institutional driveways. Reference Anoka County’s Development Review Manual for specifics on private access.
- (2) Conditional secondary access is defined as right-in/out.
- (3) Access spacing may be determined by planning documents approved by the county (e.g., Lino Lakes I-35E AUAR)
- (4) Any spacing deviations shall have a detailed traffic study completed by the requesting agency, AND approved by the County Engineer.

A key challenge facing East Bethel and its planning partners, Anoka County and MnDOT, is adequately balancing access and mobility on the roadway system. Most roadways serve both functions to some degree.

In an efficient roadway network, the different roadway classifications function together in a complementary fashion to serve the needs of the traveling public. The proportion of arterials, collectors, and local streets must have proper balance to achieve a roadway system that operates effectively. Modifications made to a roadway's functions without consideration of the complete roadway system will tend to undermine the operations of the system. For example, a system comprised of all local streets would not move traffic very well. Conversely, a system of too many arterials would not provide adequate land use access.

The City will adopt the Anoka County Highway Department Access Spacing Guidelines as presented in Table 2. The guidelines are broken into different area or facility types within each functional classification. For each facility type, the recommended full-movement intersection spacing is given along with the spacing for a conditional secondary intersection. This secondary intersection typically has restricted movements (e.g., right-in/right-out). In addition, each facility type identifies the treatment of private access. It should be noted that the guidelines are more restrictive (exception/deviation) of private access in urbanizing areas than in rural and/or urban core areas (subject to conditions). This is due to the fact that planning should be able to limit private access in these developing areas versus areas that have already been developed (core urban area) and/or areas where there is no other supporting street system (rural).

Access Policy Implementation

It is important to consider the following points when implementing these guidelines:

- The guidelines are long-term goals, not absolute rules.
- Maintaining flexibility is important in promoting access consolidation.
- The City's approach to implementation is as important as the guidelines themselves.
- Existing physical barriers or constraints need to be considered.

The City of East Bethel will adopt the Access Spacing Guidelines presented in Table 2 for the following reasons:

- By establishing these policies, the City can plan, design, and implement land use and transportation strategies that control the flow of traffic between roadways and surrounding land uses.
- The proposed access management guidelines are based on the City's updated functional classification map, which was coordinated with the City's future land use map. Therefore, by adopting these access guidelines, they will parallel any future developments or land use changes resulting from the Comprehensive Land Use Plan update. Appropriate sections of the guidelines should also be incorporated into City zoning and subdivision ordinances.
- The proposed Access Management Guidelines, as noted, identify access spacing recommendations based on functional classification rather than traffic volumes. This method provides a long-term understanding of how each corridor will function and operate and will enable the City to protect access on roadways before traffic volumes reach specific thresholds.

Access guidelines can be implemented using different methods such as land use regulations, subdivision regulations, access permit processes, and access/transportation committees. Any process should also deal with situations outside the guidelines, such as hardship cases. In existing corridors where significant development has occurred, the number of existing access points usually exceeds access guidelines. Unless these areas are undergoing redevelopment, access management must be approached differently.

The following access suggestions provide some alternatives for minimizing access and access problems in areas where the guidelines cannot be met:

- **Encourage shared driveways and internal circulation plans:** If indirect access cannot be achieved during plat reviews, promote internal site circulation using shared access points.
- **Restricted turning movements to reduce conflicts:** If access points cannot be eliminated, consider turning movement restrictions (e.g., left-in only or right-in/right-out only) through installation of raised median or other channelization or signing. Eliminating a single turning movement can significantly reduce vehicle conflicts and potential crashes.
- **Develop good parallel street systems for carrying local traffic:** Make sure that important arterial routes have a good parallel street system to provide the local access function and to carry shorter local trips.

- **Develop proper setbacks for future frontage roads, interchanges, and overpasses:** If frontage roads, interchanges, or overpasses cannot be justified (benefits do not outweigh costs), make sure that proper building and parking lot setbacks are established so that future frontage roads can be installed with minimal impacts.
- **Develop proper secondary street spacing:** When reviewing plats and new development proposals, be sure that they provide proper intersection spacing for future signals. As a guideline, signalized intersections should be limited depending upon the type of street. Collector streets should provide some continuity and connectivity with other street systems.
- **Encourage proper lot layout to minimize access points:** Promote direct residential access points onto local routes, not arterials or major collectors. Direct residential access to arterial or collector routes can result in complaints when traffic levels increase.
- **Encourage connectivity between developments:** Individual development should align streets to provide access to existing developments or reserve right-of-way to provide for future connections to adjacent developments. This promotes neighborhood connectivity, good emergency services, and more efficient travel for mail, garbage, and bus services, as well as street maintenance activities.

Roadway Design Standards

In conjunction with the designation of the functional classification of each East Bethel roadway, and based on the City's Land Use Zoning, minimum road design standards are recommended as part of this Transportation Plan. Recommended standards to be established for the City jurisdictional roads are provided in Table 3 on the next page and include: pavement load design weight; right-of-way width; roadway widths at and between intersections including shoulder and travel lane widths; and intersection spacing. The City will also implement traffic calming measures and strategies where appropriate and applicable to minimize incidents and improve safety, particularly in residential neighborhoods and near schools, etc.

The location of trails adjacent to the roadways should be governed by the roadway functional classification. On arterial roads, the trail should be located beyond the traffic clear zone or behind a protective barrier. Major and minor collectors should maintain a clear zone between the trail and the traffic lane. On frontage roads, neighborhood collectors, and city streets, the trails should be designated by barriers, striping, signage, and pavement markings. Trail standards will be developed and approved through City Council policies.

Table 3: Recommended Standards by Functional Classification

FUNCTIONAL CLASSIFICATION	LAND USE ZONING	DESIGN SPEED MPH	PAVEMENT WEIGHT DESIGN TONS	SHOULDERS TONS	*RIGHT-OF-WAY WIDTH FEET	STREET SECTION WIDTH		MINIMUM INTERSECTION SPACING (MILES)
						Between Intersections Shldr-Lane	At Intersections Shldr-Lane	
Local	Residential	30	9	9	66	31.5'	31.5'	1/16
Local	Commercial Industrial	30	10	10	80	44' (10'-12'-12'-10')	58' (11.5'-12'-11'-12'-11.5')	1/16
Frontage Roads	All Residential Commercial, & Industrial	35-45	10	10	80	49' (10'-12'-12'-10')	59' (11.5'-12'-12'-12'-11.5') (1) (2) (3)	1/8
Minor Collector	All Residential Commercial, & Industrial	40-55	10	10	80-urban 100-rural	36' (6'-12'-12'-6')	44' (4'-12'-12'-12'-4') (1) (2) (3)	1/8
Major Collector	All Residential Commercial, & Industrial	40-55	10	10	100	44' (10'-12'-12'-10')	52' (8'-12'-12'-12'-8') (1) (2) (3)	1/4
Minor Arterial	Per Anoka County							
Principal Arterial	Per Mn/DOT							

* Add 20' of right-of-way or permanent easement for each proposed trail along roadway.

- 1) Exiting Lane – Leaving Intersection
- 2) Approach Left Turn Lane
- 3) Approach Combination Thru- Right Turn Lane
- 4) Approach Thru Lane
- 5) Approach Right Turn Lane

Future Roadway Needs and Improvements

As the City of East Bethel continues to develop and implement strategies to encourage well-planned growth and development, transportation linkages will remain an important aspect of all related activities. Developing and enhancing the local streets, pathways, and bikeways as part of an interconnected system is important to the overall mobility and accessibility within the community. Integrating land use and transportation planning activities will help to create sustainable developments both commercial and residential and provide residents with a variety of options as they utilize local services and amenities.

Equally important is the development of an adequate regional roadway network. Many of the challenges and opportunities relating to the roadway system in East Bethel are regional in nature and involve state and county roads over which the City of East Bethel does not have direct jurisdiction. The City can, however, work in cooperation with MnDOT and Anoka County to discuss ideas and develop plans for improvements and enhancements to the roadway system. Traffic operations on the arterial system undoubtedly have a significant impact on the collector and local street system and the community as a whole.

TH 65 is the only Metropolitan highway located within the community. As previously discussed on page 12, the City will use the TAC finding as a guide for future planning adjacent to TH 65.

Viking Boulevard, is also being considered by MnDOT as a future state highway that would provide for an east-west corridor/connection through northern Anoka County. Presently there are no efficient roadways that serve motorists in these directions other than County State Aid Highway 242 which is also a two-lane highway. Additional traffic lanes - potentially five lanes total including turn lanes and access improvements - would be necessary. These additions would have significant impacts through East Bethel. The City will be actively engaged as these discussions progress with MnDOT and Anoka County.

The next section of this plan discusses future roadway projects anticipated by the City to maintain an acceptable level of service on the roadway network. The City is committed to ensuring that land use and transportation plans are integrated and will work to ensure that future right-of-way needed for the construction of access improvements along the TH 65 and the Viking Boulevard corridor are set aside, and that any future development considers these improvements.

Anoka County is currently updating their transportation plan for the entire county. The City anticipates that the study may reclassify the function of certain road segments and understands that changes in the transportation plan may be needed in response to the study findings.

Roadway Improvement Projects

Traffic Forecasts

Daily traffic forecasts for the year 2040 were prepared by Anoka County for the Principal and A-Minor Arterials. The Metropolitan Council's new Twin Cities travel demand forecasting model was used to develop the future traffic forecasts. These traffic forecasts are presented on Figure 2.

Improvements

In order to expand the proposed roadway system from the existing system and to meet future traffic needs, the City will have to prepare for a series of improvement projects between now and the year 2040 and beyond. The City's primary focus for new infrastructure improvements are the construction of service roads adjacent to TH 65. As further discussed in Appendix A of this document, the City has been divided into three Growth Areas. The service roads with the highest priority include those roads from 181st Avenue to Viking Boulevard, which are in Growth Area C. East Bethel would initiate infrastructure improvements in Growth Area A and Growth Area B as needed to facilitate development and the expansion of the municipal sewer and water system.

As discussed on page 12, MnDOT has prepared an Access Management Plan for the TH 65 Corridor through East Bethel. The focus of intersection improvements on TH 65 include the construction of five reduced conflict intersections (RCI). MnDOT has already constructed the RCI's at 181st Avenue, 187th Lane, and Viking Boulevard. The proposed service road alignments and RCI locations are shown on Figure 6 on the next page. Estimated costs for the City service road system are presented in Appendix A of this document.

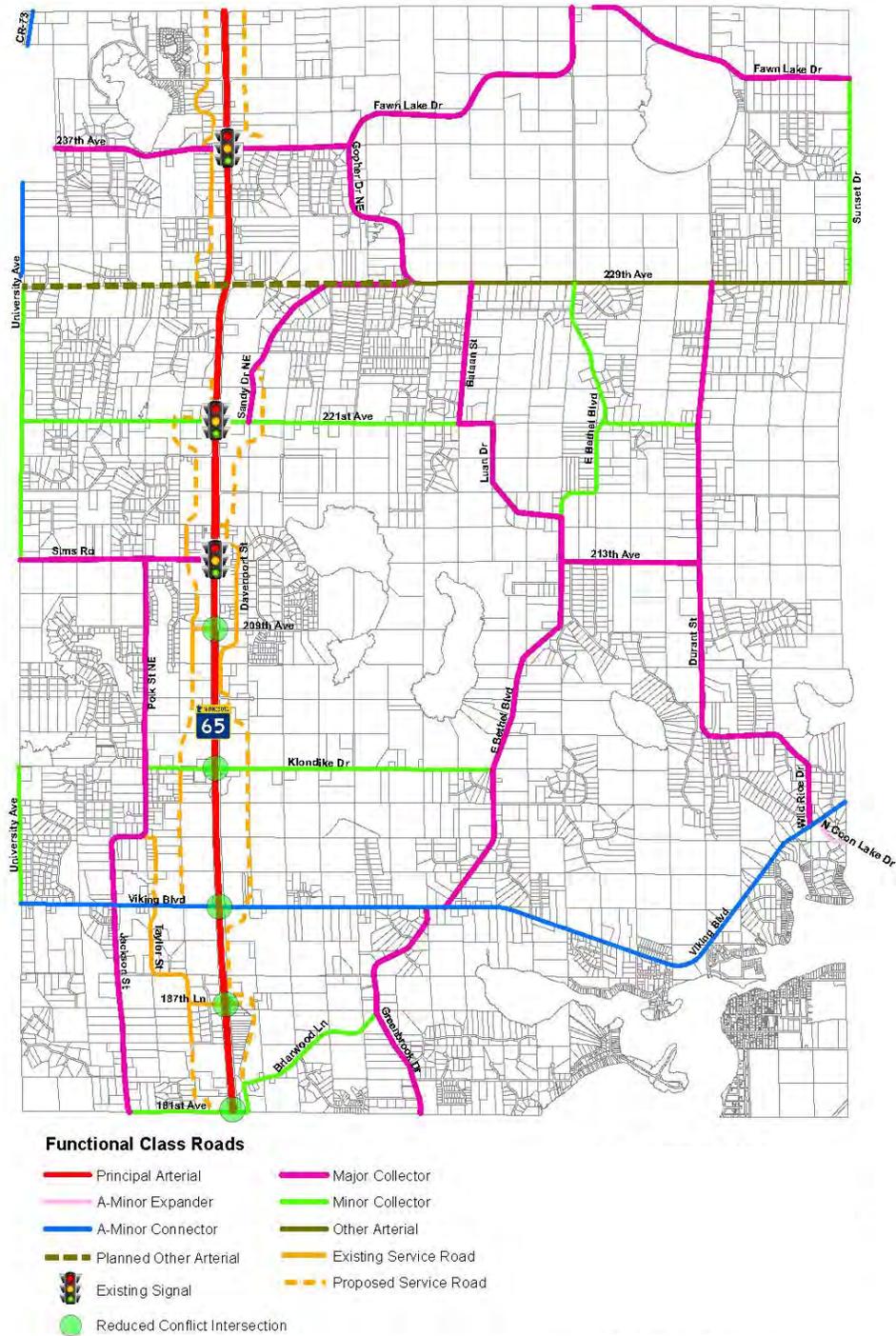
Roadway Financing Options

The construction of the City's functionally classified local, jurisdictional city collectors and frontage roadways is expected to be financed by MSA funding and assessments to the abutting and benefiting property owners or by the developers as they plat and subdivide the undeveloped lands. The construction and financing of principal arterials is handled almost exclusively by MnDOT, while Anoka County would carry the primary role in the construction and financing of the functionally classified arterials and collectors which are under the County's jurisdiction.

A primary difficulty for local units of government is the financing of minor and major collector roadways, which are under their jurisdiction, but on the perimeter of the developments. Direct private access onto these collector roadways is limited and controlled to promote a higher level of mobility, which makes it more difficult to show benefit for assessment purposes. Cities are, therefore, looking at alternative financing options and seeking legislation, which would permit such things as: street utility fees; street

access fees, and area connection fees. These fees usually are most successful when imposed in conjunction with new adjacent developments that utilize these connector roadways for access.

FIGURE 6: HIGHWAY 65 INTERSECTION CONTROLS AND SERVICE ROADS



Future Planning Activities and Needs

The City of East Bethel recognizes the need for further study as it relates to various transportation impacts that future development and growth present. The City is considering a policy that would require traffic impact studies in the future relative to proposed developments. As part of East Bethel's continued growth and development, it is likely that the City will receive applications for large-scale development. In order to continue to provide traffic safety and mobility, the impacts of these developments need to be understood. The technical focus of this transportation plan was to identify the need and general location of proposed streets, regulate access, and guide right-of-way acquisition.

Transportation Goal and Policies

Goal:

Integrate land use and transportation planning to create a land use pattern and a transportation system that enhances the livability of the community.

Policies:

1. Maintain a safe, efficient and convenient road transportation system.
2. Protect the integrity of the transportation system.
3. Incorporate transportation mobility and access into development plans.
4. Promote transit-oriented design in major community development areas and adjacent to future commuter rail stations.
5. Maintain and/or enhance linkages to the county and regional networks.
6. Work with the Metropolitan Council and Anoka County to provide transit opportunities to residents including express and local bus service, van/carpooling, commuter rail, and paratransit services.
7. Work with neighboring communities to identify opportunities that will ensure transit, bikeways, and other corridor connections to commuter rail services.
8. Preserve major transportation corridors through responsible development.
9. Draft and enforce the inclusion of bicycle/pedestrian ways as part of all new development plans.

10. Restrict access to TH 65 through the adoption of reasonable intersection spacing and access management guidelines.
11. Work with MnDOT to replace existing accesses on TH 65 with frontage and backage roads and intersections that meet spacing goals.
12. Aggressively pursue providing other transit programs and opportunities that benefit residents and businesses.
13. Coordinate transportation planning and system improvements with affected local, county, regional, and state jurisdictions.
14. Develop land use development standards that promote safe access to the transportation system in the City.
15. Utilize Anoka County resources when appropriate as part of transportation planning data collection including traffic modeling projections for county, municipal state aid, and collector roadways.

TRANSPORTATION ANALYSIS ZONES (TAZ)

The City of East Bethel was divided into 13 TAZ which are show on Figure 7 on the next page. Table 4, provides projected 2020, 2030 and 2040 population, household and employment densities by TAZ. These forecasts were provided by the Metropolitan Council. Traffic projections and roadway capacity data currently available take into account the implementation of municipal services, and therefore accurately reflect transportation needs into the future. Anticipated 2040 traffic volumes are presented on Figure 2.

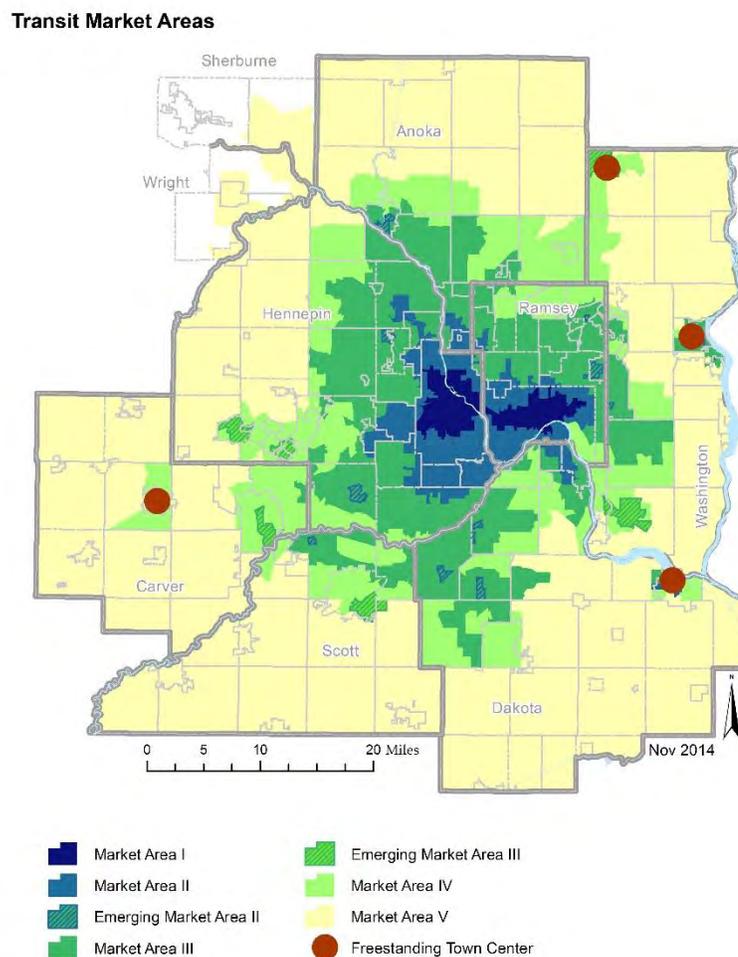
TABLE 4: POPULATION, HOUSEHOLDS AND EMPLOYMENT

TAZ	2020			2030			2040		
	POPULATION	HOUSEHOLDS	EMPLOYMENT	POPULATION	HOUSEHOLDS	EMPLOYMENT	POPULATION	HOUSEHOLDS	EMPLOYMENT
1	690	270	50	860	340	50	1010	410	50
2	1800	700	100	2200	860	100	2470	990	100
3	390	150	120	690	270	120	1140	460	120
4	880	350	160	1150	470	160	1410	590	150
5	1410	560	220	1820	740	230	2230	940	240
6	460	170	90	490	190	140	520	210	190
7	1280	470	270	2110	800	320	3210	1250	370
8	1730	640	180	1920	720	180	1800	700	170
9	610	230	0	630	240	0	600	240	0
10	1160	430	160	1380	530	170	1650	660	160
11	850	320	200	940	360	220	1060	430	240
12	640	240	20	670	260	20	680	280	30
13	480	180	120	550	210	240	620	250	370

TRANSIT SYSTEM

The transit system plan provides an overview of the basic components of transit planning, including demographic factors, transit route and network design factors and urban design factors that support transit usage. Local governments have the primary responsibility for planning transit-supportive land use through their comprehensive planning and subdivision and zoning ordinances. The *TPP* includes updated Transit Market Areas, which are shown in Figure 8, which reflect 2010 Census information and an updated methodology that better aligns types and levels of transit service to expected demand. These market areas identify the types of transit services that are provided within each area.

FIGURE 8: TRANSIT MARKET AREAS



2040 TRANSPORTATION POLICY PLAN | METROPOLITAN COUNCIL
Figure 6-3



East Bethel is a Transit Marked Area V. Transit Market Area V is defined as an area that “has very low population and employment densities and tends to be primarily rural communities and agricultural uses. General public dial-a ride service may be appropriate here, but due to the very low intensity land uses these areas are not well-suited for fixed-route transit service”. The *TPP*'s Transit Investment Plan does not show any transit investments planned for East Bethel in the Current Revenue Scenario.

Key to the regional system is the expansion of transit services that will ultimately provide commuters and other travelers with choices in how they choose to get to work, school, and other activities. Enhancements as part of the local and state roadway improvement projects such as the addition of bus-only lanes on highway shoulders and the construction of added park-and-ride facilities will assist in developing a “network” of transit services and options. Residents of the community have existing alternative transit options such as Dial-A-Ride through the Anoka County Traveler and volunteer driver programs and ridesharing.

East Bethel currently has two park-and-pool facilities. One at 237th Avenue and TH 65 and a second at 207th Avenue and TH 65 at the City-owned ice arena. Residents of the community can obtain further information on the park-and-pool sites on the City's website. While East Bethel currently does not have regular route or express bus service, the demand is increasing for facilities such as a park-and-pool/ridesharing sites or park-and-ride facilities serviced by express buses that would travel to the Twin Cities Metropolitan areas.

BICYCLE AND PEDESTRIAN TRANSPORTATION

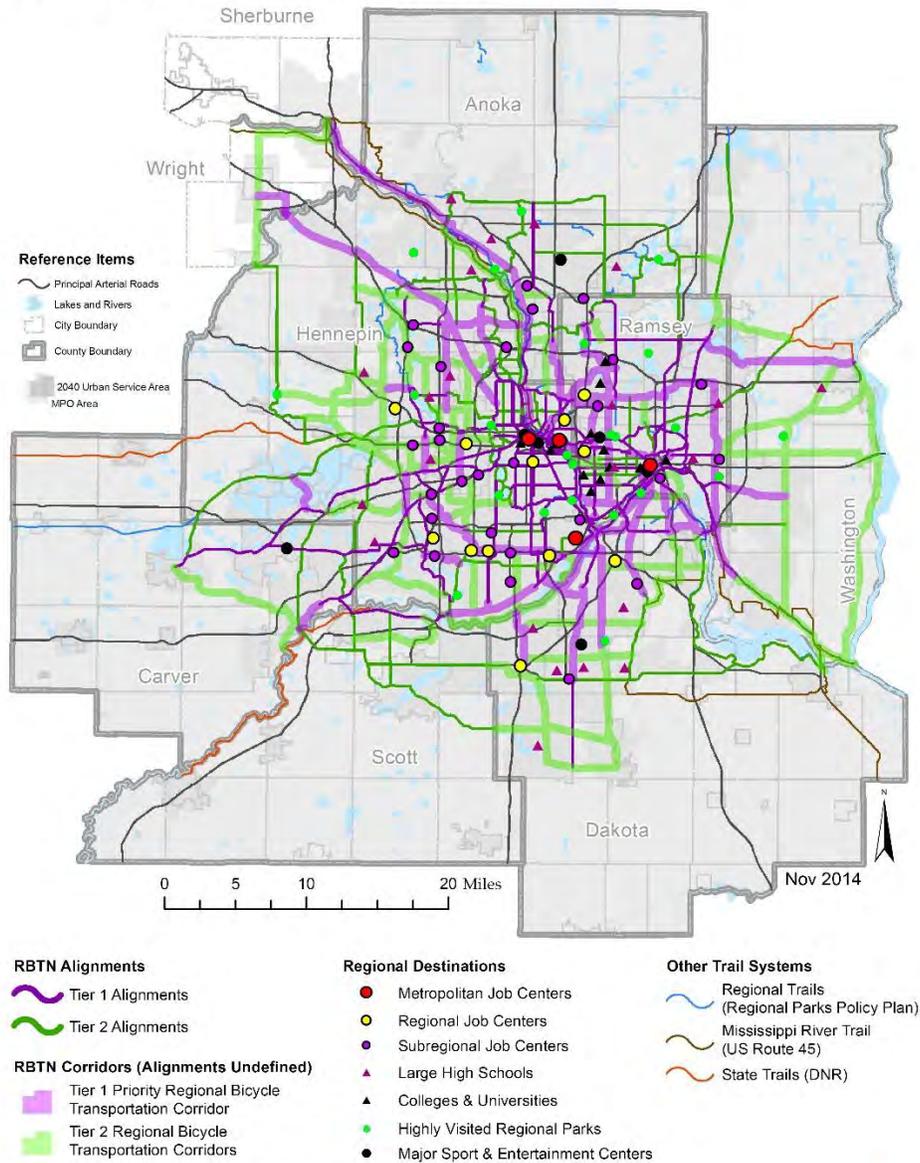
Regional Bicycle Transportation Network

The *2040 TPP* encourages the use of bicycles as a mode of transportation. The *TPP* establishes for the first time a Regional Bicycle Transportation Network (RBTN). Figure 9 on the following page shows the RBTN. East Bethel does not have any identified routes on the RBTN. The goal of the RBTN is to establish an integrated seamless network of on-street bikeways and off-road trails that complement each other to most effectively improve conditions for bicycle transportation at the regional level. Cities, counties, and park agencies are encouraged to plan and implement future bikeways within and along these designated corridors and alignments to support the RBTN vision.

The RBTN corridors and alignments make up the “trunk arterials” of the overall system of bikeways that connect to regional employment and activity centers. These are not intended to be the only bicycle facilities in the region, and local units should also consider planning for any additional bike facilities desired by their communities.

FIGURE 9: REGIONAL BICYCLE TRANSPORTATION NETWORK VISION

Regional Bicycle Transportation Network Vision



2040 TRANSPORTATION POLICY PLAN | METROPOLITAN COUNCIL
Figure 7-1

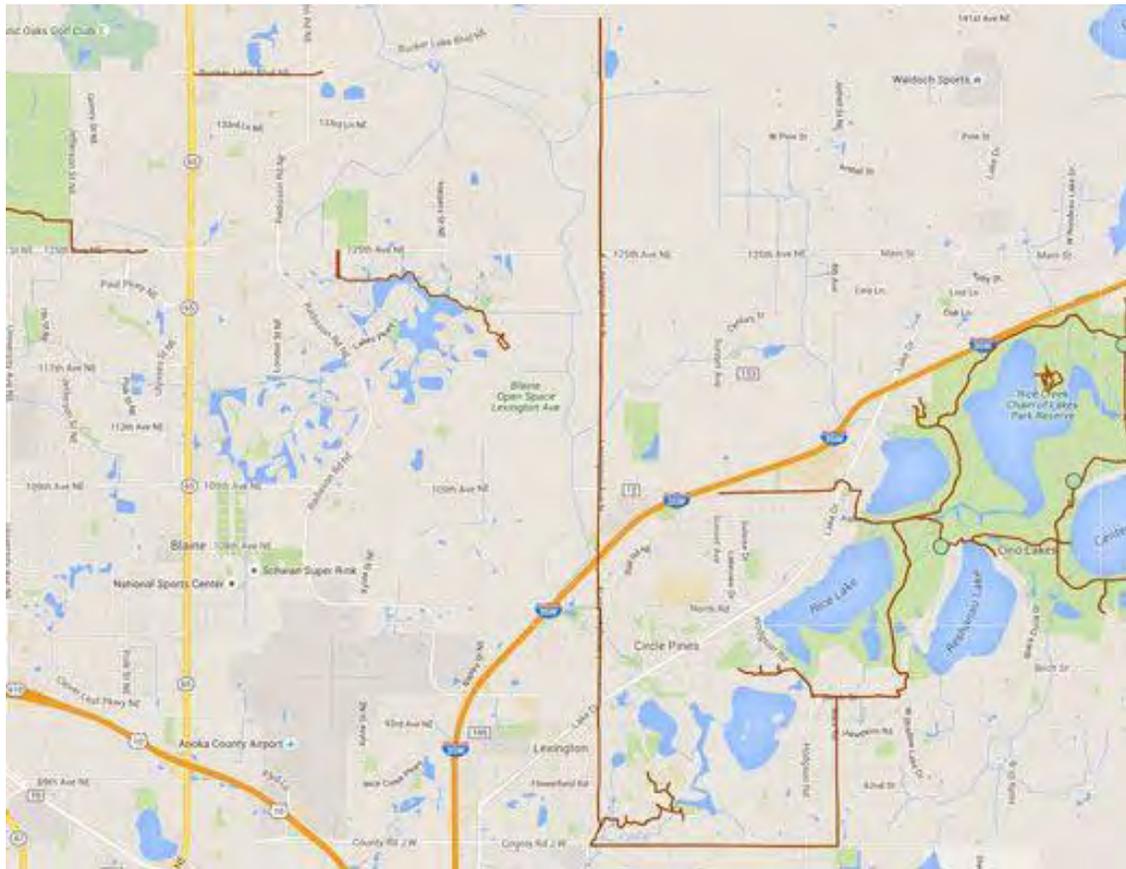


Anoka County Regional Trails

The North Anoka County Regional Trail is a search corridor that proposes a route that crosses the northern section of the county from Sherburne County east to Washington County. The trail alignment is proposed to pass through Nowthen, Oak Grove, East Bethel, and Linwood Township. The plan is for the North Anoka County Regional Trail to connect to Lake George and Martin-Island-Linwood Lakes Regional Parks. The trail will connect with two north/south routes, those being Rum River and East Anoka County Regional Trails. The estimated cost of this new 17-22 mile long trail would be \$1.87 to 2.3 million. To date, only a small segment of the trail is complete – about one mile that runs through Lake George Regional Park. The County will work with the local agencies and the County Highway Department to develop the trail. This regional trail is a search corridor, which means that they do not have Met-Council-approved master plans that identify the trail alignments. Since alignments have not yet been approved they are not eligible for Regional Parks System funding for acquisition and development.

The East Anoka County Regional Trail is located in the northeast corner of the city and another very short segment in the southeast corner. There is a Met-Council approved master plan for the alignment, but there is no timeframe for the section that still needs to be built in East Bethel. The trail will be 27 miles long and will connect the north end of the county to the south end, starting in East Bethel and ending in Blaine. It will be linked to four (4) other regional trails and will have access to many city trails and parks. Figure 10 illustrates what is currently constructed on the East Anoka County Regional Trail.

FIGURE 10: THE EAST ANOKA COUNTY REGIONAL TRAIL CURRENTLY, BEFORE THE EXPANSION NORTH INTO EAST BETHEL



On the next two pages, Figures 11 and 12 illustrate the expansion areas for both the North and East Anoka County Regional Trails on a county and city basis.

FIGURE 11: REGIONAL TRAIL SEARCH CORRIDORS IN ANOKA COUNTY

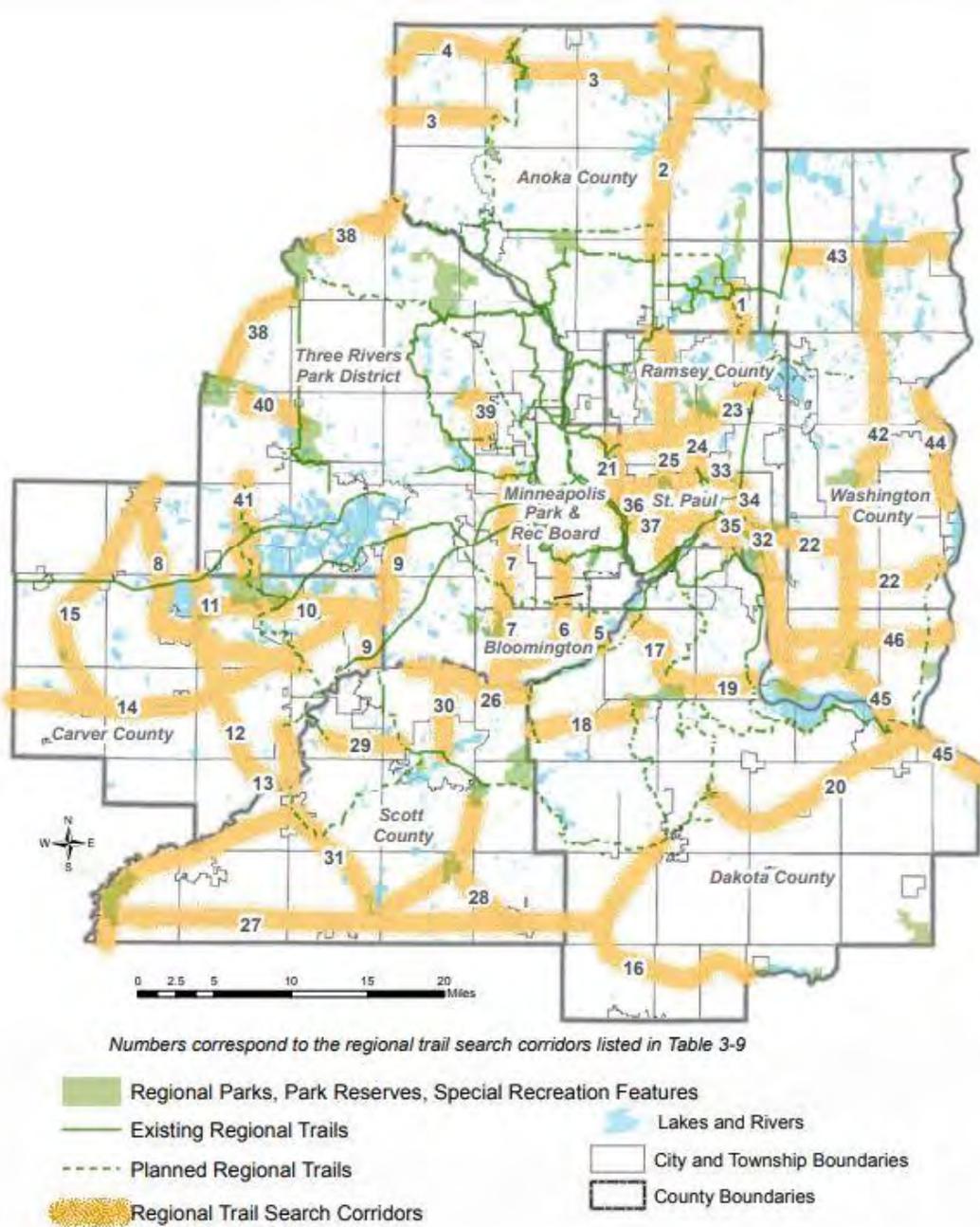
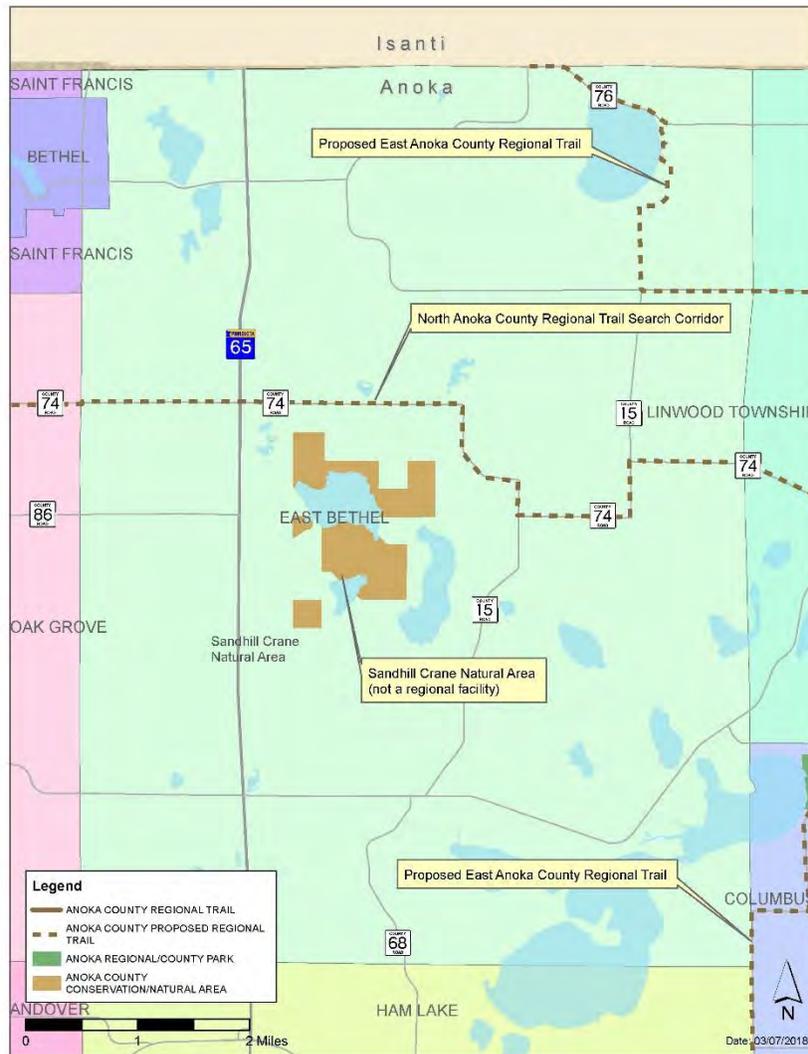


FIGURE 12: REGIONAL TRAIL SEARCH CORRIDORS IN EAST BETHEL



Local Bicycle and Pedestrian Trail System

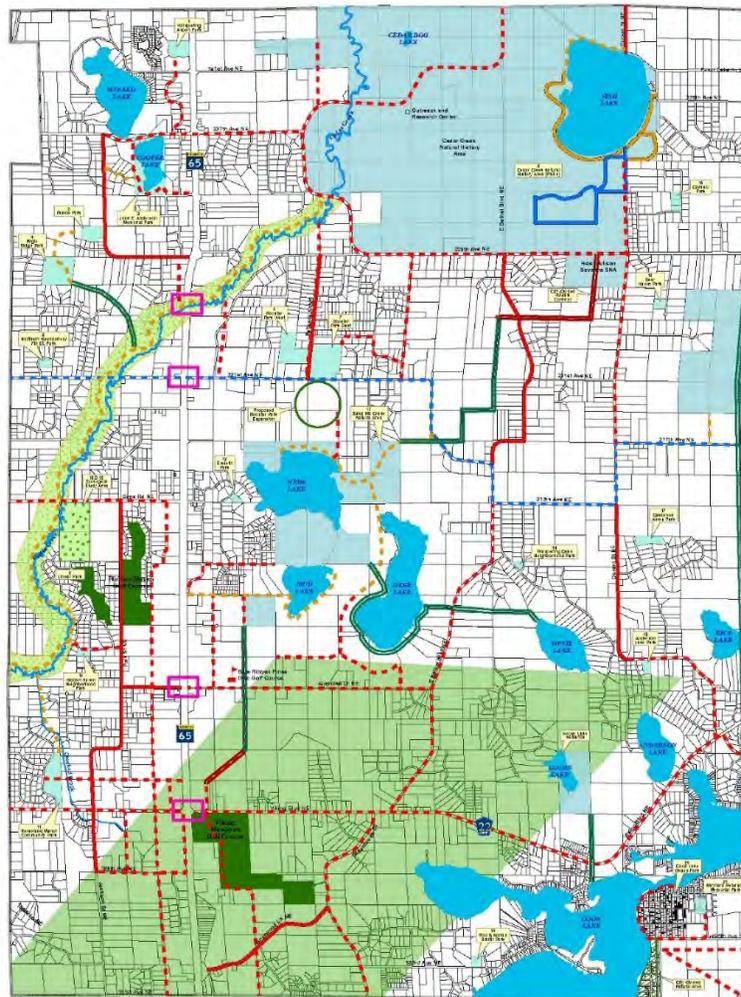
Throughout the past several years, many additions, improvements, and recognition of trail corridors have occurred. The Parks and Recreation Department has worked cooperatively with the Anoka County Highway Department and local municipalities in establishing and developing the regional trail system. These coordinated efforts have allowed for creative ways to finance, develop, and construct trails.

While pedestrian and bicycle systems can serve a wide variety of purposes, walking and biking are primarily recreational activities in East Bethel. The provision of adequate facilities for pedestrians and bicyclists promotes non-motorized travel and improves safety.

A pedestrian and bicycle system should provide a connection between concentrated activity areas such as schools, parks, and dense commercial properties. There is currently only one school and no concentrated commercial areas within East Bethel. However, East Bethel is fortunate to have two nature areas, which are the Cedar Creek Natural History Area and the Sandhill Crane Nature Area. One of East Bethel’s goals is to eventually connect these two areas with a trail system.

The map on the following page, Figure 13, illustrates the proposed city trails and whether they are to be bituminous or natural.

FIGURE 13: COMPREHENSIVE TRAILS AND OPEN SPACE CONCEPT PLAN



- Legend**
- Existing City Trail - On Road
 - Existing City Trail - Off Road
 - Existing City Trail (Winter Use Only)
 - Proposed City Trail - Bituminous
 - Proposed City Trail - Natural
 - Proposed County Regional Trails
 - Future Connection/Greenway
 - Existing Connection/Greenway
 - Existing City Parks
 - Open Space Managed by Others
 - Future Park Location
 - City-Owned Natural Area
 - City-Owned Wildlife Corridor
 - Future Greenway Corridor
 - SD #15 Ecological Study Area
 - Road Crossing Issue

**Comprehensive Trails
and Open Space
Concept Plan**

Figure B-10

Facilities in Proposed Urban Area

As discussed in this document, the City of East Bethel plans to develop its Trunk Highway 65 corridor with municipal sewer and water, which will include high density residential and commercial development. Current City Code requires that sidewalks be constructed on one side of all new streets in this urban development area. The sidewalks are predominantly designed for pedestrian traffic only. Since the neighborhood roads will be low volume and low speed, it is anticipated that bicycle traffic will use the streets for travel.

Facilities in Existing Rural Area

The area outside the Trunk Highway 65 corridor is currently and will remain rural in nature. Most of the developments in these areas include 2-acre average lot densities. These neighborhood streets are very low volume and low speed and typically do adequately accommodate both pedestrian and bicycle traffic.

Crossings at Local Major Collectors and Arterial Roadways

The City of East Bethel receives annual funding from MnDOT to maintain and construct their Municipal State Aid System. These streets are the City's major local collectors and typically begin or terminate at a County or State Highway. It is the City's policy to construct, at a minimum, 6-foot shoulders on each side of their local major collectors as they are constructed or reconstructed. These shoulders are intended to facilitate both pedestrians and bicyclist travel in a one-way direction.

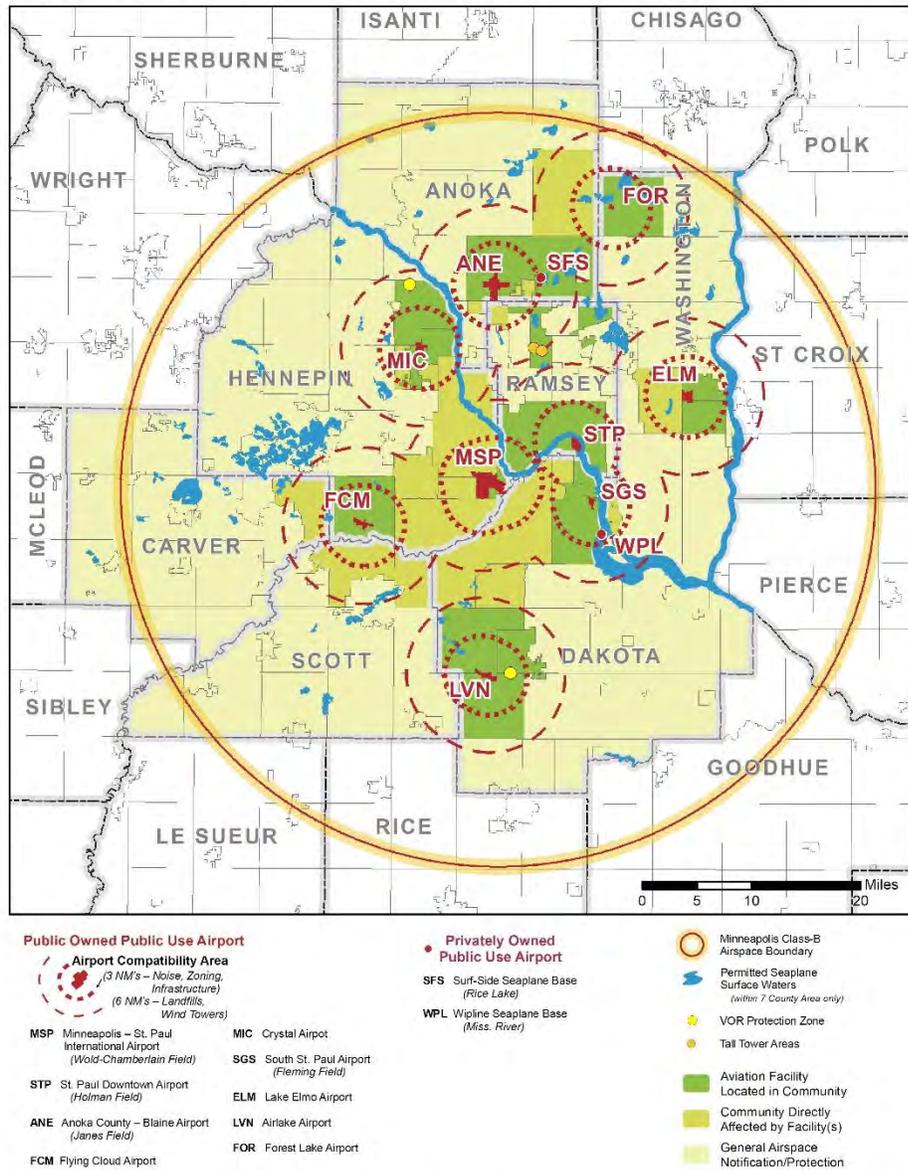
East Bethel has two major highway corridors, through the City, including Trunk Highway 65 and Viking Boulevard. Crossings for pedestrians and bicyclists can be challenging for these types of roadways. When opportunity presents itself, the City will work with MnDOT and Anoka County to improve trail crossings at these major highway corridors. For example, MnDOT recently constructed reduced conflict intersections on Trunk Highway 65 at 181st Avenue, 187th Lane and at Viking Boulevard. All of these intersections included pedestrian ramps, lighting, and the RCI signal at Viking Boulevard includes push buttons.

AVIATION SYSTEM

The Metropolitan Aviation System is comprised of nine airports, which are shown on Figure 14, and off-airport navigational aids. There are no new airports or navigational aids that have been added to the system in the *2040 TPP*.

FIGURE 14: AIRPORT SERVICE AREAS

Airport Service Areas



2040 TRANSPORTATION POLICY PLAN | METROPOLITAN COUNCIL
Figure 9-1



East Bethel is not located within any airport influence area. The closest airport to the City is the Anoka County-Blaine airport located 15 miles to the south of the City. The City will notify MnDOT in the event that any new structures are proposed in excess of 200 feet. The only lake where seaplane usage is permitted is Coon Lake in the southeast corner of the City.

Each community has a responsibility to ensure that the Comprehensive Plan includes airspace protection from potential hazards to air navigation, including electronic interference. Local codes and ordinances will reflect measures to control height of structures, particularly as it relates to conditional use permits.

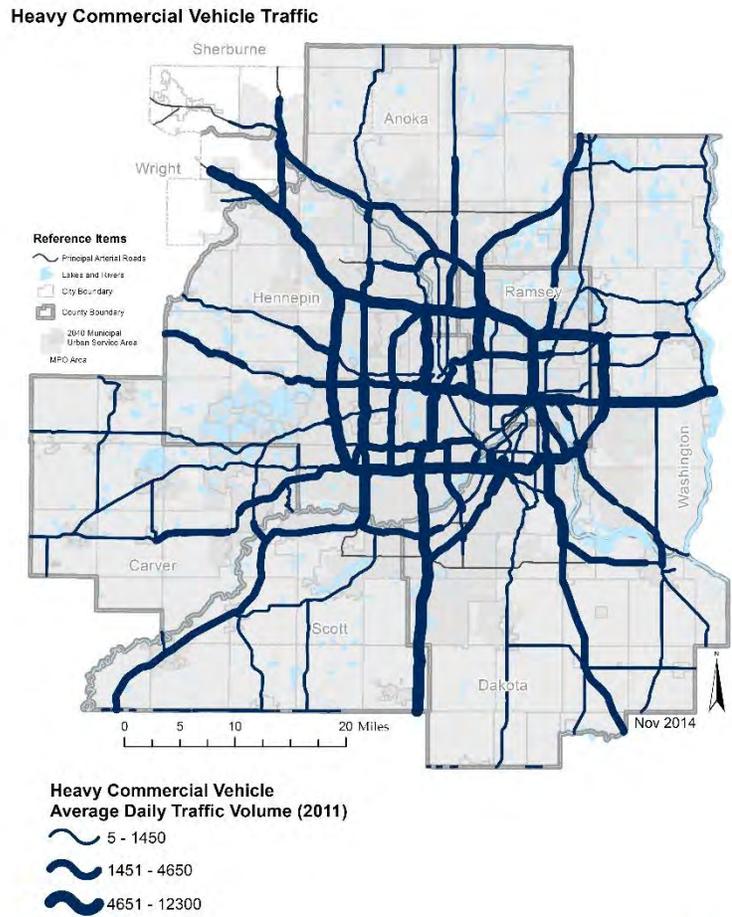
Additionally, East Bethel recognizes, for purposes of safe use of surface waters and compatible land use, that within the seven-county metro area certain public waters are designated by MnDOT Office of Aeronautics as permitted seaplane use areas under state rules.

FREIGHT

Most aspects of freight movement are controlled by the private sector, so unlike other sections of the *TPP*, there is not a specific plan adopted for future public-sector investment in freight facilities. East Bethel has one industrial park that generates truck-based freight movement. The industrial park is between 185th Avenue and 189th Avenue directly west of TH 65. In 2017 the City constructed a much-needed secondary access to this area via a new service road from 187th Lane to Viking Boulevard. The City has not experience any other issues, local roadway issues, or problems with facilities truck-based freight movement.

According to the most current Minnesota Department of Transportation Heavy Commercial Daily Traffic (HCDDT) Map shown on Figure 15 on the next page, the only measured freight traffic is through traffic on TH 65.

FIGURE 15: HEAVY COMMERCIAL VEHICLE TRAFFIC

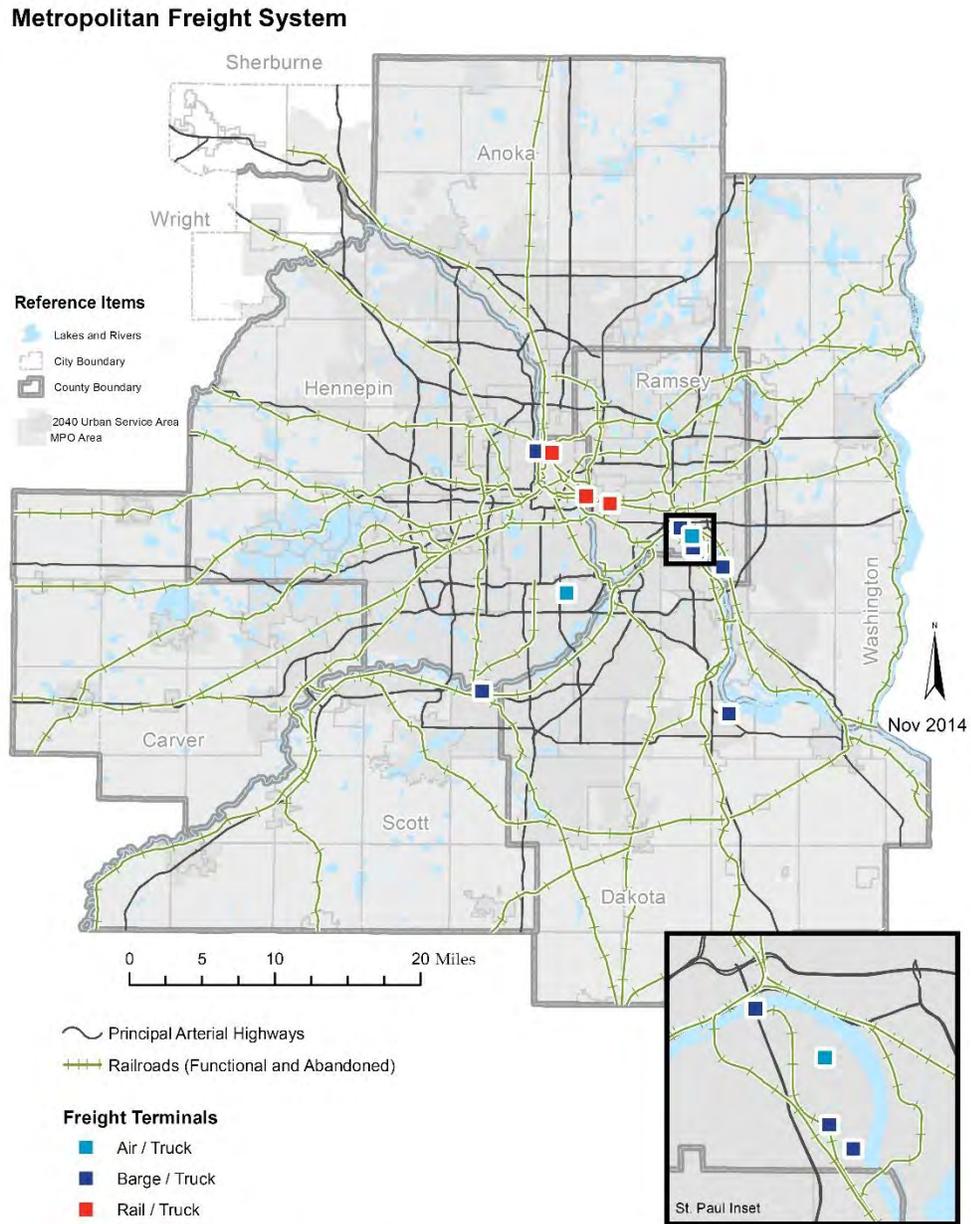


2040 TRANSPORTATION POLICY PLAN | METROPOLITAN COUNCIL
Figure 1-8



The Burlington Northern Santa Fe Railroad owns and operates a single-track freight railway that runs north/south on the east side of the City. A majority of the rail alignment is in Oak Grove as shown on Figure 16 on the next page.

FIGURE 16: METROPOLITAN FREIGHT SYSTEMS



2040 TRANSPORTATION POLICY PLAN | METROPOLITAN COUNCIL
 Figure 1-6



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- Attachment 2 – City’s Code Regulating Individual On-Site Sewage Treatment Systems
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WASTEWATER

At the publish date of the 2008 Comprehensive Plan the City of East Bethel was pursuing alternatives that would allow for the implementation of municipal water and sanitary sewer within portions of the community experiencing development pressures. More specifically, the areas along the Trunk Highway 65 corridor as well as Viking Boulevard (County Road 22). These areas are becoming more and more desirable to land developers.

The City was working with the Metropolitan Council Environmental Services (MCES) to assist in examining the most appropriate location(s), treatment systems, and potential costs to construct the necessary facilities to support existing and future development. The Metropolitan Council contracted with a consulting firm to further assess these and other municipal service elements; an initial report was available in February 2006.

The City contracted with a consulting firm to study the feasibility of construction the first phase of the proposed municipal sewer collection and distribution system. The Phase 1 Project included the general area south of Viking Boulevard and west of Trunk Highway 65. The report was first available in September 2010.

The City of East Bethel and the MCES did move forward with the construction of the Phase 1 Utility Project in 2011. The MCES also constructed a Regional Water Reclamation Facility (Facility) that went online in 2014.

Municipal Treatment and Wastewater Collection

Treatment Facilities

In addition to the MCES Facility, there is one community wastewater treatment plant (WTP) within the City boundaries, known as Village Green. The City did own and operate the Castle Towers WTP until 2014. The Castle Towers WTP has since been decommissioned.

The MCES Facility

The Facility is a water reclamation plant that provides tertiary treatment and disinfection of wastewater, followed by distribution of treated effluent to two separate subsurface infiltration sites. The facility is designed to treat an average wet weather flow of 470,000 gallons per day. Each infiltration site is designed to receive up to 410,000 gallons per day on an annual average basis. This is a Class B facility.

The facility includes influent pumping, fine screening and grit removal, one set of biological treatment tanks with a five-stage biological nutrient removal system, two membrane biological reactor units for tertiary treatment, chemical addition capability, ultraviolet disinfection, back-up chlorination, and pumping and conveyance facilities. Residual biosolids from the plant are periodically removed and delivered to another MCES plant for further treatment and disposal. The facility has back-up equipment and procedures to ensure reliability of the treatment process.

The facility's two infiltration sites consist of multi-celled grass-covered earthen basins and the associated distribution system consisting of underground 16-inch and 10-inch pipe that carries water year-round to both

sites for distribution of the treated effluent. Each site is designed to confine multiple cells in shallow, soil-covered basins with granular material at the bottom to facilitate delivery of the treated effluent through the unsaturated zone. Both infiltration sites have a piezometer, in the middle of each site to measure elevations, and to serve as observation ports for the piping. The sites also have a network of eight monitoring wells to determine if there are changes in ground water quality or elevations. The treated effluent is delivered to the two sites to optimize cell performance based on the operational requirements to control the mound height and maintain an unsaturated zone above the water table.

Some of the facility's treated effluent may be used for reuse activities. Effluent that meets the limits and monitoring requirements outlined in Waste Stream Stations WS005 and WS006 may be reused for the corresponding activities described for Disinfected Tertiary 2.2 Effluent and Disinfected Secondary 23 Effluent in the Municipal Wastewater Reuse factsheet found on the MPCA website (www.pca.state.mn.us). If the facility proposes reuse for an activity not listed in the fact sheet, a request must be made to the MPCA describing the activity. Future reuse activities that include the construction of permanent piping systems to distribute the treated effluent to users may require a major permit modification. However, at this time the MCES is only conveying effluent to the two subsurface disposal sites.

Village Green WTP

The Village Green WTP is a privately-owned Class C facility. The facility treats wastewater from a mobile home community. Its treatment consists of an aeration tank, final clarifier, and a chlorine contact tank. The disposal is a subsurface disposal through a rapid infiltration basin. This plant is permitted for 30,000 gallons per day. The location of the Village Green WTP is shown on Figure 5.

Castle Towers WTP

The Castle Towers Wastewater Treatment Plant was a Class B facility which was recently decommissioned by the City. This facility treated wastewater from the Castle Tower mobile home community and the Whispering Aspen plat, which consists of single-family residents. The plant treatment consisted of a mechanical component, sand filters, a polishing pond, and sludge drying beds. The disposal was a surface water disposal into Minard Lake. This plant was permitted for 120,000 gallons per day. The wastewater that was previously treated at the Castle Towers WTP is now collected by gravity and discharged to Lift Station No. 2. The lift Station No. 2 forcemain conveys the wastewater to the MCES collection system at Viking Boulevard.

Cedar Creek and East Bethel Community School

The school district has a Class D wastewater facility that services Cedar Creek Community School and East Bethel Community School. Its treatment consists of a trench system with monitoring wells. This plant is permitted for 15,000 gallons of water per day.

Projected Flows to the Facilities

Projected wastewater flows to the MCES Facility, the Village Green Facility and the Cedar Creek/East Bethel Community School are presented in the table below. Projected flows for the MCES Facility are based on the Metropolitan Council population forecasts. Based on the Metropolitan Council population projections, it is estimated that East Bethel will service 3,005 households with its municipal sewer system by 2040. The City anticipates the growth in three separate areas as shown and labeled on Figure 2 as Growth Area A, Growth Area B and Growth Area C.

PROJECTED WASTEWATER FLOWS TO MCES FACILITY					
Year	Population Served by Municipal Sewer	Households Served by Municipal Sewer	Employment Served by Municipal Sewer	Average Annual Flow (MGD)	Peak Month Flow (MGD)
2010	0	0	0	0	0
2020	1,100	427	1,033	0.12	0.41
2030	3,500	1,331	1,258	0.36	1.28
2040	7,380	3,000	2,000	0.82	2.88

PROJECTED WASTEWATER FLOWS TO VILLAGE GREEN FACILITY					
Year	Population Served by CSTS	Households Served by CSTS	Employment Served by CSTS	Average Annual Flow (MGD)	Peak Month Flow (MGD)
2010	430	150	4	0.025	0.030
2020	430	150	4	0.025	0.030
2030	430	150	4	0.025	0.030
2040	430	150	4	0.025	0.030

PROJECTED WASTEWATER FLOWS TO CEDAR CREEK/EAST BETHEL SCHOOL					
Year	Population Served by CSTS	Households Served by CSTS	Employment Served by CSTS	Average Annual Flow (MGD)	Peak Month Flow (MGD)
2010	0	0	50	0.011	0.012
2020	0	0	50	0.011	0.012
2030	0	0	50	0.011	0.012
2040	0	0	50	0.011	0.012

Collection System

Both MCES and East Bethel own and operate wastewater collection systems within East Bethel. The existing MCES collection system is shown on Figure 1. The City's existing and proposed collection system is shown on Figures 2 through 5. Proposed system improvements are discussed on Page 8.

New Community or Cluster Treatment Systems

The City of East Bethel will allow for development consistent with providing a public sanitary sewer collection, treatment, and disposal system to serve the areas within the corporate boundary. Community or cluster wastewater treatment systems may be considered when municipal sanitary sewer collection systems are not readily accessible. The community or cluster systems will provide for easier future connections at a lower overall economic impact. All privately owned wastewater systems will be required to procure all regulating agency approvals. It is anticipated that these systems would be privately owned and operated.

Infiltration/Inflow (I/I) Criteria

East Bethel's collection system is less than six years old. The design and construction of new sewers and the connection of new buildings to the sewer system in East Bethel will meet the industry standards for tightness and minimize the entry of I/I into the collection system.

The City of East Bethel standards meet the State of Minnesota requirements. All new sewers are designed and installed so leakage into the sewer is less than 100 gallons per day per inch-diameter per mile of sewer. To ensure compliance with this standard, the City of East Bethel requires on-site construction observation during construction and verification testing prior to acceptance of the public improvements. Certification by a professional engineer that new facilities are installed in accordance with all specifications is also required. Records of these certifications will be maintained by the City.

To ensure that all municipal utilities are properly constructed and meet all state, federal, and local requirements, the City of East Bethel has prepared an Engineering Manual that addresses the material and workmanship that will be required for all municipal improvements. The Engineering Manual was adopted by City Council on March 2, 2005. The Engineering Manual requires that all sanitary sewer facilities and water work be designed to conform to the "10 State Standards" and be constructed in accordance with City Engineers Association of Minnesota Standard Specification except as modified by specific City of East Bethel requirements.

The connection of building laterals to the local sewer system will be permitted by the building department. A licensed plumber shall certify that the connection was made in accordance with the building code.

Ordinances

East Bethel has adopted an ordinance that prohibits the connection of roof leaders, foundation drain tile, and sump pumps from new construction to the sanitary sewer system. Section 74-197 of the City Code states the following:

The City reserves the right to regulate the disposal of any waste through the sanitary sewer system both in quantity and character.

- (1) No person shall discharge or cause to be discharged any stormwater, surface water, groundwater, roof runoff, subsurface drainage, cooling water or unpolluted industrial process waters to any sanitary sewer.
- (2) Stormwater and all other unpolluted drainage shall be discharged to such sewers as are specifically designed as storm sewers or to a natural outlet approved by the City Administrator to a storm sewer or natural outlet.

Maintenance Program

East Bethel has developed a Sanitary Sewer Maintenance Policy, which includes an ongoing sewer cleaning and inspection program as part of the routine maintenance of the collection system. I/I sources are often identified during inspection and include open and leaking sewer joints, cracked pipes, missing joint gaskets, pick holes in manhole covers, and offset manhole frames. A copy of the policy is included as Attachment 1.

Individual Sewage Treatment

The majority of wastewater disposal in the City is by individual on-site systems. The existing sanitary sewer systems consist of septic tanks, dry wells and drain fields, and other on-site treatment systems, the exact combination of which is not summarized.

Many of the ISTS systems in the proposed municipal service area were old and previous reports indicate a number of systems were both failing and/or are non-conforming systems. Specifically, the southern portion of the City currently includes areas that have both higher ground water elevations and poorer soils, making construction of new systems both difficult and expensive.

In the last 5 years the existing businesses south of Viking Boulevard and west of Trunk Highway 65 have abandoned their ISTS systems and connected to the City system. With the construction of a new service road between 187th Lane and Viking Boulevard in 2017, along with the extension of trunk sewer facilities, the Our Saviors Church campus will be connecting to the sewer and water systems in 2018. The City is currently in the process of completing construction plans to extend services on the east side of Trunk Highway 65. This project will provide City sewer and water service to all the existing businesses between 184th Avenue and 187th Lane.

The Coon Lake Area is a heavily developed lakeshore area with older homes and smaller platted lots. Reconstruction of existing systems is limited based on the availability of adequate lands, high water table, and general terrain of the area. The City recently sponsored a project to assist with the replacement of the ISTS system in the Coon Lake area.

The City of East Bethel has adopted, by reference and as amended, the Individual Sewage Treatment Standards of the Minnesota Pollution Control Agency, cited as Minnesota Rules 7080 and 7081. This section of the City's Code outlines restrictions and requirements for the evaluation of treatment sites and the installation, construction, and maintenance of individual sewage treatment systems. The City's Code regulating Individual On-site Sewage Treatment Systems is included in Attachment 2. Attachment 3 provides a list of the known non-complaint ISTS systems.

Projected Flows to Individual Sewage Treatment Systems

Projected wastewater flows to Individual Sewage Treatment Systems (ISTS) are presented in the table below. Projected flows are based on the Metropolitan Council population forecasts.

PROJECTED WASTEWATER FLOWS TO ISTS				
Year	Population Served by ISTS	Households Served by ISTS	Employment Served by ISTS	Average Annual Flow (MGD)
2010	11,196	3,910	1,069	1.07
2020	10,870	4,123	613	1.13
2030	11,470	4,519	638	1.23
2040	10,590	4,250	146	1.16

Policies

Policy 1

It is the policy of the City of East Bethel to prevent and eliminate infiltration and inflow problems within the sanitary sewer system.

Policy 2

It is the policy of the City of East Bethel to extend and upgrade its sanitary sewer collection system in a staged manner consistent with the staged growth plan of the City.

Policy 3

It is the policy of the City of East Bethel to provide a sanitary sewer collection system within the City's boundary consistent with the staged growth plan.

Policy 4

It is the policy of the City of East Bethel to provide a sanitary sewer collection system for all areas considered for annexation.

MUNICIPAL WATER SERVICE

The City of East Bethel water distribution system currently has 62 residential connections and 15 Commercial connections. The average day (AD) demand is approximately 40,000 gallons. The City's existing and proposed municipal water system improvements are shown on Figure 6 through 8.

East Bethel currently has two separate public water supply and distribution systems. One system is on the north end of the City and the other system is on the south end of the City. The north system is shown on Figure 6 and the south system is shown on Figure 8. These systems currently provide municipal water service to the customers previously discussed. All other residential and non-residential properties are served by private wells.

The table below summarizes the estimated storage and water supply needs through 2040 broken out by growth area.

DESCRIPTION	AREA A	AREA B	AREA C
Required Fire Flow (gpm)	2,500	2,500	2,500
Fire flow Duration (hrs)	3	3	3
Total Fire Flow Demand (gals)	450,000	450,000	450,000
Peak Day Demand (mgd)	1.12	2.46	3.03
Peak Day Demand (gpm) ¹	930	2053	2525
3-hour Peak Day Demand (gals)	167,457	369,551	454,566
20% Reserve (gals) ²	223,276	492,734	606,088
Total Water Required (gals) ³	840,732	1,312,285	1,510,654
Total Number of Wells Needed	4	6	5
Number of Existing Wells	2	0	2
Total Number of New Wells Needed	2	6	3
Total Firm Pumping Rate (gpm) ⁴	2,100	3,500	2,800
Total Firm Pumping 3 hour event (gals)	378,000	630,000	504,000
Total Storage Required ⁵	462,732	682,285	1,006,654
Existing Storage Available (gals)	0	0	500,000
Storage Tank Construction (gals)	500,000	750,000	500,000
¹ Peak day demand rate based on 20-hour day. ² Reserve is 20% of peak day demand volume. ³ Total water required = total fire flow demand + 3-hour peak day demand + 20% reserve. ⁴ Projected firm well capacity based on all wells in service except the highest capacity well. ⁵ Total storage required = total water required - total firm pumping 3-hour event.			

System Improvements

Proposed system improvements are discussed below.

East Bethel Policies

It is the policy of the City of East Bethel to fulfill Minnesota Statutes Section 103G.291, which requires cities with a municipal water supply system to develop a Water Supply Plan. The City of East Bethel's Water Supply Plan is currently under review by the Minnesota Department of Natural Resources. The Water Supply Plan is included as Attached 4.

PROPOSED SYSTEM IMPROVEMENTS

This Section summarizes the sewer and water trunk facilities needed in the 2040 growth areas. Trunk sizes and facility improvements are designed to handle the 2040 growth areas when they are fully developed. The estimated ERU's at full development are included in Attachment No. 1.

Growth Area A

Growth Area A is generally between 237th Avenue and the north City limit. A portion of this area is currently served by city sewer and water. The current service area includes the Castle Towers mobile home park and the Whispering Aspen plat. This area has 2 existing wells and 2 existing lift stations. Water treatment is limited to chlorine, fluoride, and the addition of polyphosphate.

Existing Capacity

Lift Station 1 exclusively services the Castle Towers Mobile Home Park. Lift Station 1 discharges to Lift Station 2 via force main and gravity sewer. Existing Lift Station 2 will service Growth Area A. The construction of this lift station was initiated to allow for the decommissioning of the Castle Towers WTP. This lift station discharges at Viking Boulevard through a 10-inch force main which is shown on Figure 3.

2040 Capacity Needs

The immediate need for this area is water storage. The system currently operates with two pneumatic tanks which provide negligible storage. As shown on the table in Section 2.0, it is estimated that this area will require 2 additional wells and 500,000 gallons of storage when fully developed. The capacity of Lift Station 2 is currently limited by the force main size. The lift station capacity is approximately 650 gpm. It is anticipated that an additional force main will be constructed to provide the fully developed capacity of 1,000 gpm. The additional forcemain will also significantly increase the system reliability by providing a redundant pipe.

Growth Area B

Growth Area B is generally between 207th Avenue and 225th Avenue. This area is not currently served by city sewer and water.

Existing Capacity

There are no existing City sewer and water improvements in this area.

2040 Capacity Needs

As shown on the table in Section 2.0, it is anticipated that this area will require 6 wells and 750,000 gallons of storage when fully developed. Lift Station 3 and 4 are proposed to service the north portion of Growth Area B. The estimated capacity required for Lift Stations 3 and 4 are 500 gpm and 600 gpm respectively. The remaining area could be serviced by extending the gravity sewer trunk that is currently just south of Viking Boulevard. Although it is technically feasible to extend the gravity line from Viking Boulevard, it may be more cost effective to construct Lift Station 5, either as a temporary or permanent facility, to provide Growth Area B with sewer service. Additional study will be required to determine the most cost-effective solution for providing this area with sewer service. The initial estimated design capacity for Lift Station 5, assuming it will also collect waste from Lift Stations 1-4, is 3,100 gpm.

Growth Area C

Growth Area C is generally between the south City limit to ¼ mile north of Viking Boulevard. A portion of this area is currently serviced by sewer and water. The current service area is general south of Viking Boulevard and west of Trunk Highway 65. This area has 2 existing wells, one 500,000-gallon elevated storage tank, and one water treatment plant. Waste water treatment is provided by the MCES Facility.

Existing Capacity

The capacity of the two existing wells and the existing water treatment plant are 1,400 gpm and 1,000 gpm respectively. As previously discussed, there is also a 500,000-gallon elevated water storage tank. The current capacity of the MCES Facility is approximately 470,000 gallons per day.

2040 Capacity Needs

Other than extending trunk sewer and water facilities to expand the service area, Growth Area C does not have any immediate capacity needs. As shown on the table in Section 2.0 it is estimated that this area will require 3 new wells and 500,000 gallons of additional water storage when fully developed.

Capital Improvement Costs

East Bethel has estimated the capital improvement costs for each growth area. Costs for three scenarios were reviewed. The three scenarios were as follows:

Scenario 1 – Street, trunk sewer and trunk water improvements and water treatment.

Scenario 2 – Trunk sewer and trunk water improvements without street improvements.

Scenario 3 – Trunk sewer and trunk water improvements without street improvements or water treatments.

The total cost for each scenario is summarized below:

DESCRIPTION	GROWTH AREA A	GROWTH AREA B	GROWTH AREA C	TOTAL
Scenario 1	\$20,964,000	\$42,277,000	\$21,432,000	\$84,673,000
Scenario 2	\$16,869,000	\$35,647,000	\$17,402,000	\$69,918,000
Scenario 3	\$10,109,000	\$24,337,000	\$11,552,000	\$45,998,000

Detailed cost estimates are included in Attachment 5.

SURFACE WATER MANAGEMENT

The City of East Bethel is located within the borders of the Upper Rum River and Sunrise River Watershed Management Organizations. The City of East Bethel last updated their Local Surface Water Management Plan (LSWMP) in April 2011. The Upper Rum River Watershed Management Organization (URRWMO) had their Watershed Management Plan approved by Board of Water and Soil Resources (BWSR) on April 25, 2007. The URRWMO is currently working on their 2017-2018 Water Management Plan. A draft of this plan is currently being reviewed by BWSR. The Sunrise River Watershed Management Organization (SRRWMO) had their Watershed Management Plan approved by BWSR in the Year 2010. The City of East Bethel has 2 years to update their Local Water Management Plan once the WMO plans are updated and approved by the BWSR. The URRWMO's and SRRWMO Watershed Management Plan's require member communities to adopt and implement the Plan's requirements.

East Bethel Local Surface Water Management Plan

The East Bethel Local Water Management Plan (Plan) includes the elements required by the URRWMO, SRRWMO and the Metropolitan Council. Minnesota Statute 103B and the resulting Minnesota Rules Chapter 8410 guided the requirements of the Plan. The Plan includes procedures to protect, preserve, and use natural surface and groundwater storage and retention systems while minimizing public capital expenditures needed to correct flooding and water quality problems. The Plan identifies means to effectively protect and improve surface and groundwater quality in East Bethel. It also establishes more uniform local policies and official controls for surface and groundwater management. Procedures are included to prevent erosion of soils into surface water systems, promote groundwater recharge, protect and enhance fish and wildlife habitat and water related recreational facilities, and to secure other benefits associated with the proper management of surface and groundwater. A copy of the Current East Bethel Local Water Management Plan is included as Attachment 6.

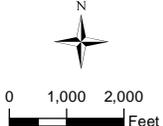
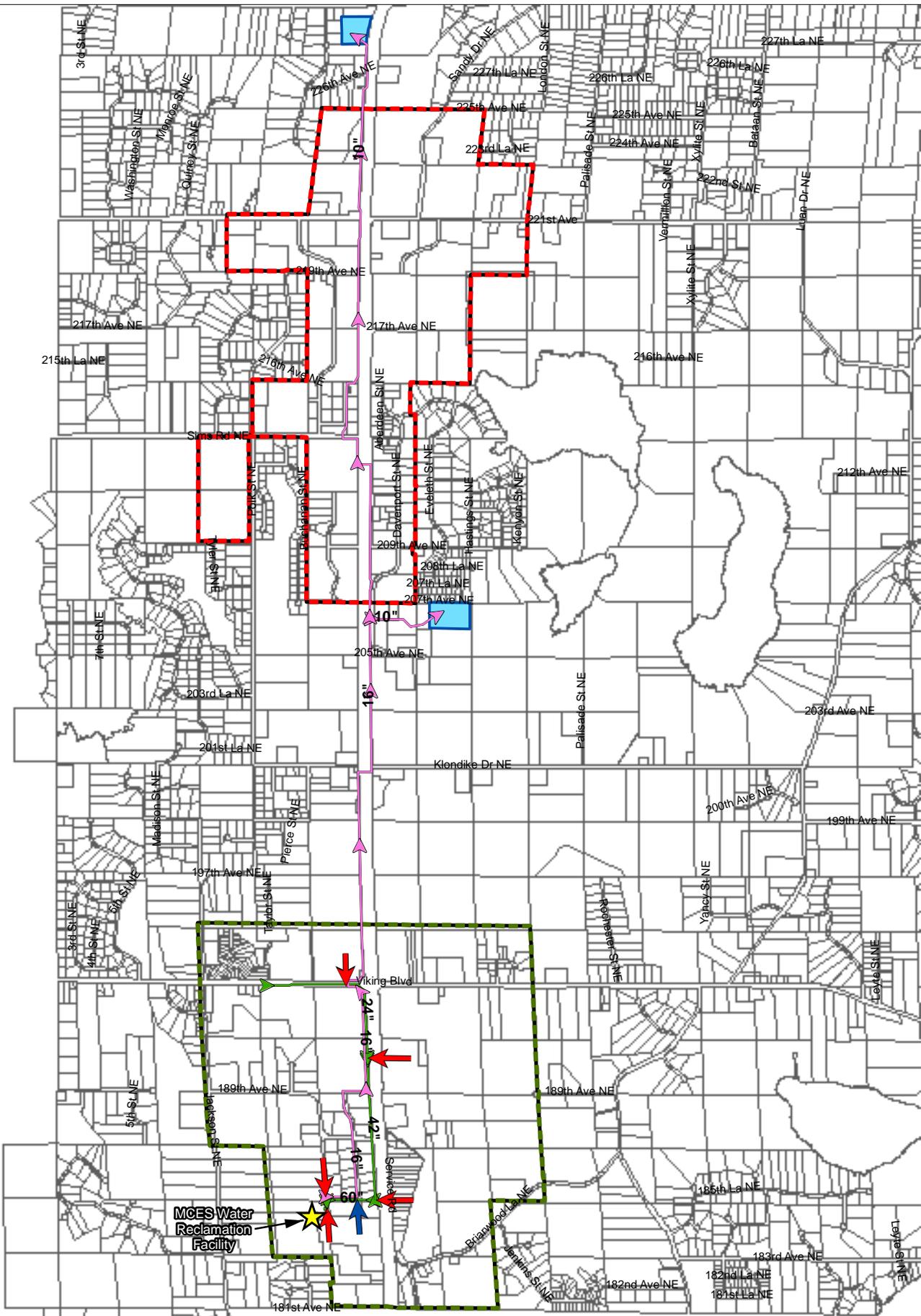
Impaired Waters

East Bethel has three water bodies on the 303d Impaired Waters List. The water bodies include Coon Lake, Cedar Creek and Crooked Brook. Coon Lake is impaired for mercury, Cedar Creek for escherichia coli and Crooked Brook for dissolved oxygen. The TMDL study is complete for Coon lake and the target dates for completion of the TMDL for Cedar Creek and Crooked Brook are 2018 and 2027, respectively.

Groundwater Protection

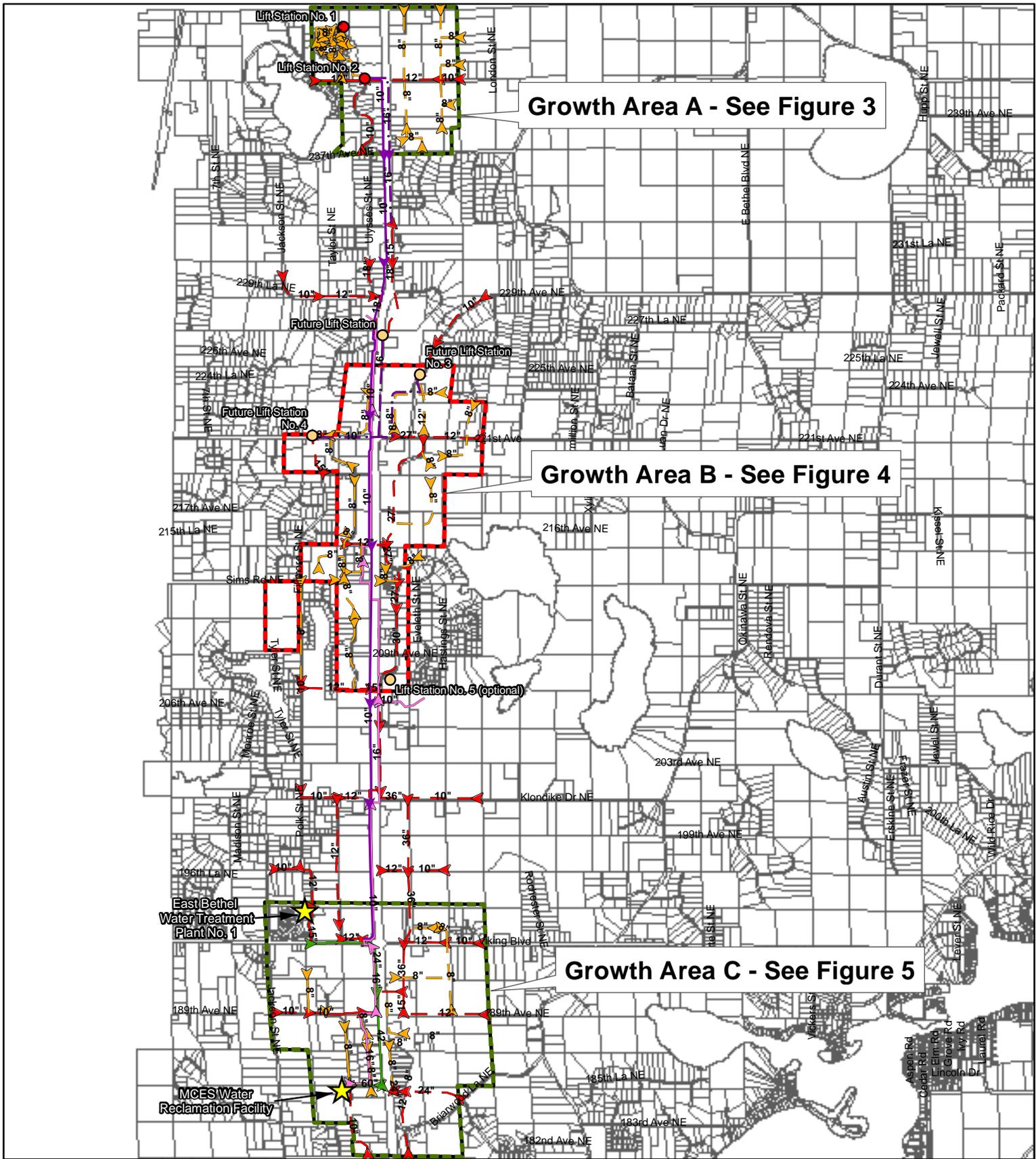
The City recognizes the importance of groundwater sensitivity and has established environmental protection policies that will enhance protection of groundwater in the City and the region. The City will ensure protection of local groundwater through implementation of its Local Water Management Plan, its ordinances regulating private on-site sewage treatment systems, its Water Supply Plan, its Wellhead Protection Plan, and its other applicable Ordinances.

FIGURES



- Legend**
- Existing Connections
 - Future Connections
 - MCES Sewer Trunk
 - MCES Reclaimed Water Forcemain
 - Infiltration Sites
 - 2030 MUSA
 - 2040 MUSA

Figure 1
Existing MCES System



Growth Area A - See Figure 3

Growth Area B - See Figure 4

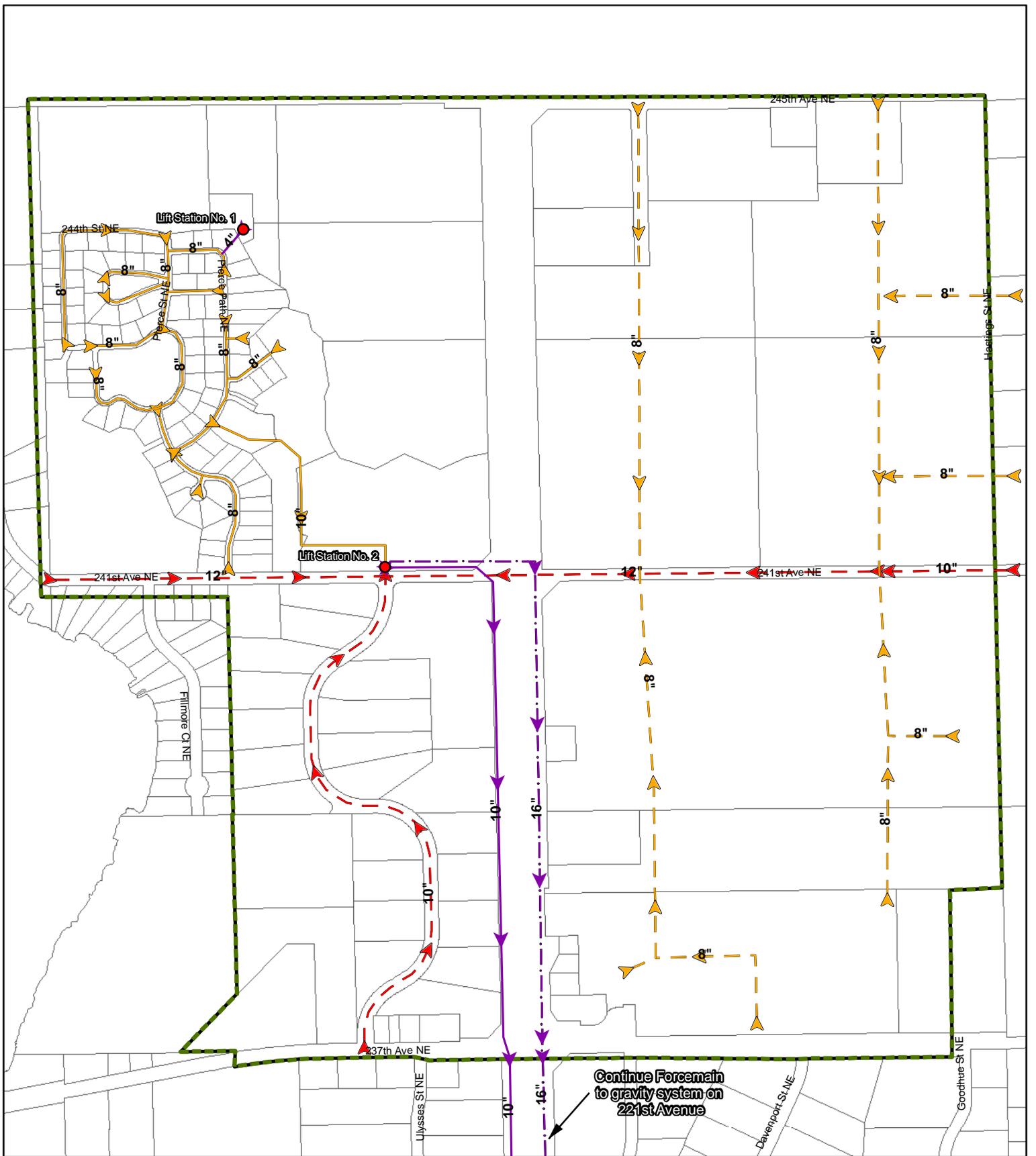
Growth Area C - See Figure 5

0 3,000 6,000
FEET

Legend	
	Existing City Sewer Trunk
	Proposed City Sewer Trunk
	Existing City Sewer Lateral
	Proposed City Sewer Lateral
	Existing City Sewer Forcemain
	Proposed City Sewer Forcemain
	Existing Lift Station
	Future Lift Station
	2030 MUSA
	2040 MUSA
	MCES Reclaimed Water Forcemain
	MCES Sewer Trunk

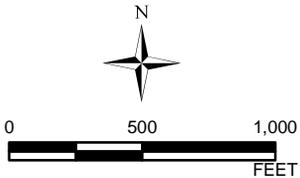
Figure 2
2040 Comprehensive Sewer Plan





Legend

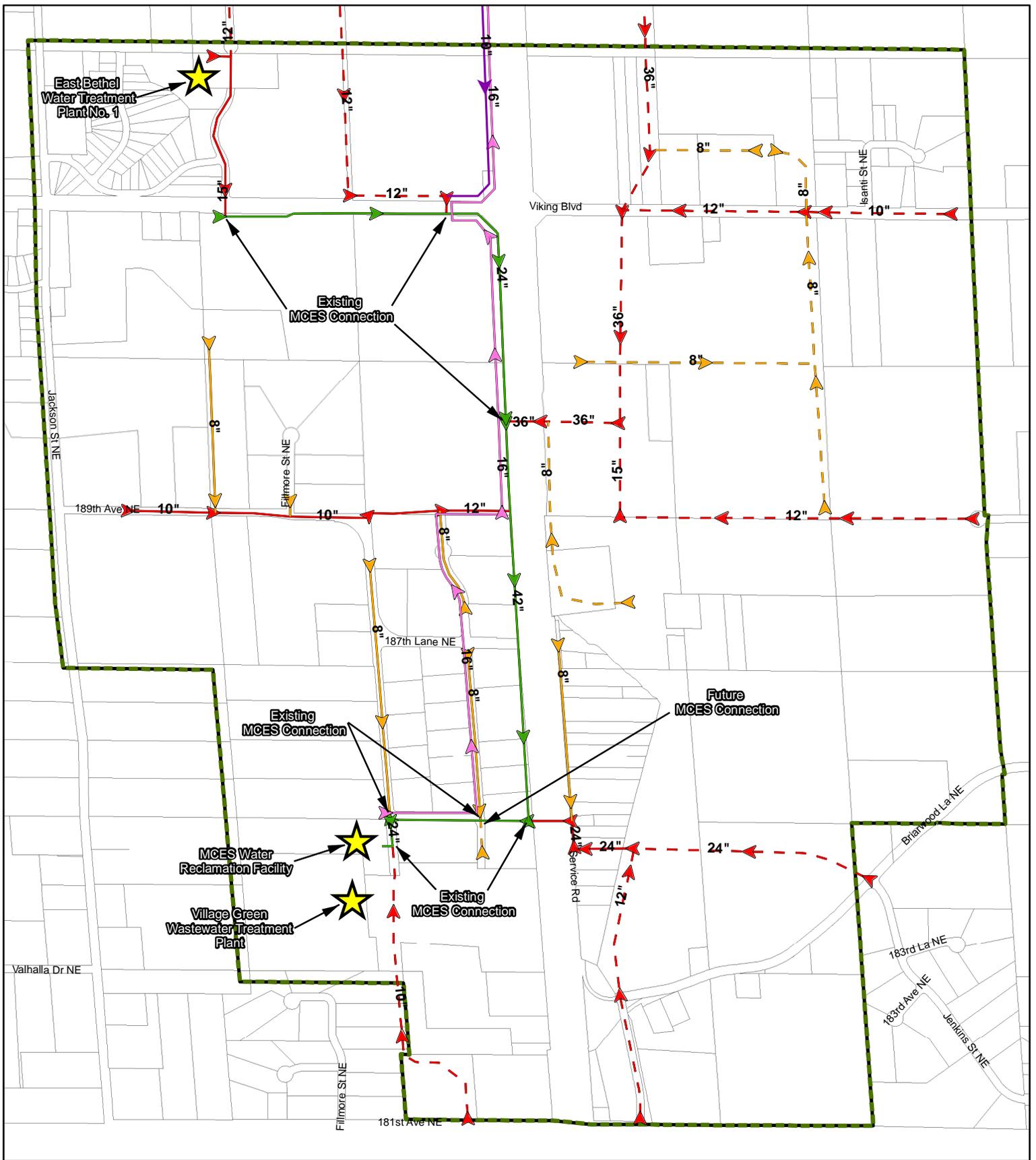
- Existing City Sewer Trunk
- Proposed City Sewer Trunk
- Existing City Sewer Lateral
- Proposed City Sewer Lateral
- Existing City Sewer Forcemain
- Proposed City Sewer Forcemain
- MCES Reclaimed Water Forcemain
- MCES Sewer Trunk
- Existing Lift Station
- Future Lift Station
- 2030 MUSA
- 2040 MUSA



**Hakanson
Anderson**

Figure 3
2040 Comprehensive Sewer Plan
Growth Area - A





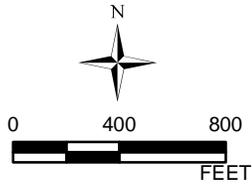
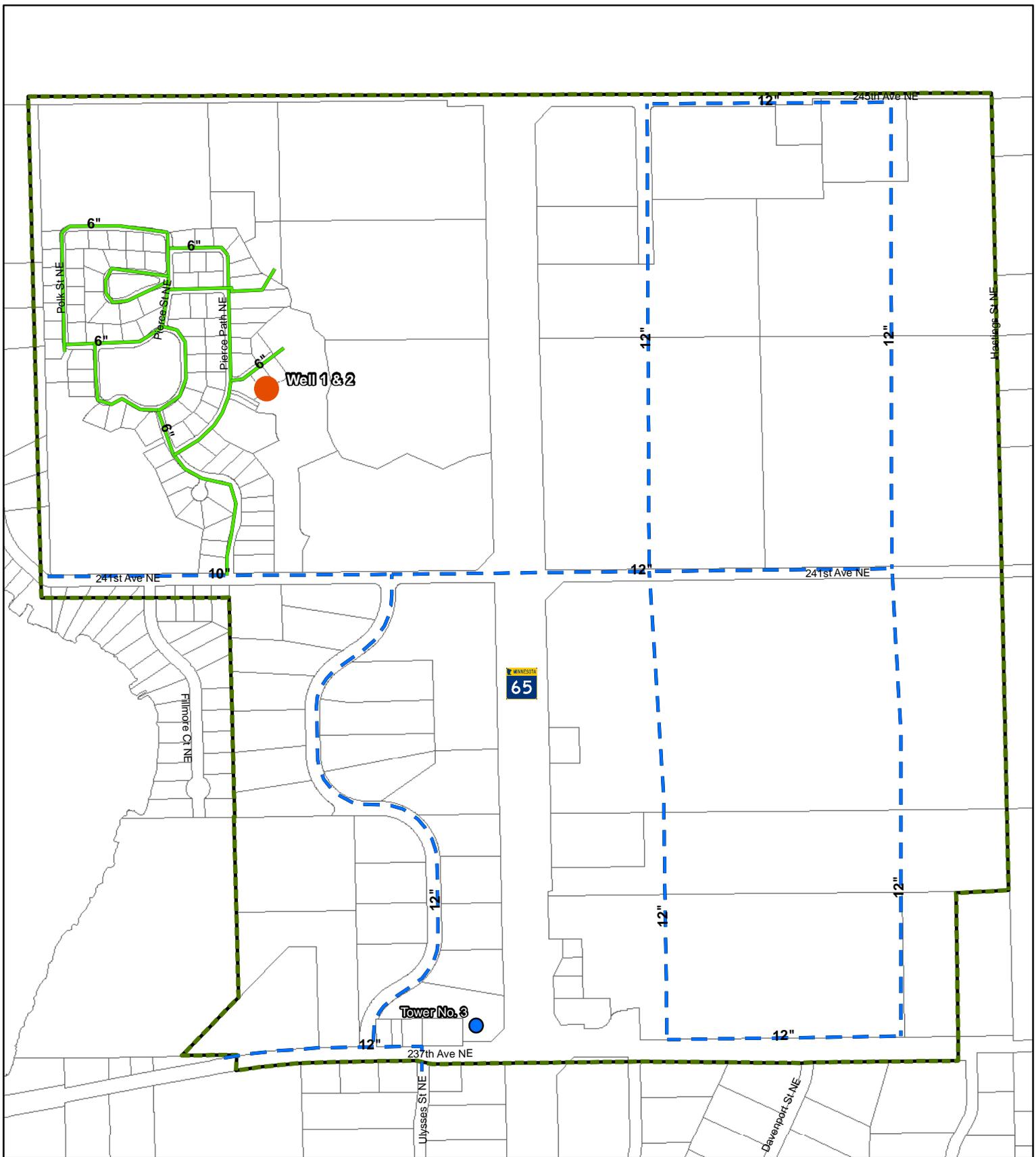
Hakanson
Anderson

Legend

- ▶ Existing City Sewer Trunk
- - -▶ Proposed City Sewer Trunk
- ▶ Existing City Sewer Lateral
- - -▶ Proposed City Sewer Lateral
- ▶ Existing City Sewer Forcemain
- - -▶ Proposed City Sewer Forcemain
- ▶ MCES Reclaimed Water Forcemain
- ▶ MCES Sewer Trunk
- Existing Lift Station
- Future Lift Station
- 2030 MUSA
- 2040 MUSA

Figure 5
2040 Comprehensive Sewer Plan
Growth Area - C



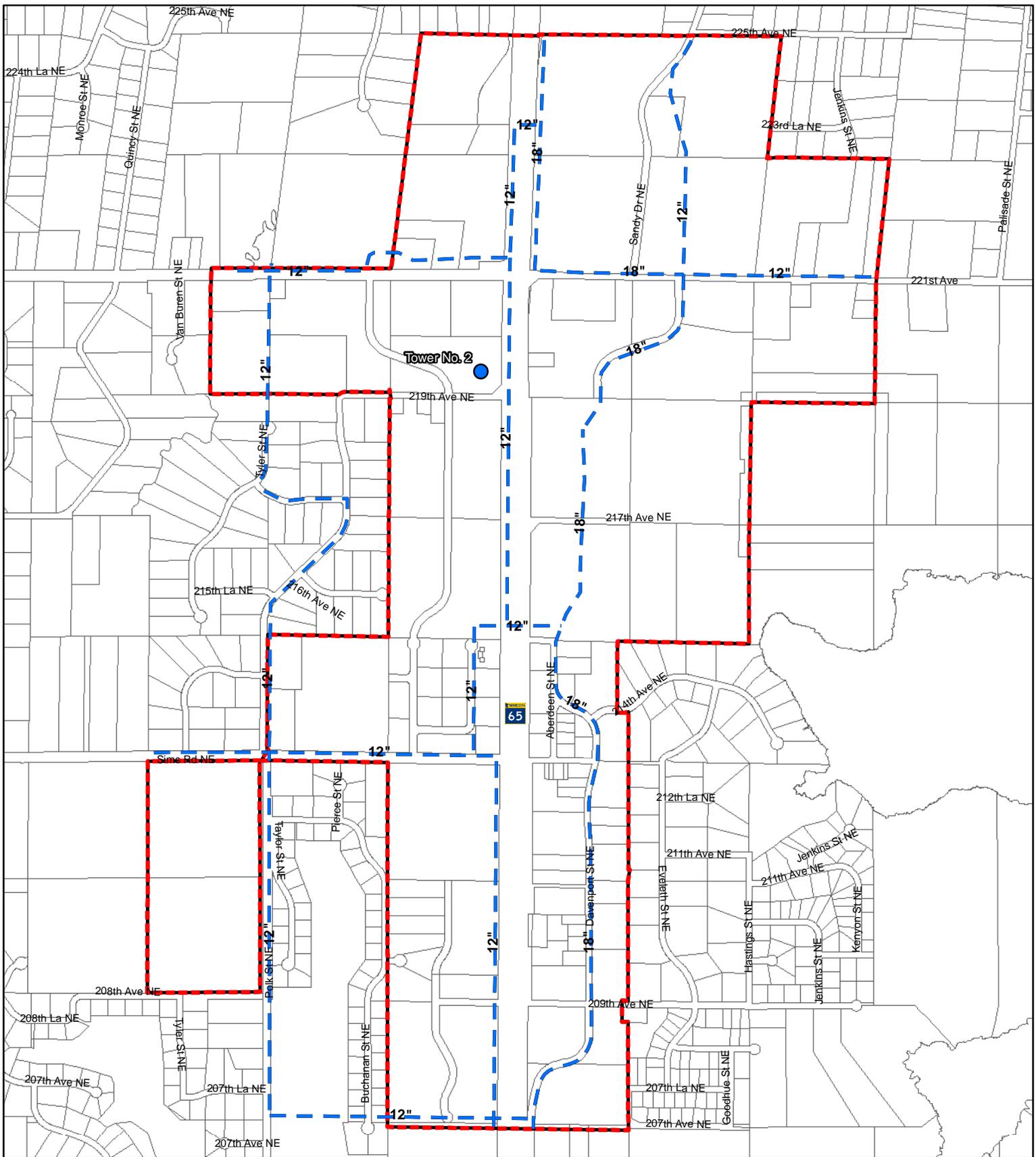


Legend

- Existing City Watermain Lateral
- Existing City Watermain Trunk
- - - Proposed City Watermain Trunk
- Proposed Water Tower
- Existing Water Tower
- Parcels
- 2030 MUSA
- 2040 MUSA
- Existing Well

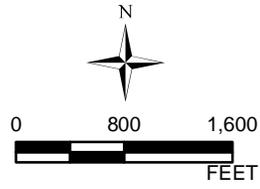
Figure 6
2040 Comprehensive Watermain Plan
Growth Area - A





Tower No. 2

65



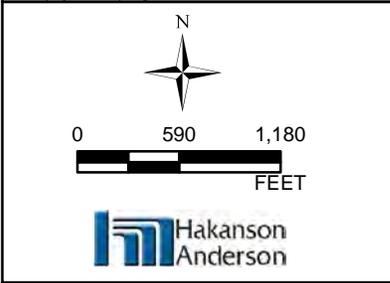
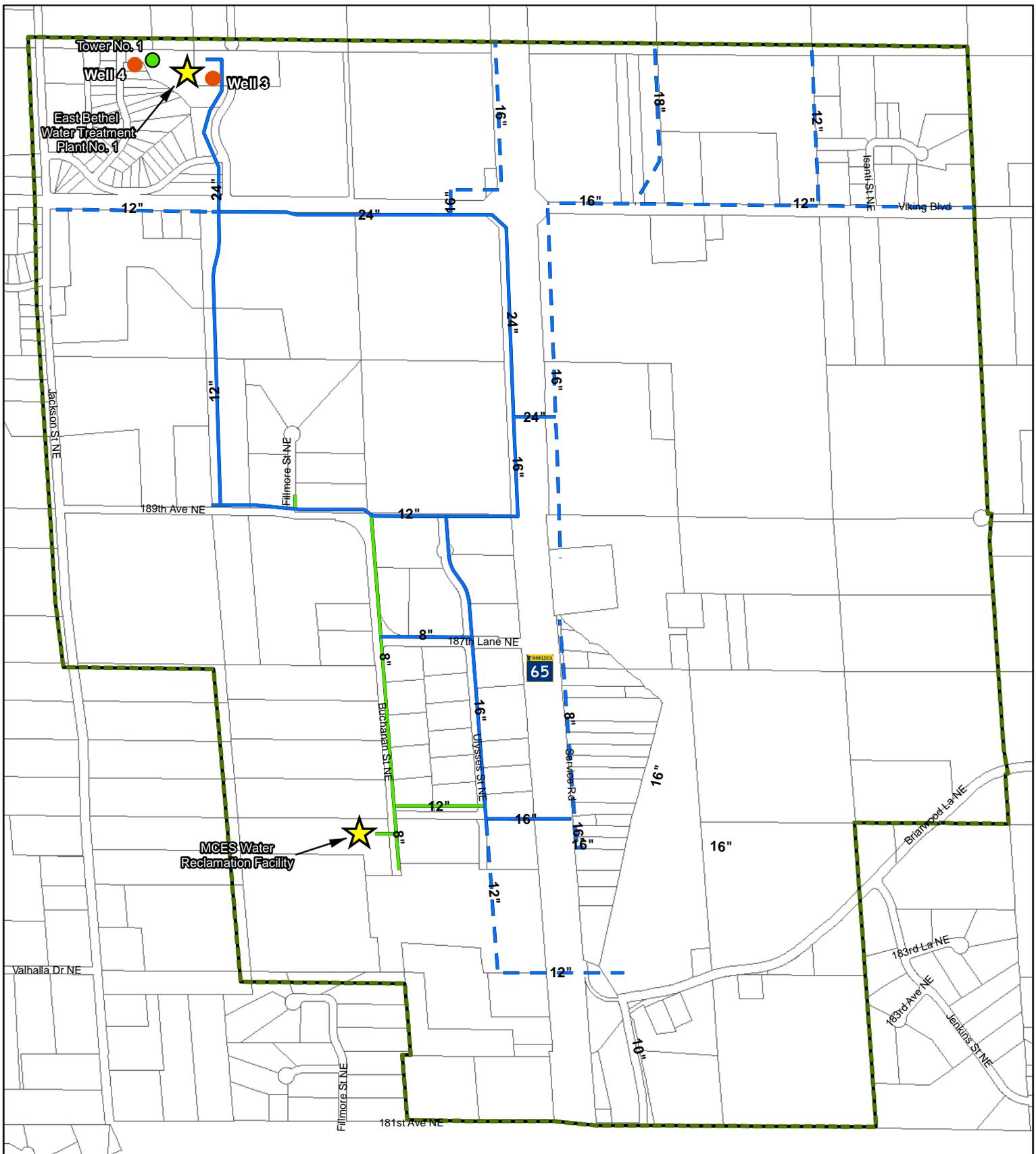
**Hakanson
Anderson**

Legend

- Existing City Watermain Lateral
- Existing City Watermain Trunk
- - - Proposed City Watermain Trunk
- Proposed Water Tower
- Existing Water Tower
- Parcels
- 2030 MUSA
- 2040 MUSA
- Existing Well

Figure 7
2040 Comprehensive Watermain Plan
Growth Area - B





Legend	
	Existing City Watermain Lateral
	Existing City Watermain Trunk
	Proposed City Watermain Trunk
	Proposed Water Tower
	Existing Water Tower
	Parcels
	2030 MUSA
	2040 MUSA
	Existing Well

Figure 8
2040 Comprehensive Watermain Plan
Growth Area - C

ATTACHMENT 1

Sanitary Sewer Maintenance Policy and ERU Calculations



Sanitary Sewer Maintenance Policy

1. Purpose

It is the policy of the City of East Bethel to comply with all applicable state and federal regulatory requirements.

The City intends to provide effective and efficient maintenance to its sanitary sewer system by evaluating political, social, safety, and economic concerns, among others. Procedures identified in this policy are intended to maintain the sanitary sewer system to prevent sewer backups. These procedures, when implemented, may also extend the service life of various components of the sanitary sewer system.

The City has 7353 feet of public sanitary sewer mains, 49 manholes and 2 lift stations within the Castle Towers Waste Water Treatment service area. The City also has 6897 feet of public sanitary sewer mains, 24 manholes and 32,276 feet of force main within the Metropolitan Council Environmental Services Waste Water Treatment Plant service area.

Procedures identified in this policy are intended to maintain the City's sanitary sewer system to prevent sewer backups and to extend the life of the system. The City has developed and implemented this policy that takes into consideration public safety, the City's budget and personnel, environmental concerns, and the cost of implementation versus the benefit to be achieved. The City will use its employees, equipment and/or private contractors to provide this service.

While the City fully intends to meet the guidelines established in this policy, there may be times when this is not feasible. Issues including, but not limited to, budget constraints, critical equipment failure, or weather and other emergencies may prevent the City from meeting the guidelines established herein. The Public Works Manager may override provisions established within this policy. Deviations from the goals established in this policy will be documented.

The City will use this policy to guide any sanitary sewer maintenance activities to be provided by a contractor or a party other than the City.

2. Routine Maintenance and Inspection Goals

A. Sanitary Sewer Mains

Scope of City's Responsibility - The City will maintain the components of the public sanitary sewer system. This includes sanitary sewer mains, manholes, lift stations, waste water treatment plants, and other components. Private property owners are responsible for the maintenance of sanitary sewer components from their property up to and including the connection to the public system.

Schedule – The City's goal is to inspect and maintain the components of its sanitary sewer system on a regular basis.

Equipment – The equipment used to perform maintenance will depend upon the equipment available and its effectiveness as determined by qualified staff.

Television Inspection – The City’s sanitary sewer mains will be inspected routinely by television. Sanitary sewer mains in a new development must be televised before said mains are turned over to the City. Television inspection may also be used to inspect the system where there are possible problems. In addition, the City may require any main near a construction site to be televised before and after the construction (i.e., near blasting, digging, street maintenance or reconstruction, other activities that might disrupt the main, etc.)

Visual recordings of sewer main televising will be required of any vendor performing this service for the City. A written report summarizing and interpreting the findings of the televising will also be required. These records will be kept by the City for a minimum of 12 years.

B. Sanitary Sewer Lift Stations

The City maintains lift stations using specific maintenance that is reasonable and recommended. The number of lift stations, location, date of installation, and capacity of each lift station is kept on record. Maintenance for each lift station is reflected in Standard Operating Procedures (SOP) and Standard Maintenance Procedures (SMP).

Components of SOP and SMP include:

- Easy availability of original manuals with manufacturers’ recommended maintenance schedules for all lift station equipment
- Operating procedures for manipulating pump operations (manually or automatically) during wet weather to increase in-line storage of wet weather flows
- Setting wet well operating levels to limit pump start/stops
- Cleaning wet well
- Calibrating flow meters or conducting draw down tests
- Regular rotation of lead, lag, and backup pumps
- Regular inspections of lift station, alarm systems and electrical components
- Maintenance of operation logs and general records for all lift station activities, including inspections
- Clean force mains
- Identify problem areas/components

3. Inflow and Infiltration

Inflow and infiltration occur when clear water gets into the sanitary sewer system. This may occur through cracks or leaks in the sewer pipes and manholes or through sump pumps incorrectly connected to the sanitary sewer system. Inflow and infiltration can lead to backups, overflows and unnecessary and expensive treatment of clear water.

City employees will periodically inspect manholes to identify any that contribute to this problem. Sanitary sewer mains will be maintained and inspected pursuant to the City’s Sanitary Sewer Maintenance Policy.

4. Personnel Responsibilities and Requirements

A. Exercise of Professional Judgment

It is expected that City employees, in accordance with their job duties and responsibilities, will exercise their professional judgment in the implementation of this policy. Further, it is expected that in emergency situations (see Emergency Response Policy) City employees will be required to exercise their discretion and weigh political, social, and economic considerations including but not limited to public and employee safety, the potential for damage to private property and the City sanitary sewer system, and environmental concerns.

B. Training and Education

The City will provide training to employees responsible for maintenance of and emergency response to issues with the sanitary sewer system. Training of employees will include education necessary to earn and maintain appropriate operator certifications. Training will also address standard operating procedures, proper use of equipment, emergency response and other topics required by state and federal regulatory agencies.

C. Work Schedule

Full-time City employees in the Public Works Department will be expected to work eight-hour shifts. In emergencies, employees may be required to work in excess of eight hours. Budget and safety concerns may limit the length of time an employee is permitted to work.

D. Weather Conditions

Regular sewer maintenance operations will be conducted only when weather conditions do not endanger the City employees and equipment. Factors that may delay sewer maintenance operations include, but are not limited to: severe cold, severe heat, flooding, rain, snow and other severe weather events.

5. Documentation

The City will document all of its inspection and maintenance activities and emergency responses for its sanitary sewer system. The City will also document circumstances that limit its ability to comply with this policy. A report should be prepared periodically for the purpose of evaluating maintenance activities and for determining goals for the future. These records will be kept in accordance with the City's records retention schedule.

6. Public Education

Periodically, the City will inform residents of their responsibilities related to sanitary sewer service from the City of East Bethel.

7. Other Sanitary Sewer System Policies

The City has a number of other policies and/or ordinances that are important to the ongoing operation of the City's sanitary sewer system. The following documents are available on the City's web site and in the public works department.

- Sanitary Sewer Emergency Response Policy
- Sanitary Sewer Ordinance

Area A

Land Use Category	Net Area (Acres)	ERU's per Acre	Total ERU'S
Low Density Residential	128	3	382.8
Medium Density Residential	92	7.5	686.475
Light Industrial	153	1	153.25
Medium Industrial	149	2	298.62
Commercial	0	4	0
Mixed Use	22	5	110
Public	0	3	0
Park/ Natural Area	2	0	0
		Subtotal	1,631

Area B

Land Use Category	Net Area (Acres)	ERU's per Acre	Total ERU'S
Low Density Residential	40	3	121.2
Medium Density Residential	28	7.5	208.35
Light Industrial	94	1	94.23
Medium Industrial	0	2	0
Commercial	274	4	1095.08
Mixed Use	368	5	1840
Public	78	3	233.76
Park/ Natural Area	0	0	0
		Subtotal	3,593

Area C

Land Use Category	Net Area (Acres)	ERU's per Acre	Total ERU'S
Low Density Residential	89	3	265.8
Medium Density Residential	155	7.5	1162.125
Light Industrial	95	1	95.43
Medium Industrial	0	2	0
Commercial	110	4	438
Mixed Use	469	5	2345
Public	34	3	101.94
Park/ Natural Area	0	0	0
		Subtotal	4,408

Total ERU'S	9,632
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ATTACHMENT 2

City's Code Regulating Individual On-
Site Sewage Treatment Systems

ARTICLE II. - SEWAGE TREATMENT¹¹

Footnotes:

--- (1) ---

Editor's note— Ord. No. 50, Second Series, adopted Nov. 5, 2014, amended Art. II in its entirety to read as herein set out. Former Art. II, §§ 74-19—74-42, pertained to similar subject matter, and derived from Ord. No. 61F, §§ 1—10, adopted Feb. 16, 2005; Ord. No. 61G, §§ 1—11, adopted Oct. 18, 2006.

Sec. 74-19. - Purpose and intent.

The purpose of the sewage and wastewater treatment and disposal standards shall be to provide minimum standards for and regulation of Subsurface Sewage Treatment Systems (SSTS) and septage disposal, including the proper location, design, construction, operation, maintenance and repair to protect surface water and groundwater from contamination by human sewage and waterborne household and commercial waste; to protect the public's health and safety, and eliminate or prevent the development of public nuisances pursuant to the authority granted under Minnesota Statutes §§ 145A.05, 115.55 and Minnesota Rules chapter 7080 through 7083 as amended, that may pertain to sewage and wastewater treatment in the city.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-20. - Applicability.

This article shall apply to those sites, properties or facilities which are licensed, permitted, or otherwise regulated by city ordinance, and/or located within the city.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-21. - Authority.

The ordinance from which this article is derived is adopted pursuant to the authorization contained in Minn. Stats. §§ 145A.05, 115.55, and Minnesota Administrative Rules Chapter 7082.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-22. - Administration.

This article shall be administered by the city building department. The term "department" where used in this article, means the city building department.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-23. - Minnesota rules adopted.

Minnesota Administrative Rules Chapters 7080 through 7083, along with any future amendments relating to subsurface sewage treatment systems, are hereby adopted by reference and made a part of this article as if fully set forth herein.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-24. - System abandonment.

Septic tanks that are no longer intended to be used must be abandoned. Septic tanks must be pumped and removed, crushed, or filled in with sand. A septic system, or component thereof, that is no longer intended to be used must also be abandoned in accordance with Minnesota [Administrative] Rules Chapter 7080.2500. The contractor must also fill out a Minnesota SSTS abandonment reporting form and submit a copy to the city.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-25. - Enforcement.

- (a) Violation of any condition imposed by the city on a license, permit or variance, or any false statement shall be guilty of a misdemeanor, punishable as provided in section 1-14.
- (b) Work conducted without a permit or inspections shall be deemed an Imminent Public Health and Safety Threat and shall be discontinued within 24 hours. Any person performing SSTS work, or installed an SSTS without the required permit shall be guilty of a misdemeanor, punishable as provided in section 1-14.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-26. - Permits.

- (a) No person shall install, alter, or extend any sewage treatment system in the city without first applying for and obtaining a permit from the building department and, at the same time, paying a fee as listed in the fee schedule determined by resolution by the city council. When all the requirements are met a permit will be issued. Such permit shall be valid for a period of 12 months from the date of issuance.
- (b) Work on a septic system shall only be performed by a Minnesota certified SSTS person with the appropriate business license. Any person performing work on a septic system without the required licenses or in violation of this article is guilty of a misdemeanor, punishable as provided in section 1-14.
- (c) Permit fee shall be doubled for any work conducted without first obtaining a permit.
- (d) A full septic design meeting the requirements of Minnesota [Administrative Rules] Chapter 7080 or Chapter 7081 must be submitted before a building permit for new construction is approved. The septic design and house plans must indicate the same number of bedrooms. In the event there is a discrepancy in the number of bedrooms, the building permit will not be issued until the discrepancy is resolved to the satisfaction of the building department.
- (e) Permit applications for new and replacement SSTS shall include a management plan for the owner that includes a schedule for septic tank maintenance.
- (f) When weather does not allow a full site evaluation to be completed, a design of the worst case scenario shall be submitted. Worst case scenario shall be a mound system, septic tanks and lift station. When weather permits, a full site evaluation and a new design may be submitted to the building department for review.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-27. - Operating permit.

An operating permit shall be required of all owners of new holding tanks, type IV and V systems; MSTs and other SSTs that the department has determined requires operational oversight. Application for an operating permit shall be made on a form provided by the department or by the state. The owner of holding tanks installed after the effective date of this article shall provide the department with a copy of a contract with a licensed sewage maintenance business for monitoring and removal of holding tank contents.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-28. - Treatment required.

All sewage generated, in unsewered areas shall be treated and dispersed by an approved SSTs or a system permitted by the Minnesota Pollution Control Agency.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-29. - Soil treatment area.

For lots platted after April 1, 1996, a design shall locate space for two soil treatment areas. All lots platted after January 1, 1998, shall have a tested soil treatment area suitable for two type I systems (standard systems) as defined by Minnesota [Administrative] Rules Chapter 7080 and 7081. The area must be large enough to accommodate two systems. The area shall be at least 5,000 square feet for each system unless approved by the building official, and must be protected by fencing to keep construction traffic off.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-30. - Type I systems (standard systems).

- (a) Type I systems shall take priority for new construction and on upgrades where those systems can be reasonably installed.
- (b) Type I systems shall be defined as systems constructed in unaltered soils and are trenches, pressure beds, at-grades, or mound systems.
- (c) Type I systems shall be designed according to Minnesota [Administrative Rules Chapter] 7080.2200.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-31. - Type II systems.

- (a) Floodplain areas MN [Minnesota Administrative Rules Chapter] 7080.2270.
- (b) Privies MN [Minnesota Administrative Rules Chapter] 7080.2280.
- (c) Holding tanks MN [Minnesota Administrative Rules Chapter] 7080.2290.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-32. - Type III systems.

As defined in Minnesota Chapter 7080.2300.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-33. - Type IV systems.

As defined in Minnesota [Administrative Rules] Chapter 7080.2350. Type IV systems shall be designed by a Minnesota SSTS certified intermediate designer (less than 2,500 gpd) or advanced designer.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-34. - Type V systems.

As defined in Minnesota [Administrative Rules] Chapter 7080.2400. Type V systems shall be designed by a Minnesota SSTS certified advanced designer with a licensed professional engineer.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-35. - Inspections.

The permittee shall notify the city prior to the completion and covering of the subsurface sewage treatment system (SSTS). The installation and construction of the SSTS shall be in accordance with the permit requirements and the approved design. Inspections will be made during the construction of the SSTS to assure that the system has been constructed per approved design.

- (1) A test pit is required to verify the depth of redoximorphic features prior to the installation of the drainfield. The pit shall be provided by the contractor. The test pit must be wide enough to allow a safe environment for the inspector. The pit shall also be in a location approved by the inspector.
- (2) The inspector shall verify soil separation between the bottom of the drainfield and any restrictive layer, water table or redoximorphic features.
- (3) No part of the system shall be covered until it has been inspected and approved by the inspector, unless prior arrangements have been made.
- (4) Proposals to alter the permitted construction will require an amended design be submitted to the building department for review.
- (5) It shall be the responsibility of the property owner or authorized agent to schedule an inspection on the workday preceding the day inspection is desired.
- (6) The installer shall complete a signed as-built drawing indicating the location and setbacks of all tanks and soil treatment area. The location of the manhole covers on the septic tanks must be noted by measuring from two points of the structure to the center of the cover. As-built must be submitted to the city inspector at the time of inspection.
- (7) If proper notice is given and the inspector does not appear for an inspection within two hours after the time is set, the installer may complete the installation. The installer shall then file a signed as-built, including photographs of the system prior to covering, with the city within five working days. The as-built shall include a certified statement that the work was installed in accordance with the approved design and permit conditions, and that it was free from defects.
- (8) Upon satisfactory completion and final inspection of the system, the inspector shall issue a certificate of compliance. If upon inspection the inspector discovers that any part of the system is not constructed in accordance with the minimum standards provided in this article, the inspector shall give the applicant written notification describing the defects. The applicant shall

be responsible for the correction or elimination of all defects, and no system shall be placed or replaced in service until all defects have been corrected or eliminated.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-36. - Compliance.

No person shall cause or permit the location, construction, alteration, extension, conversion, operation, or maintenance of a subsurface sewage treatment system, except in full compliance with the provisions of this article.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-37. - Prohibited systems.

Graveless pipe, drip systems and warrantee systems are prohibited within the city.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-38. - Conflict resolution.

Subsurface sewage treatment systems regulated under this article, conflicts and other technical disputes over new construction, replacement, and existing systems will be reviewed by the building official. Soils conflicts will be resolved following [Minnesota Administrative Rules Chapter] 7082.0700 Subp. 5.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-39. - Operation guarantee.

Neither the issuance of a permit nor the inspection of a system shall constitute any warranty or guarantee of operation of the system.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-40. - Minimum qualification.

Site evaluation, system design, installation, construction, alteration, extension, repair, inspection, and system pumping and servicing shall be performed by Minnesota Pollution Control Agency licensed SSTS businesses or qualified employees of this city. Any work performed on a septic system without the required licenses or permits is in violation of this article and is guilty of a misdemeanor, punishable as provided in section 1-14.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-41. - Site evaluation and design requirements.

The following are site evaluation and design requirements for septic systems:

- (1) Minnesota SSTS Rules must be followed.

- (2) At least one additional bedroom shall be added in the design of a septic system with an unfinished basement.
- (3) Minimum of three soil borings are to be conducted within the primary treatment area, and one soil borings in the secondary treatment area.
- (4) Minimum of one percolation test is to be conducted within the primary treatment area. The percolation test shall be conducted near the center of the drainfield location.
- (5) The designer shall include the direction and percent of slope on site evaluation, along with elevation of the drainfield.
- (6) For lots platted after April 1, 1996, a design shall locate space for a second soil treatment area.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-42. - Minimum septic tank capacity for dwellings, and pump tank sizes, and other tank requirements.

- (a) Septic tank capacity for dwellings must be sized according to MPCA 7080.1930 Table V.
- (b) 4 or more bedrooms also require two compartments, or multiple tanks.
- (c) Pressurized systems require a separate 1,000 gallon pump tank.
- (d) The pump tank may be reduced in size by 50 percent if approved by the building official. Reduction in size will not be permitted due to financial reasons.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-43. - Sewer pipe.

The building sewer pipe extending from the house to the tank shall not be less than four inches in diameter and must meet the strength requirements of Schedule 40 plastic pipe, and no 90 degree ells shall be permitted. The pipe shall be supported or sleeved in such manner so that there is no deflection during backfilling or settling of the soil. Schedule 40 plastic pipe is also required from the septic tank to another tank or to the distribution medium.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-44. - Setback requirements.

Setback from buildings, property lines and wells shall be in accordance with the requirements of Minnesota [Administrative] Rules Chapter 7080.2150.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-45. - Setback reduction.

Setback from detached accessory buildings or garages with no basements, on the same property may be reduced by 50 percent if approved by the building official.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-46. - Variances.

- (a) Variances for setback to a property line must be approved by the city council.
- (b) Variances for holding tanks are required by the city council except for the replacement of an existing holding tank.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-47. - Septic tank maintenance.

- (a) The owner of an individual sewage treatment system or the owner's agent shall regularly, but in no case less frequently than every three years measure or remove the accumulations of floating materials at the top of each septic tank, along with the sludge, which includes the solids denser than water. Whenever the top of the sludge layer is less than 12 inches below the bottom of the outlet baffle, or the bottom of the scum layer is less than three inches above the bottom of the bottom of the outlet baffle, the owner or the owner's agent shall have the tank pumped. Pumping of the tank must be completed by a MPCA certified pumper.
- (b) Failure to have the septic tanks cleaned when the system is found to require cleaning shall be cause for the city to provide for the cleaning service, and provide the property owner with an advance notification of the date the system will be cleaned. The cost of this service shall be assessed to the property owner.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-48. - Compliance inspection.

An SSTS compliance inspection is required:

- (1) For a new or replacement SSTS.
- (2) Before the sale or property transfer within the city.
- (3) When adding a bedroom.
- (4) When a parcel having an existing system undergoes development, subdivision, or split.
- (5) In shoreland management areas: When a building permit is required for building, remodeling, alterations, additions or a variance is received in a shoreland management area (any part of the property within the shoreland management area) between December 1st and May 1st the city may issue a permit or variance immediately with the requirement that a compliance inspection be completed by June 1st and the applicant submits a certificate of compliance within 15 days. If a system is deemed noncompliant and is not an imminent public health threat, a property owner has ten months to bring the system into compliance. If the owner fails to get a compliance inspection on the septic system or to bring the system into compliance after the required ten months after receiving notice of a failing system, the owner is in violation of city ordinance and is guilty of a misdemeanor and must bring the septic system into compliance. If the owner does not bring the septic system into compliance within the time required by code, a stop work order will be posted and no work or inspections for the building will be permitted until the septic system is brought into compliance.
- (6) If an existing system (constructed prior to April 1, 1996) is not an immediate public health threat, the tank is watertight and provides at least two feet of soil separation, the system does not need to be upgraded, repaired or replaced or its use discontinued, as long as the system is not located in the shoreland area, wellhead protection areas (200 feet from any public water supply well, that is any well serving 25 persons or more for 60 days of the year) or serving as a food, beverage, or lodging establishment. The three foot rule applies in those circumstances with the 15 percent reduction in separation permitted by this article.

- (7) Certificates of compliance or notices of noncompliance shall be issued on the state pollution control agency's (MPCA) inspection form for existing septic systems. Copies shall be provided to the property owner and city within 15 days.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-49. - Allowable reduction for existing systems.

Compliance inspection; 15 percent vertical separation reduction. Minnesota Administrative Rules 7080.1500, subp. 4D is amended to allow 15 percent reduction of vertical separation (separation distance no less than 30.6 inches) may be determined to be compliant for existing systems to account for settling and variable interpretations. The 15 percent reduction is permitted on all septic system constructed after April 1, 1996.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-50. - Failing septic systems and septic systems which pose an imminent public health threat.

- (a) A failing SSTS that is failing to protect groundwater shall be upgraded, replaced or its use discontinued within ten months. The building department will give consideration to weather conditions as it applies to compliance dates. If the system is not upgraded or replaced within ten months and can't be installed due to weather conditions, then money shall be placed in escrow until a new system can be installed or repairs can be made. A septic design by a certified septic professional must be submitted to the building department for review, and a permit issued prior to any repair, except for restriction of discharge.
- (b) Any SSTS which poses an imminent threat to public health and safety shall be brought into compliance with this article within a period of 90 days. Discharge from the tank must be restricted immediately and regular pumping of the tanks by a MPCA licensed septic professional must be done to prevent the discharge of effluent until the repairs are made. If the system is not upgraded or replaced within 90 days and can't be installed due to weather conditions, then money shall be placed in escrow until a new system can be installed or repairs can be made. A septic design by a certified septic professional must be submitted to the building department for review, and a permit issued prior to any repair, except for restriction of discharge.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-51. - Escrow for a new or replacement septic system.

From December 1st through May 1st escrow for a new or replacement septic system may be held at 125 percent of the cost of a new septic system. At least two septic system bids are required to determine the cost of a new or replacement system; the larger of the two bids must be used to determine the escrow amount.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-52. - Change in use or condition of the system has changed or been altered.

A certificate of compliance may be voided if, subsequent to the issuance of the certificate, the use of the premises or condition of the system has changed or been altered.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-53. - Holding tanks.

- (a) Holding tanks shall not be used as a sanitary system for new residential construction or for improvements greater than 50 percent of the assessed value of the structure at the time of the application for the improvement. Subsequent improvements shall count towards the 50 percent value limit for improvement.
- (b) Holding tanks shall only be used as a corrective action for sewage disposal for preexisting uses when a standard treatment system or other systems cannot be installed.
- (c) Holding tanks must have a visual or audio alarm for the prevention of overflow.
- (d) The homeowner of a holding tank shall provide the building department a copy of a contract with a licensed sewage maintenance business for monitoring and removal of the holding tank contents.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-54. - Floodplain.

An SSTS shall not be located in a floodway or floodplain. The location within the flood fringe is permitted, provided that the design complies with this article and all rules and statutes.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-55. - Class V injection wells.

All owners of new or replacement SSTS that are considered to be Class V injection wells, as defined in the Code of Federal Regulations, title 40, part 144, are required by the Federal Government to submit SSTS inventory information to the Environmental Protection Agency.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-56. - Septage disposal.

No person shall dispose the contents of any septic tank, privy, or cesspool in any manner within the city without a site evaluation conducted by a city inspector and written permission from the department.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-57. - Prohibit surface discharge.

Surface discharge of sewage from SSTS is prohibited. Unless issued a national pollution discharge elimination system permit by the MPCA.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-58. - Subject to change.

The requirements of this article are intended to be comparable to the environmental protection agency (EPA), Minnesota pollution control agency (MPCA), and the Minnesota department of health (MDH) standards. Should this article differ from other agency standards or should EPA, MPCA, or MDH standards change, the more strict standards shall apply. Any fee pertaining to this article may be changed by resolution of the city council.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-59. - Misdemeanor.

Any person who fails to comply with the provisions of this article may be charged with a misdemeanor and upon conviction thereof, shall be punished therefore as provided in section 1-14 of the City Code. A separate offense shall be deemed committed upon each day during or on which a violation occurs or continues.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-60. - Injunctive relief.

In the event of a violation or a threat of violation of this article, the department may institute appropriate actions or proceedings to include injunctive relief to prevent, restrain, correct, or abate such violations or threatened violations; and the city attorney may institute a civil action.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-61. - Civil action.

In the event of a violation of this article, the city may institute appropriate actions or proceedings to include injunctive relief to prevent, restrain, correct, or abate such violations, or threatened violations, and the city attorney may institute such action.

(Ord. No. 50, Second Series, 11-5-2014)

Sec. 74-62. - Effective date.

This article shall be effective immediately upon passage by the city council.

(Ord. No. 50, Second Series, 11-5-2014)

Secs. 74-63—74-66. - Reserved.

ATTACHMENT 3

List of known Non-Complaint
ISTS Systems

Non-Compliant ISTS

CASE #	DATE OPENED	COMPLIANCE ISSUE	PIN NUMBER
ST2018-00006	1/18/2018	SEPTIC	103323230008
ST2018-00005	1/18/2018	SEPTIC	253323130051
ST2018-00004	1/18/2018	SEPTIC	253323120006
ST2018-00003	1/18/2018	SEPTIC	243323420016
ST2018-00002	1/18/2018	SEPTIC	363323120027
ST2018-00001	1/18/2018	SEPTIC	303323240007
ST2017-00004	6/8/2018	SEPTIC	363323240319
ST2017-00001	3/6/2017	SEPTIC	343323410002
ST2016-00029	11/15/2016	SEPTIC	363323230172
ST2016-00025	9/8/2016	SEPTIC	363323240012
ST2016-00006	3/10/2016	SEPTIC	363323240003
ST2015-00026	9/30/2015	SEPTIC	343323410004
ST2016-00023	9/3/2015	SEPTIC	363323210294
ST2015-00012	4/8/2015	SEPTIC	363323120128
SI2018-00002	1/18/2018	SEPTIC	333323410011
SI2018-00001	1/18/2018	SEPTIC	333323340019
SI2016-00007	7/28/2016	SEPTIC	293423410001

ATTACHMENT 4

Water Supply Plan

*East Bethel Water Supply Plan
December 30, 2016*

Complete Table 1 with information about the public water supply system covered by this WSP.

Table 1. General information regarding this WSP

Requested Information	Description
DNR Water Appropriation Permit Number(s)	1014-1049
Ownership	<input checked="" type="checkbox"/> Public or <input type="checkbox"/> Private
Metropolitan Council Area	<input checked="" type="checkbox"/> Yes or <input type="checkbox"/> No (and county name)
Street Address	2241 221st Ave NE
City, State, Zip	East Bethel, MN 55011
Contact Person Name	Nate Ayshford
Title	Public Works Manager
Phone Number	763-367-7876
MDH Supplier Classification	Municipal

PART 1. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and availability. Information summarized in Part 1 can be used to develop Emergency Preparedness Procedures (Part 2) and the Water Conservation Plan (Part 3). This data is also needed to track progress for water efficiency measures.

A. Analysis of Water Demand

Complete Table 2 showing the past 10 years of water demand data.

- Some of this information may be in your Wellhead Protection Plan.
- If you do not have this information, do your best, call your engineer for assistance or if necessary leave blank.

If your customer categories are different than the ones listed in Table 2, please describe the differences below:

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*East Bethel Water Supply Plan
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Table 2. Historic water demand (see definitions in the glossary after Part 4 of this template)

Year	Pop. Served	Total Connections	Residential Water Delivered (MG)	C/I/I Water Delivered (MG)	Water used for Non-essential	Wholesale Deliveries (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)	Water Supplier Services	Percent Unmetered/Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per capita Demand (GPCD)
2005	44	15													
2006	79	27											July		
2007	121	41	3,042,100				3,042,100				8,334	16,668	July	68	68
2008	123	42	2,403,200				2,403,200	3,143,306		24%	6,584	13,168	July	54	54
2009	123	42	2,247,400				2,247,400	3,509,369		46%	6,157	12,314	July	50	50
2010	123	42	2,038,820				2,038,820	4,348,835		53%	5,586	11,172	July	45	45
2011	123	42	1,678,600				1,678,600	3,071,619		45%	4,600	9,200	July	37	37
2012	123	42	1,766,000				1,766,000	4,178,347		68%	4,838	9,676	July	39	39
2013	126	43	2,953,590	1,095,594			4,049,184	7,189,347		44%	11,094	22,188	July	88	88
2014	174	59	1,931,891	2,613,622			4,545,513	10,357,583		65%	12,453	24,906	July	71	71
2015	203	69	2,335,891	4,635,031			6,970,922	10,875,4351		46%	19,098	38,196	July	94	94
Avg. 2010-2015	145	49					3,508,173	6,510,300		58%	9,611	19,222	July	62	62

MG – Million Gallons **MGD** – Million Gallons per Day **GPCD** – Gallons per Capita per Day

See Glossary for definitions

*East Bethel Water Supply Plan
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Complete Table 3 by listing the top 10 water users by volume, from largest to smallest. For each user, include information about the category of use (residential, commercial, industrial, institutional, or wholesale), the amount of water used in gallons per year, the percent of total water delivered, and the status of water conservation measures.

Table 3. Large volume users

Customer	Use Category (Residential, Industrial, Commercial, Institutional, Wholesale)	Amount Used (Gallons per Year)	Percent of Total Annual Water Delivered	Implementing Water Conservation Measures? (Yes/No/Unknown)
1 METROPOLITAN COUNCIL	INDUSTRIAL	4,696,718	67%	UNKNOWN
2 EAST BETHEL MOVIE THEATER	COMMERCIAL	616,662	9%	YES
3 RIVER COUNTRY COOPERATIVE	COMMERCIAL	392,012	6%	YES
4 DESIGNING EARTH CONTRACTING	COMMERCIAL	152,962	2%	YES
5 AGGRESSIVE HYDRAULICS	INDUSTRIAL	116,969	1.6%	YES
6 SHAW TRUCKING	COMMERCIAL	65,420	.9%	YES
7 NUSS TRUCK AND EQUIPMENT	COMMERCIAL	55,856	.8%	YES
8 NORTHBOUND WOODWORKS	COMMERCIAL	52,961	.7%	YES
9 CLASSIC CONSTRUCTION	COMMERCIAL	52,341	.7%	YES
10 JP INVESTMENTS	COMMERCIAL	24,259	.4%	YES

B. Treatment and Storage Capacity

Complete Table 4 with a description of where water is treated, the year treatment facilities were constructed, water treatment capacity, the treatment methods (i.e. chemical addition, reverse osmosis, coagulation, sedimentation, etc.) and treatment types used (i.e. fluoridation, softening, chlorination, Fe/MN removal, coagulation, etc.). Also describe the annual amount and method of disposal of treatment residuals. Add rows to the table as needed.

Table 4. Water treatment capacity and treatment processes

Treatment Site ID (Plant Name or Well ID)	Year Constructed	Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
Treatment Plant 1	2012	1,200,000	Pressure Filtration	Fe/Mn removal, chlorination, fluoridation	NA	Backwash to sediment pond	No

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Treatment Site ID (Plant Name or Well ID)	Year Constructed	Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
Total	NA	1,200,000	NA	NA		NA	

Complete Table 5 with information about storage structures. Describe the type (i.e. elevated, ground, etc.), the storage capacity of each type of structure, the year each structure was constructed, and the primary material for each structure. Add rows to the table as needed.

*East Bethel Water Supply Plan
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Table 5. Storage capacity, as of the end of the last calendar year

Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
1	Elevated storage	2012	Steel	500,000
2	Ground storage	1987	Steel	16,000
3	Other -			
Total	NA	NA	NA	

Treatment and storage capacity versus demand

It is recommended that total storage equal or exceed the average daily demand.

Discuss the difference between current storage and treatment capacity versus the water supplier’s projected average water demand over the next 10 years (see Table 7 for projected water demand):

Projected average demand in ten years is expected to be 0.13 MGD, which is significantly below the current storage and treatment capacity of the system.

C. Water Sources

Complete Table 6 by listing all types of water sources that supply water to the system, including groundwater, surface water, interconnections with other water suppliers, or others. Provide the name of each source (aquifer name, river or lake name, name of interconnecting water supplier) and the Minnesota unique well number or intake ID, as appropriate. Report the year the source was installed or established and the current capacity. Provide information about the depth of all wells. Describe the status of the source (active, inactive, emergency only, retail/wholesale interconnection) and if the source facilities have a dedicated emergency power source. Add rows to the table as needed for each installation.

Include copies of well records and maintenance summary for each well that has occurred since your last approved plan in **Appendix 1**.

Table 6. Water sources and status

Resource Type (Groundwater, Surface water, Interconnection)	Resource Name	MN Unique Well # or Intake ID	Year Installed	Capacity (Gallons per Minute)	Well Depth (Feet)	Status of Normal and Emergency Operations (active, inactive, emergency only, retail/wholesale interconnection))	Does this Source have a Dedicated Emergency Power Source? (Yes or No)
Groundwater	Well 3	782113	2011	500	347	Active	Yes
Groundwater	Well 4	782114	2011	500	345	Active	Yes
Groundwater	Well 1	431637	1987	600	480	Active	No
Groundwater	Well 2	773539	2010	600	286	Active	No

Limits on Emergency Interconnections

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Discuss any limitations on the use of the water sources (e.g. not to be operated simultaneously, limitations due to blending, aquifer recovery issues etc.) and the use of interconnections, including capacity limits or timing constraints (i.e. only 200 gallons per minute are available from the City of Prior Lake, and it is estimated to take 6 hours to establish the emergency connection). If there are no limitations, list none.

Well 1 exceeds allowable radium limits. Well 2 is blended with Well 1 to meet radium requirements.

D. Future Demand Projections – Key Metropolitan Council Benchmark

Water Use Trends

Use the data in Table 2 to describe trends in 1) population served; 2) total per capita water demand; 3) average daily demand; 4) maximum daily demand. Then explain the causes for upward or downward trends. For example, over the ten years has the average daily demand trended up or down? Why is this occurring?

The system serviced by Wells 3 and 4 has only been in service for 2 years. 14 commercial connections with expected residential and commercial growth to occur in a focused area along the TH 65 corridor near County Highway 22. The system serviced by Wells 1 and 2 has 50 residential homes in one development. The non-metered water use is associated with system flushing and operations to prevent freezing. Trend analysis is difficult with only a couple of years worth of data. Water demand increases during summer months for landscape irrigation. Many of the commercial customers were allowed to use their private well for landscape irrigation provided there were no cross connections which keeps demand on the municipal system down. Residential irrigation is limited by tiered water rates.

Use the water use trend information discussed above to complete Table 7 with projected annual demand for the next ten years. Communities in the seven-county Twin Cities metropolitan area must also include projections for 2030 and 2040 as part of their local comprehensive planning.

Projected demand should be consistent with trends evident in the historical data in Table 2, as discussed above. Projected demand should also reflect state demographer population projections and/or other planning projections.

Table 7. Projected annual water demand

Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD)
2016	11,761	220	75	.02	.04
2017	11,921	385	75	.03	.06
2018	12,081	549	75	.04	.08
2019	12,241	714	75	.05	.10
2020	12,400	879	75	.07	.14
2021	12,560	1044	75	.08	.16
2022	12,760	1208	75	.09	.18
2023	12,910	1373	75	.10	.20

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Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD)
2024	13,070	1538	75	.12	.24
2025	13,230	1702	75	.13	.26
2030	15,400	4,161	75	.32	.64
2040	18,400	7,161	75	.54	1.08

GPCD – Gallons per Capita per Day

MGD – Million Gallons per Day

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Projection Method

Describe the method used to project water demand, including assumptions for population and business growth and how water conservation and efficiency programs affect projected water demand:

Projections are based on 580 ERU's by 2025. Population served is based on 2.94 residents per household (per ERU). Average day demand is based on the estimated population times the 75 gpcd. Maximum day demand is based on a peaking factor of 2.0. Projected demand is based on average demand plus estimated irrigation demand. Population estimates are based on the Met Council 2040 Plan.

E. Resource Sustainability

Monitoring – Key DNR Benchmark

Complete Table 8 by inserting information about source water quality and quantity monitoring efforts. List should include all production wells, observation wells, and source water intakes or reservoirs. Add rows to the table as needed. Find information on groundwater level monitoring program at: http://www.dnr.state.mn.us/waters/groundwater_section/obwell/index.html

Table 8. Information about source water quality and quantity monitoring

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
Well No. 3 - 782113	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
Well No. 4 - 782114	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
Monitoring Well No. 1 - 782121	<input type="checkbox"/> production well <input checked="" type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input checked="" type="checkbox"/> other	<input type="checkbox"/> continuous <input checked="" type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
Monitoring Well No. 2 - 783647	<input type="checkbox"/> production well <input checked="" type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input checked="" type="checkbox"/> other	<input type="checkbox"/> continuous <input checked="" type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge

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MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
Monitoring Well No. 3	<input type="checkbox"/> production w <input checked="" type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input checked="" type="checkbox"/> other	<input type="checkbox"/> continuous <input checked="" type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
Well No. 1 - 431637	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input checked="" type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input type="checkbox"/> SCADA <input checked="" type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
Well No. 2 - 773539	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input checked="" type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input type="checkbox"/> SCADA <input checked="" type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge

Water Level Data

A water level monitoring plan that includes monitoring locations and a schedule for water level readings must be submitted as **Appendix 2**. If one does not already exist, it needs to be prepared and submitted with the WSP. Ideally, all production and observation wells are monitored at least monthly.

Complete Table 9 to summarize water level data for each well being monitored. Provide the name of the aquifer and a brief description of how much water levels vary over the season (the difference between the highest and lowest water levels measured during the year) and the long-term trends for each well. If water levels are not measured and recorded on a routine basis, then provide the static water level when each well was constructed and the most recent water level measured during the same season the well was constructed. Also include all water level data taken during any well and pump maintenance. Add rows to the table as needed.

Provide water level data graphs for each well in **Appendix 3** for the life of the well, or for as many years as water levels have been measured. See DNR website for Date Time Water Level

<http://www.dnr.state.mn.us/groundwater/hydrographs.html>

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Table 9. Water level data

See Appendix 3

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)	Long-term Trend in water level data	Water level measured during well/pumping maintenance
Well No. 3 - 782113	QBAA-Quaternary Buried Artesian Aquifer		<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
Well No. 4 - 782114	MTPL-Multiple		<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
Monitoring Well No. 1 – 782121	Wonewoc		<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
Monitoring Well No. 2 – 783647	MTPL – Multiple		<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
Monitoring Well No. 3	Shallow Groundwater		<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____

Potential Water Supply Issues & Natural Resource Impacts – Key DNR & Metropolitan Council Benchmark

Complete Table 10 by listing the types of natural resources that are or could be impacted by permitted water withdrawals. If known, provide the name of specific resources that may be impacted. Identify what the greatest risks to the resource are and how the risks are being assessed. Identify any resource protection thresholds – formal or informal – that have been established to identify when actions should be taken to mitigate impacts. Provide information about the potential mitigation actions that may be taken, if a resource protection threshold is crossed. Add additional rows to the table as needed. See glossary at the end of the template for definitions.

Some of this baseline data should have been in your earlier water supply plans or county comprehensive water plans. When filling out this table, think of what are the water supply risks, identify the resources, determine the threshold and then determine what your community will do to mitigate the impacts.

Your DNR area hydrologist is available to assist with this table.

For communities in the seven-county Twin Cities metropolitan area, the *Master Water Supply Plan Appendix 1 (Water Supply Profiles)*, provides information about potential water supply issues and natural resource impacts for your community.

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Table 10. Natural resource impacts

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
<input checked="" type="checkbox"/> River or stream	Cedar Creek	<input checked="" type="checkbox"/> None anticipated <input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed report <input checked="" type="checkbox"/> Proximity (<1.5 miles) <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> No data available <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____
<input type="checkbox"/> Calcareous fen	None	<input checked="" type="checkbox"/> None anticipated <input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed Report <input checked="" type="checkbox"/> Proximity (<5 miles) <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____

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Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
<input type="checkbox"/> Lake	None	<input checked="" type="checkbox"/> None anticipated <input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed report <input checked="" type="checkbox"/> Proximity (<1.5 miles) <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____
<input checked="" type="checkbox"/> Wetland	See Map in Appendix 2.	<input type="checkbox"/> None anticipated <input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed report <input type="checkbox"/> Proximity (<1.5 miles) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____

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Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
<input type="checkbox"/> Trout stream	None	<input checked="" type="checkbox"/> None anticipated <input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed report <input checked="" type="checkbox"/> Proximity (< 5 miles) <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____
<input checked="" type="checkbox"/> Aquifer	<ul style="list-style-type: none"> • MTPL • QBAA 	<input type="checkbox"/> None anticipated <input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Proximity (obwell < 5 miles) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____

* Examples of thresholds: a lower limit on acceptable flow in a river or stream; water quality outside of an accepted range; a lower limit on acceptable aquifer level decline at one or more monitoring wells; withdrawals that exceed some percent of the total amount available from a source; or a lower limit on acceptable changes to a protected habitat.

Wellhead Protection (WHP) and Surface Water Protection (SWP) Plans

Complete Table 11 to provide status information about WHP and SWP plans.

- The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health’s (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.
- The City of East Bethel is working with the Minnesota Department of Health and MN Rural water to develop its Wellhead Protection Plan. Part 1 is complete and Part 2 should be complete in 2018.

Table 11. Status of Wellhead Protection and Surface Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	<input checked="" type="checkbox"/> In Process <input type="checkbox"/> Completed <input type="checkbox"/> Not Applicable		
SWP	<input type="checkbox"/> In Process <input type="checkbox"/> Completed <input checked="" type="checkbox"/> Not Applicable		

F. Capital Improvement Plan (CIP)

Please note that any wells that received approval under a ten-year permit, but that were not built, are now expired and must submit a water appropriations permit.

Adequacy of Water Supply System

Complete Table 12 with information about the adequacy of wells and/or intakes, storage facilities, treatment facilities, and distribution systems to sustain current and projected demands. List planned capital improvements for any system components, in chronological order. Communities in the seven-county Twin Cities metropolitan area should also include information about plans through 2040.

The assessment can be the general status by category; it is not necessary to identify every single well, storage facility, treatment facility, lift station, and mile of pipe.

Please attach your latest Capital Improvement Plan as **Appendix 4**.

Table 12. Adequacy of Water Supply System

System Component	Planned action	Anticipated Construction Year	Notes
Wells/Intakes	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Water Storage Facilities	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		

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System Component	Planned action	Anticipated Construction Year	Notes
Water Treatment Facilities	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Distribution Systems (pipes, valves, etc.)	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input checked="" type="checkbox"/> Expansion/addition	2017	
Pressure Zones	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Other:	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		

Proposed Future Water Sources

N/A

Complete Table 13 to identify new water source installation planned over the next ten years. Add rows to the table as needed.

Table 13. Proposed future installations/sources

Source	Installation Location (approximate)	Resource Name	Proposed Pumping Capacity (gpm)	Planned Installation Year	Planned Partnerships
Groundwater	Sec 8 T. 33 R. 23	Mt Simon	900	2030+	
Surface Water					
Interconnection to another supplier					

Water Source Alternatives - Key Metropolitan Council Benchmark

Do you anticipate the need for alternative water sources in the next 10 years? Yes No

For metro communities, will you need alternative water sources by the year 2040? Yes No

If you answered yes for either question, then complete table 14. If no, insert NA.

N/A

Complete Table 14 by checking the box next to alternative approaches that your community is considering, including approximate locations (if known), the estimated amount of future demand that could be met through the approach, the estimated timeframe to implement the approach, potential partnerships, and the major benefits and challenges of the approach. Add rows to the table as needed.

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For communities in the seven-county Twin Cities metropolitan area, these alternatives should include approaches the community is considering to meet projected 2040 water demand.

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Table 14. Alternative water sources

Alternative Source Considered	Source and/or Installation Location (approximate)	Estimated Amount of Future Demand (%)	Timeframe to Implement (YYYY)	Potential Partners	Benefits	Challenges
<input type="checkbox"/> Groundwater						
<input type="checkbox"/> Surface Water						
<input type="checkbox"/> Reclaimed stormwater						
<input type="checkbox"/> Reclaimed wastewater						
<input type="checkbox"/> Interconnection to another supplier						

Part 2. Emergency Preparedness Procedures

The emergency preparedness procedures outlined in this plan are intended to comply with the contingency plan provisions required by MDH in the WHP and SWP. Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failings, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. Municipalities that already have written procedures dealing with water emergencies should review the following information and update existing procedures to address these water supply protection measures.

A. Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (Public Law 107-188, Title IV- Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan.

Do you have a federal emergency response plan? Yes No

If yes, what was the date it was certified? June 2015

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

Table 15. Emergency Preparedness Plan contact information

Emergency Response Plan Role	Contact Person	Contact Phone Number	Contact Email
Emergency Response Lead	FIRE CHIEF DUCHARME	763-367-7886	MARK.DUCHARME@CI.EAST-BETHEL.MN.US
Alternate Emergency Response Lead	JACK DAVIS, CITY ADMINISTRATOR	763-367-7850	JACK.DAVIS@CI.EAST-BETHEL.MN.US

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? Yes No

At a minimum, a water supplier should prepare and maintain an emergency contact list of contractors and suppliers.

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280 . Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and conservation plans that have been

approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Telephone List

Prepare and attach a list of emergency contacts, including the MN Duty Officer (1-800-422-0798), as **Appendix 5**. A template is available at www.mndnr.gov/watersupplyplans

The list should include key utility and community personnel, contacts in adjacent water suppliers, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list and date it. Thereafter, update on a regular basis (once a year is recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the Emergency Manager for that community. Responsibilities and services for each contact should be defined.

Current Water Sources and Service Area

Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

Do records and maps exist? Yes No

Can staff access records and maps from a central secured location in the event of an emergency?

Yes No

Does the appropriate staff know where the materials are located?

Yes No

Procedure for Augmenting Water Supplies

Complete Tables 16 – 17 by listing all available sources of water that can be used to augment or replace existing sources in an emergency. Add rows to the tables as needed.

In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Municipalities are encouraged to execute cooperative agreements for potential emergency water services and copies should be included in **Appendix 6**. Outstate Communities may consider using nearby high capacity wells (industry, golf course) as emergency water sources.

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WSP should include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MDH are required for interconnections or the reuse of water.

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use	List of services, equipment, supplies available to respond
FIRE STATION #1	300 GPM		

GPM – Gallons per minute MGD – million gallons per day

Table 17. Utilizing surface water as an alternative source

Surface Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use
N/A				

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

Allocation and Demand Reduction Procedures

Complete Table 18 by adding information about how decisions will be made to allocate water and reduce demand during an emergency. Provide information for each customer category, including its priority ranking, average day demand, and demand reduction potential for each customer category. Modify the customer categories as needed, and add additional lines if necessary.

Water use categories should be prioritized in a way that is consistent with Minnesota Statutes 103G.261 (#1 is highest priority) as follows:

1. Water use for human needs such as cooking, cleaning, drinking, washing and waste disposal; use for on-farm livestock watering; and use for power production that meets contingency requirements.
2. Water use involving consumption of less than 10,000 gallons per day (usually from private wells or surface water intakes)

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3. Water use for agricultural irrigation and processing of agricultural products involving consumption of more than 10,000 gallons per day (usually from private high-capacity wells or surface water intakes)
4. Water use for power production above the use provided for in the contingency plan.
5. All other water use involving consumption of more than 10,000 gallons per day.
6. Nonessential uses – car washes, golf courses, etc.

Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Lower priority uses will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. Water use for lawn sprinkling, vehicle washing, golf courses, and recreation are legislatively considered non-essential.

Table 18. Water use priorities

Customer Category	Allocation Priority	Average Daily Demand (GPD)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	800,100	
Institutional	4	25,400	
Commercial	2	254,000	
Industrial	3	190,500	190,500
Irrigation	5	515,000	515,000
Wholesale	NA		
Non-Essential	6		
TOTAL	NA	1,785,000	705,515

GPD – Gallons per Day

Tip: Calculating Emergency Demand Reduction Potential

The emergency demand reduction potential for all uses will typically equal the difference between maximum use (summer demand) and base use (winter demand). In extreme emergency situations, lower priority water uses must be restricted or eliminated to protect priority domestic water requirements. Emergency demand reduction potential should be based on average day demands for customer categories within each priority class. Use the tables in Part 3 on water conservation to help you determine strategies.

Complete Table 19 by selecting the triggers and actions during water supply disruption conditions.

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Table 19. Emergency demand reduction conditions, triggers and actions (Select all that may apply and describe)

Emergency Triggers	Short-term Actions	Long-term Actions
<input type="checkbox"/> Contamination <input type="checkbox"/> Loss of production <input type="checkbox"/> Infrastructure failure <input checked="" type="checkbox"/> Executive order by Governor <input type="checkbox"/> Other: _____	<input type="checkbox"/> Supply augmentation through _____ <input checked="" type="checkbox"/> Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input type="checkbox"/> Water allocation through _____ <input type="checkbox"/> Meet with large water users to discuss their contingency plan.	<input type="checkbox"/> Supply augmentation through _____ <input checked="" type="checkbox"/> Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input type="checkbox"/> Water allocation through _____ <input type="checkbox"/> Meet with large water users to discuss their contingency plan.

Notification Procedures

Complete Table 20 by selecting trigger for informing customers regarding conservation requests, water use restrictions, and suspensions; notification frequencies; and partners that may assist in the notification process. Add rows to the table as needed.

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
<input checked="" type="checkbox"/> Short-term demand reduction declared (< 1 year)	<input checked="" type="checkbox"/> Website <input checked="" type="checkbox"/> Email list serve <input type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input type="checkbox"/> Press release (TV, radio, newspaper), <input type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Annually	
<input checked="" type="checkbox"/> Long-term Ongoing demand reduction declared	<input checked="" type="checkbox"/> Website <input checked="" type="checkbox"/> Email list serve <input type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input type="checkbox"/> Press release (TV, radio, newspaper), <input type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Annually	
<input checked="" type="checkbox"/> Governor’s critical water deficiency	<input checked="" type="checkbox"/> Website <input checked="" type="checkbox"/> Email list serve	<input checked="" type="checkbox"/> Daily <input type="checkbox"/> Weekly	

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

Enforcement

Prior to a water emergency, municipal water suppliers must adopt regulations that restrict water use and outline the enforcement response plan. The enforcement response plan must outline how conditions will be monitored to know when enforcement actions are triggered, what enforcement tools will be used, who will be responsible for enforcement, and what timelines for corrective actions will be expected.

Affected operations, communications, and enforcement staff must then be trained to rapidly implement those provisions during emergency conditions.

Important Note:

Disregard of critical water deficiency orders, even though total appropriation remains less than permitted, is adequate grounds for immediate modification of a public water supply authority's water use permit (2013 MN Statutes 103G.291)

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) Yes No

If yes, attach the official control document to this WSP as **Appendix 7**.

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

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? Yes No

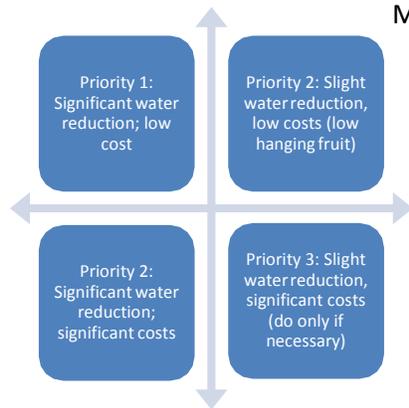
If yes, cite the regulatory authority reference: Emergency Preparedness Plan_____.

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If no, who has authority to implement water use restrictions in an emergency?

--

PART 3. WATER CONSERVATION PLAN



Minnesotans have historically benefited from the state’s abundant water supplies, reducing the need for conservation. There are however, limits to the available supplies of water and increasing threats to the quality of our drinking water. Causes of water supply limitation may include: population increases, economic trends, uneven statewide availability of groundwater, climatic changes, and degraded water quality. Examples of threats to drinking water quality include: the presence of contaminant plumes from past land use activities, exceedances of water quality standards from natural and human sources, contaminants of emerging concern, and increasing pollutant trends from nonpoint sources.

There are many incentives for conserving water; conservation:

- reduces the potential for pumping-induced transfer of contaminants into the deeper aquifers, which can add treatment costs
- reduces the need for capital projects to expand system capacity
- reduces the likelihood of water use conflicts, like well interference, aquatic habitat loss, and declining lake levels
- conserves energy, because less energy is needed to extract, treat and distribute water (and less energy production also conserves water since water is use to produce energy)
- maintains water supplies that can then be available during times of drought

It is therefore imperative that water suppliers implement water conservation plans. The first step in water conservation is identifying opportunities for behavioral or engineering changes that could be made to reduce water use by conducting a thorough analysis of:

- Water use by customer
- Extraction, treatment, distribution and irrigation system efficiencies
- Industrial processing system efficiencies
- Regulatory and barriers to conservation
- Cultural barriers to conservation
- Water reuse opportunities

Once accurate data is compiled, water suppliers can set achievable goals for reducing water use. A successful water conservation plan follows a logical sequence of events. The plan should address both conservation on the supply side (leak detection and repairs, metering), as well as on the demand side (reductions in usage). Implementation should be conducted in phases, starting with the most obvious and lowest-cost options. In some cases one of the early steps will be reviewing regulatory constraints to water conservation, such as lawn irrigation requirements. Outside funding and grants may be available for implementation of projects. Engage water system operators and maintenance staff and customers in brainstorming opportunities to reduce water use. Ask the question: “How can I help save water?”

Progress since 2006

Is this your community’s first Water Supply Plan? Yes No

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If yes, describe conservation practices that you are already implementing, such as: pricing, system improvements, education, regulation, appliance retrofitting, enforcement, etc.

Brand new system with leak detection on all water meters. Public education achieved through the City Newsletter. As demand increases, regulation and pricing will be used to help conserve water. The residential development is new homes and therefore, already include water conservation fixtures such as low flow toilets.

If no, complete Table 21 to summarize conservation actions taken since the adoption of the 2006 water supply plan.

Table 21. Implementation of previous ten-year Conservation Plan

N/A

2006 Plan Commitments	Action Taken?
Change water rates structure to provide conservation pricing	<input type="checkbox"/> Yes <input type="checkbox"/> No
Water supply system improvements (e.g. leak repairs, valve replacements, etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Educational efforts	<input type="checkbox"/> Yes <input type="checkbox"/> No
New water conservation ordinances	<input type="checkbox"/> Yes <input type="checkbox"/> No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Enforcement	<input type="checkbox"/> Yes <input type="checkbox"/> No
Describe other	<input type="checkbox"/> Yes <input type="checkbox"/> No

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

N/A

A. Triggers for Allocation and Demand Reduction Actions

Complete table 22 by checking each trigger below, as appropriate, and the actions to be taken at various levels or stages of severity. Add in additional rows to the table as needed.

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Table 22. Short and long-term demand reduction conditions, triggers and actions

Objective	Triggers	Actions
Protect surface water flows	<input type="checkbox"/> Low stream flow conditions <input checked="" type="checkbox"/> Reports of declining wetland and lake levels <input type="checkbox"/> Other: _____	<input type="checkbox"/> Increase promotion of conservation measures <input checked="" type="checkbox"/> Other: To be determined.
Short-term demand reduction (less than 1 year)	<input type="checkbox"/> Extremely high seasonal water demand (more than double winter demand) <input type="checkbox"/> Loss of treatment capacity <input checked="" type="checkbox"/> Lack of water in storage <input type="checkbox"/> State drought plan <input type="checkbox"/> Well interference <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Adopt (if not already) and enforce the critical water deficiency ordinance to restrict or prohibit lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input type="checkbox"/> Supply augmentation through _____ <input type="checkbox"/> Water allocation through _____ <input type="checkbox"/> Meet with large water users to discuss user's contingency plan.
Long-term demand reduction (>1 year)	<input type="checkbox"/> Per capita demand increasing <input type="checkbox"/> Total demand increase (higher population or more industry) Water level in well(s) below elevation of _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Develop a critical water deficiency ordinance that is or can be quickly adopted to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input type="checkbox"/> Enact a water waste ordinance that targets overwatering (causing water to flow off the landscape into streets, parking lots, or similar), watering impervious surfaces (streets, driveways or other hardscape areas), and negligence of known leaks, breaks, or malfunctions. <input checked="" type="checkbox"/> Meet with large water users to discuss user's contingency plan. <input type="checkbox"/> Enhanced monitoring and reporting: audits, meters, billing, etc.
Governor's "Critical Water Deficiency Order" declared	<input checked="" type="checkbox"/> Describe	<input checked="" type="checkbox"/> See Section E in Appendix 7

B. Conservation Objectives and Strategies – Key benchmark for DNR

This section establishes water conservation objectives and strategies for eight major areas of water use.

Objective 1: Reduce Unaccounted (Non-Revenue) Water loss to Less than 10%

The Minnesota Rural Waters Association, the Metropolitan Council and the Department of Natural Resources recommend that all water uses be metered. Metering can help identify high use locations and times, along with leaks within buildings that have multiple meters.

It is difficult to quantify specific unmetered water use such as that associated with firefighting and system flushing or system leaks. Typically, water suppliers subtract metered water use from total water pumped to calculate unaccounted or non-revenue water loss.

Is your five-year average (2005-2014) unaccounted Water Use in Table 2 higher than 10%?

Yes No

What is your leak detection monitoring schedule? (e.g. monitor 1/3rd of the city lines per year)

New system with leak detection on water meters. Monitoring schedule not yet developed.

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

What is the date of your most recent water audit? N/A

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

Leak detection and survey: every year every other year periodic as needed Year last leak detection survey completed: ____

If Table 2 shows annual water losses over 10% or an increasing trend over time, describe what actions will be taken to reach the <10% loss objective and within what timeframe

The City of East Bethel Water system is less than 5 years old with all meters having leak detection capabilities. Because of a low customer base, frequent flushing of the hydrants is required to keep water circulating in the system. As our customer base increases, which is expected with new development being planned, the amount of unmetered water will continue to decrease. The City will look for other, nonpotable uses of the flushed water.

Metering -AWWA recommends that every water supplier install meters to account for all water taken into its system, along with all water distributed from its system at each customer's point of service. An effective metering program relies upon periodic performance testing, repair, maintenance or replacement of all meters. AWWA also recommends that water suppliers conduct regular water audits to ensure accountability. Some cities install separate meters for interior and exterior water use, but some research suggests that this may not result in water conservation.

Complete Table 23 by adding the requested information regarding the number, types, testing and maintenance of customer meters.

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Table 23. Information about customer meters

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years)
Residential	55	55	55		2 / 20
Irrigation meters					___ / ___
Institutional					___ / ___
Commercial	14	14	14		1 / 20
Industrial					___ / ___
Public facilities					___ / ___
Other					___ / ___

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years)
TOTALS	69	69	69	NA	NA

For unmetered systems, describe any plans to install meters or replace current meters with advanced technology meters. Provide an estimate of the cost to implement the plan and the projected water savings from implementing the plan.

N/A

Table 24. Water source meters

	Number of Meters	Meter testing schedule (years)	Number of Automated Meter Readers	Average age/meter replacement schedule (years)
Water source (wells/intakes)	2		2	2/20
Treatment plant				___ / ___

Objective 2: Achieve Less than 75 Residential Gallons per Capita Demand (GPCD)

The 2002 average residential per capita demand in the Twin Cities Metropolitan area was 75 gallons per capita per day.

Is your average 2010-2015 residential per capita water demand in Table 2 more than 75? Yes No

What was your 2010 – 2015 five-year average residential per capita water demand? 62 g/person/day

Describe the water use trend over that timeframe:

The system that is serviced by Wells 3 and 4 is two years old and only serves 14 connections in a commercial district. There is not enough info to establish trends. Residential per capita use that is serviced by Wells 1 and 2 has always been very low due to high water rates.

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Complete Table 25 by checking which strategies you will use to continue reducing residential per capita demand and project a likely timeframe for completing each checked strategy (Select all that apply and add rows for additional strategies):

Table 25. Strategies and timeframe to reduce residential per capita demand

N/A

Strategy to reduce residential per capita demand	Timeframe for completing work
<input type="checkbox"/> Revise city ordinances/codes to encourage or require water efficient landscaping.	
<input type="checkbox"/> Revise city ordinance/codes to permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use. Check with plumbing authority to see if internal buildings reuse is permitted	
<input type="checkbox"/> Revise ordinances to limit irrigation. Describe the restricted irrigation plan:	
<input type="checkbox"/> Revise outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements.	
<input type="checkbox"/> Make water system infrastructure improvements	
<input type="checkbox"/> Offer free or reduced cost water use audits) for residential customers.	
<input type="checkbox"/> Implement a notification system to inform customers when water availability conditions change.	
<input type="checkbox"/> Provide rebates or incentives for installing water efficient appliances and/or fixtures indoors (e.g., low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet aerators, water softeners, etc.)	
<input type="checkbox"/> Provide rebates or incentives to reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
<input type="checkbox"/> Identify supplemental Water Resources	
<input type="checkbox"/> Conduct audience-appropriate water conservation education and outreach.	
<input type="checkbox"/> Describe other plans	

Objective 3: Achieve at least a 1.5% per year water reduction for Institutional, Industrial, Commercial, and Agricultural GPCD over the next 10 years or a 15% reduction in ten years.

Complete Table 26 by checking which strategies you will used to continue reducing non-residential customer use demand and project a likely timeframe for completing each checked strategy (add rows for additional strategies).

Where possible, substitute recycled water used in one process for reuse in another. (For example, spent rinse water can often be reused in a cooling tower.) Keep in mind the true cost of water is the amount on the water bill PLUS the expenses to heat, cool, treat, pump, and dispose of/discharge the water. Don't just calculate the initial investment. Many conservation retrofits that appear to be prohibitively expensive are actually very cost-effective when amortized over the life of the equipment. Often reducing

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water use also saves electrical and other utility costs. Note: as of 2015, water reuse, and is not allowed by the state plumbing code, M.R. 4715 (a variance is needed). However several state agencies are addressing this issue.

Table 26. Strategies and timeframe to reduce institutional, commercial industrial, and agricultural and non-revenue use demand

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
<input type="checkbox"/> Conduct a facility water use audit for both indoor and outdoor use, including system components	
<input checked="" type="checkbox"/> Install enhanced meters capable of automated readings to detect spikes in consumption	Completed
<input type="checkbox"/> Compare facility water use to related industry benchmarks, if available (e.g., meat processing, dairy, fruit and vegetable, beverage, textiles, paper/pulp, metals, technology, petroleum refining etc.)	
<input type="checkbox"/> Install water conservation fixtures and appliances or change processes to conserve water	
<input type="checkbox"/> Repair leaking system components (e.g., pipes, valves)	
<input checked="" type="checkbox"/> Investigate the reuse of reclaimed water (e.g., stormwater, wastewater effluent, process wastewater, etc.)	Continuous
<input type="checkbox"/> Reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
<input type="checkbox"/> Train employees how to conserve water	
<input type="checkbox"/> Implement a notification system to inform non-residential customers when water availability conditions change.	
<input type="checkbox"/> Rainwater catchment systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, industrial processes, water features, vehicle washing facilities, cooling tower makeup, and similar uses shall be approved by the commissioner. Proposed plumbing code 4714.1702.1 http://www.dli.mn.gov/PDF/docket/4714rule.pdf	
<input checked="" type="checkbox"/> Describe other plans: Work with Work with bulk water users to capture water during flushing events.	

Objective 4: Achieve a Decreasing Trend in Total Per Capita Demand

Include as **Appendix 8** one graph showing total per capita water demand for each customer category (i.e., residential, institutional, commercial, industrial) from 2005-2014 and add the calculated/estimated linear trend for the next 10 years.

Describe the trend for each customer category; explain the reason(s) for the trends, and where trends are increasing.

Based on limited data it appears that the current PCD is below the average for the Twin Cities Metropolitan area.

Objective 5: Reduce Peak Day Demand so that the Ratio of Average Maximum day to the Average Day is less than 2.6

Is the ratio of average 2005-2014 maximum day demand to average 2005-2014 average day demand reported in Table 2 more than 2.6? Yes No

The East Bethel water SCADA system does not have the ability to meter daily use. Because our wells run once a week due to low demand, we are estimating the average maximum day to average day ratio at 2.0 based on tank level measurements during the hottest and driest summer measurements. Most of our customers utilize separate meters for irrigation or a separate well with no cross connections so irrigation increases are very low.

Calculate a ten year average (2005 – 2014) of the ratio of maximum day demand to average day demand:

N/A

The position of the DNR has been that a peak day/average day ratio that is above 2.6 for in summer indicates that the water being used for irrigation by the residents in a community is too large and that efforts should be made to reduce the peak day use by the community.

It should be noted that by reducing the peak day use, communities can also reduce the amount of infrastructure that is required to meet the peak day use. This infrastructure includes new wells, new water towers which can be costly items.

Objective 6: Implement a Conservation Water Rate Structure and/or a Uniform Rate Structure with a Water Conservation Program

Water Conservation Program

Municipal water suppliers serving over 1,000 people are required to adopt demand reduction measures that include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction. These measures must achieve demand reduction in ways that reduce water demand, water losses, peak water demands, and nonessential water uses. These measures must be approved before a community may request well construction approval from the Department of Health or before requesting an increase in water appropriations permit volume (*Minnesota Statutes*, section 103G.291, subd. 3 and 4). Rates should be adjusted on a regular basis to ensure that revenue of the system is adequate under reduced demand scenarios. If a municipal water supplier intends to use a Uniform Rate Structure, a community-wide Water Conservation Program that will achieve demand reduction must be provided.

Current Water Rates

Include a copy of the actual rate structure in **Appendix 9** or list current water rates including base/service fees and volume charges below.

Volume included in base rate or service charge: gallons or _____ cubic feet _____ other

Frequency of billing: Monthly Bimonthly Quarterly Other: _____

Water Rate Evaluation Frequency: every year every _____ years no schedule

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Date of last rate change: 12-21-16

Table 27. Rate structures for each customer category (Select all that apply and add additional rows as needed)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
Residential	<input checked="" type="checkbox"/> Monthly billing <input checked="" type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input checked="" type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input type="checkbox"/> Use water bill to provide comparisons <input checked="" type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform <input type="checkbox"/> Odd/even day watering	<input type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
Commercial/ Industrial/ Institutional	<input checked="" type="checkbox"/> Monthly billing <input checked="" type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input type="checkbox"/> Use water bill to provide comparisons <input checked="" type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform	<input type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
<input type="checkbox"/> Other			

*** Rate Structures components that may promote water conservation:**

- **Monthly billing:** is encouraged to help people see their water usage so they can consider changing behavior.
- **Increasing block rates (also known as a tiered residential rate structure):** Typically, these have at least three tiers: should have at least three tiers.
 - The first tier is for the winter average water use.
 - The second tier is the year-round average use, which is lower than typical summer use. This rate should be set to cover the full cost of service.
 - The third tier should be above the average annual use and should be priced high enough to encourage conservation, as should any higher tiers. For this to be effective, the difference in block rates should be significant.
- **Seasonal rate:** higher rates in summer to reduce peak demands

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- **Time of Use rates:** lower rates for off peak water use
- **Bill water use in gallons:** this allows customers to compare their use to average rates
- **Individualized goal rates:** typically used for industry, business or other large water users to promote water conservation if they keep within agreed upon goals. **Excess Use rates:** if water use goes above an agreed upon amount this higher rate is charged
- **Drought surcharge:** an extra fee is charged for guaranteed water use during drought
- **Use water bill to provide comparisons:** simple graphics comparing individual use over time or compare individual use to others.
- **Service charge or base fee that does not include a water volume** – a base charge or fee to cover universal city expenses that are not customer dependent and/or to provide minimal water at a lower rate (e.g., an amount less than the average residential per capita demand for the water supplier for the last 5 years)
- **Emergency rates** -A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

****Conservation Neutral****

- **Uniform rate:** rate per unit used is the same regardless of the volume used
- **Odd/even day watering** –This approach reduces peak demand on a daily basis for system operation, but it does not reduce overall water use.

***** Non-Conserving *****

- **Service charge or base fee with water volume:** an amount of water larger than the average residential per capita demand for the water supplier for the last 5 years
- **Declining block rate:** the rate per unit used decreases as water use increases.
- **Flat rate:** one fee regardless of how much water is used (usually unmetered).

Provide justification for any conservation neutral or non-conserving rate structures. If intending to adopt a conservation rate structure, include the timeframe to do so:

Objective 7: Additional strategies to Reduce Water Use and Support Wellhead Protection Planning

Development and redevelopment projects can provide additional water conservation opportunities, such as the actions listed below. If a Uniform Rate Structure is in place, the water supplier must provide a Water Conservation Program that includes at least two of the actions listed below. Check those actions that you intent to implement within the next 10 years.

Table 28. Additional strategies to Reduce Water Use & Support Wellhead Protection

<input type="checkbox"/>	Participate in the GreenStep Cities Program, including implementation of at least one of the 20 “Best Practices” for water
<input type="checkbox"/>	Prepare a master plan for smart growth (compact urban growth that avoids sprawl)
<input type="checkbox"/>	Prepare a comprehensive open space plan (areas for parks, green spaces, natural areas)
<input checked="" type="checkbox"/>	Adopt a water use restriction ordinance (lawn irrigation, car washing, pools, etc.)
<input type="checkbox"/>	Adopt an outdoor lawn irrigation ordinance
<input type="checkbox"/>	Adopt a private well ordinance (private wells in a city must comply with water restrictions)
<input checked="" type="checkbox"/>	Implement a stormwater management program

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<input type="checkbox"/>	Adopt non-zoning wetlands ordinance (can further protect wetlands beyond state/federal laws-for vernal pools, buffer areas, restrictions on filling or alterations)
<input type="checkbox"/>	Adopt a water offset program (primarily for new development or expansion)
<input type="checkbox"/>	Implement a water conservation outreach program
<input type="checkbox"/>	Hire a water conservation coordinator (part-time)
<input type="checkbox"/>	Implement a rebate program for water efficient appliances, fixtures, or outdoor water management
<input type="checkbox"/>	Other

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

As stated below

Tip: The process to monitor demand reduction and/or a rate structure includes:

- a) The DNR Hydrologist will call or visit the community the first 1-3 years after the water supply plan is completed.
- b) They will discuss what activities the community is doing to conserve water and if they feel their actions are successful. The Water Supply Plan, Part 3 tables and responses will guide the discussion. For example, they will discuss efforts to reduce unaccounted for water loss if that is a problem, or go through Tables 33, 34 and 35 to discuss new initiatives.
- c) The city representative and the hydrologist will discuss total per capita water use, residential per capita water use, and business/industry use. They will note trends.
- d) They will also discuss options for improvement and/or collect case studies of success stories to share with other communities. One option may be to change the rate structure, but there are many other paths to successful water conservation.
- e) If appropriate, they will cooperatively develop a simple work plan for the next few years, targeting a couple areas where the city might focus efforts.

A. Regulation

Complete Table 29 by selecting which regulations are used to reduce demand and improve water efficiencies. Add additional rows as needed.

Copies of adopted regulations or proposed restrictions or should be included in **Appendix 10** (a list with hyperlinks is acceptable).

Table 29. Regulations for short-term reductions in demand and long-term improvements in water efficiencies

Regulations Utilized	When is it applied (in effect)?
<input type="checkbox"/> Rainfall sensors required on landscape irrigation systems	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input checked="" type="checkbox"/> Water efficient plumbing fixtures required	<input checked="" type="checkbox"/> New development <input type="checkbox"/> Replacement <input type="checkbox"/> Rebate Programs
<input checked="" type="checkbox"/> Critical/Emergency Water Deficiency ordinance	<input checked="" type="checkbox"/> Only during declared Emergencies

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Regulations Utilized	When is it applied (in effect)?
<input type="checkbox"/> Watering restriction requirements (time of day, allowable days, etc.)	<input type="checkbox"/> Odd/even <input type="checkbox"/> 2 days/week <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Water waste prohibited (for example, having a fine for irrigators spraying on the street)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Limitations on turf areas (requiring lots to have 10% - 25% of the space in natural areas)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other
<input type="checkbox"/> Soil preparation requirements (after construction, requiring topsoil to be applied to promote good root growth)	<input type="checkbox"/> New Development <input type="checkbox"/> Construction Projects <input type="checkbox"/> Other
<input type="checkbox"/> Tree ratios (requiring a certain number of trees per square foot of lawn)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other
<input type="checkbox"/> Permit to fill swimming pool and/or requiring pools to be covered (to prevent evaporation)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Ordinances that permit stormwater irrigation, reuse of water, or other alternative water use (Note: be sure to check current plumbing codes for updates)	<input type="checkbox"/> Describe

B. Retrofitting Programs

Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use, as well as energy costs. It is recommended that municipal water suppliers develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and appliances. Some water suppliers have developed partnerships with organizations having similar conservation goals, such as electric or gas suppliers, to develop cooperative rebate and retrofit programs.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

Retrofitting Programs

Complete Table 30 by checking which water uses are targeted, the outreach methods used, the measures used to identify success, and any participating partners.

Table 30. Retrofitting programs (Select all that apply)

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Water Use Targets	Outreach Methods	Partners
<input type="checkbox"/> Low flush toilets, <input type="checkbox"/> Toilet leak tablets, <input type="checkbox"/> Low flow showerheads, <input type="checkbox"/> Faucet aerators;	<input type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input type="checkbox"/> Water conserving washing machines, <input type="checkbox"/> Dish washers, <input type="checkbox"/> Water softeners;	<input type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input type="checkbox"/> Rain gardens, <input type="checkbox"/> Rain barrels, <input type="checkbox"/> Native/drought tolerant landscaping, etc.	<input type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization

Briefly discuss measures of success from the above table (e.g. number of items distributed, dollar value of rebates, gallons of water conserved, etc.):

This system is new. A retrofitting program has not been established

C. Education and Information Programs

Customer education should take place in three different circumstances. First, customers should be provided information on how to conserve water and improve water use efficiencies. Second, information should be provided at appropriate times to address peak demands. Third, emergency notices and educational materials about how to reduce water use should be available for quick distribution during an emergency.

Proposed Education Programs

Complete Table 31 by selecting which methods are used to provide water conservation and information, including the frequency of program components. Select all that apply and add additional lines as needed.

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Table 31. Current and Proposed Education Programs

Education Methods	General summary of topics	#/Year	Frequency
Billing inserts or tips printed on the actual bill			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Consumer Confidence Reports			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Social media distribution (e.g., emails, Facebook, Twitter)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Paid advertisements (e.g., billboards, print media, TV, radio, web sites, etc.)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Presentations to community groups			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Staff training	How to identify water misuse.	1	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Facility tours			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Displays and exhibits	Annual town hall meeting - general education on how to conserve and the benefits of conserving water.	1	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Marketing rebate programs (e.g., indoor fixtures & appliances and outdoor practices)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community news letters	General education on how to conserve and the benefits of conserving water.	1	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

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Education Methods	General summary of topics	#/Year	Frequency
Direct mailings (water audit/retrofit kits, showerheads, brochures)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Information kiosk at utility and public buildings			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Public service announcements			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Cable TV Programs			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Demonstration projects (landscaping or plumbing)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
K-12 education programs (Project Wet, Drinking Water Institute, presentations)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community events (children’s water festivals, environmental fairs)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community education classes			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Water week promotions			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Website (include address)	General education on how to conserve and the benefits of conserving water.		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Targeted efforts (large volume users, users with large increases)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Notices of ordinances			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

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Education Methods	General summary of topics	#/Year	Frequency
Emergency conservation notices			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Other:			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Briefly discuss what future education and information activities your community is considering in the future:

Developing a Critical Water Deficiency Ordinance that will be provided to customers and available on the City website. We will continue to update our residents, on private and public supplies, how to conserve water through our quarterly newsletter.

Part 4. ITEMS FOR METROPOLITAN AREA COMMUNITIES

Minnesota Statute 473.859 requires WSPs to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process.



Much of the information in Parts 1-3 addresses water demand for the next 10 years. However, additional information is needed to address water demand through 2040, which will make the WSP consistent with the Metropolitan Land Use Planning Act, upon which the local comprehensive plans are based.

This Part 4 provides guidance to complete the WSP in a way that addresses plans for water supply through 2040.

A. Water Demand Projections through 2040

Complete Table 7 in Part 1D by filling in information about long-term water demand projections through 2040. Total Community Population projections should be consistent with the community's system statement, which can be found on the Metropolitan Council's website and which was sent to the community in September 2015.

Projected Average Day, Maximum Day, and Annual Water Demands may either be calculated using the method outlined in *Appendix 2* of the *2015 Master Water Supply Plan* or by a method developed by the individual water supplier.

B. Potential Water Supply Issues

Complete Table 10 in Part 1E by providing information about the potential water supply issues in your community, including those that might occur due to 2040 projected water use.

The *Master Water Supply Plan* provides information about potential issues for your community in *Appendix 1 (Water Supply Profiles)*. This resource may be useful in completing Table 10.

You may document results of local work done to evaluate impact of planned uses by attaching a feasibility assessment or providing a citation and link to where the plan is available electronically.

C. Proposed Alternative Approaches to Meet Extended Water Demand Projections

Complete Table 12 in Part 1F with information about potential water supply infrastructure impacts (such as replacements, expansions or additions to wells/intakes, water storage and treatment capacity, distribution systems, and emergency interconnections) of extended plans for development and redevelopment, in 10-year increments through 2040. It may be useful to refer to information in the community's local Land Use Plan, if available.

Complete Table 14 in Part 1F by checking each approach your community is considering to meet future demand. For each approach your community is considering, provide information about the amount of

future water demand to be met using that approach, the timeframe to implement the approach, potential partners, and current understanding of the key benefits and challenges of the approach.

As challenges are being discussed, consider the need for: evaluation of geologic conditions (mapping, aquifer tests, modeling), identification of areas where domestic wells could be impacted, measurement and analysis of water levels & pumping rates, triggers & associated actions to protect water levels, etc.

D. Value-Added Water Supply Planning Efforts (Optional)

The following information is not required to be completed as part of the local water supply plan, but completing this can help strengthen source water protection throughout the region and help Metropolitan Council and partners in the region to better support local efforts.

Source Water Protection Strategies

Does a Drinking Water Supply Management Area for a neighboring public water supplier overlap your community? Yes No

If you answered no, skip this section. If you answered yes, please complete Table 32 with information about new water demand or land use planning-related local controls that are being considered to provide additional protection in this area.

Table 32. Local controls and schedule to protect Drinking Water Supply Management Areas

Local Control	Schedule to Implement	Potential Partners
<input checked="" type="checkbox"/> None at this time		
<input type="checkbox"/> Comprehensive planning that guides development in vulnerable drinking water supply management areas		
<input type="checkbox"/> Zoning overlay		
<input type="checkbox"/> Other:		

Technical assistance

From your community’s perspective, what are the most important topics for the Metropolitan Council to address, guided by the region’s Metropolitan Area Water Supply Advisory Committee and Technical Advisory Committee, as part of its ongoing water supply planning role?

- Coordination of state, regional and local water supply planning roles
- Regional water use goals
- Water use reporting standards
- Regional and sub-regional partnership opportunities
- Identifying and prioritizing data gaps and input for regional and sub-regional analyses
- Others: _____

GLOSSARY

Agricultural/Irrigation Water Use - Water used for crop and non-crop irrigation, livestock watering, chemigation, golf course irrigation, landscape and athletic field irrigation.

Average Daily Demand - The total water pumped during the year divided by 365 days.

Calcareous Fen - Calcareous fens are rare and distinctive wetlands dependent on a constant supply of cold groundwater. Because they are dependent on groundwater and are one of the rarest natural communities in the United States, they are a protected resource in MN. Approximately 200 have been located in Minnesota. They may not be filled, drained or otherwise degraded.

Commercial/Institutional Water Use - Water used by motels, hotels, restaurants, office buildings, commercial facilities and institutions (both civilian and military). Consider maintaining separate institutional water use records for emergency planning and allocation purposes. Water used by multi-family dwellings, apartment buildings, senior housing complexes, and mobile home parks should be reported as Residential Water Use.

Commercial/Institutional/Industrial (C/I/I) Water Sold - The sum of water delivered for commercial/institutional or industrial purposes.

Conservation Rate Structure - A rate structure that encourages conservation and may include increasing block rates, seasonal rates, time of use rates, individualized goal rates, or excess use rates. If a conservation rate is applied to multifamily dwellings, the rate structure must consider each residential unit as an individual user. A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

Date of Maximum Daily Demand - The date of the maximum (highest) water demand. Typically this is a day in July or August.

Declining Rate Structure - Under a declining block rate structure, a consumer pays less per additional unit of water as usage increases. This rate structure does not promote water conservation.

Distribution System - Water distribution systems consist of an interconnected series of pipes, valves, storage facilities (water tanks, water towers, reservoirs), water purification facilities, pumping stations, flushing hydrants, and components that convey drinking water and meeting fire protection needs for cities, homes, schools, hospitals, businesses, industries and other facilities.

Flat Rate Structure - Flat fee rates do not vary by customer characteristics or water usage. This rate structure does not promote water conservation.

Industrial Water Use - Water used for thermonuclear power (electric utility generation) and other industrial use such as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

Low Flow Fixtures/Appliances - Plumbing fixtures and appliances that significantly reduce the amount of water released per use are labeled “low flow”. These fixtures and appliances use just enough water to be effective, saving excess, clean drinking water that usually goes down the drain.

Maximum Daily Demand - The maximum (highest) amount of water used in one day.

Metered Residential Connections - The number of residential connections to the water system that have meters. For multifamily dwellings, report each residential unit as an individual user.

Percent Unmetered/Unaccounted For - Unaccounted for water use is the volume of water withdrawn from all sources minus the volume of water delivered. This value represents water “lost” by miscalculated water use due to inaccurate meters, water lost through leaks, or water that is used but unmetered or otherwise undocumented. Water used for public services such as hydrant flushing, ice skating rinks, and public swimming pools should be reported under the category “Water Supplier Services”.

Population Served - The number of people who are served by the community’s public water supply system. This includes the number of people in the community who are connected to the public water supply system, as well as people in neighboring communities who use water supplied by the community’s public water supply system. It should not include residents in the community who have private wells or get their water from neighboring water supply.

Residential Connections - The total number of residential connections to the water system. For multifamily dwellings, report each residential unit as an individual user.

Residential Per Capita Demand - The total residential water delivered during the year divided by the population served divided by 365 days.

Residential Water Use - Water used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Should include all water delivered to single family private residences, multi-family dwellings, apartment buildings, senior housing complexes, mobile home parks, etc.

Smart Meter - Smart meters can be used by municipalities or by individual homeowners. Smart metering generally indicates the presence of one or more of the following:

- Smart irrigation water meters are controllers that look at factors such as weather, soil, slope, etc. and adjust watering time up or down based on data. Smart controllers in a typical summer will reduce water use by 30%-50%. Just changing the spray nozzle to new efficient models can reduce water use by 40%.
- Smart Meters on customer premises that measure consumption during specific time periods and communicate it to the utility, often on a daily basis.
- A communication channel that permits the utility, at a minimum, to obtain meter reads on demand, to ascertain whether water has recently been flowing through the meter and onto the

premises, and to issue commands to the meter to perform specific tasks such as disconnecting or restricting water flow.

Total Connections - The number of connections to the public water supply system.

Total Per Capita Demand - The total amount of water withdrawn from all water supply sources during the year divided by the population served divided by 365 days.

Total Water Pumped - The cumulative amount of water withdrawn from all water supply sources during the year.

Total Water Delivered - The sum of residential, commercial, industrial, institutional, water supplier services, wholesale and other water delivered.

Ultimate (Full Build-Out) - Time period representing the community's estimated total amount and location of potential development, or when the community is fully built out at the final planned density.

Unaccounted (Non-revenue) Loss - See definitions for "percent unmetered/unaccounted for loss".

Uniform Rate Structure - A uniform rate structure charges the same price-per-unit for water usage beyond the fixed customer charge, which covers some fixed costs. The rate sends a price signal to the customer because the water bill will vary by usage. Uniform rates by class charge the same price-per-unit for all customers within a customer class (e.g. residential or non-residential). This price structure is generally considered less effective in encouraging water conservation.

Water Supplier Services - Water used for public services such as hydrant flushing, ice skating rinks, public swimming pools, city park irrigation, back-flushing at water treatment facilities, and/or other uses.

Water Used for Nonessential Purposes - Water used for lawn irrigation, golf course and park irrigation, car washes, ornamental fountains, and other non-essential uses.

Wholesale Deliveries - The amount of water delivered in bulk to other public water suppliers.

Acronyms and Initialisms

AWWA – American Water Works Association

C/I/I – Commercial/Institutional/Industrial

CIP – Capital Improvement Plan

GIS – Geographic Information System

GPCD – Gallons per capita per day

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GWMA – Groundwater Management Area – North and East Metro, Straight River, Bonanza,

MDH – Minnesota Department of Health

MGD – Million gallons per day

MG – Million gallons

MGL – Maximum Contaminant Level

MnTAP – Minnesota Technical Assistance Program (University of Minnesota)

MPARS – MN/DNR Permitting and Reporting System (new electronic permitting system)

MRWA – Minnesota Rural Waters Association

SWP – Source Water Protection

WHP – Wellhead Protection

APPENDICES TO BE SUBMITTED BY THE WATER SUPPLIER

Appendix 1: Well records and maintenance summaries – see Part 1C

Appendix 2: Water level monitoring plan – see Part 1E

Appendix 3: Water level graphs for each water supply well - see Part 1E

Appendix 4: Capital Improvement Plan - see Part 1E

Appendix 5: Emergency Telephone List – see Part 2C

Appendix 6: Cooperative Agreements for Emergency Services – see Part 2C

Appendix 7: Municipal Critical Water Deficiency Ordinance – see Part 2C

Appendix 8: Graph showing annual per capita water demand for each customer category during the last ten-years – see Part 3 Objective 4

Appendix 9: Water Rate Structure – see Part 3 Objective 6

Appendix 10: Adopted or proposed regulations to reduce demand or improve water efficiency – see Part 3 Objective 7

Appendix 11: Implementation Checklist – summary of all the actions that a community is doing, or proposes to do, including estimated implementation dates – see www.mndnr.gov/watersupplyplans

Appendix 1

Well records and maintenance summaries

There have been no maintenance needs to the wells or pumps to date.

Appendix 2

Water level monitoring plan

**Groundwater Monitoring Plan
DNR Permit No. 2014 – 1049**

City of East Bethel

The City will monitor water levels in Production Wells No. 3 and No. 4 using a pressure transducer. Data will be logged for each well with the SCADA system. Water level readings shall be collected hourly. Monthly hand measurements will be collected to calibrate the automated water level measurements. All water level measurements are to be recorded as depth to water from the top of casing and are to be recorded as decimal feet to the nearest 0.1-foot.

The City will monitor water levels in the following three Observation wells

- Monitoring Well No. 1 - MDH Unique #783647, a buried aquifer well (also called HA 1).
- Monitoring Well No. 2 - MDH Unique # 782121, a Wonewoc aquifer well (also called HA 5).
- Monitoring Well No. 3 - No Unique Number, a 20-foot water table well (also called HA 2).

All of these wells will be monitored using a pressure transducer/data logger. Water level readings shall be collected hourly in the wells. Monthly hand measurements will be collected to calibrate the automated water level measurements. All water level measurements are to be recorded as depth to water from the top of casing and are to be recorded as decimal feet to the nearest 0.1-foot.

Information about when the production wells are pumping and the pumped volume will be reported with the well water level data.

The data logger, hand measurements, and pumping data shall be submitted in electronic format to the DNR's Groundwater Coordinator (gwlevelcoor.dnr@state.mn.us) on a quarterly basis or upon request. The logger data set shall include a date/time stamp and water level measurement.

Production well and monitoring well data for each well, based on the DNR template, is attached.

Ground Water Level Measurement Form for Production Well No. 3

DNR Permit Number: 2014 - 1049
Permittee Name: City of East Bethel
Permittee Well Number: Production Well No. 3
MDH Unique Well Number: 782113
Well Address: 19458 Taylor Street NE, East Bethel, MN 55011

Measuring Point Height Above
Ground Surface (ft):

Measuring Point Description Top of casing

Method of measurement SCADA/Pressure Transducer

Date of Measurement (MM/DD/YYYY)	Time of Measurement (24 hour time)	Depth to water (feet)
Start November, 2011	Continuous	

Ground Water Level Measurement Form for Production Well No. 4

DNR Permit Number: 2014 - 1049
Permittee Name: City of East Bethel
Permittee Well Number: Production Well No. 4
MDH Unique Well Number: 782114
Well Address: 19458 Taylor Street NE, East Bethel, MN 55011

Measuring Point Height Above
Ground Surface (ft):

Measuring Point Description Top of casing

Method of measurement SCADA/Pressure Transducer

Date of Measurement (MM/DD/YYYY)	Time of Measurement (24 hour time)	Depth to water (feet)
---	---	------------------------------

Start November, 2011	Continuous	
----------------------	------------	--

Ground Water Level Measurement Form for Monitoring Well No. 1

DNR Permit Number: 2014 - 1049

Permittee Name: City of East Bethel

Permittee Well Number: Monitoring Well No. 1 - Data Logger 3923

MDH Unique Well Number: 782121

Well Address: 19458 Taylor Street NE, East Bethel, MN 55011

Top of Casing Elevation: 906.36

Measuring Point Height Above Ground Surface (ft): 2.34

Measuring Point Description: Top of casing

Method of measurement: Pressure Transducer

Date of Measurement (MM/DD/YYYY)	Time of Measurement (24 hour time)	Depth to water (feet)
Start November, 2011	Continuous	

Ground Water Level Measurement Form for Monitoring Well No. 2

DNR Permit Number: 2014 - 1049

Permittee Name: City of East Bethel

Permittee Well Number: Monitoring Well No. 2 - Data Logger 3931

MDH Unique Well Number: 783647

Well Address: 19458 Taylor Street NE, East Bethel, MN 55011

Top of Casing Elevation: 914.32

Measuring Point Height Above Ground Surface (ft): 3.75

Measuring Point Description: Top of casing

Method of measurement: Pressure Transducer

Date of Measurement (MM/DD/YYYY)	Time of Measurement (24 hour time)	Depth to water (feet)
Start November, 2011	Continuous	

Ground Water Level Measurement Form for Monitoring Well No. 3

DNR Permit Number: 2014 - 1049

Permittee Name: City of East Bethel

Permittee Well Number: Monitoring Well No. 3 - Data Logger 3828

MDH Unique Well Number:

Well Address: 19458 Taylor Street NE, East Bethel, MN 55011

Top of Casing Elevation: 906.80

Measuring Point Height Above Ground Surface (ft): 4.31

Measuring Point Description: Top of casing

Method of measurement: Pressure Transducer

Date of Measurement (MM/DD/YYYY)	Time of Measurement (24 hour time)	Depth to water (feet)
Start November, 2011	Continuous	



Legend

- Monitoring Well
- Production Well

**City of East Bethel
Well Monitoring
Location Map**

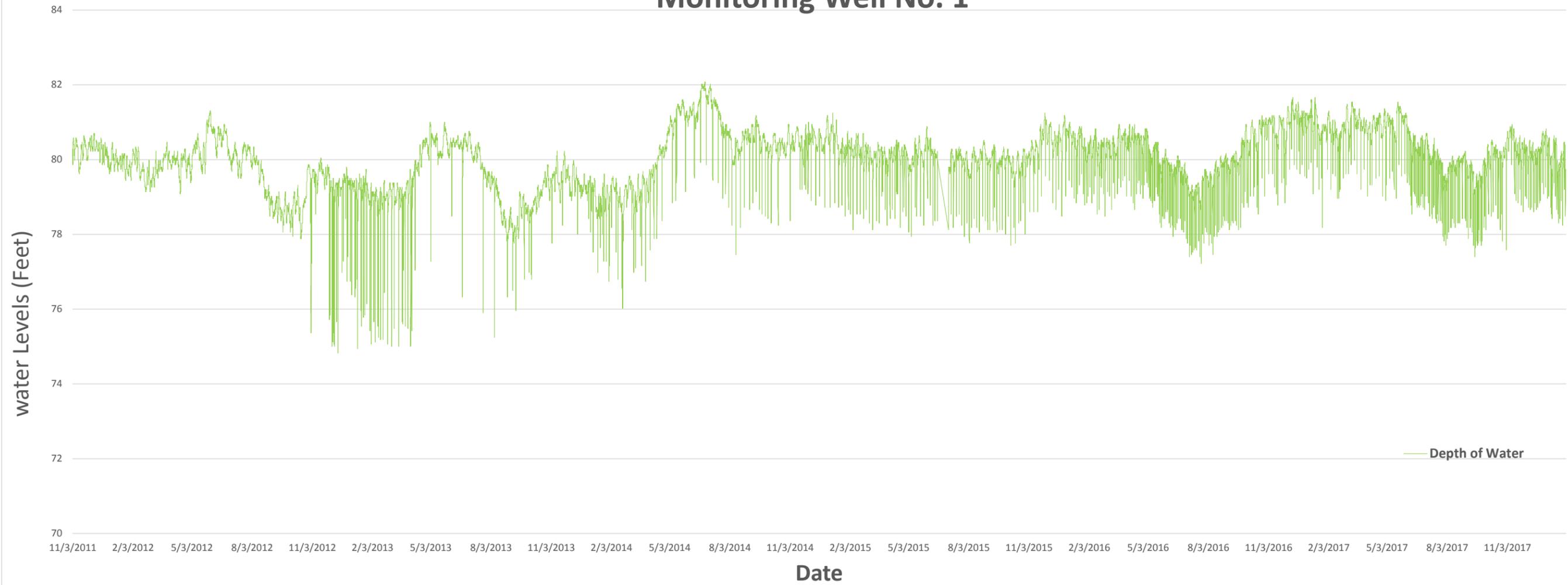


Legend

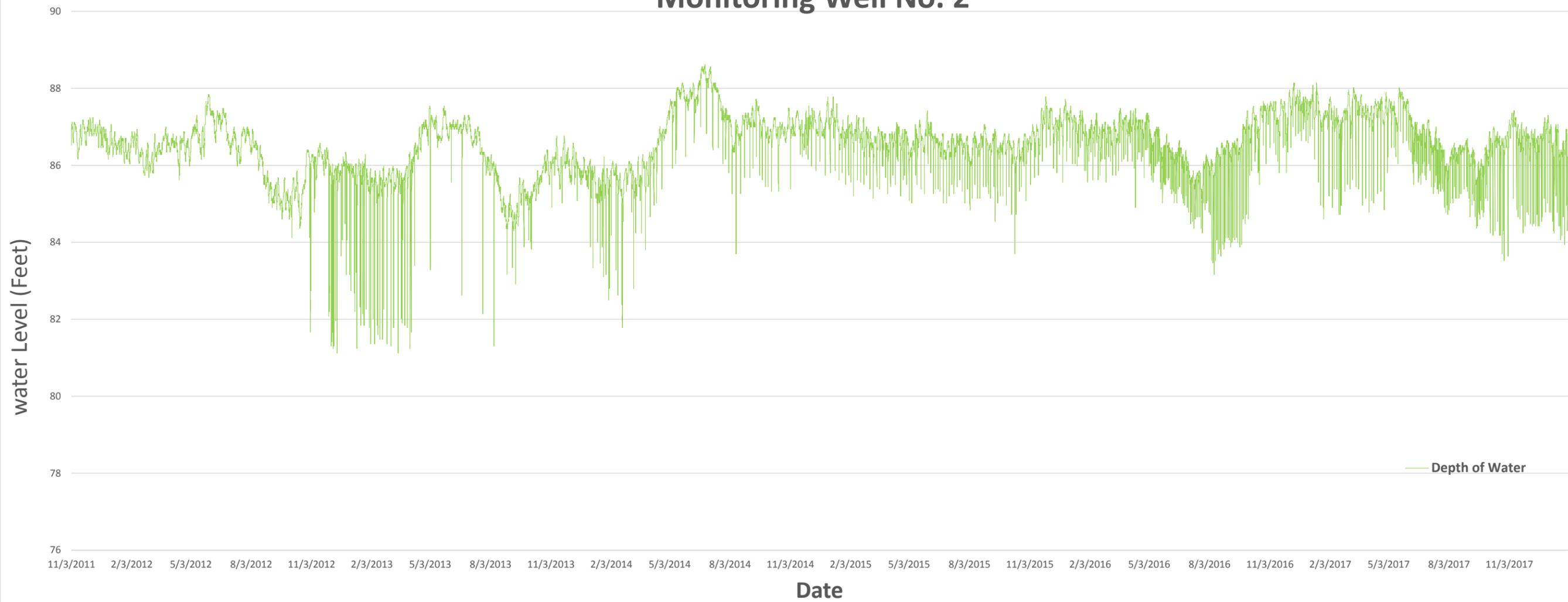
- Production Well
- 1.5 Mile Radius
- DNR Protected Water
- DNR Protected Watercourse
- NWI Wetlands
- City Watermain
- MCES Reclaimed Watermain

**City of East Bethel
Resource Location Map**

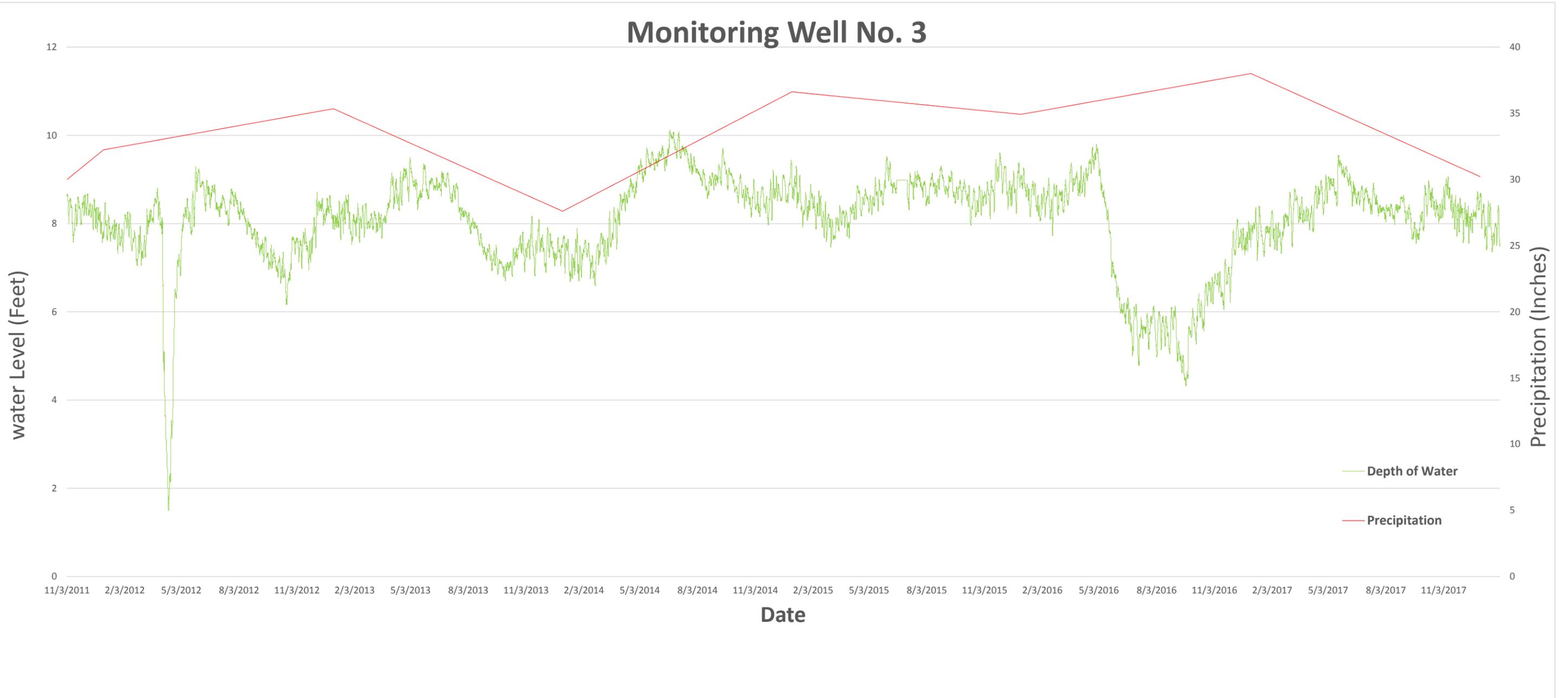
Monitoring Well No. 1



Monitoring Well No. 2



Monitoring Well No. 3



Appendix 3

Water level graphs for each water supply well

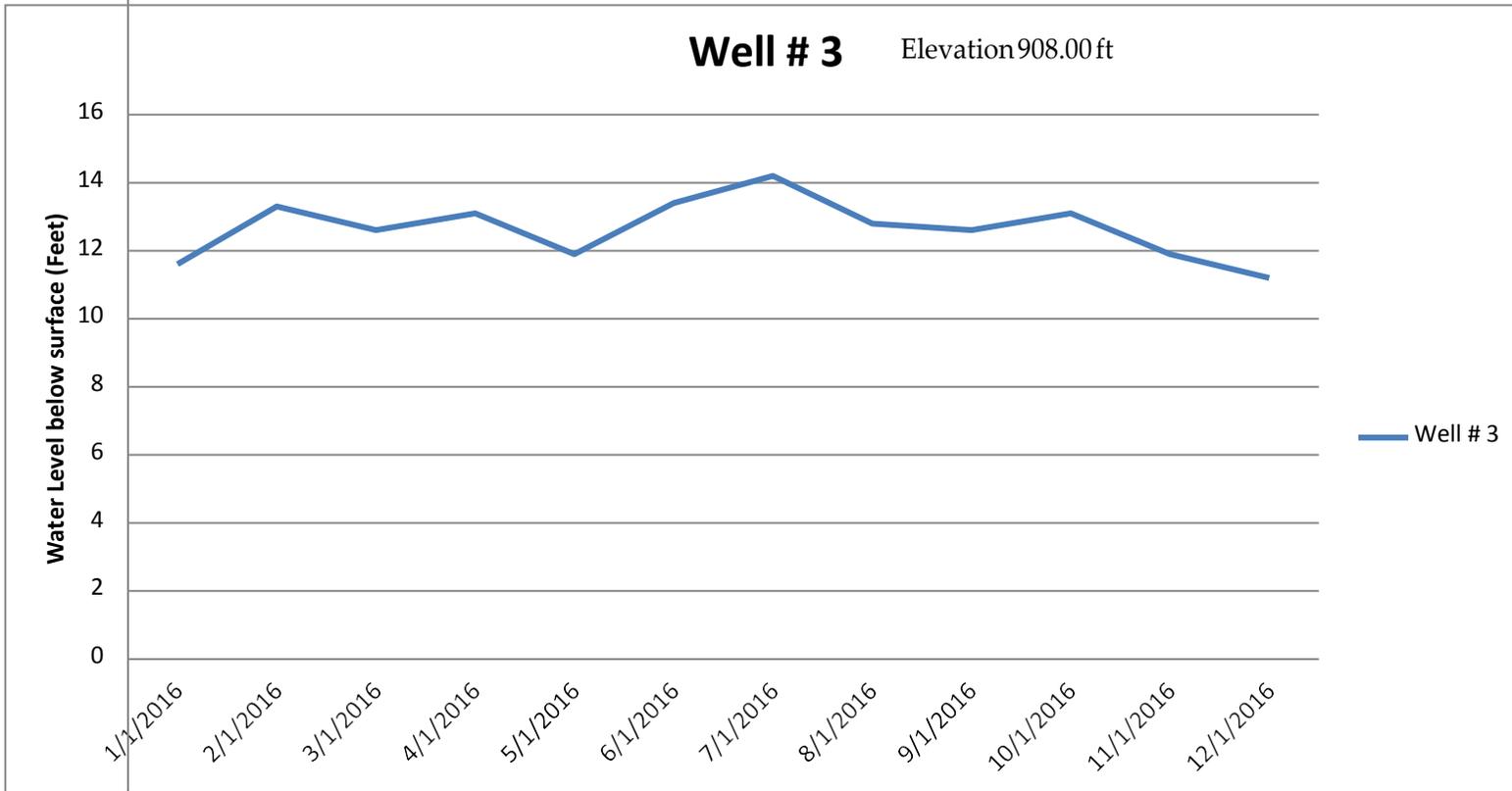
The City of East Bethel currently has a SCADA system that provide continuous monitoring of water levels. We are working with the MN DNR to incorporate a way for the data to be directly sent to the DNR. The DNR was looking into a grant opportunity to help with the costs associated with the technology updates.

The water levels are currently recorded daily and the water levels are checked manually monthly. The records will be sent to the DNR groundwater coordinator quarterly. Data from production well #4 is missing due to a faulty pressure transducer switch, but has been replaced and is currently measuring water levels accurately.

Static Level of Wells

Date Well # 3 Well # 4

1/1/2016	11.6	
2/1/2016	13.3	
3/1/2016	12.6	
4/1/2016	13.1	
5/1/2016	11.9	
6/1/2016	13.4	
7/1/2016	14.2	
8/1/2016	12.8	
9/1/2016	12.6	
10/1/2016	13.1	
11/1/2016	11.9	
12/1/2016	11.2	23.6



Appendix 4

Capital Improvement Plan

There are plans to spend \$800,00 to expand the south sewer and water system in 2017. No other expansions are planned in the next 5 years.

Appendix 5

Emergency Telephone List

City of East Bethel Water Emergency Telephone List

Emergency Response Team	Name	Work Telephone	Alternate Telephone
Emergency Response Lead	Nate Ayshford	763-367-7876	612-328-1529
Alternate Emergency Response Lead	Jack Davis	763-367-7850	612-715-1855
Water Operator	Jeremiah Haller	612-328-3927	
Alternate Water Operator	Jason Hehir	763-807-0779	
Alternate Water Operator	Chad Citrowske	763-439-9822	

State and Local Emergency Response Contacts	Name	Work Telephone	Alternate Telephone
State Incident Duty Officer	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
County Emergency Director	Terry Stoltzman	911	911
National Guard	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
Mayor/Board Chair	Steve Voss	651-308-0198	
Fire Chief	Mark DuCharme	763-367-7886	612-328-6833
Sheriff			
Police Chief			
Ambulance			
Hospital			
Doctor or Medical Facility			

State and Local Agencies	Name	Work Telephone	Alternate Telephone
MDH District Engineer			
MDH	Drinking Water Protection	651-201-4700	
State Testing Laboratory	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
MPCA			
DNR Area Hydrologist			
County Water Planner			

Utilities	Name	Work Telephone	Alternate Telephone
Electric Company	Connexus Energy	7633232600	
Gas Company			
Telephone Company			
Gopher State One Call	Utility Locations	800-252-1166	651-454-0002
Highway Department			

Technical/Contracted Services/Supplies	Name	Work Telephone	Alternate Telephone
MRWA Technical Services	MN Rural Water Association	800-367-6792	
Well Driller/Repair	EH Renner and Sons	763-427-6100	
Pump Repair			
Electrician			
Plumber			
Backhoe			
Chemical Feed			
Meter Repair			
Generator			
Valves			
Pipe & Fittings			
Water Storage			
Laboratory			
Engineering firm	Hakanson Anderson	763-427-5860	

Appendix 6

Cooperative Agreements for Emergency Services

East Bethel is not adjacent to any other municipal water systems. They currently do not have any cooperative agreement.

Appendix 7

Municipal Critical Water Deficiency Ordinance

ORDINANCE NO. 216

AN ORDINANCE regulating nonessential water usage upon critical water deficiency as authorized by Minn. Stat. § 103G.291, subd. 1 and 2.

The City Council of the City of East Bethel ordains:

CHAPTER 74 – UTILITIES, Article V. – Regulating Waterworks and Sanitary Sewer, Division 2. – Water, Section 74-161. - Critical Water Deficiency Declaration

(a) Purpose. This ordinance establishes water conservation restrictions; and the plan will be in effect at any time the governor declares by executive order a critical water deficiency, pursuant to Minnesota Statutes section 103G.291.

(b) Definitions.

Administrator in statutory cities means the person assigned duties pursuant to Minn. Stat. § 412.151; or the city manager pursuant to Minn. Stat. § 412.601 – 412.751 or in charter cities as determined by city charter.

Department means the city water department.

Emergency means the declaration of a critical water deficiency by the governor.

Irrigation means the watering of shrubs, trees, sod, seeded areas, gardens, lawns, or any other outdoor vegetation, except outdoor vegetation utilized for agricultural purposes.

Notification to public means notification through local media, including interviews and issuance of news releases.

Public water supplier means the city or other entity that owns, manages, or operates a public water supply, as defined in Minn. Stat. § 144.382, subdivision 4.

Reclaimed water means water collected from rooftops, paved surfaces, or other collection devices and all water utilized more than once before re-entering the natural water cycle.

Water recirculation system means any system which enables a user to reuse water at least once prior to returning the water to the natural water cycle.

(c) Application.

- (1) This ordinance applies to all customers of public water suppliers who own or control water use on any premises.
- (2) No person shall make, cause, use, or permit the use of water received from a public water supply for residential, commercial, industrial, governmental, or any other purpose in any manner contrary to any provision in this ordinance.
- (3) Mandatory emergency conservation measures shall be implemented based upon the declaration of a critical water emergency by the governor.

(d) Declaration of critical water deficiency. Upon the declaration of a critical water deficiency by the governor, the public water supplier shall immediately post notice of the emergency declaration at the usual meeting place of the city council, or the official city bulletin board. The city shall provide notification to the public as quickly as possible or through established water supply plans emergency response plans or procedures.

(e) Mandatory emergency water conservation measures. Upon declaration of a water emergency and notification to the public, the following mandatory restrictions upon nonessential water use shall be enforced:

- (1) Outdoor irrigation of yards, gardens, golf courses, parklands, and other non-agricultural land, except for those areas irrigated with reclaimed water, is prohibited.
- (2) Washing or spraying of sidewalks, driveways, parking areas, tennis courts, patios, or other paved areas with water from any pressurized source, including garden hoses, except to alleviate immediate health or safety hazards, is prohibited.
- (3) The outdoor use of any water-based play apparatus connected to a pressurized source is prohibited.
- (4) Restaurants and other food service establishments are prohibited from serving water to their customers, unless water is specifically requested by the customer.
- (5) Operation of outdoor misting systems used to cool public areas is prohibited.
- (6) The filling of swimming pools, fountains, spas, or other exterior water features is prohibited.
- (7) The washing of automobiles, trucks, trailers, and other types of mobile equipment is prohibited, except at facilities equipped with wash water recirculation systems, and for vehicles requiring frequent washing to protect public health, safety, and welfare.

(f) Variances. The City Administrator or their designee, is authorized to grant variances to this ordinance where strict application of its provisions would result in serious hardship to a customer. A variance may be granted only for reasons involving health or safety. An applicant may appeal the denial of a variance within five (5) days of the decision by submitting a written appeal to the City Administrator. The City Council shall hear the appeal at the next City Council meeting. The decision of the City Council is final.

(g) Violation.

- (1) Violations shall be determined and cited by the City Administrator or his/her designee. A violator may appeal the citation within five (5) days of its issuance by submitting a written appeal to the City. The City Council shall hear the appeal at the next City Council meeting. The decision of the City Council is final. Violators may be granted an administrative waiver if evidence is provided that equipment failure was the cause of the violation. A letter from a qualified vendor or equipment invoice will be required to show proof of equipment failure.
- (2) Upon discovery of a first violation, the violator shall be issued, either personally or by mail, a warning letter that sets forth the violation and which shall describe the remedy and fines for future violations.
- (3) Upon subsequent violations at the same location, the violator shall be issued, either personally or by mail, a citation that sets forth the violation and shall describe the remedy. Fines shall be added to the monthly water bill of the owner or current occupant of the premises where the violation occurred. The imposition of the fine shall in no way limit the right of the City to pursue other legal remedies.

(h) Enforcement. The City Administrator or his/her designee is authorized to designate city employees or law enforcement personnel to enforce the provisions of this ordinance.

(i) Severability. If any provision of this ordinance or the application of any provision to a particular situation is held to be invalid by a court of competent jurisdiction, the remaining

portions of the ordinance and the application of the ordinance to any other situation shall not be invalidated.

(j) Effective date. This ordinance becomes effective from and after its passage and publication.

Passed by the City Council of East Bethel on _____, 2017.

Approved:

Mayor

Attested:

City Administrator

Appendix 8

Graph showing annual per capita water demand
for each customer category during the last ten-
years

New system information not available.

Appendix 9

Water Rate Structure

**City of East Bethel
2017 Fee Schedule**

UTILITY OPERATION FEES	
<i>Water and Sewer - Access Charges</i>	
WATER SYSTEM ACCESS CHARGE-WHISPERING ASPEN	\$500
SEWER SYSTEM ACCESS CHARGE-WHISPERING ASPEN	\$3,350
SEWER SYSTEM ACCESS CHARGE- MET COUNCIL	\$3,185
WATER SYSTEM ACCESS CHARGE-PHASE I WATER SYSTEM SERVICE AREA	\$3,600
SEWER SYSTEM ACCESS CHARGE-PHASE I SEWER SYSTEM SERVICE AREA	\$2,000
SEWER TRUNK CHARGE - PHASE 1 SEWER SYSTEM SERVICE AREA (USERS WITH ERU >1 or NON-RESIDENTIAL CONNECTIONS)	\$11,500
SEWER SYSTEM ACCESS CHARGE- MET COUNCIL	\$3,185
<i>Water - Operational Charges</i>	
(1) Water use Charges - Residential (Whispering Aspen) - Wells 1 and 2	
BASE CHARGE	\$18.77 PER MONTH
USAGE CHARGES:	
0 - 2,000 GALLONS PER MONTH	\$10.60 PER 1,000 GALLONS
2,001 - 5,000 GALLONS PER MONTH	\$12.72 PER 1,000 GALLONS
5,001 - 10,000 GALLONS PER MONTH	\$15.26 PER 1,000 GALLONS
OVER 10,000 GALLONS PER MONTH	\$18.32 PER 1,000 GALLONS
(2) Water Use Charges – Phase I Water System Service Area - Wells 3 and 4	
BASE CHARGE	\$15.90 PER ERU PER MONTH
USAGE CHARGES:	
0 - 10,000 GALLONS PER MONTH	\$3.18 PER 1,000 GALLONS
OVER 10,000 GALLONS PER MONTH	\$3.80 PER 1,000 GALLONS
<i>Sewer - Operational Charges</i>	
(1) Sewer Treatment - Residential (Whispering Aspen)	
BASE CHARGE	\$6.13 PER MONTH
USAGE CHARGE	\$6.30 PER 1,000 GALLONS
<i>(Residential based on water use during January)</i>	
(2) Sewer Treatment – Phase I Sewer System Service Area	
BASE CHARGE	\$5.30 PER MONTH PER ERU
USAGE CHARGE	\$5.05 PER 1,000 GALLONS
(3) Sewer Treatment - Mobile Park (Greystone)	

Appendix 10

Adopted or proposed regulations to reduce
demand or improve water efficiency

With a small customer base and new system designed for expansion, water use is needed to keep lines cleared out for proper chlorine residual at the end user.

As the system expands and development occurs, the City will continue to work on water conservation measures.

Examples include odd/even watering days, tiered rate structure for commercial users, and reclaimed water irrigation.

Appendix 11

Implementation Checklist – summary of all the actions that a community is doing, or proposes to do, including estimated implementation dates

**Appendix 11
Implementation Checklist**

Activity Implemented	Activity or Action Item	Timeframe
Actions to reduce residential per capita demand		
X	Make water system infrastructure improvements	Ongoing
X	Offer water use audits for residential customers (currently free).	Ongoing
X	Continue to update water rate structure to reward conservative water use.	Ongoing
X	Conduct audience-appropriate water conservation education and outreach.	Ongoing
Actions to reduce total water demand		
X	Install enhanced meters capable of automated readings to detect spikes in consumption	2016
X	Implement a stormwater management program	Ongoing
	Implement a water conservation outreach program	Ongoing
	Revise Comprehensive Plan that guides development in vulnerable drinking water supply management areas and wellhead protection plan	2018
X	Perform Water Audit to track water usage and loss	Ongoing

ATTACHMENT 5

CIP Costs

TABLE 1

**Sanitary Sewer and Water Supply Estimate
City of East Bethel**

Schedule "A" - Street and Storm Sewer

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	SUBGRADE PREPARATION	LF	\$25.00	12,400	\$310,000.00	22,770	\$569,250.00	13,800	\$345,000.00	48,970	\$1,224,250.00
2	AGGREGATE BASE CLASS 5	TON	\$18.00	25,404	\$457,270.67	46,649	\$839,681.70	28,272	\$508,898.00	100,325	\$1,805,851.00
3	WEARING COURSE MIXTURE (B)	TON	\$65.00	4,631	\$301,006.17	8,504	\$552,734.72	5,154	\$334,990.74	18,288	\$1,188,732.00
4	NON WEARING COURSE MIXTURE (B)	TON	\$64.00	5,789	\$370,469.14	10,630	\$680,288.89	6,442	\$412,296.30	22,860	\$1,463,055.00
5	CONCRETE CURB & GUTTER DESIGN B618	LF	\$12.00	24,800	\$297,600.00	45,540	\$546,480.00	27,600	\$331,200.00	97,940	\$1,175,280.00
6	RESTORATION	ACRE	\$4,000.00	134.3	\$537,190.08	71.5	\$285,977.96	37.7	\$150,927.46	244	\$974,096.00
7	STORM SEWER	LF	\$70.00	12,400	\$868,000.00	22,770	\$1,593,900.00	13,800	\$966,000.00	48,970	\$3,427,900.00
Total Schedule "A"				Estimated Construction Cost		\$3,141,540	\$5,068,320	\$3,049,320	\$11,259,164.00		
				Rounded cost		\$3,150,000	\$5,100,000	\$3,100,000	\$11,300,000		

Schedule "B" - Sanitary Sewer

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	8" PVC SEWER PIPE	LF	\$60.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
2	10" PVC SEWER PIPE	LF	\$65.00	4,000	\$260,000.00	330	\$21,450.00	2,750	\$178,750.00	7,080	\$460,200.00
3	12" PVC SEWER PIPE	LF	\$70.00	8,400	\$588,000.00	4,820	\$337,400.00	4,500	\$315,000.00	17,720	\$1,240,400.00
4	15" PVC SEWER PIPE	LF	\$75.00	0	\$0.00	1,450	\$108,750.00	1,450	\$108,750.00	2,900	\$217,500.00
5	21" PVC SEWER PIPE	LF	\$115.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
6	24" PVC SEWER PIPE	LF	\$120.00	0	\$0.00	0	\$0.00	2,900	\$348,000.00	2,900	\$348,000.00
7	27" PVC SEWER PIPE	LF	\$122.00	0	\$0.00	8,250	\$1,006,500.00	0	\$0.00	8,250	\$1,006,500.00
8	30" PVC SEWER PIPE	LF	\$135.00	0	\$0.00	6,740	\$909,900.00	0	\$0.00	6,740	\$909,900.00
9	36" PVC SEWER PIPE	LF	\$145.00	0	\$0.00	5,600	\$812,000.00	3,770	\$546,650.00	9,370	\$1,358,650.00
10	DEWATERING	LF	\$50.00	12,400.00	\$620,000.00	27,190.00	\$1,359,500.00	15,370.00	\$768,500.00	54,960	\$2,748,000.00
11	FORCEMAIN	LF	\$90.00	14,200	\$1,278,000.00	6,400	\$576,000.00	0	\$0.00	20,600	\$1,854,000.00
12	JACKING	LF	\$800.00	250	\$200,000.00	750	\$600,000.00	460	\$368,000.00	1,460	\$1,168,000.00
13	LIFT STATION	EACH	\$500,000.00	0	\$0.00	2	\$1,000,000.00	0	\$0.00	2	\$1,000,000.00
14	PRECAST MANHOLE	EACH	\$8,000.00	35	\$283,428.57	78	\$621,485.71	44	\$351,314.29	157	\$1,256,229.00
Total Schedule "B"				Estimated Construction Cost		\$3,229,430	\$7,352,990	\$2,984,970	\$13,567,379.00		
				Rounded cost		\$3,300,000	\$7,400,000	\$3,000,000	\$13,600,000		

Schedule "C" - Watermain

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	TREATMENT	GPM	\$2,500.00	2,100	\$5,250,000.00	3,500	\$8,750,000.00	1,800	\$4,500,000.00	7,400	\$18,500,000.00
2	6" WATERMAIN - PVC PIPE	LF	\$26.00	1,210	\$31,460.00	3,090	\$80,340.00	1,410	\$36,660.00	5,710	\$148,460.00
3	10" WATERMAIN - PVC PIPE	LF	\$32.00	6,250	\$200,000.00	12,340	\$394,880.00	2,545	\$81,440.00	21,135	\$676,320.00
4	12" WATERMAIN - PVC PIPE	LF	\$44.00	17,850	\$785,400.00	34,750	\$1,529,000.00	15,700	\$690,800.00	68,300	\$3,005,200.00
5	16" WATERMAIN - PVC PIPE	LF	\$56.00	0	\$0.00	0	\$0.00	9,950	\$557,200.00	9,950	\$557,200.00
6	18" WATERMAIN - PVC PIPE	LF	\$60.00	0	\$0.00	14,650	\$879,000.00	1,400	\$84,000.00	16,050	\$963,000.00
7	10" GATE VALVE AND BOX	EACH	\$1,300.00	23	\$30,468.75	46	\$60,157.50	10	\$12,406.88	79	\$103,034.00
8	12" BUTTERFLY VALVE	EACH	\$2,500.00	45	\$111,562.50	87	\$217,187.50	39	\$98,125.00	171	\$426,875.00
9	16" BUTTERFLY VALVE	EACH	\$3,600.00	0	\$0.00	0	\$0.00	25	\$89,550.00	25	\$89,550.00
10	18" BUTTERFLY VALVE	EACH	\$3,800.00	0	\$0.00	37	\$139,175.00	4	\$13,300.00	40	\$152,475.00
11	WATER TOWER	MG	\$2,000,000.00	0.5	\$1,000,000.00	0.75	\$1,500,000.00	0.5	\$1,000,000.00	2	\$3,500,000.00
12	HYDRANT / BOX / VALVE	EACH	\$6,000.00	60	\$361,500.00	154	\$926,100.00	70	\$422,925.00	285	\$1,710,525.00
13	WELL AND RAW WATER LINES	EACH	\$500,000.00	2	\$1,000,000.00	6	\$3,000,000.00	3	\$1,500,000.00	11	\$5,500,000.00
14	JACKING	LF	\$800.00	0	\$0.00	750	\$600,000.00	200	\$160,000.00	950	\$760,000.00
Total Schedule "C"				Estimated Construction Cost		\$8,770,400	\$18,075,840	\$9,246,410	\$36,092,639.00		
				Rounded cost		\$8,800,000	\$18,100,000	\$9,300,000	\$36,100,000		

Estimated Construction Costs

Street & Storm Sewer	\$3,150,000	\$5,100,000	\$3,100,000	\$11,350,000
Sanitary Sewer	\$3,300,000	\$7,400,000	\$3,000,000	\$13,700,000
Water	\$8,800,000	\$18,100,000	\$9,300,000	\$36,200,000

Contingency & Overhead 30%	\$15,250,000	\$30,600,000	\$15,400,000	\$61,250,000
ROW (\$40,000 per Acre)	\$4,575,000	\$9,180,000	\$4,620,000	\$18,375,000
	\$1,138,700	\$2,496,800	\$1,411,400	\$5,046,900
Total Estimated Project Cost	\$20,964,000	\$42,277,000	\$21,432,000	\$84,673,000

TABLE 2

**Sanitary Sewer and Water Supply Estimate
City of East Bethel**

Schedule "A" - Street and Storm Sewer

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	SUBGRADE PREPARATION	LF	\$25.00	12,400	\$310,000.00	22,770	\$569,250.00	13,800	\$345,000.00	48,970	\$1,224,250.00
2	AGGREGATE BASE CLASS 5	TON	\$18.00	25,404	\$457,270.67	46,649	\$839,681.70	28,272	\$508,898.00	100,325	\$1,805,851.00
3	WEARING COURSE MIXTURE (B)	TON	\$65.00	4,631	\$301,006.17	8,504	\$552,734.72	5,154	\$334,990.74	18,288	\$1,188,732.00
4	NON WEARING COURSE MIXTURE (B)	TON	\$64.00	5,789	\$370,469.14	10,630	\$680,288.89	6,442	\$412,296.30	22,860	\$1,463,055.00
5	CONCRETE CURB & GUTTER DESIGN B618	LF	\$12.00	24,800	\$297,600.00	45,540	\$546,480.00	27,600	\$331,200.00	97,940	\$1,175,280.00
6	RESTORATION	ACRE	\$4,000.00	134.3	\$537,190.08	71.5	\$285,977.96	37.7	\$150,927.46	244	\$974,096.00
7	STORM SEWER	LF	\$70.00	12,400	\$868,000.00	22,770	\$1,593,900.00	13,800	\$966,000.00	48,970	\$3,427,900.00
Total Schedule "A"				Estimated Construction Cost		\$3,141,540	\$5,068,320	\$3,049,320	\$11,259,164.00		
				Rounded cost		\$0	\$0	\$0	\$0		

Schedule "B" - Sanitary Sewer

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	8" PVC SEWER PIPE	LF	\$60.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
2	10" PVC SEWER PIPE	LF	\$65.00	4,000	\$260,000.00	330	\$21,450.00	2,750	\$178,750.00	7,080	\$460,200.00
3	12" PVC SEWER PIPE	LF	\$70.00	8,400	\$588,000.00	4,820	\$337,400.00	4,500	\$315,000.00	17,720	\$1,240,400.00
4	15" PVC SEWER PIPE	LF	\$75.00	0	\$0.00	1,450	\$108,750.00	1,450	\$108,750.00	2,900	\$217,500.00
5	21" PVC SEWER PIPE	LF	\$115.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
6	24" PVC SEWER PIPE	LF	\$120.00	0	\$0.00	0	\$0.00	2,900	\$348,000.00	2,900	\$348,000.00
7	27" PVC SEWER PIPE	LF	\$122.00	0	\$0.00	8,250	\$1,006,500.00	0	\$0.00	8,250	\$1,006,500.00
8	30" PVC SEWER PIPE	LF	\$135.00	0	\$0.00	6,740	\$909,900.00	0	\$0.00	6,740	\$909,900.00
9	36" PVC SEWER PIPE	LF	\$145.00	0	\$0.00	5,600	\$812,000.00	3,770	\$546,650.00	9,370	\$1,358,650.00
10	DEWATERING	LF	\$50.00	12,400.00	\$620,000.00	27,190.00	\$1,359,500.00	15,370.00	\$768,500.00	54,960	\$2,748,000.00
11	FORCEMAIN	LF	\$90.00	14,200	\$1,278,000.00	6,400	\$576,000.00	0	\$0.00	20,600	\$1,854,000.00
12	JACKING	LF	\$800.00	250	\$200,000.00	750	\$600,000.00	460	\$368,000.00	1,460	\$1,168,000.00
13	LIFT STATION	EACH	\$500,000.00	0	\$0.00	2	\$1,000,000.00	0	\$0.00	2	\$1,000,000.00
14	PRECAST MANHOLE	EACH	\$8,000.00	35	\$283,428.57	78	\$621,485.71	44	\$351,314.29	157	\$1,256,229.00
Total Schedule "B"				Estimated Construction Cost		\$3,229,430	\$7,352,990	\$2,984,970	\$13,567,379.00		
				Rounded cost		\$3,300,000	\$7,400,000	\$3,000,000	\$13,600,000		

Schedule "C" - Watermain

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	TREATMENT	GPM	\$2,500.00	2,100	\$5,250,000.00	3,500	\$8,750,000.00	1,800	\$4,500,000.00	7,400	\$18,500,000.00
2	6" WATERMAIN - PVC PIPE	LF	\$26.00	1,210	\$31,460.00	3,090	\$80,340.00	1,410	\$36,660.00	5,710	\$148,460.00
3	10" WATERMAIN - PVC PIPE	LF	\$32.00	6,250	\$200,000.00	12,340	\$394,880.00	2,545	\$81,440.00	21,135	\$676,320.00
4	12" WATERMAIN - PVC PIPE	LF	\$44.00	17,850	\$785,400.00	34,750	\$1,529,000.00	15,700	\$690,800.00	68,300	\$3,005,200.00
5	16" WATERMAIN - PVC PIPE	LF	\$56.00	0	\$0.00	0	\$0.00	9,950	\$557,200.00	9,950	\$557,200.00
6	18" WATERMAIN - PVC PIPE	LF	\$60.00	0	\$0.00	14,650	\$879,000.00	1,400	\$84,000.00	16,050	\$963,000.00
7	10" GATE VALVE AND BOX	EACH	\$1,300.00	23	\$30,468.75	46	\$60,157.50	10	\$12,406.88	79	\$103,034.00
8	12" BUTTERFLY VALVE	EACH	\$2,500.00	45	\$111,562.50	87	\$217,187.50	39	\$98,125.00	171	\$426,875.00
9	16" BUTTERFLY VALVE	EACH	\$3,600.00	0	\$0.00	0	\$0.00	25	\$89,550.00	25	\$89,550.00
10	18" BUTTERFLY VALVE	EACH	\$3,800.00	0	\$0.00	37	\$139,175.00	4	\$13,300.00	40	\$152,475.00
11	WATER TOWER	MG	\$2,000,000.00	0.5	\$1,000,000.00	0.75	\$1,500,000.00	0.5	\$1,000,000.00	2	\$3,500,000.00
12	HYDRANT / BOX / VALVE	EACH	\$6,000.00	60	\$361,500.00	154	\$926,100.00	70	\$422,925.00	285	\$1,710,525.00
13	WELL AND RAW WATER LINES	EACH	\$500,000.00	2	\$1,000,000.00	6	\$3,000,000.00	3	\$1,500,000.00	11	\$5,500,000.00
14	JACKING	LF	\$800.00	0	\$0.00	750	\$600,000.00	200	\$160,000.00	950	\$760,000.00
Total Schedule "C"				Estimated Construction Cost		\$8,770,400	\$18,075,840	\$9,246,410	\$36,092,639.00		
				Rounded cost		\$8,800,000	\$18,100,000	\$9,300,000	\$36,100,000		

Estimated Construction Costs

Street & Storm Sewer	\$0	\$0	\$0	\$0
Sanitary Sewer	\$3,300,000	\$7,400,000	\$3,000,000	\$13,700,000
Water	\$8,800,000	\$18,100,000	\$9,300,000	\$36,200,000
=====				
Contingency & Overhead 30%	\$12,100,000	\$25,500,000	\$12,300,000	\$49,900,000
ROW (\$40,000 per Acre)	\$3,630,000	\$7,650,000	\$3,690,000	\$14,970,000
	\$1,138,700	\$2,496,800	\$1,411,400	\$5,046,900
Total Estimated Project Cost	\$16,869,000	\$35,647,000	\$17,402,000	\$69,918,000

TABLE 3

**Sanitary Sewer and Water Supply Estimate
City of East Bethel**

Schedule "A" - Street and Storm Sewer

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	SUBGRADE PREPARATION	LF	\$25.00	12,400	\$310,000.00	22,770	\$569,250.00	13,800	\$345,000.00	48,970	\$1,224,250.00
2	AGGREGATE BASE CLASS 5	TON	\$18.00	25,404	\$457,270.67	46,649	\$839,681.70	28,272	\$508,898.00	100,325	\$1,805,851.00
3	WEARING COURSE MIXTURE (B)	TON	\$65.00	4,631	\$301,006.17	8,504	\$552,734.72	5,154	\$334,990.74	18,288	\$1,188,732.00
4	NON WEARING COURSE MIXTURE (B)	TON	\$64.00	5,789	\$370,469.14	10,630	\$680,288.89	6,442	\$412,296.30	22,860	\$1,463,055.00
5	CONCRETE CURB & GUTTER DESIGN B618	LF	\$12.00	24,800	\$297,600.00	45,540	\$546,480.00	27,600	\$331,200.00	97,940	\$1,175,280.00
6	RESTORATION	ACRE	\$4,000.00	134.3	\$537,190.08	71.5	\$285,977.96	37.7	\$150,927.46	244	\$974,096.00
7	STORM SEWER	LF	\$70.00	12,400	\$868,000.00	22,770	\$1,593,900.00	13,800	\$966,000.00	48,970	\$3,427,900.00
Total Schedule "A"				Estimated Construction Cost		\$3,141,540	\$5,068,320	\$3,049,320	\$11,259,164.00		
				Rounded cost		\$0	\$0	\$0	\$0		

Schedule "B" - Sanitary Sewer

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	8" PVC SEWER PIPE	LF	\$60.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
2	10" PVC SEWER PIPE	LF	\$65.00	4,000	\$260,000.00	330	\$21,450.00	2,750	\$178,750.00	7,080	\$460,200.00
3	12" PVC SEWER PIPE	LF	\$70.00	8,400	\$588,000.00	4,820	\$337,400.00	4,500	\$315,000.00	17,720	\$1,240,400.00
4	15" PVC SEWER PIPE	LF	\$75.00	0	\$0.00	1,450	\$108,750.00	1,450	\$108,750.00	2,900	\$217,500.00
5	21" PVC SEWER PIPE	LF	\$115.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
6	24" PVC SEWER PIPE	LF	\$120.00	0	\$0.00	0	\$0.00	2,900	\$348,000.00	2,900	\$348,000.00
7	27" PVC SEWER PIPE	LF	\$122.00	0	\$0.00	8,250	\$1,006,500.00	0	\$0.00	8,250	\$1,006,500.00
8	30" PVC SEWER PIPE	LF	\$135.00	0	\$0.00	6,740	\$909,900.00	0	\$0.00	6,740	\$909,900.00
9	36" PVC SEWER PIPE	LF	\$145.00	0	\$0.00	5,600	\$812,000.00	3,770	\$546,650.00	9,370	\$1,358,650.00
10	DEWATERING	LF	\$50.00	12,400.00	\$620,000.00	27,190.00	\$1,359,500.00	15,370.00	\$768,500.00	54,960	\$2,748,000.00
11	FORCEMAIN	LF	\$90.00	14,200	\$1,278,000.00	6,400	\$576,000.00	0	\$0.00	20,600	\$1,854,000.00
12	JACKING	LF	\$800.00	250	\$200,000.00	750	\$600,000.00	460	\$368,000.00	1,460	\$1,168,000.00
13	LIFT STATION	EACH	\$500,000.00	0	\$0.00	2	\$1,000,000.00	0	\$0.00	2	\$1,000,000.00
14	PRECAST MANHOLE	EACH	\$8,000.00	35	\$283,428.57	78	\$621,485.71	44	\$351,314.29	157	\$1,256,229.00
Total Schedule "B"				Estimated Construction Cost		\$3,229,430	\$7,352,990	\$2,984,970	\$13,567,379.00		
				Rounded cost		\$3,300,000	\$7,400,000	\$3,000,000	\$13,600,000		

Schedule "C" - Watermain

Item	Description	Unit	Unit Price	Growth Area A		Growth Area B		Growth Area C		Total Estimated Quantity	Total Estimated Cost
				Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost	Estimated Quantity	Estimated Cost		
1	TREATMENT	GPM	\$0.00	2,100	\$0.00	3,500	\$0.00	1,800	\$0.00	7,400	\$0.00
2	6" WATERMAIN - PVC PIPE	LF	\$26.00	1,210	\$31,460.00	3,090	\$80,340.00	1,410	\$36,660.00	5,710	\$148,460.00
3	10" WATERMAIN - PVC PIPE	LF	\$32.00	6,250	\$200,000.00	12,340	\$394,880.00	2,545	\$81,440.00	21,135	\$676,320.00
4	12" WATERMAIN - PVC PIPE	LF	\$44.00	17,850	\$785,400.00	34,750	\$1,529,000.00	15,700	\$690,800.00	68,300	\$3,005,200.00
5	16" WATERMAIN - PVC PIPE	LF	\$56.00	0	\$0.00	0	\$0.00	9,950	\$557,200.00	9,950	\$557,200.00
6	18" WATERMAIN - PVC PIPE	LF	\$60.00	0	\$0.00	14,650	\$879,000.00	1,400	\$84,000.00	16,050	\$963,000.00
7	10" GATE VALVE AND BOX	EACH	\$1,300.00	23	\$30,468.75	46	\$60,157.50	10	\$12,406.88	79	\$103,034.00
8	12" BUTTERFLY VALVE	EACH	\$2,500.00	45	\$111,562.50	87	\$217,187.50	39	\$98,125.00	171	\$426,875.00
9	16" BUTTERFLY VALVE	EACH	\$3,600.00	0	\$0.00	0	\$0.00	25	\$89,550.00	25	\$89,550.00
10	18" BUTTERFLY VALVE	EACH	\$3,800.00	0	\$0.00	37	\$139,175.00	4	\$13,300.00	40	\$152,475.00
11	WATER TOWER	MG	\$2,000,000.00	0.5	\$1,000,000.00	0.75	\$1,500,000.00	0.5	\$1,000,000.00	2	\$3,500,000.00
12	HYDRANT / BOX / VALVE	EACH	\$6,000.00	60	\$361,500.00	154	\$926,100.00	70	\$422,925.00	285	\$1,710,525.00
13	WELL AND RAW WATER LINES	EACH	\$500,000.00	2	\$1,000,000.00	6	\$3,000,000.00	3	\$1,500,000.00	11	\$5,500,000.00
14	JACKING	LF	\$800.00	0	\$0.00	750	\$600,000.00	200	\$160,000.00	950	\$760,000.00
Total Schedule "C"				Estimated Construction Cost		\$3,520,400	\$9,325,840	\$4,746,410	\$17,592,639.00		
				Rounded cost		\$3,600,000	\$9,400,000	\$4,800,000	\$17,600,000		

Estimated Construction Costs

Street & Storm Sewer	\$0	\$0	\$0	\$0
Sanitary Sewer	\$3,300,000	\$7,400,000	\$3,000,000	\$13,700,000
Water	\$3,600,000	\$9,400,000	\$4,800,000	\$17,800,000
=====				
Contingency & Overhead 30%	\$6,900,000	\$16,800,000	\$7,800,000	\$31,500,000
ROW (\$40,000 per Acre)	\$2,070,000	\$5,040,000	\$2,340,000	\$9,450,000
	\$1,138,700	\$2,496,800	\$1,411,400	\$5,046,900
Total Estimated Project Cost	\$10,109,000	\$24,337,000	\$11,552,000	\$45,998,000

ATTACHMENT 6

Local Surface Water Management Plan



Water Management Plan

July 2019



**Wetland
Protection**

**Water
Quality**

**Flood
Control**



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APPENDIX A

WMO Joint Powers Agreements

1.0 Introduction and Executive Summary

1.1 Purpose of the Plan

The City of East Bethel is located in the north central portion of Anoka County. The City has an abundance of water resources which include numerous wetlands, several large lakes, and wooded areas, parks, and recreational lands. This plan provides the framework to be followed to preserve these resources as the city develops.

This plan was prepared to fulfill the legal requirements of the Metropolitan Surface Water Planning Rules (Chapter 8410). This plan also meets the current adopted policies and requirements of each of the Water Management Organizations within the city and other local, state, and federal agencies.

This plan was revised as part of the City's 2040 Comprehensive Plan Update.

1.2 General Approach to Planning

The general approach to water resource planning focuses on wetland protection, water quality, and flood control; each are described below.

1.2.1 Wetland Protection

Stormwater runoff carries soil particles, nutrients, and contaminants which can change the ecological balance of the receiving water body. Changes in the volume or rate of stormwater entering or discharging from the water body can also change the ecological balance. Change in the ecological balance of a wetland often results in changes in the water quality, changes in animal and fish habitat, replacement of native vegetation with invasive and tolerant plant species, and/or other impacts to the wetland's functions and values.

The State of Minnesota has published a guidance document which develops a methodology for determining the susceptibility of wetlands to degradation by stormwater input. This methodology relates wetland type to a level of susceptibility as shown in Table 3-2. Wetlands such as bogs and fens can be easily degraded by changes in the stormwater inflows and are designated as highly susceptible. On the other hand, floodplain forests can tolerate relatively significant changes in the chemical and physical characteristics of stormwater inflow without degradation and are therefore slightly susceptible. Commonly observed shallow marshes and wet meadows dominated by cattail and reed canary grass (respectively) have a moderate susceptibility to stormwater fluctuations.

Wetland management standards were developed to determine how and when stormwater should be routed through a wetland to minimize potential impacts. These standards, shown in Table 3-2, were largely based on the state guidance document. These standards determine tolerable hydrologic change in terms of bounce (difference

between the peak flood elevation and the wetland elevation), inundation period (time that flood waters temporarily stored in the wetland exceed the wetland elevation), and runoff control (elevation of the outlet).

These standards provide guidance for the management of stormwater to minimize wetland impacts. It is assumed that wetland impacts will be minimized and existing wetland functions and values will be maintained if the proposed management system and criteria meet the management standards shown in Table 3-2.

1.2.2 Water Quality Protection

Within the eight main watersheds of the City of East Bethel, there are hundreds of water bodies ranging in size from lakes to small stormwater detention basins. Nonpoint pollution associated with stormwater runoff creates adverse impacts; the degree of impact depends on the water body's natural ability to remove, absorb, or process the pollutants through chemical, physical, or biological processes. Poor water quality usually indicates a situation where the resource receives more nutrients, or other pollutants, than can be processed naturally. Planning for water quality protection is necessary to preserve the beneficial uses of existing water bodies, as well as to evaluate wetland impacts as described above.

All water bodies will be classified into one of three groups. The classification groups are based on WMO's criteria and wetland vegetation susceptibility. Table 3-3 defines the water quality classification groups adopted by the city. Section 5 discusses how each group will be managed for water quality.

1.2.3 Flood Control

The flood and rate control portion of the planning consisted of estimating the 100-year flood elevation and discharge rate for each watershed. East Bethel has vast amounts of stormwater storage available in its wetlands and lakes. This storage was used in the development of the hydrologic model for the city. A summary of the watershed data is included in Section 11.

1.2.4 Stormwater Pollution Prevention Program

As required by the Clean Water Act, the City of East Bethel has prepared a Stormwater Pollution Prevention Program (SWPPP). The SWPPP is a requirement of the NPDES General Permit No. MNR040000, which authorizes Municipal Separate Storm Sewer System (MS4) operators to discharge stormwater. The goal of the Stormwater Pollution Prevention Program, when implemented, is to reduce the discharge of pollutants into receiving waters to the Maximum Extent Practicable (MEP).

There are six minimum control measures outlined below that are required to be included in the Stormwater Pollution Prevention Program under the requirements of the permit. Within each of the six minimum control measures, there are a number of Best Management Practices (BMP's) that are required for each minimum control measure

which are outlined in the City's SWPPP. The six minimum control measures are as follows:

1. Public Education and Outreach on Stormwater Impacts
2. Public Participation/Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

1.3 Management Goals and Policies

As part of the planning process, goals and policies were developed for the management of resources within East Bethel. Goals propose the desired end; policies provide the means to achieve the goals. Goals are provided for wetland protection, water quality, water quantity, flood plain and shoreland management, recreation, open space and wildlife management, groundwater protection, erosion and sedimentation control, and drainageway maintenance. The goals and policies of this plan are presented in Section 4, and Section 5 – Implementation provides more specific details on how the goals and policies will be achieved.

1.4 Plan Organization

The Plan is organized as follows:

- **Section 2** presents **physical and general information** which relates to the city's resources.
- **Section 3** describes East Bethel's **surface water resources**. Section 3 presents the wetland, water quality, and water quantity management strategies.
- **Section 4** presents the **city's water resource goals and policies**.
- **Section 5** presents the **implementation strategies** to accomplish the goals and policies.
- **Sections 6 through 11** present **inventory data and management information** for each of the eight major watersheds within the city.
- **Section 12** outlines the procedures for **amending** this Plan.
- **Section 13** presents the required **submittals** for a development.
- **Section 14** presents a **description** of the **Hydrology Model** used for the plan.
- **Section 15** presents the **glossary of terms**.

2.0 Physical Environment Inventory

2.1 Climate

East Bethel and the Twin Cities area have a continental-type climate because of their proximity to the geographic center of the North American continent. The area has moderate amounts of precipitation, wide daily and seasonal temperature fluctuations, warm humid summers, and cold winters. Figure 2-1 summarizes the normal monthly temperatures and Figure 2-2 summarizes the normal monthly precipitation for the area.

The freeze-free period for the area is long enough that the stable crops of the area reach maturity without much danger from frost. The 50% probability of temperatures of 32° or lower can be expected later than May 12 and earlier than September 27.

Precipitation patterns are influenced by moisture from the Gulf of Mexico. Precipitation occurs as rain, freezing rain, hail, and snow. Tornadoes, severe thunderstorms, and hailstorms occur occasionally and are of short duration. Measurable precipitation of 0.01 inch occurs on about 110 days per year, 4 of which have 1 inch or more. Rainfall intensity of about 1 ½ inches an hour can be expected to recur once in 3 years. Annual normal precipitation is approximately 30 inches, of which approximately two-thirds occurs during the summer months of May through September.

The annual snowfall in East Bethel averages approximately 44 inches. Runoff from snowmelt can occur any time during the winter. The most severe snowmelt runoff conditions usually occur in March and early April, especially when rain falls on top of the snowpack.

The prevailing winds are northwesterly in the winter and spring, and shift to east and southeasterly in summer and fall. The average annual wind speed is close to 10 miles per hour.

2.2 Precipitation Measurement Station

The National Oceanic and Atmospheric Administration (NOAA) monitoring network has a long-term precipitation station near East Bethel. The station is in St. Francis, which is a northwestern neighbor of East Bethel. This station was selected to be used as a reference for any entity conducting future water quality or quantity studies in the city. The current thirty-year normal (1961-90) for annual precipitation at the St. Francis station is 29.84 inches.

2.3 Topography and Landforms

The topography in East Bethel was shaped by several ice advances into east-central Minnesota during the last (Wisconsin) glaciation, which occurred about 10,000 years

ago. In East Bethel, a large glacial outwash deposit, called the Anoka sandplain is the dominant geomorphic feature. It was formed largely by glacial drainage (melt-water) from the receding Grantsburg sublobe of the Des Moines glacier. The surface of the Anoka sandplain is flat to moderately undulating. Low regions of upland represent areas of till left from previous ice movements that were not buried by the outwash sand. Other features of positive relief are patches of sand dunes, formed by southwesterly winds after the sandplain was abandoned by the outwash streams. Landscape features of negative relief include numerous lakes and marshes which formed as ice blocks, originally buried by the outwash sand melted to create the depressions, which are now filled with water or organic soils. A topographic map can be seen in Figure 2-3.

2.4 Watersheds and Drainage Patterns

The City of East Bethel is within the jurisdiction of the Upper Rum River Watershed Management Organization (URRWMO) and the Sunrise River Watershed Management Organization (SRWMO). In general, water from the URRWMO drains to the Rum River, and water from the SRRWMO drains to the Sunrise River.

With the county ditch system in place, the drainage patterns for the City of East Bethel are fairly well defined. This plan divides the city into eight major watersheds; they include Fish Lake, Coopers Lake, Deer Lake, Sunrise River, Crooked Brook, Coon Lake, Rice Lake and Cedar Creek. These eight watersheds and the WMO boundaries are shown on Figure 2-4. Each of these eight major watersheds are further divided into subwatersheds. Each subwatershed is designated by a number that corresponds to the subwatershed and the outlet. Each subwatershed is discussed further in Sections 6 through 10.

The Fish Lake Watershed is located in northeastern East Bethel. It drains west to Cedar Creek and ultimately to the Rum River. Fish Lake is the only major water body located in this watershed.

The Coopers Lake Watershed is located in northwestern East Bethel. It drains south to Cedar Creek and ultimately to the Rum River. Coopers Lake and Minard Lake are the two major water bodies located in this watershed.

The Deer Lake Watershed is located in central East Bethel. It drains south to the Crooked Brook Watershed, eventually reaching Cedar Creek and ultimately joining the Rum River. Mud Lake, Deer Lake and Ned's Lake are the major water bodies in this watershed.

The Sunrise River Watershed is located in the northeast corner of East Bethel. It drains east to the Sunrise River. There are no major water bodies located in this watershed.

The Crooked Brook Watershed is located in the southwest corner of East Bethel. It drains northwest, through county ditches to Cedar Creek and ultimately to the Rum River. There are no major water bodies in this watershed.

The Coon Lake Watershed is located in the southeast corner of East Bethel. It drains southeast, through county ditches to Coon Lake and ultimately to the Sunrise River. Devil Lake, Anderson Lake, Goose Lake, and Coon Lake are the major water bodies located in this watershed.

The Rice Lake Watershed is located in east central East Bethel. It drains southeast, through county ditches, to Rice Lake and ultimately to the Sunrise River. The only major water body in this watershed is Rice Lake.

The Cedar Creek Watershed runs from the north central border to the west central border of East Bethel. This watershed contains Cedar Creek. Cedar Creek drains from Athens Township, north of East Bethel, through East Bethel, and eventually joins the Rum River in the City of Andover. Approximately 75% of the stormwater runoff in East Bethel eventually reaches Cedar Creek.

The Rum River joins the Mississippi River in the City of Anoka. The Sunrise River first drains to the St. Croix River, which then, eventually, joins the Mississippi River in eastern Minnesota.

2.5 MnDNR Protected Waters, Wetlands and Water Courses

The Minnesota Department of Natural Resources (MnDNR) has designated certain waters of the state as public waters (Minn. Rules 6115.1060). MnDNR “Protected Waters and Wetlands” maps show public waters within the city. A MnDNR permit is required for work within a designated public water. Protected waters and wetlands maps show public waters as one of the following:

- Protected waters
- Protected wetlands
- Protected watercourses

Figure 2.5 shows the protected waters, wetlands, and water courses located in the city. Protected waters are identified with a number and the letter “P”. Protected wetlands are identified with a number and the letter “W”. Protected wetlands include, and are limited to, types 3, 4, and 5 wetlands that have not been designated protected waters and are 2 ½ acres or more in size (10 acres in unincorporated area). Cedar Creek is the only protected watercourse in East Bethel. Figure 2-6 illustrates the typical wetland types found in East Bethel.

2.5.1 Protected Waters

There are 19 protected waters within the boundary of East Bethel. All of these basins are relatively shallow, ranging from partially-drained wetland areas to moderately shallow lakes (average depth less than 10 feet). The following provides a brief

description of East Bethel's major protected waters/lakes. Table 2-1 lists the protected waters within East Bethel.

**Table 2-1
East Bethel Public Waters**

I.D. No.	Name	Twp./Range	Section(s)	Local Government Unit	Group²	Area (acres)	DNR Shoreland¹ Classification	OHW
02-42P	Coon Lake	32,33/22,23	1-3, 25-27; 35-36	Ham Lake, Linwood, East Bethel	1	1498	GD	904.75
02-43P	Rice Lake	33/22,23	18,19,13,2 4	Linwood, East Bethel	3	262	NE	
02-55P	Lone Pine Lake	33/23	2,3,10,11	East Bethel	1	209	NE	
02-56P	Booster Pond	33/23	4	East Bethel	1	15	NE	
02-57P	Neds Lake	33/23	8,9,16,17	East Bethel	1	551	NE	
02-58P	Devil Lake	33/23	14,23	East Bethel	3	103	NE	
02-59P	Deer Lake	33/23	15,16,21,2 2	East Bethel	1	376	NE	
02-60P	Mud Lake	33/23	16	East Bethel	1	184	NE	
02-62P	Goose Lake	33/23	23,26	East Bethel	3	257	NE	
02-63P	Anderson Lake	33/23	24,25	East Bethel	3	84	NE	
02-65P	Fish Lake	34/23	25,26,35,3 6	East Bethel	1	432	NE	
02-67P	Minard Lake	34/23	29,30,31	East Bethel	1	124	RD	923.00
02-70P	Coopers Lake	34/23	31,32	East Bethel	1	58	NE	
02-151P	unnamed lake	34/23	NE 26	East Bethel	1	35	NOTSL	
02-152P	Cedar Bog Lake	34/23	NW 27	East Bethel	1	3	NOTSL	
02-154P	unnamed lake	34/23	27	East Bethel	1	3	NOTSL	
02-160P	unnamed lake	34/23	35	East Bethel	1	5	NOTSL	
02-161P	unnamed lake	34/23	35	East Bethel	1	23	NOTSL	
02-440P	unnamed lake	33/23	4	East Bethel	1	2	NOTSL	

¹ NE = Natural Environment, RD = Recreational Development, GD = General Development, NOTSL = Not regulated by shoreland rules.

² See Section 3.2.

2.5.1.1 Coon Lake (02-42P)

Coon Lake is a 1,507-acre meandered basin located in the cities of East Bethel, Ham Lake and Columbus. It is the largest lake in Anoka County with an average depth of 10 feet and a maximum depth of 25 feet. Coon Lake has a fish population which consists of White Sucker, Carp, Black Bullhead, Brown Bullhead, Yellow Bullhead, Northern Pike, Yellow Perch, Largemouth Bass, Pumpkinseed Sunfish, Bluegill Sunfish, Hybrid Sunfish, White Crappie, Black Crappie and Golden Shiner. Existing water quality data for Coon Lake is shown on Table 2-2. Coon Lake is currently on the Minnesota Pollution Control Agencies 303(d) Impaired Waters list for mercury. This is further discussed in Section 3.4.2.2.

**Table 2-2
Existing Water Quality Data
Coon Lake**

Parameter ¹	Unit	1980	1984	1989	1994	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
pH															8.0
Specific Conductivity	uS/cm														190
Turbidity	FNR U														6
Dissolved Oxygen	mg/l														8.5
Temperature	°C														23
Salinity	%														0
Chlorophylla-a	ppb	28.3	16.2	13.1	15.7	14.5	14.4	9.4	14.6	17.6	14.8	16.6	4.6	6.2	17
Total Phosphorus	ppb	40	50	51	33	34	29.8	20.6	25.8	42.3	29.6	33.7	33.8	32	37
Secchi	m	1.2	1.5	1.8	1.9	1.4	1.8	2.3	2.0	1.8	1.9	1.8			1.8
TSI		59	58	57	54	56	54	50	53	56	54	55			

¹ Results shown are average values. Detailed results can be obtained through the US EPA STORET data retrieval system.

2.5.1.2 Rice Lake (02-43P)

Rice Lake is a 633-acre meandered basin in the City of East Bethel and Linwood Township. The lake is affected by County Ditch No. 16, which inlets to the lake from the northwest. Rice Lake then outlets through a ditch/creek to Boot Lake.

2.5.1.3 Devil Lake (02-58P)

Devil Lake is a 69-acre meandered basin in East Bethel. The maximum depth of the lake is 4 feet. The lake is affected by County Ditch No. 56. The lake is now managed for waterfowl and furbearers.

2.5.1.4 Deer Lake (02-59P)

Deer Lake is a 376-acre meandered basin located in East Bethel. The lake has an average depth of 3 feet with a maximum of 9 feet. Some northern pike have been harvested over the years, but the lake contains mostly rough fish such as suckers and bullheads. The lake is managed by the Mn DNR as a waterfowl and furbearer habitat.

2.5.1.5 Goose Lake (02-62P)

Goose Lake is a 213-acre basin in East Bethel. The lake is affected by County Ditch No. 56 which runs through the lake and outlets to Coon Lake.

2.5.1.6 Anderson Lake (02-63P)

Anderson Lake is a 75-acre basin in East Bethel. The lake discharges to Coon Lake through a small unnamed ditch.

2.5.1.7 Fish Lake (02-65P)

Fish Lake is a 432-acre basin located within the Cedar Creek Natural History Area in East Bethel. The lake has an average depth of 3 feet with a maximum depth of 10 feet. Fish Lake was stocked with largemouth bass, crappie and northern pike between 1926 and 1942 and with northern pike in 1971. No further stocking has been undertaken. The lake experienced a winterkill in 1988 and 1989.

2.5.1.8 Minard Lake (02-67P)

Minard Lake is a 124-acre meandered basin in East Bethel. The lake has an average depth of 4 feet with a maximum depth of 7 feet. The lake is considered a marginal fish and game lake and is managed as a waterfowl and furbearer habitat by the Mn DNR. Two Secchi disc transparency measurements were made on the lake in 1990 at 2.5 feet and 1991 at 5.0 feet. No conclusions on problems or water quality can be made from this assessment.

2.5.1.9 Coopers Lake (02-70P)

Coopers Lake is a 58-acre basin in East Bethel. The lake was stocked with walleye and used for a rearing pond (fish stocking) by the Mn DNR from 1970 to 1983. As a rearing pond the lake failed to produce walleye fingerlings in 1983 and therefore no further similar efforts have been undertaken by the MnDNR.

Secchi disc transparency measurements were undertaken in 1975 and 1989 on Coopers Lake. Seventeen (17) observations in 1975 resulted in an average transparency of 6.5 feet as contrasted with two measurements of 2.0 feet in 1989. While the 1975 measurements would indicate that the lake is in a good to very good condition, the two 1989 measurements would reflect an extremely poor state. Further Secchi disc measurements would be necessary to define the water quality of Coopers Lake.

2.5.2 Protected Wetlands

In addition to the 19 protected waters, there are 39 other basins within the East Bethel area which have been inventoried by MnDNR. All of these basins are known as public waters wetlands (M.S., section 103G.005, subdivision 18) and therefore their beds along with the lakes are subject to regulatory authority of the Minnesota Department of Natural Resources (MnDNR).

Public waters wetlands mean all types 3, 4 and 5 wetlands, as defined in United States Fish and Wildlife Service Circular 39 (USDI, 1971), not included within the definition of public waters, that are ten or more acres in size in unincorporated areas, or 2-½ acres in incorporated areas. Table 2-2 lists the public waters wetlands subject to MnDNR jurisdiction.

**Table 2-3
East Bethel Public Waters Wetlands**

I.D. No.	Name	Twp./Range	Section(s)	Local Government Unit	Group	Area (acres)	DNR Shoreland¹ Classification	OHW²
02-61W	unnamed wetland	33/23	17,18,19,2	East Bethel	1	39	NOTSL	
02-64W	unnamed wetland	34/23	20,29	East Bethel	1	15	NE	
02-66W	unnamed wetland	34/23	29	East Bethel	1	16	NE	
02-68W	unnamed wetland	34/23	31	East Bethel	1	25	NE	
02-69W	unnamed wetland	34/23	31,32	East Bethel	1	25	NE	
02-150W	unnamed wetland	34/23	25	East Bethel	1	14	NOTSL	
02-153W	unnamed wetland	34/23	29	East Bethel	1	11	NOTSL	
02-156W	unnamed wetland	34/23	25,36	East Bethel	1	20	NOTSL	
02-157W	unnamed wetland	34/23	36	East Bethel	1	9	NOTSL	
02-163W	unnamed wetland	34/23	36	East Bethel	1	11	NOTSL	
02-166W	unnamed wetland	33/23	3	East Bethel	1	4	NOTSL	
02-170W	unnamed wetland	33/23	3	East Bethel	1	74	NOTSL	
02-171W	unnamed wetland	33/23	5	East Bethel	1	5	NOTSL	
02-172W	unnamed wetland	33/23	3	East Bethel	1	10	NOTSL	
02-175W	unnamed wetland	34/24	30	East Bethel	1	7	NOTSL	
02-189W	unnamed wetland	34/23	30	East Bethel	1	8	NOTSL	
02-190W	unnamed wetland	34/23	30	Bethel/ East Bethel	1	74	NOTSL	
02-199W	unnamed wetland	34/23	31	East Bethel	1	3	NOTSL	
02-280W	unnamed wetland	34/23	36	East Bethel	1	3	NOTSL	
02-349W	unnamed wetland	33/23	6,7	East Bethel	1	47	NOTSL	
02-350W	unnamed wetland	33/23	7	East Bethel	1	6	NOTSL	
02-351W	unnamed wetland	33/23	7	East Bethel	1	3	NOTSL	
02-366W	unnamed wetland	33/23	19	East Bethel	1	10	NOTSL	
02-377W	unnamed wetland	33/23	NW 31	East Bethel	1	28	NOTSL	
02-379W	unnamed wetland	33/23	31	East Bethel	1	11	NOTSL	
02-380W	unnamed	33/23	31	East Bethel	1	3	NOTSL	

	wetland							
02-381W	unnamed wetland	33/23	31	East Bethel	1	4	NOTSL	
02-393W	unnamed wetland	32,33/23	6;31	Oak Grove/ East Bethel	1	47	NOTSL	
02-439W	unnamed wetland	33/23	8	East Bethel	1	27	NOTSL	
02-442W	unnamed wetland	33/23	3,10	East Bethel	1	11	NOTSL	915.29
02-452W	unnamed wetland	33/23	10	East Bethel	1	8	NOTSL	
02-453W	unnamed wetland	33/23	NE 9	East Bethel	1	4	NOTSL	
02-455W	unnamed wetland	33/23	9	East Bethel	1	21	NOTSL	
02-456W	unnamed wetland	33/23	8,17	East Bethel	1	10	NOTSL	
02-457W	unnamed wetland	33/23	NW 16	East Bethel	1	5	NOTSL	
02-459W	unnamed wetland	33/23	15	East Bethel	1	5	NOTSL	
02-472W	unnamed wetland	32/23	4	Ham Lake/ East Bethel	1	12	NOTSL	
02-718W	unnamed wetland	33/23	8	East Bethel	1	27	NOTSL	
02-719W	unnamed wetland	33/23	10	East Bethel	1	4	NOTSL	

¹ NE = Natural Environment, NOTSL = Not regulated by shoreland rules.

² The Ordinary High Water (OHW) elevation is recorded from the 1929 datum unless otherwise noted.

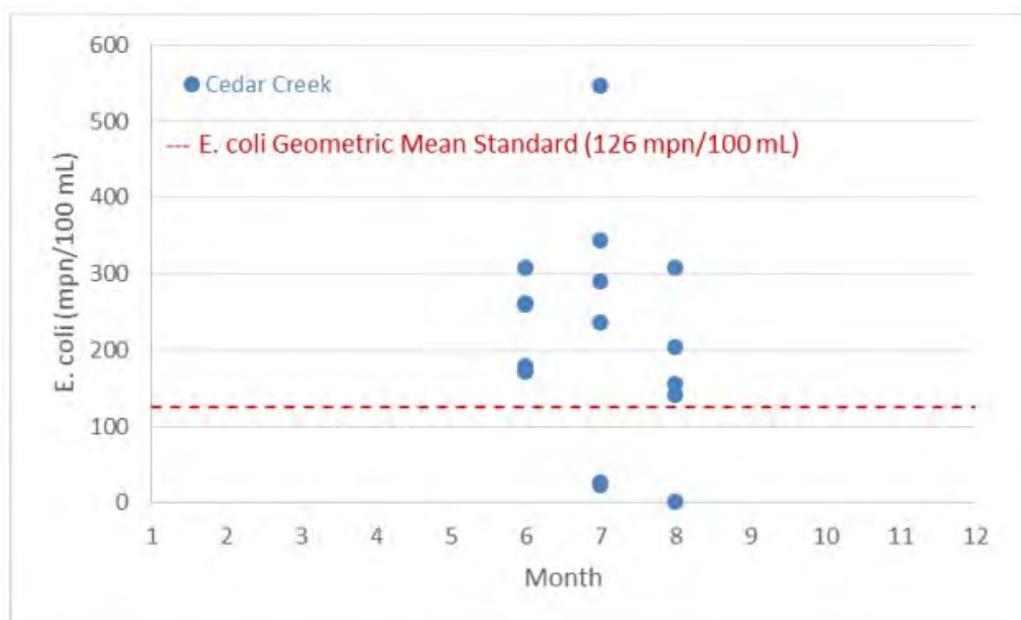
2.5.3 Watercourses

Public waters also includes all natural and altered watercourses with a total drainage area greater than two square miles. Cedar Creek is the only protected watercourse in East Bethel. The other watercourse of interest in East Bethel is Crooked Brook, which is further discussed below.

2.5.3.1 Cedar Creek

Cedar Creek is a large stream that originates in south-central Isanti County and flows south. The Cedar Creek drainage area is approximately 66.2 square miles. It is a silty bottom stream, and highly sinuous with many oxbows. In most areas it has a broad, flat floodplain. In north-central Anoka County it flows through some areas of high-quality natural communities including the Cedar Creek Natural History Area. Habitat surrounding the stream in other areas is of moderate to high quality. Cedar Creek is a tributary to the Rum River, and Crooked Brook (County Ditch 67) is an important tributary to Cedar Creek.

Cedar Creek is currently on the Minnesota Pollution Control Agency 303(d) Impaired Waters list for high *E. coli*, which is a naturally occurring bacteria that can be harmful to humans if ingested at high levels. The Minnesota water quality rules state, “*E. coli* bacteria shall not exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than 10% of all samples taken during any calendar month individually exceed 1,260 organisms per 100 mL. The standard applies only between April 1 and October 31.” Cedar Creek was monitored by MPCA from 2006-2015; the water quality data is shown in Graph 1 below.



Graph 1. *E. coli* data by month from 2006-2015 from the Rum River TMDL report

Sources for high *E. coli* can include waste from livestock, wildlife, human, and pet sources. The City of East Bethel was given a wasteload load allocation based on the flow regime of Cedar Creek. High reductions in the very high flow zones typically indicates larger area-induced indirect pollutant sources, while high reduction in very low flow zones can be caused by direct pollutant loads in close proximity to the stream, such as livestock in a stream or failing septic systems. Cedar Creek needs reduction in very high, mid, and low flow zones. East Bethel’s Wasteload allocation is in Table 2-4. This is further discussed in Section 3.4.2.3.

**Table 2-4
East Bethel Cedar Creek *E. coli* Wasteload Allocation**

TMDL Component (billions of organisms/day)	Flow Zone				
	Very High	High	Mid	Low	Very Low
East Bethel City MS4	108.39	56.62	35.14	24.65	13.06
Subwatershed Reduction	81%	0%	69%	27%	NA
Overall Subwatershed Reduction Required	58%				

2.5.3.2 Crooked Brook

Crooked Brook, which is County Ditch 67, is a small ditch/stream that originates in southwest East Bethel and flows northwest where it joins Cedar Creek. It is perhaps the largest tributary to Cedar Creek. Crooked Brook is currently on the Minnesota Pollution Control Agency 303(d) Impaired Waters list for low dissolved oxygen. This is further discussed in Section 3.4.2.1.

The Anoka Conservation District monitored Crooked Brook between 1998 and 2006. The water quality data is shown in Table 2-5. Since then, a streambank restoration project took place along a residential property that borders Crooked Brook in East Bethel in 2010. The Petro Streambank Restoration project included removing invasive species, grading, stabilization via fabrics and biologs, and native species buffer planting. The project length was 170 feet and stabilized 2,550 square feet.

In more recent years, the 2016 Rum River Watershed Monitoring and Assessment Report reported Crooked Brook 2013 data supporting above threshold scores for fish and macroinvertebrates, which “...help[s] overcome the existing dissolved oxygen impairment from a previous assessment.” The 2017 Rum River Watershed TMDL study mentioned Crooked Brook’s DO impairment but did not address this issue. The report stated, “[it] will be addressed in subsequent watershed assessment and restoration

activities.” The 2019 Upper Rum River Watershed Management Plan does not consider Crooked Brook a high priority, but the watershed encourages efforts to improve its water quality. Further investigation is still needed to determine the TMDL for dissolved oxygen.

**Table 2-5
Existing Water Quality Data
Crooked Brook**

Parameter ¹	Unit	1998	2001	2003	2006
pH		7.6	7.4	7.5	
Specific Conductivity	uS/cm	384	383	425	
Turbidity	FNR U	15	5	4	
Dissolved Oxygen Max.	mg/l	8.0	9.6	11	5.2
Dissolved Oxygen Min.	mg/l	4.3	4	4.20	2.8
Dissolved Oxygen Average	mg/l	5.7	6.2	6.2	5.7
Temperature	°C	22.6	19.3	14	
Salinity	%	0.01	0.01	0.01	
Chloride	mg/l	21	26	30	
Total Phosphorus	ppb	140	145	182	
Total Suspended Solids	mg/l	15	10	19	

¹ Results shown are average values unless otherwise noted. Detailed results can be obtained through the US EPA STORET data retrieval system.

2.5.3.3 St. Croix River

The St. Croix River runs between the state of Minnesota and state of Wisconsin and has a watershed basin covering approximately 7,760 square miles. The City of East Bethel is split between two subwatersheds – the Upper Rum River and Sunrise. The Sunrise subwatershed is a part of the St. Croix River watershed. The 2012 Lake St. Croix Nutrient TMDL gave the state of Minnesota a categorical phosphorus WLA, which included the East Bethel MS4. The other MS4s include: MnDOT Metro District, Century College, Cottage Grove, Forest Lake, Grant, Hugo, Lake Elmo, Mahtomedi, Maplewood, North Branch, North St. Paul, Oakdale, Pine Springs, Ramsey County, Stillwater, Valley Branch WD, Washington County, West Lake Township, White Bear Lake, and Woodbury.

Since the 2012 TMDL report, four more MS4s were added: Bayport, Minnesota Correction Facility – Stillwater, Oak Park Heights, and Wyoming City. MCPA shifted 1,606 pounds per year of phosphorus from the TMDL load allocation to the waste load allocation due to the new areas. The WLA for the phosphorus for all of Minnesota’s MS4s is 24.1 lbs/day.

2.6 Other Regulated Wetlands

In addition to the MnDNR waters discussed in Section 2.5, many additional wetlands within the city are included on the NWI maps but are not MnDNR water bodies. The following three characteristics make these water bodies exclusive from the MnDNR public waters and public waters wetlands.

- First, an individual basin may be dominated by wetland habitat (Types 1,2,6, and 7 [USDI, 1971] not statutorily covered by MnDNR and yet is immediately adjacent to an inventoried MnDNR basin or watercourse.
- Second, an individual isolated wetland basin may be smaller than the minimum MnDNR size (2 ½ or 10 acres) as discussed previously.
- Third, an individual isolated wetland basin may be dominated by habitat types (Types 1,2,6, and 7) not statutorily covered by MnDNR.

Excavation, filling, grading and/or development actions which may adversely affect these resources may be subject to federal permitting authority under Sections 404 and 401 of the Clean Water Act, (33 USC 125 et. seq.) and city approval under the 1991 Wetland Conservation Act, as amended.

2.7 County Ditches

A network of ditches was constructed in the late 1800s and early 1900s to drain surface waters from existing lakes and wetlands in northwest Anoka County in order to make additional lands available for agricultural use. In East Bethel, there were eight ditches constructed by Anoka County during the period of 1891 through 1922. This network of ditches drains most of the land in East Bethel. Minimal maintenance has been performed on the ditches since their construction, therefore the ditch system is in poor condition and operating below design capacity. The county ditch system is shown in Figure 2-3.

Land use within East Bethel has changed dramatically since the construction of the ditch system. Although much of the city has retained a rural character, significant urban cluster development has occurred. The ditch systems within residential areas no longer being used to benefit agricultural operations but have become a conveyance for urban stormwater runoff.

2.8 Groundwater Resource Data

The surficial outwash (Anoka Sand Plain) deposits located across East Bethel will yield small to large quantities of water. Where the aquifer has sufficient saturated thickness, a well may yield several hundred gallons of water per minute. The regional groundwater flow within the surficial aquifers and glacial drift is generally to the southeast, except near Cedar Creek where groundwater tends to flow toward the creek.

Groundwater is the primary drinking water source in the city. Groundwater is an important water resource and can be obtained from three aquifers within the city. The first groundwater resource is the shallow surficial drift aquifer, which is most susceptible to contamination. See Section 2.15 for further discussion on groundwater contamination. The next aquifer, which is hydraulically connected to the surficial aquifer, is the Franconia-Ironton-Galesville. The third available groundwater resource is the lower lying Mt. Simon-Hinckley aquifer.

The MnDNR has observation wells located throughout the state. The two wells located nearest to East Bethel are in Soderville and Bethel. Water levels have been measured approximately monthly in these wells since the early 1970's. These wells are completed at the water table in the fine sand deposits of the Anoka Sand Plain aquifer. This aquifer is quite uniform. Although these wells do not identify site-specific seasonal high-water levels, this data provides information from which we can generalize about the expected behavior of the water table in the city.

The highest water levels in the MnDNR wells are typically observed in April or May, and the lowest water levels typically occur in February. Water levels in the late summer and early fall are near the mid-point of the seasonal water level fluctuation. The groundwater elevation for these two wells are shown in figures 2-7 and 2-8.

2.9 Soils

The United States Department of Agriculture, Soil Conservation Service published the Soil Survey of Anoka County in 1977. The survey lists soils found in Anoka County along with their general characteristics and limitations on land use and development. The Soil Survey should be referenced for soils identifications and associated limitations on specific development sites. Figure 2-9 shows the soil associations occupying the City.

The City contains three soil associations. The Hubbard-Nymore Association is located in two areas on the northern limit of the city. This association is nearly level to slightly sloping and contains excessively drained soils that are sandy throughout. Hubbard soils are black and dark grayish brown at the surface and are underlain by dark brown and yellowish-brown coarse sand. Nymore soils are very dark gray and black to very dark grayish brown loamy sand underlain by dark brown loamy sand.

Soils of the Hubbard-Nymore Association are well-suited to urban uses and moderately well-suited to farming and recreation. Control of wind erosion and the water table in low-lying areas is often necessary.

The majority of the city is occupied by the Zimmerman-Isanti-Lino Association. This association ranges from excessively drained to very poorly drained, and is dominated by fine sands throughout. This association is a broad undulating sand plain left by outwash from receding glaciers. A high-water table is characteristic of the association. Zimmerman soils are excessively drained soils consisting of very dark gray and dark-

brown fine sand underlain by yellowish-brown and light yellowish-brown fine sand. The Isanti soils are very poorly drained black fine sandy loam underlain by gray and dark gray fine sand. Isanti soils occur in depressions and low-lying areas. Lino soils are somewhat poorly drained black, dark gray, or dark grayish-brown loamy fine sand underlain by mottled brown and light brownish-gray fine sand.

Much of this area is well-suited to urban development where the high-water table doesn't limit its use. The soils are moderately well-suited to farming and recreation. Primary management concerns include control of wind erosion and the water table in low-lying areas.

A small area of the Rifle-Isanti Association is located in the southeast corner of the city. This association is nearly level, very poorly drained soils formed in organic material and fine sand. Rifle soils occur in large bogs and are very poorly drained. They have a surface layer of very dark brown mucky peat. The next layer and the underlying material are dark yellowish-brown and very dark grayish-brown mucky peat.

Isanti soils occur as slight rises and narrow rims around island like features and are very poorly drained. They have a surface layer typically of black loamy fine sand or fine sandy loam. The subsoil is gray and dark-gray fine sand. The underlying material is light brownish-gray fine sand.

Most of this association is poorly suited to urban, farm, and recreational uses. A large part of this association is a game refuge. If drained, the organic soils are suited to specialty crops. The largest acreage is in cultured sod.

2.10 Native Vegetation

The City of East Bethel is in the northern deciduous forest region. The forest types were mainly northern hardwoods and oak. Within the oak forest were "oak openings" and scattered areas of pine. Grassland areas and scattered small wooded areas occurred on the Hubbard-Nymore association, especially on Hubbard soils. Small "oak openings," or savannas, were associated with Nymore soils and in some places with Sartell soils. Organic soil areas having poor drainage outlets were treeless. Other areas having better drainage were covered with stands of tamarack, white cedar, and black ash. Glacial till soils were covered with northern hardwood forest types, such as sugar maple, elm, basswood, red and white oak, ash, butternut, ironwood, and aspen.

The woodland that has not been cleared for crops is similar to what existed before settlement. It occurs as scattered small tracts and has been logged a number of times. Wooded areas are now very much in demand for home sites.

2.11 Land Use

Settlement of East Bethel began around 1850. The city is part of the Twin Cities Metropolitan area, and since 1950 has undergone rapid development. The population growth trend for East Bethel and the surrounding area is shown in the table below.

**Table 2-6
Population and Growth Trends for the Area**

Local Government	1970^a	1980^b	1990^b	2000^b	2010^c	2020^c	2030^c	2040^c
City of East Bethel	2,586	6,626	8,050	10,941	11,626	12,400	15,400	18,400
City of Nowthen	1,129 ^e	1,976 ^e	2,429 ^e	3,557 ^e	4,443	4,590	5,100	5,500
City of Bethel	311	272	394	443	466	480	520	550
City of Ham Lake	3,327 ^d	7,832	8,924	12,710	15,296	16,200	17,700	18,700
City of St. Francis	897	1,184	2,463	4,910	7,218	8,200	10,400	12,600
City of Oak Grove	NA	NA	NA	6,903	8,031	8,600	9,500	10,400

- a. U.S. Department of Commerce. Bureau of the Census. 1980 Census of the Population. Publication No. PC80-1-A25.
- b. U.S. Census Bureau, 2000 Census of Population and Housing, *Population and Housing Unit Counts* PHC-3-25, Minnesota, Washington, DC, 2003.
- c. Metropolitan Council. Thrive MSP 2040 – Forecasts as of January 1, 2019.
- d. Ham Lake Township.
- e. Burns Township.

2.11.1 Existing Land Use

The City of East Bethel has assembled a Comprehensive Plan to coordinate future development. Land use within the city is a mixture of suburban residential and commercial uses. There is a large area in the north-central part of the city, around Fish Lake, which is used for parks, public open space, and conservancy. Existing land use can be seen in the Comprehensive Plan.

2.11.2 Future Land Use

As shown in Table 2-6, the City of East Bethel is expected to have continued population growth through the year 2020. The city will experience increased residential development as people working in the Twin Cities’ first and second tier suburbs continue to move outward from those urban areas. The City is in the process of completing a major Comprehensive Plan revision. In general, the proposed plan consists of providing municipal sewer and water services along Trunk Highway 65, County Road 22, and neighborhoods around the Coon Lake area. Figure 2-10 shows the proposed future land use.

2.12 Parks and Open Spaces

The most significant open space in East Bethel is the Cedar Creek Natural History Area. It consists of over 3,000 acres in northern East Bethel. This area is devoted to research and is under the control of the University of Minnesota. Although the Cedar Creek Natural History Area is not open for public use, it serves as a unique natural preserve in the City.

Anoka County Park near Ned's, Mud and Deer Lake is 172 acres, and provides activities such as nature hiking and bird and wildlife watching. The park will remain primarily undeveloped in order to preserve its natural amenities.

In addition to the County parkland above, approximately 435 total acres of land around Ned's, Mud and Deer Lakes is government owned. According to the Minnesota County Biological Survey of the Department of Natural Resources, this area is one of few unique, undisturbed natural areas within the Twin Cities metropolitan area. It includes tamarack swamp, willow swamp, mixed hardwood swamp, wet meadows, and oak savanna. In addition, a wide variety of native plants and animals inhabit the area, including rare species such as Blanding's turtles, sandhill cranes, and lanceleaf violets.

Given the increasing pressure for residential development, including rural development in East Bethel, the County, the City and the MnDNR are in the process of developing a plan to combine their respective resources and land to establish the *Sand Hill Crane Natural Area*. The preliminary vision for this area is focused on low-impact recreation and public educational programs about this natural resource. Campfire Girls, a Girl Scout Camp, is also located on the eastern edge of the City surrounding 224th Avenue.

2.13 Fish and Wildlife Habitat

The water bodies and open spaces through the city provide habitat for fish and wildlife species including birds, mammals, and reptiles. Ducks and geese are present in large numbers at lakes, wetlands and open water areas. Vegetative cover in the undeveloped open areas support many mammalian species such as deer, raccoon, squirrels, chipmunks, and rabbits. The numerous wetlands in East Bethel provide habitat for a variety of aquatic species including snakes, turtles and frogs.

2.14 Unique Features and Scenic Areas

The MnDNR Natural Heritage Program and Nongame Wildlife Program maintains a database of rare plant or animal species and significant natural features. This data is listed in the WMO plans.

2.15 Pollutant Sources

The Minnesota Pollution Control Agency maintains up-to-date data on potential sources of groundwater contamination including: sanitary landfills, dumps, hazardous waste sites, registered underground and above ground storage tank sites, feedlots, abandoned wells, and permitted wastewater discharges. This information is available through the 14 databases maintained by the Minnesota Pollution Control Agency, Property Transfer, File Evaluation Service.

To address the susceptibility of the surficial aquifer to contamination, the Minnesota Department of Natural Resources, Division of Waters, contracted with the Minnesota Geological Survey to conduct an assessment study in 1991-92. The study, Regional Ground Water Assessment – Anoka Sand Plain, Anoka, Chisago, Isanti, and Sherburne

Counties, Minnesota, followed guidelines from the Department. A geologic sensitivity map was generated from the study and portrays an estimate of the time of vertical travel for water soluble, geologically inert materials released at the surface to reach the uppermost (surficial) aquifer.

The City of East Bethel has very high susceptibility to groundwater contamination. The “very high” designation indicates that the estimated travel time for water-borne surface contaminants to reach the uppermost aquifer is hours to months. However, this high sensitivity does not mean that groundwater has been degraded, or conversely, that it will be degraded. Rather, it indicates which areas are at greater risk of contamination as a result of high soil permeability and shallow groundwater levels.

2.16 Water Resources Related Agreements

The City of East Bethel has entered into two water resource related agreements which affect how the City manages its water resources. These agreements include:

- Amended Sunrise River Watershed Management Organization Joint Powers Agreement, in cooperation with the Cities of East Bethel, Ham Lake and Columbus and Linwood Township, August 2011.
- Amended Upper Rum River Watershed Management Organization Joint Powers Agreement, in cooperation with the Cities of East Bethel, Bethel, Ham Lake, Oak Grove, Saint Francis and Nowthen, January 2011.

Copies of the Joint Powers Agreements are included in Appendix A.

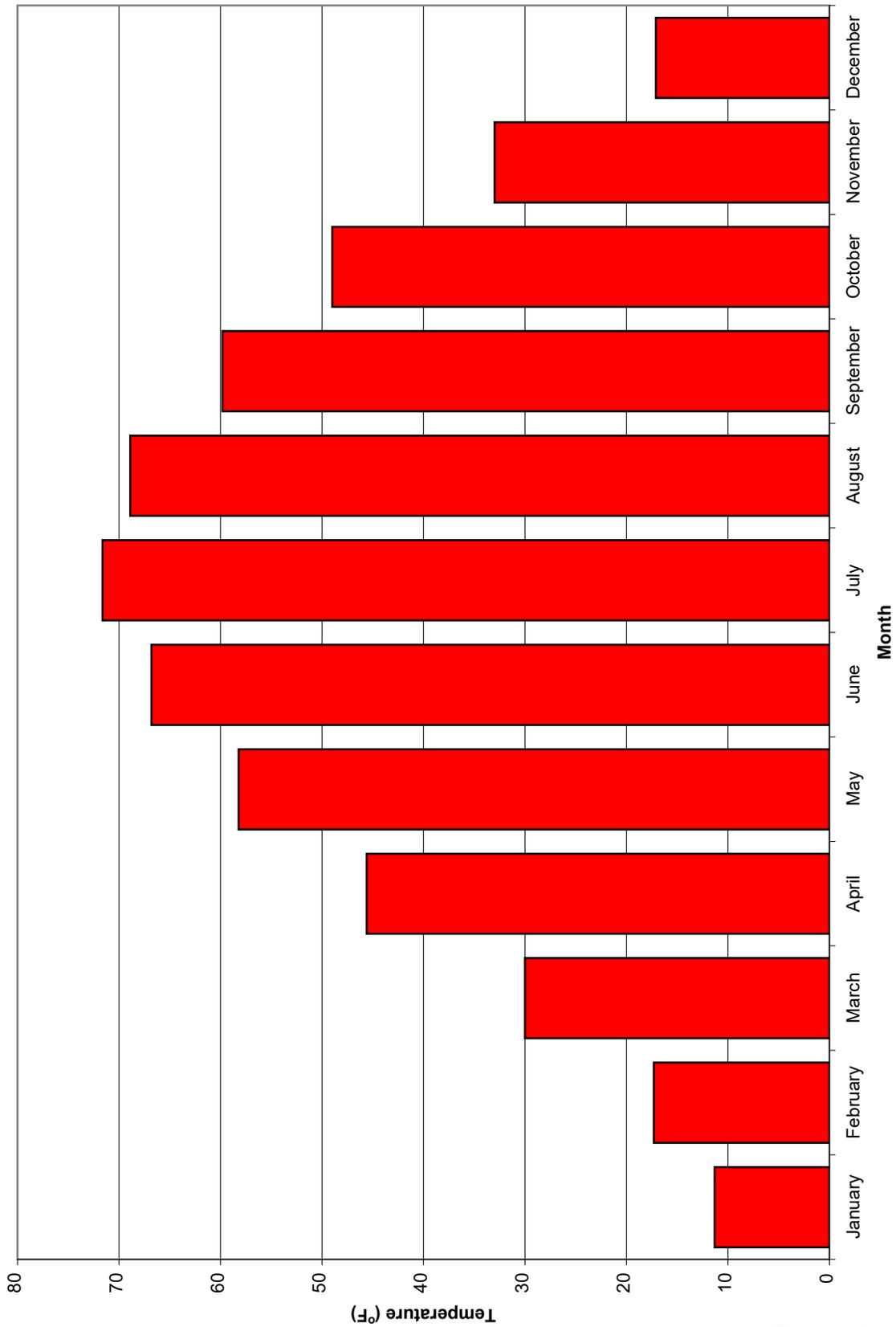


Figure 2-1
Monthly Temperature Normals
City of East Bethel

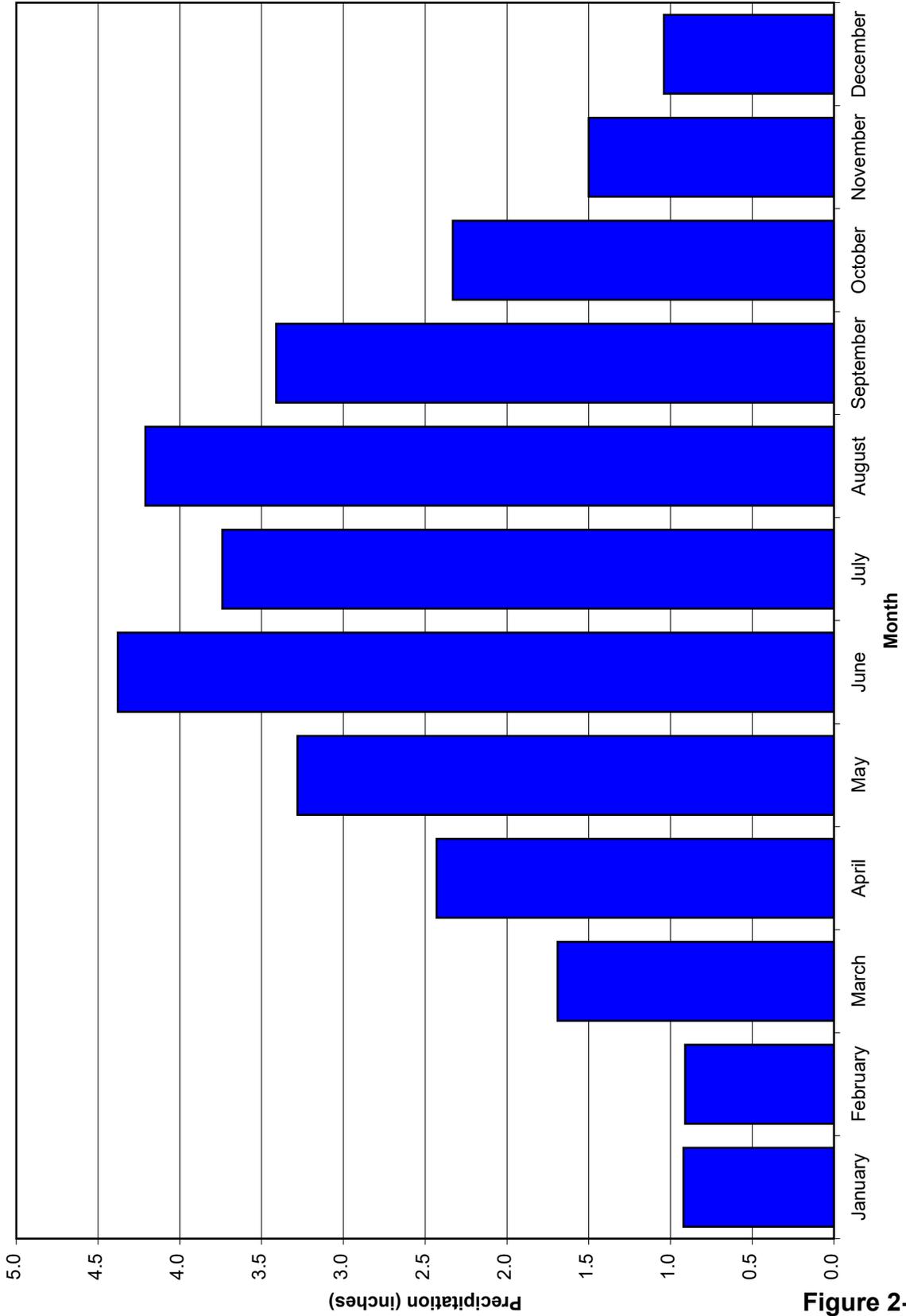
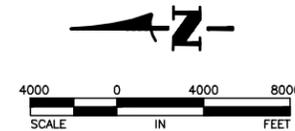
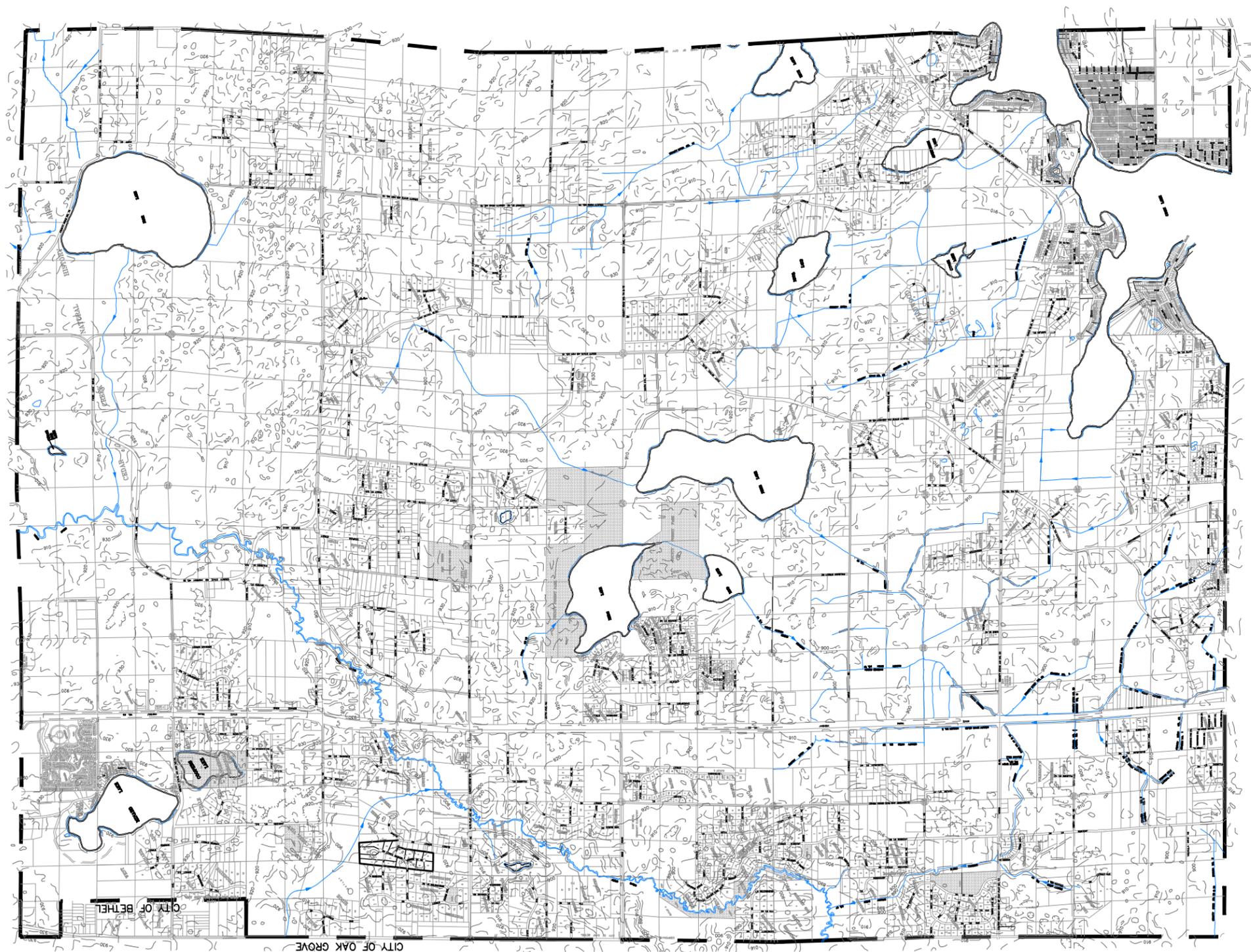


Figure 2-2
Monthly Precipitation Normals
City of East Bethel



LEGEND

- --** DENOTES CORPORATE LIMITS
- - - - -** DENOTES TEN FOOT CONTOURS

SOURCE:

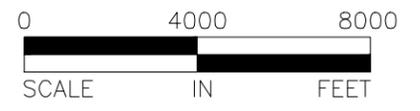
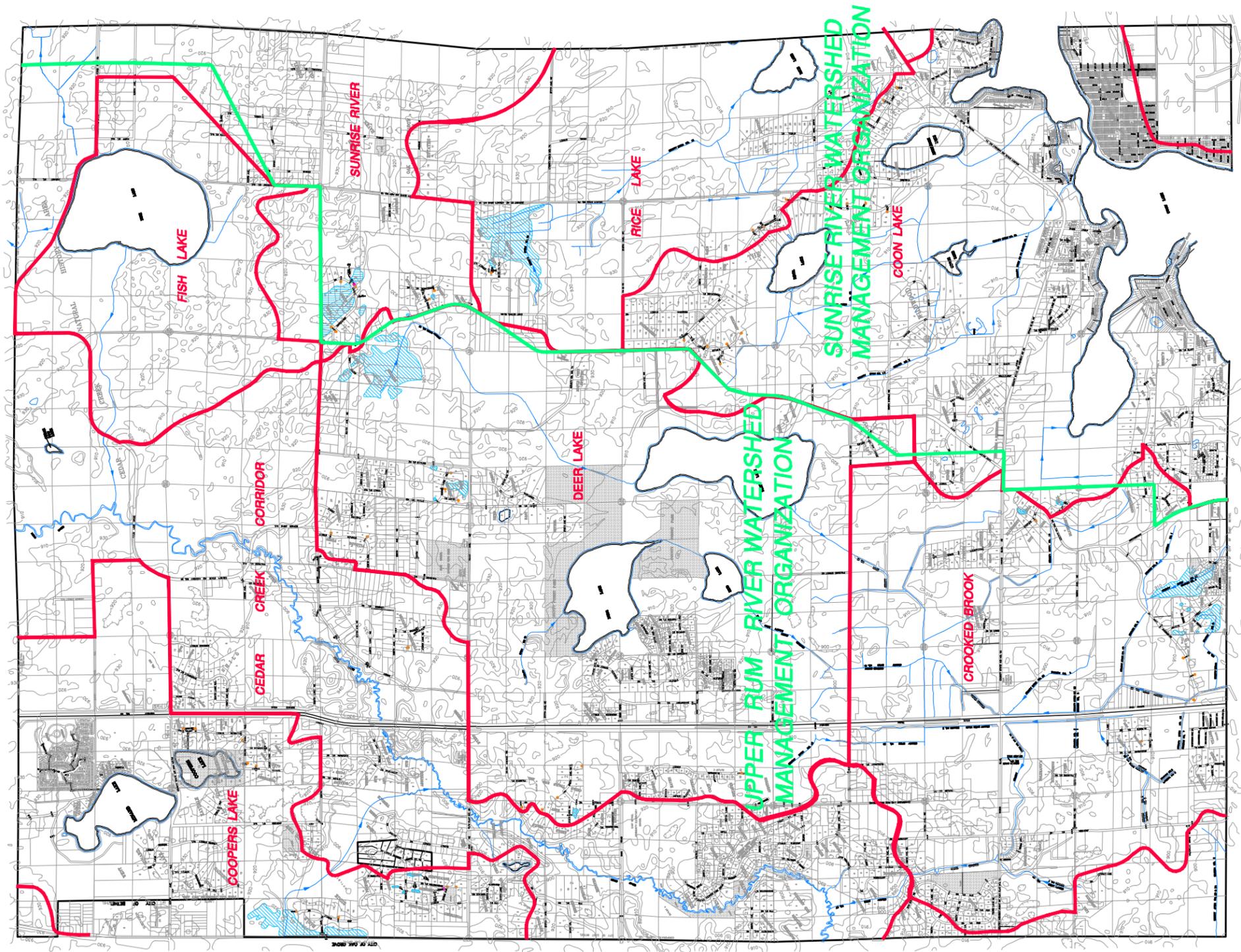
USGS MAPS	
CEDAR	1993
COON LAKE BEACH	1993
ISANTI	1974
ST. FRANCIS	1974

**Hakanson
Anderson
Assoc., Inc.**
Civil Engineers and Land Surveyors
3601 Thurston Ave., Anoka, Minnesota 55303
612-427-5860 FAX 612-427-0520

**FIGURE 2-3
TOPOGRAPHIC MAP
CITY OF EAST BETHEL**

DATE: NOVEMBER, 1999

FILE: EB403



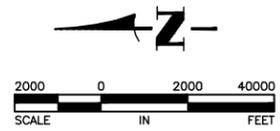
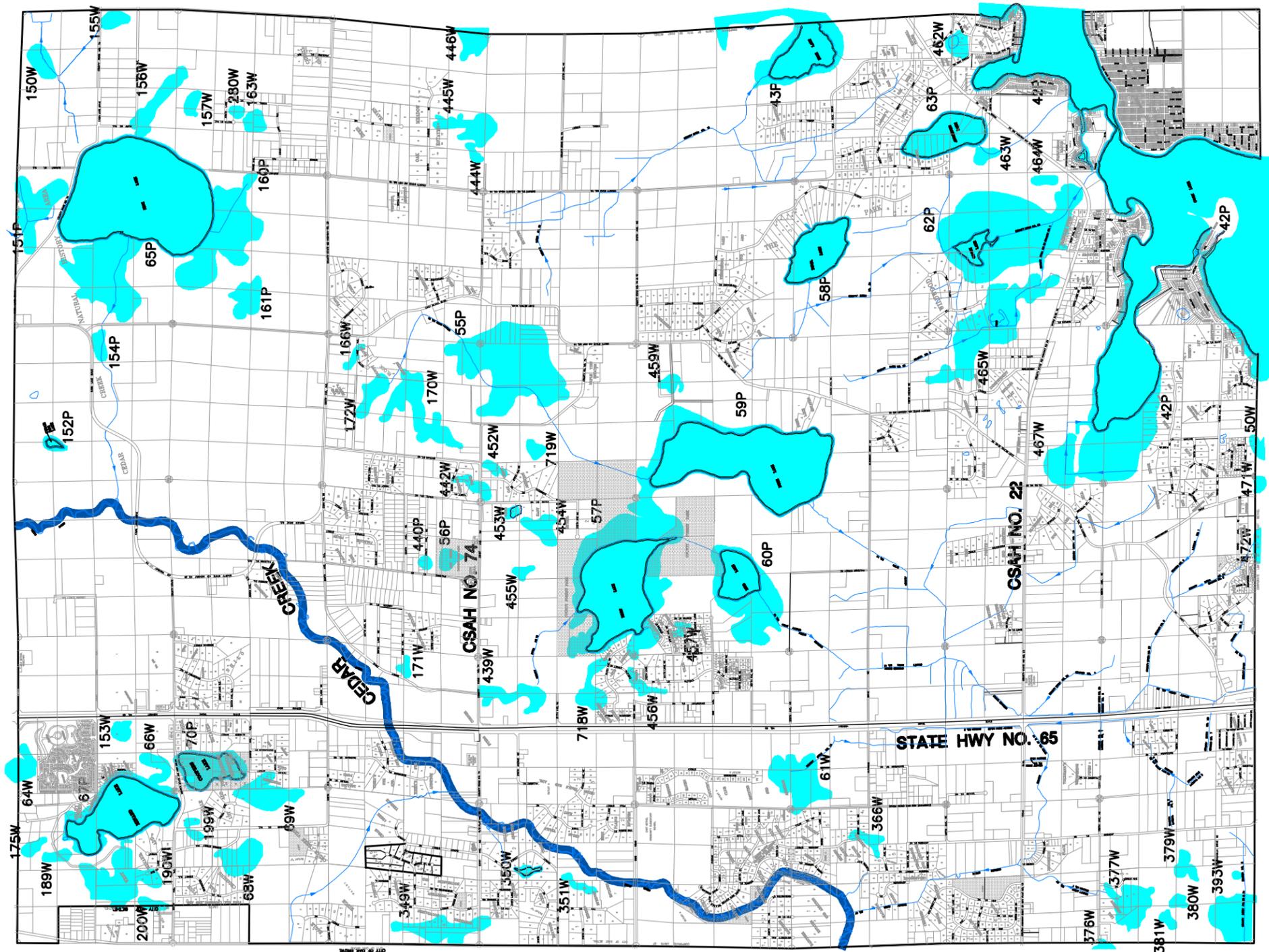
LEGEND

- DENOTES EAST BETHEL'S WATERSHED DIVIDES
- DENOTES WATERSHED MANAGEMENT ORGANIZATION JURISDICTIONAL BOUNDARY

FIGURE 2-4
WMO JURISDICTIONAL
BOUNDARIES
CITY OF EAST BETHEL

DATE: NOVEMBER, 1999

FILE: EB403



LEGEND

- 160P DENOTES PROTECTED WATER
- 456W DENOTES PROTECTED WETLAND
- DENOTES PROTECTED WATER COURSE

FIGURE 2-5
MnDNR PROTECTED WATERS
CITY OF EAST BETHEL

DATE: NOVEMBER, 1999

FILE: EB403



TYPE 2 – Wet Meadow



TYPE 5 – Open Water



TYPE 3 – Shallow-water Marsh



TYPE 6 – Shrub Swamp



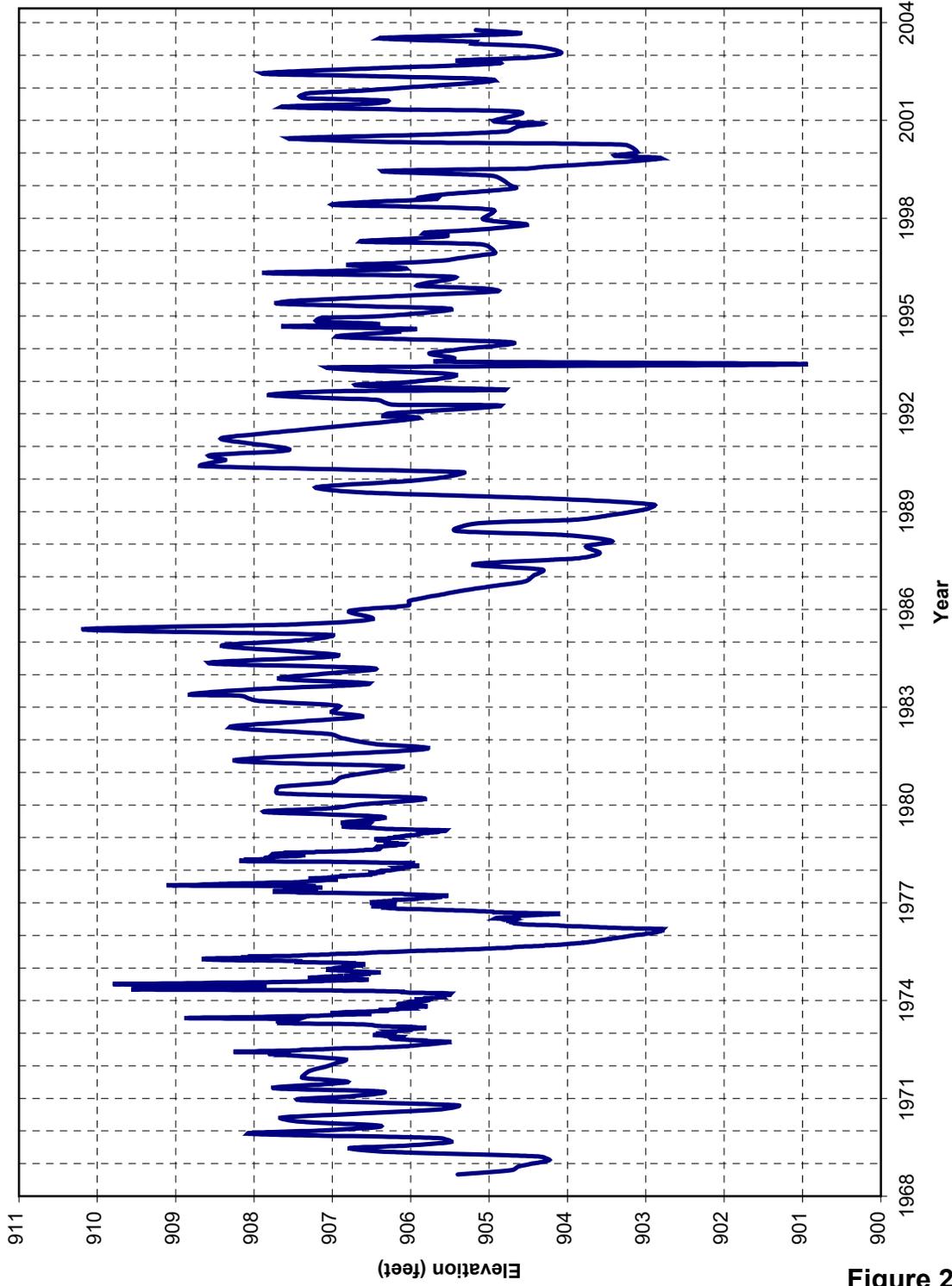
TYPE 4 – Deep-water Marsh



TYPE 7 – Wooded Swamp

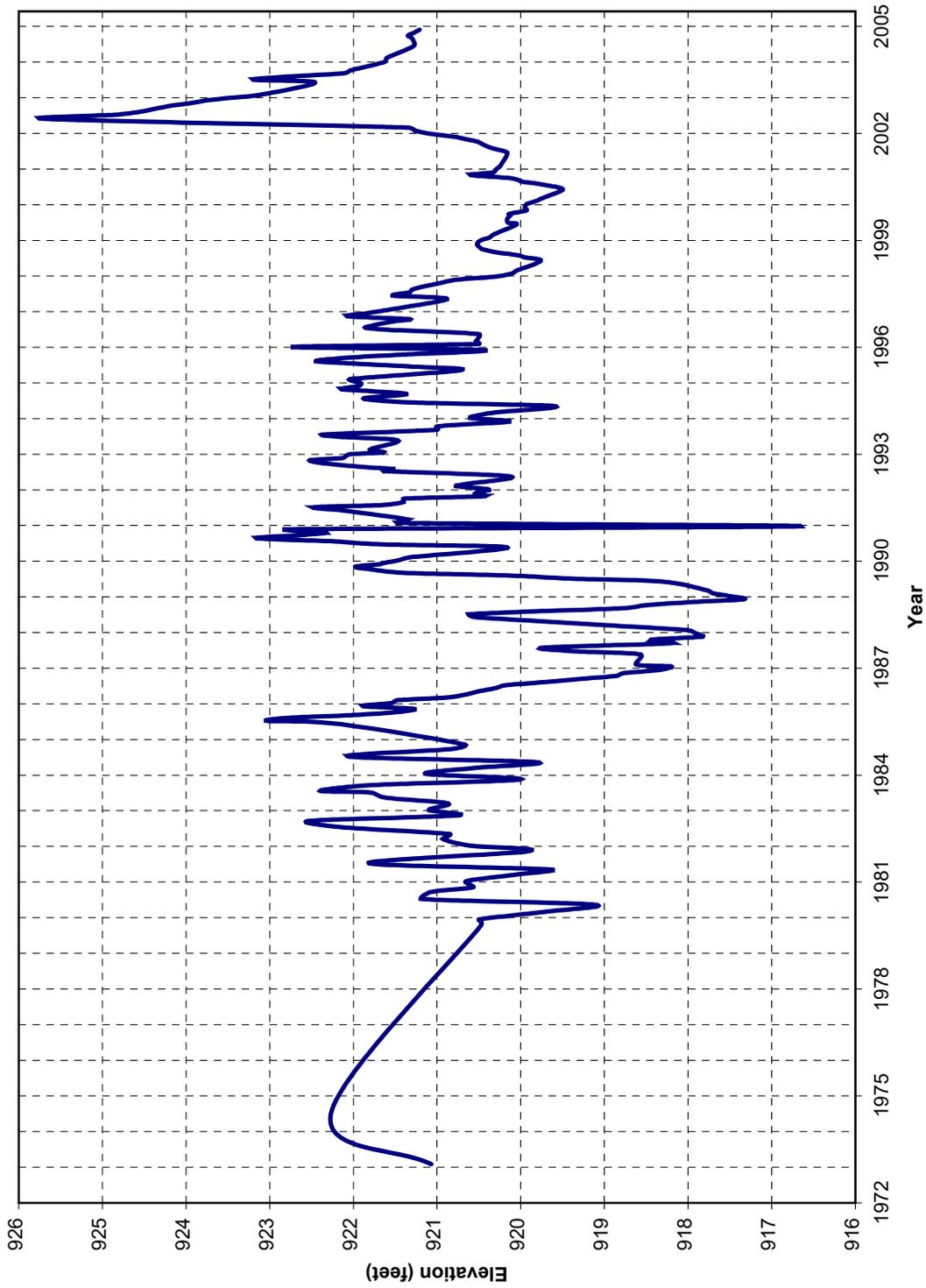
*Photos from "Wetland Types and Definitions"
Minnesota Department of Natural Resources*

**Figure 2-6
Typical Wetland Types
City of East Bethel**



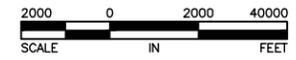
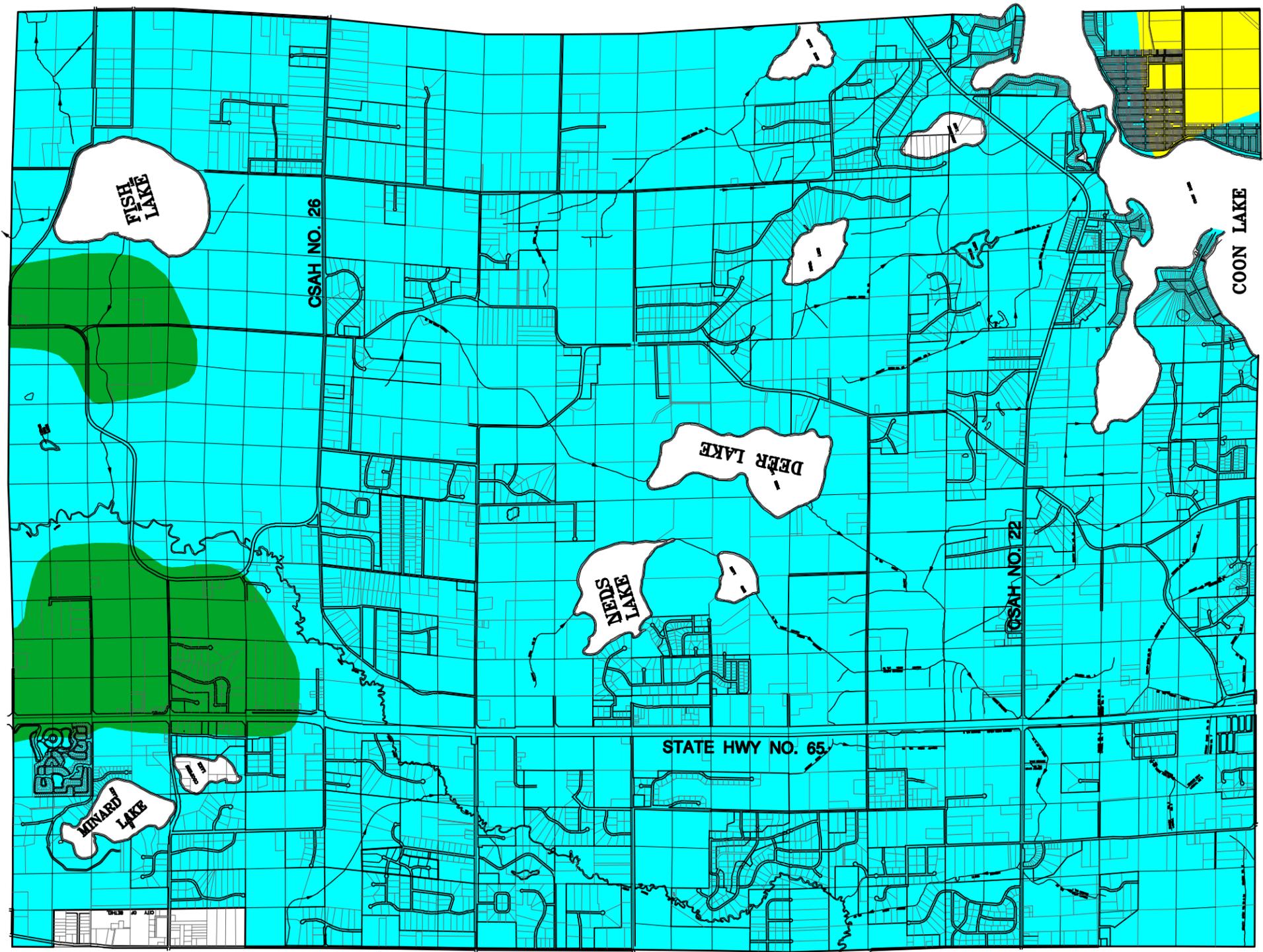
MnDNR Well #2014 located in Soderville, T32, R23, SE1/4, NE1/4, E1/4 Sec.4

Figure 2-7
Soderville Well
Groundwater Elevations
City of East Bethel



MnDNR Well #2025 located in Bethel, T34, R24, SW1/4, NE1/4, SE1/4 Sec.25

Figure 2-8
Bethel Well
Groundwater Elevations
City of East Bethel



LEGEND

- 
 ZIMMERMAN-ISANTI-LINO ASSOCIATION:
 NEARLY LEVEL TO UNDULATING,
 EXCESSIVELY DRAINED, SOMEWHAT
 POORLY DRAINED AND VERY POORLY
 DRAINED SOILS THAT ARE DOMINATED
 BY FINE SANDS THROUGHOUT

- 
 HUBBARD-NYMORE ASSOCIATION:
 NEARLY LEVEL TO GENTLY SLOPING,
 EXCESSIVELY DRAINED SOILS THAT
 ARE SANDY THROUGHOUT

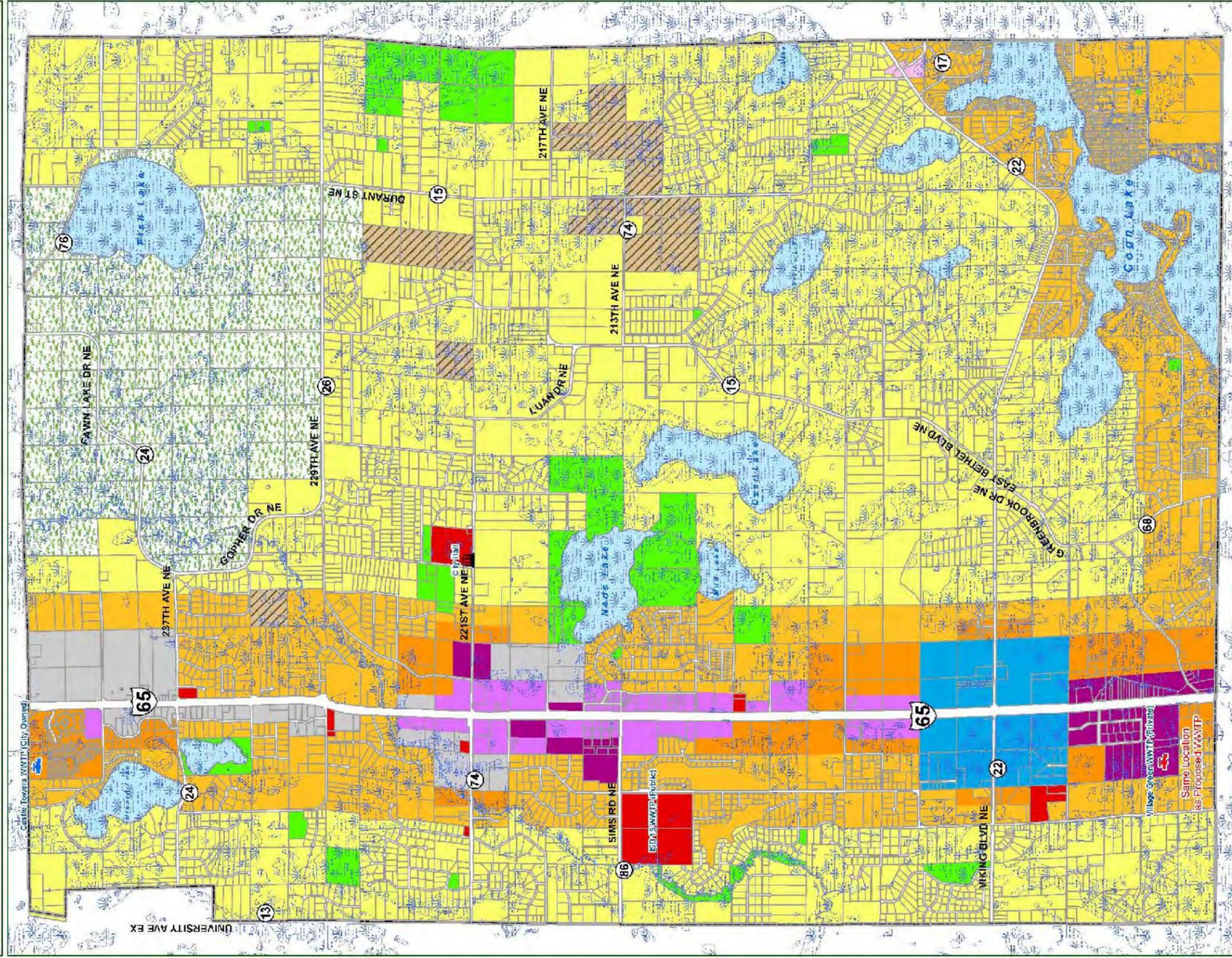
- 
 RIFLE-ISANTI ASSOCIATION:
 NEARLY LEVEL, VERY POORLY
 DRAINED SOILS FORMED IN
 ORGANIC MATERIAL AND FINE SAND

FIGURE 2-9
SOILS MAP
CITY OF EAST BETHEL

DATE: NOVEMBER, 1999 FILE: EB403



FUTURE LAND USE



Landuse

- Agriculture
- Light Industrial
- Low Density Residential (1' per 10 acres)
- Central Business
- Highway Business
- Light Industrial
- Low Density Residential (1' per 10 acres)
- Low / Medium Density Residential (3-4 per acre)

City Facilities

- Park/Open Space
- City Hall
- Castle Towers WWTF (City Owned)
- Village Green WWTP (Private)

Other

- Parcel/Lot
- Wetlands
- Water
- City Limits

Scale: 0, 0.25, 0.5 Miles

Source: Aerial Imagery, Planning Department, Esri, Esri/IGIS

East Bethel

Figure V-2



**FIGURE 2-10
FUTURE LAND USE
CITY OF EAST BETHEL**

3.0 Management Strategies and Problem Areas

This section presents the process and information used to develop the management plan strategies for wetlands, water quality and flood control. Section 3.4 discusses the known problem areas within the city.

3.1 Wetland Protection

This section describes the process that was used to develop a wetland management strategy. The objective of this process is to provide no net loss of wetland functions and values. Impacts to wetlands include not only direct impacts such as filling and draining, but also indirect impacts from stormwater inputs. This process is based on the state guidance document “Stormwater and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands” (State of Minnesota, Stormwater Advisory Group, June 1997), the Upper Rum River Watershed Management Organization (URRWMO) Comprehensive Watershed Management Plan and the Sunrise River Watershed Management Organization (SRWMO) Watershed Management Plan.

3.1.1 Wetland Classifications

Wetlands throughout the city serve a variety of beneficial functions including maintaining water quality, reducing flooding and erosion, providing groundwater recharge areas, providing food and habitat for wildlife and providing open space. Wetlands are important to the health, safety, economy, and general welfare of the city and regulating the wetlands and the land uses around them is therefore in the public interest.

The URRWMO and SRWMO provide wetland regulations for buffers, setbacks, sequencing, replacement and excavations and special protections for the wetland types that are most highly valued locally. The URRWMO and SRWMO seek to identify highly-valued wetlands and gives them greater protections, and allow more flexibility in and around lower-valued wetlands. The URRWMO and SRWMO have developed four wetland classes that are summarized, with the defining characteristics of each wetland class, in Table 3-1. As shown, the scores from five MnRAM categories are used to classify wetlands.

The state guidance document developed a methodology for determining the susceptibility of wetlands to degradation by stormwater input. This methodology relates wetland type to a level of susceptibility as shown in Table 3-3. Wetlands such as bogs and fens can be easily degraded by changes in the stormwater inflows and are designated as highly susceptible. On the other hand, floodplain forests can tolerate relatively significant changes in the chemical and physical characteristics of stormwater inflow without degradation and are therefore slightly susceptible. Figure 3-1, which was created by the Anoka Conservation District, is provided as a guide for a preliminary assessment. This figure has been generated without the benefit of field verifications.

3.1.2 Wetland Management Standards

3.1.2.1 Wetland Standards based on Classification

Wetland management standards were developed for each wetland classification. These standards, shown in Table 3-2, were based largely on the URRWMO Comprehensive Watershed Management Plan and the SRWMO Watershed Management Plan. The standards determine minimum buffer widths, structure setbacks, sequencing and avoidance requirements, wetland replacement ratios, and excavation areas.

These standards provide guidance for the management of stormwater to minimize wetland impacts. It is assumed that wetland impacts will be minimized and existing wetland functions and values will be maintained if the proposed management system and criteria meet the management standards shown in Table 3-2. Specific requirements designed to implement the city's wetland management strategies are outlined in Section 5.1

3.1.2.2 Wetland Standards based on Relative Susceptibility

Wetland management standards were developed to determine how and when stormwater should be routed through a wetland to minimize potential impacts. These standards, shown in Table 3-4, were largely based on the state guidance document. These standards determine tolerable hydrologic change in terms of bounce (difference between the peak flood elevation and the wetland elevation), inundation period (time that flood waters temporarily stored in the wetland exceed the wetland elevation), and runoff control (elevation of the outlet).

These standards provide guidance for the management of stormwater to minimize wetland impacts. It is assumed that wetland impacts will be minimized and existing wetland functions and values will be maintained if the proposed management system and criteria meet the management standards shown in Table 3-4. Specific requirements designed to implement the city's wetland management strategies are outlined in Section 5.1.

3.1.3 Wetland Function and Value Assessment

A wetland function and value assessment for the five categories listed in Table 3-1 will be required where any of the following activities are proposed:

- Subdivision creating three or more lots and creating impervious surfaces or structures.
- Any projects with wetland impacts as defined by the WCA (Minnesota Rules 8420).
- Wetland excavation greater than 0.5 acres.

The latest version of the “Minnesota Routine Assessment Method for evaluating Wetland Functions” shall be used to assess receiving waters. The assessment shall be completed by qualified wetland personnel who specialize in such work. Developers will be responsible for submitting the assessment for private projects. The assessments will be subjected to review and approval by the City.

**Table 3-1
Wetland Classifications for Wetland Buffers, Setbacks, Sequencing, Replacement and Excavation**

Wetland Classification →		High Priority Wetlands	Moderate Priority Wetlands	Minor Priority Wetlands	Use Wetlands
Description →		High quality natural basins that serve both target wetland functions of water quality treatment and wildlife habitat.	Wetlands that highly perform one of the two target wetland functions (water quality treatment or wildlife habitat).	Wetlands that do not highly perform either of the two target wetland functions (water quality treatment or wildlife habitat).	Wetlands created for stormwater management. These wetlands usually need periodic maintenance.
Targeted Wetland Functions	MnRAM Category				
Water Quality Treatment	Downstream water quality protection	MnRAM Score is “high” for at least one of these two MnRAM categories	MnRAM Score is “high” for at least one of these two MnRAM categories	Does not score “exceptional” or “high” for any of these MnRAM categories	Wetlands created for stormwater management. MnRAM scores are irrelevant.
	Maintenance of wetland water quality				
		AND	OR		
Wildlife Habitat	Vegetative diversity/integrity	MnRAM Score is “exceptional” or “high” for one or more of these three MnRAM categories	MnRAM Score is “exceptional” or “high” for one or more of these MnRAM categories		
	Maintenance of characteristic wildlife habitat structure				
	Maintenance of characteristic amphibian habitat				

Most wetlands serve a groundwater recharge function, so wetland standards were designed to be protective of this function in all wetlands.

**Table 3-2
Wetland Buffer Width, Setback, Sequencing, Replacement and Excavation Requirements**

Standard	Wetland Classification			
	High Priority Wetlands ¹	Moderate Priority Wetlands	Minor Priority Wetlands	Use Wetlands ²
Average Buffer Width ³	25 ft	15 ft	15 ft	Top of Slope
Structure Setbacks ³	50 ft	25 ft	25 ft	25 ft
Sequencing and Avoidance	No impacts allowed without demonstrating significant public benefit.	WCA sequencing applies.	WCA sequencing applies.	WCA sequencing applies.
Wetland Replacement Ratios	Minnesota Wetland Conservation Act (WCA) ratios apply			
Excavation	Excavations >0.5 acres must be denied for portions of wetlands that score high on the MnRAM vegetative diversity criteria		All excavations >0.5 acres regulated per text	

¹ Standards shall apply to wetlands adjacent to Significant Natural Environmental Areas (SNEA).

² Standards shall also apply to stormwater ponds.

³ See the City Code for special setback requirements for the plats of Whispering Aspen and Viking Preserve, Significant Natural Environmental Areas (SNEA), Cedar Creek, and Lakes.

Table 3-3
Wetland Classification by Sensitivity to Stormwater Inputs

Highly Susceptible Wetland Types:¹	Moderately Susceptible Wetland Types:²	Slightly Susceptible Wetland Types:³	Least Susceptible Wetland Types:⁴
Sedge Meadows	Shrub-carrs ^a	Floodplain Forests ^a	Gravel Pits
Open Bogs	Alder Thickets ^b	Fresh (Wet) Meadows ^b	Cultivated Hydric Soils
Coniferous Bogs	Fresh (Wet) Meadows ^{c,e}	Shallow Marshes ^c	Dredged Material/Fill Material Disposal Sites
Calcareous Fens	Shallow Marshes ^{d,e}	Deep Marshes ^c	
Coniferous Swamps	Deep Marshes ^{d,e}		
Low Prairies			
Lowland Hardwood Swamps			
Seasonally Flooded Basins			

1. Special consideration must be given to avoid altering these wetland types. Inundation must be avoided. Water chemistry changes due to alteration by stormwater impacts can also cause adverse impacts. Note: All scientific and natural areas and pristine wetlands should be considered in this category regardless of wetland type.
2. a., b., c. Can tolerate inundation from 6 inches to 12 inches for short periods of time. May be completely dry in drought or late summer conditions. d. Can tolerate +12 inches inundation, but adversely impacted by sediment and/or nutrient loading and prolonged high-water levels. e. Some exceptions.
3. a. Can tolerate annual inundation of 1 to 6 feet or more, possibly more than once/year. b. Fresh meadows which are dominated by reed canary grass. c. Shallow marshes dominated by reed canary grass, cattail, giant reed or purple loostrife.
4. These wetlands are usually so degraded that input of urban stormwater may not have adverse impacts.

Notes: There will always be exceptions of the general categories listed above. Use best professional judgement. Appendix A of the State Guidance document contains a more complete description of wetland characteristics under each category. Pristine wetlands are those that show little disturbance from human activity.

Source: "Stormwater and Wetlands: Planning and Evaluation Guideline for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands" State of Minnesota, Stormwater Advisory Group, June 1997.

Table 3-4
Stormwater Input Limitations

Standard	Wetland Susceptibility				Comments
	Highly Susceptible	Moderately Susceptible	Slightly Susceptible	Least Susceptible	
Storm Bounce	Existing	Existing plus 0.5 feet	Existing plus 1.0 feet	No limit	Hydrologic analysis must be conducted on an annualized basis or a broad range of storm events from very small (1/4 inch) to large, i.e. 10- or 25-year storms
Discharge Rate	Existing	Existing	Existing or less	Existing or less	
Inundation Period (1- and 2-year event)	Existing	Existing plus 1 day	Existing plus 2 days	Existing plus 7 days	
Inundation Period (100-year event and greater)	Existing	Existing plus 7 days	Existing plus 14 days	Existing plus 21 days	
Runout Control Elevation (Free Flowing)	No change	No change	0 to 1.0 feet above existing runout	0 to 4.0 feet above existing runout	
Runout Control Elevation (Landlocked)	Above delineated wetland	Above delineated wetland	Above delineated wetland	Above delineated wetland	

3.2 Water Quality

Within the eight main watersheds of the City of East Bethel, there are hundreds of water bodies ranging in size from lakes to small stormwater detention basins. Nonpoint pollution associated with stormwater runoff creates adverse impacts; the degree of impact depends on the water body's natural ability to remove, absorb, or process the pollutants through chemical, physical, or biological processes. Poor water quality usually indicates a situation where the resource receives more nutrients, or other pollutants, than can be processed naturally. Planning for water quality protection is necessary to preserve the beneficial uses of existing water bodies, as well as to evaluate wetland impacts as described in Section 3.1.

3.2.1 Water Quality Management Groups

This section describes the water quality management process that was used to prioritize water bodies for water quality protection. All water bodies will be classified into one of three groups. The classification groups are based on WMO's criteria and wetland vegetation susceptibility. Table 3-5 defines the water quality classification groups adopted by the city.

**Table 3-5
Definition of Water Quality Classification Groups**

Group 1	All waters (lakes and watercourses) and public waters wetlands which have been inventoried by the Minnesota Department of Natural Resources in accordance with Minnesota Statutes, section 103G.005, subdivision 15 and 18. This group shall also include all wetlands which are considered highly susceptible to stormwater.
Group 2	This group shall include all wetlands which are considered moderately susceptible to stormwater and do not meet any requirements of a Group 1 water. This group shall also include all wetlands immediately adjacent to Group 1 public waters and public waters wetlands with habitats dominated by Types 1,2,6, and 7 (Shaw, S.P. and C.G. Fredine, 1956).
Group 3	This group shall include all wetlands which are considered slightly or least susceptible to stormwater and do not meet any requirements of a Group 1 or Group 2 water.

Water bodies will be managed to the most stringent water quality protection level shown in Table 3-5. For example, a sedge meadow may not be an inventoried wetland by the MnDNR, but may be considered "highly susceptible" which would make it a Group 1 waterbody.

The city intends to review plans for construction activities to ensure that water quality goals are met. Activities will be regulated according to the classification (Group 1, 2, or 3) of the

receiving water listed in Table 3-5. Specific requirements designed to implement the city's water quality management strategies are outlined in Section 5.2.

Water quality protection will also be achieved through implementation of the City's Stormwater Pollution Prevention Program (SWPPP) as discussed in Section 1.2.4.

3.3 Water Quantity

The flood and rate control portion of the planning consisted of estimating the 100-year flood elevation and discharge rate for each watershed. This section discusses the flood insurance study and the city's flood and rate control process.

3.3.1 Flood Insurance Study

A Flood Insurance Study (FIS) of the City of East Bethel was completed in May 1980 by the Federal Emergency Management Agency (FEMA). The FIS maps indicate the boundaries for 100-year levels. The study did not determine the actual flood elevations except for the profile along Cedar Creek. The 100-year flood elevations reported for Cedar Creek were used in the plan.

3.3.2 Flood Protection Level

Storm drainage systems are typically designed to pass a flood of a designated magnitude called the design flood. The design flood generally balances the cost of flood damages with the cost of the storm drainage system to achieve an overall minimum public cost. Watersheds in East Bethel are classified as requiring protection for either the 1 or 10 percent chance flood based on expected flood damages. Storm drainage systems that serve as the outlet for areas where flood damage is likely to occur must safely pass the critical-duration 1 percent chance flood. Storm drainage systems for areas where no significant flood damage or disruption of infrastructure is likely to occur must safely pass the critical-duration 10 percent chance flood.

3.3.3 Hydrologic Model

Simulating the stormwater system using a hydrologic model is important in determining the adequacy of the existing system and to provide guidance in designing systems to handle surface runoff for ultimate development conditions. A hydrologic model simulates the rainfall-runoff process so that runoff rates and volumes from design storms can be estimated for different stormwater configurations and land use conditions.

As rain falls on the watershed, several different processes move the water from the ground surface to one of three ultimate destinations. Initially water is stored in depressions and on the surface of the ground, and begins to infiltrate into the soil. As rainfall continues, the storage capacity of these depressions is exceeded and the excess water begins to runoff into gutters, swales, ditches and storm sewers. In East Bethel, these conveyance paths lead to county and public ditches, creeks or to one of the many lakes, ponds and wetlands in the city.

The amount of rain and the time over which the rain occurs influence the amount of runoff and the rate at which the runoff travels from the watershed. In addition to the rainfall conditions, the physical characteristics of the watershed also determine the volume of water that leaves the watershed as runoff, and the resulting flood levels in the ponds, wetlands and lakes in the watershed.

East Bethel's storm drainage system was analyzed for the 1 percent chance flood for existing and proposed (ultimate development) conditions. The 1 percent chance flood is used to design storm drainage systems that serve as the outlet for areas where significant flood damage is likely to occur.

A range of rainfall and runoff durations was analyzed to determine the critical event for each stormwater storage area and subwatershed. The storm or runoff duration that produces the greatest discharge (or detention storage volume, as appropriate) in each subwatershed is considered the critical duration for that subwatershed. The analysis used the 24-hour, and the 2- and 4-day duration rainfall events for non-landlocked areas. For landlocked areas runoff was analyzed for two back-to-back 1 percent chance rainstorms and the 10-day snowmelt. The critical 100-year runoff or precipitation event was used to determine the flood elevation of the stormwater storage areas, the amount of detention storage the areas should provide, and the outflow from the watershed.

To reflect proposed conditions, the hydrologic analyses assumed ultimate development consistent with the city's Comprehensive Plan. Full development land use generally has more impervious area (such as roads, driveways and roofs), which causes greater runoff volumes and rates than undeveloped areas.

The drainage divides were determined using:

- City of East Bethel storm sewer maps
- Various development plans
- Four USGS Maps: Cedar-1993, Coon Lake Beach – 1993, Isanti – 1974, St. Francis – 1974
- Field Surveyed pipes and water levels

For areas that are undeveloped or underdeveloped, the future watershed divides were assumed to follow the existing divides.

HydroCAD was used as the hydrologic model to simulate flow through the storm drainage systems in East Bethel. This computer model creates a hydrograph for each watershed. The model then routes these hydrographs through storage areas (such as wetlands, lakes, and detention ponds) and conveyance systems (storm sewers and ditches) and combines them with hydrographs from other subwatersheds. The hydrologic model estimates both the peak rate of runoff and the volume of runoff. The peak rate of runoff is the primary factor in determining storm sewer sizes. The volume of runoff is the primary factor in the design and

evaluation of stormwater storage areas and in the assessment of hydrologic impacts to wetlands. A more detailed discussion about the HydroCAD Model is given in Section 14.0.

3.3.4 Rate Control and Flood Storage

East Bethel has vast amounts of stormwater storage available in its wetlands and lakes. This storage was used in the development of the hydrologic model for the city. The storage areas were estimated from the USGS topographic maps and the elevations were based on field surveys of existing water levels and pipe inverts.

All projects that disturb one or more acres and certain projects in the shoreland zone, as discussed in Section 5.2.6 will be required to control the rate of discharge from each site. The proposed discharge rate shall not exceed the existing discharge rate for the 2-, 10-, and 100-year, 24-hour storm events. Section 5.2 discusses additional water quantity and quality requirements.

3.3.5 Flood Control

Flood control has been directed primarily at the management of flood levels which include the protection of structures and the safety of the residents of the city.

3.3.5.1 Flood Protection Standards

It is common practice in stormwater management to provide a safety factor against flooding. This factor of safety is typically represented as a vertical separation distance between the peak flood elevation and the flood damage elevation. This vertical separation is called the "freeboard." Section 5.2 presents the freeboard values that will be used for the city.

3.3.5.2 Flood Control System

The flood control system in East Bethel consists of the wetlands, ponds and lakes for storage of runoff, the roadways, storm sewers, ditches and streams for conveyance of water from the watershed, and the management of the water in the system. Normal levels, flood levels, flood storage, peak discharges and proposed storm sewer pipe sizes for each watershed are tabulated in the tables in Section 11.

The stormwater management plan provides guidance for construction and improvement of the drainage system required for ultimate development conditions within East Bethel. There is a certain amount of flexibility in the guidelines of the management plan. Although, any departure from the management plan must include compensating adjustments to maintain the continuity of the plan.

3.4 Problem Areas

An assessment of the known problem areas in the city was completed as part of this plan. The following paragraphs summarize the assessment.

3.4.1 Flooding Concerns Within the City

3.4.1.1 *Whispering Oaks*

In 1999, the city initiated a drainage study to address complaints from residents living in the Whispering Oaks development, which was constructed in 1995. Whispering Oaks consists of a single-family residential development with a 2.0 acre minimum lot size. Several residents complained about standing water in their front yards after heavy rainfalls.

The designed drainage system consists of a backyard infiltration pond on Lots 9 and 10 of Block 2, which was constructed approximately 3 feet deep. When the pond fills past the 3-foot depth, it overflows through a ditch which conveys water to the Rendova Street ditch and then eventually to the outlet pipe which crosses Rendova Street and drains east.

A field survey was conducted as part of the study. It was concluded that several driveway culverts which are within the Rendova Street ditch were installed 6 inches too high. Therefore, when the infiltration pond overflows, water ponds about 6 inches deep in front of the culverts on Lots 7 and 8 of Block 2.

Corrective Action:

This flooding does not threaten any structures and the ponded water eventually infiltrates into the ground. No further action will be taken by the city on this issue.

3.4.1.2 *Subwatersheds 300, 310 and 411*

Subwatersheds 300, 310 and 411 all have experienced raised water elevations due to beaver dam construction in the drainage ditches which serve as outlets for these watersheds. The beaver dam construction has caused flooding on Lots 1 and 2 of Block 4 in DeGardners 2nd Addition.

Corrective Action:

The city has in the past, and will continue to trap the beavers and remove the constructed dams as necessary.

3.4.1.3 *Fish Lake Outlet*

In the past, water levels experienced in Fish Lake have been high enough to jeopardize the integrity of County Road 76. Fish Lake is within Subwatershed 100. The outlet consists of a ditch which drains to the west to Outlet 100. Outlet 100 consists of two 18-inch CMP's. It is not known if the increased water levels are from an obstructed drainageway, or from area groundwater levels.

Corrective Action:

The City has cleaned the drainageway and culverts which has restored the outlet capacity of Fish Lake. No further action is anticipated.

3.4.1.4 Street Flooding

Segments of 183rd Avenue N.E. and Cedar Road in Subwatershed 709 have experienced short term flooding during periods of heavy rain.

Corrective Action:

The vertical alignment of these streets will be reviewed when upgrades are considered to 183rd Avenue and Cedar Road.

3.4.1.5 Nordin Estates

Nordin Estates, which is located in the southwest corner of Subwatershed 709, has experienced flooding of house basements in the past. The development is served by an outlet which crosses 181st Lane N.E. This pipe discharges to a private drainage ditch which conveys water to the south into Ham Lake. The flooding problem appears to be the private drainage ditch. The ditch is in poor condition and full of sediment and vegetation. The city has attempted to get permission to clean the private ditch, however, the owner will not cooperate with the city.

Corrective Action:

The flooding issue will be further reviewed when 181st Lane N.E. is upgraded.

This development has also experienced high ground water elevations in the past which have inundated the septic drainfields of the residents. The city initiated a study in 1997 to further investigate this issue. The area groundwater is directly influenced by the large waterbody of Coon Lake.

It was concluded from the study that lowering the area water table was not feasible. No further corrective actions are anticipated.

3.4.2 Lake and Stream Water Quality Problems

3.4.2.1 Crooked Brook

Crooked Brook from County Ditch 28 to Cedar Creek has been listed on the Minnesota Pollution Control Agency Impaired Waters list. Crooked Brook has been listed for low dissolved oxygen.

Corrective Action:

The 2017 Rum River Watershed TMDL report did not include Crooked Brook's impairment, but it may be incorporated in future findings. The URRWMO has included Crooked Brook in

their future monitoring plan. The City of East Bethel will set aside funds to review ways to meet the TMDL requirement, and the City revise its Water Management Plan as necessary to comply with future findings.

3.4.2.2 Coon Lake

Coon Lake has been listed on the Minnesota Pollution Control Agency's Impaired Waters list for mercury.

Corrective Action:

Impacts of mercury are mainly regional in nature. For this reason, it is anticipated that the TMDL Study for Coon Lake will be conducted by state and federal agencies. The City of East Bethel will revise its Water Management Plan as necessary to comply with future findings.

3.4.2.3 Cedar Creek

Cedar Creek has been listed on the MPCA's Impaired Waters list for *E. coli*. The City of East Bethel has an *E. coli* TMDL for the Cedar Creek watershed.

Corrective Action:

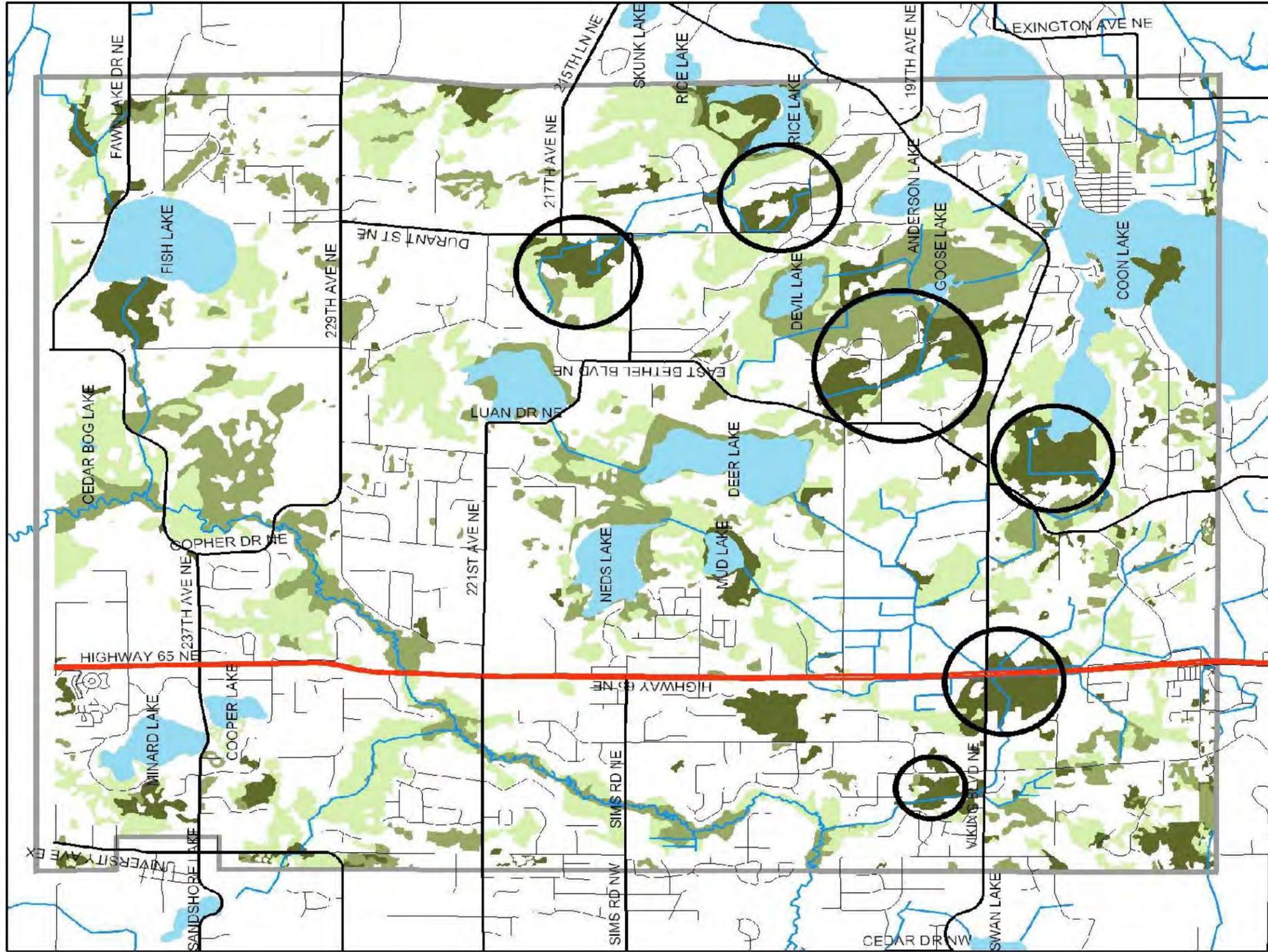
The City of East Bethel will set aside funds to review ways to meet the TMDL requirement, and the City revise its Water Management Plan as necessary to comply with future findings.

3.4.2.4 St. Croix River

The City of East Bethel has a phosphorus reduction TMDL for the Lake St. Croix watershed.

Corrective Action:

The City will be reducing its phosphorus load as this area develops. Additional funds will be set aside to review methods to further meet the TMDL requirement, and the City will revise its Water Management Plan as necessary to comply with future findings.



Wetland Susceptibility to Degradation by Stormwater Impacts

- High
- Moderate
- Slight

○ Special Attention Areas for Function Values Analysis

■ Lakes

— Perennial and Intermittent Streams and Ditches

**FIGURE 3-1
WETLAND SUSCEPTIBILITY
TO DEGRADATION BY
STORMWATER IMPACTS**

4.0 Goals and Policies

This section presents the goals and policies developed for the management of water resources within East Bethel. Goals are provided for wetland protection, water quality, water quantity, flood plain and shoreland management, recreation, open space and wildlife management, groundwater protection, erosion and sedimentation control, and drainageway maintenance. Goals propose the desired end; policies provide the means to achieve the goals. Section 5.0 provides more specific detail on how the goals and policies will be implemented.

4.1 Wetlands

Goal: Maintain or enhance wetland functions and values.

Policy 1:

Act as the Local Government Unit responsible for administration of the Wetland Conservation Act.

Policy 2:

Manage wetlands consistent with City ordinances and state and federal wetland regulations.

Policy 3:

Improve or enhance wetlands where economically feasible.

Policy 4:

Manage stormwater runoff to wetlands to avoid, minimize, and mitigate impacts to wetland functions and values consistent with this plan.

Policy 5:

Encourage establishment and maintenance of buffer areas around wetlands.

Policy 6:

Consider wetland biotic communities when evaluating water level fluctuation (bounce) in wetlands.

4.2 Water Quality

Goal: Manage stormwater to protect designated water bodies as outlined in this plan.

Policy 1:

Maintain and periodically update the water quality management classification of the city's water bodies.

Policy 2:

Manage stormwater consistent with the water quality standards outlined in this plan. In cases where a portion of the water body or its watershed is not entirely within East Bethel, stormwater will be managed to meet or exceed WMO standards.

Policy 3:

Cooperate with WMOs in water quality monitoring, modeling, and planning to protect priority resources. Cooperation could include: providing information on storm drainage features; topographic information, and inventory data; serving as a liaison between the WMO and city residents; implementing prescribed education programs and BMPs and financial support for WMO programs.

Policy 4:

Require development and redevelopment proposals to be consistent with the city's water quality management goals and water quality management standards including the implementation of NURP and infiltration standards for pretreatment of runoff and implementation of BMPs as prescribed in the plan. The city will review development proposals for consistency with this plan.

Policy 5:

Implement structural and non-structural stormwater BMPs on city projects and activities.

Policy 6:

Educate East Bethel residents about household BMPs to protect the city's water resources.

Policy 7:

Maintain, operate, and clean city owned structural BMPs such as sedimentation and detention structures as needed to preserve the initial intended performance.

Policy 8:

PUD's and conservation development designs are encouraged for parcels containing, or are adjacent to, waterbodies, high quality wetlands, and natural communities.

Policy 9:

Discharge of waters from dewatering projects should be through some form of treatment that removes solids and other pollutants, and in a manner that maximizes groundwater recharge without causing damage to public or private properties.

4.3 Water Quantity

Goal: Minimize flooding potential while minimizing, to the greatest extent practical, the public capital expenditures necessary to control excessive volumes and rates of runoff.

Policy 1:

The city will promote preservation of the retention capacities of the lakes, streams, wetlands and ditches of the present drainage system in order to control rates of runoff and potential flooding.

Policy 2:

The city will encourage the retention, on and in the soil, of the highest practical percentage of the annual precipitation in consideration of the overlying land use zoning.

Policy 3:

Detention facility design will include access for maintenance of the outlet structure and to the facility in general.

Policy 4:

Provide a positive overflow from all stormwater ponds and wetlands.

Policy 5:

Require low floors of new structures to be built to have 2 feet of freeboard protection for the critical duration 1 percent chance flood. Low floors of new structures adjacent to landlocked basins shall be elevated a minimum of 2 feet above the elevation of two consecutive 1 percent chance storms and low openings shall be 1 foot above the 10-day snowmelt as outlined in this plan.

Policy 6:

Review development and redevelopment proposals for consistency with this plan.

Policy 7:

Correct existing flooding problems within available funding constraints by upgrading the storm drainage system or implementing flood protection improvements.

Policy 8:

Trunk storm drainage systems that serve as the outlet for areas where flooding of structures or where significant flood damage is likely to occur will typically be designed to meet freeboard protection standards for the critical duration 1 percent chance flood. The design shall be based on a hydrograph method for appropriate rainfall and snowmelt events. The design shall be based on

proposed ultimate land use. The design shall consider potential flood, wetland, and water quality impacts to upstream and downstream areas.

Policy 9:

Trunk storm drainage systems for areas where no significant flood damage or disruption of infrastructure is to occur shall be designed to safely convey the critical duration 10 percent chance flood. The design shall be based on proposed ultimate land use. The design shall consider potential flood, wetland, and water quality impacts to upstream and downstream areas.

Policy 10:

Manage the rate and volume of runoff in general accordance with the stormwater management criteria presented in this plan.

Policy 11:

Provide emergency overflows for storm drainage systems where possible.

Policy 12:

Maintain, clean, and replace storm drainage systems as needed to preserve the initial design capacity.

Policy 13:

Where practical, stormwater conveyors shall not discharge directly into streams or lakes without at least primary sedimentation in natural or manmade basins.

Policy 14:

Require stormwater discharge volume control in new development and redevelopment to be protective against future flooding problems.

4.4 Floodplain Management

Goal: Manage floodplain areas to minimize flooding and protect the functions of the floodplain.

Policy 1:

Manage activities within the floodplain in accordance with the city's ordinance and state and federal regulations.

Policy 2:

The city shall prohibit encroachment into the floodway that will reduce storage capacity unless the storage volume is mitigated.

Policy 3:

The city shall manage the land use within the 100-year flood level as designated by this plan or the National Flood Insurance Program Flood Insurance Rate Maps (FIRM).

4.5 Shoreland Management

Goal: Manage shoreland areas to protect the functions and values of shoreland regulated water bodies.

Policy 1:

Manage activities within the shoreland districts in accordance with the city ordinance and state and federal regulations.

4.6 Recreation, Open Space and Wildlife Management

Goal: To protect and enhance fish and wildlife habitat areas and water recreational facilities.

Policy 1:

The city shall seek opportunities for integration of recreation open space and wildlife management facilities in conjunction with possible future water resource capital improvement projects.

Policy 2:

The city shall encourage protection and/or preservation of wetlands and uplands that provide habitat for game fish spawning and wildlife, especially in the residential development areas.

4.7 Groundwater

Goal: Maintain and improve existing groundwater quality.

Policy 1:

The evaluation and control of development in groundwater recharge areas shall be protected from potential sources of contamination in accordance with Minnesota Statutes section 103H.001 and the City Ordinances.

Policy 2:

The disposal of any solid or liquid wastes shall be controlled as necessary to ensure that the underground waters of the watershed are maintained within the range of natural background quality.

Policy 3:

Cooperate with Anoka County Health Department in ensuring that abandoned wells are properly sealed according to the Minnesota Department of Health Well Code.

4.8 Erosion and Sedimentation Control

Goal: Prevent, to the extent possible, sediment from entering the city's surface water resources and to control the erosion from drainageways within the city.

Policy 1:

Require development and redevelopment to implement construction site erosion and sediment control practices consistent with the city's Sediment and Erosion Control Ordinance, and the NPDES General Construction Permit and the "Minnesota Stormwater Manual", latest version.

Policy 2:

Inspect construction sites and provide enforcement for conformance to the site's approved erosion and sediment control plans.

Policy 3:

The City will encourage the preservation of natural vegetation.

4.9 Drainageway Maintenance

Goal: Maintain drainageways to ensure design capacities are met.

Policy 1:

The city shall maintain public water management structures between waters and wetlands, and regional detention basins.

Policy 2:

The responsibility for inspection, maintenance or repairs to the county ditch system shall remain with and be coordinated through Anoka County, Department of Highways.

4.10 Public Education Outreach and Participation

Goal: Maintain or improve existing water quality through education, training and participation of East Bethel residents and employees.

Policy 1:

Implement the public education and outreach strategies outlined in the City's SWPPP.

Policy 2:

Implement the public participation strategies outlined in the City's SWPPP.

Policy 3:

Provide training opportunities to City employees to prevent or reduce pollutant runoff from Municipal Operations.

4.11 Illicit Discharge Detection and Elimination

Goal: Maintain or improve existing water quality through implementation and enforcement of an illicit discharge detection and elimination program.

Policy 1:

Implement and enforce the illicit discharge detection and elimination strategies outlined in the City's SWPPP.

5.0 Plan Implementation

To uphold the goals and policies of this Plan, the City will review all proposed developments and improvements. Approvals for BMPs relating to water quality, wetland protection, and erosion and sediment control and rate control will be required for all developments and land disturbances including projects less than one acre that are part of a larger common plan of development or sale and applications that require permitting by City Ordinance.

The City has established the following regulatory control and criteria relating to its policies. These controls and criteria apply to the management of: wetlands, floodplains, shorelands, water quantity and quality, groundwater, soil erosion and sedimentation control and recreation, open space and wildlife and municipal operations. While these controls and criteria relate to one of the policy areas, it should be noted that they are interrelated and may serve multiple purposes.

The criteria, as a minimum, establish the degree of performance necessary to achieve improvements in water quantity and quality management. These criteria are not intended to dictate or preempt the design process, but rather provide a guide to proper development. Section 13 outlines the development submittals required for the city to complete the engineering review for proposed developments.

5.1 Wetlands

As discussed in Section 3.0, the city's strategy for managing wetlands will be guided by designating waters and wetlands in groups.

5.1.1 Wetland Alterations

Wetland alteration will continue to be permitted and enforced through City Ordinance and state and federal agencies. These regulatory programs are well established and agency personnel are trained to make qualitative judgments regarding wetland values. The City will continue to administer the Wetland Conservation Act.

5.1.2 Field Delineation

Any proposed development will require a field delineation by a qualified individual using accepted methodology. The functional values of identified wetlands must be assessed according to the latest version of MnRAM.

5.1.3 Wetland Excavation

Excavation may be allowed for wetland restoration, enhancement of wildlife habitat or for treatment of stormwater runoff, and then only when it will not have a substantial or adverse effect upon the ecological and hydrological characteristics of the wetland and

meets all City Ordinances, state and federal regulations, and the requirements of the Upper Rum River and Sunrise River Watershed Management Organizations.

5.1.4 Wetland Fill

Any filling shall not cause the total natural flood storage capacity of the wetland to fall below the projected volume that the wetland would hold following a 24-hour duration, 1 percent (100-year) frequency rainfall over the fully developed drainage area.

Fill material shall not be placed below the Ordinary High Water (OHW) level of state public waters and public waters wetlands without obtaining appropriate permits from the Army Corps of Engineers, Minnesota Department of Natural Resources, and the City as required. Fill material may only be placed within the wetland limit if there are not conflicts with floodplain management policies and, if federal, state and local permits as may be required are obtained.

5.1.5 Stormwater Runoff

Stormwater runoff into wetlands shall conform to the requirements listed in Table 3-2.

5.1.6 Sequencing Procedures

When a proposed wetland alteration(s) involves excavation, filling, or stormwater runoff, the City will determine the applicability of the 1991 Minnesota Wetland Conservation Act, as amended. Project proposers must follow City Ordinances and the sequencing procedures described in Minnesota Rules, Chapter 8420 – Wetland Conservation. Sequencing will be restricted in “Highly Susceptible” wetlands. No impacts (as defined by the WCA) are allowed in “Highly Susceptible” wetlands unless significant public benefit can be demonstrated.

5.1.7 Wetland Buffers

Wetland buffers are unmowed areas adjacent to wetlands that contain non-invasive vegetation, preferably dense native vegetation. Buffers filter pollutants before they can enter the wetland, reduce erosion, protect vegetation diversity and wildlife habitat, and minimize human impacts to the wetlands. Wetland buffers shall be established around all wetlands when any of the following activities are proposed:

- Subdivision creating three or more lots and creating impervious surfaces or structures.
- Any projects with wetland impacts as defined by the WCA (Minnesota Rules 8420).
- Wetland excavation greater than 0.5 acres.

Buffer widths are shown in Table 3-2.

5.1.7.1 Buffer Averaging

Buffers are encouraged to have a meandering shape for a more natural appearance and in order to make reasonable accommodations for nearby features of the development or landscape. The buffer width may vary around the wetland such that:

1. It may be 10 feet less than the minimum allowable (see Table 3-2), but not less than 5 feet.
2. The total acreage of the buffer cannot be reduced.
3. In areas of concentrated inflow to the wetland, the buffer cannot be less than the minimum allowable buffer width in Table 3-2.

5.1.7.2 Buffer Variances

Variances of buffer width may, at the City's discretion, be granted for the following reasons:

1. Part of the required buffer is outside of the wetland's watershed. Due to topography near the wetland, runoff flows away from and never enters the wetland through surface flows. Variances should only be for that portion of the buffer that would be outside of the wetland's watershed.
2. If drainage is redirected to an area where a buffer is feasible.
3. If the site is not generating stormwater or is using stormwater minimizing techniques such as rain gardens, rain barrels, vegetated swales, and other BMP's to replace the functions of the buffers.
4. If the applicant is protecting additional upland, beyond that required by other ordinances or control measures, to connect existing wildlife habitat.
5. Roads and other linear projects, except those created as part of new residential or commercial developments.
6. No buffers are required for small wetlands where the entire wetland area is less than or equal to the area of wetland impact allowed without replacement as *de minimis* under the WCA.

5.1.7.3 Activities Prohibited within Buffers

Activities that disturb the roots or influence the growth of vegetation are prohibited, including:

1. Mowing (except as part of City-approved wetland buffer management or for pedestrian trails).

2. Structures.
3. Paving (except as allowed in Section 5.1.7.4).
4. Retaining walls.
5. Clearing and removal of vegetation (except selective clearing and pruning of individual trees and shrubs, which are dead, diseased, hazards, or removal of noxious or invasive weeds).
6. Introduction of non-native vegetation.
7. Filling, dumping, or yard waste disposal.
8. Fertilization.
9. Removal of buffer monuments.
10. Septic systems.

5.1.7.4 Activities Allowed within Buffers

1. Management needed to establish the buffer, such as mowing or burning.
2. Activities consistent with municipal park management plans.
3. Plantings that enhance the natural vegetation.
4. Selective clearing and pruning of individual trees and shrubs, which are dead, diseased, or hazards.
5. Noxious or invasive vegetation removal.
6. Use and maintenance of an unimproved access strip not more than 10 feet wide for recreational access and the exercise of riparian rights.
7. Pedestrian trails, provided that at least 10 feet of buffer remains between the trail and wetland.
8. Placement, maintenance, or repair of utility and drainage systems that exist on creation of the buffer strip or are required by the City, as long as any adverse impacts have been avoided or minimized.
9. Construction, maintenance, repair, or reconstruction of existing and future public roads as long as any adverse impacts have been avoided or minimized.

10. Others as approved by the City.

5.1.7.5 Buffer Easements

A conservation easement (preferred), or functional equivalent such as a drainage and utility easement or outlot, is required on the wetland and buffer.

5.2 Water Quantity and Quality Management

The water quantity and quality management strategy are guided by requiring all developments to adhere to this Plan's policies and criteria for the control of surface runoff. The following prescribe the design criteria for water quality and quantity assessment.

5.2.1 General Hydrology

Hydrologic analysis of stormwater runoff for the planning and design of flows in storm sewers, ditches, streams and channels to lakes, detention basins, and wetlands shall be made using generally accepted hydrograph methods.

Determination of total runoff volume should follow the USDA-SCS curve number method which incorporates land use and hydrologic soil groups. Specific step-by-step process can be found in the Soil Conservation Service (SCS) publication National Engineering Handbook: Chapter 4, SCS Hydrology (1972), and Hydrology Guide for Minnesota (1992). Peak runoff rates should be determined through the use of the SCS method incorporating "time of concentration" for both pre and post development conditions.

The developed runoff hydrograph should then be routed through the drainage area, that is, mathematically the peaks and volumes are followed as they move in a wave progressively downstream.

"Design Storms" or storm volumes for hydrologic analyses shall be based upon Hershfield, D.M., 1961, Rainfall Frequency Atlas of the United States for Durations of 30 minutes to 24 hours and Return Periods from 1 to 100 years, Technical Publication Number 40 (TP-40) along with the supplementary documents entitled: Vinha, K., J. A. Sventek and G.L. Oberts, 1995: Precipitation Frequency Analysis for the Twin Cities Metropolitan Area, Metropolitan Council, Publication Number 32-95-009 and Fredrick, R.H., 1977, Five-to-Six-Minute Precipitation Frequency for the Eastern United States, NOAA Technical Memorandum NWS HYDRO-35, Office of Hydrology, Silver Spring, Maryland.

The rational method may be used to determine peak runoff rates for primary systems. Construction of a hydrograph should be undertaken which characterizes the movement of surface water as a function of time and precipitation.

5.2.2 Rainfall

Usually the standard 24-hour SCS rainfall distribution will be used to calculate the peak discharge rates and levels from developments. The following minimum rainfall and snowmelt values shall be used in calculations for the City of East Bethel:

<u>Event</u>	<u>Rainfall (inches)</u>
1 year, 24 hour	2.44
2 year, 24 hour	2.82
10 year, 24 hour	4.18
25 year, 24 hour	5.17
50 year, 24 hour	6.02
100 year, 24 hour	6.93
100 year, 2 day	7.32
100 year, 4 day	7.98
100 year, 10 day snowmelt	7.2 inches of runoff

5.2.3 Curve Numbers

Table 13-1 in Section 13 lists the allowable Curve Numbers (CN) which shall be used for design. Hydrologic soil groups shall be determined based upon the Soil Survey for Anoka County, Minnesota as published by the United States Department of Agriculture Soil Conservation Service in Cooperation with Minnesota Agricultural Experiment Station. Curve numbers used to model post-construction conditions in soil types B, C and D shall be shifted down one Hydrologic Soil Group Classification to account for grading impacts to soil structure, unless soil is amended or deep ripped.

The curve numbers presented for predevelopment are considered maximum values while curve numbers for post development are considered minimum values. The designer shall use their engineering judgment to select the appropriate curve numbers.

5.2.4 Flood Protection

Consistent with state and federal regulations, East Bethel requires that the level of flood protection along all ditches, detention basins, lakes, streams and wetlands be established based upon the 1 percent (100-year frequency) flood. Land use within floodplains shall be regulated in accordance with city ordinance and state floodplain zoning regulations.

The following freeboard values are required for the City of East Bethel:

- Landlocked Basins (no outlet) 2.0 feet (Established high water, see 5.2.6.8.)
- Non-Landlocked Basins 2.0 feet (100-year frequency)

5.2.5 Waterbody Classification

The first step involved in implementing the water quality goals is to classify the receiving water body as discussed in Section 3.2. Table 5-1 then outlines the requirements for each classification group.

**Table 5-1
General Requirements for Water Management
According to Water Quality Management Classification**

Management Classification	Best Management Practices	Runoff Treatment			
		Infiltration Basins	Skimming	Sediment Removal	Nutrient Removal
Group 1 and Group 2	Required	May be required, see 5.2.6.1.1	Required	Required	Required
Group 3	Required	May be required see 5.2.6.1.1	Required	Required	Not Required

For watersheds that require nutrient and sediment removal, the permanent pool shall be designed per Section 5.2.6.1. For watersheds that require only sediment removal, the permanent pool shall be designed per section 5.2.6.2.

5.2.6 Stormwater Basin Design

It is the policy of the City of East Bethel to require the following types of projects to control urban stormwater quantity and quality through a management approach of better site design, infiltration, and detention.

- Development and redevelopment projects disturbing one or more acres.
- Projects in the shoreland zone that meet the following conditions (except that peak flow rate control requirements are not applicable for shoreland zone projects):
 - Projects requiring a building permit and a variance from the maximum impervious surface percentage.
 - Any project requiring a building permit that increases or replaces impervious surface by 1,000 square feet or more.

The following order preference for stormwater management techniques shall be followed:

- First – Better site design (as defined in the Minnesota Stormwater Manual Chapter 4)
- Second – Infiltration
- Third – Extended detention basins or NURP ponds

Detention and infiltration techniques, whether on-site or regional in nature, shall be designed to incorporate all requirements of the National Pollution Discharge Elimination

System Application for General Stormwater Permits for Construction Activity (MN R100001) and the following:

5.2.6.1 Infiltration Basins

All new development and redevelopment projects disturbing one or more acres will be required to infiltrate within 48 hours the first 1.1 inches of runoff from the impervious areas created by new project where there are A and B soils. Infiltration techniques will not be allowed in stormwater hotspots. Potential stormwater hotspots are defined as a land use or activity that produces higher concentrations of trace metals, hydrocarbons, or pollutants not normally found in stormwater. Examples include fueling stations, vehicle service or washing areas, vehicle fleet storage areas and facilities that generate or store hazardous materials. Infiltration basins shall be designed, constructed and maintained in accordance with “Stormwater infiltration Best Management Practices” of the Minnesota Stormwater Manual, Latest Version with the following additional requirements:

1. Construction of an approved pre-treatment system shall be required prior to discharging to the infiltration basin.
2. Exit velocities from the pre-treatment system shall be less than 3 feet per second for the 100-year storm event and flows shall be evenly distributed across the width of the outlet.
3. During the planning and design phase of a project, infiltration rates shall be determined using soil borings. A minimum of three soil borings or pits shall be submitted with the design to verify soil types and infiltration capacity characteristics and to determine the depth to restrictive soil layers and groundwater. The depth of the soil borings or pits shall be a minimum of ten feet below the bottom elevation of the proposed infiltration practice. Soil boring reports shall be conducted by a qualified geotechnical professional. If infiltration rates are not measured directly with an infiltrometer, the maximum soil infiltration rates used for design purposes shall be those found in Table 5-2 below.

The MIDS calculator or similar program shall be used to determine the effectiveness of the infiltration practice.

**Table 5-2
Infiltration Rates for Hydrologic Soil Groups**

Hydrologic Soil Group	Soil Textures	Corresponding Unified Soil Classification	Infiltration Rate (in/hr)
A	Gravel, sand, sandy gravel, silty gravel, loamy sand, sandy loam	GW – Well-graded gravel or well-graded gravel with sand GP – Poorly graded gravel or poorly graded gravel with sand	1.6
		GM – Silty gravel or silty gravel with sand SW – Well-graded sand or well-graded sand with gravel SP – Poorly graded sand or poorly graded sand with gravel	0.8
B	Loam, silt loam	SM – Silty sand or silty sand with gravel	0.6
		ML – Silt OL – Organic silt or organic silt with sand or gravel or gravelly organic silt	0.3
C	Sandy clay loam	GC – Clayey gravel or clayey gravel with sand SC – Clayey sand or clayey sand with gravel	0.2
D	Clay, clay loam, silty clay loam, sandy clay, silty clay	CL – Lean clay or lean clay with sand or gravel or gravelly lean clay CH – Fat clay or fat clay with sand or gravel or gravelly fat clay OH – Organic clay or organic clay with sand or gravel or gravelly organic clay MH – Elastic silt or elastic silt with sand or gravel	<0.2

Source: Minnesota Stormwater Manual

4. The bottom of the infiltration practice must be at least three feet from the seasonal high ground water table, bedrock, or other impeding layer.
5. Infiltration practices must not have standing water longer than 48 hours following each storm event.

5.2.6.1.1 Maintenance Guidelines

The following guidelines will help ensure that the infiltration basin can be maintained effectively after construction:

1. Adequate access must be provided for all infiltration practices for inspection, maintenance and landscaping upkeep, including appropriate equipment and vehicles.
2. A legally binding and enforceable maintenance plan clarifying responsible parties is required for all infiltration practices.

3. A way to visually inspect infiltration practice performance, such as a perforated PVC observation well.
4. An easement and/or outlot is required over the area inundated by the 100-year storm event and adequate to provide maintenance access.
- 5.

5.2.6.1.2 Infiltration in Drinking Water Supply Management Areas (DWSMA)

Some areas may not be suitable for infiltration due to elevated risk of groundwater contamination. DWSMA boundaries are available from public water suppliers or the Minnesota Department of Health (MDH, <http://www.health.state.mn.us/divs/eh/water/swp/maps/index.htm>).

Projects within a DWSMA should refer to MDH guidance entitled “Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas” (<http://www.health.state.mn.us/divs/eh/water/factsheet/index.html>) to determine if infiltration techniques are appropriate. This guidance relies on the answers to the following questions:

1. Is the wellhead protection area or DWSMA considered vulnerable?
2. Does the aquifer receiving the water from the infiltration basin exhibit fracture or solution-enhanced groundwater flow conditions (secondary porosity features)?
3. Is the proposed infiltration site within the 1-year time-of-travel (emergency response zone) as designated by MDH?
4. What current or proposed land uses drain to the infiltration site? If the land use is commercial, industrial, municipal, or transportation corridors, are emergency procedures for containment of spills established and acceptable?
5. Are site planning, BMPs, pre-treatment, or secondary containment measures, or natural attenuation characteristics in the vadose zone acceptable to meet federal drinking water standards?

5.2.6.1.3 Nutrient Removal

When infiltration is not feasible or allowed, a permanent pool (“dead storage”) volume, shall be provided, below the normal elevation which shall be greater than or equal to the runoff from a 2.5-inch rainstorm over the entire contributing drainage area assuming full development. This modified NURP criteria includes a 25 percent increase in basin storage to permit routine sediment accumulation over a 20-year design period,

assuming the drainage area is protected with proper erosion and sedimentation control practices. The permanent pool average depth (basin volume/basin area) shall be greater than 4 feet with a maximum depth of 10 feet.

The runoff volume shall consider the entire area contributing to the pond; however, the minimum permanent pool volume must be greater than or equal to the volume produced from 0.5 inches of runoff from all impervious areas in the contributing watershed.

5.2.6.2 Sediment Removal

When only sediment removal is required, a permanent pool (“dead storage”) volume shall be provided below the normal elevation which shall be greater than or equal to 250 cubic feet per acre of impervious area. Design the outlet to remove all suspended solids greater than forty microns (fine sand). The basin shall be designed such that the minimum area is equal to or greater than 450 square feet per cubic feet of outflow for the 2 year storm event.

In areas where infiltration basins, per Section 5.2.6.1.1 are required, no additional sediment removal will be required.

5.2.6.3 Emergency Spillway

An emergency spillway (emergency outlet) adequate to control the critical one percent frequency/duration rainfall event (usually 100-year, 24-hour).

5.2.6.4 Basin Side Slopes

Basin side slopes above the normal water level should be no steeper than 4:1, and preferably flatter. A basin shelf with a minimum width of 10 feet and a slope of 10:1 starting at the normal water level shall be provided.

5.2.6.5 Length to Width Ratio

To prevent short-circuiting, the distance between major inlets and the normal outlet shall be maximized. The ratio of maximum length to maximum width of the permanent pool should be at least 3:1.

5.2.6.6 Flood Storage

To protect downstream channels and structures the following flood control criteria are required for basin design:

1. A flood pool (“live storage”) volume above the normal elevation shall be adequate so that the peak discharge rates from the 2-year, 10-year, and 100-year frequency, critical duration storms (usually the 24-hour) are no greater than predevelopment basin watershed conditions.

2. Dead storage volume may not be utilized as live storage.

5.2.6.7 Skimming Structures

Skimming structures shall be utilized for each basin. The skimming structure shall be in accordance with the City Standard Plates. Skimming structures shall be shown on the plans.

5.2.6.8 For Areas without Formal Outlets (i.e. Landlocked Areas)

Wherever practical, the construction of a positive outlet is required. Where the construction of a positive outlet is not practical, the following shall apply:

The minimum building elevation (low floor) shall be set two (2) feet above the level resulting from two concurrent 100-year rainfall events. The starting elevation of the pond/waterbody prior to the runoff event shall be established by one of the following:

1. Existing Ordinary High Water level established by the Minnesota Department of Natural Resources;
2. Local observation well records, as approved by the City; or
3. Mottled soil.

All areas below the established high water level shall be contained within a drainage and utility easement.

Landlocked areas shall also be analyzed for the 100 year 10 day snowmelt event. The analysis shall consider a minimum of 7.2 inches of runoff. The minimum building opening shall be set a minimum of 1 foot above the 100 year 10 day snowmelt elevation.

5.2.6.9 Stormwater Discharge

Discharge must be made to a receiving stream, ditch, or another pond or an approved discharge route as shown in the Water Management Plan.

5.2.6.10 Storm Sewer

- A. Storm sewer sizing shall be based upon the 10 year storm event. Inlet capacities and roadway spread at each inlet shall be determined. The maximum allowable roadway spread at any inlet shall be one-half of the traveled lane.

Storm sewer inlets shall be spaced to ensure that not more than ½ of the traveled lane is inundated during the 10 year storm event. Manning's equation shall be utilized to determine the flow in the street at each catchbasin for verification of actual spread. A Manning's n of 0.016 shall be utilized for asphalt pavement. Additionally, grate inlet capacities shall be verified at the maximum allowable depth of flow to verify that the proposed grates will pass the 10 year flows. When appropriate, by-pass flows shall be considered in calculations.

B. Storm sewer systems shall also meet the following requirements:

1. Maintain a minimum velocity of 3 fps for 10-year storm event.
2. Maintain a minimum cover of 2 feet from top of pipe to top of casting or flow line elevation.
3. Maintain a minimum of 3 feet of final cover over corrugated high density polyethylene (HDPE) pipe. See the Engineering Manual to determine when HDPE is allowed.
4. Maintain a minimum of 1.5 feet of final cover over RCP in areas not used for vehicle traffic.
5. Storm sewers inverts, which outlet to detention basins, shall be placed at the normal level of the basin. Storm sewers may be submerged a maximum of $\frac{1}{2}$ the pipe diameter below the basin normal level if approved by the City Engineer.

5.2.7 Rate Control Requirements

Post development peak flow rates shall not exceed existing rates, in aggregate, within the project boundary for the 2-, 10-, and 100-year, 24-hour storm events. For areas that discharge to “special waters” as defined in the NPDES General Stormwater Permit for Construction Activities, the permanent stormwater management system must be designed such that the pre and post project runoff rates and volumes from the 1- and 2-year, 24-hour storm events remain the same.

5.2.8 Exemptions

The following activities are exempt:

1. Road reconstruction projects that do not add more than 1 acre of new impervious surface.
2. Road mill and overlay.
3. Maintenance and paving of existing gravel roads.
4. Agricultural crop production activities not creating additional impervious surfaces.
5. Emergency activities necessary for protection of life, property, or natural resources.

5.3 Water Quality Monitoring Program

The City will continue to cooperate with the WMOs with water quality monitoring, modeling, and planning to protect priority resources. The WMOs in cooperation with the Anoka Conservation District will continue to monitor water quality in Cedar Creek, Crooked Brook, and Coon Lake. The existing water quality data is presented in Section 2 of this plan. The City of East Bethel promotes Coppers Lake as a swimmable water

body. This lake has park facilities and a swimming beach on the south end. The City, in cooperation with the Anoka Conservation District, will add Coopers Lake to the monitoring program.

The City will use Table 5-3 as a guide to evaluate the quality of its Lakes.

**Table 5-3
Water Quality Standards**

Parameter	Unit	Standard
pH		6.5 to 9.0
Turbidity	FNRU	25
Dissolve Oxygen	Mg/l	>5
Chlorophylla-a	ppb	<15
Total Phosphorus	ppb	<40
Secchi	meters	> 1.2
TSI		<57

5.4 Flood Plains and Shoreland Management

Various levels of government are involved in regulation of surface water, wetlands and floodplain. As previously discussed, the MnDNR has inventoried and classified water bodies and wetlands in the State of Minnesota. The “protected waters and wetlands” program identifies water bodies and wetlands that require DNR permits for activities like draining, filling, dredging, and diverting of water. The MnDNR *Shoreland Management Program* has also established a classification system for lakes greater than 10 acres in size and rivers with a drainage area two square miles or greater. These classifications establish minimum development standards for protection by local units of government and are related to their use. The standards apply to those areas within 300 feet of a classified river and 1000 feet from a classified lake.

The City of East Bethel enforces the standards described above, which are generally consistent with existing zoning, and outlined in Table 5-4. Actual regulations may be stricter. “Impact Zone” refers to areas immediately adjacent to lakes, rivers, and bluffs that are necessary to preserve in order to maintain good water and visual qualities of these resources. Floodplain and shoreland areas are governed by the City’s Shoreland and Floodplain Ordinances, which regulate activities adjacent to water bodies classified by the Minnesota DNR.

**Table 5-4
MnDNR Shoreland Management Program Minimum Regulations**

Classification	Lakeshore Lots					Non-Lakeshore Lots	
	Min. Lot Width	Min. Lot Area	Min. Structure Setback (from water)	Min. ISTS Setback (from water)	Impact Zone	Min. Lot Width	Min. Lot Area
<i>Natural Environment lakes not listed below</i>	200	80,000	150	150	75	200	80,000
Recreational Development <i>Minard Lake</i>	150	40,000	100	75	50	150	40,000
General Development <i>Coon Lake</i>	100	20,000	75	50	37.5	150	40,000
Tributary River <i>Cedar Creek</i>	100	N/A	100	75	50	N/A	N/A

5.5 Recreation, Open Space and Wildlife Management

Through development review the city shall encourage protection and/or preservation of wetlands and uplands that provide habitat for fish and wildlife.

5.6 Groundwater Management

The City of East Bethel contains natural characteristics which result in high to very high sensitivity for groundwater contamination. The Plan contains policies and criteria which will guide land use development to protect existing groundwater quality.

5.6.1 Groundwater Protection Ordinance

The City will adopt a Groundwater Protection Ordinance which acts as a guideline for best management practices and land use controls to protect groundwater recharge areas.

5.6.2 Well Abandonment

The City will develop, in cooperation with the Anoka Conservation District and Anoka County Extension, an education program relating to land use control practices and proper well abandonment procedures in accordance with Minnesota Rules, Section 4725.2700.

5.6.3 Individual Sewage Treatment Systems

A principal risk of direct contamination of groundwater comes from sewage from individual sewage treatment systems. East Bethel will ensure protection of local

groundwater through implementation of its ordinances regarding private on-site sewer systems. Wetlands, floodplain and shoreland areas also serve as important areas of groundwater recharge. Strategies to protect these areas were described in the previous sections.

5.7 Soil Erosion and Sediment Control

Although development is moderate within the City of East Bethel, significant increases are anticipated. The control of erosion and sedimentation remains important to maintaining water quality in the area. Of paramount importance to the maintenance of water quality in the City is the proper enforcement of erosion and sediment controls. Enforcement will involve indirect and direct approaches.

5.7.1 Indirect Approach

The indirect approach includes incentives within the ordinance such as the requirement for a performance bond equal to the work to be performed and civil penalties of up to \$700 per day for each violation.

5.7.2 Direct Approach

The direct approach involves the inspection and enforcement of the sediment control elements in the Plan to ensure compliance with the principles and standards. The inspection and enforcement will be undertaken by the City or its representative.

The following soil loss limits and conservation principles will be guided by the following criteria (Soil Loss Limits and Conservation Principles) for applicable land disturbance activities. Conservation practices installed as source or structural control measures shall be based upon site conditions and the application of the Universal Soil Loss Equation (USLE). The USLE is applied to a given site in order to determine the need for structural or source control measures for the Worst Case Soil Loss Condition. When the Post-disturbance Condition is determined, the USLE is again applied to evaluate whether permanent source or structural control measures will achieve the applicable soil loss limits.

5.7.3 Soil Loss Limits

5.7.3.1 Urban Land Use

The average annual soil loss rate on any post construction grade shall not exceed 2 tons per acre per year as calculated by the use of the Universal Soil Loss Equation (USLE). At the discretion of the erosion and sediment control plan approving authority, a developer may be required to document performance.

5.7.3.2 Agricultural Land Use

The average annual soil loss rate shall not exceed 5 tons per acre per year as calculated by the use of the Universal Soil Loss Equation (USLE). At the discretion of URRWMO or a local government unit, an agricultural land user may be required to document conformance.

5.7.4 Conservation Principles

For applicable urban land disturbance activities, the developer shall prepare and implement an erosion and sediment control plan. The Plan shall include the necessary erosion and sediment control practices, implementation schedule and other necessary items to conform to the General Stormwater Permit for Construction Activity (MN R100001) and City ordinance.

The erosion and sediment control practices selected for the plan shall be designed, applied, installed and maintained within the prescribed practice standards and specifications to ensure effective reduction of soil losses within the tolerable limits previously identified. It shall be the developer's option to select a specific practice or combination of practices that will provide effective control of erosion within the limits of generally accepted soil and water conservation practices and in concert with the particular development stage. The "Erosion Control Handbook II" prepared by the Minnesota Department of Transportation, dated 2006 shall be used as a guide.

5.7.5 Stormwater System Maintenance Plan

The Stormwater System Maintenance Plan has been developed to assure that the system of stormwater retention/treatment basins and stormwater conveyance systems are adequately inspected and maintained to assure that they meet their design functions. Outlined below are the inspection and maintenance activities the City intends to implement:

1. At a minimum, 20 percent of all City stormwater retention, infiltration, and treatment basins and outlets will be inspected each year on a rotating basis to determine if the basin's retention and treatment characteristics are adequate.
2. On a two-year cycle, portions of the City's storm sewer system will be inspected on a rotating basis. During these inspections, debris present at trash grates and catch basins grates will be removed so as to provide reasonable assurance that the system will operate in an unobstructed manner during rainfall events.
3. City streets will be swept once annually in all areas and twice annually in priority areas. Priority areas are those that drain directly to water bodies and/or natural wetlands without pretreatment of stormwater runoff.
4. All public sump catchbasins, sump manholes, skimmer structures and other settling or filter devices will be cleaned and inspected every year.

The City is currently evaluating and will further refine the maintenance plan in accordance with the SWPPP. This item is specifically outlined in the BMP No. 6b-3.

5.8 Stormwater Pollution Prevention Program

In addition to design guidelines and strategies previously presented the City will implement its SWPPP. Implementation of the SWPPP will assist in maintaining or improving existing water quality through implementation of public and employee education and participation programs, illicit discharge and detection programs and improved municipal operations.

5.9 Capital Improvements Plan

Table 11-5 provides an estimate of expenses and funding sources to implement the strategies outlined in this plan.

6.0 Fish Lake and Sunrise River

6.1 Fish Lake Watershed Summary

This section presents the management plan for the Fish Lake Watershed located in northeastern East Bethel. This watershed is divided into two subwatersheds. The Fish Lake Watershed contains subwatersheds 100 and 101, which flow west into Cedar Creek.

Sections 6.1.1 and 6.1.2 discuss the water resources within the subwatersheds. Watershed divides, storm sewer pipes, and existing ditches are shown on Figure 6-1, located at the end of this section. Information tables are provided in Section 11.0. Proposed land use for this watershed is shown on Figure 2-10.

6.1.1 Subwatershed 100

Location

Subwatershed 100 is located in northeastern portion of East Bethel. It contains Fish Lake and the areas south, west, and east of Fish Lake.

Drainage Area

1359 acres.

Wetlands

This subwatershed contains approximately 670 acres of wetlands, most of which is protected by the Minnesota DNR. Protected Wetlands 156W and 157W, and protected waters 65P, 160P, and 161P are all within this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west in this subwatershed. All stormwater in this subwatershed drains to Subwatershed 101 through two existing 18-inch pipes.

The existing overflow elevation is 919.4, which results in a flood elevation and discharge of 920.0 and 58 cfs, respectively. It is proposed that the two 18-inch CMPs be replaced by one 24-inch RCP, with a 12-inch diameter orifice to control flow and the overflow be built to 920.5. This will result in a flood elevation of 920.1, and less discharge, 5.4 cfs.

6.1.2 Subwatershed 101

Location

Subwatershed 101 is located in northern East Bethel, just west of East Bethel Blvd.

Drainage Area

464 acres.

Wetlands

This subwatershed contains approximately 140 acres of wetlands. There is one DNR protected water, 154P.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains from south to north in this subwatershed. Stormwater from this subwatershed drains to Cedar Creek through an existing 36-inch pipe.

6.2 Sunrise River Watershed Summary

This section presents the management plan for the Sunrise River Watershed located in northeast East Bethel. This watershed is divided into thirteen subwatersheds. The Sunrise River Watershed contains subwatersheds 500 through 512.

Sections 6.2.1 through 6.2.13 discuss the water resources within the subwatersheds. Watershed divides, storm sewer pipes, existing ditches and stormwater storage areas are shown on Figure 6-1, located at the end of this section. Information tables are provided in section 11.0.

6.2.1 Subwatershed 500

Location

This subwatershed is located on the northern border of East Bethel, west of Durant St. N.E. and north of County Rd. 76.

Drainage Area

355 acres.

Wetlands

This subwatershed contains approximately 50 acres of wetlands. Basin 151P is protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater generally drains south to north in this subwatershed. Stormwater drains to Athens Township through private ditches.

6.2.2 Subwatershed 501

Location

This subwatershed is located in the northeast corner of East Bethel, north of County Rd. 76 and east of Durant St. N.E.

Drainage Area

453 acres.

Wetlands

This subwatershed contains approximately 90 acres of wetlands. The DNR protects watershed 150W.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains west to east in this subwatershed. Stormwater drains to Linwood Township through private ditches.

6.2.3 Subwatershed 502

Location

Subwatershed 502 is located on the eastern border of East Bethel, between 239th Ave. N.E. and County Rd. 76.

Drainage Area

54 acres.

Wetlands

This subwatershed contains approximately 20 acres of wetlands. Protected Wetland 155W is within this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows south to north in this subwatershed. Stormwater drains to Subwatershed 501 through an existing 48-inch pipe.

6.2.4 Subwatershed 503

Location

This subwatershed is located on the eastern border of East Bethel, just south of 239th Ave. N.E.

Drainage Area

77 acres

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. The stormwater runoff generally drains to the existing wetlands.

6.2.5 Subwatershed 504

Location

This subwatershed is located on the eastern border of East Bethel, just north of County Rd. 26.

Drainage Area

308 acres.

Wetlands

This subwatershed contains approximately 30 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally flows into the existing wetlands.

6.2.6 Subwatershed 505

Location

This subwatershed is located in northeastern East Bethel, north of County Rd. 26 and east of Durant St. N.E.

Drainage Area

108 acres.

Wetlands

This subwatershed contains approximately 20 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally drains into the existing wetlands.

6.2.7 Subwatershed 506**Location**

This subwatershed is located on the eastern border of East Bethel, south of County Rd. 26 and east of Durant St. N.E.

Drainage Area

634 acres.

Wetlands

This subwatershed contains approximately 210 acres of wetlands. The DNR protects wetland 446W.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains west to east in this watershed. Stormwater drains to Linwood Township through open channels.

6.2.8 Subwatershed 507**Location**

This subwatershed is located in northeastern East Bethel, west of County Rd. 15 between County Rd. 26 and 221st Ave. N.E.

Drainage Area

374 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally drains to the wetlands existing in the subwatershed.

6.2.9 Subwatershed 508

Location

This subwatershed is located in northeastern East Bethel, south of County Rd. 26 and east of E. Bethel Blvd.

Drainage Area

124 acres.

Wetlands

This subwatershed contains approximately 30 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater generally drains to the water quality/rate control ponds, then to the natural ponding areas in the subwatershed.

6.2.10 Subwatershed 509

Location

This subwatershed is located in northeastern East Bethel, just north of County Rd. 26 between East Bethel Blvd. and County Rd. 15.

Drainage Area

223 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally drains to the existing wetlands in the subwatershed.

6.2.11 Subwatershed 510

Location

This subwatershed is located in northeastern East Bethel, just north of 231st Lane N.E.

Drainage Area

73 acres.

Wetlands

This subwatershed contains approximately 20 acres of wetlands, most of which are protected by the DNR. Wetlands 280W and 163W are both protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally flows into the wetlands in the subwatershed.

6.2.12 Subwatershed 511

Location

This subwatershed is located in northeastern East Bethel, just east of East Bethel Blvd.

Drainage Area

11 acres

Wetlands

This subwatershed contains no wetlands.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater generally drains to the natural ponding area in the subwatershed.

6.2.13 Subwatershed 512

Location

This subwatershed is located in northeastern East Bethel, just east of East Bethel Blvd.

Drainage Area

44 acres.

Wetlands

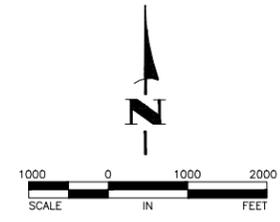
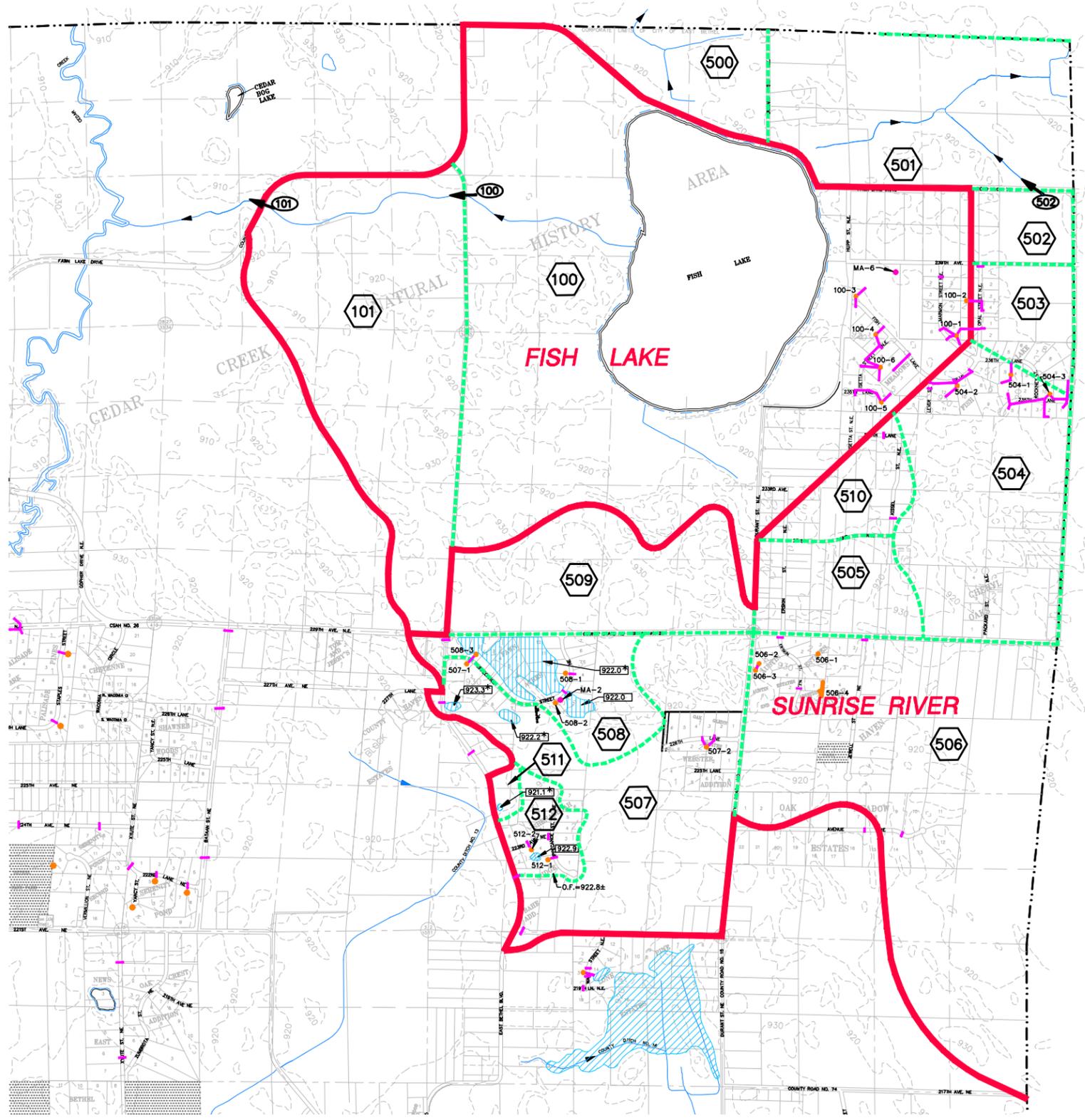
This subwatershed contains approximately 3 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally drains to the water quality/rate control ponds, then to the natural ponding area in the subwatershed.



- LEGEND**
- DENOTES EXISTING DITCH
 - DENOTES EXISTING CONTOUR (10 FOOT INTERVAL)
 - DENOTES MAJOR STORMWATER COLLECTION PIPE
 - DENOTES MINOR STORMWATER COLLECTION PIPE
 - DENOTES EXISTING WATER QUALITY/RATE CONTROL POND
 - DENOTES NATURAL PONDING AREA WITH DETERMINED 100 YEAR FLOOD ELEVATION
 - DENOTES SUBWATERSHED DIVIDE
 - DENOTES WATERSHED DIVIDE
 - DENOTES DRAINAGE FLOW
 - DENOTES MITIGATION AREA
 - DENOTES NATURAL PONDING AREA WITH DETERMINED 100 YEAR, BACK-TO-BACK, FLOOD ELEVATION

FIGURE 6-1
FISH LAKE AND
SUNRISE RIVER WATERSHEDS
CITY OF EAST BETHEL

DATE: NOVEMBER, 1999
 REVISED: DECEMBER, 2009
 FILE: EB403

May 13, 2011 - B:\4801 - B4801.dwg
 K:\Cadd\eng\CLIENT\FULLERS\East Bethel\WATERSHED-EX-2006\2006.dwg\BRAINAGE-AREAS.dwg

7.0 Coopers Lake and Cedar Creek

7.1 Coopers Lake Watershed Summary

This section presents the management plan for the Coopers Lake Watershed located in the northwest corner of East Bethel. This watershed is divided into eight subwatersheds. The Coopers Lake Watershed contains subwatersheds 200 through 207. This entire watershed flows into Cedar Creek.

Sections 7.1.1 through 7.1.8 discuss the water resources within the subwatersheds. Watershed divides, storm sewer pipes, existing ditches, and stormwater storage areas are shown on Figure 7-1. Information tables are provided in Section 11.0. Proposed land use for this watershed is shown on Figure 2-10.

7.1.1 Subwatershed 200

Location

Subwatershed 200 is located in the northwest corner of East Bethel, north of County Rd. 24 and west of State Trunk Highway #65.

Drainage Area

1256 total acres. 457 acres from Athens Township.

Wetlands

This subwatershed contains approximately 306 acres of wetlands, most of which are protected by the DNR. Protected Wetlands 200W, 190W, 189W, 175W, 66W, 153W, and 64W and Protected Water Basin 67P are all within the subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. Stormwater in this subwatershed drains first to Minard Lake, then to Subwatershed 202 through an existing 48-inch pipe.

7.1.2 Subwatershed 201

Location

Subwatershed 201 is located along the northern boundary of East Bethel, just east of State Trunk Highway #65.

Drainage Area

486 acres.

Wetlands

This subwatershed contains approximately 20 acres of wetlands. The DNR does not protect any wetlands in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. All the stormwater in this subwatershed drains to Cedar Creek through an existing 18-inch pipe.

With new development expected in this subwatershed, a better outlet is advised. For the proposed conditions, an 18-inch RCP was used. The RCP resulted in a lower flood elevation and the discharge was reduced approximately 25%.

7.1.3 Subwatershed 202**Location**

This subwatershed is located south of County Rd. 24 between Jackson St. and State Trunk Highway #65 in northwestern East Bethel.

Drainage Area

418 acres.

Wetlands

This subwatershed contains approximately 90 acres of wetlands, most of which are protected by the DNR. 69W and 70P are the protected wetland and water, respectively.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west in this subwatershed. All the stormwater in this subwatershed drains to Subwatershed 206 through an existing 24-inch pipe.

To reduce the discharge from this subwatershed, a smaller outlet is proposed. For the proposed conditions, the 24-inch CMP was replaced by a 21-inch RCP. This results in a lower flood elevation and a reduced discharge, from 23 cfs to 21 cfs. With the smaller RCP, the storage volume is also reduced.

7.1.4 Subwatershed 203

Location

This subwatershed is located in northwestern East Bethel. It is north of and includes the Pineview Addition.

Drainage Area

200 acres.

Wetlands

This subwatershed contains approximately 90 acres of wetlands. The DNR does not protect any of the wetlands.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains west to east in this subwatershed. All stormwater in this subwatershed drains to Cedar Creek through an open channel.

To control the discharge, a 21-inch RCP is proposed to replace the open channel. With the pipe, the discharge is reduced from 34 cfs to 20 cfs, but the peak storage increases. The large wetland in this subwatershed will handle the increased storage.

7.1.5 Subwatershed 204

Location

This subwatershed is located on the western boundary of East Bethel just south of County Rd. 74.

Drainage Area

151 acres

Wetlands

This subwatershed contains approximately 30 acres of wetlands. The DNR protects one wetland, 350W, in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains west to east in this subwatershed. All stormwater in this subwatershed drains to Cedar Creek through an existing 15-inch pipe.

7.1.6 Subwatershed 205

Location

This subwatershed is located on the western border of East Bethel just north of County Rd. 74.

Drainage Area

160 acres.

Wetlands

This subwatershed contains approximately 40 acres of wetlands. The DNR protects one wetland, 349W, in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater generally flows from the natural ponding areas in the north to the two water quality/rate control ponds in the south.

7.1.7 Subwatershed 206

Location

This subwatershed is located in northwestern East Bethel. It is south of County Rd. 24 between the Bethel/East Bethel city line and Jackson St.

Drainage Area

204 acres.

Wetlands

This watershed contains approximately 60 acres of wetlands, most of which the DNR protects. 68W and 99W are the two protected DNR wetlands in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater generally drains from north to south in this subwatershed. All stormwater in this subwatershed drains to Subwatershed 203 through an open channel.

7.1.8 Subwatershed 207

Location

This subwatershed is located on the western border of East Bethel, just south of Bethel.

Drainage Area

216 total acres. 117 acres from Bethel.

Wetlands

This watershed contains approximately 40 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed receives stormwater from Oak Grove through an existing 48-inch pipe under University Ave. The stormwater runoff generally drains from west to east in this subwatershed. The stormwater drains to Subwatershed 203 through an open channel.

7.2 Cedar Creek Watershed Summary

This section presents the management plan for the Cedar Creek Watershed. This watershed runs from the north central border to the west central border of East Bethel. This watershed is divided into six subwatersheds. The Cedar Creek Watershed contains subwatersheds 800 through 805. The subwatersheds collect most of the runoff from East Bethel and the water flows southwest out of the city.

Sections 7.2.1 through 7.2.6 discuss the water resources within the subwatersheds. Watershed divides, storm sewer pipes, existing ditches, and stormwater storage areas are shown on Figure 7-1, located at the end of this Section. Information tables are provided in Section 11.

7.2.1 Subwatershed 800

Location

Subwatershed 800 is located on the north central border of East Bethel.

Drainage Area

10300 total acres. 9520 acres from Athens Township.

Wetlands

This watershed contains approximately 390 acres of wetlands. Only a small Protected Water, 152P, and Cedar Creek are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater generally drains north to south in this subwatershed. All stormwater in this subwatershed drains to Subwatershed 801 through an existing 20' x 7.6' box culvert.

7.2.2 Subwatershed 801

Location

Subwatershed 801 is located in north central East Bethel, between County Roads 24 and 26.

Drainage Area

810 acres.

Wetlands

This subwatershed contains approximately 320 acres of wetlands. The DNR only protects Cedar Creek in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west in this subwatershed. The stormwater drains to Subwatershed 802 through an opening under a bridge on County Rd. 26.

7.2.3 Subwatershed 802

Location

This subwatershed is located in north central East Bethel, east of State Trunk Highway #65 between County Roads 74 and 24.

Drainage Area

1953 acres.

Wetlands

This subwatershed contains approximately 290 acres of wetlands. Along with Cedar Creek, the DNR also protects Wetland 171W.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west in this subwatershed. The stormwater drains to Subwatershed 803 through an existing 20' x 10' box culvert under State Trunk Highway #65.

7.2.4 Subwatershed 803

Location

This subwatershed is located in northwestern East Bethel, north of County Rd. 74 and west of State Trunk Highway #65.

Drainage Area

653 acres.

Wetlands

This subwatershed contains approximately 260 acres of wetlands. The DNR only protects Cedar Creek.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. The stormwater drains to Subwatershed 804 through two existing 72-inch pipes.

7.2.5 Subwatershed 804

Location

This subwatershed is located on the west central border of East Bethel, between Sims Road and County Rd. 74.

Drainage Area

421 acres.

Wetlands

This subwatershed contains approximately 80 acres of wetlands, some of which is protected by the DNR. Wetland 351W and Cedar Creek are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows from north to south in this subwatershed. The stormwater drains to Subwatershed 805 through two existing 108-inch (equivalent size) arch pipes.

7.2.6 Subwatershed 805

Location

This subwatershed is located on the east central border of East Bethel, south of Sims Road.

Drainage Area

1119 acres.

Wetlands

This subwatershed contains approximately 90 acres of wetlands, some of which is protected by the DNR. Cedar Creek and Wetland 366W are the areas protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows north to south in this subwatershed. Most of the stormwater from East Bethel leaves the city through Subwatershed 805. The peak discharge for this outlet is 595 cfs for the existing conditions, compared to 596 cfs for the proposed conditions. Only a 0.2% increase in discharge from existing to proposed conditions.

8.0 Deer Lake

8.1 Watershed Summary

This section presents the management plan for the Deer Lake Watershed located in the center of East Bethel. This watershed is divided into twenty-one subwatersheds. The Deer Lake Watershed contains subwatersheds 300 through 320, which flow south to the Crooked Brook Watershed.

Sections 8.1.1 through 8.1.21 discuss the water resources within the subwatersheds. Watershed divides, storm sewer pipes, existing ditches, and stormwater storage areas are shown on Figure 8-1, located at the end of this Section. Information tables are provided in Section 11.0. Proposed land use for this watershed is shown on Figure 2-10.

8.1.1 Subwatershed 300

Location

Subwatershed 300 is located in north central East Bethel, between E. Bethel Blvd. and Bataan St. N.E.

Drainage Area

840 acres.

Wetlands

This subwatershed contains approximately 380 acres of wetlands, most of which are protected by the DNR. Water 55P and watersheds 170W, 172W, and 166W are all protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows north to south through County Ditch No. 13. The stormwater drains to Subwatershed 301 through an existing 36-inch pipe.

8.1.2 Subwatershed 301

Location

This subwatershed is located in central East Bethel, north of Klondike Dr. N.E. and west of East Bethel Blvd.

Drainage Area

1287 acres.

Wetlands

This subwatershed contains approximately 480 acres of wetlands, some of which are protected by the DNR. Water 59P and wetlands 452W, 459W, and 719W are all protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows north to south through County Ditch No. 13. The stormwater drains to Subwatershed 404 through an existing 36-inch pipe.

To reduce discharge, a 21-inch RCP is proposed to replace the existing 36-inch CMP. Under the proposed conditions, the discharge is greatly reduced, while the storage has increased. This subwatershed contains Deer Lake, so the storage should not be a problem.

8.1.3 Subwatershed 302***Location***

This subwatershed is located in central East Bethel, just south of County Rd. 74.

Drainage Area

238 acres.

Wetlands

The subwatershed contains approximately 30 acres of wetlands, most of which are protected by the DNR. The DNR protects watersheds 453W, 454W, and 455W.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains from north to south in this subwatershed. The stormwater drains to Subwatershed 309 through an open channel.

8.1.4 Subwatershed 303***Location***

This subwatershed is located in north central East Bethel, east of Palisade St. N.E. and south of County Rd. 26.

Drainage Area

60 acres.

Wetlands

This subwatershed doesn't contain any wetlands.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally flows into two existing water quality/rate control ponds in the subwatershed.

8.1.5 Subwatershed 304

Location

This subwatershed is located in north central East Bethel, south of County Rd. 26 and west of Bataan St. N.E.

Drainage Area

170 acres.

Wetlands

This subwatershed contains approximately 5 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally flows into the wetlands in the subwatershed.

8.1.6 Subwatershed 305

Location

This subwatershed is located in north central East Bethel, north of County Road 74.

Drainage Area

219 acres

Wetlands

This subwatershed contains approximately 10 acres of wetlands, most of which is protected by the DNR. Waters 56P and 440P are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. The stormwater generally flows into the wetlands in the subwatershed.

8.1.7 Subwatershed 306

Location

This subwatershed is located in north central East Bethel, north of County Rd. 74 and west of Bataan St. N.E.

Drainage Area

63 acres.

Wetlands

This subwatershed contains approximately 5 acres of wetlands, all of which are protected by the DNR. The protected DNR wetland is 442W.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows north to south in this subwatershed. Stormwater flows into one of three existing water quality/rate control ponds before discharging into the wetland. From the wetland, the water flows to Subwatershed 308 through an existing 12-inch pipe.

To reduce the flood elevation and storage, a 15-inch RCP is proposed to replace the existing 12-inch CMP. Under the proposed conditions, the flood elevation is reduced 0.8' and the storage is reduced 4 ac-ft.

8.1.8 Subwatershed 307

Location

This subwatershed is located in north central East Bethel, just west of Bataan St. N.E.

Drainage Area

18 acres.

Wetlands

This subwatershed contains approximately 1 acre of wetlands, which are not protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater generally flows into the existing ponding area in the subwatershed.

8.1.9 Subwatershed 308

Location

This subwatershed is located in north central East Bethel, east of Xylite St. N.E. and south of County Rd. 74.

Drainage Area

33 acres.

Wetlands

This subwatershed contains approximately 5 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains from north to south in this subwatershed. Stormwater drains to Subwatershed 302 through an existing 15-inch pipe.

To accommodate future development, a 15-inch RCP is proposed to replace the existing 15-inch CMP. The proposed conditions produce a higher flood elevation and discharge. The increase is not significant enough to warrant any changes.

8.1.10 Subwatershed 309

Location

This subwatershed is located near the center of East Bethel, south of County Rd. 74 and east of State Trunk Highway #65.

Drainage Area

1107 acres.

Wetlands

This subwatershed contains approximately 550 acres of wetlands, most of which are protected by the DNR. The DNR protected wetlands are 439W, 456W, and 718W. The DNR Protected Water is 57P.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows north to south, through County Ditch No. 13 in this subwatershed. The stormwater drains to Subwatershed 310 through an open channel.

8.1.11 Subwatershed 310

Location

This subwatershed is located near the center of East Bethel. It is generally located around Mud Lake.

Drainage Area

363 acres.

Wetlands

This subwatershed contains approximately 130 acres of wetlands, most of which is protected by the DNR. Water 60P and Wetland 457W are both protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains from north to south in this subwatershed. The stormwater drains to Subwatershed 313 through an open channel.

8.1.12 Subwatershed 311

Location

This subwatershed is located near the center of East Bethel, just north of Klondike Dr. N.E.

Drainage Area

51 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south through a private ditch. The stormwater drains to Subwatershed 404 through an existing 24-inch pipe.

8.1.13 Subwatershed 312

Location

This subwatershed is located near the center of East Bethel, just north of Klondike Dr. N.E.

Drainage Area

32 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south through a private ditch. The stormwater drains to Subwatershed 404 through an existing 24-inch pipe.

8.1.14 Subwatershed 313

Location

This subwatershed is located near the center of East Bethel, east of State Trunk Highway #65 and north of Klondike Dr. N.E.

Drainage Area

448 acres.

Wetlands

This subwatershed contains approximately 130 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south through County Ditch No. 13. The stormwater drains to Subwatershed 404 through an existing 36-inch pipe.

To reduce the discharge, a smaller pipe is proposed. Under proposed conditions, a 30-inch RCP replaces the existing 36-inch CMP. This change reduces the discharge approximately 24% from 34 cfs to 26 cfs.

8.1.15 Subwatershed 314

Location

This subwatershed is located in west central East Bethel, west of State Trunk Highway #65 between 219th Ave. N.E. and County Rd. 74.

Drainage Area

77 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north in this subwatershed. The stormwater drains to Cedar Creek through an existing 24-inch pipe.

8.1.16 Subwatershed 315

Location

This subwatershed is located in west central East Bethel, west of State Trunk Highway #65 between Sims Road and 219th Ave. N.E.

Drainage Area

224 acres

Wetlands

This subwatershed contains approximately 6 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. The stormwater runoff generally drains to water quality/rate control ponds or to the existing wetland in this subwatershed.

8.1.17 Subwatershed 316

Location

This subwatershed is located in west central East Bethel, west of State Trunk Highway #65 between Sims Road and Klondike Dr. N.E.

Drainage Area

450 acres.

Wetlands

This subwatershed contains approximately 90 acres of wetlands, most of which are protected by the DNR. The DNR protects watershed 61W.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. The stormwater drains to Subwatershed 407 through an existing 18-inch pipe.

8.1.18 Subwatershed 317

Location

This subwatershed is located near the center of East Bethel, south of Klondike Dr. N.E. and west of E. Bethel Blvd.

Drainage Area

83 acres

Wetlands

This subwatershed contains approximately 4 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north in this subwatershed. All stormwater in this subwatershed drains to Subwatershed 301 through an existing 12-inch pipe. It is proposed to replace the existing 12-inch outlet with an 18-inch RCP to accommodate future development runoff.

8.1.19 Subwatershed 318

Location

This subwatershed is in west central East Bethel, just west of Fillmore St. N.E.

Drainage Area

10 acres.

Wetlands

There are no wetlands in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west in this subwatershed. The stormwater drains to the existing water quality/rate control pond, then discharges to Cedar Creek through an existing 12-inch pipe.

8.1.20 Subwatershed 319

Location

This subwatershed is located in west central East Bethel, just east of Tyler St. N.E.

Drainage Area

19 acres.

Wetlands

This subwatershed contains no wetlands.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west in this subwatershed. The stormwater drains to the existing water quality/rate control pond, then discharges to Cedar Creek through an existing 12-inch pipe.

8.1.21 Subwatershed 320

Location

This subwatershed is located in west central East Bethel, near Polk St. N.E.

Drainage Area

116 acres.

Wetlands

There are no wetlands in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west in this subwatershed. The stormwater drains to the natural ponding area, then discharges to Cedar Creek through an existing 12-inch pipe.

9.0 Crooked Brook

9.1 Watershed Summary

This section presents the management plan for the Crooked Brook Watershed located in the southwest corner of East Bethel. This watershed is divided into eighteen subwatersheds. The Crooked Brook Watershed contains subwatersheds 400 through 416 and 421. The subwatersheds flow to Cedar Creek.

Sections 9.1.1 through 9.1.18 discuss the water resources within the subwatersheds. Watershed divides, storm sewer pipes, existing ditches, and stormwater storage areas are shown on Figure 9-1, located at the end of this section. Information tables are provided in Section 11. Proposed land use for this watershed is shown on Figure 2-10.

9.1.1 Subwatershed 400

Location

This subwatershed is located on the southern border of East Bethel, just east of State Trunk Highway #65.

Drainage Area

96 total acres. 34 acres from Ham Lake.

Wetlands

This subwatershed contains approximately 6 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west, through Branch 8 of County Ditch No. 28, in this subwatershed. Stormwater drains to Subwatershed 425 through an existing 72-inch pipe.

9.1.2 Subwatershed 401

Location

This subwatershed is located on the southern border of East Bethel, south of Briarwood Lane N.E. and west of County Rd. 68.

Drainage Area

283 total acres. 49 acres from Ham Lake.

Wetlands

This subwatershed contains approximately 80 acres of wetlands. There is a DNR protected wetland, 472W, on the southern border of the city.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through Branch 6 of County Ditch No. 28, in this subwatershed. Stormwater drains to Subwatershed 424 through an existing 18-inch pipe.

9.1.3 Subwatershed 402

Location

This subwatershed is located in south central East Bethel, just east of County Rd. 68.

Drainage Area

191 acres.

Wetlands

This subwatershed contains approximately 100 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through County Ditch No. 38, in this subwatershed. Stormwater drains to Subwatershed 403 through an existing 36-inch pipe.

9.1.4 Subwatershed 403

Location

This subwatershed is located in south central East Bethel, east of County Rd. 68 and south of County Rd. 22.

Drainage Area

264 acres.

Wetlands

This subwatershed contains approximately 70 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through County Ditch No. 38, in this subwatershed. Stormwater drains to Subwatershed 404 through an existing 48-inch pipe.

9.1.5 Subwatershed 404

Location

This subwatershed is located in south central East Bethel, east of State Trunk Highway #65 between County Rd. 22 and Klondike Drive N.E.

Drainage Area

1048 acres.

Wetlands

This subwatershed contains approximately 190 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south, through County Ditch No. 13, in this subwatershed. Stormwater drains to Subwatershed 406 through an existing 72-inch pipe.

9.1.6 Subwatershed 405

Location

This subwatershed is located in southwestern East Bethel, just west of State Trunk Highway #65.

Drainage Area

71 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains west to east, through Branch 7 of County Ditch No. 28, in this subwatershed. Stormwater drains to Subwatershed 425 through an existing 30-inch pipe.

9.1.7 Subwatershed 406

Location

This subwatershed is located in south central East Bethel, east of State Trunk Highway #65 and south of County Road 22.

Drainage Area

382 acres.

Wetlands

This subwatershed contains approximately 50 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through County Ditch No. 28, in this subwatershed. Stormwater drains to Subwatershed 409 through an existing 90-inch pipe.

9.1.8 Subwatershed 407

Location

This subwatershed is located in southwestern East Bethel, west of State Trunk Highway #65 between Klondike Dr. N.E. and County Rd. 22.

Drainage Area

203 acres.

Wetlands

This subwatershed contains approximately 50 acres of wetlands, none of which is protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south, through County Ditches 36 and 28, in this subwatershed. Stormwater drains to Subwatershed 409 through an existing 48-inch pipe.

9.1.9 Subwatershed 408

Location

This subwatershed is located in southwestern East Bethel, just north of County Rd. 22.

Drainage Area

91 acres.

Wetlands

This subwatershed contains approximately 60 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. Stormwater drains to Subwatershed 409 through an existing 30-inch pipe.

9.1.10 Subwatershed 409

Location

This subwatershed is located in southwestern East Bethel, west of State Trunk Highway #65 and south of County Rd. 22.

Drainage Area

302 acres.

Wetlands

This subwatershed contains approximately 6 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows from south to north through County Ditches 67, 13 and 28 in this subwatershed. Stormwater drains to Subwatershed 413 through an existing 90-inch pipe.

9.1.11 Subwatershed 410

Location

This subwatershed is located in southwestern East Bethel, east of Jackson St. N.E. and north of County Rd. 22.

Drainage Area

128 acres.

Wetlands

This subwatershed contains approximately 20 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west in this subwatershed. Stormwater drains to Subwatershed 412 through an existing 15-inch pipe.

With increased development, the flood elevation will overtop the road, unless the existing culvert is replaced. An 18-inch RCP, placed one foot below the existing invert, and a control structure, placed at the existing invert, are proposed to replace the existing 15-inch CMP. This would result in a lower flood elevation, 900.0 to 899.4, and a lower discharge, 23 cfs to 14 cfs.

9.1.12 Subwatershed 411

Location

This subwatershed is located in southwestern East Bethel, just south of County Rd. 22.

Drainage Area

258 acres.

Wetlands

This subwatershed contains approximately 100 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through County Ditch No. 67, in this subwatershed. Stormwater drains to Subwatershed 412 through an existing 42-inch pipe.

9.1.13 Subwatershed 412

Location

This subwatershed is located in southwestern East Bethel, north of County Rd. 22 and west of Jackson St. N.E.

Drainage Area

220 acres.

Wetlands

This subwatershed contains approximately 80 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through County Ditch No. 67, in this subwatershed. Stormwater drains to Cedar Creek through an open channel.

9.1.14 Subwatershed 413

Location

This subwatershed is located in southwestern East Bethel, west of Jackson St. N.E. and south of County Rd. 22.

Drainage Area

25 acres.

Wetlands

There are no wetlands in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west, through County Ditch No. 67, in this subwatershed. Stormwater drains to Subwatershed 412 through 66 and 54-inch existing pipes.

9.1.15 Subwatershed 414

Location

This subwatershed is located on the southern border of East Bethel, near Fillmore St. N.E.

Drainage Area

13 acres

Wetlands

This subwatershed contains approximately 3 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains west to east in this subwatershed. Stormwater drains to the City of Ham Lake through an existing 18-inch pipe.

9.1.16 Subwatershed 415

Location

This subwatershed is located on the southern border of East Bethel, south of Briarwood Lane N.E.

Drainage Area

88 total acres. 9 acres from Ham Lake.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west, through Branch 8 of County Ditch No. 28, in this subwatershed. Stormwater drains to Subwatershed 400 through an open channel.

9.1.17 Subwatershed 416

Location

This subwatershed is located on the southern border of East Bethel, just west of State Trunk Highway #65.

Drainage Area

24 acres.

Wetlands

This subwatershed contains approximately 3 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. Stormwater drains to Ham Lake through an existing 30-inch pipe.

9.1.18 Subwatershed 421

Location

This subwatershed is located on the southern border of East Bethel, just east of Jackson St. N.E.

Drainage Area

9 acres.

Wetlands

This subwatershed contains approximately 2 acres of wetlands, which are not protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. Stormwater drains to Ham Lake through an existing 15-inch pipe.

9.1.19 Subwatershed 422

Location

This subwatershed is located in Southwestern East Bethel, just south of 187th Lane N.E.

Drainage Area

45 acres.

Wetlands

This subwatershed contains approximately 2 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through County Ditch No. 28, in this subwatershed. Stormwater drains to Subwatershed 409 through an existing 36-inch pipe. The existing pipe will be replaced when 187th Lane is reconstructed.

9.1.20 Subwatershed 423

Location

This subwatershed is located in southwestern East Bethel, just west of Buchanan St. N.E.

Drainage Area

266 acres

Wetlands

This subwatershed contains approximately 90 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains west to east in this subwatershed. Stormwater drains to Subwatershed 422 through an existing 54-inch pipe.

9.1.21 Subwatershed 424

Location

This subwatershed is located in southwestern East Bethel, just north of Briarwood Lane N.E.

Drainage Area

153 acres.

Wetlands

This subwatershed contains approximately 30 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains east to west, through Branch 6 of County Ditch No. 28, in this subwatershed. Stormwater drains to Subwatershed 425 through an open channel.

9.1.22 Subwatershed 425

Location

This subwatershed is located in southwestern East Bethel, just east of State Trunk Highway #65.

Drainage Area

56 acres.

Wetlands

This subwatershed contains approximately 20 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through County Ditch No. 28, in this subwatershed. Stormwater drains to Subwatershed 426 through an existing open channel. A 72-inch RC culvert will replace the open channel when the Trunk Highway 65 service road is realigned.

9.1.23 Subwatershed 426

Location

This subwatershed is located in southwestern East Bethel, east of State Trunk Highway #65 and south of 187th Lane N.E.

Drainage Area

8 acres

Wetlands

This subwatershed contains approximately 1 unprotected acre of wetland.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through County Ditch No. 28 in this subwatershed. Stormwater drains to subwatershed 406 through an existing open

channel. A 72-inch RC culvert will replace the open channel when 187th Lane is constructed.

9.1.24 Subwatershed 427

Location

This subwatershed is located in southwestern East Bethel, west of Trunk Highway #65 and south of 187th Lane.

Drainage Area

15 acres.

Wetlands

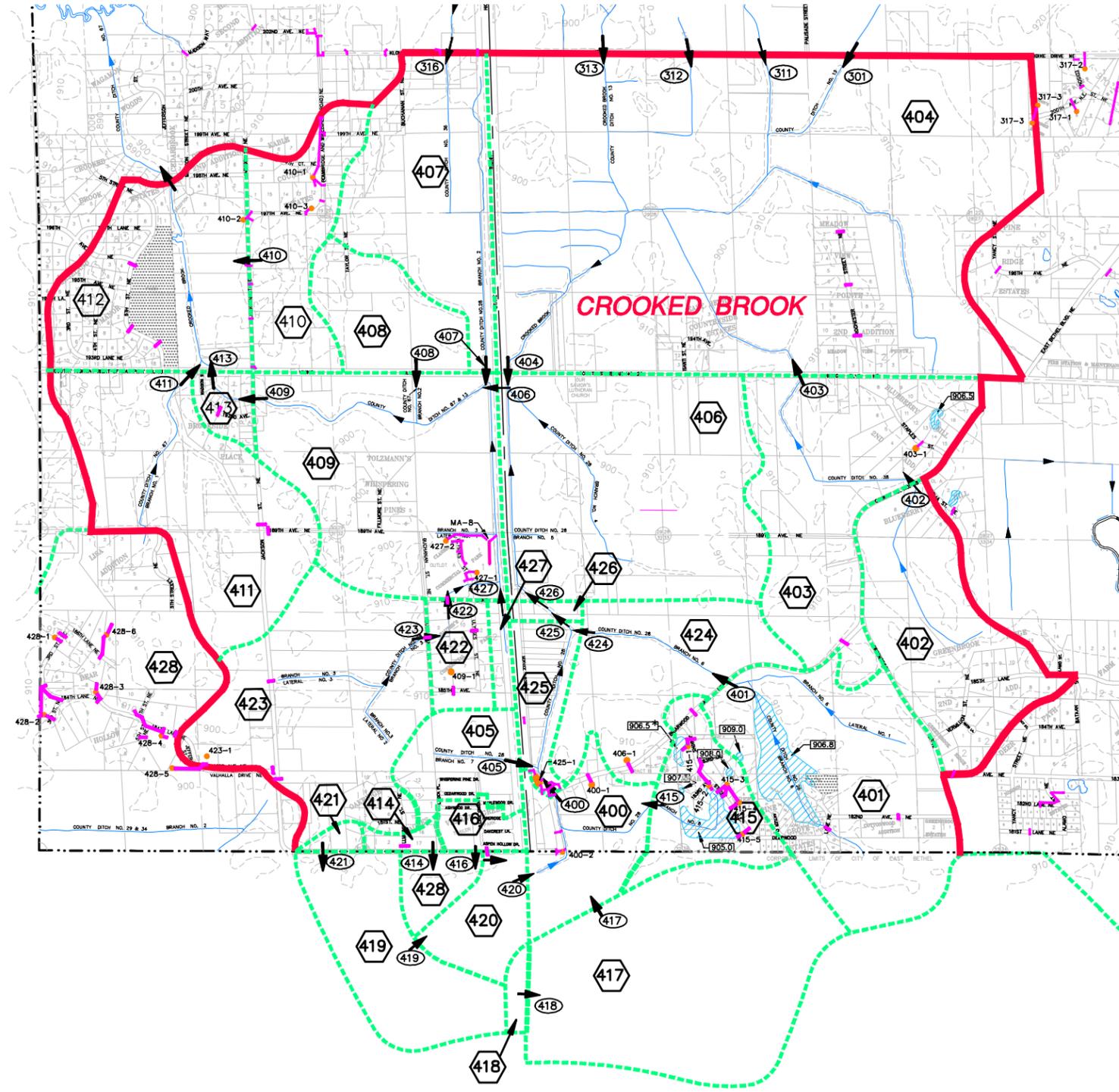
This subwatershed does not contain any wetlands.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north in this subwatershed. Stormwater drains to subwatershed 409 through an existing 18-inch pipe. The pipe will be lengthened when 187th Lane is reconstructed.



- LEGEND**
- DENOTES EXISTING DITCH
 - DENOTES EXISTING CONTOUR (10 FOOT INTERVAL)
 - DENOTES MAJOR STORMWATER COLLECTION PIPE
 - DENOTES MINOR STORMWATER COLLECTION PIPE
 - DENOTES EXISTING WATER QUALITY/RATE CONTROL POND
 - DENOTES NATURAL PONDING AREA WITH DETERMINED 100 YEAR FLOOD ELEVATION
 - DENOTES SUBWATERSHED DIVIDE
 - DENOTES WATERSHED DIVIDE
 - DENOTES DRAINAGE FLOW
 - DENOTES MITIGATION AREA
 - DENOTES NATURAL PONDING AREA WITH DETERMINED 100 YEAR, BACK-TO-BACK, FLOOD ELEVATION

FIGURE 9-1
CROOKED BROOK WATERSHED
CITY OF EAST BETHEL

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 REVISED: DECEMBER, 2009
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10.0 Rice Lake and Coon Lake

10.1 Rice Lake Watershed Summary

This section presents the management plan for the Rice Lake Watershed located in east central East Bethel. This watershed is divided into seven subwatersheds. The Rice Lake Watershed contains subwatersheds 600 through 606.

Sections 10.1.1 through 10.1.7 discuss the water resources within the subwatersheds. Watershed divides, storm sewer pipes, existing ditches, and stormwater storage areas are shown on Figure 10-1, located at the end of this section. Information tables are provided in section 11.0. Proposed land use for this watershed is shown on Figure 2-10.

10.1.1 Subwatershed 600

Location

This subwatershed is located in east central East Bethel, just west of East Bethel Blvd.

Drainage Area

23 acres

Wetlands

This subwatershed contains approximately 2 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows north to south in this subwatershed. Stormwater drains to Subwatershed 601 through an existing 15-inch pipe.

To reduce the storage and the flood elevation, a 15-inch RCP is proposed to replace the existing 15-inch CMP. Under these conditions, the flood is reduced 0.6' and the storage decreases 1 ac-ft. The discharge increases, but only slightly.

10.1.2 Subwatershed 601

Location

This subwatershed is located in east central East Bethel, north of County Rd. 74, between County Rd. 15 and East Bethel Blvd.

Drainage Area

548 acres.

Wetlands

This subwatershed contains approximately 160 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains west to east, through County Ditch No. 16, in this subwatershed. Stormwater drains to Subwatershed 606 through an existing 48-inch pipe.

10.1.3 Subwatershed 602

Location

This subwatershed is located in east central East Bethel, north of County Rd. 74 and east of County Rd. 15.

Drainage Area

353 acres

Wetlands

This subwatershed contains approximately 50 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. Stormwater drains to Subwatershed 606 through an existing 24-inch pipe.

10.1.4 Subwatershed 603

Location

This subwatershed is located in east central East Bethel, south of Wild Rice Dr. and north of 200th Lane N.E.

Drainage Area

135 acres.

Wetlands

This subwatershed contains approximately 40 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains south to north, through a private ditch, in this subwatershed. Stormwater drains to Subwatershed 606 through an existing 18-inch pipe.

10.1.5 Subwatershed 604

Location

This subwatershed is located in east central East Bethel, west of County Rd. 74 and south of County Rd. 15.

Drainage Area

285 acres.

Wetlands

This subwatershed contains approximately 100 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally flows north to south in this subwatershed. Stormwater drains to Subwatershed 606 through an existing 27-inch pipe.

10.1.6 Subwatershed 605

Location

This subwatershed is located in east central East Bethel, just east of County Rd. 74.

Drainage Area

40 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. Stormwater drains to Subwatershed 604 through an existing 18-inch pipe.

10.1.7 Subwatershed 606

Location

This subwatershed is located on the eastern border of East Bethel, south of County Rd. 74 and north of Wild Rice Dr.

Drainage Area

1925 total acres. 689 acres from Linwood Township.

Wetlands

This subwatershed contains approximately 680 acres of wetlands in East Bethel, some of which are protected by the DNR. Water 43P is protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south, through County Ditch No. 16, in this subwatershed. Stormwater drains to Rice Lake and then to Linwood Township.

10.2 Coon Lake Watershed Summary

This section presents the management plan for the Coon Lake Watershed located in southeast East Bethel. This watershed is divided into ten subwatersheds. The Coon Lake Watershed contains subwatersheds 700 through 709.

Sections 10.2.1 through 10.2.10 discuss the water resources within the subwatersheds. Watershed divides, storm sewer pipes, existing ditches, and stormwater storage areas are shown on Figure 10-1, located at the end of this section. Information tables are provided in Section 11.0.

10.2.1 Subwatershed 700

Location

This subwatershed is located near the center of East Bethel, west of East Bethel Blvd. near Deer Lake.

Drainage Area

68 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. The stormwater drains to Subwatershed 702 through an existing 27-inch pipe.

10.2.2 Subwatershed 701

Location

This subwatershed is located in east central East Bethel, near Devil Lake.

Drainage Area

455 acres.

Wetlands

This subwatershed contains approximately 190 acres of wetlands, some of which are protected by the DNR. 58P is a DNR protected water in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. The stormwater drains to Subwatershed 702 through an open channel.

10.2.3 Subwatershed 702

Location

This subwatershed is located in southeastern East Bethel, north of County Rd. 22 and southeast of East Bethel Blvd.

Drainage Area

993 acres

Wetlands

This subwatershed contains approximately 660 acres of wetlands, some of which are protected by the DNR. Wetland 464W and Water 62P are protected by the MnDNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south, through County Ditch No. 56, in this subwatershed. The stormwater drains to Coon Lake through an existing 60-inch pipe.

10.2.4 Subwatershed 703

Location

Subwatershed 703 is located in southeastern East Bethel, just east of East Bethel Blvd.

Drainage Area

121 acres

Wetlands

This subwatershed contains approximately 50 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south, through Branch 2 of County Ditch No. 56, in this subwatershed. The stormwater drains to Subwatershed 706 through an existing 12-inch pipe.

A 15-inch RCP is proposed to replace the damaged 12-inch CMP existing now. Under the proposed conditions, with more development, the storage and discharge remain almost the same as they were in the existing conditions.

10.2.5 Subwatershed 704

Location

This subwatershed is located in south central East Bethel, west of East Bethel Blvd. and north of County Rd. 22.

Drainage Area

115 acres.

Wetlands

This subwatershed contains approximately 10 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally drains to the wetlands in this subwatershed.

10.2.6 Subwatershed 705

Location

This subwatershed is located in south central East Bethel, north of County Rd. 22 and east of East Bethel Blvd.

Drainage Area

127 acres.

Wetlands

This subwatershed contains approximately 30 acres of wetlands, none of which are protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

This subwatershed is landlocked. Stormwater runoff generally drains to the existing wetlands in the subwatershed.

10.2.7 Subwatershed 706

Location

This subwatershed is located in southeastern East Bethel, just north of County Rd. 22.

Drainage Area

465 acres.

Wetlands

This subwatershed contains approximately 200 acres of wetlands. 465W is a DNR protected wetland in this subwatershed.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south, through Branch 1 of County Ditch No. 56, in this subwatershed. The stormwater drains to Subwatershed 702 through an existing open channel.

10.2.8 Subwatershed 707

Location

This subwatershed is located in southeastern East Bethel, northwest of County Rd. 22.

Drainage Area

354 acres.

Wetlands

This subwatershed contains approximately 140 acres of wetlands, most of which are protected by the DNR. Water 63P and Wetland 463W are both protected by the DNR.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. The stormwater drains from Anderson Lake to Coon Lake through an existing 24-inch pipe.

10.2.9 Subwatershed 708

Location

This subwatershed is located in southeastern East Bethel, northwest of County Rd. 22.

Drainage Area

16 acres.

Wetlands

This subwatershed does not contain any wetlands.

Water Quality

Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains north to south in this subwatershed. The stormwater drains to Coon Lake through an existing 24-inch pipe.

10.2.10 Subwatershed 709

Location

This subwatershed is located in southeastern East Bethel, around Coon Lake.

Drainage Area

3881 total acres. 1269 acres from Ham Lake and Columbus Township.

Wetlands

This subwatershed contains approximately 1690 acres of wetlands, most of which are protected by the DNR. Water 42P and Wetlands 467W, 50W and 471W are all protected by the DNR.

Water Quality

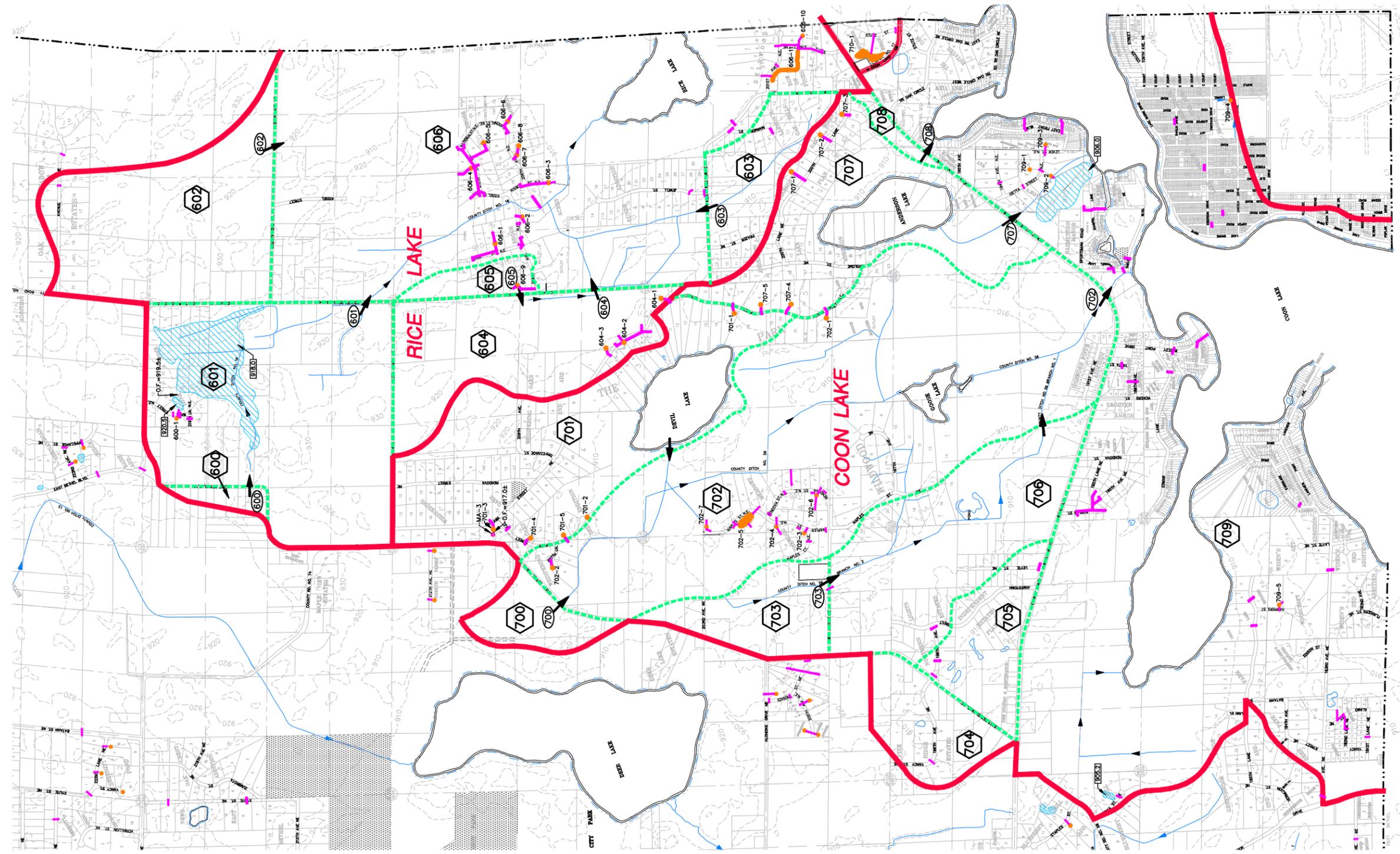
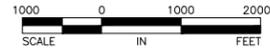
Water quality management strategies shall be implemented throughout this watershed as discussed in Section 5.0.

Flood Control

Stormwater runoff generally drains to Coon Lake. Stormwater outlets Coon Lake in Columbus Township through two existing 30-inch pipes.

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**Hakanson
 Anderson
 Assoc., Inc.**
 Civil Engineers and Land Surveyors
 3601 Thurston Ave., Anoka, Minnesota 55303
 612-427-5860 FAX 612-427-0520



LEGEND

- DENOTES EXISTING DITCH
- DENOTES EXISTING CONTOUR (10 FOOT INTERVAL)
- DENOTES MAJOR STORMWATER COLLECTION PIPE
- DENOTES MINOR STORMWATER COLLECTION PIPE
- DENOTES EXISTING WATER QUALITY/RATE CONTROL POND
- DENOTES NATURAL PONDING AREA WITH DETERMINED 100 YEAR FLOOD ELEVATION
- DENOTES SUBWATERSHED DIVIDE
- DENOTES WATERSHED DIVIDE
- DENOTES DRAINAGE FLOW
- DENOTES MITIGATION AREA
- DENOTES NATURAL PONDING AREA WITH DETERMINED 100 YEAR, BACK-TO-BACK, FLOOD ELEVATION

FIGURE 10-1
RICE LAKE AND
COON LAKE WATERSHEDS
CITY OF EAST BETHEL

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 REVISED: DECEMBER, 2009
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11.0 Watershed Data Tables

This section contains data tables which present pertinent information to the watersheds discussed in Sections 6-10. Also attached is the Capital Improvements Program. The tables are as follows:

- Table 11-1: Tabulates Existing Conditions Watershed Data
- Table 11-2: Tabulates Proposed Conditions Watershed Data
- Table 11-3: Tabulates Existing Water Quality/Rate Control Pond Information
- Table 11-4: Tabulates Existing Wetland Mitigation Area Information
- Table 11-5: Capital Improvement Program

The legend that pertains to the tables is as follows:

Footnotes

¹When an “NA” is listed for the proposed conditions outlet size and type; the outlet should be replaced with an RCP which has an equivalent capacity as the existing conditions pipe.

²The reported flood elevation is based on Flood Insurance Study.

³The reported bounce is the depth at which the water will rise at the outlet during the 100-year storm event. This bounce was reported when actual field elevations were not available.

Abbreviations

- OC = Open Channel
- CMP = Corrugated Metal Pipe
- RCP = Reinforced Concrete Pipe
- HDPE = High Density Polyethylene Pipe
- INA = Information Not Available
- NA = Not Applicable
- CCP = Corrugated Polyethylene Pipe

**Table 11-1
EXISTING CONDITIONS WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	EXISTING OUTLET				WATER ELEV. (feet)	OVERFLOW ELEV. (feet)	MnDNR NUMBER	OHWL (feet)	100-yr STORM EVENT - EXISTING CONDITIONS				
		ELEV. (feet)	SIZE (inches)	TYPE	LENGTH (feet)					NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)
Fish Lake Watershed														
100	1359	917.6	18	CMP	28	NONE	919.4	161P, 160P, 65P, 157W, 156W	INA	917.5	920.0	NA	521	58
		917.5	18	CMP	28									
101	464	907.6	36	CMP	60	911.3	914.4	154P	INA	907.6	913.0	NA	282	50
Coopers Lake Watershed														
200	1256	919.8	48	CMP	58	919.9	926.6	200W, 190W, 189W, 175W, 66W, 153W, 64W, 67P	67P = 923.0	919.8	923.4	NA	382	50
201	486	911.8	18	CMP	60	NONE	918.4	NA	NA	911.8	918.5	NA	106	45
202	418	918.4	24	CMP	60	NONE	922.8	69W, 70P	INA	918.4	922.7	NA	270	23
203	200	898.0	NA	OC	NA	INA	NA	NA	NA	898.0	900.7	NA	207	34
204	151	897.7	15	CMP	66	NONE	903.9	350W	INA	897.7	900.7	NA	41	5
205	160	NA	NA	NA	NA	INA	NA	349W	INA	NA	NA	NA	NA	NA
206	204	NA	NA	OC	NA	INA	NA	68W, 99W	INA	NA	NA	2.1	86	20
207	216	NA	NA	OC	NA	INA	NA	NA	NA	NA	911.8	NA	62	47
208	400	906.5	48	CMP	69	907.8	911.2	NA	NA	906.5	909.0	NA	123	29
Deer Lake Watershed														
300	840	912.8	36	CMP	70	914.3	921.6	166W, 170W, 172W, 55P	INA	912.8	915.4	NA	525	21
301	1287	899.4	36	CMP	67	899.7	904.9	452W, 719W, 459W, 59P	INA	899.4	902.4	NA	539	42
302	238	NA	NA	OC	NA	INA	NA	453W, 454W, 455W	INA	NA	NA	2.5	48	30
303	60	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
304	170	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
305	219	NA	NA	NA	NA	INA	NA	440P, 56P	INA	NA	NA	NA	NA	NA
306	63	914.3	12	CMP	60	NONE	919.1	442W	915.3	914.3	917.5	NA	11	4
307	18	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
308	33	913.5	15	CMP	60	NONE	916.4	NA	NA	913.5	915.9	NA	8	5
309	1107	NA	NA	OC	NA	INA	NA	439W, 718W, 456W, 57P	INA	NA	NA	3.3	448	51
310	363	NA	NA	OC	NA	INA	NA	60P, 457W	INA	NA	NA	2.5	258	29
311	51	896.7	24	CMP	44	897	902.3	NA	NA	896.7	898.3	NA	10	6
312	32	897.1	24	CMP	52	897.2	902.6	NA	NA	897.1	898.1	NA	6	5
313	448	895.5	36	CMP	46	896.8	901.4	NA	NA	895.5	898.0	NA	169	34
314	77	895.7	24	CMP	75	NONE	903.8	NA	NA	895.7	897.6	NA	10	12

**Table 11-1
EXISTING CONDITIONS WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	EXISTING OUTLET				WATER ELEV. (feet)	OVERFLOW ELEV. (feet)	MnDNR NUMBER	OHWL (feet)	100-yr STORM EVENT - EXISTING CONDITIONS				
		ELEV. (feet)	SIZE (inches)	TYPE	LENGTH (feet)					NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)
Deer Lake Watershed (cont.)														
315	224	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
316	450	901.1	18	CMP	64	NONE	904.8	61W	INA	901.1	903.7	NA	146	7
317	83	907.5	12	CMP	38	NONE	909.5	NA	NA	907.5	909.6	NA	10	18
318	10	896.5	12	HDPE	20	INA	899.5	NA	NA	896.5	898.5	NA	0	5
319	19	NA	12	RCP	96	INA	NA	NA	NA	918.9	922.1	NA	1	6
320	116	NA	12	RCP	96	INA	NA	NA	NA	NA	919.3	NA	2	3
Crooked Brook Watershed														
400	96	893.5	72	RCP	152	898.5	905.8	NA	NA	893.5	902.2	NA	32	290
401	283	900.2	18	RCP	64	INA	909.2	472W	INA	900.2	904.6	NA	32	42
402	191	899.9	36	RCP	64	902.7	909.1	NA	NA	899.9	903.3	NA	129	35
403	264	898.1	48	RCP	80	901.6	908.6	NA	NA	898.1	902.6	NA	102	82
404	1048	887.6	72	CMP	69	890.4	896.1	NA	NA	887.6	893.7	NA	655	161
405	71	897.2	30	RCP	195	897.5	NA	NA	NA	897.2	898.5	NA	14	8
406	382	886.5	90	CMP	195	890.1	897.8	NA	NA	886.5	894.1	NA	366	256
407	203	887.1	48	RCP	96	890.1	896.2	NA	NA	887.1	891.0	NA	80	42
408	91	888.3	30	CMP	116	889.8	894.4	NA	NA	888.3	890.3	NA	49	14
409	302	885.7	90	CMP	107	888.7	895.7	NA	NA	885.7	892.0	NA	799	200
410	128	897.1	15	CMP	56	NONE	900.0	NA	NA	897.1	900.0	NA	22	23
411	258	891.9	42	CMP	84	892.0	895.4	NA	NA	891.9	893.6	NA	81	20
412	220	NA	NA	OC	NA	INA	NA	NA	NA	NA	NA	7.1	468	188
413	25	885.5	66	CMP	88	887.8	895.0	NA	NA	885.5	890.8	NA	2	200
		885.4	54	CMP	91									
414	13	901.0	18	RCP	55	NONE	NA	NA	NA	901.0	902.2	NA	1	4
415	88	NA	NA	OC	NA	INA	NA	NA	NA	NA	904.1	NA	7	20
416	24	899.8	15	RCP	89	INA	903.2	NA	NA	899.8	905.0	NA	3	12
417	388	899.8	24	CMP	62	INA	904.8	NA	NA	899.8	NA	NA	NA	NA
418	12	900.7	24	RCP	230	INA	NA	NA	NA	900.7	902.2	NA	1	6
419	127	NA	24	RCP	50	INA	NA	NA	NA	NA	NA	2.7	17	19
420	70	895.7	72	RCP	270	INA	NA	NA	NA	895.7	901.4	NA	19	53
421	9	902.9	15	RCP	55	NONE	NA	NA	NA	902.9	903.9	NA	1	3
422	45	889.2	36	RCP	80	892.0	898.0	NA	NA	889.2	893.5	NA	14	51
423	266	892.0	54	RCP	64	894.3	899.0	NA	NA	892.0	894.9	NA	127	47
424	153	NA	NA	OC	NA	INA	NA	NA	NA	NA	NA	2.4	77	50
425	56	894.2	NA	OC	NA	INA	NA	NA	NA	894.2	898.8	NA	107	214
426	8	894.0	NA	OC	NA	INA	NA	NA	NA	894.0	898.6	NA	5	214
427	15	898.4	18	CMP	90	NONE	903.0	NA	NA	898.4	901.5	NA	1	8

**Table 11-1
EXISTING CONDITIONS WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	EXISTING OUTLET				WATER ELEV. (feet)	OVERFLOW ELEV. (feet)	MnDNR NUMBER	OHWL (feet)	100-yr STORM EVENT - EXISTING CONDITIONS				
		ELEV. (feet)	SIZE (inches)	TYPE	LENGTH (feet)					NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)
Fish Lake Watershed														
100	1359	917.6	18	CMP	28	NONE	919.4	161P, 160P, 65P, 157W, 156W	INA	917.5	920.0	NA	521	58
		917.5	18	CMP	28									
101	464	907.6	36	CMP	60	911.3	914.4	154P	INA	907.6	913.0	NA	282	50
Coopers Lake Watershed														
200	1256	919.8	48	CMP	58	919.9	926.6	200W, 190W, 189W, 175W, 66W, 153W, 64W, 67P	67P = 923.0	919.8	923.4	NA	382	50
201	486	911.8	18	CMP	60	NONE	918.4	NA	NA	911.8	918.5	NA	106	45
202	418	918.4	24	CMP	60	NONE	922.8	69W, 70P	INA	918.4	922.7	NA	270	23
203	200	898.0	NA	OC	NA	INA	NA	NA	NA	898.0	900.7	NA	207	34
204	151	897.7	15	CMP	66	NONE	903.9	350W	INA	897.7	900.7	NA	41	5
205	160	NA	NA	NA	NA	INA	NA	349W	INA	NA	NA	NA	NA	NA
206	204	NA	NA	OC	NA	INA	NA	68W, 99W	INA	NA	NA	2.1	86	20
207	216	NA	NA	OC	NA	INA	NA	NA	NA	NA	911.8	NA	62	47
208	400	906.5	48	CMP	69	907.8	911.2	NA	NA	906.5	909.0	NA	123	29
Deer Lake Watershed														
300	840	912.8	36	CMP	70	914.3	921.6	166W, 170W, 172W, 55P	INA	912.8	915.4	NA	525	21
301	1287	899.4	36	CMP	67	899.7	904.9	452W, 719W, 459W, 59P	INA	899.4	902.4	NA	539	42
302	238	NA	NA	OC	NA	INA	NA	453W, 454W, 455W	INA	NA	NA	2.5	48	30
303	60	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
304	170	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
305	219	NA	NA	NA	NA	INA	NA	440P, 56P	INA	NA	NA	NA	NA	NA
306	63	914.3	12	CMP	60	NONE	919.1	442W	915.3	914.3	917.5	NA	11	4
307	18	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
308	33	913.5	15	CMP	60	NONE	916.4	NA	NA	913.5	915.9	NA	8	5
309	1107	NA	NA	OC	NA	INA	NA	439W, 718W, 456W, 57P	INA	NA	NA	3.3	448	51
310	363	NA	NA	OC	NA	INA	NA	60P, 457W	INA	NA	NA	2.5	258	29
311	51	896.7	24	CMP	44	897	902.3	NA	NA	896.7	898.3	NA	10	6
312	32	897.1	24	CMP	52	897.2	902.6	NA	NA	897.1	898.1	NA	6	5
313	448	895.5	36	CMP	46	896.8	901.4	NA	NA	895.5	898.0	NA	169	34
314	77	895.7	24	CMP	75	NONE	903.8	NA	NA	895.7	897.6	NA	10	12

**Table 11-1
EXISTING CONDITIONS WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	EXISTING OUTLET				WATER ELEV. (feet)	OVERFLOW ELEV. (feet)	MnDNR NUMBER	OHWL (feet)	100-yr STORM EVENT - EXISTING CONDITIONS				
		ELEV. (feet)	SIZE (inches)	TYPE	LENGTH (feet)					NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)
Deer Lake Watershed (cont.)														
315	224	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
316	450	901.1	18	CMP	64	NONE	904.8	61W	INA	901.1	903.7	NA	146	7
317	83	907.5	12	CMP	38	NONE	909.5	NA	NA	907.5	909.6	NA	10	18
318	10	896.5	12	HDPE	20	INA	899.5	NA	NA	896.5	898.5	NA	0	5
319	19	NA	12	RCP	96	INA	NA	NA	NA	918.9	922.1	NA	1	6
320	116	NA	12	RCP	96	INA	NA	NA	NA	NA	919.3	NA	2	3
Crooked Brook Watershed														
400	96	893.5	72	RCP	152	898.5	905.8	NA	NA	893.5	902.2	NA	32	290
401	283	900.2	18	RCP	64	INA	909.2	472W	INA	900.2	904.6	NA	32	42
402	191	899.9	36	RCP	64	902.7	909.1	NA	NA	899.9	903.3	NA	129	35
403	264	898.1	48	RCP	80	901.6	908.6	NA	NA	898.1	902.6	NA	102	82
404	1048	887.6	72	CMP	69	890.4	896.1	NA	NA	887.6	893.7	NA	655	161
405	71	897.2	30	RCP	195	897.5	NA	NA	NA	897.2	898.5	NA	14	8
406	382	886.5	90	CMP	195	890.1	897.8	NA	NA	886.5	894.1	NA	366	256
407	203	887.1	48	RCP	96	890.1	896.2	NA	NA	887.1	891.0	NA	80	42
408	91	888.3	30	CMP	116	889.8	894.4	NA	NA	888.3	890.3	NA	49	14
409	302	885.7	90	CMP	107	888.7	895.7	NA	NA	885.7	892.0	NA	799	200
410	128	897.1	15	CMP	56	NONE	900.0	NA	NA	897.1	900.0	NA	22	23
411	258	891.9	42	CMP	84	892.0	895.4	NA	NA	891.9	893.6	NA	81	20
412	220	NA	NA	OC	NA	INA	NA	NA	NA	NA	NA	7.1	468	188
413	25	885.5	66	CMP	88	887.8	895.0	NA	NA	885.5	890.8	NA	2	200
		885.4	54	CMP	91									
414	13	901.0	18	RCP	55	NONE	NA	NA	NA	901.0	902.2	NA	1	4
415	88	NA	NA	OC	NA	INA	NA	NA	NA	NA	904.1	NA	7	20
416	24	899.8	15	RCP	89	INA	903.2	NA	NA	899.8	905.0	NA	3	12
417	388	899.8	24	CMP	62	INA	904.8	NA	NA	899.8	NA	NA	NA	NA
418	12	900.7	24	RCP	230	INA	NA	NA	NA	900.7	902.2	NA	1	6
419	127	NA	24	RCP	50	INA	NA	NA	NA	NA	NA	2.7	17	19
420	70	895.7	72	RCP	270	INA	NA	NA	NA	895.7	901.4	NA	19	53
421	9	902.9	15	RCP	55	NONE	NA	NA	NA	902.9	903.9	NA	1	3
422	45	889.2	36	RCP	80	892.0	898.0	NA	NA	889.2	893.5	NA	14	51
423	266	892.0	54	RCP	64	894.3	899.0	NA	NA	892.0	894.9	NA	127	47
424	153	NA	NA	OC	NA	INA	NA	NA	NA	NA	NA	2.4	77	50
425	56	894.2	NA	OC	NA	INA	NA	NA	NA	894.2	898.8	NA	107	214
426	8	894.0	NA	OC	NA	INA	NA	NA	NA	894.0	898.6	NA	5	214
427	15	898.4	18	CMP	90	NONE	903.0	NA	NA	898.4	901.5	NA	1	8

**Table 11-1
EXISTING CONDITIONS WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	EXISTING OUTLET				WATER ELEV. (feet)	OVERFLOW ELEV. (feet)	MnDNR NUMBER	OHWL (feet)	100-yr STORM EVENT - EXISTING CONDITIONS				
		ELEV. (feet)	SIZE (inches)	TYPE	LENGTH (feet)					NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)
Sunrise River Watershed														
500	355	NA	NA	OC	NA	INA	NA	151P	NA	NA	NA	NA	NA	NA
501	453	NA	NA	OC	NA	INA	NA	150W	NA	NA	NA	NA	NA	NA
502	54	912.8	48	CMP	58	915.8	919.3	155W	NA	912.8	916.1	NA	27	17
503	77	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
504	308	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
505	108	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
506	634	NA	NA	OC	NA	INA	NA	446W	NA	NA	NA	NA	NA	NA
507	374	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
508	124	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
509	223	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
510	73	NA	NA	NA	NA	INA	NA	280W, 163W	NA	NA	NA	NA	NA	NA
511	11	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
512	44	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
Rice Lake Watershed														
600	23	916.1	15	CMP	52	NONE	918.7	NA	NA	916.1	918.0	NA	3	3
601	548	904.7	48	CMP	61	907.1	912.6	NA	NA	904.7	908.0	NA	262	47
602	353	910.8	24	CMP	61	NONE	918.7	NA	NA	910.8	913.8	NA	99	12
603	135	906.2	18	CMP	55	906.3	909.2	NA	NA	906.2	907.9	NA	47	5
604	285	904.7	27	CMP	50	905.3	909.7	NA	NA	904.7	906.7	NA	120	12
605	40	906.8	18	CMP	50	907.6	912.3	NA	NA	906.8	908.4	NA	13	4
606	1925	901.5	48	RCP	80	902.1	NA	43P	INA	901.5	904.0	NA	1163	43
Coon Lake Watershed														
700	68	908.3	27	CMP	69	909.6	914.2	NA	NA	908.3	910.4	NA	6	13
701	455	NA	NA	OC	NA	INA	NA	58P	INA	NA	NA	1.9	164	16
702	993	902.0	60	RCP	72	904	913.1	62P, 464W	INA	902.0	905.6	NA	598	62
703	121	908.8	12	CMP	31	NONE	910.7	NA	NA	908.8	910.1	NA	50	3
704	115	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
705	127	NA	NA	NA	NA	INA	NA	NA	NA	NA	NA	NA	NA	NA
706	465	NA	NA	OC	NA	INA	NA	465W	NA	NA	NA	1.3	201	8
707	354	904.3	24	RCP	64	905.5	909.5	63P, 463W	INA	904.3	907.3	NA	126	18
708	16	906.1	24	RCP	80	NONE	914.1	NA	NA	906.1	907.5	NA	0	10
709	3881	900.9	2 - 30	RCP	20	904	905.5	42P, 467W, 50W, 471W	42P = 904.8	904.0	905.3	NA	5578	84
Cedar Creek Watershed														
800	10300	897.3	20' x 7.6'	Wood Box	66	INA	907.8	152P	INA	897.3	NA	NA	NA	NA
801	810	898.1	30.5' x 5.4'	Concrete Bridge	42	900.3	906.6	NA	NA	898.1	905.1	NA	1555	1205
802	1953	892.2	20' x 10'	Concrete Box	150	895.2	906.1	171W	INA	892.2	899.0 ²	NA	1068	746
803	653	889.2	72	RCP	88	892.8	900.9	NA	NA	889.2	896.0 ²	NA	1078	482
		889.3	72	RCP	88									
804	421	883.1	84 x 138	Concrete Arch	64	887.8	894.7	351W	INA	883.1	891.0 ²	NA	38	485
		883.2	84 x 138	Concrete Arch	64									
805	1119	NA	NA	OC	NA	INA	NA	366W	INA	NA	883.0 ²	NA	68	589

**Table 11-2
PROPOSED CONDITIONS - WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	PROPOSED OUTLET		100-yr STORM EVENT - PROPOSED CONDITIONS					COMMENTS
		SIZE (inches)	TYPE ¹	NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)	
Fish Lake Watershed									
100	1359	24	RCP	917.5	920.1	NA	577	5.4	Proposed: Construct road to 920.5. Culvert invert @ 916.5. Control structure outlet @ 917.5.
101	464	NA	NA	907.6	912.4	NA	225	43	
Coopers Lake Watershed									
200	1256	NA	NA	919.8	923.4	NA	382	50	457 acres from Athens Township.
201	486	18	RCP	911.8	918.4	NA	105	33	
202	418	21	RCP	918.4	922.6	NA	258	21	
203	200	21	RCP	898.0	901.8	NA	305	20	
204	151	NA	NA	897.7	900.7	NA	41	5	
205	160	NA	NA	NA	NA	NA	NA	NA	
206	204	NA	NA	NA	NA	2.1	86	20	
207	216	NA	NA	NA	911.8	NA	63	48	117 acres from Bethel.
208	400	NA	NA	906.5	909	NA	123	29	Entire watershed is in Oak Grove.
Deer Lake Watershed									
300	840	NA	NA	912.8	915.5	NA	532	22	
301	1287	21	RCP	899.4	902.7	NA	605	18	
302	238	NA	NA	NA	NA	2.7	51	33	
303	60	NA	NA	NA	NA	NA	NA	NA	
304	170	NA	NA	NA	NA	NA	NA	NA	
305	219	NA	NA	NA	NA	NA	NA	NA	
306	63	15	RCP	914.3	916.7	NA	7	8	
307	18	NA	NA	NA	NA	NA	NA	NA	
308	33	15	RCP	913.5	916.1	NA	8	8	
309	1107	NA	NA	NA	NA	3.3	454	53	
310	363	NA	NA	NA	NA	2.5	263	30	
311	51	NA	NA	896.7	898.4	NA	11	7	
312	32	NA	NA	897.1	898.1	NA	7	5	
313	448	30	RCP	895.5	898.4	NA	201	26	
314	77	NA	NA	895.7	897.7	NA	10	12	

**Table 11-2
PROPOSED CONDITIONS - WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	PROPOSED OUTLET		100-yr STORM EVENT - PROPOSED CONDITIONS					COMMENTS
		SIZE (inches)	TYPE ¹	NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)	
Fish Lake Watershed									
100	1359	24	RCP	917.5	920.1	NA	577	5.4	Proposed: Construct road to 920.5. Culvert invert @ 916.5. Control structure outlet @ 917.5.
101	464	NA	NA	907.6	912.4	NA	225	43	
Coopers Lake Watershed									
200	1256	NA	NA	919.8	923.4	NA	382	50	457 acres from Athens Township.
201	486	18	RCP	911.8	918.4	NA	105	33	
202	418	21	RCP	918.4	922.6	NA	258	21	
203	200	21	RCP	898.0	901.8	NA	305	20	
204	151	NA	NA	897.7	900.7	NA	41	5	
205	160	NA	NA	NA	NA	NA	NA	NA	
206	204	NA	NA	NA	NA	2.1	86	20	
207	216	NA	NA	NA	911.8	NA	63	48	117 acres from Bethel.
208	400	NA	NA	906.5	909	NA	123	29	Entire watershed is in Oak Grove.
Deer Lake Watershed									
300	840	NA	NA	912.8	915.5	NA	532	22	
301	1287	21	RCP	899.4	902.7	NA	605	18	
302	238	NA	NA	NA	NA	2.7	51	33	
303	60	NA	NA	NA	NA	NA	NA	NA	
304	170	NA	NA	NA	NA	NA	NA	NA	
305	219	NA	NA	NA	NA	NA	NA	NA	
306	63	15	RCP	914.3	916.7	NA	7	8	
307	18	NA	NA	NA	NA	NA	NA	NA	
308	33	15	RCP	913.5	916.1	NA	8	8	
309	1107	NA	NA	NA	NA	3.3	454	53	
310	363	NA	NA	NA	NA	2.5	263	30	
311	51	NA	NA	896.7	898.4	NA	11	7	
312	32	NA	NA	897.1	898.1	NA	7	5	
313	448	30	RCP	895.5	898.4	NA	201	26	
314	77	NA	NA	895.7	897.7	NA	10	12	

**Table 11-2
PROPOSED CONDITIONS - WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	PROPOSED OUTLET		100-yr STORM EVENT - PROPOSED CONDITIONS					COMMENTS
		SIZE (inches)	TYPE ¹	NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)	
Deer Lake Watershed (cont.)									
315	224	NA	NA	NA	NA	NA	NA	NA	
316	450	NA	NA	901.1	903.7	NA	146	7	
317	83	18	RCP	907.5	909.2	NA	9	12	Existing culvert is plugged Proposed: Culvert invert @ 906.5. Control structure outlet @ 907.5.
318	10	NA	NA	896.5	898.6	NA	0	5	
319	19	NA	NA	918.9	922.1	NA	1	6	
320	116	NA	NA	NA	919.3	NA	2	3	
Crooked Brook Watershed									
400	96	NA	NA	893.5	902.3	NA	32	291	34 acres from Ham Lake.
401	283	NA	NA	900.2	904.6	NA	34	42	49 acres from Ham Lake.
402	191	NA	NA	899.9	903.3	NA	129	35	
403	264	NA	NA	898.1	902.6	NA	102	83	
404	1048	NA	NA	887.6	893.6	NA	631	149	
405	71	NA	NA	897.2	898.5	NA	14	8	
406	382	NA	NA	886.5	894.1	NA	361	253	
407	203	NA	NA	887.1	891.0	NA	81	43	
408	91	NA	NA	888.3	890.3	NA	49	14	
409	302	NA	NA	885.7	892.1	NA	821	206	
410	128	18	RCP	897.1	899.4	NA	15	14	Proposed: Culvert invert @ 896.1. Control structure outlet @ 897.1.
411	258	NA	NA	891.9	893.6	NA	82	20	
412	220	NA	NA	NA	NA	7.3	480	194	
413	25	NA	NA	885.5	890.9	NA	2	206	
414	13	NA	NA	901	902.2	NA	1	4	
415	88	NA	NA	NA	904.2	NA	7	21	9 acres from Ham Lake.
416	24	30	RCP	899.8	902.3	NA	1	39	Proposed: Culvert @ 898.1.
417	388	NA	NA	899.8	NA	NA	NA	NA	Entire watershed is in Ham Lake.
418	12	NA	NA	900.7	902.2	NA	1	6	Entire watershed is in Ham Lake.
419	127	NA	NA	NA	NA	2.7	17	19	Entire watershed is in Ham Lake.
420	70	NA	NA	895.7	901.4	NA	19	53	Entire watershed is in Ham Lake.
421	9	NA	NA	902.9	904	NA	1	3	
422	45	36	RCP	889.2	893.8	NA	15	53	
423	266	NA	NA	892.0	895.0	NA	129	49	
424	153	NA	NA	NA	NA	2.4	77	50	
425	56	72	RCP	891.5	898.1	NA	113	197	Proposed: Culvert @ 891.5.
426	8	72	RCP	891.3	898	NA	7	196	Proposed: Culvert @ 891.3.
427	15	18	CMP	898.4	902.2	NA	1	9	Existing culvert is being extended.

**Table 11-2
PROPOSED CONDITIONS - WATERSHED DATA**

WATERSHED NUMBER	TOTAL WATERSHED AREA (acres)	PROPOSED OUTLET		100-yr STORM EVENT - PROPOSED CONDITIONS					COMMENTS
		SIZE (inches)	TYPE ¹	NORMAL ELEV. (feet)	FLOOD ELEV. (feet)	BOUNCE ³ (feet)	STORAGE (ac-ft)	PEAK DISCHARGE (cfs)	
Sunrise River Watershed									
500	355	NA	NA	NA	NA	NA	NA	NA	
501	453	NA	NA	NA	NA	NA	NA	NA	
502	54	NA	NA	912.8	916.1	NA	27	18	
503	77	NA	NA	NA	NA	NA	NA	NA	
504	308	NA	NA	NA	NA	NA	NA	NA	
505	108	NA	NA	NA	NA	NA	NA	NA	
506	634	NA	NA	NA	NA	NA	NA	NA	
507	374	NA	NA	NA	NA	NA	NA	NA	
508	124	NA	NA	NA	NA	NA	NA	NA	
509	223	NA	NA	NA	NA	NA	NA	NA	
510	73	NA	NA	NA	NA	NA	NA	NA	
511	11	NA	NA	NA	NA	NA	NA	NA	
512	44	NA	NA	NA	NA	NA	NA	NA	
Rice Lake Watershed									
600	23	15	RCP	916.1	917.4	NA	2	4	
601	548	NA	NA	904.7	908.1	NA	266	48	
602	353	NA	NA	910.8	913.9	NA	102	13	
603	135	NA	NA	906.2	907.9	NA	47	5	
604	285	NA	NA	904.7	906.7	NA	122	12	
605	40	NA	NA	906.8	908.4	NA	13	4	
606	1925	NA	NA	901.5	904.0	NA	1169	44	689 acres from Linwood Township.
Coon Lake Watershed									
700	68	NA	NA	908.3	910.5	NA	7	13	Southeast end of culvert is damaged.
701	455	NA	NA	NA	NA	1.9	164	16	
702	993	NA	NA	902	905.6	NA	600	62	
703	121	15	RCP	908.8	910.1	NA	49	4	North end of cuvert is damaged.
704	115	NA	NA	NA	NA	NA	NA	NA	
705	127	NA	NA	NA	NA	NA	NA	NA	
706	465	NA	NA	NA	NA	1.3	205	8	
707	354	NA	NA	904.3	907.3	NA	126	18	
708	16	NA	NA	906.1	907.7	NA	0	11	
709	3881	NA	NA	904.0	905.3	NA	5579	84	1269 acres from Ham Lake & Columbus Township Proposed: Control structure outlet @ 903.3.
Cedar Creek Watershed									
800	10300	NA	NA	897.3	NA	NA	NA	NA	9520 acres from Athens Township.
801	810	NA	NA	898.1	905.1	NA	1555	1205	Elevation is to the creek bed.
802	1953	NA	NA	892.2	899.0 ²	NA	1070	748	
803	653	NA	NA	889.2	896.0 ²	NA	1076	481	
804	421	NA	NA	883.1	891.0 ²	NA	38	484	
805	1119	NA	NA	NA	883.0 ²	NA	68	591	

**Table 11-3
Inventory of Existing Water Quality/Rate Control Ponds**

NUMBER	DEVELOPMENT	POND INFORMATION						OUTLET INFORMATION			COMMENTS
		YEAR BUILT	NORMAL ELEV.	FLOOD ELEV.	BOTTOM ELEV.	SKIMMER Y or N	SKIMMER TYPE	SIZE (inches)	TYPE	LENGTH (feet)	
Fish Lake Watershed											
100-1	Meadows of Fish Lake	2004	917.5	920.0	914.0	Y	Reverse Grade Pipe	15"	RCP	85	
100-2	Meadows of Fish Lake	2004	918.0	920.0	914.0	NA	NA	NA	NA	NA	Land locked, EOF @ 918.0
100-3	Meadows of Fish Lake	2004	917.5	920.0	914.0	Y	Reverse Grade Pipe	15"	RCP	20	
100-4	Meadows of Fish Lake	2004	917.5	918.3	914.0	NA	NA	15"	RCP	NA	Outlet FES @ 917.6
100-5	Meadows of Fish Lake	2004	917.5	918.5	914.0	Y	Reverse Grade Pipe	15"	RCP	70	
100-6	Meadows of Fish Lake	2004	917.5	918.2	914.0	Y	Reverse Grade Pipe	15"	RCP	34	
Coopers Lake Watershed											
200-1	Wargo Ponds		920.0	924.2	917.0	Y	Reverse Grade Pipe	18"	RCP	20	FES outle
200-2	Wargo Ponds		920.8	924.2	919.0	Y	Reverse Grade Pipe	15"	RCP	12	
200-3	Wargo Ponds		910.0	924.2	915.0	Y	Reverse Grade Pipe	18"	RCP	16	Skimmer Structure at end on swale north of pond
200-4	Whispering Aspen		921.0	925.3	918.0	NA	NA	NA	NA	NA	FES outle
200-5	Whispering Aspen		922.3	925.3	918.0	NA	NA	NA	NA	NA	
200-6	Whispering Aspen		921.0	925.5	918.0	NA	NA	NA	NA	NA	FES outlet to Pond 200-15. EOF @ 926.0
201-1	Cemstone Redimix Plant	2004	922.0	923.8	917.0	Y	Reverse Grade Pipe	18"	RCP	60	
201-2	Cemstone Redimix Plant	2004	922.0	923.8	917.0	Y	Reverse Grade Pipe	18"	RCP	60	
201-3	NA		925.0	927.3	925.0	NA	NA	NA	NA	NA	Overflow @ 927.9
201-4	NA		925.0	927.9	925.0	NA	NA	NA	NA	NA	Overflow @ 927.9
201-5	NA		925.0	927.9	925.0	NA	NA	NA	NA	NA	Overflow @ 927.3
202-1	Northern Oaks		921.8	923.5	917.8	Y	Baffled Weir	15"	HDPE	80	
202-2	Northern Oaks		921.5	922.5	918.5	Y	Baffled Weir	15"	HDPE	20	
202-3	West Side Estates	1998	925.0	925.5	922.0	Y	Baffled Weir	15"	HDPE	20	

**Table 11-3
Inventory of Existing Water Quality/Rate Control Ponds**

NUMBER	DEVELOPMENT	POND INFORMATION						OUTLET INFORMATION			COMMENTS
		YEAR BUILT	NORMAL ELEV.	FLOOD ELEV.	BOTTOM ELEV.	SKIMMER Y or N	SKIMMER TYPE	SIZE (inches)	TYPE	LENGTH (feet)	
202-4	West Side Estates	1998	924.0	925.5	918.0	Y	Baffled Weir	15"	RCP	NA	Equalizer culvert between 202-4 & 202-5
202-5	West Side Estates	1998	924.0	925.5	920.0	Y	Baffled Weir	15"	RCP	NA	Equalizer culvert between 202-5 & 202-4
202-6	Shade Tree Commerical Park		NA	925.0	913.0	NA	NA	NA	NA	NA	2 yr = 917.1
202-7	Shade Tree Commerical Park		NA	925.0	914.0	NA	NA	NA	NA	NA	2 yr = 915.2
203-1	Eagle Ridge	1999	911.5	912.5	906.0	Y	Skimmer Manhole	6"	PVC	38	
205-1	Northern Boundaries 2 nd		NA	913.5	909.0	N	NA	NA	OC	NA	
205-2	Northern Boundaries 2 nd		NA	912.5	909.0	N	NA	NA	OC	NA	
207-1	Eagle Ridge	1999	910.0	911.1	906.0	Y	Skimmer Manhole	6"	PVC	66	
Deer Lake Watershed											
301-1	Norlyn Farms	2005	NA	NA	920.0	N	NA	NA	OC	NA	Riprap overflow @ 921.7
301-2	Norlyn Farms	2005	NA	NA	923.0	N	NA	NA	OC	NA	Riprap overflow @ 925.5
303-1	Palisade Pines	1997	918.0	919.4	NA	N	NA	12"	CMP	30	
303-2	Palisade Pines	1997	NA	920.5	914.0	N	NA	11' wide	OC	NA	
305-1	Serenity Ponds 2nd Addition		NA	919.6	915.0	NA	NA	NA	NA	NA	Riprap overflow @ 920.0
306-1	Serenity Pond	1999	915.0	916.4	908.0	Y	Baffled Weir	15"	CPP	35	
306-2	Serenity Pond	1999	918.7	919.9	914.0	Y	Baffled Weir	15"	CPP	55	
306-3	Serenity Pond	1999	924.0	924.9	920.0	Y	Baffled Weir	15"	CPP	35	
309-1	NA		NA	NA	909.0	NA	NA	15"	RCP	NA	FES outlet @ 911.0
309-2	NA		908.1	NA	903.0	Y	Reverse Grade Pipe	24"	RCP	27	
309-3	NA		NA	NA	906.0	NA	NA	15"	RCP	NA	FES outlet @ 907.3
313-1	NA		905.5	908.0	896.0	Y	Reverse Grade Pipe	15"	RCP	26	
313-2	NA	2008	908.2	911.2	904.0	Y	Reverse Grade Pipe	15"	RCP	26	
313-3	NA	2007	909.7	911.4	908.0	Y	Reverse Grade Pipe	18"	CPP	290	

**Table 11-3
Inventory of Existing Water Quality/Rate Control Ponds**

NUMBER	DEVELOPMENT	POND INFORMATION						OUTLET INFORMATION			COMMENTS
		YEAR BUILT	NORMAL ELEV.	FLOOD ELEV.	BOTTOM ELEV.	SKIMMER Y or N	SKIMMER TYPE	SIZE (inches)	TYPE	LENGTH (feet)	
315-1	Cedar Trails 2 nd Addition	1997	NA	917.7	912.0	N	NA	NA	OC	NA	
315-2	Cedar Trails 2 nd Addition	1997	NA	917.4	910.0	N	NA	NA	OC	NA	
315-3	Oakwood Trails		912.6	916.2	910.0	Y	Reverse Grade Pipe	24"	CPP	557	
316-1	Hidden Haven Country Club Estates 3 rd Addition		907.0	910.0	903.0	Y	Reverse Grade Pipe	8"	PVC	40	
316-2	NA		911.0	912.7	907.0	Y	Reverse Grade Pipe	15"	RCP	27	
316-3	NA		903.1	909.3	900.0	Y	Reverse Grade Pipe	18"	RCP	287	
316-4	NA		913.0	915.8	909.0	Y	Reverse Grade Pipe	18"	RCP	241	
316-5	Victory Meadows	NA	914.3	910.0	NA	NA	NA	NA	NA	NA	
316-6	Victory Meadows	NA	916.3	912.0	NA	NA	NA	NA	NA	NA	
317-1	Klondike Ridge	2000	909.0	909.5	906.0	Y	Baffled Weir	NA	OC	NA	
317-2	Klondike Ridge	2000	910.5	911.0	904.0	Y	Baffled Weir	NA	OC	NA	Emergency overflow @ 911.0
317-3	Swensons Klodike Estates		916.0	920.4	916.0	NA	NA	NA	NA	NA	EOF @ 920.9
318-1	Cedar Trails East		896.5	NA	892.5	N	NA	12"	HDPE	20	Overflow @ 899.5
319-1	Cedar Trails East		918.9	921.9	913.9	N	NA	12"	RCP	96	
Crooked Brook Watershed											
400-1	NA	1999	NA	905.5	902.2	N	NA	9' wide	Riprap Overflow	13	
400-2	NA	1999	898.5	902.6	897.0	Y	Reverse Grade Pipe	18"	RCP	16	
403-1	Blueberry Hill 2 nd Addition		904.5	906.5	901.0	N	NA	15"	CMP	24	
406-1	NA	1999	NA	905.5	902.2	N	NA	9' wide	Riprap Overflow	13	
409-1	Sauter's Commercial Park		896.0	897.1	892.0	Y	Baffled Weir	12"	CMP	12	

**Table 11-3
Inventory of Existing Water Quality/Rate Control Ponds**

NUMBER	DEVELOPMENT	POND INFORMATION						OUTLET INFORMATION			COMMENTS
		YEAR BUILT	NORMAL ELEV.	FLOOD ELEV.	BOTTOM ELEV.	SKIMMER Y or N	SKIMMER TYPE	SIZE (inches)	TYPE	LENGTH (feet)	
410-1	NA		899.0	902.3	895.0	NA	NA	NA	NA	NA	Outlet FES @ 903.8
410-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Pond information unavaible
410-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Pond information unavaible
415-1	Briar Creek	2000	904.2	906.5	898.0	Y	Baffled Weir	12"	CPP	14	
415-2	Briar Creek	2000	904.4	907.1	898.0	Y	Baffled Weir	12"	CPP	33	
415-3	Briar Creek	2000	903.7	904.6	895.0	Y	Baffled Weir	12"	RCP	157	
415-4	Briar Creek	2000	904.0	904.7	895.0	N	NA	12"	CPP	135	
415-5	Briar Creek	2000	903.5	904.6	899.5	Y	Baffled Weir	12"	CPP	43	
423-1	Bear Hollows		900.8	901.7	NA	NA	NA	NA	NA	NA	Land locked
425-1	NA	1999	895.7	NA	892.4	Y	Reverse Grade Pipe	24"	RCP	32	
427-1	Classic Commerical Park		891.2	895.5	888.0	Y	Reverse Grade Pipe	36"	RCP	55	
427-2	Classic Commerical Park		892.0	896.9	882.0	Y	Reverse Grade Pipe	33"	RCP	254	
428-1	Bear Hollow		901.8	904.0	897.8	Y	Reverse Grade Pipe	12"	RCP	35	
428-2	Bear Hollow		902.5	903.4	898.5	Y	Reverse Grade Pipe	12"	RCP	33	
428-3	Bear Hollow		901.6	904.0	897.6	Y	Reverse Grade Pipe	12"	RCP	50	
428-4	Bear Hollow		902.0	903.5	898.0	Y	Reverse Grade Pipe	12"	RCP	35	
428-5	Bear Hollow		901.5	901.9	899.5	NA	NA	NA	NA	NA	Riprap overflow @ 901.5
428-6	Bear Hollow		901.8	903.0	897.8	Y	Reverse Grade Pipe	12"	RCP	37	

**Table 11-3
Inventory of Existing Water Quality/Rate Control Ponds**

NUMBER	DEVELOPMENT	POND INFORMATION						OUTLET INFORMATION			COMMENTS
		YEAR BUILT	NORMAL ELEV.	FLOOD ELEV.	BOTTOM ELEV.	SKIMMER Y or N	SKIMMER TYPE	SIZE (inches)	TYPE	LENGTH (feet)	
Sunrise River Watershed											
504-1	Meadows of Fish Lake		916.7	917.4	914.0	Y	Reverse Grade Pipe	15"	RCP	90	
504-2	Meadows of Fish Lake		917.0	918.5	912.0	Y	Reverse Grade Pipe	15"	RCP	34	
504-3	Meadows of Fish Lake		916.7	917.5	914.0	NA	NA	NA	NA	NA	Outlet @ 916.7
506-1	Austin Estates		920.4	NA	918.0	NA	NA	NA	NA	NA	2yr = 923.6
506-2	Austin Estates		920.0	923.8	918.0	NA	NA	NA	NA	NA	Riprap weir @ 923.8 to Pond 506-3
506-3	Austin Estates		920.0	NA	920.0	NA	NA	NA	NA	NA	2 yr = 924.1
506-4	Austin Estates 2nd Addition		920.0	922.9	916.0	NA	NA	NA	NA	NA	Land locked, 100yr B/B @ 924.9
507-1	Fawn Acres	1999	921.5	924.2	917.5	N	NA	15"	CMP	111	Equalizer culvert between 507-1 & 508-3
507-2	Oak Glen Estates	2008	924.0	925.6	918.0	Y	Reverse Grade Pipe	15"	RCP	129	
508-1	Fawn Acres	1999	922.0	920.9	918.0	Y	Baffled Weir	12"	CMP	26	
508-2	Fawn Acres	1999	922.0	923.4	918.0	Y	Baffled Weir	15"	CMP	32	
508-3	Fawn Acres	1999	921.5	924.2	918.5	Y	Baffled Weir	12"	CMP	36	Equalizer culvert between 508-3 & 507-1
512-1	Shenandoah Ridge	1998	NA	920.5	918.0	N	NA	10' wide	Grouted Riprap Overflow	15	
512-2	Shenandoah Ridge	1998	NA	920.5	918.0	N	NA	10' wide	Grouted Riprap Overflow	15	
Rice Lake Watershed											
600-1	Lone Pine Estates	1999	919.0	921.2	914.0	Y	Baffled Weir	18"	RCP	120	
604-1	The Park		908.5	NA	NA	NA	NA	NA	OC	NA	Top of berm @ 910.5
604-2	The Park		908.7	NA	NA	NA	NA	NA	OC	NA	Top of berm @ 909.7
604-3	The Park		908.4	NA	NA	NA	NA	NA	OC	NA	Top of berm @ 909.8
606-1	Oak Brook Acres		906.0	907.1	902.0	Y	Reverse Grade Pipe	15"	RCP	52.0	
606-2	Oak Brook Acres		906.0	907.6	902.0	Y	Reverse Grade Pipe	15"	RCP	12.0	

**Table 11-3
Inventory of Existing Water Quality/Rate Control Ponds**

NUMBER	DEVELOPMENT	POND INFORMATION						OUTLET INFORMATION			COMMENTS
		YEAR BUILT	NORMAL ELEV.	FLOOD ELEV.	BOTTOM ELEV.	SKIMMER Y or N	SKIMMER TYPE	SIZE (inches)	TYPE	LENGTH (feet)	
606-3	Oak Brook Acres		906.0	907.4	902.0	Y	Reverse Grade Pipe	15"	RCP	13.0	
606-4	Oak Brook Acres		908.2	911.0	904.0	Y	Reverse Grade Pipe	15"	RCP	38.0	
606-5	Oak Brook Acres		912.5	913.4	912.0	NA	NA	NA	NA	NA	Land locked
606-6	Oak Brook Acres		906.5	908.5	902.0	Y	Reverse Grade Pipe	15"	RCP	81.0	
606-7	Oak Brook Acres		906.8	908.6	902.0	Y	Reverse Grade Pipe	15"	RCP	20	
606-8	Oak Brook Acres		906.0	907.7	905.0	NA	NA	15"	RCP	130	FES
606-9	Oak Brook Acres		907.8	909.2	902.0	Y	Reverse Grade Pipe	15"	RCP	16	
606-10	Dellwood Acres		909.3	910.4	900.0	NA	NA	NA	NA	NA	EOF @ 913.8
606-11	Dellwood Acres		908.5	910.4	907.0	Y	Reverse Grade Pipe	15"	HDPE	143	
Coon Lake Watershed											
701-1	The Park		908.8	NA	NA	NA	NA	NA	OC	NA	Top of berm @ 910.8
701-2	Whispering Oaks 3 rd Addition	1998	912.0	912.7	910.0	Y	Baffled Weir	NA	Grouted Riprap Overflow	NA	
701-3	Whispering Oaks		NA	NA	913.0	N	NA	NA	OC	NA	Overflows to a Wetland Mitigation Area
701-4	Whispering Oaks 3 rd Addition	1998	913.0	914.4	911.0	Y	Baffled Weir	NA	Grouted Riprap Overflow	NA	
701-5	Whispering Oaks 3 rd Addition	1998	912.0	913.0	910.0	Y	Baffled Weir	NA	Grouted Riprap Overflow	NA	
702-1	The Park		908.2	NA	NA	NA	NA	NA	OC	NA	Top of berm @ 909.8
702-2	Whispering Oaks 3 rd Addition	1998	910.0	910.9	906.0	Y	Baffled Weir	NA	Grouted Riprap Overflow	NA	

**Table 11-3
Inventory of Existing Water Quality/Rate Control Ponds**

NUMBER	DEVELOPMENT	POND INFORMATION						OUTLET INFORMATION			COMMENTS
		YEAR BUILT	NORMAL ELEV.	FLOOD ELEV.	BOTTOM ELEV.	SKIMMER Y or N	SKIMMER TYPE	SIZE (inches)	TYPE	LENGTH (feet)	
702-3	Oakwood Meadows		910.8	911.7	910.0	Y	Weir Overflow	12"	PVC	35.0	
702-4	Oakwood Meadows		910.8	911.8	910.0	Y	Weir Overflow	12"	PVC	77.0	
702-5	Oakwood Meadows		910.8	911.7	910.0	Y	Weir Overflow	12"	PVC	25.0	
702-6	Oakwood Meadows		912.5	912.5	911.0	Y	Weir Overflow	12"	PVC	175.0	
702-7	Oakwood Meadows		910.8	911.5	910.0	Y	Weir Overflow	12"	PVC	20.0	
707-1	Larson's Oak Hills Plan 2		NA	NA	906.0	NA	NA	NA	OC	NA	
707-2	Larson's Oak Hills Plan 2		NA	NA	906.0	NA	NA	NA	OC	NA	
707-3	Larson's Oak Hills Plan 2		NA	NA	908.0	NA	NA	NA	OC	NA	
707-4	The Park		909.5	NA	NA	NA	NA	NA	OC	NA	Top of berm @ 911.5
707-5	The Park		909.5	NA	NA	NA	NA	NA	OC	NA	Top of berm @ 911.0
709-1	Kaite's Way		908.0	909.7	907.0	NA	NA	NA	NA	NA	Outlet FES @ 908.0
709-2	Kaite's Way		907.0	908.3	903.0	NA	NA	NA	NA	NA	Outlet FES w/weir @ 907.0
709-3	Kaite's Way		NA	905.7	903.5	NA	NA	NA	NA	NA	
709-4	Rhoden Addition		904.0	908.3	902.0	NA	NA	NA	NA	NA	EOF @ 908.6
709-5	Woodcroft	2007	906.6	908.3	902.0	Y	Reverse Grade Pipe	15"	RCP	16	
710-1	Peterson Ridge		904.0	906.4	903.0	NA	NA	NA	NA	NA	100 yr B/B = 911.4
Cedar Creek Watershed											
802-1	Pinecrest Estates		NA	913.0	908.0	N	NA	NA	OC	NA	
802-2	Cedar Creek Meadows		907.0	907.3	904.0	Y	Weir Wall	8"	PVC	15	Top of weir wall @ 907.0
802-3	Cedar Creek Meadows		912.4	914.3	910.0	Y	Reverse Grade Pipe	12"	RCP	125	
802-4	Shade Tree Crossing		910.0	914.2	910.0	NA	NA	NA	NA	NA	Land locked, 100yr B/B @ 916.6
802-5	Shade Tree Crossing		908.0	915.3	908.0	NA	NA	NA	NA	NA	Land locked, 100yr B/B @ 917.6
802-6	Shade Tree Crossing		914.0	915.6	910.0	Y	Reverse Grade Pipe	15"	HDPE	20	Weir overflow @ 915.6
802-7	Shade Tree Crossing		918.0	920.8	918.0	NA	NA	NA	Weir Overflow	NA	100yr B/B @ 921.8, Weir overflow @ 921.9

**Table 11-3
Inventory of Existing Water Quality/Rate Control Ponds**

NUMBER	DEVELOPMENT	POND INFORMATION						OUTLET INFORMATION			COMMENTS
		YEAR BUILT	NORMAL ELEV.	FLOOD ELEV.	BOTTOM ELEV.	SKIMMER Y or N	SKIMMER TYPE	SIZE (inches)	TYPE	LENGTH (feet)	
802-8	Birch Meadows 2nd Addition		NA	925.5	920.0	NA	NA	NA	NA	NA	Riprap overflow @ 925.5
802-9	Baltimore Cedar Creek		908.0	909.5	902.0	Y	Reverse Grade Pipe	15"	HDPE	28	

**Table 11-4
Inventory of Existing Wetland Mitigation Areas**

Wetland Mitigation Number	Mitigation Area (s.f.)	Year Built	Development	Location	
				Block Number	Lot Number
MA - 1	1,200		Northern Boundaries 2 nd	2	4
MA - 2	14,400	1999	Fawn Acres	3	1 & 2
MA - 3	17,000	1995	Whispering Oaks	3	7 & 8
MA - 4	13,100	1998	Country Haven Estates	1	1
MA - 5	7,000	1999	Eagle Ridge	2	1
MA - 6	NA	2004	Meadows of Fish Lake	NA	NA
MA - 7	14,930	2004	Cemstone Redimix Plant	1	1
MA - 8	3.35 Acres	2005	Classic Commercial Park	1	1

**TABLE 11-5
CAPITAL IMPROVEMENT PROGRAM**

Project Description		Year						Funding Source ¹
		2019	2020	2021	2022	2023	Beyond 2023	
A. SWPPP TASKS								
1	Distribute Educational Materials	\$440	\$440	\$440	\$440	\$440		SWUF
2	Coordination of Education Program	\$500	\$500	\$500	\$500	\$500		SWUF
3	Annual Public Meeting	\$580	\$340	\$340	\$340	\$340		SWUF
4	Solicit Public Input and opinion on the Adequacy of the SWPPP	\$170	\$170	\$170	\$170	\$170		SWUF
5	Consider Public Input	\$290	\$290	\$290	\$290	\$290		SWUF
6	Storm Sewer System Map	\$1,500	\$1,500	\$500	\$500	\$500		SWUF
7	Regulatory Control Program	\$680	\$680	\$680	\$680	\$680		SWUF
8	Illicit Discharge Detection	\$680	\$680	\$680	\$680	\$680		SWUF
9	Identification of Non Stormwater Discharges and Flows	\$680	\$680	\$680	\$680	\$680		SWUF
10	Ordinance or other Regulatory Mechanism	\$170	\$170	\$170	\$170	\$170		SWUF
11	Construction Site Implementation of Erosion and Sediment Control BMPs	\$340	\$340	\$340	\$340	\$340		SWUF
12	Waste Controls for Construction Site Operators	\$340	\$340	\$340	\$340	\$340		SWUF
13	Site Plan Review	\$340	\$340	\$340	\$340	\$340		SWUF
14	Reports of Stormwater Noncompliance	\$340	\$340	\$340	\$340	\$340		SWUF
15	Site Inspections and Enforcement	\$340	\$340	\$340	\$340	\$340		SWUF
16	Implementation of Structural and/or Non-structural BMPs	\$340	\$340	\$340	\$340	\$340		SWUF
17	Long-term Operation and Maintenance of BMPs	\$2,120	\$2,120	\$2,120	\$2,120	\$2,120		SWUF
18	Municipal Operations and Maintenance Program	\$1,260	\$1,260	\$1,260	\$1,260	\$1,260		SWUF
19	Street Sweeping	\$14,760	\$15,060	\$15,750	\$16,450	\$17,150		SWUF
20	Annual Inspection of All Structural Pollution Control Devices	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900		SWUF
21	Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900		SWUF
22	Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas	\$1,060	\$1,060	\$1,060	\$1,060	\$1,060		SWUF
23	Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures	\$4,420	\$4,420	\$4,420	\$4,420	\$4,420		SWUF
24	Record Reporting and Retention of all Inspections and Responses to the Inspections	\$1,060	\$1,060	\$1,060	\$1,060	\$1,060		SWUF
25	TMDL Implementation Review	\$1,500	\$1,500	\$1,500	\$10,000	\$10,000		SWUF
26	TMDL Implementation	\$0	\$0	\$0	\$10,000	\$10,000	\$30,000	SWUF
Subtotal		\$41,710	\$41,770	\$41,460	\$60,660	\$61,360	\$30,000	

**TABLE 11-5
CAPITAL IMPROVEMENT PROGRAM**

Project Description		Year						Funding Source ¹
		2019	2020	2021	2022	2023	Beyond 2023	
B. Annual WMO Expense								
25		\$23,672	\$24,145	\$24,628	\$25,121	\$25,623		SWUF
Subtotal		\$23,672	\$24,145	\$24,628	\$25,121	\$25,623	\$0	
C. Improvements For Future Municipal Services								
26	Future Improvements			\$300,000	\$300,000	\$300,000		All Funds
Subtotal		\$0	\$0	\$300,000	\$300,000	\$300,000	\$0	
D. Scheduled City Improvement Projects								
27	189th Avenue	\$50,000						MSACF
28	East Service Road		\$300,000					SCF
Subtotal		\$50,000	\$300,000	\$0	\$0	\$0	\$0	
E. Storm Sewer Improvements²								
29	Subwatershed 100						\$10,790	Dev
30	Subwatershed 201						\$10,270	Dev
31	Subwatershed 202						\$10,530	Dev
32	Subwatershed 203						\$10,530	Dev
33	Subwatershed 301						\$10,530	Dev
34	Subwatershed 306						\$8,450	Dev
35	Subwatershed 308						\$8,450	Dev
36	Subwatershed 313						\$11,310	Dev
37	Subwatershed 317						\$10,270	Dev
38	Subwatershed 410						\$10,270	Dev
39	Subwatershed 422						\$11,700	MSCAF
40	Subwatershed 425						\$19,500	MSCAF
41	Subwatershed 426						\$19,500	MSCAF
42	Subwatershed 427						\$1,950	Dev
43	Subwatershed 600						\$8,450	Dev
44	Subwatershed 703						\$8,450	Dev
Subtotal		\$0	\$0	\$0	\$0	\$0	\$170,950	

**TABLE 11-5
CAPITAL IMPROVEMENT PROGRAM**

Project Description		Year					Beyond 2023	Funding Source ¹
		2019	2020	2021	2022	2023		
F. Proposed Developments								
45	Viking Preserve	\$200,000						Dev
46	Future		\$150,000	\$150,000	\$150,000	\$150,000		Dev
Subtotal		\$200,000	\$150,000	\$150,000	\$150,000	\$150,000	\$0	
TOTALS		\$315,382	\$515,915	\$516,088	\$535,781	\$536,983	\$200,950	

¹ SWUF = Stormwater Utility Fund
 SCF = Street Capital Fund
 MSACF = Municipal State Aid Construction Fund
 Dev = Developer Funds

² Project timing will be based on development. Some projects may be constructed sooner than shown in the CIP.

12.0 Plan Amendments

This plan will be reviewed at five to ten-year intervals to determine whether updates are required to meet changing legal or physical conditions. Amendments may be either minor or major.

Minor amendments are amendments that do not change the goals, policies, management strategies, and management processes. Minor amendments include, but are not limited to the following:

- Updates to the storm drainage system based on construction or to correct errors or omissions.
- Changes to watershed divides provided they do not affect major watershed divides.
- Minor amendments as defined by Minn. Rules 8410.0020, Subp. 10 which reads as follows:
“. . . items such as recodification of the plan, revision of a procedure meant to streamline administration of the plan, clarification of the intent of a policy, the inclusion of additional data not requiring interpretation, or any other action that will not adversely affect a local unit of government or diminish a water management organizations' ability to achieve the plan's goals or implementation program.”

Minor amendments will be submitted to the affected WMO as required by respective WMO policy.

Major amendments will include:

- Modifications to the watershed divides or storm drainage system that change the projected rates and volume of flow.
- Modifications to the goals and policies.
- Major amendments, when required, will involve the same steps as approval of the original document.

13.0 Development Submittal Requirements

13.1 Purpose and Intent

This section of the plan is intended to provide Developer's Engineers with a standardized format for submittal of drainage plans and calculations and wetland delineation and mitigation reports to the City for review. A standardized format will provide the following:

- Reduce preparation time for submittals by providing direct guidelines for Developer's Engineers to follow.
- Reduce review time required by the City's Engineer by ensuring that a complete and comprehensive drainage plan and calculations are submitted.
- Ensure that the City will receive the best possible protection of its resources, which could be adversely affected by inadequate stormwater management planning.

13.2 General Requirements – Grading, Drainage, and Erosion Control Plan

Grading, Drainage, and Erosion Control Plans shall be provided by the Developer in accordance with the City Code. Several items critical to the review of the drainage system must be adequately depicted on the plan by the Developer's Engineer. The following key elements must be depicted on the plan:

13.2.1 Topography

Existing and proposed contours at a minimum of 2-foot intervals. A 1-foot contour interval or proposed spot elevations shall be used where conditions dictate. The determination of contour interval shall be made based upon clarity and readability of the plans.

13.2.2 Stormwater Basins

Infiltration and wet basin locations as depicted by the proposed contours. Normal level and 2-year, 10 year and 100 year flood water levels shall be depicted on the plan for each basin. Basins are required at each outfall point from the proposed plat. Perimeter berm elevation and width shall be clearly labeled on plan sheets.

Permanent wet detention basins, when used, may be utilized as construction detention basins, provided they are cleaned after permanent erosion control measures are established. Design features of the infiltration and wet detention basins shall be as described in this Plan.

13.2.3 Erosion Control Features

Locations of silt fence, bale checks, wood fiber blanket, rock construction entrances, storm drain inlet protection, outlet projection, rip rap, temporary seeding, permanent

seeding, sod, mulch, or other erosion control features proposed to be implemented for the project.

13.2.4 Wetland Delineation

Show the field delineated boundaries of all public waters and wetlands.

13.2.5 Storm Sewer Facilities

Storm sewer facilities, when utilized, shall be adequately depicted on the drawings. As a minimum, the following must be shown on the plan:

Storm sewer pipe length, grade, type of material, and size between each catch basin and manhole.

Catchbasin and manhole structural data including size or diameter, depth, and material of construction. A typical section depicting each different type of catchbasin or manhole used shall be shown on the drawing. Type of casting utilized shall be referenced for each catchbasin or manhole. Elevations for the top of inlet and each invert shall be referenced on the drawing.

A typical curb section for urban design streets shall be shown on the drawing.

If ditch sections are used, a typical section shall be shown on the drawing depicting bottom width and side slopes of the ditch.

Details of skimming structures utilized.

13.3 Storm Drainage System Submittal Requirements

The stormwater drainage report shall be comprised of the following sections to provide the City Engineer with adequate base information for which to review the report. The following data must be included in the report:

Title Page. The title page shall list the project name, project location, date prepared, and preparer's name, title, and company.

Table of Contents. The table of contents must provide a description of the major categories of the report and also list each hydrograph and reservoir report presented in the report.

Summary. The summary must provide descriptions of items critical to the review of the entire report. Assumptions and results of the calculations shall be included in the summary:

- A. Pre-Development Site Conditions (Existing)
 - 1. Total site area
 - 2. Delineation of sub-drainage areas, as appropriate.
 - 3. For each drainage area, or sub-drainage area, provide the following information:
 - a. Area in acres.

- b. Curve number (with justification)
- c. Time of Concentration (with justification)
- d. Runoff rate and runoff volume

B. Post-Development Site Conditions (Proposed)

- 1. Total site area
- 2. Delineation of sub-drainage areas, as appropriate.
- 3. For each drainage area, or sub-drainage area, provide the following information:
 - a. Area in acres
 - b. Curve number (with justification)
 - c. Time of Concentration (with justification)
 - d. Runoff rate and runoff volume

C. Comparison of pre-development to post-development runoff rates and volumes when rate control is required.

D. Discussion of temporary and permanent erosion control measures utilized.

E. A discussion of the storm sewer system, if applicable, to include a summary of flows to each catchbasin and the depth of water over each catchbasin during the ten year event.

Drainage maps: Drainage maps depicting pre-development and post-development conditions. The maps may be 22"x34" plans, but shall also be provided on 11"x17" reductions. The plans shall delineate drainage area and sub-drainage area boundaries. All areas shall be labeled and referenced to those presented in the report.

Computer Printouts: Drainage maps of all hydrograph and reservoir files shall be included at the back of the report for reference.

13.4 Wetland Delineation and Replacement

13.4.1 Wetland Delineation

When a regulated use or activity is proposed on a property which is within a wetland or wetland buffer area, a wetland delineation and report is required. The applicant shall provide a wetland report prepared by a qualified Wetland Specialist. The wetland report shall include the following:

- 1. Vicinity map;
- 2. A copy of a National Wetland Inventory Map identifying the wetlands on or adjacent to the site;
- 3. A site map setting forth all of the following:
 - a. Surveyed wetland boundaries based upon delineation;
 - b. Site boundary property lines and roads;
 - c. Internal property lines, rights-of-way, easements, etc.;

- d. Existing physical features of the site including buildings, fences, and other structures, roads, parking lots, utilities, water bodies, etc.;
 - e. Contours at the smallest readily available intervals, preferably at 2-foot intervals;
 - f. Hydrologic mapping showing patterns of surface water movement and know subsurface water movement into, through, and out of the site area.
 - g. Location of all test holes and vegetation sample sites, numbered to correspond with flagging in the field and field data sheets.
4. A report which discusses the following:
 - a. Location information (legal description, parcel number and address);
 - b. Delineation. The wetland boundaries on the site established by the delineation shall be staked and flagged in the field. If the wetland extends outside the site, the delineation report shall discuss all wetland areas within 150 feet of the site, but need only delineate those wetland boundaries within the site;
 - c. General site conditions including topography, acreage, and surface areas of all wetlands identified;
 - d. Hydrological analysis, including topography, of existing surface and known significant sub-surface flows into and out of the subject wetland(s);
 - e. Analysis of functional values of existing wetlands, including vegetative, faunal, and hydrologic conditions;
 5. A summary of proposed activity and potential impacts to the wetland(s);
 6. Recommended wetland group, including rationale for the recommendation;
 7. Site plan of proposed activity, including location of all parcels, tracts, easement, roads, structures, and other modifications to the existing site. The location of all wetlands and buffers shall be identified on the site plan.

13.4.2 Wetland Replacement

When wetland impacts cannot be avoided, the applicant shall prepare a Wetland Replacement Plan. The Wetland Replacement Plan components shall conform to the requirements of Minnesota Rules 8420.0530.

**Table 13-1
City of East Bethel Runoff Curve Numbers**

Cover Description	Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	A	B	C	D
Fully developed urban areas (vegetation established)				
Open space (lawns, parks, golf courses, cemeteries, etc.)				
Grass Cover > 75%	39	61	74	80
Grass Cover < 75%	49	65	77	82
Impervious areas:				
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	98	98	98	98
Streets and roads:				
Paved; curbs and storm sewers (excluding right-of-way)	98	98	98	98
Paved; open ditches (including right-of-way)	83	89	92	93
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
Water Surface:	100	100	100	100
Urban Districts:				
Commercial and business	NA ¹	92	94	95
Industrial	NA ¹	88	91	93
Residential districts by average lot size:				
1/8 acre or less (town houses)	NA ¹	85	90	92
1/4 acre	NA ¹	75	83	87
1/3 acre	NA ¹	72	81	86
1/2 acre	NA ¹	70	80	85
1 acre	59	68	79	84
2 acres and greater	55	65	77	82
Developing Urban Areas				
Newly graded areas (pervious areas only, no vegetation)	77	86	91	94
Undeveloped areas				
Agricultural land (all current uses)	55	67	77	82
Pasture, grassland, or range – continuous forage for grazing	49	65	77	82
Meadow – continuous grass, protected from grazing and generally mowed for hay	30	58	71	78
Brush – brush-weed-grass mixture with brush the major element	35	56	70	77
Woods – grass combination (orchard or tree farm)	43	65	76	82
Woods	36	60	73	79

¹Use of Type A soil is not allowed for this hydrologic condition.

14.0 Hydrologic/Hydraulic Models

14.1 General Overview

The need for stormwater modeling has increased as new construction changes the usage of the surrounding land. For example, replacing a stand of trees with a parking lot has a dramatic effect on runoff, greatly increasing its total volume and the rate of runoff. The potential for erosion and flooding is increased in areas downstream of construction. To prevent such damage, the runoff must be predicted before construction so that suitable steps can be taken to handle the runoff in a safe and effective manner.

HydroCAD, a hydrologic computer modeling program, was used for this management plan. Hydraulic evaluations of pipes, ditches, and other structures were performed using standard engineering procedures and are not discussed. The Flood Insurance Study for Cedar Creek was adopted by this plan and was not restudied.

To determine the critical flood levels for each subwatershed, runoff volumes from pervious and impervious areas were determined for storms with durations varying between one and four days and a snowmelt runoff event with a duration of ten days.

14.2 Hydrologic Model (HydroCAD)

Stormwater modeling and drainage design techniques can be divided into two basic groups:

- 1) Steady-state (constant flow) methods, such as the Rational Method as applied to storm sewer pipe networks.
- 2) Hydrograph generation and routing procedures designed to simulate the time varying nature of actual runoff.

Although HydroCAD can be used for steady-state designs, it is designed primarily as a hydrograph generation and routing program. It is based primarily on hydrology techniques developed by the Soil Conservation Service (SCS) combined with standard hydraulics calculations. For any given storm these techniques are used to generate hydrographs throughout a watershed.

14.2.1 Runoff Volumes

The volume and rate of runoff from a subwatershed are affected by the runoff curve number (CN). The soil group classification and antecedent soil moisture condition have an effect on the CN.

The soil group classification used for this study is Group B. Soil Group B contains shallow, sandy loams. The antecedent soil moisture condition (AMC) is a measure of how much rain falls five days before a 24-hour storm. For this study, AMC II was used. The total 5 day antecedent rainfall, for AMC II, is 0.5-1.1" during the dormant season

and 1.4 – 2.1” during the growing season. From this information a CN, which indicates the percentage of runoff from a subwatershed, can be determined. For this study, the CN's range from 50-100. With the CN and the rainfall distribution and duration information, the runoff from each subwatershed can be determined using the SCS TR-20 method.

14.2.2 Rainfall Distribution and Duration

Design storm characteristics must be determined for the model. This requires determining both the amount of precipitation and the intensity distribution of the precipitation. Technical Paper Numbers 40 and 49, and Hydro-35 published by the National Weather Service was used to determine the amount of precipitation.

Two separate rainfall intensity distributions were used for this study. The 1-day duration uses a SCS Type II distribution, which is used for the continental U.S. east of the Sierra Nevada and Cascade Mountains in California, Oregon, and Washington. The Type II distribution is based on the generalized rainfall depth-duration frequency relationships shown in technical publications of the Weather Bureau. The rainfall intensity distribution for the 2-day and 4-day storm durations was developed from F.A. Huff's fourth quartile, 50 percent probability hyetograph. This hyetograph is discussed in Huff's paper, "Time Distribution of Rainfall in Heavy Storms", published in Water Resources Research, Fourth Quarter, 1967.

14.2.3 Flood Elevations

After the hydrographs are created for each subwatershed, they are routed through storage areas (wetlands, lakes, detention ponds, etc.) and conveyance systems (storm sewers and ditches) and combined with other hydrographs at junctions with other subwatersheds. Specific characteristics of the water body and its outlet are input into the elevation-flood storage-discharge relationship used in the routing through each water body.

The storm duration that is critical for a watershed is dependent on the watershed size and slope, the volume of storage available in the system, and the outlet capacity. The critical duration is determined by routing several different duration storms of a given frequency and determining which duration produces the greatest peak discharge or flood elevation. A small watershed with little available storage will have a critical storm of shorter duration than a large watershed with abundant storage.

The elevations reported in this plan have been derived using limited topographic information and shall not be used for the purpose of establishing flood protection standards of new or existing structures. As development/building applications are submitted, the applicants will be required to further investigate the drainage patterns in accordance with Section 13.0 to more accurately determine flood elevations.

15.0 Glossary

1 Percent Chance Flood: The flood event that has an annual probability of being equaled or exceeded in any given year of 1 percent. This flood is the result of the critical duration 1 percent chance storm falling on the watershed. This is also commonly called the “100-year” flood.

10 Percent Chance Flood: The flood event that has an annual probability of being equaled or exceeded in any given year of 10 percent. This flood is the result of the critical duration 10 percent chance storm falling on the watershed. This is also commonly called the “10-year” flood.

100-Year Storms: Rainstorms of varying duration (e.g. 2-, 6-, 24-hour) and intensities (inches per hour) expected to recur on the average of once every one hundred years (1% frequency probability).

Acre-Foot: A measurement of water volume that is equal to 1 foot of water covering an area of 1 acre.

Algae: Simple rootless plants that grow in bodies of water in relative proportion to the amount of nutrients available. Algal blooms, or sudden growth spurts, can affect water quality adversely.

Aquifer: Saturated permeable geologic unit(s) that can transmit significant quantities of water under ordinary hydraulic gradients.

Bedrock Aquifer: One or more saturated geologic units composed of sedimentary, metamorphic, or igneous rock, that can transmit significant quantities of water under ordinary hydraulic gradients.

Best Management Practices (BMPs): Practices that can be used to control urban nonpoint source pollution.

BMP Fingerprinting: A series of techniques used to manage stormwater to minimize impacts to wetlands, forest, and sensitive stream reaches. Techniques include bypassing flow around a wetland and discharge of stormwater to a pretreatment pond around or adjacent to the wetland.

Bounce: The vertical elevation difference between the peak flood elevation and the wetland elevation.

County Ditch: An open channel to conduct the flow of water. (Minnesota Statutes, section 103E.005, Subd. 8). County ditch includes only those ditches which are part of the public drainage system as identified in the Anoka County Public Ditch Inventory dated January 1992.

Design Storm: A rainfall event of specific return frequency and duration (e.g., a storm with a 2-year frequency of occurrence and 24-hour duration) that is used to calculate the runoff volume and peak discharge rate.

Detention: The temporary storage of storm runoff used to control the peak discharge rates, and which provides gravity settling of pollutants.

Detention Pond: An impoundment that is normally dry but is used to store water runoff until it is released from the structure. Used to reduce the peak discharge from stormwater runoff.

Detention Time: The amount of time a parcel of water actually is present. Theoretical detention time for a runoff event is the average time parcels of water reside in the basin over the period of release.

Ditch Repair: To restore all or part of a drainage system, as nearly as practicable, to the same condition as when originally constructed and subsequently improved.

- Resloping of ditches, leveling and reseeding of waste banks, if necessary, to prevent further deterioration;
- Realignment of original construction, if necessary, and to restore the effectiveness of the system or prevent the drainage of a wetland;
- Routine operations that may be required to remove obstructions and maintain the efficiency of the drainage system;
- Restoration or enhancement of wetlands; and
- Wetland replacement under Minnesota Statutes, section 103G.222.

Erosion: Wearing away of the lands or structures by running water, glaciers, winds, and waves.

Eutrophication: The natural or artificial process of nutrient enrichment whereby a water body becomes filled with aquatic plants and low in oxygen content.

Evapotranspiration: Water evaporated and transpired from soil and plant surfaces.

Flood Fringe: The portion of the floodplain outside of the floodway.

Flood Profile: A graph of a longitudinal plot of water surface elevations of a flood event along a reach of a stream or river.

Floodplain: Lowland area adjoining water bodies which are susceptible to inundation of water during a flood.

Floodway: The channel of a watercourse and those portions of the adjoining floodplain which are reasonably required to carry and discharge the 100-year flood.

Freeboard: A factor of safety above a certain flood level. This typically is defined as the vertical separation (feet) between the design flood level (e.g., 1 percent chance flood elevation) and the lowest floor of a structure or the top of an embankment. Freeboard compensates for the many unknown factors (e.g., waves, ice, debris, etc.) that may increase flood levels beyond the calculated level.

Geology: The science which treats the origin, history, and structure of the earth, as recorded in the rocks; together with the forces and processes now operating to modify rocks.

Glacial Drift: Material which was deposited by glaciers.

Groundwater: Water underneath the ground surface that is under positive pressure.

Hydric Soils: Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrograph: A graph showing variation in the water depth or discharge in a stream or channel, over time, at a specified point of interest.

Hydrology: The applied science concerned with the waters of the earth in all its states – their occurrences, distribution, and circulation through the unending hydrologic cycle of: precipitation; consequent runoff, stream flow, infiltration, and storage; eventual evaporation; and reprecipitation.

Impervious Area: Impermeable surfaces, such as pavement or rooftops, which prevent the infiltration of water into the soil.

Infiltration: The entrance of water into the soil or other porous material through the interstices or pores of a soil or other porous medium.

Inundation Period: Time that flood waters temporarily stored in the wetland exceed the wetland elevation. Difference between the peak flood elevation and the wetland elevation.

Invert Elevation: The vertical elevation of a pipe or orifice in a pond which defines the water level.

Judicial Ditch: A public drainage system established under Chapter 106 of the Minnesota Statutes and under the jurisdiction of the district court or a watershed management organization.

Landlocked Lake or Basin: Area which has an outlet that is significantly higher than the normal water level of the lake, pond, or wetland.

Lateral Ditch: Any open channel or storm sewer drainage construction by branch or extension, or a system of branches and extensions, or a drain that connects or provides an outlet to property with an established drainage system (Minnesota Statutes, section 103E.005, subdivision 15). Lateral includes only those facilities which are connected to the Anoka County Ditch system as identified in the Anoka County Public Ditch Inventory dated January 1992.

Level of Protection: The amount of secondary stormwater runoff capacity required to avoid flood damage and provide for public safety.

Level of Service: The amount of primary stormwater runoff capacity required to avoid unusual hardship or significant interference with normal public activities (transportation, sanitary, or utilities).

Management Strategy: The specific physical, legal or administrative actions recommended or implemented based upon the established criteria and will achieve the policies and goals.

Nationwide Urban Runoff Program (NURP): A study initiated by the EPA in 1978 to develop a consistent database and set of recommendations to be used to make planning decisions about nonpoint pollution issues. This study included 28 projects across the United States that were completed independently under the direction of the EPA. This study has been used extensively in both the characterization of stormwater quality, and as a guide to implementation of management alternatives for stormwater treatment. The most often cited management option derived from this study is a detention basin referred to as a NURP pond. The NURP study provided recommendations for the size and shape of detention ponds to provide pollutant removal efficiency.

No Net Loss: No reduction in the area and value of a wetland from existing conditions.

Nonpoint Source Pollution: Pollution from any source other than any discernible, confined and discrete conveyances, including but not limited to surface runoff from agricultural, silvicultural, mining, construction, subsurface disposal and urban activities.

Normal Level: For basins, that water elevation maintained by a natural or man-made outlet.

Nutrients: Fertilizer, particularly phosphorous and nitrogen (the two most common components that run off in sediment).

On-Site Detention: A method of temporarily storing stormwater runoff at a development site in the form of wet or dry basins. While the primary objective is water quality control, significant reduction in outflow conveyor overloading is accomplished for high intensity, short duration storm events. This method is employed on developments when the regional detention basin approach is not available, usually due to site location of either facility.

Ordinary High Water (OHW) Level: The boundary of public waters and wetlands, and shall be an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high-water level is the elevation of the top of the bank of the channel. For reservoirs and flowages, the ordinary high-water level is the operating elevation of the normal summer pool.

Peak Discharge: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Percolation: Movement of water through soil layers of material.

Policies: The plans or course of action to be followed in achieving the goals.

Post-Disturbance Condition: The state of a site following crop or development establishment in which source and/or structural control measures have been implemented resulting in erosion and sedimentation control achieving soil loss limits.

Precipitation: The total measurable supply of water of all forms of falling moisture, including dew, rain, mist, snow, hail, and sleet; usually expressed as depth of liquid water on a horizontal surface in a day, month, or year, and designated as daily, monthly, or annual precipitation.

Primary Capacity: The volume and/or rate of stormwater runoff defined as that level of service provided by the primary system.

Primary System: The primary system conveys runoff from the more frequent events such as the 2 to 10-year events. In general, the system is composed of swales, ditches, gutters, and storm sewers.

Public Waters: Any waters as defined in Minnesota Statutes, section 105.37, subdivisions 14 and 15.

Reach: Longitudinal segments of a stream defined by natural or manmade restrictions. In an urban area the segments of the stream between two consecutive road crossings could typically constitute a reach.

Recharge: Replenishment of the groundwater system by natural or artificial means.

Recurrence Interval: The average interval of time, based on a statistical analysis of actual or representative stream flow records, which can be expected to elapse between floods equal to or greater than a specified stage or discharge. The recurrence interval is generally expressed in years.

Regional Detention Basin: A natural pond or wetland area, often modified by man, in which a minimum and permanent water level is maintained. During periods of stormwater runoff of various durations, the basin receives additional water, stores it temporarily, and releases it at a controlled rate(s). In addition to runoff flow equalization in reducing existing flooding problems, the basin serves pollutants from existing as well as planned development.

Retention: The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

Retention Facility: A permanent natural or manmade structure that provides for the storage of stormwater runoff by means of a permanent pool of water.

Riparian: A relatively narrow strip of land that borders a stream or river, often coincides with the maximum water surface elevation of the 100-year storm.

Runoff: That portion of the precipitation which is not absorbed by the deep strata but finds its way into the surface water system after meeting the demands of evapotranspiration.

Secchi Disc: A circular plate, used to measure the transparency or clarity of water by noting the greatest depth at which it can be visually detected. Its primary use is in the study of lakes.

Secondary Capacity: The volume and/or rate of stormwater runoff in excess of the primary capacity and defined as that level of protection provided by the secondary system.

Secondary System: The system is composed of all the pathways that runoff takes when the capacity of the primary system is exceeded and in general is composed of streets, swales, ditches, storm sewers, detention basins, creeks, streams and rivers.

Sediment: Solid matter carried by water, sewage, or other liquids.

Shoreland: Land located within the following distances from public water: 1,000 feet from the ordinary high-water level of a lake, pond, or flowage; and 300 feet from a river or stream, or the landward extent of a floodplain designated by ordinances on a river or stream, whichever is greater.

Source Control: The application of erosion techniques including but not limited to: mulching, seeding, sodding, and greenbelts.

Stormwater Runoff: The flow on the surface of the ground, resulting from precipitation in the form of rainfall or snowmelt.

Structural Control: The application of construction erosion techniques including but not limited to: sediment basins, silt fences, debris dams, dikes, terracing, riprap and diversions.

Swale: A natural depression or wide shallow ditch used to temporarily store, route, or filter runoff.

Time of Concentration: The time required for surface runoff from the most remote part of a drainage basin to reach the basin outlet.

Transpiration: The process by which plants dissipate water into the atmosphere from leaves and other surfaces.

Universal Soil Loss Equation: A method developed by the Agricultural Research Service, USDA, and used by Soil and Water Conservation Districts to estimate the average annual soil erosion based on rainfall, soil erodibility, slope of the land, length of slope, vegetative cover, and erosion control practices.

Water Bodies: Natural and man-made depressions and stormwater conveyance and storage facilities including wetlands, lakes, ponds, streams and rivers.

Watershed: A geographical area which collects precipitation and provides runoff to a particular collector such as a stream, lake, or marsh.

Worst-case Soil Loss Condition: The state of a site which is denuded and rough grade contours could create the greatest potential soil loss (e.g., a site in which all of the vegetative cover is removed, the existing or interim grades are unstabilized and could result in significant soil loss).

APPENDIX A

WMO Joint Powers Agreements

- **Sunrise River**
- **Upper Rum River**

AMENDED

SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION

JOINT POWERS AGREEMENT

THIS AMENDED JOINT POWERS AGREEMENT made and entered into as of the date of execution by and between the Local Government Units of the City of Columbus, City of East Bethel, City of Ham Lake and Linwood Township. The purpose of this Joint Powers Agreement is to establish a Water Management Organization to assist the member local units of government with surface water, ground water, water quality and water usage issues.

WHEREAS, the parties to this Agreement have authority pursuant to Minnesota Statutes, Chapter 471.59, to jointly or cooperatively, by agreement, exercise any power common to the contracting parties. Pursuant to Minnesota Statutes, Chapters 103B.201 to 103B.255, these local units of government have authority to jointly or cooperatively manage or plan for the management of surface water within a defined watershed; and

WHEREAS the parties to this Agreement desire to prepare a surface water management plan for the purpose of management and implementation of the programs identified by Minnesota Statutes, Chapters 103B.201 through 103B.255.

NOW, THEREFORE, the parties to this Agreement do mutually agree as follows:

SECTION I

General Purpose

1.1 It is the general purpose of the parties to this Agreement to establish a Water Management Organization to jointly and cooperatively develop a Watershed Management Plan for the purposes of (a) protecting, preserving, and using natural surface and groundwater storage and retention systems in the Sunrise River Watershed; (b) minimizing public capital expenditures needed to correct flooding and water quality problems; (c) identifying and planning for means to effectively protect and improve surface and groundwater quality; (d) assist with establishing more uniform local policies and official controls for surface and ground water management; (e) preventing erosion of soil into surface water systems; (f) promoting groundwater recharge; (g) protecting and enhancing fish and wildlife habitat and water recreational facilities; and (h) securing other benefits associated with the proper management of surface and groundwater. The plan and programs shall operate within the boundaries of the Sunrise River Watershed as set forth in Appendix 1 and 2, attached hereto (hereinafter "Area").

SECTION II

Sunrise River Watershed Management Organization

2.1 Establishment: There is hereby established the "Sunrise River Watershed Management Organization" whose membership shall be appointed in accordance with the provisions of this section and whose duties shall be to carry out the purposes contained herein. The Sunrise River Watershed Management Organization (hereinafter "Organization") shall be constituted as described in Section 2.2.

2.2 Membership Appointment: Each party to this Agreement shall appoint two (2) representatives to serve as members of the Organization board. Each representative of a party to this agreement who is current in the payment of operating costs shall have one (1) vote. Representatives appointed to the Organization board shall be evidenced by a resolution or certified copy of official meeting minutes of the governing body of each party and filed with the Organization.

2.3 Alternate Members: One alternate member of the Organization board may be appointed by appropriate resolution or certified copy of official meeting minutes of the governing body of each party to this Agreement filed with the Organization. The alternate member may attend any meeting of the Organization board when a regular member representing that party is absent and vote on behalf of the party the member represents. If an Organization board member is also an officer of the Organization, the alternate member shall not be entitled to serve as such officer.

2.4 Term: The members of the Organization board shall be filled by the governing body of the party whose membership position on the board is vacant. Removal of a board member or alternate board member shall be at the sole discretion of the appointing authority. The term of appointment is at the sole discretion of the appointing authority.

2.5 Vacancies: The Organization shall notify the Board of Water and Soil Resources of member appointments and vacancies in member positions within 30 days. A vacancy on the Organization board shall be filled by 90 days after the vacancy occurs by the governing body of the party whose membership position on the board is vacant.

Vacancies resulting from expiration of members' terms or other reasons shall be filled only after published notice of the vacancy once a week for two (2) successive weeks in a newspaper of general circulation in the watershed management organization area. The notices must state that the party is considering applications for appointment of a member to the Organization board and that persons interested in being appointed to serve on the board may submit their names to the appointing authority for consideration. A vacancy shall not be filled until at least 15 days have elapsed after the last published notice.

2.6 Compensation and Expenses: The Organization members shall not be entitled to compensation or reimbursement for expenses incurred in attending meetings, except to the extent that the governing body of a party may determine to compensate or reimburse the

expenses of the member(s) it appoints, in which case the obligation to make such payments shall be that of the party and not that of the Organization.

2.7 Officers: The Organization board shall elect from its membership a chair, a vice-chair, a secretary, and a treasurer. All such officers shall hold office for a term of one (1) year and until their successors have been qualified and duly elected by the board. An officer may serve only while a member of the Organization. A vacancy in an office shall be filled from the membership of the board by election for the remainder of the unexpired term of such office.

2.8 Duties of Officers: The duties of the officers of the Organization shall be as outlined in Parts 40 and 41, Article VII, Robert's Rules of Order, as the board deems necessary.

2.9 Quorum: Voting members of the Organization board representing a majority of the parties to this Agreement shall constitute a quorum. Less than a quorum may adjourn a scheduled meeting.

2.10 Meetings:

A. Meetings of the Organization board will be scheduled as needed, with the annual meeting held in February at the East Bethel City Hall, 2241 221st Avenue NE, East Bethel, MN 55011. Notice of all regular meetings shall be provided with a minimum of thirty (30) days advance notice of the meeting by the secretary of the Board to all parties to this Agreement. Such meeting notice shall be posted on the official notification board for each party to this agreement.

At the annual meeting the board, at a minimum, shall:

1. Elect officers for the next fiscal year;
2. Establish the annual budget and work plan;
3. Hear recommendations on amendments to this agreement and the watershed management plan;
4. Biennially renew or decide on contracts for professional, legal, and administrative services; and
5. Decide on meeting dates.

B. Special meetings may be held at the call of the chair or by any three (3) members of the board giving not less than 72 hours written notice of the time, place, and purpose of such meeting delivered by mailed or email to the residence of each Organization member and delivered to the City or Town Hall of each party to this Agreement.

C. All meetings of the board are subject to Minnesota Statutes, Section 13D and the notice provisions contained therein. Posted notice, when required, shall be given separately to each party to this Agreement.

2.11 Conduct of Meetings: The Organization board shall adopt rules of order and procedure for the conduct of its meetings; the board may adopt any such rules as a

majority of all voting members shall agree. Decisions by the board may not require more than a majority vote, except a decision on a capital improvement project may require a unanimous vote by all parties.

2.12 Organization Office: The office of the Organization shall be the East Bethel City Hall, 2241 221st Avenue NE, East Bethel, MN 55011. All notices to the Organization shall be delivered or served at said office.

SECTION III

Organization Powers and Duties

3.1 Authority: Upon execution of the Agreement by all parties, the Organization shall have authority provided for in Minnesota Statutes, Chapter 103B.211 through 103B.255, unless otherwise limited by this Agreement that provides for, in part:

A. The authority to prepare, adopt and implement a plan for the Sunrise River Watershed meeting the requirements of Minnesota Statutes, Chapter 103B.231.

B. The authority to review and approve local water management plans as provided in Minnesota Statutes, Chapter 103B.235, Subd. 3, Review.

C. Other powers necessary to exercise the authority under clauses A and B, including the power to enter into contracts for the performance of functions with governmental units or persons.

3.2 Watershed Management Plan: The Organization shall prepare a Watershed Management Plan for the Sunrise River Watershed. The plan shall be in compliance with Minnesota Statutes, chapter 103B.231, Subd. 4 as from time to time amended. This Chapter describes plan contents to include but not limited to the following:

A. Description of the existing physical environment, land use and development in the Sunrise River Watershed. It shall further describe the environment, land use and development proposed in existing local and metropolitan comprehensive plans; and

B. Present information on the hydrologic system in the Sunrise River Watershed and its components, including any drainage systems previously constructed under Minnesota Statutes, Chapter 103E, and existing and potential problems relating thereof; and

C. State objectives and policies, including management principles, alternatives and modifications, water quality, and protection of natural characteristics; and

D. Set forth a management plan, including the hydrologic and water quality conditions that will be sought and significant opportunities for improvement; and

E. Describe the effect of the Watershed Management Plan on existing drainage systems; and

F. Describe conflicts between the Watershed Management Plan and existing plans of local government units; and

G. Set forth an Implementation Program consistent with the Watershed Management Plan, which may include a Capital Improvement Program; and

H. Set out a procedure for amending the Watershed Management Plan. The plan shall be amended as required from time to time.

3.3 Employment: The Organization may contract for services, may contract services from parties to this Agreement, or may employ such other persons as it deems necessary. Where staff services of a party are contracted, such services shall not reduce the financial commitment of such party to the operating fund of the Organization unless the Organization so authorizes.

3.4 Committees: The Organization may appoint such committees and subcommittees as it deems necessary. The Organization shall establish a citizen advisory committee and technical advisory committee and promote other means of public participation.

Citizen and/or technical advisory committees will be formed from time-to-time as deemed appropriate by the Organization board and shall be issue-specific. Committees may be formed that include both citizens and technical experts. Committees shall operate by seeking consensus, while noting any dissenting opinions. Committee findings shall be reduced to writing and submitted to the Organization board. In all cases, committees shall be advisory in nature and their findings shall be referred to the Organization board. Issues that may warrant formation of advisory committees include but are not limited to amendments or updates to the Organization's Watershed Management Plan; lake level or water quality issues; a total maximum daily load (TMDL) impaired waters study or implementation of the study; capital improvement projects; major hydrological changes in the watershed and others as deemed appropriate by the Organization board.

Technical advisory committees shall include technical experts in areas relating to land use, natural resources, pollution control, and soil and water resources.

Citizen advisory committees shall include residents and elected officials from the affected area including but not limited to homeowners; business owners; lake association or lake improvement district representatives; and, others, as deemed appropriate by the Organization Board.

All advisory committees shall include at least one Organization board member.

3.5 Rules and Regulations: The Organization may prescribe and promulgate such rules and regulations as it deems necessary or expedient to carry out its powers and duties and the purpose of the Agreement.

3.6 Review and Recommendations: Where the Organization is authorized or requested to review and make recommendations on any matter relating to the Watershed Management Plan, the Organization shall act on such matter within 60 days of receipt of the matter referred. Failure of the Organization to act within 60 days shall constitute approval of the matter referred, unless the Organization requests and receives from the referring unit of government an extension of time to act on the matter referred. Such extension shall be in writing and acknowledged by both parties.

The Board shall adopt an appeal procedure for any party aggrieved by a decision of the Board or an alleged failure to implement the Plan pursuant to Minnesota Statutes, Chapter 103B.231, Subd. 13.

3.7 Ratification: The Organization may, and where required by this Agreement shall, refer matters to the governing bodies of the parties for review, comment or action

3.8 Financial Matters:

A. Method of Operation: The Organization may collect and receive money and contract for services subject to the provision of the Agreement from the parties and from any other sources approved by the Organization. The organization may incur expenses and make disbursements necessary and incidental to the effectuation of the purposes of this Agreement. Funds may be expended by the Organization in accordance with procedures established herein. Checks shall be signed by the chair or treasurer. Other legal instruments shall be executed on behalf of the Organization by the chair or vice-chair and an appointed Board member.

B. Operating Funds. On or before June 1st of each year, the Organization shall prepare a work plan and operating budget for the following year. The annual budget shall provide details to support the proposed revenues and expenditures for the Organization. This detail shall be sufficient to meet standard budget and/or accounting principles generally recognized for governmental organizations. Expenditures may include administrative expenses, plan development costs, review expenses, capital improvement costs authorized in Section 3.12, and insurance costs as authorized in Section 3.14. Upon the approval of a majority of the partners of this agreement, the budget shall be recommended to the parties for ratification along with a statement showing each party's proposed share of the budget. The budget shall be implemented only after ratification by all parties to this Agreement. Failure to ratify or pay its share of the budget by any party to this Agreement shall be subject to the procedures in Section 3.6. Each party's share of the operating cost is based on 50% of their portion of the watershed's Total Market Value (TMV) and 50% of their portion of the Total Taxable Watershed Acreage (TWA).

Work Plan - $((PA / WA) + (PV / WV)) / 2$ = the party's percentage share of the organization's operating budget.

PA = Party's area within the watershed organization area

WA = watershed organization area

PV = party's market valuation within the watershed organization area

WV = market valuation of the watershed organization area

Operating Costs - Total amount to be divided equally between members of the Joint Powers Agreement. Operating costs per the operating budget are defined as copies, postage, recording secretary fees, insurance, and administrative fee charged to each member community.

After ratification by the organization, the Organization Secretary shall certify the recommended budget to each party on or before June 1 of each year together with a statement showing the budgeted amounts applicable to each party. Each party shall pay over to the Organization the amount owing based on invoices presented for services rendered. Amounts due and owing shall be paid by parties to this Agreement within 30 days of the invoice.

C. Review Services: When the Organization is authorized or requested to undertake a review and submit recommendations to a party as provided in this Agreement, the Organization shall conduct such review, without charge, except as provided below. Where the project size and complexity of review are deemed by the Organization to be extraordinary and substantial, the Organization may charge a fee for such review services, the amount to be based upon direct and indirect costs attributable to that portion of review services determined by the Organization to be extraordinary and substantial. Where the Organization determines that a fee will be charged for extraordinary and substantial review services, or where the flowage enters the Sunrise River, but the party is not a member of the Sunrise River Watershed Management Organization, the party to be charged shall receive written notice from the Organization of the services to be performed and the fee therefore, prior to undertaking such review services. Unless the party to be charged objects within fifteen (15) days of receipt of such written notice to the amount of the fee to be charged, such review services shall be performed and the party shall be responsible for the cost thereof. If the party to be charged objects to the proposed fee for such services with fifteen (15) days and the party and the Organization are unable to agree on a reasonable alternative amount for review services, such extraordinary and substantial review services shall not be undertaken by the Organization. Payment for such services shall be in advance of any work performed.

3.9 Annual Audit. The Organization shall annually prepare a comprehensive financial report on operations and activities. An annual audit, by an independent accounting firm or the State Auditor, shall be provided for that includes a full and complete audit of all books and accounts the Organization is charged with maintaining. Such audit shall be conducted in accordance with generally accepted auditing principles and guidelines. A copy of the annual financial report and auditor's statement shall be provided to all parties to this agreement and to the Board of Water and Soil Resources no later than June 30th of each year. The report to the Board of Water and Soil Resources shall include an annual

activity report. All of its books, reports and records shall be available for and open to examination by any party at all reasonable times.

3.10 Gifts, Grants, Loans. The Organization may, within the scope of this Agreement, accept gifts, may apply for and use grants of money or other property from the United States, the State of Minnesota, a local government unit or other governmental unit or organization or any person or entity for the purpose described herein. The Organization may enter into any reasonable agreement required in connection therewith. The Organization shall comply with any laws or regulations applicable to grants, donations and agreements. The Organization may hold, use, and dispose of such money or property in accordance with the terms of the gift, grant, or agreement relating thereto.

3.11 Contracts. The Organization may make such contracts and enter into any such agreements as it deems necessary to make effective any power granted to it by this Agreement. Every contract for the purchase or sale of merchandise, materials, or equipment by the Organization shall be let in accordance with the Uniform Municipal Contracting Law, Minnesota Statutes, Section 471.345 and the Joint Exercise of Powers Statute, Minnesota Statutes, Section 471.59. No member or employee of the Organization or officer or employee of any of the parties shall be directly or indirectly have an interest in any contract made by the Organization.

3.12 Works of Improvement: Works of improvement for protection and management of the natural resources of the Area, including, but not limited to, improvements to property, land acquisition, easements, or right-of-way, may be initiated by:

A. Recommendation of the Organization to a party or parties; or

B. Petition to the Organization by the governing body of a party or parties.

Where works of improvement are recommended by the Organization, the Organization shall first determine whether such improvement will result in a local or regional benefit to the area. Where the Organization determines that the benefits from the improvement will be local or not realized beyond the boundaries of the party in which the improvement is to be established, the Organization may recommend such improvement to the governing body of the unit of government which the Organization determines will be benefited. The recommendation shall include the total estimated cost of the improvement and a detailed description of the benefits to be realized.

Where the Organization determines that the benefits from the improvement will be beyond the local unit or beyond the boundaries of the party in which the improvement is to be established, the Organization may recommend such improvement to each party to this Agreement which the Organization determines will be benefited thereby. The recommendation of the Organization shall include the total estimated cost of the improvement, a description of the extent of the benefits to be realized by each party to this Agreement and the portion of the cost to be borne by each party benefited in accordance with the benefit of party to this Agreement.

Each party to whom the Organization submits such recommendation shall respond within 60 days from receipt of such recommendation. Where the Organization determines that the benefits of such improvement will be local, the unit of government to whom such recommendation is made may decline to ratify and undertake said improvement. Where the Organization determines that the benefits of such improvement will be regional, all Parties to this Agreement must ratify the project proposal before any project is moved forward by the Organization. Should the project not be ratified by all Parties to this Agreement, the Organization shall continue to review and recommend alternative methods of cooperation and implementation among those parties ratifying the recommendation of the Organization, unless and until the Organization determines that said improvement is no longer feasible.

When works of improvement are initiated by a Party to this Agreement, a copy of the proposed project shall be submitted to the Organization for review and comment. The Organization shall review and make recommendations on the proposed improvement and its compliance with the Organization's management plan in accordance with the provisions of Section 3.5 of this Agreement.

When a proposed improvement may be eligible for federal or state funds as a cost-share project, the Organization shall receive the approval of all Parties to this Agreement prior to submission of any grant request. No member Party shall unreasonably withhold approval for a grant application. All improvements that are considered for state or federal grant funding that have a local or member share (matching funds) must be submitted for approval in advance of the proposed grant award. All improvements that are considered for state or federal grant funding shall be presented to each Party to the Agreement for review, comment and approval and shall provide details to include projects scope, estimated cost, estimated matching share, benefits to be derived and project timing.

3.13 Claims. The Organization or its agents may enter upon lands within or without the Sunrise River Watershed to make surveys and investigations to accomplish the purpose of the Organization. The Organization shall be liable for actual damages resulting there from. But every person who claims damages shall serve the Chairperson or Secretary of the Organization with a notice of claim as required by Minnesota Statutes, Section 466.05. The Organization shall obtain court orders authorizing and directing such entries when necessary due to refusals of landowners to allow the same.

3.14 Indemnification and Insurance. Any and all claims that arise or may arise against the Organization, its agents or employees as a consequence of any act or omission on the part of the Organization or its agents or employees while engaged in the performance of this Agreement shall in no way be the obligation or responsibility of the parties. The Organization shall indemnify, hold harmless and defend the parties, their officers and employees against any and all liability, loss, costs, damages, expenses, claims, or actions, including attorney's fees which the parties, their officers, or employees may hereafter sustain, incur, or be required to pay, arising out of or by reason of any act or omission of the Organization, its agents or employees in the execution, performance, or failure to

adequately perform the Organization's obligations and understandings pursuant to the Agreement.

The Organization agrees that in order to protect itself as well as the parties under the indemnity provision set forth above, it will at all times during the term of this Agreement keep in force the following insurance policies in the limits specified.

A. Commercial General Liability/Professional Liability: \$1,250,000 per incident and shall include the following endorsements:

B. Automobile Coverage (\$0)

C. Worker's Compensation Coverage (statutory minimum)

The minimum liability limits shall be increased to the statutory limits provided for member local units of government in Minnesota Statutes.

Any policy obtained and maintained under this clause shall provide that it shall not be cancelled, materially changed or not renewed without a minimum of thirty (30) days prior notice thereof to each of the parties.

Prior to the effective date of this Agreement, and as a condition precedent to this Agreement, the Organization will furnish the parties with certificates of insurance listing each party to the Agreement as an additional insured.

3.15 General: The Organization may take all such other actions as are reasonably necessary and convenient to carry out the purpose of this Agreement.

SECTION IV

Mediation

4.1 The parties agree that any controversy that cannot be resolved between parties shall be submitted to for mediation. Mediation shall be conducted by a mutually agreeable process by all parties.

SECTION V

Termination of Agreement

5.1 This Agreement may be terminated by approval of two-thirds vote of the governing bodies of each party hereto, provided that all such approvals occur within a ninety (90) day period. Withdrawal of any party may be accomplished by filing written notice with the Organization and the other parties sixty (60) days prior to the effective date of termination. No party may withdraw from this Agreement until the withdrawing party has met its full financial obligations through the effective date of such withdrawal.

SECTION VI

Dissolution of Organization

6.1 The Organization shall be dissolved under any of the following conditions:

A. Upon termination of this Agreement;

B. Upon unanimous agreement of all parties; or

C. Upon the membership of the Organization being reduced to fewer than three (3) parties.

D. Process. At least 90 days notice of the intent to dissolve shall be given to affected counties and the Board of Water and Soil Resources. Upon dissolution, all personal property of the Organization shall be sold, and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the parties. Such distribution of Organization assets shall be made in proportion to the total contributions to the Organization for such costs made by each party. All payments due and owing for operating costs under Section 3.8, B, or other unfilled financial obligations, shall continue to be the lawful obligation of the parties.

SECTION VII

Amendment

7.1 The Organization may recommend changes and amendments to this Agreement to the governing bodies of the parties. Amendments shall be adopted by all governing bodies of the parties. Adopted amendments shall be evidenced by appropriate resolutions or certified copies of meeting minutes of the governing bodies of each party filed with the Organization and shall, if no effective date is contained in the amendment, become effective as of the date all such filings have been completed.

SECTION VIII

Counterparts

8.1 This Agreement shall be executed in several counterparts and all so executed shall constitute one Agreement, binding on all of the parties hereto. Each party to the agreement shall receive a fully executed copy of the entire document following adoption by all parties.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the 2nd day of March, 2010.

CITY OF COLUMBUS

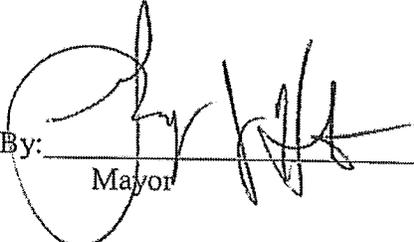
By: Michael Mettler
Mayor

Dated: 3/02/2010

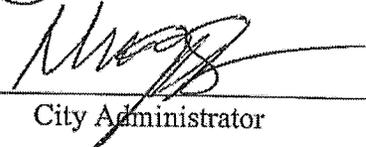
By: Elizabeth Kinosh
City Clerk

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of
the 17th day of March, 2010.

CITY OF EAST BETHEL

By: 
Mayor

Dated: March 17, 2010

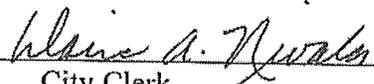
By: 
City Administrator

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of
the 10 day of February, 2010.

CITY OF HAM LAKE

By: 
Mayor

Dated: 2/10/10

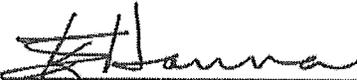
By: 
City Clerk

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of
the 4 day of April, 2010.

LINWOOD TOWNSHIP

By: 
Board Chair

Dated: 4-13-2010

By: 
Township Clerk

SRWMO JPA Appendix 1

SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION
LEGAL DESCRIPTION OF SUBJECT PROPERTY

All of Linwood Township, Anoka County.

That part of East Bethel Township, Anoka County lying Easterly of the following described line:

Beginning on the Anoka and Isanti County Line at the Northwest corner of East Half of East Half of Section 25, Township 34 North, Range 23 West, Anoka County, Minnesota; thence South along the West line of East Half of East Half of Section 25 and East Half of East Half of Section 36 to the Southeast corner of Northwest Quarter of Northeast Quarter of Section 36; thence Southwesterly in a straight line to the intersection of Durant Street and 231st Lane NE on the East line of Section 35, Township 34 North, Range 23 West, thence South along Durant Street to 229^h Avenue at the Northeast corner of Section 2, Township 33 North, Range 23 West; thence West along 229^h Avenue and North line of Section 2 to East Bethel Boulevard at the Northwest corner of Section 2; thence Southerly along East Bethel Boulevard to 221st Avenue and the North line of Section 11, Township 33 North Range 23 West; thence in a straight line to East Bethel Boulevard at the Northwest corner of the Southwest Quarter of Section 11; thence Southerly along East Bethel Boulevard to the center of Section 22, Township 33 North Range 23 West; thence in a straight line to the Northwest corner of the Southeast quarter of the Southwest Quarter of Section 22. Thence South along the West line of East Half of Southwest Quarter of Section 22 and the East Half of Northwest Quarter of Section 27 to the Southwest corner of East Half of Northwest Quarter Section 27;

Thence West along the North line of Southwest Quarter Section 27 to the West line of Section 27; thence South along the West line of Sections 27 and 34 to the Northeast corner of the Southeast Quarter of Section 33, Township 33 North, Range 23 West:

Thence West along the North line of the Southeast Quarter of Section 33 to the centerline of County Road No. 68 (Greenbrook Drive); thence Southerly along the centerline of County Road No. 68 to the South line of Section 33, which is also the South line of East Bethel, and the North line of Ham Lake; and there terminating.

That part of Columbus Township, Anoka County lying Northerly of the following described line:

Beginning at the West line of Section 6, Township 32 North, Range 22 West, at the Northwest corner of the South Half of Section 6, which is the Northerly line of Coon Creek Watershed District; thence Easterly along the Northerly line of the South Half of Section 6 to the Southwest corner of East Half of Northeast Quarter of Section 6; thence North along the West line of East Half of Northeast Quarter to the Northwest

corner of the East Half of Northeast Quarter; thence East along the North line of Section 6 to the Southwest corner of Section 32, Township 33 North, Range 22 West;

Thence North along the West line of Section 32 to the Northwest corner of the South Half of the South Half of Section 32, thence Easterly along the North line of South Half of South Half to the East line of Section 32; thence Southerly along the Easterly line of Section 32 and Section 5, Township 32 North, Range 22 West, to the Southwest corner of Northwest Quarter of Section 4; thence Easterly along the South line of the Northwest Quarter to Northwest corner of East Half of Southwest Quarter; thence Southerly along the West line of East Half of Southwest Quarter to South line of Section 4; thence Easterly along the South line of Section 4 to the Northeast corner of Northwest Quarter of Section 9;

Thence Southerly along the East line of Northwest Quarter to Northeast corner of Southwest Quarter, of Section 9; thence, departing from the boundary of Coon Creek Watershed District to follow the Northerly line of Rice Creek Watershed District, Southerly on the East line of the Southwest Quarter to the Southeast corner of the Northeast Quarter of the Southwest Quarter; thence Easterly on the North line of the South Half of the Southeast Quarter to the Northeast corner of the South Half of the Southeast Quarter of Section 9; thence Northerly on the West line of Section 10 to the Northwest corner of the South Half of the Northwest Quarter of Section 10;

Thence Easterly on the North line of the South Half of the North Half of Section 10 and South Half of the Northwest Quarter of Section 11 to the Northeast corner of the South Half of the Northwest Quarter of Section 11; thence Northerly on the West line of the East Halves of Sections 11 and 2 to the Northwest corner of South Half of Southeast Quarter of Section 2; thence Easterly on the South line of North half of Southeast Quarter of Section 2 to a point of intersection with the Southerly extension of the East line of Lot 1, Block 2, (Hansen Farms); thence North on said line to the Northeast corner of Lot 1, Block 2, (Hansen Farms); thence Northeasterly to the Southeast corner of Lot 8, Block 1, (Hansen Farms); thence North along the East line of Lot 8, Block 1, (Hansen Farms) to the Northeast corner of Lot 8, Block 1, (Hansen Farms) at the North line of South Half of Section 2; thence Easterly on the North line of the South Halves of Section 2 and 1 to the Northeast corner of the Southwest Quarter of Section 1; thence Southerly on the East line of the Southwest Quarter to the Southeast corner of the Southwest Quarter; thence Easterly on the North line of Section 12 to the Northeast corner of the West Half of the Northeast Quarter of Section 12;

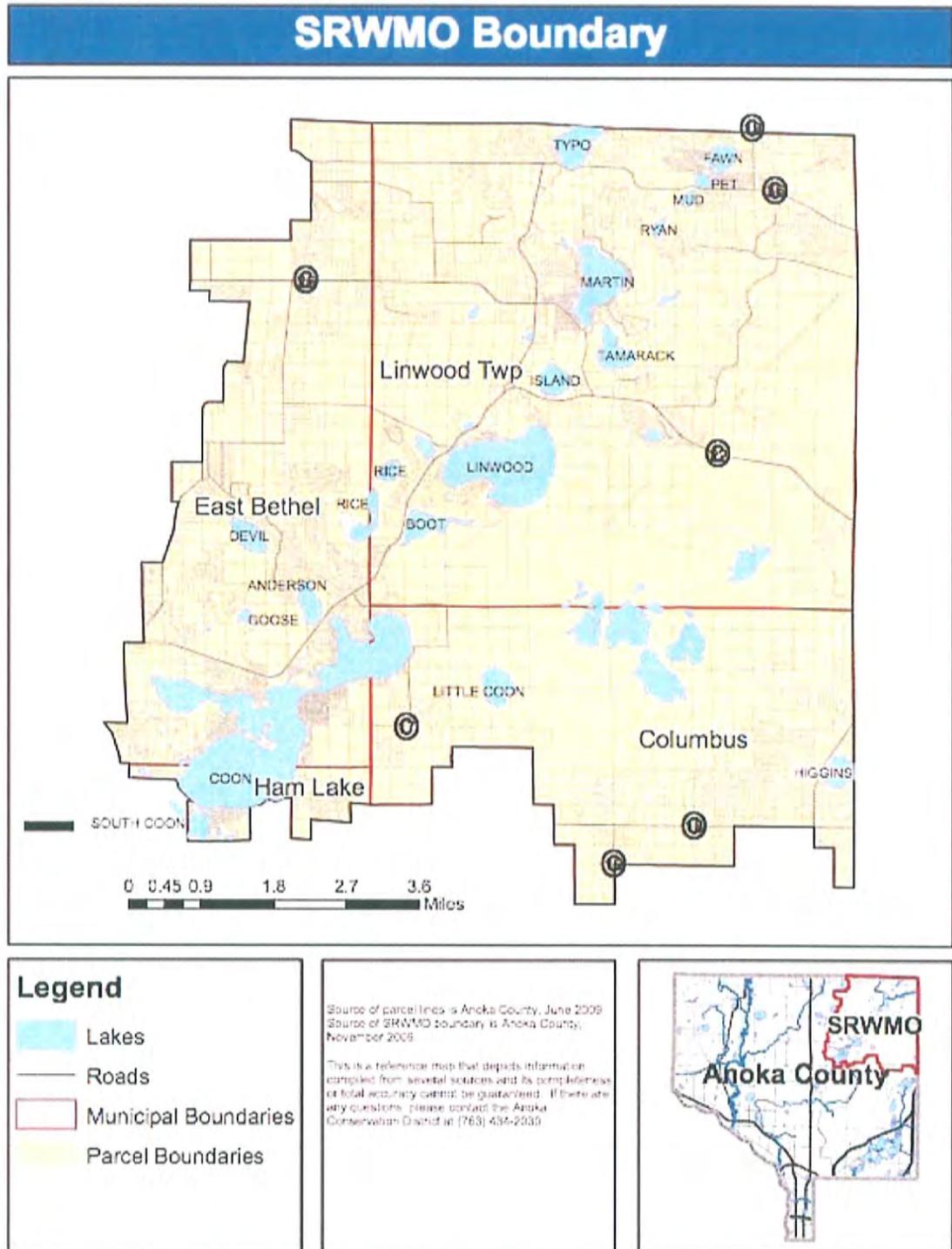
Thence Southerly on the East line of the West Half of the Northeast Quarter to the Southeast corner of the West Half of the Northeast Quarter; thence Easterly on the North line of the Southeast Quarter to the Northeast corner of the Southeast Quarter; this point being on the East boundary of Columbus Township, and the East boundary of Anoka County; and there terminating.

That part of Ham Lake, Anoka County described as follows:

Government Lot 1 and Government Lot 2 Section 1, the Northeast Quarter of Section 1, the Northwest Quarter of the Southeast Quarter of Section 1, the Southeast Quarter of the Northwest Quarter of Section 1, the North Half of the Southwest Quarter of Section 1, the Southwest Quarter of the Southwest Quarter of Section 1 and that part of Government Lot 1 of Section 2 lying North of the Southeast Quarter, Government Lot 3 and Government Lot 4, Section 2 and Government Lot one and Government Lot 3 in Section 3, the Southeast Quarter of the Southeast Quarter of Section 3, that part of Government Lot 2 in Section 3 lying East of the West Half of the Northeast Quarter, all in Township 32 North, Range 23 West.

That part of Forest Lake Township, Washington County lying Westerly of the following described line:

The center line of Elmcrest Ave N within the Northeast Quarter of Section 6, Township 32 North, Range 21 West.



AMENDED
UPPER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION
JOINT POWERS AGREEMENT

THIS AGREEMENT, made and entered into as of the date of execution by and between the Local Government Units of:

Town of Burns, City of Bethel, City of East Bethel, City of Ham Lake, City of Oak Grove and City of St. Francis for the establishment of a watershed management organization.

WITNESSETH:

WHEREAS, the parties to this Agreement have authority pursuant to Minnesota Statutes, Section 471.59 to jointly or cooperatively by agreement exercise any power common to the contracting parties and pursuant to Minnesota Statutes, Sections 103B.201 to 103B.255 have authority to jointly or cooperatively manage or plan for the management of surface water; and

WHEREAS, the parties to this Agreement desire to prepare a surface water management plan for the purpose of management and implementation of the programs required by Minnesota Statutes, Sections 103B.201 to 103B.255.

NOW, THEREFORE, the parties to this Agreement do mutually agree as follows:

SECTION I

General Purpose

1.1 It is the general purpose of the parties to this Agreement to establish an organization to jointly and cooperatively develop a Watershed Management Plan and an Implementation Program and a Capital Improvement Program for the purposes of (a)

protecting, preserving and using natural surface and groundwater storage and retention systems in the Upper Rum River Watershed; (b) minimizing public capital expenditures needed to correct flooding and water quality problems; (c) identifying and planning for means to effectively protect and improve surface and groundwater quality; (d) establishing more uniform local policies and official controls for surface and groundwater management; (e) preventing erosion of soil into surface water systems; (f) promoting groundwater recharge; (g) protecting and enhancing fish and wildlife habitat and water recreational facilities; and (h) securing the other benefits associated with the proper management of surface and groundwater. The plan and programs shall operate within the boundaries of the Upper Rum River Watershed as set forth in Exhibit 1, attached hereto (hereinafter "Area").

SECTION II

Upper Rum River Watershed Management Organization

2.1 Establishment: There is hereby established the "Upper Rum River Watershed Management Organization" whose membership shall be appointed in accordance with the provisions of this section and whose duties shall be to carry out the purposes contained herein.

The Upper Rum River Watershed Management Organization (hereinafter "Organization") shall be constituted as described in Section 2.2

2.2 Membership Appointment: Each party to this Agreement shall appoint two (2) representatives to serve as members of the Organization board. Each representative of a dues-paying party

shall have one (1) vote. Representatives to the Organization board shall be evidenced by a resolution of the governing body of each party, filed with the Organization.

2.3 Alternate Members: One alternate member of the Organization board may be appointed by appropriate resolution of the governing body of each party to this Agreement, filed with the Organization. The alternate member may attend any meeting of the Organization board when a regular member representing that party is absent and vote on behalf of the party the member represents. If an Organization board member is also an officer of the Organization, the alternate member shall not be entitled to serve as such officer.

2.4 Term: The members of the Organization board shall be filled by the governing body of the party whose membership position on the board is vacant; a member may be removed by the governing body by whom appointed for just cause.

2.5 Vacancies: The Organization shall notify the Board of Water and Soil Resources of member appointments and vacancies in member positions within 30 days. A vacancy on the Organization board shall be filled by 90 days after the vacancy occurs by the governing body of the party whose membership position on the board is vacant. Vacancies resulting from expiration of members' terms and other reasons shall be filled only after published notice of the vacancy once a week for two (2) successive weeks in a newspaper of general circulation in the watershed management organization area; the notices must state that the party is considering

applications for appointment of a member to the Organization board and that persons interested in being appointed to serve on the board may submit their names to the party for consideration. A vacancy shall not be filled until at least 15 days have elapsed after the last published notice.

2.6 Additional Parties-Membership: The Organization, with the ratification of the governing bodies of all voting members of the Organization, may invite other local government units within the Upper Rum River Watershed to also become parties to this Agreement. The governing body of any such additional party shall appoint a member to the Organization who shall have voting rights in accordance with the provisions of Section 2.2 and in all respects thenceforth enjoy the full rights, duties and obligations of this Agreement.

2.7 Compensation and Expenses: The Organization members shall not be entitled to compensation or reimbursement for expenses incurred in attending meetings, except to the extent that the governing body of a party may determine to compensate or reimburse the expenses of the member(s) it appoints, in which case the obligation to make such payments shall be that of the party and not that of the Organization.

2.8 Officers: The Organization board shall elect from its membership a chair, a vice-chair, a secretary and a treasurer and such other officers as it deems necessary to reasonably carry out the purpose of this Agreement. All such officers shall hold office for a term of one (1) year and until their successors have been

elected by the board. An officer may serve only while a member of the Organization and may be re-elected to an office. A vacancy in an office shall be filled from the membership of the board by election for the remainder of the unexpired term of such office.

2.10 Duties of Officers: The duties of the officers of the Organization shall be as outlined in Parts 40 and 41, Article VII, Robert's Rules of Order.

2.11 Quorum: Voting members of the Organization board representing a majority of the parties to this Agreement shall constitute a quorum, but less than a quorum may adjourn a scheduled meeting. For the purpose of this Section 2.10, only one voting representative of a party need be present to establish the presence of that party for the purpose of constituting a quorum.

2.12 Meetings:

- A. Meetings of the Organization board will be scheduled on the third Tuesday of the month as needed but at least annually, on a day selected by the board. The annual meeting shall normally be held on the third Tuesday of July at 7:00 p.m. at Oak Grove City Hall. At the annual meeting the board, at a minimum, shall:
1. Elect officers for the next fiscal year;
 2. Establish the annual budget and work plan;
 3. Hear recommendations on amendments to this agreement and the watershed management plan;
 4. Biennially renew or decide on contracts for professional, legal and administrative services;
 5. Decide on any monthly meetings that should be cancelled; and
 6. Conduct such other business as necessary.
- B. Special meetings may be held at the call of the chair or by any three (3) members of the board giving not less than 72 hours written notice of the time, place and purpose of such meeting delivered or mailed to the residence of each Organization member.
- C. All meetings of the board are subject to Minnesota

Statutes, Section 471.705 and the notice provisions contained therein. Posted notice, when required, shall be given separately by each party to this Agreement.

2.13 Conduct of Meetings: The Organization board shall adopt rules of order and procedure for the conduct of its meetings; the board may adopt any such rules as a majority of all voting members shall agree. Decisions by the board may not require more than a majority vote, except a decision on a capital improvement project may require no more than a two-thirds vote.

2.14 Organization Office: The office of the Organization shall be the Oak Grove City Hall, 19900 Nightingale Street NW, Cedar, Minnesota 55011. All notices to the Organization shall be delivered or served at said office.

SECTION III

Organization Powers and Duties

3.1 Authority: Upon execution of this Agreement by the parties, the Organization shall have authority as follows:

- D. The authority to prepare, adopt and implement a plan for the Upper Rum River Watershed meeting the requirements of Minnesota Statutes, Section 103B.231.
- E. The authority to review and approve local water management plans as provided in Minnesota Statutes, Section 103B.235.
- F. The authority of a Watershed District under Minnesota Statutes, Chapter 103D, to regulate the use and development of land in the Upper Rum River Watershed when one or more of the following conditions exists:

- (1) The local government unit exercising planning and zoning authority over the land under Minnesota Statutes, Section 366.10 to 366.19, 394.21 to 394.37 or 462.351 to 462.364, does not have a local water management plan approved and adopted in accordance with the requirements of Minnesota Statutes, Section 103B.235 or has not adopted the

implementation program described in the plan;

- (2) An application to the local government unit for a permit for the use and development of land requires an amendment to or variance from the adopted local water management plan or implementation program of the local unit; or
 - (3) The local government unit has authorized the Organization to require permits for the use and development of land.
- G. The authority of a Watershed District under Minnesota Statutes, Section 103D.625, to accept the transfer of drainage systems in the Upper Rum River Watershed, to repair, improve and maintain the transferred drainage systems and to construct all new drainage systems and improvements of existing drainage systems in the watershed, provided that projects may be carried out under the powers granted in Minnesota Statutes, Sections 103B.205 to 103B.255 or Chapter 103D or 103E and that proceedings of the board with respect to the systems must be in conformance with the watershed plan adopted under Minnesota Statutes, Section 103B.231.
- H. The authority of a Watershed District under Minnesota Statutes, Section 103D.911 to adopt a budget and decide on the total amount necessary to be raised from ad valorem tax levies to meet the budget.
- I. The authority of a Watershed District under Minnesota Statutes, Section 103D.915 to certify its budget with the auditor of each county having territory within the joint powers watershed management organization.
- J. The authority of a Watershed District under Minnesota Statutes, Section 103D.901 to file approved assessment statements with each affected county.
- K. Other powers necessary to exercise the authority under clauses A through C, including the power to enter into contracts for the performance of functions with governmental units or persons.
- L. The authority to levy a tax as provided in Minnesota Statutes, Section 103B.241.
- M. The authority to establish a watershed management tax district as provided in Minnesota Statutes, Section 103B.245.
- N. The authority to certify for payment all or any part of

the cost of a capital improvement as provided in Minnesota Statutes, Section 103B.251.

3.2 Watershed Management Plan: The Organization shall prepare a Watershed Management Plan for the Upper Rum River Watershed. The plan shall:

- A. Describe the existing physical environment, land use and development in the Upper Rum River Watershed, and shall further describe the environment, land use and development proposed in existing local and metropolitan comprehensive plans;
- B. Present information on the hydrologic system in the Upper Rum River Watershed and its components, including any drainage systems previously constructed under Minnesota Statutes, Chapter 103B, and existing and potential problems relating thereof;
- C. State objectives and policies, including management principles, alternatives and modifications, water quality and protection of natural characteristics;
- D. Set forth a management plan, including the hydrologic and water quality conditions that will be sought and significant opportunities for improvement;
- E. Describe the effect of the Watershed Management Plan on existing drainage systems;
- F. Describe conflicts between the Watershed Management Plan and existing plans of local government units;
- G. Set forth an Implementation Program consistent with the Watershed Management Plan, which includes a Capital Improvement Program and standards and schedules for amending the comprehensive plans and official controls of local government units in the watershed to bring about conformance with the Watershed Management Plan; and
- H. Set out a procedure for amending the Watershed Management Plan.

The plan shall be amended as required from time to time.

3.3 Employment: The Organization may contract for services, may utilize existing staff of the parties and may employ such other persons as it deems necessary. Where staff services of a party are

utilized, such services shall not reduce the financial commitment of such party to the operating fund of the Organization unless the Organization so authorizes, where the utilization of staff services is substantial.

3.4 Committees: The Organization may appoint such committees and sub-committees as it deems necessary. The Organization shall establish citizen and technical advisory committees unless other means of public participation are established.

3.5 Rules and Regulations: The Organization may prescribe and promulgate such rules and regulations as it deems necessary or expedient to carry out its powers and duties and the purpose of this Agreement.

3.6 Review and Recommendations: Where the Organization is authorized or requested to review and make recommendations on any matter, the Organization shall act on such matter within 60 days of receipt of the matter referred. Failure of the Organization to act within 60 days shall constitute approval of the matter referred, unless the Organization requests and receives from the referring unit of government an extension of time to act on the matter referred. Where the Organization makes recommendations on any matter to a party, the governing body of a party not acting in accordance with any such recommendation shall submit a written statement of its reasons for doing otherwise to the Organization within ten days of its decision to act contrary to the Organization's recommendation. The Organization shall review the written statement and if determined insufficient by the Organ-

ization, request written clarification within an additional ten days.

3.7. Ratification: The Organization may, and where required by this Agreement shall, refer matters to the governing bodies of the parties for ratification. Within 60 days the governing bodies of the parties shall take action upon any matter referred for ratification.

3.8 Financial Matters:

Subdivision 1 - Method of Operation: The Organization may collect and receive money and services subject to the provisions of this Agreement from the parties and from any other sources approved by the Organization, and it may incur expenses and make expenditures and disbursements necessary and incidental to the effectuation of the purposes of this Agreement. Funds may be expended by the Organization in accordance with procedures established herein. Orders, checks and drafts shall be signed by the chair or vice-chair and the treasurer. Other legal instruments shall be executed on behalf of the Organization by the chair and secretary.

Subdivision 2 - Operating Funds (Dues): On or before August 1st of each year, the Organization shall prepare a work plan and an operating budget for the following year for the purpose of providing funds to operate the Organization's business. Organization expenditures may include administrative expenses, plan development, review expenses, capital improvement costs as authorized in Section 3.12 and insurance costs as authorized in

Section 3.14. Upon the approval of all voting members of the Organization, the budget shall be recommended to the parties for ratification along with a statement showing each party's proposed share of the budget. The budget shall be implemented only after ratification by each party to this Agreement. Failure to ratify or pay its share of the budget by any party to this Agreement shall be subject to the procedures in Section 3.6. Each party shall contribute funds toward the budget according to the following formula:

$(PA + WA) + (PV + WV) + 2 =$ the party's percentage share of the Organization's operating budget.

PA = party's area within the watershed organization area.

WA = watershed organization area.

PV = party's market valuation within the watershed organization area.

WV = market valuation of the watershed organization area.

After ratification the Secretary shall certify the recommended budget to each party on or before September 1 of each year together with a statement showing the amounts due from each party. Each party shall pay over to the Organization the amount owing in two equal installments, the first on or before January 1st and the second on or before July 1st in accordance with the tax year for which the amount due is being paid.

Subdivision 3 - Review Services: When the Organization is authorized or requested to undertake a review and submit recommendations to a party as provided in this Agreement, the Organization shall conduct such review, without charge, except as

provided below. Where the project size and complexity of review are deemed by the Organization to be extraordinary and substantial, the Organization may charge a fee for such review services, the amount to be based upon direct and indirect costs attributable to that portion of review services determined by the Organization to be extraordinary and substantial. Where the Organization determines that a fee will be charged for extraordinary and substantial review services, or where the flowage enters the Upper Rum River, but the party is not a member of the Upper Rum River Watershed Management Organization, the party to be charged shall receive written notice from the Organization of the services to be performed and the fee therefor, prior to undertaking such review services. Unless the party to be charged objects within 15 days of receipt of such written notice to the amount of the fee to be charged, such review services shall be performed and the party shall be responsible for the cost thereof. If the party to be charged objects to the proposed fee for such services within 15 days and the party and the Organization are unable to agree on a reasonable alternative amount for review services, such extraordinary and substantial review services shall not be undertaken by the Organization.

3.9 Annual Accounts: The Organization shall annually make a full and complete financial accounting and report to each party and to the Board of Water and Soil Resources. The report to the Board of Water and Soil Resources shall include an annual activity report. All of its books, reports and records shall be available

for and open to examination by any party at all reasonable times. Any member may request that the Organization conduct and provide to its members financial statements audited by an independent certified public accountant.

3.10 Gifts, Grants, Loans: The Organization may, within the scope of this Agreement, accept gifts; may apply for and use grants or loans of money or other property from the United States, the State of Minnesota, a local government unit or other governmental unit or organization or any person or entity for the purpose described herein; may enter into any reasonable agreement required in connection therewith; may comply with any laws or regulations applicable thereto; and may hold, use and dispose of such money or property in accordance with the terms of the gift, grant, loan or agreement relating thereto.

3.11 Contracts: The Organization may make such contracts and enter into any such agreements as it deems necessary to make effective any power granted to it by this Agreement. Every contract for the purchase or sale of merchandise, materials or equipment by the Organization shall be let in accordance with the Uniform Municipal Contracting Law, Minnesota Statutes, Section 471.345 and the Joint Exercise of Powers Statute, Minnesota Statutes, Section 471.59. No member or employee of the Organization or officer or employee of any of the parties shall be directly or indirectly interested in any contract made by the Organization.

3.12 Works of Improvement: Works of improvement for

protection and management of the natural resources of the Area, including, but not limited to, improvements to property, land acquisition, easements or rights-of-way, may be initiated by:

- A. Recommendation of the Organization to a party or parties;
or
- B. Petition to the Organization by the governing body of a party or parties.

Where works of improvement are recommended by the Organization, the Organization shall first determine whether such improvement will result in a local or regional benefit to the Area. Where the Organization determines that the benefits from the improvement will be local or not realized beyond the boundaries of the party in which the improvement is to be established, the Organization shall recommend such improvement to the governing body of the unit of government which the Organization determines will be benefited thereby, with the total estimated cost of the improvement and a description of the benefits to be realized beyond the boundaries of the party in which the improvement is to be established, the Organization shall recommend such improvement to each governing body of the units of government which the Organization determines will be benefited thereby. The recommendation of the Organization shall include the total estimated cost of the improvement, a description of the extent of the benefits to be realized by each unit of government and the portion of the cost to be borne by each party benefited in accordance with the extent of the benefit of each unit of government as described by the Organization.

Each party to whom the Organization submits such recommendation shall respond within 60 days from receipt of such recommendation. Where the Organization determines that the benefits of such improvement will be local, the unit of government to whom such recommendation is made may decline to ratify and undertake said improvement. Where the Organization determines that the benefits of such improvement will be regional, unless all parties to whom such recommendation is directed decline to ratify and undertake said improvement, the Organization shall continue to review and recommend alternative methods of cooperation and implementation among those parties ratifying the recommendation of the Organization, unless and until the Organization determines that said improvement is no longer feasible.

When works of improvement are initiated by the governing body of a party or parties to this Agreement, said governing body or bodies shall submit a petition to the Organization setting forth a description of the proposed work of improvement, the benefits to be realized by said improvement, its total estimated cost and a proposed cooperative method for implementation of the improvement, if applicable. The Organization shall review and make recommendations on the proposed improvement and its compliance with the Organization's management plan in accordance with the provisions of Section 3.5 of this Agreement.

When a proposed improvement may be eligible for federal or state funds as a cost-share project, the Organization may undertake a proposed work of improvement for the area, subject to

Organization recommendation to and ratification by the parties to this Agreement, as required for an improvement of regional benefit.

The Organization is further authorized to undertake experimental improvement projects within the Area to serve as a basis for evaluation of other improvements by the parties. When the Organization determines to undertake an experimental improvement project, the costs of such project shall be the obligation of the Organization and not of the parties to this Agreement.

3.13 Claims: The Organization or its agents may enter upon lands within or without the Upper Rum River Watershed to make surveys and investigations to accomplish the purpose of the Organization. The Organization shall be liable for actual damages resulting therefrom, but every person who claims damages shall serve the Chairperson or Secretary of the Organization with a notice of claim as required by Minnesota Statutes, Section 466.05. The Organization shall obtain court orders authorizing and directing such entries when necessary due to refusals of landowners to allow the same.

3.14 Indemnification and Insurance: Any and all claims that arise or may arise against the Organization, its agents or employees as a consequence of any act or omission on the part of the Organization or its agents or employees while engaged in the performance of this Agreement shall in no way be the obligation or responsibility of the parties. The Organization shall indemnify, hold harmless and defend the parties, their officers and employees.

against any and all liability, loss, costs, damages, expenses, claims or actions, including attorney's fees which the parties, their officers or employees may hereafter sustain, incur or be required to pay, arising out of or by reason of any act or omission of the Organization, its agents or employees in the execution, performance or failure to adequately perform the Organization's obligations and understandings pursuant to the Agreement.

The Organization agrees that in order to protect itself as well as the parties under the indemnity provision set forth above, it will at all times during the term of this Agreement keep in force the following protection in the limits specified:

- A. Commercial General Liability/Professional Liability (\$200,000 per individual; \$600,000 per incident) including the following endorsements:
- B. Automobile Coverage (\$ 0)
- C. Worker's Compensation Coverage (statutory minimum)

Any policy obtained and maintained under this clause shall provide that it shall not be cancelled, materially changed or not renewed without thirty days prior notice thereof to each of the parties.

Prior to the effective date of this Agreement, and as a condition precedent to this Agreement, the Organization will furnish the parties with certificates of insurance listing the Organization as a certificate holder.

3.15 General: The Organization may take all such other

actions as are reasonably necessary and convenient to carry out the purpose of this Agreement.

SECTION IV

Arbitration

4.1 The parties agree that any controversy that cannot be resolved between a party and the Organization through the review and recommendations procedures outlined herein shall be submitted to binding Arbitration. The Uniform Arbitration Act (Minnesota Statutes, Sections 572.08 - 572.30) is adopted by the Organization as the authority to be followed in submitting all controversies to Arbitration. The result of the Arbitration shall be binding on the party and the Organization. Arbitration shall be by a panel of three arbitrators. The party and the Organization each shall select one arbitrator to represent its position in the controversy. The two arbitrators then shall select a third arbitrator, and in the event they are unable to agree on a third arbitrator, either side may petition the District Court to appoint a third arbitrator. Thereafter, arbitration shall proceed as outlined in the Uniform Arbitration Act.

SECTION V

Termination of Agreement

5.1 This Agreement may be terminated by approval of two-thirds vote of the governing bodies of each party hereto, provided that all such approvals occur within a 90 day period. Withdrawal of any party may be accomplished by filing written notice with the organization and the other parties 60 days prior to the effective

date of the termination. No party may withdraw from this Agreement until the withdrawing party has met its full financial obligations through the effective date of such withdrawal.

SECTION VI

Dissolution of Organization

6.1 The Organization shall be dissolved under any of the following conditions:

- A. Upon termination of this Agreement;
- B. Upon unanimous agreement of all parties; or
- C. Upon the membership of the Organization being reduced to less than three (3) parties.

At least 90 days notice of the intent to dissolve shall be given to affected counties and the Board of Water and Soil Resources. Upon dissolution, all personal property of the Organization shall be sold, and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the parties. Such distribution of Organization assets shall be made in proportion to the total contributions to the Organization for such costs made by each party. All payments due and owing for operating costs under Section 3.7, Subd. 2, or other unfilled financial obligations, shall continue to be the lawful obligation of the parties.

SECTION VII

Amendment

7.1 The Organization may recommend changes in and amendments to this Agreement to the governing bodies of the parties. Amendments shall be adopted by a two-thirds majority vote of the

governing bodies of the parties within 90 days of referral. Amendments shall be evidenced by appropriate resolutions of the governing bodies of each party filed with the Organization and shall, if no effective date is contained in the amendment, become effective as of the date all such filings have been completed.

SECTION VIII

Counterparts

8.1 This Agreement may be executed in several counterparts and all so executed shall constitute one Agreement, binding on all of the parties hereto notwithstanding that all of the parties are not signatory to the original or the same counterpart.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day of complete execution hereof by the parties.

BURNS TOWNSHIP

SEAL
Dated: 9/9/97

TOWN OF BURNS

By: Miriam R. Burgasato
Chairman of Town Board

By: Penney J. Amey
Town Clerk

CITY OF BETHEL

By: [Signature]
Mayor

SEAL
Dated: 9/3/97

By: Sarah Tossen
City clerk

CITY OF EAST BETHEL

By: [Signature]
Mayor

By: [Signature]
City Clerk

SEAL

Dated: Sept. 3, 1997

CITY OF HAM LAKE

By: [Signature]
Mayor

By: [Signature]
City Clerk

SEAL

Dated: 7/2/97

CITY OF OAK GROVE

By: [Signature]
Mayor

By: [Signature]
City Clerk

SEAL

Dated: 9-8-97

CITY OF ST. FRANCIS

By: [Signature]
Mayor

By: [Signature]
City Clerk

SEAL

Dated: 9/3/97

CHAPTER 7: IMPLEMENTATION

ZONING ORDINANCE

In 2007, the City of East Bethel adopted Appendix A: Zoning Ordinance. The ordinance was geared towards the existing zoning and the designation of East Bethel as a “Rural Center” and a “Diversified Rural” community. The “Rural Center” is an urbanizing corridor approximately three quarters of a mile on each side of Minnesota Highway 65 and the “Diversified Rural” is the remainder of the City which is not planned to be served with City sewer and water. According to the 2040 Comprehensive Plan, single family detached residential housing areas accounts for approximately 18 percent of the gross acres in the City. Commercial and industrial land uses account for just over one percent of the gross acres in the City. Figure 7-1 shows the existing zoning map. With the adoption of the 2040 Comprehensive Plan, the City will create three (3) additional Zoning districts to ensure compliancy between the two (2) documents. The Zoning Ordinance will be updated no later than nine (9) months after the adoption of the Comprehensive Plan.

The existing zoning classifications include:

- Agricultural District (A) – This district is intended for agricultural uses and allows densities at 1 unit per 10 acres.
- Rural Residential (RR) – This district is intended to accommodate residential land uses at low densities that promote the rural character of East Bethel and allows densities at 1 unit per 2.5 acres.
- Single-Family Residential (R-1) – This district is intended to accommodate single-family dwellings where similar residential development is likely to occur and allows densities up to 4 units per acre.
- Single-Family and Townhome Residential (R-2) – This district is intended to accommodate a mix of single-family and attached/detached townhomes at a more typical single-family density and allows densities up to 6 units per acre.
- Limited Business (B-1) – This district is intended to provide for limited retail and service commercial activities.

- Central Business (B-2) – This district is intended to provide for the general retail shopping of persons living in East Bethel and surrounding trade area.
- Highway Commercial (B-3) – This district is intended to provide for commercial areas serving the highway traveling public.
- Light Industrial (I) – This district is intended to provide areas of the city suitable for activities and uses that are commercial and general services related and/or of a light industrial nature.
- City Center (CC) – This district is intended to create a focal point in the community that embodies the principles of urban mixed-use development.
- Public/Institutional (P/I) – This district is intended to provide areas that are primarily under ownership by units of government, public and private institutions.
- Planned Business Overlay (PBD) – This overlay district is intended to establish standards for exterior architecture, design, landscaping, and signage of buildings that contribute to a community image of quality, visual aesthetics, permanence, and stability.
- Planned Unit Development (PUD) – This district is intended to allow flexibility and variation from conventional ordinance standards in exchange for higher standards of development design and creativity. The PUD provisions are also intended to promote the efficient use of land and promote cost-effective public and private infrastructure systems.

To implement the 2040 Land Use Map, the proposed zoning districts are described below, including the creation of three (3) new zoning districts (Mixed Use, Medium Industrial and Coon Lake):

- Agricultural District (A) – This district is intended for agricultural uses and allows densities at 1 unit per 10 acres.
- Rural Residential (RR) – This district is intended to accommodate residential land uses at low densities that promote the rural character of East Bethel and allows densities at 1 unit per 2.5 acres.
- Single-Family Residential (R-1) – This district is intended to accommodate single-family dwellings where similar residential development is likely to occur and allows densities up to 4 units per acre.

- Single-Family and Townhome Residential (R-2) – This district is intended to accommodate a mix of single-family and attached/detached townhomes at a more typical single-family density and allows densities up to 6 units per acre.
- Limited Business (B-1) – This district is intended to provide for limited retail and service commercial activities.
- Central Business (B-2) – This district is intended to provide for the general retail shopping of persons living in East Bethel and surrounding trade area.
- Highway Commercial (B-3) – This district is intended to provide for commercial areas serving the highway traveling public.
- Light Industrial (I) – This district is intended to provide areas of the city suitable for activities and uses that are commercial and general services related and/or of a light industrial nature.
- Mixed Use (MXU) – The Mixed Use zoning district will replace the existing City Center (CC) zoning district. The Mixed Use zoning district will serve as an area in which residential, commercial and possibly light industrial land uses are permitted.
- Medium Industrial (MI) – There is a new Medium Industrial land use category in the 2040 Comprehensive Plan. A Medium Density zoning district will describe the businesses and operations that can occur in the Medium Industrial land use category that could not occur in the Light Industrial land use category.
- Coon Lake (CL) – The existing parcels around Coon Lake are significantly smaller than the 2.5 acre lots intended in the Rural Residential zoning district. The new Coon Lake zoning district may reduce the amount of variance requests from the Coon Lake neighborhood and may encourage investments in the structures and properties if the standards allow for options for renovations.

SUBDIVISION ORDINANCE

In October 2007, the City adopted Subdivision Ordinance 212. The ordinance is established regulations that ~~can~~ allow for the implementation of the provisions within the 2040 Comprehensive Plan and the Zoning Ordinance. The Subdivision Ordinance will be reviewed to ensure consistency with the Zoning Ordinance and the 2040 Comprehensive Plan. Updates will be needed and will

be completed within nine (9) months after the adoption of the 2040 Comprehensive Plan.

BUILDING CODES

The City currently administers the State Building Code and will continue to do so.

ENFORCEMENT

The City has a code enforcement program in place which responds to complaints in a timely and proactive fashion.

HOUSING

The implementation of a housing plan requires action by many entities. As a result of this, some goals may be achieved in a short period of time while other goals may take longer. The strategies in obtaining the City's housing goals are further explained in Chapter II. Housing.

PUBLIC FACILITIES

The City will need to address fiscal issues as they pertain to public facilities and appropriate funds in the most responsible manner that is in the best interest of the community.

- Develop a detailed water supply system that services existing and proposed development needs in those areas identified in this plan as a Rural Center.
- Develop a detailed sanitary sewer system that will service those areas identified in this plan as a Rural Center.
- Work directly with Anoka County and MNDOT to pursue and coordinate transportation projects identified in this plan.
- Continue to develop, adopt, and update the capital improvement program (CIP) in order to address short- and long-term public facility needs throughout the community. The CIP will address needs within areas identified as Diversified Rural and Rural Centers.
- Develop a Park Development Program to insure the development of new park and trail facilities within new developments to serve the needs of new residents.

- Continue to repair, replace, and/or expand play equipment and facilities in existing parks.

COMPREHENSIVE PLAN REVIEW

The Comprehensive Plan will be reviewed on an annual basis to ensure that the plan remains as an effective development guide for East Bethel. As necessary, corrections will be made to deal with unforeseen circumstances.

Planning for the Future of East Bethel: An Update to the Comprehensive Plan

TABLE 5-1: CAPITAL IMPROVEMENT COST SUMMARY

Street Capital Projects 2018-2022 Funding Analysis

MUNICIPAL STATE AID FUND	Beginning Balance	Sources (Revenues)	Uses (Project Costs)	Ending Balance
2018 Beginning Balance	-\$578,313			
Municipal State Aid Funding		\$567,365		-\$10,948
None			\$0	-\$10,948
2018 Ending Balance				-\$10,948
2019 Beginning Balance	-\$10,948			
Municipal State Aid Funding		\$567,365		\$556,417
Municipal Service Road Project			\$1,500,000	-\$943,583
MN DOT Setaside Funds		\$500,000		-\$443,583
Cooperative Agreement Grant		\$200,000		-\$243,583
2019 Ending Balance				-\$243,583
2020 Beginning Balance	-\$243,583			

Municipal State Aid Funding		\$567,365		\$323,782
MN DOT Setaside Funds		\$500,000		\$823,782
181st Ave Reconstruction			\$400,000	\$423,782
2020 Ending Balance				\$423,782
2021 Beginning Balance	\$423,782			
Municipal State Aid Funding		\$567,365		\$991,147
Davenport St Reconstruction			\$600,000	\$391,147
2021 Ending Balance				\$391,147
2022 Beginning Balance	\$391,147			
Municipal State Aid Funding		\$567,365		\$958,512
University Ave Reconstruction			\$450,000	\$508,512
2022 Ending Balance				\$508,512
TOTAL MUNICIPAL STATE AID FUND SOURCES & USES		\$4,036,825	\$2,950,000	

Note: MSA Funding can be "Advanced Funded" to meet certain requirements. The City can advance fund up to 4 times the construction allotment or \$3,000,000 whichever is less. A negative balance is not an indication of too many projects. It simply means the City has anticipated numerous projects and can fund this within the regulations identified by MN DOT.

Parks CIP 2018-2022 Funding Analysis

PARK CAPITAL FUND	Beginning Balance	Sources (Revenues)	Uses (Project Costs)	Ending Balance
2018 Beginning Balance	\$80,125			
Transfer From General Fund		\$75,000		\$155,125
Playground Equipment Booster East			\$45,000	\$110,125
Playground Equipment Anderson Lakes			\$45,000	\$65,125
John Anderson Trail Segment			\$37,000	\$28,125
Misc Park Projects and Tree Planting			\$5,000	\$23,125
City Mural			\$3,000	\$20,125
2018 Ending Balance				\$20,125
2019 Beginning Balance	\$23,125			
Transfer From General Fund		\$75,000		\$98,125
Dog Park			\$20,000	\$78,125
Playground Equipment Eveleth Park			\$35,000	\$43,125

Misc Park Projects and Tree Planting			\$5,000	\$38,125
2019 Ending Balance				\$38,125
2020 Beginning Balance	\$38,125			
Transfer From General Fund		\$75,000		\$113,125
Booster West Trail Segment			\$40,000	\$73,125
Misc Park Projects and Tree Planting			\$5,000	\$68,125
2020 Ending Balance				\$68,125
2021 Beginning Balance	\$68,125			
Transfer From General Fund		\$75,000		\$143,125
Booster West Playground Equipment			\$125,000	\$18,125
Misc Park Projects and Tree Planting			\$5,000	\$13,125
2021 Ending Balance				\$13,125
2022 Beginning Balance	\$13,125			\$13,125
Transfer From General Fund		\$75,000		\$88,125
Skateboard Equipment Booster West			\$75,000	\$13,125

Misc Park Projects and Tree Planting			\$5,000	\$8,125
2022 Ending Balance				\$8,125
TOTAL PARK CAPITAL FUND SOURCES AND USES		\$375,000	\$450,000	

PARK ACQUISITION AND DEVELOPMENT FUND	Beginning Balance	Sources (Revenues)	Uses (Project Costs)	Ending Balance
2018 Beginning Balance	\$30,143			
Park Dedication Fees		\$0		\$30,143
No projects funded			\$0	\$30,143
2018 Ending Balance				\$30,143
2019 Beginning Balance	\$30,143			
Park Dedication Fees		\$60,000		\$90,143
Pavilion at Norseland Manor Park			\$30,000	\$60,143
Irrigation system at Norseland Park			\$30,000	\$30,143
2019 Ending Balance				\$30,143
2020 Beginning Balance	\$30,143			
Park Dedication Fees		\$60,000		\$90,143
Fence at Norseland Manor Park			\$30,000	\$60,143
Norseland Park/Jackson St Trail Connection			\$30,000	\$30,143
2020 Ending Balance				\$30,143
2021 Beginning Balance	\$30,143			
Park Dedication Fees		\$80,000		\$110,143

Oak Brook Trail Segment			\$15,000	\$95,143
2021 Ending Balance				\$95,143
2022 Beginning Balance	\$95,143			
Park Dedication Fees		\$80,000		\$175,143
New Park/Trail Development			\$75,000	\$100,143
2022 Ending Balance				\$100,143
TOTAL PARK ACQUISITION AND DEVELOPMENT FUND SOURCES AND USES		\$280,000	\$210,000	
<u>Park Dedication Fees</u> - Residential = 10% of land or cash not to exceed \$2,000 per lot. Commercial = 5% of land or cash not to exceed \$2,000 per acre.				

SANITARY SEWER AND POTABLE WATER

The 2030 Metropolitan Urban Service Area (MUSA) includes the northern growth boundary node (Area A) and the southern growth boundary node (Area C). Area A currently has lift stations to supply public sanitary sewer and has municipal wells to supply potable water, but the Area A lacks an elevated water tower to provide stable water flow and suitable fire protection pressure. Area C has currently a Metropolitan Council operated water treatment plant to provide public sanitary sewer and has municipal wells and an elevated water tower to provide adequate potable water supply. An elevated water tower for Area A is estimated at approximately \$1,300,000 in 2017 dollars. The capital improvement program will need to be modified to identify the revenue to cover the cost of the elevated water tower.

The 2040 MUSA includes a third middle growth boundary node (Area B). The sewer and water infrastructure costs are identified in the Sanitary Sewer and Water Plans (Appendix A) to supply sanitary sewer and potable water to the properties identified within the 2040 MUSA. The capital improvement program will need to be evaluated annually to identify what infrastructure from the Sanitary Sewer and Water Plans will need to be planned for.

INDIVIDUAL SEWAGE TREATMENT SYSTEMS (ISTS)

The Metropolitan Council requires the City to develop a plan for the management of on-site sewage disposal systems. These systems are private septic treatment systems on individual lots. In the City of East Bethel, these systems are located throughout the City.

There are approximately 4,300 existing systems located in the City of East Bethel in which the City manages the systems, as shown in Figure 7.2. All septic installations require a permit issued by the City. The East Bethel City Council adopted amended Ordinance 61G (Appendix D) on October 18, 2006. Ordinance 61G empowers the City of East Bethel to regulate on-site sewage disposal systems pursuant to the authority granted under Minnesota Statute Chapters 115 and 145A and Minnesota Rules Chapter 7080. Details regarding enforcement provisions can be found in Ordinance 61G.

The property owners of on-site septic systems are required to pump the tanks in no case less frequently than every three years. The City has an electronic database of all properties in the City. The database is programmed to sort entered information and provide a list of ISTS that are due to be pumped in the current calendar year. Reminders are posted in the quarterly newsletter to property owners indicating the need to pump the septic system. Notices are sent to property owners if a system fails a compliance inspection. Failure on the part of the property owner to have the system pumped is cause for the City of East Bethel to provide for pumping service of the tanks in which the cost of the services are assessed to the property owner; however, the City has a high compliance rate and has yet to assess a property.

Since septic installations require a permit to be issued by the City, all permits issued and dates of inspections are recorded by hard copy, to be placed in the address file, and input into the electronic database.

Figure 7.1 Existing Zoning Map

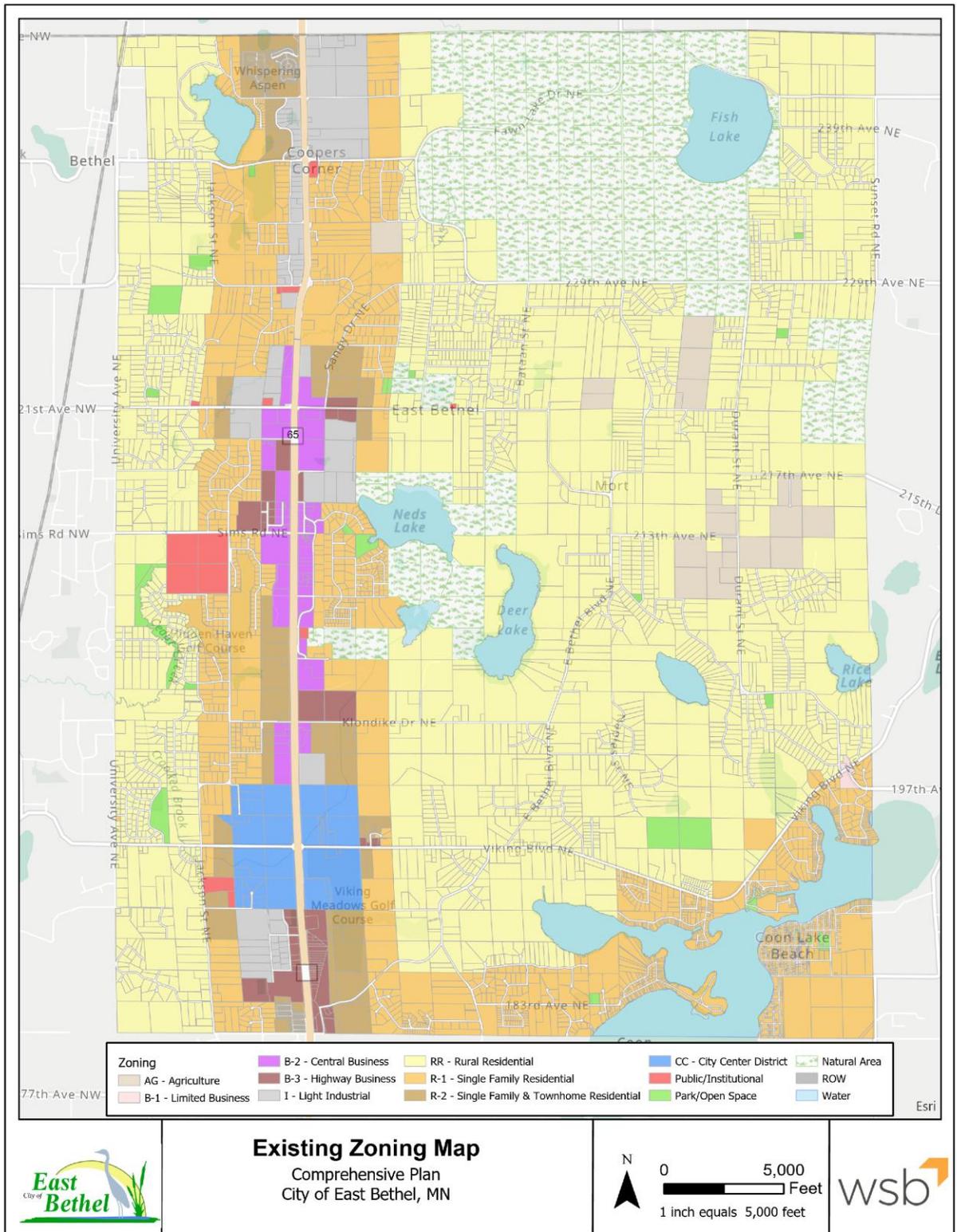
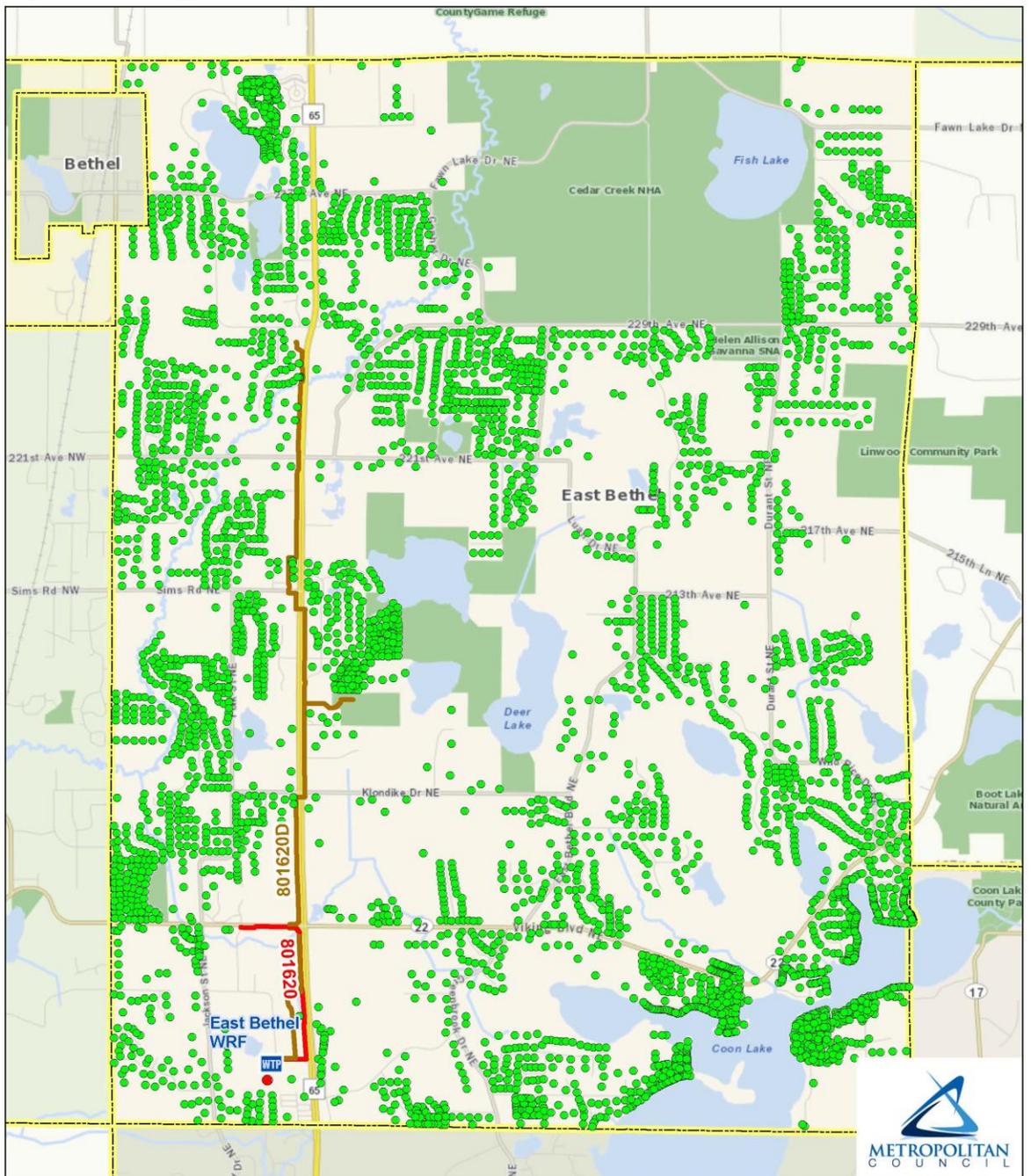


Figure 7.2 Existing ISTS



Individual Sewer Treatment Systems (ISTS)

- Individual Sewer Treatment Systems (ISTS)
- Village Green WTP
- WTP MCES Wastewater Treatment Plant
- MCES Gravity Interceptor
- MCES Effluent
- City & Township Boundaries

Source Data: Anoka County Parcels 2019 and MCES.
Map created by MCES.

