Final

SANITARY SEWER SERVICE AREA PLAN FOR THE CITY OF BEAVER DAM, DODGE COUNTY, WISCONSIN

JULY 18, 2001

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PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL
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ACKNOWLEDGMENTS

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I. BACKGROUND INFORMATION

A. INTRODUCTION

The Sanitary Sewer Service Area Plan, or water quality plan, is the official citywide water quality management plan for the City of Beaver Dam and the surrounding Township of Beaver Dam. The terms "sanitary sewer service area plan" and "water quality plan" will be used interchangeably throughout this report and they are intended to mean the same thing.

The sewer service area plan provides an inventory of land use and environmental conditions in the planning area, projects future land use based upon a logical extension of the existing conditions, and develops a proposed sanitary sewer service boundary to guide the development of public sewer facilities. The proposed boundary identifies land in the planning area that is most suitable for urban development by the construction of cost effective public sewer facilities.

In accordance with the directives of the federal law, the state established a continuing area-wide water quality management planning process. This process is described by Wisconsin Administrative Code NR 121, enacted in 1981. The City of Beaver Dam water quality plan is developed as part of the water quality management plans for Dodge County as well as the Rock River basin. These plans are reviewed by the Wisconsin Department of Natural Resources (DNR) as part of the statewide continuing water quality management planning process. Though there are many separate plans, the overall goal is to maintain consistency and support between the city water quality plans and the plans of the larger basin areas.

1. Purpose of this Study

Sewer service area plans are an integral part of the comprehensive long range planning done by the county, cities, villages, and townships. The purpose of the plan is to provide a policy framework and a set of guidelines to enforce the federal, state, and local water quality programs in the City of Beaver Dam and the surrounding township. The plan identifies areas that can be developed to provide municipal services in a cost effective manner and in a way that protects environmentally sensitive areas. Sewer service area plans serve as a basis for Department of Natural Resources approval of state and federal grants for the planning and construction of wastewater collection and treatment facilities. They also serve as a basis for DNR approval of locally proposed sanitary sewer extensions and approval of private sewer laterals by the Department of Commerce, Division of Safety and Buildings. Environmentally sensitive areas are also identified in the service area plans to serve as a guide for environmental permit decisions by federal and state agencies.

Sewer service area plans are intended to be an important planning and development guide for local communities. The water quality management plan for the City of Beaver Dam primarily addresses the following purposes:

1. Establish the geographic boundaries of a sewer service area for the year 2020 as part

of a periodically revised plan.

2. Provide a technical basis to anticipate future needs for wastewater collection and centralized treatment facilities for the planning area.
3. Provide recommendations for solutions to on-site wastewater treatment problems.
4. Serve as a guideline for government involvement in water quality management and establish common goals for developing detailed community plans.
5. Identify areas to be protected from development in order to protect environmental, social, and economic concerns.
6. Become part of a countywide water quality plan to guide water quality management in Dodge County.

The sewer service area plan is used as a planning and growth management tool. It is incorporated into village and city master plans to encourage cost effective growth areas to reduce the expense of furnishing wastewater treatment and other services to areas with limitations for development.

The program was also developed to outline and protect environmentally sensitive areas from indiscriminate urban growth. Such areas include, but are not limited to, wetlands, floodplains, steep slopes, hydric soils and shorelands.

2. Background Information

The City of Beaver Dam has recently completed an update to the comprehensive plan entitled "Development Vision 2020". This process started in December of 1998 with the city plan commission forming a citizens advisory committee. It is intended that the sanitary sewer service area plan will act as a complement to the comprehensive plan, and together the two plans will provide the framework for future growth in the area. The members of the plan commission and advisory committee who worked on the comprehensive plan were as follows:

Plan Commission Members: Mayor Tom Olson, Council Members William Hollihan and William Snell, Director of Public Works Bruce Gall, Maria Bislew, Terry Perschke, Edward C. Jacobs

Advisory Committee for Long Range Planning: Dodge County Highway Commissioner Robert Sindelar, Ric Fiegel, Jeff Kitchen, Harold Moylan, Ken Serchen, Beaver Dam Area Development Corporation Vice-President Trent Campbell, Beaver Dam Area Chamber of Commerce President Myrtle Clifton

Monthly meetings were held throughout calendar year 1999 by these groups to develop a long range comprehensive plan which was adopted by the City of Beaver Dam in November of 1999. This document will provide support data for the sanitary sewer service area plan such as; existing land use, population trends and forecast, along with the preferred development vision for the next 20 years.

II. GOALS AND OBJECTIVES

A. OVERVIEW

The diversity of community interests and local government bodies involved in urban development activities and sanitary sewer extensions requires that common goals be established for urban service area planning. Goals, objectives and policies that have been used in the past (community land use plans or comprehensive plans) should be re-evaluated for the purposes of a sanitary sewer service area plan. Any departures from past ideas and activities should be identified and discussed.

Goals can be defined as statements of the direction in which the plan is aimed.

Objectives are specific statements of desired results which are measurable and contribute to the accomplishment of a goal.

Policies, which are discussed in the implementation section of this report, are actions or guidelines directed toward achieving objectives which should be followed in day-to-day decision making.

1. Background Information

The information contained herein, presents a series of value statements which were derived from qualitative information collected as part of the comprehensive plan update committee discussions in February and March, 1999. MSA Professional Services (MSA) presented profile information to a 13-member Planning Group appointed by the City and facilitated a discussion leading to development of Beaver Dam "Value Statements". The committee was asked to brainstorm some general likes and dislikes regarding the City and perceptions as long-term residents of this community. The analysis identified past and present characteristics such as natural resource base, population/demographics, economic conditions, land use, transportation, along with public utilities and services. It then identified how Beaver Dam's development has evolved and where/how the community presently stands. This information was used to develop the following community value statements. The Values Statements established a framework for subsequent discussions involving future visions of the City.

2. Development Vision 2020 Value Statements

The following value statements were formulated and recommended for Public Hearing by the Planning Committee on July 22, 1999. They state in general terms what the Planning Committee and general residents value about the community. They seek to represent the positive aspects of the community, or the things that Beaver Dam is doing correctly; and therefore, should be continued into the future.

a. Sense of Community

Residents of Beaver Dam value the physical cleanliness of the city, its appearance to visitors, the rural, small-town atmosphere, clean, neat neighborhoods. They show

this support by the property maintenance, condition of public streets, low crime rate, appeal to families, and membership in various churches and service clubs.

b. Development Issues

Beaver Dam residents value the momentum of development on the north side of the City, the relative absence of heavy industry and its associated problems, and the pro-active attitude toward business park development and business retention.

c. Parks and Recreation Activities

The residents of Beaver Dam value their natural and designed open spaces, seasonal activities, water-based recreational opportunities and golf courses. This is exemplified in their support of municipal park and recreation facilities and programs, family and company activities, and abundance of outdoor activities in all seasons.

d. Schools

The residents of Beaver Dam value the scope and scale of the public and private school system serving the City. This is shown in their on-going support of public school programs and capital projects at all levels from elementary through technical colleges, parochial schools and private academy.

e. Transportation Links, Location

The residents of Beaver Dam value the geographic location of their community. An excellent highway system links the community to Madison and the Fox River Valley; Chicago and Minneapolis are within 4 hours driving time. Residents use the regional airports in Madison and Milwaukee, as well as the Dodge County Airport in Juneau. Rail opportunities for freight service within the City and Amtrak passenger service within 15 miles of most residents.

f. Municipal Services

The residents of Beaver Dam value the services provided on their behalf by the municipal government and quasi-public agencies. They have developed and maintained a progressive, responsible City government, a pro-active attitude regarding business development and retention, and a healthy and financially competitive tax structure. Quasi-public agencies provide additional services to the residents with health care, parochial schools, long-term nursing care, and social services.

g. Residential Opportunity

The residents of Beaver Dam value the residential neighborhoods and take pride in maintaining their appearance; they value the diversity of housing types and opportunities for all income levels but prefer the separation of similar land uses and densities.

B. GOALS

Statements of the direction in which the plan is aimed.

1. To preserve and enhance the natural features that make Beaver Dam a desirable place to live, visit, and do business, while encouraging development in suitable areas.

2. Provide the infrastructure necessary to serve the level of development proposed in the Comprehensive Plan entitled "Development Vision 2020", while continuing to provide environmentally safe, efficient and cost-effective utilities to the community.

3. Promote sound, environmentally sensitive, and efficient urban development on the fringe of the present urbanized area thru sequential, orderly and compatible growth.

4. Maximize the capacity and promote the efficient use of the wastewater treatment facilities.

5. Coordinate the efforts of local government (City of Beaver Dam, Township of Beaver Dam, and County of Dodge) to promote responsible planning and implementation of shared facilities and interests.

C. OBJECTIVES

Specific statements of desired results which are measurable and contribute to the accomplishment of a goal.

1. Identify, map, preserve, and in some cases (where practical, economical, and environmentally feasible as determined by the plan review authority) restore, in a natural state, the features that make Beaver Dam and the surrounding area a desirable place to live, visit and do business.

2. Prepare and implement a Sanitary Sewer Service Area Plan which;
   - correlates with the development vision and trends of the comprehensive plan,
   - protects environmentally sensitive areas,
     by encouraging future development to locate in areas suitable for development where environmental impacts can be sufficiently mitigated
   - recognizes environmentally limited areas, and
   - identifies cost-effective development areas.

3. Protect environmental resources and ground water thru the application of high-quality design standards for all new sanitary sewer extensions.

4. Use advance planning to identify the most desirable and effective locations for new sanitary sewer interceptors, pumping stations, and related infrastructure, and protect the corridors and areas which affect these items thru development regulation and approval processes.

5. Promote diverse public input, and request active participation by adjacent governmental bodies, in the development and implementation of plans, studies, and actions that have a common interest.

III. INVENTORY, CRITICAL ISSUES AND ANALYSIS

A. PLANNING AREA

The planning area is located in the northwest-central part of Dodge County, Wisconsin and includes the City of Beaver Dam which is the county's largest municipality. The planning area is tributary to Crystal Creek, the Beaver Dam Lake, the Beaver Dam River, and is within the limits of the "Upper" Rock River Basin. The Rock River flows thru Dodge County and southern Wisconsin, then into Illinois, where it ultimately meets the Mississippi River at the Illinois-Iowa state border.

The planning area as shown in Figure 1 is the study area for the sanitary sewer service area plan. It represents the limits of an area which the City of Beaver Dam identified in it's comprehensive plan as being beyond the probable development scenario for the next 20 years. It encompasses all or a portion of the following sections in the City of Beaver Dam and/or the Township of Beaver Dam:

Sections 20, 21, 22, 23, 26, 27, 28, 32, 33, 34 and 35 in Township 12 North, Range 14 East; and Sections 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11 in Township 11 North, Range 14 East, Dodge County, Wisconsin.

B. DEVELOPMENT AND TRENDS

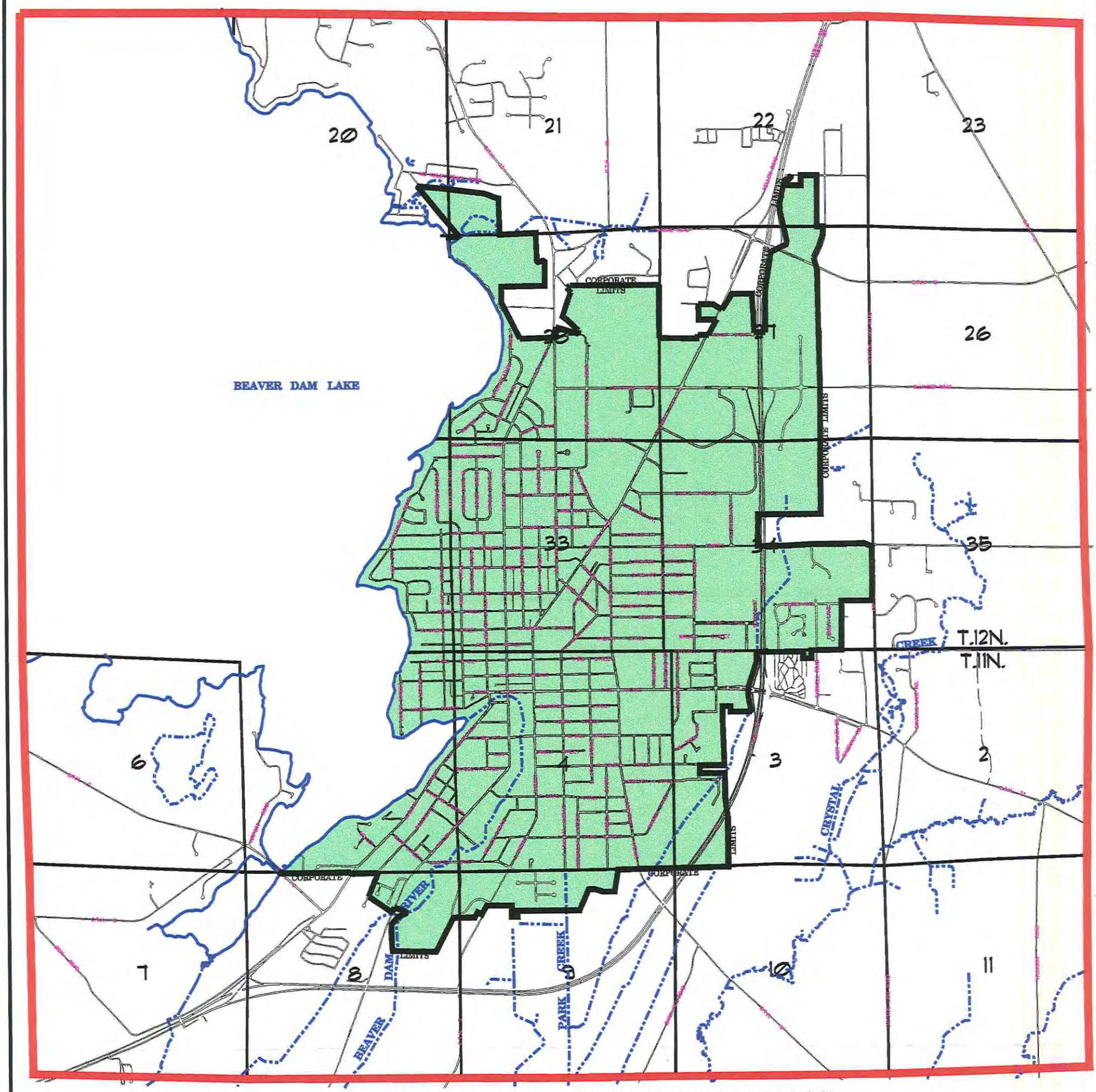
The future development pattern of the City of Beaver Dam is discussed in detail within the updated comprehensive plan entitled "Development Vision 2020". Figure 2 of this report is a reproduction of the map which was adopted during this process showing the future development vision. The following points highlight the main characteristics of the major land uses that describe this map and which are essentially the broad goals of the comprehensive plan.

- **Residential**

  - ✓ Variable housing densities (single family versus moderate or high density) in specific locations.
  - ✓ Higher density development adjacent to or near arterial streets.
  - ✓ Minimize conflicts by identifying alternative land uses early to prevent housing developments adjacent to high intensity uses.
  - ✓ Single-family residential development will continue to be the dominant housing unit type.
  - ✓ The private market will still play a primary role in determining the City's housing type and design. The City's role in determining the land use pattern, housing density and location will be greater under this scenario. These changes will be the result of modified land use ordinances and commitment to the "preferred development vision".
  - ✓ All new residential development will be serviced by municipal sanitary sewer and water.

08 DEC 2000

Study Area Identified for Purposes of Establishing a Beaver Dam Sanitary Sewer Service Area



TOWNSHIP 11 & 12 NORTH, RANGE 14 EAST
CITY OF BEAVER DAM AND TOWN OF BEAVER DAM

N
W E
S

SCALE
0 1320 (1/4 MI) 2640 (1/2 MI) 1800 (3/4 MI)

LEGEND

STUDY AREA BOUNDARY

G:/PROJECTS/21DS/218/218004/CADD/EXHIBITS/STUDYLIMIT.DGN

FIGURE 1

MSA PROFESSIONAL SERVICES
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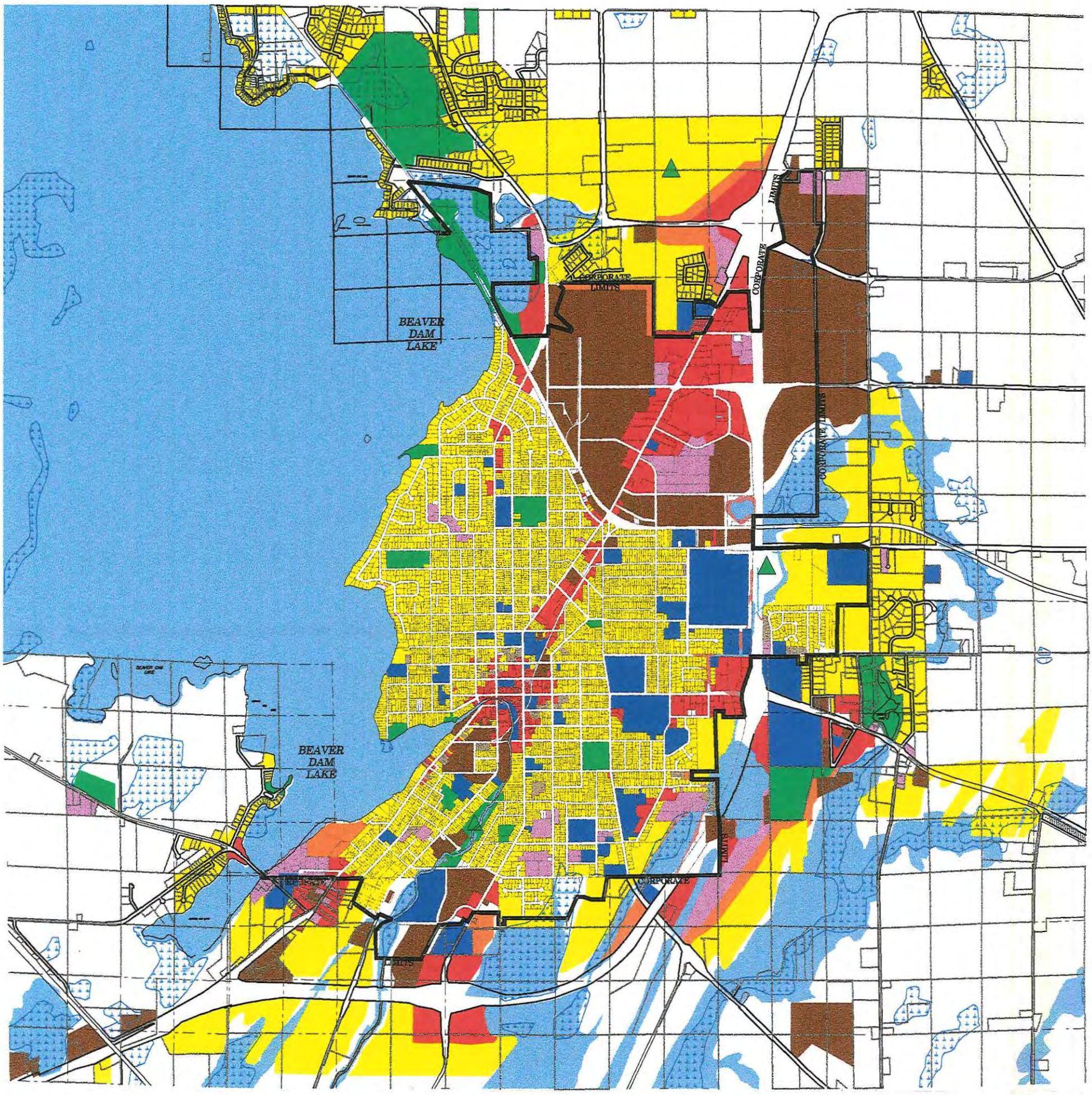
08 DEC 2000

Development Vision 2020 as per the Adopted Comprehensive Plan City of Beaver Dam, Dodge County, WI



LEGEND

- RESIDENTIAL
- MULTI-FAMILY RES. (2-4 UNITS)
- MULTI-FAMILY RES. (5+ UNITS)
- COMMERCIAL
- INDUSTRIAL
- PUBLIC
- OPEN SPACE/PARKS
- 100-YEAR FLOOD AREA
- FUTURE PARK
- MAPPED WETLANDS

N W E S

SCALE

0 1320 (1/4 MI) 2640 (1/2 MI) 1800 (3/4 MI)

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FIGURE 2

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- ✓ The City will continue its focus on revitalization and renovation of existing housing which already has infrastructure and neighborhood.
- ✓ New residential developments of varying densities will occur more infrequently as a result of the changes made to existing ordinances.
- ✓ Some residential design criteria will be implemented, particularly in regard to historic preservation and development within historic districts.
- ✓ The ratio of owner occupied housing units will continue to be weighted in favor of owner occupied (single-family) units; renter occupied (multi-family) units will also experience growth, but less so under this Vision. An overall multi-family total of 35% of all housing units will be the goal.
- ✓ Residential development will continue to parallel infrastructure expansions. Traffic patterns and access to neighborhood commercial development will be evaluated so that the new residential neighborhoods will not be far removed from commercial activity; this scenario would promote more pedestrian-oriented development, and slightly reduce roadway congestion and dependence on the automobile.

- **Commercial**

  - ✓ Focus development along main corridors and within City boundaries.
  - ✓ Highway commercial strip development will be centered on interchange locations, not spread throughout the community.
  - ✓ Areas along USH 151, but not accessible from highway, will be discouraged from retail or industrial uses.
  - ✓ The type and location of new commercial development under this vision will be a combination of regional shopping center, commercial strip development, and a centralized downtown commercial district. Small commercial nodes located in the proximity of new residential developments will be discouraged except at the intersection of major thoroughfares.
  - ✓ Efforts to revitalize the downtown commercial area will continue; the downtown will be a vibrant and fully utilized commercial retail and office area, consisting primarily of service, office and local retail trade operations.

- **Industrial**

  - ✓ Industrial expansion, relocation and development is encouraged through the work of the Beaver Dam Area Development Corporation (BDADC), expansion of the Beaver Dam Business Park, and designation of land uses adjacent to the Business Park.
  - ✓ Land available for expansion and relocation of growing industrial uses will be maintained in coordination with the Beaver Dam Business Park and future expansions of this development.
  - ✓ There will be a fluid system of relocating, expanding or bringing new industries into the Business Park. Vacant sites within the central part of the

City will then be filled with smaller industries from either within or outside the City that were marketed and acquired through aggressive BDADC efforts.

- ✓ The Beaver Dam Business Park and existing vacant sites will continue to be marketed aggressively in an effort to fill vacancies, provide employment opportunities within the City, diversify the City's economic base, and repay the Tax Incremental Finance debt.
- ✓ Truck traffic conflicts between industrial and residential land uses will be minimized through the enforcement of existing truck routes through the City.

- **Government/Institutional**

  - ✓ Little expansion of government/institutional land area.
  - ✓ The Fire Department will engage in a study of response times and determine the need for a secondary facility.

C. COMMUNITY GROWTH PROJECTION

Population projections are a key factor in the forecasting of urban growth. The following information on population and land use projections is taken from the City of Beaver Dam's recently adopted comprehensive plan, entitled "Development Vision 2020". These projections should be updated and revised to reflect updated census information and revised growth projections as they become available in the future.

The Wisconsin Department of Administration (DOA) official population projections indicate a population which will remain fairly constant. According to DOA projections, the overall population of Dodge County is expected to increase approximately 3.26% between the years 1997 and 2020. This number indicates an annual growth rate between 1997 and 2020 of 0.14 percent. This projected growth rate is below the historical growth rates that have varied between 0.44% and 0.87% since 1960.

Due to the City of Beaver Dam's location on the edge of three expanding commuting shields including the Madison metropolitan area, the Milwaukee metropolitan area, and the Fox River Valley, the DOA's projected "no-growth" scenario seems unlikely. Both anecdotal information from local officials and official population estimates from 1990 through 1999 indicate that this "no-growth" profile is not probable.

In order to prepare land use alternatives for this twenty-year plan, a realistic vision for the future is needed. The economic and population growth experienced in the area since 1990 has created some questions as to the applicability of the population projections produced several years ago by the Wisconsin DOA.

Three alternative population scenarios were developed in response to these concerns. The "moderate projection" was selected as part of the framework for the City of Beaver Dam comprehensive plan.

The "high projection" was selected by Dodge County to provide the framework for their comprehensive plan. Although both these methods are not a formal population projection, these scenarios were based upon knowledge of current trends and expectations.

In order to remain consistent with the City of Beaver Dam's comprehensive plan, the "moderate projection" of population will be used herein. For a variety of reasons, this scenario was selected for planning purposes herein. Although less statistically valid as a trends analysis, there are some mitigating circumstances which lead to this opinion. First, the overall county plan weighs heavily upon the recent growth in communities like Ashippun and Watertown on the edge of the Milwaukee and Madison area commuting shields. Secondly, there is some validity in planning for a higher rate of growth and being prepared for what could occur as opposed to planning for a lower population and having to respond to greater numbers without a viable plan.

1. Population Projection

To determine future changes in a community - particularly land use changes - the first step is to approximate what the future population level might become. To calculate that value, three methods were used, the first one giving a low population projection, the second one resulting in a high value, and the third a moderate level between the first two.

a. Low Population Projection

The first method of determining future population levels was to simply use the population projections generated for communities in Wisconsin by the Wisconsin Department of Administration (DOA). The DOA's projection of Beaver Dam's population for January 1, 1999, is 15,000 people and 16,058 for 2015. These projections are based on the community's past population levels as reported to the Census for the last several decades. The Census is taken every ten years.

For the sake of making land use projections, we will assume that land use changes will parallel population changes. In order to make land use projections using the projected change in population as our guide, we use something called a population *multiplier*. The multiplier is simply the projected population level divided by the present population level. In determining the Low Population Multiplier, we used the DOA projection for 1999 as our current population estimate and the DOA projection for 2015 as our future population estimate. The **Low Population Multiplier** was derived using the following equation:

$$\frac{\text{16,058 (2015 DOA Population Projection)}}{\text{15,000 (1998 DOA Population Projection)}} = 1.0705$$

b. High Population Projection

The second method of determining future population levels was to incorporate the current planning work done by Dodge County. For the past 12 months, the County has been engaged in a similar land use planning process using consulting services. The timing of their analysis preceded the City of Beaver Dam effort by 10 months. Therefore, the County had produced much documentation on County-wide estimates and land use prior to discussions on similar topics at City Hall.

As in the Low Population Multiplier, we will assume that land use changes will parallel population changes. The multiplier is simply the projected population level divided by the present population level. In determining the High Population Multiplier, we used the Dodge County projection for 1997 as our current population estimate and the County projection for 2020 as our future population estimate. The **High Population Multiplier** was derived using the following equation:

$$\frac{\text{17,184 (2020 Dodge County Plan Population Projection)}}{\text{14,884 (1997 DOA Population Projection)}} = 1.1545$$

c. Moderate Population Projection

Given the continuation of trends up to 1990, the DOA and County's population projections may be a very sound way of determining future populations. However, discussions with officials at City Hall indicated that the basic value of both projections - the 1990 Census - may be significantly flawed. Also, the time between the 1990 Census and the current planning effort - nearly the entire decade - made identification of current population the most important element of the equation.

Because of these two elements (Census undercount and timeline from last Census count) the plan authors contrived a third method of determining current and future population levels. These two pieces of information led to a modification of both previous projections; in the first case to modify the basic population base, in the second to modify the known growth occurring in the City. While this effort may be the most complicated, it also has the potential to be the most accurate.

For additional details of this analysis, see the comprehensive plan, entitled "Development Vision 2020".

The Moderate Population Multiplier is calculated by using the 1998 modified projection as the denominator and the modified 2020 projection as the numerator. The **Moderate Population Multiplier** was derived using the following equation:

$$\frac{\text{17,105 (2020 Local Population Projection)}}{\text{15,253 (1998 Local Population Projection)}} = 1.1214$$

2. Land Use Projection

a. Existing Land Use

Figure 3 is a graphical representation of the existing land use in the vicinity of the City of Beaver Dam. Table 1 shows the City of Beaver Dam's 1998 land use areas broken down by category and as a percentage of the developed and total areas. These calculations were taken directly from a land use interpretation of the digitized mapping for the City's tax parcels. Excluding roadways, the developed area comprises nearly 68 percent (2,947.8 acres) of the City's total area (4,336.6 acres). Again excluding roadways, the total undeveloped or agricultural land area within the City is about 12 percent (504.5 acres) of the total area contained within the City's corporate boundary.

Of the land use categories, residential land uses are the most predominant in the City (50.54% of developed area). Public and quasi-public land comprises the second-highest proportion of the developed area with nearly seven and one-half percent of the total developed area under some type of public or quasi-public use. Park and open space land uses includes the third highest proportion of the developed area, still over seven percent. Industrial land use comprises over six percent - the fourth highest proportion. Commercial land is the least consumptive land use category with a little more than five and one-half percent of the developed land in this classification.

b. Projected Population and Associated Land Use

The plan recognizes that the city currently has a population of approximately 15,253 people. In the year 2020 the plan projects the population to be 17,105 people. Accordingly, the plan shows that this increase of 1,852 people will require an additional 464.9 acres of land. The additional land is projected to be allocated by use according to Table 5: Land Use Space Requirement Projection.

It is to note that the following densities are assumed for this plan.

Estimated persons per household in the year 2020 = 2.50
Estimated housing units per acre in the expansion area = 3.15

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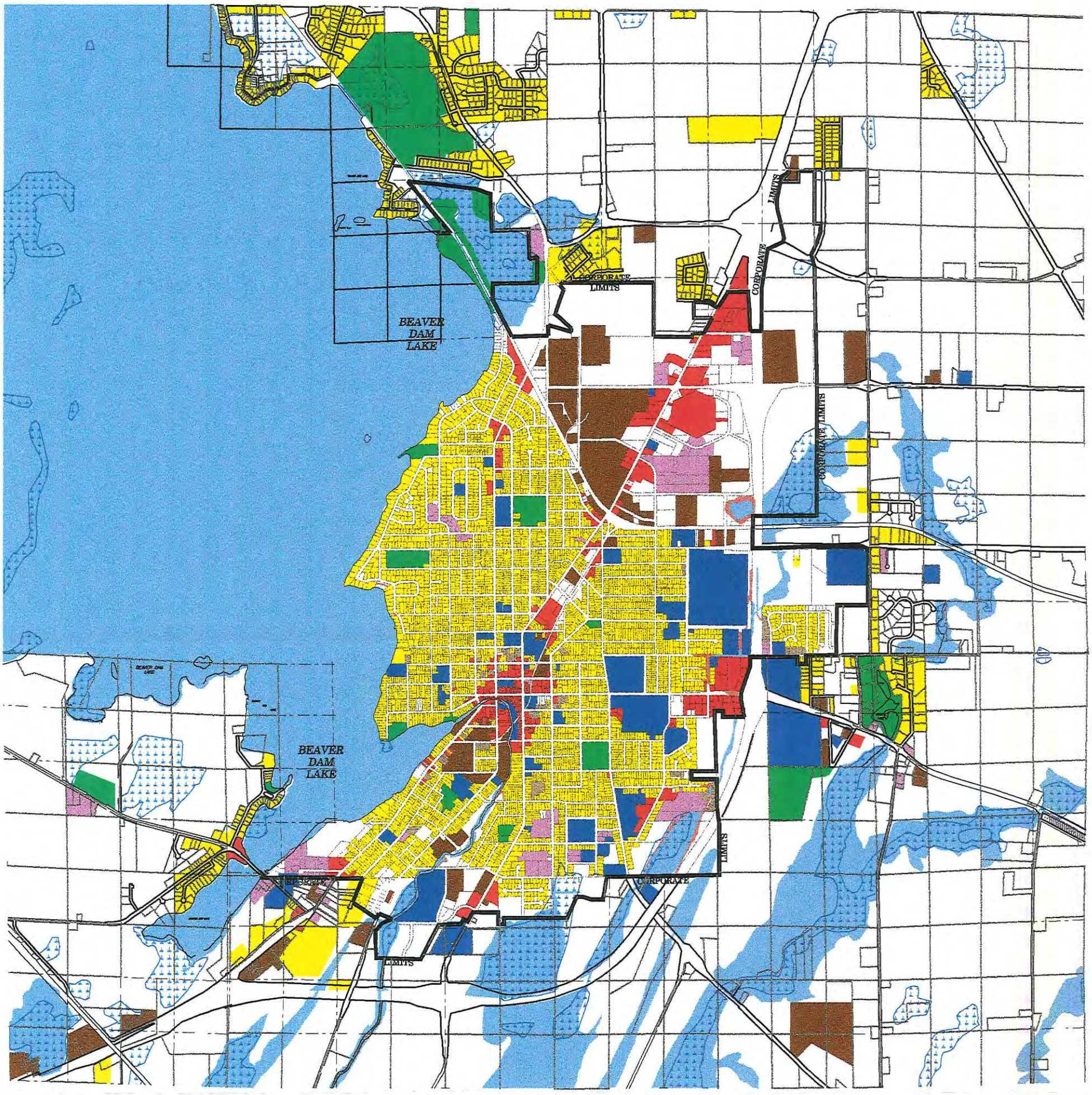
Existing Land Use as per the Adopted Comprehensive Plan City of Beaver Dam, Dodge County, WI



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LEGEND

- RESIDENTIAL
- MULTI-FAMILY RES. (2-4 UNITS)
- MULTI-FAMILY RES. (5+ UNITS)
- COMMERCIAL
- INDUSTRIAL
- PUBLIC
- OPEN SPACE/PARKS
- 100-YEAR FLOOD AREA
- MAPPED WETLANDS

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FIGURE 3

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Table 1
1998 Land Use Area Calculations by Land Use Category

Land Use Category	Area (Acres)	Percent of Total Developed Area	Percent of Total Area
Single Family Residential	1,802.3	47.03%	41.56%
Two - Four Family Residential	29.4	0.77%	0.68%
Five or more Family Residential	104.9	2.74%	2.42%
Total Residential	1,936.6	50.54%	44.66%
Commercial	211.2	5.51%	4.87%
Industrial	239.0	6.24%	5.51%
Public and Quasi-Public	285.0	7.44%	6.57%
Park and Open Spaces	276.0	7.20%	6.36%
Developed Area (Not including Roadways)	2,947.8	76.93%	67.97%
Roadways (Est. based on 30% of Developed Area)	884.3	23.08%	20.39%
Total Developed Area	3,832.1	100.00%	88.37%
Total Undeveloped Area (including wetlands, floodplain, and restricted areas)	504.5	----	11.63%
Total Area of City	4,336.6	----	100.00%

b. Future Land Use Changes

The population multipliers, created for each population projection scenario, are used to project the continuation of present land use areas and proportions into the future, given their relative assumptions regarding the population.

To generate these future land use areas, each 1998 land use category is multiplied by the respective multiplier; the product is the future land use area within the given land use category. Therefore in simple terms, it is assumed that the land use acreage for each category will increase in proportion to the population. Tables 2, 3 and 4 outline the Low, Moderate and High land use area projections for the City.

Table 2
2020 Land Use Area Projections by Land Use Category - Low Projections (Department of Administration)

Use Category	1998 Area (Acres)	2020 Area (Acres)	2020 Percent of Total Developed Area
Single Family Residential	1,802.3	1,929.4	47.03%
Two - Four Family Residential	29.4	31.5	0.77%
Five or more Family Residential	104.9	112.3	2.74%
Total Residential	1,936.6	2,073.2	50.54%
Commercial	211.2	226.1	5.51%
Industrial	239.0	255.9	6.24%
Public and Quasi-Public	285.0	305.1	7.44%
Park and Open Spaces	276.0	295.5	7.20%
Developed Area (Not including Roadways)	2,947.8	3,155.8	76.92%
Roadways (Est. based on 30% of Developed Area)	884.3	946.7	23.08%
Total Developed Area	3,832.1	4,102.5	100.00%

Table 3
2020 Land Use Area Projections by Land Use Category - Moderate Projections (City of Beaver Dam)

Land Use Category	1998 Area (Acres)	2020 Area (Acres)	2020 Percent of Total Developed Area
Single Family Residential	1,802.3	2,021.0	47.03%
Two - Four Family Residential	29.4	32.9	0.77%
Five or more Family Residential	104.9	117.6	2.74%
Total Residential	1,936.6	2,171.5	50.54%
Commercial	211.2	236.8	5.51%
Industrial	239.0	268.0	6.24%
Public and Quasi-Public	285.0	319.6	7.44%
Park and Open Spaces	276.0	309.5	7.20%
Developed Area (Not including Roadways)	2,947.8	3,305.4	77%
Roadways (Est. based on 30% of Developed Area)	884.3	991.6	23%
Total Developed Area	3,832.1	4,297.0	100.00%

Table 4
2020 Land Use Area Projections by Land Use Category - High Projections
(Dodge County)

Land Use Category	1998 Area (Acres)	2020 Area (Acres)	2020 Percent of Total Developed Area
Single Family Residential	1,802.3	2,080.7	47.03%
Two - Four Family Residential	29.4	33.9	0.77%
Five or more Family Residential	104.9	121.1	2.74%
Total Residential	1,936.6	2,235.7	50.54%
Commercial	211.2	243.9	5.51%
Industrial	239.0	275.9	6.24%
Public and Quasi-Public	285.0	329.0	7.44%
Park and Open Spaces	276.0	318.6	7.20%
Developed Area (Not including Roadways)	2,947.8	3,403.1	76.92%
Roadways (Est. based on 30% of Developed Area)	884.3	1,020.9	23.08%
Total Developed Area	3,832.1	4,424.0	100.00%

3. Summary of Urban Land Use Area Projections

The land use projections, as described in the previous section, estimate the amount of additional undeveloped land area necessary to accommodate projected City development through the year 2020. Table 5 summarizes the estimate of the land use space requirements for the growth projection as adopted by the City of Beaver Dam comprehensive plan update. This correlates to the "moderate projection" method.

Table 5
Land Use Space Requirement Projection

LAND USE	1998 ACTUAL (acres)	2020 PROJECTED (acres)	INCREASE (acres)	INCREASE (percent)
Residential	1936.6	2171.5	234.9	12.1%
Commercial	211.2	236.8	25.6	12.1%
Industrial	239.0	268.0	29.0	12.1%
Public & Quasi-Public	285.0	319.6	34.6	12.1%
Park & Open Space	276.0	309.5	33.5	12.1%
Roadways	884.3	991.6	107.3	12.1%
TOTAL	**3832.1**	**4297.0**	**464.9**	**12.1%**

D. SEWERAGE SYSTEM CAPACITY

Figure 4 indicates the approximate coverage of the existing sanitary sewer facilities for the City of Beaver Dam. This coverage area includes the city proper, along with three developments which are currently served and are located beyond the corporate limits. These three developments are: North Hills Trailer Court, South Hills Trailer Court, and Shady Oaks Subdivision. All three developments are residential in nature, containing a private collection system and a private pumping station. The waste is transported to the municipal system by means of a pressurized private force main pipe from the pumping station. All waste flows are measured at the pumping station by a flow meter. These flow quantities are currently invoiced to the private districts at a rate which is 125% of the current rate for customers located within the corporate limits.

In June of 1999, a "Wastewater Treatment Plant Capacity Evaluation" was completed for the City of Beaver Dam by Applied Technologies of Brookfield, Wisconsin. The information contained herein is taken from this report.

1. Treatment Plant Description

The City of Beaver Dam owns and operates a wastewater treatment plant (WWTP) that discharges to the Beaver Dam River, which is part of the Upper Rock River Watershed. The WWTP is an extended air activated sludge plant with grit removal, primary clarifiers, chlorination and dechlorination. Sludge is treated in anaerobic digesters and land applied. The plant was designed in 1983 and placed into operation in 1985. The wastewater characteristics used in the design are given in Table 6.

Table 6
Design Wastewater Characteristics

Parameter	Design Flow or Loading
Flow	
Average	3.5 mgd
Peak Day	12.0 mgd
Peak Hour	17.9 mgd
BOD_5	
Average	8,430 lb/day
Peak	10,325 lb/day
Suspended Solids	
Average	6,576 lb/day
Ammonia-N	
Average	690 lb/day
Peak	1,100 lb/day

mgd = million gallons per day lb/day = pounds per day

07 DEC 2000

Limits Of Existing Sanitary Sewer Service
Wastewater Treatement Facility
City of Beaver Dam, Dodge County, WI

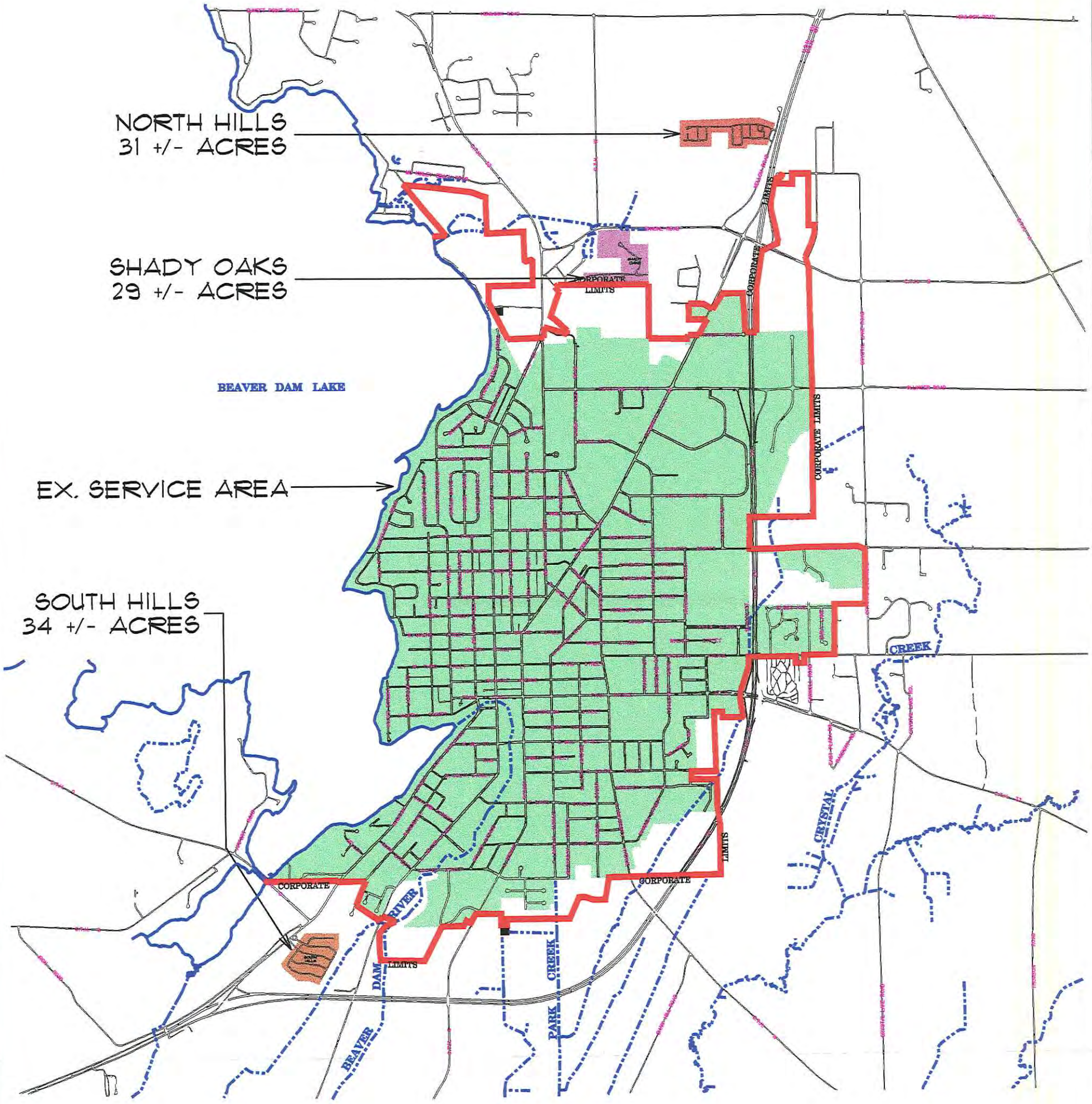

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FIGURE 4

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2. Process Description

The overall operation and function of the current wastewater treatment facility can be broken-down into a number of sub-components. These sub-components are briefly described as follows, and together they comprise the normal operating process at the WWTP.

Preliminary Treatment

The preliminary treatment processes include raw wastewater pumping, bar screens, grit removal, and comminution. Wastewater flows through a 48-inch interceptor sewer to the influent pump station located in the service building. Screw pumps lift the wastewater about 30 feet to the bar screens, also located in the service building. The two mechanically cleaned bar screens remove large objects from wastewater, including branches, wood, rags, and plastic items. The items which are removed by the bar screens fall by gravity into dumpsters and are hauled to a landfill. Continuing from the bar screen, the waste water flows by gravity to the vortex-induced grit removal units located in a nearby building. Grit which is removed by this process is augered to dumpsters and is also hauled to a landfill. Currently, the communitors are bypassed. The wastewater is monitored by a Parschall flume to determine flow rates and sampled before entering the primary clarifiers.

Primary Treatment

Screened and de-gritted wastewater flows by gravity through three 60 foot square primary clarifiers. Wastewater flow is quieted in the large clarifiers, and most of the particulate material settles to the bottom, where the sludge is mechanically scraped off the bottom. The clarifiers have a skimmer and a scum collection box to remove floating material. About 60% of the Total Suspended Solids (TSS) and 30% of the Biochemical Oxygen Demand (BOD) is removed in this process.

The primary clarifiers receive waste activated sludge (WAS) from the secondary treatment system for co-settling with primary sludge. Co-settled sludge is pumped to the primary anaerobic digesters for further treatment. Primary effluent flows by gravity to a splitter box, where flow is divided between the aeration tanks.

Secondary Treatment

Secondary (biological) treatment is accomplished with an extended air activated sludge process. Each of six aeration tanks has a volume of about 460,000 gallons, with a total volume of 2.77 million gallons. At the design average flowrate of 3.5 million gallons per day (mgd), the aeration tanks have a hydraulic retention time (HRT) of about 19 hours. The aeration tanks contain a microbial population of bacteria, protozoa, rotifers, and other organisms that consume primarily soluble solids in wastewater. The mixture of water and microbiological organisms is called

"mixed liquor." The aeration tanks have a grid system of diffusers on the bottom of the tanks where air is bubbled through the mixed liquor. The air is necessary for the aerobic biological process and keeps the mixed liquor well-mixed.

Three final clarifiers allow the activated sludge to settle and separate from the water. Most of the activated sludge is pumped back to the aeration tank influent, and is called return activated sludge (RAS). Recycling the activated sludge increases the lifespan of the microbiological organisms. The average time that biomass spends in the aeration tanks is called the sludge age, or mean cell residence time (MCRT). Under existing conditions, the WWTP has a sludge age of about 14 days. Since the microorganisms are constantly reproducing, a certain amount of activated sludge has to be removed from the aeration, or "wasted," to maintain a steady population. The waste activated sludge (WAS) can be dewatered in the gravity thickener, but is currently pumped to the primary clarifiers and co-settled with primary sludge. Final effluent flows to the chlorine contact chambers for disinfection.

Disinfection

Before discharge to the river, the final effluent is chlorinated for disinfection. The Beaver Dam WWTP uses chlorine gas for disinfection and sulfur dioxide for dechlorination. Post aeration increases the dissolved oxygen (DO) level above the minimum permitted limit. The effluent flowrate is determined with a Parshall flume.

Sludge Handling

Sludge from primary and secondary treatment, co-settled in the primary clarifiers, is stabilized in two primary anaerobic digesters, where about half of the volatile (organic) solids are biologically converted to methane gas, carbon dioxide, and water. The digestion process reduces odors and makes the sludge less desirable to rodents, insects, and other pests. The digested sludge is pumped to secondary digesters for temporary storage, where excess water is decanted. The methane gas produced during digestion is used as fuel in two of the four blowers supplying air to the activated sludge process. The methane gas is temporarily stored under a floating cover within one of the secondary digesters.

Sludge produced at the WWTP is land applied as fertilizer in neighboring farm fields. In warmer months, the sludge is applied at about 2% solids concentration directly from the secondary digesters. Sludge cannot be applied when the ground is frozen, therefore the facility stores sludge for a period of up to six months. To save space, the sludge is dewatered in a belt filter press to about 12% solids. Polymer is added at the belt filter press to aid in the separation of the sludge from the water. The sludge cake is loaded into trucks and sent to the on-site sludge storage building until warmer months, when it is land applied.

3. Executive Summary - WWTP Capacity Evaluation

The City of Beaver Dam owns and operates a wastewater treatment plant with a stated design capacity at average conditions of 3.5 million gallons per day, 8,430 pounds per day (lb/d) of biochemical oxygen demand (BOD_5), 6,576 lb/d of total suspended solids (TSS), and 690 lb/d of ammonia as nitrogen (NH_4-N).

In 1995 and 1997, the treatment plant's point totals for the Compliance Maintenance Annual Report exceeded 70, and the facility entered the departmental recommendation range. Plant age (currently at 15 years) and influent flows and loadings within 90% of the stated design capacity at average conditions contributed to the point totals. The treatment plant has consistently met effluent limits. Applied Technologies conducted a plant capacity study to determine the capacity of each unit process within the treatment plant and the overall plant capacity.

Table 7 contains a summary of the plant capacity analysis. Capacity is expressed in terms of flowrate and population equivalents (PEs). The capacity of each unit process is the maximum flowrate the process can handle (at existing wasteload concentrations) and remain within standard design parameters found in NR 110 or other design references. Capacity in terms of flowrate was converted to PEs assuming that an average of 100 gpd of wastewater is discharged per person.

Table 7
Unit Process Capacities

Unit Process	Capacity [mgd]	Capacity [PEs][a]	Percent capacity in use
Primary Clarifiers	10.73	107,300	29%
Aeration Basin	4.30	43,000	73%
Aeration System	5.08	50,800	61%
Final Clarifiers	8.03	80,300	39%
Chlorine Contact	5.05	50,500	61%
Gravity Thickener	9.54	95,400	35%
Primary Digester	5.04	50,400	58%
Sludge Storage	4.42	44,200	63%

a) Assumes 1 PE is equivalent to 100 gallons per day.

The capacity of the Beaver Dam WWTP is 4.30 mgd. This capacity is equivalent to the smallest capacity in Table 7, and is based on co-settling WAS and primary sludges in the primary clarifiers. Using existing wasteload concentrations, the facility can treat 10,000 lb/d of BOD_5, 6,700 lb/d of TSS, and 856 lb/d of total Kjeldahl nitrogen (TKN).

If the plant is re-rated to 4.3 mgd, the plant could serve and additional 12,200 residents, or an additional 2800 lb/d of BOD_5, 1,900 lb/d of TSS, and 1,200 lb/d of TKN from commercial and industrial contributors, or a combination of sources.

E. ENVIRONMENTALLY SENSITIVE AREAS

Protecting water resources for ourselves and future generations is the primary reason for preparation of the sewer service area plan. To accomplish this, identification of "environmentally sensitive areas" or areas where development would have a more adverse impact on water quality is necessary. Unchecked development within these environmentally sensitive areas would lead to serious degradation of inland waters. By limiting development within these areas the quality of our water resources can be maintained. Figure 5 entitled "Environmentally Significant Lands in the Beaver Dam Study Area" is a graphic representation relating to the following discussion.

Environmentally Sensitive Areas (ESA's) are geographic areas which encompass especially valuable natural resource features such as lakes, rivers, streams, wetlands, and their associated undeveloped shorelands, floodplains, hydric soils and areas of steep slopes. ESA's as defined within this report are as follows:

- Any Environmentally Sensitive Area associated with a non-navigable flowage, river or stream shall extend 25 feet from both sides of the center of the channel of such feature.

- All floodplains (FEMA 100-year) shall be designated as ESA's.

- All Department of Natural Resources (DNR) mapped wetlands shall be included in an ESA. Any Environmentally Sensitive Area associated with such a wetland which is at least two acres in size shall extend 50 feet beyond the edge of the wetland.

- Areas of steep slope 20 percent or greater shall be designated as ESAs. Areas with a slope between 12% and 20% require site specific construction site and stormwater management planning.

- Publicly owned scientific and natural areas and areas with identified archaeological sites shall be included in the ESA.

- Other significant natural resource features, including but not limited to, river and stream headwaters, woodlands, high-value wildlife habitat areas, geologic and natural area sites, steep slopes, and wet, poorly drained and organic soils, shall be considered for inclusion as an ESA on a case-by-case basis by the city and plan advisory committee after consultation with DNR.

Sewer extensions for development within designated ESA's will be prohibited. An exception to this exclusion does exist as the plan recognizes that it may be necessary, in some case, to construct sanitary sewers across and through identified environmental corridors, and that, compatible land uses such as public parks and outdoor recreation facilities may need sewer at a future date. Also, mapping detail may not portray exact boundaries of physical features as they currently exist, in which case an onsite inspection would need to be conducted to properly identify the environmental corridor. The City Plan Commission and WDNR will review these exceptions/modification of

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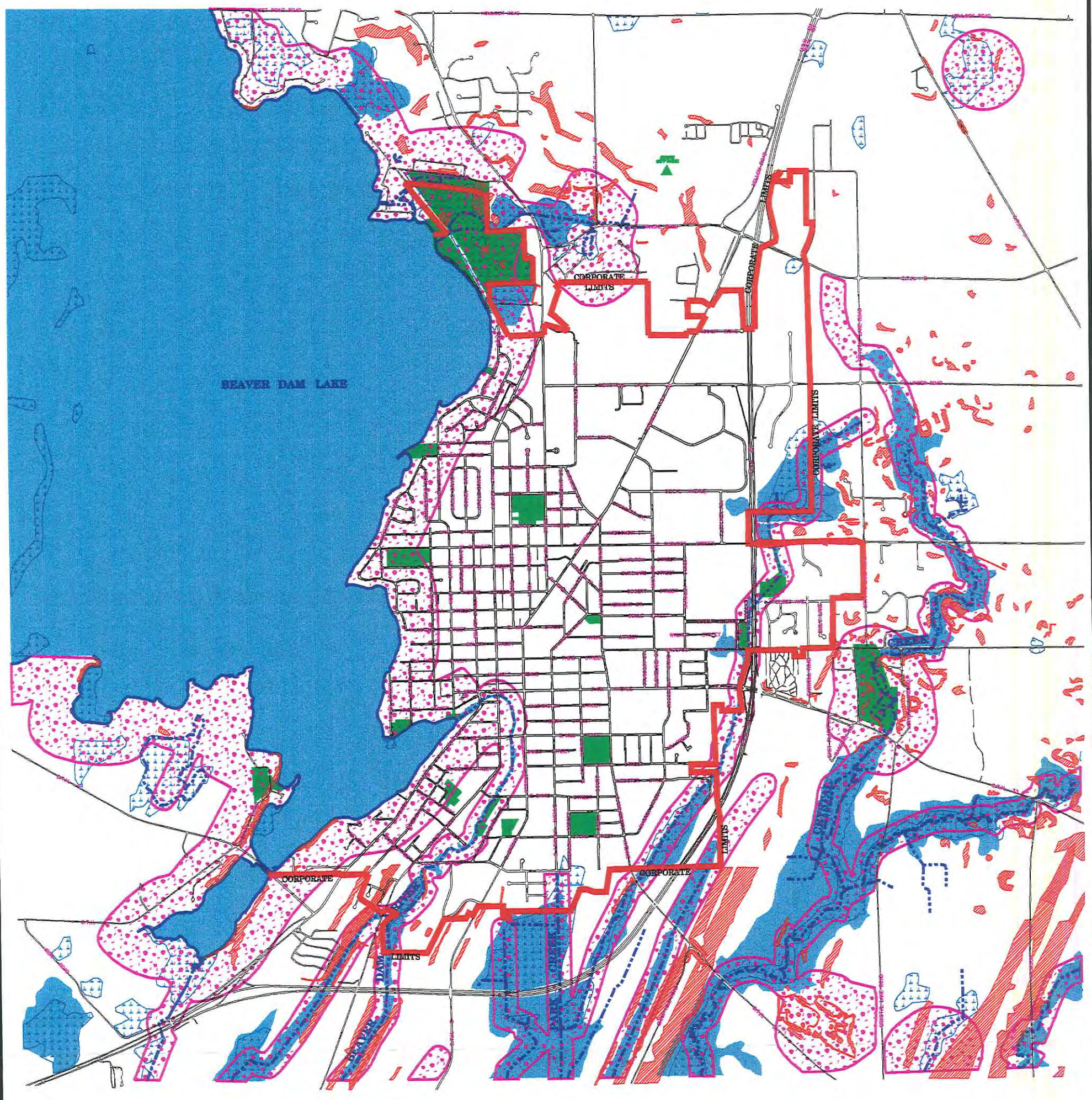
Environmentally Significant Lands in the Beaver Dam Study Area



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W E
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SCALE

0 1320 (1/4 MI) 2640 (1/2 MI) 1800 (3/4 MI)

LEGEND

- 100-YEAR FLOOD AREA
- MAPPED WETLANDS
- RIVER, STREAM OR WATERWAY
- EXISTING PARK LAND
- STEEP SLOPE (12%-20%)
- STEEP SLOPE (GREATER THAN 20%)
- SHORELANDS

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FIGURE 5

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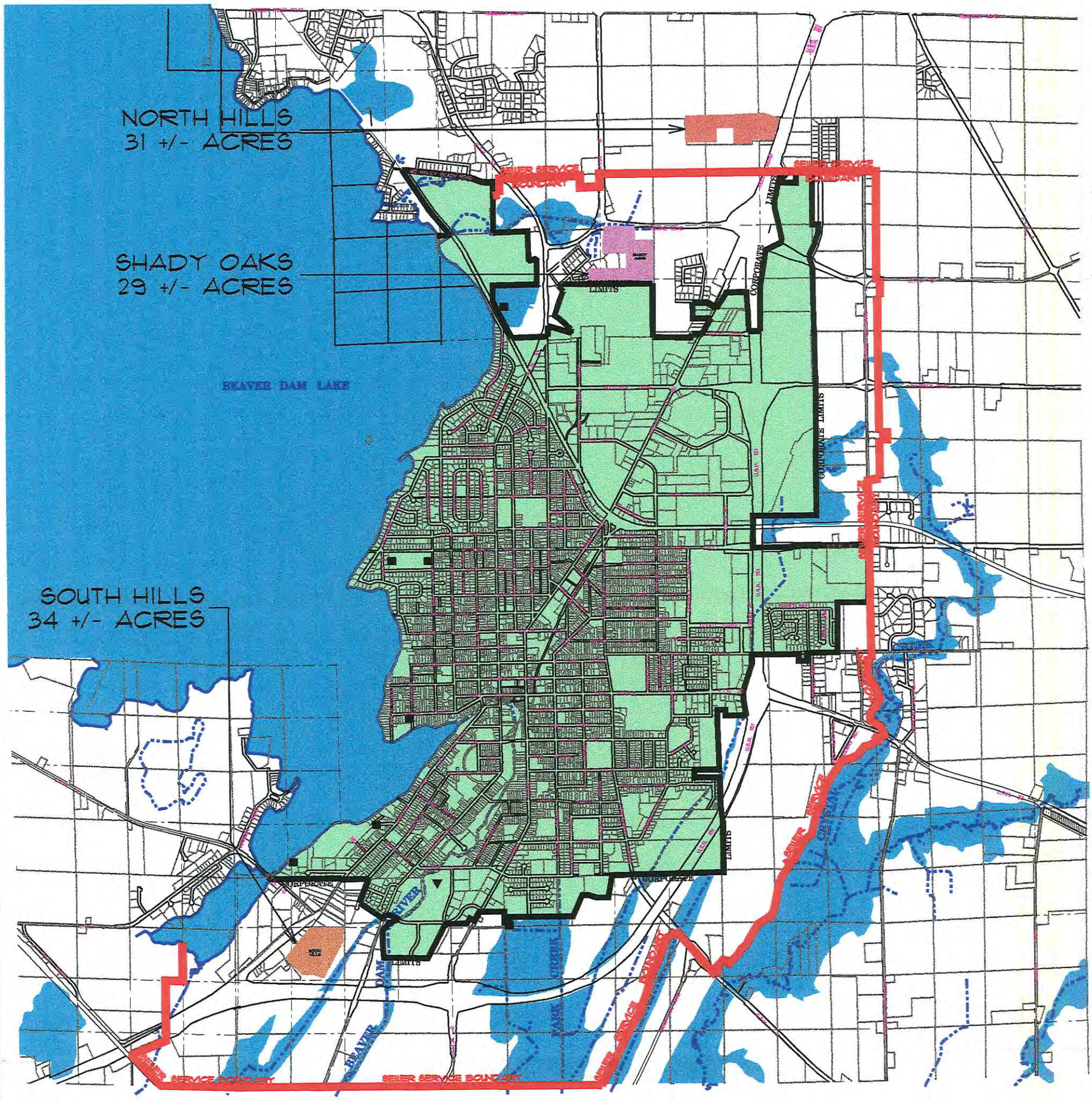
18 JAN 2001

Sanitary Sewer Service Area
Wastewater Treatment Facility
City of Beaver Dam, Dodge County, WI



N
W E
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SCALE
0 1320 (1/4 MI) 2640 (1/2 MI) 1800 (3/4 MI)

LEGEND

- EXISTING CITY LIMIT AREA
- SHADY OAKS SUBDIVISION
- SOUTH HILLS TRAILER COURT
- NORTH HILLS TRAILER COURT
- WASTEWATER TREATMENT PLANT
- LIFT STATION
- SEWER SERVICE BOUNDARY-2020

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FIGURE 6

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environmental corridor mapping on a case-by-case basis. Pursuant to NR 1.95, when an exception of this particular nature exists, all reasonable alternatives to crossing the environmental corridor with sanitary sewer will be considered. Any changes to the ESA delineation would require a plan amendment and WDNR approval.

Intensive uses to be considered for exclusion from within ESA's include but are not limited to permanent structures such as residential, commercial, or industrial buildings; impervious surfaces such as parking lots and concrete or asphalt surfaced storage areas; and site disturbing activities such as clearing, grubbing, grading, and filling. Any consideration of development within or adjacent to an ESA must be in conformance with all applicable Federal, State, and local rules and regulations including the provisions and requirements of the Federal Clean Water Act, Wisconsin Administrative Codes NR 103, 115, 116, 117, 121, 216, and 299, and local zoning ordinances.

Uses which may be compatible with the protection and preservation of ESA's include non-intensive recreational facilities such as trails and picnic areas; in some instances, utility facilities such as sewer and water lines, detention basins, and stormwater drainage-ways; and limited clearing, grubbing, grading, and filling.

If there is any doubt to the location of, or infringement on ESA's at the time of sewer extension or boundary amendment requests (as delineated on the review maps), the reviewing agency (City of Beaver Dam) will consult with and request site specific information (including proposed building footprints) from the local municipality and/or petitioner. This information, along with the ESA criteria from this plan, will be used to make a recommendation on the proposal.

Application of the above ESA definition will not apply to those areas currently developed or platted at the time of plan publication, but will apply to those areas not yet developed or platted at the time of publication.

Maps 6A-G show the location of ESA's throughout the planning area. Although ESA's may overlay existing developed lands, it is their location throughout the undeveloped portion of the Sewer Service Area that will determine future sewered development.

1. Areas Where Development is Prohibited

a. Wetlands

Wisconsin State Statute 23.32 defines wetlands as "an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic (water tolerant) vegetation and which has soils indicative of wet conditions (hydric soils)". For this report, the statutory definition of a wetland will be used. Examples of wetlands are open and wooded swamps, shallow and deep water marshes, wet meadows and prairies, and ephemeral ponds.

These wetlands are important for groundwater recharge and discharge and often provide habitat for a wide variety of plants and animals. Wetlands also provide natural open space, reduce flood peaks and help maintain both surface and groundwater quality. The functional values of wetlands include: active and passive recreation, stream and lake buffer areas, pollutant trap, groundwater recharge, wildlife and fisheries habitat, and maintenance of stream base flows.

In general, any development in a wetland destroys valuable ecosystems, adversely affects surface water drainage and alters the quality of groundwater supplies. In addition, specialized construction techniques must be used when building structures, roads, and sanitary sewers in wetland areas. If these more costly specialized techniques are not used, recurring problems with frost action and infiltration of groundwater can reduce the effective life of the structures.

Note that for purposes of interpretation of the limits of the City of Beaver Dam's sanitary sewer service area, a 50 foot wide buffer shall be incorporated around each wetland area which is at least 2 acres in size. This buffer shall be interpreted as being a restricted part of each wetland determination.

b. Floodplain

Construction in the floodway portion of the floodplain of any major drainageway is currently prohibited or regulated through existing Wisconsin Statutes and local ordinances. The floodway is the channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional flood discharge. All floodplain areas have been removed from potential development areas. However, much of the flood fringe in the developed area has been developed so the floodway is the area shown in these cases. Public utilities, streets and bridges can be extended in floodplain areas, however, they must comply with all state and local regulations. (Outlined in Wisconsin Administrative Code NR116).

c. Hydric Soils

Soils types with a high water table exhibiting a saturated condition at or near the ground surface are generally characterized as hydric soils. The presence of saturated soil conditions may restrict the installation of building foundations and subject basements to seasonal wetness and flooding. Development on hydric soils increases the likelihood of surface and ground water contamination within these areas. Hydric soils are defined as soils that have the following soil map units as indicated in the United States Soil Conservation Services Publication entitled Soil Survey of Dodge County, Wisconsin.

Ad	Aw	AzA	BmA	Br	Co
Da	ElA	EmA	EoA	Ha	Ho
KaA	LkA	Ma	Mb	Mc	Md

Me	Mf	Na	To	Pa	Rs
Se	Wb	WcA			

There may be isolated areas with hydric soil characteristics which may be appropriate for limited development. Such areas maybe developed following detailed analysis by soil experts and through implementation of appropriate construction techniques.

d. Existing or Proposed Greenbelts

Greenbelts are typically assumed to only provide a natural open area or park use. However, in addition to the aesthetic and natural benefits of maintaining greenbelts, they also serve essential purposes. The natural drainageways established as greenbelts route storm water out of developed areas with a minimum of adverse effect and at a nominal cost. This stormwater routing technique can keep storm sewer construction at a minimum. Proper design of these preserved areas will reduce erosion and prevent damage to developed areas. In addition to a utility easement, the natural gradient of the drainageway provides an economical location for gravity interceptor sewers.

e. Slopes Greater than 20 Percent

Areas with steep slopes (greater than 20 percent) have been identified as developmentally limited areas. Construction activities on steep slopes typically require more site preparation and earth work, and can result in severe erosion and sedimentation problems if adequate drainage facilities and revegetation practices are not completed in a short period of time. This erosion deteriorates the water quality and can result in increased property damage downstream.

No land disturbance activities are allowed on slopes of 20% or greater except for access roads or installation of utilities to building sites of less than 20% slope. Development of lands having slopes of at least 12 percent but less than 20 percent, which are proximal to streams or other environmental features, should also be considered for designation as environmentally sensitive areas and excluded from development.

2. Areas Where Development is Controlled

a. Shorelands

Local County and Municipal Ordinances outline the potential uses of shorelands. Such controls are necessary to prevent any adverse affect of the natural waterways. If properly administered, conditional development can occur.

Shorelands shall include those areas within 1,000 feet of the ordinary highwater mark

of navigable lakes, ponds, or flowages, and within 300 feet of the ordinary highwater mark of navigable rivers or streams or to the landward side of the floodplain, whichever distance is greater. For the purposes of navigability, it is assumed that all lakes, ponds, flowages, rivers, and streams that appear as permanent bodies of water on the United States Geological Survey (USGS) quadrangle maps are navigable bodies of water.

b. Soil Conditions for Private Septic Systems

Through existing State and County regulatory agencies, development on soils that are unsuitable for private waste disposal systems is avoided. This will prevent homes outside the city limits from being constructed on unsuitable soils and later requiring annexation for sewer connections due to failing septic systems. Such connections are often more expensive when trying to design around existing unplanned development.

c. Local Zoning Uses/Restrictions

Although local zoning ordinances attempt to regulate uncontrolled growth, public needs significantly influence final land use. Local zoning can be altered if the change is warranted and authorized by the local governing agency.

d. Flood Fringe

The flood fringe is that portion of the floodplain outside of the floodway, which is covered by flood water during the regional flood. Development within the flood fringe portion of the general floodplain district must comply with local standards for development in those areas, and any other ordinance or other state or federal regulation/permit affecting such lands.

e. Slopes of 12 to 20 Percent Outside of Designated Environmentally Sensitive Areas

In order to protect the planning area's lakes, rivers and streams from excessive stormwater runoff, this plan calls for the City to review and approve erosion and sedimentation control plans for an entire developing site and/or plat when slopes of 12% or greater exist. Those lands should be developed in accord with standards for development that address erosion control, minimum lot size/building area requirements, vegetation removal, and site specific grading plans.

f. Storm Water Management Areas

A detailed analysis of the current storm water runoff pattern has been conducted for the area immediately surrounding the corporate limits of the City of Beaver Dam. This study is described in more detail and referenced in a later section of this report.

A number of areas within the sanitary sewer service boundary for 2020 have been identified as significant for the purposes of storm water management. These areas are indicated on the mapping for this report. Although the areas indicated are approximate in location and size, the intent is to identify and map these areas for consideration by review and approval authorities. The referenced storm water study contains approximate volumes for each proposed storm water structure based upon a post-development scenario which is consistent with the updated comprehensive plan entitled "Development Vision 2020".

Future development plans may alter the proposed location, size, capacity and contributing area of these storm water management facilities based upon a more detailed development proposal and study. It is intended that the information presented herein form the basis for future review and approval considerations and in addition, provide an initial "heads-up" related to future storm water management concerns.

g. Other Significant Areas

Upland resource areas, groundwater recharge/discharge areas, and areas of exposed bedrock were also considered.

The most significant areas of groundwater recharge/discharge were determined to be contained within the existing wetland and shoreland areas. For this reason these areas were not included as a specifically mapped and/or identified area.

There were no areas identified as significant upland resource or exposed bedrock. Similarly these areas were not included as a specifically mapped and/or identified area.

3. Areas Where Development is Discouraged

a. Agricultural Preservation Areas

It is always undesirable to take valuable farm land out of production. However, due to changing property values, urban pressures often outweigh agricultural demands. Unfortunately, most of the property available for development in the planning area is agricultural land.

It is the intent of this plan is to encourage development to occur in a location which conforms with the overall development vision as set forth in the City's current comprehensive plan and is also beneficial to the overall needs of the community and surrounding area. In general, this vision may encourage "in-fill" development within the current service limits, or it may encourage the development of lands which are in proximity to an existing development or service area so as to maximize the cost

effective use of existing utilities and services. It should discourage development which does not promote an orderly extension of municipal services along with the orderly and timely conversion of agricultural lands.

b. Areas with Construction Problems Not in Prohibited Areas

Construction problems translate into additional costs; costs that are absorbed by the person developing a property and by the entire service area through high utility costs. Although these areas will be somewhat naturally controlled through additional costs, the developer may feel that these costs are justifiable. Even with discouragement, undesirable growth may occur.

4. Areas Where Development is Encouraged

a. Lands in Proximity to Existing Development that are not within Environmentally Sensitive Areas

Such properties could be developed economically and with a minimum of adverse effects.

b. Existing Developable Property within the City Limits

In-filling of available property maximizes the cost effective use of existing utilities. Development in such areas will be encouraged. This objective needs to be balanced against the desire to have adequate vacant land for building site selection and housing choice.

5. Summary

In summary, growth will be controlled by the following categories:

Prohibited:
wetlands (including a 50 foot wide buffer area)
floodways
greenbelts
hydric soils
steep slopes (20% or greater)

Controlled:
shorelands
adverse soil conditions
zoning uses
flood fringe
slopes between 12% and 20%

storm water management areas

Discouraged:
agricultural preservation areas
construction problems

Encouraged:
infilling adjacent suitable areas

Prohibited and controlled areas are included in the ESA's. Proper application of methods used to encourage, control and prohibit development through policy action will directly satisfy the goals and objectives of this study.

IV. MAPPING BACKGROUND

A. WETLANDS

The wetland areas shown on the mapping for this report are based upon a graphical interpretation of the "Wisconsin Wetlands Inventory" maps as prepared by the Department of Natural Resources. The report maps are not intended to accurately represent the location, size or existence of wetlands. The exact determination of wetland areas shall be by field survey or other approved methods.

The specific map used herein is labeled "Wisconsin Wetlands Inventory - DNR Bureau of Planning - County Dodge - Townships T12N R14E, T12N R15E, T11N R14E, T11N R15E". The original aerial photography date is listed as July 24, 1978 with revisions in July 1, 1982 and September 27, 1988.

Note that for purposes of interpretation of the limits of the City of Beaver Dam's sanitary sewer service area, a 50 foot wide buffer shall be incorporated around each wetland area. This buffer shall be interpreted as being a restricted part of each wetland determination.

B. FLOODPLAINS

The limits of the regional flood (100-year) shown on the mapping for this report are based upon a graphical interpretation of the "Flood Insurance Study" maps as prepared by the Federal Emergency Management Agency (FEMA). The report maps are not intended to accurately represent the location, size or existence of flood areas. The exact determination of flood areas shall be by field survey or other approved methods.

The specific information used herein is contained in three documents. These documents are labeled as follows:

"FIRM - Flood Insurance Rate Map - County of Dodge, Wisconsin (Unincorporated Areas) - Panel 70 of 210 - Community Panel Number 550094 0070 B - Effective Date: June 15, 1981 - Federal Emergency Management Agency - Federal Insurance Administration"

"FIRM - Flood Insurance Rate Map - County of Dodge, Wisconsin (Unincorporated Areas) - Panel 100 of 210 - Community Panel Number 550094 0100 B - Effective Date: June 15, 1981 - Federal Emergency Management Agency - Federal Insurance Administration"

"Flood Insurance Study - City of Beaver Dam, Wisconsin - Dodge County - October 3, 1983 - Federal Emergency Management Agency - Community Number 550095"

C. SHORELANDS

Shoreland areas include those areas within 1,000 feet of the ordinary highwater mark of navigable lakes, ponds, or flowages, and within 300 feet of the ordinary highwater mark of navigable rivers

or streams or to the landward side of the floodplain, whichever distance is greater. For the purposes of navigability, it is assumed that all lakes, ponds, flowages, rivers, and streams that appear as permanent bodies of water on the United States Geological Survey (USGS) quadrangle maps are navigable bodies of water. The location and extent of these bodies of water have been determined thru the combined use of the USGS maps and thru digitized aerial photography. The report maps are based upon current information and data and are approximate in the location, size or existence of shorelands. The exact determination of these areas shall be verified by local review and approval authorities.

The USGS quadrangle map dated 1980 and labeled "Beaver Dam Quadrangle - Wisconsin - Dodge County - 7.5 Minute Series (Topographic)" has been used to identify the location and extent of *permanent bodies of water* as referenced above.

In addition, digitized aerial photography performed on April 4th and 5th of 1998 by Aero-metric of Sheboygan, Wisconsin has been used to further enhance the size and location of these features.

D. STEEP SLOPES AND HIGHLY ERODIBLE SOILS

The steep slope areas shown on the mapping for this report are based upon a graphical interpretation of the digitized aerial photography as described previously. This mapping generated 2 foot interval ground contours which were analyzed for slopes ranging from 12% to 20% and also greater than 20%. The report maps are based upon current information and data and are approximate in the location, size or existence of steep slopes. The exact determination of these areas shall be verified by local review and approval authorities.

Additionally, the "Soil Survey of Dodge County Wisconsin - United States Department of Agriculture - Soil Conservation Service in cooperation with Research Division of the College of Agricultural and Life Sciences - University of Wisconsin" and dated February 1980 has been used to determine soil classifications, properties, and locations.

E. GREENBELTS

The greenbelt areas shown on the mapping for this report are based upon a graphical interpretation of the digitized aerial photography as described previously. These areas were determined to have significance in the management of storm water runoff. A minimum width of 50 feet shall be used for the interpretation of these areas for this report. The maximum size, location and related characteristics shall be as shown on the maps of this report (or as referenced by this report).

F. STORM WATER MANAGEMENT AREAS

The storm water management areas shown on the mapping for this report are based upon a graphical interpretation of the digitized aerial photography as described previously. These areas were determined to have significance in the management of storm water runoff. The location and size of these areas is approximate and shall be verified by future detailed studies.

V. SANITARY SEWER SERVICE AREA 2020

A. METHODOLOGY

The amount of land that can be included in the sanitary sewer service area boundary is limited by the need for urban land area to accommodate City growth within the 20 year planning period. However, in addition to a pure analytical approach, a certain amount of intuition, or instinctive knowledge based upon facts and observed trends, should be applied.

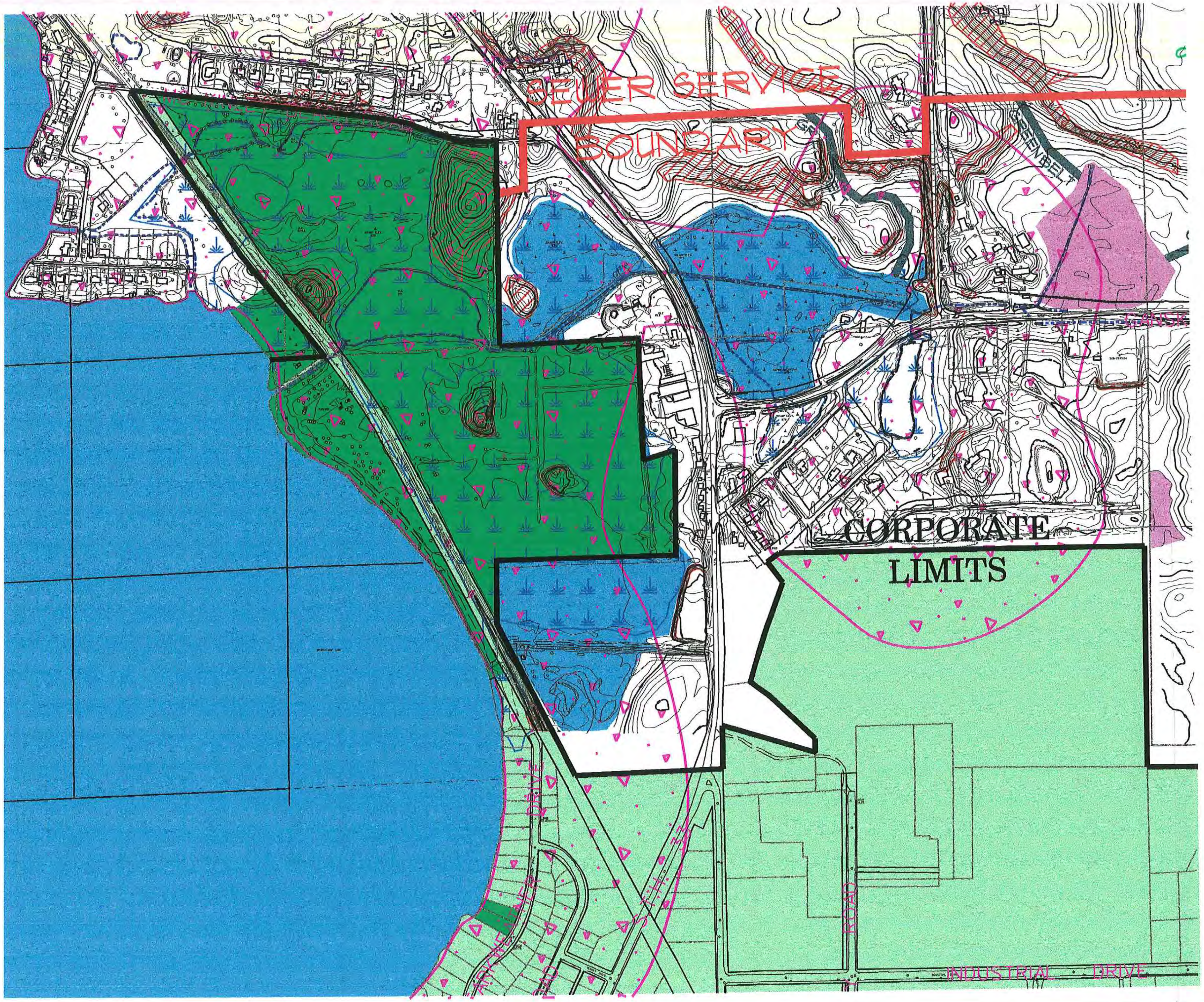
Figure 6, along with the corresponding detail maps labeled Figure 6A thru 6G, show the limits of the sanitary sewer service expansion area thru the year 2020.

Although the sewer service boundary is based upon the acreage allocations presented herein, the placement of anticipated growth is based upon known or expected developments, identified development trends and knowledge of the local real estate market. A reserve margin is used to take into account the uncertainties of the real estate market since it is difficult to predict which individual parcels might be available for development. Additionally, this margin will help account for the irregularities and fragmentation in the spatial arrangement of the future development areas as indicated by Figure 7. Note that there are many non-connected and irregular areas because of the glacial drumlin topography. These drumlins tend to run in a northeast to southwest direction and tend to break-up the developable areas into smaller units.

Figure 7 is a map which shows the "developable" area within the sanitary sewer service boundary. These "developable" areas are further categorized as "unrestricted" and "controlled development". The controlled areas have possible issues with: shoreland zoning, adverse soil conditions, flood fringe, and/or slopes between 12% and 20%. While development is possible in these areas, it will be somewhat more difficult and restrictive. A summary of the land areas comprising the sanitary sewer service expansion area is contained in Table 8.

Table 8
Breakdown of the Sanitary Sewer Service Expansion Area

AREA CLASSIFICATION	APPROXIMATE AREA (Acres)	PERCENT OF TOTAL
Developable Area (Unrestricted)	882.0	34.85%
Storm Water Management (Unrestricted Areas)	39.5	1.56%
Developable Area (Controlled)	198.4	7.84%
Storm Water Management (Controlled Areas)	23.3	0.92%
Un-Developable Area (wetlands, floodways, greenbelts, hydric soils, slopes greater than 20%)	1387.8	54.83%
TOTAL	**2531.0**	**100.00%**



NOTE:
1. THE WETLAND AREAS SHOWN ARE GRAPHICAL INTERPRETATIONS BASED UPON THE "WISCONSIN WETLANDS INVENTORY" MAPS AS PREPARED BY THE DEPARTMENT OF NATURAL RESOURCES. THIS MAP IS NOT INTENDED TO ACCURATELY REPRESENT THE LOCATION, SIZE OR EXISTENCE OF WETLANDS. THE EXACT DETERMINATION OF WETLAND AREAS SHALL BE BY FIELD SURVEY OR OTHER APPROVED METHODS.

NOTE THAT ALL WETLAND AREAS SHALL INCLUDE A 50' WIDE BUFFER (SEE REPORT FOR DETAILS)

2. THE 100-YEAR FLOOD AREAS SHOWN ARE GRAPHICAL INTERPRETATIONS BASED UPON THE "FLOOD INSURANCE STUDY" AS PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. THIS MAP IS NOT INTENDED TO ACCURATELY REPRESENT THE LOCATION, SIZE OR EXISTENCE OF FLOOD AREAS. THE EXACT DETERMINATION OF FLOOD AREAS SHALL BE BY FIELD SURVEY OR OTHER APPROVED METHODS.

3. THE STEEP SLOPES, SHORELANDS, GREENBELTS, STORM WATER MANAGEMENT, AND OTHER SIGNIFICANT AREAS ARE BASED UPON CURRENT INFORMATION AND DATA. THEY ARE APPROXIMATE IN LOCATION AND SIZE AND SHALL BE VERIFIED BY LOCAL REVIEW AND APPROVAL AUTHORITIES.

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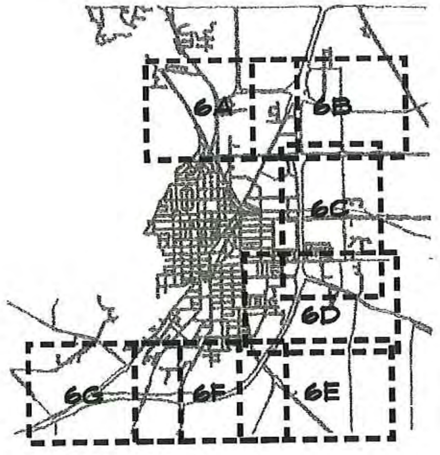

SHEET INDEX

FIGURE 6A

LEGEND
- 100-YEAR FLOOD AREA
- MAPPED WETLANDS
- RIVER, STREAM OR WATERWAY
- PARK LAND
- STEEP SLOPE (12%-20%)
- STEEP SLOPE (21% OR MORE)
- SHORELANDS
- GREENBELT
- STORM WATER MGM'T AREA (APPROX. LOCATION & SIZE)

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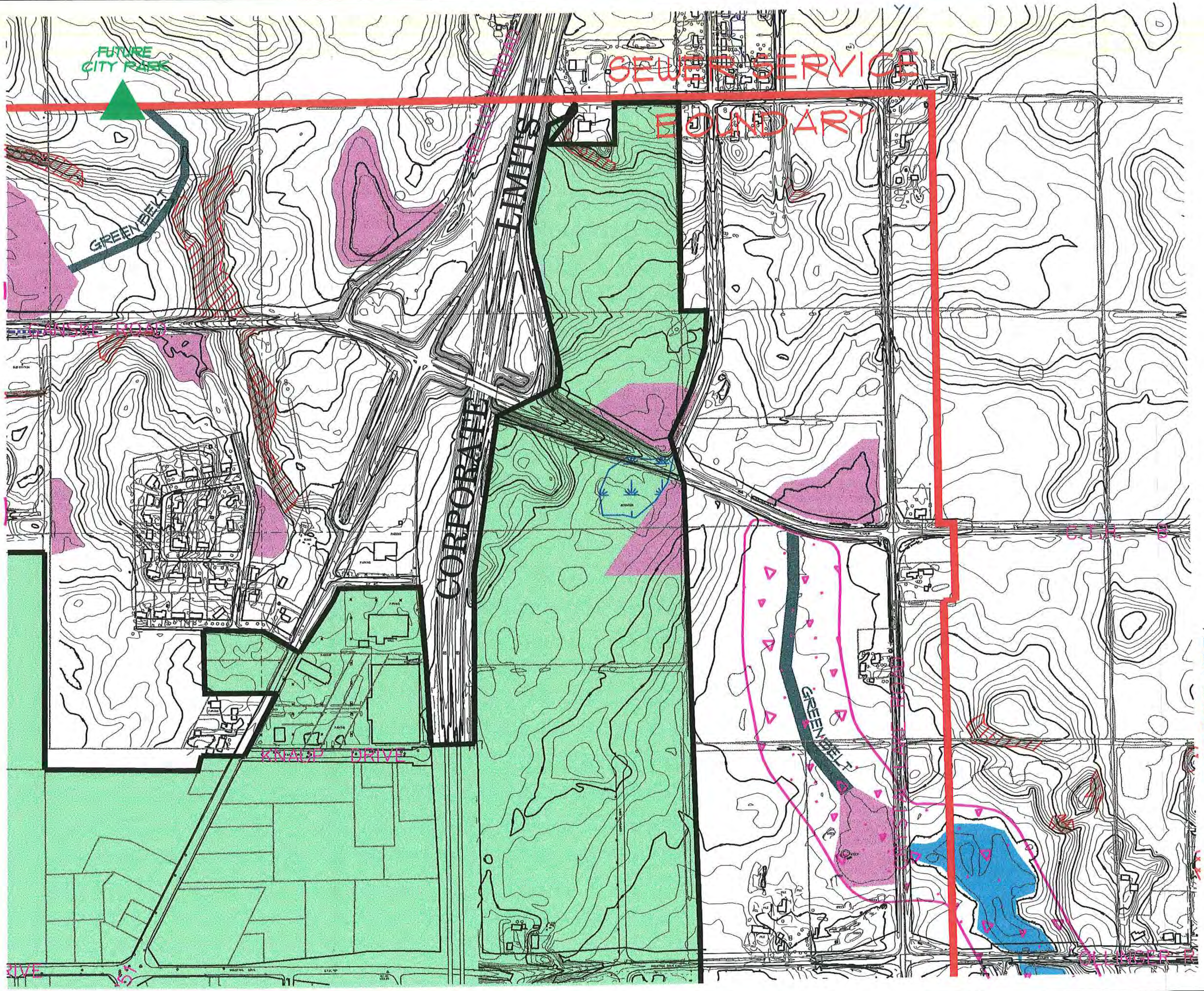

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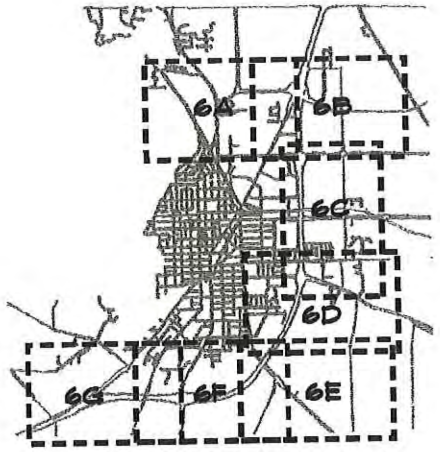
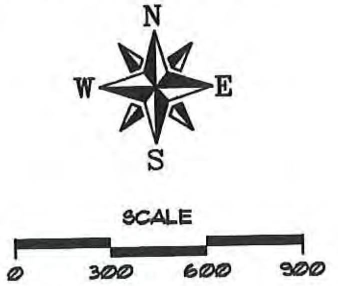


SHEET INDEX

FIGURE 6B

LEGEND
- 100-YEAR FLOOD AREA
- MAPPED WETLANDS
- RIVER, STREAM OR WATERWAY
- PARK LAND
- STEEP SLOPE (12%-20%)
- STEEP SLOPE (21% OR MORE)
- SHORELANDS
- GREENBELT
- STORM WATER MGM'T AREA (APPROX. LOCATION & SIZE)



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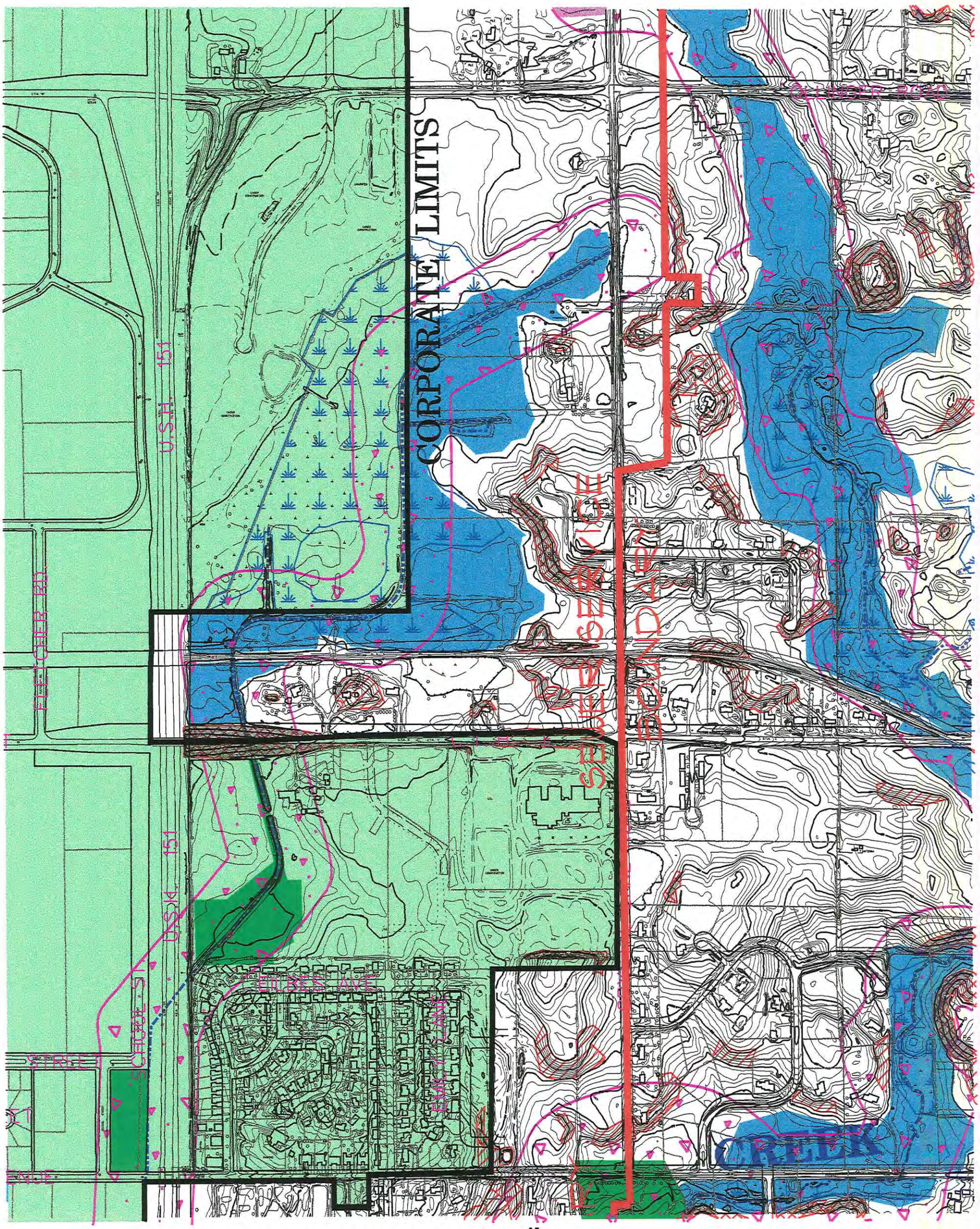

NOTE:
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NOTE THAT ALL WETLAND AREAS SHALL INCLUDE A 50' WIDE BUFFER (SEE REPORT FOR DETAILS)

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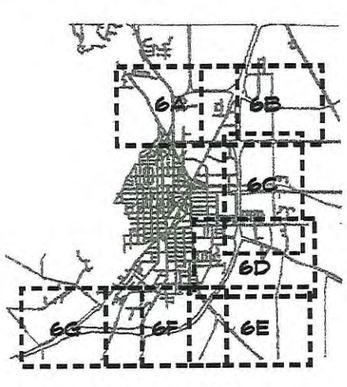

SHEET INDEX

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LEGEND
- 100-YEAR FLOOD AREA
- MAPPED WETLANDS
- RIVER, STREAM OR WATERWAY
- PARK LAND
- STEEP SLOPE (12%-20%)
- STEEP SLOPE (21% OR MORE)
- SHORELANDS
- GREENBELT
- STORM WATER MGM'T AREA (APPROX. LOCATION & SIZE)

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FIGURE 6C

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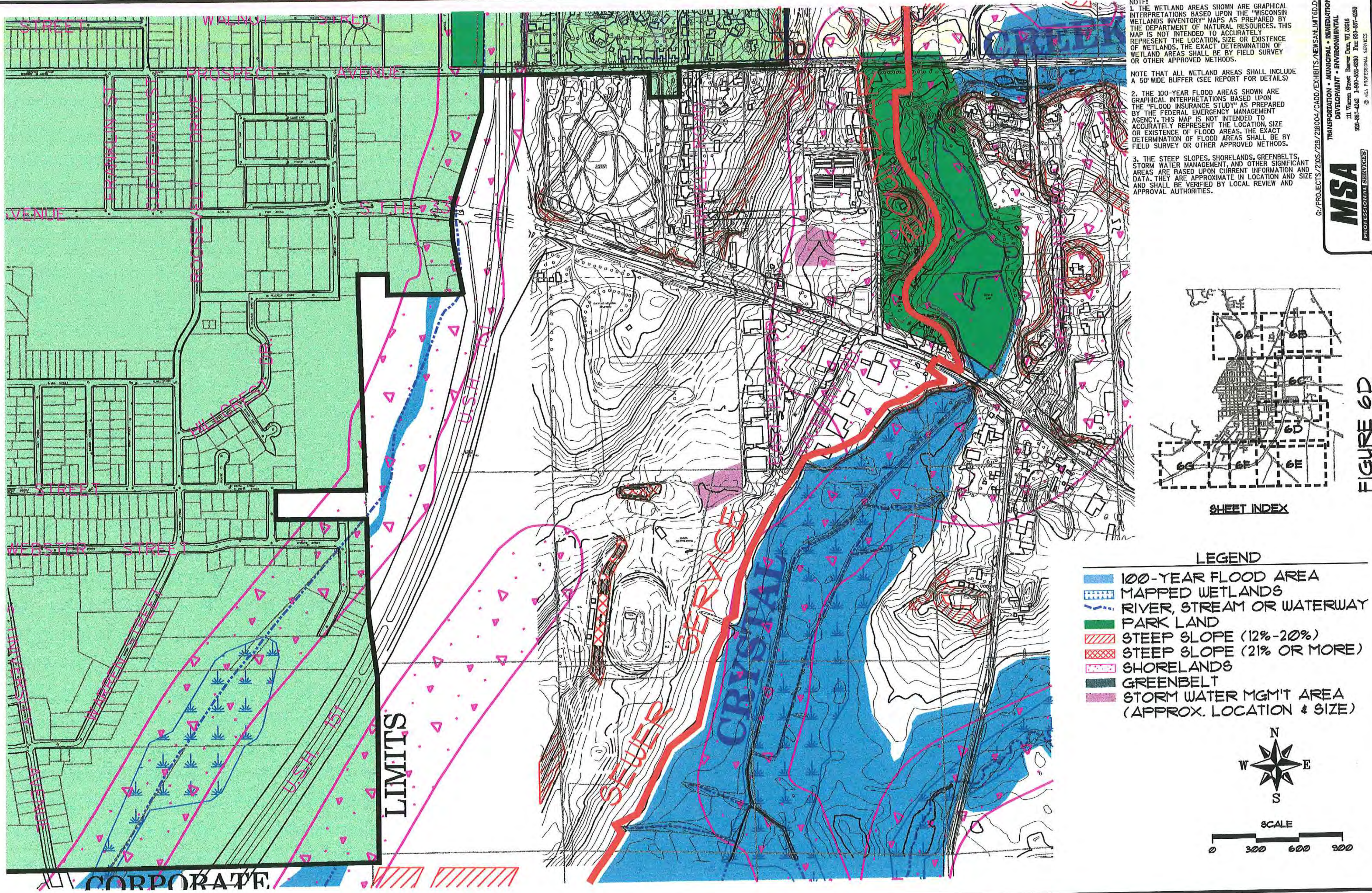

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FIGURE 6D

05 DEC 2000

CORPORATE

GREENBELT

SERVICE BOUNDARY

NOTE:
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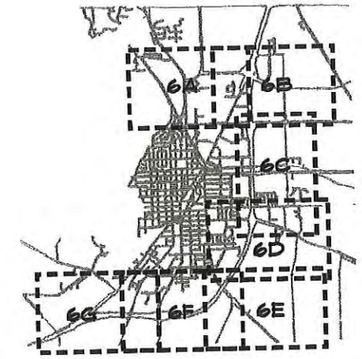

SHEET INDEX

LEGEND

- 100-YEAR FLOOD AREA
- MAPPED WETLANDS
- RIVER, STREAM OR WATERWAY
- PARK LAND
- STEEP SLOPE (12%-20%)
- STEEP SLOPE (21% OR MORE)
- SHORELANDS
- GREENBELT
- STORM WATER MGM'T AREA (APPROX. LOCATION & SIZE)

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FIGURE 6E

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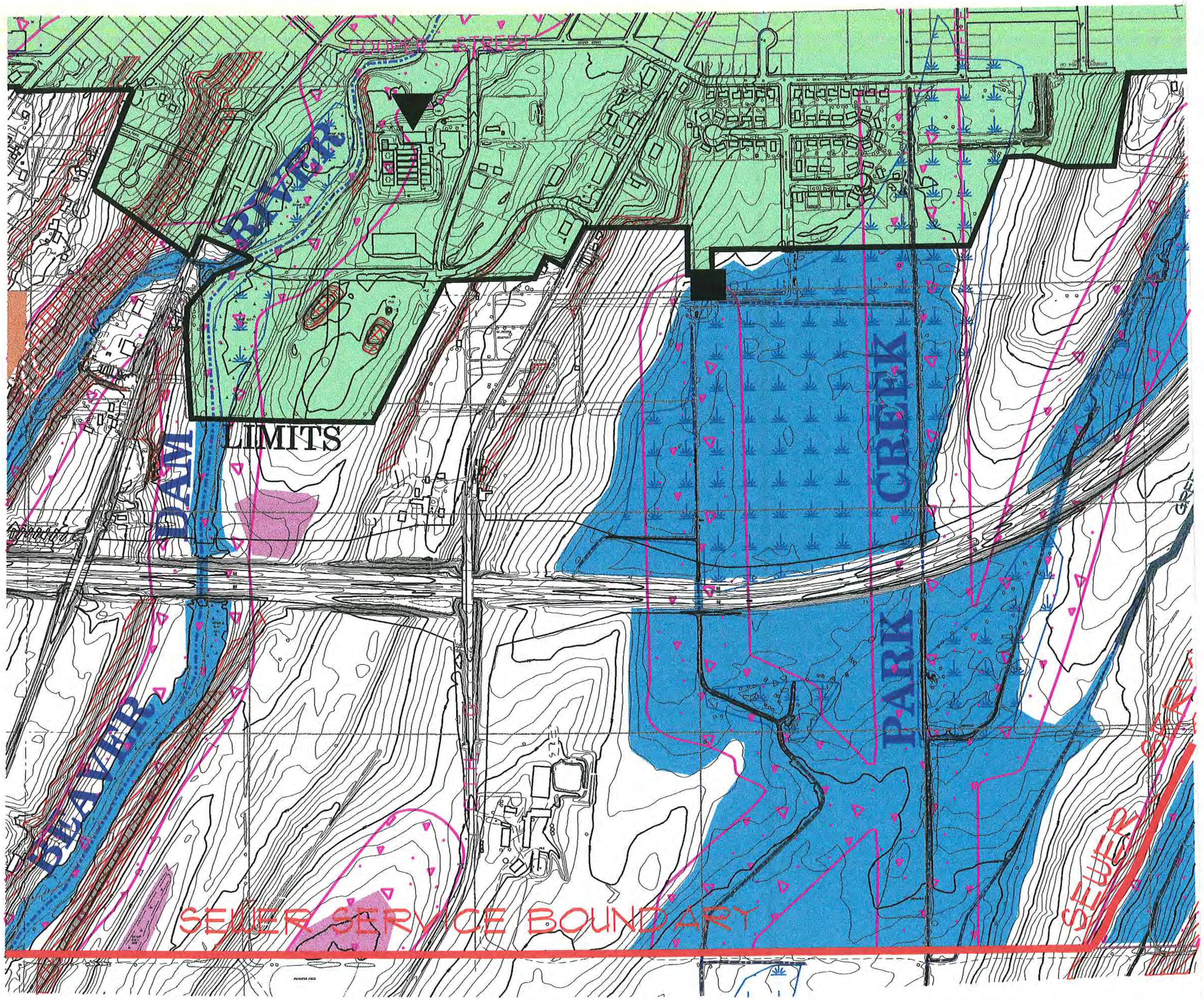

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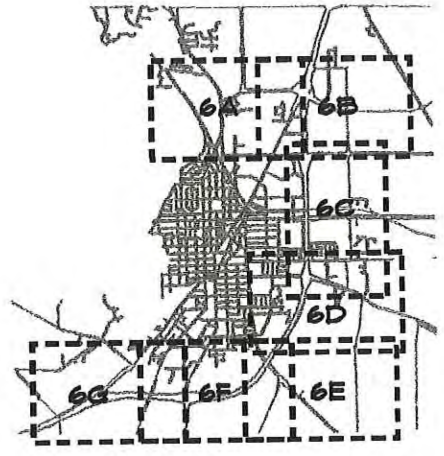

SHEET INDEX

FIGURE 6F

LEGEND

- 100-YEAR FLOOD AREA
- MAPPED WETLANDS
- RIVER, STREAM OR WATERWAY
- PARK LAND
- STEEP SLOPE (12%-20%)
- STEEP SLOPE (21% OR MORE)
- SHORELANDS
- GREENBELT
- STORM WATER MGM'T AREA (APPROX. LOCATION & SIZE)

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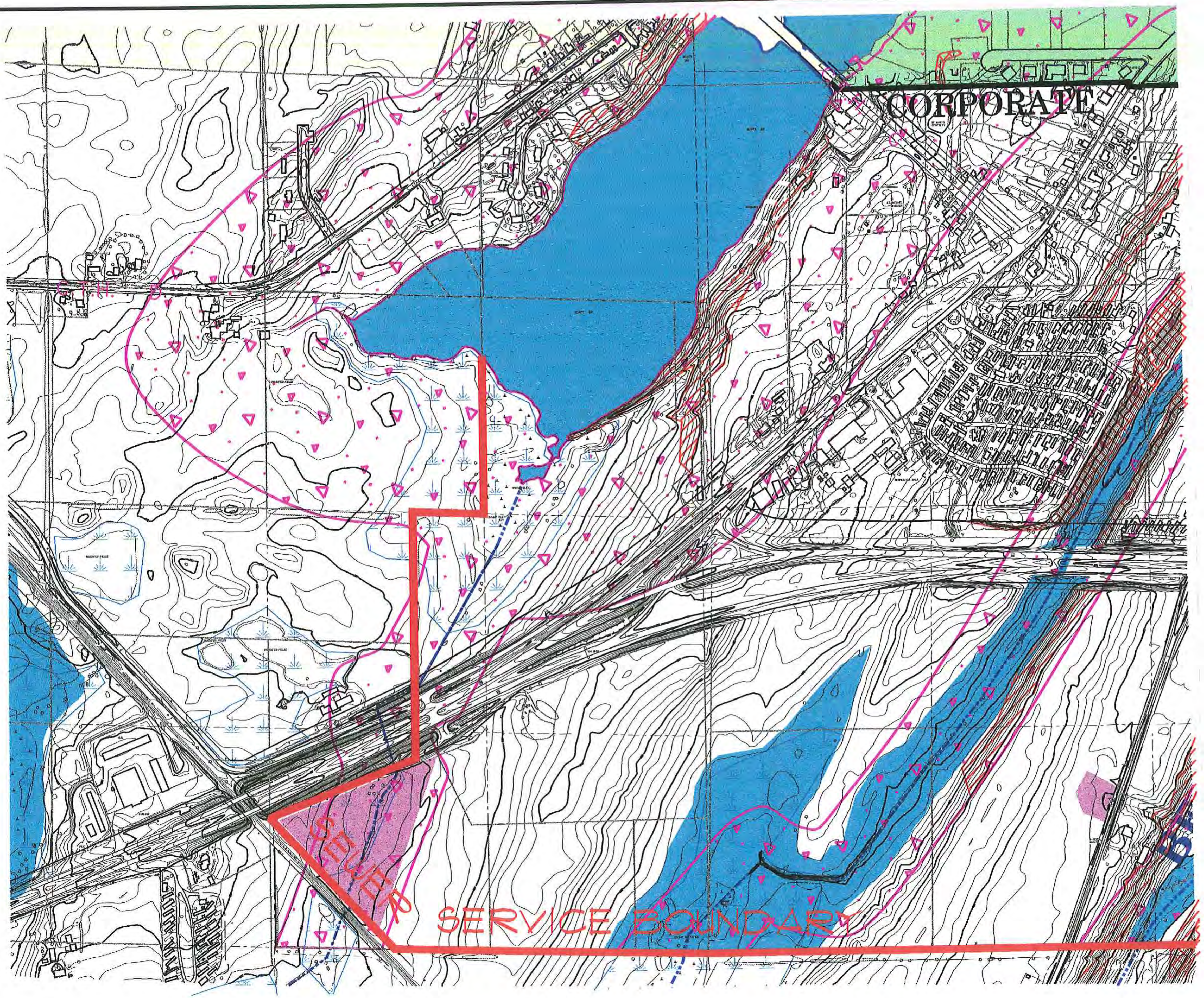

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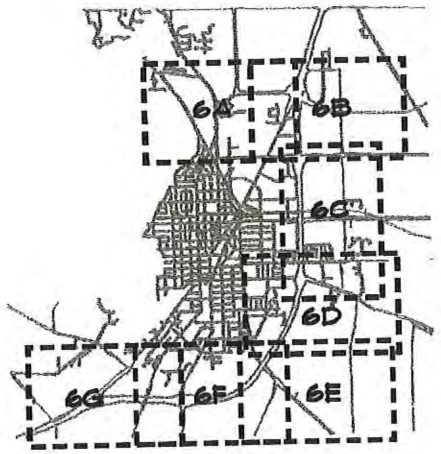

SHEET INDEX

FIGURE 6G

LEGEND

- 100-YEAR FLOOD AREA
- MAPPED WETLANDS
- RIVER, STREAM OR WATERWAY
- PARK LAND
- STEEP SLOPE (12%-20%)
- STEEP SLOPE (21% OR MORE)
- SHORELANDS
- GREENBELT
- STORM WATER MGM'T AREA (APPROX. LOCATION & SIZE)

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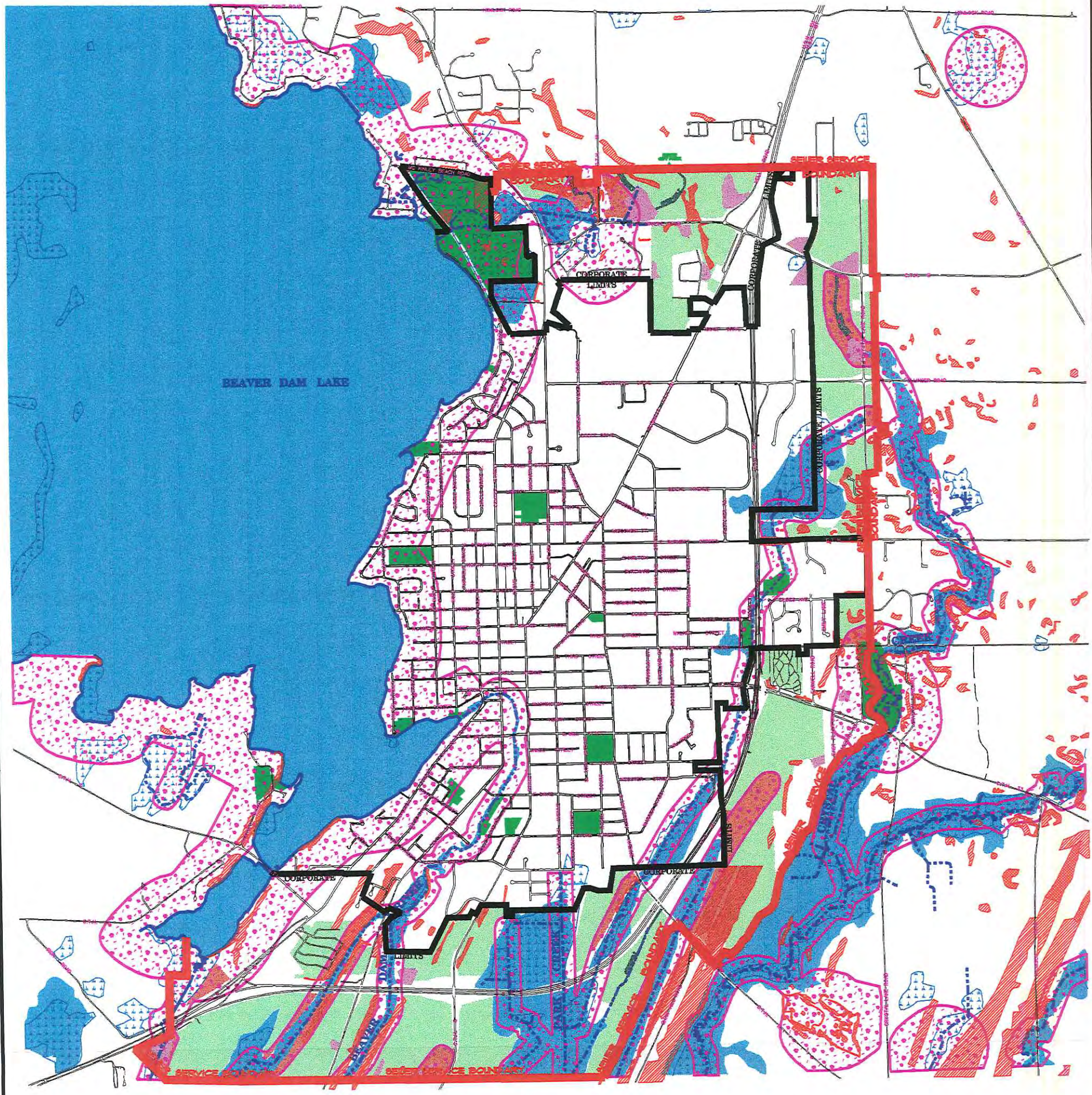
Developable Areas within the Sanitary Sewer Service Area



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LEGEND

- 100-YEAR FLOOD AREA
- MAPPED WETLANDS
- RIVER, STREAM OR WATERWAY
- PARK LAND
- STEEP SLOPE (12%-20%)
- STEEP SLOPE (GREATER THAN 20%)
- SHORELANDS
- GREENBELT
- STORM WATER MGM'T AREA
- UNRESTRICTED DEVELOPMENT
- CONTROLLED DEVELOPMENT

FIGURE 7

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B. DESCRIPTION OF THE SERVICE BOUNDARY LIMITS

The limits of the year 2020 sanitary sewer service area are shown graphically in Figures 6 and 7. However, the following text provides a written description to further enhance the graphical depiction. Where a discrepancy may exist between the written description and the mapping, the intent of the written description shall control.

The written description commences at the northwest corner of the City of Beaver Dam and proceeds clockwise with a breakdown by individual section.

Section 21, Town 12 North, Range 14 East

Commencing at the current corporate limit line of the City of Beaver Dam located at the southwest corner of tax parcel # 1214-2134-001; thence easterly along the south line of said tax parcel to the easterly line of the same; thence northerly along the east line of said tax parcel and an extension thereof to the north line of the Southeast 1/4 of the Southwest 1/4 of said Section 21; thence easterly along said northerly line to the northwest corner of the Southwest 1/4 of the Southeast 1/4 of said Section 21; thence easterly along the north line of said Southwest 1/4 of the Southeast 1/4 to the west line of tax parcel # 1214-2143-001; thence southerly along the west line of tax parcel # 1214-2143-001 to the south line of the same; thence easterly along said south line to the west right-of-way line of C.T.H. W; thence northerly along said right-of-way line to the north line of the Southwest 1/4 of the Southeast 1/4 of said Section 21; thence easterly along the north line of the Southwest 1/4 of the Southeast 1/4 of said Section 21 and also the north line of the Southeast 1/4 of the Southeast 1/4 of said Section 21 to the west line of Section 22-12-14 at the northwest corner of the Southwest 1/4 of the Southwest 1/4 of said Section 22.

Section 22, Town 12 North, Range 14 East

Continuing in Section 22 at the northwest corner of the Southwest 1/4 of the Southwest 1/4 of said Section 22; thence easterly along the north line of the Southwest 1/4 of the Southwest 1/4, the north line of the Southeast 1/4 of the Southwest 1/4, the north line of the Southwest 1/4 of the Southeast 1/4, and the north line of the Southeast 1/4 of the Southeast 1/4 to the west line of Section 23-12-14 at the northwest corner of the Southwest 1/4 of the Southwest 1/4 of said Section 23.

Section 23, Town 12 North, Range 14 East

Continuing in Section 23 at the northwest corner of the Southwest 1/4 of the Southwest 1/4 of said Section 23; thence easterly along the north line of tax parcel # 1214-2333-001 to the east line of the same; thence southerly along the east line of said tax parcel # 1214-2333-001, tax parcel # 1214-2333-002, and tax parcel # 1214-2333-003 and a southerly extension thereof until it intersects with the north line of Section 26-12-14.

Section 26, Town 12 North, Range 14 East

Continuing in Section 26 at the point previously described; thence continuing southerly along an extension of the east line of said tax parcel # until it intersects with the centerline of C.T.H. B; thence easterly along said centerline to a point where an extension of the east line of tax parcel # 1214-2623-001 intersects said centerline; thence southerly along the east line of said tax parcel # 1214-2623-001 and a northerly extension thereof to the south line of said tax parcel; thence westerly along said south line to a point which is offset 300 feet from the centerline of N. Crystal Lake Road; thence southerly parallel to the centerline of N. Crystal Lake Road until it intersects with the north line of tax parcel # 1214-2633-001; thence easterly along the north line of said tax parcel to the east line of the same; thence southerly along the east line of said tax parcel # 1214-2633-001 to the north line of Section 35-12-14.

Section 35, Town 12 North, Range 14 East

Continuing in Section 35 at the point previously described; thence westerly along the north line of said Section 35 to the east line of tax parcel # 1214-3522-001; thence southerly along the east line of said tax parcel and an extension thereof to the north line of tax parcel # 1214-3522-002; thence southwesterly along the northerly line of said tax parcel to the west line of Section 35 and the centerline of N. Crystal Lake Road; thence southerly along said line to the Southwest Corner of said Section 35.

Section 2 and Section 3, Town 11 North, Range 14 East

Continuing at the point previously described; thence due south until a point which is 50 feet distant from the westerly regional flood plain line for Crystal Creek; thence southerly running continuously parallel and 50 foot offset from the westerly regional flood plain line of Crystal Creek to the north line of Section 10-11-14.

Section 10, Town 11 North, Range 14 East

Continuing at the point previously described; thence southwesterly running continuously parallel and 50 foot offset from the westerly regional flood plain line of Crystal Creek to the centerline of C.T.H. W; thence northwesterly along said centerline approximately 1500 feet to a point which is 50 feet northwesterly and distant from the westerly regional flood plain line of an un-named tributary to Park Creek; thence southwesterly running continuously parallel and 50 foot offset from the westerly regional flood plain line of an un-named tributary to Park Creek to the east line of Section 9-11-14.

Section 9, Town 11 North, Range 14 East

Continuing at the point previously described; thence southwesterly running continuously parallel and 50 foot offset from the westerly regional flood plain line of an un-named tributary to Park Creek to the south line of said Section 9; thence westerly along said south line to the Southeast Corner of Section 8-11-14.

Section 8 and Section 7, Town 11 North, Range 14 East

Continuing at the Southeast Corner of said Section 8; thence westerly along the south line of said section to the Southeast Corner of Section 7-11-14.

Continuing at the Southeast Corner of said Section 7; thence westerly along the south line of said section to the northeasterly right-of-way line of the Chicago and Northwestern Railroad; thence northwesterly along said right-of-way line to the south right-of-way line of U.S.H. 151; thence northeasterly along the right-of-way of said U.S.H. 151 to a point where the east line of tax parcel # 1114-0742-001 extended south intersects said right-of-way line; thence northerly along the east line of said tax parcel and an extension thereof and also the east line of tax parcel # 1114-0731-001 to the south line of the Southwest 1/4 of the Northeast 1/4 of said Section 7 said line also being the south line of Bainbridge Court Subdivision; thence easterly along said south line to the east line of the Southwest 1/4 of the Northeast 1/4 of said Section 7 said line also being the east line of Bainbridge Court Subdivision; thence northerly along said east line to the shore of Beaver Dam Lake; thence northeasterly along said shoreline in both Section 7-11-14 and Section 8-11-14 to the existing corporate limits located along the north line of said Section 8-11-14.

C. SUMMARY OF PUBLIC INPUT AND PARTICIPATION

An advisory committee to the City's Plan Commission was established to prepare and refine this document. The committee consisted of representatives from the City of Beaver Dam, the Town of Beaver Dam, and the County of Dodge all being beneficiaries of the water quality plan. The Advisory Committee for the Beaver Dam Sanitary Sewer Area Plan consists of the following individuals:

Trent Campbell, V.P. of B.D. Area Development Corp.
Ruth Johnson, Wis. Dept. of Natural Resources
Michael J. Laue, MSA Professional Services, Inc.
Thomas D. Olson, Mayor - City of Beaver Dam
Don Quarford, Wastewater Superintendent - City of Beaver Dam
Ken Serchen, Dodge County Supervisor
Leland Winkler, Supervisor - Township of Beaver Dam

In addition to these members other interested individuals have attended various meetings. These individuals represent the following entities:

the Town of Beaver Dam Plan Commission and the Town Chairman;
the Dodge County Planning and Development Department;
the Department of Natural Resources;
the City of Beaver Dam Common Council and Board of Public Works;
the City of Beaver Dam City Engineer and Director of Public Works;
the City of Beaver Dam staff, including Finance Director and Water Superintendent; and
a local real estate development company.

A series of public meetings were held to define and shape the plan. These meetings were held at city

hall on the following dates:

October 11, 2000 at 1:30 p.m.:	Informational project kick-off meeting General discussion of topics • Introduction • Purpose of Study • Background Information
November 6, 2000 at 1:30 p.m.:	General discussion of topics • Overview and Background Information • Goals, Objectives and Policies • Planning Area
December 4, 2000 at 1:30 p.m.:	General discussion of topics • Development and Trends • Environmentally Sensitive Areas • Goals, Objectives and Policies • Storm Water Management
January 8, 2001 at 1:30 p.m.:	General discussion of topics • Community Growth Projections • Sewerage System Capacity • Mapping Background • Sanitary Sewer Service Area 2020 • Boundary Agreement
January 17, 2001 at 7:00 p.m.:	Public Informational Meeting and Presentation to Plan Commission

VI. IMPLEMENTATION

A. POLICIES

Policies are actions or guidelines directed toward achieving objectives which should be followed in day-to-day decision making. In order for this section to make sense, the related goals and objectives have been included.

Goal 1: *To preserve and enhance the natural features that make Beaver Dam a desirable place to live, visit, and do business, while encouraging development in suitable areas.*

Objective 1: *Identify, map, preserve, and in some cases (where practical, economical, and environmentally feasible as determined by the plan review authority) restore, in a natural state, the features that make Beaver Dam and the surrounding area a desirable place to live, visit and do business.*

Policy 1a: The local governmental bodies will promote preservation or restoration of the identified natural features by revising codes, policies, rules, and regulations accordingly, and to promote preservation in the review and approval of development proposals.

Policy 1b: Proposed developments should include areas which set aside open space for recreation, storm water retention, and include natural drainage ways to reduce peak storm water flows by increasing infiltration of storm runoff throughout watershed.

Goal 2: *Provide the infrastructure necessary to serve the level of development proposed in the Comprehensive Plan entitled "Development Vision 2020", while continuing to provide environmentally safe, efficient and cost-effective utilities to the community.*

Objective 2: *Prepare and implement a Sanitary Sewer Service Area Plan which;*

- *correlates with the development vision and trends of the comprehensive plan,*
- *protects environmentally sensitive areas,*
  by encouraging future development to locate in areas suitable for development where environmental impacts can be sufficiently mitigated
- *recognizes environmentally limited areas, and*
- *identifies cost-effective development areas.*

Policy 2a: The delegated planning entity, which will provide conformance reviews in accordance with the approved sanitary sewer service area plan, shall promote area wide water quality.

Policy 2b: Subdivision designs which do not provide adequate means of protecting future

residents from problems associated with drainage and steep slopes will be rejected. In addition, developers will be required to submit detailed plans for adequately managing stormwater in such areas.

Goal 3: *Promote sound, environmentally sensitive, and efficient urban development on the fringe of the present urbanized area thru sequential, orderly and compatible growth.*

Objective 3: *Protect environmental resources and ground water thru the application of high-quality design standards for all new sanitary sewer extensions.*

Policy 3a: The City of Beaver Dam, thru the Board of Public Works and it's designated representatives, will continue to review plans and specifications for sanitary sewer extensions and will continue to provide periodic observation of construction to verify that the work is being performed in conformance with the approved design and construction standards.

Policy 3b: Eliminate inadequate on-site sewage systems within the urban service area through cost effective systems which can be adapted to the conventional city collection system, as urban services are extended into those areas.

Goal 4: *Maximize the capacity and promote the efficient use of the wastewater treatment facilities.*

Objective 4: *Use advance planning to identify the most desirable and effective locations for new sanitary sewer interceptors, pumping stations, and related infrastructure, and protect the corridors and areas which affect these items thru development regulation and approval processes.*

Policy 4: The City of Beaver Dam will prepare and periodically update a plan for the general staging of sanitary sewer extensions into the urban fringe. The plan will be based upon considerations of cost, land demand by type, and environmental protection.

Goal 5: *Coordinate the efforts of local government (City of Beaver Dam, Township of Beaver Dam, and County of Dodge) to promote responsible planning and implementation of shared facilities and interests.*

Objective 5: *Promote diverse public input, and request active participation by adjacent governmental bodies, in the development and implementation of plans, studies, and actions that have a common interest.*

Policy 5: The City of Beaver Dam will ask the Town of Beaver Dam to officially adopt and

follow the Sanitary Sewer Service Area Plan as well as the other elements of the comprehensive plan as they apply to land in the township.

B. IMPLEMENTATION PROCESS

1. General

Upon adoption of this plan, the Department of Natural Resources will require a map of the Beaver Dam Urban Service Area. Proposed sanitary sewer extensions will be reviewed against this map to determine if the extensions are in conformance with the current service area boundary. The City of Beaver Dam Board of Public Works will be responsible for advising the Department of Natural Resources on whether the proposed sewer extensions are within the urban service area. Finally, the Board of Public Works, with recommendations from the Beaver Dam Plan Commission, will review proposed amendments to the urban service area boundary and make recommendations to the department on such proposals.

The Chairperson of the Board of Public Works or his/her designee (typically the City Engineer) will act as the Administrative Agent.

2. Approval Process

The City Plan Commission prepares plan updates and amendments with the assistance of the Town of Beaver Dam Plan Commission, the Dodge County Planning and Development Department, the City of Beaver Dam Wastewater Superintendent, and the City Engineering Department.

Draft updates or amendments are reviewed by the Board of Public Works. The Board of Public Works reviews the proposal for consistency with the sewer service area plan policy and makes a recommendation to the City of Beaver Dam Common Council. The meetings for review and recommendation shall be properly noticed and conducted as public informational hearings.

The Common Council shall make the final recommendation to forward the plan to the Department of Natural Resources.

The Department of Natural Resources reviews the plan for approval, based upon consistency with applicable state statutes and administrative code.

Upon receipt of Department of Natural Resources approval, the city, town, and county agencies will be required to incorporate changes to the urban service area on their respective development plans.

3. Responsibilities of the Administrative Agent

Call meetings of the required review and approval committees, boards, commissions, and/or agencies as necessary.

Direct the preparation of conformance review documents in accord with applicable regulations. The Administrative Agent shall forward said documents to the City Plan Commission, the Town of Beaver Dam Plan Commission, and the Dodge County Planning and Development Department. The Administrative Agent shall review plan updates and amendments with the Board of Public Works.

Coordinate review of sanitary sewer extensions by city staff for conformance with the urban service area plan.

Provide written notification of conformance or non-conformance of sanitary sewer extensions submitted for approval within fifteen (15) working days of receiving the written request for approval. Plans should be approved if the request for sanitary sewer extension is within the urban service area and the plans conform with the goals and policies of the Sanitary Sewer Service Area Plan. Notification should indicate that the acceptance letter should be forwarded to the Department of Natural Resources as part of the applicants submittal for sanitary sewer extension plan approval.

Direct the presentation of technical information to the Board of Public Works regarding sanitary sewer extension requests, plan amendments, and package treatment proposals within the planning area.

4. Procedures for Sanitary Sewer Extensions

The City of Beaver Dam or its consulting engineers should submit a letter and a simple plan map of the proposed sewer extension and approximate 20-year service area (or larger in specific cases if justified on a cost effective basis) with a copy of DNR Form 3400-105 "Sanitary Sewer Extension Submittal" for the proposed extension, to the City Engineer. To avoid delays, this submittal shall be made early in the planning process, prior to completing detailed plans and specifications for the project. Submitting the plan early will insure that local review is made prior to submittal of the plans to the DNR and that costly detailed sewer design and specifications documents are not prepared for areas that do not conform to the plan service area and are subsequently rejected by the DNR.

The Board of Public Works will review all submissions and will notify the applicant of the findings in writing within 15 working days of receipt of the plan map. If the proposed sewer extension is in conformance with the plan, the Administrative Agent's notification should be attached to the sewer extension plans which are submitted to the Department of Natural Resources by the applicant.

If the applicant wishes to appeal the boundary determination of the Board of Public Works, or if the Board concludes that there is an interpretative question concerning the service area boundary, the request will be reviewed by the Plan Commission and a recommendation will be presented to the Board.

If the proposed extension is determined to be outside of the sewer service area or incompatible with the current water quality plan, the applicant will be informed. If the applicant wishes to pursue the extension, the applicant should request a plan amendment. The amendment process is discussed in the following section. In almost all cases a sewer service area boundary amendment will be required

to make the extension conform to the plan. The applicant may also appeal a boundary ruling to the Department of Natural Resources.

5. Criteria and Procedures for Amending the Plan

Requests for amendment of the adopted sewer service area and plan map could involve undeveloped or already developed land and could be initiated by one of several sources: property owners, the City of Beaver Dam, or another government agency. Three types of amendments are possible. The first kind involves no change in the total service area. For every acre added, an acre is deleted. The second type includes the use of the reserve area or unallocated land. The third kind of amendment involves an increase in the total service area. This third type of amendment would be approved by the department if it is justified by unanticipated growth or density of development that is different than what is estimated in this document.

Criteria for review of a proposed plan amendment includes the following information:

- Sewer service can be provided in a cost effective manner.
- The receiving, collection and treatment facility can adequately transport and treat the wastewater from the area and the amount of undeveloped land in the proposed area.
- The amendment is consistent with the policies and goals of this plan.
- The amendment conforms with local plans.
- There will be no significant adverse water quality and/or environmental impact associated with providing sewer service to the area.

The procedure for amending the plan should be similar for all of the above cases. If the request is initiated by a property owner, Step 1 below will be necessary. If the request is initiated by the City of Beaver Dam, the process will begin with Step 2. The steps required for plan amendment are outlined as follows:

Step 1: The property owner(s) may apply to the City Engineer to request the plan amendment area and the applicant shall provide information showing that the proposal is consistent with the criteria above.

Step 2: The application would be forwarded to the City of Beaver Dam Plan Commission. The application should be accompanied by a map of the proposed area to be serviced, existing and anticipated population and wastewater generation of the area and a description of the type of development that is expected to occur. The Plan Commission shall consult with the Town of Beaver Dam Plan Commission, the Dodge County Planning and Development Department, the City of Beaver Dam Wastewater Superintendent, and the City Engineering Department and shall evaluate

the application against the criteria and other relevant factors and make a recommendation to the Board of Public Works.

Step 3: The Board of Public Works shall hold a public hearing and review the request on the basis of the stated criteria and any other relevant factors. The Board will then forward its recommendation to the Common Council. If the Town of Beaver Dam and the Dodge County Planning and Development Department do not make a recommendation within 30 days of their receipt of the request, the Common Council may proceed to consider the request without their recommendations.

Step 4: The Common Council shall evaluate the recommendation of the Board of Public Works, the Plan Commission, the Town of Beaver Dam Plan Commission, and the Dodge County Planning and Development Department, if received, and then forward its recommendation to the Wisconsin Department of Natural Resources.

Step 5: If approved by the Department of Natural Resources, the requested amendment will be adopted and become part of the existing plan. The Department of Natural Resources will notify the Board of Public Works and the Administrative Agent of its action.

6. Plan Updates

A comprehensive review and update of the sewer service plan should be completed at least every five years. However, the plan should be updated whenever there is an obvious change in community needs. The plan update will be controlled and directed by using the approval and review process outlined in this plan. Updates to the plan are intended to address the following components:

A revision of the population and demographic projections for the next 20-year planning period shall be reviewed by the Department of Administration (DOA) per NR 121.

A review of housing starts, population densities, household size changes, and urban development trends within the planning area.

An assessment of the impact of major land use changes in the planning area.

An examination of the significant environmental changes.

A review and revision of the goals and objectives of the plan, based on present concepts and needs.

A discussion of any social or economic impacts on the area that may affect the area-wide water quality planning efforts.

A list and explanation of any interim amendments to the plan that occurred since the last update to the plan.

A revised service area boundary based on 20-year projections.

A review of any affective changes in the constitutional or implementation structure of the plan.

An update of citizen participation efforts.

C. BOUNDARY AGREEMENT AND ANNEXATION POLICY

The City of Beaver Dam and the Town of Beaver Dam have discussed the possibility of a future boundary agreement and annexation policy. At the January 8, 2001 meeting of the advisory committee, the mayor and town chairman, speaking on behalf of their respective governmental entities, agreed that discussions relative to a boundary agreement and annexation policy would take place after the Town of Beaver Dam completes it's comprehensive plan.

The Town of Beaver Dam, with the assistance of the Dodge County Planning and Development Department is currently undertaking the process of creating a comprehensive plan. It was stated at the January 8th meeting of the advisory committee that the plan is expected to be complete in approximately 9 months, or approximately September of 2001.

VII. RELATED WATER QUALITY ISSUES

A. STORM WATER MANAGEMENT

The thorough nature of comprehensive planning implies long range and geographically broad consideration of storm water flows and water quality during and after development of major land parcels. This type of planning effort has a direct relationship to the overall water quality and works hand-in-hand with the sanitary sewer service area plan.

Currently, the City of Beaver Dam does not have a storm water management zoning ordinance in effect. The management and regulation of storm water is divided among federal, state, county, and local governments, depending upon the land's status of incorporation, location, size, and activities affecting storm water on the land.

Phase II federal storm water regulations, which may affect the City of Beaver Dam in the near future, will require municipal storm water discharge permits for certain municipalities with populations of less than 100,000. Under this permit process, the city will be required to create and enforce rules which will control the discharge of pollutants.

Appendix B of this report contains a "model" storm water management zoning ordinance as prepared by the Wisconsin Department of Natural Resources. It is included for reference purposes for users of this document. It may, at some point in the future, provide the framework for a new ordinance to be adopted by the City of Beaver Dam.

At this point, the control of pollutants in storm water and erosion control at construction sites, is regulated by the Department of Natural Resources under Chapter NR216 of the Wisconsin Administrative Code, the Department of Commerce, the Department of Transportation, and local governments.

Under Chapter NR216 a landowner of a construction site is required to obtain coverage under a construction site storm water discharge permit. The landowner is required to ensure that a site specific erosion control plan and storm water management plan are developed and implemented at the site. Also under NR216, discharges of storm water from certain facilities require coverage under an industrial storm water discharge permit. The owner or operator of the permitted industrial facility is required to develop and implement a plan to reduce exposure of industrial materials to storm water.

The Uniform Dwelling Code as administered by the Department of Commerce contains provisions to control erosion during construction of one and two family dwellings. The Department of Commerce also regulates the construction activities at larger commercial building sites.

Through state statue and interagency agreements, regulation of erosion control at highway sites, is handled by the Department of Transportation.

Although there is coverage of certain activities under the regulations of the agencies described herein, there are still a number of activities that are not covered unless it is by adoption of a local storm water ordinance. There should be a heightened awareness about the consequences of, and laws relating to, erosion control and storm water pollution. A better understanding of problems associated with this pollution by owners, developers, and contractors, coupled with improved enforcement of ordinances by local government should be a priority.

As a first step towards the control of storm water pollution and overall water quality, the City of Beaver Dam has not only undertaken this sanitary sewer service area plan, but also undertaken a related storm water study. This study is entitled "Storm Water Management Study for the Year 2020 Expansion Area - Beaver Dam, Wisconsin". The purpose of the study was to:

- map the existing drainage patterns in the urban service area;
- identify the limits of the drainage basins;
- quantify the storm water discharge from these areas based upon pre-development conditions;
- quantify the storm water discharge from these areas under post-development conditions as identified in the comprehensive plan entitled "Development Vision 2020";
- identify and map "greenbelt" areas to preserve the natural infiltration and conveyance of storm water;
- identify and map areas which have the potential to control and manage the discharge of storm water; and
- provide preliminary estimates of the ultimate size and capacity of storm water management structures (basin size based upon an inflow rate equal to the 50-year post-development storm and a release rate equal to the 2-year pre-development storm).

The results of the storm water study were included in the mapping for the sanitary sewer service area plan. Details of the storm water analysis can be found in the referenced report.

Additionally it should be noted that a conservation buffer has been included around each wetland area (see the mapping and the section entitled "Environmentally Sensitive Areas" of this report). This 50 foot wide strip of land is intended to remain in permanent vegetation and is designed to slow water runoff, improve water quality, provide shelter and stabilize the areas adjacent to the stream or wetland. The immense benefit, yet low installation and maintenance cost, makes conservation buffers truly *common sense conservation*. The benefits are as follows:

- slow runoff
- reduce downstream flooding
- stabilize stream banks
- reduce soil erosion
- remove up to 60% or more of pathogens in runoff
- remove up to 75% or more of sediment in runoff
- remove up to 50% or more of nutrients and pesticides in runoff
- provide food, nesting cover and shelter for wildlife
- provide setback distance for chemical use from watercourses
- establishment of natural vegetation to enhance aesthetic beauty of shorelands.