

**MIAMI VALLEY REGIONAL
PLANNING COMMISSION SANITARY
SEWER FEASIBILITY STUDY
FINAL REPORT
JULY, 2015**

Prepared for:

Jackson Township

Darke County Commissioners



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MIAMI VALLEY
Regional Planning Commission

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Public Involvement Summary

Steering Committee Meeting Agenda #1 January 19, 2015

Steering Committee Meeting Minutes #1 January 19, 2015

Steering Committee Meeting Agenda #2 April 6, 2015

Steering Committee Meeting Minutes #2 April 6, 2015

Steering Committee Meeting Agenda #3 June 2, 2015

Steering Committee Meeting Minutes #3 June 2, 2015

Public Meeting Handout

Public Meeting Minutes June 16, 2015

Press Releases

Biological and Water Quality Study of the Stillwater River Watershed 2001

Biological and Water Quality Study of Twin of the Stillwater River Basin 2015

Darke County Health Department Areas of Concern

Environmental Overview

ABBREVIATIONS

EPA	Environmental Protection Agency
GPD	Gallons Per Day
STEP	Septic Tank Effluent Pump
Mg/L	Milligrams Per Liter
MGD	Million Gallons Per Day
BOD	Biochemical Oxygen Demand
CBOD ₅	Five Day Carbonaceous Biochemical Oxygen Demand
MVRPC	Miami Valley Regional Planning Commission
D.O.	Dissolved Oxygen
WWTP	Wastewater Treatment Plant
R/D	Recirculation/Dilution
FPA	Facility Planning Area
O,M&R	Operation, Maintenance, and Repair

Chapter 1 - Executive Summary

Purpose of Study

The purpose of this study is to identify, evaluate, and present information pertaining to the existing and future wastewater system within Jackson Township. This study will also gain a sense of the potential growth expected in the area, and present options of different wastewater collection and treatment systems. In addition, the study develops cost-effective alternatives for wastewater service in the area. This study will be used by the Miami Valley Regional Planning Commission (MVRPC) and Darke County for the purpose of future planning needs. Jackson Township was selected for this study because of the inability to stay within the health regulations when replacing failing septic tanks.

Alternatives Considered

The existing and future wastewater needs were analyzed to help determine different collection and treatment options. These options include:

Wastewater Collection System Alternatives considered the following:

- Gravity Sewer System
- Septic Tank Effluent Pumping (STEP) System
- Grinder Pump Sewer System
- Vacuum Sewer System

Wastewater Treatment System Alternatives considered the following:

- Construct new Wastewater Treatment Plant (WWTP)
 - Extended Aeration
 - Lagoon
 - Packed Bed Media Filter
- Regionalize with Adjacent Community
 - Transport Wastewater to Union City

Conclusion

All of the different collection and treatment alternatives, listed above, were analyzed into many different scenarios. Each scenario looked at the cost of the project, O,M&R, and different environmental factors. All of these factors helped determine a best case scenario for Jackson Township.

Recommendation

After considering the economic cost-effective analysis and the environmental conditions, the following regional solutions are recommended:

Darke County should install a Grinder Pump collection system with connections into the Union City sewer system for treatment at the Union City lagoon treatment system. However, at this time, Union City has expressed that they would not be interested in providing treatment services for Jackson Township. Darke County should continue to meet with Union City and determine if this option is viable.

Should this option not work, Darke County should install a Grinder Pump collection system and construct its own lagoon treatment facility

Table 1-1: Funding Summary

Combined Areas: Grinder Sewer / Union City Lagoon

CUSTOMERS/EDUs			196
PROJECT COST- Collection System			\$3,440,184
PROJECT COST- Treatment System			\$295,614
TOTAL PROJECT COST			\$3,735,798
ANNUAL O,M&R			\$99,000
FINANCING			
CDBG Formula Grant			\$50,000
Residential Public Infrastructure Grant			\$480,000
OPWC Grant			\$400,000
Unsewered Area Assistance Program			\$250,000
Local Funds - Capacity Fee			\$0
Rural Dev. Grant (up to 35% of Project Cost)			\$1,310,000
OPWC Loan	30	0.00%	\$800,000
OWDA Loan	30	2.00%	\$0
OEPA WPCLF Loan	30	0.00%	\$0
Rural Development Loan	40	2.75%	\$445,798
Total Financing			\$3,735,798
ANNUAL DEBT			
Annual OPWC Payment			\$26,667
Annual OWDA Payment			\$0
Annual OEPA WPCLF Payment			\$0
Annual Rural Development Payment			\$18,515
ANNUAL DEBT PAYMENT			\$45,181
DEBT PAYMENT PER MONTH PER EDU			\$19.21
O,M&R PAYMENT PER MONTH PER EDU			\$42.09
TOTAL PAYMENT PER MONTH PER EDU			\$61.30

Combined Areas: Grinder Sewer / Darke County operated Lagoon

CUSTOMERS/EDUs			196
PROJECT COST- Collection System			\$3,440,184
PROJECT COST- Treatment System			\$1,817,112
TOTAL PROJECT COST			\$5,257,296
ANNUAL O,M&R			\$62,500
FINANCING			
CDBG Formula Grant			\$50,000
Residential Public Infrastructure Grant			\$480,000
OPWC Grant			\$400,000
Unsewered Area Assistance Program			\$250,000
Local Funds - Capacity Fee			\$0
Rural Dev. Grant (up to 35% of Project Cost)			\$1,840,000
OPWC Loan	30	0.00%	\$800,000
OWDA Loan	30	2.00%	\$0
OEPA WPCLF Loan	30	0.00%	\$0
Rural Development Loan	40	2.75%	\$1,437,296
Total Financing			\$5,257,296
ANNUAL DEBT			
Annual OPWC Payment			\$26,667
Annual OWDA Payment			\$0
Annual OEPA WPCLF Payment			\$0
Annual Rural Development Payment			\$59,693
ANNUAL DEBT PAYMENT			\$86,360
DEBT PAYMENT PER MONTH PER EDU			\$36.72
O,M&R PAYMENT PER MONTH PER EDU			\$26.57
TOTAL PAYMENT PER MONTH PER EDU			\$63.29

Chapter 2 - Introduction

Background

In accordance with the Water Pollution Control Act amendments of 1972, the Miami Valley Regional Planning Commission (MVRPC) serves as the Designated Water Quality Planning Agency for the 5-county Miami Valley Region. Under Section 208 of the EPA's Clean Water Act, MVRPC has the responsibility for reviewing and approving individual Wastewater Treatment Facility Plans and their associated Facility Planning Areas.

In 2014, MVRPC received a grant sponsored by Ohio EPA to evaluate and provide wastewater collection and treatment alternatives for several communities within the 5-county region agreeing to take part in the study. The Darke County Commissioners selected Jackson Township to participate in this study. This report is the result of that commitment.

Objective

The objective of this study is to provide a cost-effective and environmentally sound wastewater collection and treatment system for the Jackson Township planning areas. The design of the system will take the growth and development of the area into consideration. The new system will meet the requirements established by the Ohio Environmental Protection Agency (Ohio EPA).

Planning Area

The Darke County Health Department has provided a list of areas of concern within Jackson Township. This list contains a description of the failing septic tanks and their location. Six areas are identified 1-6 based on the priority of replacing the failing septic tanks. For the purpose of this study, the six areas of concern are broken up into three planning areas. All of the planning areas are located on the western edge of Darke County just east of the Village of Union City. Figure 2-1 shows the locations of the six areas of concern and Figure 2-2 illustrates the boundaries of the different planning areas.

The first area, planning area A, consists of priority areas 1 and 3 containing 52 homes. The first priority area contains 41 homes located along Arnold Road, Union City-Elroy Road, and State Route 47. Priority area 3 is located along Arnold Road with 11 homes. Priority areas 2 and 6 make up planning area B. Planning Area B contains the largest amount of homes of 116. The homes in priority area 2 are mainly located along State Route 571 and Amspaugh Road for priority area 6. Planning area C consists of the 15 homes in priority area 5 and 13 homes in priority area 4. Priority area 5 is located on Worth Road and Priority area 4 is located on Pickett Road.

Scope of Study

A brief summary of the scope of this study is presented below. The planning period for this study is 25 years or through the year 2040, exceeding Ohio EPA's requirement for a 20 year analysis.

Data Collection and Review - Data relevant to the Planning Area was collected, reviewed and analyzed. This data included previous studies concerning wastewater needs, Ohio EPA documented inspection and water quality data.

Develop Population & Sewer Needs Forecasts – Based on historical and existing population data, the projected future wastewater needs for the designated study area over a 25-year planning period was developed.

Factors such as cost, environmental impacts, regulatory and permitting requirements must be taken into consideration when evaluating wastewater collection and treatment alternatives.

Develop and Evaluate Alternatives- In establishing the criteria for the design of wastewater systems, several factors were considered. These included the length of time the facilities should serve before replacement or expansion is necessary, the population to be served, the type of customers to be served (i.e. residential, commercial, industrial, etc.) and the projected wastewater flows (both average daily and peak hourly flows) over the span of the planning period.

Draft Report- Based on the work generated in the above tasks, a Draft Report summarizing the findings and recommendations is to be prepared. The draft report will be reviewed with Darke County and other stakeholders and comments/ feedback will be incorporated into the Final Report.

Final Report- After review of the draft report and revisions made pursuant to comments received, a final report will be prepared and delivered to Darke County, MVRPC, and the Ohio EPA.

Methodology

Brief descriptions of the methods used in the preparation of this study are shown below.

Study Area Boundary- The general study area was determined by MVRPC and was refined during the first steering committee meeting.

Projections of Sewer Needs for the Study Area - The following calculations were used to determine the average daily flow and the peak hourly flow.

Wastewater Systems

Average Daily Flow = Population x 100 gallons/day/person

Peak Hourly Flow = Average Daily Flow x 4.0 peaking factor

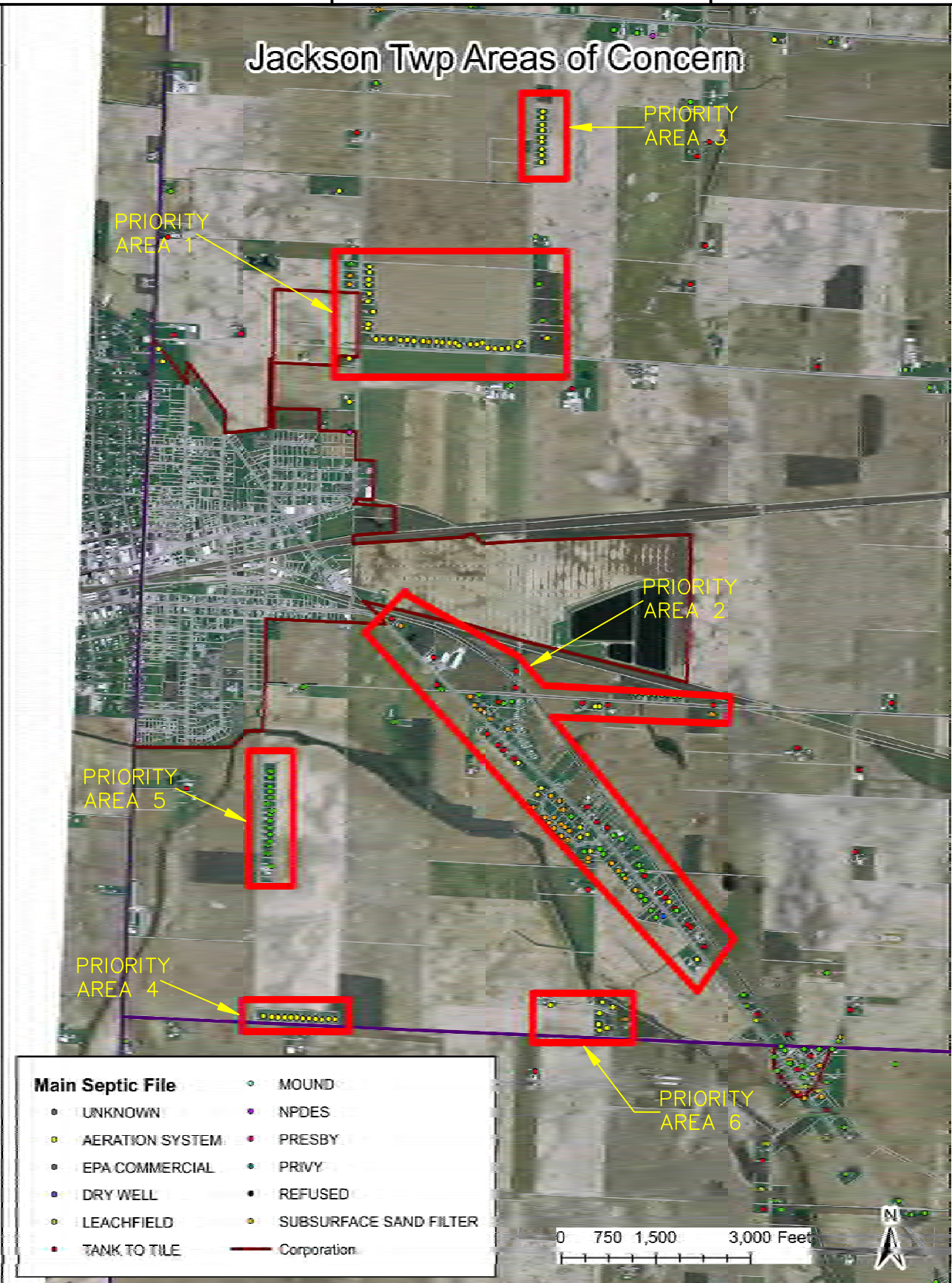


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FIGURE 2-1: JACKSON TOWNSHIP AREAS OF
CONCERN

GRAPHIC SCALE
0 1125 2250
(IN FEET)
1 inch = 2250 ft.



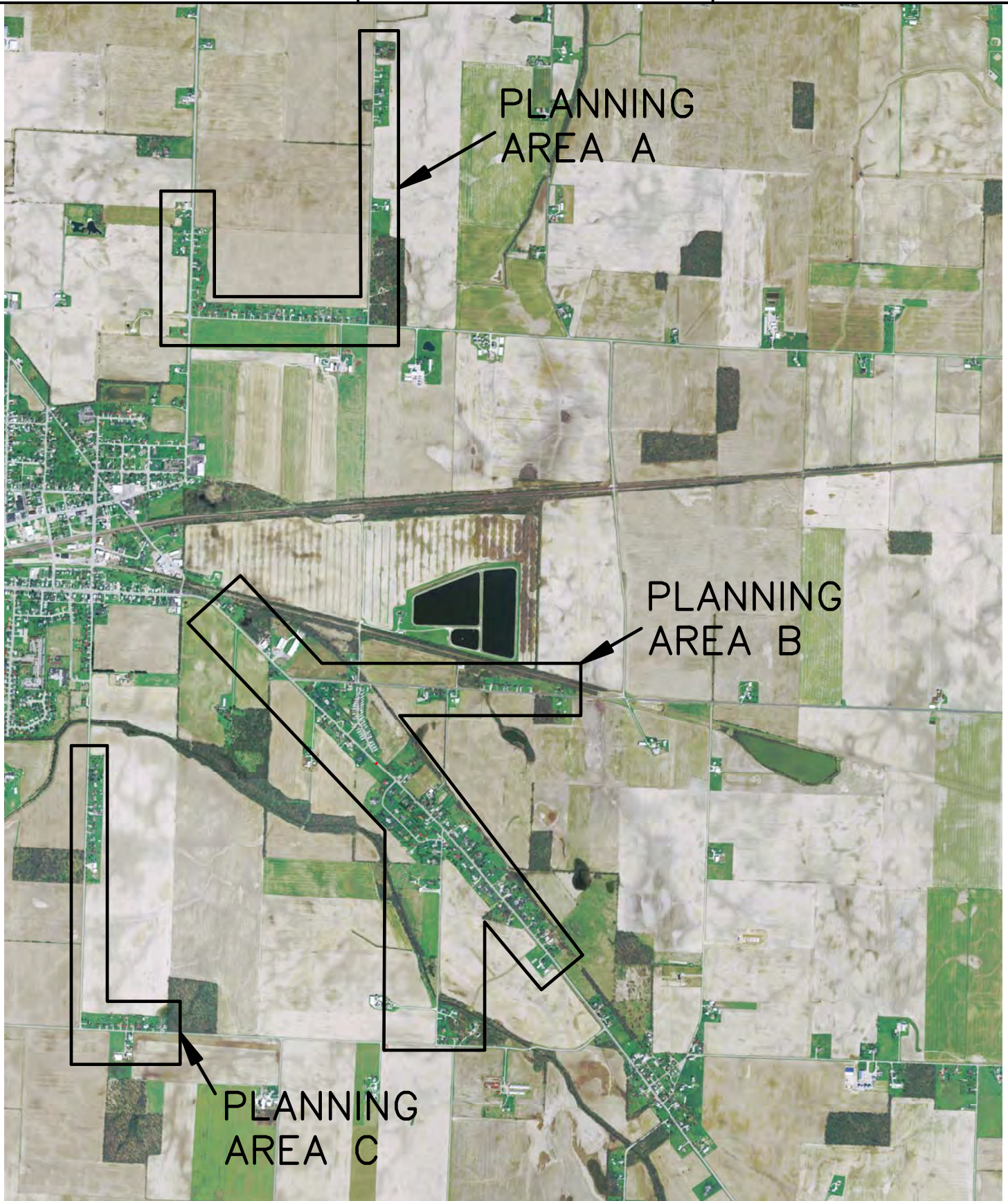
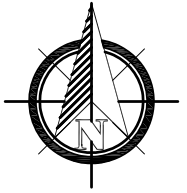


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FIGURE 2-1: PLANNING AREA

GRAPHIC SCALE
0 1000 2000
(IN FEET)
1 inch = 2000ft.



Chapter 3 - Existing Conditions

Existing Water Systems

The existing source of drinking water for both residences and commercial establishments in the Jackson Township planning areas are private wells. There is a potential for contamination with onsite septic systems failing. The installation of a centralized wastewater system will preserve the drinking water in the area.

Existing Wastewater Systems

A centralized collection and treatment system does not exist within the Jackson Township planning areas, with the exception of the Morris Mobile Home park. Each residence and business is responsible for its own on-site treatment system. Many of these on-site systems are comprised of steel or masonry septic tanks with minimal leaching fields, aeration systems, or even direct or indirect connections to drainage tiles. Many of these on-lot treatment systems are failing and discharging raw or partially treated sewage to drainage swales which finds its way into the water table and adjacent streams. These systems do not meet Ohio EPA discharge standards. Also, most of the homes in the area are located on very small lots that do not have adequate space for septic system installation or replacement.

The Morris Mobile Homes Park located in planning area B is connected to the Village of Union City's wastewater collection system. The collected wastewater is sent to Union City's WWTP located just north of the park. One home located along State Route 571 also ties into the collection system. Figures 3-1, 3-2, and 3-3 show the layout of the existing wastewater collection system, which were provided by the Village of Union City.

Environmental Conditions

The environmental conditions in Darke County and the study area are important factors in determining the wastewater collection and treatment alternatives that are viable for the study area. The environmental conditions are analyzed in the following sections.

Soils

The majority of the study area is located within two soil classifications. The two classifications within the Jackson Township planning areas generate the Blount and Crosby soil groups. The following information is generated from the United States Department of Agriculture National Resource Conservation Service. The soil in the area would need to have a soil study completed if a treatment plant where to use a land application for dispersal of the wastewater. Figure 3-4, shows all the soil associations within the Jackson Township planning area.

The Blount soil series is the dominant soil series in the planning areas. The slope for this soil ranges from 2-4 percent. These slopes help generate a high water runoff. A high

runoff classification leads to little or no flooding or ponding for this soil. The depth to the water table is approximately 6-12 inches below the surface. Blount soil in this area can only hold about 5.7 inches of water in the soil profile, which is a low rating.

The second leading soil class in the planning area is Crosby. This class has a 0-2 percent slope, which leads to a medium runoff class rating. The depth to the water table in these areas ranges from approximately 6-24 inches below the surface. Similarly to the Blount soil class there is little to no flooding or ponding. The Crosby class also has a low amount of available water storage of approximately 5.7 inches.

Topography

Jackson Township has a rolling topography. The highest elevation in the area is approximately 1095 feet and the lowest elevation is roughly 1060 feet located near Dismal Creek. The average elevation in the area is approximately 1080 feet.

The bedrock in the area slopes downward from the west to the east. The highest elevation of the bed rock is 1016 feet, which is located in the northern part of the Area. The lowest bedrock elevation of 960 is located at the southeastern end of the Area. The average depth to the bedrock is 100 feet. Figures 3-5 indicates the elevation of the bedrock in the Area.

Surface Water

There is one identifiable body of water with in the area. It is a stream known as Dismal Creek, located in between planning areas B and C. This creek is a tributary to Greenville Creek running approximately 19 miles. Dismal Creek could be used as a possible discharge point for future wastewater treatment plants, depending on the stream flow of the creek. Additional coordination with the Ohio EPA will be required for discharge limitations to Dismal Creek. Pertinent portions of the *Biological and Water Quality Study of the Stillwater River Watershed* and *Biological and Water Quality Study of the Stillwater Basin* are included in the appendix of this report.

Wetlands

There are a few wetlands identified by the National Wetlands Inventory Program in the area. These wetlands do not interfere with the planning of the collection or treatment systems. The location of these wetlands can be found in Figures 3-6 and 3-7.

Flood Hazard Area (100 yr. flood plain)

Flood plains are formed by the periodic overflow of the stream and its resulting sediment deposition and realignment of the stream course. They are characteristically flat and fertile, and can extend over large areas of land.

Although flood plains are often perceived as desirable development sites, they are potentially hazardous in terms of loss of life, property, and land. The 100-year flood reoccurrence interval is most commonly accepted as a reasonable measure of flood-prone areas. Figures 3-8 shows the aerial extent of the 100-year flood of the Dismal Creek, Greenville Creek, and its tributaries, as identified on the Federal Emergency Management Agency (FEMA) map.

Land Use

The planning area has three different land categories. The three different categories for this study are vacant/agriculture, residential, and commercial. Figures 3-9 and 3-10 show the locations of each of the land categories.

The vacant/agriculture category, which is the largest, is composed of 345 acres and is approximately 60 percent of the land in the planning areas.

The second largest land use category, residential, is composed of single-family dwellings, multi-family dwellings, and vacant residences with a potential of human habitation. The primary residential areas lie on the main roads in the areas. Residential land use in the planning areas is comprised of approximately 214 acres, which is 38 percent of the area.

Commercial land comprises the third largest percentage of acres in the planning areas. This land is comprised of lots used to conduct business instead of homes. Commercial land use makes up approximately 2 percent of the planning area and contains approximately 13 acres.

Table3-1: Existing Land Use

LAND USE TYPE	ACREAGE	PERCENTAGE
Vacant/Agriculture	345	60
Residential	214	38
Commercial	13	2
Total	572	100

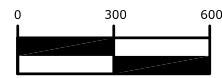


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FIGURE 3-1: UNION CITY SANITARY MAP 1

GRAPHIC SCALE

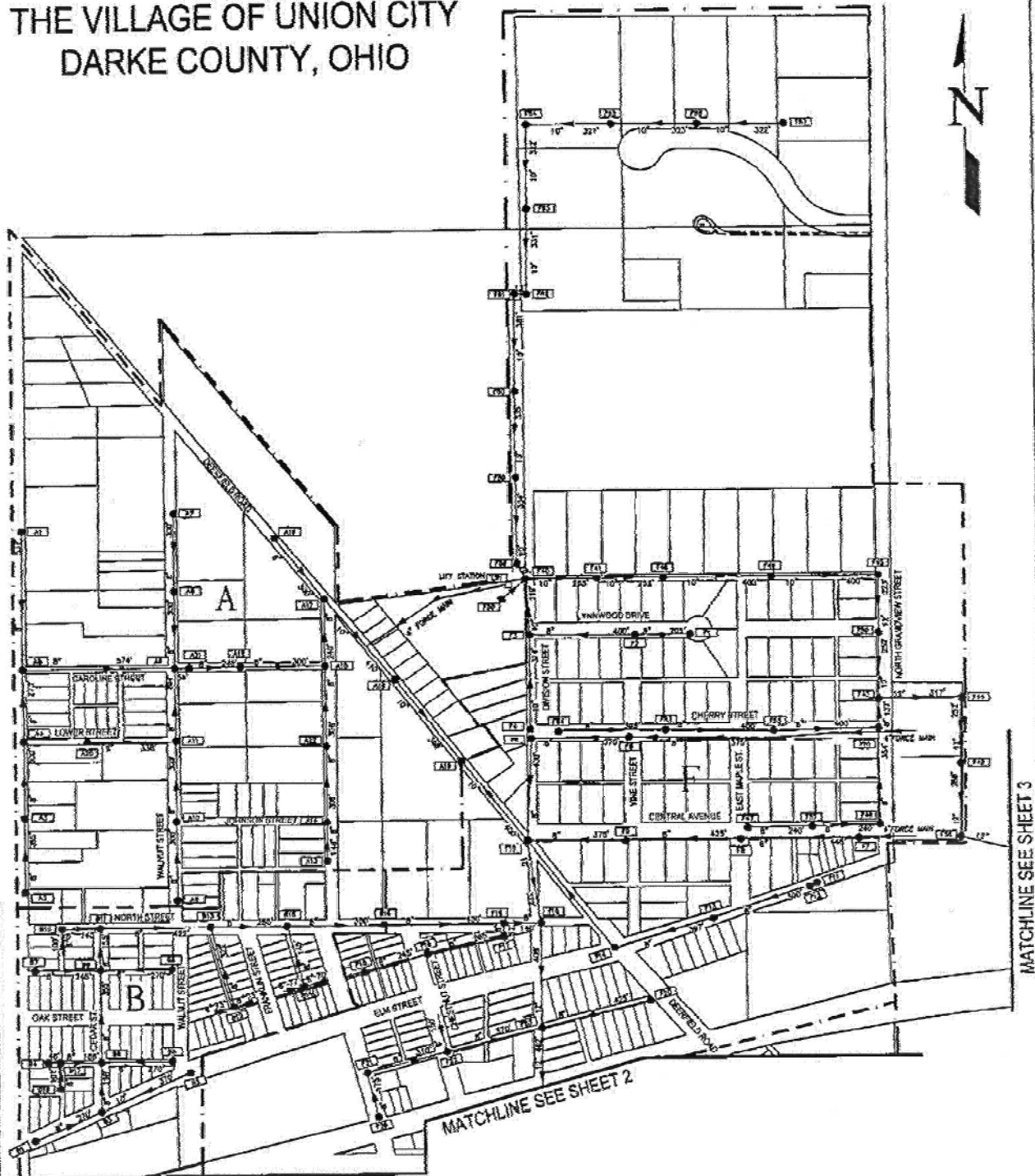


(IN FEET)

1 inch = 600 ft.



**THE VILLAGE OF UNION CITY
DARKE COUNTY, OHIO**



**SANITARY MAP
1 OF 3**

DATE:

10/24/05

DWG/REVISED BY:

T.E.T

PREPARED BY:



**KEY
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GROUP, INC.**

SCALE: 1"=500'



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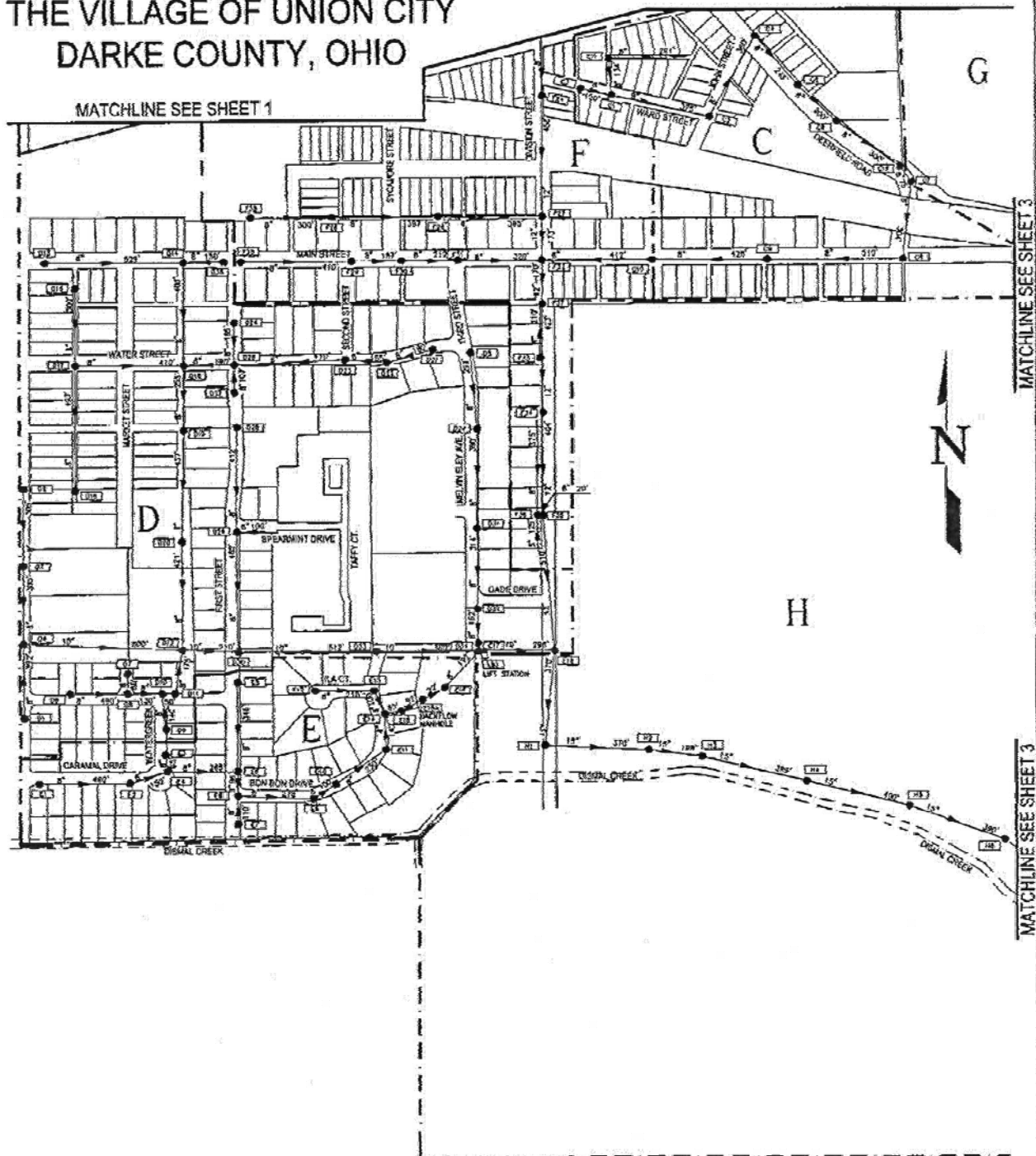
FIGURE 3-2: UNION CITY SANITARY MAP 2

GRAPHIC SCALE
0 300 600
(IN FEET)
1 inch = 600 ft.



**THE VILLAGE OF UNION CITY
DARKE COUNTY, OHIO**

MATCHLINE SEE SHEET 1



**SANITARY MAP
2 OF 3**

DATE:

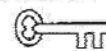
10/24/05

SCALE: 1"=500'

DWG/REVISED BY:

T.E.T

PREPARED BY:



**KEY
ENGINEERING
GROUP, INC.**

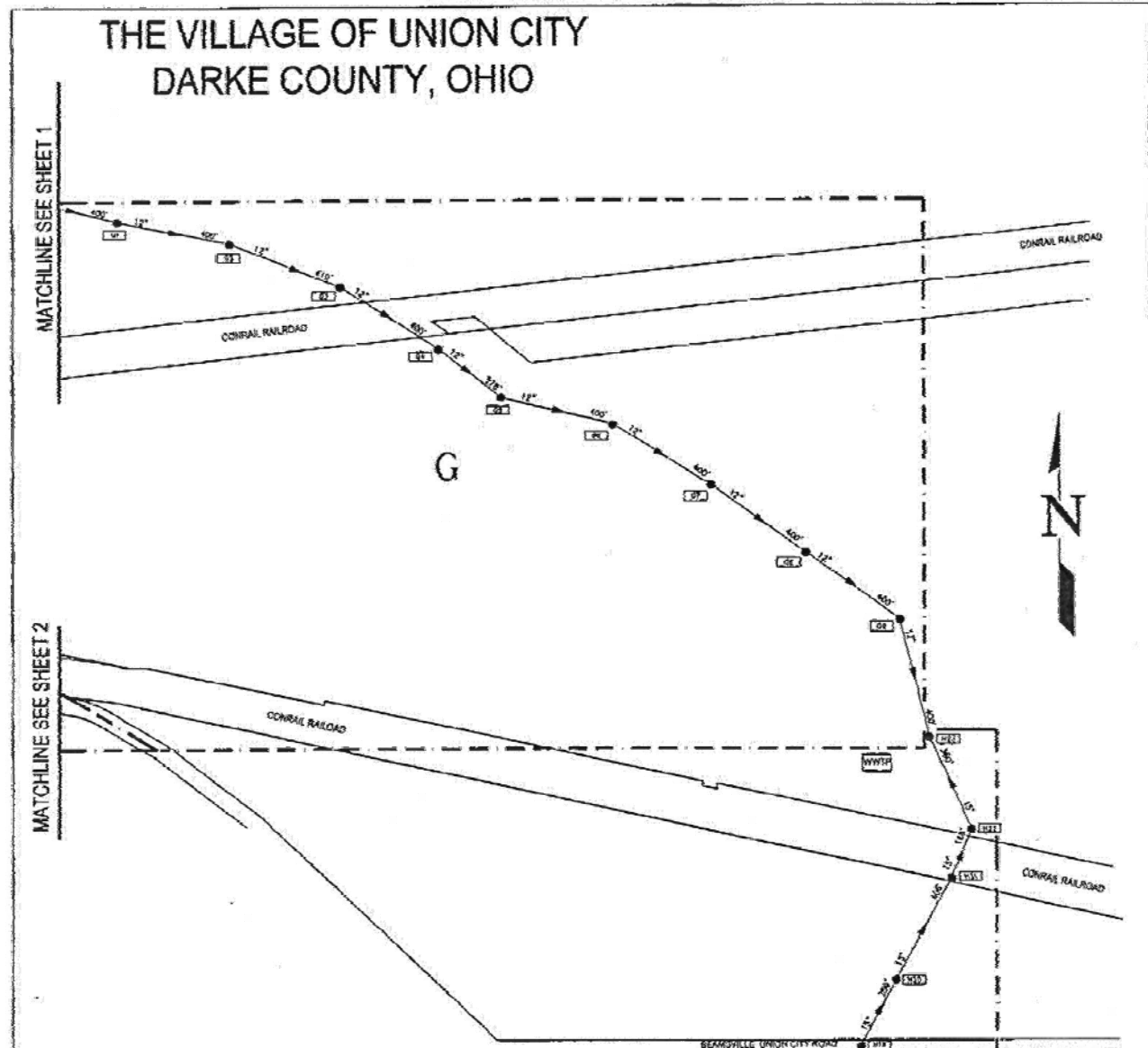


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FIGURE 3-3: UNION CITY SANITARY MAP 3

GRAPHIC SCALE
0 300 600
(IN FEET)
1 inch = 600 ft.



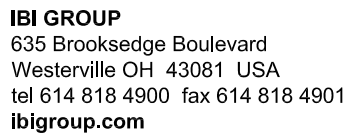
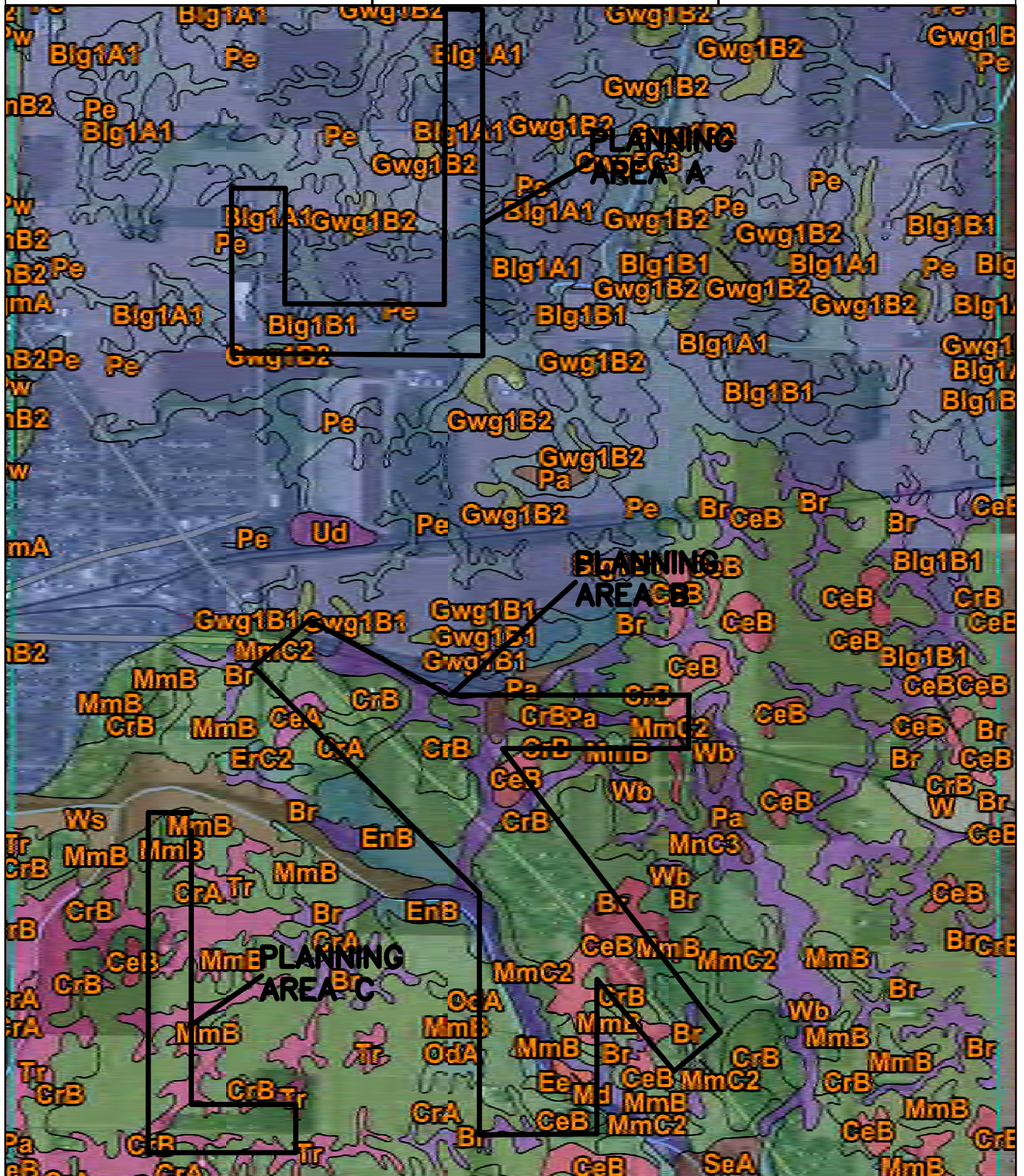
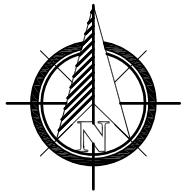


FIGURE 3-4: AREA SOILS



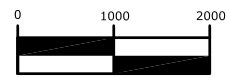


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FIGURE 3-5: AREA BEDROCK

GRAPHIC SCALE



(IN FEET)

1 inch = 2000 ft.

