FINAL REPORT

STUDY AND RECOMMENDATION OF CONSOLIDATING WASTEWATER SYSTEMS

DEARBORN COUNTY REGIONAL SEWER DISTRICT DEARBORN COUNTY, INDIANA

January 25, 2007

Final
Summary Report for Study and Recommendation of Consolidating Wastewater Systems in Dearborn County, Indiana

January 25, 2007

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I. INTRODUCTION

In January 2006 the Dearborn County, Indiana Regional Sewer District (DCRSD) entered into an engineering agreement with Woolpert, Inc. (Woolpert) to develop a Study and Recommendation of Consolidating Wastewater Systems throughout Dearborn County. The Study was authorized to achieve multiple goals, among which was the review of existing public wastewater systems to ascertain their condition and their capability to be expanded and/or combined. County officials stated their overriding goal for the project was to develop a centralized public sewer agency that would have the authority, financial capability, and staff to plan, operate, and administer public wastewater facilities throughout Dearborn County.

County officials reasoned that the administrative structure of a single county-wide sewer district should enable Dearborn County to plan and achieve wastewater system improvement goals that are essential for the provision of effective and efficient wastewater collection and treatment throughout the county, to protect and improve public health and water quality in the streams within Dearborn County, and to accommodate growth that is anticipated throughout the county.

To this end the DCRSD Board hired Woolpert to research and document existing public wastewater facilities within Dearborn County, evaluate the possibility of combining them into regional facilities, and develop recommendations for future wastewater system improvements that would meet the goals and needs of the County. Initial discussions and project goals focused on the following two top priorities:

- Recommendation and provision of wastewater system improvements to areas where there are current water-quality problems as soon as possible to alleviate pollution and public health problems;
- Recommendation and provision of wastewater service to areas throughout Dearborn County that would accommodate long-range development goals established by the Dearborn County Commissioners and the Dearborn County Planning Department.

In preparation for the wastewater system evaluation, Woolpert completed the information-gathering phase of this project. Project engineers visited and/or investigated every municipal and two privately owned wastewater systems in Dearborn County to interview the staff and administrators, inventory their facilities, document wastewater system capacities, and also document wastewater system problems. The findings of the information-gathering phase were documented in the Summary Memorandum submitted to DCRSD officials in May 2006, and described in a PowerPoint presentation at the DCRSD Board meeting on May 4, 2006. Following are a few selected highlights of the findings during the information-gathering phase:

1. The existing Dearborn County sewer districts and the communities they serve include:
    a. The Dearborn County Regional Sewer District (no facilities);
    b. The South Dearborn Regional Sewer District (owning a wastewater treatment plant [WWTP] serving the cities of Lawrenceburg, Greendale, and Aurora, the community of Hidden Valley Lake, and the Pernod Ricard distillery);
    c. The Town of St. Leon and surrounding properties within its sanitary sewer collection system;
    d. The Town of Dillsboro;
    e. The Town of Moores Hill;
    f. The unincorporated community of Bright, served by privately owned LMH Utilities;

g. The community of Hidden Valley Lake, which has a sanitary sewer collection system under private ownership of Valley Rural Utility Company (VRUC).

2. The Town of Dillsboro recently completed construction of a new WWTP which is rated for an average flow of 0.5 million gallons per day (mgd) and a peak flow of 2.0 mgd. Present average flow is 0.12 mgd with a peak flow of 0.4 mgd. Consequently, the treatment plant has significant capacity for additional customers.

3. The Lawrenceburg collection system is in good condition but does not have the capacity to accept growth along many of the fringe areas.

4. The City of Greendale's sanitary sewer collection system is in good condition and has adequate capacity for Greendale's needs. However, the City is concerned about peak wet weather flows from VRUC and does not believe that they would be able to convey additional flows should VRUC increase its pumping capacity.

5. LMH Utilities owns and operates an existing WWTP that has a 300,000 gallons-per-day (gpd) capacity (equivalent to serving approximately 1,000 homes). IDEM has approved a 180,000-gpd expansion of the facility to a total capacity of 480,000 gpd (about 1,600 homes). Construction of the expansion is currently underway.

6. The St. Leon Sewer District owns a 0.3-mgd wastewater treatment facility that presently serves 981 customers. The Sewer District currently has applications and/or commitments for capacity that will exceed the existing WWTP capacity. Consequently, the Sewer District is in the process of planning a 300,000-gpd WWTP expansion.

7. DCRSD requested that St. Leon conduct a Wastewater Treatment Alternatives and Financial Analysis to determine the costs to provide 500,000 gpd of treatment capacity to DCRSD. The County based the request on an estimated 500 developable acres within the St. Leon service area, with projected flows at 1,000 gpd per acre.

8. The Hidden Valley Lake sewer system conveys flow to pumping stations and an equalization basin at the main pump station to retain flows in excess of the station's capacity of 900,000 gpd. The collected wastewater is pumped to the City of Greendale, which by contract transports the wastewater to the SDRSD wastewater facility for treatment.

9. The Hidden Valley Lake sanitary sewer collection system experiences severe I/I with downspouts and residential sump pumps suspected as possible contributors. The flow equalization basin was utilized approximately 15 times in 2005 and overflowed in March 2006.

10. The City of Aurora's sanitary sewer collection system experiences major problems with combined sewer overflows (CSOs) and SSOs. In general, most of the problems are caused by excessive I/I which is exacerbated during wet weather and high river stages.

11. The South Dearborn Regional Sewer District (SDRSD) provides only wastewater treatment services for, and is owned by, Lawrenceburg, Aurora, and Greendale. In addition to providing treatment for wastewater collected by the owners, wastewater from Hidden Valley Lake is treated as part of the City of Greendale's allotment. All flow is pumped from the aforesaid owners and is metered and sampled at the treatment facility for billing purposes.

12. Recent updates and improvements to the South Dearborn Regional Sewer District treatment plant have provided available excess capacity that could be utilized on a regional basis.

13. The topography across Dearborn County provides some unique challenges for extending sewer service to the unsewered areas of the County. The topography also opens up some opportunities for regional solutions with adjoining municipalities.

14. The Dearborn County Board of Health and the Dearborn County Regional Sewer District recognize that failed septic tanks are a serious public health and water quality problem.

15. The Dearborn County Commissioners and the Economic Development Initiative (EDI) have pursued the establishment of tax-increment financing (TIF) districts in several areas of the County. As these TIF Districts are established, wastewater collection and treatment services will be needed for these areas.

During the information-gathering phase the focus of this project was the existing public and privately owned wastewater collection and treatment systems that serve the densely populated areas of Dearborn County. The intent was to determine how and where these facilities may be connected and/or consolidated, and the facilities and administrative decisions that would be necessary to achieve that goal.

As discussions and engineering evaluations proceeded, the goal to solve current pollution and public health problems never changed. The long-term goal of extending public wastewater service throughout the county to accommodate development was clarified, however, to conform to economic realities. It became clear that the goal to physically integrate some of the existing sewer districts was unrealistic. County officials acknowledged that it is unlikely that all existing public wastewater systems will be physically consolidated; the operational realities of such a plan would be impractical and the capital costs would be beyond reach. In fact, that goal clouded the real goals of this project – to effectively and efficiently provide wastewater collection and treatment wherever it is needed throughout the county, to protect and improve public health and water quality in the streams within Dearborn County, and to accommodate economic development and growth that is anticipated throughout the county.

Therefore, the DCRSD's long-term goals were revised. The resulting updated project goals for the evaluation phase of this study are listed below:

- Provide wastewater collection and treatment where there are public health concerns and where water quality is impaired.
- Accommodate economic development, providing wastewater collection and treatment facilities for proposed and planned areas of commercial and industrial development.
- Document the advantages and disadvantages of administrative and physical consolidation of existing sewer districts.

The above project goals are consistent with the needs of two water quality "problem areas" and two proposed economic development areas being monitored by county officials long before this study was authorized. One of the water quality problem areas is the High Ridge Estates subdivision in Clay Township north of U.S. Route 50 between Aurora and Dillsboro. A wastewater treatment facility that once served this subdivision has long been out of service, having been allowed to deteriorate. The result is the pollution of Hogan Creek by inadequately treated wastewater from High Ridge Estates.

The other water quality problem area is the small community of Guilford, west of State Route 1 on the border of Miller and York Townships. Ineffective septic systems throughout this community are allowing untreated wastewater to settle on the ground surface and eventually flow into Tanners Creek.

The proposed economic development areas are tax-increment financing (TIF) districts located along Interstate 74 between the Town of St. Leon and the City of Harrison, Ohio (the "West Harrison TIF"), on the south side of St. Leon at the intersection of I-74 and State Route (SR) 1 (the "St. Leon TIF"), and along U.S. 50 on the west edge of Aurora (the "U.S. 50 TIF"). Public wastewater system improvements for these areas were considered a high priority by DCRSD officials at the beginning of this project, and they remained top priorities throughout the planning and infrastructure evaluations. (The High Ridge Estates subdivision and the U.S. 50 TIF district are in close proximity to each other and are treated as one study area hereafter in this report.)

Another area for future wastewater system improvements also came into focus as this wastewater system consolidation study progressed. Following the announcement of a new automotive manufacturing facility by Honda of America in Greensburg, Indiana, Dearborn County officials revised their projections for economic development areas. A new area where economic development is expected is along I-74 in the northwest quadrant of Dearborn County, west of the Town of St. Leon. Woolpert was asked to evaluate wastewater system improvement alternatives for this area, in addition to those mentioned above. These four areas became the focus of this study.

This Summary Report for the study and recommendation of consolidating wastewater systems in Dearborn County is a follow-up to the Summary Memorandum developed for this project in May 2006, mentioned above. This report represents the conclusions of this project.

II. OVERVIEW - CONSOLIDATION EVALUATION CRITERIA AND ISSUES

There are a number of important factors that must be considered when evaluating wastewater improvement alternatives for Dearborn County, whether they are applied to the consolidation of existing adjacent public systems or to new wastewater systems developed for currently unserved areas. These are factors related to the physical facilities needed to provide public wastewater service.

Topography

One of the key determining factors throughout Dearborn County is its topography. Most of the county is hilly, with some areas that may be classified as rugged terrain. This fact has determined the types of wastewater systems that have already been installed in parts of the county. For instance, the publicly owned sewer system serving northerly county residents near the Town of St. Leon is constructed almost entirely of pressure sewers with residential grinder pump stations. This was one of the few options for service in that part of the county because gravity sewers could not convey wastewater to the location chosen for the publicly owned wastewater treatment plant (WWTP).

Extension of wastewater systems to other parts of the county must be based on similar physical constraints. Local terrain will determine where gravity sewers are feasible and cost-effective, and where they cannot be used. Topography will then impact the design of wastewater collection systems for unserved areas, necessitating some type of pressurized system. It could be a localized system of small gravity sewers flowing into a pump station that conveys wastewater to a WWTP, or it could be a pressure sewer / grinder pump station system similar to the one serving the area around St. Leon.

Existing Facilities vs. Proposed New Facilities

Engineering hydraulic calculations and cost-estimating calculations are used to evaluate the feasibility of upgrading existing wastewater infrastructure and expanding it to achieve system consolidation, versus developing entirely new wastewater systems to provide service to currently unsewered areas. At issue are the following:

- Capacity of existing sewer systems and WWTPs to serve new customers with minimal expansion;
- Capacity/magnitude of sewer system and WWTP improvements needed to continue the use of existing systems to serve new customers;
- The impact of local topography on both of the above;
- Operational requirements of the continued use of (upgraded) existing systems, versus operational requirements of new wastewater systems;
- Abandonment of existing facilities, including WWTPs, in favor of the design and construction of new regional facilities;
- Local preference for gravity systems versus pressurized systems;
- Comparative cost of designing, building and then operating upgrades to existing systems versus new.

Capital cost and lifetime cost (including annual operating cost, staffing, etc.) are often the determining factors in decisions related to consolidation of existing systems versus building new ones. However, Dearborn County has other evaluation criteria that must be noted, as mentioned above and below.

Local Public Health and Water Quality Issues

The water pollution problems from the High Ridge Estates subdivision are serious enough to have been referred for enforcement action from the Indiana Department of Environmental Management (IDEM). High Ridge Estates' NPDES discharge permit was revoked, and discharge of wastewater to Hogan Creek has been prohibited. The community of Guilford has similar problems. The solutions must come soon and they must be effective. A "whatever it takes" approach is appropriate, but that approach can still include the evaluation of valid improvement alternatives.

The criteria for evaluating improvement alternatives to solve High Ridge Estates and community of Guilford public health and water quality problems include the following:

- The nature of the pollution problems – failed public wastewater treatment for High Ridge Estates, and failed private septic systems in Guilford;
- Health threats to human populations;
- Environmental threats to local bodies of water, especially Hogan Creek near High Ridge Estates, and Tanners Creek near Guilford;
- National Pollutant Discharge Elimination System (NPDES) permit discharge limits that will be required by IDEM for improvements at both locations;
- Local solutions for the current populations at both locations versus expanded solutions that also solve other wastewater system challenges in the local region;
- The impact of proposed improvements on neighboring public wastewater systems.

Proposed Commercial / Industrial Development

One of the goals of the consolidation of wastewater systems in Dearborn County is to accommodate proposed commercial and industrial development. It became clear during the evaluation of improvement alternatives that Dearborn County is in the early stages of new development along the I-74 corridor. The West Harrison TIF district and the St. Leon TIF district were created to correspond to and stimulate economic development along the I-74 corridor. Another economic development area is proposed in the northwest quadrant of Dearborn County, on the west side of St. Leon along I-74. Which should come first – new commercial and industrial enterprises, with the County responding with wastewater system infrastructure after a period of two to three years? Or should development of the infrastructure come first, to attract the best and most profitable businesses to Dearborn County?

DCRSD Committee members believe the wastewater system infrastructure should be planned and developed conservatively. This sometimes means planning for economic development, not just reacting to it, which would enable the County to take advantage of development opportunities when they arise, and being ready with wastewater infrastructure approved or ready for service. This study includes evaluations of both approaches, with the suggestion that the DCRSD should be pro-active in providing the public services that new industries need to be successful, and thereby making Dearborn County successful.

III. PROJECTIONS OF FUTURE WASTEWATER FLOW RATES

This study serves as a master plan of proposed public wastewater system development for Dearborn County. As such it must contain certain elements featured in all wastewater system master plans. The wastewater system improvement alternatives described in the following section are based on assumed wastewater flow rates for the areas proposed for service. The wastewater flow rates must be based on sound assumptions related to the future population (or "equivalent population") of the service area. And the projected equivalent population must be based on reliable projections of land use and density of development.

Land-Use Planning & Corresponding Population Projections

Woolpert researched existing and projected land-use and population projection data to develop realistic projections for the future and for recommended wastewater system improvement alternatives. Starting at the beginning, projections of future land use assumptions were considered the basis for all other projections for this project. Woolpert obtained information regarding existing land use from the Dearborn County Planning Department, and projected future land use from Dearborn County Land Use Public and Advisory Committee working documents. These documents included maps showing existing and projected future land use throughout the county, noting areas where commercial / industrial development was predicted, as well as future residential growth. Dense development within city corporate boundaries was shown, and future growth was shown generally spreading outwardly from the existing city cores, along state and federal highways, and especially along the I-74 corridor.

Population projections were also obtained from the Dearborn County Planning Department and from the Ohio-Kentucky-Indiana Regional Council of Governments (OKI).

The land use and population projections from the above sources were used as the benchmark on which to compare alternate future development projections. During the project, new information was introduced relating to the Honda of America automobile manufacturing facility about 30 miles west of Dearborn County in Greensburg, Indiana. This resulted in updated development projections for this report, focusing on the planning of commercial and industrial development along the northern tier of Dearborn County. The resulting land-use projections along I-74 remained similar to, but slightly different from the projected land-use map obtained from the Dearborn County Land Use Public and Advisory Committee. The evaluation of wastewater system needs and recommendations was then updated to include alternatives to provide service to the northwest quadrant of Dearborn County.

Existing Land Use

Significant land-use documents were valuable in the development of future population and wastewater flow projections. The Dearborn County Comprehensive Plan contains "land-use planning principles" that were noteworthy for this study. Among them are the following:

1. "Continue to grow and prosper…with continued availability of a variety of housing choices along with appropriate levels of commercial uses balanced together in order to sustain appropriate levels of public services.

2. "Promote a tax base that supports appropriate infrastructure maintenance and levels of public services….(Promote) land uses that have positive fiscal impacts.
3. "Encourage new development only where there is adequate existing infrastructure….Over time available infrastructure and services should be expanded pursuant to a plan and a budget to support necessary additional development.

4. "Plan and direct growth to the extent that it can fairly balance the rights of landowners with community needs….conservation of farmland and open space…to preserve the local economy and to preserve a high quality of life.

5. "Establish prerequisite development criteria for individual land use designations, based on the provision of public services and infrastructure as well as site limitations.

    a. "Adequate roadways,…sanitary waste disposal…to serve the needs of associated development shall be available concurrent with development in all land use designations….

6. "Encourage mixed-use development patterns…and complimentary relationships between residential uses, transportation facilities, and public and private services."

A map showing existing land use was obtained from the Dearborn County Planning Department. It is enclosed in Appendix B as Figure 1. It was useful in locating existing residential and commercial/industrial development and correlating the development to existing wastewater service areas. The existing land use map was also used to determine the density of existing development, and the potential for growth within existing wastewater service areas and beyond.

Large areas of existing residential and commercial/industrial development in Dearborn County are concentrated primarily in the incorporated municipal areas, including Lawrenceburg, Greendale, Aurora, Dillsboro, Moores Hill, and St. Leon. Municipal wastewater service is available in all of these areas. Dense residential development outside the cities and towns is located in Hidden Valley Lake, nearby Bright and along the south side of St. Leon. These areas also have wastewater collection systems. Hidden Valley Lake's wastewater collection system is connected to the municipal system serving Greendale. Rural areas around St. Leon are served by the St. Leon collection system and WWTP, and the unincorporated community of Bright is served by a WWTP privately owned by LMH Utilities.

There are other smaller pockets of residential and commercial development at numerous locations in Dearborn County that are noteworthy because of their need for public wastewater system improvements. Among these are the High Ridge Estates subdivision and the community of Guilford.

Existing land-use development densities are generally broken down according to the following land-use categories:

- Low-density residential – Greater than 3 acres per home
- Moderate-density residential – 1-3 acres per home
- High-density residential – Less than 1 acre per home
- Commercial/industrial
- Institutional/educational
- Agricultural

- Park/recreational
- Other

For purposes of developing wastewater flow projections, this report focuses on the first five land-use categories (residential, commercial/industrial, educational/institutional), for both existing and proposed future development.

Projected Future Land Use

The projection of future land use was illustrated in the future land use map obtained from the Dearborn County Land Use Public and Advisory Committee. This map is enclosed in Appendix B as Figure 2. It became a critical guide for projecting the locations of future development and the need for future wastewater system service areas. Future development areas were projected at the following locations:

- Within and beyond the existing corporate boundaries of Lawrenceburg, Greendale, and Aurora
- Along the U.S. Route 50 corridor between Aurora and Dillsboro
- On the north and west sides of Dillsboro
- Along the State Route (SR) 1 corridor between Greendale and St. Leon
- Along the SR 350 corridor between Aurora and Moores Hill
- On the west side of Hidden Valley and Bright within Miller Township
- Along the I-74 corridor from the east county line (Indiana/Ohio state boundary) to the west county line

Woolpert suggested a modified development pattern shown in the map enclosed in Appendix B as Figure 3. Future development is projected throughout Dearborn County to be a mix of residential, commercial/industrial, and institutional/educational development. The development densities are proposed as described in the Existing Land Use section above.

Future residential development is projected near Hidden Valley and Bright in Miller Township, and to a lesser extent along the U.S. 50, SR 350, and SR 1 corridors.

Commercial and industrial development is what Dearborn County planners promote because of its positive impact on Dearborn County's employment picture and tax base. The two primary areas of projected future commercial and industrial development are centered along the U.S. 50 corridor from Aurora to the west side of Dillsboro and along the entire length of I-74 in the northern part of the county. In fact, three TIF Districts have been created and/or proposed in these growth areas – one along U.S. 50 and two along I-74. Taking advantage of expected growth along the I-74 corridor, the two northerly TIF Districts are on the south and east sides of St. Leon.

Wastewater service districts are needed for all of the above projected development areas. By their locations, some of the areas may be served by expansion of existing sewer district(s). Other areas may require new wastewater facilities. Alternatives for wastewater service to the above-mentioned areas of future growth are described in subsequent sections of this report.

Population Projections

Dearborn County has experienced significant population growth in the last 25 years, and the growth is expected to continue. Following are the U.S. Census population data for the county since 1980, including an estimate for the year 2004:

Table 1 – Historical Population Data						
1980 Population	1990 Population	Percent Growth, 1980-1990	2000 Population	Percent Growth, 1990-2000	2004 Population Estimate	Percent Growth, 2000-2004
34,291	38,835	13.3%	46,109	18.7%	48,583	5.37%

Population projections for the future have been developed by the U.S. Census and OKI, as well as the Dearborn County Planning Department. The projected population for Dearborn County in the year 2030 has ranged from only 54,339 (U.S. Census) to more than 71,000 (Dearborn County Planning Department). For this project Woolpert developed estimated county-wide growth projections, including projections for each township, for comparison purposes. The projections are shown below:

Table 2 - Dearborn County Population Projections Projected Population by Township					
Township	2000 Population	Projected Annual Growth Rate, 2000-2020	Projected 2020 Population	Projected Annual Growth Rate, 2020-2030	Projected 2030 Population
Caesar Creek Township	285	0.25%	300	0.25%	307
Center Township	5,431	0.50%	6,001	0.50%	6,308
Clay Township	3,051	0.50%	3,371	0.50%	3,543
Harrison Township	3,108	1.50%	4,186	1.00%	4,624
Hogan Township	1,138	1.00%	1,389	0.65%	1,482
Jackson Township	1,419	3.00%	2,563	2.00%	3,124
Kelso Township	1,912	1.00%	2,333	0.65%	2,489
Lawrenceburg Township	10,434	0.50%	11,528	0.50%	12,118
Logan Township	2,513	2.00%	3,734	1.50%	4,334
Manchester Township	2,930	1.00%	3,575	1.00%	3,949
Miller Township	8,605	2.50%	14,100	1.50%	16,364
Sparta Township	2,809	0.50%	3,104	0.50%	3,262
Washington Township	1,488	0.50%	1,644	0.50%	1,728
York Township	985	1.00%	1,202	1.00%	1,328
Total for Dearborn County	**46,108**	**1.24%**	**59,030**	**0.96%**	**64,960**

DCRSD Committee members reviewed the various population projections for purposes of this report, and agreed that the projections suggested above by Woolpert were realistic and should serve as the basis of future wastewater flow projections. For purposes related to this report the projected county-wide population for the year 2030 is 64,960.

Wastewater Flow Projections for Proposed County Service Areas

The population projections in the preceding section were developed as a basis for wastewater flow projections for master planning purposes. The population projections were generally based on projected land use and projected density of development, as described above in the sections related to future land use. Wastewater flow rate projections were developed using the same projections of land use and development density, but were limited to the areas being considered for future wastewater systems.

There are four areas proposed for future wastewater service in Dearborn County that will be described in the following sections of this report. (The reasons for choosing the four areas were explained in the Introduction section of this report and are elaborated upon in later sections that address each service area.) The four proposed wastewater service areas are identified as follows:

- High Ridge Estates subdivision and the U.S. Route 50 corridor
- Guilford and western Miller Township
- West Harrison TIF district
- Northwest Quadrant service area

The wastewater flow projections developed for each of the proposed service areas generally correspond to the population projections for each area. The actual wastewater flow projections are based on projected service area size, land use and household size. The following typical household size and unit flow rates were used to develop the total flow projections for each proposed service area:

- Flow rate per person: 100 gallons per capita per day (gpcd)
- Average household size of residential unit: 3.0 persons per residence
- Flow rate per single-family residential unit: 300 gpcd
- Commercial/industrial development 1,000 gallons per day per acre

Based on the above average household size and unit flow rates, design-year flow rates were projected for each proposed wastewater service area. The projected total average and peak daily flow rates for each proposed wastewater system service area are provided in the following sections that evaluate improvement alternatives for each area studied.

Wastewater Service Areas in the Remaining Portions of Dearborn County

The information-gathering phase of this project focused on existing wastewater service areas throughout Dearborn County. During the evaluation of wastewater system improvement alternatives it became clear that the most cost-effective approach to providing publicly owned wastewater service throughout Dearborn County will be to maintain the decentralized service structure now in existence. Conversely, it would not be cost-effective to plan a county-wide centralized single wastewater conveyance and treatment system. County officials then became

interested in the long-term outlook for service area boundaries, so that future extension of wastewater service would conform to an agreed-upon plan.

Woolpert developed a map based on Dearborn County's own land-use map suggesting future wastewater service area boundaries. These suggested long-term future boundaries, along with the proposed short-term wastewater service areas evaluated within this report, have been agreed upon by DCRSD Committee members, and are depicted on the map in Figure 4 in Appendix B.

IV. SANITARY SEWER AND WASTEWATER TREATMENT SYSTEM IMPROVEMENT ALTERNATIVES

This section presents various sanitary sewer and wastewater treatment system improvement alternatives that were developed, evaluated, discussed, and presented to DCRSD Board Committee members for consideration. Each alternative represents a technical approach to resolve wastewater system problems or achieve other Dearborn County goals related to wastewater system development. Some of the alternatives for the proposed service areas are "apples-to-apples" comparisons intended to provide a cost-effective evaluation of improvement choices, and thereby enable County officials to authorize cost-effective solutions in providing publicly-owned wastewater service. Other suggested wastewater system improvements are purposely contrasted with "unequal" alternatives because the varying options will enable the County to achieve varying goals, and a larger investment in facilities may prove to meet a greater need and/or achieve a greater goal.

In the previous sections the criteria for evaluating the improvement alternatives were presented, and the logic for arriving at wastewater system capacities was explained. In summary, a projection of future land use, development types and densities was the most important factor in determining the required sizes and capacities of proposed wastewater system improvements for each service area. Proposed service areas were determined, either by the number of acres and/or number of homes required in a system to solve a water pollution problem or to accommodate economic development. Equivalent population densities were applied to each area by predetermined land-use projections and densities, and by assumed household size. Finally, unit flow rates were applied per household and per acre of undeveloped land to arrive at the required wastewater system capacity being evaluated.

The first two systems evaluated below are hybrids of the above-described process. For both the High Ridge Estates subdivision and the small community of Guilford, the solution of serious public health and water pollution problems is the highest priority. However, both communities are adjacent to rapidly growing areas that may also require new publicly-owned wastewater conveyance and treatment systems. Therefore, improvement alternatives are presented that will meet the immediate need present in both communities, as well as alternatives that may also provide extended service to the surrounding area.

Following are the four development areas that were evaluated for this report, including two in northern Dearborn County:

- High Ridge Estates subdivision and part of the U.S. 50 corridor between Aurora and Dillsboro, including the U.S. 50 TIF district;
- The unincorporated community of Guilford and surrounding area;
- The West Harrison TIF district;
- The northwest quadrant of Dearborn County

High Ridge Estates Subdivision and U.S. 50 Corridor Wastewater System Improvements

The High Ridge Estates subdivision formerly utilized a package wastewater treatment plant that received wastewater from a small sewer system aligned along High Ridge Road and Timberview Road. This package treatment plant deteriorated, apparently through neglect, and became useless.

Currently wastewater from this subdivision drains through the original collection system into a lagoon that provides virtually no treatment, and overflows into Hogan Creek.

Dearborn County officials view this water pollution problem as possibly their highest-priority wastewater issue that requires a solution. Woolpert has evaluated the size of the existing subdivision and the corresponding wastewater system capacity required to provide adequate conveyance and treatment for High Ridge Estates residents, along with the projected wastewater flows from the site of the former Walston's Mobile Home Park (MHP), which is being re-developed. (It is Woolpert's understanding that the new development on the former Walston's site is also in need of a wastewater treatment system.) County officials have also pointed out that other nearby developments already or soon will require public wastewater system improvements, including the TIF district along U.S. 50 near Marsh Road and a proposed subdivision on the south side of U.S. 50 near Hueseman and Mount Tabor Roads. Therefore, this report includes alternatives to provide wastewater collection and treatment to High Ridge Estates and the other nearby developments, which have been named "the U.S. 50 Corridor" developments throughout this report.

Alternative No. 1 – High Ridge Estates and U.S. 50 Corridor Wastewater Conveyed to a Local WWTP

Both the High Ridge Estates subdivision and the Walston's MHP had their own wastewater collection and treatment systems. High Ridge Estates' WWTP was allowed to deteriorate, and Walston's wastewater system was allowed to continue in service, though the Walston's MHP is now being replaced by a new subdivision of pre-manufactured homes.

Two other developments located nearby must be included in this evaluation. The U.S. 50 TIF district is located near the intersection of U.S. 50 and Marsh Road, and a new residential subdivision is being developed along the south side of U.S. 50 in the vicinity of Hueseman and Mount Tabor Roads. All four developments need public wastewater service. All four are in close proximity to each other, and Dearborn County officials are interested in consolidating the conveyance and treatment systems of all four developments into one system, including a single WWTP, to avoid having as many as four separate small WWTPs that must be operated, maintained, and monitored.

The proposed service area includes approximately 240 homes located on approximately 1200 acres of land classified as residential land use. The area also includes 725 acres of future industrial area. Given current and projected land use, the area could ultimately require a 1.0-mgd wastewater treatment facility. However, given existing land use and projected growth and development projections, a 100,000-gpd wastewater treatment facility would be adequate to provide service to all the existing residences in the service area and also provide sufficient capacity to provide for anticipated growth for the next 15 to 20 years.

It is believed that the existing vitrified clay pipe gravity sewers within the High Ridge Estates allow relatively high volumes of inflow and infiltration (I/I) into the collection system. An investigation should be completed to confirm this, and then sewer rehabilitation or replacement should be carried out if necessary. It is assumed herein that sanitary sewer rehabilitation will be needed at High Ridge Estates because of the suspected problems with the existing collection system.

As an overriding policy, it is recommended that as the DCRSD accepts existing collection systems, an I/I investigation be conducted to ensure that the existing systems are water-tight. This will minimize collection and treatment costs in the future.

By contrast, it is assumed that a collection system upgrade will not be paid for by Dearborn County at the other three sites. This is because the developers of those sites should cover the costs of improvements.

Woolpert contacted IDEM regarding this proposed project, explaining general WWTP capacity goals and the approximate location of the proposed WWTP. Woolpert requested information related to preliminary discharge permit limits, to provide a basis for design of a new WWTP. IDEM responded by stating in a letter that the following limits are appropriate for a WWTP with a design flow up to 0.25 MGD serving High Ridge Estates and the U.S. 50 corridor, and discharging into a tributary of South Hogan Creek:

Table 3 – Preliminary Effluent Limits for 0.25-MGD WWTP Serving High Ridge Estates and the U.S. 50 Corridor and Discharging into a Tributary of South Hogan Creek

	Summer		Winter		
Parameter	Monthly Avg.	Weekly Avg.	Monthly Avg.	Weekly Avg.	Units
$CBOD_5$	20	30	25	40	mg/l
Total Suspended Solids (TSS)	24	36	30	45	mg/l
Ammonia-nitrogen	1.7	2.6	3.2	4.8	mg/l
Parameter	Daily Minimum	Daily Maximum	Monthly Avg.		Units
pH	6.0	9.0			S.U.
Dissolved Oxygen:					
Summer	6.0				mg/l
Winter	5.0				mg/l
E. coli		235	125		#/100 ml

Consistent with the above preliminary discharge limits, the local WWTP required for these four developments along the U.S. 50 corridor is proposed with the following treatment processes:

- Preliminary treatment, including mechanical screening
- Aeration for biological treatment of wastewater
- Primary and secondary clarification
- Recycling, removal, and stabilization of biosolids
- Chemical or biological treatment for phosphorus removal

- Effluent disinfection by chlorination or ultra-violet light, or other process

Based on the system requirements, the High Ridge Estates and U.S. 50 Corridor Alternative No. 1 includes the following proposed infrastructure that would be provided by the DCRSD:

- 4-inch pressurized force main: 4,620 lineal feet (lf)
- 200-gallon per minute (gpm) pump station
- 6-inch pressurized force main: 12,360 lf
- 100,000-gpd WWTP, designed to allow for future expansions as capacity needs dictate, and owned and maintained by the DCRSD

Other wastewater system infrastructure related to the development of the U.S. 50 corridor would be provided by the developer or property owner of each of the other three developments.

The Engineer's opinion of the probable project cost of the above wastewater system is $2,626,700. This cost estimate is itemized in Table 1 in Appendix A. This system is depicted in Figure 5 in Appendix B.

The advantages of designing and building a joint wastewater collection and treatment system for the High Ridge Estates subdivision and the U.S. 50 corridor include the following:

- It would be a solution to the public health concerns and water quality problem in Hogan Creek;
- It would provide a WWTP that can serve all four developments, eliminating as many as three additional facilities;

One disadvantage may be cited for this alternative:

- DCRSD would have to provide a permanent WWTP operational staff for the new facility, with newly hired county employees dedicated to this purpose, or through a contract with a nearby sewer district.

Alternative No. 2 – High Ridge Estates and U.S. 50 Corridor Wastewater Conveyed to Dillsboro WWTP

Dearborn County could avoid building and operating a new local WWTP to serve the U.S. 50 corridor if wastewater generated at High Ridge Estates and nearby developments is conveyed to the Dillsboro WWTP for treatment. This would be a viable alternative based on the fact that there is currently no County staff that would operate a new WWTP, and because there is ample available capacity at the Dillsboro facility to treat additional flow. Another obvious advantage would be the savings of not constructing a new treatment facility.

The cost savings noted above would be offset, however, by the cost of installing a long force main to convey wastewater from High Ridge Estates and the U.S. 50 corridor in a westerly direction to the Dillsboro WWTP. Dillsboro officials have explained that this force main would

have to be connected to their municipal wastewater system on the west side of Dillsboro at the municipal WWTP. This means the force main would have to be extended along U.S. 50 on the north side of Dillsboro to a point on the west side of town, where it would then be extended in a southerly direction to the WWTP site. It could not be connected to the sewer system on the east side of Dillsboro because of lack of sewer system capacity.

As for Alternative No. 1, the service area proposed for this Alternative No. 2 includes:

- High Ridge Estates subdivision;
- A new development on the former Walston's MHP site;
- The U.S. 50 TIF district near Marsh Road;
- A new subdivision proposed on the south side of U.S. 50.

The population and wastewater flow projections noted for the High Ridge Estates Alternative No. 1 apply to this alternative.

It is assumed that the High Ridge Estates collection system will be rehabilitated, but the sanitary collection systems serving the other three growth areas will be installed or upgraded by the respective developers. Based on these assumptions, the following infrastructure must be instaled for this alternative:

- Two 200-gallon per minute (gpm) pump stations
- 4-inch pressurized force main: 4,620 lf
- 6-inch pressurized force main: 10,460 lf
- 8-inch pressurized force main: 25,020 lf

The Engineer's opinion of the probable project cost of the above wastewater system is $3,658,600. This cost estimate is itemized in Table 2 in Appendix A. This system is depicted in Figure 6 in Appendix B.

It is assumed that any arrangement that Dearborn County officials would make with the Town of Dillsboro would require payments by new county customers to partially cover the capital cost of the recently constructed Dillsboro WWTP. It will also involve an ongoing WWTP operational cost that must be negotiated.

The advantages of designing and building a joint wastewater collection system to convey wastewater from the High Ridge Estates subdivision and other developments along the U.S. 50 corridor to the Dillsboro WWTP include the following:

- It would be a solution to the public health and water quality problem in Hogan Creek;
- It would take advantage of available treatment capacity at the new Dillsboro municipal WWTP, which was built with substantial excess capacity;
- It would eliminate as many as three small wastewater treatment plants;
- It could be designed to allow future expansion of service along the U.S. 50 corridor without major upgrades to the wastewater system infrastructure.

The disadvantages of this proposed project would be:

- The capital cost of the force main and pump stations needed to convey wastewater approximately 5 miles to the Dillsboro WWTP;
- A presumed cost to be negotiated later to defray part of the capital cost of the Dillsboro WWTP;
- A monthly or annual cost needed to cover part of the operation and staffing of the Dillsboro WWTP;
- The potential remediation of the abandoned lagoon at the Dillsboro WWTP, a potential cost-burden to County residents.

Alternative No. 3 – High Ridge Estates and U.S. 50 Corridor Wastewater Conveyed to Aurora Sanitary Collection System

The third alternative for the High Ridge Estates and U.S. 50 corridor developments would be to collect and convey wastewater toward the east to the City of Aurora's sanitary sewer collection system. The wastewater would then be conveyed through Aurora to the South Dearborn Regional Sewer District's WWTP along U.S. 50 in Lawrenceburg. This alternative seemed to have merit when it was first considered because the Aurora collection system already includes a sewer that conveys wastewater from customers on the westerly edge of Aurora along U.S. 50. However, the capacity of this sewer is inadequate for the proposed developments, and a new sewer would have to be installed to convey the larger volume of wastewater.

Another issue precludes further consideration of this conveyance alternative. The Aurora sanitary sewer system has serious I/I problems. Four sanitary sewer overflows (SSOs) are active, and the city is under an Agreed Order from IDEM. One of the provisions of the enforcement action is a ban on additional connections to the sewer system until the SSOs are removed/de-activated. Therefore, no additional capacity can be accepted from areas west of Aurora at the current time or in the foreseeable future. This constraint on the US 50 TIF, and for resolving the High Ridge Estates problem, is unacceptable to DCRSD officials. For this reason, no further consideration of the Aurora connection is given in this report for wastewater flows from the High Ridge Estates subdivision and the U.S. 50 corridor developments.

Guilford Area Wastewater System Improvement Alternatives

The unincorporated community of Guilford is the other high-priority area requiring wastewater system improvements because of serious public health concerns and surface and ground water quality problems. DCRSD officials have explained that a majority of the residential septic tank treatment systems in Guilford have failed, and untreated wastewater is settling on the ground surface and eventually flowing into Tanners Creek. It could be argued that some of the properties in Guilford are health hazards. A publicly-owned wastewater collection and treatment system is needed to remedy this health and pollution problem.

The estimated population of the community of Guilford is based on the number of dwellings within the community, which is approximately 54. At three persons per single-family dwelling, the design population is thus 162. At a unit flow rate of 100 gpcd, the design average daily wastewater flow rate is 16,200 gallons per day (gpd). The peak daily flow rate is approximately 50,000 gpd, based on a peaking factor of three.

There are at least three wastewater improvement alternatives available to solve the Guilford area septic system failures. Two of them focus on Guilford only; the third alternative provides a more comprehensive solution for a larger development goal. These are described below.

Alternative No. 1 – Guilford Community Local Sanitary Sewer System and WWTP

One solution to the septic tank problem in Guilford would be to design and install a public sewer system throughout the small community and convey the wastewater to a new WWTP dedicated to serve the community of Guilford. The assumption for this report is that the wastewater collection system would have to be a pressurized system, with small grinder pump stations serving each property. The wastewater would then be conveyed via small-diameter force mains to a nearby package WWTP designed and manufactured to provide all treatment processes in a compact layout.

Woolpert has not obtained preliminary WWTP discharge limits from IDEM for a facility to serve Guilford. However, based on the size of the receiving stream (Tanners Creek) and related information for a proposed WWTP upstream of this location (described later in this report), the following treatment processes are proposed for a package WWTP serving Guilford:

- Preliminary treatment, including mechanical screening
- Aeration for biological treatment of wastewater
- Primary and secondary clarification
- Recycling, removal, and stabilization of biosolids
- Chemical or biological treatment for phosphorus removal
- Effluent disinfection by chlorination or ultra-violet light, or other process

Based on the system requirements, Guilford Alternative No. 1 includes the following proposed infrastructure:

- 3-inch pressurized force main: 2,500 lineal feet (lf)
- 54 grinder pump stations (one per property; the capital cost would be the responsibility of the property owner)
- 4-inch pressurized force main: 2,000 lf
- 50,000-gpd WWTP owned and operated by the DCRSD

The Engineer's opinion of the probable project cost of the above wastewater system is $789,000. This cost estimate is itemized in Table 3 in Appendix A. This system is depicted in Figure 7 in Appendix B.

The advantages of designing and building a local wastewater collection and treatment system for Guilford include the following:

- It would be a relatively simplistic solution to the public health and water quality problems in Tanners Creek and throughout Guilford;
- This alternative could probably be implemented relatively quickly.

The disadvantages related to this improvement alternative include the following:

- It would be a large capital investment by Dearborn County to serve a very small community;
- The capital cost and operational cost of privately-owned grinder pump systems might not be affordable for Guilford property owners.
- It would not address other pending developments in this general area, including proposed commercial developments and expected residential development to the northeast in Miller Township.

Alternative No. 2 – Guilford Community Local Sanitary Sewer System and Conveyance to Greendale Sewer System

By far the largest capital cost item in the localized Guilford wastewater system alternative described above is the wastewater treatment plant. From an engineering perspective, this leads to the evaluation of other technical alternatives. For small wastewater systems such as that required for Guilford it is often advantageous to seek connection to another nearby established conveyance and treatment system.

Based on its location, the community of Guilford could be considered an extension of the South Dearborn Regional Sewer District. This alternative was developed to take advantage of this geographical fact. A pressurized local wastewater collection system would be proposed like the one described above for the localized WWTP alternative. The privately-owned grinder pumps proposed for this system would be typically designed with the capability to pump fairly long distances or to overcome large friction "head" (pressure). Based on that fact, the pressurized sewer system in Guilford would be designed to convey wastewater through the local 3-inch force mains and also through a long 4-inch force main from Guilford to an existing gravity sewer recently installed by the City of Greendale along State Route 1. The connection point would be near the intersection of SR 1 and Green Road, where the new sewer was terminated. From there Guilford's wastewater would be conveyed through the Greendale municipal sewer system to the South Dearborn Regional Sewer District's WWTP on U.S. 50 in Lawrenceburg.

Based on the system requirements, Guilford Alternative No. 2 includes the following proposed infrastructure:

- 3-inch pressurized force main: 2,500 lineal feet (lf)
- 54 grinder pump stations (one per property; the capital cost would be the responsibility of the property owner);
- 4-inch or 6-inch pressurized force main: 14,200 lf
- Two 150-gpm pump stations

The Engineer's opinion of the probable project cost of the above wastewater system is $1,132,000. This cost estimate is itemized in Table 4 in Appendix A. This system is depicted in Figure 8 in Appendix B.

The advantages of designing and building a local wastewater collection system for Guilford and connecting it to the Greendale sewer system include the following:

- It would be a solution to the public health and water quality problems in Tanners Creek and throughout Guilford;

- It would save the capital construction cost and ongoing operational cost associated with a small WWTP dedicated to the community of Guilford;

The potential disadvantages of this approach are:

- Utilizing a pressure sewer system, there would be very limited capacity for growth;
- It would be a large capital investment by Dearborn County for a very small community;
- The capital cost and operational cost of grinder pump systems might not be affordable for Guilford property owners.
- Dearborn County customers would probably have to pay a sewer rate surcharge to Greendale;
- It would not address other pending developments in this general area, including proposed commercial developments and expected residential development to the northeast in Miller Township.

Alternative No. 2A - Guilford Community Local Sanitary Sewer System and Conveyance to Perfect North Slopes Pump Station

This improvement alternative is similar to Guilford Alternative No. 2, except that it is based on a connection of the proposed Dearborn County-owned sewer system and force main serving Guilford to the existing privately-owned pump station conveying wastewater from the Perfect North Ski Slopes to the City of Lawrenceburg's wastewater collection system. The Perfect North pump station conveys wastewater from the ski facility to Lawrenceburg over the hills that separate Perfect North from Lawrenceburg. Wastewater is then conveyed through the Lawrenceburg sewer system to the WWTP owned by the South Dearborn Regional Sewer District.

This alternative may be a short-term solution to the Guilford area wastewater problem as it entails using public funding to upgrade private facilities. Inadequate information was obtained about the Perfect North pump station and force main to make a recommendation regarding its use for this purpose. System capacities are unknown, and the capability to convey potentially higher future flows based on projected growth in the general area is also unknown. Further study would be required if this is a conveyance alternative that County officials are interested in. It is not considered further in this report, although it is assumed that the capital costs could be similar to those identified in Alternative No. 2.

Alternative No. 3 – Guilford Community Local Sanitary Sewer System Connected to New Regional Wastewater System

Alternative No. 3 addresses a different goal for wastewater service in the Guilford area. It is not an "equal" alternative to the preceding three described above. An analysis of growth trends and wastewater system needs in east-central Dearborn County reveals the potential for significant growth throughout Miller Township and nearby areas. (Guilford is on the border between Miller and York Townships.) Recent rapid growth in Bright and Hidden Valley may be viewed as the early stage of an ongoing growth trend in Miller, Logan, and Harrison Townships, which has been typical for other Greater Cincinnati suburban areas. Table 2 on page 10 indicates that these are three of the four townships with the highest projected growth rates in Dearborn County for the next 30 years. There will be a corresponding need for wastewater system improvements if these growth trends continue in the upcoming years.

During the evaluation of this alternative it was noted that new residential and commercial growth in Miller Township is expected along some of the main north-south thoroughfares between SR 1 and the existing developments in Bright and Hidden Valley Lake. Some of these development corridors include Salt Fork Road, Mount Pleasant Road, Sawdon Ridge Road, and Kaiser Road in the southern part of the township.

The Tanners Creek valley would be the natural location of a regional wastewater treatment plant to serve the above growth areas. The local topography generally slopes in a southerly direction to the Tanners Creek valley from the northerly edge of Miller Township, the southern portions of Logan and Harrison Townships, and most of York Township. Figure 3 indicates that a wide area of residential and commercial growth is projected for this entire area, including all but the extreme southwest corner of Miller Township.

A future regional public wastewater facility was evaluated to serve this area. The areas proposed for initial wastewater service are the community of Guilford and existing development along SR 1 between Guilford and Greendale. Other areas that could be served would be added as development occurs, or based on new inter-local wastewater service agreement(s). The WWTP and sewer collection system capacity could be designed to include wastewater from areas that already have public wastewater service, if an inter-local agreement would be mutually beneficial. It is believed that the customer base will be large enough in the near future to support a 1.0-million-gallon-per-day (MGD) WWTP.

The estimated population that could be served by the regional wastewater facility would be approximately 10,000. At a unit flow rate of 100 gpcd, the design average daily wastewater flow rate would be 1.0 MGD. The peak daily flow rate would be 3.0 MGD, based on a peaking factor of three.

Based on the above proposed new wastewater service area, Guilford Alternative No. 3 includes the following proposed infrastructure:

- 3-inch pressurized force main within the community of Guilford: 2,500 lineal feet (lf)
- 54 grinder pump stations within Guilford (one per property; the capital cost would be the responsibility of the property owner);
- 4-inch pressurized force main extended from Guilford collection system to proposed WWTP near intersection of Pribble Road & SR 1 : 8,820 lf
- 18-inch gravity sewer located along the appropriate development corridor to convey wastewater from new customers to a regional pump station: 7,600 lf
- 4,000-gpm pump station located near the intersection of SR 1 and Salt Fork Road, to convey wastewater to the proposed WWTP;
- 12-inch force main to convey wastewater to WWTP: 5,340 lf
- 1.0-MGD WWTP located near the intersection of SR 1 and Ripple Road, owned and operated by the DCRSD

The 1.0-MGD WWTP suggested above would be designed on a site dedicated for long-term use. A treatment process that would be appropriate for this facility would be the sequencing batch reactor (SBR) treatment process. This process would utilize the familiar biological treatment approach common to most wastewater treatment plants, but it would be somewhat more compact than a typical treatment plant that utilizes the process known as conventional activated sludge treatment. The other advantage of an SBR treatment facility would be the ease of expansion. SBR plants use treatment basins that may be duplicated side-be-side, allowing the treatment plants to be easily expanded to accommodate increases in wastewater flow rates that result from residential and commercial/industrial growth in the wastewater service area.

Woolpert has not yet obtained preliminary discharge limits from IDEM for a regional WWTP in southern Miller Township. Preliminary discharge limits are assumed that are similar to others reported within this document. On that basis, the proposed SBR treatment plant would include some of the treatment processes and equipment that would be found in other alternate designs, and treatment basins that are in contrast with other designs. The treatment processes would include the following:

- Preliminary treatment, including mechanical screening and grit removal;
- Sequencing batch reactors that feature phased, sequential treatment processes, including basin filling, basin aeration and mixing for biological treatment of the wastewater, settling for clarification, biosolids removal and recycling, and basin emptying;
- Stabilization of biosolids;
- Chemical or biological treatment for phosphorus removal if necessary;
- Flow control ("equalization"), if necessary prior to disinfection, to account for the batch treatment process;
- Effluent disinfection by chlorination or ultra-violet light, or other process.

The Engineer's opinion of the probable project cost of the above wastewater system is $12,941,000. This cost estimate is itemized in Table 5 in Appendix A. This system is depicted in Figure 9 in Appendix B.

A relatively large volume of wastewater conveyed to the proposed county-owned WWTP from new customers in Miller Township would represent an important and fairly consistent flow rate that would be beneficial to maintain the biological treatment process. Therefore, the inclusion of flow from existing and new development in Miller Township would be an advantage to the County for this alternative to be successful. Given the projection of growth for this portion of the County, a new wastewater facility may also be viewed as a pro-active investment by County leaders to accommodate economic development and growth, which is one of the goals of this study. The authorization of the design and construction of such a facility, coupled with careful planning, would allow Dearborn County officials to be ready for the projected growth, and not inhibit it.

Advantages:

- The regional WWTP alternative would solve Guilford public health and water quality problems as well as serve other customers that are available now and in the near future.
- New and/or existing wastewater system customers in Miller Township would be able to sustain the biological treatment process in a new regional WWTP.
- A new regional WWTP would be viewed as a pro-active investment by county leaders to accommodate expected development.

- A single regional WWTP designed to serve all of western Miller Township would make a separate, small WWTP at Guilford unnecessary.

Disadvantages:

- The capital cost of this alternative is much higher than the other three Guilford area wastewater system improvement alternatives;
- The initial customer base for this alternative would have to include existing residents and/or businesses;
- The capital cost and operational cost of grinder pump systems might not be affordable for Guilford property owners

Northern Dearborn County Wastewater System Improvement Alternatives

Northern Dearborn County is projected to see a significant degree of commercial/industrial development in the foreseeable future along the I-74 corridor. Knowing this, County officials created the West Harrison TIF district in Harrison Township and the St. Leon TIF district at the intersection of I-74 and SR 1. Creation of these TIF districts should provide the incentive for commercial/industrial development to proceed. Another incentive that is needed has been made clear by Dearborn County economic development officials - wastewater conveyance and treatment facilities are needed to bring the commercial/industrial development to the TIF districts.

West Harrison TIF District

Planning has been underway by St. Leon officials to expand the St. Leon WWTP. The expansion is intended to accommodate new residential customers within its existing wastewater service area as well as projected new commercial/industrial customers within the West Harrison TIF district and elsewhere. The DCRSD Board has debated whether to participate in the St. Leon WWTP expansion. Because many of the new customers that are expected to connect to this system will be DCRSD customers instead of St. Leon customers, the DCRSD Board and the St. Leon Sewer District are negotiating a potential agreement for funding a proposed expansion of the St. Leon WWTP from 0.3 MGD to 0.6 MGD. This would ensure WWTP capacity for the DCRSD for initial development.

The St. Leon WWTP is in the flood plain of the Whitewater River, as is most of the West Harrison TIF district. For purposes of this report, it is assumed that a pump station and force main will be required to provide wastewater service to new developments in the TIF district. They would be connected to an existing 6-inch force main extended from the St. Leon WWTP in an easterly direction beneath the Whitewater River. It is also assumed that these facilities would be provided or funded by the DCRSD. It is assumed that local gravity sewers or pressurized force mains that would comprise the sewer network serving new development would be paid for by the developers or property owners.

Approximately 534 acres are included in the West Harrison TIF district. Of this total area, approximately 300 acres is developable land and the remainder is flood plain which would probably not be cost-effective to develop. Based on the unit flow rates provided earlier in this report, the approximate average daily wastewater flow rate is projected to be 300,000 gpd, and the peak flow rate is projected to be 1,000,000 gpd. This would represent approximately 100 percent of the proposed 300,000-gpd WWTP expansion project.

The DCRSD's negotiations with the St. Leon Sewer District for partial funding of the St. Leon WWTP expansion represent an investment in the future development of northern Dearborn County, and a cooperative approach that will be documented by an inter-local wastewater service agreement. The cost of the WWTP investment will depend on the final design of that project, which is beyond the scope of this study. The engineer's opinion of the project cost for the West Harrison TIF district sewer system is $1,370,000. This cost estimate is itemized in Table 6 in Appendix A. This system is depicted in Figure 10 in Appendix B.

Advantages:

- The St. Leon WWTP is immediately adjacent to this TIF district.
- A 6-inch force main has already been installed beneath the Whitewater River, providing a wastewater infrastructure direct connection between the West Harrison TIF district and the St. Leon WWTP.
- The future wastewater system customers in the West Harrison TIF district will be DCRSD customers, and an inter-local agreement has been proposed between the DCRSD and the St. Leon Sewer District for an expansion of the customer base and the capacity of the St. Leon WWTP.

Disadvantages:

- Potential wastewater system customers in the eastern part of the West Harrison TIF district may be able to connect to the City of Harrison sanitary sewer collection system more readily than to the more distant St. Leon collection system.

Northwest Quadrant

The early phases of this project did not focus on the Northwest Quadrant of Dearborn County, because the project priorities had always been public health and water quality problem areas elsewhere in the County, and economic development opportunities at the U.S. 50, West Harrison, and St. Leon TIF districts. After announcement of the Honda of America manufacturing facility to be built in nearby Greensburg, Dearborn County officials requested an analysis of wastewater conveyance and treatment alternatives in Jackson Township, which were considered to be the "Northwest Quadrant" alternatives.

The first step in developing wastewater system alternatives for the new development area was to define the projected land use and the proposed service area. Land-use projections had already been made as reflected in the proposed land-use map (Figure 4). Much of the area along the I-74 corridor within one mile of I-74 had been projected as future commercial/industrial land. The proposed service area would be comprised entirely of this future zoning category.

The proposed service area was then defined. County officials agreed that the Northwest Quadrant service area should extend from the westerly Dearborn County line to the St. Leon town limits within Kelso Township, and from slightly north of Feller Road, about one mile north of I-74, to

Gutapfel Road, approximately 1½ miles south of I-74. This proposed wastewater service area contains more than 5,000 acres with a proposed industrial future land use, of which approximately 4,000 acres are developable.

Instead of developing an equivalent population, Woolpert developed an estimated wastewater flow rate for this area based on the projected land use and the wastewater unit flow rates developed earlier in this report. At full development the estimated average daily wastewater flow rate could exceed 4.0 MGD, and the estimated peak daily flow rate could exceed 10.0 MGD. However, because it represents an entirely new development area, initial average daily wastewater flow rates were estimated at approximately 0.5 MGD, or 500,000 gpd.

One alternative for a publicly-owned wastewater system for this area was proposed, to be comprised of the following components:

- 18-inch gravity sewer along SR 46: 6,670 lf;
- 24-inch gravity sewer along SR 46: 10,220 lf;
- 4,000-gpm pump station (future capacity);
- 12-inch pressurized force main along SR 46: 800 lf;
- 0.5-MGD WWTP located near the intersection of SR 46 and Trackville Road, to be owned and operated by the DCRSD

The sewer system is presented as a "skeleton" system that would be extended as development occurs. It is proposed as a system that Dearborn County officials would fund to accommodate and plan for commercial/industrial development that is expected in this area. Any extension of the system would be provided by developers or property owners.

Nearly all municipal wastewater treatment plants utilize biological treatment of the wastewater. The facilities proposed herein are no different. Biological treatment facilities depend upon a consistent wastewater flow rate to provide the microorganisms used for treatment adequate food to thrive. Therefore, the new facility suggested for the Northwest Quadrant must receive ongoing flow from wastewater system customers. Because this WWTP is suggested as a facility that would stimulate commercial/industrial development, it is possible that it would initially have a very small customer base, and possibly an inadequate flow rate to sustain the biological treatment system. It is suggested that an inter-local agreement could be developed with the St. Leon Sewer District to temporarily divert flow from a portion of St. Leon sewer customers in the westerly portion of the St. Leon collection system to provide an ongoing source of wastewater ("food") for the biological treatment organisms. After the customer base within the Northwest Quadrant has grown to increase the flow conveyed to this WWTP, the wastewater flow from the St. Leon customers could either be permanently directed to the Northwest WWTP owned by the DCRSD, or it could be returned to its current flow pattern. Permanently directing St. Leon flow to the facility would be beneficial to the St. Leon Sewer District in that additional service could be

provided without upgrading the currently stressed infrastructure. The inter-local agreement between the DCRSD and the St. Leon Sewer District would define this.

If the above suggestion could not be arranged, a much smaller package treatment plant could be built by the County, but it would have to be abandoned and replaced later by a larger facility as growth occurs.

Woolpert contacted IDEM regarding this proposed project, requesting preliminary discharge permit limits, to provide a basis for design of a new WWTP. IDEM responded by stating that the following limits are appropriate for a WWTP with a design flow up to 4.0 MGD serving northwest Dearborn County, and discharging into Tanners Creek:

Table 4 – Preliminary Effluent Limits for 4.0-MGD WWTP Serving Northwest Dearborn County And Discharging into Tanners Creek

	Summer		Winter		
Parameter	Monthly Avg.	Weekly Avg.	Monthly Avg.	Weekly Avg.	Units
$CBOD_5$	20	30	25	40	mg/l
TSS	24	36	30	45	mg/l
Ammonia-nitrogen	1.6	2.4	3.1	4.7	mg/l
Parameter	Daily Minimum	Daily Maximum	Monthly Avg.		Units
pH	6.0	9.0			S.U.
Dissolved Oxygen:					
Summer	6.0				mg/l
Winter	5.0				mg/l
E. coli		235	125		#/100 ml

IDEM also noted requirements for monitoring influent and effluent mercury concentrations for this proposed major facility, and other monitoring requirements that are typical for all municipal treatment plants.

The 0.5-MGD WWTP suggested for the Northwest Quadrant development project is similar in concept, though smaller in capacity, to the "Guilford Alternative No. 3," the regional WWTP proposed for Miller Township. A sequencing batch reactor (SBR) treatment plant would serve the County well in this area because it is easily expandable. As commercial/industrial development would proceed, the treatment plant capacity could be enlarged. By contrast, the sewer system would be sized for a future capacity at its initial design and installation, as this is the most cost-effective solution for collection systems.

This wastewater collection and treatment system could therefore serve the Northwest Quadrant of Dearborn County by meeting an immediate need to accommodate the development that is expected, and also provide wastewater service through many years of gradual growth.

The Engineer's opinion of the probable project cost of the above wastewater system is $9,750,000. This cost estimate is itemized in Table 7 in Appendix A. This wastewater collection and treatment system is depicted in Figure 11 in Appendix B.

Advantages

- A new WWTP to serve the proposed Northwest Quadrant economic development area would be a pro-active investment by county leaders to accommodate and stimulate expected commercial/industrial development in Jackson Township, capitalizing on economic development opportunities related to the construction of the Honda of America manufacturing facility in Greensburg.
- A completed (already constructed) wastewater system serving the proposed Northwest Quadrant will attract development, not hinder it.
- Initial wastewater system customers needed to sustain a biological treatment process may be added to the customer base as development proceeds. A temporary arrangement with the St. Leon Sewer District may be feasible to ensure that the initial (existing) customer base is adequate until the new customers are added to the system. There are capacity benefits for the St. Leon system associated with this alternative.
- An SBR treatment process could be designed and built that would be easily expanded in this projected growth area.
- A skeleton sewer system could be constructed that would serve as the backbone of the system, and future expansion would be extended thereafter.

Disadvantages:

- There is no current customer base for the proposed wastewater system improvement.
- Project financing will have to be developed to allow this project to proceed toward completion.
- Consistent with Dearborn County Planning Department projections, establishment of a publicly-owned wastewater collection and treatment system in northern Jackson Township will change the rural character of Jackson Township permanently. (This is viewed as a disadvantage according to some observers, but as an advantage to others.)

It should be noted that conveyance of wastewater from the Dearborn County Northwest Quadrant development area to the existing Sunman, Indiana, WWTP was briefly considered for this study. However, inadequate treatment capacity and the high cost of new infrastructure made this alternative unfeasible, and it was discarded.

V. ADVANTAGES AND DISADVANTAGES OF WASTEWATER SYSTEM IMPROVEMENT ALTERNATIVES

As stated earlier in this report, some of the wastewater system improvement alternatives proposed herein have been evaluated as "apples-to-apples" or equal alternatives. Other improvement alternatives are presented as solutions to revised wastewater infrastructure challenges and meeting revised development goals. Following is a discussion on the merits of the various improvement alternatives, pointing out advantages and disadvantages of implementing each alternative. Some of the following discussion is a re-iteration of information already presented, but it is believed that the elaboration of the advantages and disadvantages will be helpful in arriving at agreed-upon final recommended improvements.

High Ridge Estates Subdivision and the U.S. 50 Corridor Wastewater System Improvements

Three improvement alternatives were evaluated for this area. The Aurora alternative was previously eliminated, so only the remaining two are discussed below.

Alternative No. 1 – High Ridge Estates and U.S. 50 Corridor Wastewater Conveyed to a Local WWTP

This improvement alternative included a proposed new WWTP to serve the High Ridge Estates subdivision, the former Walston's MHP, the U.S. 50 TIF district, and a proposed new subdivision on the south side of U.S. 50. This facility would replace the two separate WWTPs that formerly served the High Ridge Estates and Walston's developments. A sanitary sewer collection system rehabilitation project was also included for High Ridge Estates. There are advantages and disadvantages to this proposal, as follows:

Advantages:

- It would be a solution to the public health concerns and water quality problem in Hogan Creek;
- It would provide a WWTP that can serve all four developments.

Disadvantage:

- Dearborn County would have to provide a permanent WWTP operational staff for the new facility, with newly hired county employees dedicated to this purpose, or through a contract with a nearby sewer district.

Alternative No. 2 – High Ridge Estates and U.S. 50 Corridor Wastewater Conveyed to Dillsboro WWTP

This wastewater system improvement would open up the U.S. 50 corridor for development. The important factor would be the design of a properly sized wastewater pump station or multiple pump stations and a force main to convey the design-year wastewater volume to the Dillsboro

WWTP, making sure that those facilities can serve the region without becoming undersized because of growth.

Advantages:

- The new wastewater conveyance facilities would be a solution to the public health and water quality problem in Hogan Creek;
- Conveying wastewater to Dillsboro instead of treating it locally would take advantage of available treatment capacity at the new Dillsboro municipal WWTP, which was built with substantial excess capacity;
- Utilizing the Dillsboro WWTP would eliminate as many as three additional small wastewater treatment plants;
- If properly designed, the new conveyance system should allow future expansion of service along the U.S. 50 corridor without major upgrades to the wastewater system infrastructure.

Disadvantages:

- The capital cost of the force main and pump stations needed to convey wastewater approximately 5 miles to the Dillsboro WWTP;
- A presumed cost for new county wastewater system customers or the DCRSD to be negotiated later to defray part of the capital cost of the recently constructed Dillsboro WWTP;
- A monthly or annual cost needed to cover part of the operation and staffing of the Dillsboro WWTP;
- The potential remediation of the abandoned lagoon at the Dillsboro WWTP, a potential cost-burden to County residents.

Guilford Area Wastewater System Improvements

Three distinct alternatives were described for the Guilford area, the implementation of which would provide distinct advantages and disadvantages. This area of projected high growth became an important part of the evaluation of the future of wastewater system development in Dearborn County. Alternative No. 2A is not considered here because it would involve using public money to upgrade private facilities.

Alternative No. 1 – Guilford Community Local Sanitary Sewer System and WWTP

The “simplest” solution to the problem of failing septic systems in Guilford would be the design and construction of a small local WWTP to serve the community of Guilford only. This facility would have to be approved by IDEM to discharge into Tanners Creek. The limited scope of the project might allow a relatively quick solution to a current pollution problem. It would not address any other potential and/or future wastewater customers in this area of Dearborn County.

Advantages:

- Designing and building a local wastewater collection and treatment system for Guilford would be a relatively "simplistic" solution to the public health and water quality problem in Tanners Creek and throughout Guilford;
- This alternative could probably be implemented relatively quickly.

Disadvantages:

- Providing a public wastewater system of this type for Guilford without addressing the wastewater system needs of nearby development may force the County to address other new customers with another wastewater facility later, which may not be cost-effective. Growth projections indicate that the need will exist.
- If designed to serve the existing community of Guilford only, the "local" WWTP would probably not be easily expandable for additional future customers.
- It would be a large capital investment by Dearborn County for a very small community;
- The capital cost and operational cost of grinder pump systems might not be affordable for Guilford property owners.

Alternative No. 2 – Guilford Community Local Sanitary Sewer System and Conveyance to Greendale Sewer System

This alternative also focuses only on the community of Guilford, along with a small number of existing property owners along SR 1 between Guilford and Greendale. The connection to the Greendale sewer system is a viable option from an engineering perspective because the flow rate expected from Guilford is small. As for Alternative No. 1, this alternative would not address other potential and future wastewater system customers resulting from the expected growth in Miller Township.

Advantages:

- The connection to the Greendale sewer system would be a solution to the public health and water quality problem in Tanners Creek and health dangers throughout Guilford;
- It would save the capital construction cost and ongoing operational cost associated with a small WWTP dedicated to the community of Guilford;

Disadvantages:

- Utilizing a pressure sewer system, there would be very limited capacity for growth;
- It would be a large capital investment by Dearborn County for a very small community;
- The capital cost and operational cost of grinder pump systems might not be affordable for Guilford property owners.
- It would not address other pending developments in this general area, including proposed commercial developments and expected residential development to the northeast in Miller Township.

Alternative No. 3 – Guilford Community Local Sanitary Sewer System Connected to New Regional Wastewater System

This alternative would go the farthest in addressing projected future residential growth in Miller Township. The cost is not comparable to Alternatives No. 1 and No. 2, but the goal is much larger – to accommodate the growth that County officials believe is coming.

Advantages:

- The regional WWTP alternative would solve Guilford public health and water quality problems as well as serve other customers that are available now and in the near future.
- New and/or existing customers in Miller Township would be able to sustain the biological treatment process in a new regional WWTP.
- A new regional WWTP would be viewed as a pro-active investment by County leaders to accommodate expected development.
- A single regional WWTP designed to serve all of western Miller Township would make a separate, small WWTP at Guilford unnecessary.

Disadvantages:

- The capital cost of this alternative is much higher than the other three Guilford area wastewater system improvement alternatives;
- The customer base for this alternative would have to include existing residents and/or businesses;
- The capital cost and operational cost of grinder pump systems might not be affordable for Guilford property owners

Northern Dearborn County Wastewater Systems

West Harrison TIF District

Most of the land included in the West Harrison TIF District is available for development. The St. Leon Sewer District has planned to convey wastewater from future developments within this TIF district to the St. Leon WWTP.

Advantages:

- The St. Leon WWTP is immediately adjacent to this TIF district.
- A 6-inch force main has already been installed beneath the Whitewater River, providing a wastewater infrastructure direct connection between the West Harrison TIF district and the St. Leon WWTP.
- The future wastewater system customers in the West Harrison TIF district will be DCRSD customers, and an inter-local agreement has been proposed between the DCRSD and the St. Leon Sewer District for an expansion of the customer base and the capacity of the St. Leon WWTP.

Disadvantages:

- Potential wastewater system customers in the eastern part of the West Harrison TIF district may be able to connect to the City of Harrison sanitary sewer collection system more readily than to the more distant St. Leon collection system.

Northwest Quadrant

Only one improvement alternative has been presented for this proposed service area, one that would provide a "skeleton" sewer system along SR 46 and a 0.5-MGD WWTP for initial sewer customers in and near the proposed economic development area.

Advantages:

- A new WWTP would be a pro-active investment by county leaders to accommodate and stimulate expected commercial/industrial development in Jackson Township, capitalizing on economic development opportunities related to the construction of the Honda of America manufacturing facility in Greensburg.
- A completed (already constructed) wastewater system serving the proposed Northwest Quadrant will attract development, not hinder it.
- Initial wastewater system customers needed to sustain a biological treatment process may be added to the customer base as development proceeds. A temporary arrangement with the St. Leon Sewer District may be feasible to ensure that the initial (existing) customer base is adequate until the new customers are added to the system. There are capacity benefits for the St. Leon system associated with this alternative.
- An SBR treatment process could be designed and built that would be easily expanded in this projected growth area.
- A skeleton sewer system could be constructed that would serve as the backbone of the system, and future expansion would be extended thereafter.

Disadvantages:

- There is no current customer base for the proposed wastewater system improvement.
- Project financing will have to be developed to allow this project to proceed toward completion.
- Consistent with Dearborn County Planning Department projections, establishment of a publicly-owned wastewater collection and treatment system in northern Jackson Township will change the rural character of Jackson Township permanently. (This is viewed as a disadvantage according to some observers, but as an advantage to others.)
- It should be noted that conveyance of wastewater from the Dearborn County Northwest Quadrant development area to the existing Sunman, Indiana, WWTP was briefly considered for this study. However, inadequate treatment capacity and the high cost of new infrastructure made this alternative unfeasible, and it was discarded.

VI. WASTEWATER SYSTEM IMPROVEMENT RECOMMENDATIONS AND CAPITAL IMPROVEMENTS PROGRAM

This section contains Woolpert's recommendations of wastewater improvement alternatives for the four proposed wastewater service areas and suggestions for the development of a capital improvements program to finance the projects. The projects are presented in the same order as in the preceding report sections.

Wastewater System Improvement Recommendations

High Ridge Estates Subdivision and the U.S. 50 Corridor Wastewater System Improvements

Woolpert believes that the most cost-effective wastewater system improvement alternative, Alternative No. 1, should be recommended to serve High Ridge Estates and the U.S. 50 corridor developments. There is no incentive for the DCRSD to add to the cost of this project when it could be designed to solve public health and water quality problems and also accommodate currently projected growth. Therefore, the local WWTP and sewer collection system is recommended over the pressurized force main conveying wastewater to Dillsboro.

This recommendation would save the county approximately $1,030,000 in up-front capital costs, based on the engineer's opinion of the probable project cost for both improvement alternatives. Even though Alternative No. 2 would not include the design and construction of a new WWTP, it would include the ongoing cost of operation of a proportional share of the existing Dillsboro WWTP, and a proportional share of the debt owed on the recent construction of this facility. The county would control its costs with its own facility.

The county facility could also be expanded if necessary to accommodate additional local development. This would not be accomplished as easily, nor cost-effectively, if a larger or second parallel force main was needed to convey additional wastewater from the proposed development areas all the way to Dillsboro.

Guilford Area Wastewater System

East-central Dearborn County has the conditions that correspond to both goals of this project. The community of Guilford has serious public health and water quality problems because of failing septic systems, and Miller Township is where much of the growth is projected for Dearborn County. Both challenges must be resolved. Alternative No. 3, design and construction of a regional WWTP, is the recommended solution.

The engineer's opinion of the probable project cost for Alternative No. 3 is several times the cost of the other two feasible solutions to the Guilford water quality problem. But if a new regional WWTP is not built to serve this area, a patchwork solution might result, with multiple, smaller service areas and facilities being installed. Or the commercial and residential growth that is projected for Miller Township would be stifled. This solution would solve the challenges within the context of a County-owned and operated facility.

One of the initial challenges might be providing a customer base for the biological treatment process at a new regional WWTP to operate properly. This may be approached by one or more of the following – (1) limiting the initial capacity of the treatment plant, (2) planning the WWTP to correspond with the growth in this area, and (3) pursuing inter-local agreements to provide wastewater service to existing wastewater system customers at the new facility, if such agreement(s) are mutually beneficial. Dearborn County should be cautious with this approach, however, to avoid entering into an inter-local agreement that would not control the quality and quantity of wastewater that would be conveyed to the new facility during wet weather.

West Harrison TIF District

Because there are already wastewater facilities installed to connect the West Harrison TIF District properties to the St. Leon WWTP site, Dearborn County should enter into an inter-local agreement with the St. Leon Sewer District to assign the West Harrison TIF District wastewater to be treated at the St. Leon WWTP.

This should be carried out as reasonably soon as possible to fulfill one of the main goals of this project – to accommodate and spur economic development in the TIF districts throughout Dearborn County. This TIF district is well-situated to the City of Harrison on the east for commercial growth, and the St. Leon WWTP on the west for provision of wastewater service. There should be no barrier to implementing this recommendation.

Northwest Quadrant

This proposed development area may be viewed as a part of the larger I-74 corridor, a geographical region with interstate access that is prime property for economic development. The Dearborn County Planning Commission has projected that this entire area would be developed commercially and/or industrially, based on Honda of America announcing the construction of their automotive manufacturing facility in Greensburg.

To capitalize on economic development opportunities, Dearborn County should authorize the design and construction of a County-owned wastewater collection system and treatment plant as soon as project financing can be arranged. The County could then exercise some control over the type of development that is proposed for this area, and also benefit by having the much-needed wastewater system infrastructure ready for the development, instead of losing the opportunity for growth and tax revenue for lack of needed infrastructure.

Wastewater System Capital Improvements Program

The scope of this project originally included a sewer rate study. Woolpert had proposed to analyze the various rate levels and rate structures among the multiple existing sewer districts throughout Dearborn County, summarize them, and propose a gradual reconciliation of sewer rates when a single county-wide sewer district was to be created.

Although the DCRSD has made great progress at establishing itself as a county-wide sewer district to provide publicly-owned wastewater service where needed (assuming the recommendations in this report are implemented), it will still be one of several sewer districts, and the sewer rates will continue to vary widely from district to district. A summary of the sewer rates in existence throughout the county follows:

Table 5 – Comparison of County-Wide Sewer Rates	
Sewer District	**Sewer Rates / Fees / Funding Sources**
Dillsboro	$20/month plus $7.55/1,000 gal., based on water usage; Customers formerly outside the Town pay additional $21 per month for extension of sewers; Tap-in fee = $1,650.
Lawrenceburg	Sewer rates based on water usage; rate information not provided for this study; Customers outside corporate limits pay surcharge; Tap-in fee = $350.
Greendale	$8.74/month for first 2,000 gal., based on water usage; $3.15/1,000 gal. for next 8,000 gal.; $2.92/1,000 gal. for next 10,000 gal.; $2.18/1,000 gal. for next 20,000 gal.; Tap-in fee for 5/8" & 3/4" meters = $3,500; High-strength waste surcharge = $0.25 / lb BOD; $0.10 / lb TSS; $685/day pH.
LMH Utilities	"Tariffs" are $42/month (average); Tap-in fee = $625.
Pernod-Ricard	N/A
St. Leon	Bi-monthly rates based on first 4,000 gal. of water usage: $57.00 for users with grinder pumps maintained by St. Leon; $52.00 for users with grinder pumps maintained by customer; $4.72/1,000 gal. greater than 4,000 gal.; $76.38 for unmetered usage for single-family dwelling; Tap-in fee = $4,000 plus cost of grinder pump if required.
VRUC	Special fees information not provided for this study.
SDRSD	Special fees to the four municipal and industrial owners based on a contracted proportion of ownership and the flow and strength of wastewater conveyed to the WWTP. "Fixed fees" and "variable fees" apply.
Aurora	Sewer rates and revenue bonds; rate information not provided for this study.
Moores Hill	Rate information not available.

County officials agreed that it is premature to try to reconcile the above rates, given that each of the sewer districts continues to exist. They also agreed that it is premature to try to establish sewer rates applicable to any of the proposed wastewater service areas that will be served by the DCRSD. The reasons include the following:

- The DCRSD has not implemented any capital projects to date.
- There are currently no DCRSD sewer system customers.
- The DCRSD must evaluate and then approve the recommended projects described within this report.
- The project financing has not yet been established.

The County must first establish which projects will be implemented, and then pursue project financing. Sewer rates can be reliably calculated only after it is known how capital projects will be funded, and after a continuing revenue stream will be established from sewer system customers.

Dearborn County certainly has multiple capital improvements that must be implemented and funded on an annual basis. The capital improvements recommended herein may be some of the

largest capital investments in wastewater systems that the County has ever confronted. A summary of the capital costs recommended within this report is presented in the table below:

Table 6 – Recommended Wastewater System Capital Projects	
Wastewater Service Area and Project Name	**Engineer's Opinion of Probable Project Cost**
High Ridge Estates and U.S. 50 Corridor Wastewater Conveyed to a Local WWTP	$2,626,700
Guilford Community Local Sanitary Sewer System Connected to New Regional Wastewater System	$12,941,000
West Harrison TIF District	$1,370,700
Northwest Quadrant	$9,750,000
Total Capital Cost for All Recommended Projects	**$26,688,400**

The DCRSD's challenge is to implement some or all of the above recommended projects when the DCRSD is a relatively new sewer district with no customers. The need for the projects is clear, and the challenge is not unprecedented. Nevertheless, the DCRSD must propose and pursue innovative financing for the above projects. Following is a discussion on financing options.

Capital Project Financing

This report was not intended to include an exhaustive explanation of project financing options. However, the options available to the County are worth pursuing, as listed below:

- Community Development Block Grant Water & Sewer Program – grants;
- Rural Development Program;
- Federal earmarking of projects associated with legislation passed by Congress;
- State of Indiana revolving loan program for wastewater system improvement projects;
- Grants or loans from local entities

There are more sources of project financing than those listed above. Dearborn County economic development leaders could assist the DCRSD to pursue any and all opportunities to finance these critical projects to solve the public health and water quality problems, and to promote economic development throughout Dearborn County.

Table No. 1
High Ridge Estates
Alternative-1
Local WWTP

ITEM	Quantity	Unit	Unit cost	Total cost
HDPE or PVC force main				
1 1/4" to 2"		LF	$15	$0
3"		LF	$20	$0
4"	4621	LF	$30	$138,637
6"	12356	LF	$45	$556,002
8"		LF	$60	$0
10"		LF	$80	$0
12"		LF	$90	$0
Low Pressure Grinder				
Pump system				
Grinder pump		EA	$6,000	$0
Service Connection		EA	$1,500	$0
Air release/flushing valve		EA	$3,000	$0
Pump station				
200 gpm	2	EA	$125,000	$250,000
500 gpm		EA	$150,000	$0
1000 gpm		EA	$200,000	$0
2000 gpm		EA	$350,000	$0
4000 gpm		EA	$600,000	$0
Gravity sewer				
8"		LF	$80	$0
12"		LF	$100	$0
15"		LF	$110	$0
18"		LF	$125	$0
24"		LF	$150	$0
30"		LF	$175	$0
36"		LF	$200	$0
42"		LF	$250	$0
Manholes				
Wastewater treatment				
50,000 gpd		EA	$500,000	$0
100,000 gpd	1	EA	$900,000	$900,000
200,000 gpd		EA	$1,600,000	$0
500,000 gpd		EA	$3,500,000	$0
1,000,000 gpd		EA	$6,000,000	$0
			Sub Total	**$1,844,639**

Mutipliers Description				Multiplier
Admin, Legal, & Misc				10%
Land acquisition				5%
Engineering				15%
Construction Inspection + testing				10%
Construction admin				5%
Construction contengency				10%
Total Multipliers				**55%**

Total Capital Cost Estimate $2,859,190

Table No. 2
High Ridge Estates
Alternative-2
Dillsboro WWTP

ITEM	Quantity	Unit	Unit cost	Total cost
HDPE or PVC force main				
1 1/4" to 2"		LF	$15	$0
3"		LF	$20	$0
4"	4621	LF	$30	$138,637
6"	10462	LF	$45	$470,794
8"	25016	LF	$60	$1,500,934
10"		LF	$80	$0
12"		LF	$90	$0
Low Pressure Grinder				
Pump system				
Grinder pump		EA	$6,000	$0
Service Connection		EA	$1,500	$0
Air release/flushing valve		EA	$3,000	$0
Pump station				
200 gpm	2	EA	$125,000	$250,000
500 gpm		EA	$150,000	$0
1000 gpm		EA	$200,000	$0
2000 gpm		EA	$350,000	$0
4000 gpm		EA	$600,000	$0
Gravity sewer				
8"		LF	$80	$0
12"		LF	$100	$0
15"		LF	$110	$0
18"		LF	$125	$0
24"		LF	$150	$0
30"		LF	$175	$0
36"		LF	$200	$0
42"		LF	$250	$0
Manholes				
Wastewater treatment				
50,000 gpd		EA	$500,000	$0
100,000 gpd		EA	$900,000	$0
200,000 gpd		EA	$1,600,000	$0
500,000 gpd		EA	$3,500,000	$0
1,000,000 gpd		EA	$6,000,000	$0
			Sub Total	**$2,360,365**

Mutipliers Description				Multiplier
Admin, Legal, & Misc				10%
Land acquisition				5%
Engineering				15%
Construction Inspection + testing				10%
Construction admin				5%
Construction contengency				10%
Total Multipliers				**55%**

Total Capital Cost Estimate $3,658,565

Table No. 3
Guilford Collection System
Alternative-1
Local WWTP

IDEM	Quantity	Unit	Unit cost	Total cost
HDPE or PVC force main				
1 1/4" to 2"		LF	$15	$0
3"	2479	LF	$20	$49,580
4"	1986	LF	$30	$59,580
6"		LF	$45	$0
8"		LF	$60	$0
10"		LF	$80	$0
12"		LF	$90	$0
Low Pressure Grinder				
Pump system				
Grinder pump		EA	$6,000	$0
Service Connection		EA	$1,500	$0
Air release/flushing valve		EA	$3,000	$0
Pump station				
200 gpm		EA	$125,000	$0
500 gpm		EA	$150,000	$0
1000 gpm		EA	$200,000	$0
2000 gpm		EA	$350,000	$0
4000 gpm		EA	$600,000	$0
Gravity sewer				
8"		LF	$80	$0
12"		LF	$100	$0
15"		LF	$110	$0
18"		LF	$125	$0
24"		LF	$150	$0
30"		LF	$175	$0
36"		LF	$200	$0
42"		LF	$250	$0
Manholes				
Wastewater treatment				
50,000 gpd	1	EA	$400,000	$400,000
100,000 gpd		EA	$750,000	$0
200,000 gpd		EA	$1,400,000	$0
500,000 gpd		EA	$3,250,000	$0
1,000,000 gpd		EA	$6,000,000	$0
			Sub Total	**$509,160**

Mutipliers Description				Multiplier
Admin, Legal, & Misc				10%
Land acquisition				5%
Engineering				15%
Construction Inspection + testing				10%
Construction admin				5%
Construction contengency				10%
Total Multipliers				**55%**

Total Capital Cost Estimate $789,198

Table No. 4
Guilford Collection System
Alternative-2
Greendale Sewer

IDEM	Quantity	Unit	Unit cost	Total cost
HDPE or PVC force main				
1 1/4" to 2"		LF	$15	$0
3"	2479	LF	$20	$49,580
4"	14157	LF	$30	$424,710
6"		LF	$45	$0
8"		LF	$60	$0
10"		LF	$80	$0
12"		LF	$90	$0
Low Pressure Grinder				
Pump system				
Grinder pump		EA	$6,000	$0
Service Connection		EA	$1,500	$0
Air release/flushing valve	2	EA	$3,000	$6,000
Pump station				
200 gpm	2	EA	$125,000	$250,000
500 gpm		EA	$150,000	$0
1000 gpm		EA	$200,000	$0
2000 gpm		EA	$350,000	$0
4000 gpm		EA	$600,000	$0
Gravity sewer				
8"		LF	$80	$0
12"		LF	$100	$0
15"		LF	$110	$0
18"		LF	$125	$0
24"		LF	$150	$0
30"		LF	$175	$0
36"		LF	$200	$0
42"		LF	$250	$0
Manholes				
Wastewater treatment				
50,000 gpd		EA	$400,000	$0
100,000 gpd		EA	$750,000	$0
200,000 gpd		EA	$1,400,000	$0
500,000 gpd		EA	$3,250,000	$0
1,000,000 gpd		EA	$6,000,000	$0
			Sub Total	**$730,290**

Mutipliers Description				Multiplier
Admin, Legal, & Misc				10%
Land acquisition				5%
Engineering				15%
Construction Inspection + testing				10%
Construction admin				5%
Construction contengency				10%
Total Multipliers				**55%**

Total Capital Cost Estimate $1,131,950

Table No. 5
Guilford Collection System
Alternative-1
Regional WWTP

IDEM	Quantity	Unit	Unit cost	Total cost
HDPE or PVC force main				
1 1/4" to 2"		LF	$15	$0
3"	2479	LF	$20	$49,580
4"	8823	LF	$30	$264,690
6"		LF	$45	$0
8"		LF	$60	$0
10"		LF	$80	$0
12"	5336	LF	$90	$480,240
Low Pressure Grinder				
Pump system				
Grinder pump		EA	$6,000	$0
Service Connection		EA	$1,500	$0
Air release/flushing valve		EA	$3,000	$0
Pump station				
200 gpm		EA	$125,000	$0
500 gpm		EA	$150,000	$0
1000 gpm		EA	$200,000	$0
2000 gpm		EA	$350,000	$0
4000 gpm	1	EA	$600,000	$600,000
Gravity sewer				
8"		LF	$80	$0
12"		LF	$100	$0
15"		LF	$110	$0
18"	7634	LF	$125	$954,250
24"		LF	$150	$0
30"		LF	$175	$0
36"		LF	$200	$0
42"		LF	$250	$0
Manholes				
Wastewater treatment				
50,000 gpd		EA	$400,000	$0
100,000 gpd		EA	$750,000	$0
200,000 gpd		EA	$1,400,000	$0
500,000 gpd		EA	$3,250,000	$0
1,000,000 gpd	1	EA	$6,000,000	$6,000,000
			Sub Total	**$8,348,760**

Mutipliers Description				Multiplier
Admin, Legal, & Misc				10%
Land acquisition				5%
Engineering				15%
Construction Inspection + testing				10%
Construction admin				5%
Construction contengency				10%
Total Multipliers				**55%**

Total Capital Cost Estimate $12,940,578

Table No. 6
West Harrison TIF District

IDEM	Quantity	Unit	Unit cost	Total cost
HDPE or PVC force main				
1 1/4" to 2"		LF	$15	$0
3"	10326	LF	$20	$206,520
4"	17038	LF	$30	$511,140
6"	3704	LF	$45	$166,680
8"		LF	$60	$0
10"		LF	$80	$0
12"		LF	$90	$0
Low Pressure Grinder				
Pump system				
Grinder pump		EA	$6,000	$0
Service Connection		EA	$1,500	$0
Air release/flushing valve		EA	$3,000	$0
Pump station				
200 gpm		EA	$125,000	$0
500 gpm		EA	$150,000	$0
1000 gpm		EA	$200,000	$0
2000 gpm		EA	$350,000	$0
4000 gpm		EA	$600,000	$0
Gravity sewer				
8"		LF	$80	$0
12"		LF	$100	$0
15"		LF	$110	$0
18"		LF	$125	$0
24"		LF	$150	$0
30"		LF	$175	$0
36"		LF	$200	$0
42"		LF	$250	$0
Manholes				
Wastewater treatment				
50,000 gpd		EA	$400,000	$0
100,000 gpd		EA	$750,000	$0
200,000 gpd		EA	$1,400,000	$0
500,000 gpd		EA	$3,250,000	$0
1,000,000 gpd		EA	$6,000,000	$0
			Sub Total	**$884,340**

Mutipliers Description				Multiplier
Admin, Legal, & Misc				10%
Land acquisition				5%
Engineering				15%
Construction Inspection + testing				10%
Construction admin				5%
Construction contengency				10%
Total Multipliers				**55%**

Total Capital Cost Estimate $1,370,727

Table No. 7
Northwest Industrial/Commercial
Regional WWTP

IDEM	Quantity	Unit	Unit cost	Total cost
HDPE or PVC force main				
1 1/4" to 2"		LF	$15	$0
3"		LF	$20	$0
4"		LF	$30	$0
6"		LF	$45	$0
8"		LF	$60	$0
10"		LF	$80	$0
12"	804	LF	$90	$72,360
Low Pressure Grinder				
Pump system				
Grinder pump		EA	$6,000	$0
Service Connection		EA	$1,500	$0
Air release/flushing valve		EA	$3,000	$0
Pump station				
200 gpm		EA	$125,000	$0
500 gpm		EA	$150,000	$0
1000 gpm		EA	$200,000	$0
2000 gpm		EA	$350,000	$0
4000 gpm	1	EA	$600,000	$600,000
Gravity sewer				
8"		LF	$80	$0
12"		LF	$100	$0
15"		LF	$110	$0
18"	6669	LF	$125	$833,625
24"	10221	LF	$150	$1,533,150
30"		LF	$175	$0
36"		LF	$200	$0
42"		LF	$250	$0
Manholes				
Wastewater treatment				
50,000 gpd		EA	$400,000	$0
100,000 gpd		EA	$750,000	$0
200,000 gpd		EA	$1,400,000	$0
500,000 gpd	1	EA	$3,250,000	$3,250,000
1,000,000 gpd		EA	$6,000,000	$0
			Sub Total	**$6,289,135**

Mutipliers Description				Multiplier
Admin, Legal, & Misc				10%
Land acquisition				5%
Engineering				15%
Construction Inspection + testing				10%
Construction admin				5%
Construction contengency				10%
Total Multipliers				**55%**

Total Capital Cost Estimate $9,748,159

DEARBORN COUNTY
INDIANA

II

LEGEND

- Agricultural
- Low Density Residential
- Moderate Density Residential
- High Density Residential
- Commercial
- Educational
- Institutional
- Industrial
- Parks & Recreation
- Golf Course
- Cemetery
- Mining / Quarry
- Landfill
- Water
- Township Boundary

0 0.5 1 2 3 4 5
Miles

Figure 1
Dearborn County Current Land Use

Study and Recommendation of Consolidating
Wastewater Systems in Dearborn County

Project ID: 065106
Date: January 18, 2007

Woolpert, Inc
4141 Rosslyn Drive
Cincinnati, OH 45209-1183
513.272.8300
Fax: 513.272.8301
WOOLPERT

DEARBORN COUNTY
INDIANA

N

Jackson
Kelso
Logan
Harrison
York
Miller
Manchester
Lawrenceburg
Sparta
Hogan
Center
Washington
Clay
Caesar Creek

I-74
SR 46
US 52
SR 1
SR 48
SR 350
US 50
SR 62
SR 262
SR 148
SR 56
I-275

LEGEND

- Interstates
- US/STATE routes
- Roads
- Residential
- Agricultural
- Industrial
- Commercial mix
- Commercial retail
- Commercial industrial

0 0.5 1 2 3 4 5
Miles

Figure 2

Dearborn County Future Land Use

Study and Recommendation of Consolidating
Wastewater Systems in Dearborn County

Project ID: 065106
Date: January 18, 2007

Woolpert, Inc
4141 Rosslyn Drive
Cincinnati, OH 45209-1183
513.272.8300
Fax: 513.272.8301
WOOLPERT

DEARBORN COUNTY
INDIANA

II

LMH

Valley Rural Utilities

SR 1
US 52
I-74
SR 46
Kelso
Logan
Harrison
Jackson
York
Miller
SR 48
Manchester
Lawrenceburg
US 50
SR 350
Sparta
Hogan
SR 148
Center
Washington
SR 56
Clay
SR 62
SR 262
Caesar Creek

LEGEND

- Existing low-moderate-density residential
- Existing high-density residential
- Future residential
- Future residential (long-term)
- Future industrial
- Future industrial (long-term)
- Future commercial
- TIF
- Township boundaries
- Interstates
- US/STATE routes
- Roads

0 0.5 1 2 3 4 5 Miles

Figure 3

Modified Future Land Use

Study and Recommendation of Consolidating Wastewater Systems in Dearborn County

Project ID: 065106
Date: January 18, 2007

Woolpert, Inc
4141 Rosslyn Drive
Cincinnati, OH 45209-1183
513.272.8300
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WOOLPERT

DEARBORN COUNTY
INDIANA

II

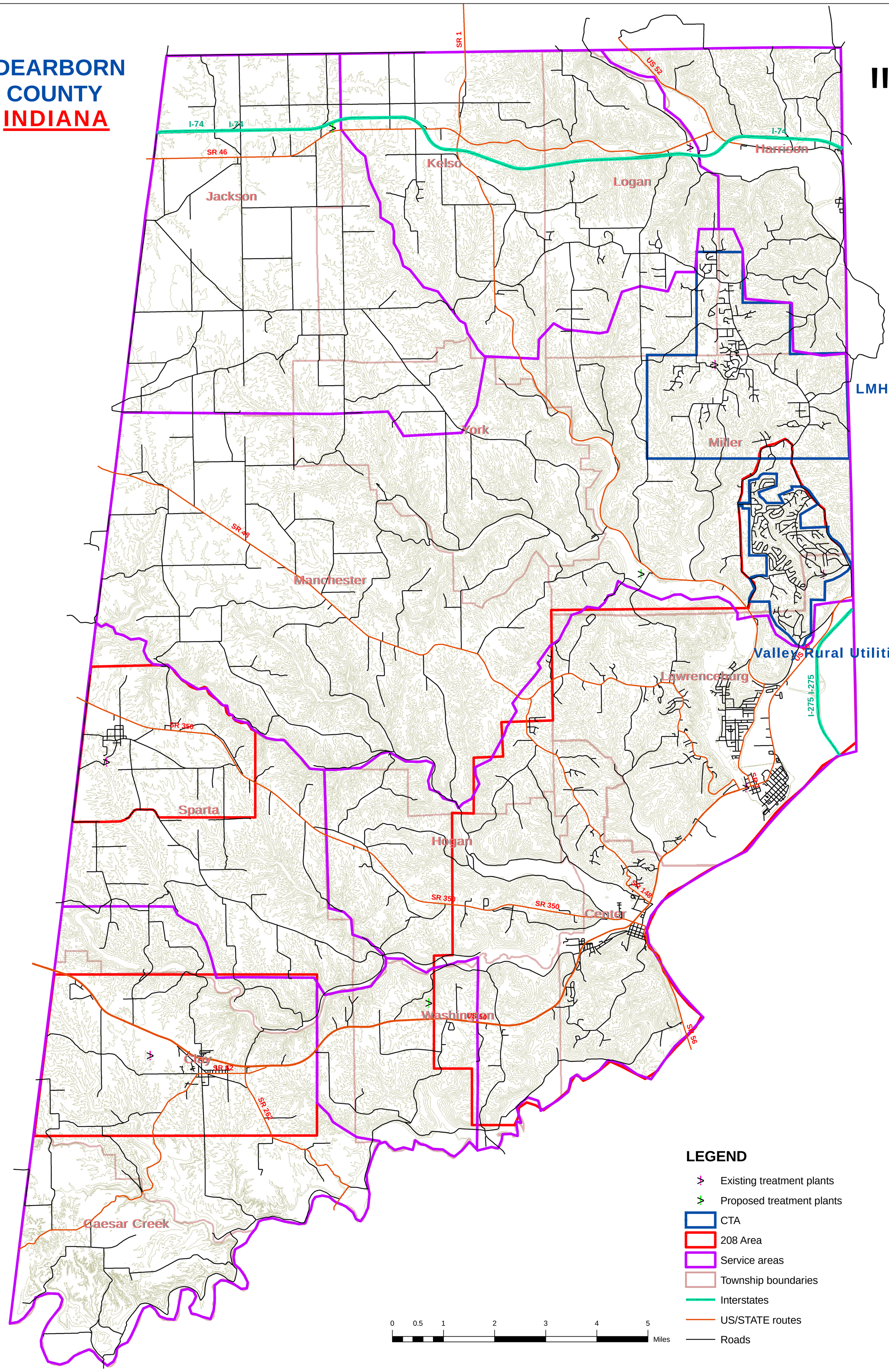

Figure 4

Proposed Future Wastewater Service Areas

Study and Recommendation of Consolidating
Wastewater Systems in Dearborn County

Project ID: 065106
Date: January 18, 2007

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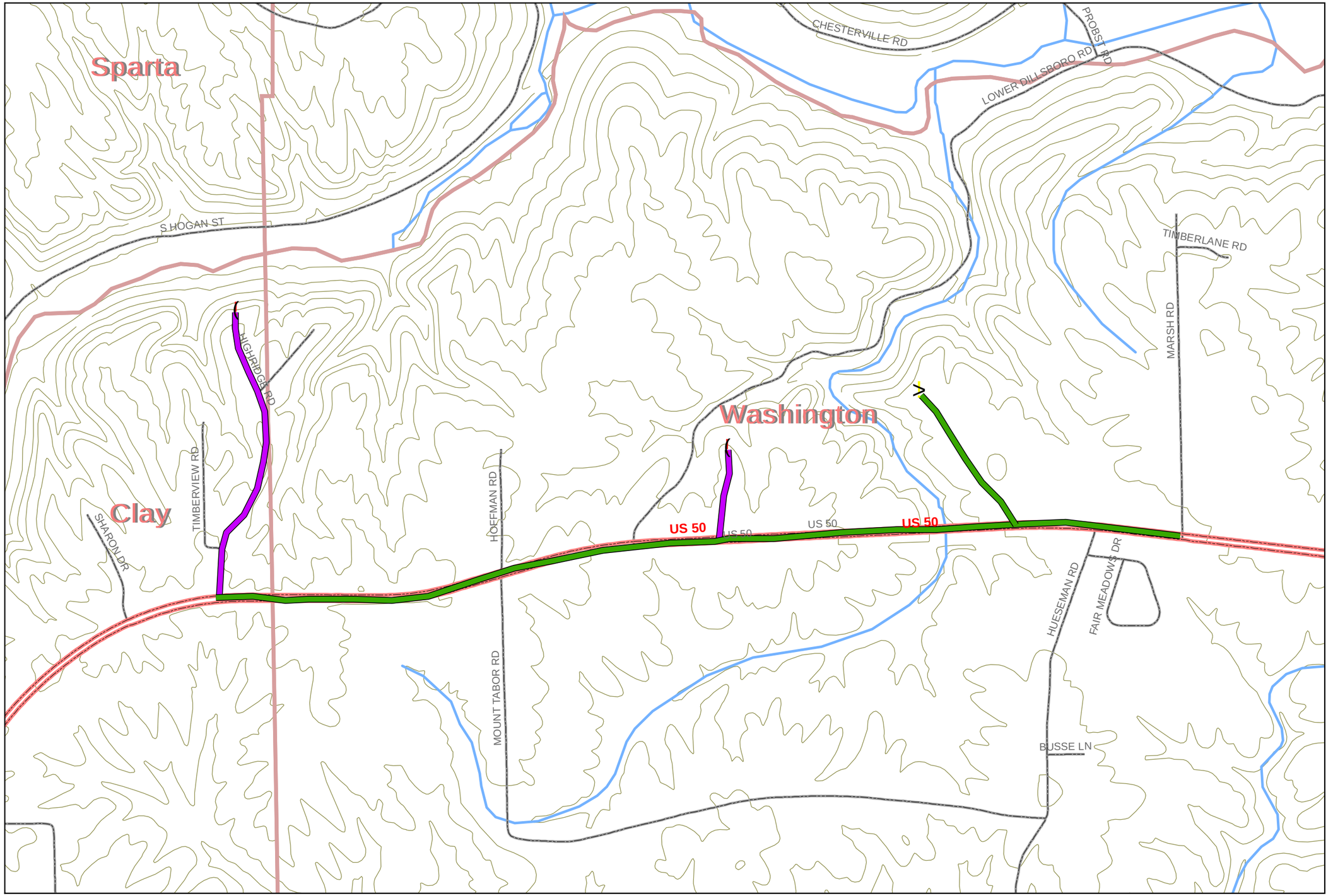

II

LEGEND

- Treatment plants
- Pump stations
- 3 inch force main
- 4 inch force main
- 6 inch force main
- Interstates
- US/STATE routes
- Roads/Streets
- Streams
- Rivers
- Township boundaries

Woolpert, Inc
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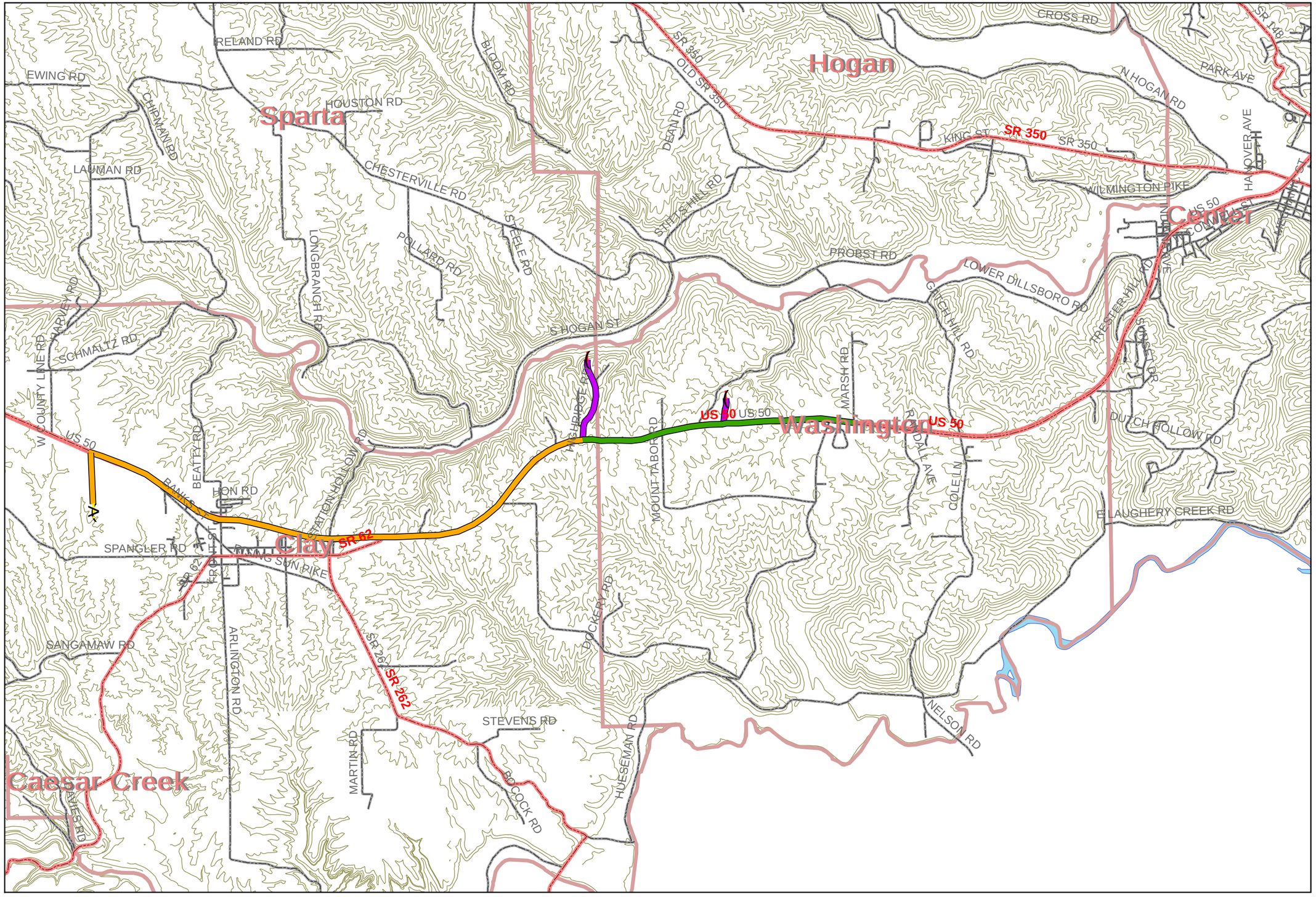
Collection System Alternatives
Dearborn County, Indiana
High Ridge Estates

0 500 1,000 2,000 3,000 4,000 Feet

Project ID: 065106
Date: January 18, 2007

Fig. No.5

Alternative-1
Local WWTP



II

LEGEND

- Treatment plants
- Pump stations
- 3 inch force main
- 4 inch force main
- 6 inch force main
- 8 inch force main
- Interstates
- US/STATE routes
- Roads/Streets
- Streams
- Rivers
- Township boundaries

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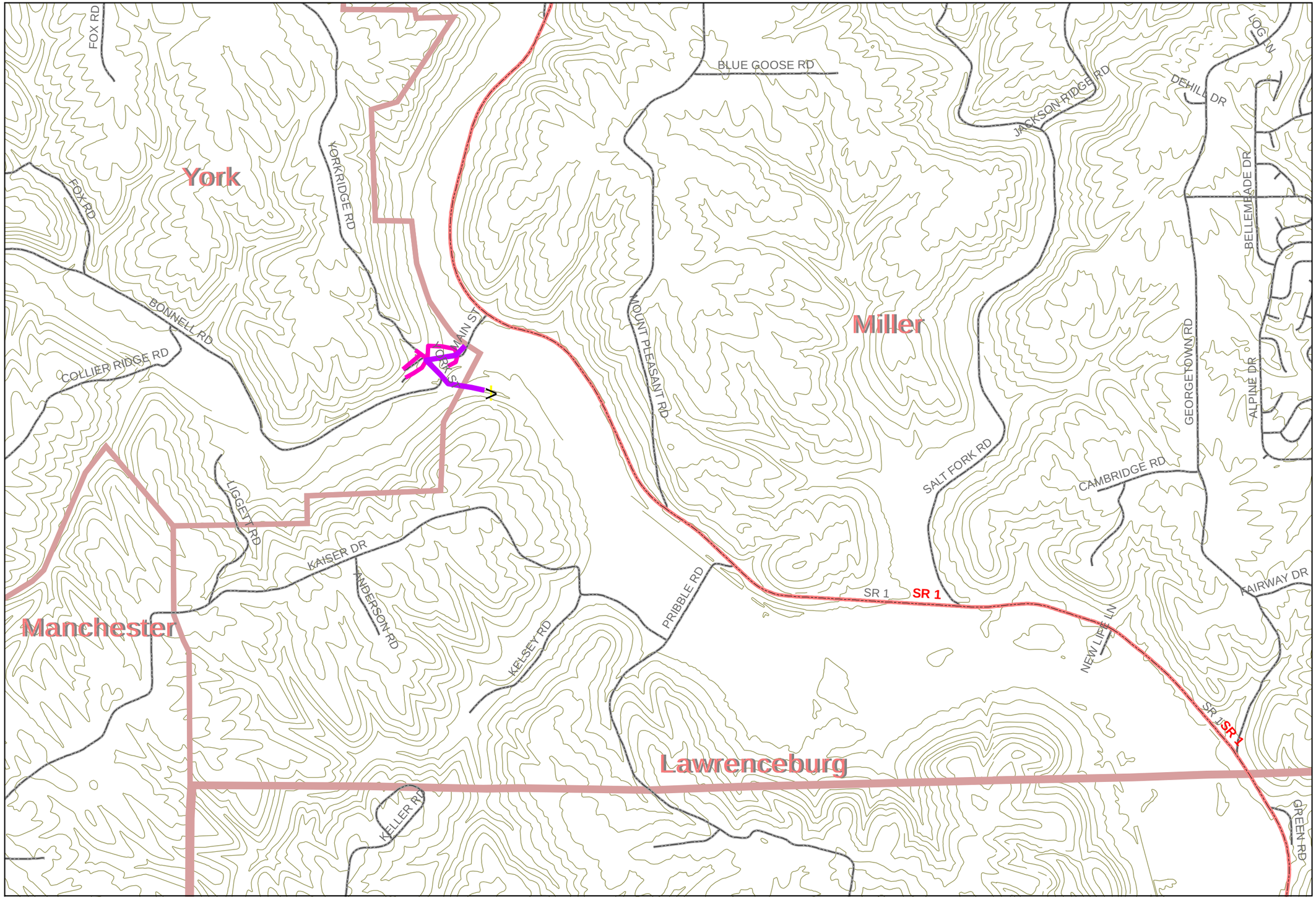
513.272.8300
WOOLPERT Fax: 513.272.8301

Collection System Alternatives
Dearborn County, Indiana
High Ridge Estates

0 1,500 3,000 6,000 9,000 12,000 Feet

Project ID: 065106
Date: January 18, 2007

Fig. No.6
Alternative-2
Dillsboro WWTP



LEGEND

- Treatment plants
- 3 inch force main
- 4 inch force main
- 6 inch force main
- Interstates
- US/STATE routes
- Roads/Streets
- Streams
- Rivers
- Township boundaries

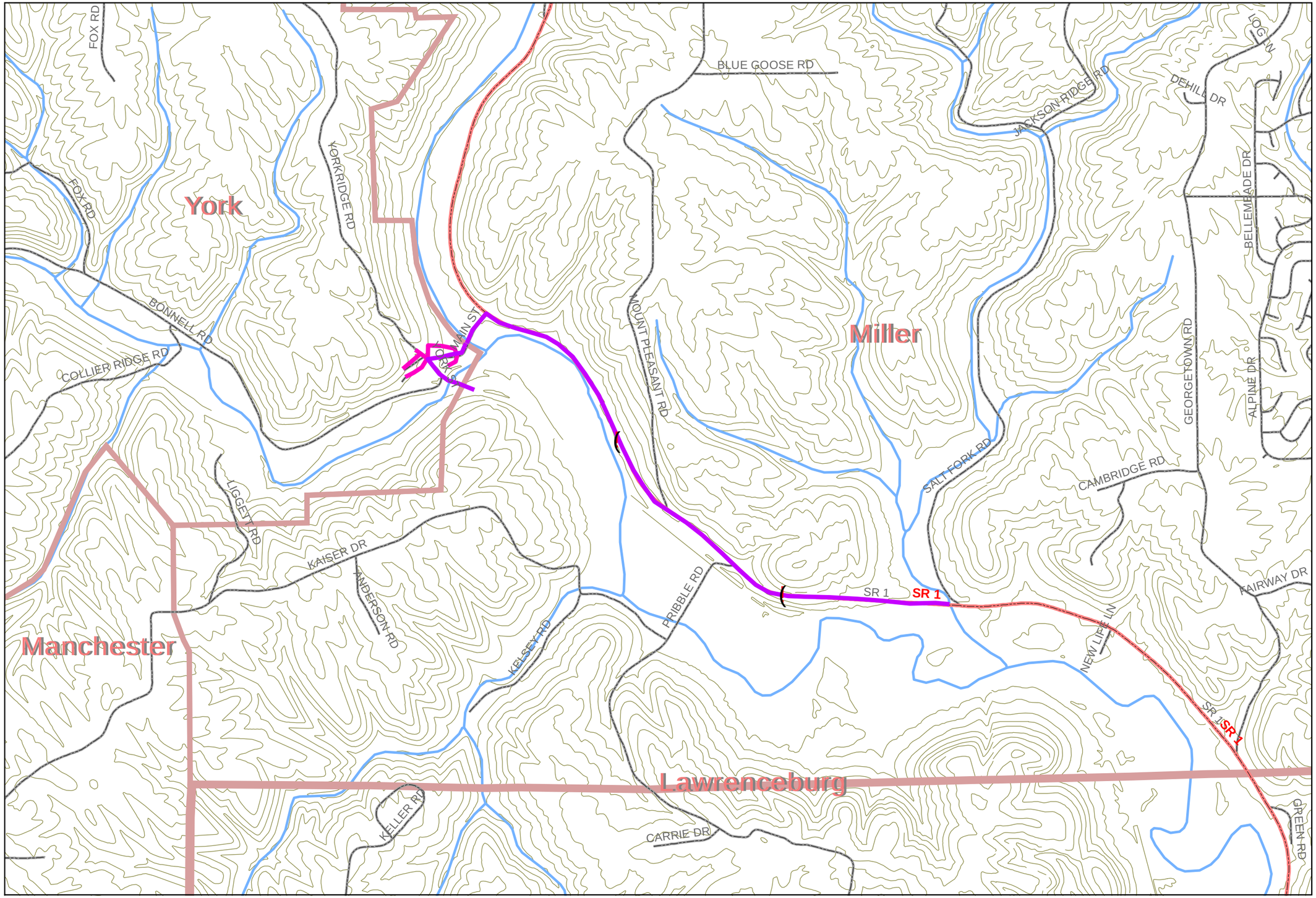
Woolpert, Inc
4141 Rosslyn Drive
Cincinnati, OH 45209-1183
513.272.8300
Fax: 513.272.8301

Collection System Alternatives
Dearborn County, Indiana
Community of Guilford

0 625 1,250 2,500 3,750 5,000 Feet

Project ID: 065106
Date: January 18, 2007

Fig. No.7
Alternative-1
Local WWTP



II

LEGEND

- Pump Stations
- 3 inch force main
- 4 inch force main
- 6 inch force main
- Interstates
- US/STATE routes
- Roads/Streets
- Streams
- Rivers
- Township boundaries

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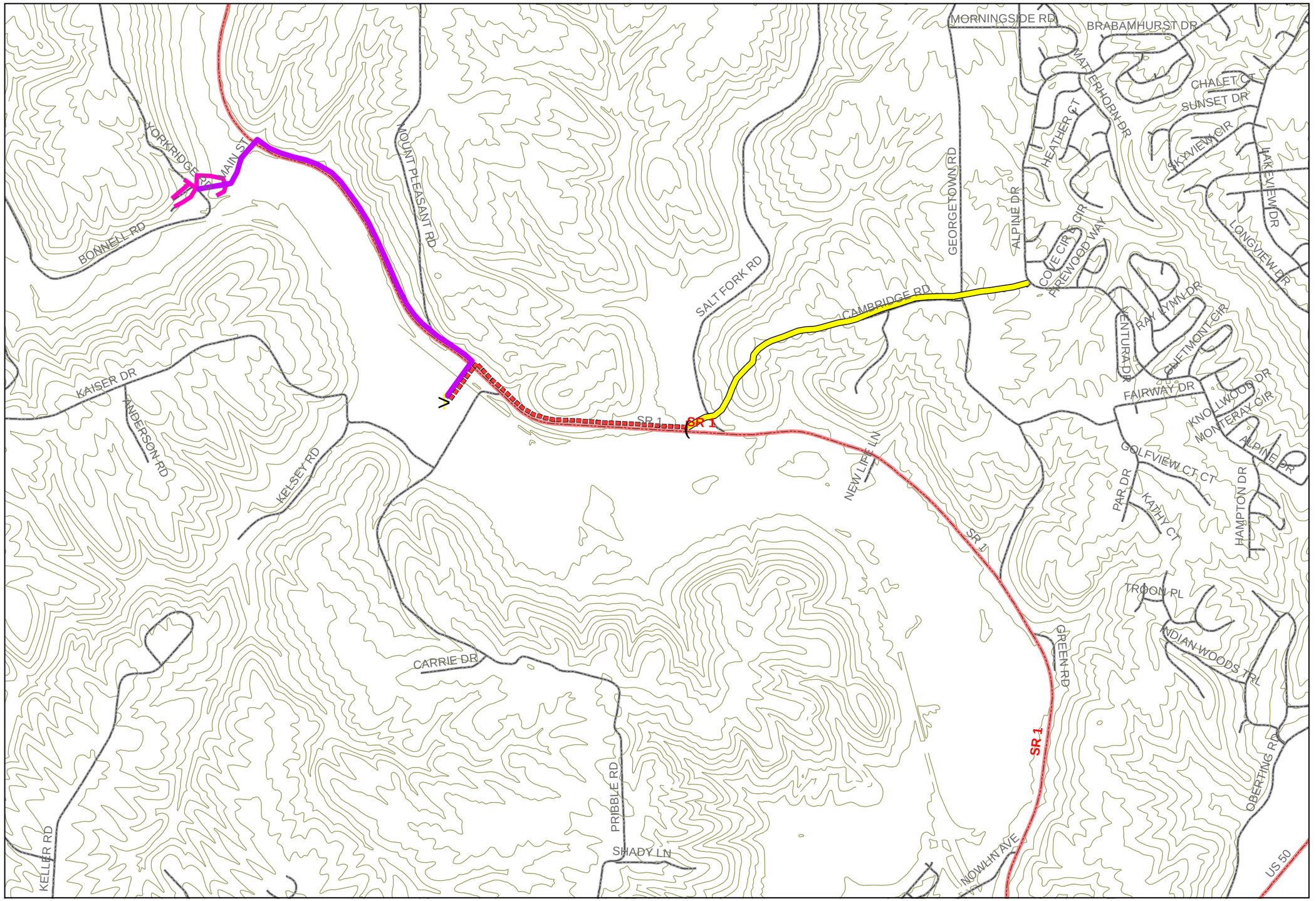
Collection System Alternatives
Dearborn County, Indiana
Community of Guilford

0 625 1,250 2,500 3,750 5,000 Feet

Project ID: 065106
Date: January 18, 2007

Fig. No. 8
Alternative-2
Greendale Sewer



II

LEGEND

- Treatment plants
- Pump station
- 3 inch force main
- 4 inch force main
- 6 inch force main
- 12" force main
- 18" sewer
- Interstates
- US/STATE routes
- Roads/Streets
- Streams

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Cincinnati, OH 45209-1183
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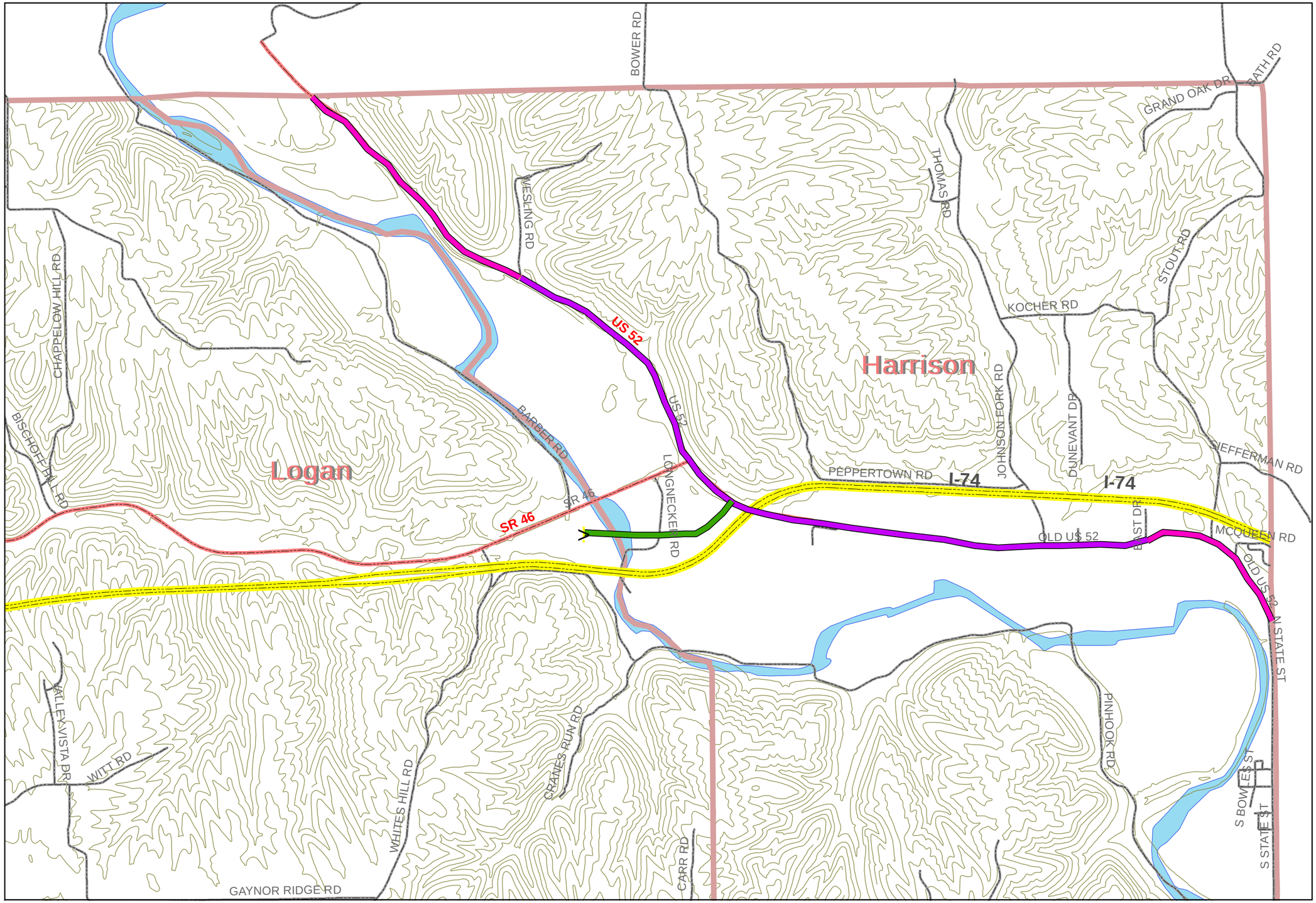
Proposed Collection System
Dearborn County, Indiana
Community of Guilford

0 700 1,400 2,800 4,200 5,600 Feet

Project ID: 065106
Date: January 18, 2007

Fig. No.9
Alternative No.3
Regional WWTP



II

LEGEND

- Treatment plants
- 3 inch force main
- 4 inch force main
- 6 inch force main
- Interstates
- US/STATE routes
- Roads/Streets
- Streams
- Rivers
- Township boundaries

0 750 1,500 3,000 4,500 6,000 Feet

Project ID: 065106
Date: January 18, 2007

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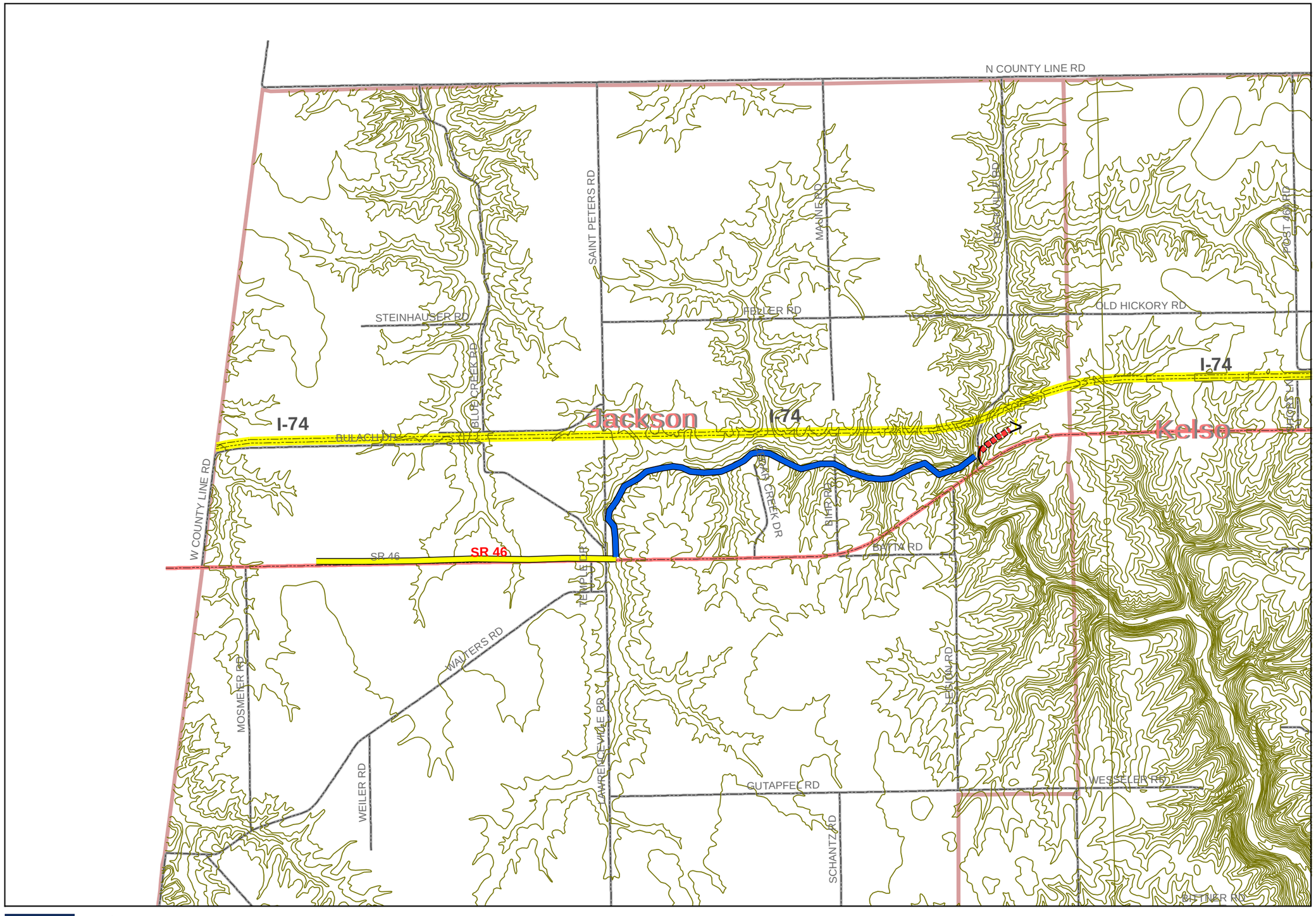
Collection System Alternatives
Dearborn County, Indiana
West Harrison TIF District

Fig. No. 10

St. Leon WWTP



II

LEGEND

- Treatmet plant
- Pump station
- 12 inch sewer
- 12 inch force main
- 18 inch sewer
- 24 inch sewer
- Interstates
- US/STATE routes
- Roads/Streets
- Streams
- Rivers
- Township boundaries

Woolpert, Inc
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Collection System Alternatives
Dearborn County, Indiana
Northwest Industrial/Commercial

0 750 1,500 3,000 4,500 6,000 Feet

Project ID: 065106
Date: January 18, 2007

Fig. No. 11
Regional WWTP