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March 26, 2013

Anshu Singh  
Kentucky Division of Water  
200 Fair Oaks Lane, Fourth Floor  
Frankfort, KY 40601

Re: Mercer County Sanitation District Regional Facilities Plan

Dear Ms. Singh:

Please find enclosed an updated Facilities Plan for Mercer County Sanitation District. The plan has been updated to reflect a change to the Burgin area. The original plan directed wastewater flows from Burgin to Harrodsburg for treatment. This report has been updated to show wastewater flow from Burgin being taken to Danville for treatment. The executive summary as well as all pertinent sections have been update to reflect this change.

Please let us know if you have any questions.

Sincerely,

STRAND ASSOCIATES, INC.®

A handwritten signature in cursive script that reads "Michael L. Davis".

Michael L. Davis, P.E.  
Senior Associate

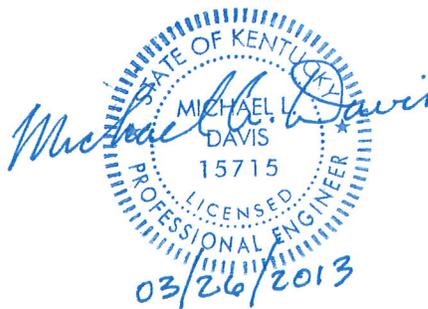
Enclosure(s)

c/enc.: Mike Sanford, Mercer County Sanitation District, General Manager

Report for  
**Mercer County Sanitation  
District, Kentucky**

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Regional Wastewater Facilities Plan



Prepared by:

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November 2006  
Revised March 2013



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**SECTION 1  
EXECUTIVE SUMMARY**

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## **1.01 INTRODUCTION AND BACKGROUND**

The Mercer County Sanitation District (MCSD) was created by the Mercer County Fiscal Court in 2005. The MCSD commissioned Strand Associates, Inc. (SAI) to complete a Regional Wastewater Facility Plan (RWWFP) to evaluate wastewater conveyance and treatment needs for the 20-year planning period ending in 2026. The planning area includes all of Mercer County except the City of Harrodsburg planning area. This report will develop the recommended plan to provide reliable wastewater service to areas of need.

Following its initial approval in 2007, the RWWFP was amended in 2013 to evaluate Danville WWTP as a treatment option.

## **1.02 EXISTING ENVIRONMENT**

The majority of residents within the MCSD planning area utilize on-site treatment systems for wastewater disposal. There are a few small, privately owned, package treatment plants scattered throughout the county.

Many areas throughout the planning area have problems with on-site disposal failures caused by shallow depths of rock, poorly draining soils, and small lot sizes. Improper disposal of wastewater is causing public health concerns and contamination of groundwater and surface waters. Several surface waters within Mercer County have documented concerns over the quality of water. In particular, Herrington Lake, a recreational jewel in the area is contaminated.

The Mercer County Health Department was consulted to identify areas of concern in the county where proper wastewater disposal is creating a public health or environmental concern. Figure 2.02-1 shows the areas of greatest interest within this plan.

## **1.03 EXISTING WASTEWATER COLLECTION AND CONVEYANCE**

There are a limited number of private wastewater treatment systems that include small collection systems. Harrodsburg owns and operates a collection system serving the city residents. MCSD does not own any existing collection or conveyance infrastructure.

## **1.04 EXISTING WASTEWATER TREATMENT FACILITIES**

Most county residents have private wastewater treatment systems. Several package treatment plants provide treatment for county residents. Harrodsburg owns a large wastewater treatment plant capable of handling about 2.6 million gallons of wastewater per day and is operating at about half its capacity.

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**1.05 WASTELOAD AND FLOW FORECASTS**

Population projections have been made for all areas of concern in the county planning area. Projections for the proposed service areas outpaced the state data center projections for the county as a whole. Table 1.05-1 lists the anticipated 2026 service populations for each service area. Projections for populations were used to predict wastewater flow rates and pollutant loadings.

Sub-Areas	2026 Population	2026 Average Daily Flow (mgd)
<b>0-5 Year Customers</b>		
Brightleaf	681	0.129
Burgin (w/i City Limits)	1488	0.149
Burgin (o/s City Limits)	311	0.031
Ag. Heritage Center	1,000	0.030
<b>5-10 Year Customers</b>		
Stringtown	268	0.027
Bradshaw's Camp	375	0.038
Chimney Rock	294	0.029
Herrington Woods	284	0.028
Paradise Camp (High)	110	0.011
Lakeview Point	340	0.034
Salvisa & Bondsville	2135	0.223
McAfee	548	0.055
Providence	248	0.025
Cottonwood	214	0.021
<b>10-20 Year Customers</b>		
Paradise Camp (Low)	434	0.066
Ashley's Camp	166	0.017
Hager's Camp	63	0.006
Cane Run Camp	133	0.013
Mallard Cove	127	0.013
Hardin Heights	121	0.012
Dix Dam (E.W. Brown)	200	0.006
Total (20 yrs)	9540	0.934

**Table 1.05-1 Service Area Population and Flow Projections for Mercer County Sanitation District**

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**1.06 EXISTING FACILITIES EVALUATION AND RATING**

Currently, residents of the Burgin and rural Mercer County utilize septic systems and a few privately owned package treatment plants for their wastewater treatment needs. As mentioned, through conversations with the Mercer County Health Department some systems in the area have failed or are failing. The package treatment plants are in various states of repair, but all have a finite useful life expected to end within this 20 year plan.

**1.07 COLLECTION AND CONVEYANCE ALTERNATIVES**

Service Area	Alternative	Favorability	20-year Capital Cost	Recommended
Brightleaf	A. Do Nothing	Low	N/A	
	B. Conventional Gravity Sewers	High	\$806,000	X
Burgin	A. Do Nothing	Low	N/A	
	B. Conventional Gravity	High	\$9,343,000	X
	C. Low Pressure	Medium	\$9,244,000	
Herrington Lake	A. Do Nothing		N/A	
	B. Low Pressure	High	\$12,340,000	X
	C. STEP	Low	\$16,960,000	
Stringtown	A. Do Nothing	Low	N/A	
	B. Conventional Gravity	High	\$1,860,000	X
Salvisa	A. Do Nothing	Low	N/A	
	B. Conventional Gravity	High	\$8,949,000	
	C. Low Pressure	Medium	\$6,260,000	X
McAfee	A. Do Nothing	Low	N/A	
	B. Conventional Gravity	High	\$8,491,000	X

**Table 1.07-1 Summary of Service Areas Collection System Alternatives**

For each service area alternative methods of collecting wastewater were considered. Alternatives generally included doing nothing, constructing a conventional gravity sewer system, construction of individual grinder pump stations with a low pressure force main system and use of a septic tank effluent pumping system with a low pressure force main. Projected costs for each area and the selected alternative are shown in Table 1.07-1.

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**1.08 WASTEWATER TREATMENT ALTERNATIVES**

In most cases wastewater treatment at the Harrodsburg or Danville WWTP was considered the only viable alternative. In more remote areas, other alternatives were evaluated. For the Salvisa Service Area construction of a small regional treatment plant was considered. The evaluation cannot be completed until the Kentucky Division of Water provides the wasteload allocation. In the Herrington Lake Service Area, an alternative form of treatment was evaluated. The system would include use of septic tanks at each residence, a regionally-located recirculating media filter and effluent disposal through drip irrigation below the ground surface.

These alternatives were each evaluated on the basis on capital costs, total present worth costs (where treatment alternatives were considered), and non-monetary factors. Table 1.08-1 lists the results of these evaluations. Capital costs generally include both conveyance and treatment. The recommended alternatives are identified in Table 1.08-1.

Service Area	Description	Favorability	20-year Capital Cost <sup>(1)</sup>	Recommended
Brightleaf	No Change	Low	\$0	
	Convey to Harrodsburg.	High	\$949,000	X
Burgin (with Paradise Camp)	Convey to Danville. Size for Paradise Camp.	High	\$2,060,000	
	Convey to Danville. Size for All Herrington Lake.	High	\$2,504,000	X
Stringtown	No Change	Low	\$0	
	Convey to Harrodsburg.	High	\$350,000	X
Herrington Lake	Convey and treat at Herrington Lake Subsurface Discharge Treatment Facility.	Medium	\$5,590,000	
	Convey to Danville.	High	\$3,585,000	X
Salvisa	Convey to and treat at Salvisa WWTP.	ND	ND <sup>1</sup>	
	Convey to Harrodsburg.	High	\$5,040,000	X
McAfee	No Change	Low	\$0	
	Convey to Harrodsburg.	High	\$1,650,000	X

<sup>(1)</sup>Presented in September 2006 Dollars.  
ND<sup>1</sup> – No Wasteload Data Provided from KDOW.

**Table 1.08-1 Projected Wastewater Conveyance & Treatment Capital Costs**

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## 1.09 RECOMMENDED PLAN

The recommended alternatives for each service area are summarized below by phase of implementation.

### 0-5 year projects:

#### A. Brightleaf Service Area

The recommended plan includes assumption of ownership and operation of the four existing collection systems and elimination of the four package treatment plants. MCSD should investigate and rehabilitate the collection system in the Brightleaf Estates system using some limited grant funding provided by a line item appropriation in the 2006 State Budget. Further, MCSD should eliminate all four treatment plants and construct the Brightleaf Regional Pumping Station and force main to deliver wastewater to the Harrodsburg collection system for treatment at the existing Harrodsburg WWTP. In eliminating the package treatment plants, a few small trunk sewer extensions and pump stations/force main extensions will be required. These improvements are shown in Figures 8.03-1 and 9.03-1. Design criteria for the project elements were presented in Table 9.03-2.

The capital cost for the proposed improvements are projected to be \$1,755,000.

It is recommended this area receive the highest priority for service by MCSD. Construction is expected to proceed as early as 2007. As mentioned, MCSD has a \$1,000,000 grant available for this project. Additional funding should be pursued. The regionalized nature of this project makes funding attractive.

#### B. Burgin Service Area

The recommended plan includes construction of a conventional gravity collection system in lieu of continued operation of septic tanks and the two operational package treatment plants. The gravity collection system would utilize gravity sewer pipe to convey wastewater to a regional Pumping Station. The regional Pumping station would then pump the wastewater to Danville for treatment. Two small pump stations are also required to convey wastewater to the regional pumping station. The pump station and force main system should be sized to accommodate future service areas along Herrington Lake. These improvements are shown in Figure 8.03-2a and 9.03-2a. Design criteria for the project elements were presented in Table 9.03-5.

The capital cost for the proposed improvements are projected to be \$11,847,000.

It is recommended this area receive the third highest priority for service by MCSD following the Brightleaf area and the Agriculture Heritage Center. Discussions with the City of Burgin Mayor, Council and citizens will be necessary prior to undertaking this project.

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C. Agricultural Heritage Center (Part of McAfee Service Area)

The recommended plan includes construction of a pumping station and force main to transport the wastewater to the Harrodsburg collection system. The Harrodsburg Brentwood Pumping Station would then pump the wastewater to the Harrodsburg WWTP for treatment. An intermediate pump station would be required between Burgin and Harrodsburg. Utilization of the Brentwood station is only anticipated to occur for a limited time until the MSCD installs regional pumping infrastructure to deliver all wastewater to the Harrodsburg WWTP. The regional infrastructure would be installed with the McAfee and Salvisa service area projects. The force main installation should consider installation of a parallel force main for future use. These improvements are shown in Figure 8.03-6 and 9.03-7. Design criteria for the project elements were presented in Table 9.03-19.

The capital cost for the proposed improvements are included in the McAfee total costs

5-20 year projects:

D. Paradise Camp Service Area (on Herrington Lake)

The recommended plan includes construction of a low pressure grinder pumping station in lieu of continued operation of septic tanks and the one operational package treatment plant. The low pressure collection system would include simplex grinder pumps at each residence and small diameter force mains to transport the wastewater to a regional Pumping Station near Paradise Camp. The regional Pumping station would then pump the wastewater to Burgin for pumping to Danville for treatment. It is anticipated the Burgin infrastructure will be in place prior to the Paradise Camp project. These improvements are shown in Figure 8.03-3b and 9.03-6. Design criteria for the project elements were presented in Table 9.03-14.

The capital cost for the proposed improvements are included in the Herrington Lake total cost.

E. Herrington Lake Service Area

The recommended plan includes construction of a low pressure grinder pumping system in lieu of continued operation of septic tanks and the one operational package treatment plant. The low pressure collection system would include simplex grinder pumps at each residence and small diameter force mains to transport the wastewater to several regional pumping stations. The regional pumping stations would then pump the wastewater to Burgin for pumping to Danville for treatment. It is anticipated the Burgin infrastructure will be in place prior to the Herrington Lake projects. These improvements are shown in Figures 8.03-3a and 9.03-6. Design criteria for the project elements were presented in Table 9.03-14.

The capital cost for the proposed improvements are projected to be \$15,925,000.

*Revised March 2013*

F. Stringtown Service Area

The recommended plan includes construction of a gravity collection system to collect wastewater and a trunk sewer to deliver wastewater to the Harrodsburg collection system for treatment at the existing Harrodsburg WWTP. Minor improvements to the existing Harrodsburg infrastructure may be required near the point of connection. These improvements are shown in Figures 8.03-4 and 9.03-3. Design criteria for the project elements were presented in Table 9.03-10.

The capital cost for the proposed improvements are projected to be \$2,210,000.

G. Salvisa Service Area

The recommended plan includes construction of a low pressure grinder pumping station in lieu of continued operation of septic tanks and the one operational package treatment plant. The low pressure collection system would include simplex grinder pumps at each residence and small diameter force mains to transport the wastewater to a regional pumping station. The regional pumping station will deliver wastewater to the Harrodsburg treatment plant for treatment. Collection and pumping would eliminate existing on-site disposal systems and one package treatment plant. Pumping to Harrodsburg entails two pumping stations between Salvisa and Harrodsburg where wastewater would be repumped given the distance between the areas. These improvements are shown in Figures 8.03-5b and 9.03-7. Design criteria for the project elements were presented in Table 9.03-17.

The capital cost for the proposed improvements are projected to be \$11,300,000.

The alternatives of constructing a new Salvisa treatment plant and pumping to Lawrenceburg should be considered prior to starting design.

H. McAfee Service Area

The recommended plan includes construction of a gravity collection system to collect wastewater to a series of regional pumping stations and deliver wastewater to the Harrodsburg treatment plant for treatment. Collection and pumping would eliminate existing on-site disposal systems and one package treatment plant. Pumping to Harrodsburg entails two pumping stations between Salvisa and Harrodsburg where wastewater would be re-pumped given the distance between the areas. These improvements are shown in Figures 8.03-6 and 9.03-7. Design criteria for the project elements were presented in Table 9.03-19.

The capital cost for the proposed improvements are projected to be \$10,141,000.

The recommended plan includes an ambitious effort to provide reliable wastewater service to many densely populated and unsewered areas of the County. The completion of these projects will take many years and require substantial funding. In total, the capital costs total over \$53,000,000 for the recommended plan.

*Revised March 2013*

## **1.10 IMPLEMENTATION SCHEDULE**

The recommended plan will be phased in over the next 20-year study period. We recommend proceeding immediately with the initial infrastructure as identified in Section 10. Grant funding will be vital in order to make these ambitious projects cost-effective.

## **1.11 RATE IMPACTS**

MCSD does not have any customers at the present time and thus has no rate structure in place.

The potential user charge rates for the Brightleaf service area were computed based on many assumptions for funding sources and O&M costs. The evaluation predicted, a customer discharging 4,000 gallons per month would be charged about \$39 per month to become an annual total of \$470 per year. An official rate study should be prepared to establish fair and equitable rates once the project is near completion.

MCSD will have to evaluate rates for each specific service area and determine the equitability of charging rates that vary by area or rates that are universal. Rate determinations for other service areas are too dependent on actual project costs and funding scenarios to be predicted in this report. There is risk in under and over projecting potential rates.

*Revised March 2013*

**SECTION 8**  
**COLLECTION AND CONVEYANCE**

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## 8.01 INTRODUCTION

This section will evaluate alternatives for providing collection and conveyance of wastewater within the next 20 years to those communities identified in Section 6 that are located within the MCSD Planning Area.

## 8.02 GENERAL

As discussed previously in Section 4, MCSD neither owns nor operates any public wastewater collection/conveyance and/or treatment facilities. The majority of the MCSD Planning Area is served by septic tanks, leach fields, and/or in some cases, on-site private package treatment facilities with varying degrees of operating problems. This facilities plan will establish an effective approach to remedy these problems. All private package treatment plants within the individual communities discussed in Section 6 will eventually be decommissioned and any associated private collection system will be operated by MCSD and be rehabilitated based on condition of the existing collection system. The majority of individual communities discussed in Section 6 do not have an existing collection system. Table 8.02-1 lists the communities discussed in Section 6 to receive sewer service within the next 20 years. This table also shows the anticipated time frame they will likely transition to public sewer service. Each Service Area was either treated individually or combined with adjacent Service Areas to help facilitate an effective collection system approach. The selection of Service Areas to become combined was based upon proximity to other individual Service Areas, associated topography and ability to phase growth within the area. Refer to Figure 5.02-3 for the locations of each Service Area.

The following section provides information regarding collection and conveyance alternatives available to the MCSD. The following alternatives are based on phasing in the 0-5 year, 5-10 year, 10-20 year, and beyond 20-year Service Areas as discussed in Section 6.

## 8.03 ALTERNATIVES

There are eight unique Service Areas defined in Table 8.02-1 that were reviewed within this 20 year planning study to provide the reasonable alternatives for collection and conveyance of wastewater to one central location for either treatment or further conveyance to an existing treatment facility. This section will discuss the collection and conveyance portion of the system, while Section 9 will cover the treatment alternative available for each of these areas.

### A. Brightleaf Service Area

#### 1. Alternative A – Do Nothing

This alternative consists of doing nothing to the existing package treatment plants and associated collection systems. Additional sewer service within the Brightleaf Area would be very limited and current problems would not be addressed as discussed in the recent *Brightleaf Area Sewer Report*, see Appendix B. The summary of findings within this report noted the only

collection system available for evaluation was the Brightleaf Estates System. This system appeared to be in good working condition as corrective measures have been undertaken as a result of previous and current sewer evaluations. There are still some minor defects that have not been addressed to date. Neither collection systems for the Brightleaf North Homeowners Association and Greenview Mobile Home Park were evaluated but do appear to have a compact Service Area. Infiltration and inflow is likely a factor in the Greenview Mobile Home Park Package Treatment Plant experiencing hydraulic capacity concerns. The Brightleaf Resort and Golf Course Collection System was also not evaluated but was considered to be distributed over a large Service Area. Grease and Oil management may need to be improved from the restaurant to this PTP.

Service Area	0-5yrs	5-10 yrs	10-20 Years
Bright Leaf	Brightleaf Estates, Brightleaf Resort, Brightleaf North Homowners Assoc., Greenview Mobile Home Park		
Burgin	Burgin w/i City Limits, Burgin o/s City Limits		
Ag. Heritage Center			
Chimney Rock Combined		Chimney Rock, Bradshaw's Camp , Herrington Woods	Cane Run Camp, Ashley's Camp, Hager's Camp
Paradise Camp Combined		Paradise Camp (High), Lakeview Point	Paradise Camp (Low)
Stringtown		Stringtown	
Salvisa		Salvisa, Bondsville	
McAfee	KY Agricultural Heritage Center	McAfee, Providence, Cottonwood Estates	
Dix Dam Combined			Mallard Cove, Hardin Heights, Dix Dam (E.W. Brown Plant)

**Table 8.02-1 Combined Service Areas Within MCSD Planning Area**

The do nothing alternative is not recommended.

2. Alternative B – Conventional Gravity Sewer and Conveyance System

There are several independent gravity collection systems located throughout the Brightleaf Combined area that each connect to a Private Package Treatment Plant. Sanitary sewer improvements to the existing collection systems and the combining of these systems with either pumping stations or a direct gravity connection to an adjacent gravity collection system will result in the elimination of four package treatment plants with varying levels of permit compliance concerns. All these system will combine at one central location before discharging wastewater into a gravity trunk sewer that would lead to a regional pumping station before being conveyed to the Harrodsburg Collection System. This regional pump station would be sized and located further downstream to allow for future growth to occur utilizing a gravity system within the area over the next 20 years. Figure 8.03-1 shows the proposed improvements to the Brightleaf Service Area and Table 8.03-1 list the new pumping station characteristics to this area. Given the proximity to the Harrodsburg Collection System and the current use of Conventional Gravity System, other alternatives to public collection were logically eliminated from further review.

Lift Station Name	Type	Flow (gpm)	TDH (feet)	No. of Pumps	Wet Well Diameter (feet)	Force Main Size (inches)
Greenview	Grinder	30	80	2	5	2.5 & 4 **
Brightleaf Resort (existing)	Grinder	80	90	2	5	3 & 4 **
Brightleaf Regional	Submersible	180	115	2	8	6
		*360	145			

\*Indicates replacement pump characteristics required between 10-20 years  
\*\* Indicates shared force main

**Table 8.03-1 Brightleaf Alternative B- Recommended Characteristics of Pump Stations**

B. Burgin Service Area

1. Alternative A – Do Nothing

Sewage treatment facilities in Burgin consist of individual private septic tank systems and associated leach fields as the current form of wastewater treatment. In a letter provided by the Mercer County Health Department, see Appendix A, a dye test was performed in Burgin and dye was found within the Burgin Spring and Cane Run Creek indicating that these existing wastewater systems are not effective at preventing contamination. These outdated septic systems, poor soil conditions and small lot sizes that limit the effective leachfield area have all

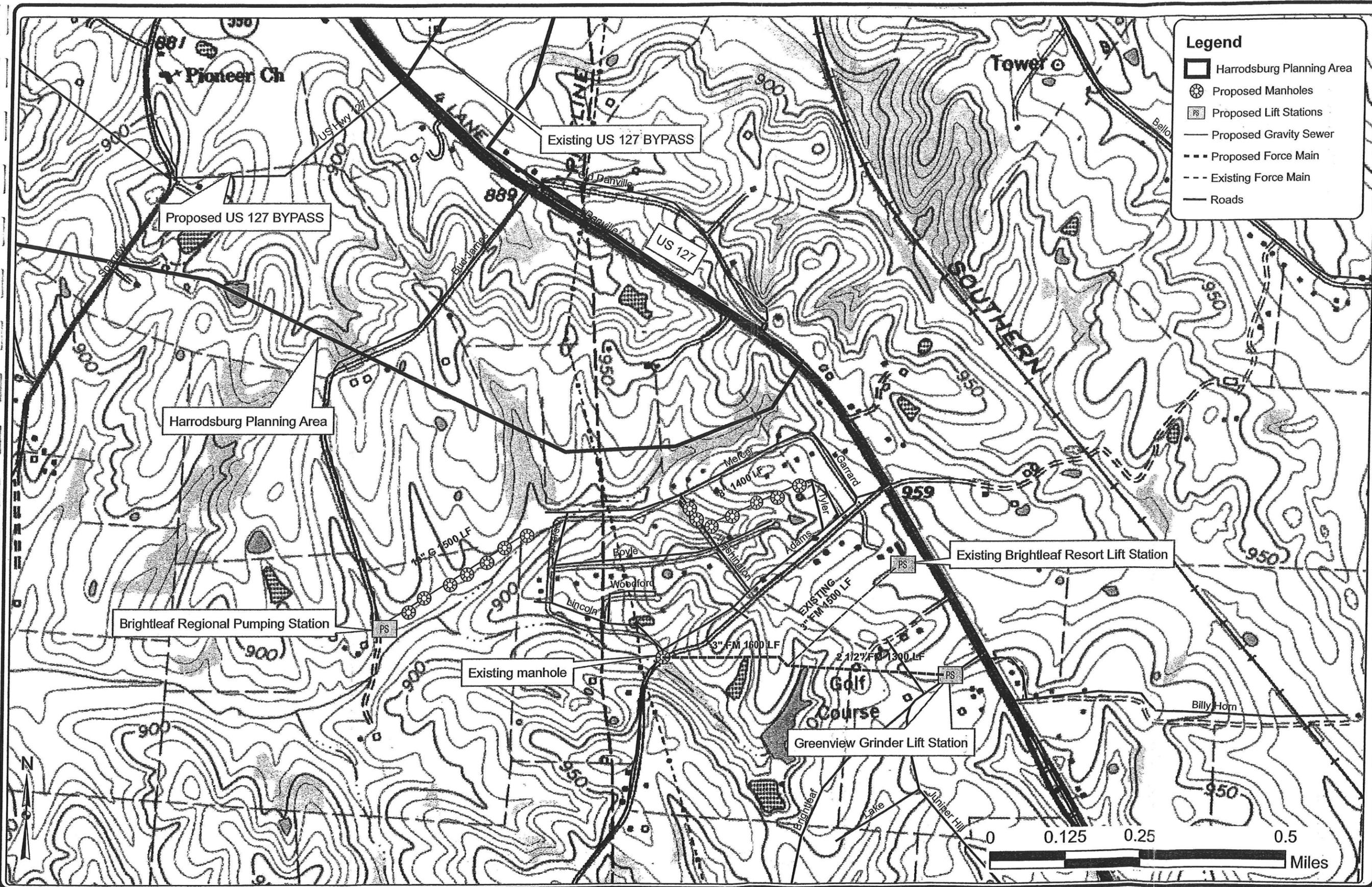


Figure 8.03-1  
 Brightleaf Alternative B-  
 Conventional Gravity and Conveyance Sewer System  
 Mercer County Regional Wastewater Facilities Plan  
 Mercer County Sanitation District



FIGURE 8.03-1  
 2.992-002

contributed to this problem. Further water samples taken from the Burgin Spring and Cane Run Creek were positive for e-coli bacteria, a microbial marker for inadequately treated wastewater. The “Do Nothing” approach would have the least capital cost to the MCSD but not address significant health and environmental concerns and may limit future growth from commercial and industrial establishments.

## 2. Alternative B – Conventional Gravity Sewer and Conveyance System

The most common form of collection system found throughout the state of Kentucky is the Conventional Gravity Sewer System. This system would utilize PVC SDR 35 gravity sewer lines (8-inch diameter minimum, minimum slope 0.004) to convey wastewater in a direct path to a manhole located approximately every 300 feet. These manholes serve to provide a point of entry for maintenance purposes and provide a path for redirecting flow, should pipe directions need to change or an additional line is added to the network of piping. Through the use of such system, the existing individual septic tank systems would be disconnected and decommissioned from service. Each septic tank should first be pumped clean before either being removed entirely or broken down to eliminate potential health hazards. Lateral lines from each individual residence would be reconnected to the public gravity sewer system through pre-manufactured tee fittings at service connections. Given the topography, Burgin requires two small pump stations and one central submersible pumping station with force main. Further review of conveyance to treatment facilities will be discussed in Section 9. Of all public collection systems the conventional gravity sewer requires the least amount of continued maintenance.

### Advantages

- System would be consistent with that used in other areas of the County
- Eliminates the need for individual septic tank installations
- Eliminates septic tank maintenance
- Excellent access to sewer for routine maintenance
- Conventional municipal wastewater collection system

### Disadvantages

- Higher susceptibility to Infiltration/Inflow (I/I)
- Greater number of manholes and larger diameter pipe
- Potential back flooding into basements or overflow from manholes due to blockages in sewer lines
- Small lot sizes make this type of system a challenge to install

See Figure 8.03-2a for the proposed conventional gravity system network.

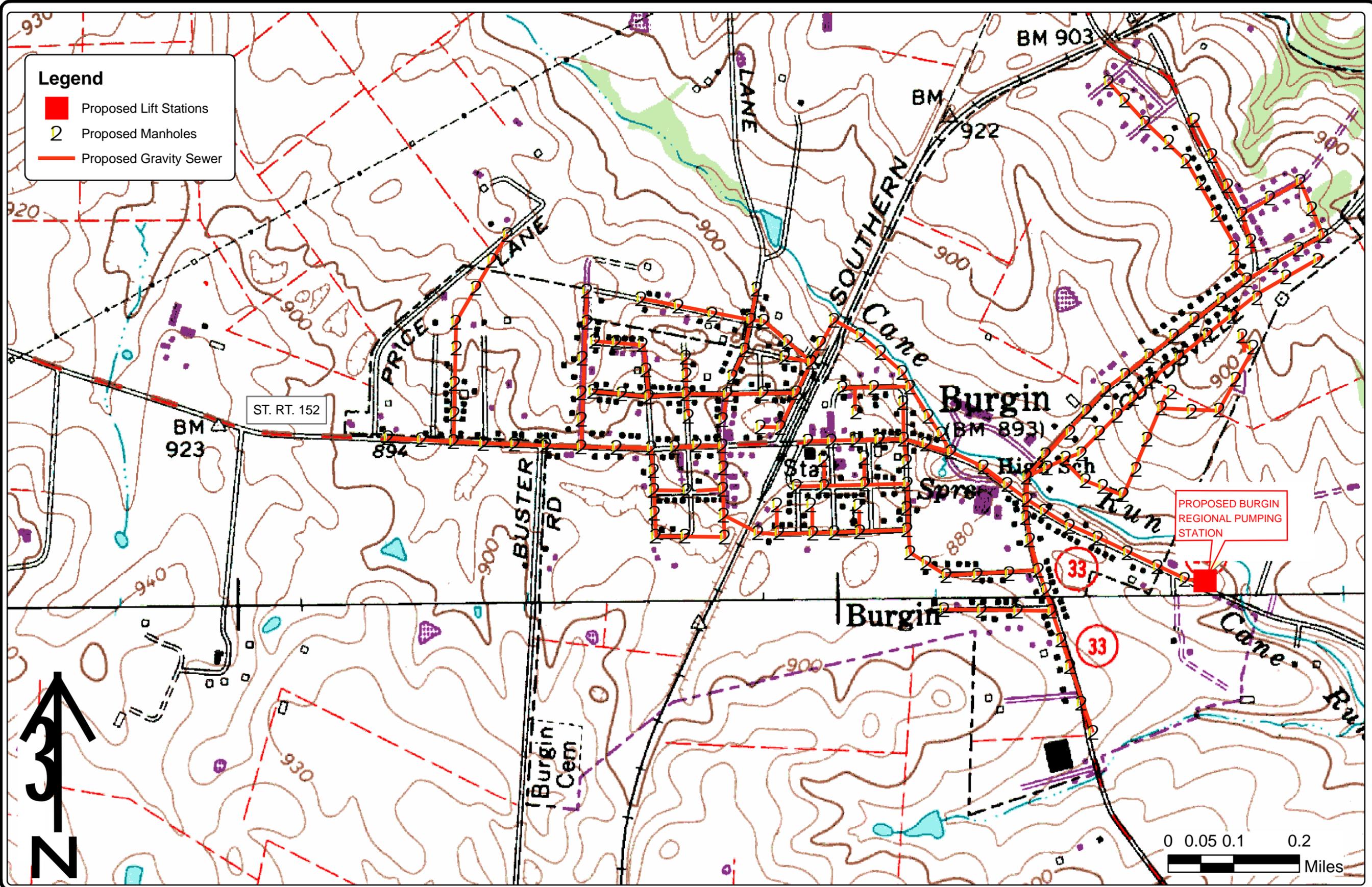


Figure 8.03-2a  
 Burgin Service Area Alternative B-  
 Conventional Gravity and Conveyance Sewer System  
 Mercer County Regional Wastewater Facilities Plan  
 Mercer County Sanitation District



FIGURE 8.03-2a  
 2.992-002

3. Alternative C – Low Pressure, Small Diameter Force Main with Grinder Pump Stations

Another option available within the Burgin Service Area is the use of small individual grinder pumping stations at each individual property. This alternative would also require the decommissioning of all existing septic tank systems as discussed in the Conventional Gravity Sewer Alternative. The small diameter force mains would be PVC SDR 26 (2-inch minimum). The biggest advantage of this system is topography does not limit the location of the force mains and as such the lines are able to be located around existing structures more readily. This system would network to a large regional pumping station for conveyance to a treatment system.

Advantages

- Less susceptible to Infiltration/Inflow
- Limited number of manholes required
- Does not require extra depth for excavation
- Eliminates the need for individual septic tank installations
- Eliminates septic tank maintenance

Disadvantages

- Operability of individual grinder pump stations and check valves critical to successful operation of collection and conveyance system
- Limited access to sewer for routine maintenance
- More maintenance required to maintain grinder pump stations
- Not a Conventional municipal wastewater collection system-may require specific operator experience
- System would not be uniform to other areas of the County

Figure 8.03-2b provides a general system layout of this alternative for the Burgin Service Area.

C. Herrington Lake Service Area (Chimney Rock Combined, Paradise Camp Combined & Dix Dam Combined)

1. Alternative A – Do Nothing

The first alternative consists of doing nothing to the existing package treatment plants, associated collection systems and individual septic tank systems. As far as an initial capital cost, this alternative would have the least amount of capital involved to the MCSD. However, this would not address the number of existing failing septic tank systems scattered throughout the Herrington Lake Area. Should this option be chosen, it is possible that no further development may take place that requires the use of a septic tank system and leachfields given the topography and the shallow rock depths. This was confirmed in a letter from the Mercer County Health Department (MCHD), see Appendix A. Those residents with current failing septic tank systems should be required, at a minimum, to make improvements at the discretion of the

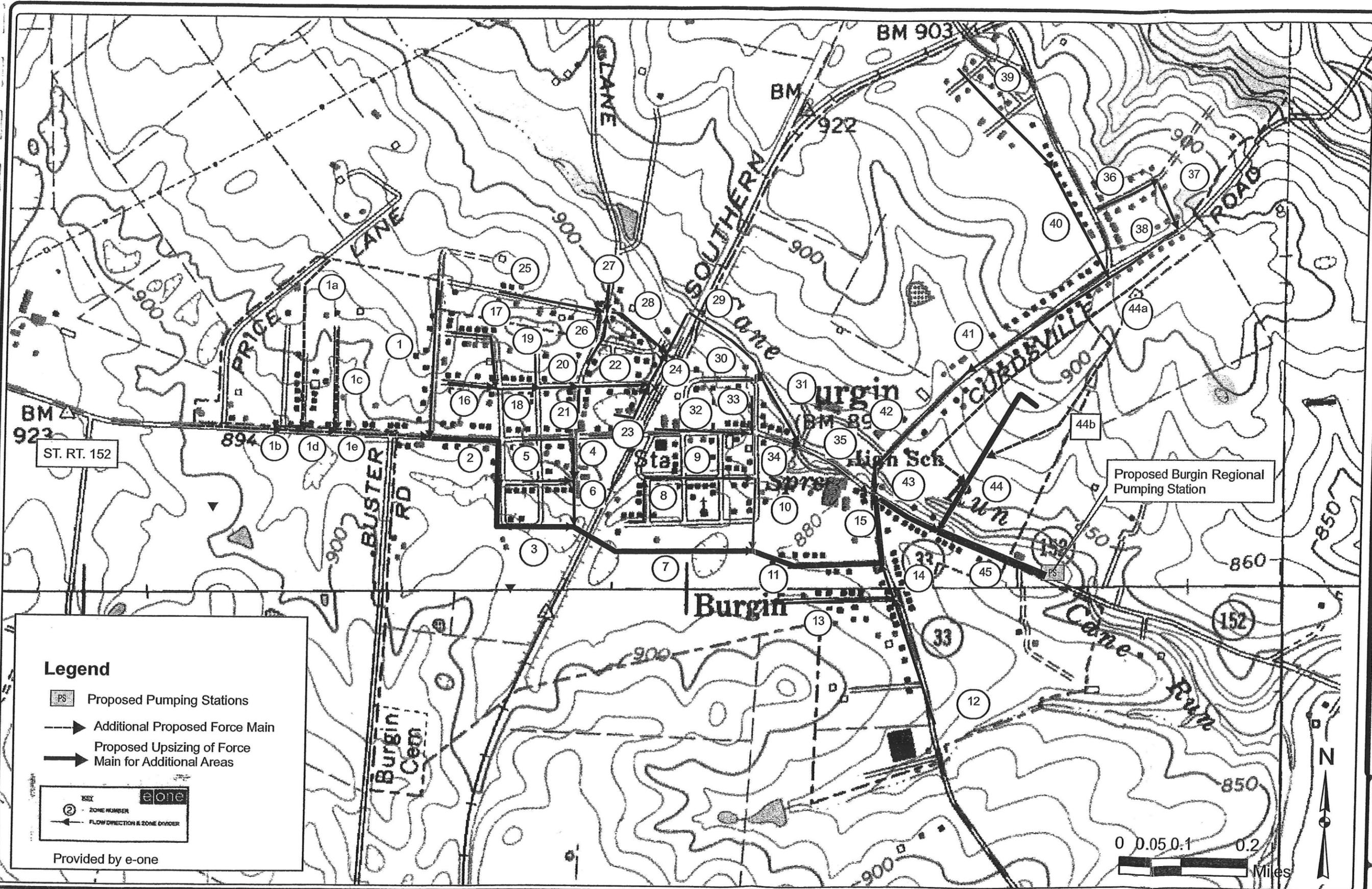


Figure 8.03-2b  
 Burgin Service Area Alternative C-  
 Low Pressure, Small Diameter Force Main with Grinder Pump Stations  
 Mercer County Regional Wastewater Facilities Plan  
 Mercer County Sanitation District



FIGURE 8.03-2b  
 2.992-002

MCHD. This may include the installation of holding tanks that can be very costly to the individual property owner for regular pumping, hauling and disposal.

2. Alternative B – Low Pressure, Small Diameter Force Main with Grinder Pump Stations

Given the topographic and soil limitations of this area, a viable alternative for a public sewer system around the Herrington Lake area would be the use of a low pressure small diameter force main system that would require individual grinder pumping stations at each residence. This would require the decommissioning of the existing septic tank systems as they have been identified as a consistent source for I/I. SDR 26 PVC piping (2-inch minimum) would likely be the small diameter force main material of choice. This option would be well suited as force main can be laid relatively shallow (36 inches of cover minimum) and be routed more directly around existing structures. Each of the combined Service Areas identified within the Herrington Lake Area would be centralized to one main pumping station for Chimney Rock, Paradise Camp and Dix Dam before being conveyed to a treatment system to be discussed in Section 9.

Advantages

- Less susceptible to Infiltration/Inflow
- Limited number of manholes required
- Does not require extra depth for installation
- Eliminates the need for individual septic tank installations
- More compatible with conventional gravity collection systems than Alternative C
- Eliminates septic tank maintenance

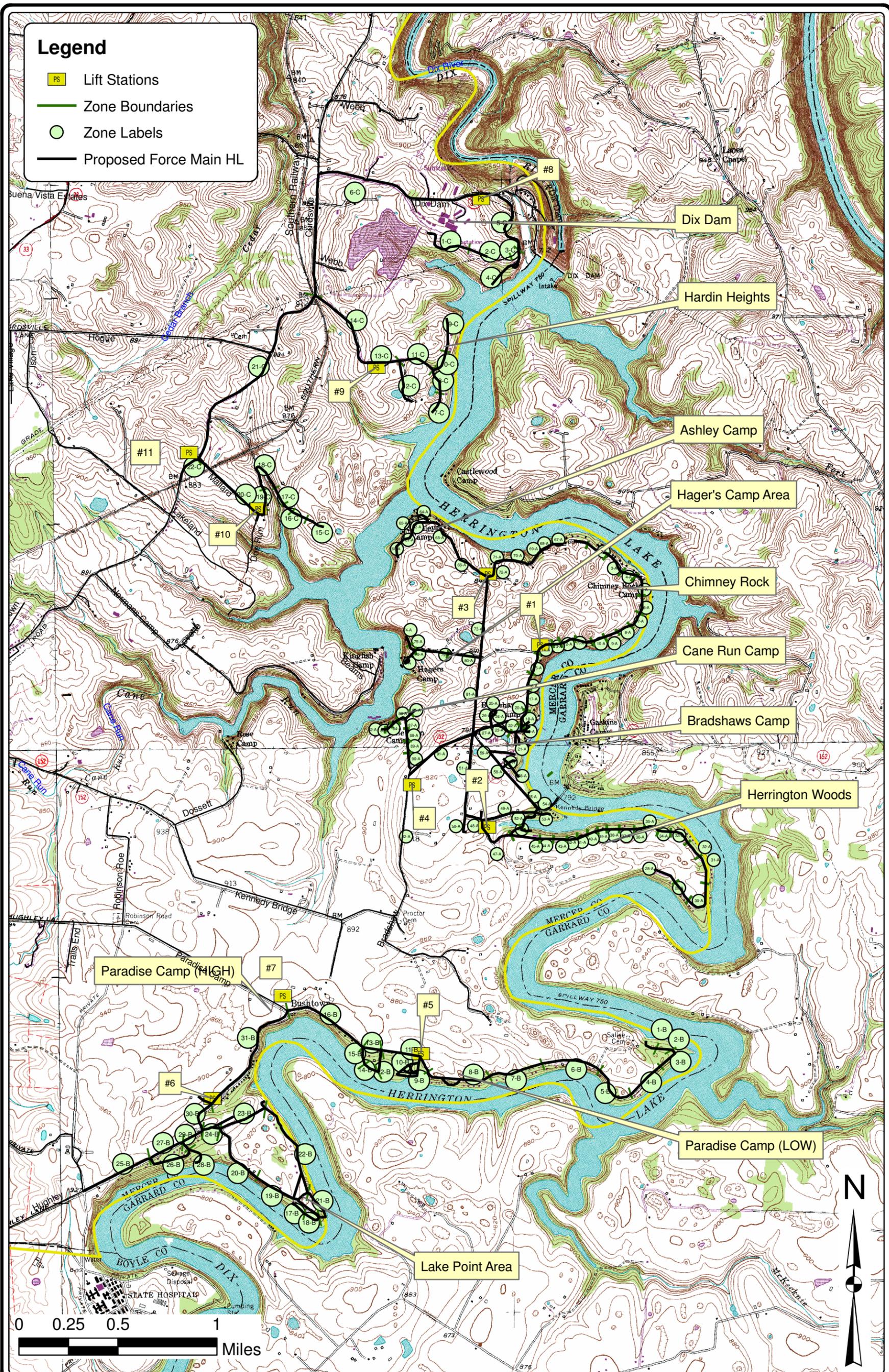
Disadvantages

- Operability of individual grinder pump stations and check valves critical to successful operation of collection and conveyance system
- Limited access to system for routine maintenance
- More maintenance required to maintain grinder pump stations
- Not a Conventional municipal wastewater collection system-may require specific operator experience
- System would not be uniform to other areas of the County

Figure 8.03-3a shows this alternative network for Herrington Lake Area.

3. Alternative C – Septic Tank Effluent/Small Diameter Force Main with Grinder Pump Station.

This alternative provides for conveying wastewater collected within each of the three proposed Combined Service Areas along Herrington Lake. As with Alternative B, each Combined Service Area would collect wastewater to one centralized pumping station for conveyance to a proposed wastewater treatment system. However, this option would require replacement of existing septic tanks with properly sized watertight septic tank systems for each individual wastewater generator and an enforceable maintenance program along with small diameter gravity piping



**Figure 8.03-3a**  
**Herrington Lake Service Area Alternative B-**  
**Low Pressure Force Main with Grinder Stations**  
 Mercer County Regional Wastewater Facilities Plan  
 Mercer County Sanitation District

components. The septic tank effluent would then be directed by an individual customer grinder station to a common grinder station for conveyance through a small diameter force main to the centralized pumping station. By using this alternative, primary treatment of the wastewater would occur on-site within the individual septic tanks resulting in a low solids influent concentration at the treatment facility.

#### Advantages

- Less susceptible to Infiltration/Inflow (using new watertight septic tanks)
- Limited number of manholes required
- Does not require extra depth for installation

#### Disadvantages

- Installation of new impermeable septic tanks
- Requires periodic maintenance of all septic tanks at each source
- Less access to sewer for routine maintenance
- Dissimilar to existing conventional system in other areas of the County
- Operability of grinder pump stations critical to successful operation of collection and conveyance system
- Not a Conventional municipal wastewater collection system -may require specific operator experience
- Wasteloads discharged from these systems is highly concentrated

Figure 8.03-3b provides a proposed layout for this alternative around the Herrington Lake Area.

#### D. Stringtown Service Area

##### 1. Alternative A – Do Nothing

When reviewing alternatives, one option is to do nothing. There is no expense on the part of a public entity to result in the most advantageous capital cost. This option, however, does nothing to address environmental, public health concerns and long terms needs regarding proper treatment and disposal of wastewater in the area given there are several older septic tank systems. Future developments could be limited given the more recent private septic tank system regulations.

##### 2. Alternative B – Conventional Gravity Sewer and Conveyance System

Stringtown is located in close proximity to the City of Harrodsburg Collection System, like the Brightleaf area. Selection of a collection system for this small community logically lends itself to follow the conventional gravity sewer type system due to topography and collection system consistency with the City of Harrodsburg. This system would utilize PVC SDR 35 gravity sewer lines (8-inch diameter minimum, minimum slope 0.004) to convey wastewater to a manhole located approximately every 300 feet. These manholes serve as point of connection between linear piping systems to redirect flow and provide a point of entry for maintenance purposes.