

Item	Components	Unit	Unit Cost	0 - 10-yr		10 - 20-yr	
				Units	Cost	Units	Cost
1	6" Force Main* (Brightleaf Ctl. PS)	LF	\$15	5500	\$83,000	0	\$0
2	Brightleaf Regional Pump Station (180 gpm @ 115ft TDH-10yrs)& (360 gpm @ 145ft TDH-20yrs) with all associated appurtenances, wet well and valve vault	LS	\$155,000	1	\$155,000	0	\$50,000
3	Air Release Valves w/Manholes	EA	\$5,000	2	\$10,000	0	\$0
4	Odor Control Equipment@Brightleaf Regional P.S.	LS	\$26,450	1	\$26,000	0	\$0
5	Portable Generator	LS	\$35,000	1	\$35,000	0	\$0
6	Easements- 6" Force Main	LF	\$1.75	5500	\$10,000	0	\$0
7	Land-P. S. Site (0.25 Acres)	Acre	\$4,000	1	\$4,000	0	\$0
8	Boring & Jack w/ Casing 6-inch Force Main (outside H-burg Planning Area) (1 Road Bore)	LF	\$120	50	\$6,000	0	\$0
9	Harrodsburg Collection System Upgrade (rough est. per GRW)	LS	\$250,000	1	\$250,000	0	\$0
10	Harrodsburg WWTP Upgrade <sup>(1)</sup>	GPD	\$0	117000	\$0	12000	\$0
	Total				\$579,000		\$50,000
	Total footage of gravity sewer			0		0	
	Total footage of force main			5500		0	
	Restoration-pavement and driveways (5%)				\$29,000		
	Erosion and Sediment Control (2%)				\$12,000		\$1,000
	General conditions (5%)				\$29,000		\$3,000
	Subtotal construction costs				\$649,000		\$54,000
	Construction contingencies and engineering (35%)				\$227,000		\$19,000
	Total capital costs				\$876,000		\$73,000

\*Assumed using SDR 21 PVC.

<sup>(1)</sup> Capacity available today, no upfront cost

**Table 9.03-3 Opinion of Probable Construction Cost for Brightleaf Service Area Alternative B- Conveying to Harrodsburg WWTP**

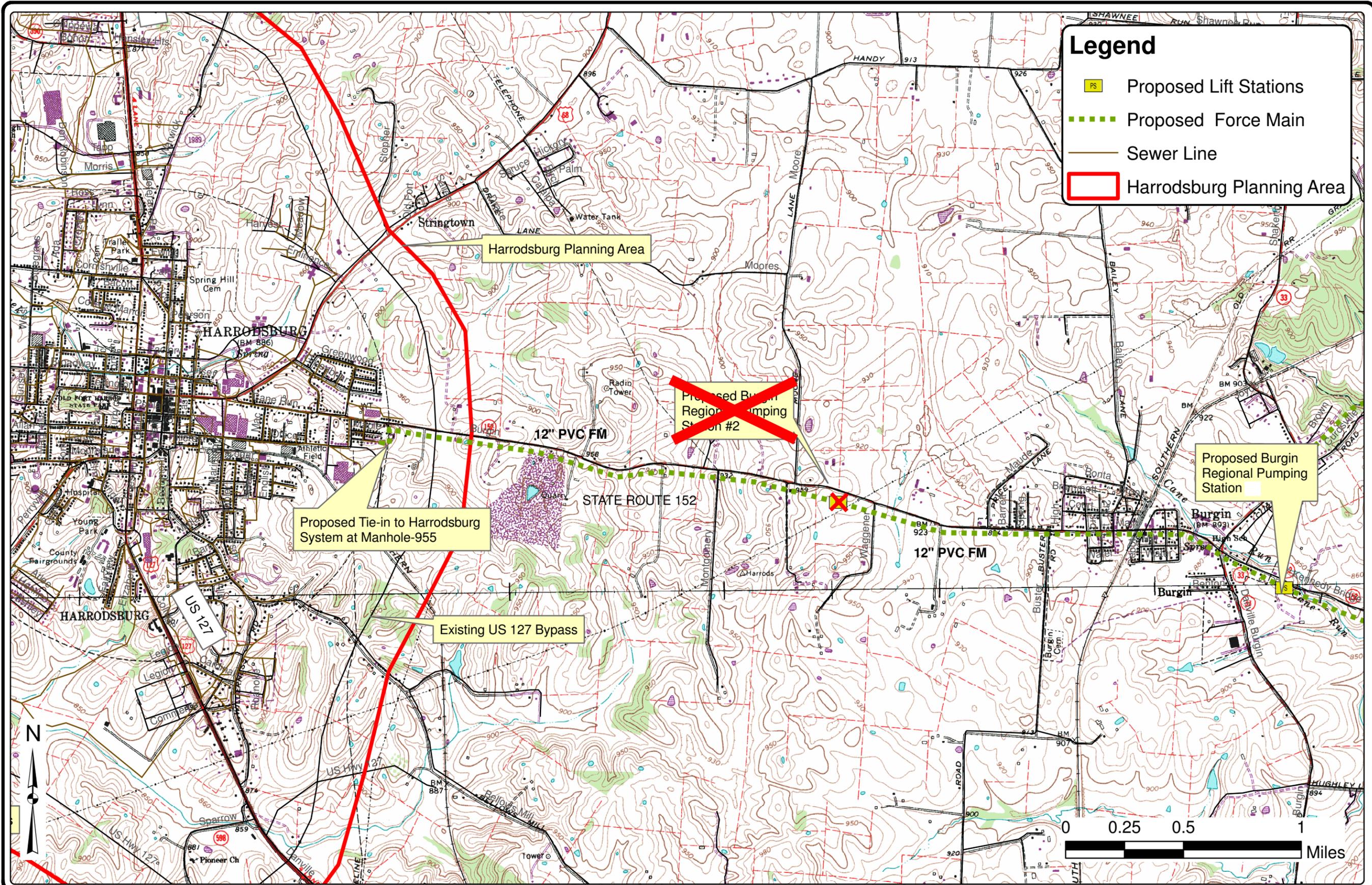
## 2. Burgin Service Area

As discussed in Section 6 of this facilities plan, the Burgin Service Area is planned to receive sewer service within the first 5 years of this plan. Two alternatives for collection were considered. With either form of collection system all wastewater will flow to one central location, where a Regional Pump Station will convey the wastewater to Harrodsburg or Danville. This option supports the KDOW recommended regionalization approach. The only variable in this approach is selecting Harrodsburg or Danville as the preferred utility for wastewater disposal. Table 9.03-4 lists the design criteria used for the conveyance of wastewater to the Harrodsburg Collection System from Burgin Service Area with future consideration for the addition of areas along the Herrington Lake. Table 9.03-5 lists the design criteria used for the conveyance of wastewater to the Danville Collection System. Alternative A includes anticipated wastewater flow from Burgin and the Paradise Camp Service Area. The Paradise Camp Service Area was evaluated for conveyance to the Harrodsburg or Danville WWTP due to topographic limitations restricting other effective forms of wastewater treatment, its vicinity to Burgin #1 Pump Station and to decommission a package treatment plant. Alternative B includes wastewater flow from Herrington Lake Service Areas, should the alternative for treatment along Herrington Lake be found less preferable than conveyance to Harrodsburg or Danville.

Table 9.02-2 shows the projected flows for these alternatives. These criteria were then used to develop the cost opinion for Alternative A as shown in Table 9.03-6 and Alternative B in Table 9.03-7 for conveyance of wastewater to Harrodsburg. Table 9.03-8 and Table 9.03-9 show the cost opinion for Alternative A and B respectively for conveyance of wastewater to Danville. Harrodsburg and Danville were identified as options for treating Burgin's wastewater due to geographic proximity and topographic limitations.

Appendix E provides correspondence with Engineer on behalf of the City of Harrodsburg regarding the Harrodsburg Collection System. Two Harrodsburg connection options were identified that also included Stringtown flows. Of these alternatives, direct connection to the adjacent Harrodsburg Collection System Region 8 was least costly and included upgrade to the Harrodsburg Downtown Interceptor Sewer before ultimately being conveyed to the Harrodsburg WWTP. Given the associated flow of the Stringtown Community contributing to the collection system cost estimate from Harrodsburg, only 90% of the total Harrodsburg Collection System Upgrade Cost was attributed to Alternative B and only 65% of the same cost was included in Alternative A as a large portion of flow from Herrington Lake was not a part of this alternative. Figure 9.03-2 shows the proposed force main route for the Harrodsburg alternative. Figure 9.03-2a shows the proposed force main route for the Danville alternative.

Appendix H provides correspondence with the City of Danville regarding the contract the City approved to provide sewer service for Mercer County. For the Danville treatment alternative, the Burgin pump station will pump to the Danville Mocks Creek pump station on KY 33, north of Danville. Danville's pump station/conveyance system and WWTP have sufficient capacity to serve the Burgin area. If sewer service is expanded to the Herrington Lake area, portions of the Danville conveyance system and WWTP capacity will need to be reconfirmed. The Burgin force main will



**Legend**

- Proposed Lift Stations
- Proposed Force Main
- Sewer Line
- Harrodsburg Planning Area

**Figure 9.03-2**  
**Burgin Service Area Alternative B-**  
**Conveyance to Harrodsburg WWTP**  
 Mercer County Regional Wastewater Facilities Plan  
 Mercer County Sanitation District



**FIGURE 9.03-2**  
 2.992-002

discharge directly into the existing 14-inch North Point Force Main at a location north of the Mocks Creek Pump Station. Figure 9.03-2a shows the proposed force main route for conveyance to Danville. The Danville treatment alternative has a lower initial capital cost because the force main is shorter and fewer bores are required for highway and railroad crossings. Additionally, the life cycle cost for the Danville alternative is lower primarily due to significantly lower treatment costs. Harrodsburg's current treatment charge is \$4.00 per thousand gallons. Danville's current treatment charge is \$1.87 per thousand gallons, with provision for an annual adjustment based on the consumer price index. The Danville treatment alternative is preferred based on reduced treatment cost, coupled with lower capital cost for infrastructure. In following evaluations for the Herrington Lake service area the Harrodsburg treatment option will not be considered in the evaluations.



**FIGURE 9.03-2A**  
**BURGIN SERVICE AREA ALTERNATIVE B -**  
**CONVEYANCE TO DANVILLE WWTP**  
**MERCER COUNTY REGIONAL WASTEWATER FACILITIES PLAN**  
**MERCER COUNTY SANITATION DISTRICT**  
**MERCER/BOYLE COUNTY, KENTUCKY, SUMMER 2013**



**FIGURE 9.03-2A**  
**2992.017**

Process	Units	No. of Units	Flow Unit/MGD	Design Criteria
<b>Alternative A-Burgin Combined and Paradise Camp Service Area</b>				
Burgin #1 Submersible Pumps (Non-Clog) Includes future Herrington Lake Service Area	EA	2	790 gpm	Submersible 4-inch with backup pump at approx. 180ft TDH
Burgin #1 P.S. Wet Well (Total Storage=24,463 gallons) (15,650 gal wet well at 18.5 ft) + 8,812 gal for emergency storage within 12-inch Interceptor sewer)	EA	2	0.292 mgd	> 2 hr. detention time-20yrs. 12 ft diameter with 25ft depth for pumps and HWL Alarm at 18.5 ft depth for emergency storage) along with 1500 ft of 12-inch new interceptor sewer line
Burgin #1 P.S. Odor Control Chemical Feed System	EA	1	0.292 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Burgin #1 P.S. Force Main (10-inch SDR 21)	LF	27,500	1.144 mgd	> 2 ft/sec. 790 gpm = 3.23 fps-20yrs.
Burgin #1 P.S.-Air Release Valves	EA	13	N/A	At highpoints within the force mains
<b>Alternative B -Burgin and All Herrington Lake Service Areas</b>				
Burgin #1 Submersible Pumps (Non-Clog) Includes future Herrington Lake Service Areas	EA	2	860 gpm - 10yrs, 1250 gpm -20yrs	Submersible 6-inch with backup pump at approx.210ft TDH
Burgin #1 P.S. Wet Well (Total 2 well Storage=38,038 gallons) (14,635 gal each wet well at 17.3 ft) + 8,812 gal for emergency storage within 12-inch Interceptor sewer)	EA	2	0.454 mgd	> 2 hr. detention time-20yrs. 2- (12 ft diameter with 25ft depth for pumps and HWL Alarm at 17.3 ft depth for emergency storage) along with 1500 ft of 12-inch new interceptor sewer line
Burgin #1 P.S. Odor Control Chemical Feed System	EA	1	0.454 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Burgin #1 P.S. Force Main (12-inch SDR 21)	LF	27,500	1.818 mgd	> 2 ft/sec. 860 gpm = 2.4 fps-10yrs & 1260 gpm =3.6 fps-20yrs.
Burgin #1 P.S.-Air Release Valves	EA	13	N/A	At highpoints within the force mains

**Table 9.03-4 Design Criteria for Burgin Service Area Conveyance to Harrodsburg Collection System for Treatment at HWWTP (with consideration for Herrington Lake Communities)**

Process	Units	No. of Units	Flow Unit/MGD	Design Criteria
<b>Alternative A-Burgin Combined and Paradise Camp Service Area</b>				
Burgin #1 Submersible Pumps (Non-Clog) Includes future Herrington Lake Service Area	EA	2	790 gpm	Submersible 4-inch with backup pump at approx. 160ft TDH
Burgin #1 P.S. Wet Well (Total Storage=24,463 gallons) (15,650 gal wet well at 18.5 ft) + 8,812 gal for emergency storage within 12-inch Interceptor sewer)	EA	2	0.292 mgd	> 2 hr. detention time-20yrs. 12 ft diameter with 25ft depth for pumps and HWL Alarm at 18.5 ft depth for emergency storage) along with 1500 ft of 12-inch new interceptor sewer line
Burgin #1 P.S. Odor Control Chemical Feed System	EA	1	0.292 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Burgin #1 P.S. Force Main (12-inch SDR 21)	LF	19,500	1.144 mgd	> 2 ft/sec. 790 gpm = 3.23 fps-20yrs.
Burgin #1 P.S.-Air Release Valves	EA	11	N/A	At highpoints within the force mains
<b>Alternative B -Burgin and All Herrington Lake Service Areas</b>				
Burgin #1 Submersible Pumps (Non-Clog) Includes future Herrington Lake Service Areas	EA	2	860 gpm - 10yrs, 1250 gpm -20yrs	Submersible 6-inch with backup pump at approx. 150ft TDH
Burgin #1 P.S. Wet Well (Total 2 well Storage=38,038 gallons) (14,635 gal each wet well at 17.3 ft) + 8,812 gal for emergency storage within 12-inch Interceptor sewer)	EA	2	0.454 mgd	> 2 hr. detention time-20yrs. 2- (12 ft diameter with 25ft depth for pumps and HWL Alarm at 17.3 ft depth for emergency storage) along with 1500 ft of 12-inch new interceptor sewer line
Burgin #1 P.S. Odor Control Chemical Feed System	EA	1	0.454 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Burgin #1 P.S. Force Main (12-inch SDR 21)	LF	19,500	1.818 mgd	> 2 ft/sec. 860 gpm = 2.4 fps-10yrs & 1260 gpm =3.6 fps-20yrs.
Burgin #1 P.S.-Air Release Valves	EA	11	N/A	At highpoints within the force mains

**Table 9.03-5 Design Criteria for Burgin Service Area Conveyance to Danville Collection System for Treatment at DWWTP (with consideration for Herrington Lake Communities)**

Item	Components	Unit	Unit Cost	Installation Markup	0-10yrs		10-20yrs	
					Units	Cost	Units	Cost
1	10" Force Main* (Burgin#1PS)	LF	\$25	1.00	27,500	\$688,000	0	\$0
2	Burgin #1 Pump Station (790 gpm @ 200ft TDH-20yrs) with all associated appurtenances, wet well, and valve vault	LS	\$400,000	1.00	1	\$400,000	0	\$100,000
3	Air Release Valves w/Manholes	EA	\$5,000	1.00	13	\$65,000	0	\$0
4	Odor Control Equipment@ Burgin #1 P.S.	LS	\$26,450	1.00	1	\$26,000	0	\$0
5	Harrodsburg Collection System Upgrade through Downtown Interceptor (rough est. per GRW) (~60% of \$1.25M)	LS	\$1,250,000	1.00	1	\$750,000	0	\$0
6	Harrodsburg WWTP Upgrade <sup>(1)</sup>	Avg. GPD	\$0	1.00	186000	\$0	106000	\$0
7	Stream Crossings (2)	LF	\$100	1.00	150	\$15,000	0	\$0
8	Easements-Force Mains	LF	\$1.75	1.00	27500	\$49,000	0	\$0
9	Land-P.S. Site (0.25 Acres)	Acre	\$5,000	1.00	1	\$5,000	0	\$0
10	Boring & Jack w/ Casing 10-inch Force Main (outside H-burg Planning Area) (~12 crossings w/ 4 large crossings)	LF	\$300	1.00	800	\$240,000	0	\$0
	<b>Total</b>					\$2,238,000		\$100,000
	Total footage of force main				27500		0	
	Restoration-pavement and driveways (5%)					\$110,000		\$112,000
	Erosion and Sediment Control (2%)					\$45,000		\$2,000
	General conditions (5%)					\$112,000		\$5,000
	Subtotal construction costs					\$2,507,000		\$107,000
	Construction contingencies and engineering (35%)					\$878,000		\$38,000
	<b>Total capital costs</b>					\$3,385,000		\$145,000

\*Assumed using SDR 21 PVC.

<sup>(1)</sup>Capacity available today, no up front cost.

**Table 9.03-6 Opinion of Probable Construction Cost Alternative A for Burgin and Paradise Camp Service Area- Conveying to Harrodsburg WWTP**

Item	Components	Unit	Unit Cost	0-10-yrs		10-20-yrs	
				Units	Cost	Units	Cost
1	12" Force Main (Burgin#1 PS)	LF	\$30	27500	\$825,000		\$0
2	Burgin #1 Pump Station (860 gpm @ 117ft TDH-10yrs & 1260 gpm @ 134ft TDH-20yrs) with all associated appurtenances, two wet wells and valve vault	LS	\$450,000	1	\$450,000	0	\$250,000
3	Air Release Valves w/Manholes	EA	\$5,000	13	\$65,000		\$0
4	Odor Control Equipment@ Burgin #1 P.S.	LS	\$30,000	1	\$30,000	0	\$0
5	Harrodsburg Collection System Upgrade through Downtown Interceptor (rough est. per GRW) (~90% of \$1.25M)	LS	\$1,250,000	1	\$1,125,000		\$0
6	Harrodsburg WWTP Upgrade <sup>(1)</sup>	Avg. GPD	\$0	186000	\$0	106000	\$0
7	Stream Crossings (2)	LF	\$100	150	\$15,000	0	\$0
8	Easements-Force Mains	LF	\$1.75	27500	\$49,000	0	\$0
9	Land-P.S. Site (0.25 Acres)	Acre	\$5,000	1	\$5,000	0	\$0
10	Boring & Jack w/ Casing 10-inch Force Main (outside H-burg Planning Area) (~12 crossings w/ 4 large crossings)	LF	\$300	800	\$240,000		\$0
	<b>Total</b>				<b>\$2,804,000</b>		<b>\$250,000</b>
	Total footage of force main			27500		0	
	Restoration-pavement and driveways (5%)				\$141,000		
	Erosion and Sediment Control (2%)				\$57,000		\$5,000
	General conditions (5%)				\$141,000		\$13,000
	Subtotal construction costs				\$3,143,000		\$268,000
	Construction contingencies and engineering (35%)				\$1,101,000		\$94,000
	Total capital costs				\$4,244,000		\$362,000

\*Assumed using SDR 21 PVC.

<sup>(1)</sup>Capacity available today, no up front cost.

**Table 9.03-7 Opinion of Probable Construction Cost Alternative B for Burgin with All Herrington Lake Service Areas- Conveying to Harrodsburg WWTP**

Item	Components	Unit	Unit Cost	Installation Markup	0-10yrs		10-20yrs	
					Units	Cost	Units	Cost
1	10" Force Main* (Burgin#1 PS)	LF	\$25	1.00	19500	\$488,000	0	\$0
2	Burgin #1 Pump Station (790 gpm @ 200ft TDH-20yrs) with all associated appurtenances, wet well, and valve vault	LS	\$400,000	1.00	1	\$400,000	0	\$100,000
3	Air Release Valves w/Manholes	EA	\$5,000	1.00	11	\$55,000	0	\$0
4	Odor Control Equipment@ Burgin #1 P.S.	LS	\$26,000	1.00	1	\$26,000	0	\$0
5	Stream Crossings (2)	LF	\$100	1.00	150	\$15,000	0	\$0
6	Easements-Force Mains	LF	\$1.75	1.00	19500	\$35,000	0	\$0
7	Land-P.S. Site (0.25 Acres)	Acre	\$5,000	1.00	1	\$5,000	0	\$0
8	Boring & Jack w/ Casing 10-inch Force Main (outside H-burg Planning Area) (~12 crossings w/ 4 large crossings)	LF	\$300	1.00	800	\$240,000	0	\$0
	<b>Total</b>					\$1,264,000		\$100,000
	Total footage of force main				19500		0	
	Restoration-pavement and driveways (5%)					\$64,000		
	Erosion and Sediment Control (2%)					\$26,000		\$2,000
	General conditions (5%)					\$64,000		\$5,000
	Subtotal construction costs					\$1,418,000		\$107,000
	Construction contingencies and engineering (35%)					\$497,000		\$38,000
	<b>Total capital costs</b>					\$1,915,000		\$145,000

\*Assumed using SDR 21 PVC.

**Table 9.03-8 Opinion of Probable Construction Cost Alternative A for Burgin and Paradise Camp Service Area- Conveying to Danville WWTP**

Item	Components	Unit	Unit Cost	0-10-yrs		10-20-yrs	
				Units	Cost	Units	Cost
1	12" Force Main (Burgin#1 PS)	LF	\$30	19500	\$585,000		\$0
2	Burgin #1 Pump Station (860 gpm @ 117ft TDH-10yrs & 1260 gpm @ 134ft TDH-20yrs) with all associated appurtenances, two wet wells and valve vault	LS	\$450,000	1	\$450,000	0	\$250,000
3	Air Release Valves w/Manholes	EA	\$5,000	11	\$55,000		\$0
4	Odor Control Equipment@ Burgin #1 P.S.	LS	\$30,000	1	\$30,000	0	\$0
5	Stream Crossings (2)	LF	\$100	150	\$15,000	0	\$0
6	Easements-Force Mains	LF	\$1.75	19500	\$35,000	0	\$0
7	Land-P.S. Site (0.25 Acres)	Acre	\$5,000	1	\$5,000	0	\$0
8	Boring & Jack w/ Casing 10-inch Force Main (outside H-burg Planning Area) (~12 crossings w/ 4 large crossings)	LF	\$300	800	\$240,000		\$0
	Total				\$1,415,000		\$250,000
	Total footage of force main			19500		0	
	Restoration-pavement and driveways (5%)				\$71,000		
	Erosion and Sediment Control (2%)				\$29,000		\$5,000
	General conditions (5%)				\$71,000		\$13,000
	Subtotal construction costs				\$1,586,000		\$268,000
	Construction contingencies and engineering (35%)				\$556,000		\$94,000
	Total capital costs				\$2,142,000		\$362,000

\*Assumed using SDR 21 PVC.

**Table 9.03-9 Opinion of Probable Construction Cost Alternative B for Burgin with All Herrington Lake Service Areas- Conveying to Danville WWTP**

3. Stringtown Community

The Stringtown Service Area is located adjacent to the revised Harrodsburg Planning Area and existing Collection System. As a result, only a conventional collection system like that in Harrodsburg was reviewed in detail. Appendix E provides documented correspondence with Engineer on behalf of the City of Harrodsburg regarding the Harrodsburg Collection System capacity constraints, cost and connecting alternatives. As discussed in the previous paragraph, two options were identified to get flow into the Harrodsburg system from this Service Area and from Burgin and Herrington Lake Service Areas. One alternative was to pump the combined flows around the southern US 127 bypass for discharge into the Harrodsburg Southern Interceptor Sewer stub out before US 127 (\$1.8 Million Total Combined Flows). The other option was to have combined flows directly connected to the adjacent Harrodsburg Collection System Region 8 that would also require upgrades to include their Downtown Interceptor Sewer before ultimately being conveyed to the Harrodsburg WWTP (\$1.25 Million Total Combined Flows). As a result of a direct gravity connection to Harrodsburg Region 8 Collection System and this later alternative being least costly, approximately 10% of the total \$1.25 million was considered relative to the Stringtown Service Area for the required upgrades to the Harrodsburg Collection System. The Burgin and Herrington Lake Service Areas were assigned the remaining 90% of this identified cost. Table 9.03-10 shows the design criteria for the gravity sewer portion connecting to the Harrodsburg Collection System, while Table 9.03-11 gives the cost opinion for this alternative. Figure 9.03-3 provides the preliminary layout of conveyance into Harrodsburg Sewer Collection System.

4. Herrington Lake Service Area

This unique region of Mercer County is bounded entirely on the western side by Herrington Lake. As discussed previously, current individual sub-surface treatment systems are in varying degrees of failure given soil and topographic limitations. Consideration was given on a cursory level to a surface discharge wastewater treatment plant but was deemed highly unlikely as both potential receiving waters of Herrington Lake and the Kentucky River extending beyond the Mercer County line were identified on the 303(d) list. Another alternative for treatment was the construction of a Recirculating Sand Filter Treatment Plant with sub-surface disposal using drip irrigation. This option identified as Herrington Lake Service Area Alternative A would be decentralized with one to each area or cluster of areas. The location for this type of treatment system is critical as the soil conditions affect the required acreage needed for disposal of treated effluent through a drip irrigation system. The land application criteria for this subsurface disposal system were based on 0.1 to 0.2 gallons per day per square foot loading rate for clay soil.

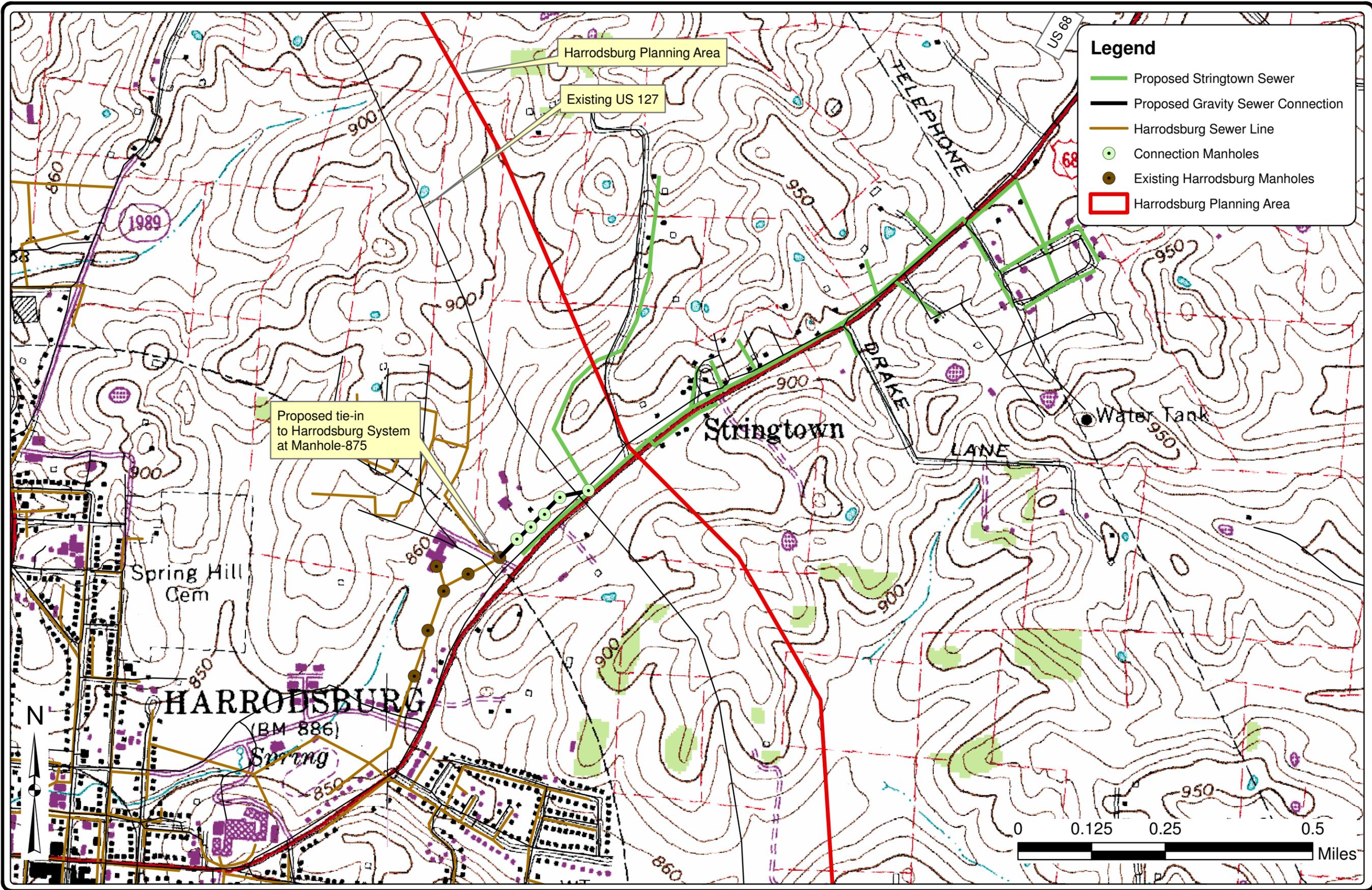


Figure 9.03-3  
 Stringtown Service Area Alternative B-  
 Conveyance to Harrodsburg Collection System for Treatment at Harrodsburg WWTP  
 Mercer County Regional Wastewater Facilities Plan  
 Mercer County Sanitation District



FIGURE 9.03-3  
 2.992-002

Process	Units	Number of Units	Flow Unit/MGD	Design Criteria
Gravity Sewer (10-inch SDR 35)	FT	1000	0.111 mgd	> Min. Slope = 0.28 % 77 gpm (20yrs)
Manholes	EA	5	N/A	At Bends.

\*See Section 8 regarding the remaining associated gravity collection system.

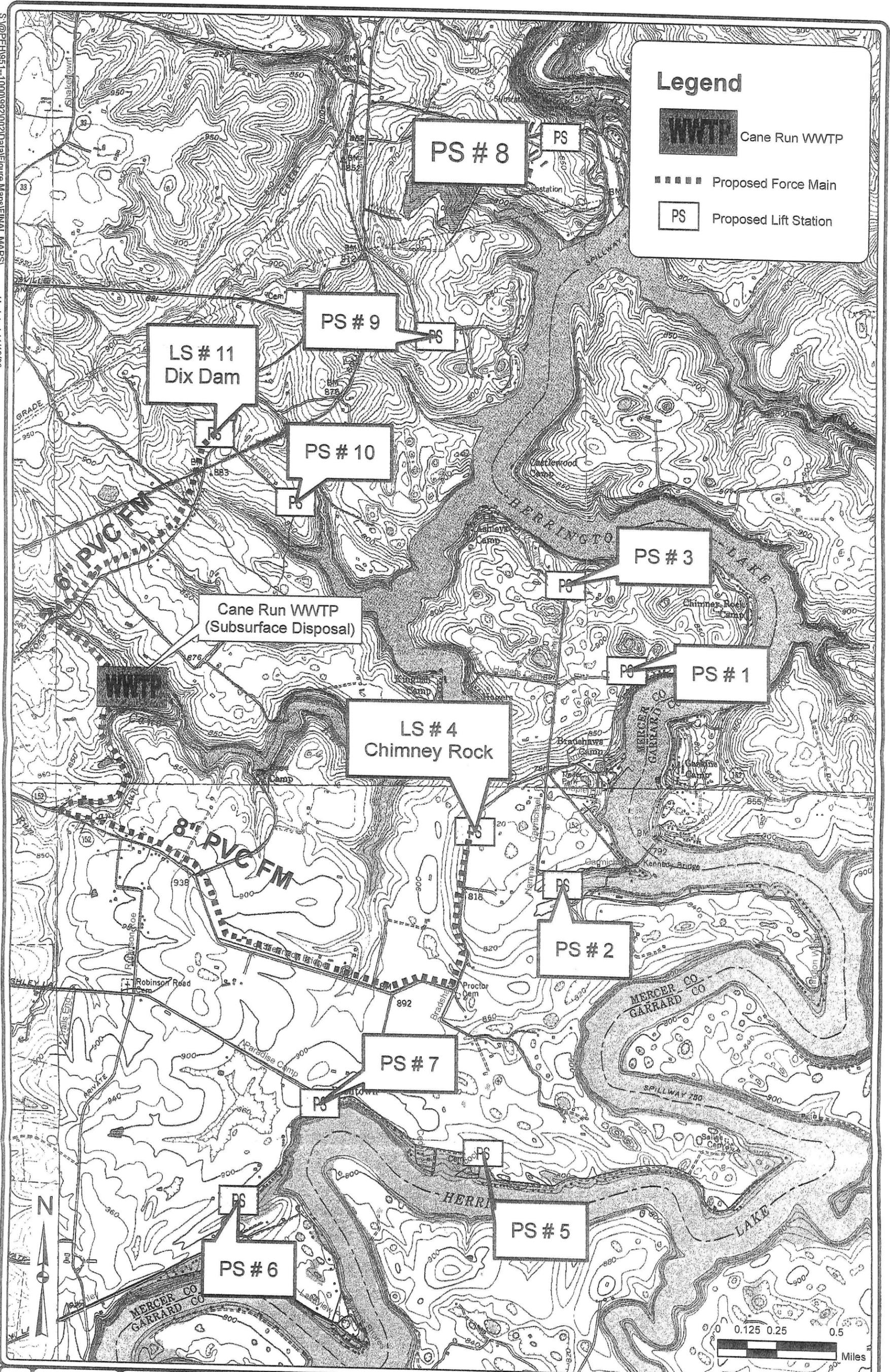
**Table 9.03-10 Design Criteria for Stringtown Alternative B- Conveyance to Harrodsburg Collection System for Treatment at HWWTP**

Item	Components	Unit	Unit Cost	0 -10-yr		10 -20-yr	
				Units	Cost	Units	Cost
1	10" diam per linear foot	LF	\$60	1000	\$60,000		\$ -
2	4-ft diam manholes*	EA	\$4,000	5	\$20,000		\$0
3	Harrodsburg Collection System Upgrade through Downtown Interceptor (rough est. per GRW) (~10% of \$1.25M)	LS	\$1,250,000	1	\$125,000		\$0
4	Harrodsburg WWTP Upgrade <sup>(1)</sup>	Avg. GPD	\$0	186000	\$0	106000	\$0
	Total				\$205,000		\$0
	Total footage of force main			0		0	
	Restoration-pavement and driveways (10%)				\$21,000		
	Erosion and Sediment Control (3.5%)				\$7,000		\$0
	General conditions (10%)				\$21,000		\$0
	Subtotal construction costs				\$254,000		\$0
	Construction contingencies and engineering (35%)				\$89,000		\$0
	Total capital costs				\$350,000		\$0

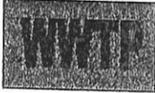
\*Manhole minimum approximately every 300ft.

<sup>(1)</sup>Capacity available today, no up front cost.

**Table 9.03-11 Opinion of Probable Construction Cost Alternative B for Stringtown Service Area- Conveying to Harrodsburg WWTP**



**Legend**

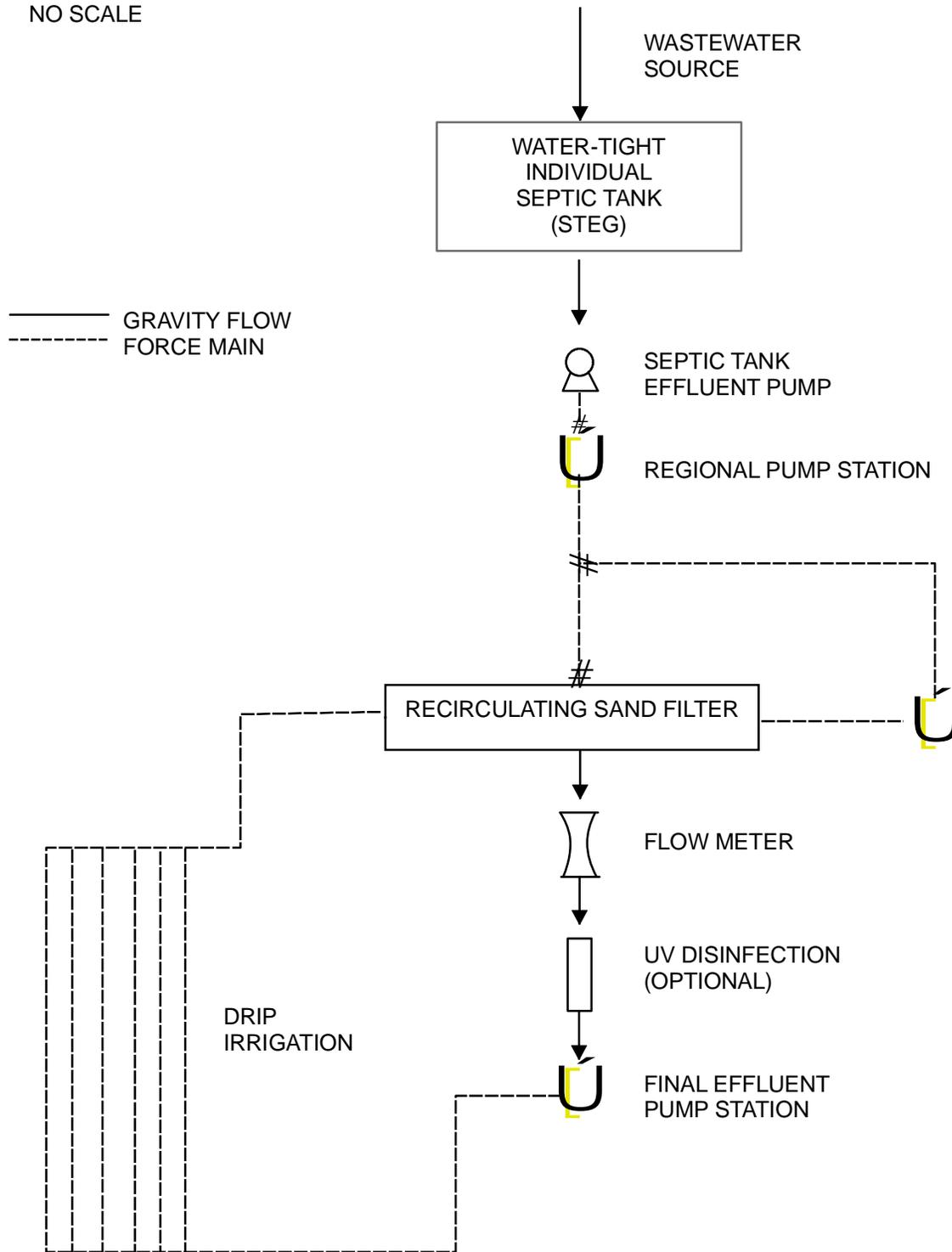
-  Cane Run WWTP
-  Proposed Force Main
-  Proposed Lift Station

**Figure 9.03-4**  
**Herrington Lake Service Area Alternative A-**  
**Herrington WWTP Subsurface Disposal System**  
 Mercer County Regional Facilities Plan  
 Mercer County Sanitation District

**STRAND**  
 ASSOCIATES, INC.  
 ENGINEERS

FIGURE 9.03-4  
 2.992-002

PROCESS SCHEMATIC  
NO SCALE



S:\@PEH\951-1-1000\992\002\Data\Figure Maps\FINAL MAPS

Update 1/1/9/06

Figure 9.03-5  
Herrington Service Area Alternative A-  
Schematic for Typical Recirculating Sand Filter  
with Drip Irrigation Disposal Treatment Plant  
Mercer County Regional Wastewater Facilities Plan  
Mercer County Sanitation District



FIGURE 9.03-5  
2.992-002

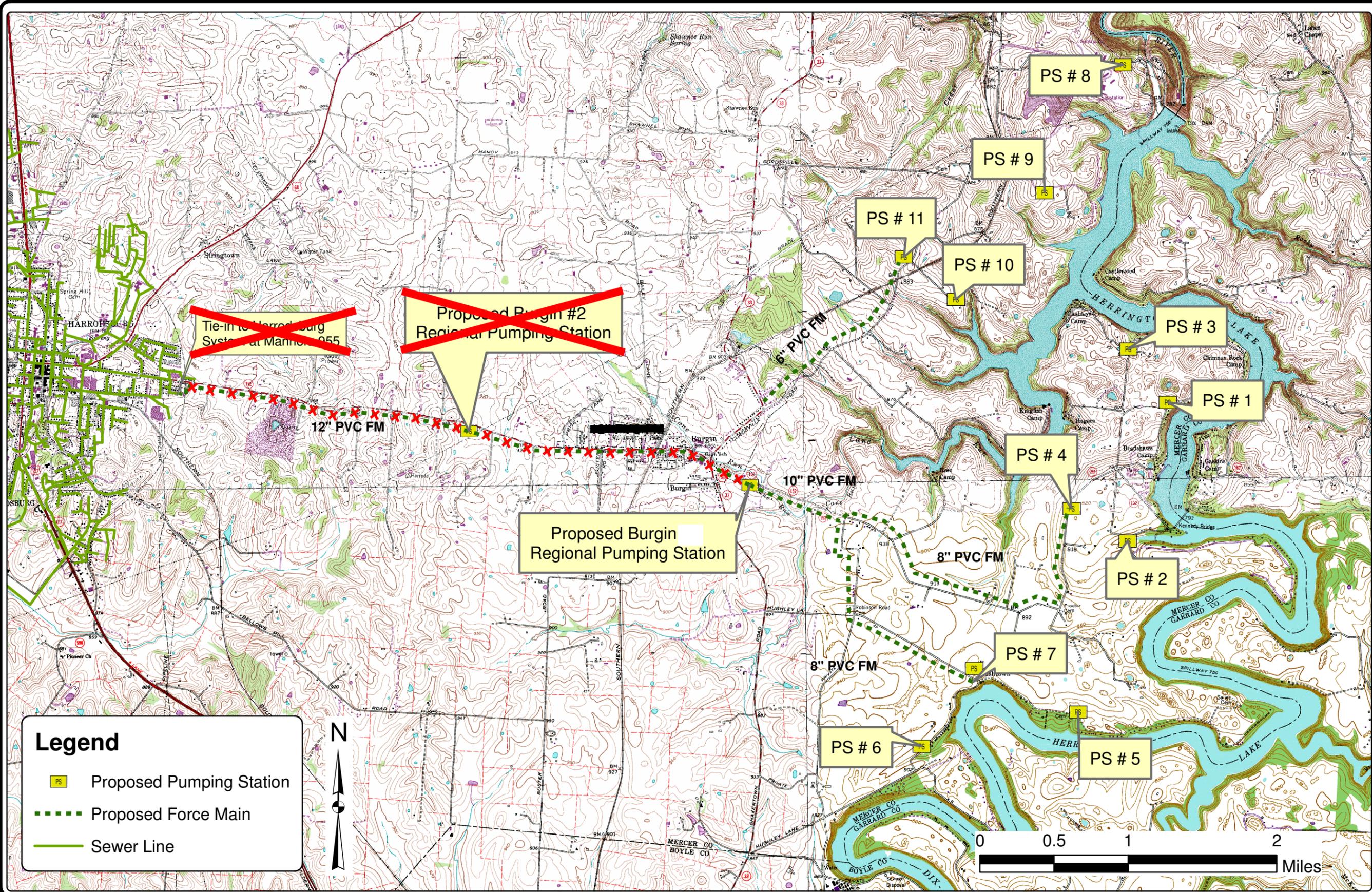
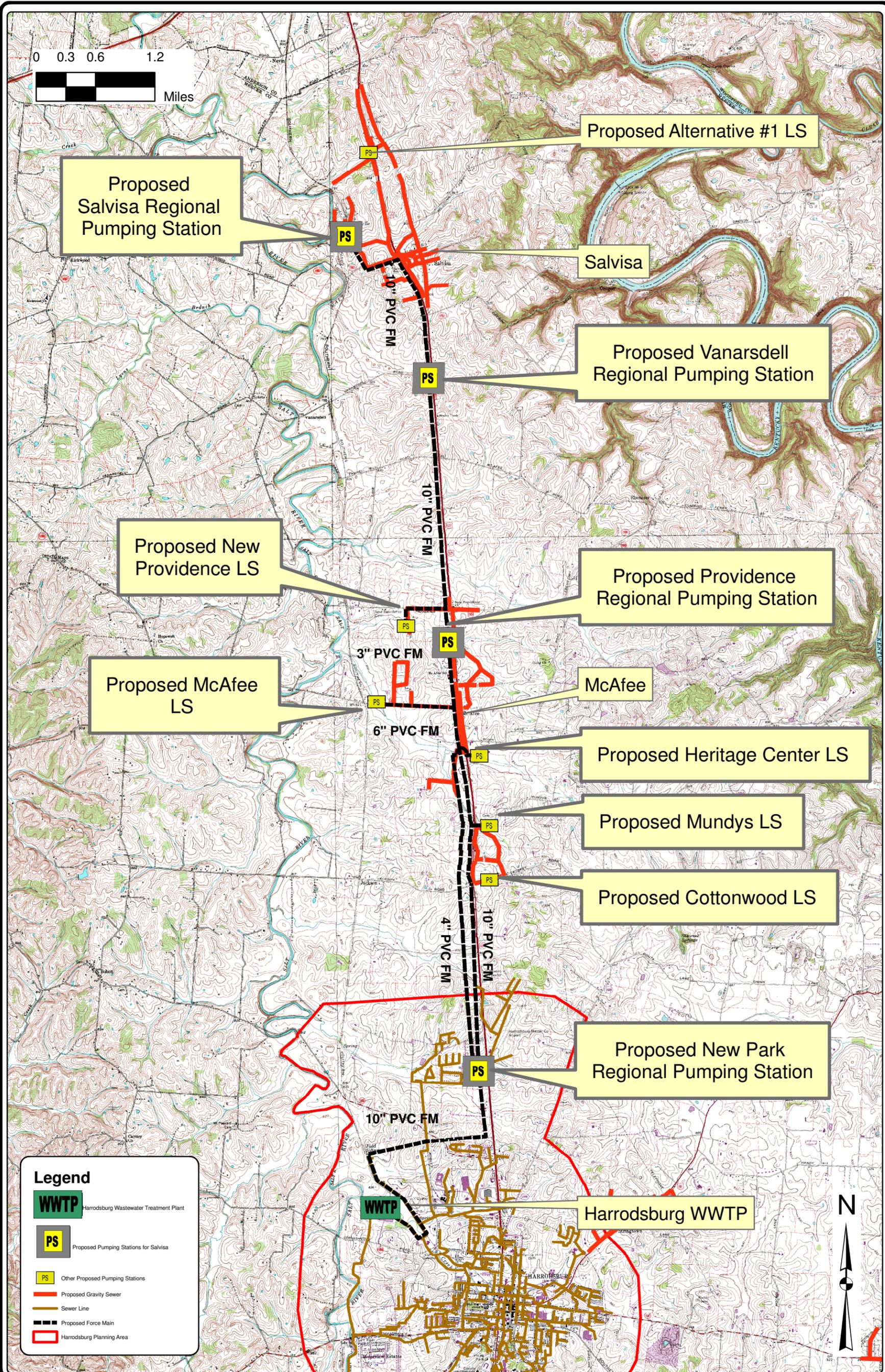


Figure 9.03-6  
 Herrington Lake Service Area Alternative B-  
 Conveyance to Burgin Regional Pumping Station  
 Mercer County Regional Wastewater Facilities Plan  
 Mercer County Sanitation District



Figure 9.03-6  
 2.992-002



**Figure 9.03-7**  
**Salvisa Service Area Alternative B-**  
**Conveyance to McAfee then to Harrodsburg WWTP**  
Mercer County Regional Wastewater Facilities Plan  
Mercer County Sanitation District

The Recirculating Sand Filter System does not backwash but may need to be raked on occasion to help facilitate movement through the filter as solids can build up on the top layer significantly reducing porosity through the filter. The gravel/sand filters must receive primary treated influent from a closed collection system with watertight seamless septic tanks to preclude infiltration and inflow as this form of treatment cannot cost-effectively process additional flows. Figure 9.03-4 shows the proposed Alternative A location for the sub-surface treatment plant and associated conveyance system to this facility. Table 9.03-12 lists the design criteria for Alternative A as discussed with equipment manufacturer representatives and based upon previous project experience. For this type of subsurface disposal system, the average daily flow at peak population for 20 years was applied in accordance with manufacturer recommendations. The capital cost associated with this form of treatment system is provided in Table 9.03-13 and a typical schematic for Alternative A is shown in Figure 9.03-5.

Herrington Lake Service Area Alternative B includes Paradise Camp Service Area for direct conveyance of wastewater to Burgin #1 Pump Station. Wastewater then would be delivered to the Danville Collection System for ultimate Treatment at the Danville WWTP. Figure 9.03-6 shows the conveyance route for this Alternative. Table 9.03-14 provides the design criteria used for Alternative B, while Table 9.03-15 shows the capital cost for all of the Herrington Lake Service Areas. To compare this capital cost to that provided for Alternative A, Paradise Camp costs must be excluded as shown in Table 9.03-16, while keeping the same cost difference for conveyance from Burgin to the Danville WWTP.

#### 5. Salvisa Service Area

Table 8.03-5a shows the preliminary proposed conventional collection system for Salvisa Service Area.

Alternative A was intended to include construction of a Salvisa WWTP with a discharge to the Salt River. A wasteload allocation request letter dated March 27, 2006 was sent to KDOW requesting discharge effluent limitations for discharge into the Salt River near Bondville for flows of 0.25-mgd, 0.5-mgd, and 1.0-mgd. KDOW has yet to respond prior to this planning study being completed. A copy of correspondence is provided in Appendix G. Until a WLA is provided by KDOW no further assessment can be made regarding this alternative. The evaluation of alternatives for Salvisa should be revisited once adequate information is received into order to perform a complete comparison of alternatives. This report is only able to provide and recommend Alternative B - Conveyance to the Harrodsburg WWTP until further information becomes available on other possible alternatives. The City of Lawrenceburg and Anderson County Fiscal Court were recently allocated funds for a project that would extend their sewer system towards the Bluegrass Parkway. Additional information is needed regarding this potential project before this alternative can be reviewed in greater detail. The Design Criteria for Alternative B-Conveyance to Harrodsburg WWTP is provided in Table 9.03-17, while Table 9.03-18 lists the capital cost estimate for Alternative B. Figure 9.03-7 shows the Salvisa Alternative B-Conveyance to the Harrodsburg WWTP. A portion of infrastructure shown in this Figure and provided in the previous tables will

share cost with the McAfee Combined Community starting from the Providence Lift Station to discharge Point at the Harrodsburg WWTP.

<b>Process</b>	<b>Units</b>	<b>Number of Units</b>	<b>Flow Unit/ MGD</b>	<b>Design Criteria</b>
Individual Impermeable septic Tank Systems- Preliminary Treatment*	EA	336 – 10 yrs 720 – 20 yrs	245 gpd per dwelling	+2.5 days HRT** 100 gpcd 2.45 people/home
Chimney Rock #4 Submersible Pumps (Non-Clog) I	EA	2	440 gpm	Submersible 4-inch with backup pump at approx. 175ft TDH
Chimney Rock #4 L.S. Wet Well (Total Storage=10,998 gal wet well at 16 ft)	EA	1	0.132 mgd	> 2 hr. detention time-20yrs. 12 ft diameter with 18ft depth for pumps and HWL Alarm at 13 ft depth for emergency storage
Chimney Rock #4 L.S. Odor Control Chemical Feed System	EA	1	0.132 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Chimney Rock #4 L.S. Force Main (8-inch SDR 21)	LF	17,400	0.634 mgd	> 2 ft/sec. 440 gpm = 2.81 fps-20yrs. Frictional Headloss = 54 ft -20 yrs. Static Headloss = ((920-820)+21)=121 ft
Chimney Rock #4 L.S.-Air Release Valves	EA	3	N/A	At highpoints within the force mains
Dix Dam #11 Submersible Pumps (Non-Clog)	EA	2	220 gpm	Submersible 4-inch with backup pump at approx. 50 ft TDH
Dix Dam #11 L.S. Wet Well (Total Storage=2,644 gal wet well at 12.5 ft)	EA	1	0.031 mgd	> 2 hr. detention time-20yrs. 6 ft diameter with 19ft depth for pumps and HWL Alarm at 12.5 ft depth for emergency storage
Dix Dam #11 L.S. Odor Control Chemical Feed System	EA	1	0.031 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Dix Dam #11 L.S. Force Main (6-inch SDR 21)	LF	8,500	0.312 mgd	> 2 ft/sec. 220 gpm = 2.5 fps-20yrs. Frictional Headloss = 31 ft -20 yrs. Static Headloss = ((900-900)+19)=19 ft
Burgin #1 L.S.-Air Release Valves	EA	3	N/A	At highpoints within the force mains
Recirculating Sand Filter 52ft x 200 ft	EA	2+1 - 10 yrs 4+1 - 20 yrs	0.082 mgd - 10 yrs 0.162 mgd - 20 yrs	3.89 GPD/SF Recycle Ratio 4:1 1 day Storage In Series with an additional bed at rest
Final Disposal Pumps into Drip Irrigation System	EA	2	150 gpm	Submersible 4-inch with backup pump. 57 gpm, each – 10 yrs ADF 113 gpm, each – 20 yrs ADF
Drip Irrigation System	Acres	16.4 acres- 10 yrs 32.4 acres- 20yrs	0.082 mgd -10 yrs 0.162 mgd - 20 yrs	5000 GPD/Acre

\*See Section 8, Table 8.05-3b for Capital Cost as connected to Collection System (includes Paradise Camp Combined).

\*\* Hydraulic Retention Time (based on average daily flow).

**Table 9.03-12 Design Criteria for Alternative A Herrington Lake (Dix Dam Combined & Chimney Rock Combined Only) Alternative A- Conveyance to & Treatment at Herrington WWTP - Sub-surface Discharge System**

tem	Components	Unit	Unit Cost	0-10yrs		10-20yrs	
				Units	Cost	Units	Cost
1	8" Force Main* (Chimney Rock#4 PS)	LF	\$20	17400	\$348,000	0	\$0
2	6" Force Main* (Dix Dam#11 PS)	LF	\$15	8500	\$128,000	0	\$0
3	Chimney Rock #4 Pump Station (440 gpm @ 175ft TDH-20yrs) with all associated appurtenances, wet well, and valve vault	LS	\$150,000	1	\$150,000	0	\$40,000
4	Air Release Valves w/Manholes	EA	\$5,000	3	\$15,000	0	\$0
5	Dix Dam #11 Pump Station (220 gpm @ 50ft TDH-20yrs) with all associated appurtenances, wet well and valve vault	LS	\$125,000	1	\$125,000	0	\$25,000
6	Air Release Valves w/Manholes	EA	\$5,000	3	\$15,000	0	\$0
7	Odor Control Equipment@ Chimney Rock #4 P.S. & Dix Dam #11 P.S.	LS	\$20,700	2	\$41,000	0	\$10,000
8	Recirculating Sand Filter WWTP includes plant pumps and piping systems (~60% of Total Herrington Lake Flows)	Avg. GPD	\$13	82000	\$1,066,000	82000	\$1,066,000
9	Drip Irrigation System	Avg. GPD	\$2	82000	\$164,000	82000	\$164,000
10	Stream Crossings (6)	LF	\$100	600	\$60,000	0	\$0
11	Easements-Force Mains	LF	\$1.75	25900	\$45,000	0	\$0
12	Land-WWTP & P.S. Site (0.25 Acres)	Acre	\$4,000	35	\$140,000	10	\$40,000
13	Boring & Jack w/ Casing 6-8-inch Force Main (~5 crossings)	LF	\$150	800	\$120,000	0	\$0
	Total				\$2,417,000		\$1,345,000
	Total footage of force main			17400		0	
	Restoration-pavement and driveways (5%)				\$121,000		
	Erosion and Sediment Control (2%)				\$48,000		\$27,000
	General conditions (5%)				\$121,000		\$67,000
	Subtotal construction costs				\$2,707,000		\$1,439,000
	Construction contingencies and engineering (35%)				\$947,000		\$504,000
	Total capital costs				\$3,650,000		\$1,940,000

\*Assumed using SDR 21 PVC.

**Table 9.03-13 Opinion of Probable Construction Cost for Herrington Lake Combined Community Alternative A- Conveying to Herrington WWTP Surface Disposal System**

<b>Process</b>	<b>Units</b>	<b>Number of Units</b>	<b>Flow Unit/ MGD</b>	<b>Design Criteria</b>
Chimney Rock #4 Submersible Pumps (Non-Clog) I	EA	2	440 gpm	Submersible 4-inch with backup pump at approx. 171ft TDH
Chimney Rock #4 P.S. Wet Well (Total Storage=10,998 gal wet well at 16 ft)	EA	1	0.132 mgd	> 2 hr. detention time-20yrs. 12 ft diameter with 18ft depth for pumps and HWL Alarm at 13 ft depth for emergency storage
Chimney Rock #4 P.S. Odor Control Chemical Feed System	EA	1	0.132 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Chimney Rock #4 P.S. Force Main (8-inch SDR 21)	LF	17,400	0.634 mgd	> 2 ft/sec. 440 gpm = 2.81 fps-20yrs. Frictional Headloss = 50 ft -20 yrs. Static Headloss = ((920-820)+21)=121 ft
Chimney Rock #4 P.S.-Air Release Valves	EA	3	N/A	At highpoints within the force mains
Dix Dam #11 Submersible Pumps (Non-Clog)	EA	2	220 gpm	Submersible 4-inch with backup pump at approx. 58 ft TDH
Dix Dam #11 P.S. Wet Well (Total Storage=2,644 gal wet well at 12.5 ft)	EA	1	0.031 mgd	> 2 hr. detention time-20yrs. 6 ft diameter with 19ft depth for pumps and HWL Alarm at 12.5 ft depth for emergency storage
Dix Dam #11 P.S. Odor Control Chemical Feed System	EA	1	0.031 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Dix Dam #11 P.S. Force Main (6-inch SDR 21)	LF	8,500	0.312 mgd	> 2 ft/sec. 220 gpm = 2.5 fps-20yrs. Frictional Headloss = 29 ft -20 yrs. Static Headloss = ((910-900)+19)=29 ft
Dix Dam #11 P.S.-Air Release Valves	EA	4	N/A	At highpoints within the force mains
Paradise Camp #7 Submersible Pumps (Non-Clog)	EA	2	350 gpm	Submersible 4-inch with backup pump at approx. 88 ft TDH
Paradise Camp #7 P.S. Wet Well (Total Storage=9,400 gal wet well at 16 ft)	EA	1	0.031 mgd	> 2 hr. detention time-20yrs. 10 ft diameter with 21.5ft depth for pumps and HWL Alarm at 16 ft depth for emergency storage
Paradise Camp #7 P.S. Odor Control Chemical Feed System	EA	1	0.031 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Paradise Camp #7 P.S. Force Main (8-inch SDR 21)	LF	12,400	0.504 mgd	> 2 ft/sec. 350 gpm = 2.23 fps-20yrs. Frictional Headloss = 26 ft -20 yrs. Static Headloss = ((915-875)+21.5)=61.5 ft
Paradise Camp #7 P.S.-Air Release Valves	EA	5	N/A	At highpoints within the force mains

(See Table 9.03-4-Alternative B-for further Design Criteria used from Burgin #1 LS to the Harrodsburg Collection System.)

**Table 9.03-14 Design Criteria for Alternative B- All Herrington Lake Combined-Conveyance to Burgin #1 LS**

Item	Components	Unit	Unit Cost	Installation Markup	0 - 10-yr		0 - 20-yr	
					Units	Cost	Units	Cost
1	8" Force Main* (Chimney Rock#4 PS)	LF	\$20	1.00	17400	\$348,000	0	\$0
2	6" Force Main* (Dix Dam#11 PS)	LF	\$15	1.00	8500	\$128,000	0	\$0
3	8" Force Main* (Paradise Camp#7PS)	LF	\$20	1.00	12400	\$248,000	0	\$0
4	Chimney Rock #4 Pump Station (440 gpm @ 171ft TDH-20yrs) with all assoc. appurtenances, wet well & valve vault	LS	\$250,000	1.00	1	\$250,000	0	\$75,000
5	Air Release Valves w/Manholes	EA	\$5,000	1.00	3	\$15,000	0	\$0
6	Dix Dam #11 Pump Station (220 gpm @ 58ft TDH-20yrs) with all assoc. appurtenances, wet well & valve vault	LS	\$125,000	1.00	1	\$125,000	0	\$25,000
7	Air Release Valves w/Manholes	EA	\$5,000	1.00	3	\$15,000	0	\$0
8	Paradise Camp #7 Pump Station (350 gpm @ 163ft TDH-20yrs) with all assoc. appurtenances, wet well & valve vault	LS	\$175,000	1.00	1	\$175,000	0	\$50,000
9	Air Release Valves w/Manholes	EA	\$5,000	1.00	5	\$25,000	0	\$0
10	Odor Control Equipment@ Chimney Rock#4 PS, Dix Dam#11 PS & Paradise Camp#7 PS	LS	\$20,700	1.00	3	\$63,000	0	\$0
11	12" Force Main for Burgin#1 PS <b>-Difference b/w Burgin Alt.A &amp; Alt.B</b>	LF	\$5	1.00	19500	\$97,000	0	\$0
12	Burgin #1 Pump Station (860 gpm @ 140ft TDH-10yrs & 1260 gpm @ 180ft TDH-20yrs) with all assoc. appurtenances, 2 wet wells and valve vault <b>-Difference b/w Burgin Alt.A &amp; Alt.B</b>	LS	\$50,000	1.00	1	\$50,000	0	\$150,000
13	Air Release Valves w/Manholes <b>-Difference b/w Burgin Alt.A &amp; Alt.B</b>	EA	\$0	1.00	4	\$0		\$0
14	Odor Control Equipment@ Burgin #1 P.S. <b>-Difference b/w Burgin Alt.A &amp; Alt.B</b>	LS	\$4,000	1.00	1	\$4,000		\$0
15	Stream Crossings (8) (before Burgin - no difference after)	LF	\$100	1.00	560	\$56,000	0	\$0
16	Easements-Force Mains	LF	\$1.75	1.00	57800	\$102,000	0	\$0
17	Land -P.S. Site (0.25 Acres) (before Burgin - no difference after.)	Acre	\$4,000	1.00	2	\$8,000	0	\$0
18	Boring & Jack w/ Casing 12-inch Force Main (outside H-burg Planning Area) (~12 crossings w/ 4 large crossings) -Difference b/w Burgin Alt.A & Alt.B	LF	\$300	1.00	800	\$240,000		\$0
19	Boring & Jack w/ Casing 6"&8" Force Main (before Burgin)	LF	\$150	1.00	800	\$120,000		\$0
	Total					\$2,069,000		\$300,000
	Total footage of force main				19500		0	
	Restoration-pavement and driveways (5%)					\$104,000		\$15,000
	Erosion and Sediment Control (2%)					\$42,000		\$6,000
	General conditions (5%)					\$104,000		\$15,000
	Subtotal construction costs					\$2,319,000		\$336,000
	Construction contingencies and engineering (35%)					\$812,000		\$118,000
	Total capital costs					\$3,131,000		\$454,000

\*Assumed using SDR 21 PVC.

**Table 9.03-15 Opinion of Probable Construction Cost for All Herrington Lake Service Area with Paradise Camp Service Area Alternative B- Conveying to Danville WWTP**

Revised March 2013

Item	Components	Unit	Unit Cost	0 - 10-yr		0 - 20-yr	
				Units	Cost	Units	Cost
1	8" Force Main* (Chimney Rock#4 PS)	LF	\$20	17400	\$348,000	0	\$0
2	6" Force Main* (Dix Dam#11 PS)	LF	\$15	8500	\$128,000	0	\$0
3	Chimney Rock #4 Pump Station (440 gpm @ 171ft TDH-20yrs) with all assoc. appurtenances, wet well & valve vault	LS	\$250,000	1	\$250,000	0	\$75,000
4	Air Release Valves w/Manholes	EA	\$5,000	3	\$15,000	0	\$0
5	Dix Dam #11 Pump Station (220 gpm @ 58ft TDH-20yrs) with all assoc. appurtenances, wet well & valve vault	LS	\$125,000	1	\$125,000	0	\$25,000
6	Air Release Valves w/Manholes	EA	\$5,000	3	\$15,000	0	\$0
7	Odor Control Equipment@ Chimney Rock#4 PS,Dix Dam#11 PS	LS	\$20,700	2	\$42,000	0	\$0
8	12" Force Main for Burgin#1 PS <b>-Difference b/w.Burgin Alt.A &amp; Alt.B</b>	LF	\$5	19500	\$97,000	0	\$0
9	Burgin #1 Pump Station (860 gpm @ 140ft TDH-10yrs & 1260 gpm @ 180ft TDH-20yrs) with all assoc. appurtenances, 2 wet wells and valve vault <b>-Difference b/w Burgin Alt.A &amp; Alt.B</b>	LS	\$50,000	1	\$50,000	0	\$150,000
10	Air Release Valves w/Manholes <b>-Difference b/w Burgin Alt.A &amp; Alt.B</b>	EA	\$0	4	\$0		\$0
11	Odor Control Equipment@ Burgin #1 P.S. <b>-Difference b/w Burgin Alt.A &amp; Alt.B</b>	LS	\$4,000	1	\$4,000		\$0
12	Stream Crossings (8) <b>(before Burgin - no difference after)</b>	LF	\$100	560	\$56,000	0	\$0
13	Easements-Force Mains	LF	\$1.75	45400	\$80,000	0	\$0
14	Land -P.S. Site (0.25 Acres) <b>(before Burgin - no difference after.)</b>	Acre	\$4,000	2	\$8,000	0	\$0
15	Boring & Jack w/ Casing 12-inch Force Main (outside H-burg Planning Area) (~12 crossings w/ 4 large crossings) <b>-Difference b/w Burgin Alt.A &amp; Alt.B</b>	LF	\$300	800	\$240,000		\$0
16	Boring & Jack w/ Casing 6"&8" Force Main (before Burgin)	LF	\$100	800	\$80,000		\$0
	<b>Total</b>				\$1,538,000		\$250,000
	Total footage of force main			19500		0	
	Restoration-pavement and driveways (5%)				\$77,000		\$13,000
	Erosion and Sediment Control (2%)				\$31,000		\$5,000
	General conditions (5%)				\$77,000		\$13,000
	<b>Subtotal construction costs</b>				\$1,723,000		\$281,000
	<b>Construction contingencies and engineering (35%)</b>				\$604,000		\$99,000
	<b>Total capital costs</b>				\$2,327,000		\$380,000

\*Assumed using SDR 21 PVC.

**Table 9.03-16 Opinion of Probable Construction Cost for Herrington Lake Service Area without Paradise Camp Service Area Alternative B- Conveying to Danville WWTP. (For comparison with Alternative A)**

Process	Units	No. of Units	Flow Unit/MGD	Design Criteria
Salvisa Pump Station (L.S.) Submersible Pumps (Non-Clog)	EA	2	500 gpm - 10yrs 570 gpm - 20 yrs	Submersible 6-inch with backup pump at approx.150ft TDH for first 10yrs & 153ft TDH for 10-20 yrs (Size for 20 yrs.)
Salvisa P.S. Wet Well (Total Storage=18,717 gallons) (16,073 gal wet well at 19 ft) + 3,644 gal for emergency storage within 18-inch Interceptor sewer)	EA	1	0.223 mgd	> 2 hr. detention time-20yrs. 12 ft diameter with 25ft depth for pumps and HWL Alarm at 19 ft depth for emergency storage) along with 200 ft of 18-inch new interceptor sewer line
Salvisa P.S. Odor Control Chemical Feed System	EA	1	0.223 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Salvisa P.S. Force Main (10-inch SDR 21)	LF	9,300	0.823 mgd	> 2 ft/sec. 500 gpm = 2.04 fps-10 yrs & 570 gpm = 2.33 fps-20yrs. Frictional Headloss = 14 ft -10yrs & 17 ft -20 yrs. Static Headloss = ((870-760)+25)=135 ft
Salvisa P.S.-Air Release Valves	EA	2	N/A	At highpoints within the force mains
Vanarsdell Submersible Pumps (Non-Clog) Includes future Herrington Lake Combined flows	EA	2	500 gpm - 10yrs 570 gpm - 20 yrs	Submersible 6-inch with backup pump at approx.123ft TDH for first 10yrs & 128 ft TDH for 10-20 yrs (Size for 20 yrs.)
Vanarsdell P.S. Wet Well (Total well Storage=18,611 gal. wet well at 22 ft)	EA	1	0.223 mgd	> 2 hr. detention time-20yrs. 12 ft diameter with 28ft depth for pumps and HWL Alarm at 22 ft depth for emergency storage) -No Interceptor
Vanarsdell P.S. Force Main (10-inch SDR 21)	LF	14,500	0.823 mgd	> 2 ft/sec. 500 gpm = 2.04 fps-10 yrs & 570 gpm = 2.33 fps-20yrs. Frictional Headloss = 20 ft -10yrs & 25 ft -20 yrs. Static Headloss = ((890-815)+28)=103 ft
Vanarsdell P.S.-Air Release Valves	EA	5	N/A	At highpoints within the force mains
Providence P.S. Submersible Pumps (Non-Clog) Includes future Providence Service Area flows	EA	2	500 gpm - 10yrs 680 gpm - 20 yrs	Submersible 6-inch with backup pump at approx.171ft TDH for first 10yrs & 200 ft TDH for 10-20 yrs (Size for 20 yrs.)
Providence P.S. Wet Well (Total Storage=20,705 gallons) (16,919 gal each wet well at 20 ft) + 3,786 gal for emergency storage within 8-inch Interceptor sewer)	EA	1	0.454 mgd	> 2 hr. detention time-20yrs. 12 ft diameter with 25ft depth for pumps and HWL Alarm at 20 ft depth for emergency storage) along with 1450 ft of 8-inch new interceptor sewer line
Providence P.S. Odor Control Chemical Feed System	EA	1	0.454 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Providence P.S. Force Main (10-inch SDR 21)	LF	22,900	0.974 mgd	> 2 ft/sec. 500 gpm = 2.04 fps-10 yrs & 680 gpm = 2.78 fps-20yrs. Frictional Headloss = 56 ft -10yrs & 84 ft -20 yrs. Static Headloss = ((920-830)+25)=115 ft
Providence P.S.-Air Release Valves	EA	7	N/A	At highpoints within the force mains
Park P.S. Submersible Pumps (Non-Clog) Includes future McAfee Service Area flows	EA	3-10yrs, 4- 20yrs	425 gpm-10yrs, 425 gpm -20yrs	Submersible 6-inch with backup pump at approx.116ft TDH for first 10yrs & 145ft TDH for 10-20 yrs)
Park P.S. Wet Well (Generator Required, Total Storage=8,460 gal. wet well at 10 ft)	EA	1	1.217 mgd - 10 yrs & 1.476 mgd - 20 yrs	Generator Required Storage too large for >2 hr. detention time-20yrs. 12 ft diameter with 17ft depth for pumps and HWL Alarm at 10 ft depth for emergency storage) -No Interceptor
Park P.S. Odor Control Chemical Feed System	EA	1	1.217 mgd - 10 yrs & 1.476 mgd - 20 yrs	2-Positive Displacement Chemical Feed Pumps with 1-Fiberglass Storage Tank
Park P.S. Force Main (12-inch SDR 21)	LF	17,750	1.476 mgd	> 2 ft/sec. 845 gpm = 2.4 fps-10yrs & 1275 gpm =3.62 fps-20yrs. Frictional Headloss = 26 ft -10 yrs & 55 ft -20 yrs. Static Headloss = ((920-855)+25)=90 ft.
Park P.S.-Air Release Valves	EA	5	N/A	At highpoints within the force mains

\*Assumed using SDR 21 PVC.

**Table 9.03-17 Design Criteria for Salvisa Service Area Alternative B- Conveying to Harrodsburg WWTP. (w/ McAfee Service Area Considered)**

*Revised March 2013*

Item	Components	Unit	Unit Cost	0-10-yr		10-20-yr	
				Units	Cost	Units	Cost
1	10" force main* (Salvisa PS)	LF	\$23	9300	\$214,000	0	\$0
2	10" force main* (Vanarsdell PS)	LF	\$23	14500	\$334,000	0	\$0
3	10" force main* (Providence PS) <b>(84%)**</b>	LF	\$23	22800	\$440,000	0	\$0
4	12" force main* (Park PS) <b>(56%)**</b>	LF	\$30	17700	\$300,000	0	\$0
5	Salvisa Pump Station to Vanarsdell PS & HWWTP (500 gpm @ 150ft TDH-10yrs) & (570gpm @ 153ft TDH-20yrs) with all associated appurtenances, wet well & valve vault	LS	\$250,000	1	\$250,000	0	\$60,000
6	Air Release Valves w/Manholes	EA	\$5,000	2	\$10,000	0	\$0
7	Vanarsdell Pump Station to Providence PS & HWWTP (500 gpm @ 123ft TDH-10yrs) & (570gpm @ 128ft TDH-20yrs) with all associated appurtenances, wet well & valve vault	LS	\$250,000	1	\$250,000	0	\$60,000
8	Air Release Valves w/Manholes	EA	\$5,000	5	\$25,000	0	\$0
9	Providence Pump Station <b>(84%)**</b> <b>(Includes Salvisa, Bondsville, New Providence PS &amp; Providence discharge)</b> <b>(Sharing 10"FM with McAfee PS &amp; Mundys PS)</b> (500 gpm @ 181ft TDH-10yrs) & (680gpm @ 200ft TDH-20yrs) with all associated appurtenances, wet well & valve vault (2nd wet well 10-20yrs)	LS	\$300,000	1	\$250,000	0	\$130,000
10	Air Release Valves w/Manholes <b>(84%)**</b>	EA	\$5,000	7	\$30,000	0	\$0
11	Park Pump Station <b>(56%)**</b> <b>(Includes Salvisa Service Area, McAfee Service Area &amp; Heritage Ctr)</b> (2 pumps+1backup, each 425 gpm @ 116ft TDH, EA-10yrs) & (3pumps+1backup, each 425 gpm @ 145ft TDH, EA-20yrs) with all assoc. appurtenances, wet well, generator & valve vault	LS	\$450,000	1	\$250,000	0	\$100,000
12	Air Release Valves w/Manholes <b>(56%)**</b>	EA	\$5,000	5	\$10,000	0	\$0
13	Odor Control Equipment@ Providence P.S. <b>(84%)**</b> & Park P.S. <b>(56%)**</b>	LS	\$26,450	2	\$30,000	0	\$0
14	Portable Generator	LS	\$35,000	1	\$35,000	0	\$0
15	Stream Crossings (8) (Providence PS <b>(84%)**</b> & Park PS <b>(56%)**</b> )**	LF	\$100	400	\$30,000	0	\$0
16	Easements- 10"Force Mains (Providence PS <b>(84%)**</b> & Park PS <b>(56%)**</b> )**	LF	\$1.75	64300	\$90,000	0	\$0
17	Boring & Jack w/ Casing for 10-inch Force Main (Providence PS <b>(84%)**</b> & Park PS <b>(56%)**</b> ) (~21 w/ 15 Large Bores)	LF	\$300	1800	\$450,000	0	\$0
18	Harrodsburg WWTP Upgrade <sup>(1)</sup> (Salvisa & Bondville Only)	Avg. GPD	\$0	154000	\$0	69000	\$0
	Total				\$2,998,000		\$350,000
	Total footage of force main			64300		0	
	Restoration-pavement and driveways (5%)				\$150,000		
	Erosion and Sediment Control (2%)				\$60,000		\$7,000
	General conditions (5%)				\$150,000		\$18,000
	Subtotal construction costs				\$3,358,000		\$375,000
	Construction contingencies and engineering (35%)				\$1,175,000		\$131,000
	Total capital costs				\$4,530,000		\$510,000

\*Assumed using SDR 21 PVC.

\*\*Indicates % shared cost with other Service Areas based on % total gallons needed in shared system.

<sup>(1)</sup> Capacity available today, no upfront cost.

**Table 9.03-18 Opinion of Probable Construction Cost for Salvisa Service Area  
Alternative B- Conveying to Harrodsburg WWTP. (with McAfee Service Area Considered)**

*Revised March 2013*

## 6. McAfee Service Area

The McAfee Service Area was considered for public sewer service because of growth potential and its location relative to US 127, Bluegrass Parkway the City of Harrodsburg. McAfee Service Area at present only has individual septic tank systems. The Kentucky Agricultural Heritage Center was recently added to the list of reasons for providing sewer service to this area of Mercer County. For this area, conventional collection and conveyance systems with treatment in Harrodsburg was the only alternative considered. All wastewater will be collected to regional pumping stations that then pump either directly into the 10-inch proposed force main to be shared with Salvisa and Bondville or into the Providence Pumping Station for further conveyance within a 10-inch force main to the Park Pumping Station. At the Park Pumping Station, both the Heritage Center and Providence Pumping Stations converge before being pumped through a 12-inch force main directly to the Harrodsburg WWTP. Figure 9.03-8 shows the orientation of this system. The Design Criteria for this Alternative B is shown in Table 9.03-19. These criteria were used to develop an estimated cost for implementation of this alternative and are provided in Table 9.03-20.

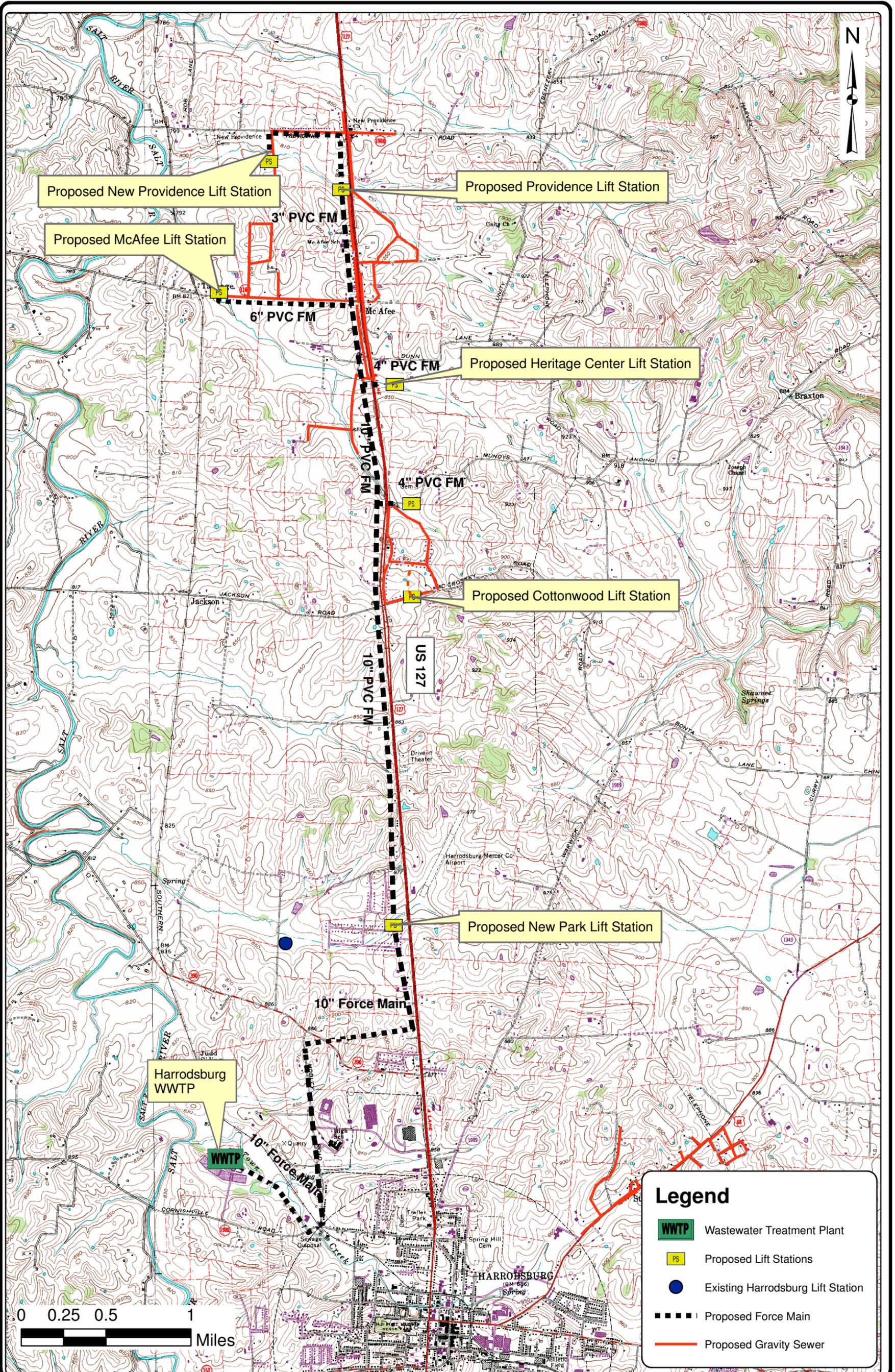
### 9.04 PROJECTED COSTS

Capital costs and operation and maintenance costs were evaluated for each of the alternatives. The anticipated capital cost for each wastewater treatment alternative as previously discussed is summarized in Table 9.04-1.

Operation and maintenance costs were evaluated relative to the Mercer County Sanitation District direct expenses for the initial Brightleaf Service Area Alternative and for those involving multiple treatment options. Direct Wastewater treatment related operation and maintenance costs for the Harrodsburg and Danville WWTP were reviewed with both municipalities. The cost for such expense will be incorporated into the dollar per thousand gallons treated cost charged to the Mercer County Sanitation District Customers as provided by either City. For the Brightleaf, Stringtown, McAfee, and Salvisa Service Areas, only conveyance to Harrodsburg was considered viable at this time. For the Burgin and Herrington Lake areas conveyance to Danville was selected as the preferred alternative. The Danville WWTP offers a more preferable rate, causing conveyance from Burgin and the Herrington Lake areas to Danville to be a more cost-effective alternative.

Of these Service Areas, Brightleaf will be the first to receive public sewer service. To help plan for the near term operation and maintenance (O&M) of this sewer system, an annual budget includes the following:

- Approximately \$10,000 to cover such costs as gravity sewer cleanout to remove blockages and force main emergency break repairs
- A part-time staff member would also be required to oversee the maintenance program for the system and facilitate emergency repair crews
- Electric costs for operating the pump stations
- Treatment costs charged by Harrodsburg



**Figure 9.03-8**  
**McAfee Service Area Alternative B-**  
**Conveyance to Harrodsburg WWTP**  
 Mercer County Regional Wastewater Facilities Plan  
 Mercer County Sanitation District

The Herrington Lake Service Area has two treatment alternatives under consideration. Table 9.04-2 presents the Annual O & M Costs for the Herrington Lake Service Area. This alternative comparison covered treatment for both the Dix Dam Combined Service Area and Chimney Rock Combined Service Areas. This alternative includes costs for equipment maintenance including septic tank clean out, the negotiated Danville sewer rate of \$1.87 per 1000 gallons, Herrington WWTP treatment costs at \$4.00 per average gallon day, and operation staff. Electrical cost for conveyance to Danville to that of the Herrington WWTP was found to be comparable and was not included in the above costs.

Process	Units	No.of Units	Flow Unit/MGD	Design Criteria
Providence P.S. Submersible Pumps (Non-Clog) Includes future Providence Service Area flows	EA	2	500 gpm - 10yrs 680 gpm - 20 yrs	Submersible 6-inch with backup pump at approx.171ft TDH for first 10yrs & 200 ft TDH for 10-20 yrs (Size for 20 yrs.)
Providence P.S. Wet Well (Total Storage=20,705 gallons) (16,919 gal each wet well at 20 ft) + 3,786 gal for emergency storage within 8-inch Interceptor sewer)	EA	1	0.454 mgd	> 2 hr. detention time-20yrs. 12 ft diameter with 25ft depth for pumps and HWL Alarm at 20 ft depth for emergency storage) along with 1450 ft of 8-inch new interceptor sewer line
Providence P.S. Odor Control Chemical Feed System	EA	1	0.454 mgd	2-Positive Displacement Chemical Feed Pumps & 1-Fiberglass Storage Tank
Providence P.S. Force Main (10-inch SDR 21)	LF	22,900	0.974 mgd	> 2 ft/sec. 500 gpm = 2.04 fps-10 yrs & 680 gpm = 2.78_fps-20yrs. Frictional Headloss = 56 ft -10yrs & 84 ft -20 yrs. Static Headloss = ((920-830)+25)=115 ft
Providence P.S.-Air Release Valves	EA	7	N/A	At highpoints within the force mains
Park P.S. Submersible Pumps (Non-Clog) Includes future McAfee Service Area flows	EA	3-10yrs, 4- 20yrs	425 gpm-10yrs, 425 gpm -20yrs	Submersible 6-inch with backup pump at approx.116ft TDH for first 10yrs & 145ft TDH for 10-20 yrs)
Park P.S. Wet Well (Generator Required, Total Storage=8,460 gal. wet well at 10 ft)	EA	1	1.217 mgd - 10 yrs & 1.476 mgd - 20 yrs	Generator Required Storage too large for >2 hr. detention time-20yrs. 12 ft diameter with 17ft depth for pumps and HWL Alarm at 10 ft depth for emergency storage) -No Interceptor
Park P.S. Odor Control Chemical Feed System	EA	1	1.217 mgd - 10 yrs & 1.476 mgd - 20 yrs	2-Positive Displacement Chemical Feed Pumps with 1-Fiberglass Storage Tank
Park P.S. Force Main (12-inch SDR 21)	LF	17,750	1.476 mgd	> 2 ft/sec. 845 gpm = 2.4 fps-10yrs & 1275 gpm =3.62 fps-20yrs. Frictional Headloss = 26 ft -10 yrs & 55 ft -20 yrs. Static Headloss = ((920-855)+25)=90 ft.
Park P.S.-Air Release Valves	EA	5	N/A	At highpoints within the force mains

\*Assumed using SDR 21 PVC.

**Table 9.03-19 Design Criteria for McAfee Service Area Alternative B- Conveying to Harrodsburg WWTP. (w/ Heritage Center & Salvisa Service Area Considered)**