

### 8.30 Pump Station Improvements

A description of the existing conveyance system pumping stations and deficiencies was discussed in previous sections of this report. Proposed improvements to the pumping stations include the following:

**Depot Road Pumping Station:** Proposed improvements include new pump bases, new guide rails, new check valves, new VFD controls, new telemetry system and a general rehabilitation of the structure. Replacing the existing 10 inch force main with a new 16 inch force main is also included in this upgrade.

**Island Creek Pumping Station:** Proposed improvements include abandonment of the existing pumping station and the construction of an appropriately sized submersible or wet well mounted suction lift pumping station adjacent to the existing station. The new station will utilize the existing force main to pump to the Paintsville WWTP. The proposed pumping will have a new telemetry system to monitor operations.

**Flat Rock Station:** Proposed upgrade to include new pumps, rails, telemetry system and control panel.

**Lowe’s Pump Station:** Improvements to include new rails, new telemetry system, new control panel, new pump bypass, a lifting system to facilitate pump removal for maintenance and new “chopper type” pumps.

**Cross Creek Pump Station #1:** Upgrade will include new guide rails, telemetry system, new chopper type pumps, new control panel and re-setting top.

**Cross Creek Pump Station #2:** Upgrade will include new control panel and new telemetry system.

**Golf Course Pump Station:** Upgrade will include new pump controls, pump bypass connection and telemetry.

**Paintsville Lake Pump Station:** Upgrade will include new telemetry system.

**Village Green Pump Station:** Upgrade will include a new telemetry system.

**West Van Lear #1 Pump Station:** Proposed improvements would include an upgrade of the telemetry system, replacement of one of the pumps, repair the pump replaced to act as a spare and correct some electrical issues.

**West Van Lear #2 Pump Station:** Replace pumps with chopper pumps, new control panel and upgrade telemetry system.

**Stoney Brook Pump Station:** It is proposed that this station receive new pumps, controls, guide rails and the addition of a telemetry system for station monitoring.

**Dewey Dam Pumping Station:** Replace one pump.

**Auxier Pump Station #2:** Install new lifting chains, new chopper pumps and repair access road.

**Auxier Pump station #1:** Replace pumps, new pump bypass connection and new access road.

**Honey Branch Pre-Screening Facility :** Upgrade includes:

Replace one existing screens with vertical mechanical screen

Refurbish one existing screen.

New screen control system

Remove existing crane and trolley

New HVAC system designed to operate in Class I Division I conditions

- Replace door and garage door and hardware with corrosion resistant materials
- Refurbish and securely anchor existing siphon mechanisms
- Remove existing suction lift pumps
- Completely refurbish interior surfaces of facility

The total projected project cost for **Pump Station Improvements** is:

**\$ 2,568,500.00**

A breakdown of these projected project costs for **Pump Station Improvements** can be found in **Table 8.04-2**.

#### **8.40 Extending Sewer Service**

Utilizing conventional collection systems was the only alternate considered in arriving at construction costs for extending sewers into areas currently not provided sewer service. Each sewer extension will be considered individually and funding will be pursued anticipating that the addition of customers will provide adequate income to fund each extension. The following is a detailed breakdown of the cost estimates for each area and is listed in the priority that has been provided by Paintsville Utilities.

**Table 8.10-1**

Preliminary Cost Estimate					
Powells Addition Area Sewer Extension					
NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	6,000	LF	\$60.00	\$360,000.00
2	Force Main	2,000	LF	\$25.00	\$50,000.00
3	4" Sewer Tap	80	EA	\$1,000.00	\$80,000.00
4	4" Gravity Sewer Line	2,300	LF	\$20.00	\$46,000.00
5	Manhole	30	EA	\$2,500.00	\$75,000.00
6	Road Bore	200	LF	\$120.00	\$24,000.00
7	Connection	1	EA	\$2,000.00	\$2,000.00
8	Lift Station	1	LS	\$100,000.00	\$100,000.00
9	Telemetry	1	LS	\$30,000.00	\$30,000.00
10	Gravel Replacement	150	LF	\$10.00	\$1,500.00
11	Full Width Pavement Replacement	3,000	LF	\$25.00	\$75,000.00
12	Concrete and Pavement Replacement	260	LF	\$25.00	\$6,500.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$850,000.00</b>
<b>Estimated Project Budget</b>					
	Construction			\$850,000.00	
	Contingency			\$85,000.00	
	Engineering			\$75,000.00	
	Inspection			\$50,000.00	
	Administration			\$25,000.00	
	Legal			\$10,000.00	
	Land			\$15,000.00	
<b>Total Estimated Project Budget</b>				<b>\$1,110,000.00</b>	

**Table 8.10-2**

Preliminary Cost Estimate					
Van Lear Area Sewer Extension					
NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	30,000	LF	\$60.00	\$1,800,000.00
2	Force Main	15,000	LF	\$25.00	\$375,000.00
3	4" Sewer Tap	350	EA	\$1,000.00	\$350,000.00
4	4" Gravity Sewer Line	15,000	LF	\$20.00	\$300,000.00
5	Manhole	185	EA	\$2,500.00	\$462,500.00
6	Road Bore	900	LF	\$120.00	\$108,000.00
7	Connection	1	EA	\$2,000.00	\$2,000.00
8	Lift Station	2	LS	\$100,000.00	\$200,000.00
9	Telemetry	2	LS	\$30,000.00	\$60,000.00
10	Gravel Replacement	600	LF	\$10.00	\$6,000.00
11	Full Width Pavement Replacement	3,160	LF	\$25.00	\$79,000.00
12	Concrete and Pavement Replacement	300	LF	\$25.00	\$7,500.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$3,750,000.00</b>
<b>Estimated Project Budget</b>					
	Construction			\$3,750,000.00	
	Contingency			\$375,000.00	
	Engineering			\$270,000.00	
	Inspection			\$145,000.00	
	Administration			\$50,000.00	
	Legal			\$25,000.00	
	Land			\$25,000.00	
	<b>Total Estimated Project Budget</b>			<b>\$4,640,000.00</b>	

**Table 8.10-3**

Preliminary Cost Estimate				
KY Hwy 23 Sewer Extension				
ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
6 inch force main	32,000	LF	\$30.00	\$960,000.00
2 inch force main	500	LF	\$25.00	\$12,500.00
10 inch casing and bore	1,120	LF	\$250.00	\$280,000.00
Railroad Bore	100	LF	\$300.00	\$30,000.00
6 inch directional bore	1,100	LF	\$200.00	\$220,000.00
2 inch directional bore	200	LF	\$150.00	\$30,000.00
6 inch plug valves	10	EA	\$2,500.00	\$25,000.00
Air/vaccum valves	5	EA	\$2,000.00	\$10,000.00
Lift Station	1	LS	\$375,000.00	\$375,000.00
Grinder Pump Stations	57	EA	\$5,000.00	\$285,000.00
Duplex grinder pump station for school	1	EA	\$30,000.00	\$30,000.00
Gravel Replacement	500	LF	\$10.00	\$5,000.00
1-1/4 inch force main directional bore	5,000	LF	\$25.00	\$125,000.00
Bituminous Replacement	400	LF	\$25.00	\$10,000.00
Connection to existing manhole	1	EA	\$4,000.00	\$4,000.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>				<b>\$2,401,500.00</b>
<b>Estimated Project Budget</b>				
Construction	\$2,401,500.00			
Contingency	\$240,000.00			
Engineering	\$180,000.00			
Inspection	\$105,000.00			
Administration	\$50,000.00			
Legal	\$25,000.00			
Land	\$25,000.00			
<b>Total Estimated Project Budget</b>	<b>\$3,026,500.00</b>			

**Table 8.10-4**

Preliminary Cost Estimate					
KY Hwy 321 Area Sewer Extension					
NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	16,000	LF	\$60.00	\$960,000.00
2	Force Main	5,000	LF	\$25.00	\$125,000.00
3	4" Sewer Tap	150	EA	\$1,000.00	\$150,000.00
4	4" Gravity Sewer Line	4,300	LF	\$20.00	\$86,000.00
5	Manhole	100	EA	\$2,500.00	\$250,000.00
6	Road Bore	700	LF	\$120.00	\$84,000.00
7	Connection	2	EA	\$2,000.00	\$4,000.00
8	Lift Station	2	LS	\$100,000.00	\$200,000.00
9	Telemetry	1	LS	\$30,000.00	\$30,000.00
10	Gravel Replacement	700	LF	\$10.00	\$7,000.00
11	Full Width Pavement Replacement	7,800	LF	\$25.00	\$195,000.00
12	Concrete and Pavement Replacement	360	LF	\$25.00	\$9,000.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$2,100,000.00</b>
<b>Estimated Project Budget</b>					
	Construction			\$2,100,000.00	
	Contingency			\$210,000.00	
	Engineering			\$160,000.00	
	Inspection			\$100,000.00	
	Administration			\$50,000.00	
	Legal			\$25,000.00	
	Land			\$25,000.00	
<b>Total Estimated Project Budget</b>				<b>\$2,670,000.00</b>	

**Table 8.10-5**

Preliminary Cost Estimate  
 Hager Hill Area Sewer Extension

NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	4,000	LF	\$60.00	\$240,000.00
2	Force Main	3,000	LF	\$25.00	\$75,000.00
3	4" Sewer Tap	34	EA	\$1,000.00	\$34,000.00
4	4" Gravity Sewer Line	1,050	LF	\$20.00	\$21,000.00
5	Manhole	20	EA	\$2,500.00	\$50,000.00
6	Road Bore	300	LF	\$120.00	\$36,000.00
7	Connection	1	EA	\$2,000.00	\$2,000.00
8	Lift Station	1	LS	\$100,000.00	\$100,000.00
9	Telemetry	1	LS	\$30,000.00	\$30,000.00
10	Gravel Replacement	100	LF	\$10.00	\$1,000.00
11	Concrete and Pavement Replacement	440	LF	\$25.00	\$11,000.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$600,000.00</b>

**Estimated Project Budget**

Construction	\$600,000.00
Contingency	\$60,000.00
Engineering	\$60,000.00
Inspection	\$40,000.00
Administration	\$20,000.00
Legal	\$10,000.00
Land	\$10,000.00

**Total Estimated Project Budget** **\$800,000.00**

**Table 8.10-6**

Preliminary Cost Estimate					
Allen Heights Area Sewer Extension					
NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	4,400	LF	\$60.00	\$264,000.00
2	Force Main	10,800	LF	\$25.00	\$270,000.00
3	4" Sewer Tap	35	EA	\$1,000.00	\$35,000.00
4	4" Gravity Sewer Line	1,050	LF	\$20.00	\$21,000.00
5	Manhole	20	EA	\$2,500.00	\$50,000.00
6	Road Bore	200	LF	\$120.00	\$24,000.00
7	Connection	1	EA	\$2,000.00	\$2,000.00
8	Lift Station	1	LS	\$100,000.00	\$100,000.00
9	Telemetry	1	LS	\$30,000.00	\$30,000.00
10	Gravel Replacement	200	LF	\$10.00	\$2,000.00
11	Concrete and Pavement Replacement	80	LF	\$25.00	\$2,000.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$800,000.00</b>
<b>Estimated Project Budget</b>					
	Construction			\$800,000.00	
	Contingency			\$80,000.00	
	Engineering			\$75,000.00	
	Inspection			\$50,000.00	
	Administration			\$25,000.00	
	Legal			\$10,000.00	
	Land			\$25,000.00	
<b>Total Estimated Project Budget</b>					<b>\$1,065,000.00</b>

**Table 8.10-7**

Preliminary Cost Estimate					
American Standard Area Sewer Extension					
Paintsville Utilities					
March 2013					
NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	5,500	LF	\$60.00	\$330,000.00
2	Force Main	10,000	LF	\$25.00	\$250,000.00
3	4" Sewer Tap	25	EA	\$1,000.00	\$25,000.00
4	4" Gravity Sewer Line	750	LF	\$20.00	\$15,000.00
5	Manhole	30	EA	\$2,500.00	\$75,000.00
6	Road Bore	200	LF	\$120.00	\$24,000.00
7	Connection	1	EA	\$2,000.00	\$2,000.00
8	Lift Station	1	LS	\$100,000.00	\$100,000.00
9	Telemetry	1	LS	\$30,000.00	\$30,000.00
10	Gravel Replacement	200	LF	\$10.00	\$2,000.00
11	Full Width Pavement Replacement	5,800	LF	\$25.00	\$145,000.00
12	Concrete and Pavement Replacement	80	LF	\$25.00	\$2,000.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$1,000,000.00</b>
<b>Estimated Project Budget</b>					
	Construction			\$1,000,000.00	
	Contingency			\$100,000.00	
	Engineering			\$90,000.00	
	Inspection			\$60,000.00	
	Administration			\$50,000.00	
	Legal			\$25,000.00	
	Land			\$25,000.00	
	<b>Total Estimated Project Budget</b>			<b>\$1,350,000.00</b>	

**Table 8.10-8**

Preliminary Cost Estimate  
 Thealka Area Sewer Extension

NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	17,500	LF	\$60.00	\$1,050,000.00
2	Force Main	3,000	LF	\$25.00	\$75,000.00
3	4" Sewer Tap	130	EA	\$1,000.00	\$130,000.00
4	4" Gravity Sewer Line	4,000	LF	\$20.00	\$80,000.00
5	Manhole	84	EA	\$2,500.00	\$210,000.00
6	Road Bore	600	LF	\$120.00	\$72,000.00
7	Connection	1	EA	\$2,000.00	\$2,000.00
8	Lift Station	2	LS	\$100,000.00	\$200,000.00
9	Telemetry	1	LS	\$30,000.00	\$30,000.00
10	Gravel Replacement	200	LF	\$10.00	\$2,000.00
11	Full Width Pavement Replacment	5,600	LF	\$25.00	\$140,000.00
12	Concrete and Pavement Replacement	360	LF	\$25.00	\$9,000.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$2,000,000.00</b>

**Estimated Project Budget**

Construction	\$2,000,000.00
Contingency	\$200,000.00
Engineering	\$160,000.00
Inspection	\$100,000.00
Administration	\$50,000.00
Legal	\$25,000.00
Land	\$25,000.00
<b>Total Estimated Project Budget</b>	<b>\$2,560,000.00</b>

**Table 8.10-9**

Preliminary Cost Estimate					
Davis Branch Area Sewer Extension					
NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	6,000	LF	\$60.00	\$360,000.00
2	Force Main	2,000	LF	\$25.00	\$50,000.00
3	4" Sewer Tap	50	EA	\$1,000.00	\$50,000.00
4	4" Gravity Sewer Line	1,500	LF	\$20.00	\$30,000.00
5	Manhole	30	EA	\$2,500.00	\$75,000.00
6	Road Bore	200	LF	\$120.00	\$24,000.00
7	Connection	1	EA	\$2,000.00	\$2,000.00
8	Lift Station	1	LS	\$100,000.00	\$100,000.00
9	Telemetry	1	LS	\$30,000.00	\$30,000.00
10	Gravel Replacement	250	LF	\$10.00	\$2,500.00
11	Full Width Pavement Replacement	2,800	LF	\$25.00	\$70,000.00
12	Concrete and Pavement Replacement	260	LF	\$25.00	\$6,500.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$800,000.00</b>
<b>Estimated Project Budget</b>					
	Construction			\$800,000.00	
	Contingency			\$80,000.00	
	Engineering			\$75,000.00	
	Inspection			\$50,000.00	
	Administration			\$25,000.00	
	Legal			\$10,000.00	
	Land			\$25,000.00	
<b>Total Estimated Project Budget</b>					<b>\$1,065,000.00</b>

**Table 8.10-10**

Preliminary Cost Estimate					
Mill Branch Road Area Sewer Extension (Southside)					
NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	4,500	LF	\$60.00	\$270,000.00
2	4" Sewer Tap	39	EA	\$1,000.00	\$39,000.00
3	4" Gravity Sewer Line	1,200	LF	\$20.00	\$24,000.00
4	Manhole	30	EA	\$2,500.00	\$75,000.00
5	Road Bore	150	LF	\$120.00	\$18,000.00
6	Connection	1	EA	\$2,000.00	\$2,000.00
7	Gravel Replacement	100	LF	\$10.00	\$1,000.00
8	Full Width Pavement Replacment	2,800	LF	\$25.00	\$70,000.00
9	Concrete and Pavement	40	LF	\$25.00	\$1,000.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$500,000.00</b>
<b>Estimated Project Budget</b>					
	Construction			\$500,000.00	
	Contingency			\$45,000.00	
	Engineering			\$55,000.00	
	Inspection			\$40,000.00	
	Administration			\$25,000.00	
	Legal			\$10,000.00	
	Land			\$25,000.00	
<b>Total Estimated Project Budget</b>				<b>\$700,000.00</b>	

**Table 8.10 – 11**

Preliminary Cost Estimate					
Staffordville Area Sewer Extension					
NO.	ITEM	QUANT.	UNIT	UNIT PRICE	TOTAL
1	8" Gravity Sewer Line	15,000	LF	\$60.00	\$900,000.00
2	Force Main	12,000	LF	\$25.00	\$300,000.00
3	4" Sewer Tap	110	EA	\$1,000.00	\$110,000.00
4	4" Gravity Sewer Line	3,300	LF	\$20.00	\$66,000.00
5	Manhole	81	EA	\$2,500.00	\$202,500.00
6	Road Bore	700	LF	\$120.00	\$84,000.00
7	Connection	1	EA	\$2,000.00	\$2,000.00
8	Lift Station	1	LS	\$100,000.00	\$100,000.00
9	Telemetry	1	LS	\$30,000.00	\$30,000.00
10	Gravel Replacement	1,050	LF	\$10.00	\$10,500.00
11	Full Width Pavement Replacment	6,800	LF	\$25.00	\$170,000.00
12	Concrete and Pavement Replacement	1,000	LF	\$25.00	\$25,000.00
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$2,000,000.00</b>
<b>Estimated Project Budget</b>					
	Construction			\$2,000,000.00	
	Contingency			\$200,000.00	
	Engineering			\$160,000.00	
	Inspection			\$100,000.00	
	Administration			\$50,000.00	
	Legal			\$25,000.00	
	Land			\$25,000.00	
	<b>Total Estimated Project Budget</b>			<b>\$2,560,000.00</b>	

## 8.50 Wastewater Treatment

As discussed in other sections of this regional facilities plan, the Paintsville Utilities currently operates two independent wastewater treatment facilities, the Paintsville WWTP and the Honey Branch WWTP. The Paintsville WWTP is the older of the two plants and the average daily influent is nearing the plant’s design capacity. The plant is in need of an upgrade. The Honey Branch WWTP is fairly new and the average daily influent is much less than the predicted flow. The plant is currently operating at about one third of design capacity.

Based on data and recommendations from previous revisions of the Paintsville Utilities Regional Wastewaters Facilities Plan, the Regional Wastewaters Facility Plan of the Honey Branch Planning Area, and actual flow records at the Paintsville WWTP and Honey Branch WWTP, the following projected wastewater flows for the combined waste water treatment plant are recommended:

	<b>2015</b>	<b>2040</b>
	<b><u>Avg. Daily Flow</u></b>	<b><u>Avg. Daily Flow</u></b>
<b>Paintsville WWTP</b>	<b>990,000 GPD</b>	<b>1,116,000 GPD</b>
<b>Honey Branch WWTP</b>	<b>340,000 GPD</b>	<b>570,000 GPD</b>
<b>Combined System</b>	<b>1,330,000 GPD</b>	<b>1,686,000 GPD</b>

Forecasted flows developed in Section 7 of this regional facilities plan indicate that a total capacity of 1,686,000 GPD will be required by 2040.

### 8.51 Cost Effective Analysis

Capital, operation and maintenance costs were considered for both upgrading the existing treatment plants in their current locations and combining the plants at the Honey Branch location. Current operation and maintenance costs were provided by Paintsville Utilities for both facilities. They are shown in Table 8.08-1.

#### 8.08-1 Paintsville Operating Expenses 6/30/14 – 6/30/14

<b>PAINTSVILLE UTILITIES</b>			
<b>WASTEWATER OPERATING EXPENSES</b>			
<b>Based on FYE 6/30/14 Actual Expenses and FYE 6/30/15 Budget Calculations</b>			
	PAINTSVILLE	HONEY BRANC	TOTAL
PAYROLL	\$ 128,000.00	\$ 92,000.00	\$ 220,000.00
PAYROLL TAXES	\$ 10,000.00	\$ 7,000.00	\$ 17,000.00
HEALTH INSURANCE	\$ 45,000.00	\$ 45,000.00	\$ 90,000.00
RETIREMENT	\$ 23,000.00	\$ 16,500.00	\$ 39,500.00
WORKERS COMP	\$ 5,800.00	\$ 4,200.00	\$ 10,000.00
DRUG TESTING	\$ 200.00	\$ 200.00	\$ 400.00
TRAINING	\$ 250.00	\$ 250.00	\$ 500.00
ELECTRICITY	\$ 67,000.00	\$ 130,000.00	\$ 197,000.00
UTILITIES	\$ 183,000.00	\$ 5,900.00	\$ 188,900.00
TELEPHONE	\$ 3,000.00	\$ 2,000.00	\$ 5,000.00
CHEMICALS	\$ 41,000.00	\$ 29,000.00	\$ 60,000.00
LAB & TESTING	\$ 15,500.00	\$ 15,500.00	\$ 31,000.00
SLUDGE REMOVAL	\$ 61,000.00	\$ -	\$ 61,000.00
OPERATING SUPPLIES	\$ 7,300.00	\$ 5,400.00	\$ 12,700.00
REPAIRS & MAINTENANCE	\$ 31,950.00	\$ 28,450.00	\$ 60,400.00
FUEL	\$ 3,500.00	\$ 3,000.00	\$ 6,500.00
INSURANCE	\$ 11,000.00	\$ 12,000.00	\$ 33,000.00
TOTALS	\$ 636,500.00	\$ 396,400.00	\$ 1,032,900.00

Estimates for future O&M costs were based on this information. It should be noted that O&M costs should be expected to increase annually over the planning period. However for simplicity comparison and for calculating the present worth of each alternative, it is

assumed that the O&M costs would remain constant throughout the 20-year planning period. Salvage values were based on a straight line depreciation of the 20 year period and is assumed to have a salvage value equal to 50% of the initial construction cost.

Other benefits to consider that may not necessarily be reflected in the analysis include:

- Consolidating operations, manpower and equipment
- Reducing the cost and frequency for sludge disposal
- Reducing energy consumption
- Relocating wastewater treatment facility to a rural location outside of the city limits

## 8.52 Decentralization

With this option both treatment facilities would remain in operation. The existing Paintsville WWTP would be upgraded based on the anticipated loadings during the planning period. The Honey Branch WWTP would have minimal modifications made to improve treatment.

### **Alternate P-1: Converting Existing Plant to a Sequencing Batch Reactor Plant**

Conventional activated sludge treatment systems like the existing Paintsville WWTP require separate tanks for the unit processes of biological reactions (oxidation ditches) and solids-liquid separation (clarifiers) as well as requiring return activated sludge to be returned to the aeration tanks from the clarifiers.



**Figure 8.03-1 Typical SBR Equipment**

In contrast, Sequencing Batch Reactor (SBR) technology is a method of wastewater treatment in which all phases of the treatment process occur sequentially within the same tank. SBR plants have become more popular recently and offer the following advantages over conventional activated sludge treatment plants:

1. No final clarifiers or return sludge pumps are necessary
2. No solids wash out during peak flows.
3. Ability to handle organic shock loads.
4. Minimum energy required at low flows.
5. Ability to retrofit existing tanks.
6. Minimum ground space requirements.
7. High quality effluent.
8. Biological removal of Phosphorous.
9. Minimum operator attention.



**Figure 8.03-2 Typical SBR Basin**

The City of Springfield, KY recently converted a plant similar to the Paintsville WWTP to a SBR plant with excellent results. In order to increase the capacity of the Paintsville WWTP to the proposed 1.237 MGD design capacity as recommended in the Paintsville Regional Wastewater Facilities Plan, it will be necessary to construct one additional SBR basin as well as to convert the two existing oxidation ditch basins to SBR basins. Other proposed improvements include:

- New vertical mechanical bar screening facility with redundant screens
- New grit removal system
- New influent flow measuring and sample systems
- New flow splitter control structure
- Conversion of the existing Polishing Clarifier to a Post Equalization Basin
- Upgrade of sludge pumping system
- Renovation of laboratory
- Upgrade belt press facility
- Phosphorus removal process and effluent filters
- New emergency generators
- New aeration equipment with VFD controls
- New aeration system for sludge holding tank
- New effluent flow measuring system
- New disinfection system
- Replace Drying Beds

Additionally to be able to comply with pending effluent limitations for phosphorous chemical storage and feed equipment will be required as well as polishing sand filters and effluent pumping station to be capable of utilizing the filters.

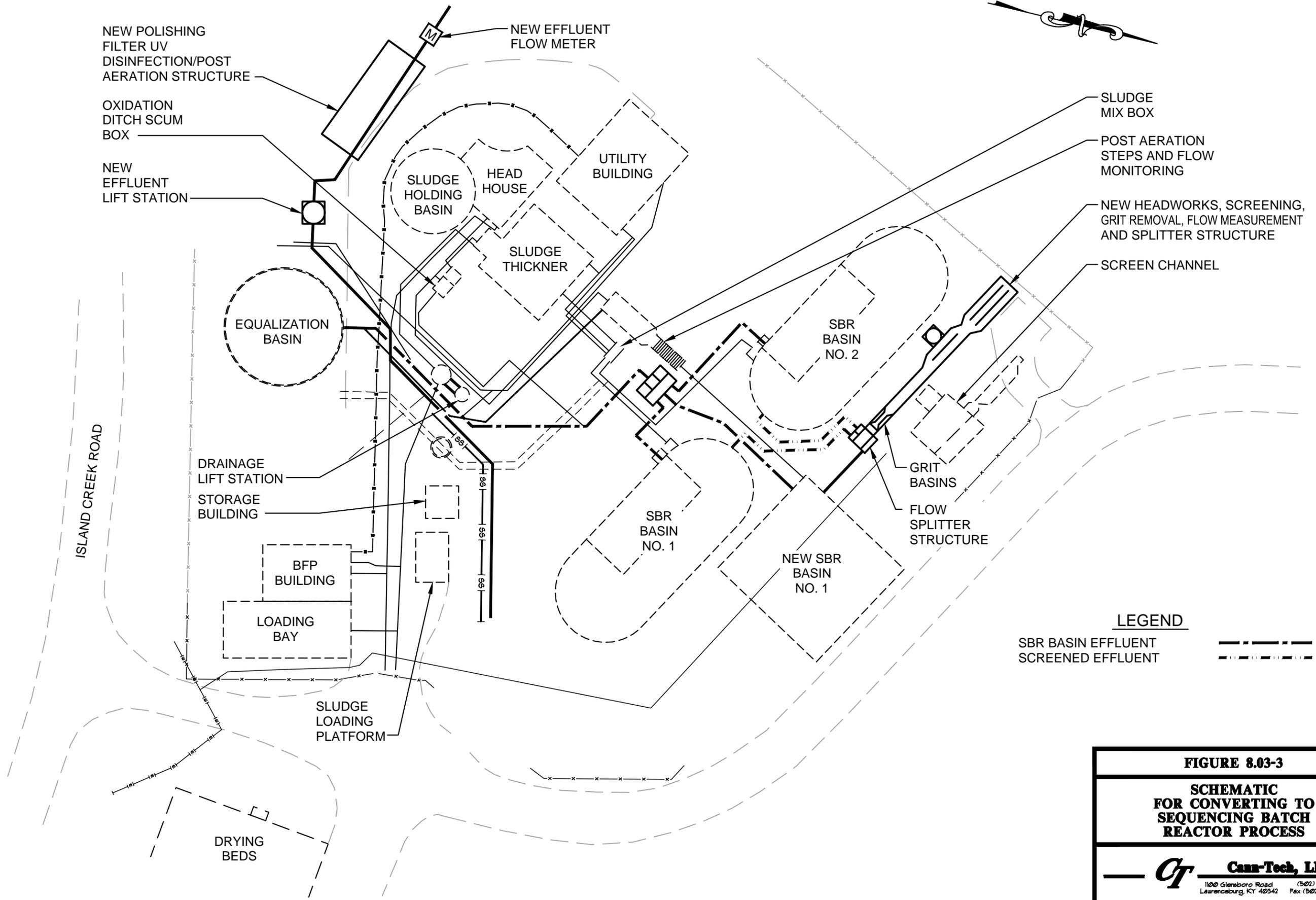
Refer to **Figure 8.03-3** for a preliminary layout for the proposed SBR plant.

The total projected project cost for:

**Alternate P-1 Converting to SBR Process** is:      **\$ 12,504,000**

This includes an allowance of \$ 2,600,000 for addressing future phosphorous effluent limits that are anticipated to be imposed by the Kentucky Division of Water.

A more detailed cost breakdown of Alternate P-1 can be found in **Table P-1**.



**FIGURE 8.03-3**

**SCHEMATIC  
FOR CONVERTING TO  
SEQUENCING BATCH  
REACTOR PROCESS**

**CT** **Cann-Tech, LLC**  
 1100 Glenboro Road (502) 853-0507  
 Laurensburg, KY 40342 Fax (502) 853-0668

**SCALE: N.T.S.      DATE: 6/2014**

<b>TABLE-1: ALTERNATE P-1 - PAINTSVILLE WWTP</b>		
<b>OPINION OF PROBABLE PROJECT COSTS</b>		
<b>Converting to Sequencing Batch Reactor Process</b>		
<b>Description</b>	<b>Quantities</b>	<b>Cost</b>
Mechanical Bar Screen with conveyor, cover and dumpster	Lump Sum	\$350,000.00
Grit Removal System	Lump Sum	\$200,000.00
Headworks Building	Lump Sum	\$250,000.00
Influent Flow Measuring System	Lump Sum	\$20,000.00
Influent Sampling System	Lump Sum	\$10,000.00
Renovation of Plant Pumping Station	Lump Sum	\$100,000.00
Conversion of Existing Oxidation Ditch to SBR	2	\$500,000.00
Construction of new SBR Basin	1	\$1,000,000.00
Flow splitter control structure	1	\$75,000.00
SBR Aeration and control Equipment	Lump Sum	\$1,100,000.00
Conversion of Existing Polishing Clarifer to Post Equalization Basin	Lump Sum	\$300,000.00
Upgrade sludge pumping equipment and valves	Lump Sum	\$50,000.00
Renovation of Lab	Lump Sum	\$50,000.00
New Roof on Headhouse	Lump Sum	\$20,000.00
New UV System	Lump Sum	\$300,000.00
Effluent sampler	Lump Sum	\$10,000.00
Upgrade belt press facility	Lump Sum	\$400,000.00
Emergency Generator	1	\$100,000.00
New aeration system for sludge holding tank	Lump Sum	\$100,000.00
New effluent flow measuring system	Lump Sum	\$20,000.00
New post aeration system	Lump Sum	\$50,000.00
<b>Subtotal</b>		<b>\$5,005,000.00</b>
Misc. Metals 3%		\$150,000.00
Painting 3%		\$150,000.00
Site Work 5%		\$250,000.00
Demolition 8%		\$400,000.00
Yard Piping and Valves 10%		\$500,000.00
Electrical and Controls 15%		\$751,000.00
HVAC 2%		\$100,000.00
<b>PROJECTED CONSTRUCTION COST</b>		<b>\$7,336,000.00</b>
Contengency, Engineering, Inspection, etc (35%)		<b>\$2,568,000.00</b>
<b>TOTAL PROJECTED PROJECT COST</b>		<b>\$9,904,000.00</b>
Alt#1 - New Phosphorous removal chemical feed equip and building	Lump Sum	\$200,000.00
Alt#2- New Polishing Sand Filters & Effluent Pumping Station	Lump Sum	\$2,400,000.00
<b>TOTAL PROJECTED PROJECT COST - ALT P-1</b>		<b>\$12,504,000.00</b>
Salvage Value (25% ) PW		\$473,940
Estimated Annual O & M Cost	\$700,000	
O & M Present Worth		\$7,415,810
Net Present Worth		\$18,485,810

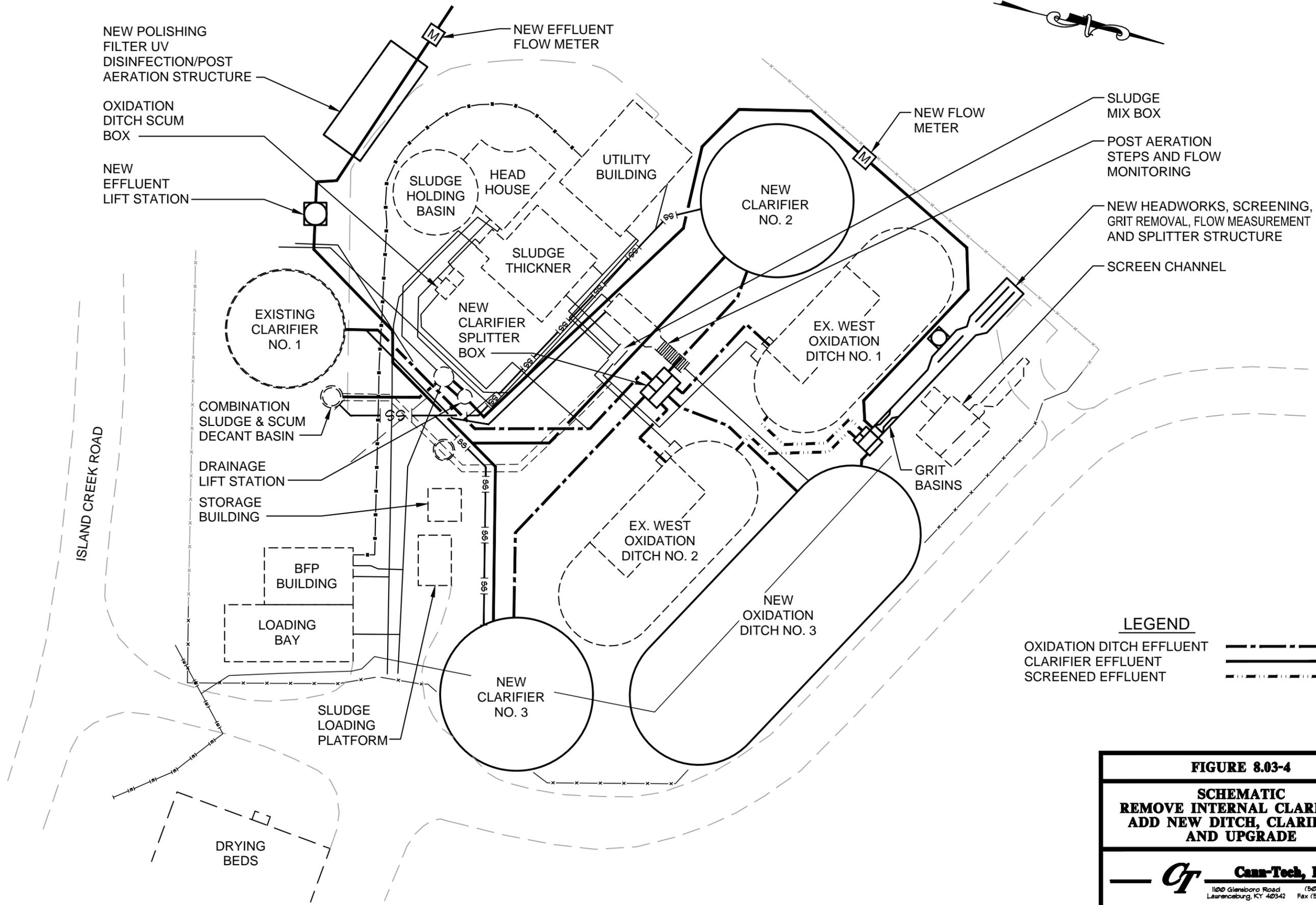
### **Alternative P-2: Remove Internal Clarifiers, Add New Ditch and Upgrade**

Alternate P-2 provides additional treatment capacity to the existing extended aeration treatment facility by removing the existing internal clarifiers within each oxidation ditch along with the addition of a third oxidation ditch. This will also require the construction of two additional final clarifiers as well as utilizing the existing polishing clarifier as a final clarifier. A schematic of the proposed facility can be seen on **Figure 8.03-4**.

Other proposed improvements will include a new Headworks Facility that will contain two mechanical vertical screens, a by-pass bar screen, one grit removal chamber and a Parshall flume for influent flow measurement. A new splitter box will be constructed to divide the flow between the three oxidation ditches. Effluent from the oxidation ditches will be directed to the three final clarifiers by a new flow distribution structure. Some additional improvements will include:

- Upgrade to sludge pumping system
- Renovation of laboratory
- Upgrade belt press facility
- New emergency generators
- New aeration system for sludge holding tank
- New effluent measuring system
- New RAS/WAS pumping station
- New disinfection system
- Drying Bed Renovations

As discussed for Alt. P-1, pending phosphorous limits will require effluent pumping, chemical feed and storage as well as polishing sand filters.



**LEGEND**

OXIDATION DITCH EFFLUENT	---
CLARIFIER EFFLUENT	====
SCREENED EFFLUENT	-.-.-.-

**FIGURE 8.03-4**

**SCHEMATIC  
REMOVE INTERNAL CLARIFIERS  
ADD NEW DITCH, CLARIFIERS  
AND UPGRADE**

**CT** **Cann-Tech, LLC**  
 1100 Glenboro Road (502) 853-0507  
 Laurensburg, KY 40342 Fax (502) 853-0668

**SCALE: N.T.S.**      **DATE: 6/2014**

U:\PAINTSVILLE\344-Paintsville Downtown Sewer Rehab\Drawings\Exhibits\Figure P-2.dwg, FIG 8.03-4, 3/25/2016 2:00:03 PM, DWG To PDF.pc3

The total projected project cost for:

**Alternate P-2- Remove Internal Clarifiers, Add New Ditch and Upgrade**

Is:     **\$ 12,691,000**

As in Alt. P-1, this estimate includes an allowance of \$ 2,600,000 to address future anticipated phosphorous effluent limits.

A more detailed breakdown of costs for Alternate P-2 can be found in **Table P-2**.

<b>TABLE P-2: ALTERNATE P-2- PAINTSVILLE WWTP</b>		
<b>OPINION OF PROBABLE PROJECT COSTS</b>		
<b>Remove Internal Clarifiers, Add New Ditch, Clarifiers and Upgrade</b>		
<b>Description</b>	<b>Quantities</b>	<b>Cost</b>
Mechanical Bar Screen with conveyor, cover and dumpster	Lump Sum	\$350,000.00
Grit Removal System	1	\$200,000.00
Headworks Building	Lump Sum	\$250,000.00
Influent Flow Measuring System	Lump Sum	\$20,000.00
Influent Sampling System	Lump Sum	\$10,000.00
Renovation of Plant Pumping Station	Lump Sum	\$100,000.00
Rehab Existing Oxidation Ditch	Lump Sum	\$250,000.00
Construction of new Oxidation Ditch	1	\$800,000.00
Flow splitter control structure	1	\$75,000.00
New Aerators with VFD	Lump Sum	\$900,000.00
New Final Clarifier	2	\$800,000.00
New Post Aeration System (diffusers, blowers, structure, etc.)	Lump Sum	\$100,000.00
New effluent flow measuring system	Lump Sum	\$20,000.00
New aeration system for sludge holding tank	Lump Sum	\$40,000.00
Clarifier flow splitter	Lump Sum	\$75,000.00
New RAS/WAS Pumping Station	Lump Sum	\$200,000.00
Upgrade sludge pumping equipment and valves	Lump Sum	\$50,000.00
Renovation of Lab	Lump Sum	\$50,000.00
New Roof on Headhouse	Lump Sum	\$20,000.00
New UV System	Lump Sum	\$300,000.00
Effluent sampler	Lump Sum	\$10,000.00
Upgrade belt press facility	Lump Sum	\$400,000.00
Emergency Generator	1	\$100,000.00
<b>Subtotal</b>		<b>\$5,120,000.00</b>
Misc. Metals 3%		\$154,000.00
Painting 3%		\$154,000.00
Site Work 5%		\$256,000.00
Demolition 8%		\$409,000.00
Yard Piping and Valves 10%		\$512,000.00
Electrical and Controls 15%		\$768,000.00
HVAC 2%		\$102,000.00
<b>PROJECTED CONSTRUCTION COST</b>		<b>\$7,475,000.00</b>
Contengency, Engineering, Inspection, etc (35%)		<b>\$2,616,250.00</b>
<b>TOTAL PROJECTED PROJECT COST</b>		<b>\$10,091,000.00</b>
Alt#1 - New Phosphorous removal chemical feed equip and buildi	Lump	\$200,000.00
Alt. #2 - New Polishing Sand Filters & Effluent Pumping Station	Lump	\$2,400,000.00
<b>TOTAL PROJECTED PROJECT COST - ALT P-2</b>		<b>\$12,691,000.00</b>
<b>Salvage Value (25%) PW</b>		<b>\$482,920</b>
<b>Estimated Annual O &amp; M Cost</b>	<b>\$700,000</b>	
<b>O &amp; M Present Worth</b>		<b>\$7,415,810</b>
<b>Net Present Worth</b>		<b>\$19,623,890</b>

---

### **Alternative P-3: Phased Upgrade to Paintsville WWTP**

Alternative P-3 is a phased approach that is intended to address current issues and facilitate future anticipated loading at the Paintsville WWTP. The proposed phased construction is as follows:

- Reduce the flow to Paintsville WWTP by reducing I &I and diverting all flow west of Paint Creek to the Honey Branch WWTP.
- Repair/replace worn equipment at Paintsville WWTP
- Increase plant capacity for future flows by adding another oxidation ditch and final clarifier.

As discussed in detail in section 8.20 of this planning document, Paintsville Utilities has obtained funding and is ready to bid a project to remove cross connections and reduce infiltration and inflow to the collection system.

With relatively simple modifications to the proposed sewer extension being planned for KY Hwy 23 all the flow being generated by customers on the west end of the City of Paintsville can be pumped to the Honey Branch WWTP for processing. This includes shopping centers, Johnson Central High School, Regional Jail, Paintsville Lake Area and Cross Creek development. It would also be possible to divert flows from the Paintsville Regional Hospital and Ramada Inn for an additional cost. Based on water usage records and other factors, we anticipate that this could reduce the average daily flow to the Paintsville WWTP by approximately 200,000 GPD.

Phase 1 of Alternative P-3 would consist of flow reduction measures and plant repairs and equipment replacement. Phase 2 will consist of expanding the Paintsville WWTP treatment capacity. **With the successful completion of Phase 1, the Phase 2 portion could likely be postponed until approximately 2030.**

The total projected project cost for:

**Alternate P-3- Phased Upgrade to Paintsville WWTP is:**

**Phase 1 -       \$ 5,558,500.00**

**Phase 2-       \$ 9,401,300.00**

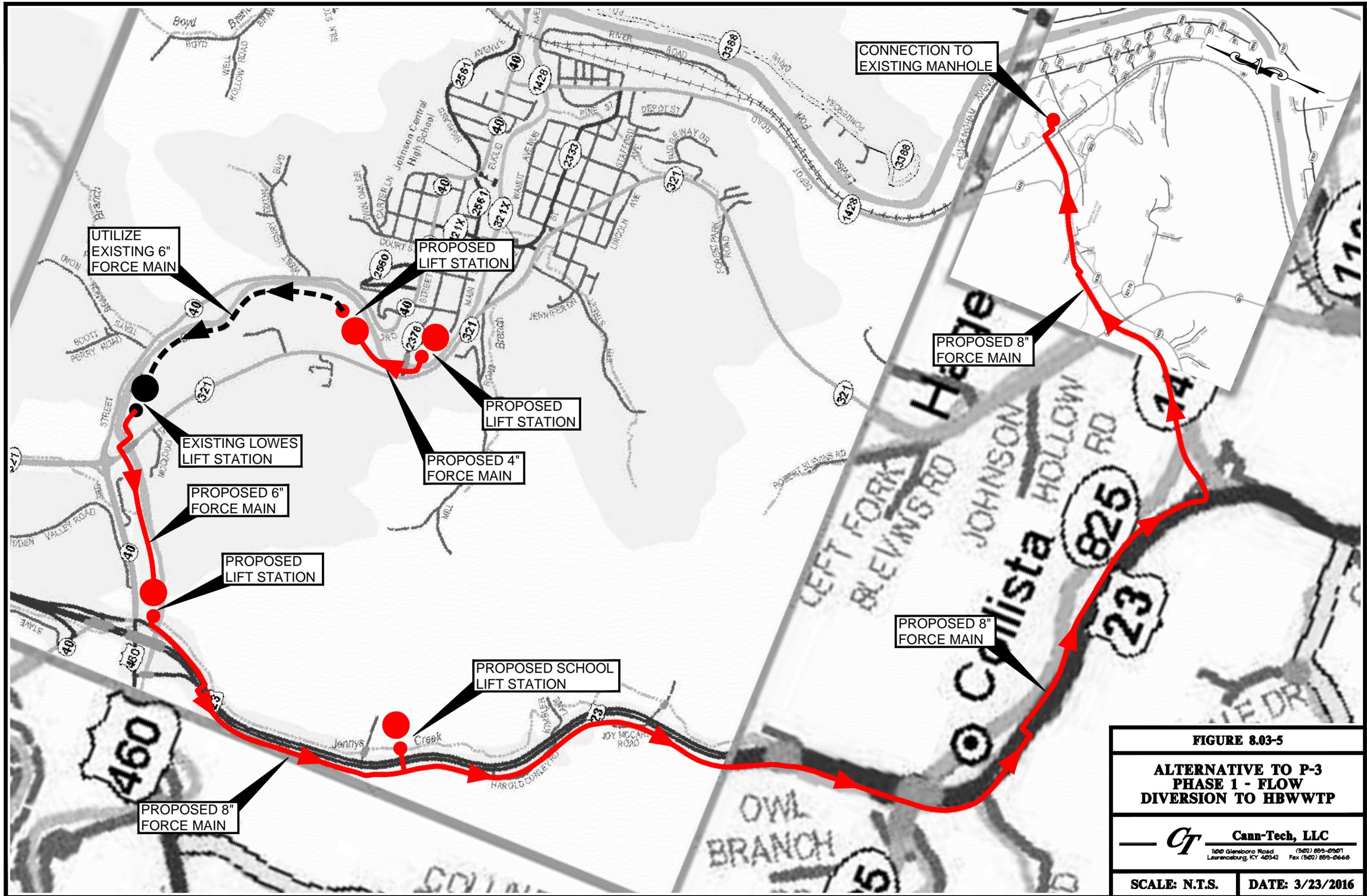
**Total Project Cost   \$ 14,959,800.00**

In order to accurately compare the costs of Alternate P-3 to the other two alternates, it is necessary to subtract the Phase 1 cost of diverting flow to the Honey Branch WWTP. Therefore the adjusted Total Project cost for comparisons is \$ 14,959,800 – (\$ 3,217,500 x 1.35) = \$ **10,616,175.00**

A more detailed breakdown of costs for Alternate P-3 can be found in **Table P-3, Phase 1 and Phase 2.**

<b>TABLE P-3: ALTERNATIVE P-3- PAINTSVILLE WWTP</b>		
<b>OPINION OF PROBABLE PROJECT COSTS</b>		
<b>Phased Upgrade to Paintsville WWTP - Phase 1</b>		
<b>Description</b>	<b>Quantities</b>	<b>Cost</b>
<b>Phase 1-Flow Diversion to HBWWTP</b>		
KY Hwy 23 Sewer Extension ( See Section 8.40 for cost breakdown)	Lump Sum	\$2,401,500.00
Upgrade force main to 8 inch - 32,000 LF x \$ 8	Lump Sum	\$256,000.00
New force main from Lowes PS to Proposed PS at US 23 and US 460 - 5,000 LF		\$200,000.00
Modifications to Lowes PS	Lump Sum	\$50,000.00
New Pump Station near high school	Lump Sum	\$120,000.00
Modification to existing Lowes Force main to reverse flow	Lump Sum	\$30,000.00
New Pump Station at Ramada Inn	Lump Sum	\$40,000.00
New Pump Station at Hospital	Lump Sum	\$40,000.00
New 4 inch force main to connect Ramada Inn	Lump Sum	\$30,000.00
Misc.	Lump Sum	\$50,000.00
<b>Total Construction Cost - Flow Diversion</b>		<b>\$3,217,500.00</b>
<b>Phase 1- Plant Repair</b>		
New electric service and modifications to provide 4 mixers per ditch	Lump Sum	\$280,000.00
New dewatering pumps at ditches	Lump Sum	\$30,000.00
Cleaning Oxidation Ditches	Lump Sum	\$70,000.00
Refurbish Plant Pump Station	Lump Sum	\$50,000.00
New Pista Grit Unit	Lump Sum	\$180,000.00
New fine screen at headworks	Lump Sum	\$130,000.00
New aeration diffusers and piping in Ditch #2	Lump Sum	\$100,000.00
Misc.		\$50,000.00
<b>Total Construction Cost - Plant Repair</b>		<b>\$900,000.00</b>
<b>PROJECTED CONSTRUCTION COST</b>		<b>\$4,117,500.00</b>
Contengency, Engineering, Inspection, etc (35%)		<b>\$1,441,000.00</b>
<b>TOTAL PROJECTED PROJECT COST</b>		<b>\$5,558,500.00</b>
<b>TOTAL PROJECTED PROJECT COST - ALT P-3 - Phase 1</b>		<b>\$5,558,500.00</b>
Salvage Value (25%) PW		<b>\$265,990</b>
Estimated Annual O & M Cost	<b>\$700,000</b>	
O & M Present Worth		<b>\$7,415,810</b>
Net Present Worth		<b>\$13,940,300</b>

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<b>FIGURE 8.03-5</b>	
<b>ALTERNATIVE TO P-3 PHASE 1 - FLOW DIVERSION TO HBWWTP</b>	
	<b>Cann-Tech, LLC</b> <small>1100 Glenboro Road Laurensburg, KY 40342 (502) 893-0307 Fax (502) 893-0668</small>
<b>SCALE: N.T.S.</b>	<b>DATE: 3/23/2016</b>

<b>TABLE P-3: ALTERNATIVE P-3- PAINTSVILLE WWTP</b>		
<b>OPINION OF PROBABLE PROJECT COSTS</b>		
<b>Phase 2- Increase Plant Capacity</b>		
<b>Description</b>	<b>Quantities</b>	<b>Cost</b>
Influent Sampling System	Lump Sum	\$10,000.00
Construction of new Oxidation Ditch	1	\$800,000.00
Flow splitter control structure	1	\$75,000.00
New Aerators with VFD	Lump Sum	\$900,000.00
New Final Clarifier	1	\$400,000.00
New Post Aeration System (diffusers, blowers, structure, etc.)	Lump Sum	\$100,000.00
New effluent flow measuring system	Lump Sum	\$20,000.00
New aeration system for sludge holding tank	Lump Sum	\$40,000.00
Clarifier flow splitter	Lump Sum	\$75,000.00
Upgrade sludge pumping equipment and valves	Lump Sum	\$50,000.00
Renovation of Lab	Lump Sum	\$50,000.00
New Roof on Headhouse	Lump Sum	\$20,000.00
New Acid disinfecting system	Lump Sum	\$300,000.00
Effluent sampler	Lump Sum	\$10,000.00
Upgrade belt press facility	Lump Sum	\$400,000.00
Emergency Generator	1	\$200,000.00
<b>Subtotal</b>		<b>\$3,450,000.00</b>
Misc. Metals 3%		\$104,000.00
Painting 3%		\$104,000.00
Site Work 5%		\$173,000.00
Demolition 8%		\$276,000.00
Yard Piping and Valves 10%		\$345,000.00
Electrical and Controls 15%		\$517,000.00
HVAC 2%		\$69,000.00
<b>PROJECTED CONSTRUCTION COST</b>		<b>\$5,038,000.00</b>
Contengency, Engineering, Inspection, etc (35%)		<b>\$1,736,300.00</b>
<b>TOTAL PROJECTED PROJECT COST</b>		<b>\$6,801,300.00</b>
Alt#1 - New Phosphorous removal chemical feed equip and bui	Lump Sum	\$200,000.00
Alt. #2 - New Polishing Sand Filters & Effluent Pumping Static	Lump Sum	\$2,400,000.00
<b>TOTAL PROJECTED PROJECT COST - ALT P-2</b>		<b>\$9,401,300.00</b>
<b>Salvage Value (25%) PW</b>		<b>\$325,455</b>
<b>Estimated Annual O &amp; M Cost</b>	<b>\$700,000</b>	
<b>O &amp; M Present Worth</b>		<b>\$7,415,810</b>
<b>Net Present Worth</b>		<b>\$16,491,655</b>

**Table 8.07-1** is a comparison of projected project costs for expanding the capacity of the existing Paintsville WWTP to meet current and projected flows.

Table 8.07-1 - Paintsville WWTP Expansion Alternatives					
			Alt. P-1	Alt. P-2	Alt. P-3
			Expanding Existing Plant with SBR System	Expanding Existing Plant with Oxidation Ditch	Phased Expansion with Oxidation Ditch
			Projected Project Cost	\$12,504,000	\$12,691,000
					\$9,401,300

Alternate P-3 would be the most cost effective method of expanding the facility.

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## Repair and Improvements to HBWWTP

As stated earlier in Section 6 of this facilities plan, the existing Honey Branch Waste Water Treatment Plant (HBWWTP) was completed and placed into operation in 2003. The three issues with the plant operations are related to malfunctioning screening equipment located in the Headworks and Pre-screening Facilities, operational issues during very cold weather and excessive suspended solids at certain times of the year impacting the performance of their UV disinfection system.

The pre-screening facility will be refurbished as a part of the plant upgrade. The plant has had some operational issues with the existing drum type screen. The plant upgrade includes replacing this screen with a fine vertical type mechanical screen and new controls.

Another issue that needs to be addressed is the difficulty to meet plant effluent limits during periods of very cold weather. Because of the very low flows being experienced at the plant and the resulting excessive hydraulic detention time, loss of temperature through the lagoons during cold periods is inhibiting nitrification in the lagoons. This can be corrected a couple of ways.

- Increasing the flow to the plant would be the most apparent method to correct this however due to the negative population growth in the planning area, this is not likely to occur timely. Diverting some of the flow from the Paintsville WWTP as proposed in Alternative P-3 is another way to increase flow to the Honey Branch facility.
- Another method that has been successfully used in colder climates is to cover the lagoons with an insulated floating cover system. This would require modifications to the aeration system in lagoons #1 and #2.

The issues related to excessive suspended solids impacting the performance of the UV disinfection system has not been a problem since the plant was allowed to utilize

Proxitane WW-12 Microbiocide as the primary disinfectant. The plant has not used the UV system since 2014 however keeps it operational as a back up system. The facility does need a more efficient facility for storing and feeding the peracetic acid.

### **Alternative HB-1: Upgrading Honey Branch WWTP**

Under the current KPDES Permit, the plant is required to monitor for phosphorous but does not have discharge limits. This upgrade will include infrastructure improvements that should facilitate the plant to meet future phosphorous limits.

Proposed improvements to be included in this upgrade include:

- Replacing existing headworks screens with vertical mechanical screens
- Repairs to concrete channels in headworks
- New influent and effluent samplers
- Installing manual control valves in RAS/WAS pump station
- Pump repairs
- Adding additional yard hydrants
- Re-painting interior of control building
- Construction of a Chemical Feed/Effluent Filtration facility
- Construction of an Effluent pumping station.
- Installing an insulated floating cover on Lagoon #3

The total projected project cost for **Alternative HB-1 – Repair and Improvements to HBWWTP** is:       **\$ 2,769,000.00.**

A more detailed breakdown of projected project costs for Alternative HB-1 can be found in **Table HB-1.**

<b>TABLE HB-1: ALTERNATE HB-1 -Honey Branch WWTP</b>		
<b>OPINION OF PROBABLE PROJECT COSTS</b>		
<b>Upgrade to Honey Branch WWTP</b>		
<b>Description</b>	<b>Quantities</b>	<b>Cost</b>
Upgrade of existing screening facility including new vertical mechanical	Lump Sum	\$200,000.00
New influent and effluent samplers	Lump Sum	\$30,000.00
New floating cover for lagoon #3	Lump Sum	\$200,000.00
New Chemical Feed/Effluent Filtration Building	Lump Sum	\$300,000.00
New Chemical feed equipment for Peracetic Acid and liquid Alum	Lump Sum	\$50,000.00
New self contained cloth effluent filters	Lump Sum	\$600,000.00
New Effluent Pumping Station	Lump Sum	\$100,000.00
Replace electric control valves with manual valves in pump room	6	\$60,000.00
Renovation of BioTower Pump #1	Lump Sum	\$10,000.00
Replace motor in sludge pump	1	\$10,000.00
Ventilation system for pump room	Lump Sum	\$20,000.00
New sump pumps pump room	2	\$10,000.00
New VFD controls for bio-tower distribution arms	Lump Sum	\$10,000.00
VFD for biopump	1	\$10,000.00
<b>Subtotal</b>		<b>\$1,610,000.00</b>
Misc. Metals 2%		\$30,000.00
Painting 5%		\$80,000.00
Site Work 2%		\$30,000.00
Demolition 3%		\$41,000.00
Yard Piping and Valves 5%		\$80,000.00
Electrical and Controls 10%		\$150,000.00
HVAC 2%		\$30,000.00
<b>PROJECTED CONSTRUCTION COST</b>		<b>\$2,051,000.00</b>
<b>Contengency, Engineering, Inspection, etc (35%)</b>		<b>\$718,000.00</b>
<b>TOTAL PROJECTED PROJECT COST - ALT B</b>		<b>\$2,769,000.00</b>
Salvage Value (25%) PW		132,495.00
Estimated Annual O&M Cost	400,000.00	
O & M Present Worth		4,237,600.00
Net Present Worth		6,874,105.00

### 8.53 Total Estimated Cost – Decentralized Option

The total estimated cost associated with the most cost effective alternatives for the decentralized option is \$ 17,728,800.

	<u>Paintsville</u>	<u>Honey Branch</u>
<b>Projected Construction Cost</b>		
<b>Phase 1</b>	<b>\$ 4,117,500</b>	<b>\$ 2,051,000.00</b>
<b>Phase 2</b>	<b>\$ 6,728,000</b>	
<b>Contingency, Eng., etc.</b>		
<b>Phase 1</b>	<b>\$ 1,441,000</b>	<b><u>\$ 718,000</u></b>
<b>Phase 2</b>	<b><u>\$ 2,673,300</u></b>	
<b>Total Projected Project Cost*</b>	<b>\$ 14,959,800</b>	<b>\$ 2,769,000</b>
<b>Total Decentralized Option</b>	<b>\$ 17,728,800</b>	
<b>Total Net Present Worth</b>	<b>\$ 29,890,250</b>	

\*Total includes \$ 3,000,000 for construction of KY Hwy 23 Sewer Extension. To be taken into account when comparing to other alternatives.

### 8.54 Regionalization

This option considers eliminating the Paintsville WWTP and expanding the Honey Branch WWTP to be capable of receiving the all current and predicted flow currently being treated at the Paintsville WWTP. This report assumes that the **Honey Branch WWTP will be upgraded to a design capacity of 2.0 MGD and a peak hourly flow capacity of 7.0 MGD.**

### **Conveyance System Modifications**

In order to consolidate the two wastewater treatment facilities it will be necessary to have a conveyance system capable of delivering all of the projected flows for the Paintsville WWTP to the site of the Honey Branch WWTP. This feasibility report considers two options for accomplishing this:

**Alternate C-1** – Utilize the existing 10 and 12 inch force mains that currently deliver sewage from the West Van Lear Area.

**Alternate C-2** – Construct a dedicated pumping station and new force main from the Paintsville WWTP to the Honey Branch WWTP.

### **Utilize Existing Force Main**

A hydraulic analysis of the existing system that conveys sewage from the West Van Lear area to the Honey Branch WWTP was done to determine if it was capable of handling the projected maximum flow rate of 3.4 million gallons per day in addition to the projected flows from the areas that is currently being served by the existing force main. Although our analysis determined that it would be possible, we do not recommend that this alternate be considered for the following reasons:

1. The velocity of the flow in the force main would approach the maximum velocity allowed by the Kentucky Division of Water.
2. The increased pressure in the force main would require that all of the existing pumping stations that are currently pumping into the line (Auxier, Porter School, American Standard and other smaller stations) be replaced or modified to be capable of pumping at a higher pressure.

3. This alternate would require constructing a new pumping station at the plant and a new force main that would discharge into the existing West Van Lear Pumping Station #2. The West Van Lear Pumping Station #2 would require modification and additional wet well capacity to handle the increased flow and additional pumps to be able to pump the wet weather flows. Additionally two intermediate pumping stations would be required to be constructed along the route of the existing force main. These would be necessary to keep the pressure in the force main from exceeding the pressure rating of the existing pipe. The pump horsepower required at the West Van Lear Pump Station #2 and the proposed intermediate pumping stations would be approximately 150 horsepower. The total horsepower in the 4 stations to transfer the sewage would be approximately 600 horsepower. This would result in excessive operating expenses.

A schematic layout of this proposed system can be found in **Figure C-1**.

The projected project cost for **Alternate C-1** is \$ **4,844,000**.

A breakdown of the projected project costs are shown in **Table C-1**.



<b>TABLE C-1: Conveyance System Modifications Utilizing Existing Force Main</b>		
<b>OPINION OF PROBABLE PROJECT COSTS</b>		
<b>Description</b>	<b>Quantities</b>	<b>Cost</b>
New 12 Inch FM from plant to West Van Lear Pump Station	10,000 LF	\$450,000.00
<b>New Pump Station at Plant PS #1</b>		
Excavation		\$30,000.00
Concrete		\$225,000.00
Site Work		\$40,000.00
Telemetry		\$35,000.00
Pumps and Controls		\$230,000.00
Electrical		\$30,000.00
Total Pump Station #1	Lump Sum	\$590,000.00
<b>New Intermediate Pump Stations (PS #2, #3, &amp; #4)</b>		
Excavation		\$90,000.00
Concrete		\$675,000.00
Site Work		\$120,000.00
Telemetry		\$105,000.00
Pumps and Controls		\$720,000.00
Electrical		\$90,000.00
Total Pump Stations #2, #3, & #4	Lump Sum	\$1,800,000.00
Upgrade of existing pumping stations feeding existing force main		\$400,000.00
Upgrades to mechanical screen at old plant		\$200,000.00
<b>PROJECTED CONSTRUCTION COST</b>		<b>\$3,440,000.00</b>
Contingency, Engineering, Inspection, etc (35%)		\$1,204,000.00
<b>Easements and Property</b>		<b>\$200,000.00</b>
<b>TOTAL PROJECTED PROJECT COST - ALT C-1</b>		<b>\$4,844,000.00</b>
Salvage Value (25%) PW		222,240
Estimated Annual O&M Cost	\$10,000	
O&M Present Worth		105,940
Net Present Worth		\$4,727,700

### **Dedicated Pump Station and Force Main**

This alternate assumes that a new duplex pumping station will be constructed at the existing Paintsville Wastewater Treatment Plant that would convey the sewage currently being treated at the plant to the expanded Honey Branch Treatment Plant. The pumps would be approximately 150 horsepower. The scope of the project will consist of one new pumping station with adequate capacity to pump wet weather flows, Utilize and upgrade the existing screening facility that would remove large items that could damage the pumps or cause clogs in the force main and a new 16 inch PVC force main. The proposed force main would be constructed from the plant to the area of the existing West Van Lear Pumping station and then run parallel to the existing force main staying within the existing easements to the Honey Branch Treatment Plant.

The proposed route of this force main is shown on **Figure C-2**.

The projected project cost **for Alternate C-2 – Dedicated Pump Station and Force Main** is:     **\$ 4,450,000.**

A more detailed breakdown of these project costs can be found in **Table C-2**.





The evaluation of conveyance system alternatives resulted in the construction of a new pump station and force main being the most cost-effective.

	<b>Existing FM</b>	<b>New Pump Sta.</b>
<b>Projected Construction Cost</b>	<b>3,440,000</b>	<b>3,190,000</b>
<b>Contingency, Eng., etc.</b>	<b>1,204,000</b>	<b>1,116,000</b>
<b>Easements &amp; Acquisitions</b>	<b>200,000</b>	<b>100,000</b>
<b>Total Project Cost</b>	<b>4,844,000</b>	<b>4,450,000</b>
<b>Net Present Worth</b>	<b>4,727,700</b>	<b>4,667,672</b>

### **Expansion Utilizing Existing Treatment Process**

As discussed in other sections of this facilities plan, the existing deep cell lagoons followed by biotowers at the existing plant meet current effluent limits except during very cold weather. Insulated floating covers will also be included in the scope of this Alternate C-3 to help address issues during cold weather. In addition this alternate will effectively double the capacity of the facility to a design flow of 2.0 MGD.

As seen in the photo below, approximately 6 acres of relatively flat land is adjacent to and available for expanding the Honey Branch Treatment Plant. The scope of Alternate C-3 is to construct 3 additional lagoons, biotowers, clarifiers and polishing filters on the adjacent property. The scope of Alternate C-3A is to construct a new 2.0 MGD Sequencing Batch Reactor treatment facility on the existing property and to utilize the existing lagoons for equalization and sludge processing.



In addition to the scope of work included in Alternate HB-1, the proposed Alternate C-3 expansion will include the following:

Modifications to existing screening facility to expand capacity and add one additional vertical mechanical fine screen.

New flow measuring and sampling facilities

Influent flow distribution structure

Three aerated and lined lagoons with insulated cover system similar to “LemTec” systems.

Two new final clarifiers

RAS/WAS pumping station

Two new fixed film Bio Towers. These may be considered as an alternate or as a future upgrade during the design phase as adequate nitrification may be achieved in the upgraded lagoon

system. Additionally if polishing sand filters are required for phosphorous removal, the Bio Towers may be deleted from the scope of this phase.

New effluent pumping station to serve sand filters and UV disinfection system.

New polishing sand filters, chemical storage building and feed equipment for phosphorus removal.

New disinfection system rated at 2 MGD design flow.

New emergency generator to provide backup power to additional equipment.

New post aeration structure

**Figure 8.05-3** shows the proposed preliminary layout of Alternate C-3. **Figure 8.05-4** is a preliminary grading plan for the expanded facility in Alternate C-3.

Also during the design phase of this project consideration should be given to pumping the plant effluent directly to the Levisa Fork of the Big Sandy River instead of discharging into John's Creek. The effluent requirements may be less restrictive and allow the polishing sand filters and other facilities for treating phosphorus to be eliminated from the project.

The projected project cost for **Alternate C-3 Plant Consolidation** is: **\$ 12,851,000.**

A breakdown of the projected costs can be found in **Table C-3.**



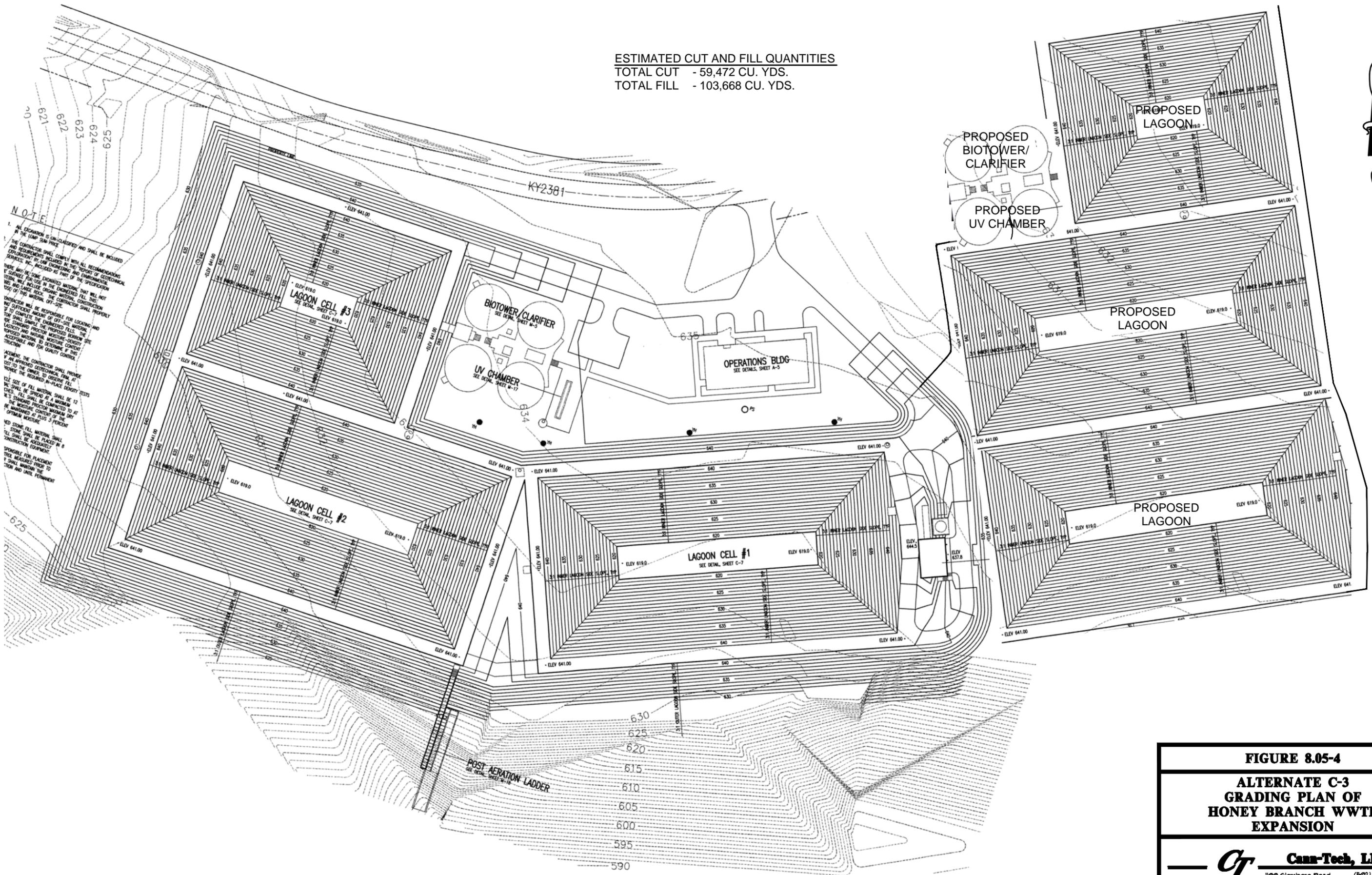
**FIGURE 8.05-3**

**ALTERNATE C-3  
PROPOSED EXPANSION OF  
HONEY BRANCH WWTP**

**CT** **Cann-Tech, LLC**  
 1100 Glenboro Road (502) 853-0507  
 Laurensburg, KY 40342 Fax (502) 853-0668

**SCALE: N.T.S.      DATE: 6/2014**

ESTIMATED CUT AND FILL QUANTITIES  
 TOTAL CUT - 59,472 CU. YDS.  
 TOTAL FILL - 103,668 CU. YDS.



**NOTE**

1. ALL EXCAVATION IS UN-CLASSIFIED AND SHALL BE INCLUDED IN THE LUMP SUM PRICE.
2. THE CONTRACTOR SHALL COMPLY WITH ALL RECOMMENDATIONS AND REQUIREMENTS INCLUDED IN THE REPORT OF GEOTECHNICAL INVESTIGATION BY LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC., INCLUDED AS PART OF THE SPECIFICATION. THERE MAY BE SOME EXISTING MATERIAL THAT WILL NOT BE SUITABLE FOR USE IN THE ENGINEERED FILL. THIS MATERIAL SHALL INCLUDE ORGANIC MATERIAL, CONSTRUCTION WASTE AND LIME ROCK. THE CONTRACTOR SHALL PROPERLY REMOVE AND DISPOSE OF THIS MATERIAL OFF-SITE.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND VERIFYING THE EXISTING UTILITY LINES AND PROVIDING ADEQUATE PROTECTION FOR ALL UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL PROVIDE ADEQUATE EROSION CONTROL MEASURES THROUGHOUT THE CONSTRUCTION PERIOD TO PREVENT SOIL EROSION AND SEDIMENTATION. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AND UTILITIES AT ALL TIMES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL PROVIDE ADEQUATE EROSION CONTROL MEASURES THROUGHOUT THE CONSTRUCTION PERIOD TO PREVENT SOIL EROSION AND SEDIMENTATION. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AND UTILITIES AT ALL TIMES.

**FIGURE 8.05-4**  
**ALTERNATE C-3**  
**GRADING PLAN OF**  
**HONEY BRANCH WWTP**  
**EXPANSION**

**CT** **Cann-Tech, LLC**  
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**SCALE: N.T.S.**      **DATE: 6/2014**

**TABLE C-3: Expansion Utilizing Existing Treatment Process - Honey Branch  
 OPINION OF PROBABLE PROJECT COSTS**

Description	Quantities	Cost
<b>Basic Upgrade: New Lagoons, clarifiers, upgrade existing facilities</b>		
Modifications to Screen Building	<b>1</b>	\$60,000.00
New mechanical screens (2) with bypass		\$220,000.00
Influent flow measuring equipment and structure		\$25,000.00
New influent and effluent samplers		\$25,000.00
New flow splitter structure		\$40,000.00
Dewater and clean sludge from existing lagoons		\$60,000.00
Addition of new insulated floating covers and aeration system to existing lagoons		\$980,000.00
New Lagoons - earthwork		\$350,000.00
New Lagoons - Liners		\$350,000.00
New Lagoons - insulated floating covers and aertion system		\$980,000.00
New Final Clarifiers (2)		\$700,000.00
New RAS/WAS/Recycle Pumping Facility		\$300,000.00
New Effluent Lift Station		\$200,000.00
New UV Disinfection Facility		\$150,000.00
New Post Aeration Structure		\$80,000.00
New Emergency Generator		\$40,000.00
Misc. repairs and upgrades to existing facilities		\$200,000.00
<b>Subtotal</b>		<b>\$4,560,000.00</b>
Misc. Metals 2%		\$91,000.00
Painting 2%		\$91,000.00
Site Work 3%		\$139,000.00
Demolition 3%		\$139,000.00
Yard Piping and Valves 15%		\$684,000.00
Electrical and Controls 15%		\$684,000.00
HVAC 1%		\$50,000.00
<b>PROJECTED CONSTRUCTION COST- BASIC UPGRADE</b>		<b>\$6,438,000.00</b>
<b>Contengency, Engineering, Inspection, etc (35%)</b>		<b>\$2,253,000.00</b>
<b>Property and Easements</b>		<b>\$400,000.00</b>
<b>TOTAL PROJECTED PROJECT COST - BASIC UPGRADE</b>		<b>\$9,091,000.00</b>
Alt. #1 - 2 new Biotowers - Project Cost Increase		\$1,560,000.00
Alt. #2 - New Polishing Sand Filters - Project Cost Increase		\$2,200,000.00
<b>TOTAL PROJECTED PROJECT COST - ALT. C-3</b>		<b>\$12,851,000.00</b>
<b>Salvage Value (24%) PW</b>		<b>\$587,322.00</b>
<b>Estimated Annual O&amp;M Cost</b>	<b>\$ 700,000.00</b>	
O&M Prsent Worth		<b>\$7,415,810.00</b>
Net Present Worth		<b>\$19,679,488.00</b>

### **Expansion Utilizing Sequencing Batch Reactor Treatment Process**

The scope of work included in proposed Alternate C-3A is to construct a basic Sequencing Batch Reactor Plant with a design capacity of 2.0 MGD on the existing Honey Branch WWTP. As shown on **Figure 8.05-5**, the reactor basin can be constructed in the area that Lagoon Cell #3 currently occupies. This would result in a substantial savings as no additional property would be required.

All of the existing influent as well as the influent from the Paintsville WWTP will be pumped to the new four cell batch reactors for treatment. The SBR plant would be followed by polishing filters and a new disinfection system and a new post aeration structure.

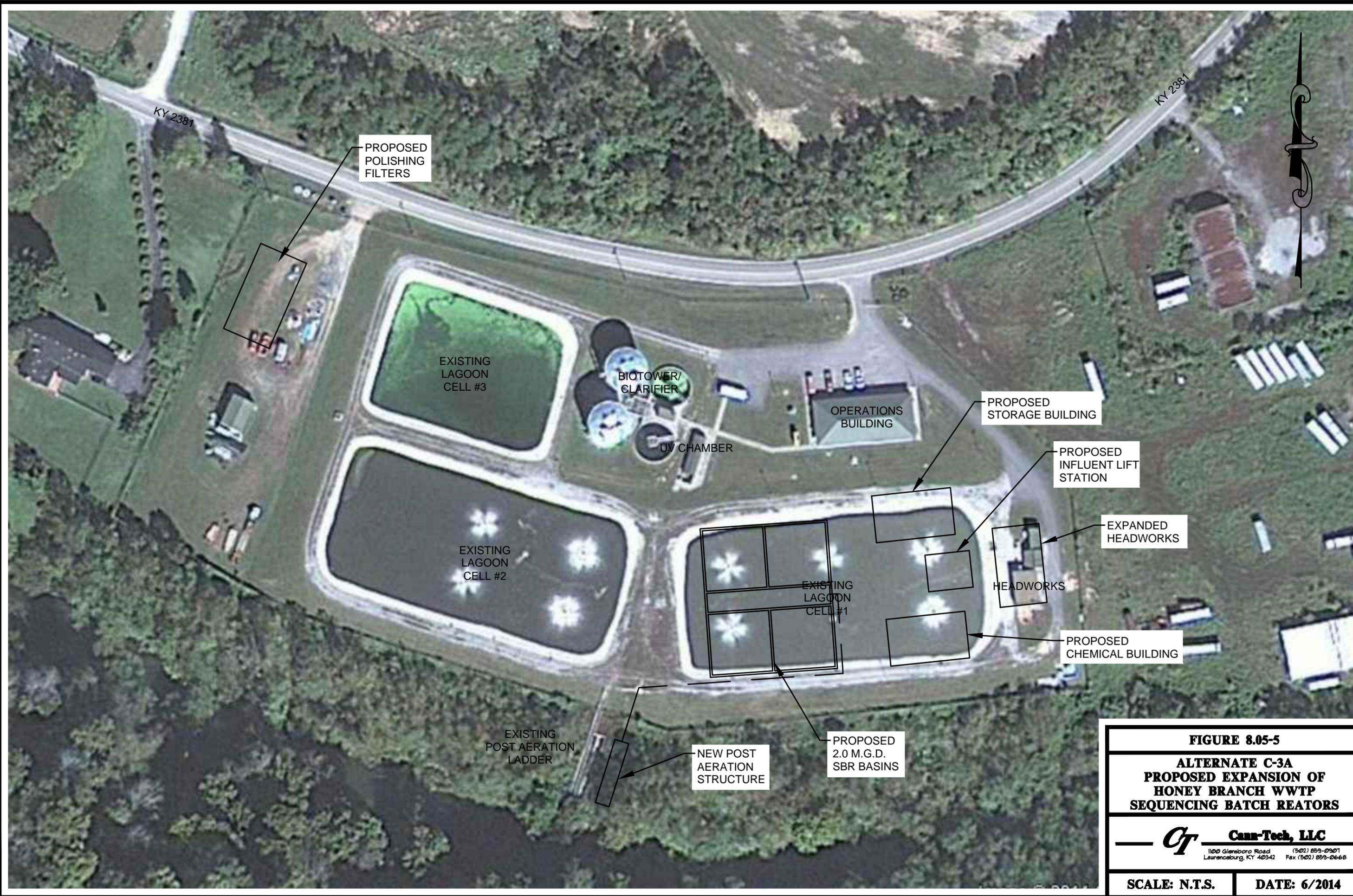
The proposed disinfection method for the plant will utilize Proxitane WW-12 Microbicide. This was approved by KY Division of Water and approval letter is included herein in Appendix F. Final design of the plant will facilitate using alternate methods of disinfection if required in the future.

Waste sludge from the SBR plant would be directed to the two existing aerated lagoons for disposal. The lagoons would basically function as an equalization basin for excessive wet weather flows and as aerobic digestion of sludge. At full capacity the SBR plant would produce approximately 42,000 gallons of waste sludge per day. The effluent from the lagoons would be routed back to the head of the plant for processing. Periodically it may be necessary to clean the lagoons and haul the sludge deposits to the landfill. This can be done by specialized contractors.

This alternate provides the advantage of being able to reduce phosphorous biologically as well as thru chemical addition. It also does not require as much land area and will facilitate future expansions easier than the lagoon systems.

The projected project cost for **Alternate 3-3A Plant Consolidation with SBR** is:  
**\$ 10,672,000.**

A breakdown of these costs can be found in **Table C-3A.**



**FIGURE 8.05-5**  
**ALTERNATE C-3A**  
**PROPOSED EXPANSION OF**  
**HONEY BRANCH WWTP**  
**SEQUENCING BATCH REACTORS**


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 Fax (502) 853-0668

**SCALE: N.T.S.**      **DATE: 6/2014**

<b>TABLE C-3A: Expansion Utilizing SBR Treatment Process</b>		
<b>OPINION OF PROBABLE PROJECT COSTS</b>		
<b>Description</b>	<b>Quantities</b>	<b>Cost</b>
<b>Basic Upgrade: Add 2.0 MGD SBR Plant</b>		
Modifications to Screen Building	<b>1</b>	\$60,000.00
New mechanical screens (2) with bypass		\$220,000.00
Influent flow measuring equipment and structure		\$25,000.00
New influent and effluent samplers		\$25,000.00
New Influent Pumping Station		\$200,000.00
New 4 cell SBR Basins (3000 cy concrete)		\$2,200,000.00
SBR controls, aeration, equipment		\$1,300,000.00
New WAS/Recycle Pumping Facility		\$150,000.00
New UV Disinfection Facility		\$150,000.00
New Post Aeration Structure		\$80,000.00
New Emergency Generator		\$40,000.00
<b>Subtotal</b>		<b>\$4,450,000.00</b>
Misc. Metals 2%		\$89,000.00
Painting 2%		\$89,000.00
Site Work 3%		\$133,000.00
Demolition 3%		\$133,000.00
Yard Piping and Valves 15%		\$667,000.00
Electrical and Controls 15%		\$667,000.00
HVAC 1%		\$44,000.00
<b>PROJECTED CONSTRUCTION COST- BASIC UPGRADE</b>		<b>\$6,272,000.00</b>
<b>Contingency, Engineering, Inspection, etc (35%)</b>		<b>\$2,200,000.00</b>
<b>TOTAL PROJECTED PROJECT COST - BASIC UPGRADE</b>		<b>\$8,472,000.00</b>
Alt. #2 - New Polishing Sand Filters - Project Cost Increase		\$2,200,000.00
<b>TOTAL PROJECTED PROJECT COST - ALT. C-3A</b>		<b>\$10,672,000.00</b>
Salvage Value (25%) PW		405,201
<b>Estimated O &amp; M Cost</b>	<b>800,000</b>	
<b>O &amp; M Present Worth</b>		<b>8,475,211</b>
<b>Net Present Worth</b>		<b>\$18,742,010</b>

The evaluation of the regionalization option resulted in expanding the Honey Branch WWTP utilizing SBR technology. A new pump station and force main will be constructed to convey wastewater from Paintsville to the Honey Branch WWTP.

	<u>Lagoons</u>	<u>SBR</u>
Projected Construction Cost	7,594,000	7,902,000
Contingency, Eng., etc.	3,057,000	2,770,000
Total Projected Project Cost	12,851,000	10,672,000
Conveyance Project Cost	4,450,000	4,450,000
Total Regionalization Option	17,301,000	15,122,000
Net Present Worth : WWTP	19,679,488	18,742,010
Conveyance	4,667,672	4,667,672
TOTAL –Net Present Worth	\$ 24,347,160	\$ 23,409,682

In order to regionalize the Paintsville WWTP and the HBWWTP, it will be necessary to expand the Honey Branch Facility from 1.0 MGD capacity to 2.0 MGD. **Table 8.08-2** provides a project cost comparison of the two alternates considered for this proposed expansion. Alternate C-3A provides the necessary capacity with no additional land purchase.

	Alt. C-3 Expanding Existing Plant with Deep Cell Lagoons	Alt. C-3A Expanding Existing Plant with SBR System
Projected Project Cost	\$12,851,000	\$10,672,000

Pumping the sewage currently being treated at the Paintsville WWTP to the expanded Honey Branch Facility would require the construction of Alternate C-2. The projected cost for this alternate is \$ 4,450,000.

### 8.55 Evaluation of Non-Monetary Factors

Often there are non-monetary factors that can influence the selection of an alternative. The non-monetary factors are evaluated in this section. The evaluation of non-monetary factors is presented in **Table 8.09-1**.

<b>Factor</b>	<b>Upgrading Both Plants (at current locations)</b>	<b>Combining Plants (at Honey Branch Location)</b>
Reliability of Process	2	3
Ability to Remove Phosphorus	2	3
Ability to Upgrade for Future Permit Requirements	2	3
Land Requirements	3	3
O & M Complexity	2	3
Sludge Management	1	3
Ability to meet permit limits	3	3
Energy Use	2	3
Odor	2	2
Constructability	2	3
<b>Total Average</b>	<b>21</b>	<b>29</b>
<b>Ranking</b>	<b>2</b>	<b>1</b>
3 = Most Favorable Rating		
1= Least Favorable Rating		

Based on non-monetary analysis, the alternate that combines both plants at the Honey Branch location is most desirable.

### **8.60 Selected Alternative**

Based on the information presented in the cost-effective analyses, the option of keeping the treatment facilities decentralized and upgrading the facilities as proposed in **Alternative P-3** and **Alternative HB-1** will be the most desirable alternatives for upgrading the facilities. Table 8.60-1 is a cost comparison of the most cost effective decentralized and regionalized alternatives.

**TABLE 8.60-1 – COST COMPARISON**

	<b>DECENTRALIZED</b>	<b>REGIONALIZED</b>
	<b>Alt. P-3 Phased Upgrade to Paintsville WWTP Phase I</b>	<b>Alt C-2 Dedicated Pump Station and Force Main</b>
<b>Projected Project Cost</b>	<b>\$5,558,500</b>	<b>\$4,445,000</b>
	<b>Alt. HB-1 Upgrade to Honey Branch WWTP</b>	<b>Alt. C-3A Expanding Honey Branch WWTP using SBR Treatment Process</b>
<b>Projected Project Cost</b>	<b>\$2,759,000</b>	<b>\$10,672,000</b>
<b>Protected Phase I 2017 Cost</b>	<b>\$8,327,500</b>	<b>\$15,122,000</b>
	<b>Alt. P-3 Phased Expansion of Paintsville WWTP Phase II</b>	
<b>Projected Phase II 2030 Project Cost</b>	<b>\$9,401,300</b>	
	<b>Alt. P-3 – Phase I Project Cost for Transferring Load to HB WWTP</b>	
<b>Cost Comparison Adj.</b>	<b>(\$4,343,625)</b>	
<b>Total Project Cost</b>	<b>\$13,385,1755</b>	<b>\$15,122,000</b>

## **9.01 General**

The Following Cross-Cutter agencies were contacted regarding the proposed project:

U.S. Fish and Wildlife

Kentucky Department of Fish and Wildlife Resources

Kentucky Heritage Council

Natural Resources and Conservation Service

U.S. Army Corps of Engineers

The scoping letters including the maps that were included and agency responses can be found in the Appendix of this Regional Facility Plan.

Paintsville Utilities is committed to comply with any and all mitigative measures required by agencies.

## **9.02 U.S. Fish and Wildlife Service**

U.S. Fish and Wildlife Service considers Direct, Indirect and Cumulative effects in review of projects. Upon review U.S Fish and Wildlife determined that there is a potential for cumulative effects as a result of possibly inducing future development.

The initial phases of proposed project are not serving any currently un-served areas. No additional customers are anticipated as a result of the proposed project. The proposed project hopes to consolidate treatment of area waste water. With the completion of this project, Paintsville Utilities will have a modern state of the art facility that is capable of providing advanced treatment of wastewater and reduce pollution to the receiving streams.

U.S Fish and Wildlife also determined the potential habitat for the Indiana bat may exist within the proposed project site. Therefore the site will be surveyed for caves, rock shelters and underground mines and U.S Fish and Wildlife will be notified of results before any construction begins. If potential habitat is found, specific mitigation measures outlined by U.S. Fish and Wildlife will be followed.

Additionally in order to minimize any potential disturbance to the Indiana Bat, trees will only be removed between October 15 and March 31<sup>st</sup>.

Project Plans will be developed to avoid impacting wetland areas and/or streams.

### **9.03 Kentucky Department of Fish and Wildlife**

Kentucky Department of Fish and Wildlife Resources (KDFWR) does not anticipate impacts to listed species or any critical habitat, wetlands, special aquatic sites, or refuge areas.

Mitigation measures to be implemented were given. They include implementing strict erosion control measures and following suggested guidelines for working within a stream.

### **9.04 Kentucky Heritage Council**

Kentucky Heritage Council indicated that no previous archeological surveys have been performed for the proposed project area, and the proposed project has the potential to uncover historical sites. Therefore, it is recommended that an Archeological Survey be performed. Areas determined to be pre-disturbed may be requested to be omitted from the archeological survey.

Additionally, photographs of all structures over 50 years of age that are visible from any above ground structures that will be constructed as part of the proposed project must be submitted to the Kentucky Heritage Council to make a preliminary determination if the structures are eligible for listing in the National Register of Historic Places.

### **9.05 National Resource Conservation Service**

National Resources Conservation Service (NRCS) determined portions of the project to be located on prime or statewide important farmland. However, these areas are located in the road right-of-way and therefore considered Prior Converted. If the proposed project remains on right-of-way in the prime and statewide important farmlands, no additional actions will be needed.

### **9.06 U.S. Army Corps of Engineers**

Construction of the proposed force main will require consent of the U.S. Army Corps of Engineers (USACE).

The USACE exercises regulatory authority under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act, 1972 (33 USC 1344) for certain activities in “waters of the United States (U.S.).” Section 404 requires that a Department of the Army (DA) permit be obtained for the placement or discharge of dredged and/or fill material into “waters of the United States (U.S.),” including wetlands, prior to conducting the work.

“Waters of the U.S.,” include hydrologically connected lakes, rivers and stream channels exhibiting the Ordinary High Water Mark (OHWM), wetlands, sloughs, wet meadows and wetlands adjacent to “waters of the U.S.” The ordinary high water mark (OHWM) elevation is the line on the bank established by the changing water surface and indicated by physical characteristics such as a clear natural line impressed on the bank; shelving;

changes in the character of the soil; destruction of terrestrial vegetation; and other indications as determined upon inspection of the area.

Section 10 requires that a DA permit be obtained for any work that occurs in, under, or over a navigable water. These waters include all waters that are currently used, were used in the past, or may be susceptible to use in the interstate or foreign commerce, and would include the Levisa Fork of the Big Sandy River in the project area.

A jurisdictional determination will be completed to determine proposed project would impact any ‘waters of the U.S.,’ including wetlands.

### **9.07 Summary of Mitigation Measures**

Mitigation measures Include:

Contractor must follow a strict Erosion Control Plan

All creek and waterway crossings shall be done by directional bore.

Proposed construction areas within prime and statewide important farmland shall be installed on right-of-way.

Project will have an archeological survey performed and project shall be rerouted as necessary to avoid impact to cultural resources.

Above ground structures determined to be within sight of structures greater than 50 years of age that are eligible for national register of historic places, shall be altered according to Kentucky historical Society recommendations.

A bat habitat survey shall be performed for the project area and findings reported to USFWS.

Trees will only be removed between October 15 and March 31.

### **9.08 Exhibits**

All aforementioned correspondence are included in the following Appendices.

## **10.1 General**

The purpose of this planning document is to evaluate the condition of the existing Paintsville collection and treatment systems and to project the system needs for the 20 year planning period. The existing downtown collection system experiences excessive infiltration and inflow during rainfall events. This excessive I&I causes treatment issues at the existing Paintsville Wastewater Treatment Plant (PWWTP). The existing aging PWWTP is operating at its rated capacity and is in need of major repairs and upgrade. The proposed projects below are intended to reduce the downtown I&I, to eliminate the existing PWWTP and to provide Paintsville with a reliable, state of the art sewage treatment facility that is designed to address current and future needs and discharge limitations.

## **10.2 Recommended Conveyance Plan**

### **Downtown I & I Reduction**

This project will address known sources of infiltration by the construction of new storm sewer collection systems, rehabilitation of leaking manholes, replacement or rehabilitation of old leaking sewer lines as required and eliminating roof drain connections. The project will also consist of the replacement of the existing undersized outfall sewer. The new outfall sewer will consist of PVC pipe and will incorporate precast manholes with sealed, watertight lids to prevent sewage overflows.

The locations of these proposed improvements are shown in detail in Section 8 of this regional facility plan.

## Upgrades to the Sanitary Pumping Stations

These upgrades are needed to correct deficiencies and to provide reliable service for the next 20 years. The following alternates are recommended:

**Pump Station Improvement Project** – Improvements to existing pumping stations in Paintsville and Honey Branch Systems.

A detailed description of the scope of this work is included in Section 8 of this regional facilities plan.

### 10.3 Treatment Plant Upgrade -Recommended Plan

The following recommendations are structured to address the City of Paintsville’s current needs, to correct deficiencies in the existing treatment facilities and to facilitate area growth projections over the next twenty years.

**Upgrading Treatment Plants (Decentralized) vs Consolidating Plants (Regionalized):** The City of Paintsville’s recent plan to annex the US 23 corridor from KY 460 to the Hager Hill Area and to provide sewer services in this area provides an opportunity to divert sewage being produced in areas on the western end of Paintsville to the Honey Branch WWTP. This will benefit both treatment plants by reducing flow at the Paintsville WWTP and reduce hydraulic detention time at the Honey Branch WWTP. After looking at several alternatives and weighing the pros and cons of each, it is apparent that the logical and cost –effective path for Paintsville Utilities to pursue is to do a phased upgrade of the Paintsville WWTP and correct some issues at the Honey Branch WWTP. To achieve this we recommend that the following Alternates be considered:

### **Alternative P-3 – Phased Upgrade to the Paintsville WWTP**

Alternative P-3 is a phased approach that is intended to address current issues and facilitate future anticipated loading at the Paintsville WWTP. The proposed phased construction is as follows:

- Reduce the flow to Paintsville WWTP by reducing I &I and diverting all flow west of Paint Creek to the Honey Branch WWTP.
- Repair/replace worn equipment at Paintsville WWTP
- Increase plant capacity for future flows by adding another oxidation ditch and final clarifier.

### **Alternative HB-1 – Upgrade to Honey Branch WWTP**

Under the current KPDES Permit, the plant is required to monitor for phosphorous but does not have discharge limits. This upgrade will include infrastructure improvements that should facilitate the plant to meet future phosphorous limits.

Proposed improvements to be included in this upgrade include:

- Replacing existing headworks screens with vertical mechanical screens
- Repairs to concrete channels in headworks
- New influent and effluent samplers
- Installing manual control valves in RAS/WAS pump station
- Pump repairs
- Adding additional yard hydrants
- Re-painting interior of control building
- Construction of a Chemical Feed/Effluent Filtration facility
- Construction of an Effluent pumping station.
- Installing an insulated floating cover on Lagoon #3

#### **10.4 Environmental Impacts:**

The evaluation of potential environmental impacts to the Planning Area with the implementation of the recommended improvements is an important part of a Regional Wastewater Facility Plan.

**Surface Water/Water Supply** – The implementation of the recommended plan should favorably impact the quality of surface water bodies in the planning area by the reduction of overflows and enhancement of wastewater treatment effluent. Water supply in the planning area is mostly from surface water bodies.

**Groundwater** – The implementation of the recommended plan should have a positive impact to the quality of groundwater present in the planning area by the reduction of leaking sewer systems and eliminating septic systems.

**Wetlands** – No construction is planned in any area of known wetlands and therefore will not adversely impact any known wetlands in the planning area.

**Floodplains-** The proposed expansion to the wastewater treatment facility will not impact the existing floodway and all structures will be protected to the 100 year flood elevation.

**Plant and Animal Communities** – Components of the recommended plan will not be constructed in the habitat areas of any known rare or endangered species in the planning area.

**Historical and Archaeological Sites-** Components of the recommended plan will not be constructed in the area of any known historical or archaeological sites located within the planning area.

**Important Farmlands-** Due to the relatively small surface area involved, the construction of the recommended plan will not impact available farmlands.

### 10.5 Institutional Structure:

Since all existing wastewater collection and treatment facilities within the planning area are owned and operated by Paintsville Utilities, no changes to the existing institutional structure will be required to implement the recommended plan.

### 10.6 Funding Plan:

Funding for the proposed system improvements can be through many sources. Anticipated funding sources at this time include:

- Rural Development (RD) - Combination Grant/Loan
- Appalachian Regional Commission Grant (ARC)
- Kentucky Infrastructure Authority Grant (KIA)
- State Revolving Fund Loan
- Cash on Hand

The first projects proposed to be completed by Paintsville Utilities will be **I&I Reduction Project** and **Pump Station Improvement Project**. The proposed funding for these two contracts is as follows:

Paintsville Utilities has started this funding package application and has received initial approval.

RUS Loan -	\$4,900,000
RUS Grant -	\$2,100,000
Paintsville Utilities -	<u>\$ 149,000</u>
Total	\$7,149,000

Proposed sewer rates after this initial construction phase is presented in Section 10.7.

The following table is a summary of the anticipated project costs for the recommended plan:

<b>TABLE 10.6-1: SUMMARY OF PROJECTED PROJECT COSTS</b>	
<b>RECOMMENDED PROJECT</b>	
<b>Downtown Collection System Improvements</b>	
Contract #1 - Infiltration and Inflow Improvements	\$2,249,335.00
Contract #2- Outfall Sewer Upgrade	\$2,687,400.00
<b>Total - Downtown Collection System Improvements</b>	<b>\$4,936,735.00</b>
<b>Pump Station Improvement Project</b>	
Contract #3 - Pump Station Improvements (2016-2017)	\$2,568,500.00
<b>Total Pump Station Improvements</b>	<b>\$2,568,500.00</b>
<b>Alternative P-3 - Phased Upgrade to the Paintsville WWTP</b>	
Phase I - Plant Repairs and US 23 Corridor Sewer (2016-2018)	\$5,585,000.00
Phase II - Expanding Paintsville WWTP Capacity (2030)	\$9,401,300.00
<b>Total Alternative P-3 - Phased Upgrade - Paintsville WWTP</b>	<b>\$14,986,300.00</b>
<b>Alternative HB-1 - Upgrades to Honey Branch WWTP</b>	
Honey Branch WWTP Upgrades (2017-2018)	\$2,769,000.00
<b>Total - Alternative HB-1 - Upgrades to Honey Branch WWTP</b>	<b>\$2,769,000.00</b>
<b>PROJECTED PROJECT COST</b>	<b>\$25,260,535.00</b>

**10.7 Projected Rates**

**SEWER RATES - EXISTING SYSTEM**

*Rates are based on water consumption.*

First 2,000 gallons.....	\$ 16.49 (Minimum)
Next 3,000 gallons.....	7.889 per 1,000 gallons
Next 5,000 gallons.....	7.889 per 1,000 gallons
Next 15,000 gallons.....	7.82 per 1,000 gallons
Next 25,000 gallons.....	7.82 per 1,000 gallons
Next 50,000 gallons.....	7.82 per 1,000 gallons
All over 100,000 gallons.....	6.64 per 1,000 gallons

*Date This Rate Went Into Effect* \_\_\_\_\_ September 2004 \_\_\_\_\_

**PROJECTED SEWER RATES AFTER I & I Reduction and Pump Station Upgrade**

First <u>2,000</u> Gallons @ \$	<u>24.39</u>	Minimum.
Next <u>3,000</u> Gallons @ \$	<u>7.69</u>	per 1,000 Gallons.
Next <u>5,000</u> Gallons @ \$	<u>7.69</u>	per 1,000 Gallons.
Next <u>15,000</u> Gallons @ \$	<u>7.64</u>	per 1,000 Gallons.
Next <u>25,000</u> Gallons @ \$	<u>7.64</u>	per 1,000 Gallons.
Next <u>50,000</u> Gallons @ \$	<u>7.64</u>	per 1,000 Gallons.
All Over <u>100,000</u> Gallons @ \$	<u>6.48</u>	per 1,000 Gallons.

**PROJECTED SEWER RATES AFTER Honey Branch Upgrade and Phase 1 –Alt P-3**

First <u>2,000</u> Gallons @ \$	<u>30.00</u>	Minimum.
Next <u>3,000</u> Gallons @ \$	<u>9.25</u>	per 1,000 Gallons.
Next <u>5,000</u> Gallons @ \$	<u>9.25</u>	per 1,000 Gallons.
Next <u>15,000</u> Gallons @ \$	<u>8.64</u>	per 1,000 Gallons.
Next <u>25,000</u> Gallons @ \$	<u>8.64</u>	per 1,000 Gallons.
Next <u>50,000</u> Gallons @ \$	<u>8.64</u>	per 1,000 Gallons.
All Over <u>100,000</u> Gallons @ \$	<u>7.48</u>	per 1,000 Gallons.

## 10.8 Implementation Schedule:

<u>Project</u>	<u>Design</u>	<u>Construction</u>
Reduction of I & I Contract #1	Complete	2016-2017
Pumping Station Improvements	Complete	2016-2017
Alt. P-3 – Phase 1	2016-2017	2018-2019
Honey Branch WWTP Upgrades	2016-2017	2018-2019
Contract # 2 – Outfall Sewer	2028	2030- 2031
Alt P-3 – Phase 2 – Plant Expansion	2028-2029	2030-2031

### **11.1 Public Meeting:**

A Public Meeting will be held at the Paintsville Recreation Center to provide general information related to this planning document and the proposed projects included in this Facilities Plan. Included in this Section 11 will be:

- Copy of newspaper advertisement

- Newspaper Affidavit

- Summary of items discussed

- Public Meeting Sign-In Sheet