REGIONAL FACILITIES PLAN

FOR THE

PINEVILLE UTILITY COMMISSION

BELL COUNTY, KENTUCKY

VOLUME II
APPENDICES

- Prepared By -

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September 2014

SECTION 13

APPENDICES

LIST OF APPENDICES

APPENDIX A

CURRENT NPDES PERMIT

COPY

STEVEN L. BESHEAR
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

LEONARD K. PETERS
SECRETARY

January 19, 2010

Mr. Bill Bunch
City of Pineville
Pineville Utility Commission
Post Office Box 277
Pineville, Kentucky 40977

Re: Pineville Wastewater Treatment Plant
KPDES No.: KY0024058
AI No.: 128
Bell County, Kentucky

Dear Mr. Bunch:

Enclosed is the Kentucky Pollutant Discharge Elimination System (KPDES) permit for the above-referenced facility. This action constitutes a final permit issuance under 401 KAR 5:075, pursuant to KRS 224.16-050.

This permit will become effective on the date indicated in the attached permit provided that no request for adjudication is granted. All provisions of the permit will be effective and enforceable in accordance with 401 KAR 5:075, unless stayed by the Hearing Officer under Sections 11 and 13.

Any demand for a hearing on the permit shall be filed in accordance with the procedures specified in KRS 224.10-420, 224.10-440, 224.10-470 and any regulations promulgated thereto. Any person aggrieved by the issuance of a permit final decision may demand a hearing, pursuant to KRS 224.10-420(2), within thirty (30) days from the date of the issuance of this letter. Two (2) copies of request for hearing should be submitted in writing to the Energy and Environment Cabinet, Office of Administrative Hearings, 35-36 Fountain Place, Frankfort, Kentucky 40601 and the Commonwealth of Kentucky, Energy and Environment Cabinet, Division of Water, 200 Fair Oaks Lane, Frankfort, Kentucky 40601. For your record keeping purposes, it is recommended that these requests be sent by certified mail. The written request must conform to the appropriate statutes referenced above.

If you have any questions regarding the KPDES decision, please contact Dan Juett, Operational Permits Section, Surface Water Permits Branch, at (502) 564-8158, extension 4894.

Further information on procedures and legal matters pertaining to the hearing request may be obtained by contacting the Office of Administrative Hearings at (502) 564-7312.

Sincerely,

Sandra L. Gruzesky, Director
Division of Water

SLG:TJB:tjb
Enclosure
c: Division of Water

KPDES

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT

PERMIT NO.: KY0024058
AI NO.: 128

AUTHORIZATION TO DISCHARGE UNDER THE KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

Pursuant to Authority in KRS 224,

City of Pineville
Pineville Utility Commission
P. O. Box 277
Pineville, Kentucky 40977

is authorized to discharge from a facility located at

Pineville Wastewater Treatment Plant
Stewart Branch Road
Pineville, Bell County, Kentucky

to receiving waters named

Cumberland River at mile point 652.7

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, III, and IV hereof. The permit consists of this cover sheet, and Part I 2 pages, Part II 1 pages, Part III 2 pages, and Part IV 3 pages.

This permit shall become effective on March 1, 2010.

This permit and the authorization to discharge shall expire at midnight, February 28, 2015.

January 19, 2010
Date Signed

Sandra L. Gruzesky, Director
Division of Water

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
Division of Water, 200 Fair Oaks Lane, Frankfort, Kentucky 40601
Printed on Recycled Paper

A1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 001 - Sanitary Wastewater (Design Flow = 0.72 MGD)

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS (lbs/day)		DISCHARGE LIMITATIONS Other Units (Specify)		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Effluent Flow (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Influent Flow (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Effluent BOD_5 (mg/l)	180	270	30	45	1/Week	24 Hr Composite
Influent BOD_5 (mg/l)	Report	Report	Report	Report	1/Week	24 Hr Composite
Percent Removal BOD_5 (%)			85 or greater		1/Month	Calculated
Effluent TSS (mg/l)	180	270	30	45	1/Week	24 Hr Composite
Influent TSS (mg/l)	Report	Report	Report	Report	1/Week	24 Hr Composite
Percent Removal TSS (%)			85 or greater		1/Month	Calculated
Ammonia Nitrogen (as mg/l N)	120	180	20	30	1/Week	24 Hr Composite
Escherichia Coli (N/100 ml)	N/A	N/A	130	240	1/Week	Grab
Dissolved Oxygen (mg/l) (minimum)	N/A	N/A	Not less than 2.0		1/Week	Grab
pH (standard units)	N/A	N/A	6.0 (min)	9.0 (max)	1/Week	Grab
Total Residual Chlorine (mg/l)	N/A	N/A	0.019	0.019	1/Week	Grab
Total Phosphorus (mg/l)	N/A	N/A	Report	Report	1/Week	24 Hr Composite
Total Nitrogen (mg/l)	N/A	N/A	Report	Report	1/Week	24 Hr Composite

The abbreviation BOD_5 means Biochemical Oxygen Demand (5-day).
The abbreviation TSS means Total Suspended Solids.
The abbreviation N/A means Not Applicable.
The effluent limitations for BOD_5 and TSS are Monthly (30 day) and Weekly (7 day) Averages.
The effluent limitations for *Escherichia Coli* are thirty (30) day and seven (7) day Geometric Means.
Total Nitrogen is to be reported as the summation of the analytical results for Total Nitrates, Total Nitrites, and Total Kjeldahl Nitrogen.
There shall be no discharge of floating solids or visible foam or sheen in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point prior to discharge to or mixing with the receiving waters or wastestreams from other outfalls.

B. SCHEDULE OF COMPLIANCE

The permittee shall achieve compliance with all requirements on the effective date of this permit.

STANDARD CONDITIONS FOR KPDES PERMIT

This permit has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal, and local agencies.

It is the responsibility of the permittee to demonstrate compliance with permit parameter limitations by utilization of sufficiently sensitive analytical methods.

The permittee is also advised that all KPDES permit conditions in KPDES Regulation 401 KAR 5:065, Section 1 will apply to all discharges authorized by this permit.

PART III

OTHER REQUIREMENTS

A. Reporting of Monitoring Results

Monitoring results obtained during each monitoring period must be reported on a preprinted Discharge Monitoring Report (DMR) Form that will be mailed to you. The completed DMR for each monitoring period must be sent to the Division of Water at the address listed below (with a copy to the appropriate Regional Office) postmarked no later than the 28th day of the month following the monitoring period for which monitoring results were obtained.

Division of Water
London Regional Office
875 South Main Street
London, Kentucky 40741
ATTN: Supervisor

Division of Water
Surface Water Permits Branch
Permit Support Section
200 Fair Oaks Lane
Frankfort, Kentucky 40601

B. Reopener Clause

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under 401 KAR 5:050 through 5:086, if the effluent standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

2. Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of KRS Chapter 224 when applicable.

C. Sludge Disposal

The disposal or final use of sewage sludge generated during the treatment of domestic sewage in a treatment works shall be disposed of in accordance with federal requirements specified in 40 CFR Part 503 and state requirements specified in Division of Waste Management regulations 401 KAR Chapter 45.

D. Certified Operators

This wastewater system shall be operated under the supervision of a Class II Kentucky Certified Operator who shall be reasonably available at all times. All other operators employed by the system shall hold a Kentucky Certificate or shall be in the process of obtaining a Kentucky Certificate. The certificates of each operator shall be prominently displayed on the wall of the system office.

E. Monthly Operating Reports

In addition to the monitoring of effluent as specified by the permit the permittee shall conduct process control monitoring on a daily basis and record the data on a Monthly Operating Report (MOR) which shall be submitted with the Discharge Monitoring Reports. Process control monitoring is that monitoring performed by the operators of the wastewater treatment plant to determine if the wastewater system is operating at its optimum efficiency. This monitoring includes but is not limited to influent and effluent quality and quantity monitoring, chemical usage, sludge monitoring including volume produced, wasted, and disposed, and monitoring of internal units such as aeration basins and oxidation ditches.

F. Outfall Signage

The permittee shall post a permanent marker at all discharge locations and/or monitoring points. The marker shall be at least 2 feet by 2 feet in size and a minimum of 3 feet above ground level with the Permittee Name and KPDES permit and outfall numbers in 2 inch letters. For internal monitoring points the marker shall be of sufficient size to include the outfall number in 2 inch letters and shall be posted as near as possible to the actual sampling location.

G. Necessity to Develop and Implement a Pretreatment Program

POTWs which meet one or more of the following criteria are required to develop, submit for approval, and implement specific Pretreatment Program Requirements.

A POTW or combination of POTWs operated by the same authority, with a total design flow greater than five (5) million gallons per day (MGD) and receiving from industrial users which pass through interfere with the operation of the POTW, or are otherwise subject to pretreatment standards.

A POTW with a design flow of five (5) MGD or less shall develop a pretreatment program if the cabinet determines that the nature or volume of the industrial wastewater, treatment process upsets, violation of the POTW effluent limitations, contamination of municipal sludge or other circumstances warrant to prevent interference with the POTW or pass through.

The permittee shall conduct annual sewer user surveys to determine if conditions warrant the development and implementation of a pretreatment program. An annual report listing the industrial users, the manufacturing processes, the nature and volume of flow and any problems caused by the users shall be submitted no later than December 31 of each year, unless otherwise specified by the Division of Water.

H. Prohibited Discharges

The following are prohibit from being discharged to the POTW.

Pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW);

Pollutants which will cause corrosive structural damage to the POTW, but in no case, discharges with a pH lower than 5.0;

Solid or viscous pollutants in amounts which will cause obstruction to the flow in sewers, or other interference with operation of the POTW;

Any pollutant, including oxygen demanding pollutants (BOD_5, etc.), released in a discharge at such a volume or strength as to cause interference in the POTW;

Heat in amounts, which will inhibit biological activity in the POTW, but in no case, heat in such quantities that the influent to the sewage treatment works exceeds 104° F (40° C);

Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through;

Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems; and,

Any trucked or hauled waste except, at discharge points designated by the POTW.

I. CSO/SSO Requirements

In conjunction with Civil Action No. 07-CI-1259 the CSO/SSO Consent Judgment, Pineville Utility Commission shall submit an annual report, in lieu of the previously submitted Combined Sewer Operational Plan (CSOP). This report will document the permittee's efforts to control and eventually eliminate the following combined sewer overflows (CSOs):

Discharge Number/Location	Latitude/Longitude	Receiving Water
002 McDonalds/Mt. View River	36°45′54″/83°42′01″	Cumberland
003 Ball Park River	36°45′48″/83°42′01″	Cumberland
004 Newtown (Closed)	36°45′48″/83°41′32″	No Discharge

PART IV

BEST MANAGEMENT PRACTICES

SECTION A. GENERAL CONDITIONS

1. Applicability

These conditions apply to all permittees who use, manufacture, store, handle, or discharge any pollutant listed as: (1) toxic under Section 307(a)(1) of the Clean Water Act; (2) oil, as defined in Section 311(a)(1) of the Act; (3) any pollutant listed as hazardous under Section 311 of the Act; or (4) is defined as a pollutant pursuant to KRS 224.01-010(35) and who have ancillary manufacturing operations which could result in (1) the release of a hazardous substance, pollutant, or contaminant, or (2) an environmental emergency, as defined in KRS 224.01-400, as amended, or any regulation promulgated pursuant thereto (hereinafter, the "BMP pollutants"). These operations include material storage areas; plant site runoff; in-plant transfer, process and material handling areas; loading and unloading operations, and sludge and waste disposal areas.

2. BMP Plan

The permittee shall develop and implement a Best Management Practices (BMP) plan consistent with 401 KAR 5:065, Section 2(10) pursuant to KRS 224.70-110, which prevents or minimizes the potential for the release of "BMP pollutants" from ancillary activities through plant site runoff; spillage or leaks, sludge or waste disposal; or drainage from raw material storage. A Best Management Practices (BMP) plan will be prepared by the permittee unless the permittee can demonstrate through the submission of a BMP outline that the elements and intent of the BMP have been fulfilled through the use of existing plans such as the Spill Prevention Control and Countermeasure (SPCC) plans, contingency plans, and other applicable documents.

3. Implementation

If this is the first time for the BMP requirement, then the plan shall be developed and submitted to the Division of Water within 90 days of the effective date of the permit. Implementation shall be within 180 days of that submission. For permit renewals the plan in effect at the time of permit reissuance shall remain in effect. Modifications to the plan as a result of ineffectiveness or plan changes to the facility shall be submitted to the Division of Water and implemented as soon as possible.

4. General Requirements

The BMP plan shall:

a. Be documented in narrative form, and shall include any necessary plot plans, drawings, or maps.

b. Establish specific objectives for the control of toxic and hazardous pollutants.

(1) Each facility component or system shall be examined for its potential for causing a release of "BMP pollutants" due to equipment failure, improper operation, natural phenomena such as rain or snowfall, etc.

(2) Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances which could result in a release of "BMP pollutants," the plan should include a prediction of the direction, rate of flow, and total quantity of the pollutants which could be released from the facility as result of each condition or circumstance.

c. Establish specific Best Management Practices to meet the objectives identified under paragraph b of this section, addressing each component or system capable of causing a release of "BMP pollutants."

d. Include any special conditions established in part b of this section.

e. Be reviewed by plant engineering staff and the plant manager.

5. Specific Requirements

The plan shall be consistent with the general guidance contained in the publication entitled "NPDES Best Management Practices Guidance Document," and shall include the following baseline BMPs as a minimum.

a. BMP Committee
b. Reporting of BMP Incidents
c. Risk Identification and Assessment
d. Employee Training
e. Inspections and Records
f. Preventive Maintenance
g. Good Housekeeping
h. Materials Compatibility
i. Security
j. Materials Inventory

6. SPCC Plans

The BMP plan may reflect requirements for Spill Prevention Control and Countermeasure (SPCC) plans under Section 311 of the Act and 40 CFR Part 151, and may incorporate any part of such plans into the BMP plan by reference.

7. Hazardous Waste Management

The permittee shall assure the proper management of solid and hazardous waste in accordance with the regulations promulgated under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1978 (RCRA) (40 U.S.C. 6901 et seq.) Management practices required under RCRA regulations shall be referenced in the BMP plan.

8. Documentation

The permittee shall maintain a description of the BMP plan at the facility and shall make the plan available upon request to NREPC personnel. Initial copies and modifications thereof shall be sent to the following addresses when required by Section 3:

Division of Water
London Regional Office
875 South Main Street
London, Kentucky 40741
ATTN: Supervisor

Division of Water
Surface Water Permits Branch
Permit Support Section
200 Fair Oaks Lane
Frankfort, Kentucky 40601

9. BMP Plan Modification

The permittee shall amend the BMP plan whenever there is a change in the facility or change in the operation of the facility which materially increases the potential for the ancillary activities to result in the release of "BMP pollutants."

10. Modification for Ineffectiveness

If the BMP plan proves to be ineffective in achieving the general objective of preventing the release of "BMP pollutants," then the specific objectives and requirements under paragraphs b and c of Section 4, the permit, and/or the BMP plan shall be subject to modification to incorporate revised BMP requirements. If at any time following the issuance of this permit the BMP plan is found to be inadequate pursuant to a state or federal site inspection or plan review, the plan shall be modified to incorporate such changes necessary to resolve the concerns.

SECTION B. SPECIFIC CONDITIONS

Periodically Discharged Wastewaters Not Specifically Covered By Effluent Conditions

The permittee shall include in this BMP plan procedures and controls necessary for the handling of periodically discharged wastewaters such as intake screen backwash, meter calibration, fire protection, hydrostatic testing water, water associated with demolition projects, etc.

STEVEN L. BESHEAR
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DIVISION OF WATER
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LEONARD K. PETERS
SECRETARY

FACT SHEET

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT TO DISCHARGE TREATED WASTEWATER INTO WATERS OF THE COMMONWEALTH

KPDES No.: KY0024058 Permit Writer: Dan Juett Date: January 19, 2010
AI No.: 128

1. SYNOPSIS OF APPLICATION

a. Name and Address of Applicant

City of Pineville
Pineville Utility Commission
P. O. Box 277
Pineville, Kentucky 40977

b. Facility Location

Pineville Wastewater Treatment Plant
Stewart Branch Road
Pineville, Bell County, Kentucky

c. Description of Applicant's Operation

City

d. Design Capacity

0.72 MGD

e. Description of Existing Pollution Abatement Facilities

Treatment consists of screening, grit removal, aeration basin, clarifiers, chlorine disinfection, dechlorination, and post aeration. Sludge Solids are pump to sludge pond for thickening, then pumped, and hauled to Middlesboro WWTP treated by belt press with final disposal in the Laurel Ridge Landfill.

f. Permitting Action

This is a reissuance of a minor KPDES permit for a municipally/regional planning authority owned wastewater treatment plant serving residential units and commercial (non-industrial) users within the municipality.

2. RECEIVING WATER

a. Name/Mile Point

Facility discharges to Cumberland River at mile point 652.7.

b. Stream Segment Use Classification

Pursuant to 401 KAR 5:026, Section 5, Cumberland River carries the following classifications: warm water aquatic habitat, primary contact recreation, secondary contact recreation, and domestic water supply.

c. Stream Segment Categorization

Pursuant to 401 KAR 5:030, Section 1 Cumberland River is categorized as an "Impaired Waters". Facility discharges to Cumberland River at mile point 652.7. The Cumberland River from 650.6 to 654.5 is listed on Kentucky's 2008 Integrated Report to Congress on the Condition of Water Resources in Kentucky Volume II 303(d) List of Surface Waters. Impaired Use is nonsupport of swimming. Pollutants of concern are pathogens. Suspected Sources include: unknown sources, septic systems, and similar decentralized systems, storm water runoff, agriculture, and combined sewer overflows. A Total maximum daily Load, TMDL, was approved by the U. S. Environmental Protection Agency in July 1998. The TMDL is titled "Removing Fecal Pollution From The Upper Cumberland River Drainage". The permit issuance does not present a water quality problem and does not contribute to the impairment conditions. A properly operated wastewater treatment plant will not contribute to the impairment.

d. Stream Low Flow Condition

The 7-day, 10-year low flow and harmonic mean conditions of Cumberland River are 16 and 175 cfs, respectively.

3. REPORTED DISCHARGE AND PROPOSED LIMITS

Serial Number 001 - Sanitary Wastewater (Design Flow = 0.72 MGD)

Effluent Characteristics	Reported Discharge Monthly Average	Reported Discharge Daily Maximum	Proposed Limits Monthly Average	Proposed Limits Daily Maximum	Applicable Water Quality Criteria and/or Effluent Guidelines
Effluent Flow (MGD)	0.476	0.664	Report	Report	401 KAR 5:065, Section 2(8)
Influent Flow (MGD)	0.474	0.664	Report	Report	401 KAR 5:065, Section 2(8)
Effluent BOD_5 (mg/l)	7	18	30	45	401 KAR 5:031, Section 4 401 KAR 5:045, Sections 3 and 5
Influent BOD_5 (mg/l)	248	560	Report	Report	401 KAR 5:065, Section 2(8)
Percent Removal BOD_5 (%)	96.68	99	85 or greater		40 CFR 133.102(a)(3)
Effluent TSS (mg/l)	8.79	34	30	45	401 KAR 5:031, Section 4 401 KAR 5:045, Sections 2 and 3
Influent TSS (mg/l)	413	939	Report	Report	401 KAR 5:031, Section 4
Percent Removal TSS (%)	97.55	99	85 or greater		40 CFR 133.02(b)(3)
Fecal Coliform (N/100 ml)	17	48	Removing from permit		401 KAR 5:080, Section 1(2)(c)2
Escherichia Coli (N/100 ml)	NR	NR	130	240	401 KAR 5:031, Section 7 401 KAR 5:045, Section 4 401 KAR 5:080, Section 1(2)(c)2
Ammonia Nitrogen (as mg/l N)	2.83	12.8	20	30	401 KAR 5:031, Section 4 401 KAR 5:045, Sections 3 and 5
Dissolved Oxygen (mg/l) (minimum)	6.78	7.3	Not less than 2.0		401 KAR 5:031, Section 4 401 KAR 5:045, Sections 3 and 5
pH (standard units)	6.5	6.8	6.0 (min)	9.0 (max)	401 KAR 5:031, Section 4 401 KAR 5:045, Section 4

3. REPORTED DISCHARGE AND PROPOSED LIMITS - SANITARY FACILTY

Serial Number 001 - Sanitary Wastewater (Design Flow = 0.72 MGD)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Total Residual Chlorine (mg/l)	0.009	0.01	0.019	0.019	401 KAR 5:031, Section 4(k)
Total Phosphorus (mg/l)	N/A	N/A	Report	Report	401 KAR 5:065, Section 2(8)
Total Nitrogen (mg/l)	N/A	N/A	Report	Report	401 KAR 5:065, Section 2(8)

The data contained under the reported discharge columns is not from the renewal application, but rather from the analysis of the DMR data that has been reported during the term of the previous permit.

The abbreviation BOD_5 means Biochemical Oxygen Demand (5-day).
The abbreviation TSS means Total Suspended Solids.
The abbreviation N/A means Not Applicable.
The abbreviation NR means not reported on the Discharge Monitoring Report (DMR).
The effluent limitations for BOD_5 and TSS are Monthly (30 day) and Weekly (7 day) Averages.
The effluent limitations for *Escherichia Coli* are thirty (30) day and seven (7) day Geometric Means.
Total Nitrogen is to be reported as the summation of the analytical results for Total Nitrates, Total Nitrites, and Total Kjeldahl Nitrogen.

4. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 001 Sanitary Wastewater (Design Flow = 0.72 MGD)

b. Effluent Characteristics

Flow (Influent/Effluent), BOD_5 (Influent/Effluent), TSS (Influent/Effluent), Fecal Coliform Bacteria, *Escherichia Coli*, pH, Ammonia Nitrogen, Dissolved Oxygen, Total Residual Chlorine (TRC), Total Phosphorus, and Total Nitrogen.

c. Pertinent Factors

Pineville Wastewater Treatment Plant is a regional facility. The public owned wastewater treatment plant treats municipal wastewater with no industrial users.

d. Monitoring Requirements

Influent sampling shall be conducted at the nearest accessible point in the collection system but prior to commencement of treatment.

Effluent sampling shall be conducted at the nearest point after final treatment but prior to discharge to or mixing with the receiving waters.

Effluent Flow monitoring shall be conducted continuously by recorder.

Influent Flow monitoring shall be conducted continuously by recorder.

BOD_5 (Influent/Effluent) and TSS (Influent/Effluent) monitoring shall be conducted once per week by 24 hour composite sampling.

Percent Removal shall be determined monthly by calculation.

Ammonia Nitrogen, Total Phosphorus and Total Nitrogen shall be monitored once per week by 24 hour composite sampling.

Escherichia Coli, pH, Dissolved Oxygen and Total Residual Chlorine shall be monitored once per week by grab sample.

e. Justification of Conditions

The Kentucky regulations cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes.

Escherichia Coli and Fecal Coliform Bacteria
The limits for *Escherichia Coli* are consistent with the requirements of 401 KAR 5:031, Section 7, 401 KAR 5:045 Section 4 and 401 KAR 5:080, Section 1(2)(c) 2. The removal of Fecal Coliform Bacteria is consistent with the requirements of 401 KAR 5:080k Section 1 (2) (c)2. Although Fecal Coliform Bacteria has been used as an indicator of fecal contamination, it does contain other species that are not necessarily fecal in origin. EPA recommends *Escherichia Coli*, which is specific to fecal material from warm-blooded animals, as the best indicator of health risk from contact with recreational waters. Therefore, it is the "Best Professional Judgment "BPJ" of the Division of Water that *Escherichia Coli* replace Fecal Coliform Bacteria on this permit.

Flow (Influent/Effluent)
The monitoring requirements for this parameter are consistent with the requirements of 401 KAR 5:065, Section 2(8).

Influent BOD_5, Influent TSS, and Percent Removal
The monitoring requirements for influent BOD_5 and influent TSS are consistent with the requirements of 401 KAR 5:065, Section 2(8). The raw influent values of these two parameters are necessary to determine compliance with the 85 percent removal requirement specified by 40 CFR 133.102 (a)(3) and (b)(3).

Ammonia Nitrogen, and Dissolved Oxygen
The limits for these parameters are consistent with the requirements of 401 KAR 5:031, Section 4, and 401 KAR 5:045, Sections 3 and 5. Section 4 of 5:031 establishes water quality criteria for the protection of Kentucky's waters. Section 5 of 5:045 requires biochemically degradable wastewaters to receive treatment in excess of secondary treatment if the Cabinet determines that the receiving water would not satisfy applicable water quality standards as a result of a facility discharge or discharges from multiple facilities

BOD_5 and Total Suspended Solids
The limits for these parameters are consistent with the requirements of 401 KAR 5:031, Section 4 and 5:045, Sections 2 and 3. Section 4 of 5:031 establishes water quality criteria for the protection of Kentucky's waters. Sections 2 and 3 of 5:045 require biochemically degradable wastewaters to receive secondary treatment.

pH
The limits for these parameters are consistent with the requirements of 401 KAR 5:031, Section 4 and 5:045, Section 4. Section 4 of 5:031 establishes water quality criteria for the protection of Kentucky's waters. Section 4 of 5:045 establishes the acceptable levels of these parameters for biochemically degradable wastewaters.

Total Residual Chlorine
The limits for these parameters are consistent with the requirements of 401 KAR 5:031, Section 4.

Total Phosphorus and Total Nitrogen
The monitoring requirements for these parameters are consistent with the requirements of 401 KAR 5:065, Section 2(8)(a). Total Nitrogen is TKN (as N) and nitrate/nitrite (as N).

5. ANTIDEGRADATION

The conditions of 401 KAR 5:029, Section 1 have been satisfied by this permit action. Since this permit action involves reissuance of an existing permit, and does not propose an expanded discharge, a review under 401 KAR 5:030 Section 1 is not applicable.

6. PROPOSED COMPLIANCE SCHEDULE FOR ATTAINING EFFLUENT LIMITATIONS

The permittee will comply with all effluent limitations by the effective date of the permit.

7. PROPOSED SPECIAL CONDITIONS WHICH WILL HAVE A SIGNIFICANT IMPACT ON THE DISCHARGE

SLUDGE DISPOSAL

The disposal or final use of sewage sludge generated during the treatment of domestic sewage in a treatment works is subject to federal requirements specified in 40 CFR Part 503 and state requirements specified in Division of Waste Management regulations 401 KAR Chapter 45.

GENERAL PRETREATMENT REQUIREMENTS

All Publicly Owned Treatment Works (POTWs) are subject to the requirements of 401 KAR 5:057.

Publicly Owned Treatment Works (POTWs) means any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a State or municipality. This definition includes any sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

7. PROPOSED SPECIAL CONDITIONS WHICH WILL HAVE A SIGNIFICANT IMPACT ON THE DISCHARGE

Municipality means a city, village, town, borough, county, parish, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial waste, other wastes, or Indian tribe or authorized Indian tribal organization, or a designated and approved management agency under Section 208 of CWA.

Prohibited Discharges

Pursuant to 401 KAR 5:057, Section 3(2) the permittee is to prevent discharges by any user to the POTW which would cause pass-through or interference. Specific prohibitions include: (1) flammable or explosive pollutants; (2) corrosive pollutants; (3) amounts of solid or viscous pollutants which could cause an obstruction; (4) pollutants including oxygen demanding pollutants discharged at a flow rate or concentration which would interfere with the POTW; (5) heat in amounts which would inhibit biological activity, but no heat in quantities such that the temperature at the POTW treatment plant exceeds 104 °F (40 °C); (6) amounts of petroleum oil, non-biodegradable cutting oil or products of mineral oil origin that would cause pass through or interference; (7) pollutants which cause toxic gases, vapors, or fumes; and (8) trucked or hauled pollutants except at discharge points designated by the POTW.

Necessity to Develop and Implement a Pretreatment Program

Pursuant to Section 6(1) POTWs which meet one or more of the following criteria are required to develop, submit for approval, and implement specific Pretreatment Program Requirements.

1. A POTW or combination of POTWs operated by the same authority, with a total design flow greater than five (5) million gallons per day (MGD) and receiving from industrial users which pass through interfere with the operation of the POTW, or are otherwise subject to pretreatment standards.

2. A POTW with a design flow of five (5) MGD or less shall develop a pretreatment program if the cabinet determines that the nature or volume of the industrial wastewater, treatment process upsets, violation of the POTW effluent limitations, contamination of municipal sludge or other circumstances warrant to prevent interference with the POTW or pass through.

Consistent with the requirements of 401 KAR 5:057, Section 6(1) and 401 KAR 5:080, Section 1(2)(c)2 the permittee shall conduct annual sewer user surveys to determine if conditions warrant the development and implementation of a pretreatment program. This condition is representative of the Division of Water's "Best Professional Judgment" that such surveys are necessary to demonstrate compliance with 401 KAR 5:057, Section 6(1).

Best Management Practices (BMP) Plan

Pursuant to 401 KAR 5:065, Section 2(10), a BMP requirement shall be included: to control or abate the discharge of pollutants from ancillary areas containing toxic or hazardous substances or those substances which could result in an environmental emergency; where numeric effluent limitations are infeasible; or to carry out the purposes and intent of KRS 224. The facility has several areas where support activities occur which have a potential of the discharge of such substances through storm water runoff or spillage. Some of these areas will drain to present wastewater treatment plants, others will not.

Certified Operators

Pursuant to 401 KAR 5:010, Section 2(1) wastewater systems shall be operated under the supervision of a certified operator who holds a Kentucky Certificate equivalent to the class of system being supervised. All other operators employed by the system shall hold a Kentucky Certificate or shall be in the process of obtaining a Kentucky Certificate.

Pursuant to 401 KAR 5:010, Section 8 wastewater systems shall be classified as follows:

- Class I: Systems with a design capacity of less than or equal to 50,000 gpd
- Class II: Systems with a design capacity of more than 50,000 gpd but less than or equal to 2.0 MGD
- Class III: Systems with a design capacity of more than 2.0 MGD but less than or equal to 7.5 MGD
- Class IV: Systems with a design capacity of more than 7.5 MGD

Section 2(2) of 401 KAR 5:010 require the certified operator to be reasonably available if not physically present while the system is operating.

Section 2(3) of 401 KAR 5:010 require the Kentucky Certificate shall be displayed on the wall of wastewater system office.

Monthly Operating Reports (MOR)

Pursuant 401 KAR 5:065, Section 2(8)3 the permit shall incorporate monitoring requirements as appropriate to assure compliance with the permit limitations. In addition to the monitoring of effluent as specified by the permit the permittee shall conduct process control monitoring on a daily basis and record the data on a Monthly Operating Report (MOR) which shall be submitted with the Discharge Monitoring Reports. Process control monitoring is that monitoring performed by the operators of the wastewater treatment plant to determine if the wastewater system is operating at its optimum efficiency. This monitoring includes but is not limited to influent and effluent quality and quantity monitoring, chemical usage, sludge monitoring including volume produced, wasted, and disposed, and monitoring of internal units such as aeration basins and oxidation ditches.

Outfall Signage

As a member of ORSANCO (Ohio River Valley Sanitation Commission) the Commonwealth of Kentucky through the Division of Water implements a requirement that the permittee post a permanent marker at each discharge point to the Ohio River. It is the Best Professional Judgment of the Division of Water, 401 KAR 5:080, Section 1(2)(c)2, that all permittees post a marker at all discharge locations and/or monitoring points. The ORSANCO requirements for the marker specify it to be at least 2 feet by 2 feet in size and a minimum of 3 feet above ground level with the Permittee Name and KPDES permit and outfall numbers in 2 inch letters. For internal monitoring points the marker shall be of sufficient size to include the outfall number in 2 inch letters and is to be posted as near as possible to the actual sampling location.

CSO/SSO Requirements

In conjunction with Civil Action No. 07-CI-1259 the CSO/SSO Consent Judgment, Pineville Utility Commission shall submit an annual report, in lieu of the previously submitted Combined Sewer Operational Plan (CSOP). This report will document the permittee's efforts to control and eventually eliminate the following combined sewer overflows (CSOs):

Discharge Number/Location	Latitude/Longitude	Receiving Water
002 McDonalds/Mt. View	36°45′54″/83°42′01″	Cumberland River
003 Ball Park	36°45′48″/83°42′01″	Cumberland River
004 Newtown (Closed)	36°45′48″/83°41′32″	No Discharge

8. PERMIT DURATION

Five (5) years. This facility is in the Tennessee/Mississippi/Cumberland Basin Management Unit as per the Kentucky Watershed Management Framework.

9. PERMIT INFORMATION

The application, draft permit, fact sheet, public notice, comments received, and additional information is available from the Division of Water at 200 Fair Oaks Lane, Frankfort, Kentucky 40601.

10. REFERENCES AND CITED DOCUMENTS

All material and documents referenced or cited in this fact sheet are a part of the permit information as described above and are readily available at the Division of Water Central Office. Information regarding these materials may be obtained from the person listed below.

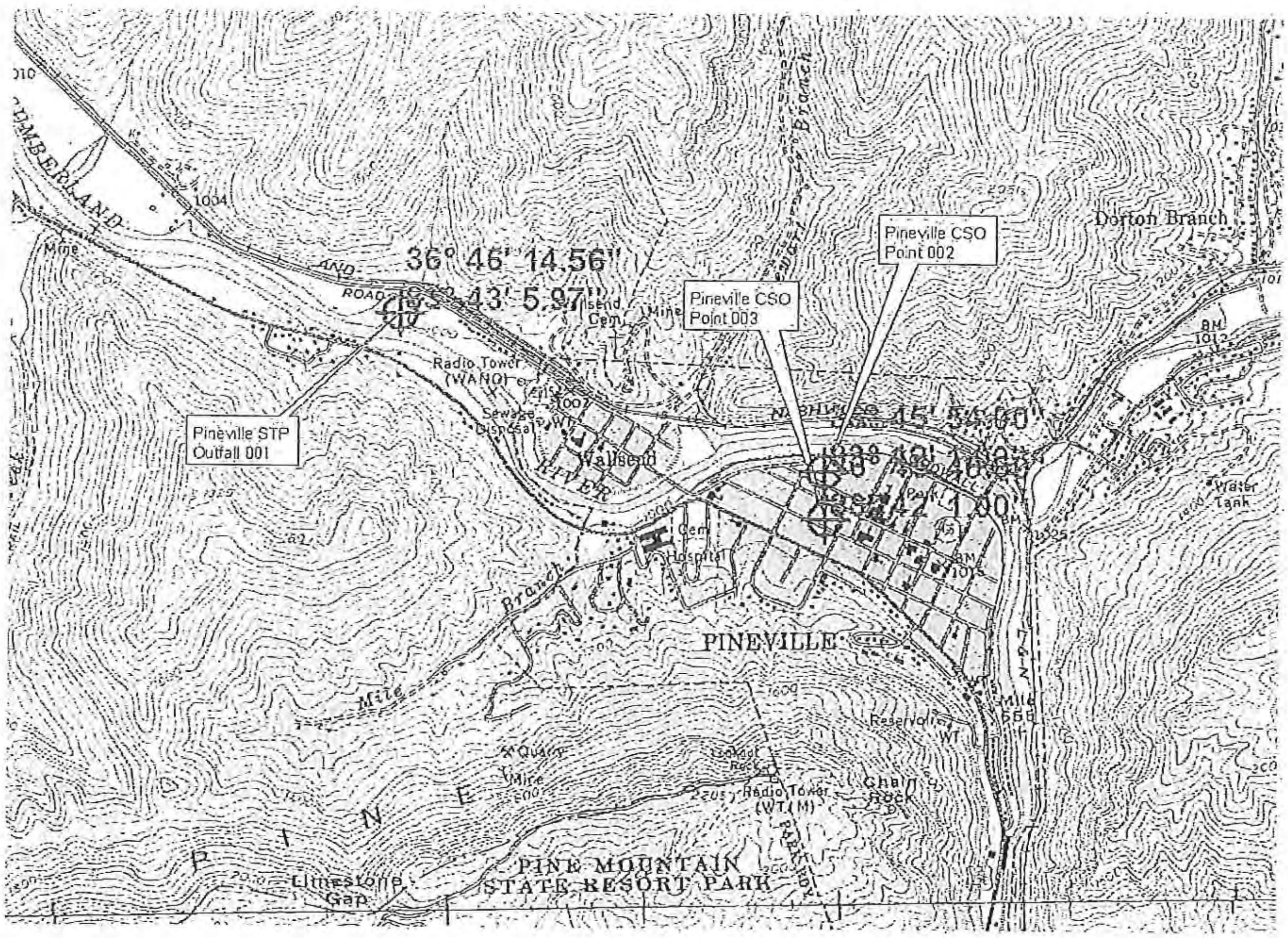
11. CONTACT

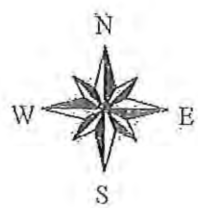
For further information on the draft permit or comment process, contact the individual identified on the Public Notice or the Permit Writer - Dan Juett at (502) 564-8158, extension 4894, or email Dan.Juett@ky.gov.

12. PUBLIC NOTICE INFORMATION

Please refer to the attached Public Notice for details regarding the procedures for a final decision, deadline for comments and other information required by 401 KAR 5:075, Section 4(2)(e).

City of Pineville
Pineville Utility Commission
Pineville STP & CSO





APPENDIX B

CONSTRUCTION COST ESTIMATES

Table B-1
Pineville WWTP Expansion
Bell County, Kentucky
V&M P#:11055-00
Date: 1/3/14
Preliminary Construction Cost Estimate

Treatment Option No.3A- Lagoon system-1.2 MGD ADF

Description	Number of Units	Units	Unit Cost, $	Total Cost,$
Headworks				
Mech. Screen & Compactor	2	EA	110000	220000
Grit chamber Upgrades	1	EA	50000	50000
Piping/valves	1	LS	25000	25000
Concrete	150	CY	750	112500
Miscellaneous	1	LS	25000	25000
Labor (25%of Equipment)	1	LS	295000	73750
Lagoon Basins Modifications				
Aeration & Mixing Equip.	1	LS	150000	150000
Piping/valves	1	LS	15000	15000
Concrete	100	CY	750	75000
Miscellaneous/Baffle wall	1	LS	25000	25000
Labor (25%of Equipment&piping)	1	LS	165000	41250
Secondary Clarifiers				
Clarifier Equipment	2	each	100000	200000
Piping/valves	1	LS	50,000	50000
Labor (25%of Equipment)	1	LS	250000	62500
Concrete	500	CY	750	375000
Miscellaneous	1	LS	25000	25000
Disinfection System				
UV Equipment	1	LS	225000	225000
Piping/Valves/Metal Bldg Frame	1	LS	100,000	100000
Concrete	150	CY	750	112500
Miscellaneous	1	LS	25000	25000
Labor (25%of Equipment)	1	LS	325000	81250
Surge Basin (0.825 Million gals)				
Pumps and Controls	1	LS	100000	100000
Piping/valves/Aeration Equipmt.	1	LS	125000	125000
Concrete	800	CY	750	600000
Miscellaneous	1	LS	25,000	25000
Labor (25%of Equipment)	1	LS	225000	56250
Post Aeration & Recycle Water System				
recycle water pump & controls	1	EA	35000	35000
Piping/Valves/aeration system	1	LS	40000	40000
Concrete	50	CY	750	37500
Miscellaneous	1	LS	15000	15000

	Labor (25%of Equipment)	1	LS	75000	18750
Digested Sludge Pumps					
	PD Pumps and Controls	2	LS	35000	70000
	Piping/Valves	1	LS	10,000	10000
	Concrete	5	CY	750	3750
	Miscellaneous	1	LS	10000	10000
	Labor (25%of Equipment)	1	LS	80000	20000
RAS/Wasted Sludge Pumps					
	Pumps and Controls	1	LS	125000	125000
	Piping/valves	1	LS	15000	15000
	Concrete	125	CY	750	93750
	Miscellaneous	1	LS	10,000	10000
	Labor (25%of Equipment)	1	LS	140000	35000
Plant Drain Pump Station Upgrades					
	Pumps & Controls	1	EA	45000	45000
	Piping/valves	1	LS	10000	10000
	Miscellaneous	1	LS	10,000	10000
	Labor (25%of Equipment)	1	LS	55000	13750
Electrical/Blower Building					
	Blowers & Controls	1	LS	200000	200000
	Ferric Chloride Feed Equipment	1	EA	30000	30000
	Building Modifications/Upgrades	1	LS	75000	75000
	Miscellaneous	1	LS	10,000	10000
	Labor (25%of Equipment)	1	LS	305000	76250
Sludge Holding Basin					
	Aeration system (new and exist)	1	LS	80000	80000
	Piping/valves	1	LS	30000	30000
	Miscellaneous	1	LS	25000	25000
	Concrete	500	Cy	750	375000
	Labor (25%of Equipment)	1	LS	110000	27500
Solids handling Building					
	Dewatering Equipment	1	LS	350,000	350000
	Building & Mechanical	1	LS	200000	200000
	Piping/Valves/miscell	1	LS	25000	25000
	Labor (25%of Equipment)	1	LS	575000	143750
Site work					
	General Excavation/Grading	1	LS		75000
	Mobilization	1	LS		25000
	Yard piping/valves	1	LS	*	100000
	Administration Bldg Renov.	1	LS	*	20000
	Miscel. concr.	1	LS	*	20000
	Miscellaneous Demo	1	LS	*	30000
	Storm Water System	1	LS	*	10000
	Electrical/Generator System	1	LS	*	400000
	Access Roads/Paving	1	LS	*	30000
	Seeding	1	LS	*	10000

Painting	1	LS	*	25000
Instrumentation/SCADA	1	LS	*	100000
Labor (50%of Equipment)*	1	LS	745000	372500
Sub-total=				6457500
Contractor OH&P at 20% *				1291500
Contingency at 10%				645750
Total Estimated Construction Cost =				**8394750**

For Budgeting Purposes Use= $ 8.5 Million

Table B-2
Pineville WWTP Expansion
Bell County, Kentucky
V&M P#:11055-00
Date: 1/3/14
Preliminary Construction Cost Estimate

Treatment Option No.3B- Membrane Bio Reactor System-1.2 MGD ADF

Description	Number of Units	Units	Unit Cost, $	Total Cost,$
Headworks				
Mech. Screen & Compactor	2	EA	200000	400000
Grit chamber Upgrades	1	EA	50000	50000
Piping/valves	1	LS	25000	25000
Concrete	250	CY	750	187500
Miscellaneous	1	LS	25000	25000
Labor (25%of Equipment)	1	LS	475000	118750
Lagoon Basins Modifications				
Aeration & Mixing Equip.	1	LS	125000	125000
Piping/valves	1	LS	15000	15000
Concrete	100	CY	750	75000
Miscellaneous/Baffle wall	1	LS	25000	25000
Labor (25%of Equipment&piping)	1	LS	140000	35000
Membrane Bio Reactor				
Equipment	1	LS	2750000	2750000
Piping/valves	1	LS	85,000	85000
Labor (25%of Equipment)	1	LS	2835000	708750
Membrane Building	1	LS	200000	200000
Concrete	600	CY	750	450000
Miscellaneous	1	LS	50000	50000
Disinfection System				
UV Equipment	1	LS	225000	225000
Piping/Valves	1	LS	50,000	50000
Concrete	150	CY	750	112500
Miscellaneous/Metal Fabrication	1	LS	50000	50000
Labor (25%of Equipment)	1	LS	275000	68750
Surge Basin (1.4 Million Gallons)				
Pumps and Controls	1	LS	100000	100000
Piping/valves/Aeration	1	LS	150000	150000
Concrete	1400	CY	750	1050000
Miscellaneous	1	LS	10,000	10000
Labor (25%of Equipment)	1	LS	250000	62500
Post Aeration & Recycle Water System				
recycle water pump & controls	1	EA	35000	35000
Piping/Valves/aeration system	1	LS	40000	40000
Concrete	10	CY	750	7500

Miscellaneous	1	LS	15000	15000
Labor (25%of Equipment)	1	LS	75000	18750
Digested Sludge Pumps				
PD Pumps and Controls	2	LS	35000	70000
Piping/Valves	1	LS	10,000	10000
Concrete	5	CY	750	3750
Miscellaneous	1	LS	10000	10000
Labor (25%of Equipment)	1	LS	80000	20000
RAS/Wasted Sludge Pumps				
Pumps and Controls	1	LS	80000	80000
Piping/valves	1	LS	10000	10000
Concrete	125	CY	750	93750
Miscellaneous	1	LS	10,000	10000
Labor (25%of Equipment)	1	LS	90000	22500
Plant Drain Pump Station Upgrades				
Pump & Controls	1	EA	60000	60000
Piping/valves	1	LS	15000	15000
Concrete	150	CY	750	112500
Miscellaneous	1	LS	10,000	10000
Labor (25%of Equipment)	1	LS	75000	18750
Electrical/Blower Building				
Blowers & Controls	1	LS	200000	200000
Chemical Feed Equipment	1	EA	50000	50000
Building Extension	1	LS	100000	100000
Building Mechanical	1	LS	20000	20000
Miscellaneous	1	LS	10,000	10000
Labor (25%of Equipment)	1	LS	50000	12500
Sludge Holding Basin				
Aeration system (new and exist)	1	LS	50000	50000
Piping/valves	1	LS	20000	20000
Miscellaneous	1	LS	25000	25000
Concrete	300	Cy	750	225000
Labor (25%of Equipment)	1	LS	70000	17500
Solids handling Building				
Dewatering Equipment	1	LS	35,000	35000
Building & Mechanical	1	LS	200000	200000
Piping/Valves/miscell	1	LS	25000	25000
Labor (25%of Equipment)	1	LS	260000	65000
Site work				
General Excavation/Grading	1	LS		50000
Mobilization	1	LS		50000
Yard piping/valves	1	LS	*	100000
Administration Bldg Renov.	1	LS	*	20000
Miscel. concr.	1	LS	*	25000
Miscellaneous Demo	1	LS	*	50000
Storm Water System	1	LS	*	10000

Electrical/Generator System	1	LS	*	500000
Access Roads/Paving	1	LS	*	30000
Seeding	1	LS	*	10000
Painting	1	LS	*	50000
Instrumentation/SCADA	1	LS	*	200000
Labor (50%of Equipment)*	1	LS	995000	497500
Sub-total=				10513750
Contractor OH&P at 20% *				2102750
Contingency at 10%				1051375
Total Estimated Construction Cost =				**13667875**

For Budgeting Purposes Use= $ 14.0 Million

Table B-3
Pineville WWTP Expansion
Bell County, Kentucky
V&M P#:11055-00
Date: 1/3/14
Preliminary Construction Cost Estimate

Treatment Option No.3C- New WWTP Site (Oxidation Ditch System)- 1.2 MGD ADF

Description	Number of Units	Units	Unit Cost, $	Total Cost,$
Headworks				
Mech. Screen & Compactor	2	EA	175000	350000
Grit Equipment	1	EA	175000	175000
Piping/valves	1	LS	50000	50000
Concrete Structures	500	CY	750	375000
Miscellaneous	1	LS	50000	50000
Labor (25%of Equipment)	1	LS	575000	143750
Extended Aeration Basins (oxidation ditch)				
Aeration& Equipment	1	LS	300000	300000
Piping/valves	1	LS	40000	40000
Concrete	1250	CY	750	937500
Miscellaneous	1	LS	25000	25000
Labor (25%of Equipment&piping)	1	LS	340000	85000
Secondary Clarifiers (2 units)				
Equipment, scum pumps	2	each	125000	250000
Piping/valves	2	each	20000	40000
Labor (25%of Equipment)	1	LS	290000	72500
Concrete	600	CY	750	450000
Miscellaneous	1	LS	25000	25000
Disinfection System				
UV Equipment	1	LS	225000	225000
Piping/Valves/Metal Bldg Frame	1	LS	100,000	100000
Concrete	150	CY	750	112500
Miscellaneous	1	LS	25000	25000
Labor (25%of Equipment)	1	LS	325000	81250
Digested Sludge Pump Sta.				
Moyno Pump & Grinder	1	EA	45000	45000
Piping/Valves	1	LS	15,000	15000
Concrete	80	CY	750	60000
Miscellaneous	1	LS	15000	15000
Labor (25%of Equipment)	1	LS	60000	15000
Post Aeration Basin				
Recycle Water Pump & Controls	1	EA	35000	35000
Piping/valves/Aeration	1	LS	50000	50000
Concrete	200	CY	750	150000
Miscellaneous	1	LS	20000	20000
Labor (25%of Equipment)	1	LS	85000	21250

RAS & Wasted Sludge Pump Station					
Equipment & Controls	1	LS	125000		125000
Piping/valves	1	LS	30000		30000
Concrete	180	CY	750		135000
Miscellaneous	1	LS	15,000		15000
Labor (25%of Equipment)	1	LS	155000		38750
Plant Drain Pump Station					
Equipment & Controls	1	EA	40000		40000
Piping/valves	1	LS	20000		20000
Concrete	100	CY	750		75000
Miscellaneous	1	LS	20,000		20000
Labor (25%of Equipment)	1	LS	60000		15000
Administration/Electrical/Blower Building					
Building	1	LS	300000		300000
Mechanical System	1	LS	40000		40000
Miscellaneous	1	LS	30,000		30000
Labor (25%of Equipment)	1	LS	340000		85000
Sludge Holding Basins					
Aeration Equipment/Blowers	1	LS	250000		250000
Piping/valves	1	LS	50000		50000
Miscellaneous	1	LS	25000		25000
Concrete	700	Cy	750		525000
Labor (25%of Equipment)	1	LS	300000		75000
Solids Handling Building					
Dewatering Equipment	1	LS	350,000		350000
Ferric Chloride Feed Equipment	1	EA	30000		30000
Building & Mechanical	1	LS	200000		200000
Piping/Valves/miscell	1	LS	25000		25000
Labor (25%of Equipment)	1	LS	605000		151250
Site work					
General Excavation/Grading	1	LS			100000
Mobilization	1	LS			50000
Yard piping/valves	1	LS		*	100000
Storm Water System	1	LS		*	15000
Electrical/Generator System	1	LS		*	500000
Access Roads/Paving	1	LS		*	20000
Seeding	1	LS		*	5000
Painting	1	LS		*	25000
Instrumentation/SCADA	1	LS		*	100000
Labor (50%of Equipment)*	1	LS	765000		382500
Sub-total=					8286250
Contractor OH&P at 20%					1657250
Contingency at 10%					828625
Total Estimated Construction Cost =					**10772125**

For Budgeting Purposes Use= $ 11 Million

Table B-4

TRANSFER PUMP STATION @ WWTP

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	***Units***	***Unit Price***	***Quantity***	***Total Price***
Mobilization/Demobilization	LS	$40,000.00	1	$40,000
Screening	LS	200,000.00	2	$400,000
Pumps & Controls	LS	120,000.00	1	$120,000
Yard Piping and Valves	LS	100,000.00	1	$100,000
Building	LS	200,000.00	1	$200,000
Surge Basin	LS	1,300,000.00	1	$1,300,000
Standby Generator Set	LS	100,000.00	1	$100,000
Diffused Aeration	LS	350,000.00	1	$350,000
Demolition	LS	40,000.00	1	$40,000
Site Work/Excavation	LS	30,000.00	1	$30,000
Electrical	LS	200,000.00	1	$200,000
Miscellaneous	LS	50,000.00	1	$50,000
Instrumentation	LS	50,000.00	1	$50,000
Painting	LS	50,000.00	1	$50,000
	SUB-TOTAL CONSTRUCTION COST			$3,030,000

Contingencies (15%)	$454,500
TOTAL ESTIMATED CONSTRUCTION COST	**$3,484,500**

Table B-5

TURKEY CREEK SEWERLINE EXTENSION

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	6,000	$55.00	$330,000
4" PVC Forcemain	LF	11,000	20.00	220,000
Manholes	EA	30	2,500.00	75,000
Sewage Lift Station	LS	1	250,000.00	250,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	40	250.00	10,000
Service Laterals	LF	600	35.00	21,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$918,000
Contingencies (15%)				137,700
TOTAL ESTIMATED CONSTRUCTION COST				**$1,055,700**

Table B-6

TURKEY CREEK SEWERLINE EXTENSION

Alternative

Preliminary Construction Cost Estimate

Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
2" PVC Force Main	LF	6,000	$15.00	$90,000
4" PVC Forcemain	LF	11,000	20.00	220,000
STEP systems	EA	40	4,500.00	180,000
Sewage Lift Station	LS	1	250,000.00	250,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	40	250.00	10,000
Service Laterals	LF	600	35.00	21,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$783,000
Contingencies(15%)				117,450
TOTAL ESTIMATED CONSTRUCTION COST				**$900,450**

Table B-7

FERNDALE SEWERLINE EXTENSION

Preliminary Construction Cost Estimate
Date: 8/1/2014

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
8" PVC Gravity Sewer	LF	7,000	55.00	385,000
4" PVC Force Main	LF	8,000	20.00	160,000
Manholes	EA	50	2,500.00	125,000
PVC Service Lateral	LF	750	35.00	26,250
Sewage Lift Station	LS	2	250,000.00	500,000
Wyes or Tees	EA	50	250.00	12,500
Pavement Repair	SY	2,000	20.00	40,000
Rehab. Existing Lift Station	LS	1	80,000.00	80,000
Tie to Ex. Lift Station	EA	1	2,000.00	2,000
			SUB-TOTAL CONSTRUCTION COST	$1,330,750
Contingencies (15%)				199,613
			TOTAL ESTIMATED CONSTRUCTION COST	**$1,530,363**

Table B-8

FERNDALE SEWERLINE EXTENSION

Alternative

Preliminary Construction Cost Estimate

Date: 8/1/2014

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
2" PVC Force Main	LF	7,000	15.00	105,000
4" PVC Force Main	LF	8,000	20.00	160,000
Step Systems	EA	50	4,500.00	225,000
PVC Service Lateral	LF	750	35.00	26,250
Sewage Lift Station	LS	2	250,000.00	500,000
Wyes or Tees	EA	50	250.00	12,500
Pavement Repair	SY	2,000	20.00	40,000
Rehab. Existing Lift Station	LS	1	80,000.00	80,000
Tie to Ex. Lift Station	EA	1	2,000.00	2,000
			SUB-TOTAL CONSTRUCTION COST	$1,150,750
Contingencies (15%)				115,075
			TOTAL ESTIMATED CONSTRUCTION COST	**$1,265,825**

Table B-9

MOUNTAIN DRIVE INDUSTRIAL PARK
SEWERLINE EXTENSION

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	*Units*	*Unit Price*	*Quantity*	*Total Price*
8" PVC Force Main & Apprt.'s	LF	$30.00	50,000	$1,500,000
10" PVC Gravity Sewer & Manholes	LF	$85.00	10,000	$850,000
OTB Sewage Lift Station Rehab	EA	$215,000.00	1	$215,000
Sewage Lift Station(Generator & Odor Cntl)	EA	$375,000.00	6	$2,250,000
16" Stl Enc Pipe (Bored RR Crossing)	LF	$200.00	400	$80,000.00
Polyethylene River crossing Directional Bore	LF	$75.00	800	$60,000.00
	SUB-TOTAL CONSTRUCTION COST			$4,955,000
Contingencies (15%)				$743,250
TOTAL ESTIMATED CONSTRUCTION COST				**$5,698,250**

Table B-10

MOUNTAIN DRIVE INDUSTRIAL PARK
SEWERLINE EXTENSION

Alternative: (On-Site Wastewater Collection System)
Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Units	Unit Price	Quantity	Total Price
Mobilization/Demobilization	LS	$40,000.00	1	$40,000
Screen, Compactor & structure	LS	250,000.00	1	$250,000
Control/Electrical Building	LS	300,000.00	1	$300,000
Stabilization Ponds, basins & equipm.	LS	560,000.00	1	$560,000
Secondary Clarifiers, tanks & equip.	EA	250,000.00	2	$500,000
Outfall Line & Pump Station	LS	750,000.00	1	$750,000
Disinfection & Post Aeration System	LS	275,000.00	1	$275,000
Sludge Blowers	EA	50,000.00	2	$100,000
Sludge Storage tanks/diffusers	LS	500,000.00	1	$500,000
Sludge Pump Station	LS	250,000.00	1	$250,000
Site Work/Excavation	LS	50,000.00	1	$50,000
Electrical	LS	300,000.00	1	$300,000
Yard Piping	LS	150,000.00	1	$150,000
Instrumentation	LS	60,000.00	1	$60,000
10" PVC Gravity Sewer & Manholes	LF	85.00	10,000	$850,000
	SUB-TOTAL CONSTRUCTION COST			$4,935,000
Contingencies (15%)				$740,250
TOTAL ESTIMATED CONSTRUCTION COST				**$5,675,250**

Table B-11

WALNUT LANE SEWERLINE EXTENSION

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	1,400	$55.00	$77,000
4" PVC Forcemain	LF	1,500	20.00	30,000
Manholes	EA	6	2,500.00	15,000
Sewage Lift Station	LS	1	200,000.00	200,000
Golf Course PS Upgrades	EA	1	80,000.00	80,000
Tie to Ex. Manhole/PS	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	12	250.00	3,000
Service Laterals	LF	600	35.00	21,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$438,000
Contingencies (15%)				65,700
TOTAL ESTIMATED CONSTRUCTION COST				**$503,700**

Table B-12

WALNUT LANE SEWERLINE EXTENSION

Alternative

Preliminary Construction Cost Estimate

Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
4" PVC Forcemain	LF	2,500	20.00	50,000
STEP systems	EA	12	4,500.00	54,000
Golf Course PS Upgrades	EA	1	80,000.00	80,000
Tie to Ex. Manhole/PS	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	12	150.00	1,800
Service Laterals	LF	600	25.00	15,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$212,800
Contingencies (15%)				31,920
TOTAL ESTIMATED CONSTRUCTION COST				**$244,720**

Table B-13

KY 119 CORRIDOR SEWERLINE EXTENSION

Preliminary Construction Cost Estimate
Date: 8/1/2014

Stage 1- Wasioto Area

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	4,500	$55.00	$247,500
Manholes	EA	20	2,500.00	50,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	40	250.00	10,000
16" Stl Enc. Pipe (Bored)	LF	250	200.00	50,000
Service Laterals	LF	600	35.00	21,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$390,500
Contingencies (15%)				58,575
TOTAL ESTIMATED CONSTRUCTION COST				**$449,075**

Stage 2- Bird Branch Area

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	10,300	$55.00	$566,500
Manholes	EA	20	2,500.00	50,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	1,000	20.00	20,000
Wyes or Tees	EA	75	250.00	18,750
Service Laterals	LF	750	35.00	26,250
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$683,500
Contingencies (15%)				102,525
TOTAL ESTIMATED CONSTRUCTION COST				**$786,025**

Stage 3- East Pineville Area

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	13,800	$55.00	$759,000
Manholes	EA	30	2,500.00	75,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	1,000	20.00	20,000

Wyes or Tees	EA	85	250.00	21,250
Service Laterals	LF	1,275	35.00	44,625
			SUB-TOTAL ESTIMATED CONSTRUCTION COST	$921,875
Contingencies (15%)				138,281
TOTAL ESTIMATED CONSTRUCTION COST				**$1,060,156**

Table B-14

KY 119 CORRIDOR SEWERLINE EXTENSION

Alternative

Preliminary Construction Cost Estimate

Date: 8/1/2014

Stage 1- Wasioto Area

Item	Unit	Quantity	Unit Price	Total Price
2" PVC Force Main	LF	4,500	$15.00	$67,500
STEP systems	EA	40	4,500.00	180,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	40	250.00	10,000
16" Stl Enc. Pipe (Bored)	LF	250	200.00	50,000
Service Laterals	LF	600	35.00	21,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$340,500
Contingencies (15%)				51,075
TOTAL ESTIMATED CONSTRUCTION COST				**$391,575**

Stage 2- Bird Branch Area

Item	Unit	Quantity	Unit Price	Total Price
2" PVC Force Main	LF	10,300	$15.00	$154,500
Step Systems	EA	75	4,500.00	337,500
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	1,000	20.00	20,000
Wyes or Tees	EA	75	250.00	18,750
Service Laterals	LF	750	35.00	26,250
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$559,000
Contingencies (15%)				83,850
TOTAL ESTIMATED CONSTRUCTION COST				**$642,850**

Stage 3- East Pineville Area

Item	Unit	Quantity	Unit Price	Total Price
2" PVC Force Main	LF	13,800	$15.00	$207,000
STEP systems	EA	85	4,500.00	382,500
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	1,000	20.00	20,000

Wyes or Tees	EA	85	250.00	21,250
Service Laterals	LF	1,275	35.00	44,625
			SUB-TOTAL ESTIMATED CONSTRUCTION COST	$677,375
Contingencies (15%)				101,606
TOTAL ESTIMATED CONSTRUCTION COST				**$778,981**

Table B-15

KFC Pump Station Upgrades

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
Mobilization/Demobilization	EA	1	$10,000.00	$10,000
Pumps and Controls	EA	2	$25,000.00	$50,000
Yardping and Valves	LS	1	20,000.00	20,000
Fencing	LS	1	6,500.00	6,500
Instrumentation	LS	1	5,000.00	5,000
Demolition	LS	1	5,000.00	5,000
Sitework/Excavation	LS	1	10,000.00	10,000
Precast Concrete	EA	1	40,000.00	40,000
Electrical	LS	1	30,000.00	30,000
Miscellaneous	LS	1	5,000.00	5,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$181,500
Contingencies (10%)				18,150
TOTAL ESTIMATED CONSTRUCTION COST				**$199,650**

Table B-16

Lake Mistake Pump Station Upgrades

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
Mobilization/Demobilization	EA	1	$10,000.00	$10,000
Yardping, Valves, Metal Fab.	LS	1	20,000.00	20,000
Instrumentation	LS	1	5,000.00	5,000
Demolition	LS	1	5,000.00	5,000
Sitework/Excavation	LS	1	10,000.00	10,000
Precast Concrete	EA	1	25,000.00	25,000
Electrical	LS	1	10,000.00	10,000
Miscellaneous	LS	1	5,000.00	5,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$90,000
Contingencies (10%)				9,000
TOTAL ESTIMATED CONSTRUCTION COST				**$99,000**

Table B-17

Clear Creek Daycare Pump Station Upgrades

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
Mobilization/Demobilization	EA	1	$10,000.00	$10,000
Yardping and Valves	LS	1	15,000.00	15,000
Instrumentation	LS	1	5,000.00	5,000
Demolition	LS	1	5,000.00	5,000
Sitework/Excavation	LS	1	5,000.00	5,000
New Pumps and Controls	EA	1	30,000.00	30,000
Electrical	LS	1	15,000.00	15,000
Miscellaneous	LS	1	5,000.00	5,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$90,000
Contingencies (10%)				9,000
TOTAL ESTIMATED CONSTRUCTION COST				**$99,000**

Table B-18

Bell High Pump Station Upgrades

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
Mobilization/Demobilization	EA	1	$10,000.00	$10,000
Pumps and Controls	EA	2	$30,000.00	$60,000
Yardping, Valves & Metal Fab.	LS	1	25,000.00	25,000
Fencing	LS	1	6,500.00	6,500
Instrumentation	LS	1	5,000.00	5,000
Demolition	LS	1	5,000.00	5,000
Sitework/Excavation	LS	1	10,000.00	10,000
Precast Concrete	EA	1	30,000.00	30,000
Electrical	LS	1	20,000.00	20,000
Miscellaneous	LS	1	10,000.00	10,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$181,500
Contingencies (10%)				18,150
TOTAL ESTIMATED CONSTRUCTION COST				**$199,650**

Table B-19

MAIN PUMP STATION UPGRADES

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Units	Unit Price	Quantity	Total Price
Mobilization/Demobilization	LS	$15,000.00	1	$15,000
VFDs & Controls	LS	75,000.00	1	$75,000
Yard Piping and Valves	LS	10,000.00	1	$10,000
Concrete	LS	5,000.00	1	$5,000
Fencing	LS	0.00	1	$0
Standby Generator Set	LS	75,000.00	1	$75,000
Demolition	LS	5,000.00	1	$5,000
Site Work/Excavation	LS	5,000.00	1	$5,000
Electrical	LS	20,000.00	1	$20,000
Miscellaneous	LS	20,000.00	1	$20,000
Instrumentation	LS	10,000.00	1	$10,000
	SUB-TOTAL CONSTRUCTION COST			$240,000

Contingencies (10%)	$24,000
TOTAL ESTIMATED CONSTRUCTION COST	**$264,000**

Table B-20

OTB Pump Station Upgrades

Preliminary Construction Cost Estimate
Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
Mobilization/Demobilization	EA	1	$5,000.00	$5,000
Pumps and Controls	EA	2	$35,000.00	$70,000
Standby Generator Set	LS	1	50,000.00	50,000
Instrumentation	LS	1	5,000.00	5,000
Demolition	LS	1	5,000.00	5,000
Odor Control System	LS	1	25,000.00	25,000
Sitework/Excavation	LS	1	5,000.00	5,000
Electrical	LS	1	25,000.00	25,000
Miscellaneous	LS	1	5,000.00	5,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$195,000
Contingencies (10%)				19,500
TOTAL ESTIMATED CONSTRUCTION COST				**$214,500**

Preliminary Construction Cost Estimate- Force Main Portion

Item	Unit	Quantity	Unit Price	Total Price
16" Force Main	LF	12,000	70.00	840,000
River/RR Crossings	LS	1	50,000.00	50,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$890,000
Contingencies (10%)				89,000
TOTAL ESTIMATED CONSTRUCTION COST				**$979,000**

Table B-21

COMBINED SEWER SEPERATION STAGE 1

Preliminary Project Cost Estimate
Date: 8/4/2014

Item	Unit	Quantity	Unit Price	Total Price
15" PVC Gravity Sewer	LF	600	$100.00	$60,000
12" PVC Gravity Sewer	LF	1,600	100.00	160,000
8" PVC Gravity Sewer	LF	1,900	75.00	142,500
8" PVC Sewer Force Main	LF	2,000	25.00	50,000
8" PE Sewer FM Creek Xing - Bore	LF	500	175.00	87,500
Sanitary Sewer Manhole	EA	16	3,500.00	56,000
Re-Connect Ex. Sewer Service	EA	50	2,000.00	100,000
12" x 6" Wyes/Tees	EA	5	400.00	2,000
12" x 4" Wyes/Tees	EA	30	350.00	10,500
8" x 6" Wyes/Tees	EA	5	300.00	1,500
8" x 4" Wyes/Tees	EA	10	250.00	2,500
8" Sewer Plug Valve	EA	4	5,000.00	20,000
4" PVC Sewer Service Lateral	LF	1,250	40.00	50,000
6" PVC Sewer Service Lateral	LF	350	50.00	17,500
Sewage Lift Station	LS	2	300,000.00	600,000
Abandon Existing LS	LS	2	15,000.00	30,000
20" Steel Encasement Pipe - Bored	SY	250	250.00	62,500
Tie FM to Ex. Manhole	EA	1	2,000.00	2,000
Tie Existing Sewer to Proposed MH	EA	5	2,000.00	10,000
Comb Sewage Air/Vac Valve	EA	2	5,000.00	10,000
Plug Existing Sewer Line	EA	5	2,000.00	10,000
Curb Box Inlet Type A	EA	17	$3,500.00	59,500
Junction Box	EA	9	1,500.00	13,500
Pipe - 18" N12	LF	375	75.00	28,125
Sidewalk - 4"	SY	288	40.00	11,520
Curb - Standard	LF	170	20.00	3,400
Asphalt Base (Trench Cap)	TON	400	70.00	28,000
Asphalt Surface	TON	617	75.00	46,275
Asphalt Milling & Texturing	TON	100	150.00	15,000
			SUB-TOTAL CONSTRUCTION COST	$1,689,820
Contingencies (15%)				$253,473
			TOTAL ESTIMATED CONSTRUCTION COST	**$1,943,293**

Table B-22

COMBINED SEWER SEPARATION STAGE 2

Preliminary Project Cost Estimate
Date: 8/4/2014

Item	Unit	Quantity	Unit Price	Total Price
12" PVC Gravity Sewer	LF	5,900	100.00	$590,000
8" PVC Gravity Sewer	LF	14,100	75.00	1,057,500
Sanitary Sewer Manhole	EA	109	3,500.00	381,500
Re-Connect Ex. Sewer Service	EA	418	2,000.00	836,000
12" x 6" Wyes/Tees	EA	21	400.00	8,400
12" x 4" Wyes/Tees	EA	100	350.00	35,000
8" x 6" Wyes/Tees	EA	48	300.00	14,400
8" x 4" Wyes/Tees	EA	249	250.00	62,250
8" Sewer Plug Valve	EA	1	5,000.00	5,000
4" PVC Sewer Service Lateral	LF	8,725	40.00	349,000
6" PVC Sewer Service Lateral	LF	1,725	50.00	86,250
Plug Existing Sewer Line	EA	5	2,000.00	10,000
Curb Box Inlet Type A	EA	88	3,500.00	308,000
Junction Box	EA	46	1,500.00	69,000
Pipe - 18" N12	LF	2,125	75.00	159,375
Sidewalk - 4"	SY	1,312	40.00	52,480
Curb - Standard	LF	930	20.00	18,600
Asphalt Base (Trench Cap)	TON	2,600	70.00	182,000
Asphalt Surface	TON	3,883	75.00	291,225
Asphalt Milling & Texturing	TON	450	150.00	67,500
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$4,583,480
Contingencies (15%)				$687,522
TOTAL ESTIMATED CONSTRUCTION COST				**$5,271,002**

Table B-23

COMBINED SEWER SEPERATION

Alternate

Preliminary Construction Cost Estimate
Date: 8/4/2014

Item	Unit	Quantity	Unit Price	Total Price
New WWTP (Option 3 C)	LS	1	$16,300,000.00	$16,300,000
Ball Field LS Upgrades	LS	1	1,867,500.00	1,867,500
Mtn View/McDonalds LS Upgrades	LS	1	1,451,250.00	1,451,250
24" DI Sewer Force Main	LF	4,500	200.00	900,000
24" DI FM Creek & RR Xings - Bore	LF	500	500.00	250,000
			SUB-TOTAL CONSTRUCTION COST	$20,768,750
Contingencies (15%)				$3,115,313
			TOTAL ESTIMATED CONSTRUCTION COST	**$23,884,063**

Table B-24

TURKEY CREEK SEWERLINE EXTENSION

Proposed Project
Preliminary Project Cost Estimate
Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	6,000	$55.00	$330,000
4" PVC Forcemain	LF	11,000	20.00	220,000
Manholes	EA	30	2,500.00	75,000
Sewage Lift Station	LS	1	250,000.00	250,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	40	250.00	10,000
Service Laterals	LF	600	35.00	21,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$918,000
Contingencies (15%)				137,700
Admin				10,000
Preliminary Engineering				25,000
Additional Sevices (Environmental, Survey, etc)				40,000
Engineering Design (7%)				64,260
Engineering Inspection				55,000
Legal				5,000
Land & Rights				5,000
TOTAL ESTIMATED PROJECT COST				**$1,259,960**

Table B-25

FERNDALE SEWERLINE EXTENSION

Proposed Project

Preliminary Project Cost Estimate

Date: 8/1/2014

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
8" PVC Gravity Sewer	LF	7,000	55.00	385,000
4" PVC Force Main	LF	8,000	20.00	160,000
Manholes	EA	50	2,500.00	125,000
PVC Service Lateral	LF	750	35.00	26,250
Sewage Lift Station	LS	2	250,000.00	500,000
Wyes or Tees	EA	50	250.00	12,500
Pavement Repair	SY	2,000	20.00	40,000
Rehab. Existing Lift Station	LS	1	80,000.00	80,000
Tie to Ex. Lift Station	EA	1	2,000.00	2,000
			SUB-TOTAL CONSTRUCTION COST	$1,330,750
Contingencies (15%)				133,075
Admin				10,000
Preliminary Engineering				25,000
Additional Services (Environmental, Survey, etc.)				40,000
Engineering Design (7%)				93,153
Engineering Inspection				55,000
Legal				5,000
Land/Rights				5,000
			TOTAL ESTIMATED PROJECT COST	**$1,696,978**

Table B-26

MOUNTAIN DRIVE INDUSTRIAL PARK
SEWERLINE EXTENSION

Preliminary Project Cost Estimate
Date: 8/1/2014

Item	***Units***	***Unit Price***	***Quantity***	***Total Price***
8" PVC Force Main & Apprt.'s	LF	$30.00	50,000	$1,500,000
10" PVC Gravity Sewer & Manholes	LF	$85.00	10,000	$850,000
OTB Sewage Lift Station Rehab	EA	$215,000.00	1	$215,000
Sewage Lift Station	EA	$375,000.00	6	$2,250,000
16" Stl. Enc. Pipe (Bored R.R. crossing)	LF	$200.00	400	$80,000.00
Polyethylene River crossing Directional Bore	LF	$75.00	800	$60,000.00
	SUB-TOTAL CONSTRUCTION COST			$4,955,000

Contingencies (15%)	$743,250
Administrative	$10,000
Legal	$10,000
Additional Services (Environmental, Survey,etc)	$60,000
Preliminary Engineering	$50,000
Engineering Design (7%)	$346,850
Engineering Inspection	$105,000
Land and Rights	$45,000
TOTAL ESTIMATED PROJECT COST	**$6,325,100**

Table B-27

WALNUT LANE SEWERLINE EXTENSION

Proposed Project

Preliminary Project Cost Estimate

Date: 8/1/2014

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	1,400	$55.00	$77,000
4" PVC Forcemain	LF	1,500	20.00	30,000
Manholes	EA	6	2,500.00	15,000
Sewage Lift Station	LS	1	200,000.00	200,000
Golf Course PS Upgrades	EA	1	80,000.00	80,000
Tie to Ex. Manhole/PS	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	12	250.00	3,000
Service Laterals	LF	600	35.00	21,000
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$438,000
Contingencies (15%)				65,700
Admin				10,000
Preliminary Engineering				20,000
Additional Sevices (Environmental, Survey, etc)				20,000
Engineering Design (7%)				30,660
Engineering Inspection				30,000
Legal				5,000
Land & Rights				5,000
TOTAL ESTIMATED PROJECT COST				**$624,360**

Table B-28

KY 119 CORRIDOR SEWERLINE EXTENSION

Proposed Project
Preliminary Project Cost Estimate
Date: 8/1/2014

Stage 1- Wasioto Area

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	4,500	$55.00	$247,500
Manholes	EA	20	2,500.00	50,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	500	20.00	10,000
Wyes or Tees	EA	40	250.00	10,000
16" Stl Enc. Pipe (Bored)	LF	250	200.00	50,000
Service Laterals	LF	600	35.00	21,000
		SUB-TOTAL CONSTRUCTION COST		$390,500
Contingencies (15%)				58,575
TOTAL ESTIMATED CONSTRUCTION COST				**$449,075**

Stage 2- Bird Branch Area

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	10,300	$55.00	$566,500
Manholes	EA	20	2,500.00	50,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	1,000	20.00	20,000
Wyes or Tees	EA	75	250.00	18,750
Service Laterals	LF	750	35.00	26,250
		SUB-TOTAL CONSTRUCTION COST		$683,500
Contingencies (15%)				102,525
TOTAL ESTIMATED CONSTRUCTION COST				**$786,025**

Stage 3- East Pineville Area

Item	Unit	Quantity	Unit Price	Total Price
8" PVC Gravity Sewer	LF	13,800	$55.00	$759,000
Manholes	EA	30	2,500.00	75,000
Tie to Ex. Manhole	EA	1	2,000.00	2,000
Pavement Repair	SY	1,000	20.00	20,000
Wyes or Tees	EA	85	250.00	21,250

Service Laterals	LF	1,275	35.00	44,625
	SUB-TOTAL CONSTRUCTION COST			$921,875
Contingencies (15%)				138,281
TOTAL ESTIMATED CONSTRUCTION COST				**$1,995,875**
Total Construction Cost (ALL 3 Stages)				$1,995,875
Contingencies (15%)				299,381
Admin				15,000
Preliminary Engineering				45,000
Additional Sevices (Environmental, Survey, etc)				60,000
Engineering Design (7%)				139,711
Engineering Inspection				120,000
Legal				15,000
Land & Rights				10,000
TOTAL ESTIMATED PROJECT COST				**$2,699,968**

Table B-29

COMBINED SEWER SEPERATION STAGE 1

Preliminary Project Cost Estimate
Date: 8/4/2014

Item	Unit	Quantity	Unit Price	Total Price
15" PVC Gravity Sewer	LF	600	$110.00	$66,000
12" PVC Gravity Sewer	LF	1,600	100.00	160,000
8" PVC Gravity Sewer	LF	1,900	75.00	142,500
8" PVC Sewer Force Main	LF	2,000	25.00	50,000
8" PE Sewer FM Creek Xing - Bore	LF	500	175.00	87,500
Sanitary Sewer Manhole	EA	16	3,500.00	56,000
Re-Connect Ex. Sewer Service	EA	50	2,000.00	100,000
12" x 6" Wyes/Tees	EA	5	400.00	2,000
12" x 4" Wyes/Tees	EA	30	350.00	10,500
8" x 6" Wyes/Tees	EA	5	300.00	1,500
8" x 4" Wyes/Tees	EA	10	250.00	2,500
8" Sewer Plug Valve	EA	4	5,000.00	20,000
4" PVC Sewer Service Lateral	LF	1,250	40.00	50,000
6" PVC Sewer Service Lateral	LF	350	50.00	17,500
Sewage Lift Station	LS	2	300,000.00	600,000
Abandon Existing LS	LS	2	15,000.00	30,000
20" Steel Encasement Pipe - Bored	SY	250	250.00	62,500
Tie FM to Ex. Manhole	EA	1	2,000.00	2,000
Tie Existing Sewer to Proposed MH	EA	5	2,000.00	10,000
Comb Sewage Air/Vac Valve	EA	2	5,000.00	10,000
Plug Existing Sewer Line	EA	5	2,000.00	10,000
Curb Box Inlet Type A	EA	17	$3,500.00	59,500
Junction Box	EA	9	1,500.00	13,500
Pipe - 18" N12	LF	375	75.00	28,125
Sidewalk - 4"	SY	288	40.00	11,520
Curb - Standard	LF	170	20.00	3,400
Asphalt Base (Trench Cap)	TON	400	70.00	28,000
Asphalt Surface	TON	617	75.00	46,275
Asphalt Milling & Texturing	TON	100	150.00	15,000
			SUB-TOTAL CONSTRUCTION COST	$1,695,820

Contingencies (15%)	$254,373
Prelininary(Flow Monitoring, CCTV Inspection)	36,149
Preliminary Engineering Report	15,000
Admin	50,000
Design (8.02% of Construction)	136,005
Inspection (4.91% of Construction)	83,265

Legal	10,000
TOTAL ESTIMATED PROJECT COST =	**$2,280,612**

Table B-30

COMBINED SEWER SEPARATION STAGE 2

Preliminary Project Cost Estimate
Date: 8/4/2014

Item	Unit	Quantity	Unit Price	Total Price
12" PVC Gravity Sewer	LF	5,900	100.00	$590,000
8" PVC Gravity Sewer	LF	14,100	75.00	1,057,500
Sanitary Sewer Manhole	EA	109	3,500.00	381,500
Re-Connect Ex. Sewer Service	EA	418	2,000.00	836,000
12" x 6" Wyes/Tees	EA	21	400.00	8,400
12" x 4" Wyes/Tees	EA	100	350.00	35,000
8" x 6" Wyes/Tees	EA	48	300.00	14,400
8" x 4" Wyes/Tees	EA	249	250.00	62,250
8" Sewer Plug Valve	EA	1	5,000.00	5,000
4" PVC Sewer Service Lateral	LF	8,725	40.00	349,000
6" PVC Sewer Service Lateral	LF	1,725	50.00	86,250
Plug Existing Sewer Line	EA	5	2,000.00	10,000
Curb Box Inlet Type A	EA	88	3,500.00	308,000
Junction Box	EA	46	1,500.00	69,000
Pipe - 18" N12	LF	2,125	75.00	159,375
Sidewalk - 4"	SY	1,312	40.00	52,480
Curb - Standard	LF	930	20.00	18,600
Asphalt Base (Trench Cap)	TON	2,600	70.00	182,000
Asphalt Surface	TON	3,883	75.00	291,225
Asphalt Milling & Texturing	TON	450	150.00	67,500
SUB-TOTAL ESTIMATED CONSTRUCTION COST				$4,583,480
Contingencies (15%)				$687,522
Prelininary(Flow Monitoring, CCTV Inspection)				$36,149
Preliminary Engineering Report				$15,000
Admin				$50,000
Design (6.81% of Construction)				$312,135
Inspection (3.58% of Construction)				$164,089
Legal				$10,000
TOTAL ESTIMATED PROJECT COST =				**$5,858,375**

APPENDIX C

CURRENT PLANT DATA

AND

SYSTEM INFORMATION

Pineville 201 Facilities Plan Update

P#: 11055-00

Table C-1- Pineville WWTP Plant Data

Date: 9/20/2012

	monthly average NH3-N effl., mg/l	Max. daily NH3-N effl., mg/l	Monthly average BOD inf., mg/l	max. Daily BOD infl.,mg/l	Monhtly average TSS Inf., mg/l	max. Daily TSS infl.,mg/l	Monhtly average BOD effl., mg/l	Daily Maximum BOD effl., mg/l	Monhtly average TSS effl., mg/l	Daily maximum TSS effl., mg/l	Montly average Flow Effl., MGD	Daily Maximum Flow Effl., MGD	Monthly average NH3-N Infl., mg/l	Daily Maximum NH3-N Infl., mg/l	Minimum DO effl.,mg/l	monthly Average Phosph. Effl., mg/l	Daily Maximum Phosp. Effl. Mg/l	Montly average Flow Infl., MGD	Daily Maximum Flow Infl., MGD	Monthly Average Nitrogen, Total, effl	Daily maximum Nitrogen Total, effl
2008																					
jan	0.5	0.5	254	452	401	755	4	6	9	12			8.5	11.2	6.1						
feb	0.5	0.5	218	444	278	595	4	7	4	5	0.444	0.69	7.3	11.2	6.3						
mar	0.5	0.5	188	449	341	520			12	21	0.511	0.657	5	8.4	6.4						
apr	0.9	1.4	218	485	627	1378	3	5	3	5	0.497	0.63	6.4	8.1	6.2						
may	1	1.4	219	311	485	1048	5	8	5	5	0.423	0.481	11.3	20.1	6.5						
jun	1.5	2.8	259	336	568	1132	3	4	4	7	0.383	0.435	10.1	14	6.5						
jul	1.7	2.2	171	359	353	1135	6	8	5	8	0.434	0.723	5.9	8.1	6.6						
aug	2	2.8	191	314	961	1328	3	4	9	19	0.392	0.692	9.1	11.5	6.2						
sep	1.7	3.4	200	372	432	1140	3	3	5	8	0.349	0.489	10.8	17.6	6.4						
oct	0.8	0.8	221	306	428	580	4	6	3	4	0.344	0.511	14	14.6	6.5						
nov	1.1	1.4	283	471	411	748	4	6	6	12	0.392	0.583	9.6	14.3	6.7						
dec	0.7	1.4	219	305	289	412	3	4	6	9	0.511	0.908	6.2	12.3	6.5						
AVG	1.075	1.591667	220.0833	383.667	464.5	897.583	3.818182	5.545455	5.916667	9.583333	0.425455	0.618091	8.683333	12.61667	6.408333						
2009																					
jan	5.6	6.7	191	282	378	1024	3	4	5	10	0.551	0.793	1.9	3.1	6.4						
feb	7.2	9.8	161	204	247	350	4	5	4	9	0.522	0.622	2.6	3.9	6.6						
mar	7.7	9.8	230	379	233	324	4	5	4	8	0.569	0.685	3	4.5	6.4						
apr	6.3	11.8	336	543	419	738	8	10	11	16	0.559	0.646	5.6	8.4	6.4						
may	4.8	6.7	162	221	727	1600	6	9	25	32	0.547	0.731	4.1	8.4	6						
jun	1.6	5.6	268	363	402	1539	1	1	8	14	0.488	0.721	5.2	7	6.1						
jul	1.1	1.7	206	306	261	640	1	1	6	8	0.461	0.688	7.7	10.4	6.2						
aug	2.1	5.6	370	518	263	350	4	7	10	32	0.488	0.727	9.1	11.2	6.2						
sep	1.2	2.5	259	626	524	1340	3	3	4	9	0.426	0.705	8.9	10.9	6						
oct	0.9	1.4	237	378	652	1372	3	3	11	24	0.478	0.63	10	11.5	6.1						
nov	0.8	1.7	115	133	388	642	1	1	11	15	0.457	0.644	6	7.6	6.1						
dec	0.9	2.5	98	120	336	626	3	4	12	17	0.619	0.901	5.1	10.6	6.2						
AVG	3.35	5.483333	219.4167	339.417	402.5	878.75	3.416667	4.416667	9.25	16.16667	0.51375	0.70775	5.766667	8.125	6.225						
2010																					
jan	0.9	1.4	142	192	238	358	3	4	17	31	0.61	0.826	3.9	5.6	6						
feb	2.1	3.4	94	123	216	338	4	7	15	22	0.509	0.664	4.9	6.7	6						
mar	2.3	5.6	135	263	323	576	3	3	14	26	0.455	0.525	11.8	13.9	6						
apr	1.8	4.8	114	172	224	366	3	3	5	8	0.493	0.675	8.6	11.3	6.1						
may	5.8	9.8	151	253	373	626	4	5	12	28	0.559	0.942	6.6	9.7	6						
jun	2.5	4.3	112	173	310	436	3	3	13	38	0.534	0.705	6.8	11	6						
jul	1.4	2	159	281	318	481	3	4	10	20	0.558	0.754	7.2	9.9	6	1.12	1.19				
aug	1.1	1.7	123	219	132	220	1	1	5	11	0.504	1.378	7.8	11.6	6						
sep	1.5	2.2	444	906	671	1124	1	7	5	8	0.53	0.866	7.5	9.4	3.17	0.95	1.37			7.5	9.4
oct	1.6	2.8	193	228	204	290	1	7	4	6	0.515	0.733			7.6	1.21	1.4			9.7	11.6
Nov	1.1	1.4	328	513	565	1240	1	7	4	13	0.629	2.286			7.9	0.95	1.25			2.2	2.2
Dec	1.9	4.2	155	335	323	540	3	3	13	22	0.746	1.497			6.9	0.5	0.67			5.1	7.8
AVG	2	3.633333	179.1667	304.833	324.75	549.583	2.5	4.5	9.75	19.41667	0.5535	0.987583	7.233333	9.9	6.139167	0.946	1.176			6.125	7.75

2011																			
jan	0.5	0.5	137	193	477	618	3	3	11	12	0.693	0.888	7.38	0.38	0.49			5.6	7
feb	0.5	0.5	315	593	612	1098	3	3	3	3	0.733	1.537	8.72	0.43	0.52			4.8	7
mar	0.7	1.4	264	332	446	720	3	3	12	27	0.841	1.287	6.34	0.41	0.75			3.2	4.5
apr	0.5	0.5	257	413	385	582	3	3	5	10	0.805	1.766	7.39	0.18	0.39			0.8	1.1
may	1.3	2	199	460	331	534	3	3	2	4	0.681	0.962	6.56	0.31	0.47			4.1	6.1
jun	1.3	1.7	301	444	520	938	3	3	2	3	0.625	1.14	5.71	0.62	0.83			2.8	3.2
jul	0.8	1.1	87	157	99	138	3	3	4	9	0.585	0.898	6.22	1.06	1.3			2.2	2.2
aug	1.2	2.2	128	311	235	322	3	3	3	6	0.681	1.011	5	0.96	1.61			2.6	3.4
sep	1.2	1.7	146	239	147	206	3	3	8	15	0.709	1.702	6.37	1.56	2.3			7.6	13
oct	0.8	1.1	180	326	206	268	3	3	4	6	0.686	1.403	6.75	1.37	2.07			1.8	2.2
Nov	0.7	1.1	65	122	104	166	3	3	6	16	0.806	1.873	7.78	0.83	1.55			4.6	6.2
Dec	1	1.4	185	277	255	372	3	3	16	25	0.798	1.307	7.32	0.45	0.5			4.5	6.3
AVG	0.875	1.266667	188.6667	322.25	318.0833	496.833	3	3	6.333333	11.33333	0.72025	1.3145	6.795	0.713333	1.065			3.716667	5.183333
2012																			
jan	1	2	246	610	233	506	3	3	16	25	0.828	1.165	6.58	0.23	0.37	0.749	1.03	2.5	4.7
feb	2	3.6	111	204	260	438	3	3	3	5	0.741	1.001	7.84	0.25	0.39	0.695	0.904	2.4	4.5
mar	2.3	3.6	133	229	174	262	3	3	11	15	0.799	1.383	5.85	1.1	2.36	0.724	1.206	4.8	7.3
apr	5.8	7.3	277	455	495	670	14	20	34	51	0.679	0.871	6.36	2	2.96	0.593	0.777	9.2	10
may	1.2	2	166	298	413	598	4	5	2	4	0.651	1.047	5.35	0.18	0.24	0.581	0.898	3.7	7.4
jun	1.3	2	250	298	365	596	4	5	2	3	0.596	0.755	3.64	0.36	0.58	0.534	0.673	3	7.6
jul	5.3	9.8	202	516	291	610	5	9	3	5	0.612	0.858	6.2	0.91	1.43	0.691	0.971	5.3	9.8
aug	1.6	2	199	285	683	1172	4	5	2	4	0.564	0.892	6.6	0.37	0.66	0.497	0.769	1.6	2
sep	3.6	6.2	273	404	686	1182	5	9	5	13	0.637	1.066	6.5	0.57	0.57	0.555	0.864	3.6	6.2
oct	5.5	7.3	324	435	610	938	8	13	7	14	0.554	0.812	4.6	1.72	4.28	0.501	0.721	5.5	7.3
Nov	4.1	7.3	286	459	329	600	5	11	6	16	0.53	0.672	8	0.26	0.54	0.488	0.605	4.1	7.3
Dec	4.1	5.6	375	837	586	1226	7	11	7	11	0.772	1.226	4.7	0.91	1.73	0.686	1.092	4.1	5.6
AVG	3.15	4.891667	236.8333	419.167	427.0833	733.167	5.416667	8.083333	8.166667	13.83333	0.663583	0.979	6.018333	0.738333	1.3425	0.607833	0.875833	4.15	6.641667
2013																			
jan	3.3	6.2	233	399	359	886	7	12	6	11	0.741	1.631	8.5	0.95	2.12	0.621	1.346	3.3	6.2
feb	5.1	7.3	321	588	530	1276	10	16	9	14	0.658	1.168	8.1	0.06	0.06	0.558	0.953	6.4	8.7
mar	5.1	7.3	233	315	496	920	22	37	57	146	0.986	1.829	7.2	3.05	3.66	0.811	1.493	5.1	7.3
apr	4.1	4.8	244	325	572	1462	15	38	69	278	0.919	1.246	5	1.89	4.15	0.74	0.997	4.1	4.8
may	5.4	10.1	239	350	528	748	9	11	14	18	0.816	1.438	6.5	0.92	1.78	0.588	1.123	5.4	10.1
jun	9	13.5	296	473	546	830	10	16	16	19	0.646	0.825	6.5	2.03	4.07	0.442	0.546	9	13.5
jul	9.6	13.8	119	168	245	394	12	16	23	28	0.81	1.754	4.7	1.65	2.28	0.567	1.062	11.9	17.4
aug	8.8	13.3	417	893	648	908	12	14	19	24	0.719	1.035	6.9	1.58	2.54	0.498	0.753	10.6	14.8
sep	9.5	12	147	191	175	278	13	21	37	70	0.659	1.025	6.4	1.65	2.52	0.453	0.724	12.3	14.4
oct	13.7	16.6	439	864	577	1134	17	27	19	24	0.582	0.729	6.8	2.5	2.96	0.41	0.516	13.7	16.6
Nov	7.2	14.7	232	381	266	426	11	18	23	41	0.675	1.414	7.6	1.04	2.65	0.482	1.414	7.2	14.7
Dec																			
AVG	7.345455	10.87273	265.4545	449.727	449.2727	842	12.54545	20.54545	26.54545	61.18182	0.746455	1.281273	6.745455	1.574545	2.617273	0.560909	0.993364	8.090909	11.68182

Existing Grit Chamber

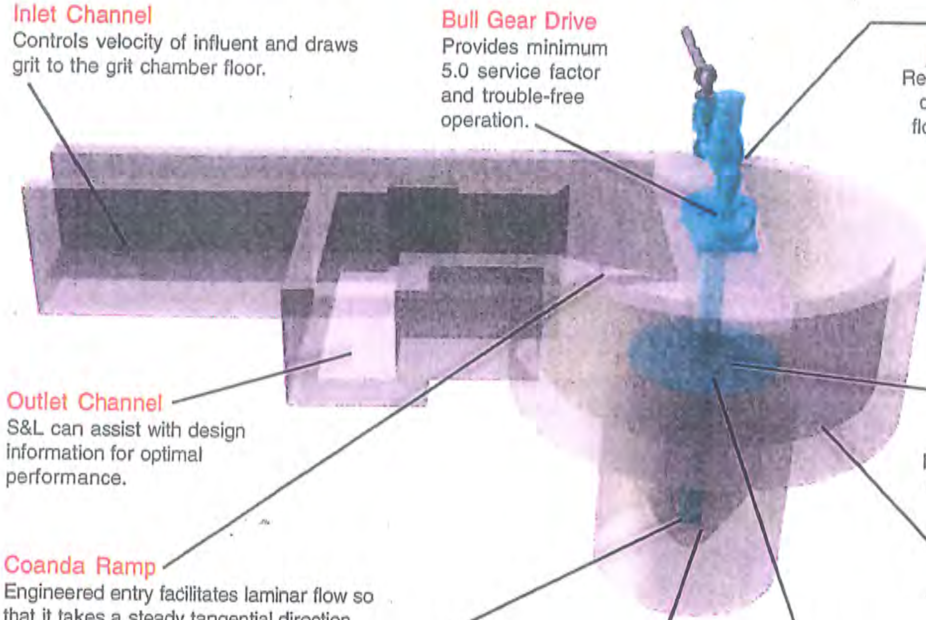
PISTA® 270° Grit Chamber Features and Benefits

GRIT REMOVAL SYSTEM

Inlet Channel
Controls velocity of influent and draws grit to the grit chamber floor.

Bull Gear Drive
Provides minimum 5.0 service factor and trouble-free operation.

PISTA® Turbo Grit Pump
[Top-Mounted & Remote-Mounted Options]
Removes grit from storage hopper to washing dewatering. Available in vacuum-primed and flooded suction arrangements. Now available with **SonicStart™** prime sensing.



Outlet Channel
S&L can assist with design information for optimal performance.

Axial-Flow Propeller
Aids in directing organic-free grit into lower hopper by enhancing flow patterns. Rounded edges prevent solids build-up, thus ensuring high efficiency.

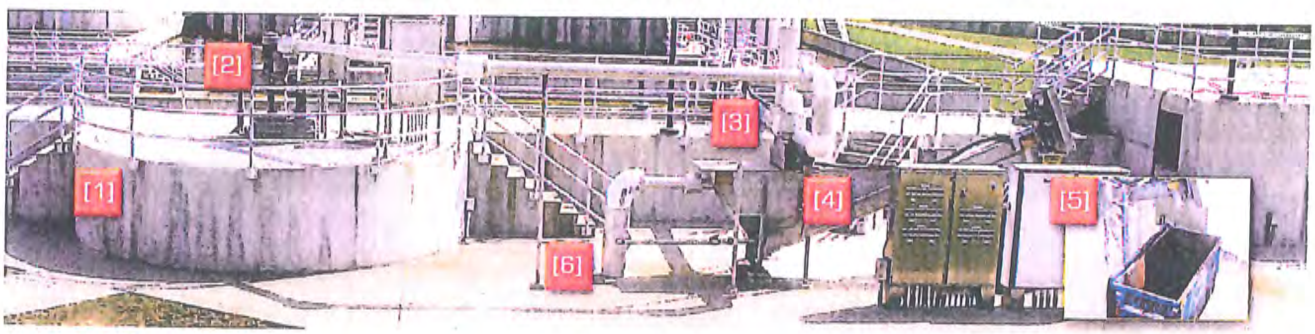
Coanda Ramp
Engineered entry facilitates laminar flow so that it takes a steady tangential direction as it enters the grit chamber and properly conditions the grit for entrapment.

Exclusive Flat-Bottom Basin Floor
Facilitates the forced vortex flow pattern inside the chamber. Minimizes organic capture while hydraulically directing grit into lower hopper. Patented, 360-degree in-line design.

PISTA® Grit Fluidizer
Patented blade exclusive to S&L design. Loosens collected grit, preventing compacting.

Storage Hopper
Stores removed grit prior to dewatering.

Hopper Cover Plate
Stationary and recessed, it removes for quick access to storage hopper.



PISTA® Grit Removal, Handling & Dewatering System Flow Scheme

GRIT REMOVAL SYSTEM

[1] ***PISTA® Grit Chamber*** — Influent enters flat-floor grit chamber hydraulically guided by coanda ramp, internal baffles and central, low-speed propeller. Forced vortex drives grit particles to center chamber floor and into lower grit hopper while organics and flow continue to plant.

[2] ***PISTA® Turbo Grit Pump*** — Top-mounted or remote mounted unit pumps collected grit slurry (kept fluid by the **PISTA®** Grit Fluidizer) to the **PISTA®**'s second-stage grit washing and dewatering system while also providing proper head.

[3] ***PISTA® Grit Concentrator*** — Specifically engineered for the **PISTA®** system, this abrasion-resistant Ni-Hard unit washes and separates grit further. It positions on the grit discharge line.

[4] ***PISTA® Grit Screw Conveyor*** — Grit from the concentrator deposits into the parallel (lamella) plate section of the S&L dewatering screw conveyor, which aids in retaining finer grit and reducing the stream's turbulence and overflow rate.

[5] ***Dewatered Grit Discharges*** from the top of the inclined screw conveyor into a container for disposal.

[6] ***The Flow and any Residual Organics are Returned*** to the inlet channel prior to the grit chamber, typically 93% of flow and 95% of organics.

Existing Grit chamber

ENGINEERING DATA

Smith & Loveless, Inc.®

14040 West Santa Fe Trail Drive
Lenexa, Kansas 66215-1284

Table 4
PISTA® GRIT CHAMBER DESIGN DATA – CONCRETE TANK – 270° UNITS

Model	0.5	1.0	2.5	4.0	7.0	12.0	20.0	30.0	50.0	70.0	100.0
Maximum Flow (MGD)	0.5	1.0	2.5	4.0	7.0	12.0	20.0	30.0	50.0	70.0	100.0
Chamber Diameter	6' – 0"		7' – 0"	8' – 0"	10' – 0" *	12' – 0"	16' – 0"	18' – 0"	20' – 0"	24'– 0"	32' – 0"
Chamber Depth	3' – 8"		3' – 8"	4' – 0"	4' – 9"	5' – 0"	5' – 6"	6' – 6"	8' – 0"	8' – 0"	10' – 0"
Grit Hopper Diameter	3' – 0"		3' – 0"	3' – 0"	5' – 0"	5' – 0"	5' – 0"	5' – 0"	5' – 0"	6' – 0"	8' – 0"
Grit Hopper Depth	5' – 0"		5' – 0"	5' – 0"	5' – 6"	6' – 8"	6' – 10"	7' – 0"	8' – 0"	8' – 0"	10' – 0"
Drive: HP	3/4		3/4	3/4	1	1	2	2	2	2	2
Input RPM	54		54	54	37	37	36	36	36	36	36
Output RPM	20		20	20	14	14	13	13	13	13	13
Estimated Shipping Wt. (Lbs.)	2000		2000	2000	2500	2500	3000	3000	3000	3000	3000
Add for Steel Shell	2300		2600	3300	4800	N/A	N/A	N/A	N/A	N/A	N/A

* 9' – 10-¼" in Steel

Now that you have selected the **PISTA®** Grit Chamber model you require, you can determine the grit storage volume in the **PISTA®** Grit Chamber.

Table 5
PISTA® GRIT CHAMBER
GRIT HOPPER STORAGE VOLUME **

MODEL	CUBIC FEET
0.5, 0.5A, 0.5B	32
1.0, 1.0A, 1.0B	32
2.5, 2.5A, 2.5B	32
4.0, 4.0A, 4.0B	32
7.0A, 7.0B	35
7.0	76
12.0, 12.0A, 12.0B	100
20.0, 20.0A, 20.0B	102
30.0, 30.0A, 30.0B	106
50.0, 50.0A, 50.0B	125
70.0, 70.0A, 70.0B	164
100.0, 100.0A, 100.0B	335

** Volumes seen above are based on the hopper dimensions listed in Tables 1 through 4, and utilizing a 60° sloped bottom in the **PISTA®** Grit Chamber's grit hopper.

Pinevlle WWTP

1775 rpm

210 HP

Performance Specifications

Universal RAI® Pressure Table

Frame Size	Speed RPM	2 PSI		4 PSI		5 PSI		6 PSI		7 PSI		10 PSI		11 PSI		12 PSI		13 PSI		14 PSI		15 PSI	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
22	1160	7	0.3	2	0.4																		
	3600	46	0.8	41	1.3	39	1.6	38	1.8	36	2.1	32	2.8	31	3.1	29	3.3						
	5275	73	1.2	68	1.9	66	2.3	64	2.7	63	3.1	59	4.2	57	4.5	56	4.9						
24	1160	19	0.4	11	0.8	8	0.9																
	3600	97	1.3	89	2.3	86	2.8	83	3.3	81	3.8												
	5275	150	1.9	143	3.4	140	4.2	137	4.9	135	5.6												
32	1160	34	0.6	27	1.1	24	1.3	21	1.6	19	1.8												
	2800	108	1.6	101	2.7	98	3.2	95	3.8	93	4.3	86	6.0	84	6.5	82	7.1	81	7.6	79	8.2	77	8.7
	3600	144	2.0	137	3.4	134	4.1	131	4.8	129	5.5	122	7.7	120	8.4	118	9.1	117	9.8	115	10.5	113	11.2
33	1160	48	0.8	39	1.4	35	1.7	31	2.1	28	2.4												
	2800	149	2.0	140	3.5	136	4.2	132	5.0	129	5.7	120	8.0	118	8.7	116	9.5						
	3600	199	2.5	189	4.5	185	5.4	181	6.4	178	7.4	170	10.3	167	11.2	165	12.2						
36	1160	85	1.2	72	2.3	66	2.8	61	3.3	57	3.8												
	2800	253	3.3	239	5.8	234	7.0	229	8.3	224	9.5												
	3600	334	4.5	321	7.7	315	9.3	310	10.9	306	12.5												
42	860	32	0.6	24	1.1	21	1.3	18	1.5	15	1.8												
	1760	87	1.3	78	2.2	75	2.7	72	3.1	69	3.6	62	5.0	60	5.5	58	5.9						
	3600	198	2.6	190	4.5	186	5.5	183	6.4	181	7.4	173	10.2	171	11.2	169	12.1	167	13.1	165	14.1	163	15.0
45	860	68	1.1	53	2.0	48	2.4	42	2.9	37	3.4												
	1760	177	2.2	162	4.1	156	5.0	151	5.9	146	6.9	133	9.6										
	3600	400	5.3	385	9.1	379	11.0	374	12.9	369	14.8	356	20.5										
47	860	92	1.4	73	2.6	66	3.2	59	3.8	53	4.4												
	1760	236	2.8	217	5.3	209	6.5	203	7.7	196	8.9												
	3600	529	7.0	510	12.0	503	14.3	496	17.0	490	19.5												
53	700	63	1.0	51	1.8	46	2.2	42	2.6	38	3.0												
	1760	203	2.7	191	4.7	186	5.7	181	6.7	177	7.7	167	10.8	163	11.8	160	12.8	157	14.2	155	15.2		
	2850	346	5.0	334	8.2	329	9.9	325	11.5	321	13.2	310	18.1	307	19.7	304	21.3	301	23.0	298	24.6	295	26.2
56	700	110	1.6	92	2.9	85	3.6	78	4.3	72	4.9												
	1760	345	4.6	326	7.7	319	9.4	312	11.1	306	12.8	290	17.9	285	19.6	280	276	23.0					
	2850	585	8.0	567	13.5	560	16.2	553	19.0	547	21.7	531	30.0	526	32.7	521	517	38.2					
59	700	170	2.2	147	4.2	138	5.1	130	6.1														
	1760	513	6.4	490	11.4	480	13.8	472	16.3	464	18.8												
	2850	865	11.8	842	19.9	832	23.9	824	27.9	816	31.9												
65	700	126	1.8	107	3.3	100	4.1	93	4.8	86	5.5	70	7.8										
	1760	387	5.3	368	9.1	360	11.0	353	12.8	347	14.7	330	20.4	325	22.3	320	24.2	316	26.1	311	27.9	307	29.8
	2350	523	7.7	513	12.8	506	15.3	499	17.8	492	20.3	475	27.4	470	30.4	466	32.9	461	35.5	457	38.0	452	40.5
68	700	203	2.7	172	5.1	160	6.3	149	7.5	139	8.7												
	1760	621	7.9	591	14.0	579	17.0	567	20.0	557	23.1	530	32.2	522	35.2	515	38.2	507	41.3	500	44.3		
	2350	855	11.4	824	19.5	812	23.5	801	27.6	790	31.6	763	43.8	755	47.8	748	51.9	740	55.9	733	60.0		
615	700	380	4.8	323	9.3	301	11.6	279	13.8	260	16.2												
	1760	1164	13.9	1107	25.2	1084	30.8	1063	36.5	1044	42.2												
	2350	1601	19.3	1544	34.6	1521	43.2	1500	49.8	1481	57.4												
76	575	179	2.3	158	4.3	150	5.4	142	6.4	134	7.4	115	10.4										
	1400	511	6.4	490	11.5	481	13.9	473	16.4	466	18.8	447	26.3	441	28.7	436	31.2	421	33.7	415	36.1	421	38.6
	2050	772	10.5	751	17.8	742	21.4	734	25.0	727	28.6	708	39.5	703	43.1	697	46.7	684	50.4	679	54.0	682	57.6
→ 711	575	336	4.0	299	7.7	284	9.6	271	11.4	258	13.3	226	18.8										
	1400	944	11.0	908	20.0	893	24.5	880	29.0	867	33.5	835	47.1										
	150	1424	17.5	1387	30.7	1373	37.3	1359	43.9	1347	50.5	1315	70.3										
718	575	563	6.3	510	12.3	489	15.4	470	18.4														
	1400	1553	17.0	1500	31.6	1479	39.0	1460	46.3														
	2050	2333	26.9	2280	47.9	2259	58.6	2240	69.4														

Calculations to Establish Current Unit Operation

Capacities, Performance Criteria, Loading Rates, Etc.

Existing Aerated Lagoon:

a) Estimate Lagoon Volume:

Lagoon shape = trough

$$\text{Volume} = LXW \times SWD + \left(\frac{B \times 4}{2} \times L\right) \times 2 - 1\ \frac{B \times 4}{2} \times L$$

$$= (121' \times 124' \times 12') + (18 \times \frac{130}{2} \times 12 \times 2) + \frac{124 \times 12 \times 18}{2}$$

$$= 180{,}048 + 28{,}080 + 13{,}392$$
$$= 221{,}520 \text{ Ft}^3 \text{ or } 1{,}656{,}969 \text{ Gallons}$$

b) Check Detention Time, based on Design Plant Capacity =

$$\text{Theta} = \frac{\text{Volume}}{\text{Flow}} = \frac{1{,}656{,}969}{724{,}000 \text{ GPD}} = \begin{matrix}2.3 \text{ Days} \\ 54 \text{ Hours}\end{matrix}$$

Therefore, system is biological extended air. Typical Theta for extended air is 18 to 36 hours.

c) Check Hydraulic Capacity if Theta = 30 hours.

$$\therefore \text{Flow} = \frac{\text{Volume}}{\text{Theta}} = \frac{1{,}656{,}969}{30/24} = 1{,}325{,}575 \text{ GPD}$$

d) Check BOD Loading into Lagoon based on Design Average BOD Concentration of 300 mg/L.

Theoretical BOD Load = 0.724 x 300 mg/L x 8.34 = 1,812 Lb/d

$$\therefore \frac{\text{BOD Loading}}{\text{Volume}} = \frac{1{,}812 \text{ Lb/d}}{221{,}520/1{,}000 \text{ Ft}^3} = 8.2 \text{ PPD}/1{,}000 \text{ Ft}^3$$

Allowable Loading is 10 – 25 Lb/d/1,000 Ft^3

e) Determine System Capacity based on an Average Loading Rate of 15 Lb/d/1,000 Ft^3.

$$\therefore \text{BOD Loading} = \frac{221{,}520 \text{ Ft}^3}{1{,}000 \text{ Ft}^3} \times 15$$

$$= 3{,}323 \text{ Lb/d}$$

$$\therefore Q = \frac{\text{BOD Lb/d}}{\text{BOD Conc. X } 8.34} = \frac{3{,}323 \text{ Lb/d}}{300 \text{ mg/L} \times 8.34} = 1.32 \text{ MGD}$$

Existing Sludge Holding Lagoon:

Usable (Water Level Dimensions) = 45’ x 45’ (approximately)

Usable Depth = 12’

No sludge removal is provided. Lagoon was designed to operate with a portable pump trailer unit. Sludge removal is via pump and haul to another WWTP. A telescoping valve is available for decanting the supernatant. There is an aspirator mixer/aerator unit to serve the sludge lagoon.

a) Determine Basin Volume:

Basin Volume = 1/3 A h A = Base Area = 45 x 45’
= 1/3 (45 x 45) x 12’ = 8,100 Ft^3 (60,588 Gallons)

b) Determine Sludge Load to Sludge Lagoon:

i) Solids Component:

320 – 20 = 300 mg/L
300 x 1.42 x 0.65 x 0.68 = 189 mg/L
Solids Loading = 189 mg/L x 0.729 MGD x 8.34 = 1,136 Lb/d

ii) Organic Component:

(300 x 0.8) – 7.4 = 232 mg/L

BOD Load = 232 mg/L x 0.724 MGD x 8.34 = 1,400 Lb/d

Total = 1,136 Lb/d + 1,400 Lb/d = 2,536 Lb/d

Sludge Production = 0.75 x 2,536 Lb/d = 1,902 Lb/d

c) Determine Hydraulic Detention (Storage) Time:

$$\text{Volume} = \frac{1{,}902 \text{ Lb/d}}{0.01 \times 62.4 \times 1.03} = 2{,}960 \text{ Ft}^3\text{/d}$$
or 22,135 GPD

$$\text{Available Detention Time} = \frac{60{,}000 \text{ Gallons}}{22{,}135 \text{ GPD}} = 2.70 \text{ Days}$$

Existing Chlorine Chamber:

Gross Basin Volume = 9’ SWD x 22’ x 24’ = 4,752 Ft^3
35,544 Gallons

a) Check Detention Times

i) At Average Design Flow =

$$t = \frac{V}{Q} = \frac{35{,}544 \text{ Gallons}}{729{,}000 \text{ GPD}} = 0.049 \text{ d} = (1.18 \text{ Hrs})$$

Minimum Requirement is 0.5 Hrs.

ii) At Peak Design Flow = $t = \frac{35{,}544 \text{ Gallons}}{724 \times 1{,}000 \times 3.88 \text{ Peak Factor}} = 0.0126 \text{ d}$

= (0.30 Hrs)

Minimum Requirement is 0.25 Hrs.

b) Check Capacity of Tank @ Minimum Guidelines

Peak Flow Capacity = $\frac{35{,}544 \text{ Gallons}}{0.25 \text{ Hrs}/24 \text{ Hrs/Day}}$ = 3,412,224 GPD

Average Flow Capacity = $\frac{35{,}544 \text{ Gallons}}{0.5 \text{ Hrs}/24 \text{ Hrs/Day}}$ = 1,706,112 GPD

Existing Secondary Clarifier:

Design Criteria:

Average Plant Design Flow = 0.724 MGD [for Surface Overflow Rate (SOR) Calculations]
Peak to Average Ratio = 3.9
Peak Design Flow = 2.82 MGD
Suggested Dry Weather SOR Range = 400 – 700 GPD/SF – WEF MOP No. 8, Pg 592
Suggested Peak Weather SOR Range = 1,000 – 1,600 GPD/SF – WEF MOP No. 8, Page 592
Suggested Maximum Average SOR = 400 GPD/SF (Typical for conventional clarifier)
Suggested Maximum Peak SOR = 1,000 GPD/SF (Great Lakes Ten States Standards)
Maximum Solids Loading Rate = 20 lb/d. SF (WEF MOP No. 8) Page 587

Maximum Weir Loading = 15,000 GPD per linear Ft.

1. Reactor Surface Area:

Reactor size shall be based on Maximum Surface Overflow Rates (SOR) using the influent wastewater flows.

$\therefore$ Gross Surface Area Available = 3 x 40' x 23' = 2,760 SF per clarifier

2. <u>Check Flow Capacity Based on Surface Overflow Rates:</u>

$$\text{Average SOR per clarifier} = \frac{Q}{A}$$

Q_{avg} = 400 GPD/SF x 2,760 SF
= 1,104,000 GPD

Q_{peak} = 1,000 GPD/SF x 2,760 SF
= 2,760,000 GPD

3. <u>Check Detention Time:</u>

Clarifier SWD = 12', Length = 3 Units x 40' Long = 120'

Gross clarifier volume =

$$\text{Cross Section: } (12' \times 15') + \frac{(8' \times 12')}{2} + \underline{(8' \times 12')} = 228$$

$\therefore$ Total volume = 120' x 228 SF = 27,360 CF (204,652 Gallons)

Flow to clarifiers with no RAS recycle:

Theta (avg) = V/Qavg= 27,360 CF/ (0.724 E6 gal /7.48 Gal/CF)
= 0.28 d (6.7 Hr)

Theta (peak) = V/Qavg= 27,360 CF/ (2.82 E6 gal /7.48 Gal/CF)
= 0.07d (1.8 Hr)

Flow to clarifiers with 100% RAS recycle:
i.e. Flow = 0.724 MGD + 0.724 MGD = 1.45 MGD

Theta (avg) = V/Qavg= 27,360 CF/ (1.45 E6 Gal /7.48 Gal/CF)
= 0.14 d (3.38 Hr)

4. <u>Weir Loading Rate:</u>

Weir length available = 3 units x 2 x 28' (double-sided weirs) = 168'

Actual weir loading at:

Average design flow = Q/weir length
= 0.724 E6 Gal/168 Ft = 4,309 GPD/Ft

The loading is less than 15,000 GPD/Ft, therefore, O.K

Existing Blowers and Blower Building:

Three (3) 40 HP blowers are available and in service.

Blowers are URAI 711 Roots, Dresser, Inc.

Calculate discharge conditions:

Elevation of blower discharge pipe (high point) = 1,050'
Elevation of diffuser piping (bottom of lagoon) = 1,034'
Change in elevation = 16'

Pressure in PSI = $\frac{16}{2.317}$ = 7 PSI

Allow another 3 PSI due to piping losses, total TDH is approximately 10 PSI.

From the dresser charts attached (refer to Appendix B), and based on 1,775 RPM and 10 PSI, the CFM per blower is approximately 1,000 CFM.

Therefore, total available blower capacity.

3 blowers x 1,000 CFM = 3,000 CFM

APPENDIX D

AREA DEMOGRAPHICS

Exhibit D-2.1

Annual Estimates of the Resident Population for Incorporated Places in Kentucky: April 1, 2010 to July 1, 2014

Source: U.S. Census Bureau, Population Division

Release Date: May 21, 2015

	Census	Population Estimates (as of July 1)					Rank	Population Change Census 2010 - July 1, 2014			
	2010	2010	2011	2012	2013	2014	2014	Number	Rank	Percent	Rank
Kentucky	4,339,367	4,349,838	4,370,038	4,383,465	4,399,583	4,413,457		74,090		1.7	
Pineville city	1,732	1,851	1,847	1,816	1,799	1,791	156	59	100	3.4	84

Note: No growth is expected in the next 20 years according to past records.

Exhibit D-2.1 continue

U.S. Census Bureau
American FactFinder

POPULATION FINDER

United States | Kentucky | Bell County

Bell County, Kentucky

city/ town, county, or zip
bell county
state
Kentucky GO
search by address »

The 2009 population estimate for Bell County, Kentucky is 28,972.

Note: Information about challenges to population estimates data can be found on the Population Estimates Challenges page.

View population trends...

	2009	2000	1990
Population	28,972	30,060	31,506

Source: U.S. Census Bureau, 2009 Population Estimates, Census 2000, 1990 Census

View more results...

Population for all counties in Kentucky, 2000-2009:
alphabetic | ranked

Map of Persons per Square Mile, Kentucky by County:
2009 | 2000 | 1990

Map of Persons per Square Mile, County by County Subdivision:
2009 | 2000 | 1990

See more data for Bell County, Kentucky on the Fact Sheet.

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.

No growth is projected in the next 20 years according to the past 20 year for Bell County.

U.S. Census Bureau
American FactFinder

Exhibit A-2, continue

POPULATION FINDER

United States | Kentucky

Kentucky

city/ town, county, or zip

state
Kentucky GO
search by address »

The 2009 population estimate for Kentucky is 4,314,113.

Note: Information about challenges to population estimates data can be found on the Population Estimates Challenges page.

View population trends...

	2009	2000	1990
Population	4,314,113	4,041,769	3,685,296

Source: U.S. Census Bureau, 2009 Population Estimates, Census 2000, 1990 Census

View more results...

Population for all counties in Kentucky, 2000-2009:
alphabetic | ranked
Map of Persons per Square Mile, United States by State:
2009 | 2000 | 1990
Map of Persons per Square Mile, Kentucky by County:
2009 | 2000 | 1990

See more data for Kentucky on the Fact Sheet.

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.

State of KY appear to be growing or a rate of 17% per 20 yrs or

DP03

SELECTED ECONOMIC CHARACTERISTICS

2006-2010 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, for 2010, the 2010 Census provides the official counts of the population and housing units for the nation, states, counties, cities and towns. For 2006 to 2009, the Population Estimates Program provides intercensal estimates of the population for the nation, states, and counties.

Subject	Bell County, Kentucky			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
EMPLOYMENT STATUS				
Population 16 years and over	23,219	+/-106	23,219	(X)
In labor force	10,232	+/-851	44.1%	+/-3.6
Civilian labor force	10,232	+/-851	44.1%	+/-3.6
Employed	9,226	+/-792	39.7%	+/-3.4
Unemployed	1,006	+/-243	4.3%	+/-1.0
Armed Forces	0	+/-123	0.0%	+/-0.2
Not in labor force	12,987	+/-840	55.9%	+/-3.6
Civilian labor force	10,232	+/-851	10,232	(X)
Percent Unemployed	(X)	(X)	9.8%	+/-2.2
Females 16 years and over	12,253	+/-104	12,253	(X)
In labor force	4,908	+/-450	40.1%	+/-3.5
Civilian labor force	4,908	+/-450	40.1%	+/-3.5
Employed	4,541	+/-442	37.1%	+/-3.5
Own children under 6 years	1,863	+/-111	1,863	(X)
All parents in family in labor force	1,029	+/-206	55.2%	+/-10.3
Own children 6 to 17 years	3,788	+/-239	3,788	(X)
All parents in family in labor force	1,992	+/-300	52.6%	+/-7.6
COMMUTING TO WORK				
Workers 16 years and over	8,992	+/-773	8,992	(X)
Car, truck, or van -- drove alone	7,600	+/-689	84.5%	+/-2.9
Car, truck, or van -- carpooled	750	+/-180	8.3%	+/-1.8
Public transportation (excluding taxicab)	46	+/-48	0.5%	+/-0.5
Walked	269	+/-109	3.0%	+/-1.2
Other means	100	+/-77	1.1%	+/-0.8
Worked at home	227	+/-138	2.5%	+/-1.5
Mean travel time to work (minutes)	21.5	+/-1.7	(X)	(X)
OCCUPATION				
Civilian employed population 16 years and over	9,226	+/-792	9,226	(X)
Management, business, science, and arts occupations	2,621	+/-328	28.4%	+/-3.0
Service occupations	1,778	+/-336	19.3%	+/-3.4
Sales and office occupations	2,156	+/-343	23.4%	+/-3.1
Natural resources, construction, and maintenance occupations	1,402	+/-308	15.2%	+/-3.0

Subject	Bell County, Kentucky			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
Production, transportation, and material moving occupations	1,269	+/-292	13.8%	+/-2.7
INDUSTRY				
'vilian employed population 16 years and over	9,226	+/-792	9,226	(X)
,griculture, forestry, fishing and hunting, and mining	703	+/-219	7.6%	+/-2.1
Construction	521	+/-152	5.6%	+/-1.6
Manufacturing	847	+/-214	9.2%	+/-2.0
Wholesale trade	219	+/-114	2.4%	+/-1.2
Retail trade	1,312	+/-259	14.2%	+/-2.5
Transportation and warehousing, and utilities	522	+/-154	5.7%	+/-1.7
Information	214	+/-137	2.3%	+/-1.5
Finance and insurance, and real estate and rental and leasing	210	+/-88	2.3%	+/-0.9
Professional, scientific, and management, and administrative and waste management services	397	+/-151	4.3%	+/-1.6
Educational services, and health care and social assistance	2,671	+/-317	29.0%	+/-2.9
Arts, entertainment, and recreation, and accommodation and food services	697	+/-189	7.6%	+/-1.9
Other services, except public administration	445	+/-182	4.8%	+/-1.9
Public administration	468	+/-147	5.1%	+/-1.5
CLASS OF WORKER				
Civilian employed population 16 years and over	9,226	+/-792	9,226	(X)
Private wage and salary workers	7,016	+/-704	76.0%	+/-3.1
Government workers	1,688	+/-311	18.3%	+/-3.1
Self-employed in own not incorporated business workers	522	+/-158	5.7%	+/-1.7
Unpaid family workers	0	+/-123	0.0%	+/-0.4
INCOME AND BENEFITS (IN 2010 INFLATION-ADJUSTED DOLLARS)				
Total households	10,902	+/-565	10,902	(X)
Less than $10,000	2,265	+/-286	20.8%	+/-2.4
),000 to $14,999	1,362	+/-233	12.5%	+/-2.1
, .5,000 to $24,999	1,872	+/-284	17.2%	+/-2.6
$25,000 to $34,999	1,288	+/-244	11.8%	+/-2.2
$35,000 to $49,999	1,547	+/-287	14.2%	+/-2.4
$50,000 to $74,999	1,427	+/-201	13.1%	+/-1.8
$75,000 to $99,999	562	+/-139	5.2%	+/-1.2
$100,000 to $149,999	439	+/-133	4.0%	+/-1.2
$150,000 to $199,999	66	+/-36	0.6%	+/-0.3
$200,000 or more	74	+/-57	0.7%	+/-0.5
Median household income (dollars)	24,724	+/-2,228	(X)	(X)
Mean household income (dollars)	36,482	+/-2,922	(X)	(X)
With earnings	6,441	+/-487	59.1%	+/-2.5
Mean earnings (dollars)	42,573	+/-5,148	(X)	(X)
With Social Security	4,380	+/-283	40.2%	+/-2.7
Mean Social Security income (dollars)	13,189	+/-721	(X)	(X)
With retirement income	2,026	+/-229	18.6%	+/-2.0
Mean retirement income (dollars)	17,110	+/-2,373	(X)	(X)
With Supplemental Security Income	1,218	+/-214	11.2%	+/-2.0
Mean Supplemental Security Income (dollars)	7,201	+/-744	(X)	(X)
With cash public assistance income	289	+/-113	2.7%	+/-1.0
Mean cash public assistance income (dollars)	2,364	+/-703	(X)	(X)
With Food Stamp/SNAP benefits in the past 12 months	2,662	+/-341	24.4%	+/-2.7
Families	7,575	+/-450	7,575	(X)
Less than $10,000	1,051	+/-222	13.9%	+/-2.7
$10,000 to $14,999	774	+/-168	10.2%	+/-2.2
$15,000 to $24,999	1,258	+/-225	16.6%	+/-2.9
',000 to $34,999	968	+/-223	12.8%	+/-2.9
,.5,000 to $49,999	1,214	+/-221	16.0%	+/-2.7
$50,000 to $74,999	1,281	+/-202	16.9%	+/-2.5

Subject	Bell County, Kentucky			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
$75,000 to $99,999	499	+/-138	6.6%	+/-1.7
$100,000 to $149,999	400	+/-125	5.3%	+/-1.6
$150,000 to $199,999	56	+/-32	0.7%	+/-0.4
)0,000 or more	74	+/-57	1.0%	+/-0.7
Median family income (dollars)	32,060	+/-2,608	(X)	(X)
Mean family income (dollars)	43,079	+/-4,411	(X)	(X)
Per capita income (dollars)	14,627	+/-1,352	(X)	(X)
Nonfamily households	3,327	+/-356	3,327	(X)
Median nonfamily income (dollars)	12,861	+/-1,551	(X)	(X)
Mean nonfamily income (dollars)	19,791	+/-2,320	(X)	(X)
Median earnings for workers (dollars)	20,901	+/-1,666	(X)	(X)
Median earnings for male full-time, year-round workers (dollars)	31,995	+/-2,429	(X)	(X)
Median earnings for female full-time, year-round workers (dollars)	27,887	+/-3,255	(X)	(X)
HEALTH INSURANCE COVERAGE				
Civilian noninstitutionalized population	(X)	(X)	(X)	(X)
With health insurance coverage	(X)	(X)	(X)	(X)
With private health insurance	(X)	(X)	(X)	(X)
With public coverage	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
Civilian noninstitutionalized population under 18 years	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
Civilian noninstitutionalized population 18 to 64 years	(X)	(X)	(X)	(X)
In labor force:	(X)	(X)	(X)	(X)
Employed:	(X)	(X)	(X)	(X)
With health insurance coverage	(X)	(X)	(X)	(X)
With private health insurance	(X)	(X)	(X)	(X)
With public coverage	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
Unemployed:	(X)	(X)	(X)	(X)
With health insurance coverage	(X)	(X)	(X)	(X)
With private health insurance	(X)	(X)	(X)	(X)
With public coverage	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
Not in labor force:	(X)	(X)	(X)	(X)
With health insurance coverage	(X)	(X)	(X)	(X)
With private health insurance	(X)	(X)	(X)	(X)
With public coverage	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL				
All families	(X)	(X)	26.2%	+/-3.1
With related children under 18 years	(X)	(X)	38.9%	+/-5.8
With related children under 5 years only	(X)	(X)	54.2%	+/-13.4
Married couple families	(X)	(X)	18.0%	+/-3.0
With related children under 18 years	(X)	(X)	24.0%	+/-5.2
With related children under 5 years only	(X)	(X)	43.3%	+/-18.2
Families with female householder, no husband present	(X)	(X)	48.6%	+/-10.1
With related children under 18 years	(X)	(X)	62.3%	+/-11.8
With related children under 5 years only	(X)	(X)	79.6%	+/-20.2
All people	(X)	(X)	29.4%	+/-2.7
Under 18 years	(X)	(X)	35.2%	+/-5.9
Related children under 18 years	(X)	(X)	34.1%	+/-5.8
Related children under 5 years	(X)	(X)	42.2%	+/-10.7
Related children 5 to 17 years	(X)	(X)	31.0%	+/-6.4
18 years and over	(X)	(X)	27.7%	+/-2.3
18 to 64 years	(X)	(X)	30.0%	+/-2.6

Subject	Bell County, Kentucky			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
65 years and over	(X)	(X)	18.3%	+/-3.4
People in families	(X)	(X)	25.6%	+/-3.2
Unrelated individuals 15 years and over	(X)	(X)	49.1%	+/-5.9

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

There were changes in the edit between 2009 and 2010 regarding Supplemental Security Income (SSI) and Social Security. The changes in the edit loosened restrictions on disability requirements for receipt of SSI resulting in an increase in the total number of SSI recipients in the American Community Survey. The changes also loosened restrictions on possible reported monthly amounts in Social Security income resulting in higher Social Security aggregate amounts. These results more closely match administrative counts compiled by the Social Security Administration.

Workers include members of the Armed Forces and civilians who were at work last week.

Industry codes are 4-digit codes and are based on the North American Industry Classification System 2007. The Industry categories adhere to the guidelines issued in Clarification Memorandum No. 2, "NAICS Alternate Aggregation Structure for Use By U.S. Statistical Agencies," issued by the Office of Management and Budget.

Occupation codes are 4-digit codes and are based on the Standard Occupational Classification (SOC) 2010. The 2010 Census occupation codes were updated in accordance with the 2010 revision of the SOC. To allow for the creation of 2006-2010 and 2008-2010 tables, occupation data in the multiyear files (2006-2010 and 2008-2010) were recoded to 2010 Census occupation codes. We recommend using caution when comparing data coded using 2010 Census occupation codes with data coded using previous Census occupation codes. For more information on the Census occupation code changes, please visit our website at http://www.census.gov/hhes/www/ioindex/.

While the 2006-2010 American Community Survey (ACS) data generally reflect the December 2009 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2006-2010 American Community Survey

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

State & County QuickFacts

Kentucky

People QuickFacts	Kentucky	USA
Population, 2011 estimate	4,369,356	311,591,917
Population, 2010	4,339,367	308,745,538
Population, percent change, 2000 to 2010	7.4%	9.7%
Population, 2000	4,041,769	281,421,906
Persons under 5 years, percent, 2010	6.5%	6.5%
Persons under 18 years, percent, 2010	23.6%	24.0%
Persons 65 years and over, percent, 2010	13.3%	13.0%
Female persons, percent, 2010	50.8%	50.8%
White persons, percent, 2010 (a)	87.8%	72.4%
Black persons, percent, 2010 (a)	7.8%	12.6%
American Indian and Alaska Native persons, percent, 2010 (a)	0.2%	0.9%
Asian persons, percent, 2010 (a)	1.1%	4.8%
Native Hawaiian and Other Pacific Islander, percent, 2010 (a)	0.1%	0.2%
Persons reporting two or more races, percent, 2010	1.7%	2.9%
Persons of Hispanic or Latino origin, percent, 2010 (b)	3.1%	16.3%
White persons not Hispanic, percent, 2010	86.3%	63.7%
Living in same house 1 year & over, 2006-2010	84.0%	84.2%
Foreign born persons, percent, 2006-2010	3.1%	12.7%
Language other than English spoken at home, pct age 5+, 2006-2010	4.6%	20.1%
High school graduates, percent of persons age 25+, 2006-2010	81.0%	85.0%
Bachelor's degree or higher, pct of persons age 25+, 2006-2010	20.3%	27.9%
Veterans, 2006-2010	331,344	22,652,496
Mean travel time to work (minutes), workers age 16+, 2006-2010	22.5	25.2
Housing units, 2010	1,927,164	131,704,730
Homeownership rate, 2006-2010	69.9%	66.6%
Housing units in multi-unit structures, percent, 2006-2010	17.7%	25.9%
Median value of owner-occupied housing units, 2006-2010	$116,800	$188,400
Households, 2006-2010	1,676,708	114,235,996
Persons per household, 2006-2010	2.48	2.59
Per capita money income in past 12 months (2010 dollars) 2006-2010	$22,515	$27,334
Median household income 2006-2010	$41,576	$51,914
Persons below poverty level, percent, 2006-2010	17.7%	13.8%

Business QuickFacts	Kentucky	USA
Private nonfarm establishments, 2009	90,661[1]	7,433,465
Private nonfarm employment, 2009		

	1,486,545[1]	114,509,626
Private nonfarm employment, percent change 2000-2009	-1.8%[1]	0.4%
Nonemployer establishments, 2009	265,757	21,090,761
Total number of firms, 2007	337,600	27,092,908
Black-owned firms, percent, 2007	3.1%	7.1%
American Indian- and Alaska Native-owned firms, percent, 2007	0.3%	0.9%
Asian-owned firms, percent, 2007	1.6%	5.7%
Native Hawaiian and Other Pacific Islander-owned firms, percent, 2007	0.0%	0.1%
Hispanic-owned firms, percent, 2007	1.1%	8.3%
Women-owned firms, percent, 2007	25.6%	28.8%
Manufacturers shipments, 2007 ($1000)	119,105,421	5,338,306,501
Merchant wholesaler sales, 2007 ($1000)	74,680,759	4,174,286,516
Retail sales, 2007 ($1000)	50,405,925	3,917,663,456
Retail sales per capita, 2007	$11,843	$12,990
Accommodation and food services sales, 2007 ($1000)	6,300,866	613,795,732
Building permits, 2010	7,986	604,610
Federal spending, 2009	56,255,193[1]	3,175,336,050[2]

Geography QuickFacts	**Kentucky**	**USA**
Land area in square miles, 2010	39,486.34	3,531,905.43
Persons per square mile, 2010	109.9	87.4
FIPS Code	21	

1: Includes data not distributed by county.
2: Includes data not distributed by state.

Population estimates for counties will be available in April, 2012 and for cities in June, 2012.

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

D: Suppressed to avoid disclosure of confidential information
F: Fewer than 100 firms
FN: Footnote on this item for this area in place of data
NA: Not available
S: Suppressed; does not meet publication standards
X: Not applicable
Z: Value greater than zero but less than half unit of measure shown

Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, American Community Survey, Census of Population and Housing, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits, Consolidated Federal Funds Report
Last Revised: Tuesday, 17-Jan-2012 16:41:36 EST

State & County QuickFacts

Bell County, Kentucky

People QuickFacts	Bell County	Kentucky
Population, 2011 estimate	NA	4,369,356
Population, 2010	28,691	4,339,367
Population, percent change, 2000 to 2010	-4.6%	7.4%
Population, 2000	30,060	4,041,769
Persons under 5 years, percent, 2010	5.5%	6.5%
Persons under 18 years, percent, 2010	21.7%	23.6%
Persons 65 years and over, percent, 2010	15.7%	13.3%
Female persons, percent, 2010	51.4%	50.8%
White persons, percent, 2010 (a)	95.6%	87.8%
Black persons, percent, 2010 (a)	2.2%	7.8%
American Indian and Alaska Native persons, percent, 2010 (a)	0.2%	0.2%
Asian persons, percent, 2010 (a)	0.3%	1.1%
Native Hawaiian and Other Pacific Islander, percent, 2010 (a)	0.0%	0.1%
Persons reporting two or more races, percent, 2010	1.5%	1.7%
Persons of Hispanic or Latino origin, percent, 2010 (b)	0.7%	3.1%
White persons not Hispanic, percent, 2010	95.1%	86.3%
Living in same house 1 year & over, 2006-2010	88.7%	84.0%
Foreign born persons, percent, 2006-2010	0.3%	3.1%
Language other than English spoken at home, pct age 5+, 2006-2010	1.5%	4.6%
High school graduates, percent of persons age 25+, 2006-2010	66.0%	81.0%
Bachelor's degree or higher, pct of persons age 25+, 2006-2010	11.3%	20.3%
Veterans, 2006-2010	1,797	331,344
Mean travel time to work (minutes), workers age 16+, 2006-2010	21.5	22.5
Housing units, 2010	13,154	1,927,164
Homeownership rate, 2006-2010	68.6%	69.9%
Housing units in multi-unit structures, percent, 2006-2010	14.0%	17.7%
Median value of owner-occupied housing units, 2006-2010	$64,500	$116,800
Households, 2006-2010	10,902	1,676,708
Persons per household, 2006-2010	2.53	2.48
Per capita money income in past 12 months (2010 dollars) 2006-2010	$14,627	$22,515
Median household income 2006-2010	$24,724	$41,576
Persons below poverty level, percent, 2006-2010	29.4%	17.7%

Business QuickFacts	Bell County	Kentucky
Private nonfarm establishments, 2009	547	90,661[1]

Private nonfarm employment, 2009	7,261	1,486,545[1]
Private nonfarm employment, percent change 2000-2009	-9.1%	-1.8%[1]
Nonemployer establishments, 2009	1,381	265,757
Total number of firms, 2007	1,696	337,600
Black-owned firms, percent, 2007	F	3.1%
American Indian- and Alaska Native-owned firms, percent, 2007	F	0.3%
Asian-owned firms, percent, 2007	3.7%	1.6%
Native Hawaiian and Other Pacific Islander-owned firms, percent, 2007	F	0.0%
Hispanic-owned firms, percent, 2007	F	1.1%
Women-owned firms, percent, 2007	29.4%	25.6%
Manufacturers shipments, 2007 ($1000)	D	119,105,421
Merchant wholesaler sales, 2007 ($1000)	196,103	74,680,759
Retail sales, 2007 ($1000)	374,889	50,405,925
Retail sales per capita, 2007	$12,915	$11,843
Accommodation and food services sales, 2007 ($1000)	38,133	6,300,866
Building permits, 2010	22	7,986
Federal spending, 2009	265,806	56,255,193[1]

Geography QuickFacts	Bell County	Kentucky
Land area in square miles, 2010	359.00	39,486.34
Persons per square mile, 2010	79.9	109.9
FIPS Code	013	21
Metropolitan or Micropolitan Statistical Area	Middlesborough, KY Micro Area	

1: Includes data not distributed by county.

Population estimates for counties will be available in April, 2012 and for cities in June, 2012.

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

D: Suppressed to avoid disclosure of confidential information
F: Fewer than 100 firms
FN: Footnote on this item for this area in place of data
NA: Not available
S: Suppressed; does not meet publication standards
X: Not applicable
Z: Value greater than zero but less than half unit of measure shown

Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, American Community Survey, Census of Population and Housing, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits, Consolidated Federal Funds Report
Last Revised: Tuesday, 31-Jan-2012 16:51:21 EST

State & County QuickFacts

Middlesborough (city), Kentucky

People QuickFacts	Middlesborough	Kentucky
Population, 2011 estimate	NA	4,369,356
Population, 2010	10,334	4,339,367
Population, percent change, 2000 to 2010	-0.5%	7.4%
Population, 2000	10,384	4,041,769
Persons under 5 years, percent, 2010	6.2%	6.5%
Persons under 18 years, percent, 2010	21.9%	23.6%
Persons 65 years and over, percent, 2010	17.5%	13.3%
Female persons, percent, 2010	53.8%	50.8%
White persons, percent, 2010 (a)	92.3%	87.8%
Black persons, percent, 2010 (a)	4.0%	7.8%
American Indian and Alaska Native persons, percent, 2010 (a)	0.2%	0.2%
Asian persons, percent, 2010 (a)	0.5%	1.1%
Native Hawaiian and Other Pacific Islander, percent, 2010 (a)	0.1%	0.1%
Persons reporting two or more races, percent, 2010	2.6%	1.7%
Persons of Hispanic or Latino origin, percent, 2010 (b)	1.0%	3.1%
White persons not Hispanic, percent, 2010	91.8%	86.3%
Living in same house 1 year & over, 2006-2010	91.0%	84.0%
Foreign born persons, percent, 2006-2010	0.5%	3.1%
Language other than English spoken at home, pct age 5+, 2006-2010	2.4%	4.6%
High school graduates, percent of persons age 25+, 2006-2010	68.7%	81.0%
Bachelor's degree or higher, pct of persons age 25+, 2006-2010	11.9%	20.3%
Mean travel time to work (minutes), workers age 16+, 2006-2010	15.2	22.5
Housing units, 2010	4,992	1,927,164
Homeownership rate, 2006-2010	56.5%	69.9%
Housing units in multi-unit structures, percent, 2006-2010	22.8%	17.7%
Median value of owner-occupied housing units, 2006-2010	$79,200	$116,800
Households, 2006-2010	4,243	1,676,708
Persons per household, 2006-2010	2.40	2.48
Per capita money income in past 12 months (2010 dollars) 2006-2010	$13,730	$22,515
Median household income 2006-2010	$20,069	$41,576
Persons below poverty level, percent, 2006-2010	38.4%	17.7%

Business QuickFacts	Middlesborough	Kentucky
Total number of firms, 2007	1,026	337,600
Black-owned firms, percent, 2007	F	3.1%
American Indian- and Alaska Native-owned firms, percent, 2007	F	0.3%
Asian-owned firms, percent, 2007	S	1.6%
Native Hawaiian and Other Pacific Islander-owned firms, percent, 2007	F	0.0%
Hispanic-owned firms, percent, 2007	F	1.1%
Women-owned firms, percent, 2007	23.9%	25.6%
Manufacturers shipments, 2007 ($1000)	D	119,105,421
Merchant wholesaler sales, 2007 ($1000)	181,423	74,680,759
Retail sales, 2007 ($1000)	298,323	50,405,925
Retail sales per capita, 2007	$30,207	$11,843
	30,826	6,300,866

Accommodation and food services sales, 2007 ($1000)

Geography QuickFacts	Middlesborough	Kentucky
Land area in square miles, 2010	7.54	39,486.34
Persons per square mile, 2010	1,370.4	109.9
FIPS Code	51924	21
Counties		

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

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Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, American Community Survey, Census of Population and Housing, County Business Patterns, Economic Census, Survey of Business Owners, Building Permits, Consolidated Federal Funds Report, Census of Governments
Last Revised: Wednesday, 06-Jun-2012 17:10:14 EDT

Bell County, Kentucky

People QuickFacts	Bell County	Kentucky
Population, 2011 estimate	28,725	4,369,356
Population, 2010 (April 1) estimates base	28,691	4,339,362
Population, percent change, April 1, 2010 to July 1, 2011	0.1%	0.7%
Population, 2010	28,691	4,339,367
Persons under 5 years, percent, 2011	5.8%	6.4%
Persons under 18 years, percent, 2011	21.9%	23.4%
Persons 65 years and over, percent, 2011	15.9%	13.5%
Female persons, percent, 2011	51.4%	50.8%
White persons, percent, 2011 (a)	95.5%	88.9%
Black persons, percent, 2011 (a)	2.4%	8.0%
American Indian and Alaska Native persons, percent, 2011 (a)	0.2%	0.3%
Asian persons, percent, 2011 (a)	0.3%	1.2%
Native Hawaiian and Other Pacific Islander persons, percent, 2011 (a)	Z	0.1%
Persons reporting two or more races, percent, 2011	1.6%	1.6%
Persons of Hispanic or Latino Origin, percent, 2011 (b)	0.8%	3.2%
White persons not Hispanic, percent, 2011	94.9%	86.1%
Living in same house 1 year & over, 2006-2010	88.7%	84.0%
Foreign born persons, percent, 2006-2010	0.3%	3.1%
Language other than English spoken at home, pct age 5+, 2006-2010	1.5%	4.6%
High school graduates, percent of persons age 25+, 2006-2010	66.0%	81.0%
Bachelor's degree or higher, pct of persons age 25+, 2006-2010	11.3%	20.3%
Veterans, 2006-2010	1,797	331,344
Mean travel time to work (minutes), workers age 16+, 2006-2010	21.5	22.5
Housing units, 2010	13,154	1,927,164
Homeownership rate, 2006-2010	68.6%	69.9%
Housing units in multi-unit structures, percent, 2006-2010	14.0%	17.7%
Median value of owner-occupied housing units, 2006-2010	$64,500	$116,800
Households, 2006-2010	10,902	1,676,708
Persons per household, 2006-2010	2.53	2.48
Per capita money income in past 12 months (2010 dollars) 2006-2010	$14,627	$22,515
Median household income 2006-2010	$24,724	$41,576
Persons below poverty level, percent, 2006-2010	29.4%	17.7%

Business QuickFacts	Bell County	Kentucky
Private nonfarm establishments, 2009	547	90,661[1]
Private nonfarm employment, 2009	7,261	1,486,545[1]
Private nonfarm employment, percent change 2000-2009	-9.1%	-1.8%[1]
Nonemployer establishments, 2009	1,381	265,757
Total number of firms, 2007	1,696	337,600
Black-owned firms, percent, 2007	F	3.1%
American Indian- and Alaska Native-owned firms, percent, 2007	F	0.3%
Asian-owned firms, percent, 2007	3.7%	1.6%
Native Hawaiian and Other Pacific Islander-owned firms, percent, 2007	F	0.0%
Hispanic-owned firms, percent, 2007	F	1.1%
Women-owned firms, percent, 2007	29.4%	25.6%

Manufacturers shipments, 2007 ($1000)	D	119,105,421
Merchant wholesaler sales, 2007 ($1000)	196,103	74,680,759
Retail sales, 2007 ($1000)	374,889	50,405,925
Retail sales per capita, 2007	$12,915	$11,843
Accommodation and food services sales, 2007 ($1000)	38,133	6,300,866
Building permits, 2011	19	7,782
Federal spending, 2010	278,795	57,270,528[1]

Geography QuickFacts	Bell County	Kentucky
Land area in square miles, 2010	359.00	39,486.34
Persons per square mile, 2010	79.9	109.9
FIPS Code	013	21
Metropolitan or Micropolitan Statistical Area	Middlesborough, KY Micro Area	

1: Includes data not distributed by county.

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

D: Suppressed to avoid disclosure of confidential information
F: Fewer than 100 firms
FN: Footnote on this item for this area in place of data
NA: Not available
S: Suppressed; does not meet publication standards
X: Not applicable
Z: Value greater than zero but less than half unit of measure shown

Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, American Community Survey, Census of Population and Housing, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits, Consolidated Federal Funds Report
Last Revised: Thursday, 07-Jun-2012 13:33:54 EDT

State & County QuickFacts

Kentucky

People QuickFacts	Kentucky	USA
Population, 2011 estimate	4,369,356	311,591,917
Population, 2010 (April 1) estimates base	4,339,362	308,745,538
Population, percent change, April 1, 2010 to July 1, 2011	0.7%	0.9%
Population, 2010	4,339,367	308,745,538
Persons under 5 years, percent, 2011	6.4%	6.5%
Persons under 18 years, percent, 2011	23.4%	23.7%
Persons 65 years and over, percent, 2011	13.5%	13.3%
Female persons, percent, 2011	50.8%	50.8%
White persons, percent, 2011 (a)	88.9%	78.1%
Black persons, percent, 2011 (a)	8.0%	13.1%
American Indian and Alaska Native persons, percent, 2011 (a)	0.3%	1.2%
Asian persons, percent, 2011 (a)	1.2%	5.0%
Native Hawaiian and Other Pacific Islander persons, percent, 2011 (a)	0.1%	0.2%
Persons reporting two or more races, percent, 2011	1.6%	2.3%
Persons of Hispanic or Latino Origin, percent, 2011 (b)	3.2%	16.7%
White persons not Hispanic, percent, 2011	86.1%	63.4%
Living in same house 1 year & over, 2006-2010	84.0%	84.2%
Foreign born persons, percent, 2006-2010	3.1%	12.7%
Language other than English spoken at home, pct age 5+, 2006-2010	4.6%	20.1%
High school graduates, percent of persons age 25+, 2006-2010	81.0%	85.0%
Bachelor's degree or higher, pct of persons age 25+, 2006-2010	20.3%	27.9%
Veterans, 2006-2010	331,344	22,652,496
Mean travel time to work (minutes), workers age 16+, 2006-2010	22.5	25.2
Housing units, 2010	1,927,164	131,704,730
Homeownership rate, 2006-2010	69.9%	66.6%
Housing units in multi-unit structures, percent, 2006-2010	17.7%	25.9%
Median value of owner-occupied housing units, 2006-2010	$116,800	$188,400
Households, 2006-2010	1,676,708	114,235,996
Persons per household, 2006-2010	2.48	2.59
Per capita money income in past 12 months (2010 dollars) 2006-2010	$22,515	$27,334
Median household income 2006-2010	$41,576	$51,914
Persons below poverty level, percent, 2006-2010	17.7%	13.8%

Business QuickFacts	Kentucky	USA
Private nonfarm establishments, 2009	90,661[1]	7,433,465
Private nonfarm employment, 2009	1,486,545[1]	114,509,626
Private nonfarm employment, percent change 2000-2009	-1.8%[1]	0.4%
Nonemployer establishments, 2009	265,757	21,090,761
Total number of firms, 2007	337,600	27,092,908
Black-owned firms, percent, 2007	3.1%	7.1%
American Indian- and Alaska Native-owned firms, percent, 2007	0.3%	0.9%
Asian-owned firms, percent, 2007	1.6%	5.7%
Native Hawaiian and Other Pacific Islander-owned firms, percent, 2007	0.0%	0.1%
Hispanic-owned firms, percent, 2007	1.1%	8.3%
Women-owned firms, percent, 2007	25.6%	28.8%

Manufacturers shipments, 2007 ($1000)	119,105,421	5,338,306,501
Merchant wholesaler sales, 2007 ($1000)	74,680,759	4,174,286,516
Retail sales, 2007 ($1000)	50,405,925	3,917,663,456
Retail sales per capita, 2007	$11,843	$12,990
Accommodation and food services sales, 2007 ($1000)	6,300,866	613,795,732
Building permits, 2011	7,782	624,061
Federal spending, 2010	57,270,528[1]	3,251,308,509[2]

Geography QuickFacts	Kentucky	USA
Land area in square miles, 2010	39,486.34	3,531,905.43
Persons per square mile, 2010	109.9	87.4
FIPS Code	21	

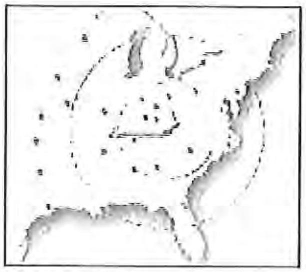
1: Includes data not distributed by county.
2: Includes data not distributed by state.

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

D: Suppressed to avoid disclosure of confidential information
F: Fewer than 100 firms
FN: Footnote on this item for this area in place of data
NA: Not available
S: Suppressed; does not meet publication standards
X: Not applicable
Z: Value greater than zero but less than half unit of measure shown

Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, American Community Survey, Census of Population and Housing, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits, Consolidated Federal Funds Report
Last Revised: Thursday, 07-Jun-2012 13:28:54 EDT

Middlesboro
Bell County
QuickFacts



Business Cost

	Kentucky Index, 2009 (U.S. = 100)
Labor Cost	94
Energy Cost	74
Overall Business Cost	89

Kentucky has the 13th lowest overall business cost in the nation.

	Gross Domestic Product Per Wage, 2010
Kentucky	$2.26
U.S.	$2.27

	Industrial Electric Cost Per KWH, 2010
Kentucky	$0.0505
U.S.	$0.0677

Kentucky has the 4th lowest cost for industrial electrical power amongst the 50 states.

Bell County Statistical Summary

	Population 2010
Bell County	28,691
Labor Market Area	238,986

	Bell County
Per Capita Income 2010	$25,531
Median Household Income 2009	$24,501
Median Home Price 2010	$54,000

	Total Available Labor 2010
Bell County	2,919
Labor Market Area	21,508

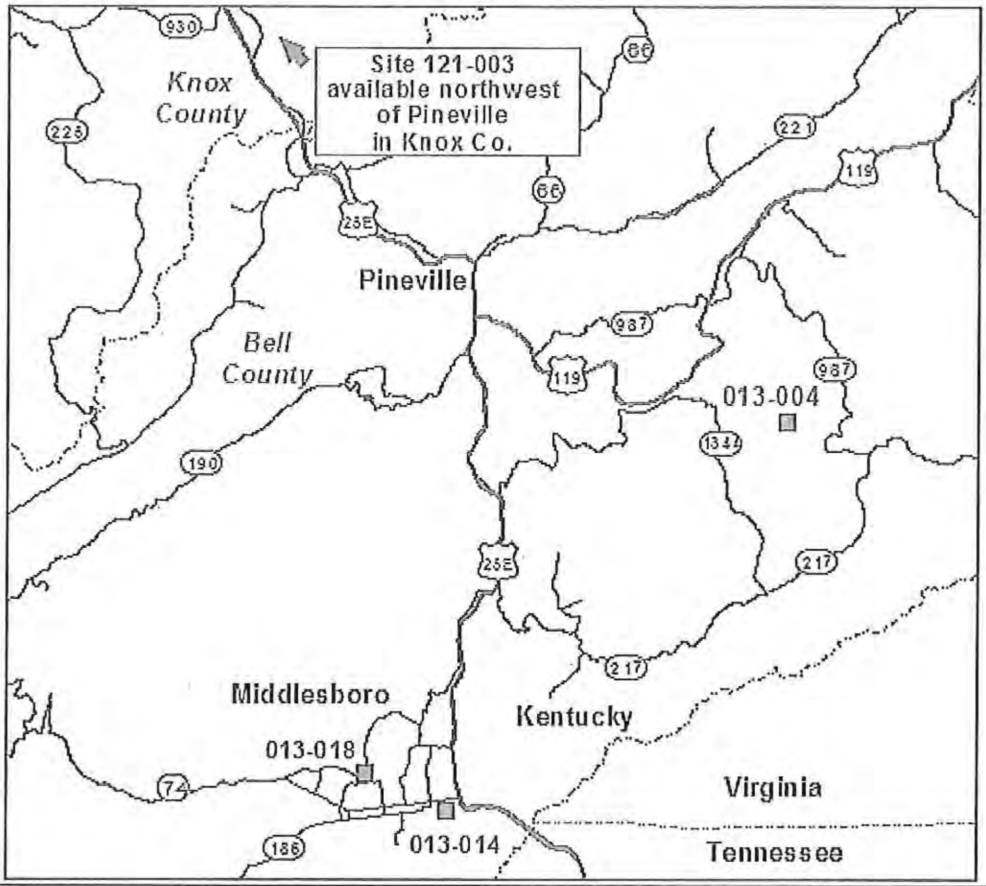
	Unemployment Rate 2011
Bell County	13.2%
Labor Market Area	11.3%
U.S.	8.9%

	Average Weekly Wage 2010
Bell County	$604
Labor Market Area	$627
U.S.	$899

Middlesboro
Bell County

Available Industrial Sites

Move your mouse over a site point for a summary; click for details



						Min. Distance To	
	Site ID	Site Name	Total Ac.	Largest Possible Tract	Rail	Interstate/ Parkway	Airport
	013-004	Pine Mountain Regional Business Park	663.6	413.6	No	36	90
	121-003	Southeast Kentucky Regional Business Park	479.9	193.6	No	3.3	98
	013-014	Whitimer Industrial Park	22.4	22.4	Possible	46	75
	013-018	Bell County Technology and Training Park	13	13	No	46	46

Middlesboro
Bell County
Demographics

Total Population

	2006	2007	2008	2009	2010
Labor Market Area	244,107	244,638	245,440	245,742	238,986
Bell County	29,120	28,995	29,075	28,938	28,691
Middlesboro	10,116	9,917	9,929	9,835	N/A
Pineville	2,010	1,980	1,990	2,047	N/A

Source: U.S. Department of Commerce, Bureau of the Census, Annual Estimates.

Population by Selected Age Groups, 2009

	Bell County		Labor Market Area	
	Number	Percent	Number	Percent
Under 16	5,789	20.0	49,257	20.0
16-24	3,297	11.4	28,125	11.4
25-44	7,757	26.8	66,209	26.9
45-64	7,810	27.0	67,009	27.3
65-84	3,810	13.2	31,124	12.7
85 and older	509	1.8	4,125	1.7
Median Age	N/A		N/A	

Source: U.S. Department of Commerce, Bureau of the Census.

Population by Race and Hispanic Origin, 2009

	Bell County		Labor Market Area	
	Number	Percent	Number	Percent
White	27,687	95.6	236,748	96.3
Black	749	2.6	5,405	2.2
Am. Indian & Alaska Native	81	0.3	667	0.3
Asian	141	0.5	771	0.3
Native Hawaiian & other Pacific Islander	27	0.1	66	0.0
Other/Multirace	287	1.0	2,192	0.9
Hispanic Origin	283	1.0	2,572	1.0

Note: Hispanic is not a race category. A person can be white, black, etc. and be of hispanic origin.
Source: U.S. Department of Commerce, Bureau of the Census.

Population Projections

	2015	2020	2025	2030
Bell County	28,671	28,078	27,384	26,669

Source: Kentucky State Data Center, University of Louisville.

Personal Income

	2005	2010	Pct. Change
Bell County	$20,027	$25,531	27.5 %
Kentucky	$28,486	$32,316	13.4 %
U.S.	$35,452	$39,937	12.7 %
Labor Market Area Range	$17,914- $23,287	$23,368- $29,065	

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Households

	2005-2009		2009
	Number of Households	Persons Per Household	Median Household Income
Bell County	11,222	2.59	$24,501

Source: U.S. Department of Commerce, Bureau of the Census. (Median Household Income)
Bureau of the Census, American Community Survey 5-year estimate (Number of Households, Persons Per Household).

Middlesboro
Bell County

Kentucky Unbridled Spirit
Cabinet for Economic Development

Utilities Providing Service In Bell County

Electric

East Kentucky Power Cooperative - 859-744-4812
Cumberland Valley Electric Inc - 606-528-2677
Kentucky Utilities (a PPL company) - 800-500-4904

Natural Gas

Delta Natural Gas Company - 859-744-6171

Sewer

Treatment Information (gallons per day)	Capacity	Avg. Flow	Excess
Middlesboro Sewerage Commission - 606-248-7625			
Middlesboro STP	3,600,000	3,000,000	600,000
Pineville Utilities Commission - 606-337-6612			
Pineville STP	724,000	730,000	-6,000

Treatment information provided by Division of Water, 502-564-3410

Water

System Information (gallons per day)	Capacity	Avg. Use	Excess
Pineville Water System - 606-337-6611	2,400,000	2,800,000	-400,000
Water Service Corp. of Kentucky - 606-248-2306	3,000,000	1,399,849	1,600,151

System information provided by Division of Water, 502-564-3410
NOTE: N/A indicates that the utility purchases its water supply from another system or that the data is not available

Middlesboro
Bell County

Business & Industry

Summary of Recent Locations and Expansions, 2010-Present

		Reported	
	Companies	Jobs	Investment
Manufacturing Location	0	0	$0
Manufacturing Expansion	4	2	$580,000
Supportive/Service Location	0	0	$0
Supportive/Service Expansion	1	N/A	$300,000

Click here for detailed location and expansion information.
Note: Totals include announced locations and expansions.
Source: Kentucky Cabinet for Economic Development (7/18/2012).

Employment by Major Industry by Place of Work, 2010

	Bell County		Labor Market Area	
	Employment	Percent	Employment	Percent
All Industries	8,935	100.0	61,001	100.0
Agriculture, Forestry, Fishing and Hunting	14	0.2	N/A	N/A
Mining	854	9.6	N/A	N/A
Construction	137	1.5	N/A	N/A
Manufacturing	895	10.0	N/A	N/A
Trade, Transportation, and Utilities	1,912	21.4	10,728	17.6
Information	67	0.7	N/A	N/A
Financial Activities	329	3.7	N/A	N/A
Services	2,633	29.5	10,475	17.2
Public Administration	299	3.3	3,444	5.6
Other	0	0.0	N/A	N/A

Source: U.S. Department of Labor, Bureau of Labor Statistics.

Major Business & Industry (Manufacturing & Supportive Service Firms Only)

Firm	Product(s)/Service(s)	Emp.	Year Established
Middlesboro			
A-D Technologies	Gas pipe and fiber optic cable	100	1971
B & C Machine Shop Inc	Machine shop, general machining, welding	11	1988
Bell Concrete Industries Inc	Precast concrete & dry cement	18	1966
Blue Diamond Industries LLC	Innerduct pipe. High density polyethylene pipe used underground to store and protect fiber optic and power cable.	65	2004
CBJ Plating & Machine	Industrial chrome plating, retail hydraulic components & seals, full repair services for hydraulic cylinders, pumps, motors, valves and other hydraulic components.	21	1985
Concrete Products	Ready-mixed concrete	5	1991

H T Hackney	Wholesale/distribution	28	1986
Hinkle Contracting Company LLC	Crushed stone, limestone & asphalt	15	1990
Ideal Print Shop	Commercial offset printing, plastic & saddle stitch binding, textile & flat surface screen printing, novelty hems/embroidery, process color work, and graphic design	8	1980
J R Hoe & Sons Inc	Iron castings, gray and ductile; pattern tooling services; CNC machined castings; prototypes; metal fabrications-steel, stainless and aluminum; AISC structural and miscellaneous; autoCAD design and engineering.	45	1909
Kirby Steel Products Inc	Metal truck equipment.	3	1965
Logan Corp	Metals service center: steel cutting; custom metal fabricating, machine shop; drill steel stems, CNC & precision machining	25	1981
Middlesboro Coca-Cola Bottling	Distribution and bottling of carbonated soft drinks and water.	125	1904
Middlesboro Daily News	Newspaper publishing	20	1910
Mountain Tarp	Tarps and tarping systems	100	1987
Smithfield Middlesboro	Smoked ham & sausage processing	575	1979
Solid Steel Solutions	After-market parts for heavy equipment, welding & manufacturing	30	2008
Three States Printing Co	Offset printing & computer typesetting	2	1948
Yeary Auto Electric	Automobile starters, alternators & drive shafts	4	1977

Source: Kentucky Cabinet for Economic Development (7/18/2012).

Middlesboro
Bell County

Kentucky Cabinet for Economic Development

REGULATIONS AND PERMITS

Other local regulations/permits may apply. Please call the local economic development contact for details

Kentucky Public Protection Cabinet
Department of Housing, Buildings and Construction
Permitting Information: http://www.dhbc.ky.gov/

Typical Building Permits	Responsible Division	# of plans	Time Frame (Days)
Site Plan	Building Codes Enforcement	1	7-30
Building/Life Safety	Building Codes Enforcement	1	7-30
Plumbing	Plumbing	3	7
Fire Protection	Fire Prevention	1	7-30
Fire Alarm and Monitoring	Fire Prevention	1	7-30
Fuel Tanks	Fire Prevention Hazardous Materials Section	1	7

Kentucky Department for Environmental Protection Permits, Fees, Regulatory Times, and Contacts Permitting Program Information: http://www.dep.ky.gov							
Permit Type	**Renewal Period**	**Fee**	**Fee Description**	**Regulatory Time**	**Contact Person**	**Contact Division**	**Telephone**
Air Quality	5 years	$150	Flat fee for 25 tons or less	120 days-Minor	Rick Shewekah	Air Quality	502-564-3999
		$30-$35	Per ton over 25 tons	210 days-Major	Rick Shewekah	Air Quality	502-564-3999
Kentucky Pollutant Discharge Elimination System	1 yr - Construction	$900	Minor Construction	180 days	Jory Becker	Water	502-564-3410
Kentucky Pollutant Discharge Elimination System	5 yr - Operation	$2,100	Minor Operation	180 days	Jory Becker	Water	502-564-3410
Kentucky Pollutant Discharge Elimination System	1 yr - Construction	$1,800	Major Construction	180 days	Jory Becker	Water	502-564-3410
Kentucky Pollutant Discharge Elimination System	5 yr - Operation	$3,200	Major Operation	180 days	Jory Becker	Water	502-564-3410
Water Withdrawal	No Renewal	No Fee		90 days	Bill Caldwell	Water	502-564-3410
Floodplain Reconstruction	No Renewal	No Fee		20 working days	Ali Daneshmand	Water	502-564-3410
Drinking Water	No Renewal	$50-$800		45 days	Mike Riley	Water	502-564-3410
401 Water Quality Certification Includes Wetlands	1 yr	No Fee		None	Jenni Garland	Water	502-564-3410
Ground Water Plan	Revise every 3 yrs	No Fee		Complete prior to operation	Peter Goodmann	Water	502-564-3410
Storm Water	New construction until construction complete Operation - 5 yrs	No Fee		File 48 hrs. prior to construction	Ronnie Thompson	Water	502-564-3410
Wastewater	Construction - 1 yr	$450 - $1,800		45 days	Hossein Mehdipour	Water	502-564-3410
Sewer Line Extension	Construction - 1 yr	$200 - $800		45 days	Harold Sparks	Water	502-564-3410
Hazardous Waste Storage	10 yrs	$3,000 - $19,400	Tanks & Containers	180 day storage	April Webb	Waste Management	502-564-6716
Hazardouse Waste Treatment/Disposal	10 yrs	$3,000 - $19,400	Dependent on application type	180 - 365 days	April Webb	Waste Management	502-564-6716
Residual Landfill	10 yrs	$5,500		180 working days	George Gilbert	Waste Management	502-564-6716

Middlesboro
Bell County
Quality of Life

General Kentucky Quality of Life Information

Median Home Price (2010): Bell County - $54,000 for 32 homes

Source: KY Department of Revenue. Data based on sales for last six months of year indicated.

Climate

Temperature	
Normal (30-year record)	58.4 degrees
Average Annual, 2007	61.2 degrees
Record Highest, September 1954 (66-year record)	103 degrees
Record Lowest, January 1985 (66-year record)	-24 degrees
Normal Heating Degree Days (30-year record)	3,690
Normal Cooling Degree Days (30-year record)	1,450
Precipitation	
Normal (30-year record)	48.22inches
Mean Annual Snowfall (30-year record)	9.9 inches
Total Precipitation, 2007	33.89 inches
Mean Number of Days Precipitation (0.01 inch or more) (30-year record)	127.6
Mean Number of Days Thunderstorms (60-year record)	48.1
Prevailing Winds	WestSouthwest
Relative Humidity (30-year record)	
1 a.m.	82 percent
7 a.m.	87 percent
1 p.m.	59 percent
7 p.m.	64 percent

Note: Heating degree day totals are the sums of positive departures of average daily temperature from 65 degrees F. Cooling degree day totals are the sum of negative departures of average daily temperature from 65 degrees F.
Source: U.S. Department of Commerce, National Climatic Data Center, Local Climatological Data, 2007.
Station of record: McGhee Tyson Airport, Knoxville, TN.

Public School District Enrollments and Expenditures, 2010-2011

	Total Enrollment	Expenditures Per Pupil	Pupil To Teacher Ratio
Bell County Schools	2,989	10,593	14.8
Middlesboro Independent Schools	1,561	11,326	14.2
Pineville Independent Schools	551	10,509	13.8

Source: Kentucky Department of Education, Office of Curriculum, Assessment and Accountability.

Certified Non-Public School Enrollments, 2008-2009

Number of Schools	Total Enrollment
1	64

Source: Kentucky Non-Public School Commission.
Note: Recognized as certified by the Kentucky Department of Education.

Bell County

High Projections Series

All Persons

	Census 1990	Estimate 1995	Census 2000	Projection 2005	Projection 2010	Projection 2015	Projection 2020	Projection 2025	Projection 2030
Total	31,506	30,919	30,060	29,698	29,216	28,615	27,809	26,830	25,649
00-04	2,127	1,983	1,826	1,704	1,613	1,513	1,403	1,312	1,234
05-09	2,301	2,147	1,979	1,838	1,723	1,632	1,531	1,419	1,327
10-14	2,496	2,350	2,188	2,021	1,886	1,768	1,675	1,572	1,457
15-19	2,700	2,440	2,169	2,103	1,942	1,812	1,699	1,609	1,510
20-24	2,293	2,089	1,875	1,700	1,649	1,523	1,418	1,332	1,261
25-29	2,435	2,227	2,007	1,831	1,659	1,610	1,486	1,386	1,301
30-34	2,473	2,267	2,048	1,878	1,715	1,556	1,511	1,394	1,298
35-39	2,320	2,345	2,346	2,049	1,882	1,717	1,557	1,511	1,395
40-44	2,207	2,223	2,217	2,263	1,975	1,815	1,656	1,501	1,457
45-49	1,765	1,945	2,097	2,054	2,096	1,830	1,681	1,535	1,390
50-54	1,500	1,813	2,094	2,237	2,189	2,233	1,954	1,792	1,636
55-59	1,367	1,533	1,677	2,064	2,206	2,157	2,201	1,928	1,766
60-64	1,365	1,394	1,408	1,677	2,064	2,207	2,158	2,200	1,930
65-69	1,385	1,289	1,185	1,302	1,550	1,908	2,043	1,995	2,034
70-74	1,041	1,039	1,028	961	1,057	1,258	1,547	1,658	1,618
75-79	858	892	916	921	858	944	1,123	1,381	1,484
80-84	493	511	523	590	592	550	605	719	884
85+	380	429	477	505	560	582	561	586	667
Change		-587	-859	-362	-482	-601	-806	-979	-1,181
% Change		-1.9	-2.8	-1.2	-1.6	-2.1	-2.8	-3.5	-4.4
Births		2,187	1,980	1,852	1,745	1,637	1,517	1,418	1,335
Deaths		1,779	1,770	1,608	1,705	1,813	1,915	2,026	2,147
Net Migration		-995	-1,069	-605	-520	-427	-410	-371	-369

Females

	Census 1990	Estimate 1995	Census 2000	Projection 2005	Projection 2010	Projection 2015	Projection 2020	Projection 2025	Projection 2030
Total	16,343	16,088	15,690	15,560	15,356	15,095	14,752	14,313	13,772
00-04	1,053	965	871	840	791	742	688	643	605
05-09	1,117	1,050	975	882	850	800	751	696	651
10-14	1,202	1,153	1,096	1,001	905	872	822	771	715
15-19	1,294	1,184	1,067	1,058	966	873	842	793	744
20-24	1,180	1,073	960	886	878	802	725	699	658
25-29	1,265	1,133	996	918	847	840	767	694	669
30-34	1,231	1,175	1,110	964	889	821	814	743	672
35-39	1,186	1,185	1,173	1,100	956	881	813	806	736
40-44	1,131	1,124	1,107	1,115	1,046	909	838	773	767
45-49	873	988	1,088	1,034	1,042	977	849	783	722
50-54	774	931	1,072	1,188	1,129	1,137	1,067	927	855
55-59	722	805	876	1,072	1,188	1,129	1,138	1,067	927
60-64	773	769	758	895	1,096	1,214	1,154	1,162	1,090
65-69	793	723	650	717	847	1,037	1,149	1,092	1,100
70-74	636	627	612	546	603	712	871	965	917
75-79	538	565	586	575	513	567	669	819	907
80-84	314	328	338	400	393	351	387	457	560
85+	261	310	355	369	417	431	408	423	477
Change		-255	-398	-130	-204	-261	-343	-439	-541
% Change		-1.6	-2.5	-0.8	-1.3	-1.7	-2.3	-3.0	-3.8
Births		1,064	944	907	855	802	743	695	654
Deaths		862	878	826	871	922	963	1,010	1,079
Net Migration		-457	-464	-210	-189	-140	-125	-122	-117

Males

	Census 1990	Estimate 1995	Census 2000	Projection 2005	Projection 2010	Projection 2015	Projection 2020	Projection 2025	Projection 2030
Total	15,163	14,831	14,370	14,138	13,860	13,520	13,057	12,517	11,877
00-04	1,074	1,018	955	864	822	771	715	669	629
05-09	1,184	1,097	1,004	956	873	832	780	723	676
10-14	1,294	1,197	1,092	1,020	981	896	853	801	742
15-19	1,406	1,257	1,102	1,045	976	939	857	816	766
20-24	1,113	1,017	915	814	771	721	693	633	603
25-29	1,170	1,094	1,011	913	812	770	719	692	632
30-34	1,242	1,092	938	914	826	735	697	651	626
35-39	1,134	1,160	1,173	949	926	836	744	705	659
40-44	1,076	1,099	1,110	1,148	929	906	818	728	690
45-49	892	957	1,009	1,020	1,054	853	832	752	668
50-54	726	882	1,022	1,049	1,060	1,096	887	865	781
55-59	645	728	801	992	1,018	1,028	1,063	861	839
60-64	592	625	650	782	968	993	1,004	1,038	840
65-69	592	566	535	585	703	871	894	903	934
70-74	405	413	416	415	454	546	676	693	701
75-79	320	327	330	346	345	377	454	562	577
80-84	179	183	185	190	199	199	218	262	324
85+	119	119	122	136	143	151	153	163	190
Change		-332	-461	-232	-278	-340	-463	-540	-640
% Change		-2.2	-3.1	-1.6	-2.0	-2.5	-3.4	-4.1	-5.1
Births		1,123	1,036	945	890	835	774	723	681
Deaths		917	892	782	834	891	952	1,016	1,068
Net Migration		-538	-605	-395	-331	-287	-285	-249	-252

Projections of the Total Population of States: 1995 to 2025

(Numbers in thousands. Resident population. For more detailed information, see Population Paper Listing #47, "Population Projections for States, by Age, Sex, Race, and Hispanic Origin: 1995 to 2025.")

SERIES A	July 1, 1995	July 1, 2000	July 1, 2005	July 1, 2015	July 1, 2025
Alabama.............	4,253	4,451	4,631	4,956	5,224
Alaska..............	604	653	700	791	885
Arizona.............	4,218	4,798	5,230	5,808	6,412
Arkansas............	2,484	2,631	2,750	2,922	3,055
California..........	31,589	32,521	34,441	41,373	49,285
Colorado............	3,747	4,168	4,468	4,833	5,188
Connecticut.........	3,275	3,284	3,317	3,506	3,739
Delaware............	717	768	800	832	861
District of Columbia	554	523	529	594	655
Florida.............	14,166	15,233	16,279	18,497	20,710
Georgia.............	7,201	7,875	8,413	9,200	9,869
Hawaii..............	1,187	1,257	1,342	1,553	1,812
Idaho...............	1,163	1,347	1,480	1,622	1,739
Illinois............	11,830	12,051	12,266	12,808	13,440
Indiana.............	5,803	6,045	6,215	6,404	6,546
Iowa................	2,842	2,900	2,941	2,994	3,040
Kansas..............	2,565	2,668	2,761	2,939	3,108
Kentucky............	3,860	3,995	4,098	4,231	4,314
Louisiana...........	4,342	4,425	4,535	4,840	5,133
Maine...............	1,241	1,259	1,285	1,362	1,423
Maryland............	5,042	5,275	5,467	5,862	6,274
Massachusetts.......	6,074	6,199	6,310	6,574	6,902
Michigan............	9,549	9,679	9,763	9,917	10,078
Minnesota...........	4,610	4,830	5,005	5,283	5,510
Mississippi.........	2,697	2,816	2,908	3,035	3,142
Missouri............	5,324	5,540	5,718	6,005	6,250
Montana.............	870	950	1,006	1,069	1,121
Nebraska............	1,637	1,705	1,761	1,850	1,930
Nevada..............	1,530	1,871	2,070	2,179	2,312
New Hampshire.......	1,148	1,224	1,281	1,372	1,439
New Jersey..........	7,945	8,178	8,392	8,924	9,558
New Mexico..........	1,685	1,860	2,016	2,300	2,612
New York............	18,136	18,146	18,250	18,916	19,830
North Carolina......	7,195	7,777	8,227	8,840	9,349
North Dakota........	641	662	677	704	729
Ohio................	11,151	11,319	11,428	11,588	11,744
Oklahoma............	3,278	3,373	3,491	3,789	4,057
Oregon..............	3,141	3,397	3,613	3,992	4,349
Pennsylvania........	12,072	12,202	12,281	12,449	12,683
Rhode Island........	990	998	1,012	1,070	1,141
South Carolina......	3,673	3,858	4,033	4,369	4,645
South Dakota........	729	777	810	840	866
Tennessee...........	5,256	5,657	5,966	6,365	6,665
Texas...............	18,724	20,119	21,487	24,280	27,183
Utah................	1,951	2,207	2,411	2,670	2,883
Vermont.............	585	617	638	662	678
Virginia............	6,618	6,997	7,324	7,921	8,466
Washington..........	5,431	5,858	6,258	7,058	7,808
West Virginia.......	1,828	1,841	1,849	1,851	1,845
Wisconsin...........	5,123	5,326	5,479	5,693	5,867
Wyoming.............	480	525	568	641	694

Projections of the Total Population of States: 1995 to 2025

(Numbers in thousands. Resident population. For more detailed information, see Population Paper Listing #47, "Population Projections for States, by Age, Sex, Race, and Hispanic Origin: 1995 to 2025.")

SERIES B	July 1, 1995	July 1, 2000	July 1, 2005	July 1, 2015	July 1, 2025
Alabama.............	4,253	4,436	4,617	4,986	5,319
Alaska..............	604	632	659	728	825
Arizona.............	4,218	4,838	5,432	6,620	7,729
Arkansas............	2,484	2,623	2,757	3,008	3,184
California..........	31,589	32,423	33,511	36,838	41,480
Colorado............	3,747	4,154	4,510	5,152	5,743
Connecticut.........	3,275	3,286	3,291	3,332	3,428
Delaware............	717	758	793	851	899
District of Columbia	554	530	542	611	702
Florida.............	14,166	15,250	16,273	18,318	20,066
Georgia.............	7,201	7,893	8,540	9,785	10,962
Hawaii..............	1,187	1,238	1,297	1,447	1,634
Idaho...............	1,163	1,332	1,489	1,775	2,008
Illinois............	11,830	12,069	12,314	12,945	13,717
Indiana.............	5,803	6,060	6,301	6,758	7,158
Iowa................	2,842	2,891	2,939	3,047	3,133
Kansas..............	2,565	2,675	2,788	3,034	3,273
Kentucky............	3,860	3,990	4,109	4,322	4,480
Louisiana...........	4,342	4,445	4,558	4,828	5,111
Maine...............	1,241	1,250	1,259	1,276	1,282
Maryland............	5,042	5,261	5,426	5,736	6,072
Massachusetts.......	6,074	6,224	6,361	6,653	7,001
Michigan............	9,549	9,711	9,835	10,115	10,423
Minnesota...........	4,610	4,822	5,014	5,414	5,778
Mississippi.........	2,697	2,826	2,949	3,195	3,413
Missouri............	5,324	5,547	5,750	6,153	6,492
Montana.............	870	937	998	1,108	1,187
Nebraska............	1,637	1,700	1,766	1,912	2,050
Nevada..............	1,530	1,863	2,130	2,547	2,854
New Hampshire.......	1,148	1,217	1,267	1,344	1,402
New Jersey..........	7,945	8,185	8,387	8,832	9,369
New Mexico..........	1,685	1,858	2,035	2,425	2,850
New York............	18,136	18,174	18,227	18,616	19,396
North Carolina......	7,195	7,789	8,312	9,206	9,916
North Dakota........	641	657	677	727	778
Ohio................	11,151	11,352	11,534	11,937	12,343
Oklahoma............	3,278	3,370	3,471	3,684	3,871
Oregon..............	3,141	3,397	3,625	4,036	4,361
Pennsylvania........	12,072	12,220	12,329	12,580	12,854
Rhode Island........	990	989	986	989	1,007
South Carolina......	3,673	3,852	4,015	4,318	4,574
South Dakota........	729	770	811	893	962
Tennessee...........	5,256	5,668	6,039	6,707	7,249
Texas...............	18,724	20,178	21,635	24,775	28,170
Utah................	1,951	2,216	2,477	2,995	3,487
Vermont.............	585	607	623	646	661
Virginia............	6,618	6,965	7,234	7,708	8,165
Washington..........	5,431	5,829	6,184	6,857	7,480
West Virginia.......	1,828	1,833	1,842	1,861	1,864
Wisconsin...........	5,123	5,324	5,502	5,864	6,185
Wyoming.............	480	519	559	636	702

APPENDIX E

PRELIMINARY DESIGN CALCULATIONS

AND

EQUIPMENT INFORMATION

SURGE BASIN

Surge Basin Sizing Calculations:

a) Size basin to handle diurnal flow.

Method 1: Mass Balance

Flow into WWTP:
Main PS, OTB, Newtown, Future Ball Field, and McDonalds pump stations.

Q_m = 2,100 GPM + 500 GPM + 1,000 GPM = 3,600 GPM

Ex grit chamber has a peak flow of 2,776 GPM (4 MGD).

Anything over grit chamber capacity will need to go over to the surge basin, therefore overflow is:

3,600 GPM – 2,776 GPM = 824 GPM

For design purposes, use 1,000 GPM.

Case 1 – 12 Hr. Diurnal Storage:

Provide 12 Hours of surge flow storage.

∴ 12 Hours x 1,000 GPM x 60 Min/Hr = 720,000 Gallons

Dimensions = 200' Long x 35' Wide x 14' SWD

Volume = 733,040 Gallons

Case 2 – 48 Hr. Storage (Owner Request):

Provide 48 Hours of surge flow storage.

∴ 48 Hours x 1,000 GPM x 60 Min/Hr = 2,880,000 Gallons

Method 2:

Where Q_A = 1.2 MGD
Q_p = 4.5 MGD

$$V = \frac{Q_p - Q_A}{p} = \frac{4.5\text{ MGD} - 1.2\text{ MGD}}{3.14} = 1.05\text{ Million Gallons}$$

Method 3:

$$V = \frac{Q_A (Q_p/Q_a - 1)^2}{(Q_p/Q_A)^2 - 1} = \frac{1.2\ (4.5/1.2 - 1)^2}{(4.5/1.2)^2 - 1}$$

$$= \frac{9.075}{13.0625} = 0.694 \text{ Million Gallons}$$

The average value of the three diurnal designs = $\frac{733{,}040 + 1{,}050{,}000 + 694{,}000}{3}$

= 825,000 Gallons

∴ Provide a surge basin with approximately 825,000 gallons.

Provide two (2) compartments with two (2) jet aerators in each compartment.

Note: For preparing cost estimates, the following surge basin volumes will be used:

i) Lagoon Alternative – 0.825 Million Gallons

ii) MBR Alternative – Membranes are best operated at 2.0 peak/avg flux ratio.
i.e. The overflow to surge basin will be:
3,600 GPM – (2 x 1.2 MGD x $\frac{694 \text{ GPM}}{\text{MGD}}$) = 1,934 GPM
For 12-Hr Storage:
12 Hrs x 60 Min x 1,934 GPM = 1,392,768 Gallons
Use 1.4 Million Gallons

iii) For Oxidation Ditch Alternative:
Use 2.9 Million (48-Hour Storage)

Often imitated...never duplicated

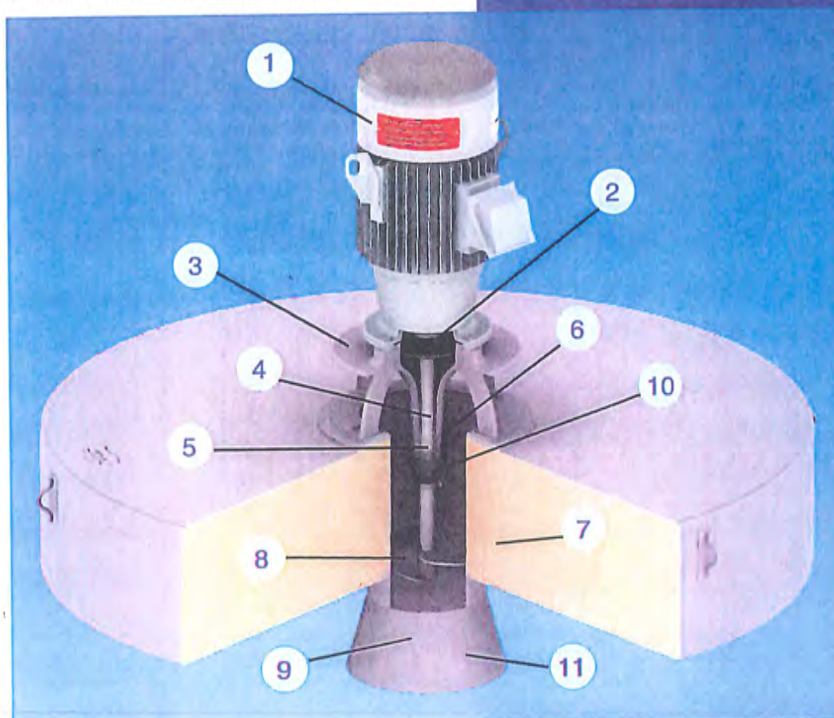
Surge Basin Jet aerator

Components

1. **Motors** are totally enclosed, fan cooled, and rated for severe duty. Motors are available in standard or high efficiency and vibration tested for optimum performance in the most stringent applications. Standard features include heavy-duty bearings and seals, class F insulation or better and a minimum 1.15 service factor.

2. **Labyrinth Seal Guard** prevents upward migration of water from contacting the lower end bell of the motor and working into motor bearing.

3. **The Diffusion Head** of an aerator must be able to support the weight of the motor, evenly distribute static and dynamic loads, and change the direction of the high velocity discharge flow, optimizing discharge pressure and spray pattern. The Aqua-Jet® aerator cast diffusion head is designed to withstand the constant stress created by the upflow spray of the aerator. Its strong flanged connection to the volute ensures that minimum stress is placed on the connections and that no vibration or fatigue results.



4. **One-Piece Shaft** of 17-4 PH (precipitation hardened) stainless steel eliminates the use of couplings which require constant lubrication with water or wastewater. The one-piece design eliminates the vibration and constant maintenance problems inherent in coupled-shaft designs, providing much greater strength than 304 or 316 stainless steel.

5. **Anti-Deflection Insert** provides support for the shaft should debris be ingested into the unit. Under normal operating conditions, the shaft runs free of support by the insert. The insert is in an optimum location allowing some flexing, yet protecting loads on bearings.

6. **The Volute** of an aerator must be able to withstand constant duty in corrosive, abrasive and high velocity propeller-induced flow. The volute of the Aqua-Jet® aerator is constructed of heavy wall stainless steel to resist this assault. The heavy construction will provide a long, trouble-free life.

7. **Float** is filled with a closed cell polyurethane foam that adds to the structural stability of the AquaJet® and prevents sinking if excessive damage to the float exterior should occur. Float exteriors are of 14 gauge stainless steel; with fiberglass available as an option on most sizes.

8. **Propeller** is a two blade design cast of 316 stainless steel. It features an 180^0 sweepback design for non-clog operation and greater operating efficiency.

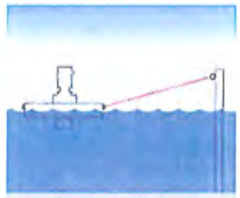
9. **Intake Cone** provides a smooth transition of flow with minimum headloss. Anti-vortex crosses are included as standard on all sizes of 20 HP and larger.

10. **Fluid Deflector** contains the thrust washer and protects the anti-deflection insert from the upward liquid flow.

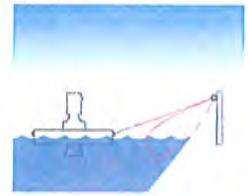
11. **Draft Tube/Anti-erosion Assembly** (optional). Draft tubes are volute extensions used to extend the intake of the aerator to a greater depth. Anti-erosion assemblies consist of a stainless steel plate attached to the bottom of the intake cone, via the anti-vortex cross. The assembly causes water to be drawn from the sides of the cone rather than from directly below it.

Mooring Arrangements

Post Mooring
Post Mooring is used in larger lagoons where distances prohibit mooring the Aqua-Jet® to the shore. A mooring post is installed into the lagoon floor and the mooring line is attached to an eyebolt in the post. For 3 or 4 point mooring.

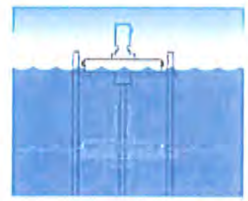


Maintenance Mooring
Maintenance Mooring enables the operator to pull the aerator to the shore, or opposite side of the basin, for maintenance without disconnecting the line. 1 or 2 mooring points are supplied with a disconnect device and a long length of cable.



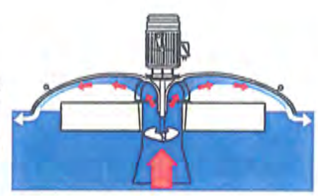
Pivotal Mooring
A Pivotal Mooring arm is used in applications with varying water levels not exceeding arm length (available up to 13 meters long). The arm fits at the base of the motor allowing the aerator to adjust to varying water levels.

Restrained Mooring
Restrained Mooring is used in applications with varying water levels. The Aqua-Jet® mooring frame fits around the mooring posts and allows the aerator to slide up and down the posts as the water level changes.

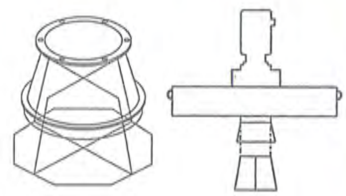


Accessories

Aqua-Jet II® Contained Flow Aerator
The Aqua-Jet II® Contained Flow Aerator is designed for applications which require continued operation of aeration equipment during cold weather months, but are limited because of an inadequate heat sink due to process selection or environmental conditions. This aerator has proven to operate efficiently in a variety of applications, even in sub-zero temperatures. The dome is essentially a spray control shield mounted to the diffusion head of the Aqua-Jet® aerator.



Anti-Erosion Assemblies
Anti-Erosion Assemblies consist of a stainless steel plate attached to the bottom of the Aqua-Jet® aerator intake cone via an anti-vortex cross. The assembly causes water to be drawn from the sides of the intake cone, rather than from directly below it; and prevents the floor erosion that can sometimes occur in shallow basins. Anti-Erosion Assemblies are available for all horsepower Aqua-Jet® aerators. Consult your Aqua-Aerobic representative, or the factory for dimensions.



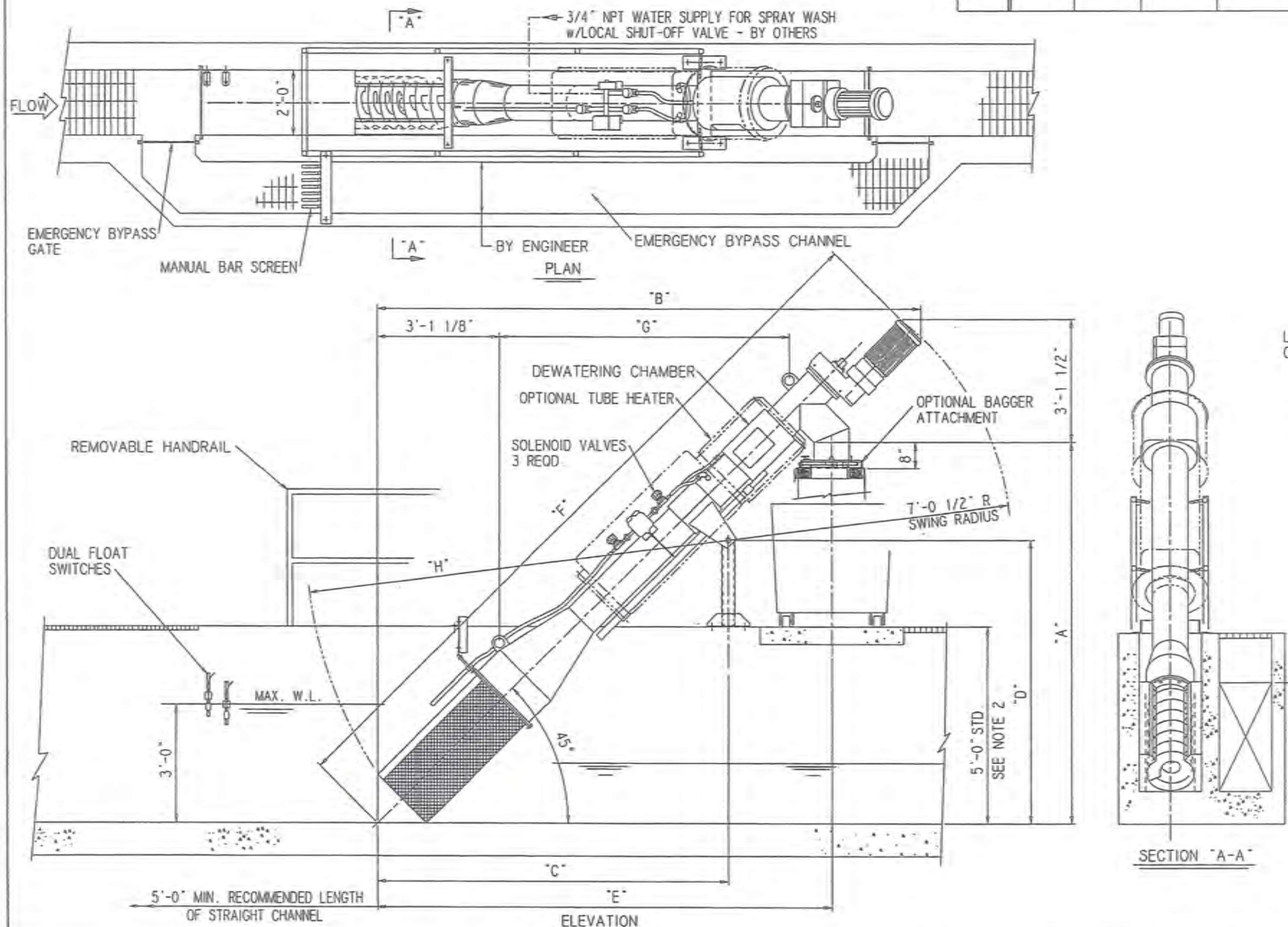
Draft Tubes
The Draft Tube accessory provides an extension of the intake cone and permits a deeper intake of water. Available in lengths of 3 and 6 feet.

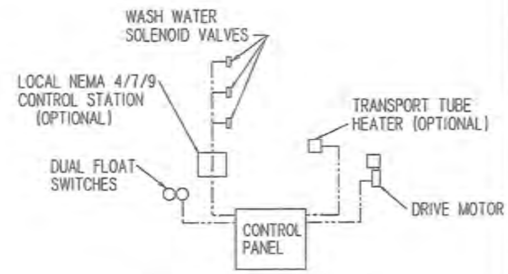
Arctic Pak
The Arctic Pak ring contains thermal resistance heaters which minimize the chance of icing on the exposed surfaces of the Aqua-Jet® aerator, such as the cast diffusion head. The Arctic Pak is complete with its own junction box (which mounts on the motor fan cover), automatic controls and control panel. Operation of the Arctic Pak is controlled by an ambient temperature thermostat. The unit is available in either 230 or 460 volts, and can be used on either floating or fix-mounted Aqua-Jet® aerators. Drawings and wiring diagrams are available on request. Contact your Aqua-Aerobic representative.

Low Trajectory Diffuser (L.T.D.) Assembly
The Low Trajectory Diffuser (L.T.D.) Assembly is a high density polyethylene ring that is attached to the top of the diffusion head, increasing the diameter of the diffuser. This arrangement lowers the spray of the Aqua-Jet® aerator reducing windblown spray and misting. Low trajectory diffusers are used in colder climates, and where a smaller, lower spray pattern is desired.

MECHANICAL SCREENS

24MS	PART No	A	B	C	D	E	F	G	H
STD	-110	9'-2 3/4"	13'-1 3/4"	8'-4 1/2"	6'-8 3/4"	11'-0 1/4"	17'-8 1/2"	6'-9 1/2"	10'-0 1/8"





CONTROL INTERCONNECTION DIAGRAM

ALL CONDUIT AND WIRE CONNECTIONS BETWEEN CONTROL PANEL AND SCREEN COMPONENTS BY OTHERS

EMERGENCY BYPASS GATE
TOP ELEV. 2" ABOVE MAX. W.L

NOTES:

1) CONTACT LAKESIDE FOR ANY ADDITIONAL REQUIREMENTS OR QUESTIONS.
2) KEEP TOP OF CENTER CHANNEL WALL AS LOW AS POSSIBLE TO ALLOW EASE OF CONSTRUCTION AND MAINTENANCE.
3) WATER SUPPLY LINES AND ELECTRICAL CONNECTIONS TO BE FLEXIBLE or QUICK DISCONNECT TYPE TO ALLOW UNIT TO PIVOT OUT OF CHANNEL.
4) BE SURE UPSTREAM PIPING IS NOT SURCHARGED AT MAX. W.L
5) FOR PROPER APPLICATION OF THIS PRODUCT REFER TO RMI-95, LAKESIDE SCREEN GENERAL DESIGN NOTES

REVISIONS	DATE	DR.	CHKD
W/FLOAT SWITCH-REVISED COARSE BAR RACK	11-27-07	GS	WK
REVISED TO CURRENT STANDARD	12-18-06	G.F.	

LAKESIDE EQUIPMENT CORPORATION

DR. SNYDER/GS DATE 11-02-99 RJS DWG. 1-18-99 SALES/ROT/WAITS FILE NO. 5102465

RAPTOR® 24" MICRO STRAINER

DWG. NO. D-58049-S REV. E

B. Screens other than semi-cylindrical screens, will not be considered for this project.

C. Design Summary

1. Number of Semi-Cylindrical Screens ....- ~~One (1)~~ Two (2) Units.
2. Average Flow per Screen, mgd.......................................-
3. Maximum Hydraulic Capacity per Screen, mgd.............- 3.35 (2325 gpm)
4. Maximum Upstream Liquid Level, inches ....- 36
5. Maximum Clean Water Headloss, inches.......................- 25
6. Nominal Screening Basket Diameter, inches..................- 21
7. Orifice Diameter, inches ....- 1/4
8. Orifice Centerline-to-Centerline Distance, inches..........- 5/16
9. Screening Channel Width, inches...................................- 24
10. Nominal Screw Conveyor Diameter, inches...................- 10
11. Minimum Screen Invert to Discharge Height, inches.....- 110
12. Speed Reducer Minimum Torque Rating, in.-lb.............- 15,700
13. Speed Reducer Minimum Thrust Rating, lb_f..................- 5,800
14. Drive Motor Size, hp ....- 2
15. Electrical Power Characteristics, VAC-Phase-Hertz......- 460/3/60
16. Motor and Solenoid Valve Electrical Classification.......- Non-Hazardous
17. Maximum Spray Wash System Flow Rate, gal/min.......- 20
18. Minimum Spray Wash System Pressure, psig ....- 60
19. Lower Wash System Number of Nozzles.......................- 6
20. Liquid Level Sensing System Type ....- Float switch
21. Electrical Enclosure Type..- NEMA 4X stainless steel

1.04 PRE-QUALIFICATION

A. All equipment manufacturers not listed in the specifications shall submit at least 15 days prior to the advertised date for receipt of bids a "Qualification Package" for the substitute or "or equal" equipment which the manufacturer proposes to furnish in lieu of products identified in the Contract Documents. The Bidder shall submit the Qualification Package under separate cover. Each Qualification Package shall be bound with protective cover, identify the specification section number and title, and the product manufacturer's name on a cover sheet. The manufacturer shall submit the Qualification Package in a sealed sturdy box or suitable container. This section outlines the procedures for proposal of substitute or "or equal" items by "Alternate" manufacturers.

B. The use of this pre-qualification requirement is intended to protect the OWNER and Bidders so that no one Bidder gains an unfair bid price advantage by quoting a lower price for a screen that does not comply with the minimum performance and salient features set for by Section 11331.

C. The "Qualification Package" for the substitute or "or equal" equipment item of products the manufacturer proposes to furnish shall include but not be limited to, the following information as defined in 1.04.D.

D. The Qualification Package submittal requirements for the equipment shall be as follows:

From: Chris Jones [Chris@jtguthrie.com]
Sent: Friday, April 02, 2010 6:23 AM
To: Marios S. Georgiou
Subject:
Attachments: D58049SE-24MS-110 w floats.pdf; D48476SD 40FS-104 floats.pdf; Raptor Fine Screen.pdf

The largest Lakeside Raptor Micro Strainer screen is a 24MS, which uses a 24 inch wide channel. With 1/4 inch openings, this unit can handle a peak raw wastewater flow of up to 3.3 mgd (2,300 gpm). A typical drawing is attached. Budget for a 24MS, outdoor duty, with NEMA 4X SS controls, dual float switches, service, and freight would be $78,000.

~~To handle the full 2,600 gpm (3.74 mgd), we would recommend a 40FS Fine Screen (brochure attached) with 1/4 inch openings. This requires a 42 inch wide channel. A drawing showing an outdoor installation is attached. Budget is $101,000.~~

Have a good weekend!

Chris Jones

J.T. GUTHRIE & SON, INC.
[P] 615.377.3952
[M] 615.478.8190

From: "Marios S. Georgiou" <msgeorgiou@Vaughnmelton.com>
Date: Thu, 1 Apr 2010 07:32:05 -0500
To: Chris Jones<Chris@jtguthrie.com>
Subject: Lakeside Micro Strainer

Chris:

Is there a micro strainer unit around 2600 gpm?
If not, What is the maximum capacity available?
send me some rough pricing if you have one in that area.
If not, send me something equivalent.

I am getting some preliminary stuff for a project in

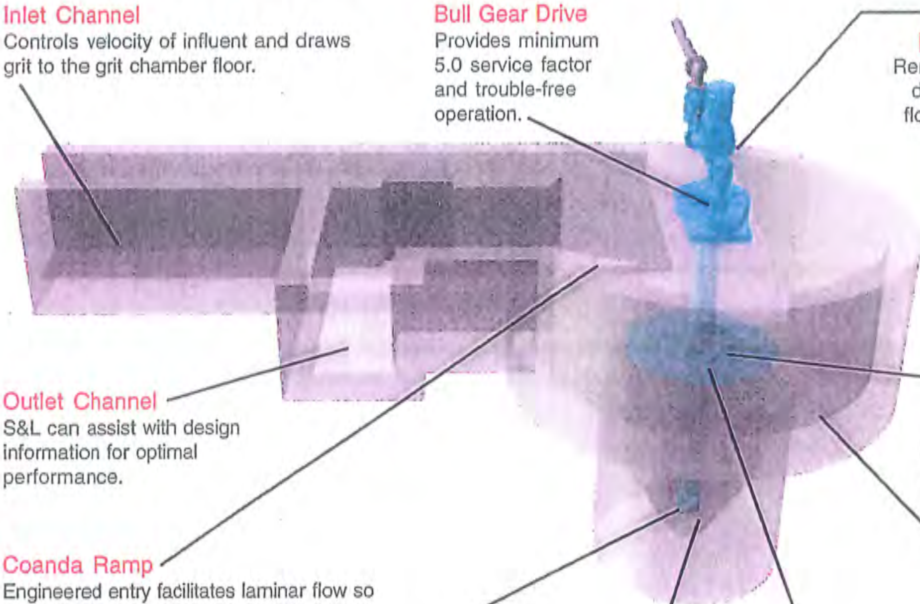
Marios S. Georgiou, PE
Vaughn & Melton Consulting Engineers
Park Terrace Center
1318-F Patton Avenue
Asheville, NC 28806
828-253-2796 PH
828-253-4864 FX
msgeorgiou@vaughnmelton.com

GRIT CHAMBER
(EXISTING)

"Existing"

PISTA® 270° Grit Chamber Features and Benefits

GRIT REMOVAL SYSTEM



Inlet Channel
Controls velocity of influent and draws grit to the grit chamber floor.

Bull Gear Drive
Provides minimum 5.0 service factor and trouble-free operation.

PISTA® Turbo Grit Pump
[Top-Mounted & Remote-Mounted Options]
Removes grit from storage hopper to washing dewatering. Available in vacuum-primed and flooded suction arrangements. Now available with **SonicStart™** prime sensing.

Outlet Channel
S&L can assist with design information for optimal performance.

Axial-Flow Propeller
Aids in directing organic-free grit into lower hopper by enhancing flow patterns. Rounded edges prevent solids build-up, thus ensuring high efficiency.

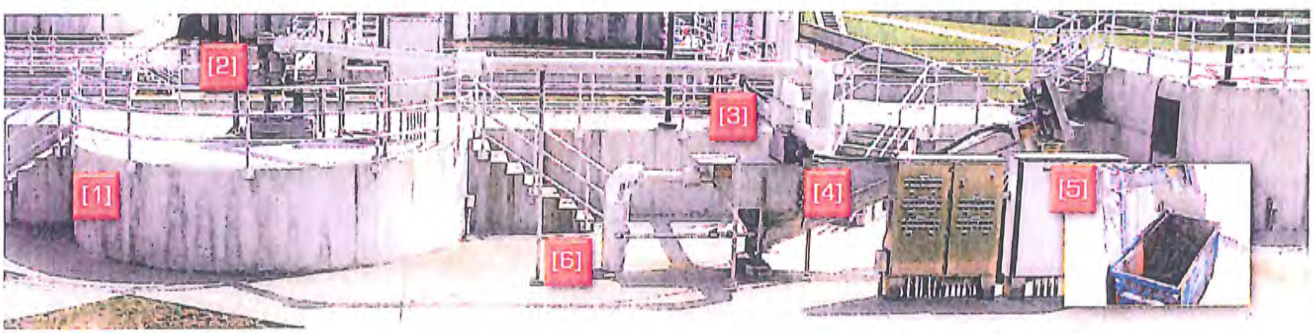
Coanda Ramp
Engineered entry facilitates laminar flow so that it takes a steady tangential direction as it enters the grit chamber and properly conditions the grit for entrapment.

Exclusive Flat-Bottom Basin Floor
Facilitates the forced vortex flow pattern inside the chamber. Minimizes organic capture while hydraulically directing grit into lower hopper. Patented, 360-degree in-line design.

PISTA® Grit Fluidizer
Patented blade exclusive to S&L design. Loosens collected grit, preventing compacting.

Storage Hopper
Stores removed grit prior to dewatering.

Hopper Cover Plate
Stationary and recessed, it removes for quick access to storage hopper.



PISTA® Grit Removal, Handling & Dewatering System Flow Scheme

GRIT REMOVAL SYSTEM

[1] ***PISTA® Grit Chamber*** — Influent enters flat-floor grit chamber hydraulically guided by coanda ramp, internal baffles and central, low-speed propeller. Forced vortex drives grit particles to center chamber floor and into lower grit hopper while organics and flow continue to plant.

[2] ***PISTA® Turbo Grit Pump*** — Top-mounted or remote mounted unit pumps collected grit slurry (kept fluid by the **PISTA®** Grit Fluidizer) to the **PISTA®**'s second-stage grit washing and dewatering system while also providing proper head.

[3] ***PISTA® Grit Concentrator*** — Specifically engineered for the **PISTA®** system, this abrasion-resistant Ni-Hard unit washes and separates grit further. It positions on the grit discharge line.

[4] ***PISTA® Grit Screw Conveyor*** — Grit from the concentrator deposits into the parallel (lamella) plate section of the S&L dewatering screw conveyor, which aids in retaining finer grit and reducing the stream's turbulence and overflow rate.

[5] ***Dewatered Grit Discharges*** from the top of the inclined screw conveyor into a container for disposal.

[6] ***The Flow and any Residual Organics are Returned*** to the inlet channel prior to the grit chamber, typically 93% of flow and 95% of organics.

Table 4 PISTA® GRIT CHAMBER DESIGN DATA – CONCRETE TANK – 270° UNITS											
Model	0.5	1.0	2.5	4.0	7.0	12.0	20.0	30.0	50.0	70.0	100.0
Maximum Flow (MGD)	0.5	1.0	2.5	4.0	7.0	12.0	20.0	30.0	50.0	70.0	100.0
Chamber Diameter	6' – 0"		7' – 0"	8' – 0"	10' – 0" *	12' – 0"	16' – 0"	18' – 0"	20' – 0"	24'– 0"	32' – 0"
Chamber Depth	3' – 8"		3' – 8"	4' – 0"	4' – 9"	5' – 0"	5' – 6"	6' – 6"	8' – 0"	8' – 0"	10' – 0"
Grit Hopper Diameter	3' – 0"		3' – 0"	3' – 0"	5' – 0"	5' – 0"	5' – 0"	5' – 0"	5' – 0"	6' – 0"	8' – 0"
Grit Hopper Depth	5' – 0"		5' – 0"	5' – 0"	5' – 6"	6' – 8"	6' – 10"	7' – 0"	8' – 0"	8' – 0"	10' – 0"
Drive: HP	3/4		3/4	3/4	1	1	2	2	2	2	2
Input RPM	54		54	54	37	37	36	36	36	36	36
Output RPM	20		20	20	14	14	13	13	13	13	13
Estimated Shipping Wt. (Lbs.)	2000		2000	2000	2500	2500	3000	3000	3000	3000	3000
Add for Steel Shell	2300		2600	3300	4800	N/A	N/A	N/A	N/A	N/A	N/A

* 9' – 10-¼" in Steel

Now that you have selected the **PISTA®** Grit Chamber model you require, you can determine the grit storage volume in the **PISTA®** Grit Chamber.

Table 5 PISTA® GRIT CHAMBER GRIT HOPPER STORAGE VOLUME **	
MODEL	CUBIC FEET
0.5, 0.5A, 0.5B	32
1.0, 1.0A, 1.0B	32
2.5, 2.5A, 2.5B	32
4.0, 4.0A, 4.0B	32
7.0A, 7.0B	35
7.0	76
12.0, 12.0A, 12.0B	100
20.0, 20.0A, 20.0B	102
30.0, 30.0A, 30.0B	106
50.0, 50.0A, 50.0B	125
70.0, 70.0A, 70.0B	164
100.0, 100.0A, 100.0B	335

** Volumes seen above are based on the hopper dimensions listed in Tables 1 through 4, and utilizing a 60° sloped bottom in the **PISTA®** Grit Chamber's grit hopper.

BIOLOGICAL LAGOON
(EXTENDED AERATION)

D. Biological Treatment (Modified Ludzack-Ettinger, MLE Process):

A variation of the extended activated sludge process will be utilized to remove and stabilize the organic and nitrogen load from the wastewater.

Activated Sludge:

A two-stage biological system designed to enhance nitrogen removal will be utilized. The system will include anoxic and aerobic reactors within the lagoon basin. The anoxic reactor will be equipped with a floating mixer to enhance flow and agitation in the reactor.

Design Criteria:

Assume MLSS = 3,500 mg/l
Assume MLVSS/MLSS ratio = 0.8 (typical, Metcalf & Eddy)
MLVSS = 0.8 x 3,500 mg/l = 2,800 mg/l
Influent BOD to aeration basins = 300 mg/l
MCRT = SRT = 30 days
Assume return sludge concentration, TSS = 10,000 mg/l (8,000 mg/l VSS) (Typical, Metcalf & Eddy)
Qavg = 1.2 MGD
Assume effluent BOD_5 = 20 mg/l

Assume Y_{nN} = 0.15 mg TSS/mgN
Assume SF = 2.5 (Peak to Average NH_3 –N Load)
Assume Average Nitrification DO Concentration of 2.0 mg/L

1) Determine the net heterotrophic yield (Y_{NH}), based on:

$$Y_{NH} = \frac{Y}{1 + K_d\ SRT}$$

Where:
Y = Yield coefficient, 0.6 mg/mg, WEF, MOP No. 8, P. 530
K_d = Decay coefficient = 0.06 d^{-1}
SRT = Solids Retention Time = 30 days

$$\therefore\ Y_{NH} = \frac{0.6}{1 + (0.06)\,(30)} \qquad = 0.214 \text{ mg/mg}$$

2) Determine the amount of nitrogen oxidized based on the influent flow and ignoring small amount used for growth of nitrifiers.

$$N_{ox} = TKN - \text{Effluent } NH_4 - N - F_u\,(Y_{NH})(S_o - S_e)$$

Where:
TKN = 40 mg/L
Effluent NH_4 – N = 3 mg/L
F_u = Fraction, typically set at 0.1
S_o = Influent BOD = 300 mg/L
N = Amount of nitrogen oxidized by nitrifying bacteria = negligible.
Soluble BOD_5 in the effluent, assuming TSSe = 20 mg/l, the biological solids are 65% biodegradable, 1g of biodegradable solids = 1.42g BOD_L and BOD_5 = 0.68 ultimate BOD_L, is:

Se = 20 mg/l x 0.65 x 1.42 g x 0.68 = 12.6 mg/l

Soluble portion of the = 20 - 12.6 mg/l = 7.4 mg/l
BOD_5 in the effluent

$\therefore N_{ox} = 40 - 3 - (0.1)(0.214)(300 - 7.4)$

$= 30.6$ mg/L

N_{ox} = (30.6 mg/L)(1.2 MGD)(8.34) = 306.2 Lbs/d

3) Determine the volume required for the entire biological system (oxic and anoxic zones) based on:

$$V = \frac{[Y_{NH}(S_o - S_e) + X_t + Y_{NN}(N_{ox})]\ Q\ (SRT)}{X}$$

Where:
V = Aeration tank volume, $Ft.^3$
Q = Influent flow, MGD
X = MLLSS, mg/L
S_o = Influent BOD, mg/L
S_e = Effluent BOD, mg/L
N_{ox} = Ammonia in influent flow oxidized, mg/L
Y_{NH} = Net yield, mg TSS/mg BOD
Y_{NN} = Net yield of nitrifying bacteria, mg TSS/mg N
X_t = Influent inert solids, mg/L (typically 60 mg/L)

$$\therefore V = \frac{[(0.214)(300 - 7.4\text{ mg/L}) + 40\text{ mg/L} + 0.15(30.6\text{ mg/L})] \times 1.2 \times 30\text{ days}}{3500\text{ mg/L}}$$

V = 1.1 million gallons

Approximate volume in existing lagoon is 1.69 Million (226,164 Ft^3)

4) Determine the detention time,

$$\text{Theta} = \frac{V}{Q} = \frac{1.69 \times 10^6 \text{ Gallons}}{1.2 \times 10^6 \text{ Gallons/Day}} = 1.4 \text{ days}$$

5) Determine the volume required for nitrification based on:

$$SRT_n = (SF)\left(\frac{1}{M_n - K_{nd}}\right)$$

Where:
M_n = Nitrifying bacteria specific growth rate
K_{nd} = Endogenous decay
SRT = Required solids retention
SF = Design safety factor = peak/avg. NH_3-N load = 2.5

$$Mn = \frac{(Mn, max)\, N}{Kn + N}\left(\frac{DO}{Ko + Do}\right)$$

When N = effluent NH_4 concentration, mg/L

Kn = nitrification – half saturation coefficient = 0.23 @ 10°C

Mn, max = $(0.50)^{10\ 0.033\ (T-20)}$ or @ 10°C = 0.23

Ko = Half saturation coefficient of DO = 0.5

$$\therefore Mn = \frac{0.23 \times 3.0 \text{ mg/L}}{0.23+3.0}\left(\frac{2.0}{(0.5) + 2\text{-}0}\right) = 0.17089\, d$$

$$\therefore SRT = 2.5\left(\frac{1}{0.17089 - 0.06}\right) = 22.54 \text{ days}$$

therefore,

$$V_N = V_T\left(\frac{SRT_N}{SRT}\right)$$

$$= \frac{226{,}164 \text{ Ft}^3 (22.54 \text{ days})}{30 \text{ days}}$$

$$= 169{,}924 \text{ Ft}^3$$

6) Determine the denitrification volume, based on:

$$V_{DN} = V_T \left(1 - \frac{SRT_N}{SRT}\right)$$

$$= 226{,}164\ Ft^3\left(1 - \frac{22.54\ days}{30\ days}\right)$$

$= 56{,}239\ Ft^3$ (420,667 Gallons)

7) Determine the net carbonaceous oxygen requirement, mg O_2/mg BOD removed based on:

$$A_N = 1.5 - 1.42\ Y + \frac{1.42\ Kd\ Y\ SRT}{1 + Kd\ SRT}$$

$$\therefore An = 1.5 - 1.42\ (0.6) + \frac{1.42\ (0.06)(0.6)(30)}{1 + (0.06)(30)}$$

$= 1.5 - 0.852 + 0.547$

$= 1.195$ mg O_2/mg BOD removed (we will use 1.2 mg O_2/mg BOD removed)

Oxygen required for 95% BOD removal = BOD loading x 1.2 lb O_2/#BOD
= 0.95 x 300 x 8.34 x 1.2 = 2,852 Lbs O_2 /#BOD

Oxygen required for nitrification = TKN loading x 4.6 lb O_2 /#TKN
= 40 x 1.2 x 8.34 Lbs/d x 4.6 = 1,842 Lbs O_2 /#TKN

Total Oxygen required in waste = 2,852 + 1,842 = 4,693 #O_2/d

Oxygen requirements per hr = 4,693/24= 196 #O_2 /hr

Standard Oxygen Requirements (SOR) under field conditions:

$$SOR = \frac{\text{Theoretical Oxygen Requirements}}{[(C'sw \times z \times Fa - C)/Csw] \times 1.024^{(T-20)\times b}}$$

where:
b= oxygen transfer correction factor, 0.85
C'sw = solubility of O_2 in tap water at field temp. =10.15 mg/l
z=salinity surface tension factor = 0.9
C=minimum DO in aeration basin = 2 mg/l
Csw=solubility of O_2 in tap water at 20^{o}C, 9.15 mg/l
Fa =oxygen solubility correction factor for given elevation

$$Fa = 1 - \frac{840 \text{ Ft} \times (0.3048)}{9,245} = 0.9723$$

Temp. = 22°C

$$SOR = \frac{4,693 \text{ Lbs/d}}{[((10.15 \text{ mg/l} \times 0.9 \times 0.9723) - 2\text{mg/l})/9.15] \times 1.024^{(22-20)\times 0.85}}$$

$$= \frac{4,693}{0.783} = 5,992 \text{ Lbs. } O_2\text{/d } (250 \text{ lbs. } (O_2\text{/hr})$$

8) Estimate the quantity of wasted activated sludge:

Observed yield coefficient, Yobs = $\frac{Y}{1 + (Kd \times MCRT)}$

where:
Y = yield coefficient, 0.6 mg/mg WEF, MOP No. 8, p. 530
Kd = decay coefficient = 0.06 d^{-1} WEF, MOP No. 8, p. 530

MCRT = 30 d
Yobs = Observed yield coefficient

$$Yobs = \frac{0.6}{1 + 0.06 \times 30} = 0.214 \text{ mg/mg}$$

Increase in MLVSS, Px = Yobs x Q x (So-Se)x 8.34
= 0.214 x 1.2 MGD x (300-7.4) x 8.34
= 627 Lbs/d

Increase in MLSS = 627 Lbs/d /0.8 = 783 Lbs/d

Volume of activated sludge wasted, Qw:

$$MCRT = \frac{V \times X}{(Qw \times Xr)+(Qe \times Xe)}$$

where:
X= MLVSS
Qw= Wasted sludge flow
Qe = Effluent flow = influent flow
Xr= Biomass concentration in RAS, TVSS
Xe= Biomass in effluent stream
MCRT = mean cell residence time
V= volume of activated sludge basins

$$30d = \frac{226{,}164 \text{ cu Ft} \times 2{,}800 \text{ mg/l} \times 7.48 \text{ gal/cu Ft} \times 1\text{MGD}/1\text{E}6 \text{ gal)}}{(Qw \times 8{,}000 \text{ mg/l}) + (1.2 \text{ MGD} \times 20 \text{ mg/l})}$$

240,000 Qw + 720 = 4,736

Qw = 0.0167 MGD

Mass of sludge wasted to digester = Px - (Q- Qw)x(VSS in effluent) x 8.34
= 783 - (1.2 - 0.0167) x 20 mg/L x 8.34 = 586 Lbs/d

9) Determine the Recirculation Ratio:

Assume the excess sludge will be wasted to the aerobic digesters via the wasted sludge pump station.

Mass balance around the aeration basins and clarifier:
MLSS(Q +Qr)=TSS in sludge x Qr

Where,
Qr = recirculated flow in RAS

3,500 mg/l (1.2 MGD) + 3,500 x Qr = 10,000 mg/l x Qr

Qr = 0.646 MGD

$$\text{Qr/Q ratio} = \frac{0.646}{1.2} = 0.54$$

10) Check detention time, theta:

Theta = Volume / average flow

Where,
average flow thru the biological train = Qraw + Qrecycle = 1.2 + 0.646 = 1.846 MGD

i. Aeration Basins:

$$\text{Theta} = 169{,}924 \frac{\text{cu ft} \times 7.48 \text{ gal/cu ft} =}{1.846 \text{ E}6 \text{ gal}} \; 0.688 \text{ d (16.5 hrs)}$$

Similarly, Theta, without any recycle flow = 1.06 d (25.4 hrs)

ii. Anoxic Basins:

Similarly, Theta = 0.23 d (5.5 hrs) with recycle

Theta = 0.35 d (8.41 hrs) without recycle

11) Check F/M = So/(Theta x X) = $\frac{300 \text{ mg/L}}{0.688 \text{ d} \times 2{,}800 \text{ mg/L}}$ = 0.155

12) Determine Organic Loading Rate:

Organic loading rate = (So x Q)/ Vol per 1,000 cu ft
= 300 mg/L x 1.2 MGD x 8.34 /226.16 cu Ft = 13.27 Lb BOD_5 /1,000 cu Ft.d (no recycle)

13) Determine Air Requirements:

According to Exhibit "___" in Appendix, the air requirements of the extended air lagoon is approximately 4 CFM per 1,000 Ft^3, therefore:

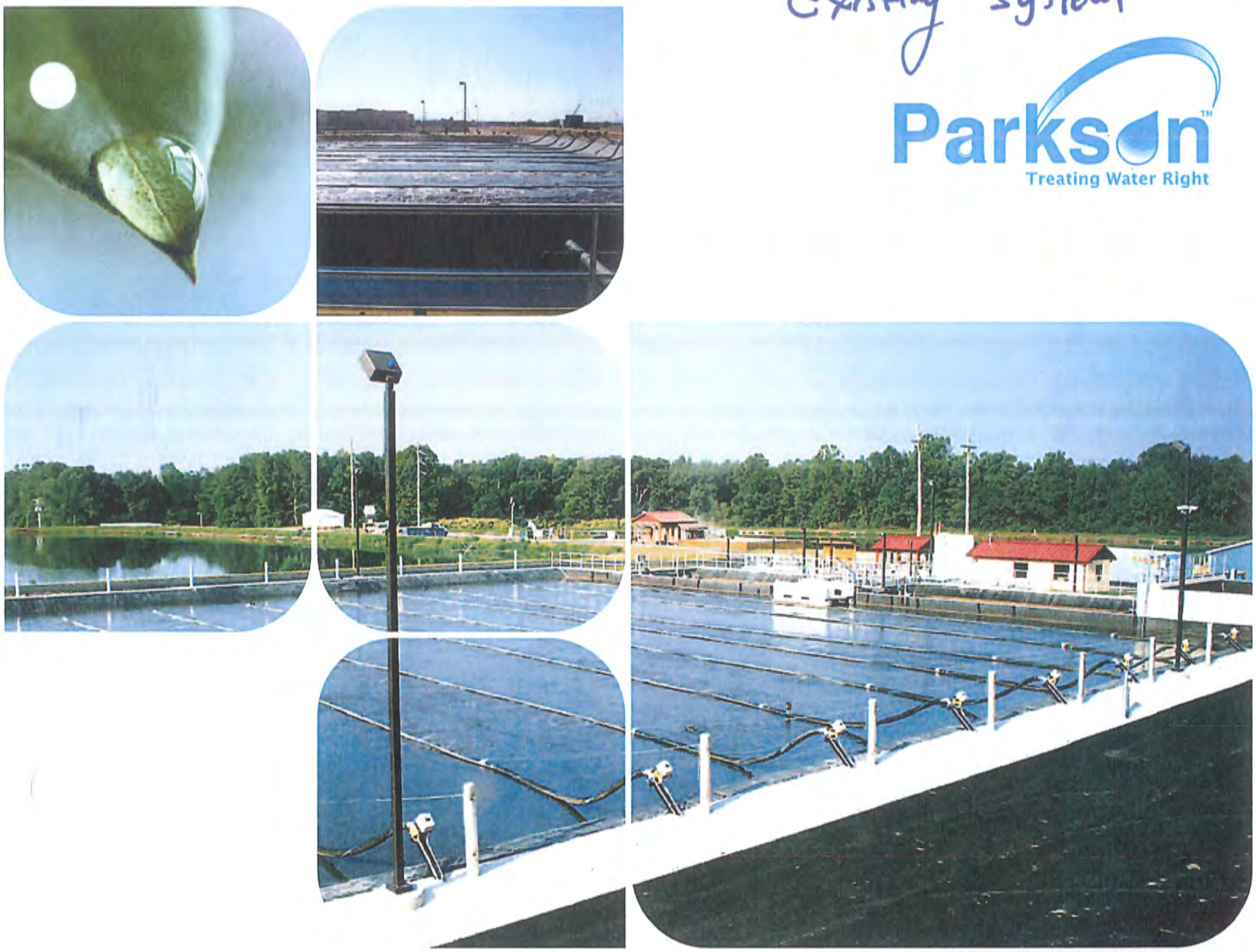
Air required = 4 CFM/1,000 Ft^3 x 169,924 Ft^3

= 676 CFM

For design purposes, we will use 1,500 CFM.

Existing System

Parkson
Treating Water Right



Biolac®

Extended Aeration Treatment System

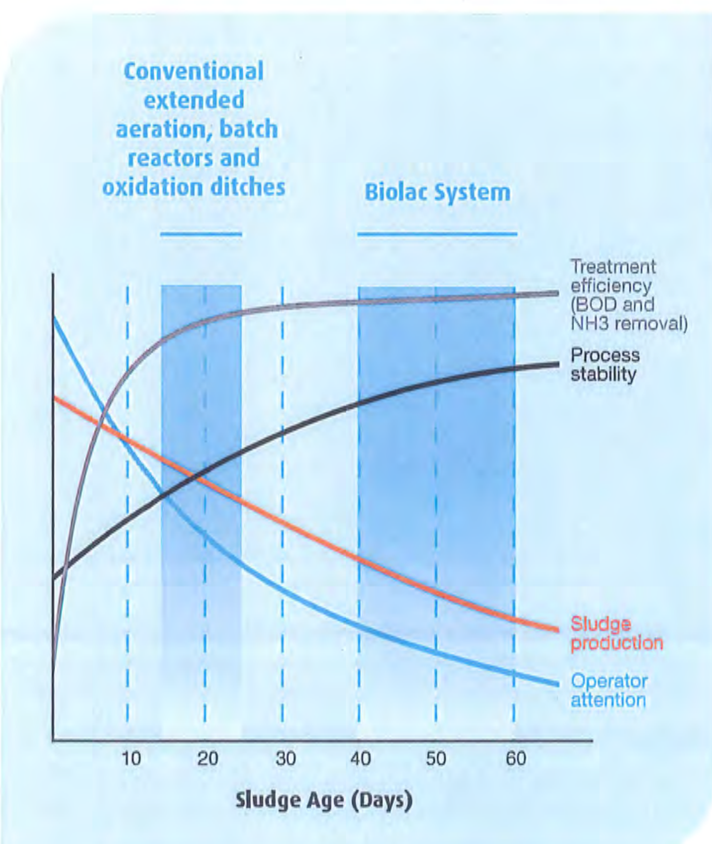
- Low loaded activated sludge technology
- High oxygen transfer efficiency delivery system
- Exceptional mixing energy from controlled aeration chain movement
- Simple system construction

Extended sludge age biological technology

The Biolac® system is an innovative activated sludge process using extended retention of biological solids to create an extremely stable, easily operated system.

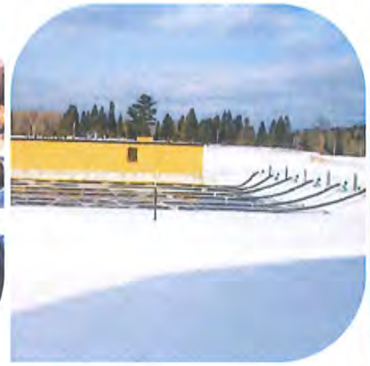
The capabilities of this unique technology far exceed ordinary extended aeration treatment. The Biolac® process maximizes the stability of the operating environment and provides high-efficiency treatment. The design ensures the lowest cost construction and guarantees operational simplicity. Over 700 Biolac® systems are installed throughout North America treating municipal wastewater and many types of industrial wastewater.

The Biolac® system utilizes a longer sludge age than other aerobic systems. Sludge age, also known as SRT (Solids Retention Time) or MCRT (Mean Cell Residence Time), defines the operating characteristics of any aerobic biological treatment system. A longer sludge age dramatically lowers effluent BOD and ammonia levels, especially on colder climates. The Biolac® long sludge age process produces BOD levels of less than 10 mg/L and complete nitrification (less than 1 mg/L ammonia). Minor modifications to the system will extend its capabilities to denitrification and biological phosphorus removal.



While most extended aeration systems reach their maximum mixing capability at sludge ages of approximately 15-25 days, the Biolac® system efficiently and uniformly mixes the aeration volumes associated with a 30-70 day sludge age.

The large quantity of biomass treats widely fluctuating loads with very few operational changes. Extreme sludge stability allows sludge wasting to non-aerated sludge ponds or basins and long storage times.



Aeration components

Simple Process Control and Operation

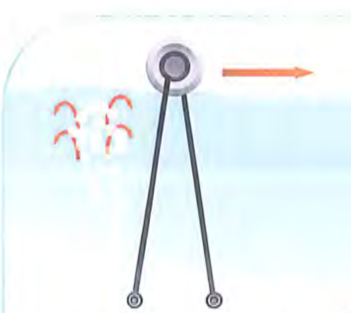
The control and operation of the Biolac® process is similar to that of conventional extended aeration. Parkson provides a very easy to use system to control both the process and aeration. Additional controls required for denitrification, phosphorus removal, dissolved oxygen control and SCADA communications are also easily implemented.

Aeration System Components

The ability to mix large basin volumes using minimal energy is a function of the unique BioFlex moving aeration chains and the attached BioFuser® fine bubble diffuser assemblies. The gentle, controlled, back and forth motion of the chains and diffusers distributes the oxygen transfer and mixing energy evenly throughout the basin area. No additional airflow is required to maintain mixing.

Stationary fine-bubble aeration systems require 8-10 CFM of air per 1000 cu. ft. of aeration basin volume. The Biolac® system maintains the required mixing of the activated sludge and suspension of the solids at only 4 CFM per 1000 cu.ft. of aeration basin volume. Mixing of a Biolac® basin typically requires 35-50 percent of the energy of the design oxygen requirement. Therefore, air delivery to the basin can be reduced during periods of low loading while maintaining effective food to biomass contact and without the risk of solids settling out of the wastewater.

BioFuser fine bubble, air diffuser assembly


Controlled oxygen transfer and mixing movement

System Construction

A major advantage of the Biolac® system is its low installed cost. Most systems require costly in-ground concrete basins for the activated sludge portion of the process. A Biolac® system can be installed in earthen basins, either lined or unlined. The BioFuser® fine bubble diffusers require no mounting to basin floors or associated anchors and leveling. These diffusers are suspended from the BioFlex floating aeration chains; The only concrete structural work required is for the simple internal clarifier(s) and blower/control buildings.

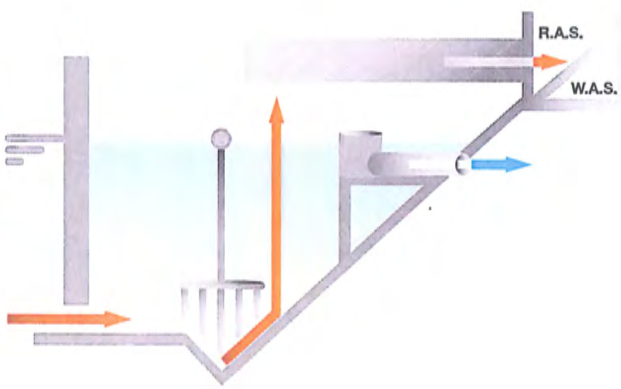
Biological Nutrient Removal

Simple control of the air distribution to the BioFlex® chains creates moving waves of oxic and anoxic zones within the basin. This repeated cycling of environments nitrifies and denitrifies the wastewater without recycled pumping of mixed liquor or additional external basins. This mode of Biolac® operation is known as the Wave Oxidation process. No additional in-basin equipment is required and simple timer-operated actuator valves regulate manipulation of the air distribution.

Biological phosphorus removal can also be accomplished by incorporating an anaerobic zone.

Type "R" Clarifier

Land space and hydraulic efficiencies are maximized using the type "R" clarifier. The clarifier design incorporates a common wall between the clarifier and aeration basin. The inlet ports in the bottom of the wall create negligible hydraulic headloss and promote efficient solids removal by filtering the flow through the upper layer of the sludge blanket. The hopper-style bottom simplifies sludge concentration and removal, and minimizes clarifier HRT. The sludge return airlift pump provides important flexibility in RAS flows with no moving parts. All maintenance is performed from the surface without dewatering the clarifier.



Parkson™ Treating Water Right

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SECONDARY CLARIFIERS

Secondary Clarifier:

Two (2) new rectangular clarifiers with chain and scraper sludge collection system will be used to remove solids from the activated sludge supernatant. Design of the sedimentation basins shall be based on average flow, 1.2 MGD. Each clarifier shall contain a sludge collection box with telescoping valve for controlling the sludge removal and visual inspection of the sludge conditions.

<u>Design Criteria:</u>

Average Design Flow = 1.2 MGD [for Surface Overflow Rate (SOR) Calculations]
Peak to Average Ratio = 3.7
Peak Design Flow = 4.5 MGD
Dry Weather SOR Range = 400 – 700 GPD/SF – WEF MOP No. 8, Page 592
Peak Weather SOR Range = 1,000 – 1,600 GPD/SF – WEF MOP No. 8, Page 592
Use Maximum Average SOR = 400 GPD/SF (Typical)
Use Maximum Peak SOR = 1,000 GPD/SF (Great Lakes Standards)
Maximum Solids Loading Rate = 20 lb/d. SF (WEF MOP No. 8) Page 587

Maximum Weir Loading = 15,000 GPD per linear Ft.

The following appurtenances will be provided:
-Scum baffles and a scum collection system shall be provided.
-Scum piping shall be glass lined or equivalent.
-A flow splitter box shall be provided to equally divide the flow to the two clarifiers.
-A sludge collection box equipped with telescoping valve shall be provided for viewing, measuring, sampling and controlling the rate of sludge withdrawal.

1. <u>Reactor Surface Area:</u>

Reactor size shall be based on Maximum Surface Overflow Rates (SOR) using the influent wastewater flows.

Number of clarifiers = 2 units
Flow per clarifier = 1.2 MGD /2 = 0.6 MGD

Surface area required:
Average flow requirements:

$$\text{Max. avg. SOR} = 400\ \text{GPD/sq Ft} = \frac{0.6\ \text{MGD} \times 1\text{E}6\ \text{gal/MGD}}{\text{Surface Area in sq Ft}}$$

SA = 1,500 sq Ft per clarifier

Peak flow requirements:

Max. Peak SOR = 1,000 GPD/sq Ft = $\frac{3.7 \times 0.6 \text{ MGD} \times 1E6 \text{ GPD/MGD}}{SA}$

SA = 2,220 sq Ft.

Therefore:

2,220 sq Ft. = Width x Length = Surface Area Required

Use 100'L x 25'W basins

The additional area will also help when one clarifier is taken out of service for maintenance or repairs.

$\therefore$Surface area = 100 x 25 = 2,500 sq Ft per clarifier

2. Surface Overflow Rate:

Average SOR per clarifier = $\frac{Q}{A}$ = $\frac{1.2 \text{ MGD}/2 \times 1E6 \text{ gal/MGD}}{2{,}500 \text{ sq Ft}}$ = 240 GPD/sq Ft which is less than 400 GPD/sq Ft, O.K

Peak SOR per = 3.7 x Average SOR per clarifier = 888 GPD/sq Ft clarifier <1,000, i.e. OK

3. Reactor Volume:

Solids loading rate: (assuming sludge recycle is 100% of the average design flow. Assume MLSS in clarifier = 3,500 mg/l (from biological reactor design)

Average hydraulic flow = 1.2 MGD + 1.2 MGD (RAS) = 2.4 MGD to two clarifiers including RAS recycle

Flow per clarifier = 2.4 MGD/2 units = 1.2 MGD

Avg Solids loading per clarifier = $\frac{(X \times Q \times 8.34)}{\text{Surface area}}$ = $\frac{3{,}500 \text{ mg/l} \times 1.2 \text{ MGD} \times 8.34}{2{,}500 \text{ sq Ft}}$

= 14.0 lb/d.sq Ft   Max. is 20 lb/d.sq Ft , OK

4. Detention Time:

Assume d = 12'

Gross clarifier (one) volume = 12 Ft x 2,500 sq Ft = 30,000 cu Ft (224,400 Gallons)

Flow Per clarifier with no RAS recycle:

Theta (avg) = V/Qavg= 30,000 cu Ft/ (0.65E6 gal /7.48 gal/cu Ft)
= 0.37 d (8.9 hr)

Theta (peak) =V/Qavg= 30,000 cu Ft/ (0.6 x 3.7 E6 gal /7.48 gal/cu Ft)
= 0.1d (2.42 hr)

Flow Per clarifier with 100% RAS recycle:
i.e. Flow = 1.2 MGD + 1.2 MGD = 2.4 MGD both clarifiers, Q = 1.2 MGD per clarifier

Theta (avg) = V/Qavg= 30,000 cu Ft/ (1.2E6 gal /7.48 gal/cu Ft)
= 0.187d (4.5 hr)

Marios Georgiou

From:	Mike Davis [mdavis@heyward.net]
Sent:	Wednesday, October 24, 2012 11:44 AM
To:	Marios Georgiou
Cc:	Cathy O'Dell; Tim Bishop
Subject:	Pineville, KY WWTP~Vaughn and Melton~Siemens~Rectangular Sludge Collectors~ Budget and Typical Drawings
Attachments:	EDS and Budget - Sludge Collector.pdf; EDS - Scum Pipe.pdf; 1.401 - Scum Pipe - Lever Operated.pdf; 1.303 - Double Tank 4-Shaft, Common Wall.pdf; 1.303B - Multiple Tank 4-Shaft, Individual Wall.pdf; 1.305 - Double Tank 4-Shaft with Cross.pdf; 1.308 - Sludge Hoppers - Dual.pdf; 1.310A - Drive Unit - Single Tank.pdf; 1.310C - Drive Units - 2 Tanks with Cross - Individual Drives.pdf; 1.310D - Drive Units - Suggested Arrangements.pdf

Marios:

Dimensions do not match prel. design calcs.

Attached is a budgetary quotation (incorrectly identified as Pikeville, not Pineville, KY) based on a design for 1.2 MGD ADF consisting of (2) 15 ft wide x 90 ft x 10 ft SWD secondary rectangular sludge collectors. The 2 channels can be operated independently and each have it own chain and scraper cross collector. An alternate for sludge withdrawal, instead of chain and scraper cross collectors, would be using telescopic sludge valves furnished by others.

The engineer can place individual drive units on separate walls (see Dwg 1.310.A), which means the wall between the 2 channels can be 12 inches wide. If the drives are placed on the same wall (see Dwg 1.310B) that center wall would need to be at least 16 inches wide.

Also included are (2) 10 inch diameter lever operated scum pipes.

Please let me know if you need any additional information. Sorry it took us so long to respond.

Best regards,

Mike Davis
Heyward Incorporated
864/414-5845

SIEMENS Industry, Inc. CONFIDENTIAL ALL RIGHTS RESERVED	**Budget Quotation and Equipment Data Sheet** **Secondary Tanks** **COLLECTOR MECHANISMS**	**Installation:** Pikeville, KY **Engineer:** Vaughn and Melton Consulting Engineers **Proposal No.:** 20120908 **Date:** October 5, 2012 **By:** B. Sprague

A. CHARACTERISTICS

Manufacturer	Siemens Industry, Inc. (Siemens) - Waukesha, Wisconsin USA
Equipment Description	Envirex® Sludge Collecting Equipment for Secondary Sedimentation Basin - Wastewater Plant
Basin Quantity	1
Each Basin Contains	2 Tanks
Each Tank Contains	1 Longitudinal Collector Mechanism one (1) Cross Collector
Total Longitudinal Collector Qty.	2
Total Cross Collector Qty.	2
Width - Longitudinal (Scraped Width)	15.00 ft (4.57m) Overall Bay Width 15.00 ft (4.57m)
Width - Cross Collector (Scraped Width)	4.00 ft (1.22m)
Tank Length - Longitudinal (Includes cross collector channel)	90.0 ft (27.43m)
Cross Collector Channel Length (Including Hopper)	15.0 ft (4.57m)
Max. WATER Depth (Measured at point nearest edge of hopper)	10.00 ft (3.05m)

Budgetary Quotation

Longitudinal Sludge Collectors	**$77,200**	**Budgetary Price** Preliminary budget price is based on limited information and is subject to change upon receipt of final bid documents. This Budgetary Quotation does not constitute a formal Offer for Sale. Budgetary prices are quoted based on delivery within one (1) year from date of this submittal, and Siemens' standard commercial terms.
Cross Collectors	**$33,800**	
Scum Pipes (2) 10 Inch Dia X 15.0 ft Lg	**$11,600**	
Estimated Freight including Scum Pipes FOB Shipping Point	**$2,200**	Est (1) Truck load
Minimum Recommended Field Service including Scum Pipes **Field Service Quantity:** Trip: 1 8 Hr Days at Site: 3	**$8,500**	
	$133,300 Total USD	* Adjust pricing based on dimension difference.

Pairs of Sprockets per Longitudinal Collector	4		
Pairs of Sprockets per Cross Collector	3		
Flight Speed - Longitudinal	1.0 ft/min	(0.30 m/min)	
Flight Speed - Cross Collector	2.0 ft/min	(0.61 m/min)	
Flight Spacing - Longitudinal	10.0 ft	(3.0m)	
Flight Spacing - Cross Collector	5.0 ft	(1.5m)	
Sludge Load (Average) - Longitudinal	2.0 lbs/ft	(3.0 kg/m)	Secondary at 2% sludge concentration with 8 inch (200mm) tall flights = 2 lbs/ft
Sludge Load (Average) - Cross Collectors	4.0 lbs/ft	(6.0 kg/m)	of flight length
Friction Factors	0.20 to 0.30 (UHMW-PE on UHMW-PE - water lubricated) 0.05 to 0.10 (UHMW-PE on Stn. Stl. - water lubricated)		
Bearing Friction Factors	0.05 per shaft assembly		
Shaft Deflection	Less than 0.033 inches / ft (2.75mm/m) of shaft length		
New or Existing Tanks	New		

B. MATERIALS

CHAIN	
Flight Carry Chain - Long	NCS720S - Non-metallic, unfilled acetal resin chain and reinforced nylon resin pins, 3/8 inch (10mm) flight fasteners, working load 2,600 lbs (11.57 kN), ultimate 6,300 lbs (28 kN), weight 1.3 lbs/ft (1.9 kg/m)
Flight Carry Chain - Cross	Same as Longitudinals
Drive Chain	NH78 - Unfilled acetal links, SS pin, working load 1,750 lbs (7.78 kN), min. ultimate 4,000 lbs (17.79 kN), weight 1.4 lbs/ft (2.1 kg/m)
FLIGHTS	
Flights - Long	Sigma Plus 3 x 8 inch (76 x 203mm) - Modulus of elasticity (E, psi) x moment of inertia (I, in^4) >/= 6.83 x 10^6 lbs-inch^2 (19.5 kN-m^2) about its minor axis, 50 to 60% glass content
Flights - Cross	Same as Longitudinals
WEAR SHOES	
Wear Shoes - Return Track	UHMW-PE unlugged every flight Wear shoe (track) - UHMW-PE 4 x 3 x 0.5 inch (102 x 76 x 12.7mm), min. 52 Shore "D" ASTM D-2240, 6,600 psi (45,500 KPA) tensile
Wear Shoes - Floor	Wear shoe (floor) - UHMW-PE, 5.5 wide x 3 x 0.5 inch (140 x 76 x 12.7mm), min. 52 Shore "D" ASTM D-2240, 6,000 psi (41,400 KPA) tensile
WEAR STRIPS	
Floor	UHMW-PE 3/8 X 3 inch (9.5 x 76mm) - 2 lines per tank
Attachment	316SS convex washer, #14 x 1.5 inch (6 x 38mm) 316SS pan head self tapping screw and vinyl anchor
Return Tracks	UHMW-PE 3/8 X 3 inch (9.5 x 76mm)
Attachment	316SS convex washer, 1/4 inch (6mm) 410SS, zinc plated self-drilling & tapping pan head screw

SHAFTING - LONGITUDINALS	**Headshaft Material:** 1018 CRS with shop preservative **Conershaft Material:** 1018 CRS with shop preservative **Cornershaft Bracket Material:** Carbon steel	**Shafting Outside Diameter**
Headshaft	Solid cold rolled steel with keyways for headshaft sprockets	3 inch (76mm)
Lower Influent Cornershaft	Solid cold rolled steel	2.5 inch (64mm)
Lower Effluent Cornershaft	Same as Lower Influent cornershaft	2.5 inch (64mm)
Upper Effluent Cornershaft	Same as Lower Influent cornershaft	2.5 inch (64mm)
Set Collars for Headshaft	Split UHMW set collar with 316SS band clamp	
SHAFTING - CROSS COLLECTORS	**Headshaft Material:** 1018 CRS with shop preservative **Cornershaft Material:** 1018 CRS with shop preservative **Shaft Bracket Material:** Carbon steel	**Shaft Outside Diamater**
Headshaft	Solid cold rolled steel with keyways for headshaft sprockets	2 inch (51mm)
Cornershafts	Full channel width, static shaft, solid 1018 cold rolled steel with A36 brackets and 316SS U-bolts	2 inch (51mm)

COLLECTOR BEARINGS - LONGITUDINALS	
Headshaft	Cast steel split housing, polyurethane ball, self-aligning, water lubricated with provisions for greasing when unsubmerged
Lower Influent and Effluent	Sprocket bearing sleeves, UHMW-PE with 316SS band clamps
Upper Effluent	Same as Lower Influent Cornershaft
COLLECTOR BEARINGS - CROSS COLLECTORS	
Headshaft	Cast steel split housing, polyurethane ball, self-aligning, water lubricated with provisions for greasing when unsubmerged
Cornershaft	Sprocket bearing sleeves, UHMW-PE with 316SS band clamps
GREASING PROVISIONS	
Greasing Provisions	Grease fitting in each wall bearing housing
Type / Material	Alemite, 1/8 inch NPT, material Monel
COLLECTOR SPROCKETS - LONGITUDINALS	
Headshaft	NCS720S, 23T-22.24 inch (565mm) PD w/ chain saver rim, split cast nylon, bolted hub with 316SS hdw. and set screws
Cornershaft	NCS720S, 17T-16.61 inch (422mm) PD, split cast nylon, bolted hub with 316SS hdw.

SPROCKETS - CROSS COLLECTORS	
Headshaft	NCS720S, 23T-22.24 inch (565mm) PD w/ chain saver rim, split cast nylon, bolted hub with 316SS hdw. and set screws
Cornershaft	NCS720S, 17T-16.61 inch (422mm) PD, split cast nylon, bolted hub with 316SS hdw.
DRIVE SPROCKET	11T-9.26 inch (235mm) PD polyurethane tooth segments, CI shear pin torque limiter hub, bronze bushed, polymeric gskt between shear faces
DRIVEN SPROCKET	40T-33.25 inch (845mm) PD, split polyurethane hub, deep dished and replaceable polyurethane tooth segments, 316 SS hdw.
RETURN TRACKS	3 x 3 x 3/8 inch (76 x 76 x 9.5mm) **Track Mat'l:** FRP
Supports	Non-metallic - Polypropylene and CPVC **Support Mat'l:** Non-metallic
Support Spacing	10.0 ft (3.0m)
DEFLECTOR ANGLES	3 x 3 x 3/8 inch (76 x 76 x 9.5mm) with UHMW-PE wear strips and 316SS fasteners **Track Mat'l:** Carbon Steel
Supports	A500 Sch. 40 steel pipe with 1/4 inch (6mm) steel end plates **Support Mat'l:** Carbon Steel Note: Deflector angles will be furnished only if it is determined by Siemens at time of drawing submittal that they are required to prevent flight contact with other components inside tank
DRIVE UNIT	
SPEED REDUCER	
Each reducer will drive	an individual collector mechanism
Longitudinal reducer will be	inline with sprocket and torque overload protection device mounted on output shaft
Individual X-Coll reducer will be	inline with sprocket and torque overload protection device mounted on output shaft
Manufacturer	Eurodrive or equal
Specifications:	Helical gear, fully housed, running in oil, anti-friction bearings throughout
Sizing of reducer	Torque rated at minimum 1.25 S.F. of calculated sludge load
Motor attachment	C-face
Paint	Original factory finish
MOTOR	
Manufacturer	Eurodrive (C-face) or equal
HP (kw)	0.5 HP (0.37kw)
Service Factor	1.15
V / Ph / Hz	230/460 V, 3 Ph, 60 Hz
RPM	1750
Encl. / Insul. / NEMA (IP) Design	TEFC (IP55) Enclosure / Class F Insulation / NEMA Design B
Efficiency	Standard
Paint	Original factory finish
Torque Overload Protection Device	Shear pin torque limiter with combination NEMA 4X (IP67) / NEMA 7 (IEC Zone 0 and 1) limit switch
Drive Base	304SS
Chain Guard	14 Ga. (3mm) 304SS with polyethylene side panels
Drive Chain Tightener	316SS bracket, self-aligning, self-lubricated

ELECTRICAL CONTROLS Controls	Not by Siemens Over torque indicating switches only - all other controls NOT by Siemens
HARDWARE Flights Miscellaneous connections Thread Standard Anchors Anchor material	 316SS HHCS's, flat washers, and locknuts 316SS Unified American Standard Stud anchors at all locations 304SS
PAINT Surface prep (Non-Subm) Surface prep (Submerged) Shop prime - Non-submerged Shop prime - Submerged Finish paint - Non-submerged Finish paint - Submerged Paint Note:	 Shop blast to SSPC-SP10 Shop blast to SSPC-SP10 Sherwin-Williams Dura-Plate 235NSF red oxide epoxy 4-8 mil DFT or Equal Sherwin-Williams Dura-Plate 235NSF red oxide epoxy 4-8 mil DFT or Equal Field applied coating by others Field applied coating by others All non-stainless steel shafting, including headshafts, cornershafting and exposed machined surfaces are solvent wiped followed by one (1) coat of Siemens standard shop preservative. Wood, stainless steel, nonferrous materials and galvanized surfaces are unpainted.
SCUM PIPES	Scum pipes by Siemens **See Separate Equipment Data Sheet (EDS)**
SPARE PARTS	Spare parts are Not included.
Operating and Maintenance Manuals	4 Quantity
Warranty	Standard - 18 months from delivery or 12 months after acceptance - which ever occurs first

EXCLUSIONS

Our equipment does NOT include any controls except as specifically stated within this Proposal, tools (except chain tool for NCS720S chain), grease lines, troughs, weirs, baffles, pumps, valves, weir gates, floor or wall sleeves, shims, grout, setting of anchor bolts, lubricants, finish painting, installation, taxes or duties, or material excluded under the General Items of this Proposal.

SIEMENS Industry, Inc. CONFIDENTIAL ALL RIGHTS RESERVED	**Equipment Data Sheet** **Secondary Tanks** **SCUM PIPES**	**Installation:** Pikeville, KY **Engineer:** Vaughn and Melton Consulting Engineers **Proposal No.:** 20120908 **Date:** October 5, 2012 **By:** B. Sprague

A. CHARACTERISTICS

Manufacturer	Siemens Industry, Inc. (Siemens) - Waukesha, Wisconsin USA
Equipment Description	Envirex® Scum Pipes Manual Lever
Total Scum Pipes	2
Scum Pipe Length	15.00 ft (4.57m)
New or Existing Tanks	New
Budgetary Quotation	For Scum Pipe pricing see Chain and Scraper Budget Quotation and Equipment Data Sheet

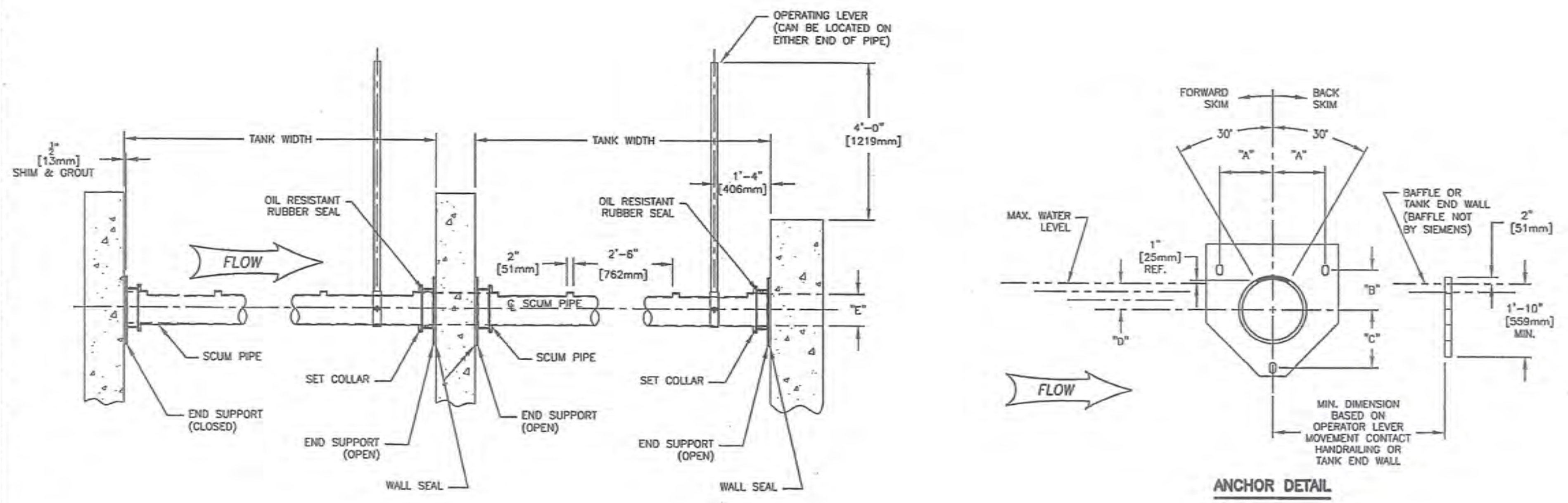
B. MATERIALS

PIPE	
Material	Carbon steel - ASTM A53, Grade B, black
Size	10 inch (250mm)
Wall Thickness	0.25 inch (6mm)
Specifications	0.25 inch (6mm) wall thickness, 60 degree slotted weir openings and 2 inch (50mm) wide full periphery stiffening bands every 2 ft (610mm)
END SUPPORTS and SET COLLARS	
Material	Carbon steel
Specifications	Adjustable end plate with rolled collar and replaceable UHMW-PE bearing liner. Set collars, same material as end plate, secures pipe and seal postion.
Seals - Wall to open end support	Plywood - 1/2" thick, Marine Grade
Seals - Pipe to open end support	Hycar - Buna N synthetic rubber
OPERATOR	
Type	Manual Lever
Lever Material	Carbon steel - ASTM A53, Grade B, black
Lubrication	No lubrication required
Specifications	1.5 inch (38mm) dia. Sch. 40 pipe lever
Min. Pipe Rotation Each Direction	30 degrees
HARDWARE	
Miscellaneous connections	316SS
Thread Standard	Unified American Standard
Anchors	Stud anchors at all locations
PAINT	
Surface prep (Non-Subm)	Shop blast to SSPC-SP10
Surface prep (Submerged)	Shop blast to SSPC-SP10
Shop prime - Non-submerged	Sherwin-Williams Dura-Plate 235NSF red oxide epoxy 4-8 mil DFT or Equal
Shop prime - Submerged	Sherwin-Williams Dura-Plate 235NSF red oxide epoxy 4-8 mil DFT or Equal
Finish paint - Non-submerged	Field applied coating by others
Finish paint - Submerged	Field applied coating by others
Paint Note:	All non-stainless steel shafting and exposed machined surfaces are solvent wiped followed by one (1) coat of Siemens standard shop preservative. Wood, stainless steel, nonferrous materials and galvanized surfaces are unpainted.

Operating and Maintenance Manuals	4 Quantity
Warranty	Standard - 18 months from delivery or 12 months after acceptance - which ever occurs first

EXCLUSIONS

Our scum pipe(s) do NOT include any controls, tools, spray headers, nozzles, effluent troughs, baffles, wall sleeves, pipe sleeves, setting of anchor bolts, special or finish painting, equipment installation, taxes or duties, equipment installation, or materials noted under the General items of our Proposal.



ANCHOR DETAIL

PIPE SIZE	"A"	"B"	"C"	"D"	"E"
8 [200mm]	8" [203mm]	4-1/2" [114mm]	8-3/4" [222mm]	2-3/4" [70mm]	8-7/8" [225mm]
10 [250mm]	8" [203mm]	4-1/2" [114mm]	8-3/4" [222mm]	3-5/8" [92mm]	11" [297mm]
12 [300mm]	8" [203mm]	4-1/2" [114mm]	8-3/4" [222mm]	4-1/2" [114mm]	1'-1" [330mm]
14 [350mm]	11-1/2" [292mm]	5-1/2" [140mm]	12-1/2" [318mm]	5" [127mm]	1'-2-1/4" [362mm]
16 [400mm]	11-1/2" [292mm]	5-1/2" [140mm]	12-1/2" [318mm]	6" [152mm]	1'-4-1/4" [413mm]
18 [450mm]	11-1/2" [292mm]	5-1/2" [140mm]	12-1/2" [318mm]	6-7/8" [175mm]	1'-6-1/4" [464mm]
20 [500mm]	11-1/2" [292mm]	5-1/2" [140mm]	12-1/2" [318mm]	7-5/8" [194mm]	1'-8-1/4" [514mm]

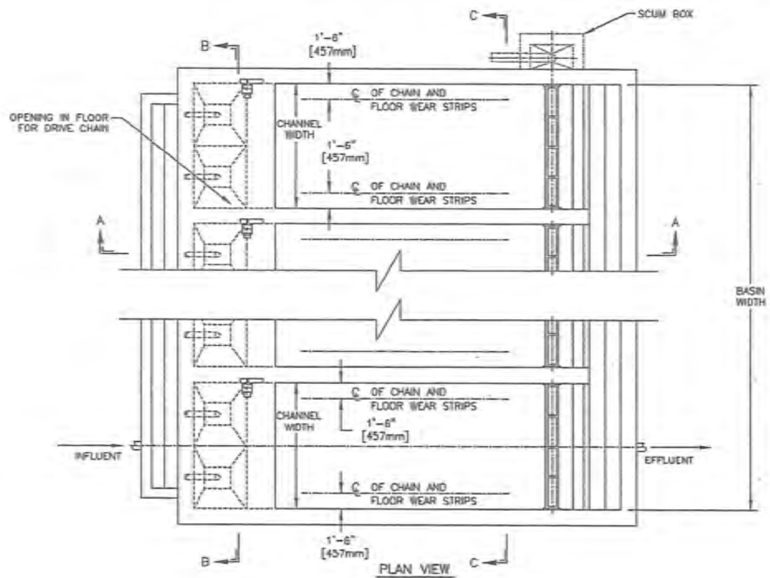
NOTE: PIPES ARE TO BE INSTALLED LEVEL TO WITHIN ±1/16" (2mm)

NOT FOR CONSTRUCTION

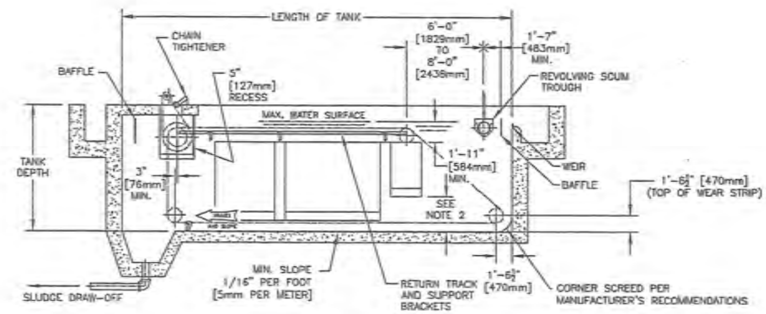
ENVIREX® PRODUCTS / REX CHAIN & SCRAPER SLUDGE COLLECTORS	DATE:
GENERAL ARRANGEMENT	SCALE: NONE
LEVER OPERATED SCUM PIPE - MANUAL OPERATOR	DESIGNER:
SIEMENS Water Technologies WAUKESHA, WI 262-547-0141	DRAWING NO.: 1.401

MASTER REVISION JAN 2008

STD: 1-0600-11X17B | INTL REF: T:\Chain Team\315 Binder Drawings\315 Binder Drawings 1\AutoCAD\1.401.dwg



PLAN VIEW



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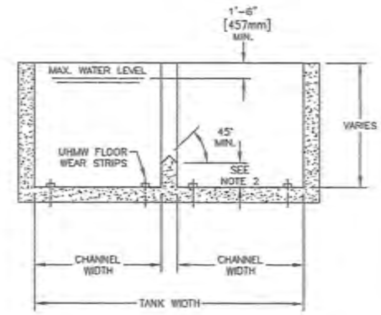

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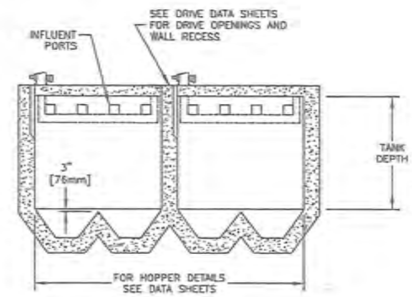


SECTION "B-B"

NOTES:

1.) TWO CHANNELS SHOWN. CHANNEL QUANTITY PER TANK CAN BE INCREASED AS REQUIRED.

2.) MINIMUM CENTER WALL VERTICAL HEIGHT IS 2'-10" (864mm) WHERE THE LOWER RETURN TRACK SUPPORT BRACKETS ARE MOUNTED AT THEEFFLUENT END OF CHANNEL AND EFFLUENT CORNERSHAFT LOCATION. AFTER THESE AREAS THE CENTER WALL CAN BE LOWERED TO 1'-0" (300mm).

DEFINITION:

BASIN = ONE OR MORE TANKS THAT SHARE COMMON INFLUENT AND EFFLUENT. ANY TANK CAN BE TAKEN OUT OF SERVICE.

TANK = ONE OR MORE CHANNELS HYDRAULICALLY COMMON TO EACH OTHER. MOST OFTEN THERE IS ONLY ONE CROSS COLLECTOR PER TANK.

CHANNEL = COLLECTOR BAY CONTAINING ONE COLLECTOR MECHANISM.

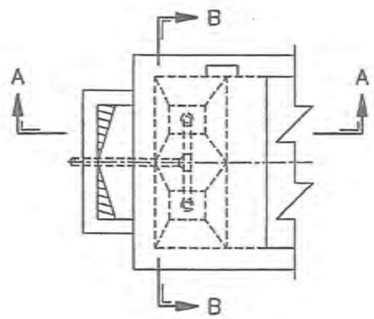
NOT FOR CONSTRUCTION

ENVIREX CHAIN & SCRAPER SLUDGE COLLECTORS	DATE:
GENERAL ARRANGEMENT	SCALE: NONE
MULTIPLE TANK – 4 SHAFT (INDIVIDUAL DRIVE WALL)	DESIGNER:
SIEMENS Water Technologies WAUKESHA, WI 262-547-0141	DRAWING NO.: 1.303B

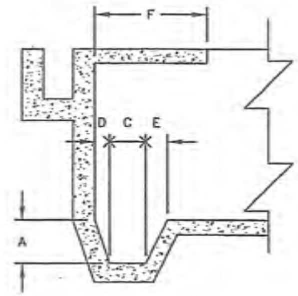
MASTER REVISION MARCH 2011

STD: 1-0200-24X3601 | INTL REF: INTR_REF_NO | BAR = 1" AT PLOT SCALE

INTL REF: T:\Chain Team\315 Binder Drawings\315 Binder Drawings AutoCAD (Masters)\1.303B – Multiple Tank 4-Shaft, Individual Wall.dwg



PLAN VIEW



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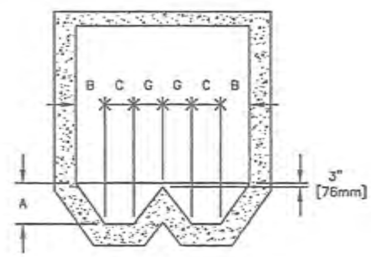


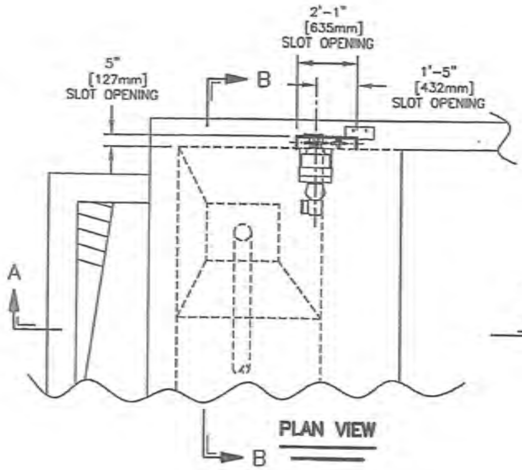
SECTION "B-B"

TANK WIDTH	"A" MIN.	"B"	"C"	"D"	"E"	"F"	"G"	REMARKS
8'-0" [2.4M]	3'-0" [914mm]	1'-0" [304mm]	2'-0" [609mm]	1'-0" [305mm]	2'-0" [609mm]	7'-0" [2134mm]	1'-0" [304mm]	
9'-0" [2.7M]	3'-0" [914mm]	1'-3" [381mm]	2'-0" [609mm]	1'-0" [305mm]	2'-0" [609mm]	7'-0" [2134mm]	1'-3" [381mm]	
10'-0" [3.0M]	3'-0" [914mm]	1'-6" [457mm]	2'-0" [609mm]	1'-0" [305mm]	2'-0" [609mm]	7'-0" [2134mm]	1'-6" [457mm]	
11'-0" [3.4M]	3'-0" [914mm]	1'-9" [533mm]	2'-0" [609mm]	1'-0" [305mm]	2'-0" [609mm]	7'-0" [2134mm]	1'-9" [533mm]	
12'-0" [3.7M]	3'-0" [914mm]	2'-0" [609mm]	2'-0" [609mm]	1'-0" [305mm]	2'-0" [609mm]	7'-0" [2134mm]	2'-0" [609mm]	
13'-0" [4.0M]	3'-0" [914mm]	2'-0" [609mm]	2'-0" [609mm]	1'-0" [305mm]	2'-0" [609mm]	7'-0" [2134mm]	2'-3" [686mm]	
14'-0" [4.3M]	3'-0" [914mm]	2'-6" [762mm]	2'-0" [609mm]	1'-0" [305mm]	2'-0" [609mm]	7'-0" [2134mm]	2'-6" [762mm]	
15'-0" [4.6M]	3'-0" [914mm]	2'-9" [838mm]	2'-0" [609mm]	1'-0" [305mm]	2'-0" [609mm]	7'-0" [2134mm]	2'-9" [838mm]	
16'-0" [4.9M]	3'-3" [990mm]	3'-1" [940mm]	2'-0" [609mm]	1'-0" [305mm]	3'-3" [990mm]	8'-3" [2515mm]	2'-11" [889mm]	
17'-0" [5.2M]	3'-6" [1066mm]	3'-4" [1016mm]	2'-0" [609mm]	1'-0" [305mm]	3'-6" [1066mm]	8'-6" [2591mm]	3'-2" [965mm]	3 HOPPERS PREFERRED
18'-0" [5.5M]	3'-9" [1143mm]	3'-8" [1118mm]	2'-0" [609mm]	1'-0" [305mm]	3'-9" [1143mm]	8'-9" [2667mm]	3'-4" [1016mm]	3 HOPPERS PREFERRED
19'-0" [5.8M]	4'-0" [1219mm]	3'-10" [1168mm]	2'-0" [609mm]	1'-0" [305mm]	4'-0" [1219mm]	9'-0" [2743mm]	3'-8" [1118mm]	3 HOPPERS PREFERRED
20'-0" [6.1M]	4'-3" [1295mm]	4'-1" [1245mm]	2'-0" [609mm]	1'-0" [305mm]	4'-3" [1295mm]	9'-3" [2819mm]	3'-11" [1194mm]	3 HOPPERS PREFERRED

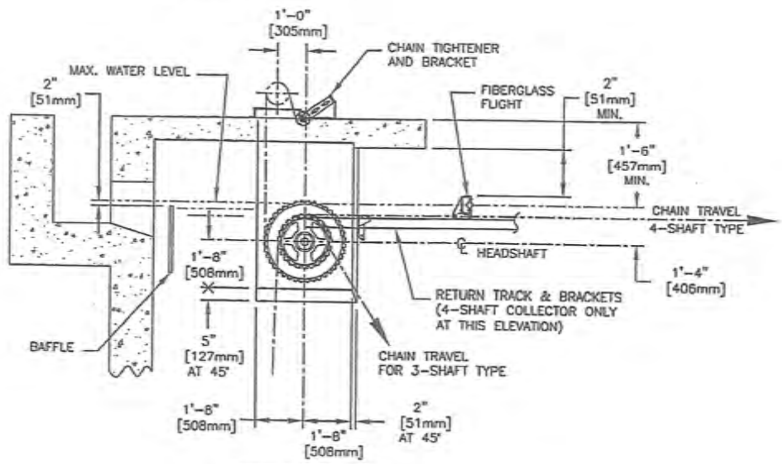
MASTER REVISION JAN 2008

ENVIREX® CHAIN & SCRAPER SLUDGE COLLECTORS	DATE:
GENERAL ARRANGEMENT	SCALE: NONE
DUAL SLUDGE HOPPER	DESIGNER:
SIEMENS Water Technologies WAUKESHA, WI 262-547-0141	DRAWING NO.: 1.308

STD: 1-0600-11X17B | INTL REF: T:\Chain Team\315 Binder Drawings\315 Binder Drawings\AutoCAD\1.308.dwg



PLAN VIEW



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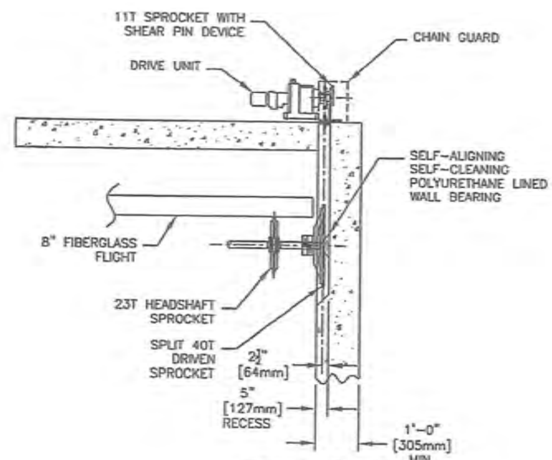

SECTION "B-B"

NOT FOR CONSTRUCTION

ENVIREX® CHAIN & SCRAPER SLUDGE COLLECTORS	DATE:
DRIVE ARRANGEMENT	SCALE: NONE
SINGLE TANK	DESIGNER:
SIEMENS Water Technologies WAUKESHA, WI 262-547-0141	DRAWING NO.: 1.310A

MASTER REVISION JAN 2008

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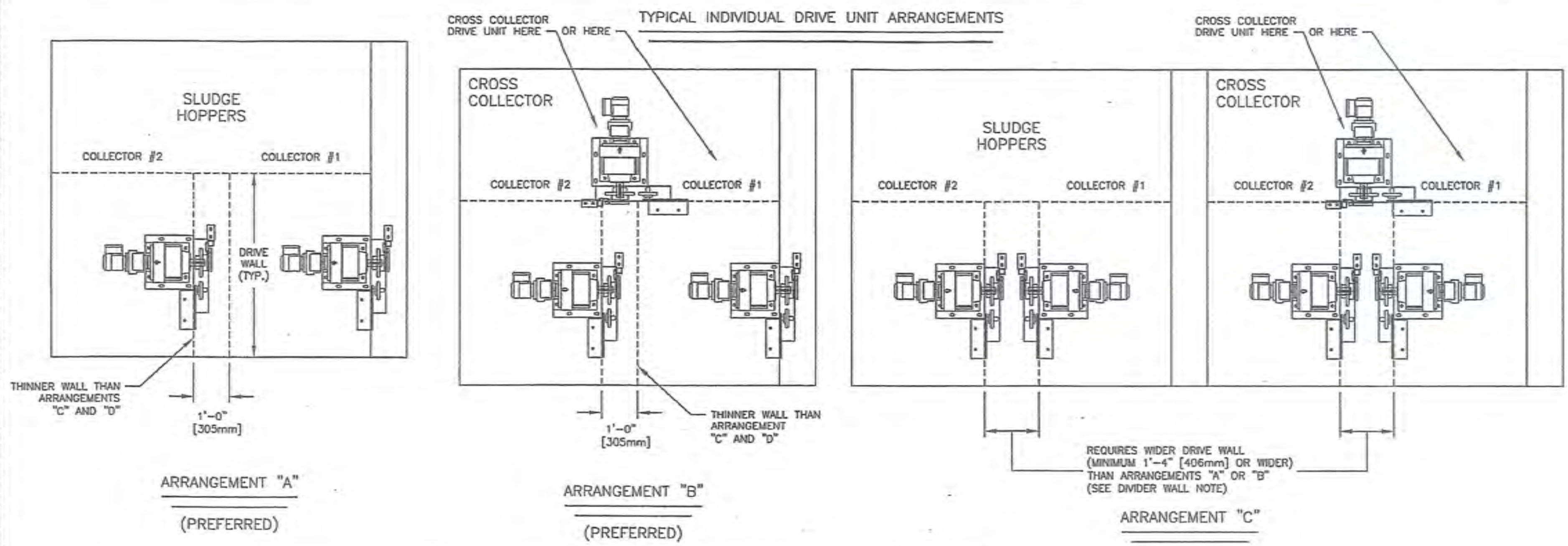
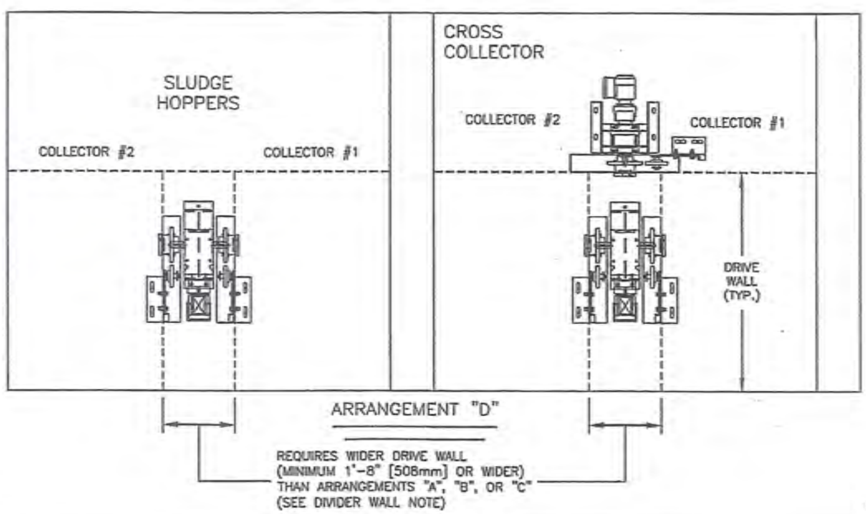
TYPICAL INDIVIDUAL DRIVE UNIT ARRANGEMENTS





DIVIDER WALL NOTE:

IF NARROWER DIVIDER WALLS (COLUMNS AND BEAMS) ARE DESIRED FOR THE REMAINING TANK LENGTH, 8 INCH (203mm) HIGH CONCRETE CORBELS (AT WATER LEVEL) AND CURBS (AT FLOOR LEVEL) ARE REQUIRED ON BOTH SIDES OF THE DIVIDER WALL.

CORBELS AND CURBS ARE ALSO REQUIRED ON THE NON-DRIVE SIDE WALL TO MAKE FLIGHTS SYMETRICAL AND INTERCHANGABLE BETWEEN TANKS.

MASTER REVISION JAN 2008

ENVIREX® CHAIN & SCRAPER SLUDGE COLLECTORS	DATE:
DRIVE ARRANGEMENT	SCALE: NONE
SUGGESTED DRIVE ARRANGEMENTS	DESIGNER:
SIEMENS Water Technologies WAUKESHA, WI 262-547-0141	DRAWING NO.: 1.310D

STD: 1-0600-11X17B | INTL REF: T:\Chain Team\315 Binder Drawings\315 Binder Drawings 1\AutoCAD\1.310D.dwg

SLUDGE HOLDING TANKS

Sludge Holding Tanks:

Further sludge stabilization will be provided in the proposed sludge holding tanks. The system is designed to operate as a conventional aerobic digester with a 15-day sludge storage capacity. Digested sludge will be dewatered by utilizing the proposed dewatering equipment. Mechanical dewatering equipment along with progressive cavity pump and a speed controller will be provided to control the sludge feed rate into the dewatering equipment.

Design Criteria:

Sludge production rate is assumed to be 0.75 lb. of sludge per lb. of BOD removed.
Minimum DO of 1.0 to 2.0 mg/L shall be maintained at all times.
Provide a minimum of 30.0 standard cu. ft. of air per minute per 1,000 cu. ft. of aeration tank for mixing purposes (Metcalf & Eddy p. 837).
Hydraulic detention time at 20 degrees C, shall be 15 days since only activated sludge will be digested (Metcalf & Eddy p. 837).
Supernatant release shall be provided for decantation.
Cake sludge shall be sent to the Landfill. Supernatant will be returned to the head of the plant.

The existing sludge holding lagoon will be utilized for sludge storage (vol = 60,000 gallons). Additional volume will be provided as needed.

An electromagnetic flow meter is available for measuring and recording sludge wasted to the sludge holding tanks.

1. Required Volume:

Total sludge production per day based on TSS and BOD load is:

- Organic load due to total suspended solids:

TSS into the biological train = 350 mg/L
Assumed TSS in effluent = 20 mg/L
TSS removed = 350 mg/l - 20 mg/l = 330 mg/l
Assuming 1.42g BODu/gTSS, BOD_5= 0.68 BODu and that biological solids are 65% biodegradable, BOD concentration from TSS is:

330 mg/L x 1.42 x 0.65 x 0.68 = 207 mg/L as BOD

Solids loading= 207 mg/l x 1.2 MGD x 8.34 = 2,071 Lbs/d

- Organic load due to BOD:

Influent BOD into the biological train = 300 mg/L

Assume 80% of BOD is soluble
Effluent SBOD = 7.4 mg/L (refer to activated sludge section)

SBOD removed = (300 x 0.8)-7.4 = 232.6 mg/L
SBOD loading = 232.6 mg/L x 1.2 MGD x 8.34
= 2,328 Lb/d

Total organic load (TSS+SBOD) = 2,071 + 2,328 = 4,399 Lbs BOD/d

Total sludge production assuming 0.75 lb sludge production per lb of BOD removed:
0.75 lb sludge x 4,399 Lbs BOD/d = 3,300 Lbs/d

Volume of sludge based on 1.50% solids = $\dfrac{\text{mass, lb/d}}{\text{\% solids x 62.4 lb/cu Ft x Spec. grav}}$

$$\frac{\text{3,300 Lbs/d}}{\text{0.015 x 62.4 lb/cu Ft x 1.03}} = \text{3,422 cu Ft/d (25,604 GPD)}$$

Volume based on 15 d = 15 d x 3,422 cu Ft = 51,330 cu Ft (384,060 gallons) detention time

Existing Volume = 60,000 gallons
Therefore, the volume requirements are:
384,060 – 60,000 gallons = 324,060 gallons

Therefore, provide two (2) basins with approximate dimensions 40 x 50 x 12’ SWD.

Total volume (new) = 359,040 gallons.

2. Oxygen Requirements:

Check for maintaining aerobic conditions and mixing requirements.

Case 1: For maintaining 1 to 2 mg/L Dissolved Oxygen (DO):

3,300 x 2.3 Lb O_2/Lb solid destroyed = 7,590 Lb O_2/d

Assuming an oxygen transfer efficiency of 8% for coarse bubble diffusers (Sanitaire, diffuser manufacturer) and standard conditions (23 % of oxygen in air):

$$\frac{\text{7,590 Lb/d}}{\text{0.08 x 0.075 lb/cu Ft x 0.232 x 1,440 min/d}} = \text{3,786 scfm}$$

Case 2: Mixing requirements:
Assuming 30 cfm/1000 cu Ft of oxygen is required to keep the solids in suspension the volume of oxygen required is:

Air requirements per:
1,000 cu Ft of digester = 30 cfm/1,000 cu Ft x digester vol.
volume

= 359,040/7.48 x 30cfm/1,000 cu Ft. min

= 1,440 scfm

Therefore, controlling oxygen requirements is 3,786 cu Ft/min.

POST AERATION BASIN

Post-Aeration Basin:

1. Determine Post-Aeration Basin Volume:

   Design post-aeration basin based on 5-minute detention time @ peak flow (Metcalf & Eddy, Page 511) or not to exceed 30 minutes detention time at current average flow:

   Case 1:

   $$\therefore \text{Volume required} = \frac{5 \text{ Min} \times 4.5 \text{ MGD} \times 92.8 \text{ Ft}^3/\text{Min.}}{5 \text{ MGD}} = 2{,}088 \text{ Ft}^3 \ (15{,}618 \text{ Gal})$$

   Case 2:

   Based on current flow of 0.561 MGD and 30 Minutes detention time,

   $$V = 30 \text{ Min} \times 0.561 \text{ MGD} \times \frac{92.8 \text{ Ft}^3/\text{Min}}{\text{MGD}} = 1{,}562 \text{ Ft}^3$$

   (11,682 Gallons) (Controls)

   Therefore, utilize one of the two existing chlorine contact basins for post-aeration volume. Approximate volume = 9,000 gallons.

   The volume will be utilized to equalize effluent flow quality and for storage of recycle water for wash water requirements, yard hydrants, etc.

2. Determine air requirements:

   Assume DO in clarifier effluent is 2.0 mg/L.
   DO required in effluent is 3.0 mg/L.
   $\therefore$ Additional DO required = 3-2 = 1.0 mg/L.
   Therefore, design an air system to provide 1.0 mg/L of DO.
   Assume effluent BOD = 10 mg/L
   Assume effluent NH_3^{-N} = 5 mg/L

   O_2 consumed = 10 mg/L BOD x 1.2 x 8.34 = 100.1 lbs/d
   = 5 mg/L NH_3^{-N} x 1.2 x 8.34 = 50 lbs/d

   O_2 / BOD = 100.1 x 1.2 mg/L O_2/mg BOD = 120 lbs/d
   O_2 / NH_3 = 50 x 4.6 mg/L O_2/mg NH_3 = 231 lbs/d

   Total theoretical O_2 in effluent = 120 + 231 = 351 lbs/d

   $$SOR = \frac{\text{theoretical } O_2 \text{ Requirements}}{\left(\frac{C'sw \times Z \times Fa - Cn}{Csw}\right) \times 1.024^{(T-20)b}}$$

where:
b = oxygen transfer correction factor, 0.85
C'sw = solubility of O_2 in tap water at field temp. = 10.15 mg/L
Z = salinity surface tension factor = 0.9
Cn = additional DO in post-aeration basin = 1 mg/L
Csw = solubility of O_2 in tap water at 20°C, 9.15 mg/L
Fa = oxygen solubility correction factor for given elevation

$$Fa = 1 - \frac{979 \text{ Ft} \times (0.3048)}{9{,}245} = 0.96$$

Temp. = 22°C

$$= \frac{351 \text{ lbs/d}}{\left(\frac{(10.15 \times 0.9 \times 0.96) - 1.0}{9.15}\right) \times 1.024^{(22-20) \times 0.85}}$$

$$= \quad 397 \text{ lbs/d}$$

3. Oxygen Requirements:

Assuming an oxygen transfer efficiency of 12.5% (2.5% SOTE and 5 water level, SSI, diffuser manufacturer Appendix J) and standard conditions (23% of oxygen in air):

$$\frac{397 \text{ lbs/d}}{0.125 \times 0.075 \text{ lb/cu Ft} \times 0.232 \times 1{,}440 \text{ min/d}} = 126 \text{ scfm}$$

This equates to 0.105 CFM per 1,000 gallons treated which is less than the required rate of 0.154 cfm/1,000 gallons in 401 KAR S:005.

Therefore, use: $\frac{0.154 \text{ CFM}}{1{,}000 \text{ Gallons}} \times 1{,}200{,}000 \text{ GPD}$

$$= \quad 185 \text{ CFM}$$

BLOWER EQUIPMENT

Blower Requirements and Availability:

The existing plant is served by 3 – 40 Hp Roots positive displacement blowers. The existing blowers have approximately 1,000 CFM capacity, each.

New Plant Expansion Requirements:

Aeration Basin =	1,500 CFM
Sludge Holding Basins =	3,786 CFM
Post-Aeration Basin =	185 CFM
Total Air Requirements =	5,471 CFM

∴ Volume of air needed = 5,471 CFM – 3,000 CFM
= 2,471 CFM

∴ Provide 3 new blowers to match the size and capacity of the existing units.

Note: The proposed surge basins and existing lagoon cell will be equipped with jet aerator mixers and won't be connected to the air compressor system.

SLUDGE DEWATERING EQUIPMENT

Sludge Dewatering Equipment:

Digested sludge will enter the dewatering building and injected with polymer solution to promote solid agglomeration and enhance water removal. Conditioned sludge will then enter the proposed dewatering unit.

Dewatered cake sludge will be collected in a shaftless screw conveyor and discharged onto a dump truck. Dewatered cake sludge will be disposed to a nearby landfill.

The dewatering system was pilot tested by the Owner in September 2010 and was capable to produce 17%-20% cake sludge. Refer to Appendix E for information on the proposed dewatering equipment and pilot test results. The estimated throughput capacity of the unit is best at 105 GPM. The unit is rated at 140 GPM by the manufacturer.

<u>Determine Hours of Operation Per Day:</u>

Assuming daily sludge production @ Q = 1.2 MGD is 25,604 GPD (see previous calculation under the sludge holding tank design).

Equipment dewatering rate = 105 GPM

$$\therefore \text{Hours of operation per day @ design capacity} = \frac{25{,}604 \text{ GPD}}{105 \text{ GPM}} = 243 \text{ minutes (or 4 hours/day)}$$

SUSTAINABLE DEWATERING

PRIME ROTARY FAN PRESS TESTING FOR WATER AND WASTEWATER SLUDGE DEWATERING

September 2, 2010

FOR THE CITY OF PINEVILLE, KY WATER AND WASTEWATER TREATMENT PLANTS

PRIME SOLUTION, INC
2861 127TH AVE
ALLEGAN, MI 49010

PHONE: (269) 673-9559
FAX: (269) 673-8241

WEBSITE: WWW.PSIROTARY.COM

Table of Contents

Key Information

Project Site:	City of Pineville WWTP 799 Stewart Branch Road Pineville, KY 40977		
Plant Contact:	Mr. Mike Adkins, WWTP Supt. Mr. Joel Goodin, WTP Supt.		
Consulting Engineer:	Vaughn & Melton Mr. Mitchel L. Brunsma, P.E. Mr. Marios S. Georgiou, P.E.		
PSI Representative:	Southern Sales Mr. Kenny Graham, 502-409-6070 Mr. Ellis King, 859-361-0373		
Test Date(s):	September 2, 2010		
Pilot Test Equipment:	Rotary Fan Press 36D 1" & 1.5" Channel Widths		
Sludge/Slurry Tested:	**WWTP**-Aerobic WAS, **WTP**- Lagoon		
Treatment Process:			
Average Results:	Feed Solids- Cake Solids- Capture Rate- Energy kW-	WWTP:6.3% WWTP:30.1% WWTP:92.3% 1.75	WTP:2.1% WTP:29.0% WTP:95.2%
Independent Lab:	N/A		
Pilot Testing Personnel:	Mr. Joe Dendel, Prime Solution Inc.		
Report Prepared By:	Mr. Joseph Dendel Prime Solution Inc. 2861 127th Avenue Allegan, MI 49010 616-540-0500		

Summary

On-site pilot testing was performed by Prime Solution, Inc. on September 2, 2010 at the City of Pineville WTP and WWTP in Pineville, KY. The mobile pilot unit used for this test was the Prime Solution Rotary Fan Press model #RFP36 including all of the necessary ancillary equipment to condition the sludge, pump the filtrate back to the plant and transfer the cake solids for disposal. The Prime Solution Rotary Fan Press is a unique compact design, totally enclosed, slow moving, low maintenance, semi-automatic operation dewatering process utilizing low pressure differentials separating the liquids from the solids. This dewatering process yields high cakes solids while using very little space/energy and operator time to complete the task.

The Rotary Fan Press operated very consistently over the trial period with a total number of two (2) samples pulled at various WWTP sludge flow rates and pretreatment options. All samples were collected and tested by Prime Solution. The cake solids ranged in dryness from 29.0 – 31.2% during the testing period as well as excellent capture rates averaging >92% and low polymer usage were achieved.

The WTP sludge was pumped from the lagoon and brought to the sight by a tanker with a total number of two (2) samples pulled at various WTP/Lagoon sludge flow rates and pretreatment options. All samples were collected and tested by Prime Solution. The cake solids ranged in dryness from 28.0 – 30.0% during the testing period as well as excellent capture rates averaging >95% and low polymer usage were achieved.

The simple push-button start-up, operation and shutdown procedures where demonstrated during the testing period. When the plant has a minimum of a semi-consistent sludge source feed, the Rotary Fan Press was demonstrated showing how the system would be setup for the automated unmanned operation. Prime Solution can provide the Rotary Fan Press as either a standalone press(s) or integrated as a complete skid package system or a mobile system. Control systems can also be custom designed for the application as well as the sludge cake transfer within the plant.

We are very grateful for the opportunity to provide this pilot testing and for all of the assistance and hospitality provided to us by the personnel of the City of Pineville. Prime Solution is available to discuss how we can help meet your objectives and can provide detailed design drawings and specifications as required for your project.

Prime Solution, Inc. is a 100% American owned company, building sustainable dewatering equipment solutions in Allegan, Michigan USA.

Introduction

Prime Solution, Inc. is a Michigan corporation, with the company headquarters in Allegan, MI. With the final development of the Rotary Fan Press, Prime Solution, Inc. was establish in 2003 and currently has over 100 installations in operation mostly for municipal wastewater treatment plants and industrial applications.

This report presents the methodology and results of the Prime Solution, Inc. Rotary Fan Press pilot test at the City of Pineville, KY WWTP on September 2, 2010. The mobile pilot unit used for this test was the Prime Solution Rotary Fan Press model #RFP36 including all of the necessary ancillary equipment to condition the sludge, pump the filtrate back to the plant and transfer the cake solids for disposal. The Prime Solution Rotary Fan Press is a unique compact design, totally enclosed, slow moving, low maintenance, semi-automatic operation dewatering process utilizing low pressure differentials separating the liquids from the solids. This dewatering process yields high cakes solids while using very little energy and operator time to complete the task.

The dewatering rate is scalable by using the hydraulic throughput of the pilot test listed in gpm per square foot of screen area by the square feet of filtration area per dewatering channel of each of the Rotary Fan Press sizes listed. RFP18 -2.8 sq. ft., RFP24-4.3 sq. ft., RFP36-10.3 sq. ft., RFP48-18.8 sq. ft..

In the conclusion of this report it establishes the design parameters for the future Rotary Fan Press installation.

Equipment Description: PILOT EQUIPMENT- RFP36D Mobile

Equipment Description

The Rotary Fan Press operates using the low differential pressure between the incoming conditioned sludge and the outgoing sludge cake combined with the very slow (1 rpm) rotational motion of the filter screens to advance the sludge through the press. (Water will seek the path of least resistance through the filter screens) As the conditioned sludge enters the annular space between the two wedgewire filter screens a pressure differential develops within the press where the liquid portion of the conditioned sludge seeks to the path of least resistance through the filter screens. The remaining solids are collected inside the two filter screens traveling towards the solids discharge of the press. At the discharge of the press an adjustable restrictor arm slows down the solids forming a (cake) plug. As the plug builds within the restriction discharge area it pushes towards the inside walls of the filter screens and the slow rotation/friction of the filter screens continuously moves the cake solids passed the restrictors arm to be discharged for disposal or further processing. Operation of the Rotary Fan Press can either be continuously or intermittent depending on your application. Clean-up is a simple push of a button, which will automatically run the wash cycle.

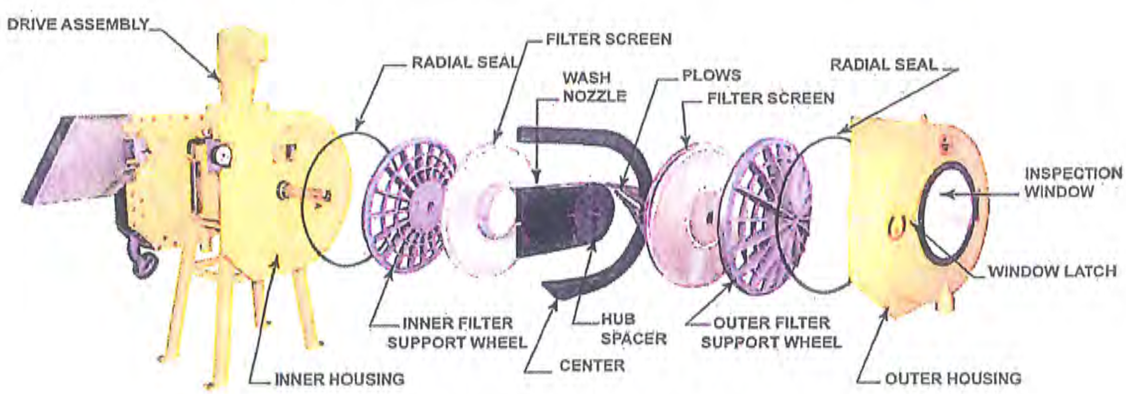


Figure 1 – Basic Construction of the Prime Solution Rotary Fan Press

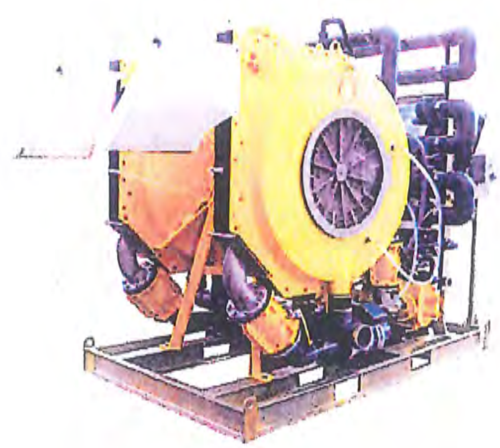
The Rotary Fan Press has very few mechanical parts as illustrated above in Figure 1. The simple slow moving dewatering channel assembly provides for a clean enclosed working environment, long service life and with standard tools any adjustments and/or repairs can be completed simply and quickly.

Equipment Description

The touch screen/PLC controls for the system are very simple to learn and provide for adjustments of the system within the pages of the screen. When establishing the mode of operation the operator can chose the particular set-points that work best for their application and should the application change it is as simple as entering the new set-points. From the touch screen the operator has the option to control the dewatering process from the sludge feed all the way through to sludge cake transfer, thus interlocking the entire system for automatic operation.

The Prime Solution Rotary Fan Press is available in four sizes 18, 24, 36 and 48. All of the Rotary Fan Presses except for the 18 are available with either one or two dewatering channels. The 36 and 48 are expandable up to four dewatering channels. Units ordered with one dewatering channel can add on the additional dewatering channels in the future for additional capacity. Higher throughput capacities are easily achieved by adding additional units will typically discharge the dewatered cake and filtrate into one common point within the plant. Due to the compact design, low speed and enclosed construction the system is very flexible for different mounting locations that will best suit the application as well as save in building and support cost to install the Rotary Fan Press.

All Rotary Fan Presses can be supplied as standalone units interconnected to other ancillary equipment or a complete skid package prewired and preplumbed to be installed with only the utility connections to be made. For the applications that require portability the skid systems can be put on a trailer, shipping container or a truck. Totally enclosed trailer systems can be custom built to your requirements.

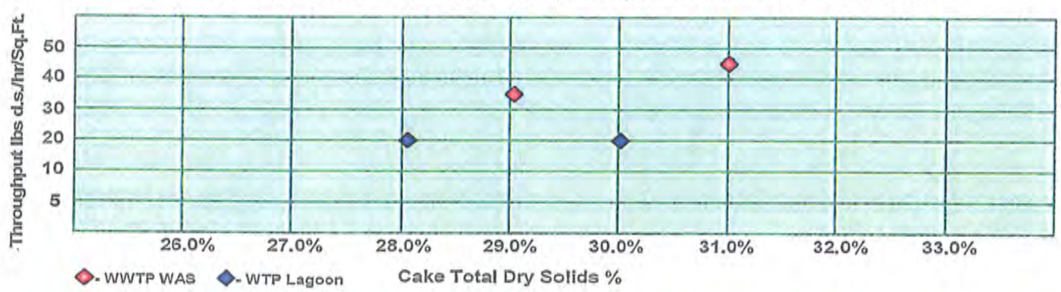


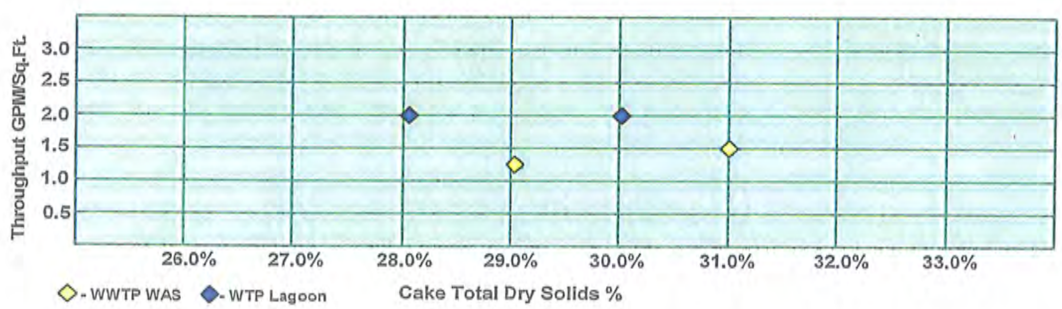
Pilot Testing Results

During the trial period at the City of Pineville, KY WWTP Prime Solution ran several tests on their thickened WAS and WTP lagoon sludge. Drawing the sludge into the Rotary Fan Press system from the sludge return for the WAS and temporary mix tank for the WTP lagoon then at the suction side of the pump diluted/blended emulsion polymer was added to the incoming sludge, where it was mixed inline to form a stable floc before entering the dewatering channels of the Rotary Fan Press.

The best polymer that was found to work for the WAS was a cationic branched/cross linked medium weight, medium charged polymer. Polymer was added at a rate of 12 – 14 lbs (100% active) per dry ton of solids during this test which is considered to be normal for this type of sludge.

Cake Dryness to Hydraulic/Solids Throughput per square foot of Filtration Area





Two (2) samples were pulled for the WTP lagoon sludge with a anionic polymer added to the mix tank prior to adding the cationic polymer as it was pumped to the press. Cake solids averaged 29.0% along with capture rates >95%

The Rotary Fan Press operated very consistently over trial period with a total number of two (2) samples each for WAS pulled during various sludge flow rates and sludge pretreatments. All samples were collected and tested by Prime Solution. The cake solids ranged in dryness from 29.0 – 31.2% during the testing period as well as excellent capture rates greater than 92% were achieved.

Prime Solution, Inc.
2861 127th Avenue
Allegan, MI 49010

Sustainable Dewatering – Simplified

PH: 269/673-9559
FX: 269/673-8241

BUDGETARY PROPOSAL

Date: January 27, 2011 **Number: P110127J1**

TO: Marios S.Georgiou, P.E.

Representative: Mr. Ellis King, Southern Sales
Phone: 859-361-0373
Project: RFP Mobile Dewatering System

We hereby submit specifications and estimates for: One (1) 28' 5th wheel trailer built to the Scope of Supply listed below for a complete Prime Rotary Fan Press Mobile Dewatering System. Maximum dewatering capacities will vary with feed solids, sludge type and desired cake solids will determine the actual amount to be dewatered. . Sludge type, feed solids, polymer selection, desired cake solids and process variations will affect performance of the equipment. The base Scope of Supply shall include one (1) RFP-48D Prime Rotary Fan Press mounted within the trailer unit. All equipment listed below will be factory tested, ready for field installation. Delivery, FET and all other taxes, installation, utility and piping connections not included in listed scope of supply is to be provided/paid for by others.

EQUIPMENT SCOPE OF SUPPLY

-One (1) 28' 5th Wheel Trailer base enclosed and with concession doors two sides, insulated and lined roof and sides on all other walls, roof vents, service door and three sliding windows. Two (2) 8,000 lb. axles with electric/hydraulic braking system. The trailer overall height shall not exceed 13'-6" in overall, standard DOT lighting and the color shall be metallic tan/gray.

- One (1) Trailer additional modifications as follows;
  TRAILER to include; aluminum diamond plate flooring, plumbing, florescent lighting, and110v convenience outlets.
  CONTROL CENTER to include; all items NEMA 4 rated or better.
  PRESS WORK AREA to include; central sump, florescent lighting, convenience outlets, aluminum diamond plate decking, utility supports, one washdown station, and general plumbing additions.

- One (1) Equipment package as follows;
  - **One (1)** RFP48D – 48" Dual Channel Rotary Fan Presses, 5 hp direct drive system and 304 s/s filter plates
  - One (1) RFP and ancillary equipment pre-wired, pre-plumbed and mounted as one system
  - One (1) In line Full Port Pneumatic Mixer w/4-port Injection Ring
  - One (1) PVC Sludge Retention Manifold, Plumbed from sludge pump to rotary press.
  - One (1) Automated flow control system
  - One (1) Mag. flow meter with panel readouts and control settings
  - One (1) Air Compressor, Receiver & Controls
  - One (1) Emulsion Polymer Feed/Blend Systems, with Controls (requires water 45 psi @ 25 gpm)
  - One (1) Rotary Positive Displacement Sludge Feed Pump with VFD gear drive direct coupled
  - One (1) Central Operator Panel with Touch Screen controls, 6" display , lamps and main disconnect power system to include operation of associated dewatering equipment as listed in this scope of supply, 480v/3/60, NEMA 4 rated enclosure.

- One (1) 3day start-up/training trip
- Two (2) Sets of Operational/Maintenance Manuals
- One (1) Standard 1 Year Limited Warranty not to exceed 18 months from shipment

We Propose to furnish material as stated, FOB Factory,-
Complete and in accordance with the above specifications for the sum of: **U.S. Dollars: $ 485,750.00**

All taxes and additional fees not listed this Scope of Supply are to be paid for by the customer.

OPTIONAL ADDERS:

- One (1) Inline grinder with optional bypass..**ADD $13,400.00**
- One (1) Folding sludge cake discharge conveyor with drive, hopper and safety supports.................. **ADD $19,600.00**

Clarifications, Exceptions & Recommendations:

Any system integration, ancillary equipment, services, access platforms, stairs and/or handrails *not* listed in Scope of Supply shall not be part of this proposal and shall be provided by others if required.

All equipment off loading, site storage, installation and interconnecting wiring and piping between all equipment listed and other ancillary equipment or sources shall be by others as selected or retained by the customer.

Any and all required polymers, testing fees, etc. not listed as included in Prime Solution, Inc. Equipment Scope of Supply shall be provided and/or paid for by others.

Delays in shipment by the customer, the customer agrees to pay storage charges equal to 0.5% of the total project order per month order is held by Prime Solution for shipment.

The customer shall be responsible to provide all suitable pretreatment chemistry for obtaining a suitable and stable flocculated sludge/slurry for mechanical dewatering to achieve any performance requirements. Prime Solution only can estimate production performance based upon information supplied by the engineer/customer, lab samples or on-site pilot testing and does not take any responsibility for final equipment performance unless overall process approved by Prime Solution, Inc. in writing.

Any changes and/or omissions in any way to the type of sludge/slurry listed in any specifications that effects dewaterablity of the sludge/slurry shall release Prime Solution of any performance responsibility. The customer understands and agrees that the type of sludge, pretreatment process, pretreatment chemistry, feed solids, polymer selection, sludge age, amount of volatile solids, desired capture rate and cake solids will affect the sludge's ability to be dewatered and performance/flow rate of the equipment.

Should any additional service trips, equipment, supplies and/or labor be required by Prime Solution to assist the customer beyond what is listed in this Scope of Supply, these charges shall be in addition to the price listed in this Scope of Supply.

Terms: 10% due upon submittals, (80%) due upon completion and prior to startup, balance (10%) balance due net 30 days after approved start-up not to exceed 45 days from shipment. All other services shall be net 30 days.

Marios S. Georgiou

From:	Joe Dendel [joe@psirotary.com]
Sent:	Friday, January 28, 2011 11:54 AM
To:	'Ellis King'; Marios S. Georgiou; Mitch L. Brunsma
Cc:	'Michele Arthur'; 'Joey Dendel'
Subject:	RE: Pineville Fan Press Quote No. p090729j3

Ellis,

I am leaving the office and can have this redone on Monday, but until then if the system was just a skid mount system the budget price would be $365,000.00 as sized.

Best regards,

Joseph Dendel
President

Sustainable Dewatering – Simplified

P: 269-673-9559
W: www.psirotary.com

From: Ellis King [mailto:EKing@southernsalesinc.com]
Sent: Friday, January 28, 2011 9:51 AM
To: 'Joe Dendel'; 'Marios S. Georgiou'; 'Mitch L. Brunsma'
Cc: 'Michele Arthur'; 'Joey Dendel'
Subject: Pineville Fan Press Quote No. p090729j3

Joe, I just left you a voice mail message asking you to provide separate pricing for the trailer.

Thanks

Regards to all.

Ellis M. King
eking@southernsalesinc.com
(859) 361-0373 cell

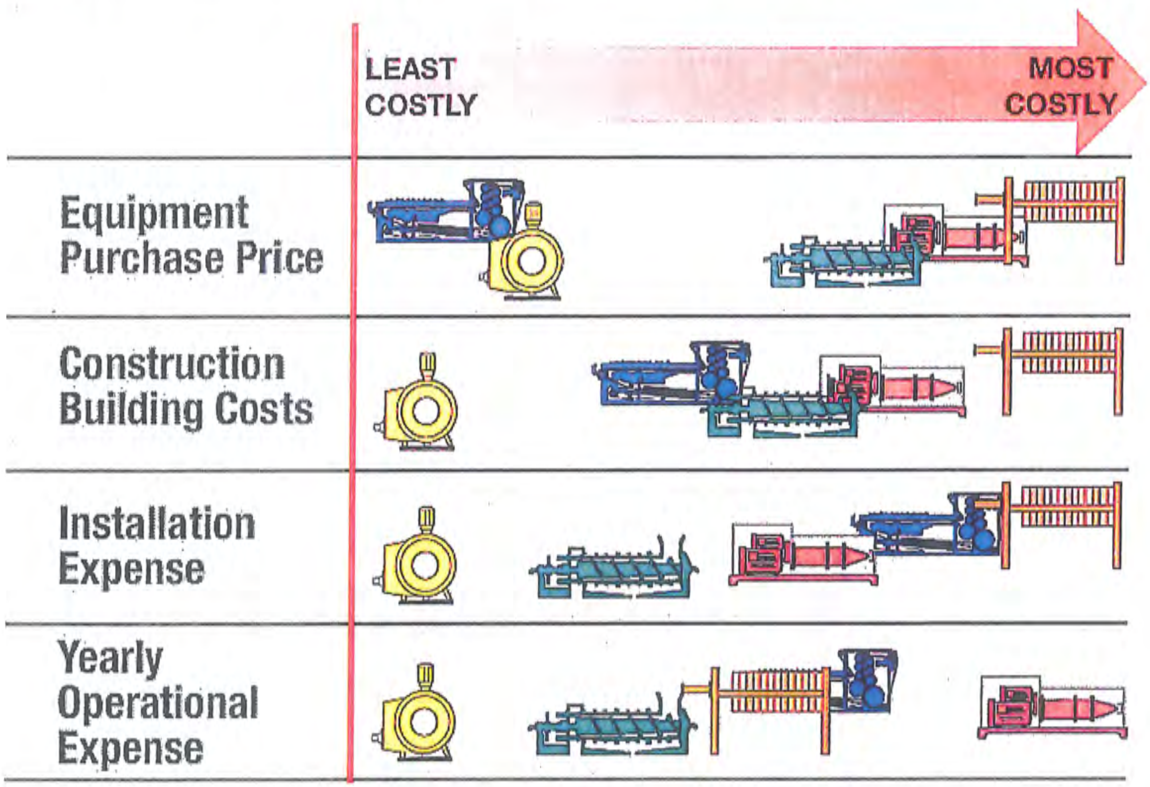
From: Joe Dendel [mailto:joe@psirotary.com]
Sent: Friday, January 28, 2011 5:43 AM
To: 'Marios S. Georgiou'; Ellis King; 'Mitch L. Brunsma'
Cc: 'Michele Arthur'; 'Joey Dendel'
Subject: RE: Pineville Fan Press Quote No. p090729j3

Marios,

Pictures from Pilot Testing

Sludge Dewatering Advantages

DESCRIPTION	Rotary Fan Press	Belt Filter Press	Centrifuge	Screw Press	Plate & Frame
Low purchase price	✓				
Minimal space requirments	✓		✓		
Continuous operation	✓	✓	✓	✓	
Totally enclosed	✓		✓		✓
Low power consumption	✓			✓	
Minimal parts susceptible to wear	✓				
High cake solids	✓		✓		✓
Minimal wash water required	✓		✓		
Easily automated	✓		✓		
Requires no special building design	✓				
Expandable	✓				✓
Minimal time required for start-up & shut down	✓				



Conclusion and Recommendations

Pilot testing was performed at the City of Pineville, KY WWTP over the time frame of September 2, 2010. The piloting trials presented in this report clearly demonstrate the capability of the Prime Solution Rotary Fan Press dewatering technology to effectively dewater both the WWTP WAS and WTP sludge from the City of Pineville, KY WWTP/WTP.

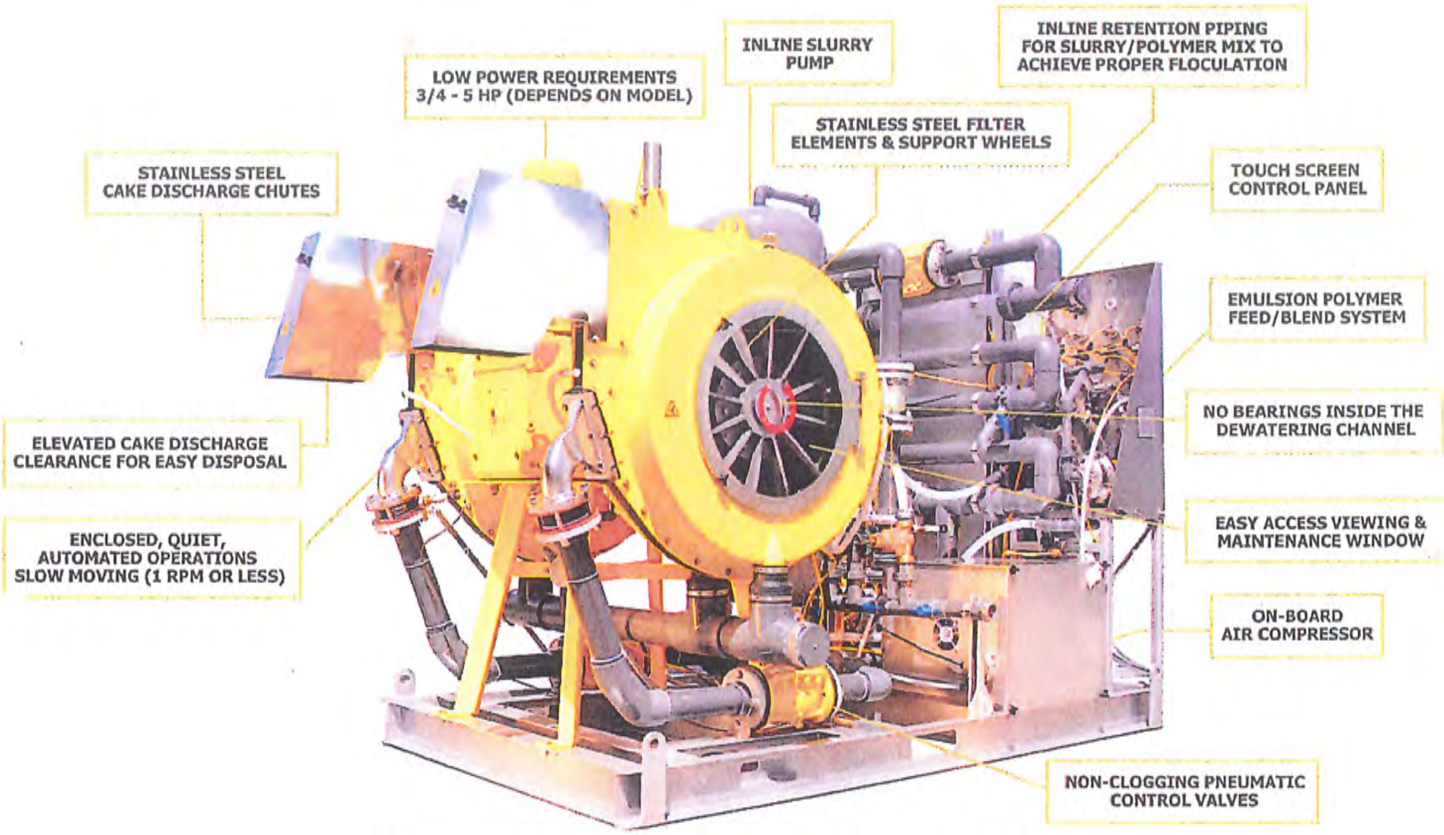
The Prime Solution Rotary Fan Press 2 year warranty is twice as long as any other manufacture in the industry providing for years of trouble free operation.

The simple easy automatic operation of the Rotary Fan Press was demonstrated along with the consistency to produce high cake solids while using low energy and wash water. The slow speed, totally enclosed design, small footprint with the lowest maintenance of any mechanical dewatering technology provides for long sustainable dewatering for the WWTP.

Should the City of Pineville, KY WWTP/WTP wish to utilize the Rotary Fan Press for both the WWTP and WTP sludge a skid system package could be trailer mounted and moved from site to site. Eventually the skid system could be permanently installed at either of the treatment plants. With the compact, low speed and enclosed design of the Rotary Fan Press allows for many space saving installations options.

Prime Solution, Inc. is available and willing to assist in maximizing the solids dewatering process and would like to express its gratitude to the City of Pineville, KY WWTP/WTP for the opportunity and support for the piloting test.

THE PRIME DEWATERING SYSTEM
PLUG IN & READY TO DEWATER



PRIME PRE-PACKAGED SKID SYSTEMS ARE OPERATIONAL READY

Prime Solution is meeting the demands of the dewatering market with our compact pre-packaged skid system. The enclosed unit delivers high throughputs in a compact space. Each system is pre-engineered and includes a Prime-Blend emulsion polymer system, inline slurry pump and inline retention piping for easy integration into the facility's system. The skid system comes factory-assembled, tested and ready for immediate operation.

PRIME
SUSTAINABLE DEWATERING

Phone 269-673-9559 psirotary.com

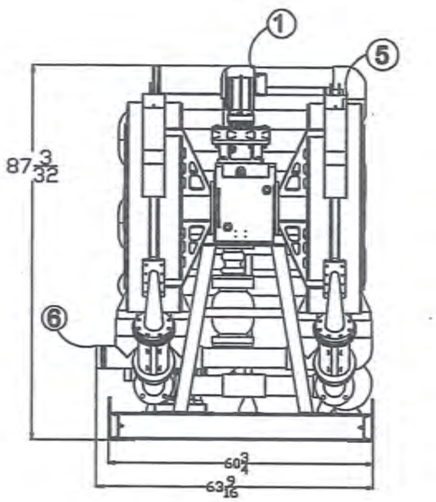
DRY WEIGHT 6200 LBS

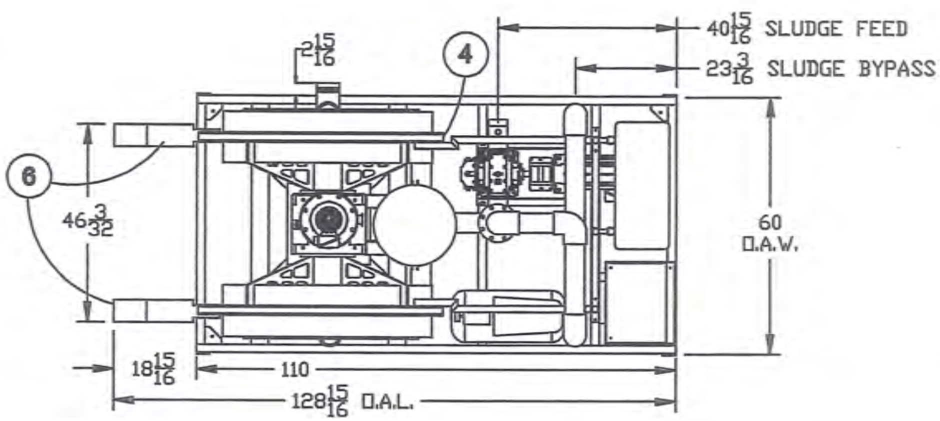
STANDARD SPECIFICATIONS

CAPACITY	140 GPM AVG.
HP	ROTARY FAN PRESS 5 HP
VOLTAGE	480V/3ph/60HZ 40 FLA.
WATER	INTERMITTENT WASH INNER CHANNEL 15 GPM @ 45 PSI OUTER CHANNEL 15 GPM @ 45 PSI
CONNECTIONS	

SLUDGE FEED	4" 150# FLANGE
FILTRATE DISCHARGE	4" FNPT
WATER INLET	2" FNPT

ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	-	48" DRIVE ASSEMBLY
2	2	-	RFP 48 INLET WELDMENT ASS'Y
3	1	-	PNEUMATIC ASSEMBLY
4	1	-	ELECTRICAL ASSEMBLY
5	1	-	48" ASS'Y RETENSION PLUMBING
6	1	-	48" ASSEMBLY BASE FRAME
7	1	-	48" ASSEMBLY SLUDGE PUMP
8	1	-	POLYMER FEED BLEND ASSEMBLY





REV.	DESCRIPTION	DATE:	BY:

PRIME Solution Inc.
2061 127 TH AVE. ALLEGAN, MI 49010
PH: 269/673-9559 FAX: 269/673-6241

TOLERANCES:
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FRACTIONAL ± 1/32
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DIMENSIONS (INCHES) UNLESS OTHERWISE SPECIFIED
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SOLUTION, INC. PRIOR WRITTEN PERMISSION IS REQUIRED FROM PRIME SOLUTION, INC. FOR ANY DUPLICATION OF SUPPLIED INFORMATION CONTAINED ON THIS DRAWING.

TITLE / DESCRIPTION: ASSEMBLY RFP-48D

DRAWN BY/DATE: GS 2-25-08
CHECKED BY/DATE:
DRAWING No. —
SCALE:
SHEET: 1 OF 2

DISINFECTION SYSTEM

Marios S. Georgiou

From:	Jim Grant [jgrant@ew2.net]
ent:	Wednesday, September 26, 2012 1:46 PM
o:	Marios S. Georgiou
Subject:	RE: Pineville WWTP Expansion-Kentucky
Attachments:	Pineville WWTP Expansion, KY UV3000Plus Quote (LBZ1248, 45% UVT) 2012-09-26 .docx

Marios,

You have identified the Pineville WWTP process as a lagoon. Lagoons typically have lower UVTs and high TSS compared to other wastewater processes. Without UVT information, we are assuming a UVT of 45% for the proposal attached. That being said, I had Trojan give me a range of equipment and operational cost for 45% to 65%. See chart below.

Use this one since we are using new secondary clar./conv.

UVT (%)	65	45
Peak Flow (MGD)	4.5	4.5
Average Flow (MGD)	1.2	1.2
Total lamps	48	112
Peak Power (kW)	12	28
Average Power (kW)	3.8	12.3
Average Annual Lamp Replacement	18	40
Capital Cost	$175,000	$290,000
Annual Power Cost	$1,663	$5,381
Annual Lamp Replacement Cost	$5,652	$12,560
Total Annual O&M Cost (power + lamps)	$7,315	$17,941

Hope this is of great assistance to your evaluation. Let me know if you need further information.

James (Jim) H. Grant, P.E.
EW2 Environmental, Inc.
Phone: 704/542-2444
Fax: 704/542-7003
Mobile: 704/577-9437
E-mail: jgrant@ew2.net

See our equipment on our website: www.ew2.net

From: Marios S. Georgiou [mailto:msgeorgiou@Vaughnmelton.com]
Sent: Tuesday, September 25, 2012 1:08 PM
To: Jim Grant
Subject: Pineville WWTP Expansion-Kentucky

Jim:

an you please provide a rough cost estimate and a draft system layout for an open channel type Trojan UV system to andle
1.2 MGD average daily flow, and a peak flow of 4.5 MGD. Need two banks of UV modules at least. Need the system with the self cleaning bulbs if possible.

The treated effluent will be coming from a Biolac type lagoon system. It operates in an extended aeration mode and has secondary clarification following the lagoon system.
¯he influent to the UV channel should be less than 30/30 mg/l of BOD/TSS.

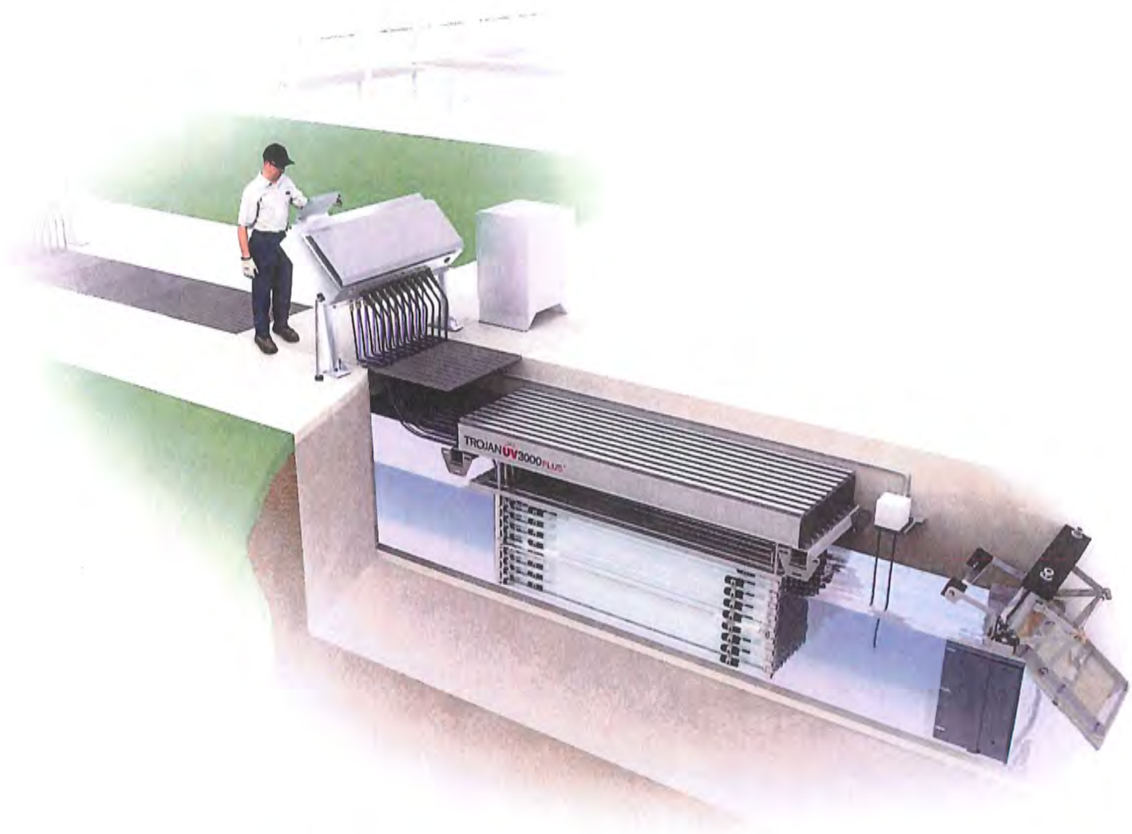
Wastewater is mostly residential/commercial. The project is located in Bell County Kentucky.

thanks

Marios S. Georgiou P.E.
Vaughn & Melton Consulting Engineers
Park Terrace Center
1318-F Patton Avenue
Asheville NC 28806
828-253-2796
msgeorgiou@vaughnmelton.com

TROJANUV3000PLUS™

PROPOSAL FOR THE PINEVILLE WWTP EXPANSION, KY
QUOTE: LBZ1248
26/09/2012



The TrojanUV3000Plus™ is operating in **over 1300** municipal wastewater plants around the world. Disinfecting **over 17 billion** gallons a day, the TrojanUV3000Plus™ has become the reference standard in the industry.

TROJAN UV3000 PLUS™

September 26, 2012

Vaughn & Melton Consulting Engineers
Park Terrace Center, 1318-F Patton Ave.
Asheville, NC 28806
US

Attention: Marios S. Georgiou

In response to your request, we are pleased to provide the following TrojanUV3000Plus™ proposal for the **Pineville WWTP Expansion** project.

The TrojanUV3000Plus™ has been shown in over 1300 installations to provide dependable performance, simplified maintenance, and superior electrical efficiency. As explained in this proposal, the system incorporates innovative features to reduce O&M costs, including variable output electronic ballasts to provide dimming capability and Trojan's revolutionary ActiClean-WW™ system – the industry's only online chemical and mechanical quartz sleeve cleaning system. All Trojan installations are supported by a global network of certified Service Representatives providing local service and support.

Please do not hesitate to call us if you have any questions regarding this proposal. Thank you for the opportunity to quote the TrojanUV3000Plus™ and we look forward to working with you on this project.

With best regards,

Ben Zwart
3020 Gore Road
London, Ontario N5V 4T7
Canada
(519) 457 – 3400 ext. 2112
bzwart@trojanuv.com

Local Representative:
James H. Grant
EW2 ENVIRONMENTAL, INC.
7245 Pineville-Matthews Road
Suite 100, Charlotte, NC. 28226
USA
(704) 542-2444

DESIGN CRITERIA

PINEVILLE WWTP EXPANSION

Peak Design Flow:	**4.5 MGD**
UV Transmittance:	**45%** (minimum)
Total Suspended Solids:	**30 mg/l** (30 Day Average, grab sample)
Disinfection Limit:	**200 fecal coliform per 100 ml**, based on a 30 day Geometric Mean of consecutive daily grab samples
Validation Factors:	**0.98** end of lamp life factor (Low-Pressure Amalgam Lamps) **0.95** fouling factor (ActiClean-WW™ Chemical / Mechanical Cleaning System)

DESIGN SUMMARY

QUOTE: LBZ1248

Based on the above design criteria, the TrojanUV3000Plus™ proposed consists of:

CHANNEL (Please reference Trojan layout drawings for details.)	
Number of Channels:	**1**
Approximate Channel Length Required:	**30 ft**
Channel Width Based on Number of UV Modules:	**21 in**
Channel Depth Recommended for UV Module Access:	**54 in**
UV MODULES	
Total Number of Banks:	**2**
Number of Modules per Bank:	**7**
Number of Lamps per Module:	**8**
Total Number of UV Lamps:	**112**
Maximum Power Draw:	**28 kW**
UV PANELS	
Power Distribution Center Quantity:	**2**
System Control Center Quantity:	**1**
MISCELLANEOUS EQUIPMENT	
Level Controller Quantity:	**1**
Type of Level Controller:	**Fixed Weir**
Automatic Chemical / Mechanical Cleaning:	**Trojan ActiClean-WW™**
UV Module Lifting Device:	**Davit Crane**
Standard Spare Parts / Safety Equipment:	**Included**

ELECTRICAL REQUIREMENTS

1. Each Power Distribution Center requires an electrical supply of one (1) 480 Volts, 3 phase, 4 wire (plus ground), 16.8 kVA.
2. The Hydraulic System Center requires an electrical power supply that is powered from the Power Distribution Center.
3. The System Control Center requires an electrical supply of one (1) 120 Volts, 1 phase, 2 wire (plus ground), 15 Amps.
4. Electrical disconnects required per local code are not included in this proposal.

COMMERCIAL INFORMATION

Total Capital Cost: $290,000 (US$)

This price excludes any taxes that may be applicable and is valid for 90 days from the date of this letter.

OPERATING COST ESTIMATE

Operating Conditions

Average Flow: **1.2 MGD**
Yearly Usage: **8750 hours**
UV Transmittance: **45%**

Power Requirements		Lamp Replacement	
Average Power Draw:	**12.3 kW**	Number lamps per year:	**40**
Cost per kW hour:	**$0.05**	Price per lamp:	**$314**
Annual Power Cost:	**$5,381**	**Annual Lamp Replacement Cost:**	**$12,560**
Total Annual O&M Cost: $17,941			

This cost estimate is based on the average flow and UV transmittance listed above. Actual operating costs may be lower due to the TrojanUV3000Plus™ automatic dose pacing control system. As UV demand decreases, by a change in operating conditions, the power level of the lamps decreases accordingly. The dose pacing system minimizes equipment power levels while the target UV dose is maintained to ensure disinfection at all times.

EQUIPMENT WARRANTEES

1. Trojan Technologies warrants all components of the system (excluding UV lamps) against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment, whichever comes first.
2. UV lamps purchased are warranted for 12,000 hours of operation or 3 years from shipment, whichever comes first. The warranty is pro-rated after 9,000 hours of operation. This means that if a lamp fails prior to 9,000 hours of use, a new lamp is provided at no charge.
3. Electronic ballasts are warranted for 5 years, pro-rated after 1 year.

MEMBRANE BIOREACTOR SYSTEM

Marios Georgiou

From: Jones, Brian [Brian.Jones@veoliawater.com]
Sent: Monday, November 12, 2012 11:09 AM
To: Marios Georgiou
Subject: Pineville, KY
Attachments: Phased MBR MRC Proposal Pineville KY 102912.pdf

Marios,

Please see the attached MBR proposal for Pineville...I apologize for the delay, but please don't hesitate to contact me with any questions you may have, or any changes to the design criteria.

Thanks,

Brian Jones
Kruger, Inc.
MBR Sales Manager
919-809-3133
brian.jones@veoliawater.com

KRÜGER

November 12, 2012

Marios S. Georgiou P.E.
Vaughn & Melton Consulting Engineers
Park Terrace Center
1318-F Patton Avenue
Asheville NC 28806

Re: NEOSEP® MBR
Pineville, KY
Kruger Project No: 5700117207

Dear Mr. Geogiou:

Please find enclosed Kruger's budgetary proposal for an MBR system design for Pineville, KY. Kruger is recommending converting the existing lagoon into a phased MBR process configuration which will consist of a single biological train and a dual membrane train containing hollow fiber membranes. The Phased MBR system utilizes a de-oz zone, and anaerobic selector, and two bioreactors in front of the submerged membrane basins. Each bioreactor is fitted with both aeration and mixing capabilities. The anoxic and oxic phases are adjusted based on TKN load into the plant and wastewater temperature. Note that the membrane tanks will require new construction. The design criteria are given as volumes required for the biological system and this can be verified once more information about the existing lagoon is provided. The proposed design is capable of treating 1.2 MGD average daily flow 2.4 MGD equalized peak daily flow. Equalization is required for flows greater than 2.4 MGD and is not included in this proposal. Kruger would be happy to assist with the design of the equalization basin if needed.

The process will easily achieve effluent objectives of CBOD/TSS/TN/TP less than 20/20/10/2 mg/L. CBOD and TSS would in fact be near non-detectable levels and effluent turbidity will easily be maintained well below 1.0 NTU. Standby chemical addition is recommended (provided by others) to achieve the TP limit of 2 mg/L. The system proposed includes a comprehensive scope of supply as you will see in the detailed equipment listing.

Kruger appreciates the opportunity to provide this proposal to you. If you have any questions or need further information, please contact our local representative, Gary Lubin with HPT or Kruger's MBR Sales Manager Brian Jones (919-809-3133, brian.jones@veoliawater.com).

Respectfully,
I. Kruger Inc.

Sent via email.

Tripp Waymack
Application Engineer

cc: MAD, BJ, AWG, CQH, BAF (Kruger)
Gary Lubin (HPT)

VEOLIA
WATER
Solutions & Technologies

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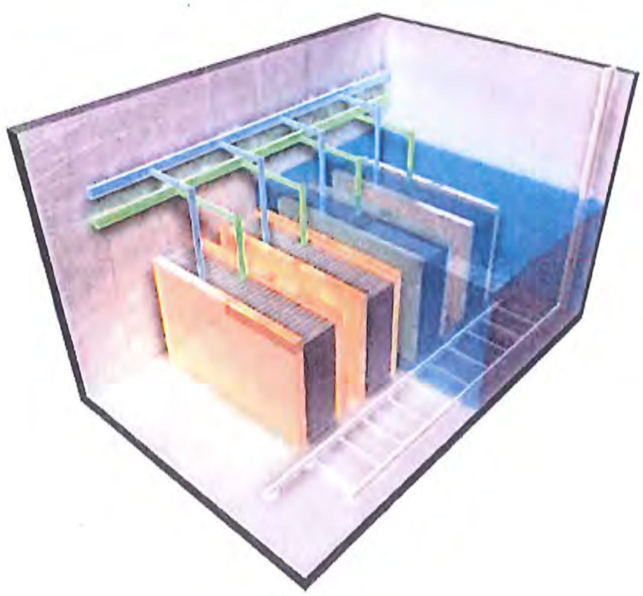
NEOSEP® MBR Proposal for

Pineville, KY

Kruger Project No.: 5700117207



Marios S. Georgiou P.E.
Vaughn & Melton Consulting Engineers
Park Terrace Center
1318-F Patton Avenue
Asheville NC 28806

November 1, 2012

VEOLIA WATER
Solutions & Technologies

1. Company Introduction

I. Kruger Inc. (Kruger) is a water and wastewater solutions provider specializing in the design and supply of advanced and innovative water and wastewater treatment solutions. The ACTIFLO® Microsand Ballasted Clarifier, BIOCON® Dryer, BIOSTYR® Biological Aerated Filter (BAF), NEOSEP® MBR and HYDROTECH Discfilters are just a few of the innovative technologies offered by Kruger. Kruger is a subsidiary of Veolia Water Solutions and Technologies (VWS), a world leader in engineering and technological solutions in water treatment for industrial companies and municipal authorities.

Kruger and Veolia Water Solutions & Technologies (VWS) actively pursue strategies to deliver sustainable and resource-efficient technologies to improve operations, reduce costs, decrease dependency on limited resource, and comply with current and anticipated regulations. Our investments in R&D typically outpace that of our competition, with a focus on developing:

- neutral or positive energy solutions
- minimized chemical consumption
- water-footprint-efficient technologies with high recovery rates
- low total system carbon footprints

By committing to the innovative development of clean and sustainable technologies and solutions worldwide, Kruger and VWS will continue to maximize the financial benefits for every customer.

2. Process Description

NEOSEP MBR System

The Kruger Phased MBR is a time managed activated sludge process that achieves nitrification and denitrification without the need for the recirculation of nitrified mixed liquor. The system consists of a pair of equal volume bioreactors, in which conditions are alternated between aerobic and anoxic. Instead of recycling nitrate rich mixed liquor at a high rate from an aerobic reactor to an upstream anoxic zone in order to achieve denitrification, the conditions within each reactor are simply alternated between aerobic and anoxic. Membrane tanks following the bioreactors provide the liquid/solid separation step. In addition, by controlled alternation of the flow path of sludge recycled (RAS) from the Membrane Tanks to the main bioreactors, the phased MBR eliminates re-introduction of high DO mixed liquor into the anoxic bioreactor.

An anaerobic selector can be added in front of the phased MBR process to achieve biological phosphorus removal. A fraction of the return sludge passes through a small de-oxygenation zone and then is sent to the anaerobic selector to ensure true anaerobic conditions in the selector.

The complete operating cycle mainly consists of two separate phases (A and C). In Phase A, influent wastewater passes through the anaerobic selector and then is directed to Reactor 1, which is in the anoxic state (aeration equipment off and mixing equipment on) where denitrification takes place using the influent BOD as the carbon source. In Reactor 1, the nitrate formed in a previous phase is reduced to nitrogen gas (N_2). The flow pattern is series flow from Reactor 1 to Reactor 2 through a gate or opening in the wall separating the reactors. During Phase A, Reactor 2 is in the aerobic state (aeration equipment on and mixing equipment off) where nitrification reactions will take place. The mixed liquor is then distributed equally to parallel Membrane Tanks where solids separation takes place. Figure 1 provides a flow diagram of phase A.

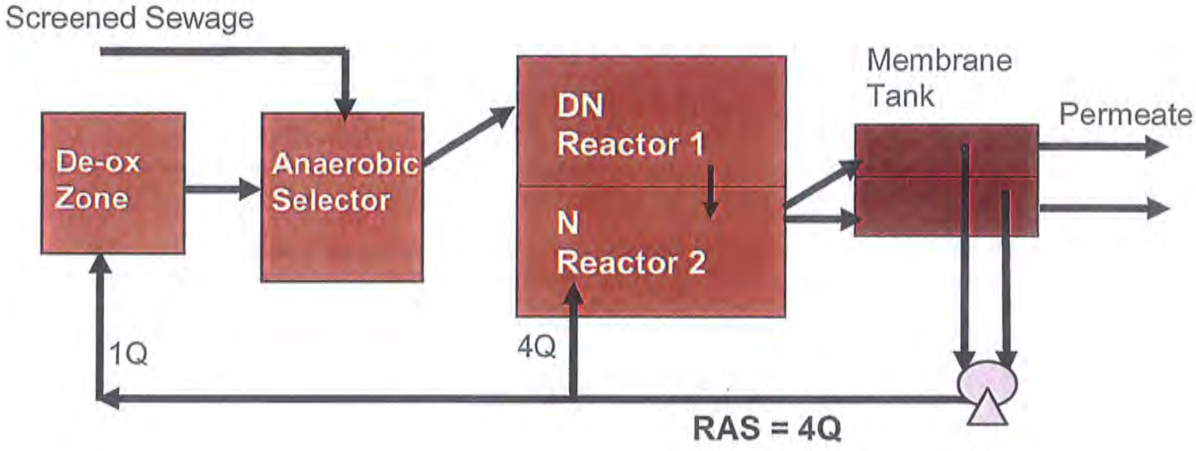


Figure 1 – Kruger Phased MBR – Phase A

Return activated sludge is conveyed from the Membrane Tanks to a RAS wetwell and pumped to an aerobic reactor, in this case Reactor 2. Recycling mixed liquor from the Membrane Tanks to the bioreactors is required in order to maintain a solids gradient at the membrane surfaces and to re-introduce the biomass to its food and oxygen source. However, since DO in the Membrane Tanks will always be relatively high, recycling RAS could potentially disrupt or reduce the denitrification rate in an anoxic bioreactor by making available an alternative electron acceptor (DO). In the Phased MBR system, the high DO mixed liquor present in the Membrane Tanks will always be introduced to an aerobic reactor ensuring that the denitrification phases will proceed in an efficient manner.

Phase C is the mirror image of phase A. The influent is now fed to bioreactor 2 after passing through the anaerobic selector, which is in an anoxic mode. Bioreactor 2 can now use the carbon in the influent stream to denitrify all of the nitrate that was formed in that reactor during phase A. Figure 2 displays the flow diagram for phase C.

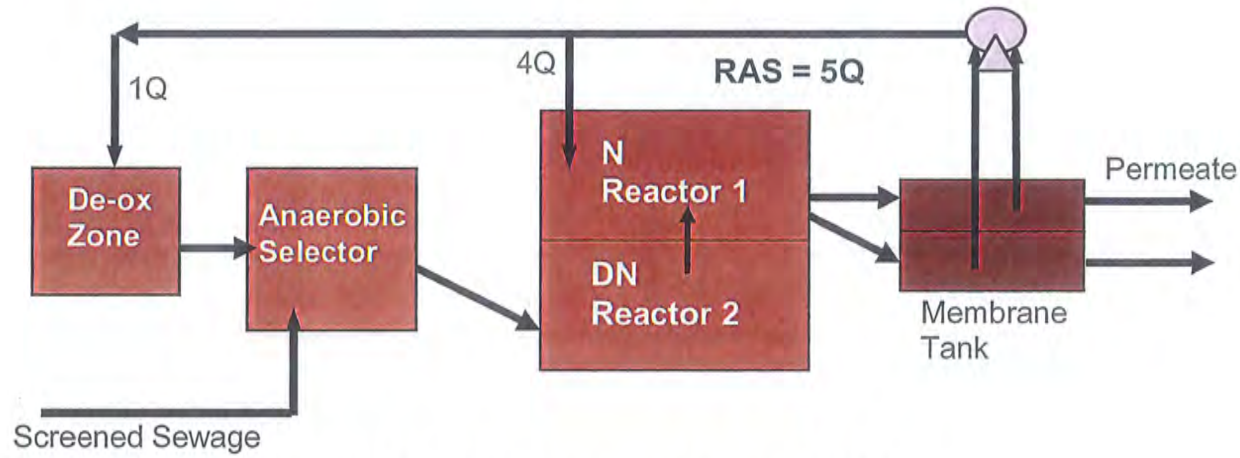


Figure 2 – Kruger Phased MBR – Phase C

Additional phases can be incorporated in Phase MBR operation. For example, Phases B and D can be added into the operation cycle when complete nitrification is required for wastewater containing high TKN concentration and with low temperatures. Figure 3 provides a flow diagram of Phase B, which will immediately follow Phase A. In previous phase (Phase A), Reactor 1 is in anoxic conditions and receiving the selector effluent. Ammonia concentration will be high at the end of phase A. In Phase B, Reactor 1 will be operated under aerobic condition in batch model. This phase will reduce the ammonia concentration in Reactor 1 significantly.

Figure 4 provides a flow diagram of Phase D, which will immediately follow Phase C. Phase D is the mirror image of phase B. Phases B and D usually are short in time compared to Phases A and C.

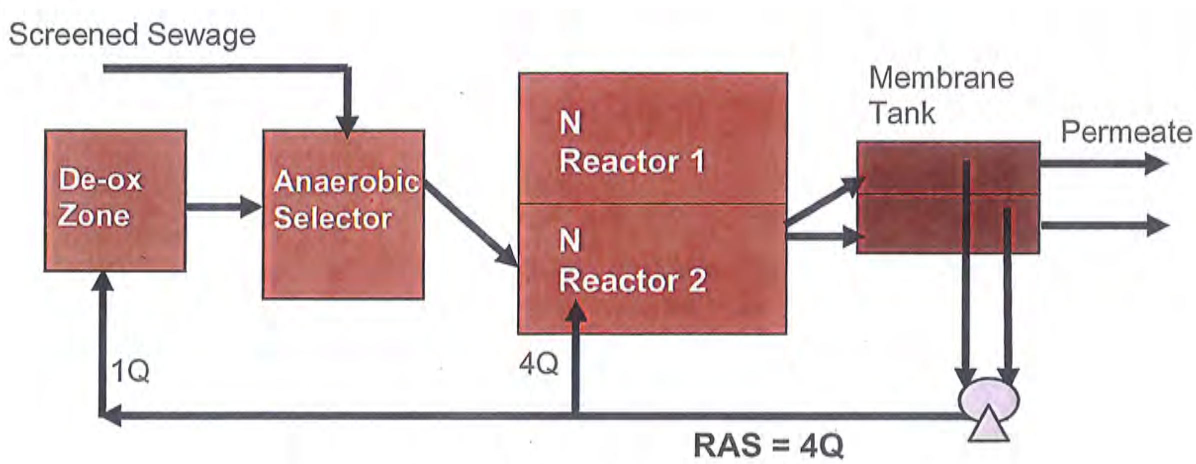


Figure 3 – Kruger Phased MBR – Phase B

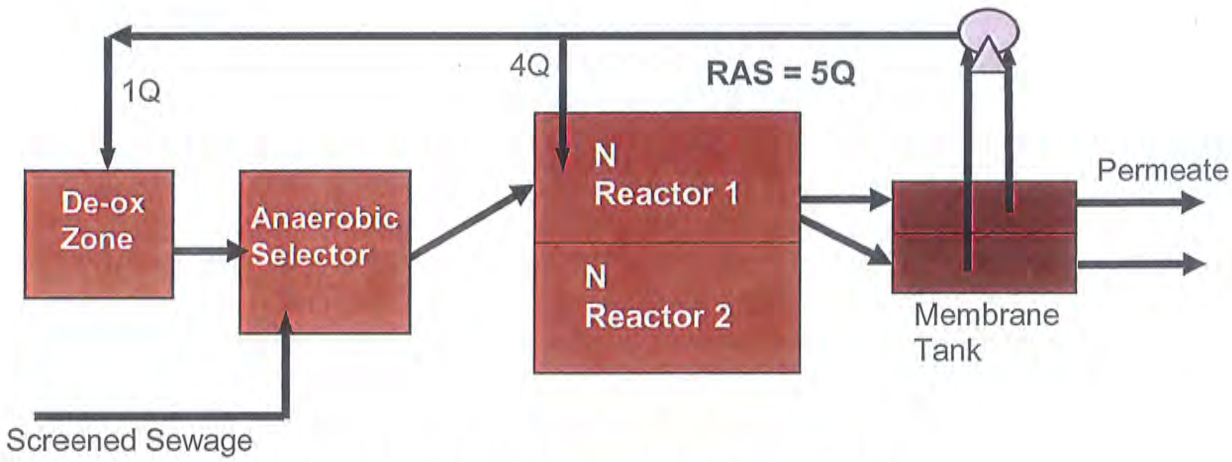


Figure 4 – Kruger Phased MBR – Phase D

The Phased MBR system has distinct advantages over more conventional MBR designs including the following:

- Power Reduction
  - one sludge Recirculation Stream is eliminated (nitrate recirculation pumping station is not necessary)
  - Optimized Nitrification – Less Blower Runtime
- No negative impact on Denitrification due to recirculated residual DO
- Anoxic and Oxic HRTs are Not Fixed and can be adjusted to handle changes in plant loading and effluent requirements
- Anaerobic zone and DN Zones operate at Higher MLSS profiles compared to conventional BNR processes with multiple recirculation loops.

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3. Process Design Summary

The design basis is summarized in Table 1. The target effluent criteria are listed in Table 2. The process design is summarized in Table 3.

Table 1: Influent Design Basis

Parameter	Units	Value
Flow, Annual Avg.	MGD	1.2
Flow, Equalized Peak	MGD	2.4
CBOD	mg/L	300
TSS	mg/L	350
TKN	mg/L	40
TP	mg/L	9
Elevation	Ft AMSL	1,000
Min/Max Temperature	^{o}C	10/20

* Assumed values

Table 2: Effluent – 30-Day Average

Parameter	Units	MBR Effluent
CBOD	mg/L	< 20
TSS	mg/L	< 20
TN	mg/L	< 10
TP	mg/L	< 2

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Table 3: Process Design Summary

Parameter	Units	Value
RAS De-oxygenation Zone (Utilize portion of existing lagoon)		
Number of Trains	---	1
Number of Tanks per Train	--	1
SWD*	ft	12
Total Volume	gals	25,000
HRT	hrs	0.5
RAS flow to De-Oxygenation Zone	--	100% of Influent
Anaerobic Selector (Utilize portion of existing lagoon)		
Number of Trains	---	1
Number of Tanks per Train	---	1
SWD*	ft	12
Total Volume	gals	50,000
HRT	hrs	1.0
Anoxic/Oxic Phased Aeration Tanks (Utilize portion of existing lagoon)		
Number of Trains	---	1
Number of Tanks per Train	---	2
SWD*	ft	12
Tank Volume (per tank)	gals	225,000
HRT	Hrs	9.0
SRT (total)	Days	20
MLSS (at $10^{o}C$)	mg/L	10,100
Alpha, beta	--	0.57/0.95
Designed OUR	mg/L	65
Residual DO concentration	mg/L	2.0
Designed AOR	lb O_2/hr	115
Designed SOR**	lb O_2/hr	282
Total Process Air Required (Two Phases)**	SCFM	1,403

VEOLIA WATER
Solutions & Technologies

RAS flow to Aeration Tanks during Oxic Phase	--	400% of influent
Membrane Tanks		
Number of Trains	---	2
Number of Tanks per Train	---	1
Number of Modules (per Tank)	---	4
Length/Width (per Tank)	ft	27.75' x 15.0'
SWD	ft	12.0
HRT	hrs	1.5
MLSS (at 10°C)	mg/L	11,700
Design Average Net Flux Rate	gal/ft²/day	9.3
Design Peak Net Flux Rate (based on Equalized peak of 2.4 MGD)	gal/ft²/day	18.6
Waste Sludge Production (at 10°C)	lb/d	2,480
Scour Air Required per tank	SCFM	645

*Assumed SWD of lagoon.
**Based on assumed SWD.

4. Scope of Supply

Kruger is pleased to present our scope of supply which includes process engineering design, equipment procurement, and field services required for the proposed treatment system, as related to the equipment specified. The work will be performed to Kruger's high standards under the direction of a Project Manager. All matters related to the design, installation, or performance of the system shall be communicated through the Kruger representative giving the Engineer and Owner ready access to Kruger's extensive capabilities.

Process and Design Engineering

Kruger provides comprehensive process engineering and design support for our NEOSEP MBR® system, including but not limited to:

- Detail process design assistance including BIOWIN modeling of the system for confirmation of design capabilities.
- Provision of drawings and specifications for use by the consulting engineer in developing the detailed plant design.
- Provision of calculations and other data and attendance at meetings as necessary during state approval processes.
- Shop drawing submittal for Engineer's review and approval. Includes detailed equipment information for all equipment supplied by Kruger.
- Equipment installation instructions for all equipment supplied by Kruger.

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Field Services
Kruger will furnish the services of a Field Engineer(s) to inspect the installation of each completed system, place the system in initial operation, and to instruct operating personnel on the proper use of the equipment. Specifically, Kruger will provide:

- Six (6) man-days in two (2) trips for installation inspection.
- Eight (8) man-days in two (2) trips for equipment start-up and training.
- Two (2) man-days in one (1) trip for follow-up training and process optimization.

Process and Mechanical Equipment
Kruger will supply the following equipment:

- Two (2) AISI 304 perforated rotary drum screens (1 duty, 1 standby), inclusive of gear drive, spray washing system, 1 mm, TEFC 460 volt, 3 phase motor, each capable of screening 1,667 GPM,
- Eight (8) Hollow fiber membrane modules, <total of 16,146 ft^2 (1,500 m^2) per module>, fine bubble scour aeration grid, and AISI 304 frame,
- Two (2) RAS pumps (1 duty, 1 standby) to pump from RAS wetwell to aeration zone, 4,167 GPM at 15 ft TDH, 30 HP inverter duty 460 volt, 3 phase motor,
- Three (3) Permeate pumps (2 duty, 1 installed standby), 952 GPM at 25 ft TDH, 15 HP inverter duty 460 volt, 3 phase motor,
- Two (2) De-ox zone submersible mixers, inclusive of mast system, hoist, winch and lifting cable, 460 volt, 3 phase motor,
- Two (2) Anaerobic selector zone submersible mixers, inclusive of mast system, hoist, winch and lifting cable, 460 volt, 3 phase motor,
- Two (2) Anoxic zone submersible mixers (for use in reactors during anoxic phase), inclusive of mast system, hoist, winch and lifting cable, 460 volt, 3 phase motor,
- Two (2) automated permeate anti-siphon valves,
- Two (2) modulating eccentric plug valves for RAS splitting between phased reactors,
- Two (2) modulating plug valves for splitting between phased reactors from anaerobic selector,
- Two (2) modulating butterfly valves for process air distribution between the two phased aeration tanks,
- One (1) Automated membrane air scour energy optimization control valve assembly,
- One (1) CIP chemical mixing tank (polyethylene), Two (2) head tanks (polyethylene), One (1) drum pump and One (1) chemical transfer pump,
- One (1) 100 hp Process Aeration blower, rotary-lobe type; includes TEFC 460 volt motor, noise enclosure, intake filter-silencer, check valve, spring loaded pressure relief valve,

- One (1) 100 hp Membrane Scour Aeration blower, rotary-lobe type; includes TEFC 460 volt motor, noise enclosure, intake filter-silencer, check valve, spring loaded pressure relief valve,
- One (1) 100 HP Common Standby blower for both aeration and membrane zones, positive displacement type; includes TEFC 460 volt motor, intake filter-silencer, check valve, pressure relief valve,
- Two (2) Fine bubble aeration grids for aeration zone, inclusive of fine bubble diffusers, 304 SS drop pipe to top of aeration zone tank wall, PVC manifold and header pipes, 304 SS pipe supports,
- Lot manual PVC ball valves, butterfly valves, camlock-type couplings, flexible hoses for connections from permeate and scour aeration header pipes to membrane modules,

PLC Control System

The instrumentation and control system is proposed as detailed herein to meet the functional requirements of the proposed systems. The complete system will include detailed engineering submittals comprised of product data sheets, panel layouts, wiring diagrams, and field installation instructions. The complete system will be comprised of the following:

Qty	Description	Manufacturer
1	NEMA 12 Steel Freestanding Panel	Saginaw
1	Back panel for Control Panel	Saginaw
1	Allen Bradley PLC Processor	Allen Bradley
1	Allen Bradley PLC Chassis	Allen Bradley
1	Allen Bradley PLC Power Supply	Allen Bradley
AR	Allen Bradley PLC Digital Input Module 16PT 24VDC	Allen Bradley
AR	Allen Bradley PLC Digital Output Module 16PT 24VDC	Allen Bradley
AR	Allen Bradley PLC Analog Input Module 8PT 4-20mA	Allen Bradley
AR	Allen Bradley PLC Analog Output Module 4PT 4-20mA	Allen Bradley
1	120 VAC Surge Protector (HSPSP12030ARJ)	Innovative Tech
AR	120VAC Circuit Breakers	Square D or Equivalent
1	24VDC 5A Power Supply (QUINT-PS-100-240AC/24DC/5)	Phoenix Contact
AR	4-20mA to 4-20mA Analog Isolator (MINI MCR-SL-I-I)	Phoenix Contact
AR	4-20mA Analog Surge Arrestor (PT2x2 24DC ST)	Phoenix Contact
AR	4-20mA Analog Surge Arrestor Base Element (PT2x2 24DC BE)	Phoenix Contact
AR	Double Level Field Terminal Block (UKK 5)	Phoenix Contact
AR	Interposing Relay w/Base for Digital Outputs	Allen Bradley
1	Uninterruptible Power Supply UPS500VA	APC
1	Ethernet Switch 4-RJ45 Ports	Phoenix Contact
1	Cabinet Light & Convenience Outlet	Leviton or Equal
AR	Misc. Wire and Conduit	
1	SCADA Panel PC Color Touchscreen w/Intel Pentium 4	Advantech or Equal
1	SCADA Software Wonderware Intouch Run Time License	Wonderware

KRÜGER

1	Completed Panel Shop Tested and UL Labeled	Kruger
1	PLC Programming	Kruger
1	SCADA Graphics, Software Development and Programming	Kruger

Note: each PLC Control Panel will include the necessary input/output plus twenty percent (20%) "live" spare wired signals for future or additional signal interface.

'AR' = as required

Field Instrumentation

One (1) Set of Field Instruments will be provided as follows:

Qty	Description	Manufacturer
2	Dissolved Oxygen Analyzer w/Transmitter (LDO, SC200) (Aeration Basins)	Hach
2	Pressure Indicating Transmitter (Cerabar S PMP71) (Permeate)	Endress + Hauser
2	Submersible Pressure Transducer (Water Pilot FMX 167) w/Local Display Transmitter (Membrane Tanks)	Endress + Hauser
2	Thermal Mass Flowmeter (FCIST-50) (Membrane Air Scour)	FCI
2	10" Magnetic Flowmeter w/Transmitter (ProMag 50) (Membrane Permeate)	Endress + Hauser
2	6" Magnetic Flowmeter w/Transmitter (ProMag 50) (RAS flow to De-ox zone)	Endress + Hauser
2	12" Magnetic Flowmeter w/Transmitter (ProMag 50) (RAS flow to reactors during aeration phase)	Endress + Hauser
2	Low Range Process 1720E Turbidimeter System 0.001-100 NTU (60101-00 w/SC200 Controller) (Membrane Permeate)	Hach
1	Instrument Start-Up and Calibration	Kruger

Scope of Supply BY INSTALLER/PURCHASER

The following items are NOT included in the scope of supply for the NEOSEP® MBR system and should be provided for by the Installing Contractor/Purchaser of the system unless explicitly stated as included in the above scope of supply. These items include, but are not necessarily limited to, the following items:

- Concrete foundations and pads,
- Course Pre-Screen
- Flow equalization tanks,
- Solids handling system,

- Effluent disinfection,
- Piping to and from the MBR system and interconnecting piping between equipment and unit operations,
- Power supply to the MBR control panel, motor starters and/or Adjustable Frequency Drives (AFDs)
- Interconnecting wiring and conduit between equipment and/or junction boxes for tank mounted equipment and control panels/VFDs/Motor Starters.
- Anchor bolts for securing provided items to concrete foundations or pads,
- Overhead gantries or cranes as needed for membrane module retrieval.
- All electrical and mechanical hardware with the exception of the equipment that is identified above,
- All work associated with buildings or other structures used for housing any part of the system provided, including HVAC and electrical work.

KRÜGER

5. Pricing, Payment Terms, and Schedule

Pricing

The price for the NEOSEP® MBR system, as defined herein, including process and design engineering, field services, and equipment supply is: **$2,485,000**.

Please note that the above pricing is expressly contingent upon the items in this proposal and are subject to I. Kruger Inc. Standard Terms of Sale detailed herein.

This pricing is FOB shipping point, with freight allowed to the job site. This pricing does not include any sales or use taxes. In addition, pricing is valid for ninety (90) days from the date of issue and is subject to negotiation of a mutually acceptable contract.

Terms of Payment

The terms of payment are as follows:

- 10% on receipt of fully executed contract
- 15% on submittal of shop drawings
- 75% on the delivery of equipment to the site

Payment shall not be contingent upon receipt of funds by the Contractor from the Owner. There shall be no retention in payments due to I. Kruger Inc. All other terms per our Standard Terms of Sale are attached.

All payment terms are net 30 days from the date of invoice. Final payment not to exceed 120 days from delivery of equipment.

Schedule

- Shop drawings will be submitted within 6-8 weeks of receipt of an executed contract by all parties.
- All equipment will be delivered within 18-20 weeks after receipt of written approval of the shop drawings.
- Installation manuals will be furnished upon delivery of equipment.
- Operation and Maintenance Manuals will be submitted within 90 days after receipt of approved shop drawings.

KRÜGER

6. I. Kruger Inc. Standard Terms of Sale

1. Applicable Terms. These terms govern the purchase and sale of the equipment and related services, if any (collectively, "Equipment"), referred to in Seller's purchase order, quotation, proposal or acknowledgment, as the case may be ("Seller's Documentation"). Whether these terms are included in an offer or an acceptance by Seller, such offer or acceptance is conditioned on Buyer's assent to these terms. Seller rejects all additional or different terms in any of Buyer's forms or documents.

2. Payment. Buyer shall pay Seller the full purchase price as set forth in Seller's Documentation. Unless Seller's Documentation provides otherwise, freight, storage, insurance and all taxes, duties or other governmental charges relating to the Equipment shall be paid by Buyer. If Seller is required to pay any such charges, Buyer shall immediately reimburse Seller. All payments are due within 30 days after receipt of invoice. Buyer shall be charged the lower of 1 ½% interest per month or the maximum legal rate on all amounts not received by the due date and shall pay all of Seller's reasonable costs (including attorneys' fees) of collecting amounts due but unpaid. All orders are subject to credit approval.

3. Delivery. Delivery of the Equipment shall be in material compliance with the schedule in Seller's Documentation. Unless Seller's Documentation provides otherwise, Delivery terms are F.O.B. Seller's facility.

4. Ownership of Materials. All devices, designs (including drawings, plans and specifications), estimates, prices, notes, electronic data and other documents or information prepared or disclosed by Seller, and all related intellectual property rights, shall remain Seller's property. Seller grants Buyer a non-exclusive, non-transferable license to use any such material solely for Buyer's use of the Equipment. Buyer shall not disclose any such material to third parties without Seller's prior written consent.

5. Changes. Seller shall not implement any changes in the scope of work described in Seller's Documentation unless Buyer and Seller agree in writing to the details of the change and any resulting price, schedule or other contractual modifications. This includes any changes necessitated by a change in applicable law occurring after the effective date of any contract including these terms.

6. Warranty. Subject to the following sentence, Seller warrants to Buyer that the Equipment shall materially conform to the description in Seller's Documentation and shall be free from defects in material and workmanship. The foregoing warranty shall not apply to any Equipment that is specified or otherwise demanded by Buyer and is not manufactured or selected by Seller, as to which (i) Seller hereby assigns to Buyer, to the extent assignable, any warranties made to Seller and (ii) Seller shall have no other liability to Buyer under warranty, tort or any other legal theory. If Buyer gives Seller prompt written notice of breach of this warranty within 18 months from delivery or 1 year from beneficial use, whichever occurs first (the "Warranty Period"), Seller shall, at its sole option and as Buyer's sole remedy, repair or replace the subject parts or refund the purchase price therefore. If Seller determines that any claimed breach is not, in fact, covered by this warranty, Buyer shall pay Seller its then customary charges for any repair or replacement made by Seller. Seller's warranty is conditioned on Buyer's (a) operating and maintaining the Equipment in accordance with Seller's instructions, (b) not making any unauthorized repairs or alterations, and (c) not being in default of any payment obligation to Seller. Seller's warranty does not cover damage caused by chemical action or abrasive material, misuse or improper installation (unless installed by Seller). THE WARRANTIES SET FORTH IN THIS SECTION ARE SELLER'S SOLE AND EXCLUSIVE WARRANTIES AND ARE SUBJECT TO SECTION 10 BELOW. SELLER MAKES NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE.

7. Indemnity. Seller shall indemnify, defend and hold Buyer harmless from any claim, cause of action or liability incurred by Buyer as a result of third party claims for personal injury, death or damage to tangible property, to the extent caused by Seller's negligence. Seller shall have the sole authority to direct the defense of and settle any indemnified claim. Seller's indemnification is conditioned on Buyer (a) promptly, within the Warranty Period, notifying Seller of any claim, and (b) providing reasonable cooperation in the defense of any claim.

8. Force Majeure. Neither Seller nor Buyer shall have any liability for any breach (except for breach of payment obligations) caused by extreme weather or other act of God, strike or other labor shortage or disturbance, fire, accident, war or civil disturbance, delay of carriers, failure of normal sources of supply, act of government or any other cause beyond such party's reasonable control.

9. Cancellation. If Buyer cancels or suspends its order for any reason other than Seller's breach, Buyer shall promptly pay Seller for work performed prior to cancellation or suspension and any other direct costs incurred by Seller as a result of such cancellation or suspension.

10. LIMITATION OF LIABILITY. NOTWITHSTANDING ANYTHING ELSE TO THE CONTRARY, SELLER SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER INDIRECT DAMAGES, AND SELLER'S TOTAL LIABILITY ARISING AT ANY TIME FROM THE SALE OR USE OF THE EQUIPMENT SHALL NOT EXCEED THE PURCHASE PRICE PAID FOR THE EQUIPMENT. THESE LIMITATIONS APPLY WHETHER THE LIABILITY IS BASED ON CONTRACT, TORT, STRICT LIABILITY OR ANY OTHER THEORY.

11. Miscellaneous. If these terms are issued in connection with a government contract, they shall be deemed to include those federal acquisition regulations that are required by law to be included. These terms, together with any quotation, purchase order or acknowledgement issued or signed by the Seller, comprise the complete and exclusive statement of the agreement between the parties (the "Agreement") and supersede any terms contained in Buyer's documents, unless separately signed by Seller. No part of the Agreement may be changed or cancelled except by a written document signed by Seller and Buyer. No course of dealing or performance, usage of trade or failure to enforce any term shall be used to modify the Agreement. If any of these terms is unenforceable, such term shall be limited only to the extent necessary to make it enforceable, and all other terms shall remain in full force and effect. Buyer may not assign or permit any other transfer of the Agreement without Seller's prior written consent. The Agreement shall be governed by the laws of the State of North Carolina without regard to its conflict of laws provisions.

VEOLIA
WATER
Solutions & Technologies

APPENDIX F

WATER QUALITY INFORMATION

Exhibit 1

Tennessee-Mississippi-Cumberland Basin Unit
Upper Cumberland River Basin
Streams

Laurel River 33.7 to 39.8 — Laurel County
Into Lake Cumberland — Segment Length: 6.1
Impaired Use(s): Warm Water Aquatic Habitat (Partial Support)
Pollutant(s): Nutrient/Eutrophication Biological Indicators; Sedimentation/Siltation
Suspected Sources: Agriculture; Legacy coal extraction; Rural (Residential Areas)

See Chapter 4, Status of TMDLs under Development Prior to 2010.

KDOW awarded $108,989 Section 319(h) Grant funds (FFY2004) to Third Rock Consultants to develop a Watershed Plan for the Corbin City Reservoir/Laurel River watershed (completed May, 2007) and $312,568 (FFY2007) to implement restoration actions identified in the Plan.

Left Fork of Straight Creek 0.0 to 13.1 — Bell County
Into Straight Creek — Segment Length: 13.1
Impaired Use(s): Warm Water Aquatic Habitat (Nonsupport); Primary Contact Recreation Water (Nonsupport); Secondary Contact Recreation Water (Nonsupport)
Pollutant(s): Sedimentation/Siltation; Total Suspended Solids (TSS); Turbidity
Suspected Sources: Coal Mining; Crop Production (Crop Land or Dry Land); Surface Mining; Upstream Source

Lewis Creek 0.0 to 3.5 — Cumberland County
Into Cumberland River — Segment Length: 3.5
Impaired Use(s): Warm Water Aquatic Habitat (Partial Support)
Pollutant(s): Nutrient/Eutrophication Biological Indicators; Organic Enrichment (Sewage) Biological Indicators; Sedimentation/Siltation
Suspected Sources: Loss of Riparian Habitat; Municipal (Urbanized High Density Area)

Lick Fork 0.0 to 1.3 — Harlan County
Into Fugitt Creek — Segment Length: 1.3
Impaired Use(s): Cold Water Aquatic Habitat (Partial Support)
Pollutant(s): Sedimentation/Siltation; Specific Conductance
Suspected Sources: Surface Mining

Line Creek 2.3 to 5.5 — Pulaski County
Into Rockcastle River — Segment Length: 3.2
Impaired Use(s): Warm Water Aquatic Habitat (Partial Support)
Pollutant(s): Cause Unknown
Suspected Sources: Source Unknown

Exhibit 1
continue

Tennessee-Mississippi-Cumberland Basin Unit
Upper Cumberland River Basin
Streams

Stony Fork 0.0 to 5.3 — Bell County
Into Bennetts Fork of Yellow Creek — Segment Length: 5.3
Impaired Use(s): Warm Water Aquatic Habitat (Nonsupport)
Pollutant(s): Sedimentation/Siltation; Turbidity
Suspected Sources: Loss of Riparian Habitat; Streambank Modifications/destabilization; Woodlot Site Clearance

Straight Creek 1.7 to 23.3 — Bell County
Into Cumberland River — Segment Length: 21.6
Impaired Use(s): Warm Water Aquatic Habitat (Partial Support)
Pollutant(s): Sedimentation/Siltation; Specific Conductance
Suspected Sources: Channel Erosion/Incision from Upstream Hydromodifications; Loss of Riparian Habitat; Rural (Residential Areas); Surface Mining

Sugar Camp Branch 0.0 to 1.4 — Pulaski County
Into Lacey Fork — Segment Length: 1.4
Impaired Use(s): Warm Water Aquatic Habitat (Nonsupport); Primary Contact Recreation Water (Nonsupport); Secondary Contact Recreation Water (Nonsupport)
Pollutant(s): pH
Suspected Sources: Source Unknown

UT to Acorn Fork 0.0 to 0.25 — Knox County
Into Acorn Fork of Stinking Creek — Segment Length: 0.25
Impaired Use(s): Warm Water Aquatic Habitat (Nonsupport)
Pollutant(s): Chloride; Sedimentation/Siltation; Specific Conductance
Suspected Sources: Highway/Road/Bridge Runoff (Non-construction Related); Loss of Riparian Habitat; Petroleum/natural Gas Activities

KDOW awarded $63,370 Section 319(h) Grant funds (FFY1999) to the Knox County Fiscal Court to conduct nonpoint source education and demonstrate BMPs in the Stinking Creek watershed.

UT to Helton Branch 0.0 to 0.4 — Knox County
Into Helton Branch — Segment Length: 0.4
Impaired Use(s): Warm Water Aquatic Habitat (Partial Support)
Pollutant(s): Sedimentation/Siltation
Suspected Sources: Channelization; Golf Courses; Legacy coal extraction; Loss of Riparian Habitat

Exhibit 1
Continue

Tennessee-Mississippi-Cumberland Basin Unit
Upper Cumberland River Basin
Streams

Whitley Branch 1.1 to 2.6		Laurel County	
Into Little Laurel River		Segment Length:	1.5
Impaired Use(s):	Primary Contact Recreation Water (Nonsupport)		
Pollutant(s):	Fecal Coliform		
Suspected Sources:	Sanitary Sewer Overflows (Collection System Failures)		

See Chapter 4, Status of TMDLs under Development Prior to 2010.

KDOW awarded $108,989 Section 319(h) Grant funds (FFY2004) to Third Rock Consultants to develop a Watershed Plan for the Corbin City Reservoir/Laurel River watershed (completed May, 2007) and $312,568 (FFY2007) to implement restoration actions identified in the Plan.

Wolf Creek 0.0 to 1.8		Whitley County	
Into Clear Fork of Cumberland River		Segment Length:	1.8
Impaired Use(s):	Warm Water Aquatic Habitat (Nonsupport)		
Pollutant(s):	Sedimentation/Siltation		
Suspected Sources:	Non-irrigated Crop Production; Surface Mining		

Wood Creek 0.0 to 1.95		Laurel County	
Into Little Rockcastle River		Segment Length:	1.95
Impaired Use(s):	Cold Water Aquatic Habitat (Nonsupport)		
Pollutant(s):	Sedimentation/Siltation		
Suspected Sources:	Habitat Modification - other than Hydromodification		

Yellow Creek 0.0 to 6.7		Bell County	
Into Cumberland River		Segment Length:	6.7
Impaired Use(s):	Warm Water Aquatic Habitat (Partial Support)		
Pollutant(s):	Nutrient/Eutrophication Biological Indicators; Organic Enrichment (Sewage) Biological Indicators; Sedimentation/Siltation; Specific Conductance; Total Dissolved Solids		
Suspected Sources:	Surface Mining; Unspecified Domestic Waste; Urban Runoff/Storm Sewers		

Exhibit 2

Table 2.4 Straight Pipes in PRIDE Region

County	No. of St. Pipes
Adair	50
Bell	376
Breathitt	1031
Casey	68
Clay	650
Clinton	32
Cumberland	42
Estill	98
Floyd	1447
Garrard	139
Green	24
Harlan	1846
Jackson	530
Jessamine	27
Johnson	1119
Knott	728
Knox	197
Laurel	72
Lawrence	306
Lee	405
Leslie	510
Letcher	1858
Lincoln	49
Magoffin	1177
Martin	1175
McCreary	80
Menifee	453
Metcalfe	30
Monroe	3
Morgan	1062
Owsley	342
Perry	969
Pike	1715
Pulaski	74
Rockcastle	76
Russell	85
Taylor	33
Wayne	87
Whitley	34
Wolfe	434

Exhibit 2

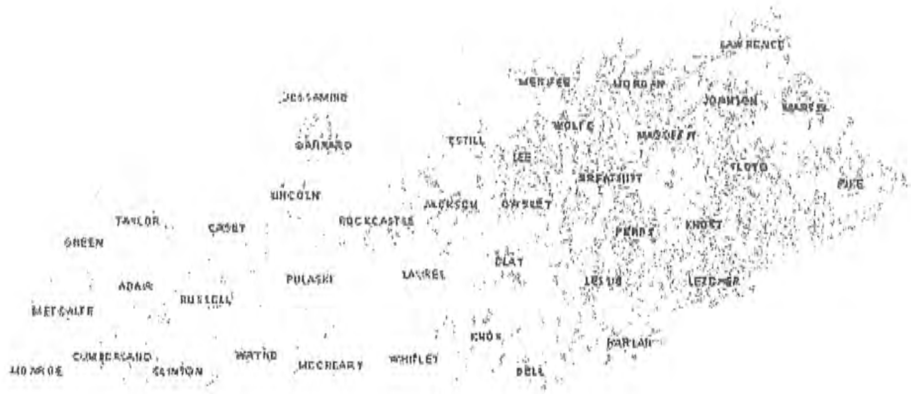


Fig 2.3 Location of Straight Pipes in the Pride Region

Exhibit 2

Table 2.5 Failing Septic Systems in PRIDE Region

County	No. of Failing Septic Systems
Adair	41
Bell	426
Breathitt	28
Casey	40
Clay	795
Clinton	27
Cumberland	33
Estill	61
Floyd	1196
Garrard	182
Green	13
Harlan	2519
Jackson	443
Jessamine	753
Johnson	1925
Knott	44
Knox	523
Laurel	990
Lawrence	16
Lee	6
Leslie	41
Letcher	146
Lincoln	135
Magoffin	1344
Martin	426
McCreary	35
Menifee	687
Metcalfe	2
Monroe	4
Morgan	1132
Owsley	20
Perry	46
Pike	1755
Pulaski	142
Rockcastle	348
Russell	51
Taylor	11
Wayne	12
Whitley	838
Wolfe	25

Exhibit 2

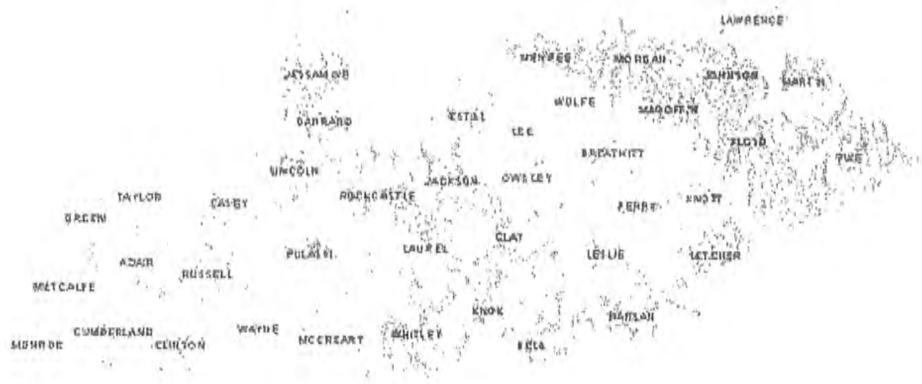


Figure 2.4 Failing Septic Systems in PRIDE Region

Exhibit 2

Table 2.6 Illegal Dumps in PRIDE Region

County	Dumps
Adair	20
Bell	38
Breathitt	45
Casey	43
Clay	70
Clinton	39
Cumberland	113
Estill	47
Floyd	34
Garrard	22
Green	23
Harlan	70
Jackson	66
Jessamine	12
Johnson	29
Knott	50
Knox	98
Laurel	28
Lawrence	45
Lee	35
Leslie	51
Letcher	60
Lincoln	31
Magoffin	101
Martin	7
McCreary	17
Menifee	7
Metcalfe	19
Monroe	18
Morgan	7
Owsley	32
Perry	55
Pike	102
Pulaski	55
Rockcastle	45
Russell	24
Taylor	9
Wayne	222
Whitley	175
Wolfe	32

Exhibit 2

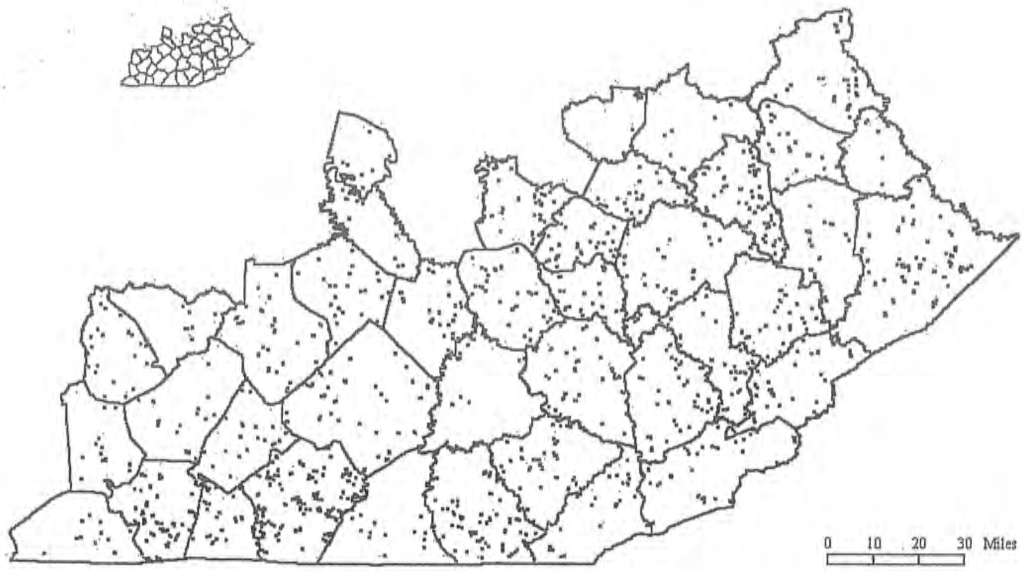


Figure 2.5 Illegal Dumps in the PRIDE Region.

Exhibit 2

Table 2.7 Mining Operations in PRIDE Region

County	Active Coal Mines and Annual Production (1998)*					
	Underground		**Surface**		**Total**	
	Mines	**Tonnage**	**Mines**	**Tonnage**	**Mines**	**Tonnage**
Adair						
Bell	18	3,446,024	13	2,089,313	31	5,535,337
Breathitt			15	5,114,284	15	5,114,284
Casey						
Clay	1	24,780	11	358,950	12	383,730
Clinton						
Cumberland						
Estill						
Floyd	40	3,371,872	8	3,549,131	48	6,921,003
Garrard						
Green						
Harlan	42	7,030,822	19	1,863,585	61	8,894,407
Jackson			1	1000	1	1000
Jessamine						
Johnson	3	1,122,515	6	161,327	9	1,283,842
Knott	34	5,323,122	23	5,708,165	57	11,031,287
Knox	16	456,128	9	192,765	25	648,893
Laurel						
Lawrence	2	238,340	4	162,482	6	400,822
Lee						
Leslie	9	7,543,274	5	1,797,234	14	9,340,508
Letcher	23	7,272,864	32	3,654,936	55	10,927,800
Lincoln						
Magoffin			2	819,070	2	819,070
Martin	27	5,932,925	17	6,328,104	44	12,261,029
McCreary						
Menifee						
Metcalfe						
Monroe						
Morgan						
Owsley			3	50,429	3	50,429
Perry	18	5,652,935	21	6,035,671	39	11,688,606
Pike	100	22,567,221	131	12,929,025	231	35,496,246
Pulaski						

Exhibit 2

Rockcastle						
Russell						
Taylor						
Wayne						
Whitley	2	83,373	7	159,168	9	242,541
Wolfe						
Totals	335	70,066,195	327	50,974,639	662	121,040,834

*Source: Annual Report of The Department Of Mines And Minerals, Com-
monwealth of Kentucky for the Year Ending December 31, 1998.
(http://www.caer.uky.edu/kdmm/)

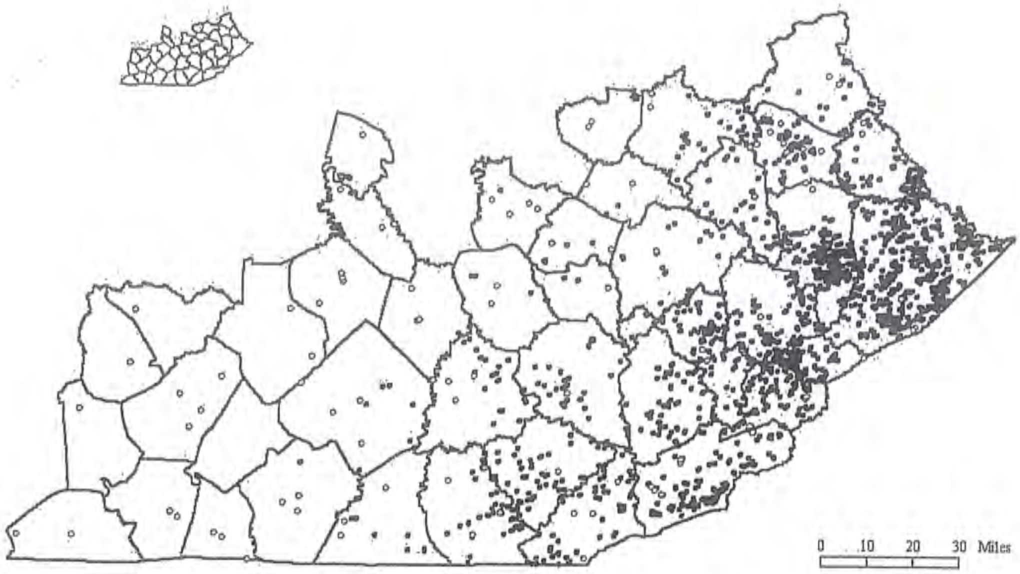
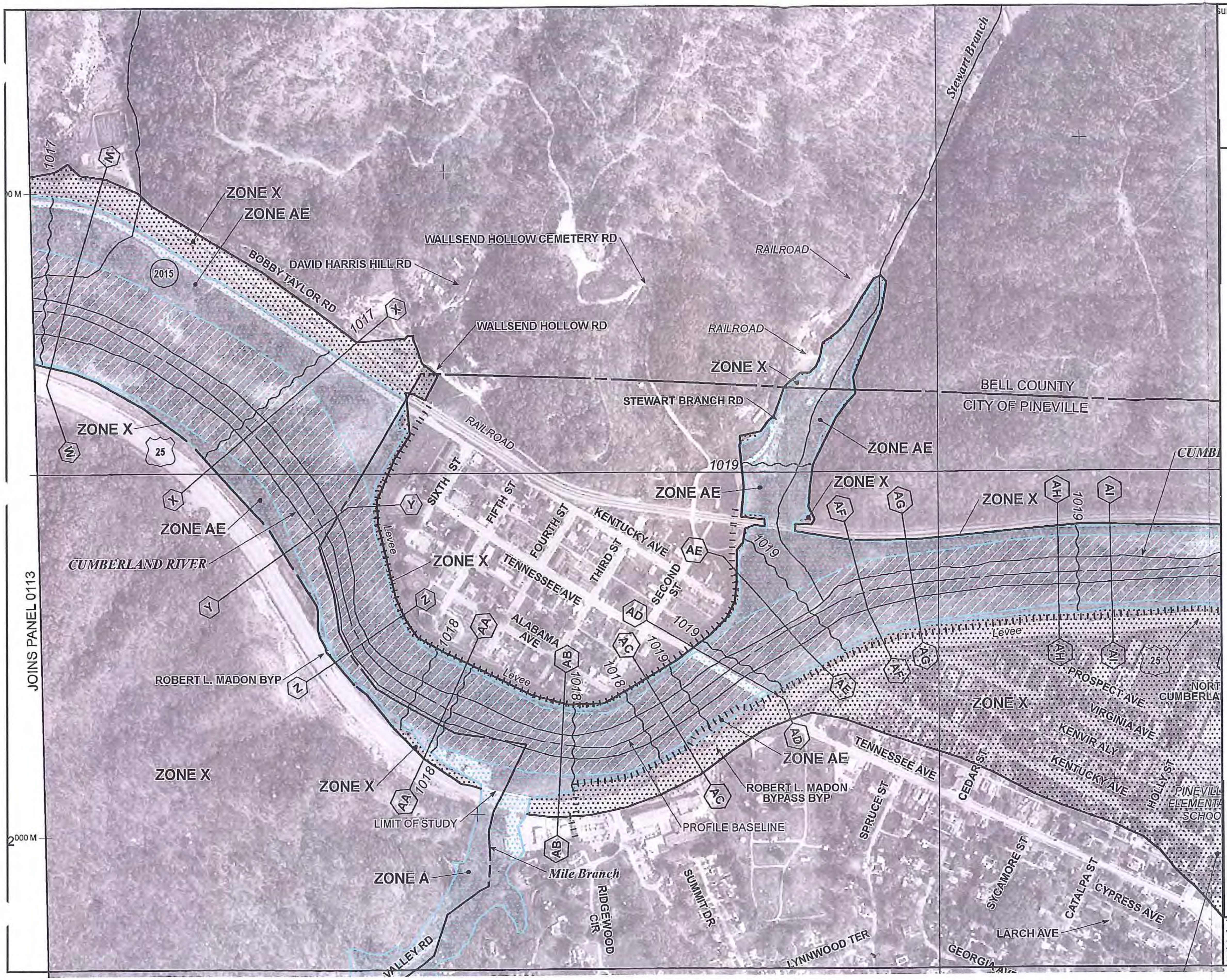


Figure 2.6 Mining Operations in the PRIDE Region (black symbols are coal; gray symbols are other types).

APPENDIX G

REGIONAL FLOODPLAIN INFORMATION



surance Program at 1-800-638-6620.

N

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0114D

FIRM

FLOOD INSURANCE RATE MAP

BELL COUNTY, KENTUCKY

AND INCORPORATED AREAS

PANEL 114 OF 360

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BELL COUNTY	210010	0114	D
PINEVILLE, CITY OF	210012	0114	D

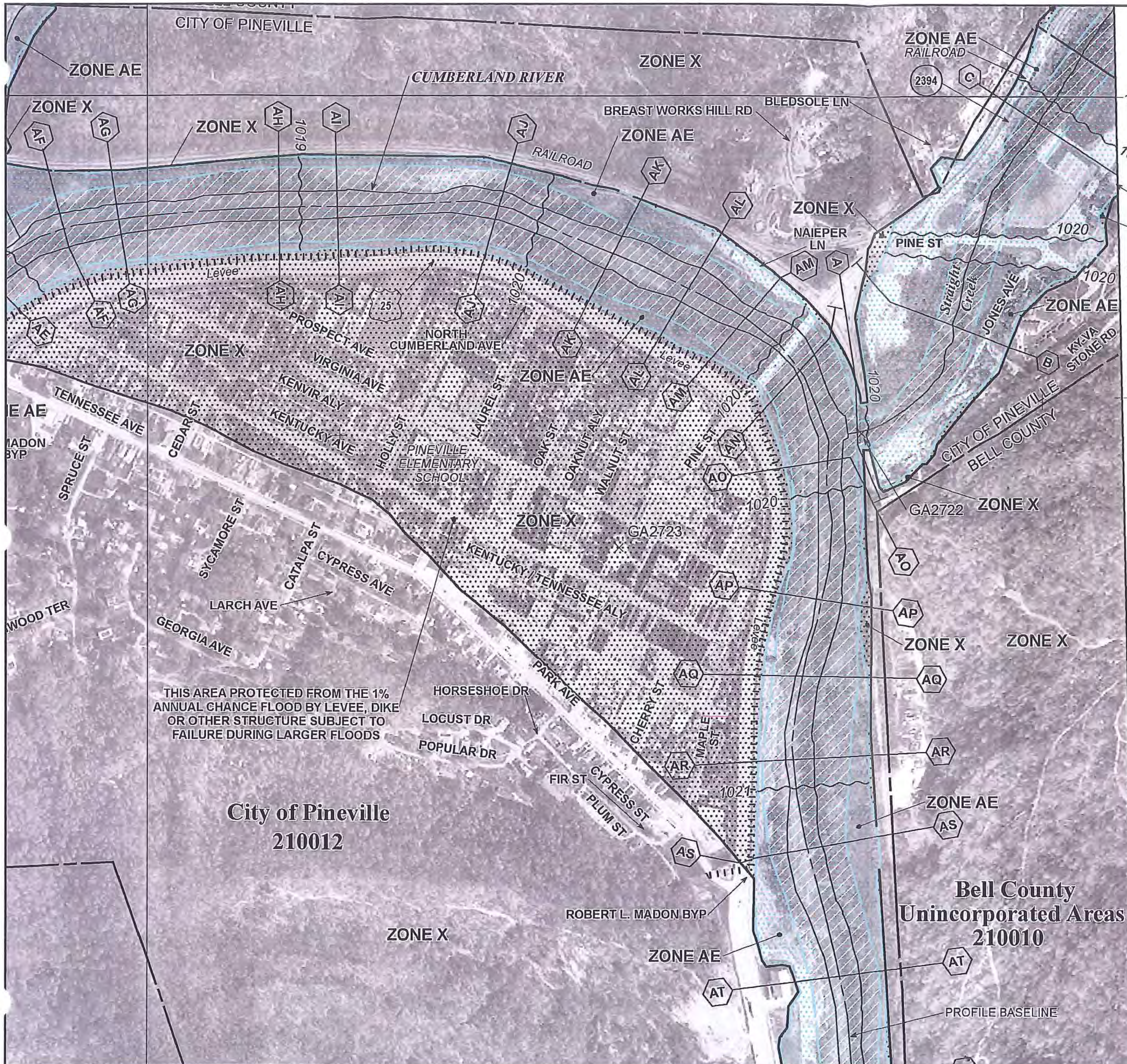
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
21013C0114D

EFFECTIVE DATE
SEPTEMBER 29, 2006

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



urance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0114D

FIRM

FLOOD INSURANCE RATE MAP

BELL COUNTY, KENTUCKY

AND INCORPORATED AREAS

PANEL 114 OF 360

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

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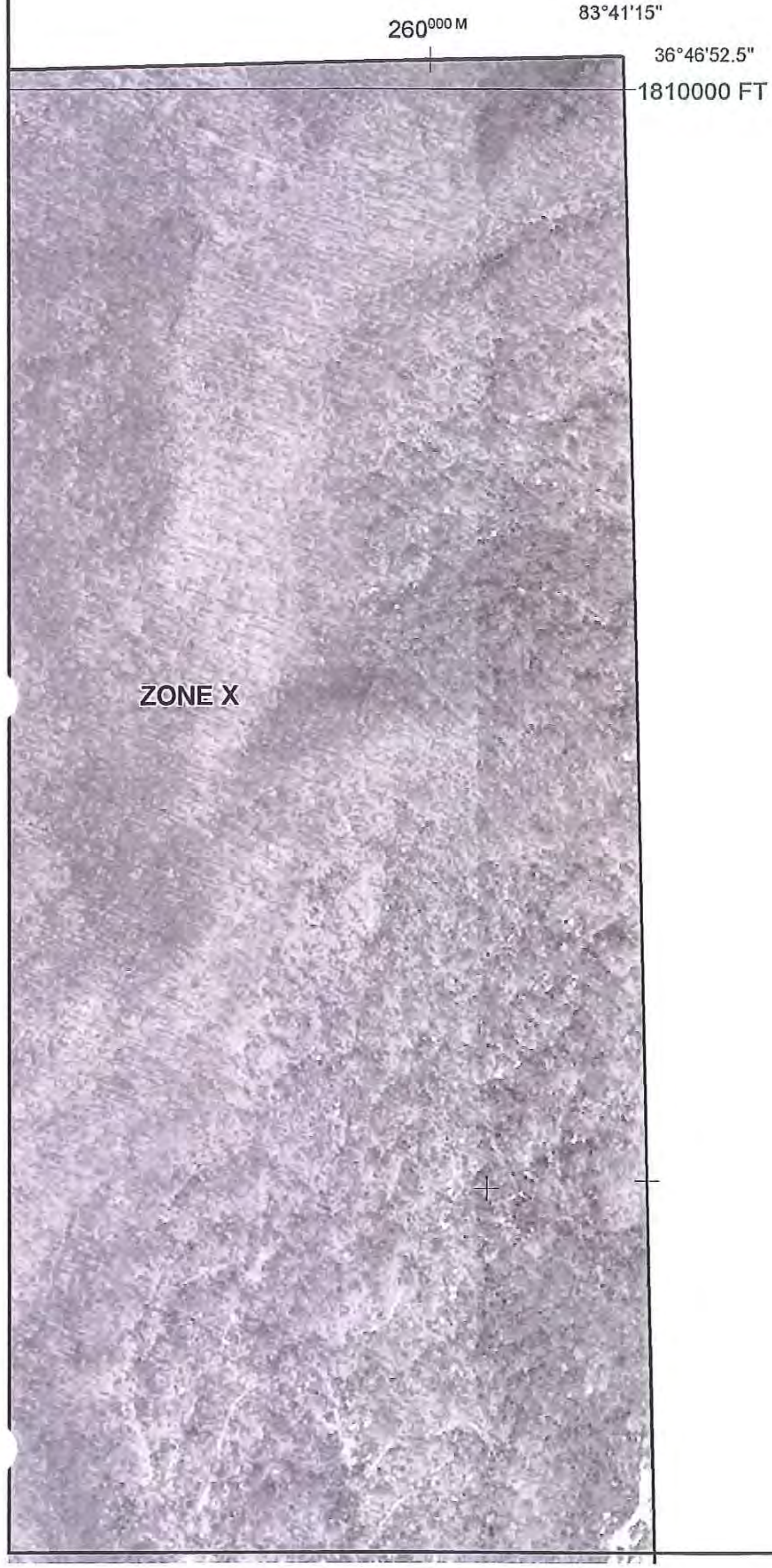


LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevation determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance of greater flood event.

ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood

surance Program at 1-800-638-6620.

N

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0114D

FIRM

FLOOD INSURANCE RATE MAP

BELL COUNTY, KENTUCKY

AND INCORPORATED AREAS

PANEL 114 OF 360

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BELL COUNTY	210010	0114	D
PINEVILLE, CITY OF	210012	0114	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
21013C0114D

EFFECTIVE DATE
SEPTEMBER 29, 2006

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX H

WASTE LOAD ALLOCATION AND FUTURE PLANNING INFORMATION

STEVEN L. BESHEAR
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

LEONARD K. PETERS
SECRETARY

April 25, 2013

Corey Napier, P.E.
Vaughn & Melton Consulting Engineers
P.O. Box 1425
Middlesboro, Kentucky 40965-3225

Re: Waste Load Allocation Request
Pineville Proposed WWTP Expansion
KPDES No.: KY0024058
Bell County, Kentucky

Dear Mr. Napier:

This is in response to your September 26, 2012 letter (attached), requesting a waste load allocation (WLA) for expansion of the subject wastewater treatment plant (WWTP) from .72 MGD to 1.2 MGD. Discharge is to remain at mile point (mp) 652.65 of the Cumberland River, segment 02034. Per your correspondence, the requested WLA information will be utilized in drafting a Regional Wastewater Facilities Plan Update.

The division notes that a Total Maximum Daily Load (TMDL) has been approved for the Cumberland River (mp 650.6 to 654.5) for fecal coliform impairments. The TMDL titled, "Removing Fecal Coliform Pollution from the Upper Cumberland River Drainage", was approved in May, 1998. State and Federal regulations allow new or expanded discharges into impaired waters only if the discharge will improve, or at least not contribute, to existing impairments. Discharge from an expanded WWTP, in compliance with applicable Kentucky Pollutant Discharge Elimination System (KPDES) permit limitations and requirements, consistent with the approved TMDL, would not be considered a contributor to the existing impairments, and could thus be approved.

Considering the above-mentioned information, applicable effluent limitations are provided below.

Design Capacity = 1.2 MGD / Discharge to mp 652.65 of the Cumberland River

Parameter	May 1 - October 31	November 1 - April 30
BOD_5	30 mg/l	30 mg/l
Total Suspended Solids	30 mg/l	30 mg/l
Ammonia Nitrogen	20 mg/l	20 mg/l
Dissolved Oxygen	2 mg/l	2 mg/l
Total Phosphorus	Monitor, mg/l	Monitor, mg/l
Total Nitrogen	Monitor, mg/l	Monitor, mg/l
Total Residual Chlorine	0.019 mg/l	0.019 mg/l

Reliability Classification = Grade C

In addition to the above requirements, the monthly average and weekly maximum values of E. coli shall be at or below 130 colonies per 100 milliliters or 240 colonies per 100 milliliters, respectively, the year around. If a form of chlorine is proposed to disinfect the wastewater, then de-chlorination will likely be needed to achieve the chlorine residual effluent limitation. Additional effluent limitations and water quality standards are contained in 401 KAR Chapter 5 and 401 KAR Chapter 10.

These preliminary design effluent limitations are valid for one (1) year from the date of this letter, and are subject to change as a result of additional information which may be presented during the public notice phase of the KPDES permitting process. As such, this letter does not convey any authorization or approval to proceed with the construction or operation of the proposed WWTP. Construction and KPDES permit applications must be submitted to request such authorization or approval. Nor does this letter ensure issuance of either permit. During the review processes of these permits the Division of Water will further evaluate the viability of the project.

Should you have any questions regarding this letter, please contact me at (502) 564-8158, extension 4914 or E-mail at Courtney.Seitz@ky.gov.

Sincerely,

Courtney Seitz

Courtney Seitz, WLA Coordinator
Wet Weather Section
Surface Water Permits Branch
Division of Water

CS

c: Anshu Singh, Water Infrastructure Branch
Compliance and Technical Assistance Branch, London Section
Division of Water Files

Vaughn & Melton
Engineering • Surveying
P.O. Box 1425
Middlesboro, Kentucky 40965-3225
Tel: (606) 248-6600
www.vaughnmelton.com

RECEIVED
SEP 28 2012
S W P B

September 26, 2012

Ms. Courtney Seitz, WLA Coordinator
Kentucky Division of Water
Wet Weather Section, Surface Water Permits Branch
200 Fair Oaks Lane
Frankfort, Kentucky 40601

RE: City of Pineville Proposed WWTP Expansion
Pineville WWTP, Pineville, Kentucky
KPDES No. KY0024058
Bell County, Kentucky
V&M Project No. 11055-00

Dear Ms. Seitz:

The City of Pineville is proposing to expand the capacity of their existing wastewater treatment plant (WWTP) from 0.724 MGD to 1.2 MGD (Average Daily Flow). The current facility is an extended aeration lagoon type facility discharging treated effluent to the Cumberland River at river mile 652.65 in Bell County. The purpose of this letter is to request a Waste Load Allocation (WLA) for the purpose of preparing a preliminary plant expansion design and cost estimate that will be part of the Facilities Plan Update. A map showing the location of the existing facility and discharge location has been attached for reference. The proposed plant expansion and outfall will remain in the same location.

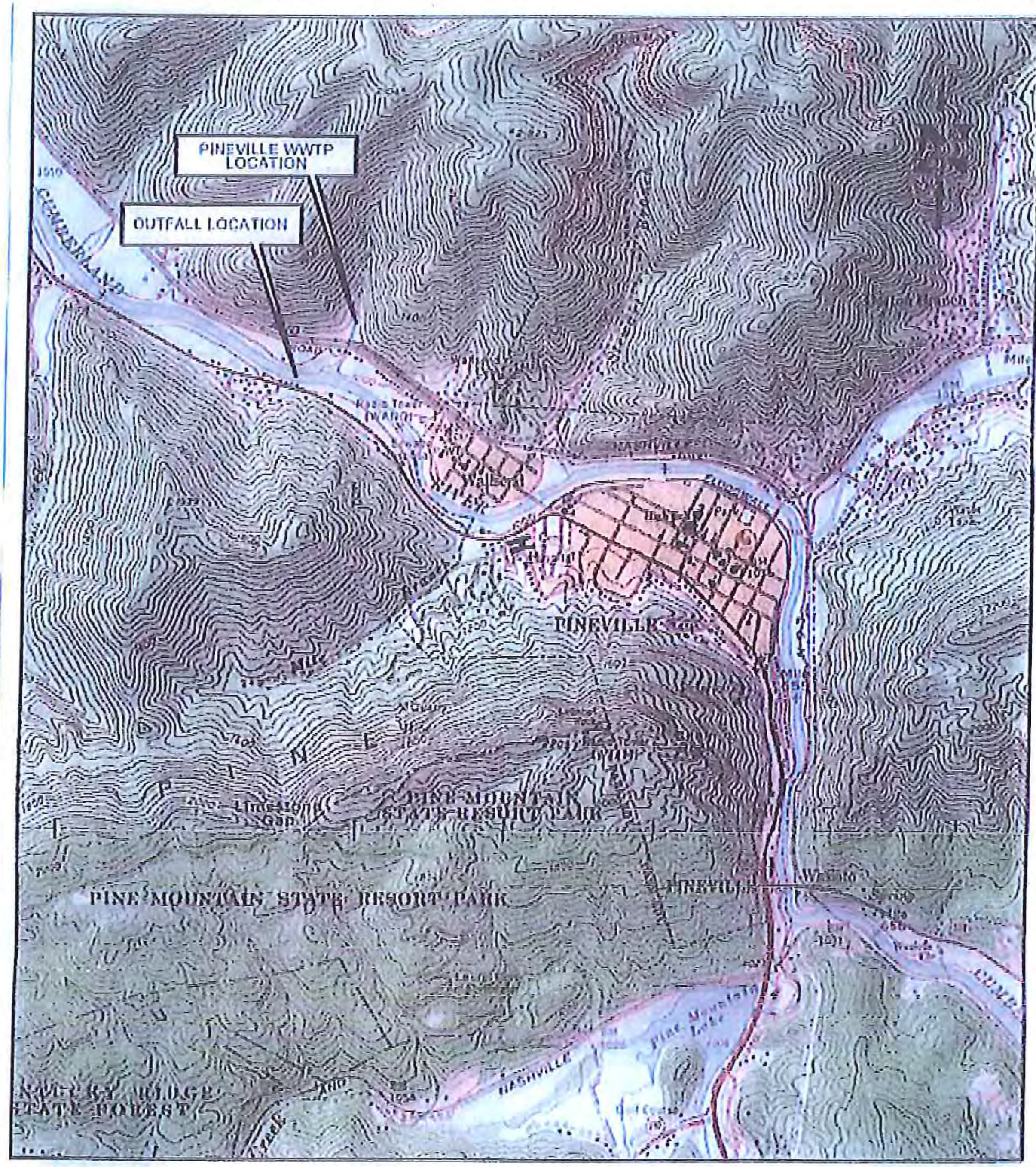
If you have any questions or need additional information, please feel free to contact me.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS

Corey Napier, P.E.

cc: Bill Bunch, Pineville Utility Commission



Vaughn & Melton
Consulting Engineers, Inc.
109 S. 24th Street
Middlesboro, Kentucky 40965
(606) 248-6600
www.vaughnmelton.com

SCALE: N.T.S.

Project Number: 11055-00
Date: Sept., 2012

VICINITY MAP - PINEVILLE WWTP

PINEVILLE, BELL COUNTY, KY.

EXHIBIT A

Vaughn & Melton

Engineering • Surveying

1909 Ailor Avenue
Knoxville, Tennessee 37921
Tel.: (865) 546-5800
Fax: (865) 546-4714
www.vaughnmelton.com

MEMORANDUM NO. 1

Date: January 3rd, 2014. Revision 1.1

To: File

From: Marios S. Georgiou, P.E.

RE: Pineville Wastewater Treatment Plant Expansion
Pineville, Kentucky
New WWTP Design Capacity
V&M Project No. 11055-00

The following information was used to establish the new daily average WWTP capacity for the referenced project:

1. WWTP Capacity Justification:

   a. Current Conditions:

Average Effluent Flow = (from 2012-2013 Plant Records)	700,000 GPD (Exhibit "A")
Average Wet-Weather Contribution =	412,000 GPD (Exhibit "B")
Percent Wet-Weather Flow Contribution =	59% (See Note 1)

   b. Future Growth Allocations:

Additional Commercial & Institutional Flow = (from Planning Projections)	59,000 GPD (Exhibit "C")
Additional Residential Flow = (from Planning Projections)	144,700 GPD (Exhibit "D")
Additional Industrial Flow = (from Planning Projections)	100,000 GPD (Exhibit "E")
Subtotal Future Growth =	303,700 GPD

c. Future I/I Contribution:

Additional I/I Contribution = (Based on 20% of Future Growth) 0.2 x 303,700 GPD =	60,740 GPD
d. Additional Reserve Capacity Flow = (Based on 25% of Future Growth)	75,925 GPD
Total Average Daily WWTP Capacity Required = = 700,000 + 303,700 + 60,740 + 75,925 =	a + b + c + d 1,140,365 GPD

Therefore, for design purposes use, 1.2 MGD (Average Daily Flow).

Note 1: The current percent and volume of wet-weather contribution from I/I and combined sewer flow, is relatively high compared to the average influent flow. A 20% contribution is normally the upper acceptable limit in any given system. Instead of treating this additional flow, the use of an off-line surge basin may be considered as an alternate management option.

Pineville 201 Facilities Plan Update
Exhibit "A"- Pineville WWTP Plant Data

P#: 11055-00
Date: 9/20/2012

	monthly average NH3-N effl., mg/l	Max. daily NH3-N effl., mg/l	Monthly average BOD inf., mg/l	max. Daily BOD infl.,mg/l	Monhtly average TSS Inf., mg/l	max. Daily TSS infl.,mg/l	Monhtly average BOD effl., mg/l	Daily Maximum BOD effl., mg/l	Monhtly average TSS effl., mg/l	Daily maximum TSS effl., mg/l
2008										
jan	0.5	0.5	254	452	401	755	4	6	9	12
feb	0.5	0.5	218	444	278	595	4	7	4	5
mar	0.5	0.5	188	449	341	520			12	21
apr	0.9	1.4	218	485	627	1378	3	5	3	5
may	1	1.4	219	311	485	1048	5	8	5	5
jun	1.5	2.8	259	336	568	1132	3	4	4	7
jul	1.7	2.2	171	359	353	1135	6	8	5	8
aug	2	2.8	191	314	961	1328	3	4	9	19
sep	1.7	3.4	200	372	432	1140	3	3	5	8
oct	0.8	0.8	221	306	428	580	4	6	3	4
nov	1.1	1.4	283	471	411	748	4	6	6	12
dec	0.7	1.4	219	305	289	412	3	4	6	9
AVG	1.075	1.591667	220.0833	383.6667	464.5	897.5833	3.818182	5.545455	5.916667	9.583333
2009										
jan	5.6	6.7	191	282	378	1024	3	4	5	10
feb	7.2	9.8	161	204	247	350	4	5	4	9
mar	7.7	9.8	230	379	233	324	4	5	4	8
apr	6.3	11.8	336	543	419	738	8	10	11	16
may	4.8	6.7	162	221	727	1600	6	9	25	32
jun	1.6	5.6	268	363	402	1539	1	1	8	14
jul	1.1	1.7	206	306	261	640	1	1	6	8
aug	2.1	5.6	370	518	263	350	4	7	10	32
sep	1.2	2.5	259	626	524	1340	3	3	4	9
oct	0.9	1.4	237	378	652	1372	3	3	11	24
nov	0.8	1.7	115	133	388	642	1	1	11	15
dec	0.9	2.5	98	120	336	626	3	4	12	17
AVG	3.35	5.483333	219.4167	339.4167	402.5	878.75	3.416667	4.416667	9.25	16.16667
2010										
jan	0.9	1.4	142	192	238	358	3	4	17	31
feb	2.1	3.4	94	123	216	338	4	7	15	22
mar	2.3	5.6	135	263	323	576	3	3	14	26
apr	1.8	4.8	114	172	224	366	3	3	5	8
may	5.8	9.8	151	253	373	626	4	5	12	28
jun	2.5	4.3	112	173	310	436	3	3	13	38
jul	1.4	2	159	281	318	481	3	4	10	20
aug	1.1	1.7	123	219	132	220	1	1	5	11
sep	1.5	2.2	444	906	671	1124	1	7	5	8
oct	1.6	2.8	193	228	204	290	1	7	4	6
Nov	1.1	1.4	328	513	565	1240	1	7	4	13
Dec	1.9	4.2	155	335	323	540	3	3	13	22
AVG	2	3.633333	179.1667	304.8333	324.75	549.5833	2.5	4.5	9.75	19.41667

	Montly average Flow Effl., MGD	Daily Maximum Flow Effl., MGD	Monthly average NH3-N Infl., mg/l	Daily Maximum NH3-N Infl., mg/l	Minimum DO effl.,mg/l	monthly Average Phosph. Effl., mg/l	Daily Maximum Phosp. Effl. Mg/l	Montly average Flow Infl., MGD	Daily Maximum Flow Infl., MGD	Monthly Average Nitrogen, Total, effl	Daily maximum Nitrogen Total, effl
2008											
jan			8.5	11.2	6.1						
feb	0.444	0.69	7.3	11.2	6.3						
mar	0.511	0.657	5	8.4	6.4						
apr	0.497	0.63	6.4	8.1	6.2						
may	0.423	0.481	11.3	20.1	6.5						
jun	0.383	0.435	10.1	14	6.5						
jul	0.434	0.723	5.9	8.1	6.6						
aug	0.392	0.692	9.1	11.5	6.2						
sep	0.349	0.489	10.8	17.6	6.4						
oct	0.344	0.511	14	14.6	6.5						
nov	0.392	0.583	9.6	14.3	6.7						
dec	0.511	0.908	6.2	12.3	6.5						
AVG	0.425455	0.618091	8.683333	12.61667	6.408333						
2009											
jan	0.551	0.793	1.9	3.1	6.4						
feb	0.522	0.622	2.6	3.9	6.6						
mar	0.569	0.685	3	4.5	6.4						
apr	0.559	0.646	5.6	8.4	6.4						
may	0.547	0.731	4.1	8.4	6						
jun	0.488	0.721	5.2	7	6.1						
jul	0.461	0.688	7.7	10.4	6.2						
aug	0.488	0.727	9.1	11.2	6.2						
sep	0.426	0.705	8.9	10.9	6						
oct	0.478	0.63	10	11.5	6.1						
nov	0.457	0.644	6	7.6	6.1						
dec	0.619	0.901	5.1	10.6	6.2						
AVG	0.51375	0.70775	5.766667	8.125	6.225						
2010											
jan	0.61	0.826	3.9	5.6	6						
feb	0.509	0.664	4.9	6.7	6						
mar	0.455	0.525	11.8	13.9	6						
apr	0.493	0.675	8.6	11.3	6.1						
may	0.559	0.942	6.6	9.7	6						
jun	0.534	0.705	6.8	11	6						
jul	0.558	0.754	7.2	9.9	6	1.12	1.19				
aug	0.504	1.378	7.8	11.6	6						
sep	0.53	0.866	7.5	9.4	3.17	0.95	1.37			7.5	9.4
oct	0.515	0.733			7.6	1.21	1.4			9.7	11.6
Nov	0.629	2.286			7.9	0.95	1.25			2.2	2.2
Dec	0.746	1.497			6.9	0.5	0.67			5.1	7.8
AVG	0.5535	0.987583	7.233333	9.9	6.139167	0.946	1.176			6.125	7.75

2011																			
jan	0.5	0.5	137	193	477	618	3	3	11	12	0.693	0.888	7.38	0.38	0.49			5.6	7
feb	0.5	0.5	315	593	612	1098	3	3	3	3	0.733	1.537	8.72	0.43	0.52			4.8	7
mar	0.7	1.4	264	332	446	720	3	3	12	27	0.841	1.287	6.34	0.41	0.75			3.2	4.5
apr	0.5	0.5	257	413	385	582	3	3	5	10	0.805	1.766	7.39	0.18	0.39			0.8	1.1
may	1.3	2	199	460	331	534	3	3	2	4	0.681	0.962	6.56	0.31	0.47			4.1	6.1
jun	1.3	1.7	301	444	520	938	3	3	2	3	0.625	1.14	5.71	0.62	0.83			2.8	3.2
jul	0.8	1.1	87	157	99	138	3	3	4	9	0.585	0.898	6.22	1.06	1.3			2.2	2.2
aug	1.2	2.2	128	311	235	322	3	3	3	6	0.681	1.011	5	0.96	1.61			2.6	3.4
sep	1.2	1.7	146	239	147	206	3	3	8	15	0.709	1.702	6.37	1.56	2.3			7.6	13
oct	0.8	1.1	180	326	206	268	3	3	4	6	0.686	1.403	6.75	1.37	2.07			1.8	2.2
Nov	0.7	1.1	65	122	104	166	3	3	6	16	0.806	1.873	7.78	0.83	1.55			4.6	6.2
Dec	1	1.4	185	277	255	372	3	3	16	25	0.798	1.307	7.32	0.45	0.5			4.5	6.3
AVG	0.875	1.266667	188.6667	322.25	318.0833	496.8333	3	3	6.333333	11.33333	0.72025	1.3145	6.795	0.713333	1.065			3.716667	5.183333
2012																			
jan	1	2	246	610	233	506	3	3	16	25	0.828	1.165	6.58	0.23	0.37	0.749	1.03	2.5	4.7
feb	2	3.6	111	204	260	438	3	3	3	5	0.741	1.001	7.84	0.25	0.39	0.695	0.904	2.4	4.5
mar	2.3	3.6	133	229	174	262	3	3	11	15	0.799	1.383	5.85	1.1	2.36	0.724	1.206	4.8	7.3
apr	5.8	7.3	277	455	495	670	14	20	34	51	0.679	0.871	6.36	2	2.96	0.593	0.777	9.2	10
may	1.2	2	166	298	413	598	4	5	2	4	0.651	1.047	5.35	0.18	0.24	0.581	0.898	3.7	7.4
jun	1.3	2	250	298	365	596	4	5	2	3	0.596	0.755	3.64	0.36	0.58	0.534	0.673	3	7.6
jul	5.3	9.8	202	516	291	610	5	9	3	5	0.612	0.858	6.2	0.91	1.43	0.691	0.971	5.3	9.8
aug	1.6	2	199	285	683	1172	4	5	2	4	0.564	0.892	6.6	0.37	0.66	0.497	0.769	1.6	2
sep	3.6	6.2	273	404	686	1182	5	9	5	13	0.637	1.066	6.5	0.57	0.57	0.555	0.864	3.6	6.2
oct	5.5	7.3	324	435	610	938	8	13	7	14	0.554	0.812	4.6	1.72	4.28	0.501	0.721	5.5	7.3
Nov	4.1	7.3	286	459	329	600	5	11	6	16	0.53	0.672	8	0.26	0.54	0.488	0.605	4.1	7.3
Dec	4.1	5.6	375	837	586	1226	7	11	7	11	0.772	1.226	4.7	0.91	1.73	0.686	1.092	4.1	5.6
AVG	3.15	4.891667	236.8333	419.1667	427.0833	733.1667	5.416667	8.083333	8.166667	13.83333	0.663583	0.979	6.018333	0.738333	1.3425	0.607833	0.875833	4.15	6.641667
2013																			
jan	3.3	6.2	233	399	359	886	7	12	6	11	0.741	1.631	8.5	0.95	2.12	0.621	1.346	3.3	6.2
feb									7	7				0.06	0.06				
mar	5.1	7.3									0.986	1.829		3.05	3.66	0.811	1.493	5.1	7.3
apr	4.1	4.8	244	325	572	1462	15	38	69	278	0.919	1.246	5	1.89	4.15	0.74	0.997	4.1	4.8
may	5.4	10.1	239	350	528	748	9	11	14	18	0.816	1.438	6.5	0.92	1.78	0.588	1.123	5.4	10.1
jun	9	13.5	296	473	546	830	10	16	16	19	0.646	0.825	6.5	2.03	4.07	0.442	0.546	9	13.5
jul	9.6	13.8	119	168	245	394	12	16	23	28	0.81	1.754	4.7	1.65	2.28	0.567	1.062	11.9	17.4
aug	8.8	13.3	417	893	648	908	12	14	19	24	0.719	1.035	6.9	1.58	2.54	0.498	0.753	10.6	14.8
sep	9.5	12	147	191	175	278	13	21	37	70	0.659	1.025	6.4	1.65	2.52	0.453	0.724	12.3	14.4
oct	13.7	16.6	439	864	577	1134	17	27	19	24	0.582	0.729	6.8	2.5	2.96	0.41	0.516	13.7	16.6
Nov	7.2	14.7	232	381	266	426	11	18	23	41	0.675	1.414	7.6	1.04	2.65	0.482	1.414	7.2	14.7
Dec																			
AVG	7.57	11.23	262.8889	449.3333	435.1111	785.1111	11.77778	19.22222	23.3	52	0.7553	1.2926	6.544444	1.574545	2.617273	0.5612	0.9974	8.26	11.98

EXHIBIT B

Determine Current Average Wet-Weather Flow Contribution using 3 different methods:

Method A:

Average Wet-Weather Flow Contribution using 2013 data = Averaged Plant Peak Effluent Flow – Average Daily Effluent Flow (From Exhibit A)

= 1.28 MGD – 0.74 MGD
= 0.54 MGD

Method B:

Average Wet-Weather Flow Contribution in 2010 = Average Plant Flow – Average Water Consumption (From Exhibit B-1)

= 0.55 MGD – 0.214 MGD
= 0.34 MGD

Method C:

Average Wet-Weather Flow Contribution in 2013 = 3-Month High Average Effluent Flow – Average Daily Dry weather Flow

$$= \frac{0.986+0.919+0.816}{3} - 0.55 = 0.357 \text{ MGD}$$

Conclusion: Use average of $\frac{0.54+0.34+0.357}{3}$ = 0.412 MGD Wet-Weather Flow

EXHIBIT C

A. Determine Future Commercial & Institutional Flow:

1) Calculated Flow from known Sources (Exhibit C-1)

Basis of Design (Refer to Exhibit C-2):

• Nursing Home Contribution: 75 Beds x 100 GPD/Bed =	7,500 GPD
• School Contribution: 700 Students x 35 GPD/Student =	24,500 GPD
• Motel Contribution: 100 Rooms x 100 GPD/Room =	10,000 GPD
• Restaurant(s) Contribution: 200 Seats x 35 Gal/Seat =	7,000 GPD
• Retail Stores Contribution: 100,000 Ft^2 x 100 GPD/1,000 Ft^2 =	10,000 GPD
Subtotal =	59,000 GPD
Total Future Commercial & Institutional Flow =	59,000 GPD

MEMORANDUM NO. 1
January 3rd, 2014
V&M Project No. 11055-00

EXHIBIT D

A. Determine Additional Residential Flow:

1) Additional Residential Growth from Known Sources:
   352 Home Units (See Attachments, Exhibit D-1)

2) Additional Residential Growth from Population Projections:
   72 Home Units (See Attachments, Exhibit D-2)

Total New Customers = 352 + 72 = 424 Customers

Therefore, Additional Future Residential Flow:

Assuming 3-Bedroom House Generates: 350 GPD/House
Assuming 2-Bedroom House Generates: 300 GPD/House
(Source: Exhibit D-3)
And Assuming 350 Houses are 3-Bedroom while the Remaining 74 Houses are 2-Bedroom

Flow = 350 Units x 350 GPD =	122,500 GPD
74 Units x 300 GPD =	22,200 GPD
Total =	144,700 GPD

MEMORANDUM NO. 1
January 3rd, 2014
V&M Project No. 11055-00

EXHIBIT D-2

From the U.S. Census Bureau, the following growth rates were established (Exhibits D-2.1) for the next 20 years:

City = 0%
County = 0%
State = 17%

∴ For design purposes, we will assume that the system will grow by an average of 10% in 20 years.

∴ Future Residential Customer Growth =
Current Customers x 0.1 =
717 x 0.1 = 72 New Customers

EXHIBIT E

A. Determine Industrial Flow Contribution:

1) Additional Industrial Growth from Known Sources:
(Exhibit E-1) and Utilizing Estimated Flow of 1,000 gal/acre (Exhibit E-2)

$\therefore$ Q = 100 acres x 1,000 gal/acre = 100,000 GPD

$\therefore$ Total Future Industrial Contribution = 100,000 GPD

Exhibit B-1

Pineville Utility Commission
Sanitary Sewer Usage by Customer Class
Calendar Year 2010
(1,000 Gallons)

	28 Commercial	28 Government	29 Residential	65 Wilderness Tr	Total
Jan	2,967	784	2,943	309	7,003
Feb	2,269	787	2,047	218	5,321
Mar	2,592	731	2,036	210	5,569
Apr	3,085	939	2,456	246	6,726
May	2,412	1,017	2,516	256	6,201
Jun	2,522	1,058	2,549	238	6,367
Jul	3,239	750	2,558	217	6,764
Aug	3,192	864	2,632	180	6,868
Sep	3,389	1,284	2,765	211	7,649
Oct	3,256	1,016	2,554	229	7,055
Nov	2,597	1,104	2,372	207	6,280
Dec	2,630	1,146	2,580	245	6,601
Total	34,150	11,480	30,008	2,766	78,404

Residential % $= \frac{30,008}{78,404} = 38\%$ (Sales)

Commercial/Industrial/other % $= 62\%$ (Sales)

Average Daily consumption $= \frac{78,404,000 \text{ gal/yr}}{365 \text{ days/yr}}$

$= 214,805$ gpd

Examining the MORs, the estimated dry weather flow was approximately 0.5 MGD. Since this flow is almost twice the volume of water sold, this may indicate that the sanitary sewer system receives flow contribution outside the water sales service area, or due to I/I infiltration.

Exhibit C-1

Commercial/Institutional

Marios S. Georgiou

From: Mitch L. Brunsma
Sent: Wednesday, March 30, 2011 4:46 PM
To: Marios S. Georgiou
Subject: RE: Pineville Sewer projections

Ferndale - 50 residences, nursing home and housing project Assume 75 beds @ nursing home
Turkey Creek - 40 residences
Hwy 119 to Page School - 225 res/bus and 1 school Assume 200 residences, 25 bus/commercial
Asher PMRIA Ind Park - just industrial park Assume 700 students @ School w/ showers/cafeteria
Walnut Lane - 12 residences

Thanks,

Mitchel L. Brunsma, P.E.

VAUGHN & MELTON CONSULTING ENGINEERS, INC.
109 South 24th Street
P.O. Box 1425
Middlesboro, Kentucky 40965
Tel.: (606)248-6600
Fax: (606)248-0372
Email: mlbrunsma@vaughnmelton.com

From: Marios S. Georgiou
Sent: Tuesday, March 22, 2011 11:54 AM
To: Mitch L. Brunsma
Subject: Pineville Sewer projections

Mitch:
You are working to determine the future number of sewer customers in the pineville sewer areas provided by Bill. Do you have any numbers yet?

Marios S. Georgiou, PE
Vaughn & Melton Consulting Engineers
Park Terrace Center
1318-F Patton Avenue
Asheville, NC 28806
828-253-2796 PH
828-253-4864 FX
msgeorgiou@vaughnmelton.com

G64.b.b

C-2

TABLE 5.1
AVERAGE FLOWS AND BOD; BASIS OF DESIGN

Classification	Design Unit	Average Flow Per Unit · Day	Loading Period Hours	BOD_5 Per Unit · Day	Note
Apartments:					
One Bedroom	per apartment	200 gal.	18	0.42 lb.	
Two Bedroom	per apartment	300 gal.	18	0.62 lb.	
Three Bedroom	per apartment	350 gal.	18	0.73 lb.	
Colleges	per student	100 gal.	18	0.20 lb.	1
Country Clubs	per member	50 gal.	12	0.20 lb.	
Factory or Office Bldg. With Showers	per employee	35 gal.	8	0.06 lb.	5
Factory or Office Bldg. Without Showers	per employee	25 gal.	8	0.06 lb.	5
Hospitals	per bed	200 gal.	18	0.40 lb.	1
Motels	per unit	100 gal.	8	0.12 lb.	1
Municipality (3.5 persons/house)	per person	100 gal.	18	0.20 lb.	
Nursing Homes	per bed	100 gal.	18	0.20 lb.	1
Restaurants					
Ordinary Rest. (not 24 hrs.)	per seat	35 gal.	12	0.20 lb.	3
24 hour Rest.	per seat	50 gal.	18	0.28 lb.	3
24 hour Rest. on Int.	per seat	70 gal.	24	0.40 lb.	3
Ord. Rest. on Int.	per seat	50 gal.	12	0.28 lb.	3
Tavern	per seat	20 gal.	12	0.12 lb.	3
Curb Service	per car space	50 gal.	18	0.28 lb.	3
Schools, Ele. and High	per student	30 gal.	8	0.06 lb.	2
Service Station	per bay or pump island	1000 gal.	--	1.67 lbs.	4
Shopping Center Without Food Service or Laundry	per thousand ft^2 of floor space	100 gal.	12	0.17 lb.	1
Subdivision (3.5 per/house)	per person	100 gal.	18	0.20 lb.	
Trailer Park for Mobile Homes	per person @ 2.5 persons per trailer	75 gal.	18	0.20 lb.	
Travel Trailer Parks; Campgrounds; Dump Stations for Trailers and Campers	per trailer or per space	150 gal.	6	0.37 lb.	1
Truck Stops					
w/24 hr. Rest.	per seat	70 gal.	24	0.80 lb.	
w/service area & fueling	per bay or pump island	1000 gal.	24	1.67 lbs.	
w/bunks	per bunk	100 gal.	24	0.12 lb.	

Exhibit A-1

Marios S. Georgiou

From: Mitch L. Brunsma
Sent: Wednesday, March 30, 2011 4:46 PM
To: Marios S. Georgiou
Subject: RE: Pineville Sewer projections

Ferndale - 50 residences, nursing home and (housing project - assume 50 more residences)
Turkey Creek - 40 residences
Hwy 119 to Page School - 225 res/bus and 1 school - assume 200 residences + 25 bus/commer.
Asher PMRIA Ind Park - just industrial park
Walnut Lane - 12 residences

Thanks,

Mitchel L. Brunsma, P.E.

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msgeorgiou@vaughnmelton.com

Total Residences = 50+50+40+200+12
= 352 new customers

Exhibit D-2.1

U.S. Census Bureau
American FactFinder

POPULATION FINDER

United States | Kentucky | Pineville city

Pineville city, Kentucky

city/ town, county, or zip
pineville
state
Kentucky GO
search by address »

The 2009 population estimate for Pineville city, Kentucky is 2,047.

Note: Information about challenges to population estimates data can be found on the Population Estimates Challenges page.

View population trends...

	2009	2000	1990
Population	2,047	2,093	2,198

Source: U.S. Census Bureau, 2009 Population Estimates, Census 2000, 1990 Census

View more results...

Population for all cities and towns in Kentucky, 2000-2009:

alphabetic | ranked

Map of Persons per Square Mile, City/Town by Census Tract:

2000 | 1990

See more data for Pineville city, Kentucky on the Fact Sheet.

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.

No growth is expected in the next 20 years according to past records.

Exhibit A-2.1 continue

U.S. Census Bureau
American FactFinder

POPULATION FINDER

United States | Kentucky | Bell County

Bell County, Kentucky

city/ town, county, or zip
bell county
state
Kentucky GO
search by address »

The 2009 population estimate for Bell County, Kentucky is 28,972.

Note: Information about challenges to population estimates data can be found on the Population Estimates Challenges page.

View population trends...

	2009	2000	1990
Population	28,972	30,060	31,506

Source: U.S. Census Bureau, 2009 Population Estimates, Census 2000, 1990 Census

View more results...

Population for all counties in Kentucky, 2000-2009:

alphabetic | ranked

Map of Persons per Square Mile, Kentucky by County:

2009 | 2000 | 1990

Map of Persons per Square Mile, County by County Subdivision:

2009 | 2000 | 1990

See more data for Bell County, Kentucky on the Fact Sheet.

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.

No growth is projected in the next 20 years according to the past 20 year for Bell County.

U.S. Census Bureau
American FactFinder

Exhibit A-2, continue

POPULATION FINDER

United States | Kentucky

Kentucky

city/ town, county, or zip

state
Kentucky GO
search by address »

The 2009 population estimate for Kentucky is 4,314,113.

Note: Information about challenges to population estimates data can be found on the Population Estimates Challenges page.

View population trends...

	2009	2000	1990
Population	4,314,113	4,041,769	3,685,296

Source: U.S. Census Bureau, 2009 Population Estimates, Census 2000, 1990 Census

View more results...

Population for all counties in Kentucky, 2000-2009:
alphabetic | ranked
Map of Persons per Square Mile, United States by State:
2009 | 2000 | 1990
Map of Persons per Square Mile, Kentucky by County:
2009 | 2000 | 1990

See more data for Kentucky on the Fact Sheet.

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.

State of KY appear to be growing at a rate of 17% per 20 yrs or

Exhibit D-3

TABLE 5.1
AVERAGE FLOWS AND BOD; BASIS OF DESIGN

Classification	Design Unit	Average Flow Per Unit · Day	Loading Period Hours	BOD_5 Per Unit · Day	Note
Apartments:					
One Bedroom	per apartment	200 gal.	18	0.42 lb.	
Two Bedroom	per apartment	300 gal.	18	0.62 lb.	
Three Bedroom	per apartment	350 gal.	18	0.73 lb.	
Colleges	per student	100 gal.	18	0.20 lb.	1
Country Clubs	per member	50 gal.	12	0.20 lb.	
Factory or Office Bldg. With Showers	per employee	35 gal.	8	0.06 lb.	5
Factory or Office Bldg. Without Showers	per employee	25 gal.	8	0.06 lb.	5
Hospitals	per bed	200 gal.	18	0.40 lb.	1
Motels	per unit	100 gal.	8	0.12 lb.	1
Municipality (3.5 persons/house)	per person	100 gal.	18	0.20 lb.	
Nursing Homes	per bed	100 gal.	18	0.20 lb.	1
Restaurants					
Ordinary Rest. (not 24 hrs.)	per seat	35 gal.	12	0.20 lb.	3
24 hour Rest.	per seat	50 gal.	18	0.28 lb.	3
24 hour Rest. on Int.	per seat	70 gal.	24	0.40 lb.	3
Ord. Rest. on Int.	per seat	50 gal.	12	0.28 lb.	3
Tavern	per seat	20 gal.	12	0.12 lb.	3
Curb Service	per car space	50 gal.	18	0.28 lb.	3
Schools, Ele. and High	per student	30 gal.	8	0.06 lb.	2
Service Station	per bay or pump island	1000 gal.	---	1.67 lbs.	4
Shopping Center Without Food Service or Laundry	per thousand ft^2 of floor space	100 gal.	12	0.17 lb.	1
Subdivision (3.5 per/house	per person	100 gal.	18	0.20 lb.	
Trailer Park for Mobile Homes	per person @ 2.5 persons per trailer	75 gal.	18	0.20 lb.	
Travel Trailer Parks; Campgrounds; Dump Stations for Trailers and Campers	per trailer or per space	150 gal.	6	0.37 lb.	1
Truck Stops					
w/24 hr. Rest.	per seat	70 gal.	24	0.80 lb.	
w/service area & fueling	per bay or pump island	1000 gal.	24	1.67 lbs.	
w/bunks	per bunk	100 gal.	24	0.12 lb.	

Exhibit E-1
Industrial

Marios S. Georgiou

From: Mitch L. Brunsma
Sent: Wednesday, March 30, 2011 4:46 PM
To: Marios S. Georgiou
Subject: RE: Pineville Sewer projections

Ferndale - 50 residences, nursing home and housing project
Turkey Creek - 40 residences
Hwy 119 to Page School - 225 res/bus and 1 school
Asher PMRIA Ind Park - just industrial park (assume 100 acre park) light industries
Walnut Lane - 12 residences

Thanks,

Mitchel L. Brunsma, P.E.

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Subject: Pineville Sewer projections

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You are working to determine the future number of sewer customers in the pineville sewer areas provided by Bill. Do you have any numbers yet?

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828-253-4864 FX
msgeorgiou@vaughnmelton.com

te\. ..r to water supply

ɜs from various domestic
on are presented in this
ɔefore collection systems

ɪunity are the residential
include institutional and
; data should be obtained
ds of estimating flowrates
ɔwrates for small systems
/ from larger systems and

er flowrates are commonly
age per capita contribution
are given in Table 2-9. For
vra n the basis of land-
sible, these rates should be
.al areas, preferably in the

ions for use in estimating
: engineer, but today such
e planning agencies. If the
be prepared, Ref. 5 may be

ates are generally expressed
:icipated future development
or commercial developments
14 m^3/ha · d). Because unit
ry effort should be made to
ain commercial sources may

institutional facilities, essen-
n, it is stressed that flowrates

Exhibit E-2

TABLE 2-9
Typical wastewater flowrates from residential sources[a]

Source	Unit	Flow, gal/unit · d Range	Typical
Apartment:			
High-rise	Person	35–75	50
Low-rise	Person	50–80	65
Hotel	Guest	30–55	45
Individual residence:			
Typical home	Person	45–90	70
Better home	Person	60–100	80
Luxury home	Person	75–150	95
Older home	Person	30–60	45
Summer cottage	Person	25–50	40
Motel:			
With kitchen	Unit	90–180	100
Without kitchen	Unit	75–150	95
Trailer park	Person	30–50	40

[a] Adapted in part from Ref. 7.
Note: gal × 3.7854 = L

vary with the region, climate, and type of facility. The actual records of institutions are the best sources of flow data for design purposes.

Recreational Facilities. Wastewater flowrates from many recreational facilities are highly seasonal. Typical data on wastewater flowrates from recreational facilities are presented in Table 2-12.

Sources and Rates of Industrial (Nondomestic) Wastewater Flows

Nondomestic wastewater flowrates from industrial sources vary with the type and size of the facility, the degree of water reuse, and the onsite wastewater treatment methods, if any. Extremely high peak flowrates may be reduced by the use of detention tanks and equalization basins. Typical design values for estimating the flows from industrial areas that have no or little wet-process type industries are 1000 to 1500 gal/acre · d (9 to 14 m^3/ha · d) for light industrial developments and 1500 to 3000 gal/acre · d (14 to 28 m^3/ha · d) for medium industrial developments. Alternatively, for estimating industrial flowrates where the nature of the industry is known, data such as those reported in Table 2-6 can be used. For industries without internal recycling or reuse programs, it can be assumed that about 85 to 95 percent of the water used in the various operations and processes will become wastewater. For large industries with internal water-reuse programs, separate estimates must be made. Average domestic

Source: Wastewater Engineering, 3rd Edition
Metcalf and Eddy

Vaughn & Melton

Engineering • Surveying

1909 Ailor Avenue
Knoxville, Tennessee 37921
Tel.: (865) 546-5800
Fax: (865) 546-4714
www.vaughnmelton.com

MEMORANDUM NO. 2

Date: January 3rd, 2014. Revision 1.1

To: File

From: Marios S. Georgiou, P.E.

RE: Pineville Wastewater Treatment Plant Expansion
Pineville, Kentucky
New WWTP Design Criteria
V&M Project No. 11055-00

The following information was used to establish the new WWTP design parmaters for the referenced project:

1. WWTP Influent Design Criteria Justification:

BOD =	350 mg/L
(2013 DMR Records, Exhibit "A", shows BOD conc. was approximately 263 mg/L)	
TSS =	450 mg/L
(2013 DMR Records show the TSS conc. was approximately 435 mg/L)	
Alkalinity =	100 mg/L
(Assumed)	
Total Phosphorous =	9.0 mg/L
(Assumed)	
Peak Instantaneous/Average Daily Flow Ratio = 3.7	
(Exhibit "B")	
Peak Design Instantaneous Flow =	1.2 MGD x 3.7 = 4.45 MGD
pH =	6-8
(Based on Records)	
TKN =	40 mg/L
(Assumed)	
Ammonia-Nitrogen =	30 mg/L
(Assumed Typical Concentration in 2011 was between 7-9 mg/L)	

2. WWTP Effluent Design Criteria Justification:

   a. Current NPDES Permit Limits:

BOD Concentration =	30 mg/L (monthly average)
TSS Concentration =	30 mg/L (monthly average)
Ammonia-Nitrogen Concentration =	20 mg/L (monthly average)
Dissolved Oxygen =	2.0 mg/L
pH =	6-9
Ecoli Bacteria, #/100 ml =	130

b. Proposed WWTP Effluent Design Limits (assumed and will need to be verified once the new waste load allocation limits are issued):

BOD Concentration =	20 mg/L
TSS Concentration =	20 mg/L
Ammonia-Nitrogen Concentration =	5.0 mg/L
Dissolved Oxygen =	3.0 mg/L
pH =	6-9
Total Nitrogen =	10 mg/L
Total Phosphorous =	2.0 mg/L
Ecoli Bacteria, #/100 ml =	100

3. Biosolids Handling:
   Sewage Sludge Biosolids shall meet Class B Requirements.

EXHIBIT "B"

Determine Peak Hourly Flow Factor:

Case 1: Based on Plant Records:
The Highest Influent Peak Flow in 2013 was 1.493 MGD

Based on Avg. influent Flow of 0.563 MGD, in 2013, the Peak/Avg Factor is $\frac{1.493}{0.561} = 2.7$

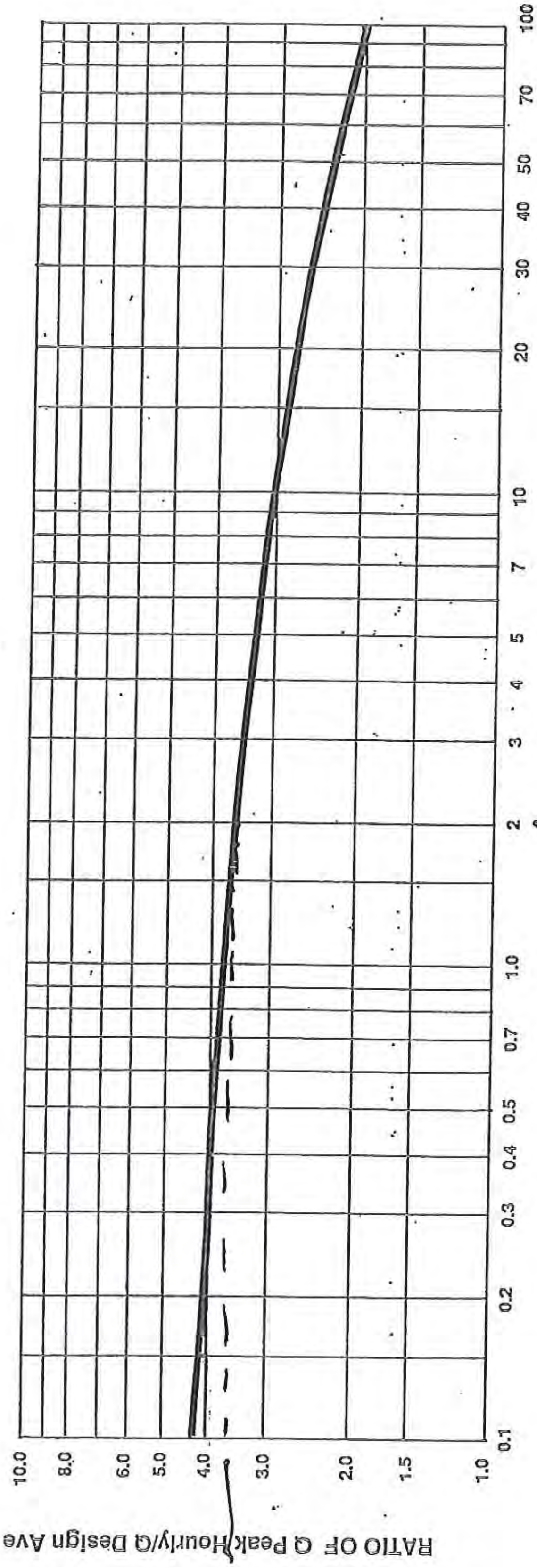
Case 2: Based on Population Numbers and the "Ten State" Guidelines (Exhibit B-1), the Peak/Average Factor = 3.7

$\therefore$ Use 3.7 for Design Purposes

Exhibit B-1

Prineville WWTP

FIGURE 1.
RATIO OF PEAK HOURLY FLOW TO DESIGN AVERAGE FLOW



POPULATION IN THOUSANDS

Q peak hourly: Maximum Rate of Wastewater Flow (Peak Hourly Flow)

Q design ave: Design Average Daily Wastewater Flow

Source: Q Peak Hourly/Q Design Ave $= \dfrac{18 + \sqrt{P}}{4 + \sqrt{P}}$ --- (P = population in thousands)

Fair, G.M. and Geyer, J.C. "Water Supply and Waste-water Disposal" 1st Ed., John Wiley & Sons, Inc., New York (1954), p. 136

3.7

Pineville 201 Facilities Plan Update
Exhibit "A"- Pineville WWTP Plant Data

P#: 11055-00
Date: 9/20/2012

	monthly average NH3-N effl., mg/l	Max. daily NH3-N effl., mg/l	Monthly average BOD inf., mg/l	max. Daily BOD infl.,mg/l	Monhtly average TSS Inf., mg/l	max. Daily TSS infl.,mg/l	Monhtly average BOD effl., mg/l	Daily Maximum BOD effl., mg/l	Monhtly average TSS effl., mg/l	Daily maximum TSS effl., mg/l	Montly average Flow Effl., MGD	Daily Maximum Flow Effl., MGD	Monthly average NH3-N Infl., mg/l	Daily Maximum NH3-N Infl., mg/l	Minimum DO effl.,mg/l	monthly Average Phosph. Effl., mg/l	Daily Maximum Phosp. Effl. Mg/l	Montly average Flow Infl., MGD	Daily Maximum Flow Infl., MGD	Monthly Average Nitrogen, Total, effl	Daily maximum Nitrogen Total, effl
2008																					
jan	0.5	0.5	254	452	401	755	4	6	9	12			8.5	11.2	6.1						
feb	0.5	0.5	218	444	278	595	4	7	4	5	0.444	0.69	7.3	11.2	6.3						
mar	0.5	0.5	188	449	341	520			12	21	0.511	0.657	5	8.4	6.4						
apr	0.9	1.4	218	485	627	1378	3	5	3	5	0.497	0.63	6.4	8.1	6.2						
may	1	1.4	219	311	485	1048	5	8	5	5	0.423	0.481	11.3	20.1	6.5						
jun	1.5	2.8	259	336	568	1132	3	4	4	7	0.383	0.435	10.1	14	6.5						
jul	1.7	2.2	171	359	353	1135	6	8	5	8	0.434	0.723	5.9	8.1	6.6						
aug	2	2.8	191	314	961	1328	3	4	9	19	0.392	0.692	9.1	11.5	6.2						
sep	1.7	3.4	200	372	432	1140	3	3	5	8	0.349	0.489	10.8	17.6	6.4						
oct	0.8	0.8	221	306	428	580	4	6	3	4	0.344	0.511	14	14.6	6.5						
nov	1.1	1.4	283	471	411	748	4	6	6	12	0.392	0.583	9.6	14.3	6.7						
dec	0.7	1.4	219	305	289	412	3	4	6	9	0.511	0.908	6.2	12.3	6.5						
AVG	1.075	1.591667	220.0833	383.6667	464.5	897.5833	3.818182	5.545455	5.916667	9.583333	0.425455	0.618091	8.683333	12.61667	6.408333						
2009																					
jan	5.6	6.7	191	282	378	1024	3	4	5	10	0.551	0.793	1.9	3.1	6.4						
feb	7.2	9.8	161	204	247	350	4	5	4	9	0.522	0.622	2.6	3.9	6.6						
mar	7.7	9.8	230	379	233	324	4	5	4	8	0.569	0.685	3	4.5	6.4						
apr	6.3	11.8	336	543	419	738	8	10	11	16	0.559	0.646	5.6	8.4	6.4						
may	4.8	6.7	162	221	727	1600	6	9	25	32	0.547	0.731	4.1	8.4	6						
jun	1.6	5.6	268	363	402	1539	1	1	8	14	0.488	0.721	5.2	7	6.1						
jul	1.1	1.7	206	306	261	640	1	1	6	8	0.461	0.688	7.7	10.4	6.2						
aug	2.1	5.6	370	518	263	350	4	7	10	32	0.488	0.727	9.1	11.2	6.2						
sep	1.2	2.5	259	626	524	1340	3	3	4	9	0.426	0.705	8.9	10.9	6						
oct	0.9	1.4	237	378	652	1372	3	3	11	24	0.478	0.63	10	11.5	6.1						
nov	0.8	1.7	115	133	388	642	1	1	11	15	0.457	0.644	6	7.6	6.1						
dec	0.9	2.5	98	120	336	626	3	4	12	17	0.619	0.901	5.1	10.6	6.2						
AVG	3.35	5.483333	219.4167	339.4167	402.5	878.75	3.416667	4.416667	9.25	16.16667	0.51375	0.70775	5.766667	8.125	6.225						
2010																					
jan	0.9	1.4	142	192	238	358	3	4	17	31	0.61	0.826	3.9	5.6	6						
feb	2.1	3.4	94	123	216	338	4	7	15	22	0.509	0.664	4.9	6.7	6						
mar	2.3	5.6	135	263	323	576	3	3	14	26	0.455	0.525	11.8	13.9	6						
apr	1.8	4.8	114	172	224	366	3	3	5	8	0.493	0.675	8.6	11.3	6.1						
may	5.8	9.8	151	253	373	626	4	5	12	28	0.559	0.942	6.6	9.7	6						
jun	2.5	4.3	112	173	310	436	3	3	13	38	0.534	0.705	6.8	11	6						
jul	1.4	2	159	281	318	481	3	4	10	20	0.558	0.754	7.2	9.9	6	1.12	1.19				
aug	1.1	1.7	123	219	132	220	1	1	5	11	0.504	1.378	7.8	11.6	6						
sep	1.5	2.2	444	906	671	1124	1	7	5	8	0.53	0.866	7.5	9.4	3.17	0.95	1.37			7.5	9.4
oct	1.6	2.8	193	228	204	290	1	7	4	6	0.515	0.733			7.6	1.21	1.4			9.7	11.6
Nov	1.1	1.4	328	513	565	1240	1	7	4	13	0.629	2.286			7.9	0.95	1.25			2.2	2.2
Dec	1.9	4.2	155	335	323	540	3	3	13	22	0.746	1.497			6.9	0.5	0.67			5.1	7.8
AVG	2	3.633333	179.1667	304.8333	324.75	549.5833	2.5	4.5	9.75	19.41667	0.5535	0.987583	7.233333	9.9	6.139167	0.946	1.176			6.125	7.75

2011																			
jan	0.5	0.5	137	193	477	618	3	3	11	12	0.693	0.888	7.38	0.38	0.49			5.6	7
feb	0.5	0.5	315	593	612	1098	3	3	3	3	0.733	1.537	8.72	0.43	0.52			4.8	7
mar	0.7	1.4	264	332	446	720	3	3	12	27	0.841	1.287	6.34	0.41	0.75			3.2	4.5
apr	0.5	0.5	257	413	385	582	3	3	5	10	0.805	1.766	7.39	0.18	0.39			0.8	1.1
may	1.3	2	199	460	331	534	3	3	2	4	0.681	0.962	6.56	0.31	0.47			4.1	6.1
jun	1.3	1.7	301	444	520	938	3	3	2	3	0.625	1.14	5.71	0.62	0.83			2.8	3.2
jul	0.8	1.1	87	157	99	138	3	3	4	9	0.585	0.898	6.22	1.06	1.3			2.2	2.2
aug	1.2	2.2	128	311	235	322	3	3	3	6	0.681	1.011	5	0.96	1.61			2.6	3.4
sep	1.2	1.7	146	239	147	206	3	3	8	15	0.709	1.702	6.37	1.56	2.3			7.6	13
oct	0.8	1.1	180	326	206	268	3	3	4	6	0.686	1.403	6.75	1.37	2.07			1.8	2.2
Nov	0.7	1.1	65	122	104	166	3	3	6	16	0.806	1.873	7.78	0.83	1.55			4.6	6.2
Dec	1	1.4	185	277	255	372	3	3	16	25	0.798	1.307	7.32	0.45	0.5			4.5	6.3
AVG	0.875	1.266667	188.6667	322.25	318.0833	496.8333	3	3	6.333333	11.33333	0.72025	1.3145	6.795	0.713333	1.065			3.716667	5.183333
2012																			
jan	1	2	246	610	233	506	3	3	16	25	0.828	1.165	6.58	0.23	0.37	0.749	1.03	2.5	4.7
feb	2	3.6	111	204	260	438	3	3	3	5	0.741	1.001	7.84	0.25	0.39	0.695	0.904	2.4	4.5
mar	2.3	3.6	133	229	174	262	3	3	11	15	0.799	1.383	5.85	1.1	2.36	0.724	1.206	4.8	7.3
apr	5.8	7.3	277	455	495	670	14	20	34	51	0.679	0.871	6.36	2	2.96	0.593	0.777	9.2	10
may	1.2	2	166	298	413	598	4	5	2	4	0.651	1.047	5.35	0.18	0.24	0.581	0.898	3.7	7.4
jun	1.3	2	250	298	365	596	4	5	2	3	0.596	0.755	3.64	0.36	0.58	0.534	0.673	3	7.6
jul	5.3	9.8	202	516	291	610	5	9	3	5	0.612	0.858	6.2	0.91	1.43	0.691	0.971	5.3	9.8
aug	1.6	2	199	285	683	1172	4	5	2	4	0.564	0.892	6.6	0.37	0.66	0.497	0.769	1.6	2
sep	3.6	6.2	273	404	686	1182	5	9	5	13	0.637	1.066	6.5	0.57	0.57	0.555	0.864	3.6	6.2
oct	5.5	7.3	324	435	610	938	8	13	7	14	0.554	0.812	4.6	1.72	4.28	0.501	0.721	5.5	7.3
Nov	4.1	7.3	286	459	329	600	5	11	6	16	0.53	0.672	8	0.26	0.54	0.488	0.605	4.1	7.3
Dec	4.1	5.6	375	837	586	1226	7	11	7	11	0.772	1.226	4.7	0.91	1.73	0.686	1.092	4.1	5.6
AVG	3.15	4.891667	236.8333	419.1667	427.0833	733.1667	5.416667	8.083333	8.166667	13.83333	0.663583	0.979	6.018333	0.738333	1.3425	0.607833	0.875833	4.15	6.641667
2013																			
jan	3.3	6.2	233	399	359	886	7	12	6	11	0.741	1.631	8.5	0.95	2.12	0.621	1.346	3.3	6.2
feb									7	7				0.06	0.06				
mar	5.1	7.3									0.986	1.829		3.05	3.66	0.811	1.493	5.1	7.3
apr	4.1	4.8	244	325	572	1462	15	38	69	278	0.919	1.246	5	1.89	4.15	0.74	0.997	4.1	4.8
may	5.4	10.1	239	350	528	748	9	11	14	18	0.816	1.438	6.5	0.92	1.78	0.588	1.123	5.4	10.1
jun	9	13.5	296	473	546	830	10	16	16	19	0.646	0.825	6.5	2.03	4.07	0.442	0.546	9	13.5
jul	9.6	13.8	119	168	245	394	12	16	23	28	0.81	1.754	4.7	1.65	2.28	0.567	1.062	11.9	17.4
aug	8.8	13.3	417	893	648	908	12	14	19	24	0.719	1.035	6.9	1.58	2.54	0.498	0.753	10.6	14.8
sep	9.5	12	147	191	175	278	13	21	37	70	0.659	1.025	6.4	1.65	2.52	0.453	0.724	12.3	14.4
oct	13.7	16.6	439	864	577	1134	17	27	19	24	0.582	0.729	6.8	2.5	2.96	0.41	0.516	13.7	16.6
Nov	7.2	14.7	232	381	266	426	11	18	23	41	0.675	1.414	7.6	1.04	2.65	0.482	1.414	7.2	14.7
Dec																			
AVG	7.57	11.23	262.8889	449.3333	435.1111	785.1111	11.77778	19.22222	23.3	52	0.7553	1.2926	6.544444	1.574545	2.617273	0.5612	0.9974	8.26	11.98

APPENDIX I

ESTIMATED O&M COST FOR DIFFERENT TREATMENT ALTERNATIVES

Table I-1.1. Estimated Annual Power Cost Spreadsheet (at design capacity) - Option 3A- Lagoon System

Project: Pineville Wastewater Treatment Plant Expansion
V&M Project Number: 11055-00
Date: 1/06/14

Unit Operation	No. of Units Available	No. of Units in operation	Run Hrs/day	Motor Hp	Brake Hp	Motor Efficiency	Cost $/KWhr	Daily Cost,$	Annual Cost,$
Headworks Screens	2	1	12	2	1.5	0.7	0.07	1.3428	490.122
Solids Compactor @ screen	2	1	12	5	4	0.85	0.07	2.948894	1076.346
Grit Chamber Pump	1	1	16	10	7	0.85	0.07	6.880753	2511.475
Solids Compactor @ Grit	1	1	16	5	4	0.85	0.07	3.931859	1435.128
EQ pumps	2	1	2	25	20	0.9	0.07	2.320889	847.1244
Anoxic Mixers	2	2	24	7.5	6	0.8	0.07	18.7992	6861.708
Secondary Clarifiers	2	2	24	1	0.5	0.8	0.07	1.5666	571.809
Aeration Blowers	3	2	18	200	150	0.9	0.07	313.32	114361.8
Internal Recycle Pumps	3	3	24	20	15	0.9	0.07	62.664	22872.36
EQ Tank Aspirators	4	4	2	50	40	0.85	0.07	19.65929	7175.642
Digester Blowers	3	2	16	100	80	0.85	0.07	157.2744	57405.14
Return Sludge Pumps	2	2	16	50	45	0.9	0.07	83.552	30496.48
Wasted Sludge Pumps	2	1	4	20	17	0.9	0.07	3.945511	1440.112
Dewatering Equipment	1	1	7	5	4	0.8	0.07	1.8277	667.1105
Dewatering Feed Pumps	1	1	7	15	12	0.7	0.07	6.2664	2287.236
Recycle Water Pump	1	1	3	50	45	0.9	0.07	7.833	2859.045
UV Disinfection	1	1	24	5	4	0.9	0.07	5.570133	2033.099
Chemical Feed Systems	4	4	18	3	2	0.8	0.07	9.3996	3430.854
Miscellaneous	1	1	18	20	15	0.9	0.07	15.666	5718.09

Estimated Total Annual Cost, $ = **264540.7**

TABLE I-2.0 – ESTIMATED VOLUME OF SLUDGE GENERATED FOR EACH OPTION CONSIDERED

(AT DESIGN PLANT CAPACITY OF 1.2 MGD AND BASED ON 18% SOLIDS)

	Sludge Rate Lb/Lb BOD	Products of Wet Sludge Lbs/Day	Wet Tons/Day	Dry Tons/Day
Lagoon System	0.75	3,300 Lbs/Day	1.65	0.30
MBR System	0.85	3,739 Lbs/Day	1.87	0.34
Oxidation Ditch System	0.75	3,300 Lbs/Day	1.65	0.30

TABLE I-3.0

ANNUAL OPERATION & MAINTENANCE COST ESTIMATE
(OPTION 3A)

LAGOON SYSTEM
OPERATING @ FULL CAPACITY, 1.2 MGD
PINEVILLE WWTP EXPANSION
V&M Project No. 11055-00

May 8, 2013

A.	Parts Replacement	$ 40,000.00
B.	Utilities Power (Refer to Table I-1.0 attached)	$264,000.00
C.	Supplies / Chemicals (Ferric Chloride, Polymer)	$ 60,000.00
D.	Sludge Handling & Disposal Fee = 0.30 Dry Tons x 365 D/Yr @ $300/Ton (Table I-2.0)	$ 32,850.00
	Total:	$396,850.00

TABLE I-3.1

ANNUAL OPERATION & MAINTENANCE COST ESTIMATE
(OPTION 3C)

OXIDATION DITCH SYSTEM
OPERATING @ FULL CAPACITY, 1.2 MGD
PINEVILLE WWTP EXPANSION
V&M Project No. 11055-00

May 8, 2013

A.	Parts Replacement	$ 45,000.00
B.	Utilities Power (Refer to Table I-1.1 attached)	$239,000.00
C.	Supplies / Chemicals (Ferric Chloride, Polymer)	$ 50,000.00
D.	Sludge Handling & Disposal Fee = 0.30 Dry Tons x 365 D/Yr @ $300/Ton (Table I-2.0)	$ 32,850.00
	Total:	$366,850.00

TABLE I-3.2

ANNUAL OPERATION & MAINTENANCE COST ESTIMATE
(OPTION 3B)

MEMBRANE BIO-REACTOR SYSTEM
OPERATING @ FULL CAPACITY, 1.2 MGD
PINEVILLE WWTP EXPANSION
V&M Project No. 11055-00

May 8, 2013

A.	Parts Replacement	$	125,000.00
B.	Utilities Power (Refer to Table I-1.2 attached)	$	436,000.00
C.	Supplies / Chemicals (Ferric Chloride, Polymer, Citric Acid, Hypochlorite)	$	70,000.00
D.	Sludge Handling & Disposal Fee = 0.34 Dry Tons x 365 D/Yr @ $300/Ton (Table I-2.0)	$	37,230.00
	Total:	$	668,230.00

Table I-1.2. Estimated Annual Power Cost Spreadsheet (at design capacity) - Option 3B-Membrane Bio Reactor System

Project: Pineville Wastewater Treatment Plant Expansion
V&M Project Number: 11055-00
Date: 1/06/14

Unit Operation	No. of Units Available	No. of Units in operation	Run Hrs/day	Motor Hp	Brake Hp	Motor Efficiency	Cost $/KWhr	Daily Cost,$	Annual Cost,$
Headworks Screens	2	1	12	2	1.5	0.7	0.07	1.3428	490.122
Solids Compactor @ screen	2	1	12	5	4	0.85	0.07	2.948894	1076.346
Grit Chamber Pump	1	1	16	10	7	0.85	0.07	6.880753	2511.475
Solids Compactor @ Grit	1	1	16	5	4	0.85	0.07	3.931859	1435.128
Anoxic Mixers	2	2	24	7.5	6	0.85	0.07	17.69336	6458.078
MBR Permeate pumps	4	4	18	50	45	0.9	0.07	187.992	68617.08
Aeration Blowers	3	2	24	200	150	0.9	0.07	417.76	152482.4
Internal Recycle Pumps	3	3	24	50	45	0.9	0.07	187.992	68617.08
Digester Blowers	3	2	16	100	80	0.85	0.07	157.2744	57405.14
EQ Tank Aspirators	4	4	2	50	40	0.85	0.07	19.65929	7175.642
EQ Pumps	2	1	2	25	20	0.9	0.07	2.320889	847.1244
Wasted Sludge Pumps	2	1	4	20	17	0.9	0.07	3.945511	1440.112
Return Sludge Pumps	2	2	16	50	45	0.9	0.07	83.552	30496.48
Dewatering Equipment	2	1	7	5	4	0.8	0.07	1.8277	667.1105
Dewatering Feed Pumps	2	1	7	15	12	0.9	0.07	4.873867	1778.961
UV Disinfection	1	1	24	5	4	0.9	0.07	5.570133	2033.099
Recycle Water Pump	2	1	4	50	45	0.9	0.07	10.444	3812.06
Chemical Feed Systems	6	6	18	5	4	0.8	0.07	28.1988	10292.56
Miscellaneous	1	1	18	50	45	0.9	0.07	46.998	17154.27

Estimated Total Annual Cost, $ = **434790.3**

Table I-1.3. Estimated Annual Power Cost Spreadsheet (at design capacity) - Option 3C- Oxidation Ditch System

Project: Pineville Wastewater Treatment Plant Expansion
V&M Project Number: 11055-00
Date: 1/06/14

Unit Operation	No. of Units Available	No. of Units in operation	Run Hrs/day	Motor Hp	Brake Hp	Motor Efficiency	Cost $/KWhr	Daily Cost,$	Annual Cost,$
Headworks Screens	2	1	12	2	1.5	0.7	0.07	1.3428	490.122
Solids Compactor @ screen	2	1	12	5	4	0.85	0.07	2.948894	1076.346
Grit Chamber	1	1	16	1	0.5	0.85	0.07	0.491482	179.3911
Solids Compactor @ Grit	1	1	16	5	4	0.85	0.07	3.931859	1435.128
Anoxic Mixers	4	2	24	7.5	5	0.65	0.07	19.28123	7037.649
Oxidation Ditch Rotors	6	4	24	50	40	0.9	0.07	222.8053	81323.95
UV system	1	1	24	5	2	0.7	0.07	3.5808	1306.992
Digester Blowers	4	3	16	100	80	0.9	0.07	222.8053	81323.95
Return Sludge Pumps	2	2	16	50	45	0.9	0.07	83.552	30496.48
Wasted Sludge Pumps	3	2	4	20	15	0.9	0.07	6.962667	2541.373
Dewatering Equipment	1	7	4	5	4	0.8	0.07	7.3108	2668.442
Dewatering Feed Pumps	1	7	4	15	12	0.9	0.07	19.49547	7115.845
Secondary Clarifiers	2	2	24	1	0.5	0.8	0.07	1.5666	571.809
Recycle Water Pump	2	1	6	50	45	0.9	0.07	15.666	5718.09
Chemical Feed Systems	4	4	18	4	3	0.8	0.07	14.0994	5146.281
Miscellaneous	1	1	18	20	15	0.9	0.07	15.666	5718.09

Estimated Total Annual Cost, $ = **234149.9**

APPENDIX J

RECURRING OPERATION & MAINTENANCE COST ESTIMATE SPREADSHEETS

AND

PRESENT VALUE COST SAMPLE CALCULATIONS

Table J-1- Present Worth of Projected Recurring Costs

Pineville WWTP Expansion
Treatment Option No. 3A- Lagoon System
Date:5/8/13
V&M Project No:11055-00

Year	Projected Plant O&M Cost, $	Plant Projected Flow, MGD	PVCA for recurring cost
2015	$ 261,921.00	0.8	$ 261,921.00
2016	$ 268,667.45	0.82	$ 256,117.68
2017	$ 275,413.90	0.84	$ 250,285.03
2018	$ 282,160.35	0.86	$ 244,438.45
2019	$ 288,906.80	0.88	$ 238,591.96
2020	$ 295,653.25	0.9	$ 232,758.32
2021	$ 302,399.70	0.92	$ 226,949.08
2022	$ 309,146.15	0.94	$ 221,174.69
2023	$ 315,892.60	0.96	$ 215,444.57
2024	$ 322,639.05	0.98	$ 209,767.18
2025	$ 329,385.50	1	$ 204,150.10
2026	$ 336,131.95	1.02	$ 198,600.08
2027	$ 342,878.40	1.04	$ 193,123.12
2028	$ 349,624.85	1.06	$ 187,724.50
2029	$ 356,371.30	1.08	$ 182,408.84
2030	$ 363,117.75	1.1	$ 177,180.19
2031	$ 369,864.20	1.12	$ 172,042.00
2032	$ 376,610.65	1.14	$ 166,997.24
2033	$ 383,357.10	1.16	$ 162,048.39
2034	$ 390,103.55	1.18	$ 157,197.50
2035	$ 396,850.00	1.2	$ 152,446.21
		Total=	$ 4,311,366.13

PVCA calculated based on 4.9% discount rate.
O&M cost at startup year is estimated to be 2/3 of the cost at ultimate capacity.

Table J-2- Present Worth of Projected Recurring Costs

Pineville WWTP Expansion
Treatment Option No. 3B- Membrane Bioreactor System
Date:5/8/13
V&M Project No:11055-00

Year	Projected Plant O&M Cost, $	Plant Projected Flow, MGD	PVCA for recurring cost
2015	$ 441,031.80	0.8	$ 441,031.80
2016	$ 452,391.75	0.82	$ 431,260.01
2017	$ 463,751.70	0.84	$ 421,438.82
2018	$ 475,111.65	0.86	$ 411,594.17
2019	$ 486,471.60	0.88	$ 401,749.68
2020	$ 497,831.55	0.9	$ 391,926.81
2021	$ 509,191.50	0.92	$ 382,145.03
2022	$ 520,551.45	0.94	$ 372,421.93
2023	$ 531,911.40	0.96	$ 362,773.36
2024	$ 543,271.35	0.98	$ 353,213.59
2025	$ 554,631.30	1	$ 343,755.37
2026	$ 565,991.25	1.02	$ 334,410.07
2027	$ 577,351.20	1.04	$ 325,187.78
2028	$ 588,711.15	1.06	$ 316,097.39
2029	$ 600,071.10	1.08	$ 307,146.72
2030	$ 611,431.05	1.1	$ 298,342.53
2031	$ 622,791.00	1.12	$ 289,690.68
2032	$ 634,150.95	1.14	$ 281,196.14
2033	$ 645,510.90	1.16	$ 272,863.09
2034	$ 656,870.85	1.18	$ 264,694.99
2035	$ 668,230.00	1.2	$ 256,694.29
		Total=	$ 7,259,634.24

PVCA calculated based on 4.9% discount rate.
O&M cost at startup year is estimated to be 2/3 of the cost at ultimate capacity.

Table J-3- Present Worth of Projected Recurring Costs

Pineville WWTP Expansion
Treatment Option No. 3C- Oxidation Ditch System
Date:5/8/13
V&M Project No:11055-00

Year	Projected Plant O&M Cost, $	Plant Projected Flow, MGD	PVCA for recurring cost
2015	$ 242,121.00	0.8	$ 242,121.00
2016	$ 248,357.45	0.82	$ 236,756.39
2017	$ 254,593.90	0.84	$ 231,364.66
2018	$ 260,830.35	0.86	$ 225,960.05
2019	$ 267,066.80	0.88	$ 220,555.53
2020	$ 273,303.25	0.9	$ 215,162.88
2021	$ 279,539.70	0.92	$ 209,792.79
2022	$ 285,776.15	0.94	$ 204,454.92
2023	$ 292,012.60	0.96	$ 199,157.97
2024	$ 298,249.05	0.98	$ 193,909.76
2025	$ 304,485.50	1	$ 188,717.31
2026	$ 310,721.95	1.02	$ 183,586.85
2027	$ 316,958.40	1.04	$ 178,523.92
2028	$ 323,194.85	1.06	$ 173,533.40
2029	$ 329,431.30	1.08	$ 168,619.59
2030	$ 335,667.75	1.1	$ 163,786.20
2031	$ 341,904.20	1.12	$ 159,036.43
2032	$ 348,140.65	1.14	$ 154,373.03
2033	$ 354,377.10	1.16	$ 149,798.29
2034	$ 360,613.55	1.18	$ 145,314.10
2035	$ 366,850.00	1.2	$ 140,921.99
		Total=	$ 3,985,447.06

PVCA calculated based on 4.9% discount rate.
O&M cost at startup year is estimated to be 2/3 of the cost at ultimate capacity.

APPENDIX J

ECONOMIC EVALUATION
SAMPLE CALCULATIONS

The economic feasibility of the available options was evaluated and determined as follows:

The following standard formula for computing the present value (PV) was used in the cost estimates made under this evaluation:

PV= Capital Cost + PV of Recurring Cost

$$PV = C_o + \text{Summation of } \frac{[C_t]}{(1 + r)^t}$$

Where:

- PV = Present value of costs.
- C_o = Costs incurred in the present year.
- C_t = Costs incurred in time t.
- t = Ending year of the life of the facility.
- r = Current EPA discount rate

Example: Option No. 3A

The estimated construction cost based on the information provided in Section 8 is $8,500,000.

Based on the attached spreadsheet (Table J-1), the present worth value of the recurring cost is estimated at $4,311,366.

Therefore, the PV value for Option No. 3A is:

PV = $8,500,000 + $4,311,366 = **$12,811,366**

In a similar fashion, the present worth value for each other alternative is computed and summarized in Table 8.3 of Section 8.

APPENDIX K

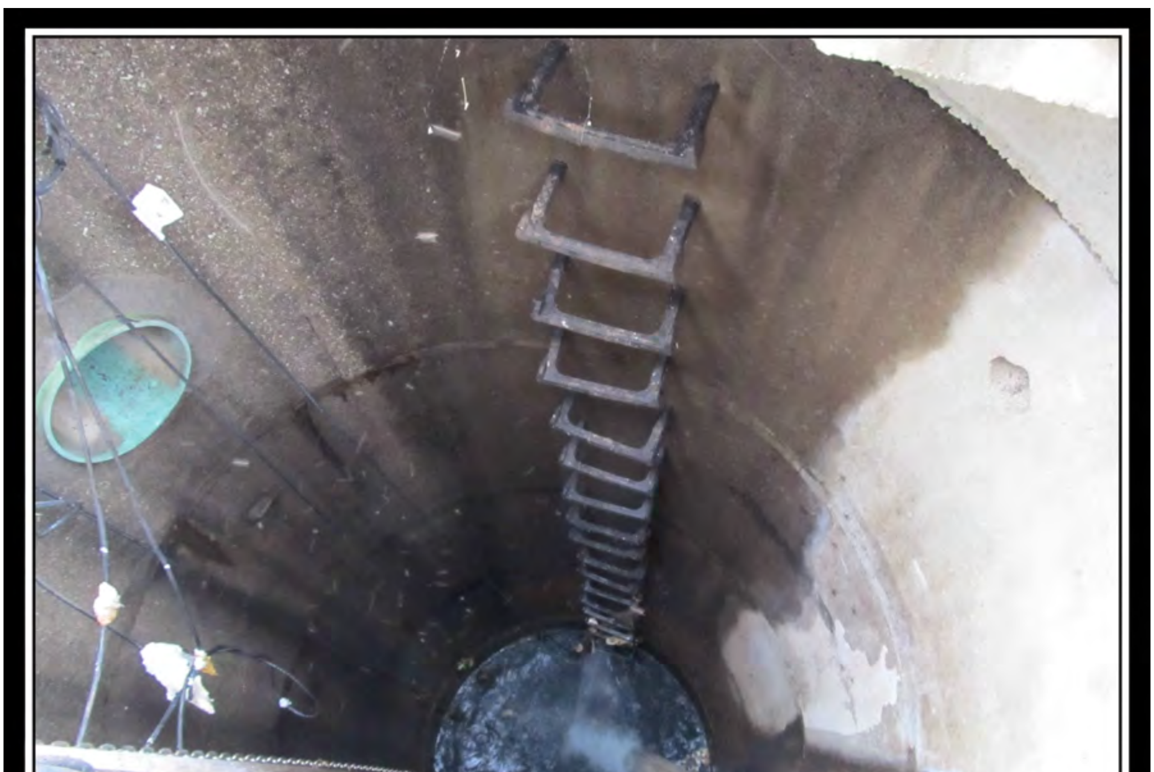
SANITARY SEWER PUMP STATION

PHOTO GALLERY

EXISTING BALL FIELD SEWAGE LIFT STATION

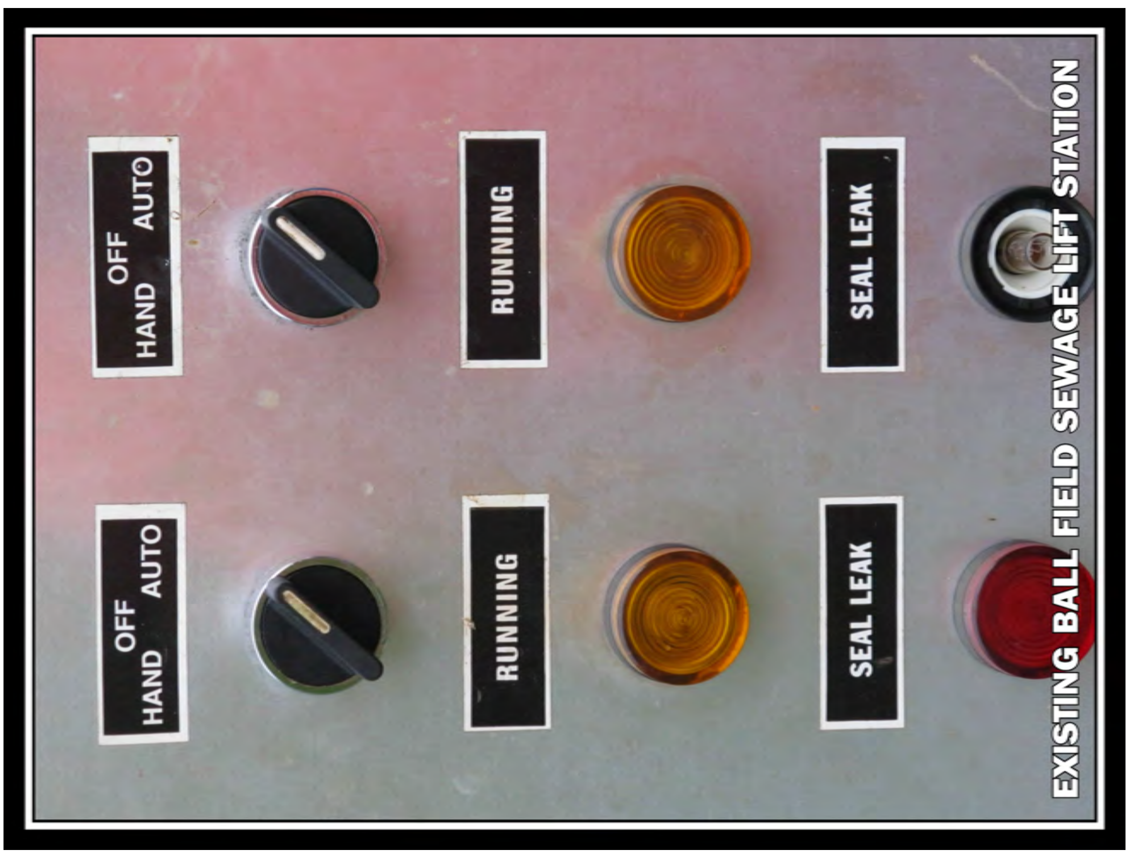
EXISTING BALL FIELD SEWAGE LIFT STATION

EXISTING BALL FIELD SEWAGE LIFT STATION



EXISTING BALL FIELD SEWAGE LIFT STATION

EXISTING BALL FIELD SEWAGE LIFT STATION



EXISTING BALL FIELD SEWAGE LIFT STATION

EXISTING BALL FIELD SEWAGE LIFT STATION

EXISTING MTN. VIEW SEWAGE LIFT STATION


EXISTING MTN. VIEW SEWAGE LIFT STATION

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EXISTING K.F.C. SEWAGE LIFT STATION

EXISTING K.F.C. SEWAGE LIFT STATION

EXISTING K.F.C. SEWAGE LIFT STATION

EXISTING K.F.C. SEWAGE LIFT STATION

EXISTING K.F.C. SEWAGE LIFT STATION


EXISTING DORTON BRANCH SEWAGE LIFT STATION


EXISTING DORTON BRANCH SEWAGE LIFT STATION

EXISTING DORTON BRANCH SEWAGE LIFT STATION

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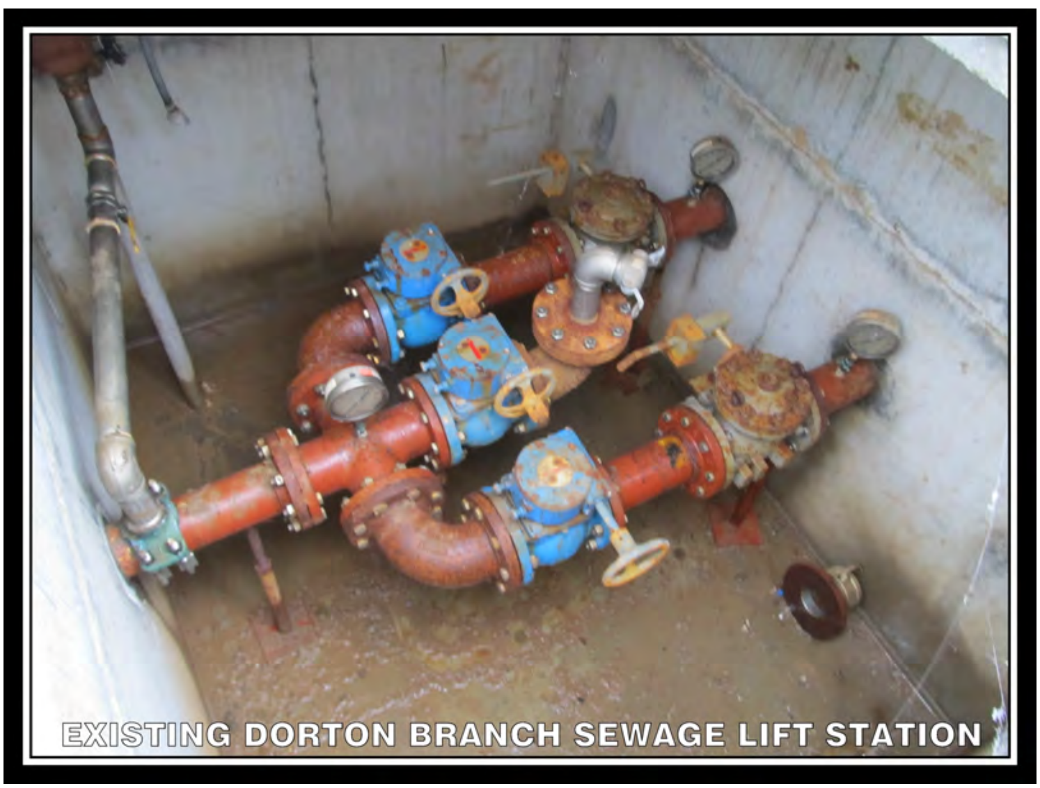
EXISTING DORTON BRANCH SEWAGE LIFT STATION


EXISTING DORTON BRANCH SEWAGE LIFT STATION

EXISTING NEWTOWN SEWAGE LIFT STATION

EXISTING NEWTOWN SEWAGE LIFT STATION

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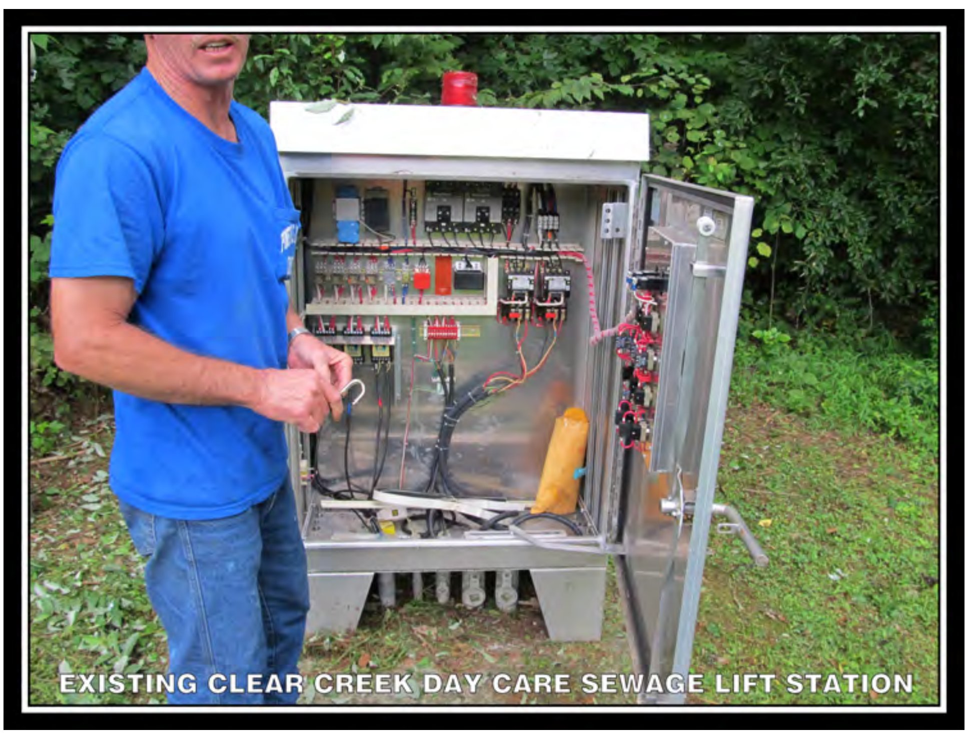
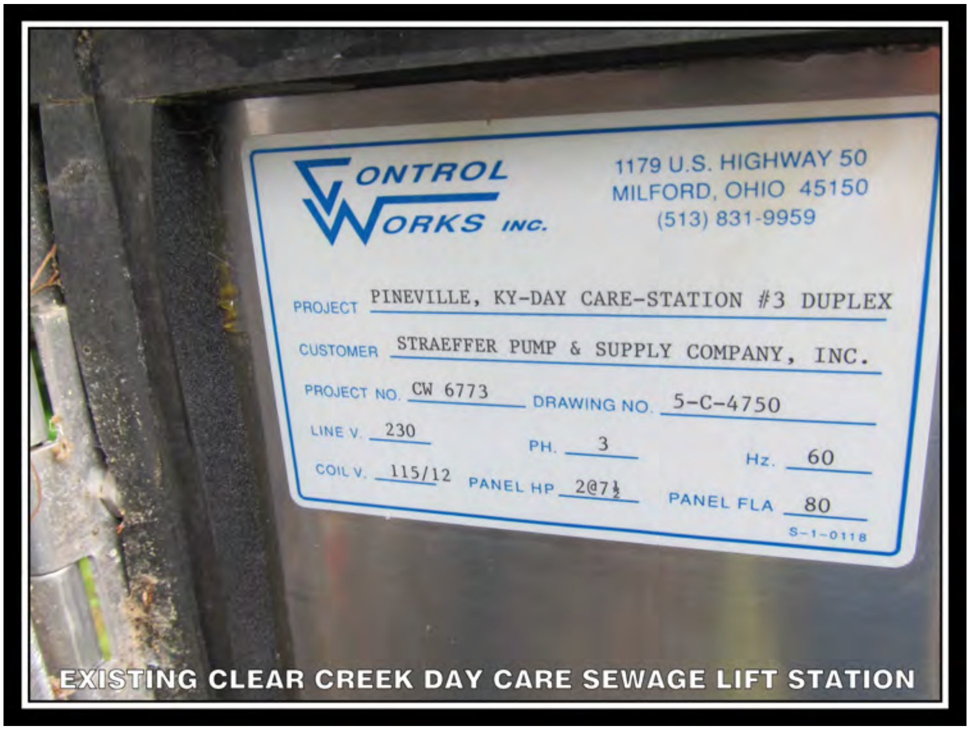
EXISTING CLEAR CREEK LODGE SEWAGE LIFT STATION


EXISTING CLEAR CREEK DAY CARE SEWAGE LIFT STATION

EXISTING CLEAR CREEK DAY CARE SEWAGE LIFT STATION



EXISTING CLEAR CREEK DAY CARE SEWAGE LIFT STATION



EXISTING CLEAR CREEK DAY CARE SEWAGE LIFT STATION

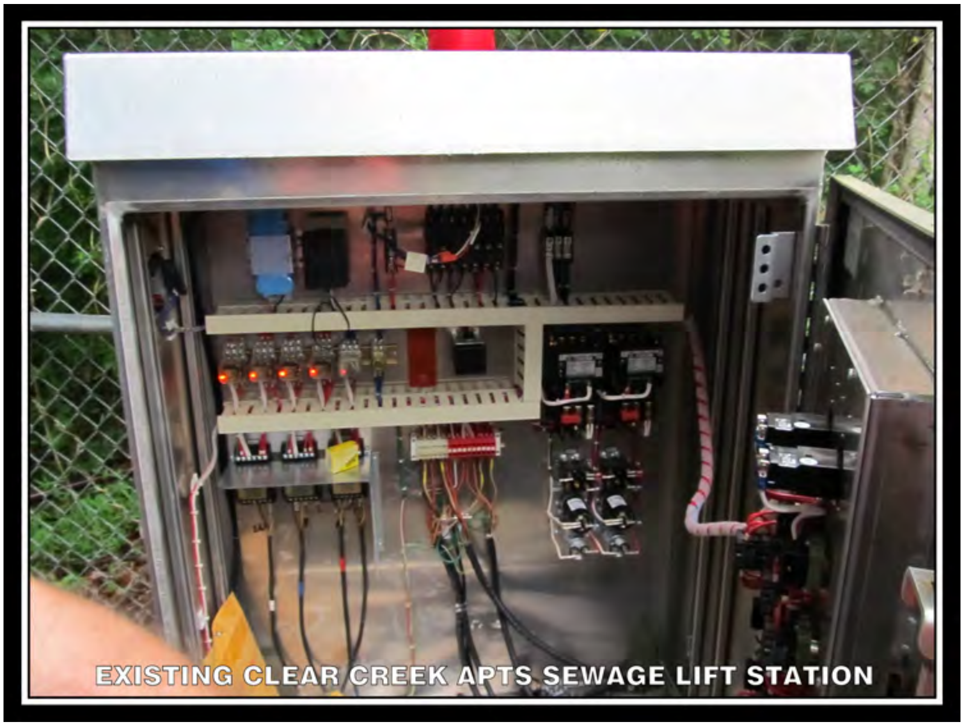
EXISTING CLEAR CREEK APTS SEWAGE LIFT STATION

EXISTING CLEAR CREEK APTS SEWAGE LIFT STATION

EXISTING CLEAR CREEK APTS SEWAGE LIFT STATION


EXISTING CLEAR CREEK APTS SEWAGE LIFT STATION


EXISTING CLEAR CREEK APTS SEWAGE LIFT STATION

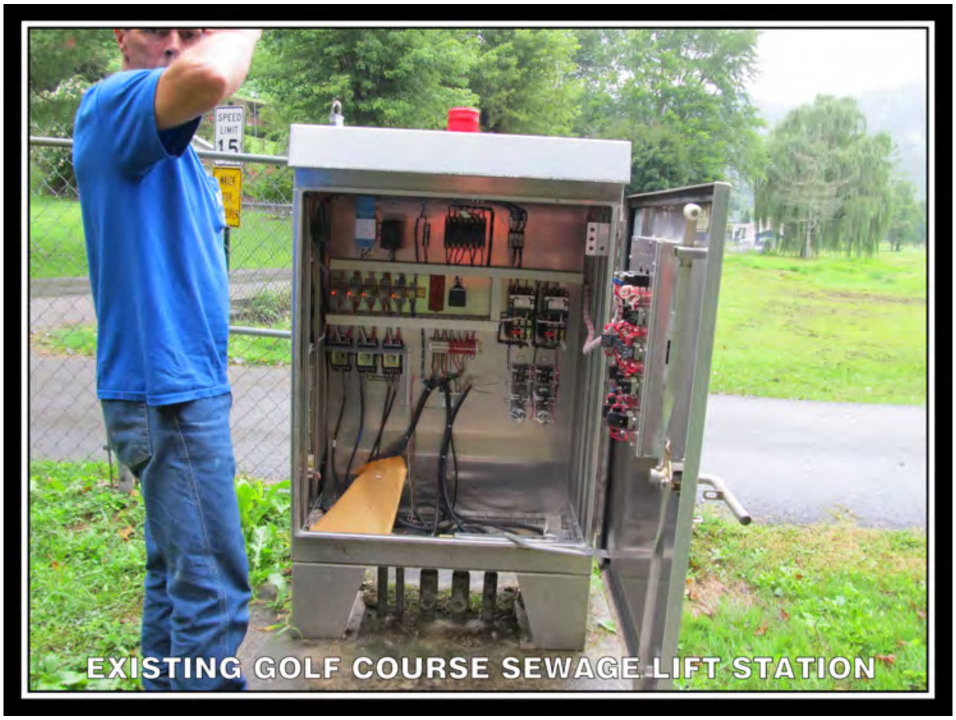


EXISTING CLEAR CREEK APTS SEWAGE LIFT STATION

EXISTING GOLF COURSE SEWAGE LIFT STATION


EXISTING GOLF COURSE SEWAGE LIFT STATION


EXISTING GOLF COURSE SEWAGE LIFT STATION



EXISTING GOLF COURSE SEWAGE LIFT STATION


EXISTING BELL HIGH SCHOOL SEWAGE LIFT STATION

EXISTING BELL HIGH SCHOOL SEWAGE LIFT STATION

EXISTING BELL HIGH SCHOOL SEWAGE LIFT STATION


EXISTING MAIN SEWAGE LIFT STATION


EXISTING MAIN SEWAGE LIFT STATION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EXISTING MAIN SEWAGE LIFT STATION


EXISTING MAIN SEWAGE LIFT STATION


EXISTING MAIN SEWAGE LIFT STATION

EXISTING MAIN SEWAGE LIFT STATION

APPENDIX L

ENVIRONMENTAL CLEARANCE INFORMATION

Vaughn & Melton
Consulting Engineers, Inc.

P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965
Tel. (606) 248-6600
Fax (606) 248-0372
www.vaughnmelton.com

FILE COPY

~~April 7, 2015~~ Resent: May 12, 2015

Division of Water (KYDOW)
Attn: Cindy McDonald
Wastewater Planning
Water Infrastructure Branch
200 Fair Oaks
Frankfort, KY 40601

RE: City of Pineville Utility Commission, Virginia Ave.
Pineville, Bell Co., KY
V&M Project No. 11055-00

Cindy:

The following attachments are cross cutter letters sent to the necessary regulatory agencies to obtain a Categorical Exclusion for the Virginia Ave Combined Sewer Separation (Phase I) as well as associated Categorical Exclusion Determination Checklist, Statutory Cross Cutter checklist, and Clearinghouse comments.

Project Narrative:

The City of Pineville (City) in Bell County, Kentucky currently owns and operates a CSS in downtown Pineville that contains two (2) permitted CSO's which discharge to the Cumberland River. In 2007, the City entered into a Consent Judgment (the Judgment) with the Commonwealth of Kentucky Environmental and Public Protection Cabinet (the State) to reduce and eliminate these CSO's. The Judgment laid out specific remedial measures and a Capital Improvement Project List (CIPL) that is to be accomplished by the City, along with required reporting and subsequent penal fees for any violations. To date, the City has completed construction of two (2) out of the three (3) required CIPL projects and is beginning preparations for the completion of the final project, the Virginia Avenue Utility Replacement Project.

Virginia Ave Combined Sewer Separation (Phase I) - The Virginia Ave Project will include constructing a separation of the combined storm/sanitary sewer along Virginia Ave in downtown Pineville. This project would replace the existing Ball Field and Mountain View Lift Stations, their associated force mains, and connections to the existing collection system. Also this project would separate the existing combined sewer along Virginia Avenue from Mountain View Avenue to the intersection of Holly Street, as well as along Holly Street and

Prospect Avenue near the City Pool. An estimated project cost is $2,233,485. (See **Exhibit "M"** for illustration)

Funding Sources	
CDBG	$1,000,000
ARC	$500,000
KIA	$733,485
	$2,233,485

If you have any questions or need further information about this project, please contact me at (606) 248-6600.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS, INC.

Corey Napier, P.E.

Enclosure: Maps, Letters, Responses

cc:

Appendix A

Categorical Exclusi   Determination Checklist for al' CWSRF Projects

Applicant Name Pineville Utility Commission

Project Name Virginia Ave. Combined Sewer Separation (Phase I)

Project No. from the Priority List CWL 13031 A11-051 WRIS Number SX 21013151

Categorical Exclusions are identified categories of actions which do not individually, cumulatively over time, or in conjunction with other Federal, State, local or private actions have a significant effect on the quality of the human environment. For a project to be eligible for a CED, it generally is a minor action relating to an existing infrastructure system which is either (1) an existing sewer collection network and treatment system; or (2) a stormwater system (including a combined sewer overflow system) and is in accordance with determination criteria contained in the State Revolving Fund Operating Agreement between the Environmental Protection Agency Region IV and the Commonwealth of Kentucky. For a project to be eligible for a CED, it must meet at least one category in I.A. and have no excluding factors in I.B. or extraordinary circumstances in II.

Check all that apply

I.A. Does the project qualify under one or more of these General Categories?

1. **Is the project for minor upgrade or minor expansion of system capacity?** ☐ Yes ☑ No
   This includes, but is not limited to: minor extensions of sanitary sewers or force mains within approximately ½ mile of the existing system to primarily serve existing development; stormwater detention pond and retention pond cleaning and dredging or minor storage increase or culvert upgrades.
   Describe:

2. **Is the project for rehabilitation of existing facilities?** ☑ Yes ☐ No
   This includes, but is not limited to: infiltration and inflow corrections in the existing wastewater collection system or equipment rehabilitation at the existing wastewater plant, pumping, or storage facilities; stormwater culvert rehabilitation and repair, rip-rap renewal or other flow dissipation structure rehabilitation, or storm sewer to grass swale conversions.
   Describe:

3. **Is the project for new minor ancillary facilities adjacent to or on the same property as existing facilities?** ☐ Yes ☑ No
   This includes, but is not limited to: new wastewater facilities and equipment for sludge handling, odor control, screening, flow equalization, disinfection, or laboratory facilities; innovative facilities at stormwater control locations, such as sedimentation basins, infiltration trenches, detention pond to retention pond retrofits, or oil and grit separators.
   Describe:

4. **Is the project only for replacement of existing onsite systems with new onsite systems, in unsewered communities?** ☐ Yes ☑ No
   Describe:

I.B. For projects that qualify under a General Category in A., do any of the following Excluding Factors apply?

1. Project will involve new or relocated discharges to surface or ground water ☐ Yes ☑ No
2. Project will result in substantial increases in the volume of discharge or the loadings of pollutant to the receiving water ☐ Yes ☑ No
3. Project will provide capacity to serve a population 30 percent greater than the existing population ☐ Yes ☑ No
4. Project will be in conflict with state or other regional growth plan or strategy ☐ Yes ☑ No
5. Project will directly or indirectly relate to upgrading or extending infrastructure systems primarily for the purposes of future development ☐ Yes ☑ No

II. Are there Extraordinary Circumstances that will disqualify an otherwise eligible project?

1. The action is known or expected to have a significant effect on the quality of the human environment, either individually or cumulatively over time. ☐ Yes ☑ No

2. The action is known or expected to have disproportionately high and adverse human health or environmental effects on any community, including minority communities, low-income communities, or federally-recognized Indian tribal communities. ☐ Yes ☑ No

3. The action is known or expected to significantly affect federally listed threatened or endangered species or their critical habitat ☐ Yes ☑ No

4. The action is known or expected to significantly affect national natural landmarks or any property with nationally significant historic, architectural, prehistoric, archeological, or cultural value, including but not limited to, property listed on or eligible for the National Register of Historic Places. ☐ Yes ☑ No

5. The action is known or expected to significantly affect environmentally important natural resource areas such as wetlands, floodplains, significant agricultural lands, aquifer recharge zones, coastal zones, barrier islands, wild and scenic rivers, and significant fish or wildlife habitat. ☐ Yes ☑ No

6. The action is known or expected to cause significant adverse air quality effects. ☐ Yes ☑ No

7. The action is known or expected to have a significant effect on the pattern and type of land use or growth and distribution of population including altering the character of existing residential area, or be inconsistent with state of local government, or federally-recognized Indian tribe approved land use plans or federal land management plans. ☐ Yes ☑ No

8. The proposed action is known or expected to cause significant public controversy about a potential environmental impact of the proposed action. ☐ Yes ☑ No

9. The proposed action is known or expected to be associated with providing financial assistance through an interagency agreement for a project that is known or expected to have potentially significant environmental impacts. ☐ Yes ☑ No

10. The proposed action is known or expected to conflict with federal, state, or local government environmental resource-protection, or land-use laws or regulations. ☐ Yes ☑ No

If all answers in I.A. are No, then the project is not eligible for a CED.
If any answers in I.B. are Yes, then the project is not eligible for a CED.
If any answers in II. are Yes, then the project is not eligible for a CED.

Signature M. [signature] Date 4/7/2015

Print Name Corey Napier Title/Affiliation Engineer

Appendix B

Statutory Cross-Cutters Checklist

Federal Laws and Authorities listed at 40 CFR 6.3

Project Name and DWSRF No. ______________________________

Area of Statutory or Regulatory Compliance	Not Applicable to This Project	Consultation Required*	Review Required*	Permits Required*	Determination of consistency Approvals, Permits Obtained*	Conditions and/or Mitigation Actions Required	Provide compliance documentation. Additional material may be attached.
Historic Properties			✓				
Floodplain Management		✓					
Wetlands Protection	✓						
Interbasin Water Transfer	✓						
Water Quality - Aquifers		✓					Verbal consultation with USCOE + KYDOW - No Impact
Endangered Species		✓					
Wild and Scenic Rivers	✓						
Air Quality	✓						
Farmlands Protection		✓					NRCS - No Impact
Environmental Justice	✓						

State or Local Statutes	(to be added by Responsible Entity)						

* Attach evidence that required actions have been taken.

Statutory Cross-Cutters Checklist (continued)

Project Name and Identification No. ______________________

Summary of Findings and Conclusions:

Summary of Environmental Conditions:

Project Modifications and Alternatives Considered:

Additional Studies Performed: (Attach study or summary)

Mitigation Measures Needed:

Prepared By:

Date:

STEVEN L. BESHEAR
GOVERNOR

DEPARTMENT FOR LOCAL GOVERNMENT
OFFICE OF THE GOVERNOR
1024 CAPITAL CENTER DRIVE, SUITE 340
FRANKFORT, KENTUCKY 40601-8204
PHONE (502) 573-2382 FAX (502) 573-2939
TOLL FREE (800) 346-5606
WWW.DLG.KY.GOV

TONY WILDER
COMMISSIONER

July 24, 2013

Mr. Mitch Brunsma
Vaughn and Melton Engineers
109 South 24th Street
Middlesboro, KY 40965

RE: Pineville: Virginia Avenue Utility Replacement
SX21013151
SAI# KY20130708-0763

Dear Mr. Brunsma:

The Kentucky State Clearinghouse, which has been officially designated as the Commonwealth's Single Point of Contact (SPOC) pursuant to Presidential Executive Order 12372, has completed its evaluation of your proposal. The clearinghouse review of this proposal indicates there are no identifiable conflicts with any state or local plan, goal, or objective. Therefore, the State Clearinghouse recommends this project be approved for assistance by the cognizant federal agency.

Although the primary function of the State Single Point of Contact is to coordinate the state and local evaluation of your proposal, the Kentucky State Clearinghouse also utilizes this process to apprise the applicant of statutory and regulatory requirements or other types of information which could prove to be useful in the event the project is approved for assistance. Information of this nature, if any, concerning this particular proposal will be attached to this correspondence.

You should now continue with the application process prescribed by the appropriate funding agency. This process may include a detailed review by state agencies that have authority over specific types of projects.

This letter signifies only that the project has been processed through the State Single Point of Contact. It is neither a commitment of funds from this agency or any other state of federal agency.

The results of this review are valid for one year from the date of this letter. Continuation or renewal applications must be submitted to the State Clearinghouse annually. An application not submitted to the funding agency, or not approved within one year after completion of this review, must be re-submitted to receive a valid intergovernmental review.

If you have any questions regarding this letter, please feel free to contact my office at 502-573-2382.

Sincerely,

Lee Nalley

Lee Nalley
Kentucky State Clearinghouse

Attachments

The Heritage Council has made the following advisory comment pertaining to State Application Identifier Number KY201307080763

The applicant must ensure compliance with the Advisory Council on Historic Preservation's Rules and Regulations for the Protection of Historic and Cultural Properties (36CRF, Part 800) pursuant to the National Historic Preservation Act of 1966, the National Environmental Policy Act of 1969, and Executive Order 11593.

Thank you for submitting information regarding your project. Based on the information provided, we currently do not have enough information to determine this project's potential to impact sites listed or eligible for listing on the National Register of Historic Places. Please refer to the following website http://www.heritage.ky.gov/siteprotect/ where you will find three separate documents to assist you in submitting additional information to our office for review. Those documents include a memo outlining the standardized Section 106 submission process, a Section 106 Cover sheet that must be included with all submissions to our office, and instructions for the proper completion of the required cover sheet and associated information.

Should you have any questions please contact our office at khc-sitecheck@ky.gov

The KY Dept. of Transportation has made the following advisory comment pertaining to State Application Identifier Number KY201307080763

Chappell (D-11), Sherri: Contact KYTC District 11 Permits before working on KYTC Right of Way.

The KY State Fish & Wildlife has made the following advisory comment pertaining to State Application Identifier Number KY201307080763

To minimize impacts to the aquatic environment the Kentucky Dept. of Fish & Wildlife Resources recommends that erosion control measures be developed and implemented prior to construction to reduce siltation into waterways located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed. Please contact Dan Stoelb @ 502-564-7109 ex. 4453 or Daniel.Stoelb@ky.gov if you have further questions or require additional information.

The Housing, Building, Construction has made the following advisory comment pertaining to State Application Identifier Number KY201307080763
no comments

The Natural Resources has made the following advisory comment pertaining to State Application Identifier Number KY201307080763

This review was based upon the information that was provided by the applicant through the Clearinghouse for this project. An endorsement of this project does not satisfy, or imply, the acceptance or issuance of any permits, certifications or approvals that may be required from this agency under Kentucky Revised Statutes or Kentucky Administrative Regulations. Such endorsement means this agency has found no major concerns from the review of the proposed project as presented other than those stated as conditions or comments.

The proposed project is subject to Division of Water (DOW) jurisdiction because the following are or appear to be involved: sewer lines and appurtenances. Prior approval must be obtained from the DOW before construction can begin. The applicant must cite the State Application Identifier (SAI #KY201307080763) when submitting plans and specifications.

The City of Pineville currently owns and operates a combined sewer system (CSS) in downtown Pineville that contains 2 permitted combined sewer overflows (CSO) which discharge to the Cumberland River. In 2007, the City entered into a Consent Judgment with the Commonwealth of Kentucky's Environmental and Public Protection Cabinet to reduce and eliminate these CSO's. To accomplish this task, the CSS will need to be completely separated in downtown Pineville. However, at an estimated cost of $8.2 million, the project will have to be accomplished in phases to help ease the enormous financial burden this presents to the City's 468 downtown sewer customers. This first phase proposed is the Virginia Avenue area. The project will include construction of 2 new sewage lift stations and associated force main along with approximately 4,100 linear feet of sanitary/storm sewer separation. The project cost is estimated at $2,233,485.

The Engineering Section of the Water Infrastructure Branch of the DOW does not oppose this project at this time; however, you need to submit Plans and Specification to the DOW for review. The Wet Weather Section of the Surface Water Permit Branch of the DOW may need to be notified of this work. Contact Paul Bridges of the Wet Weather Section at 502-564-3410 with questions related to wet weather issues. Construction of the wastewater component of this project shall not begin until written approval is received from the DOW. Mortaza Tabayeh, Water Infrastructure Branch, (502) 564-3410, Mortaza.Tabayeh@ky.gov.

No comment. Daniel Fraley, Compliance and Technical Assistance Branch, (606) 783-8655, Daniel.Fraley@ky.gov.

Best management practices shall be utilized to reduce runoff from the project into adjacent surface waters. John Brumley, Water Quality Branch, (502) 564-3410, John.Brumley@ky.gov.

No comment. Phil O'dell, Watershed Management Branch, (502) 564-3410, Phillip.O'Dell@ky.gov.

The Division of Enforcement does not object to the project proposed by the applicant. Tim Harrod, Division of Enforcement, (502) 564-2150, Timothy.Harrod@ky.gov.

From the application data, DOW ascertains that the proposed project is located in a floodplain area. Therefore, a floodplain construction permit is required for this project. Julia Harrod, Watershed Management Branch, (502) 564-3410, Julia.Harrod@ky.gov.

If the construction area disturbed is equal to or greater than 1 acre, the applicant will need to apply for a Kentucky Pollutant Discharge Elimination System (KPDES) storm water discharge permit.

Utility line projects that cross a stream will require a Section 404 permit from the US Army Corps of Engineers and a 401 Water Quality Certification from DOW.

The Kentucky Division of Water supports the goals of EPA's Sustainable Infrastructure Initiative. This Initiative seeks to promote sustainable practices that will help to reduce the potential gap between funding needs and spending at the local and national level. The Sustainable Infrastructure Initiative will guide our efforts in changing how Kentucky views, values, manages, and invests in its water infrastructure. This website, www.epa.gov/waterinfrastructure/, contains information that will help you ensure your facility and operations are consistent with and can benefit from the aims of the Sustainable Infrastructure Initiative.

The Labor Cabinet has made the following advisory comment pertaining to State Application Identifier Number KY201307080763

PW RATES MAY APPLY TO PROJECTS EXCEEDING $250,000.00. CONTACT KY LABOR CABINET AT 502-564-3534

The Kentucky Housing Corporation has made the following advisory comment pertaining to State Application Identifier Number KY201307080763
No comments.

The Cumberland Valley ADD has made the following advisory comment pertaining to State Application Identifier Number KY201307080763
No Comments

Vaughn & Melton
Consulting Engineers, Inc.

P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965
Tel. (606) 248-6600
Fax (606) 248-0372
www.vaughnmelton.com

June 13, 2014

District Engineer
U.S. Army Corps of Engineers
P.O. Box 1070
Nashville, TN 37202-1070

RE: City of Pineville Wastewater Facilities Plan Update
Pineville Utility Commission, Bell County, KY
V & M Project No. 11055-00

To Whom It May Concern:

The City of Pineville in the process of preparing a Wastewater Facilities Plan update, which proposes the following described projects:

Immediate Project

Virginia Ave Combined Sewer Separation (Phase I) - The next two years will include constructing a separation of the combined storm/sanitary sewer along Virginia Ave in downtown Pineville. This project would replace the existing Ball Field and Mountain View Lift Stations, their associated force mains, and connections to the existing collection system. Also this project would separate the existing combined sewer along Virginia Avenue from Mountain View Avenue to the intersection of Holly Street, as well as along Holly Street and Prospect Avenue near the City Pool. An estimated project cost is $2,233,485. (See **Exhibit "M"** for illustration)

Phase I (0-2 years)
No Projects

Phase II (3-10 years)

City of Pineville WWTP Expansion – The City of Pineville's WWTP is in dire need of treatment capacity. An expansion to Pineville's existing 0.721 million gallons per day (mgd) "Biolac" style wastewater treatment plant (WWTP) which will be modified by several process improvements while increasing the current design capacity to 1.2 MGD. The estimated cost of construction, including contingency, for the WWTP expansion is

$8,500,000. Refer to **Figure 12** for a detailed schematic.

City of Pineville Combined Sewer Separation - The next ten years will include a separation of the combined storm/sanitary sewer in downtown Pineville. This project would replace the entire remaining combined collection system in downtown Pineville and eliminate the two existing combined sewer overflows that discharges to the Cumberland River. An estimated project cost is $5,934,237. Refer to **Exhibit G** for a detailed map.

Ferndale Sewer Line Extension - The Ferndale area is located approximately 5 miles south of Pineville just off US 25E. This area was included in the planning area of the original 201 Facilities Plan that was prepared in 1977. Although there have been numerous extensions since the 201 plan was prepared, the Ferndale area is still un-served and in dire need of sewage collection due to the dangerously high number of failing septic systems and "straight pipes". The project will provide sewage collection/treatment to approximately 28 residences along with a nursing home and a low-income housing facility with approximately 120 apartments, both of which are currently served by on-site package treatment units (KPDES #'s KY0042218 & KY0078182, respectively). The project will allow both of these existing package treatment units to be abandoned. The project will include approximately 7,000 feet of gravity collection lines, 8,000 feet of force main, two (2) sewage lift stations, rehab of one existing sewage lift station, 50 manholes, and associated appurtenances.

Turkey Creek Sewer Line Extension - Turkey Creek is located just north of the existing sewerage area. Up to 40 potential new customers can be gained by extending sewer to this location. Due to the topography this system would be served by gravity lines. Sewage conveyance from this area back into the existing collection system will be accomplished via two sanitary sewer pump stations and 11,000 LF of 4" PVC force main. Approximately 6,000 LF of new gravity sewer lines would be constructed during this project. An estimated project cost is $998,000. Refer to **Exhibit A** for a detailed map.

Asher Industrial Park Sewer Line Extension - This future potential service area is known as the Asher Industrial Park. It is located in mid-eastern Bell County near the community of Varilla, approximately 9 miles east of the City of Pineville and approximately 20 miles west of the City of Harlan. The property consists of reclaimed surface mine land, and is known locally as "Mountain Drive". It lies on the south side of the Cumberland River on Hances Ridge and contains 453-acres of property designated for industrial development. The proposed layout of the developed property delineates 15 separate tracts. A USGS topographical map of the property, detailing the park location and the 15 tracts, is shown on **Figure 22**.

In a recent PE Report completed at the beginning of 2008, it was concluded that a direct extension of the City of Pineville's Wastewater Collection System would be the most viable and cost effective solution for sewage disposal from the Industrial Park. The recommended route consists of a transport/collection system from the Park property west down Sam Low Branch toward Hances Creek (KY 1344), then along KY 1344, under the Cumberland River, and along US 119 through a series of strategically located force mains and lift stations. These lift stations will pump the sewage to the existing OTB Lift Station located adjacent to U.S. 25E, from there the OTB Lift Station will pump directly to the WWTP.

This proposed project would lay the ground for the following 119 Corridor Project that would provide public sewer to approximately 200 residents along the 119 corridor. Sewage conveyance from this area back into the existing collection system will be accomplished via 7 sanitary sewer pump stations and 50,000 LF of parallel 4" PVC force main and approximately 10,000 LF of new 10" gravity sewer. A map showing the recommended project is illustrated on **Figure 23**. The estimated cost of the proposed project is $4,629,475.

<u>Phase III (11-20 years)</u>

<u>US 119 Corridor Sewer Line Extension Projects</u> - After the extension to the Pine Mountain Regional Industrial Park is in place it opens various opportunities to serve communities along the 119 corridor. Populated communities adjacent to the proposed route, such as Wasioto, East Pineville, Bird Branch, and Laurel Hill, could potentially benefit from the constructed lines. Several households within these populated areas are currently utilizing conventional septic systems with failing lateral fields or straight pipes disposing sanitary sewer directly into the local streams or river. Refer to **Figure 20** for a preliminary sewer line extension illustration.

This 119 corridor project has been analyzed in phases. Phase 1 would include the Wasioto area, this future potential service area is located just east of the existing sewerage area. Up to 40 potential new customers could be gained by extending sewer to this location. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 1 includes approximately 4,500 LF of new gravity sewer lines. Refer to **Figure 24** for a detailed map. An estimated total project cost is $575,991.

Phase 2 would include the Bird Branch area, by extending sewer to this location approximately 75 new residents could be served. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 3 includes approximately 10,300 LF of new gravity sewer lines. Refer to **Figure 25** for a detailed map. The estimated total project cost is $1,116,983. This project would be a prerequisite to serving the Laurel Hill area which at this point we believe would be outside this 20 year plan.

Phase 3 would include the East Pineville area, extending sewer to this location could potentially serve approximately 85 new customers. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 3 includes approximately 13,800 LF of new gravity sewer lines. Refer to **Figure 26** for a detailed map. An estimated total project cost is $1,477,649.

<u>Walnut Lane Sewer Line Extension</u> – Walnut Lane is located within the existing sewerage area and boarders the Wasioto Winds Golf Course. Up to 12 potential new customers can be gained by extending sewer to this location. Due to the topography this system would be served by gravity lines. Sewage conveyance from this area back into the existing collection system will be accomplished via one sanitary sewer pump station and 1,500 LF of 3" PVC force main. Approximately 1,400 LF of new gravity sewer lines would be constructed during this project. Refer to **Figure 31** for a detailed map. An estimated project cost is $267,600.

Please provide us with written comments or concerns you may have regarding these projects. These projects will result in an improvement in water quality in the local area. We would appreciate a timely response.

If you have any questions or need further information about these projects, please contact me or Mitch Brunsma at (606) 248-6600.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS, INC.

Corey Napier, P.E.

Enclosure: Map

cc:

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
REGULATORY BRANCH
3701 BELL ROAD
NASHVILLE, TENNESSEE 37214

July 15, 2014

SUBJECT: Reference No. LRN-2014-00677; City of Pineville Wastewater Facilities Plan Update, Pineville Utility Commission, Bell County, KY (V & M Project No. 11055-00)

Mr. Corey Napier
Vaughn & Melton Consulting Engineers, Inc.
P.O. Box 1425
Middlesboro, KY 40965

Dear Mr. Napier:

This is in regard to your recent request for our comments on the subject proposal, described in detail in your request letter, dated June 13, 2014.

The U.S. Army Corps of Engineers (USACE) has regulatory responsibilities pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Under Section 404, the USACE regulates the discharge of dredged and/or fill material into waters of the U.S., including wetlands. Under Section 10, the USACE regulates any work in, or affecting, navigable waters of the U.S.

A review of the information provided indicates the activities would involve work in waters of the U.S. (streams and/or wetlands), and a Department of the Army permit would be required.

We understand the project proposal may not have specific design plans at this time, and this inquiry is an initial review to obtain grant funds. We have no objections to the applicant receiving grant funds provided the applicant applies for and obtains any required permits prior to any disturbance to streams and/or wetlands that may occur due to project construction. The applicant may apply at any time (please reference File No. LRN-2014-00677).

If you have any questions regarding this matter, please contact me at the above address or telephone (615) 369-7500.

Sincerely,

Lisa R. Morris

Lisa R. Morris
Project Manager
Operations Division

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
3701 BELL ROAD
NASHVILLE, TENNESSEE 37214

REPLY TO
ATTENTION OF:

March 4, 2015

Regulatory Branch

SUBJECT: File No. LRN-2014-01213; Proposed Directional Bore (Sewer Line); Cumberland River Mile 653.6, Pineville, Bell County, Kentucky

Pineville Utility Commission
Attn: Bill Bunch
P.O. Box 277
Pineville, KY 40977

Dear Mr. Bunch:

This refers to your application requesting a Department of the Army (DA) permit for the installation of a new sewer line by directional drilling at Cumberland River Mile 653.6 in Pineville, Bell County, Kentucky. Please refer to File Number LRN-2014-01213 in reference to this project.

Based upon the information submitted to this office, we have determined your proposed work meets the criteria of DA Nationwide Permit (NWP) #12 Utility Line Activities, which became effective March 19, 2012 [77 FR 10184]. The proposed work consists of the installation of a new 8 to 10 inch sewer line by directional drilling at a minimum of 10 feet below the bottom of the channel. In the event a fracture occurs, the enclosed fracture contingency plan should be followed.

This verification is valid until March 18, 2017, unless the NWP authorization is modified, suspended, or revoked. If the work has not been completed by that time, you should contact this office to obtain another permit determination in accordance with the rules and regulations in effect at that time. You are also responsible for obtaining any other federal, state, and/or local permits, approvals, or authorizations.

The proposed work must be constructed in accordance with the enclosed plans, NWP, and Special Conditions. You must comply with all terms and conditions associated with this NWP and Special Conditions. If you fail to comply with any of the conditions, this authorization may be modified, suspended, or revoked and an individual permit may be required pursuant to 33 CFR 330.5(d). NWP General Condition #30 requires that you submit a signed certification. **Please sign and return the enclosed "Compliance Certification" form upon completion of the proposed activity.**

If changes in the location or approved plans are necessary, revised plans shall be submitted promptly to this office for review and approval. If you have any questions, please contact Cara Beverly at the above address, telephone (615) 369-7520 or email cara.c.beverly@usace.army.mil.

Sincerely,

Eric Reusch
Chief, Eastern Regulatory Section
Operations Division

Enclosures:
Special Conditions for File No. LRN-2014-01213
Nationwide Permit #12 Conditions
Nationwide Permit General Conditions
Plans
Location Map
Fracture Contingency Plan
Compliance Certification Form

Copy Furnished:
Vaughn & Melton Consulting Engineers
Attn: Mitch Brunsma
P.O. Box 1425
Middlesboro, KY 40965

US Army Corps
of Engineers®
Nashville District

Special Conditions
for
File No. LRN-2014-01213

1. Should evidence of fracturing arise during the construction process, all work shall stop immediately and the Corps, U.S. Fish and Wildlife Service, Kentucky Division of Water and Kentucky Department of Fish and Wildlife shall be notified. Work shall not resume until the appropriate resource and regulatory agencies have been notified. The applicant shall comply with the attached Fracture Mitigation Contingency Plan.

US Army Corps
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Nashville District

Nationwide Permit

File No. LRN-2014-01213

No. 12, Utility Line Activities

Activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities in waters of the United States, provided the activity does not result in the loss of greater than ½-acre of waters of the United States for each single and complete project.

Utility lines: This NWP authorizes the construction, maintenance, or repair of utility lines, including outfall and intake structures, and the associated excavation, backfill, or bedding for the utility lines, in all waters of the United States, provided there is no change in pre-construction contours. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and radio and television communication. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area.

Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

Utility line substations: This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a power line or utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than ½-acre of waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

Foundations for overhead utility line towers, poles, and anchors: This NWP authorizes the construction or maintenance of foundations for overhead utility line towers, poles, and anchors in all waters of the United States, provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible.

Access roads: This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including overhead power lines and utility line substations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than ½-acre of non-tidal waters of the United States. This NWP does not authorize discharges into nontidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (See 33 CFR Part 322). Overhead utility lines constructed over section 10 waters and utility lines that are routed in or under section 10 waters without a discharge of dredged or fill material require a section 10 permit.

This NWP also authorizes temporary structures, fills, and work necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if any of the following criteria are met: (1) The activity involves mechanized land clearing in a forested wetland for the utility line right-of-way; (2) a section 10 permit is required; (3) the utility line in waters of the United States, excluding overhead lines, exceeds 500 feet; (4) the utility line is placed within a jurisdictional area (i.e., water of the United States), and it runs parallel to or along a stream bed that is within that jurisdictional area; (5) discharges that result in the loss of greater than $^{1}/_{10}$ -acre of waters of the United States; (6) permanent access roads are constructed above grade in waters of the United States for a distance of more than 500 feet; or (7) permanent access roads are constructed in waters of the United States with impervious materials. (See general condition 31.)

(Sections 10 and 404)

Note 1: Where the proposed utility line is constructed or installed in navigable waters of the United States (i.e., section 10 waters) within the coastal United States, the Great Lakes, and United States territories, copies of the pre-construction notification and NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

Note 2: Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the utility line must be removed upon completion of the work, in accordance with the requirements for temporary fills.

Note 3: Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to Section 9 of the Rivers and Harbors Act of 1899. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a section 404 permit (see NWP 15).

Note 4: For overhead utility lines authorized by this NWP, a copy of the PCN and NWP verification will be provided to the Department of Defense Siting Clearinghouse, which will evaluate potential effects on military activities.

US Army Corps of Engineers ®
Nashville District

Nationwide Permit General Conditions

The following General Conditions must be followed in order for any authorization by NWP to be valid:

LRN-2014-01213

1. **Navigation**. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the US Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the US. (c) The permittee understands and agrees that, if future operations by the US require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the US. No claim shall be made against the US on account of any such removal or alteration.

2. **Aquatic Life Movements**. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. **Spawning Areas**. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. **Migratory Bird Breeding Areas**. Activities in waters of the US that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. **Shellfish Beds**. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. **Suitable Material**. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. **Water Supply Intakes**. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. **Adverse Effects From Impoundments**. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. **Management of Water Flows**. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. **Fills Within 100-Year Floodplains**. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. **Equipment**. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. **Soil Erosion and Sediment Controls**. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the US during periods of low-flow or no-flow.

13. **Removal of Temporary Fills**. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. **Proper Maintenance**. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. **Single and Complete Project**. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. **Wild and Scenic Rivers**. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, US Forest Service, US Fish and Wildlife Service).

17. **Tribal Rights**. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. **Endangered Species**. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed. (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary. (c) Non-federal permittees must submit a pre-construction notification (PCN) to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the

district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the PCN must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete PCN. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from Corps. (d) As a result of formal or informal consultation with the USFWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs. (e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the US to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. (f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the USFWS's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. (b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA is complete. (d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment. (a) Discharges of dredged or fill material into waters of the US are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal: (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the US to the maximum extent practicable at the project site (i.e., on site). (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal. (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this

requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332. (1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment. (2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered. (3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the US, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). (4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided. (5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan. (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment. (e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of the US, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs. (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. (g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management. (h) Where certain functions and services of waters of the US are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or USEPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: "When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

______________________________ ______________________
Transferee Date

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include: (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions; (b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and (c) The signature of the permittee certifying the completion of the work and mitigation.

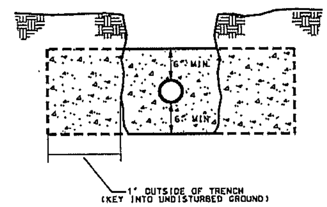
31. Pre-Construction Notification (PCN). (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a PCN as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either: (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2). (b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed project; (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the US expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans); (4) The PCN must include a delineation of wetlands, other special aquatic sites, and waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the US. The 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate; (5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and (7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act. (c) Form of PCN Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used. (d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. (2) For all NWP activities that require PCN notification and result in the loss of greater than 1/2-acre of waters of the US, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require PCN notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require PCN notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (USFWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the PCN notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each PCN notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of PCN notifications to expedite agency coordination.

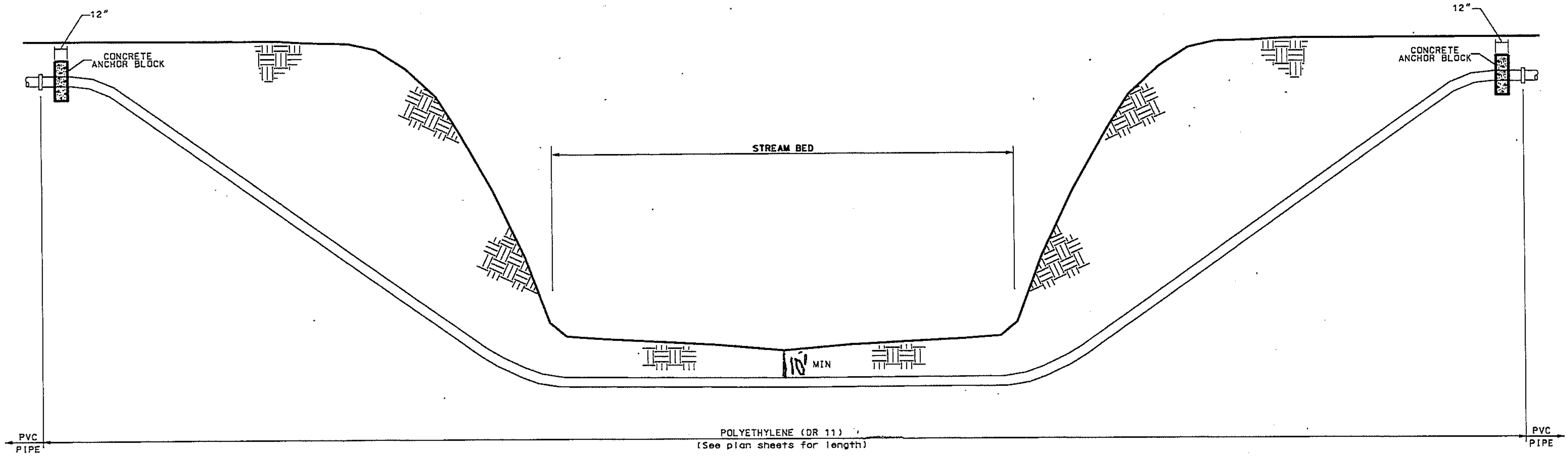
Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

NOTES:

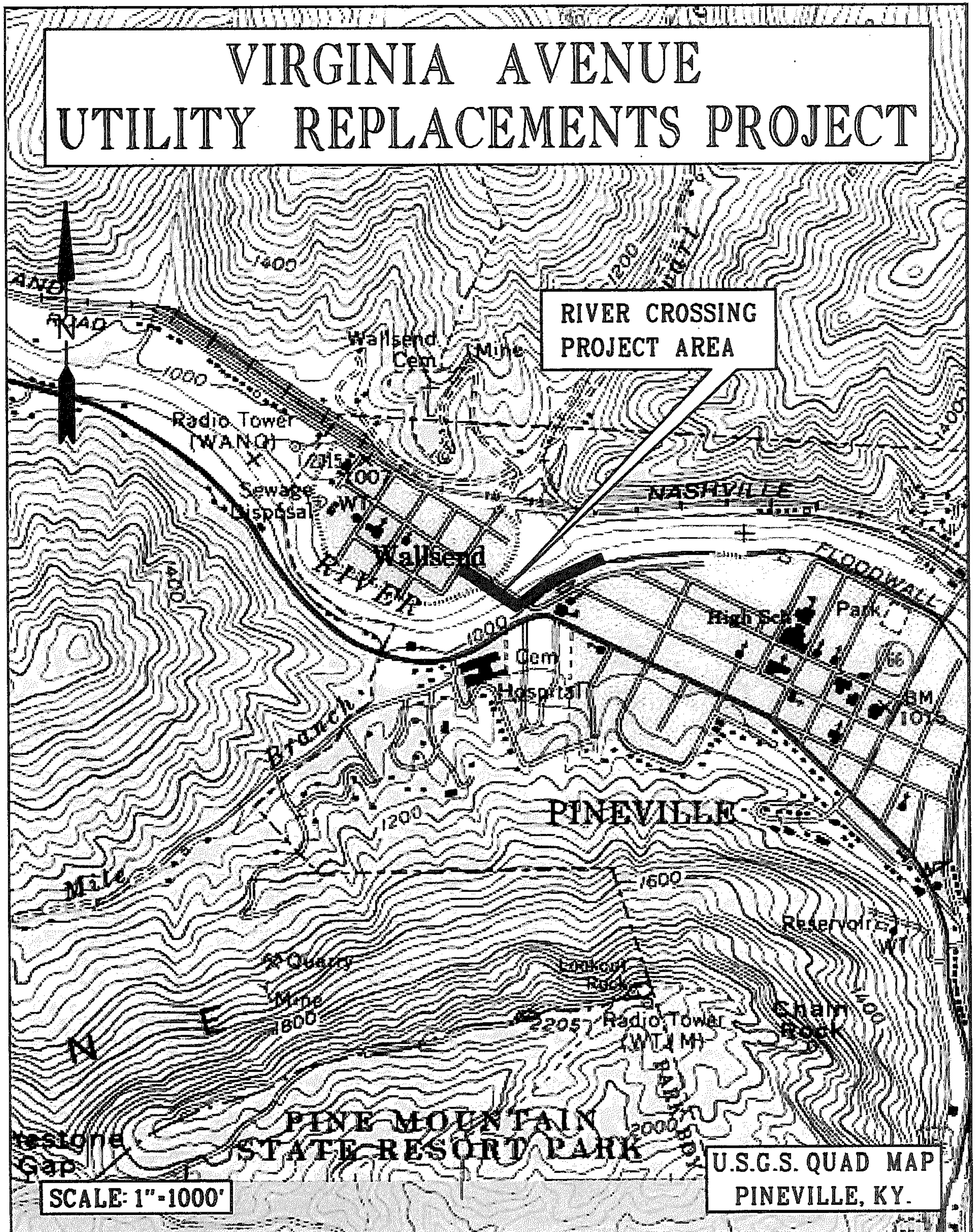
1. PVC/PE PIPE TRANSITIONS SHALL BE MADE USING HDPE MJ ADAPTER.





DIRECTIONAL BORE POLYETHYLENE STREAM CROSSING DETAIL

NOT TO SCALE


VIRGINIA AVENUE
UTILITY REPLACEMENTS PROJECT
RIVER CROSSING
PROJECT AREA
N
ROAD
1400
1000
1200
Wallsend
Cem.
Mine
Radio Tower
(WANO)
Sewage
Disposal
Wallsend
RIVER
NASHVILLE
FLOODWALL
High Sch.
Park
Cem
Hospital
BM
1015
Branch
PINEVILLE
1600
Reservoir
Quarry
Lookout
Rock
Mine
1800
2205
Radio Tower
(WTJM)
Chain
Rock
PARK BDY
PINE MOUNTAIN
STATE RESORT PARK
2000
Gap
SCALE: 1"-1000'
U.S.G.S. QUAD MAP
PINEVILLE, KY.

VIRGINIA AVENUE UTILITY REPLACEMENTS

FRAC-OUT CONTINGENCY PLAN
FOR SEWER FORCE MAIN HORIZONTAL DIRECTIONAL DRILL

Prepared for:

City of Pineville, Kentucky

Prepared by:

VAUGHN & MELTON CONSULTING ENGINEERS, INC.
109 South 24th Street
P.O. Box 1425
Middlesboro, KY 40965
Tel.: (606)248-6600
Fax: (606)248-0372

December 2014

FRAC-OUT CONTINGENCY PLAN

Project Description and Objectives

The high density polyethylene (HDPE) sewer force main in the Virginia Avenue Utility Replacement Project is proposed to cross the Cumberland River by Horizontal Directional Drilling (HDD). HDD is less intrusive than traditional open-cut trenching where habitats sustain direct soil disturbance.

Frac-out, or inadvertent return of drilling lubricant, is a potential concern when the HDD is used under sensitive habitats, waterways, and areas of concern for cultural resources. The HDD procedure uses bentonite slurry, a fine clay material as a drilling lubricant. The bentonite is non-toxic and commonly used in farming practices, but benthic invertebrates, aquatic plants and fish and their eggs can be smothered by the fine particles if bentonite were discharged to waterways.

The objectives of this purpose of this Frac-Out Contingency Plan is as follows:

- To minimize the potential for a frac-out associated with the proposed horizontal directional drilling activities
- To provide for the timely detection of any frac-outs
- To protect environmentally sensitive areas and associated riparian vegetation
- To ensure an organized, timely, and "minimum-impact" response in the event of a frac-out and release of drilling fluid
- Ensure that all appropriate notifications are made immediately to the client and appropriate regulatory personnel

The "Frac-out" plan is prepared by the drilling contractor to ensure that preventive and responsive measures can be implemented by the contractor. To minimize the potential for a frac-out, the Contingency Plan includes:

- Design protocols to be implemented for the protection of sensitive cultural and biological resources
- Design protocols to require a geotechnical engineer or qualified geologist to make recommendations regarding the suitability of the formations to be bored to minimize the potential for frac-out conditions

Prior to construction, sensitive cultural and biological resources will be protected by implementing the following measures:

- A pedestrian survey will be conducted of the drilling entry and exit areas, surrounding work areas, and the drilling route (to the extent it is accessible) to ensure that there are no cultural resources present on the surface.

- Excavation of all entry or exit points will be monitored. If any cultural resources are discovered during pit excavation or as the result of a frac-out, the appropriate State agencies will be notified.

- Where present, sensitive cultural and biological resources will be flagged for avoidance or construction limits will be clearly marked

- Barriers (straw bales or silt fences) will be erected between the bore site and nearby sensitive resources prior to drilling, as appropriate, to prevent released material from reaching the resource

- On-site briefings will be conducted for the workers to identify and locate sensitive resources at the site

- Ensure that all field personnel understand their responsibility for timely reporting of frac-outs

- Maintaining necessary response equipment on-site or at a readily accessible location and in good working order

- Disallowing fill into waters of the United States unless proper permits have been obtained

- Monitoring for the duration of drilling activities by the Engineer's construction inspector

To further reduce the potential impacts of a frac-out, construction of the force main is expected to occur during a period of low or reduced flow in the Cumberland River. Construction is expected to begin in summer of 2015 and the proposed directional bore will be completed during the first 1-2 months of the project. The drilling entry and exit areas will be clearly marked, surrounded by construction fencing and silt fencing to minimize the potential for all-site migration of drilling mud. Access and egress locations will be designated and clearly marked.

The primary areas of concern for inadvertent returns occur at the entrance and exit points where the drilling equipment are at depths of less than 5 feet deep. The likelihood of inadvertent return decreases as the depth of the pipe increases. To reduce the potential of an aquatic frac-out (i.e., under water), the depth of the force main will be kept in excess of 10 feet in areas directly beneath the confines of the Cumberland River.

Contingency Response

Once a frac-out is identified:

- All work stops, including the recycling of drilling mud/lubricant. The pressure of water above the pipe keeps excess mud from escaping through the fracture.
- The bore stem shall be pulled back to relieve pressure on frac-out.
- The Engineer shall be notified to ensure that adequate response actions are taken and notifications are made.
- Engineer shall evaluate the situation and recommend the type and level of response warranted, including the level of notification required.
- If the frac-out is minor, easily contained, has not reached the surface and is not threatening sensitive resources, drilling operations may resume after use of a leak stopping compound or redirection of the bore.
- If the frac-out has reached the surface, the following actions shall be initiated:

If the frac-out is terrestrial:

- Isolate the area with hay bales, sand bags, or silt fencing to surround and contain the drilling mud.
- Consult with regulatory agencies regarding next appropriate action among the following:
  - A mobile vacuum truck will be used to pump the drilling mud from the contained area and recycled to the return pit.
  - The drilling mud will be left in place to avoid potential damage from vehicles entering the area.
- Once excess drilling mud is removed, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation.
- Revegetated areas will be monitored twice (once after three months and again 6 months later) during the year following the frac-out to confirm revegetation is successful.

If the frac-out is aquatic (i.e., under water):

- Monitor frac-out for 4 hours to determine if the drilling mud congeals. (Bentonite will usually harden, effectively sealing the frac-out location).

- Consult with regulatory agencies regarding next appropriate action among the following:
  - If drilling mud congeals, take no other action that would potentially suspend sediments in the water column.
  - If drilling mud does not congeal, erect isolation/containment environment (coffer dam, etc.). Any material contaminated with bentonite shall be removed by hand to a depth of 2 feet or down to bedrock, contained, and properly disposed of.
- If the fracture becomes excessively large, a spill response team would be called in to contain and clean up excess drilling mud in the water.
- If the spill affects a vegetated area, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation.
- Re-vegetated areas will be monitored twice per year for two years subsequent to frac-out to confirm re-vegetation is successful.

All frac-out excavation and clean-up sites will be returned to pre-project contours using clean fill. Those areas will be stabilized. All containment measures will be removed, unless otherwise specified by regulatory agencies.

After frac-out is stabilized and any required removal is completed, document post-cleanup conditions with photographs and prepare frac-out incident report describing time, place, actions taken to remediate frac-out and measures implemented to prevent recurrence.

COMPLIANCE CERTIFICATION

YOU ARE REQUIRED TO SUBMIT THIS SIGNED CERTIFICATION REGARDING THE COMPLETED ACTIVITY AND ANY REQUIRED MITIGATION

I hereby certify that the work authorized by **Permit No. LRN-2014-01213** was done in accordance with the Corps authorization, including any general or special conditions.

____
Permittee Signature

____
Date

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative.

Submit this signed certification to the address checked below:

☒ U.S. Army Corps of Engineers
Regulatory Branch (Attn: Cara Beverly)
3701 Bell Road
Nashville, TN 37214

☐ Eastern Regulatory Field Office
501 Adesa Blvd
Suite 250
Lenoir City, Tennessee 37771

☐ Western Regulatory Field Office
2042 Beltline Road, Southwest
Building C, Suite 415
Decatur, AL 35601

Vaughn & Melton
Consulting Engineers, Inc.

P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965
Tel. (606) 248-6600
Fax (606) 248-0372
www.vaughnmelton.com

June 9, 2014

Mr. Mark Dennen
Executive Director & State Historic Preservation Officer
Kentucky Heritage Council
300 Washington Street
Frankfort, KY 40601

RE: City of Pineville Utility Commission, Facilities Plan
Pineville, Bell Co., KY
V&M Project No. 11055-00

Dear Mr. Dennen:

The City of Pineville in the process of preparing a Wastewater Facilities Plan update, which proposes the following described projects:

Immediate Project

Virginia Ave Combined Sewer Separation (Phase I) - The next two years will include constructing a separation of the combined storm/sanitary sewer along Virginia Ave in downtown Pineville. This project would replace the existing Ball Field and Mountain View Lift Stations, their associated force mains, and connections to the existing collection system. Also this project would separate the existing combined sewer along Virginia Avenue from Mountain View Avenue to the intersection of Holly Street, as well as along Holly Street and Prospect Avenue near the City Pool. An estimated project cost is $2,233,485. (See **Exhibit "M"** for illustration)

Phase I (0-2 years)
No Projects

Phase II (3-10 years)

City of Pineville WWTP Expansion – The City of Pineville's WWTP is in dire need of treatment capacity. An expansion to Pineville's existing 0.721 million gallons per day (mgd) "Biolac" style wastewater treatment plant (WWTP) which will be modified by several process improvements while increasing the current design capacity to 1.2 MGD. The estimated cost of construction, including contingency, for the WWTP expansion is $8,500,000. Refer to **Figure 12** for a detailed schematic.

City of Pineville Combined Sewer Separation - The next ten years will include a separation of the combined storm/sanitary sewer in downtown Pineville. This project would replace the entire remaining combined collection system in downtown Pineville and eliminate the two existing combined sewer overflows that discharges to the Cumberland River. An estimated project cost is $5,934,237. Refer to **Exhibit G** for a detailed map.

Ferndale Sewer Line Extension - The Ferndale area is located approximately 5 miles south of Pineville just off US 25E. This area was included in the planning area of the original 201 Facilities Plan that was prepared in 1977. Although there have been numerous extensions since the 201 plan was prepared, the Ferndale area is still un-served and in dire need of sewage collection due to the dangerously high number of failing septic systems and "straight pipes". The project will provide sewage collection/treatment to approximately 28 residences along with a nursing home and a low-income housing facility with approximately 120 apartments, both of which are currently served by on-site package treatment units (KPDES #'s KY0042218 & KY0078182, respectively). The project will allow both of these existing package treatment units to be abandoned. The project will include approximately 7,000 feet of gravity collection lines, 8,000 feet of force main, two (2) sewage lift stations, rehab of one existing sewage lift station, 50 manholes, and associated appurtenances.

Turkey Creek Sewer Line Extension - Turkey Creek is located just north of the existing sewerage area. Up to 40 potential new customers can be gained by extending sewer to this location. Due to the topography this system would be served by gravity lines. Sewage conveyance from this area back into the existing collection system will be accomplished via two sanitary sewer pump stations and 11,000 LF of 4" PVC force main. Approximately 6,000 LF of new gravity sewer lines would be constructed during this project. An estimated project cost is $998,000. Refer to **Exhibit A** for a detailed map

Asher Industrial Park Sewer Line Extension - This future potential service area is known as the Asher Industrial Park. It is located in mid-eastern Bell County near the community of Varilla, approximately 9 miles east of the City of Pineville and approximately 20 miles west of the City of Harlan. The property consists of reclaimed surface mine land, and is known locally as "Mountain Drive". It lies on the south side of the Cumberland River on Hances Ridge and contains 453-acres of property designated for industrial development. The proposed layout of the developed property delineates 15 separate tracts. A USGS topographical map of the property, detailing the park location and the 15 tracts, is shown on **Figure 22**.

In a recent PE Report completed at the beginning of 2008, it was concluded that a direct extension of the City of Pineville's Wastewater Collection System would be the most viable and cost effective solution for sewage disposal from the Industrial Park. The recommended route consists of a transport/collection system from the Park property west down Sam Low Branch toward Hances Creek (KY 1344), then along KY 1344, under the Cumberland River, and along US 119 through a series of strategically located force mains and lift stations. These lift stations will pump the sewage to the existing OTB Lift Station located adjacent to U.S. 25E, from there the OTB Lift Station will pump directly to the WWTP.

This proposed project would lay the ground for the following 119 Corridor Project that would provide public sewer to approximately 200 residents along the 119 corridor. Sewage conveyance from this area back into the existing collection system will be accomplished via 7 sanitary sewer pump stations and 50,000 LF of parallel 4" PVC force main and approximately 10,000 LF of new 10" gravity sewer. A map showing the recommended project is illustrated on **Figure 23**. The estimated cost of the proposed project is $4,629,475.

<u>Phase III (11-20 years)</u>

<u>US 119 Corridor Sewer Line Extension Projects</u> - After the extension to the Pine Mountain Regional Industrial Park is in place it opens various opportunities to serve communities along the 119 corridor. Populated communities adjacent to the proposed route, such as Wasioto, East Pineville, Bird Branch, and Laurel Hill, could potentially benefit from the constructed lines. Several households within these populated areas are currently utilizing conventional septic systems with failing lateral fields or straight pipes disposing sanitary sewer directly into the local streams or river. Refer to **Figure 20** for a preliminary sewer line extension illustration.

This 119 corridor project has been analyzed in phases. Phase 1 would include the Wasioto area, this future potential service area is located just east of the existing sewerage area. Up to 40 potential new customers could be gained by extending sewer to this location. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 1 includes approximately 4,500 LF of new gravity sewer lines. Refer to **Figure 24** for a detailed map. An estimated total project cost is $575,991.

Phase 2 would include the Bird Branch area, by extending sewer to this location approximately 75 new residents could be served. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 3 includes approximately 10,300 LF of new gravity sewer lines. Refer to **Figure 25** for a detailed map. The estimated total project cost is $1,116,983. This project would be a prerequisite to serving the Laurel Hill area which at this point we believe would be outside this 20 year plan.

Phase 3 would include the East Pineville area, extending sewer to this location could potentially serve approximately 85 new customers. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 3 includes approximately 13,800 LF of new gravity sewer lines. Refer to **Figure 26** for a detailed map. An estimated total project cost is $1,477,649.

Walnut Lane Sewer Line Extension – Walnut Lane is located within the existing sewerage area and boarders the Wasioto Winds Golf Course. Up to 12 potential new customers can be gained by extending sewer to this location. Due to the topography this system would be served by gravity lines. Sewage conveyance from this area back into the existing collection system will be accomplished via one sanitary sewer pump station and 1,500 LF of 3” PVC force main. Approximately 1,400 LF of new gravity sewer lines would be constructed during this project. Refer to **Figure 31** for a detailed map. An estimated project cost is $267,600.

Please provide us with written comments or concerns you may have regarding these projects. These projects will result in an improvement in water quality in the local area. We would appreciate a timely response.

If you have any questions or need further information about these projects, please contact me or Mitch Brunsma at (606) 248-6600.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS, INC.

Corey Napier, P.E.

Enclosure: Map

cc:

STEVEN L. BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL

BOB STEWART
SECRETARY

THE STATE HISTORIC PRESERVATION OFFICE
300 WASHINGTON STREET
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-7005
FAX (502) 564-5820
www.heritage.ky.gov

CRAIG A. POTTS
EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

July 23, 2014

Mr. Corey Napier, P.E.
Vaughn & Melton Consulting Engineers, Inc.
P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965

Re: City of Pineville Utility Commission, Facilities Plan
Pineville, Bell County, KY
V & M Project No. 11055-00

Dear Mr. Napier:

Thank you for the letter regarding the above-referenced plan. The projects described within this plan fall in an area with many previously documented historic properties. There is a high potential of direct impacts to archaeological resources and indirect effects to historic structures. Several of these properties have been listed on the National Register of Historic Places (NRHP). Some of these properties fall within a National Register District. We are also aware of Tennessee Valley Authority (TVA) easements that require protection of certain archaeological sites, such as 15Bl15 and 15Bl16, within the project area. It is the applicant's responsibility to identify properties encumbered by these easements and to adhere to their stipulations.

Given the wide range of issues evident from a review of the preliminary plan we recommend working with a cultural resource consultant who conducts both archaeological and cultural historic surveys to devise an efficient plan to identify and assess potential direct and indirect impacts to historic properties within your Area of Potential Effect (APE). Our specific comments for each component of your plan are outlined below:

Virginia Ave Combined Sewer Separation (Phase I)
Due to the presence of previously documented archaeological sites within the APE, we recommend an archaeological survey of the proposed force main located north of the bypass (denoted by the blue line in Exhibit M). Where a given project area or portions thereof have been disturbed by prior construction, the applicant may file documentation of that disturbance with the State Historic Preservation Officer and may request an opinion concerning the need of an archaeological survey. Note that agricultural activity, such as plowing, is not sufficient disturbance to preclude the need for an archaeological survey.

If any of the work associated with this phase will involve tree removal or will impact intact historic materials including, but not limited to, limestone curbs, please submit photos of these areas to our office for further consultation. Additional consultation would also be required for any construction activities that will exceed a vibration limit of 0.2 inches per second in or around the following resources: National Register listed districts, buildings or structures; unevaluated buildings or structures over 50 years of age that would be classified as "fragile." Photos of the properties and a description of the vibration causing activities should be submitted to our office to initiate consultation.

City of Pineville WWTP Expansion
If the WWTP is 50 years of age or older *at the time the proposed actions take place* please send photos of the primary façade and at least one other elevation of the main building/structure, along with photos of all related facilities over 50 years of age on the grounds.

In order to make a preliminary determination if other above-ground properties eligible for listing in the National Register of Historic Places will be affected by this project, the applicant must submit photographs of all structures 50 years or older that are within and visible from areas impacted by any above ground structures, such as (but not limited to) pump stations, associated with this project. Each photograph should be labeled by street address or map coordinates with a brief description of potential impacts or proposed treatment, and should be accompanied by a project map showing their location. Upon completion of our review, this office will advise the applicant if further consultation is required.

US 119 Corridor Sewer Line Extension Projects Phase I through III and Walnut Lane Sewer Line Extension

In order to make a preliminary determination if other above-ground properties eligible for listing in the National Register of Historic Places will be affected by this project, the applicant must submit photographs of all structures 50 years or older that are within and visible from areas impacted by any above ground structures, such as (but not limited to) pump stations, associated with this project. Each photograph should be labeled by street address or map coordinates with a brief description of potential impacts or proposed treatment, and should be accompanied by a project map showing their location. Upon completion of our review, this office will advise the applicant if further consultation is required.

The proposed project area has not been surveyed in its entirety for archaeological resources. Therefore, I recommend that the proposed project area be surveyed by a professional archaeologist and that the resulting report of these investigations be submitted to our office for review and comment. As discussed above, the applicant may file documentation of previous ground disturbance with our office concerning the need of an archaeological survey.

Should the project plans change, or should additional information become available regarding cultural resources or citizens' concerns regarding impacts to cultural resources, please submit that information to our office as additional consultation may be warranted.

In the event that human remains are encountered during project activities, all work should be immediately stopped in the area and the area cordoned off, and in accordance with KRS 72.020 the county coroner and local law enforcement must be contacted immediately. Upon confirmation that the human remains are not of forensic interest, the unanticipated discovery must be reported to the Kentucky Heritage Council and the Kentucky Office of State Archaeology in the Anthropology Department at the University of Kentucky.

If, as a result of any of the above-requested surveys or additional information, it is determined that properties that may be eligible for listing on the National Register of Historic Places will be adversely affected by these projects, additional consultation shall take place with the Kentucky Heritage Council to develop measures to avoid or mitigate the adverse effects.

Should you have any questions, feel free to contact Yvonne Sherrick of my staff at 502.564.7005, extension 113.

Sincerely,

Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP: KHC # 41910-3

Vaughn & Melton
Consulting Engineers, Inc.

P.O. Box 1425
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Middlesboro, KY 40965
Tel. (606) 248-6600
Fax (606) 248-0372
www.vaughnmelton.com

June 2, 2014

Mr. Virgil Lee Andrews, Jr.,
Field Office Supervisor
U.S. Department of the Interior
Fish and Wildlife Service
J.C. Watts Federal Building
330 West Broadway, Suite 265
Frankfort, KY 40601

RE: City of Pineville Utility Commission, Facilities Plan
Pineville, Bell Co., KY
V&M Project No. 11055-00

Dear Mr. Andrews:

The City of Pineville in the process of preparing a Wastewater Facilities Plan update, which proposes the following described projects:

Immediate Project

Virginia Ave Combined Sewer Separation (Phase I) - The next two years will include constructing a separation of the combined storm/sanitary sewer along Virginia Ave in downtown Pineville. This project would replace the existing Ball Field and Mountain View Lift Stations, their associated force mains, and connections to the existing collection system. Also this project would separate the existing combined sewer along Virginia Avenue from Mountain View Avenue to the intersection of Holly Street, as well as along Holly Street and Prospect Avenue near the City Pool. An estimated project cost is $2,233,485. (See **Exhibit "M"** for illustration)

Phase I (0-2 years)
No Projects

Phase II (3-10 years)

City of Pineville WWTP Expansion – The City of Pineville's WWTP is in dire need of treatment capacity. An expansion to Pineville's existing 0.721 million gallons per day (mgd) "Biolac" style wastewater treatment plant (WWTP) which will be modified by several process improvements while increasing the current design capacity to 1.2 MGD. The estimated cost of construction, including contingency, for the WWTP expansion is $8,500,000. Refer to **Figure 12** for a detailed schematic.

City of Pineville Combined Sewer Separation - The next ten years will include a separation of the combined storm/sanitary sewer in downtown Pineville. This project would replace the entire remaining combined collection system in downtown Pineville and eliminate the two existing combined sewer overflows that discharges to the Cumberland River. An estimated project cost is $5,934,237. Refer to **Exhibit G** for a detailed map.

Ferndale Sewer Line Extension - The Ferndale area is located approximately 5 miles south of Pineville just off US 25E. This area was included in the planning area of the original 201 Facilities Plan that was prepared in 1977. Although there have been numerous extensions since the 201 plan was prepared, the Ferndale area is still un-served and in dire need of sewage collection due to the dangerously high number of failing septic systems and "straight pipes". The project will provide sewage collection/treatment to approximately 28 residences along with a nursing home and a low-income housing facility with approximately 120 apartments, both of which are currently served by on-site package treatment units (KPDES #'s KY0042218 & KY0078182, respectively). The project will allow both of these existing package treatment units to be abandoned. The project will include approximately 7,000 feet of gravity collection lines, 8,000 feet of force main, two (2) sewage lift stations, rehab of one existing sewage lift station, 50 manholes, and associated appurtenances.

Turkey Creek Sewer Line Extension - Turkey Creek is located just north of the existing sewerage area. Up to 40 potential new customers can be gained by extending sewer to this location. Due to the topography this system would be served by gravity lines. Sewage conveyance from this area back into the existing collection system will be accomplished via two sanitary sewer pump stations and 11,000 LF of 4" PVC force main. Approximately 6,000 LF of new gravity sewer lines would be constructed during this project. An estimated project cost is $998,000. Refer to **Exhibit A** for a detailed map

Asher Industrial Park Sewer Line Extension - This future potential service area is known as the Asher Industrial Park. It is located in mid-eastern Bell County near the community of Varilla, approximately 9 miles east of the City of Pineville and approximately 20 miles west of the City of Harlan. The property consists of reclaimed surface mine land, and is known locally as "Mountain Drive". It lies on the south side of the Cumberland River on Hances Ridge and contains 453-acres of property designated for industrial development. The proposed layout of the developed property delineates 15 separate tracts. A USGS topographical map of the property, detailing the park location and the 15 tracts, is shown on **Figure 22**.

In a recent PE Report completed at the beginning of 2008, it was concluded that a direct extension of the City of Pineville's Wastewater Collection System would be the most viable and cost effective solution for sewage disposal from the Industrial Park. The recommended route consists of a transport/collection system from the Park property west down Sam Low Branch toward Hances Creek (KY 1344), then along KY 1344, under the Cumberland River, and along US 119 through a series of strategically located force mains and lift stations. These lift stations will pump the sewage to the existing OTB Lift Station located adjacent to U.S. 25E, from there the OTB Lift Station will pump directly to the WWTP.

This proposed project would lay the ground for the following 119 Corridor Project that would provide public sewer to approximately 200 residents along the 119 corridor. Sewage conveyance from this area back into the existing collection system will be accomplished via 7 sanitary sewer pump stations and 50,000 LF of parallel 4" PVC force main and approximately 10,000 LF of new 10" gravity sewer. A map showing the recommended project is illustrated on **Figure 23**. The estimated cost of the proposed project is $4,629,475.

Phase III (11-20 years)

US 119 Corridor Sewer Line Extension Projects - After the extension to the Pine Mountain Regional Industrial Park is in place it opens various opportunities to serve communities along the 119 corridor. Populated communities adjacent to the proposed route, such as Wasioto, East Pineville, Bird Branch, and Laurel Hill, could potentially benefit from the constructed lines. Several households within these populated areas are currently utilizing conventional septic systems with failing lateral fields or straight pipes disposing sanitary sewer directly into the local streams or river. Refer to **Figure 20** for a preliminary sewer line extension illustration.

This 119 corridor project has been analyzed in phases. Phase 1 would include the Wasioto area, this future potential service area is located just east of the existing sewerage area. Up to 40 potential new customers could be gained by extending sewer to this location. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 1 includes approximately 4,500 LF of new gravity sewer lines. Refer to **Figure 24** for a detailed map. An estimated total project cost is $575,991.

Phase 2 would include the Bird Branch area, by extending sewer to this location approximately 75 new residents could be served. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 3 includes approximately 10,300 LF of new gravity sewer lines. Refer to **Figure 25** for a detailed map. The estimated total project cost is $1,116,983. This project would be a prerequisite to serving the Laurel Hill area which at this point we believe would be outside this 20 year plan.

Phase 3 would include the East Pineville area, extending sewer to this location could potentially serve approximately 85 new customers. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 3 includes approximately 13,800 LF of new gravity sewer lines. Refer to **Figure 26** for a detailed map. An estimated total project cost is $1,477,649.

<u>Walnut Lane Sewer Line Extension</u> – Walnut Lane is located within the existing sewerage area and boarders the Wasioto Winds Golf Course. Up to 12 potential new customers can be gained by extending sewer to this location. Due to the topography this system would be served by gravity lines. Sewage conveyance from this area back into the existing collection system will be accomplished via one sanitary sewer pump station and 1,500 LF of 3" PVC force main. Approximately 1,400 LF of new gravity sewer lines would be constructed during this project. Refer to **Figure 31** for a detailed map. An estimated project cost is $267,600.

Please provide us with written comments or concerns you may have regarding these projects. These projects will result in an improvement in water quality in the local area. We would appreciate a timely response.

If you have any questions or need further information about these projects, please contact me or Mitch Brunsma at (606) 248-6600.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS, INC.

Corey Napier, P.E.

Enclosure: Map

cc:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

June 13, 2014

Mr. Corey Napier
Vaughn & Melton Consulting Engineers, Inc.
P.O. Box 1425
Middlesboro, KY 40965

Re: FWS 2014-B-0575; V&M Project No. 11055-00; City of Pineville; Wastewater Facilities Plan; located in Bell County, Kentucky

Dear Mr. Napier:

Thank you for the opportunity to provide comments on the above-referenced project. The U.S. Fish and Wildlife Service (Service) has reviewed this proposed project and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). This is not a concurrence letter. Please read carefully, as further consultation with the Service may be required.

Endangered Species Act comments

In accordance to section 7 of the ESA, the Service must evaluate the potential for all the direct, indirect, and cumulative effects of a proposed project on federally listed species. This includes effects of any "interrelated actions" that are part of a larger action and depend on the larger action for their justification and "interdependent actions" that have no independent utility apart from the action under consideration. Please include information about all of the potential impacts associated with the proposed project, including those from interrelated or interdependent actions (*i.e.*; buildings, utilities, roads, etc.) and future actions that are reasonably certain to occur as a result of the proposed project.

In order to assist you in determining if the proposed project has the potential to impact protected species we have searched our records for occurrences of listed species within the vicinity of the proposed project. Based upon the information provided to us and according to our databases, we believe that the following federally listed species have the potential to occur within the project vicinity:

Group	Species	Common name	Legal* Status
Mammals	*Myotis sodalis*	Indiana bat	E
	Myotis grisescens	gray bat	E
	Myotis septentrionalis	northern long-eared bat	P

Mussels	*Alasmidonta atropurpurea*	Cumberland elktoe	E
Fishes	*Phoxinus cumberlandensis*	blackside dace	T
	Etheostoma sagitta	Cumberland arrow darter	C
Insects	*Pseudanopthalmus frigidus*	icebox cave beetle	C

* *Key to notations: E = Endangered, T = Threatened, P = Proposed, C = Candidate, CH = Critical Habitat*

We must advise you that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitats and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.

Indiana bat – ***known swarming habitat***

Based on your correspondence, a portion of the proposed project is within the swarming range of a P1/P2 hibernaculum. Prior to hibernation, Indiana bats utilize the forest habitat around the hibernacula, where they feed and roost until temperatures drop to a point that forces them into hibernation. This "fall swarming" period lasts, depending on weather conditions in a particular year, from about August 16 to about November 15. This is a critical time for Indiana bats, since they are acquiring additional fat reserves and mating prior to hibernation. Another critical time for Indiana bats utilizing this swarming range is during spring emergence (~April 1 - ~May 14) from the hibernacula. During this time, bats utilize the swarming range to forage prior to migrating to their respective summering areas. It should also be noted that some bats may continue to utilize this swarming area year round; however, these are typically adult males.

We have the following recommendations relative to Indiana bats:

- Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter habitat for Indiana bats. Therefore, we would recommend that the project proponent survey the project area for any caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as Indiana bat habitat by this office.
- The project proponent can design or modify the proposed project to eliminate impacts to trees that provide roosting and foraging habitat for Indiana bats.

If tree removal is necessary for the proposed project, the Service would typically the completion of a mist net survey to provide presence/absence information before construction activities take place. However, we already know that Indiana bats are present because previous surveys have identified the proposed project area as being within the swarming range of a known Indiana bat hibernacula. Clearing trees while the bats associated with this swarming range are hibernating could still result in indirect and/or cumulative effects by changing the landscape and removing potential foraging and roosting habitat. In order to address these concerns of proposed tree removal and be in compliance with the ESA, we recommend one of the following options:

- The project proponent can modify the proposed project to eliminate or reduce impacts to suitable Indiana bat habitat, thus avoiding impacts. A habitat assessment may useful in determining if suitable Indiana bat summer roosting or foraging habitat is present in the action area of the proposed project.
- The project proponent can request formal section 7 consultation through the lead federal action agency associated with the proposed project. To request formal consultation, the project proponent would need to submit a Biological Assessment that describes the action and evaluates the effects of the action on the listed species in the project area. After formal consultation is initiated, the Service has 135 days to prepare a Biological Opinion that analyzes the effects of the action on the listed species and recommends strategies to minimize those effects.
- The project proponent may provide the Service with additional information through the informal consultation process, prepared by a qualified biologist, that includes site-specific habitat information and a thorough effects analysis (direct, indirect, and cumulative) to support a "not likely to adversely affect" determination. The Service will review this and decide if there is enough supporting information to concur with the determination.
- The project proponent may choose to assume presence of the species in the project area and enter into a Conservation Memorandum of Agreement (MOA) with the Service to account for the incidental take of Indiana bats. By entering into a Conservation MOA with the Service, Cooperators gain flexibility with regard to the removal of suitable Indiana bat habitat. In exchange for this flexibility, the Cooperator provides recovery-focused conservation benefits to the Indiana bat through the implementation of minimization and mitigation measures that are described in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky. For additional information about this option, please notify our office.

Indiana bat – ***potential habitat***

A portion of the proposed project is in Indiana bat "potential habitat." In these areas we believe that: (1) caves, rockshelters, and abandoned underground mines in the vicinity of and in the project area may potentially provide suitable wintering habitat for the Indiana bat; and (2) forested areas in the vicinity of and in the project area may potentially provide suitable summer roosting and foraging habitat for the Indiana bat. In order to address the concerns and be in compliance with the ESA, we have the following recommendations relative to potential direct and/or indirect effects as a result of impacts to the habitats listed above:

(1) During hibernation, the Indiana bat prefers limestone caves, sandstone rockshelters, and abandoned underground mines with stable temperatures of 39 to 46 degrees F and humidity above 74 percent but below saturation. Prior to hibernation, Indiana bats utilize the forest habitat up to five miles from the hibernacula to feed and roost until temperatures drop to a point that forces them into hibernation. This "swarming" period is dependent upon weather conditions and lasts from about September 15 to about November 15. This is a critical time for Indiana bats, since they are acquiring additional fat reserves and mating prior to hibernation.

Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter habitat for Indiana bats. Therefore, we recommend that the project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as Indiana bat habitat by this office.

(2) The Indiana bat utilizes a wide array of forested habitats, including riparian forests, bottomlands, and uplands for both summer foraging and roosting habitat. Indiana bats typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (*i.e.*, dead trees or dead portions of live trees). Trees in excess of 16 inches diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat. Male Indiana bats have been observed roosting in trees as small as 5 inches DBH.

To address potential impacts to Indiana bat summer roosting and foraging habitat we recommend that the project proponent survey the project site to determine the presence or likely absence of Indiana bats within the project area in an effort to determine if potential effects are likely. A qualified biologist who holds the appropriate collection permits for the Indiana bat must undertake such surveys in accordance with our most current survey guidance. If any Indiana bats are identified, we would request written notification of such occurrence(s) and further coordination and consultation. As an alternative to surveying, the following options are also available:

- The project proponent can modify the proposed project to eliminate or reduce impacts to suitable Indiana bat habitat, thus avoiding impacts. A habitat assessment may useful in determining if suitable Indiana bat summer roosting or foraging habitat is present in the action area of the proposed project.

- The project proponent can request formal section 7 consultation through the lead federal action agency associated with the proposed project. To request formal consultation, the project proponent would need to submit a Biological Assessment that describes the action and evaluates the effects of the action on the listed species in the project area. After formal consultation is initiated, the Service has 135 days to prepare a Biological Opinion that analyzes the effects of the action on the listed species and recommends strategies to minimize those effects.

- The project proponent may provide the Service with additional information through the informal consultation process, prepared by a qualified biologist, that includes site-specific habitat information and a thorough effects analysis (direct, indirect, and cumulative) to support a "not likely to adversely affect" determination. The Service will review this and decide if there is enough supporting information to concur with the determination.

- The project proponent may choose to assume presence of the species in the project area and enter into a Conservation Memorandum of Agreement (MOA) with the Service to account for the incidental take of Indiana bats. By entering into a Conservation MOA with the Service, Cooperators gain flexibility with regard to the removal of suitable Indiana bat habitat. In exchange for this flexibility, the Cooperator provides recovery-focused conservation benefits to the Indiana bat through the implementation of minimization and mitigation measures that are described in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky. For additional information about this option, please notify our office.

Gray bat

Gray bats roost, breed, rear young, and hibernate in caves year round. They migrate between summer and winter caves and will use transient or stopover caves along the way. Gray bats eat a variety of flying aquatic and terrestrial insects present along streams, rivers, and lakes. Low-flow streams produce an abundance of insects and are especially valuable to the gray bat as foraging habitat. For hibernation, the roost site must have an average temperature of 42 to 52 degrees F. Most of the caves used by gray bats for hibernation have deep vertical passages with large rooms that function as cold air traps. Summer caves must be warm, between 57 and 77 degrees F, or have small rooms or domes that can trap the body heat of roosting bats. Summer caves are normally located close to rivers or lakes where the bats feed. Gray bats have been known to fly as far as 12 miles from their colony to feed.

Because we have concerns relating to the gray bat on this project and due to the lack of occurrence information available on this species relative to the proposed project area, we have the following recommendations relative to gray bats.

- Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter/summer habitat for gray bats. Therefore, we would recommend that the project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as gray bat habitat by this office.
- Sediment Best Management Practices (BMPs) should be utilized and maintained to minimize siltation of the streams located within and in the vicinity of the project area, as these streams represent potential foraging habitat for the gray bat.

Northern long-eared bat

Much of the proposed project is in known summer and/or known winter habitat for the northern long-eared bat. This species is currently proposed for federal listing under the ESA. During the summer, northern long-eared bats typically roost singly or in colonies in a wide-variety of forested habitats, where they seek shelter during daylight hours underneath bark or in cavities/crevices of both live trees and snags, including relatively small trees and snags that are less than 5 inches in diameter at breast height (DBH). Northern long-eared bats have also been documented roosting in man-made structures (i.e., buildings, barns, etc.) during the summer. According to current winter occurrence data, northern long-eared bats predominately winter in hibernacula that include caves, tunnels, and underground mine passages.

Although species proposed for listing are not afforded protection under the ESA, when a species is listed, the prohibitions against jeopardizing its continued existence and unauthorized take are effective immediately, **regardless of an action's stage of completion**. Therefore, to avoid significant project delays, we recommend that you contact our office to identify and resolve potential conflicts regarding the northern long-eared bat in your project area.

Cumberland elktoe

The Cumberland elktoe is endemic to the Upper Cumberland watershed and is known to occur throughout Bell County. The mussel species is found in slow currents in shallow water in small creeks and headwater areas. They typically inhabit sand and gravel deposits between large boulders or rubble.

Freshwater mussels are one of the most imperiled groups of animals in North America. Reservoir construction, siltation, channelization, and water pollution are all factors that have contributed to the decline of our native mussel populations. The runoff from urban areas has degraded the quality of water and the substrate of many streams. As filter feeders, mussels are sensitive to contaminants and function as indicators of problems with water quality. The potential of the proposed project to impact federally listed mussel species, either directly or indirectly as a result of siltation/sedimentation and contamination, should be addressed when evaluating the effects of the proposed project.

Blackside dace

The blackside dace is found in the upper Cumberland River watershed, and there are known occurrences near the proposed project area. Blackside dace are small fish, usually less than three-inches in length, that inhabit small, cool, upland streams in forested areas with well-developed canopies. Dace are normally found in pools near undercut banks or other cover, such as brush or large rocks. Stream degradation is the primary threat to the blackside dace. When development activities disturb areas near the stream, the stream can quickly become degraded, creating unsuitable habitat conditions for the blackside dace. We have the following recommendations to address impacts to blackside dace:

- Design or modify the proposed project to avoid disturbance to streams in which blackside dace inhabit (*e.g.*, directional boring).
- Utilize BMPs, including directional boring, to minimize erosion and sedimentation impacts to streams in which blackside are known or are likely to inhabit.
- Minimize tree removal surrounding streams that provide habitat for blackside dace to prevent increases in water temperature.

Cumberland arrow darter

The Cumberland arrow darter typically inhabits small, headwater streams within the Upper Cumberland River system. They prefer rocky pools, runs, and glides in areas with low to moderate flow. Cumberland arrow darters are often found in streams with blackside dace and are confronted by similar threats. Our recommendations to reduce impacts to the blackside dace also apply to the Cumberland arrow darter.

The Cumberland arrow darter is a federal candidate species, which means the Service has sufficient information on its biological status and threats to propose the species as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA.

The Service encourages cooperative conservation efforts for these species because they are species that may warrant future protection under the ESA.

Icebox cave beetle

This predatory beetle is small, blind, and ecologically adapted to live in caves. This species is only found in Icebox Cave in Bell County where they typically inhabit moist or muddy habitats. Potential threats to cave beetles include cave pollution, cave vandalism, disturbance, road or other construction, and changes in cave microclimate.

The icebox cave beetle is a federal candidate species, which means the Service has sufficient information on its biological status and threats to propose the species as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA. The Service encourages cooperative conservation efforts for these species because they are species that may warrant future protection under the ESA.

Fish and Wildlife Coordination Act comments

In accordance with the provisions of the Fish and Wildlife Coordination Act, the Service has reviewed the project with regards to the effects the proposed actions may have on wetlands and/or other jurisdictional waters. We recommend that project plans be developed to avoid impacting wetland areas and/or streams, and reserve the right to review any required federal or state permits at the time of public notice issuance. The U.S. Army Corps of Engineers should be contacted to assist you in determining if wetlands or other jurisdictional waters are present or if a permit is required.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact Jessi Miller at (502) 695-0468 extension 104.

Sincerely,

Virgil Lee Andrews

Virgil Lee Andrews, Jr.
Field Supervisor

Vaughn & Melton
Consulting Engineers, Inc.

P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965
Tel. (606) 248-6600
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www.vaughnmelton.com

October 23, 2014

Mr. Lee Kemper
Ky. Department of Fish and Wildlife Resources
Engineering Division
#1 Sportman's Lane
Frankfort, KY 40601

RE: City of Pineville Utility Commission, Facilities Plan
Pineville, Bell Co., KY
V&M Project No. 11055-00

Dear Mr. Kemper:

The City of Pineville in the process of preparing a Wastewater Facilities Plan update, which proposes the following described projects:

Immediate Project

Virginia Ave Combined Sewer Separation (Phase I) - The next two years will include constructing a separation of the combined storm/sanitary sewer along Virginia Ave in downtown Pineville. This project would replace the existing Ball Field and Mountain View Lift Stations, their associated force mains, and connections to the existing collection system. Also this project would separate the existing combined sewer along Virginia Avenue from Mountain View Avenue to the intersection of Holly Street, as well as along Holly Street and Prospect Avenue near the City Pool. An estimated project cost is $2,233,485. (See **Exhibit "M"** for illustration)

Phase I (0-2 years)
No Projects

Phase II (3-10 years)

City of Pineville WWTP Expansion – The City of Pineville's WWTP is in dire need of treatment capacity. An expansion to Pineville's existing 0.721 million gallons per day (mgd) "Biolac" style wastewater treatment plant (WWTP) which will be modified by several process improvements while increasing the current design capacity to 1.2 MGD. The estimated cost of construction, including contingency, for the WWTP expansion is $8,500,000. Refer to **Figure 12** for a detailed schematic.

City of Pineville Combined Sewer Separation - The next ten years will include a separation of the combined storm/sanitary sewer in downtown Pineville. This project would replace the entire remaining combined collection system in downtown Pineville and eliminate the two existing combined sewer overflows that discharges to the Cumberland River. An estimated project cost is $5,934,237. Refer to **Exhibit G** for a detailed map.

Ferndale Sewer Line Extension - The Ferndale area is located approximately 5 miles south of Pineville just off US 25E. This area was included in the planning area of the original 201 Facilities Plan that was prepared in 1977. Although there have been numerous extensions since the 201 plan was prepared, the Ferndale area is still un-served and in dire need of sewage collection due to the dangerously high number of failing septic systems and “straight pipes”. The project will provide sewage collection/treatment to approximately 28 residences along with a nursing home and a low-income housing facility with approximately 120 apartments, both of which are currently served by on-site package treatment units (KPDES #’s KY0042218 & KY0078182, respectively). The project will allow both of these existing package treatment units to be abandoned. The project will include approximately 7,000 feet of gravity collection lines, 8,000 feet of force main, two (2) sewage lift stations, rehab of one existing sewage lift station, 50 manholes, and associated appurtenances.

Turkey Creek Sewer Line Extension - Turkey Creek is located just north of the existing sewerage area. Up to 40 potential new customers can be gained by extending sewer to this location. Due to the topography this system would be served by gravity lines. Sewage conveyance from this area back into the existing collection system will be accomplished via two sanitary sewer pump stations and 11,000 LF of 4” PVC force main. Approximately 6,000 LF of new gravity sewer lines would be constructed during this project. An estimated project cost is $998,000. Refer to **Exhibit A** for a detailed map

Asher Industrial Park Sewer Line Extension - This future potential service area is known as the Asher Industrial Park. It is located in mid-eastern Bell County near the community of Varilla, approximately 9 miles east of the City of Pineville and approximately 20 miles west of the City of Harlan. The property consists of reclaimed surface mine land, and is known locally as “Mountain Drive”. It lies on the south side of the Cumberland River on Hances Ridge and contains 453-acres of property designated for industrial development. The proposed layout of the developed property delineates 15 separate tracts. A USGS topographical map of the property, detailing the park location and the 15 tracts, is shown on **Figure 22**.

In a recent PE Report completed at the beginning of 2008, it was concluded that a direct extension of the City of Pineville's Wastewater Collection System would be the most viable and cost effective solution for sewage disposal from the Industrial Park. The recommended route consists of a transport/collection system from the Park property west down Sam Low Branch toward Hances Creek (KY 1344), then along KY 1344, under the Cumberland River, and along US 119 through a series of strategically located force mains and lift stations. These lift stations will pump the sewage to the existing OTB Lift Station located adjacent to U.S. 25E, from there the OTB Lift Station will pump directly to the WWTP.

This proposed project would lay the ground for the following 119 Corridor Project that would provide public sewer to approximately 200 residents along the 119 corridor. Sewage conveyance from this area back into the existing collection system will be accomplished via 7 sanitary sewer pump stations and 50,000 LF of parallel 4" PVC force main and approximately 10,000 LF of new 10" gravity sewer. A map showing the recommended project is illustrated on **Figure 23**. The estimated cost of the proposed project is $4,629,475.

<u>Phase III (11-20 years)</u>

<u>US 119 Corridor Sewer Line Extension Projects</u> - After the extension to the Pine Mountain Regional Industrial Park is in place it opens various opportunities to serve communities along the 119 corridor. Populated communities adjacent to the proposed route, such as Wasioto, East Pineville, Bird Branch, and Laurel Hill, could potentially benefit from the constructed lines. Several households within these populated areas are currently utilizing conventional septic systems with failing lateral fields or straight pipes disposing sanitary sewer directly into the local streams or river. Refer to **Figure 20** for a preliminary sewer line extension illustration.

This 119 corridor project has been analyzed in phases. Phase 1 would include the Wasioto area, this future potential service area is located just east of the existing sewerage area. Up to 40 potential new customers could be gained by extending sewer to this location. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 1 includes approximately 4,500 LF of new gravity sewer lines. Refer to **Figure 24** for a detailed map. An estimated total project cost is $575,991.

Phase 2 would include the Bird Branch area, by extending sewer to this location approximately 75 new residents could be served. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 3 includes approximately 10,300 LF of new gravity sewer lines. Refer to **Figure 25** for a detailed map. The estimated total project cost is $1,116,983. This project would be a prerequisite to serving the Laurel Hill area which at this point we believe would be outside this 20 year plan.

Phase 3 would include the East Pineville area, extending sewer to this location could potentially serve approximately 85 new customers. The sewage collected would flow by gravity into a sanitary sewer pump station that would be provided by the PMRIA project. Phase 3 includes approximately 13,800 LF of new gravity sewer lines. Refer to **Figure 26** for a detailed map. An estimated total project cost is $1,477,649.

<u>Walnut Lane Sewer Line Extension</u> – Walnut Lane is located within the existing sewerage area and boarders the Wasioto Winds Golf Course. Up to 12 potential new customers can be gained by extending sewer to this location. Due to the topography this system would be served by gravity lines. Sewage conveyance from this area back into the existing collection system will be accomplished via one sanitary sewer pump station and 1,500 LF of 3” PVC force main. Approximately 1,400 LF of new gravity sewer lines would be constructed during this project. Refer to **Figure 31** for a detailed map. An estimated project cost is $267,600.

Please provide us with written comments or concerns you may have regarding these projects. These projects will result in an improvement in water quality in the local area. We would appreciate a timely response.

If you have any questions or need further information about these projects, please contact me or Mitch Brunsma at (606) 248-6600.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS, INC.

Corey Napier, P.E.

Enclosure: Map

cc:

Vaughn & Melton
Consulting Engineers, Inc.

P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965
Tel. (606) 248-6600
Fax (606) 248-0372
www.vaughnmelton.com

October 22, 2014

Natural Resources Conservation Service (NRCS)
100 Fortress Properties STE 1
London, KY 40741

RE: City of Pineville Utility Commission, Facilities Plan
Pineville, Bell Co., KY
V&M Project No. 11055-00

Brian:

Prior to and during the early 1900's, the design and construction of combined sewer systems (CSS) was an accepted practice in much of the United States. In a CSS, dry weather flows are transported and treated at publicly owned treatment works (POTW), while wet weather flows that exceed the capacity of the POTW are designed to be discharged into nearby surface waters. These overflows are commonly referred to as combined sewer overflows (CSO). Because of the often high levels of suspended solids, oil and grease, pathogens, and other pollutants present in CSO's, and the human health and aquatic dangers that they pose, in 1989 the Environmental Protection Agency (EPA) published the National Combined Sewer Overflow Strategy to expedite compliance with the requirements of the Clean Water Act and to reduce and eliminate the number of permitted CSO's.

The City of Pineville (City) in Bell County, Kentucky currently owns and operates a CSS in downtown Pineville that contains two (2) permitted CSO's which discharge to the Cumberland River. In 2007, the City entered into a Consent Judgment (the Judgment) with the Commonwealth of Kentucky Environmental and Public Protection Cabinet (the State) to reduce and eliminate these CSO's. The Judgment laid out specific remedial measures and a Capital Improvement Project List (CIPL) that is to be accomplished by the City, along with required reporting and subsequent penal fees for any violations. To date, the City has completed construction of two (2) out of the three (3) required CIPL projects and is beginning preparations for the completion of the final project, the Virginia Avenue Utility Replacement Project. The purpose of this letter is to notify the Natural Resources Conservation Service (NRCS) of the upcoming project to verify that it in deed does not affect any area of their jurisdiction.

<u>Immediate Project</u>

<u>Virginia Ave Combined Sewer Separation (Phase I)</u> - The Virginia Ave Project will include constructing a separation of the combined storm/sanitary sewer along Virginia Ave in downtown Pineville. This project would replace the existing Ball Field and Mountain View Lift Stations, their associated force mains, and connections to the existing collection system. Also this project would separate the existing combined sewer along Virginia Avenue from Mountain View Avenue to the intersection of Holly Street, as well as along Holly Street and Prospect Avenue near the City Pool. An estimated project cost is $2,233,485. (See **Exhibit "M"** for illustration)

Please provide us with written comments or concerns you may have regarding this project. This project will result in an improvement in water quality in the local area. We would appreciate a timely response.

If you have any questions or need further information about these projects, please contact me at (606) 248-6600.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS, INC.

Corey Napier, P.E.

Enclosure: Map

cc:

United States Department of Agriculture

NRCS Natural Resources Conservation Service

1925 Old Main Street
Suite 2
Maysville, KY. 41056
Ph: 606-759-5570

To: Corey Napier, P.E.
Vaughn & Melton
Consulting Engineers, Inc.
P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965

Oct. 29, 2014

Re: City of Pineville Utility Commission, Facilities Plan
Pineville, Bell Co., KY
V&M Project No. 11055-00

Mr. Napier,

NRCS only provides information on the soils and/or impact to farmland according to the criteria set forth in 1985 National Food Security Act Manual.

According to the information in your request all work is to be performed within the City of Pineville, on existing easements, facilities, or previously disturbed areas which are already considered as converted lands and not affecting additional farmlands. "This determination does not apply to any lands beyond the City of Pineville or the boundaries of the existing public and private right-of-ways or areas not already previously disturbed, and therefore designated as *Converted*." This office does not have any additional concerns at this time.

If needed, additional information on the soils of Bell County is available on-line through USDA's Web Soil Survey.

If this office may be of additional assistance, please do not hesitate to contact my office in Maysville Ky. or contact the NRCS SNRM at 606-864-2180.

Steve Jacobs
Resource Soil Scientist, NRCS, Maysville, KY.

cc: Brian Jones, NRCS Supervisory Natural Resource Manager, London, KY

Received 10-22-14

Vaughn & Melton
Consulting Engineers, Inc.

P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965
Tel. (606) 248-6600
Fax (606) 248-0372
www.vaughnmelton.com

October 22, 2014

Natural Resources Conservation Service (NRCS)
100 Fortress Properties STE 1
London, KY 40741

RE: City of Pineville Utility Commission, Facilities Plan
Pineville, Bell Co., KY
V&M Project No. 11055-00

Brian:

Prior to and during the early 1900's, the design and construction of combined sewer systems (CSS) was an accepted practice in much of the United States. In a CSS, dry weather flows are transported and treated at publicly owned treatment works (POTW), while wet weather flows that exceed the capacity of the POTW are designed to be discharged into nearby surface waters. These overflows are commonly referred to as combined sewer overflows (CSO). Because of the often high levels of suspended solids, oil and grease, pathogens, and other pollutants present in CSO's, and the human health and aquatic dangers that they pose, in 1989 the Environmental Protection Agency (EPA) published the National Combined Sewer Overflow Strategy to expedite compliance with the requirements of the Clean Water Act and to reduce and eliminate the number of permitted CSO's.

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Immediate Project

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Please provide us with written comments or concerns you may have regarding this project. This project will result in an improvement in water quality in the local area. We would appreciate a timely response.

If you have any questions or need further information about these projects, please contact me at (606) 248-6600.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS, INC.

Corey Napier, P.E.

Enclosure: Map

cc:

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES

Steven L. Beshear
Governor

#1 Sportsman's Lane
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov

Bob Stewart
Secretary

Gregory K. Johnson
Commissioner

6 November 2014

Vaughn & Melton Consulting Engineers, Inc.
Attn: Corey Napier, P.E.
P.O. Box 1425
109 South 24th Street
Middlesboro, KY 40965

RE: City of Pineville Utility Commission, Facilities Plan
Pineville, Bell Co., KY
V & M Project No. 11055-00

Dear Mr. Napier:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for information regarding the subject project. The Kentucky Fish and Wildlife Information System indicates that federally and state-listed species are known to occur within close proximity to the project site. Due to the nature of the project, the KDFWR does not anticipate negative impacts to these species, or their associated critical habitat, as a result of this project. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

KDFWR recommends that you contact the appropriate US Army Corps of Engineers office and the Kentucky Division of Water prior to any work within the waterways or wetland habitats of Kentucky. Additionally, KDFWR recommends the following for the portions of the project that impact streams:

- Channel changes located within the project area should incorporate natural stream channel design.
- If culverts are used, the culvert should be designed to allow the passage of aquatic organisms.
- Culverts should be designed so that degradation upstream and downstream of the culvert does not occur.
- Development/excavation during low flow period to minimize disturbances.
- Proper placement of erosion control structures below highly disturbed areas to minimize entry of silt into area streams.

- Replanting of disturbed areas after construction, including stream banks, with native vegetation for soil stabilization and enhancement of fish and wildlife populations. We recommend a 100 foot forested buffer along each stream bank.
- Return all disturbed instream habitat to a stable condition upon completion of construction in the area.
- Preservation of any tree canopy overhanging any streams within the project area.

To minimize impacts to the aquatic environment the KDFWR recommends that erosion control measures be developed and implemented prior to construction to reduce siltation into waterways located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed.

I hope this information is helpful to you, and if you have questions or require additional information, please call me at (502) 564-7109 extension 4453.

Sincerely,

Daniel Stoelb

Dan Stoelb
Wildlife Biologist

Cc: Environmental Section File

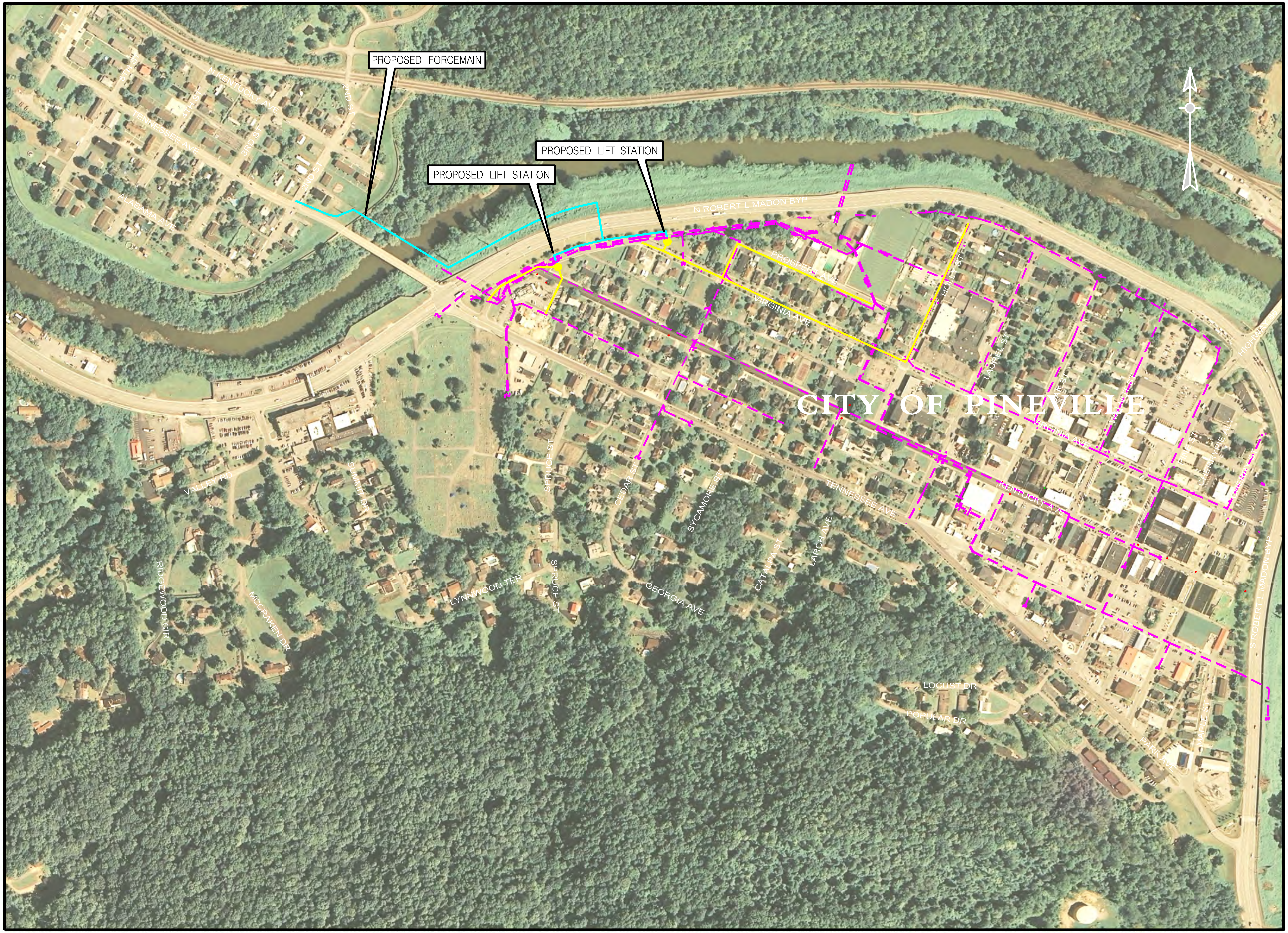

EXHIBIT M

PHASE ONE
VIRGINIA AVE SEWER SEPERATION
CITY OF PINEVILLE

BELL COUNTY, KENTUCKY

SCALE: NTS

LEGEND

- PROPOSED LIFT STATION
- PROSED GRAVITY SEWER
- PROPOSED FORCEMAIN
- EXISTING GRAVITY SEWER

Project Number: 11055-00
Date: JULY 2012

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Consulting Engineers, Inc.
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Middlesboro, Kentucky 40965
(606) 248-6600
www.vaughnmelton.com

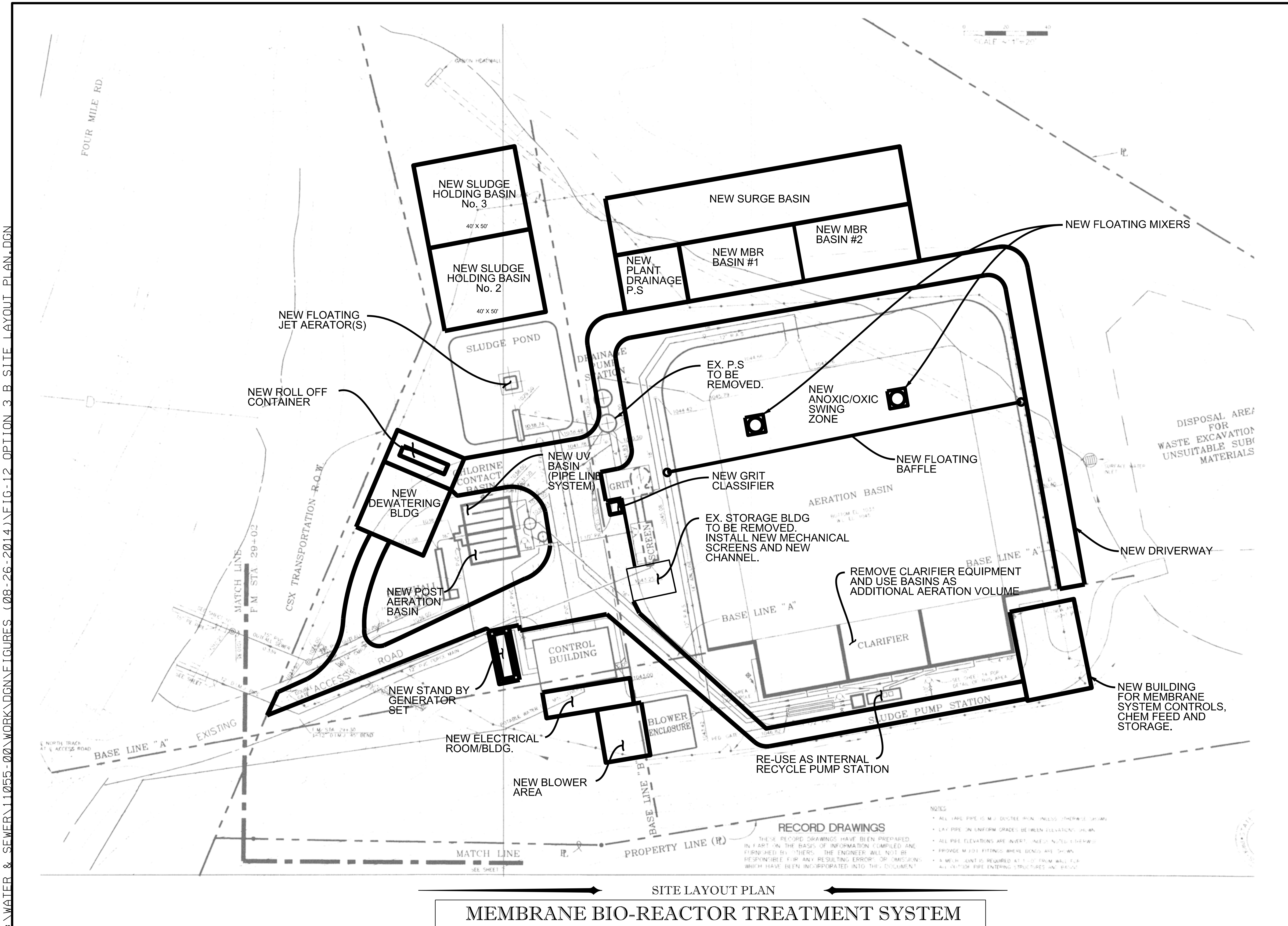

FIGURE 12 - OPTION 3B- SITE LAYOUT PLAN
REGIONAL FACILITIES PLAN
PINEVILLE, KENTUCKY

Project Number: 11055-00
Date: MAY 2014

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Consulting Engineers, Inc.
109 S. 24th Street
Middlesboro, Kentucky 40965
(606) 248-6600
www.vaughnmelton.com

M:\WATER & SEWER\11055-00\WORK\DGN\FIGURES (08-26-2014)\FIG-12 OPTION 3 B SITE LAYOUT PLAN.DGN

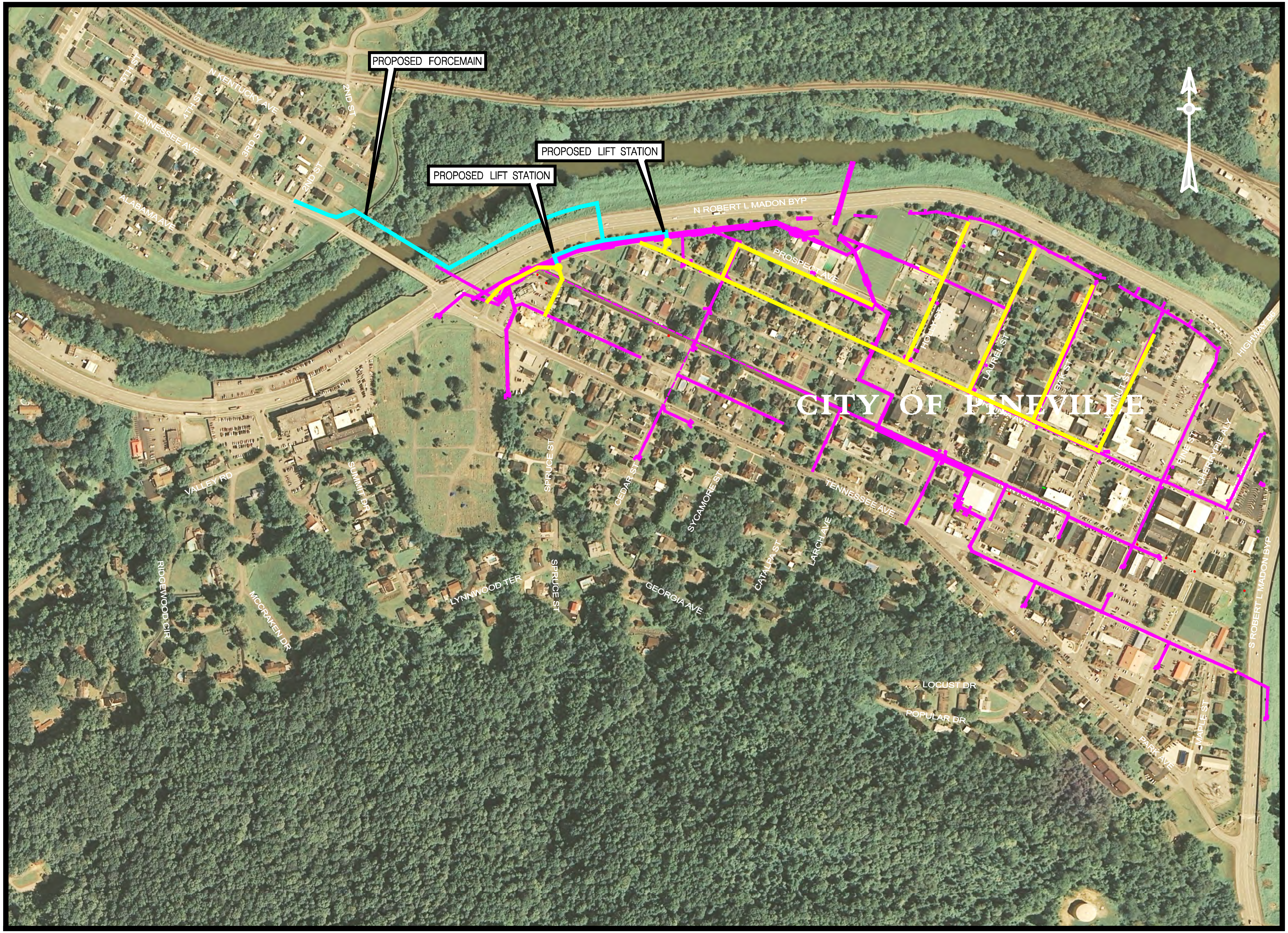

EXHIBIT G

VIRGINIA AVE SEWER SEPERATION
CITY OF PINEVILLE

BELL COUNTY, KENTUCKY

N

SCALE: NTS

LEGEND

- PROPOSED LIFT STATION
- PROSED GRAVITY SEWER
- PROPOSED FORCEMAIN
- EXISTING SEWER

Project Number: 11055-00
Date: JULY 2012

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Consulting Engineers, Inc.
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Middlesboro, Kentucky 40965
(606) 248-6600
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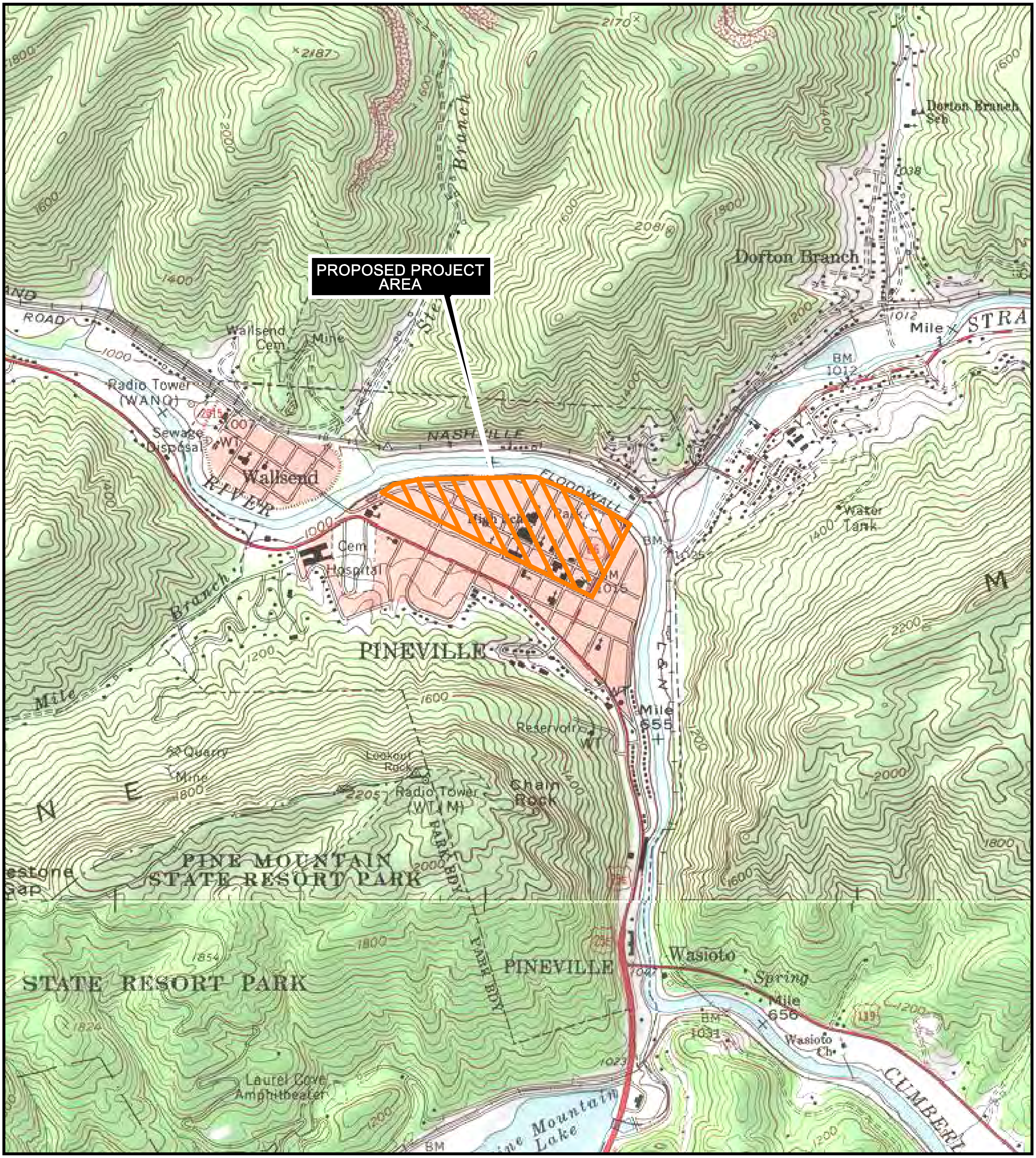

Vaughn & Melton Consulting Engineers, Inc. 109 S. 24th Street Middlesboro, Kentucky 40965 (606) 248-6600 www.vaughnmelton.com	SCALE: N.T.S.	N	
	PROPOSED PROJECT AREA		
	Project Number: 11055-00 Date: March, 2011		

VICINITY MAP - VIRGINIA AVE. UTILITY REPLACEMENT PROJECT

PINEVILLE, BELL COUNTY, KY.

EXHIBIT A

...\Work\DGN\VICINITY MAP.dgn 3/7/2011 1:43:55 PM

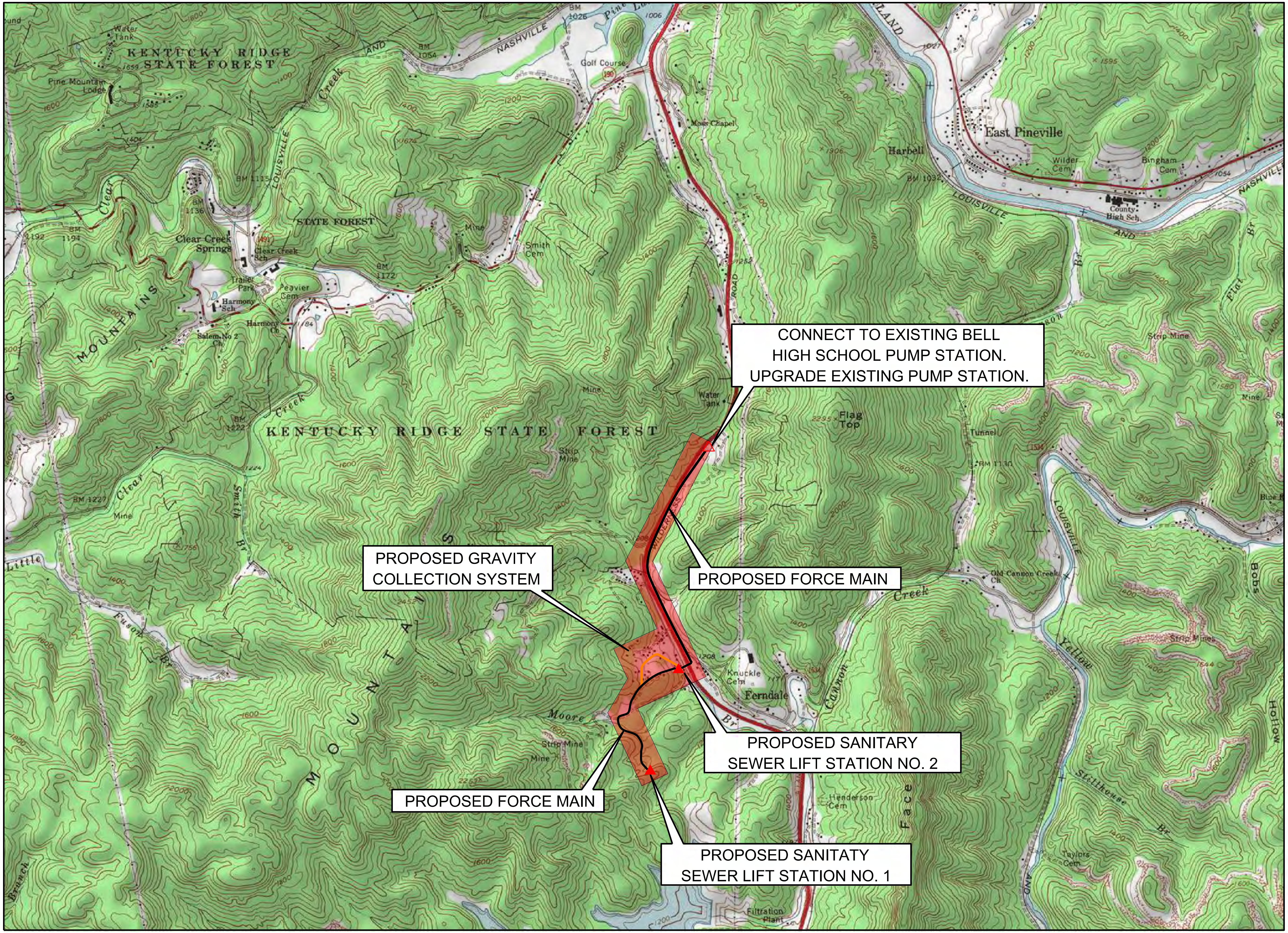

FIGURE 22 - FERNDALE SEWER LINE EXTENSION
PROPOSED OPTION
REGIONAL FACILITIES PLAN
PINEVILLE, KENTUCKY

N

SCALE: 1" = 2000'

LEGEND

- PROJECT AREA
- PROPOSED GRAVITY LINE
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- EXISTING PUMP STATION

Project Number: 11055-00
Date: AUGUST 2014

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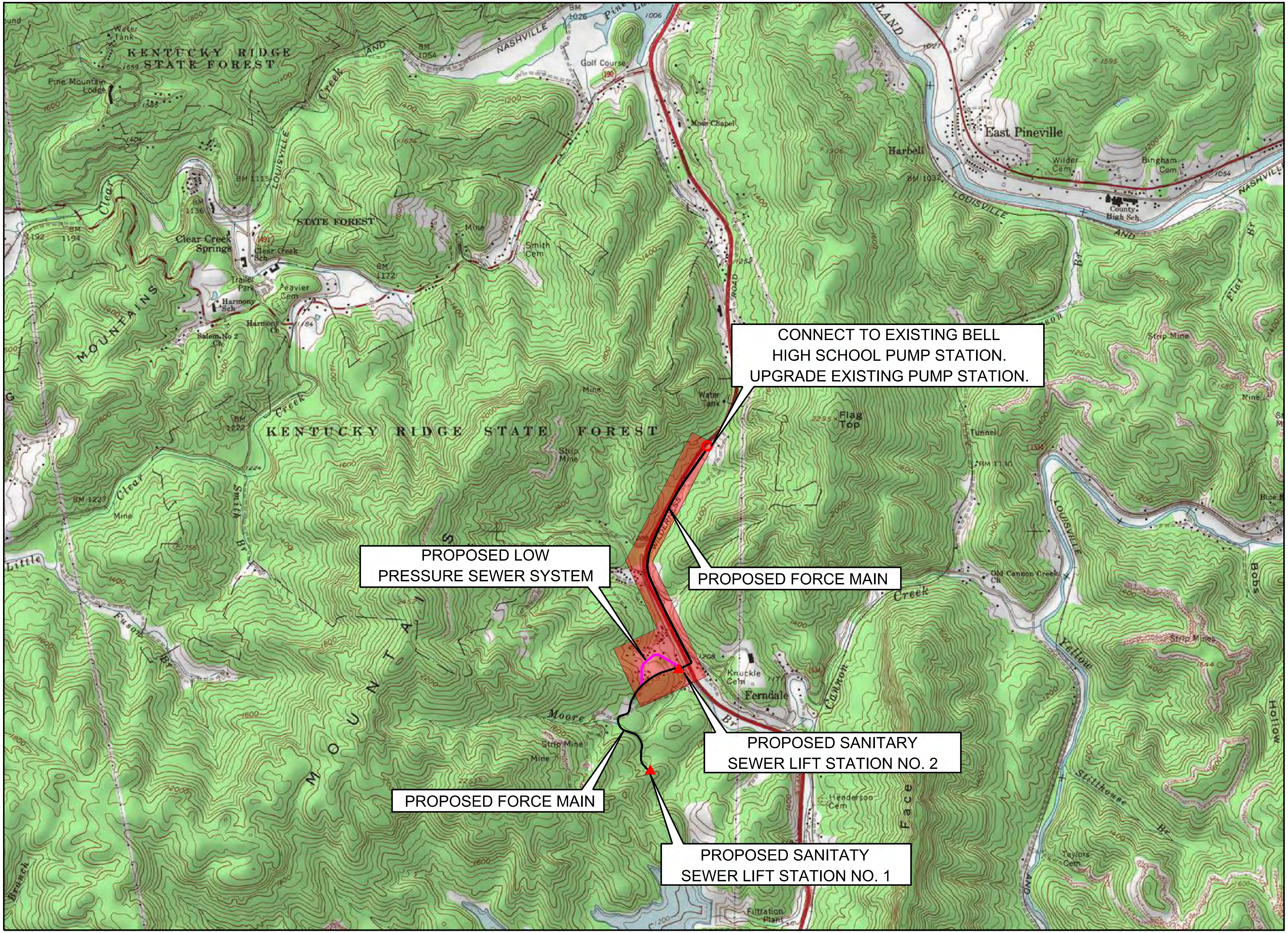

FIGURE 23 - FERNDALE SEWER LINE EXTENSION ALTERNATIVE OPTION REGIONAL FACILITIES PLAN PINEVILLE, KENTUCKY

N

SCALE: 1" = 2000'

LEGEND

- PROJECT AREA
- PROPOSED LOW PRESSURE LINE
- PROPOSED FORCE MAIN
- PROPOSED LIFT STATION
- EXISTING LIFT STATION

Project Number: 11055-00
Date: AUGUST 2014

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Vaughn & Melton
Consulting Engineers, Inc.
109 S. 24th Street
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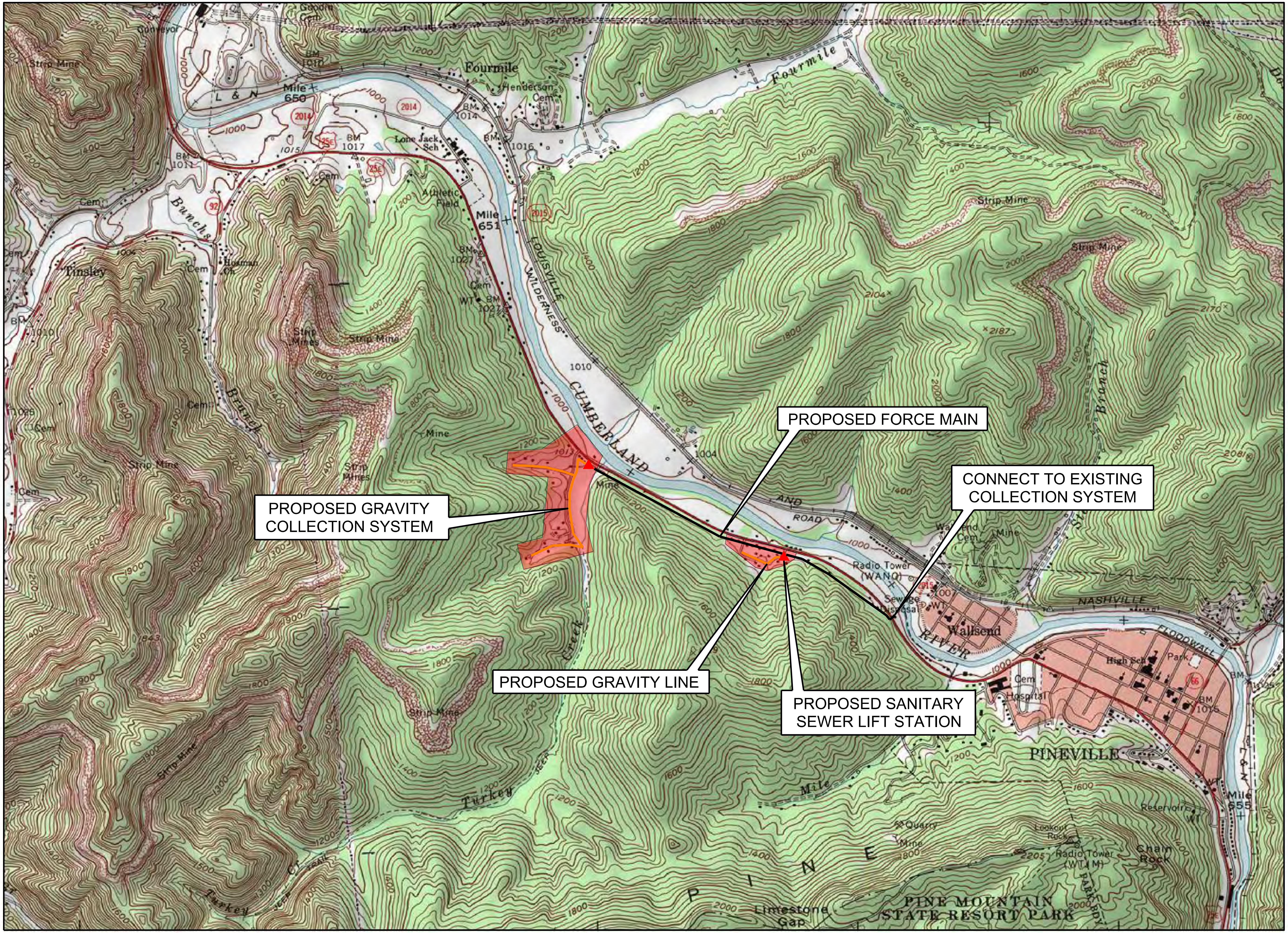

FIGURE 20 - TURKEY CREEK SEWER LINE EXTENSION
PROPOSED OPTION
REGIONAL FACILITIES PLAN
PINEVILLE, KENTUCKY

N

SCALE: 1" = 2000'

LEGEND

- PROJECT AREA
- PROPOSED GRAVITY LINE
- PROPOSED FORCE MAIN
- PROPOSED LIFT STATION

Project Number: 11055-00
Date: AUGUST 2014

Vaughn & Melton
Consulting Engineers, Inc.
109 S. 24th Street
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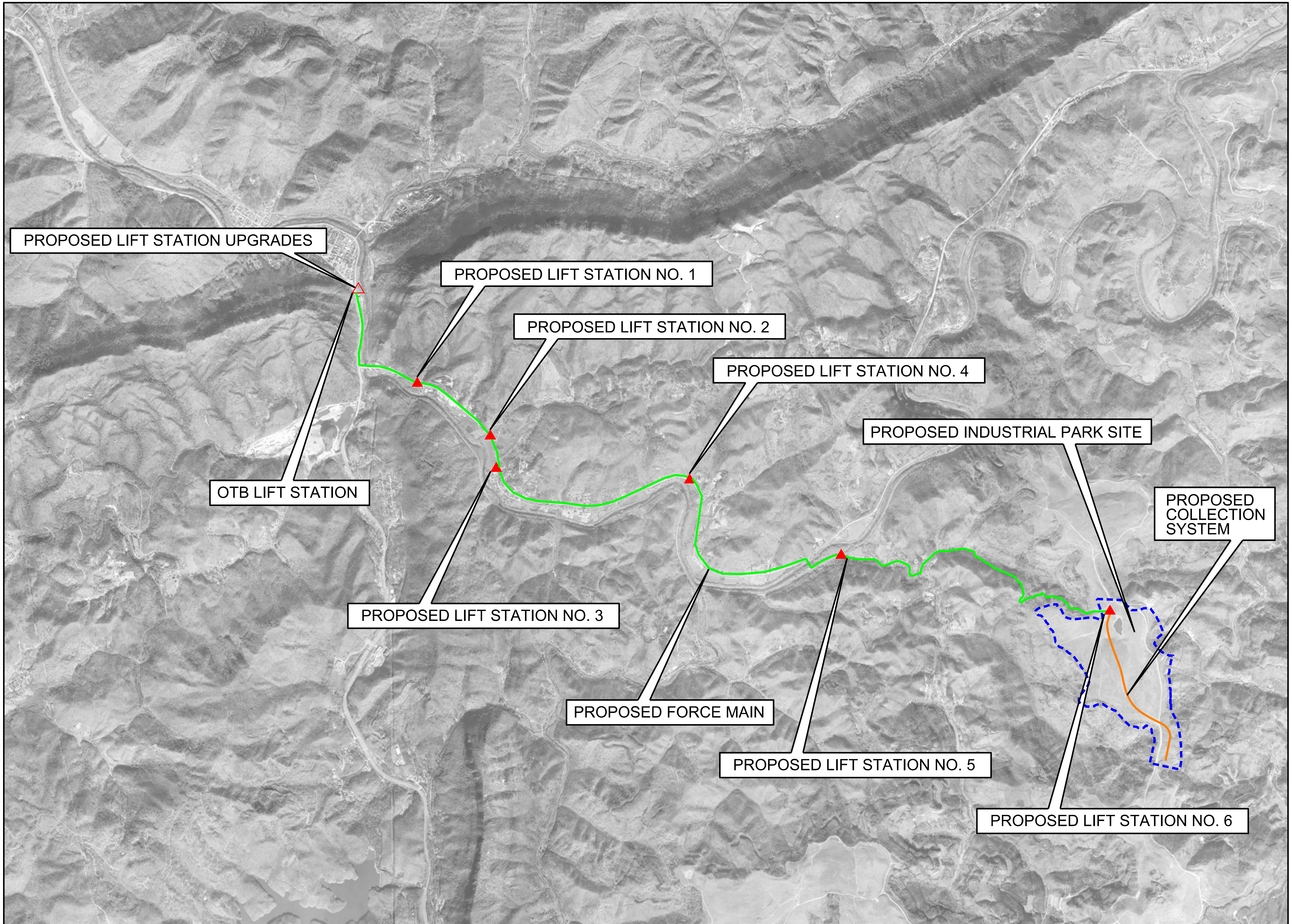

FIGURE 24 - PINE MTN REGIONAL INDUSTRIAL PARK
PROPOSED OPTION
REGIONAL FACILITIES PLAN
PINEVILLE, KENTUCKY

N

SCALE: 1" = 4000'

LEGEND

PROPOSED FORCE MAIN
PROPOSED GRAVITY LINE
EXISTING LIFT STATION
PROPOSED LIFT STATION

Project Number: 11055-00
Date: AUGUST 2014

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Vaughn & Melton
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109 S. 24th Street
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(606) 248-6600
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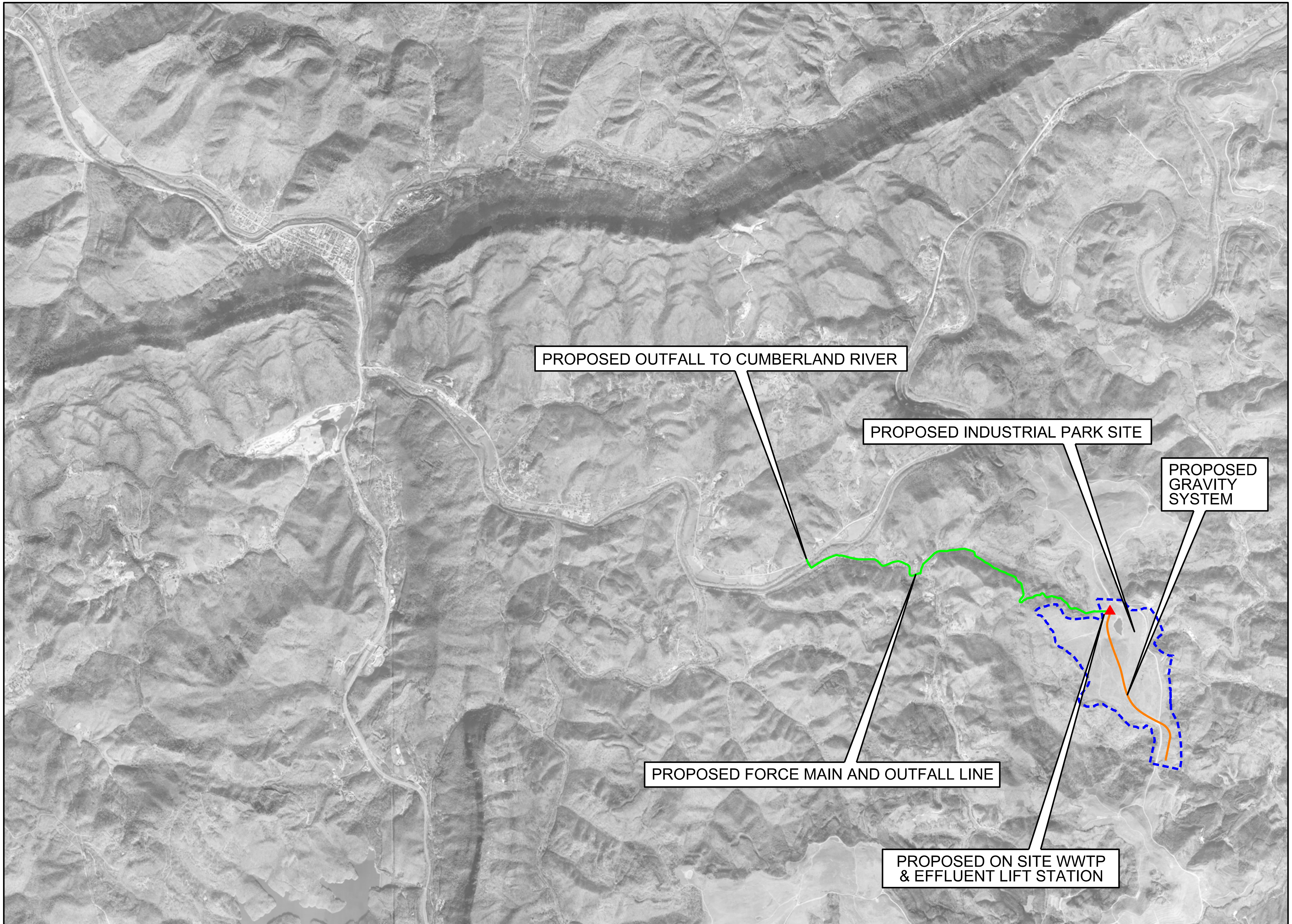

FIGURE 25 - PINE MTN REGIONAL INDUSTRIAL PARK
ALTERNATIVE OPTION
REGIONAL FACILITIES PLAN
PINEVILLE, KENTUCKY

N

SCALE: 1" = 4000'

LEGEND

PROPOSED FORCE MAIN

PROPOSED GRAVITY LINE

PROPOSED LIFT STATION

Project Number: 11055-00
Date: AUGUST 2014

Vaughn & Melton
Consulting Engineers, Inc.
109 S. 24th Street
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(606) 248-6600
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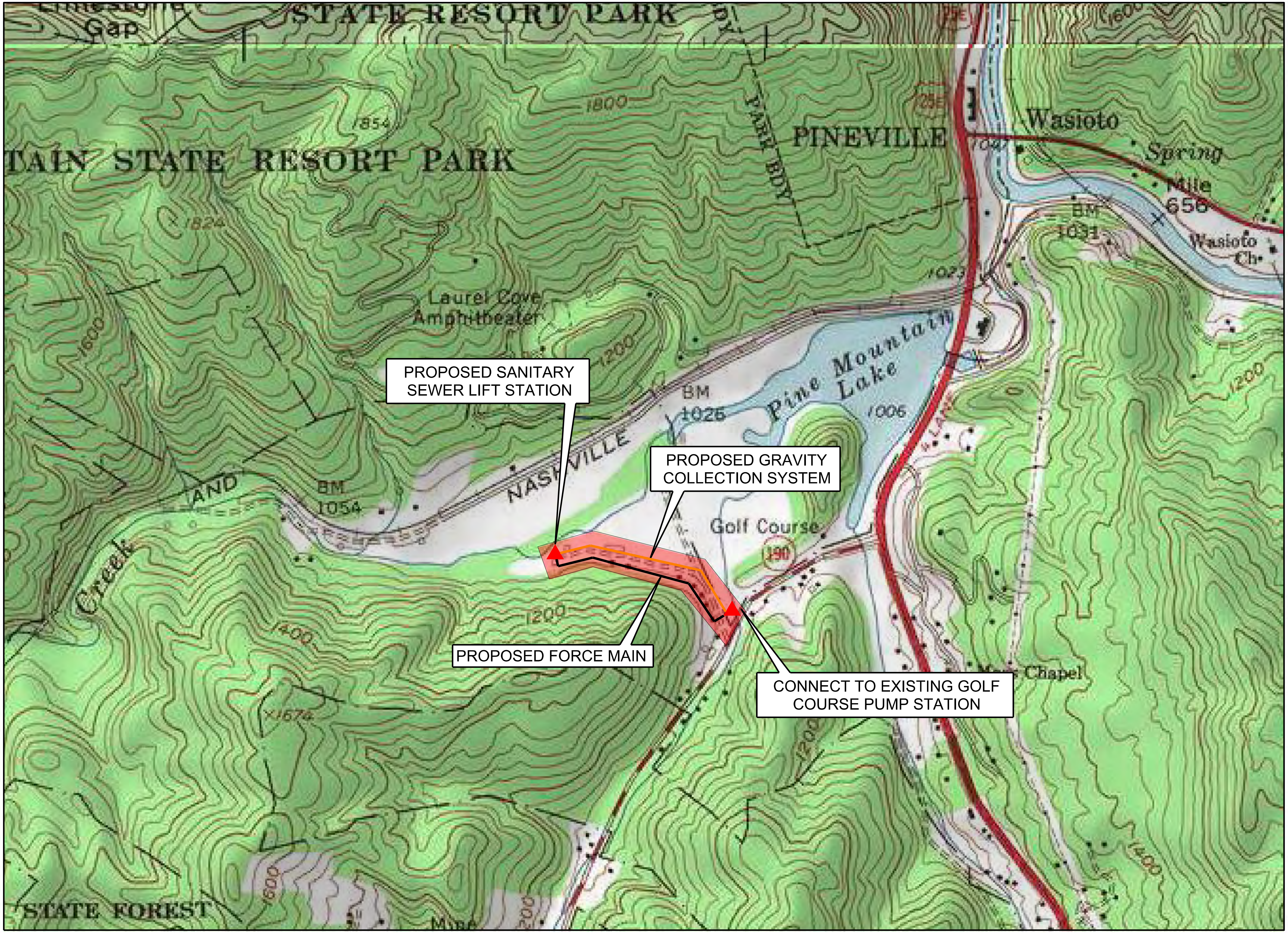

FIGURE 26 - WALNUT LANE SEWER LINE EXTENSION
PROPOSED OPTION
REGIONAL FACILITIES PLAN
PINEVILLE, KENTUCKY

N

SCALE: 1" = 1000'

LEGEND

- PROJECT AREA
- PROPOSED GRAVITY LINE
- PROPOSED FORCE MAIN
- PROPOSED LIFT STATION

Project Number: 11055-00
Date: AUGUST 2014

V&M
Vaughn & Melton
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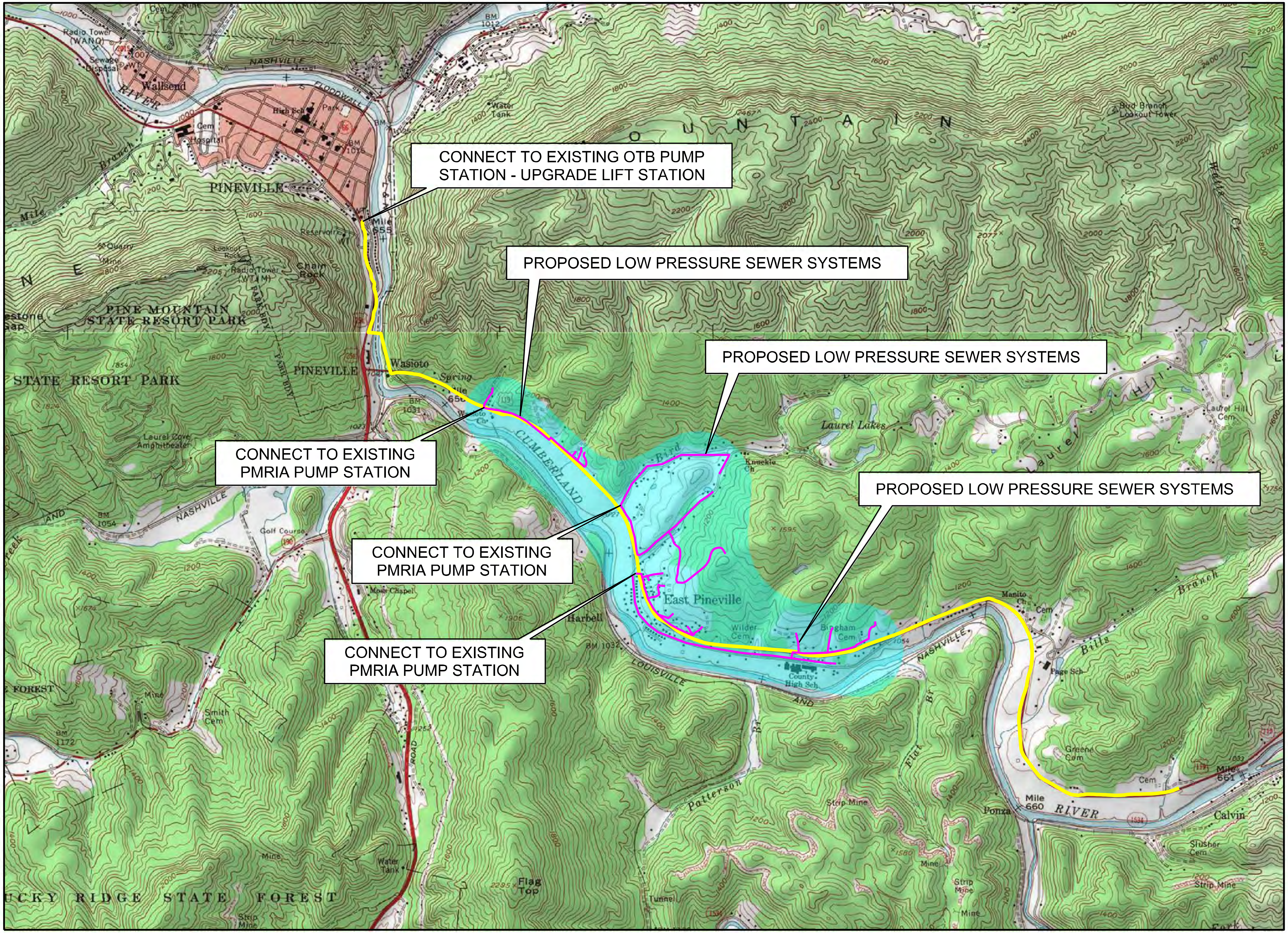

FIGURE 31 - HWY 119 CORRIDOR SEWER LINE EXTENSION
ALTERNATIVE OPTION
REGIONAL FACILITIES PLAN
PINEVILLE, KENTUCKY

N

SCALE: 1" = 2000'

LEGEND

POSSIBLE AREA OF FUTURE SERVICE

PROPOSED PARK SEWER LINE

LOW PRESSURE SEWER

Project Number: 11055-00
Date: AUGUST 2014

V&M
Vaughn & Melton
Consulting Engineers, Inc.
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Middlesboro, Kentucky 40965
(606) 248-6600
www.vaughnmelton.com

APPENDIX M

PUBLIC HEARING INFORMATION

APPENDIX N

REGIONAL WETLANDS INFORMATION

U.S. Fish and Wildlife Service

National Wetlands Inventory

Mar 23, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

Mar 23, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

Mar 23, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
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User Remarks:

U.S. Fish and Wildlife Service
National Wetlands Inventory

Mar 23, 2015

Wetlands

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U.S. Fish and Wildlife Service

National Wetlands Inventory

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- Freshwater Emergent
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- Riverine
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User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

Mar 23, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

User Remarks: