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Central City Wastewater Facilities Plan

Report

Central City, KY

May 2015

STRAND ASSOCIATES®

Report for

Central City, Kentucky

Central City Wastewater Facilities Plan

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Wastewater Treatment Elements & General Plan Contents

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May 2015

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SECTION 1
FACILITY PLAN SUMMARY

1.01 INTRODUCTION AND BACKGROUND

The Central City Regional Wastewater Facilities Plan (RFP) is a comprehensive plan for the management of wastewater collection and treatment facilities. Planning is intended to define the most appropriate "local" solution to providing wastewater service (collection and treatment) for a defined planning area over a defined period of time. The goal of the plan is to ultimately protect our environment and human health by providing reliable wastewater collection and treatment for areas of greatest need. The plan is ultimately reviewed and approved by the Kentucky Division of Water (KDOW). KDOW requires a checklist to be submitted with the completed RFP, which is enclosed in Section 12 for reference. Review and approval considers environmental and state clearinghouse reviews in addition to a technical review.

Central City is located in Muhlenberg County, Kentucky. Central City hired McGhee Engineering, Inc. (McGhee) and Strand Associates, Inc.® (Strand) to prepare an RFP to evaluate its current wastewater collection, conveyance, and treatment needs for a 20-year planning period.

1.02 PURPOSE OF THE PLAN

The purpose of this plan is to identify the improvements required to meet the projected needs in the planning area for the next 20 years. This study evaluates the existing wastewater, collection, conveyance, and treatment facilities, evaluates alternatives, and develops design and construction schedules and budgets for the recommended plan.

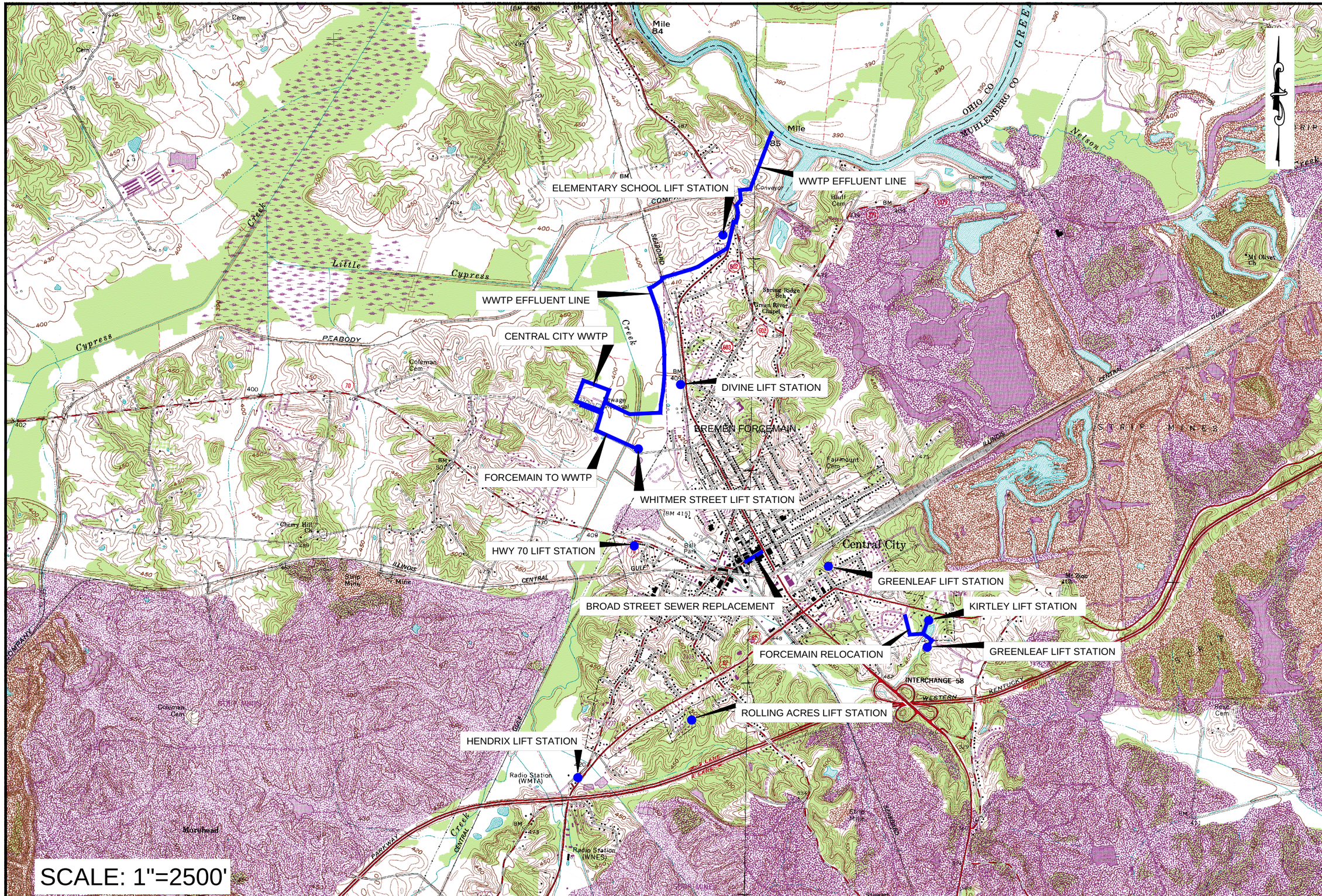
1.03 RECOMMENDED ALTERNATIVE

The recommended alternative for treatment facility improvements includes expansion of the Central City wastewater treatment plant (WWTP) to an average daily treatment capacity of 1.8 million gallons per day (mgd) and a peak hourly flow of 8.0 mgd. A new preliminary treatment facility is proposed with a capacity of 12.0 mgd in order to handle higher peak flows in the future. A fourth ring will be added to the existing oxidation ditch, a new 82-foot-diameter clarifier will be constructed, and a new ultraviolet (UV) channel will be installed to increase the capacity of the treatment plant (Alternative A). New influent and effluent force mains and pump stations will also be installed to convey the increased flow.

In addition, the recommended plan includes sewer replacement on Broad Street, sewer repairs in the Downtown area, and miscellaneous systemwide sewer repair projects. Exhibit 1.03-1 shows the location of these projects. Exhibit 1.03-1 also shows the location of several lift stations where the City may choose to add telemetry to the existing pump stations so their operation can be monitored remotely. The force main relocation shown on Exhibit 1.03-1 has already been completed under a separate project.

1.04 COST OF PROPOSED PLAN

The construction cost opinion for the Central City WWTP expansion is $7,500,000. These costs include the Whitmer Street pumping station replacement, influent force main, and effluent force



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CENTRAL CITY WASTEWATER FACILITIES PLAN
LOCATION OF PROJECTS

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

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EXHIBIT 1.03-1
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main. With the addition of collection system improvements, construction contingencies, technical services, and bonds and insurance added, the total project cost opinion is $14,000,000.

The City has already spent a total of $2,020,000 on projects related to infiltration/inflow (I/I) abatement, improved collection system function and reliability, and addressing issues in its Agreed Order. There is also $1,110,000 budgeted for additional collection system improvements to further address I/I. The total project construction budget (including wastewater treatment plant expansion, selected sewer replacements, and selected sewer repairs) is therefore $10,630,000. Nonconstruction costs add $2,470,000 (approximately 23 percent), and a contingency of $900,000 (approximately 10 percent of the future construction) brings the total project cost estimate to $14,000,000.

Project funding takes place in two phases. Expenses to date and up through the bid and award phase of the wastewater treatment plant expansion are being paid by a short-term loan through the Kentucky Rural Water Flexible Loan program. Permanent financing of the project is expected to come from United States Department of Agriculture Rural Development, the Community Development Block Grant program, and local contributions.

1.05 PLANNING AGENCY COMMITMENTS TO IMPLEMENT THE PLAN

All recommended projects will be reviewed and approved by KDOW before the construction permits can be issued.

1.06 SCHEDULE OF IMPLEMENTATION FOR RECOMMENDED PROJECTS

Exhibit 1.06-1 shows the schedule for implementing the recommended projects.

	2015				2016				2017				2018			
Task	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**
Design		■	■	■												
Approval					■	■										
Bidding and Award						■	■									
Construction								■	■	■	■	■	■			
Commission														■		

Exhibit 1.06-1 Implementation Schedule for Central City WWTP

1.07 ABBREVIATIONS AND DEFINITIONS

CY	cubic yards
BOD	biochemical oxygen demand
BOD_5	five-day biochemical oxygen demand
$CBOD_5$	carbonaceous five-day biochemical oxygen demand
DMR	Discharge Monitoring Report
DNR	Department of Natural Resources
fps	feet per second
ft	feet
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
hp	horsepower
I/I	infiltration and inflow
KDFWR	Kentucky Department of Fish and Wildlife Resources
KDOW	Kentucky Division of Water
KHC	Kentucky Heritage Council
KPDES	Kentucky Pollutant Discharge Elimination System
mgd	million gallons per day
mil gal	million gallons
ML	mixed liquor
NH_3-N	ammonia nitrate
NRCS	Natural Resource Conservation Service
O&M	operation and maintenance
PVC	polyvinyl chloride
RAS	return activated sludge
RFP	Regional Wastewater Facilities Plan
SCADA	supervisory control and data acquisition
SPEAR	*State Planning and Environment Assessment Report*
SSO	sanitary sewer overflow
TDH	total dynamic head
TSS	total suspended solids
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UV	ultraviolet
VFD	variable frequency drive
WAS	waste activated sludge
WLA	waste load allocation
WWTP	wastewater treatment plant

SECTION 2
STATEMENT OF PURPOSE AND NEED

2.01 INTRODUCTION

This Facilities Plan for the Central City Municipal Wastewater System has been prepared in anticipation of major improvements to the collection and treatment system and to replace and update the previous facilities plan that was prepared in 1977. This plan was prepared as a collaborative effort between the City's lead engineering consultant, McGhee Engineering, Inc. of Guthrie, Kentucky, and Strand Associates, Inc.® of Louisville, Kentucky.

2.02 PURPOSE AND SCOPE

The purpose of this Facilities Plan is to develop a cost-effective, environmentally sound, and implementable strategy for meeting the wastewater collection, treatment, and disposal needs of the planning area for the Central City Municipal Wastewater System. The plan is intended to provide guidance for improvement and further development of the system for the 2014 to 2034 planning period.

Specific goals of this plan include the following:

1. Document, review, and evaluate the existing wastewater collection, treatment, and disposal systems in terms of condition, serviceability under present conditions, and suitability for continuing service.

2. Project future demands to be placed on the system.

3. Evaluate current and projected regulatory issues and their impact on the system.

4. Develop potential alternatives for collecting, treating, and disposing of wastewater.

5. Investigate the various alternatives and develop a recommended plan for future improvements.

6. Provide for input from the public, operations personnel, system management, regulatory agencies, and other interested parties into the development of the plan.

2.03 KENTUCKY DIVISION OF WATER CONSIDERATIONS

The Central City Municipal Wastewater System is regulated at the state level primarily by the KDOW. Although input is expected and welcomed from all interested parties, KDOW will be the agency most involved with the review and implementation of this plan. KDOW is considered the lead agency.

Central City is currently under an agreed order requiring correction of deficiencies in its wastewater system. Details of this plan are included in Appendix A. Preparation of this Facilities Plan is a step in the corrective actions required by the Agreed Order.

2.04 DEFINE PLANNING AREA

The most recent facilities plan addressing Central City was prepared in 1977 as a joint plan for the cities of Greenville and Central City. Greenville has since updated its plan in 2004 and did not include Central City in that planning effort. In the intervening years since the development of these plans, both

communities have extended sewer service outside of the boundaries envisioned in these earlier plans. In developing a planning area for Central City for the purposes of this document, it is necessary to:

1. Incorporate the area presently served by Central City.
2. Exclude areas presently served by other systems.
3. Delineate areas that may most feasibly be served by Central City within the planning period and incorporate them into the planning area.

The most significant extension of service outside of the Central City area to occur since development of the last facilities plan was the extension of sewer service to the City of Bremen to serve a new elementary school that was being built in the community. This project was pursued as an alternative to replacing the package WWTP that had served the old facility. The extension was designed to accommodate the future development of sanitary sewer collection systems in Bremen and in South Carrollton. Construction of the pump station in Bremen and force main from Bremen to Central City was completed and placed in service in 2011.

With these goals and conditions in mind, the proposed planning area is delineated on Exhibit 2.04-1. This exhibit also includes previously established planning areas for the neighboring communities of Greenville and Drakesboro.

2.05 REFERENCES

A number of sources were accessed to obtain information necessary for the completion of this facilities plan. These sources are listed as follows.

GIS Mapping of the Central City Sewer System, Pennyrile Area Development District, Hopkinsville, Kentucky, 2014.

Drakesboro, Kentucky 201 Facilities Plan, GRW Elrod Dunson, Inc., Lexington, Kentucky, 2004.

Greenville, Kentucky 201 Facilities Plan, Tetra-Tech, Inc., Lexington, Kentucky, 2004.

Recommended Standards for Water Works, Great Lakes–Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (a.k.a. “the Ten States Standard”), 2003 ed.

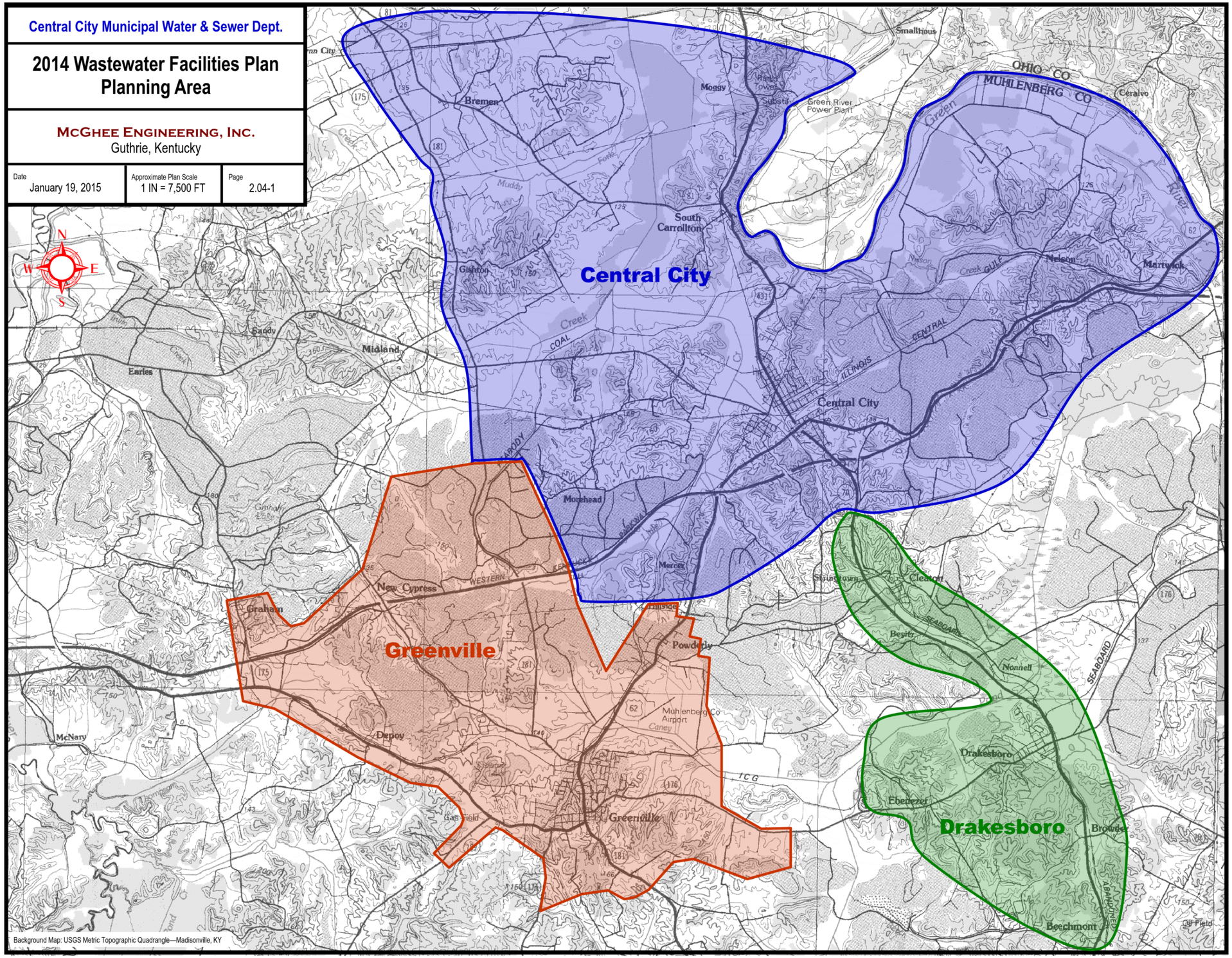
Greenville/Central City, Kentucky–201 Facilities Plan for Wastewater Treatment Works, Howard K. Bell Consulting Engineers, Hopkinsville/Lexington, Kentucky, J. R. Wauford & Co. Consulting Engineers, Inc., Nashville, Tennessee, September 1977.

Central City Municipal Water & Sewer Dept.

2014 Wastewater Facilities Plan Planning Area

McGhee Engineering, Inc.
Guthrie, Kentucky

Date	Approximate Plan Scale	Page
January 19, 2015	1 IN = 7,500 FT	2.04-1



McGhee Engineering

CENTRAL CITY WASTEWATER FACILITIES PLAN
PLANNING AREA

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MUHLENBERG COUNTY, KENTUCKY

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EXHIBIT 2.04-1
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SECTION 3
PHYSICAL CHARACTERISTICS

3.01 INTRODUCTION

The following section discusses the physical characteristics of the facilities plan study for Central City, Kentucky. This information is intended to provide a basic knowledge of the planning area in relation to its existing layout and general topographical features. The topics to be covered include describing the planning area itself, discussing geology and groundwater conditions, and noting general topographical features. Characteristics of the current use of land will be covered along with a delineation of the 100-year floodplain.

3.02 PLANNING AREA

Central City is located in the northcentral region of Muhlenberg County, in the southcentral portion of the state. The city limits include an area of approximately 5.23 square miles. As its name would suggest, it is very centrally located, lying 120 miles from both Louisville, Kentucky and Nashville, Tennessee. Some of its nearest neighbors include Madisonville, Owensboro, Hopkinsville, and Bowling Green, Kentucky.

Central City is somewhat unique in that it is the largest city in Muhlenberg County, but it is not the county seat. Central City has a population of 5,912 (United States Census Bureau, 2012 estimate) while the neighboring city and Muhlenberg County Seat, Greenville, has a population of 4,432 (United States Census Bureau, 2012 estimate).

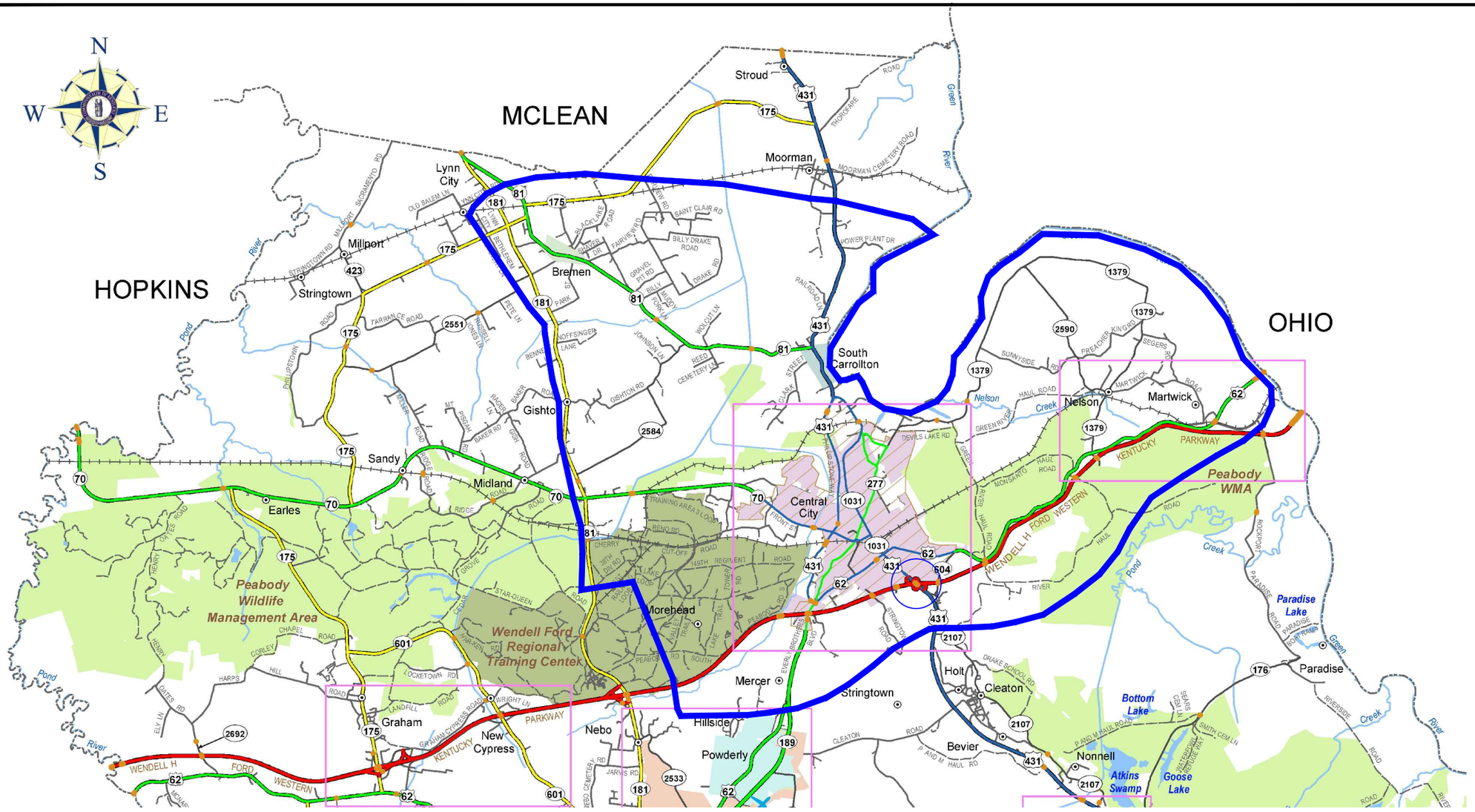
A discussion of the rationale behind the planning area delineation is presented in Section 2. Exhibit 2.04-1 shows the planning area for this facilities plan, along with the planning areas for Greenville and Drakesboro, which border the Central City planning area generally to the south.

The Central City planning area encompasses approximately 77 square miles. It is generally bounded by the Greenville and Drakesboro planning areas on the south and the Hwy 181 corridor on the west, takes in the Bremen area on the northwest, follows the Muhlenberg-Ohio County line on the north and northeast, and takes in the Western Kentucky Parkway/I-69 corridor on the southeast (see Exhibit 3.02-1).

3.03 GEOLOGY AND GROUNDWATER

Lying in the southcentral physiographic portion of the Western Coal Field province, Central City is an area of higher elevation and irregular relief covering both Pennsylvanian Age and Mississippian Age rocks, respectively. The Western Coal Field is bounded on three sides by the lower elevated Mississippian Plateau. Making up the formations of this region are beds of shale and sandstone, along with the coal seams that serve as the namesake. Reference Exhibit 3.03-1 for a geological map of the Central City area.

Several types of sedimentary rocks form the facial features of Kentucky, including limestones, sandstones, conglomerates, shales, and clays. These deposits are stratified and contain many fossilized plants and animals. Marine waters advanced and withdrew from the region time after time,



Functional Classification

- Rural Interstate
- Rural Principal Arterial
- Rural Minor Arterial
- Rural Major Collector
- Rural Minor Collector
- Urban Interstate
- Urban Freeways & Expressways
- Urban Principal Arterial
- Urban Minor Arterial Street
- Urban Collector Street
- Rural & Urban Local
- CS-0000 Functionally Classified Road No.
- Bridge
- Railroad
- Stream
- City/Town
- Airport
- Federal Aid Urbanized Area 2000
- Incorporated Area
- Lake
- State Park
- National Park or Recreation Area
- Defense Facility
- Wildlife Area
- Geological Area
- State, National, or Private Forest

Division of Planning

Kentucky UNBRIDLED SPIRIT

Functional Classification

MUHLENBERG COUNTY

2 1 0 2 4 Miles

Last map revision: FEBRUARY 2013

Road centerlines collected using GPS technology

Kentucky State Plane Coordinate System (NAD83)

transportation.ky.gov/planning

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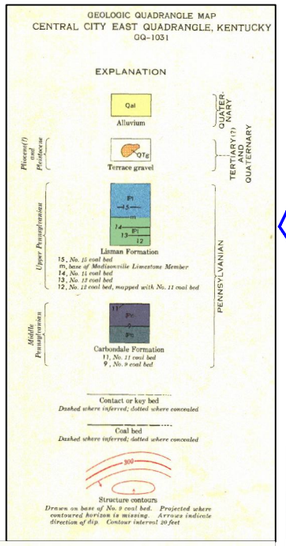

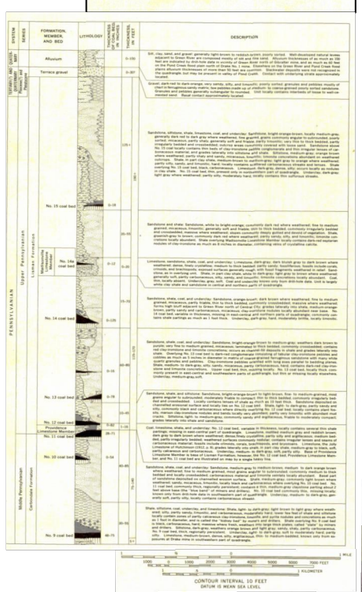

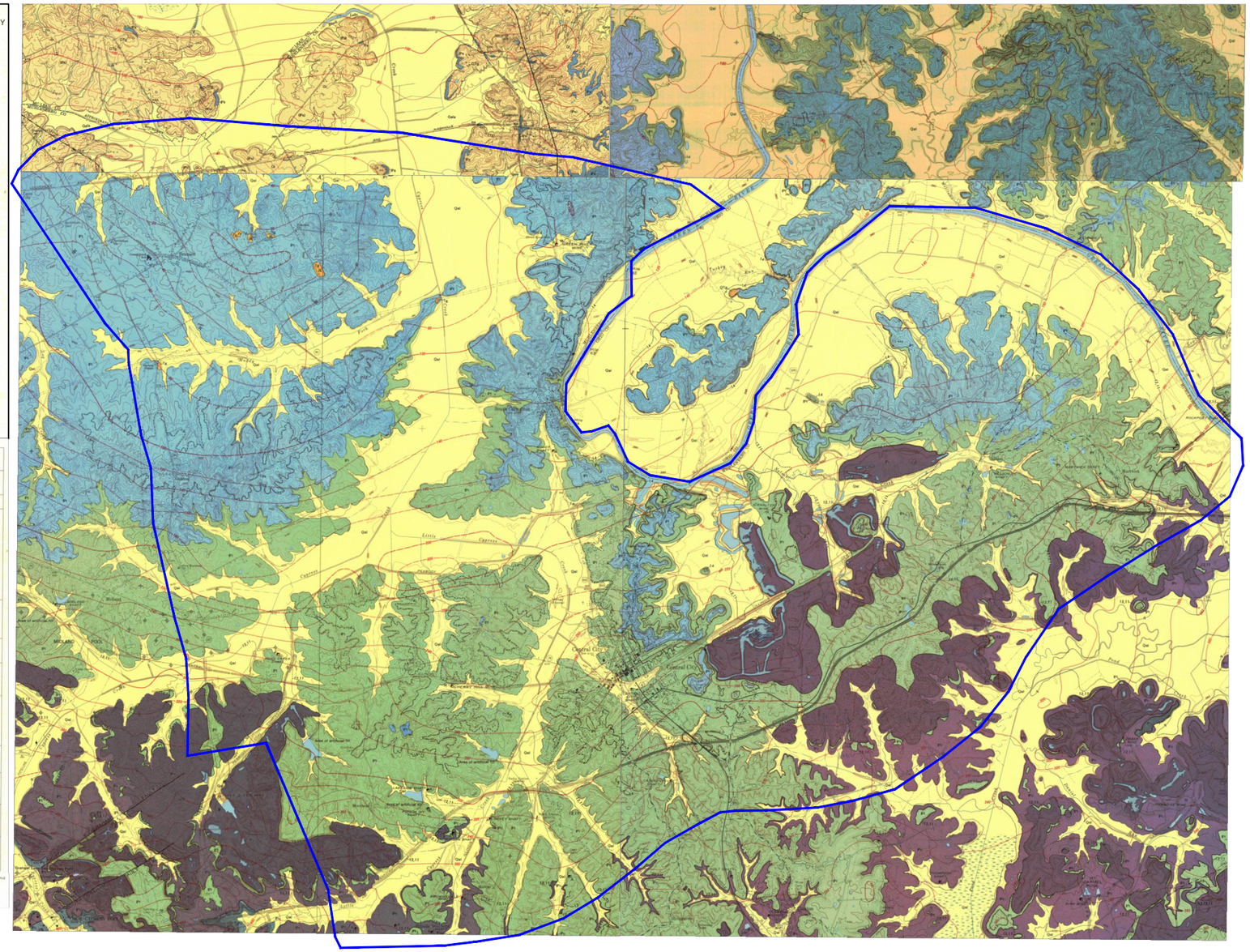

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CENTRAL CITY WASTEWATER FACILITIES PLAN
PLANNING AREA GEOLOGY

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leaving numerous opportunities for various life forms to find their permanent home within the sediment. Over time, the continuous increase in sediment deposit compressed existing vegetative layers into coal. Nonvegetative layers were compressed into sandstone and shale.

Central City's water supply is sustained mostly in part by surface streams fed by groundwater discharge from nearby aquifers. This existing situation allows for numerous chances of contamination to local water from various activities and conditions on the surface of the ground. Popular activities within the region contributing to groundwater pollution can range anywhere from sediment runoff created by mining and logging to the use of pesticides for agricultural production. The KDOW has classified Central City's region as an area of "low-moderate to high-moderate" sensitivity to groundwater pollution.

The groundwater being supplied by shallow bedrock aquifers in and around Central City is considered soft to moderately hard. However, any water contributed from the alluvium is much more iron-filled. Iron and common salt are commonly found during water testing procedures. As long as care is taken in the depth of water wells drilled for supply, the chance of increased water salinity is avoided. For Muhlenberg County, this means limiting the depth of water wells to 400 feet below sea level or higher. To reduce the risk of human and environmental health risks, Central City's public water supply is obtained from the Green River and treated to applicable standards to before distribution.

3.04 TOPOGRAPHY

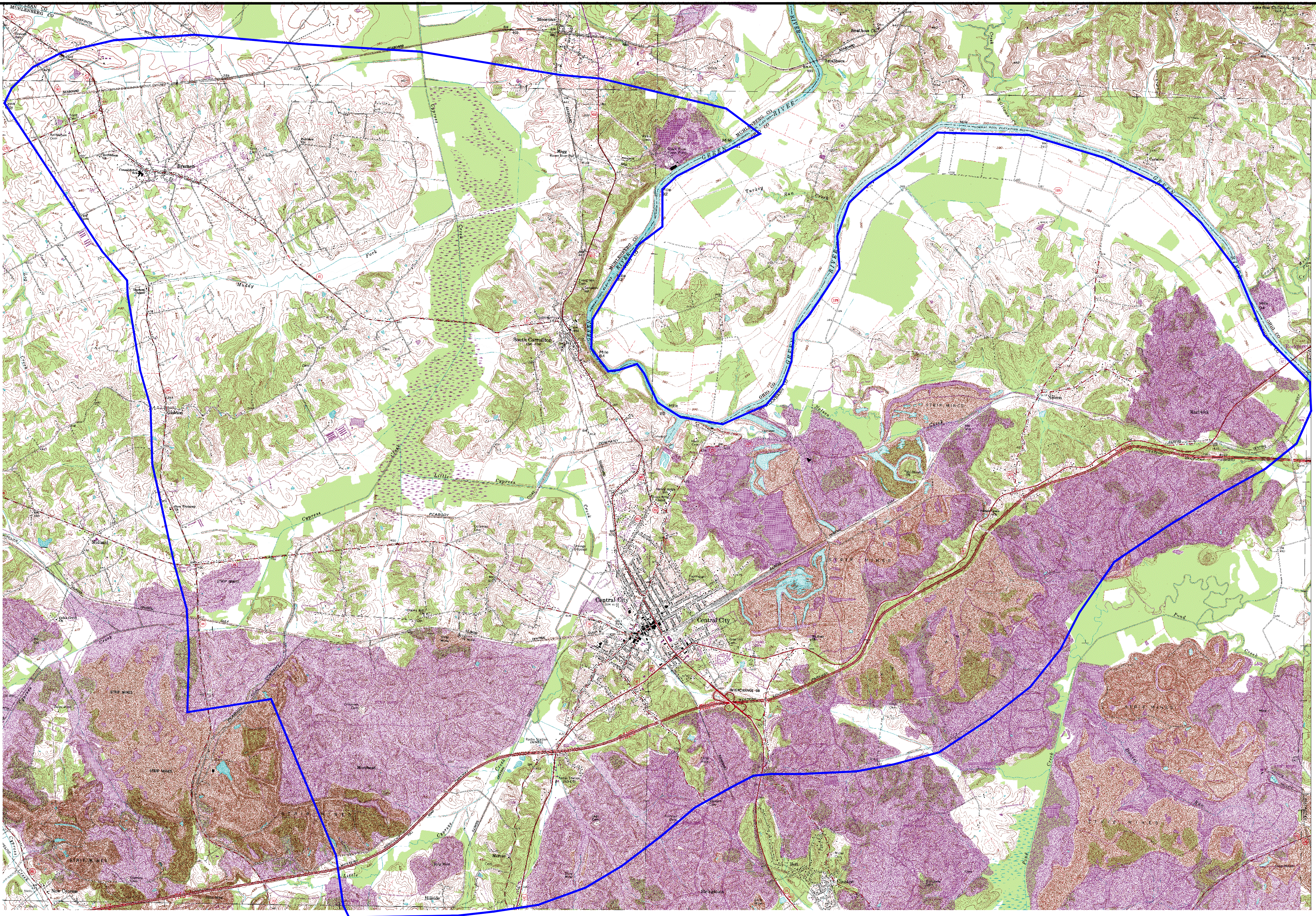
Along the southern edge of Muhlenberg County in which Central City lies, the topography is rugged and capable of producing elevation reliefs of up to 200 feet. However, Central City, lying in the more northern portion of the county contains hills that are not as steep and much more suitable for agricultural pursuits. The highest elevation in the county is approximately 760 feet above sea level, with elevations near 700 feet in the south and 500 feet in the north. The older rocks found near the surface of the planning area have been named the Vienna Limestone. Along higher elevations, these rocks are primarily of the Middle to Upper Pennsylvanian Age. However, along the most notable waterways such as the Green River and Little Cypress Creek, the surface rocks consist of the more recent Quaternary Alluvium. Please see Exhibit 3.04-1 for a topographical map view of the planning area.

3.05 100-YEAR FLOODPLAIN

Exhibit 3.05-1 presents a 100-year floodplain delineation in relation to the planning area and the city limits of Central City. As would be anticipated, the flood-prone areas are mostly along and adjacent to major drainage courses. These areas are very lightly developed and are expected to stay undeveloped for the foreseeable future.

3.06 LAND USE AND CHARACTERISTICS

Central City and the surrounding area are noted for the impact that coal mining has had and continues to have on the land. In some areas, the surface topography as well as subsurface conditions have been highly modified by mining activities. These changes have had a large impact on land use in the planning area and will continue to influence land use into the future.



SCALE: 1"=5000'

McGHEE ENGINEERING

CENTRAL CITY WASTEWATER FACILITIES PLAN
TOPOGRAPHY

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

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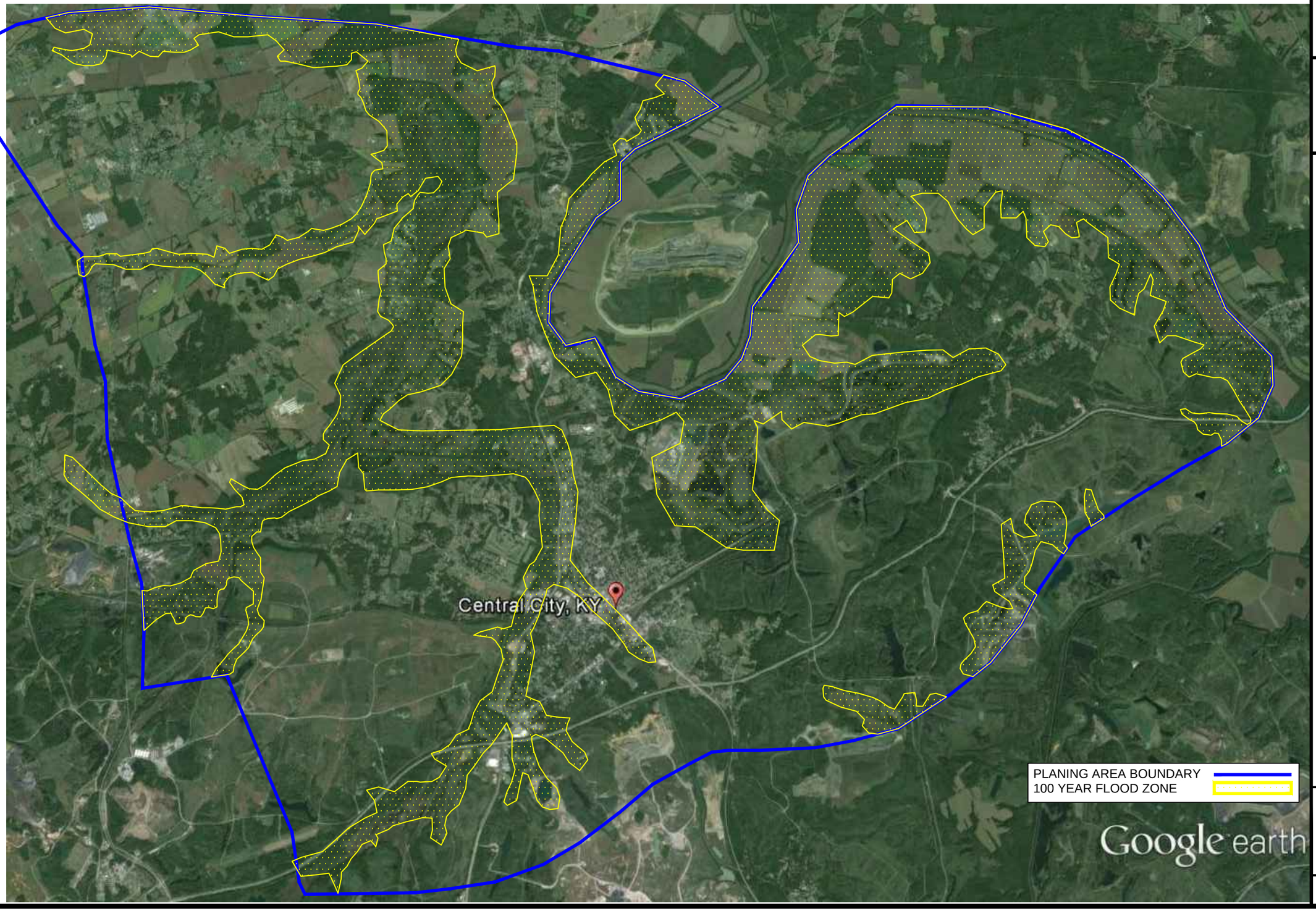

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SCALE: 1"=5000'

CENTRAL CITY WASTEWATER FACILITIES PLAN
100 YEAR FLOODPLAIN

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CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

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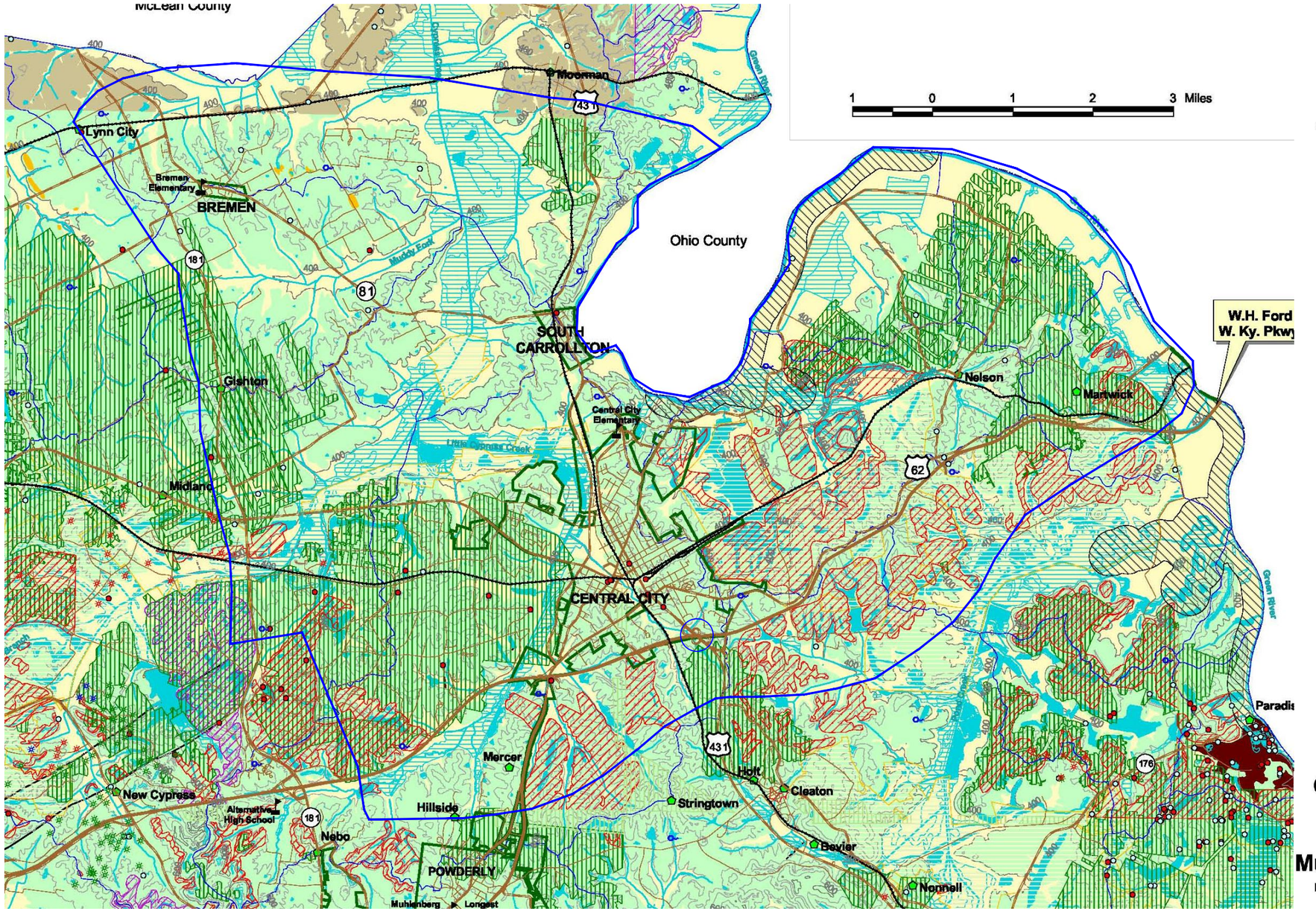
Historically, strip-mined land that has not been properly reclaimed is considered to be largely undevelopable. There are exceptions, such as the Green River Correctional Complex, which is constructed on strip-mined land within the planning area. However, most mined land is considered risky to build on, or too expensive to build on properly. This limits the land available in the planning area for development.

Based upon observations of current development trends and, in coordination with past development plans and zoning maps for the City of Central City and for Muhlenberg County, areas most likely to absorb future development are generally located to the north, east, and west of the city. New growth will most likely occur around the periphery of the city with the most significant growth taking place in the areas west and due north of the city.

Transportation networks will have a significant effect upon the future development of the city. The growth in each area will be associated with and located near a major United States highway. Community services, availability of land suitable for growth, accessibility, and utilities will also have a significant effect upon the growth in each area. The Phillip Stone Way bypass looping the eastern side of the city has enhanced development potential even though minimal growth is expected to take place in this area because of the effect of past mining operations on the land.

Residential growth will continue to take place in all areas of the City with the greatest concentration of growth expected to take place around the Country Club in the Country Club Subdivision. Medium-to-high density housing is expected to continue in the northern area of the city near US 431. Single-family residences are expected to continue to be built in the western and eastern areas of the city located along US 62. Low-to-medium density housing units may be expected to continue development in and around the downtown area. A visual representation of land use for the Central City planning area can be viewed in Exhibit 3.06-1.



EXPLANATION

- School
- Urban service boundary
- Watershed divide
- Wetlands > 1 acre (U.S. Fish and Wildlife Service, 2003)
- Wildlife management area
- Source-water protection area, zone 1
- Surface mining
- Auger mining
- Underground mining
- Mining
- Artificial fill
- Concealed fault
- Fault
- Projected fault

Water Wells

- Domestic
- Industrial
- Monitoring
- Public
- Spring

Oil and Gas Wells

- Gas well
- Oil and gas well
- Oil well
- Class II injection well

20-foot contour interval

Generalized Geologic Map for Land-Use Planning: Muhlenberg County, Kentucky

E. Glynn Beck, David A. Williams, and Daniel I. Carey

McGHEE ENGINEERING

CENTRAL CITY WASTEWATER FACILITIES PLAN
LAND USE

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

STRAND ASSOCIATES®

EXHIBIT 3.06-1
5109.012

SECTION 4
SOCIOECONOMIC CHARACTERISTICS

4.01 HISTORICAL POPULATION DATA

Being a rural community, the population of Central City does not rival many of the states more urban areas. Gathered from the 2010 census, the population of Central City is 5,978. This number shows a growth of 1.44 percent from the previous number in 2000. Compared to the average growth rate of the state (9.71 percent), Central City's is considerably lower. On levels of population density, Central City exceeds the state average with 107.39 people per square mile as compared to 81.32 for Kentucky. The racial makeup of Central City is predominantly white, which makes up 87.49 percent of the population. The education level has been measured lower than both the state and national averages.

Like many communities in Kentucky, the population of Central City has risen and fallen with national trends and with the fortunes of the coal industry. The following table shows the population of Muhlenberg County from 1900 to 2010.

1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
20,741	28,598	33,353	37,784	37,554	32,501	27,791	27,537	32,238	31,318	31,839	31,499

Table 4.01-1 Population of Muhlenberg County by Census Year

Like many rural areas, Muhlenberg County grew at a substantial pace from the early years of the twentieth century through the beginning of World War II. Postwar years saw a migration of rural residents to more urban areas and the population of Muhlenberg County declined accordingly. The 1970s saw a resurgence in the coal industry and the population of Muhlenberg County increased as a result. The population has remained fairly stable from 1980 to present.

4.02 FUTURE CONDITIONS AND DEVELOPMENT POTENTIAL

Although Central City has plenty of physical land space for development, the high level of reliance on the coal industry and relative lack of other types of industry seems to have a negative effect on development potential. Population projections show Central City declining in population over the next 20 years, which limits the city's potential for economic growth. It also shows a general need for a catalyst to increase interest in the city as a place to live and conduct business. However, to look at the city in comparison to the county, the development potential is relatively positive. It is one of the two major developed areas of Muhlenberg County (along with Greenville) and thus should be the center of trade and growth activities for the county. Transportation facilities of the area are excellent with the Western Kentucky Parkway and CSX Railway crossing the area, along with the Green River adjacent to the planning area to the north. Recent, current, and future community improvement programs demonstrate the responsiveness of the community to growth needs.

One of the major current trends that could reflect negatively on the city is the growing political push away from coal production. Central City's economic backbone is the coal mining industry, and with its future in jeopardy, it is difficult to portray the overall development potential of the area in a positive light.

However, Central City continues to undertake growth plans such as widening old streets, upgrading water treatment and distribution capabilities, and renovating of downtown structures.

History has shown that the coal industry is cyclical and that today's pariah may be tomorrow's trend. It is notoriously difficult to predict what the future holds for a community like Central City where one economic factor can weigh so heavily on the outlook. Given these conditions, Central City leaders believe that sewer facility improvement and expansion are necessary to allow future growth and development and that future socioeconomic benefits will be realized from the development of a sound wastewater treatment system capable of handling growth needs in the Central City planning area.

4.03 POPULATION PROJECTIONS

According to the University of Louisville (Kentucky), Central City is expected to decrease in population over the next several years. The planning area has already dropped approximately 1.1 percent between the 2010 census and July of 2012 from a population of 5,974 to 5,912. Muhlenberg County as a whole drops in with a 2010 population of 31,499 and projected populations as follows below:

Census		Projections							
2000	2010	2015	2020	2025	2030	2035	2040	2045	2050
31,839	31,499	31,548	31,466	31,254	30,858	30,325	29,742	29,172	28,643

Table 4.03-1 Muhlenberg County Total Population, Census 2000 and 2010, Projections 2015-2050: State, ADDs, and Counties

If we follow these projections, the population of Muhlenberg County is predicted to decrease by factors of 0.1, 2, and 9 percent over the next 10, 20, and 40 years, respectively. We will assume Central City will also decrease at the same rate. With the 2010 population for the city being 5,974, it follows that the city should have a projected population of approximately 5,968, 5,855, and 5,436 by years 2020, 2030, and 2050, respectively.

4.04 INDUSTRIAL AND COMMERCIAL USER PROJECTION

Several factors influence the growth of a community, such as accessibility, technology, education, water infrastructure, sewer facilities, and jobs. Muhlenberg County enjoys good access to Interstates 24 and 65 via the Western Kentucky Parkway. High speed internet and wireless technology have gradually entered the communities, creating greater and easier contact to the rest of the world. The local school system is strong and provides a quality education and quality medical care is readily available. Perhaps the most important development in recent years, however, is the resurgence in coal mining. While mine employment has not reached the levels experienced in the 1960s and 1970s, many jobs have been created in the mining industry in recent years. With energy prices remaining relatively high, coal is expected to be an important industry in the United States for the foreseeable future and an important source of jobs and growth in Muhlenberg County.

It should also be noted that population will eventually be impacted by the recently increased supply of treated water available to the community. Central City's own water treatment facility has just increased its treatment and production capacity to 7 mgd. An ample supply of water will promote growth, which in turn will call for an increased wastewater treatment system capacity. It is unlikely that the lack of sewer treatment capacity has impacted growth much to date, but failure to act to follow an increase in water supply and usage could have a detrimental effect on growth in the future. Considering all these factors, it is prudent to plan for modest population industry and commercial growth in the Central City and Muhlenberg County areas.

4.05 ECONOMIC IMPACT ON THE COMMUNITY

Central City presently has an economical water production system. It has an abundant, reliable water source in the Green River that is close by, relatively easy to treat, and readily available, and it has a newly retrofitted, state-of-the-art water treatment plant that has the capabilities of operating at a new level of 7 mgd.

The recent expansion of the water treatment plant to serve future needs of the region has represented a large capital expenditure, which has been partially financed by debt. Servicing the debt has resulted in increased water rates. These higher water rates will provide economic incentive to locate and repair leaks in the distribution systems and will also provide additional incentives to consumers to conserve water over the next few years. The net result that has been observed in these situations before is that water demand is likely to decrease slightly in the first few years after completion of a major expansion project before resuming an upward trend. The current level of I/I, paired with the anticipated increase in future water use and availability, guarantees a net increase in the need for sewer service and capacity. Since a solution for sewer treatment capacity will almost certainly be funded by debt as well, and knowing that increased water use and availability directly increases sewer flow, an increase in sewer rates is expected.

Although the increase in rates may have a minor impact on economic development in the community, it is more likely the increased treatment availability will provide more development opportunities for consumers than the increase in rates will turn away.

SECTION 5
EXISTING ENVIRONMENT

5.01 INTRODUCTION

This section discusses the existing environmental conditions that will either be affected by or may affect the planning of the proposed wastewater system improvements for Central City. Central City is a verdant and diverse locale that experiences all four weather seasons, exhibits a multitude of geographical features, and is home to a wide range of flora and fauna. The balance between sustaining the man-made environment and preserving the natural environment is delicate and of great importance in arriving at a viable plan for the future of the area.

5.02 PHYSIOGRAPHY

Lying in the southcentral physiographic portion of the Western Coal Field province, Central City is an area of higher elevation and irregular relief covering both Pennsylvanian Age and Mississippian Age rocks, respectively. The Western Coal Field is bounded on three sides by the lower elevated Mississippian Plateau. Making up the formations of this region are beds of shale and sandstone, along with the coal seams that serve as the namesake.

Several types of sedimentary rocks form the facial features of Kentucky, including limestones, sandstones, conglomerates, shales, and clays. These deposits are stratified and contain many fossilized plants and animals. Marine waters advanced and withdrew from the region time after time, leaving numerous opportunities for various life forms to find their permanent home within the sediment. Over time the continuous increase in sediment deposit compressed existing vegetative layers into coal. Non-vegetative layers were compressed into sandstone and shale.

Along the southern edge of Muhlenberg County in which Central City lies, the topography is rugged and capable of producing elevation reliefs of up to 200 feet. However, Central City, lying in the more northern portion of the county, contains hills that are not as steep and much more suitable for agricultural pursuits. The highest elevation in the county is approximately 760 feet above sea level, with elevations of about 700 feet in the south and 500 feet in the north.

The older rocks found near the surface of the planning area have been named the Vienna Limestone. Along higher elevations, these rocks are primarily of the Middle to Upper Pennsylvanian Age. However, along the most notable waterways such as the Green River and Little Cypress Creek, the surface rocks consist of the more recent Quaternary Alluvium.

The land within the planning area, particularly the southern part, has been impacted greatly by coal mining activities over the past 100 years, particularly strip mining. An estimated 18,845 square miles, or 38 percent of the planning area has been stripped. In these areas, soil stratigraphy and surface topography have been altered from natural conditions, soil and surface water chemistry sometimes deviate from natural conditions, and natural distribution of flora and fauna can differ from non-disturbed areas. In many cases, usage options for this mined land are limited.

5.03 HYDROLOGY

The climate in Central City is generally temperate. Climatic elements of sunlight, precipitation, humidity, and wind occur in moderation, without prolonged extremes. Central City has four distinct seasons. However, moderate temperatures prevail in all but short periods in the winter and summer.

The average annual rainfall over the past 22 years is 52 inches. The rainfall is fairly well distributed throughout the year, with the drier periods occurring in the early fall and wetter periods in the late winter and early spring. Thunderstorms may occur at any time but are most common in the spring and summer months. Localized hail and/or rainfall of 3 to 4 inches frequently accompany storms. Snowfall varies from year to year with annual total of 8 to 12 inches being common. Snows of more than a few inches or snow covering the ground for more than a few consecutive days are rare.

With the planning area being relatively small, the majority of the major hydrologic features that contribute to existing water flows lie outside of the immediate study area. The recent presence of strip-mining activities within the immediate area has left multiple ponds and lakes that catch surface runoff. Eventually, the entire planning area is drained by several creeks, streams, and tributaries, which ultimately empty into the Green River. These waterways generally have rapid rates of fall in their upper reaches to their points of origin. Once reaching the alluvial lowlands, however, these quickly change to low-gradient, slow-moving waterways flowing through locally flat terrain.

5.04 WATER QUALITY OF STREAMS AND LAKES

Central City's water supply is sustained mostly by surface streams fed by groundwater discharge from nearby aquifers. This existing situation allows for numerous chances of contamination to local water from various activities and conditions on the surface of the ground. Popular activities within the region contributing to groundwater pollution can range anywhere from sediment runoff created by mining and logging to the use of pesticides for agricultural production. KDOW has classified Central City's region as an area of "low-moderate to high-moderate" sensitivity to groundwater pollution.

The groundwater being supplied by shallow bedrock aquifers in and around Central City is considered soft to moderately hard. However, any water contributed from the alluvium is much more iron-filled. Iron, along with common salt, is generally the most common uninvited guest that appears during water testing procedures. As long as care is taken in the depth of water wells drilled for supply, the chance of increased water salinity is avoided. For Muhlenberg County, this means limiting the depth of water wells to 400 feet below sea level or higher. In order to reduce the risk of human and environmental health risks, Central City's public water supply relies on surface water from the Green River and is treated to applicable standards before distribution.

Cypress Creek, which is part of the Green River Basin, is the most notable water body in the Central City planning area. These are impaired streams that have TMDLs established for *E. coli*. Additionally, sections of the planning area include Source Water Assessment and Protection Program (SWAPP) zones protecting source water for Central City, Rockport, Calhoun, Madisonville, Livermore, and Webster County Water District.

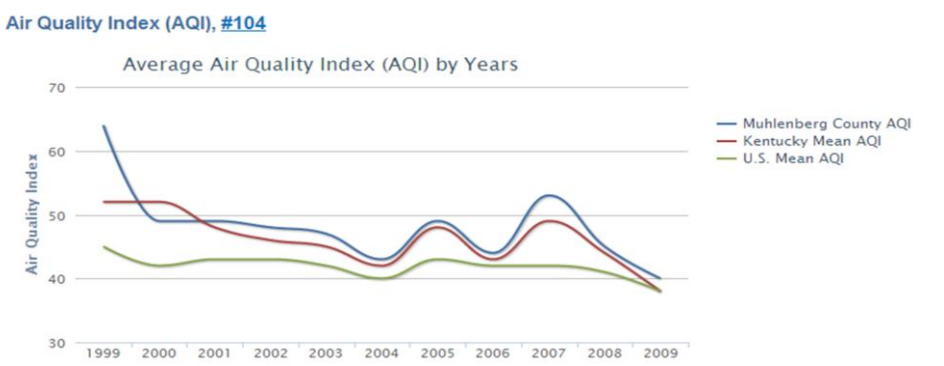
5.05 WETLANDS

Relatively few designated wetlands areas exist within the planning area. Those that do exist include an area just east of the Rose Hill water storage tank along US 62, an area near the existing WWTP, and several lowland bottoms and man-made sloughs created by old strip-mining pits that were left to fill in over time. The wetland areas that will be affected by the proposed construction are largely in the vicinity of the WWTP where new parallel lines are being built alongside existing lines. The current treated wastewater discharge point to the Green River is within the planning area and will not be significantly altered. Exhibit 5.05-1 shows the wetlands inventory map depicting the pump stations and lines as mentioned including project components.

5.06 AIR QUALITY

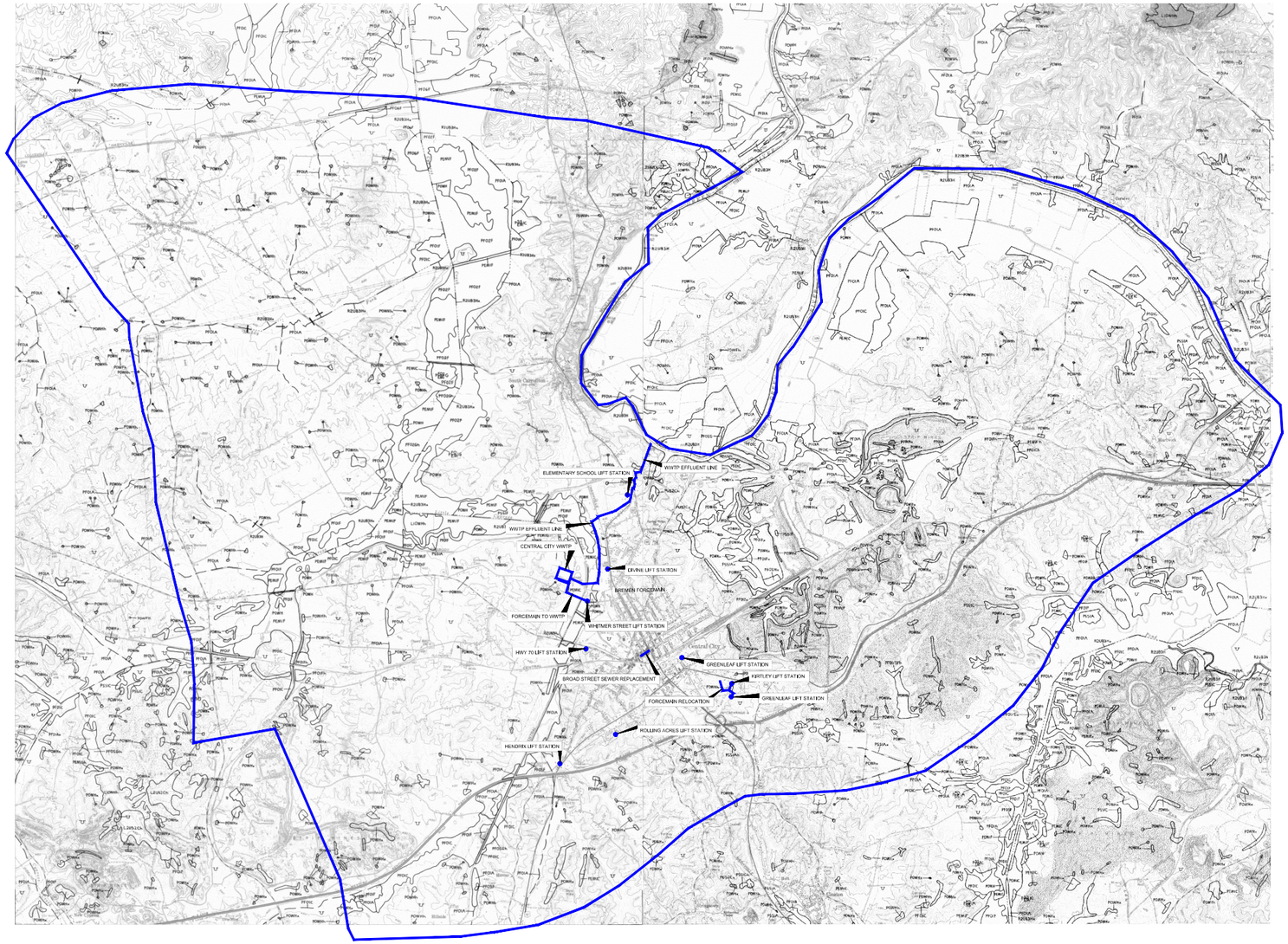
The air quality in and around Central City is a key factor in the public health and welfare of living organisms. Natural pollution can occur when a thermal inversion prevents emitted gases, smoke, and particulate matter from escaping the atmosphere by normal diffusion or dispersion. This, in areas of high emissions, can cause unhealthy conditions. Air quality not only affects living organisms. It can, and often does, by way of chemical breakdown decompose paints and corrode and oxidize various types of man-made structures.

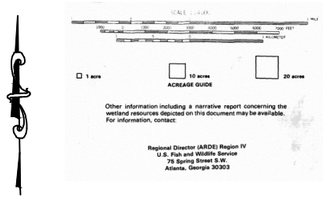
In Central City, the most common contributors to air pollution are ozone, fine particulate matter ($PM_{2.5}$), and sulfur dioxide. Muhlenberg County has generally stayed within the “good” classification for these constituents in recent years. The overall air quality index for Muhlenberg County has also stayed in the “good” range (less than 50) in recent years (see Figure 5.06-1).



Air quality indices (AQI) are numbers used by government agencies to characterize the quality of the air at a given location. As the AQI increases, an increasingly large percentage of the population is likely to experience increasingly severe adverse health effects. Air quality index values are divided into ranges, and each range is assigned a descriptor and a color code. Standardized public health advisories are associated with each AQI range. The United States Environmental Protection Agency (EPA) uses the following AQI:

Exhibit 5.06-1 Muhlenberg County Air Quality Index





Other information including a narrative report concerning the wetland resources depicted on this document may be available. For information, contact:

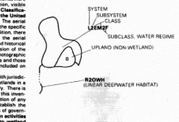
Regional Director (ARDE) Region IV
U.S. Fish and Wildlife Service
75 Spring Street S.W.
Atlanta, Georgia 30303

SPECIAL NOTE

This document was prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography in accordance with **Cowardin, et al. 1979, Classification of Wetlands and Deepwater Habitats of the United States (FWS/OBS - 79/31 December 1979).** The aerial photographs typically reflect conditions during the specific year and season when they were taken. In addition, there is a margin of error inherent in the use of the aerial photography. Also, the application of more detailed or more analytic of a single site may result in a revision of the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those obscured by dense forest cover may not be included on the maps.

Federal, State and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the extent of governmental jurisdiction. Federal, State or local government or to establish the geographical scope of the regulatory programs of government agencies. **Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek clarification, in advance of such work, of local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.**

SYMBOLOGY EXAMPLE



NOTES TO THE USER

- Wetlands which have been twice examined are indicated on the map by an asterisk (*).
- Additions or corrections to the wetlands information displayed on this map are solicited. Please forward such information to the Regional Director.
- Subsystems, Classes, Subclasses and Water Regimes in italics were developed specifically for NATIONAL WETLANDS INVENTORY mapping.
- Some areas designated as R4SB, RAB3HV, OR RAS5J/K (*INTERMITTENT STREAMS*) may not meet the definition of wetland.
- This map uses the class Unconsolidated Shore (US). On earlier NWI maps that class was designated Beach/Bar (BB), or Flat (FL). Subclasses remain the same in both versions.

AERIAL PHOTOGRAPHY

DATE	4 81	DATE	
SCALE	1:58000	SCALE	
TYPE	CIR	TYPE	

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Prepared by National Wetlands Inventory
1988

MCGHEE ENGINEERING

CENTRAL CITY WASTEWATER FACILITIES PLAN
WETLANDS INVENTORY

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

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5.07 WASTE LOAD ALLOCATION (WLA) FOR EXISTING FACILITIES

The WLA for the existing wastewater treatment facility in Central City is described in detail throughout the KPDES Permit included as Appendix B.

The existing facility discharges via a 2-mile pipeline from the plant to the Green River. The existing discharge permit provides for the limits shown in Table 5.07-1.

Parameter	Limit	Units
Flow	1.20	mgd
BOD_5	30	mg/L
TSS	30	mg/L
Fecal Coliform	200	N/100 ml
Ammonia (as N)	20	mg/L
Dissolved Oxygen	2	mg/L
pH	6-9	Std. Units
Biomonitoring, Toxicity Units	1	TU_a

Table 5.07-1 Central City WWTP Discharge Permit Limits (KPDES Permit No KY0023540)

Overall, the existing WWTP does an adequate job of meeting these limits during normal weather conditions. During wet weather, the system experiences high infiltration and inflow which, if excessive or not properly managed, can lead to interruptions in the treatment process and permit limit violations.

The current permit requires 85 percent removal of five-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS). This occasionally becomes a problem during extended wet weather flows when the influent BOD_5 and/or TSS drops to a very low level making the percent removal parameter difficult to meet. Central City has petitioned KDOW for a change to the percent removal requirement in the existing permit.

5.08 BIOLOGICAL

The flora and fauna of the planning area incorporate a wide variety of living organisms. The biological communities present are typical for rural areas of the upper south. The vegetation present within the planning area is highly dependent on the soil type and the availability of water. Most vegetative cover is agriculture related, being either crops or residual grasses from previous agricultural operations. Native vegetation is found in areas that are unsuited for agriculture, are flood prone, or in previously mined areas that have been reclaimed.

The most common natural plant community is the oak-hardwood associations interspersed with pine and cedar. Natural plant communities occur primarily in alluvial areas adjacent to streams or other

low-lying lands. Predominant tree species include black oak, red oak, white oak, water oak, ash, locust, hickory, maple, walnut, hackberry, pine, and cedar. Hardwood lumber is an important economic resource to the planning area.

Wildlife resources include the following birds: waterfowl, geese, dove, crow, blackbird, and several varieties of songbirds. Common animals include squirrel, rabbit, raccoon, opossum, gray and red fox, quail, groundhog, skunk, weasel, beaver, and muskrat. White-tailed deer, coyote, and turkey are now common in the area, having once been relatively rare.
Fish common to the area rivers and streams include channel, blue, and yellow catfish, carp, largemouth bass, spotted bass, crappie, bluegill, shellcracker, sauger, walleye, shad, and various species of darter and minnow.

The planning area lies within that portion of Kentucky designated as habitat for the Copperbelly water snake (*Nerodia erythogaster neglecta*) and the Indiana bat (*Myotis Sodalis*). All planning, design, and construction work must be coordinated with and approved by the Kentucky Department of Fish and Wildlife Resources (KDFWR) and the United States Fish and Wildlife Service (USFWS).

Given that the work proposed will all take place within the developed urban areas of Central City or along existing roads, no significant impact to important vegetation or critical habitat is expected.

5.09 CULTURAL

The culture of the Central City area has developed almost exclusively around the mining and agricultural industries. As of the 2010 census, the population of Central City was 5,978 people. Central City does not have a large industrial or manufacturing base, but it provides workers to nearby communities that do.

Even though the use of coal in the production of energy has decreased significantly in recent years, the mines still provide an income for many families throughout the region. Some of the other prominent job providers in the community include the TVA Paradise Fossil Plant in Drakesboro, the Muhlenberg County Hospital in Greenville, and the Muhlenberg County Board of Education in Powderly. The Kentucky National Guard also has a station offering employment in Central City.

Central City is home to one elementary school and one post-secondary education facility. The local high school has been consolidated to nearby Greenville. Some of the notable attractions to the nearby area include Lake Malone State Park in Dunmor, the Brewco Motorsports Shop in Central City, and the Paradise Park in Powderly.

5.10 SOILS

The most common soil associations within the planning area are Udorthents-Zanesville-Wellston and Zanesville-Wellston-Frondorf. Three smaller associations are also noted in the area around Bremen and closer to the Green River.

A. Udorthents-Zanesville-Wellston

These soils are gently sloping to steep, deep, and well drained located in strip mine areas and gently sloping to steep, moderately well drained and well drained loamy soils on hilltops and side slopes. This particular soil unit makes up about 20 percent of Muhlenberg County.

The Udorthents are in strip mine spoil, and the Zanesville and Wellston soils formed in loess and the underlying residuum. Udorthents are deep and well drained and are variable in texture and in slope. Zanesville soils are moderately well drained and well drained, and are mainly on hilltops and have a fragipan. Wellston soils are well drained and are mostly on side slopes and do not have a fragipan. Zanesville and Wellston soils have a surface layer of silt loam and a subsoil of silt loam or silty clay loam. The soils in this unit have poor potential for farming. They are subject to erosion and Udorthents have rock fragments. Most of the soils have poor potential for most urban uses.

B. Zanesville-Wellston-Frondorf

These soils are gently sloping to steep, moderately deep and deep, moderately well drained and well drained, loamy soils on narrow hilltops and on side slopes. The soils formed in thin loess and underlying residuum derived from sandstone and siltstone. The unit makes up about 43% of Muhlenberg County.

The Zanesville soils are mainly on hilltops, and Wellston and Frondorf soils are on side slopes. Zanesville soils are gently sloping and sloping, deep, moderately well drained and well drained, and have a fragipan. Wellston soils are gently sloping to steep, deep, and well drained. Frondorf soils are moderately steep and steep, moderately deep, and well drained. All of these soils have a surface layer of silt loam and a subsoil of silt loam or silt clay loam. Most of these soils have poor potential for farming; however, some soils have good potential for farming. They are mainly in small areas on narrow hilltops or in valleys. Many soils in this unit have poor potential for homesites and urban uses. Slow permeability of the fragipan, steep slopes, and moderate depth to bedrock are limitations.

C. Melvin-Karnak-McGary

These soils are nearly level, deep, somewhat poorly drained and poorly drained, loamy and clayey soils on floodplains and stream terraces. Areas of these soils are in the Green River valley and along major tributaries of the Green River. They formed in old slackwater alluvium and in alluvium that washed from upland soils that formed in residuum derived from limestone.

The Melvin and Karnak soils are on floodplains and the McGary soils are on stream terraces that are seldom flooded. Karnak and Melvin soils are poorly drained, and McGary soils are somewhat poorly drained. Karnak soils are clayey throughout, Melvin soils are loamy throughout, and McGary soils are loamy in the surface layer and clayey in the subsoil. The soils in this map unit are used mainly for cultivated crops. A few areas of these soils are in woodland or in pasture. They have good potential for most summer annual crops if they are adequately drained. They have poor potential for homesites and other urban uses. Wetness is a severe limitation.

D. Loring-Wellston

These soils are gently sloping to steep, deep, moderately well drained and well drained, loamy soils on hilltops and side slopes. The soils formed in loess or in loess and underlying residuum.

The Loring soils formed in loess and are on hilltops and side slopes. They are moderately well drained and gently sloping to moderately steep and have a fragipan. Wellston soils formed in loess and the underlying residuum and are on side slopes. They are well drained and gently sloping to steep and do not have a fragipan. Both soils have a surface layer of silt loam and a subsoil of silt loam or silty clay loam. These soils are used mainly for farming, pasture, hay, and woodland crops. These soils have fair potential for urban uses. The hazard of erosion and slow permeability in the fragipan are limitations of Loring soils for some urban uses.

E. Grenada-Loring

These soils are gently sloping to moderately steep, deep, moderately well drained, loamy soils mainly on ridgetops. These soils are moderately well drained and have a fragipan.

Grenada soils are nearly level and gently sloping and are mainly on wide ridgetops. Loring soils are gently sloping and sloping and are on narrow ridgetops and on side slopes. Both have a surface layer of silt loam and a subsoil of silt loam or silty clay loam. These soils are used mainly for farming (e.g., corn, soybeans, wheat, tobacco, hay, and pasture). The soils have a good potential for farming. The gently sloping and sloping soils are subject to erosion, and erosion control practices are needed if the soils are used for cultivated crops. The fragipan in these soils restricts water movement and root development, and some deep-rooted crops die out within a few years. The soils have good potential for most urban uses. Slow permeability in the fragipan and slope are limitations for some urban uses.

SECTION 6
EXISTING WASTEWATER SYSTEM

6.01 BACKGROUND

This section examines existing wastewater facilities and describes the method of wastewater treatment at the existing Central City WWTP.

6.02 EXISTING ON-SITE DISPOSAL

The portion of the planning area within the city boundary is generally served by the Central City municipal sewer system. A few houses within the city remain on septic systems because of their inaccessible locations. There are a few out-of-city sewer customers, but the area outside the city boundary is generally served by septic systems.

Soil conditions within the planning area vary from marginal to poor for septic system development based on percolation rates. The history of surface and underground mining also discourages the use of septic systems because of the higher likelihood of groundwater contamination from septic drainfields.

6.03 EXISTING CENTRAL CITY WASTEWATER TREATMENT PLANT

The Central City WWTP provides wastewater service to the residential, industrial, commercial, and institutional clients in the Central City service area. The WWTP is rated for 1.2 mgd average daily flow and 4.0 mgd peak hourly flow. The treatment plant originally used a trickling filter biological process but converted to the extended aeration process in the last major upgrade, which was completed at the end of 1988. The current treatment process includes influent pumping and measurement, preliminary treatment with fine screening and grit removal, biological aeration process employing an Orbal oxidation ditch, settling process using two circular clarifiers, disinfection process equipped with UV light, and effluent pumping using high efficiency turbine pumps. Plant effluent is pumped 2.25 miles from the Central City WWTP to the discharge point at Green River. Exhibit 6.03-1 presents the flow schematic for the existing Central City WWTP while Exhibit 6.03-2 shows the site location plan of existing Central City WWTP.

A. Influent Force Main and Flow Meter

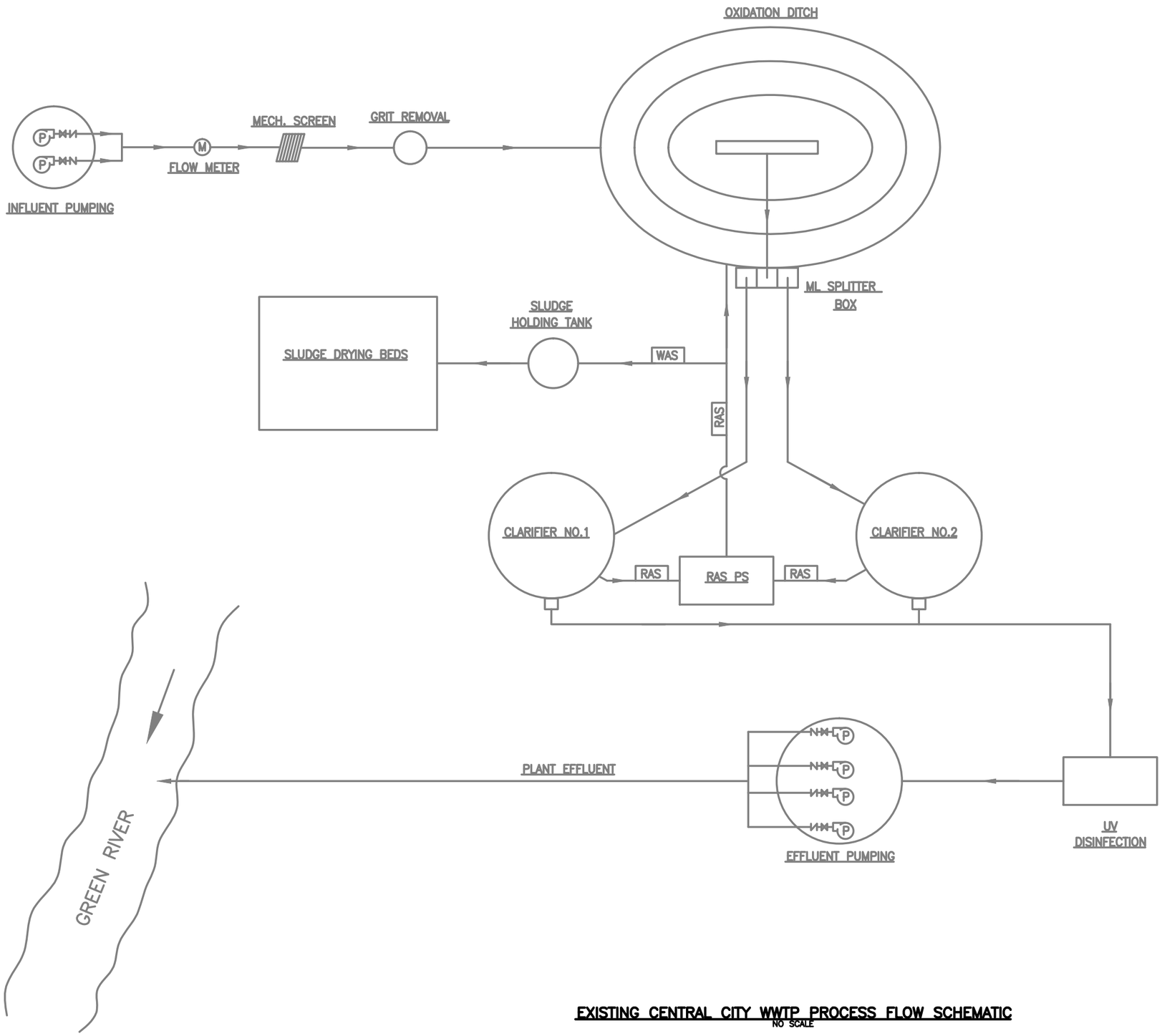
All raw wastewater is received at the influent pump station, located just off the WWTP site, and pumped to the WWTP via a 14-inch force main. The raw wastewater influent flow is measured before entering the headworks structure using a 14-inch universal venturi tube.

B. Influent Sampling

The influent samples are taken upstream of the mechanical bar screen. Composite wastewater influent samples are collected by an automatic, refrigerated sampler.

C. Screening

Preliminary treatment is performed by a mechanically cleaned bar screen with 1/4-inch openings. The process is intended to remove untreatable large solids, such as plastic bags and debris, from the influent wastewater flow to protect the downstream process equipment. The screened materials are collected and dewatered for disposal at a landfill. The rated capacity of the existing mechanical bar screen is 4.0 mgd.



LEGEND

EX. WASTERWATER FLOW
EX. SLUDGE FLOW

ABBREVIATIONS

M	FLOW METER
ML	MIXED LIQUOR
P	PUMP
PS	PUMP STATION
RAS	RETURN ACTIVATED SLUDGE
WAS	WASTED ACTIVATED SLUDGE

EXISTING CENTRAL CITY WWTP PROCESS FLOW SCHEMATIC
NO SCALE

MCGHEE ENGINEERING

EXISTING WWTP PROCESS FLOW SCHEMATIC

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

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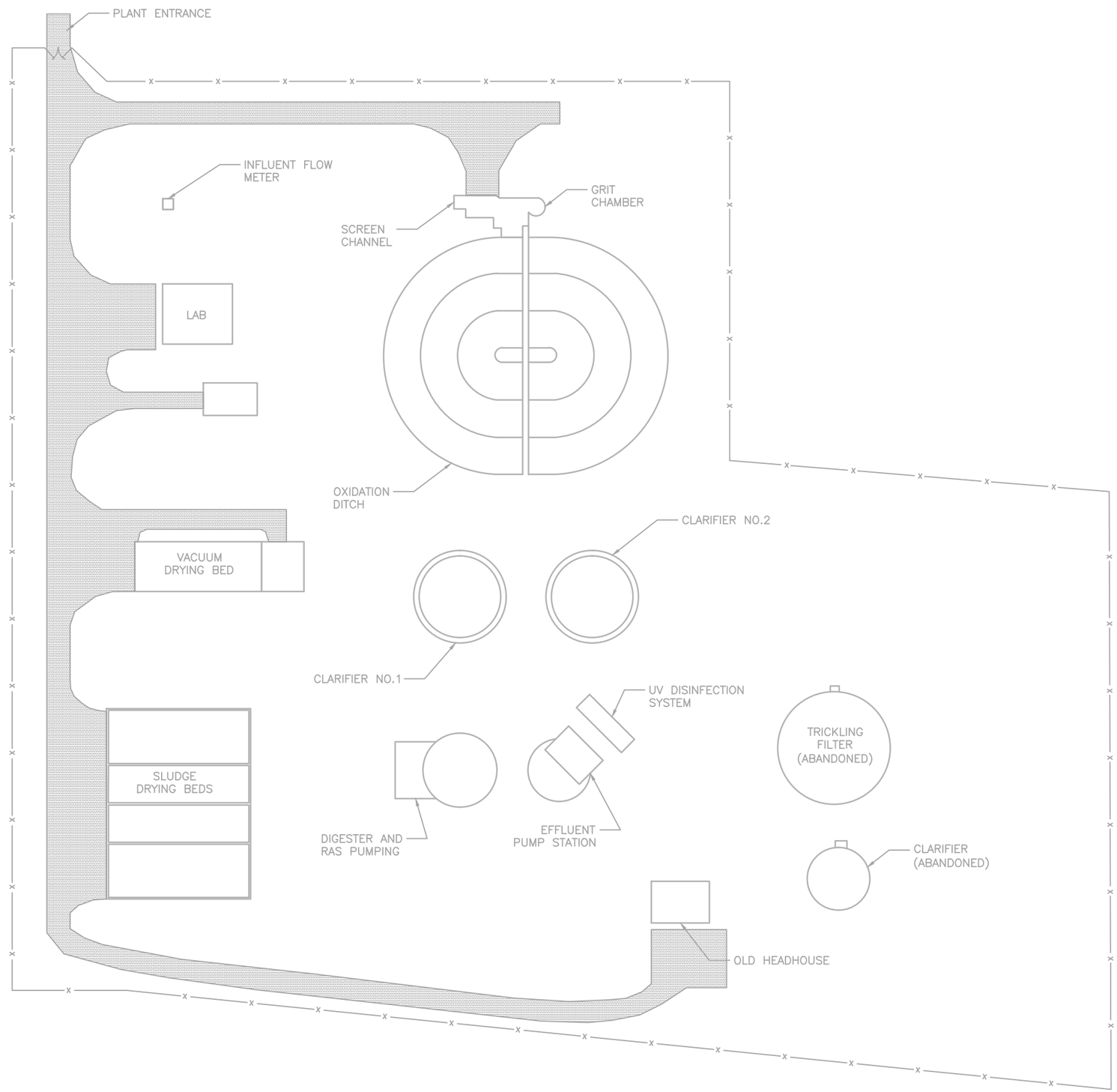
EXHIBIT 6.03-1
5109.012

File: S:\LOU\5100--5199\5109\012\Acad\Figure 6.03-1 - Existing WW Flow Schematic.dwg Time: Jan 28, 2014 - 3:20pm



EXISTING SITE LOCATION PLAN

0 15' 30' 60'

N

McGHEE ENGINEERING

EXISTING SITE LOCATION PLAN

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

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EXHIBIT 6.03-2
5109.012

File: S:\LOU\5100--5199\5109\012\Acad\Figure 6.03-2 - Site Location Plan.dwg Time: Jan 28, 2014 - 3:20pm

A manual bypass bar screen is used when the mechanical screen is taken out of service. The manual bar screen has 1-inch openings and has a rated capacity of 4.0 mgd.

D. Grit Removal

Grit removal is provided to remove untreatable small, heavy solids such as sand or grit from the influent wastewater flow to protect the downstream process equipment. Grit removal is accomplished using a vortex device to readily settle heavier solids from wastewater. Grit that settles in the grit collector chamber is pumped to a grit classifier for dewatering. Dewatered grit is disposed of in a landfill.

E. Oxidation Ditch

There is a 950,000-gallon, three-channel Orbal oxidation ditch operating at a rated capacity of 1.2 mgd. The oxidation ditch has a hydraulic detention time of 19 hours at a flow of 1.2 mgd and is designed to accept a loading of 15 lbs BOD/day/1000 ft^3. It contains four rotors that serve as primary mechanical aerators for the ditch. The ditch is currently operating at its capacity. To handle the additional flows and loadings to the Central City WWTP, the oxidation ditch will need to be expanded.

F. Final Clarifiers

There are two clarifiers, 48 feet diameter and 12 feet deep, with a combined surface settling area of 3,620 ft^2. These clarifiers provide settling or solids/liquid separation of the mixed liquor (ML) from the oxidation ditch.

G. Return Activated Sludge (RAS)/Waste Activated Sludge (WAS) Pumps

Three RAS pumps are located in the basement of the digester building. One pump is used to withdraw sludge from each clarifier and the middle pump is used as standby pump. Each RAS pump discharges into a 8-inch force main, which runs to the existing oxidation ditch. A venturi meter is provided in each RAS force main for sludge flow measurement. The withdrawal sludge from clarifiers is returned to the oxidation ditch as RAS or wasted to the sludge holding tank as WAS.

H. Ultraviolet Disinfection

There is a three-bank Trojan UV 3000 system provided at Central City WWTP for disinfection process. The effluent is disinfected to reduce the number of activate pathogenic microorganisms in the plant effluent, thereby minimizing potential public health risks in the receiving water. The existing UV disinfection system is capable of disinfecting the effluent peak flow up to 5.0 mgd.

I. Effluent Pumps and Force Main

The effluent pumps consist of two 25 horsepower (hp) (small) and two 150 hp (large) vertical turbine pumps. All pumps discharge into a common 14-inch force main that runs several miles to the Green River. One of the small pumps is used during the normal flow period, and one of the large pumps is used during the high flow period. The capacity of the pump station is equal to the pumping capacity of one of the large pumps or 4.0 mgd.

J. Sludge Holding Tank

A sludge holding tank is provided to hold the wasted sludge before sending it to the sludge drying beds. The sludge holding tank is currently in good condition and no alterations to the tank will be recommended in the expansion.

K. Sludge Drying Beds

The sludge drying beds are used to dewater the sludge before sending it to the landfill for disposal. The WWTP also has vacuum drying beds, but they are not in use. These sludge drying beds are effective during warm, dry months but are insufficient during wet periods. An alternate sludge dewatering system will be considered in the proposed expansion of the WWTP.

TABLE 6.03-1 EXISTING DESIGN CRITERIA

Design Flows			
Average Daily Flow		1.2 mgd	
Peak Hourly Flow		4.0 mgd	
Design Loadings			
BOD_5		170 mg/L	1,700 lbs/day
TSS		150 mg/L	1,500 lbs/day
NH_3-N		17 mg/L	170 lbs/day
Influent Pump Station			
Date Constructed	1975		
Type of Pumps	Dry Well Centrifugal		
Number of Pumps	3		
Control	Level Control, VFDs		
Design Capacity	No. 1	No. 2	No. 3
Head (FT)	65	65	65
Flow Rate (GPM)	1,400	1,400	1,400
Horsepower	40	40	40
Generator Rating (KW)	135		
Influent Flow Measurement			
Number of Meters		1	
Type of Meters		Venturi	
Size		14-inch	

Influent Screening

Number of Channels	2
Number of Mechanically Cleaned Screen	1
Design Capacity	4.0 mgd per 2' 6" Wide Screen
Number of Manual Cleaned Screen	1
Design Capacity	4.0 mgd

Grit Collectors

Number of Grit Chambers	1
Collector Types	Vortex
Design Capacity	4.0 mgd
Design Particle Removal Size	65 mesh

Grit Pumps

Number of Grit Pumps	1
Type of Pumps	Torque-flow with vortex impeller
Drive Type	V-belt with constant speed motor

Grit Classifier

Number of Grit Classifiers	1
Type of Grit Classifier	Reciprocating rake

Oxidation Ditch

Number of Basins	1
Effective Aeration Volume	950,000 gallon
Number of Aerators	4 (2 at 20 hp and 2 at 40 hp)
Aerator Control	constant speed
BOD Loadings	15 lbs/1000 ft^3
Hydraulic Detention Time	19 hrs @ ADF
Oxygen Supply	8,640 lb O_2/hr

Clarifiers

Number of Units	2
Clarifier Diameter	48 feet
Total Surface Area	3,620 ft^2
Surface Loading Rate	330 gpd/ft^2 @ 1.2 mgd ADF
	1,100 gpd/ft^2 @ 4.0 mgd PHF
Solids Loading Rate (2,500 mg/L MLSS)	
@ 1.2 mgd + 1.2 mgd RAS	13.8 lbs/d/ft^2
@ 4.0 mgd + 1.8 mgd RAS	33.4 lbs/d/ft^2

RAS Pumps (Existing)

Type of Pumps	Centrifugal
Number of Pumps	3 (existing)
Design Capacity	625 gpm each
Firm Capacity	1,250 gpm (with 2 pumps in operation)

UV Disinfection

Number of Channels	1
Number of UV Disinfection Units	3 banks per channel
UV Transmission	65%
Total Capacity	5.0 mgd

Effluent Pump Station

Type of Pumps	Turbine
Number of Pumps	4 (2 large + 2 small)
Design Capacity	1,000 gpm (with 1 small pump operating) 2,800 gpm (with 1 large pump operating)
Firm Capacity	4.0 mgd
Control	Constant speed pumps
Force Main	1 at 14-inch (existing)

Biosolids Holding (Existing)

Number of Tanks	1
Total Volume	95,000 gallons
Type of Aeration	Coarse Bubble Diffusion

Biosolids Holding Air Supply (Existing)

Number of Blowers	2
Type	Positive Displacement
Blower Capacity (ea.)	400 scfm
Design Mixing	30 scfm/1000 ft^3
Drive Type	Constant Speed

Sludge Dewatering

Type	Sludge Drying Beds
Number of Units	4
Surface Area	7,500 ft^3

6.04 EXISTING BIOSOLIDS DISPOSAL

The screenings and grit collected at the Central City WWTP are disposed of in a landfill along with the dewatered biosolids.

The activated sludge generated at the WWTP is wasted to the sludge holding tank, where it will be aerated and decanted before being sent to the sludge drying beds. One sludge transfer pump, located in the basement of the Digester and RAS pumping facility is used for transfer sludge from sludge holding tank to the sludge drying bed. After dewatering, sludge is sent to the Ohio County landfill for disposal. The WWTP also has a vacuum drying bed, but it is not being used. The sludge drying beds perform well during the dry weather but become ineffective during wet weather periods.

6.05 TREATMENT PLANT OPERATION AND COMPLIANCE

A. Existing KPDES Permits

A Kentucky Pollutant Discharge Elimination System (KPDES) permit KY 0023540 was issued for the Central City WWTP. The current permit was issued on November 24, 2004, and is in effect from February 1, 2005, to January 31, 2010.

The KPDES permit specifies the effluent limits for the Central City WWTP. Table 6.05-1 shows the Central City KPDES effluent limits. In addition to the concentration limits, mass effluent limits are also applied based on the 1.20 mgd rated capacity. The treatment plant must achieve at least 85 percent removal of the monthly average concentration for five-day carbonaceous biochemical oxygen demand ($CBOD_5$) and TSS regardless of the influent flows and loadings. The facility has effluent limits for fecal coliform, minimum and maximum pH, and minimum dissolved oxygen requirements.

Parameter	Quantity or Loading (lb/day)		Quality or Concentration (mg/L)			
	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Daily Maximum	Daily Minimum
Flow (mgd)	-----	-----	Report	Report	-----	-----
$CBOD_5$	300	450	30	45	-----	-----
TSS	300	450	30	45	-----	-----
Fecal Coliform			130 colonies per 100 mL	240 colonies per 100 mL		
NH_3-N	200	300	20	30	-----	-----
Dissolved Oxygen	-----	-----	-----	-----	-----	2.0
pH	-----	-----	-----	-----	9.0	6.0

[1]Reference current KPDES Permit No. KY0023540 (see Appendix B).

Table 6.05-1 Central City WWTP Existing KPDES Permit Limits[1]

B. Existing Central City WWTP Performance

The Facilities Plan uses loading data collected from January 2010 to August 2013 to evaluate the WWTP performance, as well as influent flow data from January 2008 to August 2013. Table 6.05-2 shows the Central City WWTP KPDES permit limits and performance over the past three years.

Parameter	Influent Average	Effluent Average	Capacity/ Permit Limits	Removal Percentage
Flow, mgd	1.18	1.18	1.20	
$CBOD_5$, mg/L	121	4	30	96%
TSS, mg/L	78	6	30	93%
NH_3-N, mg/L	12	1.1	20	––

Table 6.05-2 Summary of Central City WWTP Performance January 2010 to August 2013

Overall, the Central City WWTP performs exceptionally well (BOD, TSS, NH_3-N and fecal coliform removal) even though the flow to the WWTP has often exceeded the rated capacity. No violation of these limits occurred from January 2010 through May 2013.

The Central City KPDES permit currently requires an 85 percent removal of BOD and TSS on a monthly average basis. Central City's influent concentrations are periodically so low that secondary treatment does not reliably permit achievement of the 85 percent removal limit, even though Central City is in compliance with their concentration-based effluent limits issued by KPDES.

6.06 EXISTING COLLECTION AND CONVEYANCE SYSTEM

Central City is served by an existing wastewater collection and treatment system consisting of gravity sewers, pressure sewers, sewage lift stations, and one WWTP. The original collection system was installed in the early 20th century to serve what is now the downtown section of the city. The majority of this original system is comprised of vitrified clay pipe gravity sewers with brick and mortar manholes. There is some evidence to suggest that this original collection system was installed as a combined system to accommodate both wastewater and stormwater. Efforts have been made over the years to remove stormwater connections from the sanitary sewer system, but occasionally such connections are still uncovered.

Other portions of the city system that were developed after the original system was installed include clay pipe, concrete pipe, and cast iron. Portions of the system that were built from about the 1970s to the present are almost all polyvinyl chloride (PVC) with precast manholes, as are lines that have been replaced in that time frame.

Some of the outlying collection system uses pressure sewers and grinder pumps. Exhibit 6.06-1 shows the best available information on the type of pipe and system that exists in the existing collection system.

Referencing Exhibit 6.06-1, Central City's network of lift stations is made up of 19 lift stations. Each station varies in its pumping capacity, length and size of force main, and discharge point. Some stations pump from station to station, while others are pumped to a gravity manhole and flow naturally to the following system node.

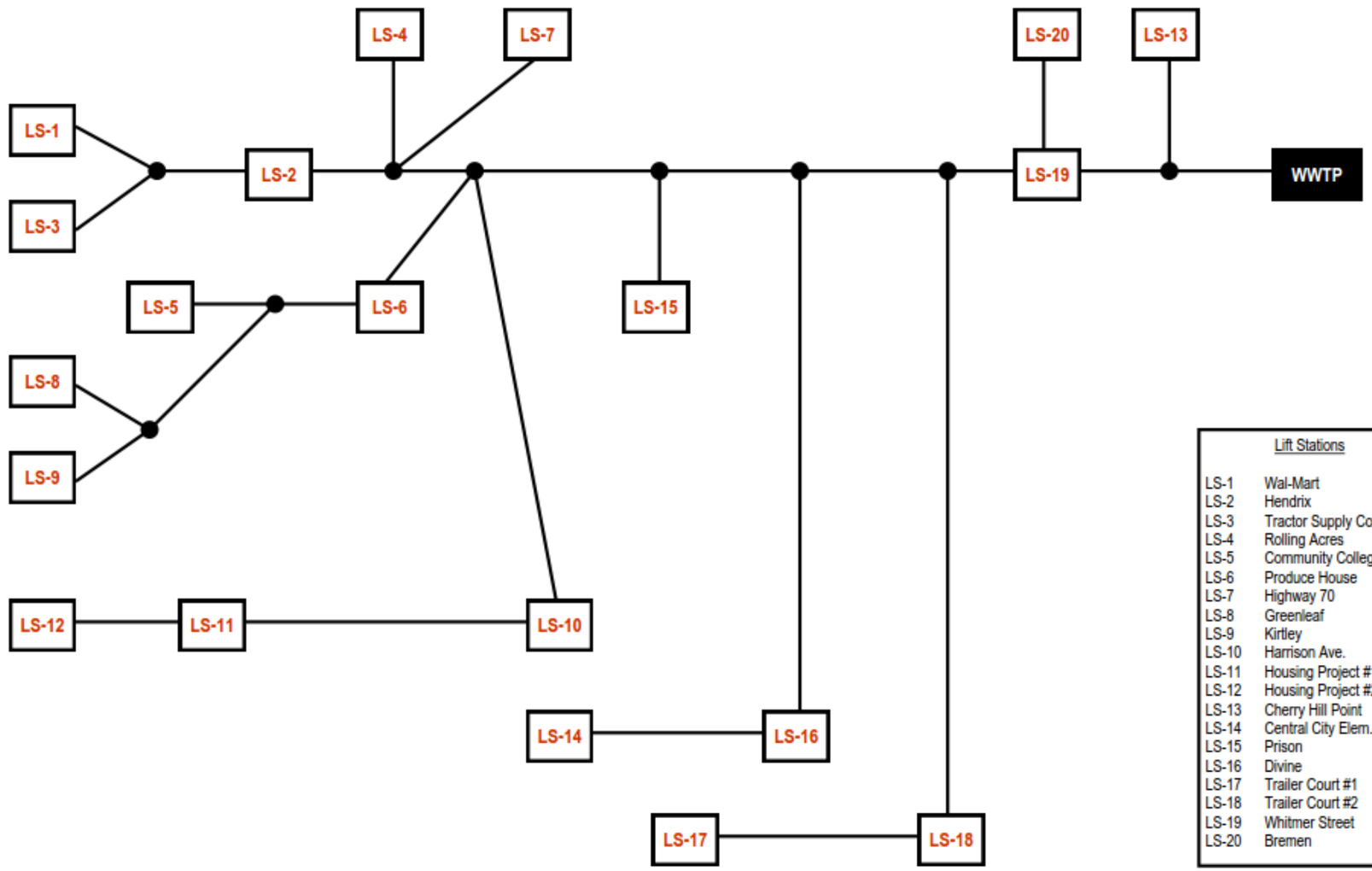
Measured at the wastewater plant, Central City currently experiences an average daily wastewater flow of 1,130,000 gallons and a maximum daily flow 3,800,000 gallons into the facility. Dry weather conditions result in a drop in the daily flow 400,000 to 600,000 gallons per day (gpd). The data available indicates there are approximately 2,137 total sewer taps capable of contributing to the system, with only 1,889 being active. These numbers equal an average daily flow of 598 gallons per active tap and a maximum daily flow of 2,024 gallons per active tap. Dry weather conditions still give a flow per active tap of 265 to 370 gallons per day.

Central City Municipal Water & Sewer Dept.

2014 Wastewater Facilities Plan
Wastewater Lift Stations

McGHEE ENGINEERING, INC.
Guthrie, Kentucky

Date	Approximate Plan Scale	Page
January 19, 2015	None	6.06-1



Lift Stations

LS-1	Wal-Mart
LS-2	Hendrix
LS-3	Tractor Supply Co.
LS-4	Rolling Acres
LS-5	Community College
LS-6	Produce House
LS-7	Highway 70
LS-8	Greenleaf
LS-9	Kirtley
LS-10	Harrison Ave.
LS-11	Housing Project #1
LS-12	Housing Project #2
LS-13	Cherry Hill Point
LS-14	Central City Elem. Sch.
LS-15	Prison
LS-16	Divine
LS-17	Trailer Court #1
LS-18	Trailer Court #2
LS-19	Whitmer Street
LS-20	Bremen

McGHEE ENGINEERING

CENTRAL CITY WASTEWATER FACILITIES PLAN
WASTEWATER LIFT STATIONS

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

STRAND ASSOCIATES®

EXHIBIT 6.06-1
5109.012

Using the common guidelines of 120 gallons per capita per day (gpcd) at average daily flow and 275 gpcd at maximum annual flow as a basis for determining if the I/I is excessive, Central City registers as excessive on both measures. Considering the population served to be 5,978 persons, the average daily flow per capita is 188 gallons and the maximum daily flow per capita is 640 gallons. Because the wet weather flows are so large, the annual average is skewed upward considerably. Using a dry weather flow of 700,000 gallons per day, which the plant rarely exceeds during dry weather conditions, the daily flow per capita is 117 gallons, which is within the limits for nonexcessive I/I.

During significant rainfall events, there is a substantial concentration of I/I entering the existing collection and conveyance system. This, along with the City's limited system mapping and inability to monitor flow throughout the system initially made pinpointing problem areas very difficult.

Over the past four years, the City has undertaken a program to identify and correct I/I and system overflows attributable to hydraulic overload. Significant achievements of that program include the following:

1. A comprehensive mapping of the collection system, including manhole inspections and measurements. This effort helped to produce the existing collection system layout presented in Exhibit 6.06-1.

2. A flow monitoring program to help identify high flow areas.

3. Smoke testing of the downtown area gravity collection system.

4. TV inspection of a portion of the downtown gravity system.

5. Replacement of 8 of the 19 lift stations in the system.

6. Replacement of force main piping for 3 of the new lift stations.

7. Replacement of 230 feet of existing gravity line, and lining via pipe bursting of 220 feet of existing clay sewer.

8. Dyed water tracing of certain lines and inlets to determine system routing and to attempt to locate inappropriate interconnections.

9. Multiple individual point repairs to correct items such as collapsed sewers, and stormwater connections.

Replacement of the eight lift stations has resulted in a more reliable system and has markedly reduced overflows that resulted from inoperable pumps. Replacement of the collection lines has had some slight reduction in I/I, although such reductions are hard to quantify.

This collection system work is ongoing. A section of failing pipe in Second Street is anticipated to be replaced this fall and more work is planned for next year. Even with an aggressive repair program, it is unlikely that Central City will be able to remove enough extraneous flow from its collection system to achieve compliance with its existing discharge permit limits for percent removal.

6.07 COLLECTION SYSTEM OPERATION, MAINTENANCE, AND COMPLIANCE

To aid in the operation and maintenance (O&M) of the existing sewer collection and conveyance system, Central City uses its own Sanitary Sewer Overflow Response Plan to minimize the impact of sanitary sewer overflows (SSOs) to the public and the environment. All SSOs are responded to in a timely manner to expedite the necessary steps to relieve the overflow. Relieving the sewage blockage and spill containment is of the highest priority, taking into consideration public health concerns. This response plan is the guideline for the standard operating procedures in the event of a SSO. The response plan is reviewed periodically to ensure that all corrective measures are being taken.

When City personnel become aware of a potential SSO during working hours, it notifies the collections system supervisor. After hours, the collections system supervisor is contacted, or if unavailable, the operator on duty at the WWTP is notified of a potential SSO, the lead contact person notifies all other staff members as needed from the Collections and Maintenance Department to assist in the spill response:

1. The crew responds to the site of the complaint with the proper spill response material and equipment. If the problem is identified as an actual spill, it may be necessary to send for additional materials or equipment.

2. The lead contact person assesses the problem and assigns the response crew job duties to eliminate the overflow.

3. If the problem escalates to an emergency situation, other city water and sewer employees may be called in to assist, and outside contractors or service providers will be called in as needed.

In the event the spill is located in a high traffic area, the lead contact person uses assistance from the City's police force to assist with providing detours, traffic control, or other services to assure public safety.

It is important to determine whether the overflow is being caused by a blockage or by hydraulic overload. If the cause is a line blockage, personnel immediately begin attempts to locate and remove the blockage. If the blockage is not relieved within the first few attempts, procedures to bypass the affected sewer are initiated.

1. Locate the nearest downstream manhole that can accept the additional flow.

2. Set up a 3-inch bypass trash pump for smaller collection lines and the 6-inch pump for larger transmission lines; this should be as a guideline, be advised that larger pumps may be needed. The pump discharge hose should be secured or placed far enough into the manhole that it will not come out during pumping. The pump and pump hose should be protected from traffic by barricades.

In the event the overflow is being caused by hydraulic overload, bypass may not be a feasible option. Central City works to contain the overflow to the smallest area possible and follows the containment procedures outlined below.

Containment is Central City's top priority during a sanitary sewer overflow event. City personnel make every effort to keep the SSO in as small of an area as possible. It is preferred that the crew keeps the SSO in the street and out of storm drains. To make sure the SSO is contained, the collections crew uses the following methods:

1. Use rubber blankets, 3-inch high rubber dams, or soil to keep the overflow from reaching a storm drain.

2. Should the overflow take place in an area not normally accessible to the public, such as fields and tributaries, the City personnel use any reasonable means to contain the flow in that area for recovery.

3. Should the flow be too much to be contained on the street and is identified as a danger to the public, the collections crew allows the flow to enter the storm drain or catch basin. The crew makes every reasonable attempt to dam up the spill in the storm drain or catch basin and recover it from that point.

All SSOs are reported as soon as: (1) the city has knowledge of the discharge, (2) reporting is possible, and (3) reporting can be provided without substantially impeding cleanup or other emergency measures. Central City reports SSOs in accordance with KPDES requirements.

1. The person currently responsible for reporting SSOs is:
   Tony Dixon, Maintenance Supervisor, (270) 543-1295.

2. In the event of any SSO, the following agencies will be notified.

   Kentucky Division of Water–Madisonville
   Main Number: (270) 824-7529

   City of Central City
   Main Number: (270) 754-2336

   State Health Department
   Main Number: (800) 372-2973 Fax: (502) 564-9523

   Muhlenberg County Health Department
   Main Number: (270) 754-3200 Fax: (270) 754-5149

Public health and safety are the top priority of the city. Proper signs to warn the public of potential contamination hazards are posted as follows after a SSO event.

1 . Posting of contamination signs are done in all cases whether there is standing water or the ground is saturated.

2 . Signs are placed in locations with high visibility so that they can be seen from all routes the public might take to enter an area.

3 . Signs remain posted for a period of not less than five days after completion of all remediation efforts.

Central City makes every effort to restore the environment to the condition that existed before the SSO occurred by using the following procedures:

1. If the SSO occurred in the street, apply household bleach to the affected area and use the nearest fire hydrant to wash down the area, dechlorinate if needed, and recover as much wash down water as possible. If the SSO occurred in an unpaved/dirt area, staff would apply hydrated lime as needed for odor control.

2 . Collect and dispose of any standing or pooled sewage that is accessible to the public.

3 . Recover any sewage within storm drains, channels, curb, gutters, and culverts.

4 . Clear surrounding area of paper, solids, and any other signs of a SSO.

5 . Replace vegetation, sidewalks, asphalt, fencing or any other items that were damaged as a result of the SSO or the work performed to restore service.

Central City prepares written documentation of the SSO and all remedial measures. The documentation includes, at a minimum, the following:

1 . Beginning and ending time.

2 . Exact location of the SSO.

3 . Any conditions that may have contributed to the cause of the SSO.

4 . Did the SSO reach surface waters or a storm drain?

5 . Estimate of total gallons spilled and the amount recovered.

6 . Damage that was caused and any repairs that were made.

7 . Photographs of the affected area.

In light of the aforementioned problems the city faces with I/I, Central City has been placed under an Agreed Order (see Appendix A). To meet the requirements set forth by this order, Central City proposes to increase the treatment capacity of the existing plant rather than attempting to isolate and replace the existing sanitary sewer system and its components.

6.08 INFILTRATION AND INFLOW

As previously mentioned, there is a considerable amount of I/I entering Central City's sewer collection and conveyance system. This added flow is most likely being caused by existing sections of sewer that are older and structurally unstable or failing (e.g., clay piping, brick and mortar manholes), sections of storm sewer that are unknowingly connected to the sanitary sewer, and various services lines that are failing or improperly tied in with the main collection system owned by the city. The downtown vicinity of Central City is particularly vulnerable to such I/I. Despite ongoing efforts to identify and disconnect storm drains, it is suspected that specifically in the downtown area, there remain storm sewers connected to the sanitary sewer system. It is also likely that several of the commercial buildings have roof and area drains that connect into the common sanitary drain.

Central City is under an Agreed Order with the State of Kentucky to rehabilitate the inadequate sewer treatment system. Along with recent construction projects completed as previously mentioned, Central City is currently in the design phase of replacing a large section of sanitary sewer along Broad Street between the 2nd Street intersection and the existing railroad tracks to the southwest. Projects like these continue to decrease the potential for I/I. However, to bring the system into compliance, it is imperative to increase the treatment capacity at the plant while simultaneously locating and correcting collection system problem areas.

SECTION 7
WASTE LOADS AND FLOW FORECAST

7.01 EXISTING WASTEWATER FLOWS AND LOADINGS

Discharge monitoring reports (DMR) for the Central City WWTP from January 1, 2010 through August 31, 2013, were reviewed to assess the existing flows and loadings to the WWTP. Table 7.01-1 summarizes historical flow and loading data for the past three years.

Parameter	Flow (mgd)	Concentration (mg/L)	Loading (lb/d)
EXISTING FLOWS			
Average Daily Flow	1.18	-----	-----
Peak Daily Flow	3.82	-----	-----
EXISTING LOADINGS AVERAGE			
$CBOD_5$		121	1,190
TSS		78	770
NH_3-N		12	118

[1]Data available for January 1, 2010, through August 31, 2013.

Table 7.01-1 Historical Central City WWTP Flows and Loadings[1]

7.02 PROJECTED DAILY WASTEWATER FLOWS

Several problems are encountered in projecting future wastewater flows for Central City. As with a lot of rural communities, Central City is projected to lose population over the planning period. This would tend to indicate that the projections for wastewater flow should trend downward as well. However, despite stagnant growth in recent years, wastewater flow has increased steadily in most communities similar to Central City. This is most likely explained by a combination of factors. First, per capita sewer usage in rural communities continues to increase as residents of these communities adopt more urban usage patterns. The fact that newer homes tend to have more water-consuming appliances (i.e., multiple bathrooms, dishwashers, garbage disposals) than homes of the past also plays a part. Also contributing to this trend is the aging of sewage infrastructure that allows more extraneous flow to enter the system. Given these considerations, it is probably inaccurate to assume that wastewater demand will decrease in the Central City system.

There are other somewhat more nebulous concepts that make flow projections difficult in Central City. As has been pointed out earlier, Central City's economy is tied closely to coal mining. History has shown a boom in the coal industry can add markedly to the population and corresponding sewer demand in a short amount of time. While these changes are not possible to project, the possibility is there and should be considered in projecting future sewer usage.

Central City has an active economic recruitment program. Again, while correctly projecting the success of such a program is difficult, the potential impact of even one new industry in the service area on sewer demand can be tremendous. One thing that can be said with certainty on the subject is that if a community does not have utility capacity to accommodate growth, growth will not occur. Projecting stagnation or decline becomes a self-fulfilling prophecy. For that reason, it is prudent to allow for at least some modest amount of unused capacity in the wastewater system even if immediate growth projections do not support doing so.

All the preceding discussion deals with projecting the average daily demand for sewage services. Another issue is projecting the peak flow appropriate for use in sewer main, pumping station, and treatment plant design. While the average flow is driven by the number of users, the peak flow number is often more dependent on the condition of the collection system. Central City has a collection system that is in poor condition in the downtown area (the oldest part of the system).

Several repair projects have been undertaken on this area in recent years with very little measurable effect on the peak flow at the WWTP. The reason for this is because the layout of the system is such that all flow into the plant is pumped by the Whitmer Street pump station. During heavy rainfall events, the peak flow at the plant is essentially equal to the pumping capacity of the Whitmer Street station for hours at a time. While the repairs have reduced flow into the system, it has not been enough to bring the total instantaneous flow down below the peak capacity of the pump station. Operators have reported that the duration of the flow peak seems to be lessening, which does indicate positive progress.

7.03 THE PROPOSED DESIGN CAPACITY OF THE CENTRAL CITY WWTP

The Central City WWTP is proposed to be expanded to handle the projected flows and loadings. The proposed average daily flow is 1.8 mgd and the proposed peak hourly flow is 8.0 mgd. The proposed influent loadings are based on the proposed flow and previous design concentrations. The proposed design capacity for the Central City WWTP expansion is summarized in Table 7.03-1.

Parameter	Flow (mgd)	Concentration (mg/L)	Loading (lbs/d)
DESIGN FLOWS			
Average Daily Flow	1.8	-----	-----
Peak Hourly Flow	8.0	-----	-----
DESIGN LOADINGS			
$CBOD_5$	-----	170	2,500
TSS	-----	150	2,300
NH_3-N	-----	17	250

Table 7.03-1 Proposed Design Capacity of the Central City WWTP

Expanding the average daily flow capacity to 1.8 mgd provides for a modest amount of excess capacity to provide growth capacity for the future without providing so much excess capacity as to represent an undue burden on rate payers should limited growth occur. Keeping the plant capacity under 2.0 MGD also allows it to be operated by the Class II operators currently employed.

The largest increase is in the peak flow capacity of the plant. Expanding the plant from its current peak flow capacity of 4.0 mgd to 8.0 mgd provides much greater capacity to handle the I/I that the system experiences. While it is presently not possible to measure the actual maximum amount of flow that would be received at the plant during heavy rainfall events, the best estimates of the maximum flow are in the range of 7.0 to 7.6 mgd. 8.0 mgd should provide capacity to handle the high flow without system surcharge or overflow. 8.0 mgd is also more in keeping with the Ten States Standards recommendation for a minimum peak flow capacity multiplier of 3.7 times average daily flow. 8.0 mgd provides a multiplier of 4.4.

7.04 THE WLA OF THE PROPOSED WWTP EXPANSION

A WLA request for the Central City WWTP expansion was sent to KDOW on May 19, 2013. The subsequent WLA letter was received on March 19, 2014. A copy of this letter is included in Appendix C.

The proposed discharge permit water quality limits are identical to the limits under the current permit.

Parameter	Loading (lb/day)	Quality or Concentration (mg/L)			
	Monthly Average	Monthly Average	Weekly Average	Daily Minimum	Daily Maximum
Design Flow (1.80 mgd)	-----	Report	Report	-----	-----
ANTICIPATED GREEN RIVER DISCHARGE EFFLUENT LIMITS[1]					
$CBOD_5$	450	30	45	-----	-----
TSS	450	30	45	-----	-----
E. coli (Geometric Mean)	-----	130 colonies per 100 mL	240 colonies per 100 mL	-----	-----
NH_3-N	300	20	30		
Dissolved Oxygen	-----	-----	-----	2.0	-----
pH	-----	-----	-----	6.0	9.0

[1]Based on Wasteload Allocation Letter (see Appendix C).

Table 7.04-1 Anticipated KPDES Effluent Limitations–Central City WWTP

SECTION 8
EVALUATION OF ALTERNATIVES

8.01 INTRODUCTION

This section presents wastewater treatment and collection alternatives available for the projected flows and loadings within the Central City Planning Area. Various alternatives are identified and those deemed the most appropriate are evaluated for cost-effectiveness including a present worth evaluation of capital and O&M costs. Additionally, nonmonetary factors are considered for each alternative to determine which alternative is the most suitable.

8.02 SCREENING OF WASTEWATER TREATMENT ALTERNATIVES

The last major expansion at Central City WWTP was completed in 1988. The expansion included a new influent pump station, new headworks structure, new Orbal oxidation ditch with extended aeration, two new clarifiers, new UV disinfection, and conversion of an existing clarifier to the effluent pumping station.

The Central City WWTP is proposed to be expanded within the next 5 years. The proposed expanded average daily flow capacity is 1.8 mgd and the peak hourly flow capacity is 8.0 mgd, as derived in Section 7.

Four alternatives have been developed for the Central City WWTP to handle the projected flows and loadings. The proposed alternatives for the Central City WWTP expansion are as follows:

- No action alternative.
- Equalization alternative–Construct a 12.0-million-gallon equalization basin following the influent pump station to hold increased flow until the existing plant has adequate capacity for treatment.
- Alternative A–Expand the Central City WWTP to 1.8 mgd by adding another ring to the existing Orbal oxidation ditch, a third final clarifier, more UV disinfection capacity, and more effluent pumping capacity.
- Alternative B–Expand the Central City WWTP to 1.8 mgd by adding another Orbal oxidation ditch, a third final clarifier, more UV disinfection capacity, and more effluent pumping capacity.

Optimization of the existing WWTP was considered in Central City. The plant has occasionally received flows above the hydraulic capacity of the plant and handled them successfully. The plant currently employs an extended aeration (low rate) activated sludge process and based on the configuration of the oxidation ditch is not a good candidate for conversion to a higher rate activated sludge process. The facility has inadequate hydraulic capacity to effectively treat the higher peak flows that are planned and therefore requires expansion for both hydraulic and organic needs.

8.03 POSSIBLE REGIONALIZATION

Regionalization of wastewater management will help to minimize the number of wastewater discharges into state waters. This is accomplished through prevention of new discharges when possible, connection to existing facilities, or the connection of one or more existing facilities into a new or existing regional treatment facility.

The Central City WWTP is the only regional treatment facility in the planning area; therefore consolidating wastewater treatment with another facility is not feasible. On-site septic treatment systems throughout the planning area will be removed from service during the planning period with the wastewater ultimately conveyed to the Central City WWTP.

Central City is one of four municipal sewer systems in Muhlenberg County and one of three that operates a WWTP. Central City is the largest community with a plant, followed by Greenville, then Drakesboro. Powderly has a collection system but pumps its wastewater to Greenville for treatment. Central City, Greenville, and Drakesboro form a triangle, with each being about 8 miles from the other.

At the present time, none of the three plants has capacity to serve both of the other communities. If Muhlenberg County were to grow significantly, it might someday be advantageous to build one regional plant to serve all three communities. With current populations and trends, however, it would be cost-prohibitive to build the pipeline and pumping facilities, plus expand one of the existing plants, or build a new plant to serve all three communities.

8.04 NO ACTION ALTERNATIVE

The “No Action” alternative does not require additional sewers, pumping stations, and construction of treatment plant capacity, nor does it provide for anticipated growth in the Central City Planning Area. The alternative would include maintaining the present wastewater treatment, collection, and conveyance systems without the needed improvements. The advantage of this alternative is no construction expenditure and no environmental impact for the direct effects of construction of the new facilities. However, this alternative fails to address needs for population growth in the Central City Planning Area and fails to address the problems with overflows occurring at the influent pump station. Central City is under an Agreed Order to correct these issues, and therefore, this “No Action” alternative is not a viable alternative and will not be considered further.

8.05 EQUALIZATION ALTERNATIVE

This alternative includes constructing a 12.0-million-gallon equalization basin to hold any flow the WWTP receives in excess of its 4.0 mgd capacity. This alternative would not include expanding any of the WWTP processes. To construct this alternative, Central City would need to acquire land adjacent to the WWTP to have adequate room to construct this equalization basin. The adjacent land to the Central City WWTP is a wetland, and acquiring this land would not be a viable option. For this reason, an equalization alternative was no longer considered.

8.06 COMMON EXPANSION REQUIREMENTS AT CENTRAL CITY WWTP

Several process components for the Central City WWTP expansion are required to be made, regardless of which alternative is selected. Those common expansion requirements include the following:

1. Expand the influent pump station to provide higher pumping capacity to the Central City WWTP.

2. Provide a new preliminary treatment facility to handle peak flow up to 12.0 mgd.

3. Expand the final clarification process capacity by adding an additional 82-foot-diameter clarifier. A RAS pumping and scum pumping facilities will be included along with the new clarifier.

4. Double the UV disinfection capacity to meet future peak flow required capacity.

5. Expand the effluent pumping and force main to transport the projected peak effluent flow to Green River.

6. Provide additional sludge dewatering capacity due to the limited capacity of the existing sludge drying beds.

Each of these six components will be discussed further.

A. Influent Pump Station and Force Main Expansion

All flow to the existing WWTP is pumped by the Whitmer Street lift station located about 1,600 feet from the plant. The pump station has three 40 hp dry well-type centrifugal sewage pumps, each rated at 1,400 GPM at 65 feet total dynamic head (TDH). The pumps are approximately 40 years old, and do not produce their design flows. The station should be able to deliver 4.0 mgd to the plant with two pumps operating. A review of flow records indicates that during prolonged rainfall events where the pumps run nonstop, the station only pumps 3.2 to 3.6 mgd.

In 1990, the station was retrofitted with a diesel generator capable of operating the pumps in the event of a prolonged power outage and variable frequency drives (VFDs).

Because of the advanced age of the equipment, and the desire of the operators to use a safer and more maintenance friendly design, the existing station will be replaced entirely with an adjacent submersible type pump station. The new station will have a firm rating of 5,600 gallons per minute (gpm) to match the plant hydraulic capacity of 8.0 mgd.

Since dry weather flows to the plant drop to around 400,000 gpd, it is desirable to have an influent pump station that can cover a wide range of flows. This will be researched in greater detail during the

design phase, but the initial concept is to provide two low-flow pumps each with VFD controls suitable for pumping flows of 0.5 to 1.0 mgd (350 to 700 gpm), and two high-flow pumps with VFDs each suitable for pumping flows of 4.0 to 8.0 mgd (2,800 to 5,600 gpm).

The existing pump station is connected to the plant by a 14-inch ductile iron force main. At the original design maximum flow rate of 2,800 gpm, the velocity in the force main would be 5.1 feet per second (fps). This is a reasonable velocity for a sewage force main in this application. Since the plan is to double the maximum flow capacity of the station, using just the existing 14-inch line would generate a velocity in the line of 10.2 fps, which is above the normally acceptable velocity in a force main and would result in high friction losses and high pumping costs. Since the existing 14-inch ductile iron line is in good condition, there is no reason to abandon it.

Considering this, the plan is to build a second, parallel 14-inch ductile iron force main from the new Whitmer Street lift station to the wastewater plant headworks.

B. New Headworks Structure

A new preliminary treatment facilities (headworks structure) is proposed at Central City WWTP to handle the design peak flow. The new headworks structure will house a mechanically cleaned screen, a manually cleaned bypass bar screen, a grit removal facility, and a Parshall flume for influent flow measurement. The existing headworks structure will be demolished since it is too small to handle the proposed peak flow and not able to be expanded without demolishing the existing oxidation ditch structure. While the design peak hourly flow capacity at the WWTP is 8.0 mgd, the new headworks is proposed with 12.0 mgd capacity to give operators some extra capacity to handle higher peak flow, which may occur in the future. This extra capacity will add a very small cost to the new headworks structure.

C. Clarification Process Expansion

One 82-foot-diameter secondary clarifier is proposed in this expansion. The location of this clarifier is shown on Exhibit 8.07-2 for Alternative A and on Exhibit 8.07-4 for Alternative B. The new clarifier is proposed to receive 60 percent of the ML flow while the two existing clarifiers handle 40 percent of the ML flow from the aeration process. The new clarifier will be constructed at the same elevation as the existing clarifiers to keep the plant's hydraulic components functioning in their current mode. The existing ML splitter box will be demolished and new ML splitter box will be constructed to proportionally divide the ML flow to the new clarifier and existing clarifiers. The new RAS and scum pumping stations will be constructed along with the new clarifier.

D. UV Disinfection Expansion

The existing UV system is capable of treating the effluent peak flow of 5.0 mgd. A new UV system identical to the existing UV system is proposed to expand the disinfection capacity and provide added redundancy at average flows. This expansion will raise the total disinfection capacity at the

Central City WWTP to 10.0 mgd to give operators some extra capacity to handle higher peak flow, which may occur in the future.

E. Effluent Pumping Expansion

The existing effluent pump station at the Central City WWTP includes four pumps, two small pumps and two larger pumps. The capacity of the existing pump station is based on the operation of one large pump or 4.0 mgd. The existing 14-inch force main is the main limitation of the pump station. Therefore, a new parallel 14-inch force main to the Green River is proposed to expand the pump station capacity. One larger pump will be added at the existing effluent pump station to satisfy the redundancy requirement. A new effluent force main will be laid parallel to the existing effluent force main. The new pump will be installed in the location of existing pumps and use the same wet well. Use of both force mains and two larger pumps (one pump for each force main) will allow the Central City WWTP to convey up to 8.0 mgd of effluent to the Green River.

F. Solids Dewatering Facilities Expansion

The existing sludge drying beds at the Central City WWTP are at their design capacity and are weather-dependent. A mechanical sludge dewatering system would avoid the effect of the inability to dewater sludge during wet weather. A budget is considered for providing a mechanical sludge dewatering system at the WWTP. The new sludge dewatering system will include sludge pumping, a polymer feed system, a wash water system, dewatering equipment, and a solids conveyor.

In addition to these six common expansion requirements, further changes to the plant would need to be made to meet the 85 percent removal requirement for BOD and TSS currently present in Central City's KPDES permit. This estimated cost of effluent filtration presented in this report was calculated under the assumption that KDOW will issue a permit modification allowing Central City to comply with mass limits in lieu of percent removal requirements. If this modification to the permit is not made, further evaluation will need to be done for Central City to reliably meet the 85 percent removal requirement.

8.07 CENTRAL CITY WWTP EXPANSION ALTERNATIVES

Two alternatives will be considered for expansion of the Central City WWTP to treat a projected average daily flow of 1.8 mgd and a projected peak hourly flow of 8.0 mgd. The treatment process alternatives are selected for the effluent limits provided by the WLA.

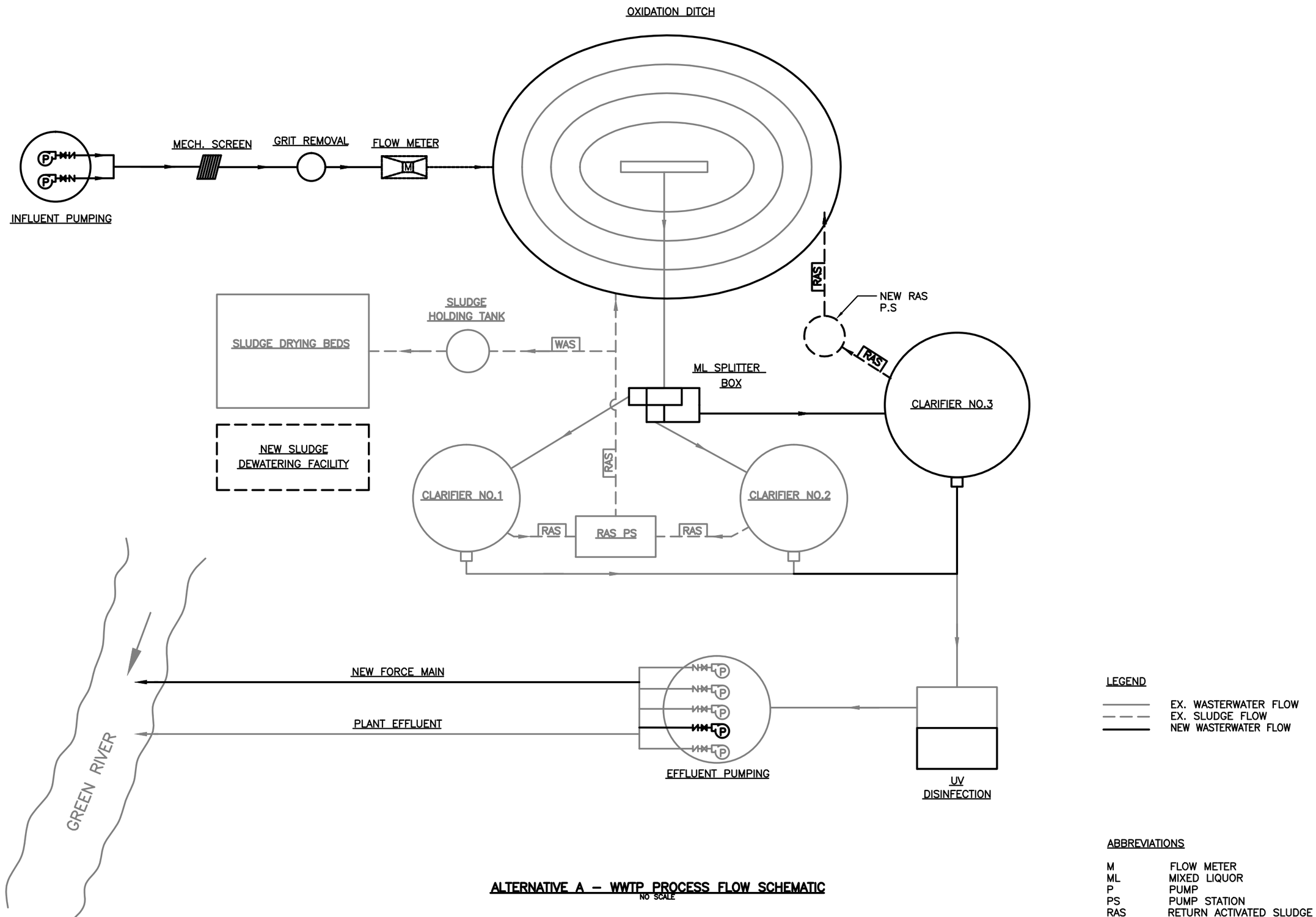
A. Alternative A–Expand the Central City WWTP to 1.8 mgd by Adding Another Ring to the Existing Orbal Oxidation Ditch

Alternative A includes expanding the existing oxidation ditch to treat an average daily flow of 1.8 mgd and the subsequent increased organic loadings. This could be accomplished by adding a fourth ring to the existing oxidation ditch. This alternative will add about 0.58 million gallons (mil gal) to the existing oxidation ditch, which brings the total effective volume

of the extended aeration process to 1.5 mil gal. Exhibit 8.07-1 represents the flow schematic for Alternative A while Exhibit 8.07-2 shows the site location plan for this Alternative. The design criteria for Alternative A is listed in Table 8.07-1.

TABLE 8.07-1 ALTERNATIVE A–ADDING ANOTHER RING TO EXISTING OXIDATION DITCH

Design Flows		
Average Daily Flow	1.8 mgd	
Peak Hourly Flow	8.0 mgd	
Design Loadings		
BOD_5	170 mg/L	2,500 lbs/day
TSS	150 mg/L	2,300 lbs/day
NH_3-N	17 mg/L	250 lbs/day
Influent Pump Station		
Type of Pumps	Submersible	
Number of Pumps	4	
Design Capacity (Pumps #1 and #2)	700 gpm @ 50 FT	
Design Capacity (Pumps #2 and #3)	2,800 gpm @ 65 FT	
Pump HP (Pumps #1 and #2)	20	
Pump HP (Pumps #2 and #4)	100	
Speed Control	VFD	
Force Main	1-14" DIP (Existing)	
	1-14" DIP (Proposed)	
Influent Screening		
Number of Channels	2	
Number of Mechanically Cleaned Screen	1	
Design Capacity	12.0 mgd	
Number of Manually Cleaned Screen	1	
Design Capacity	12.0 mgd	
Grit Collectors		
Number of Grit Chambers	1 (1 new)	
Collector Type	Vortex	
Design Capacity	12.0 mgd	
Grit Pumps		
Number of Grit Pumps	2 (1+ 1 standby)	
Type of Pump	Torque-flow with vortex impeller	
Design Capacity	250 gpm (each)	



ALTERNATIVE A – WWTP PROCESS FLOW SCHEMATIC
NO SCALE

McGHEE ENGINEERING

ALTERNATIVE A - WWTP PROCESS FLOW SCHEMATIC

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

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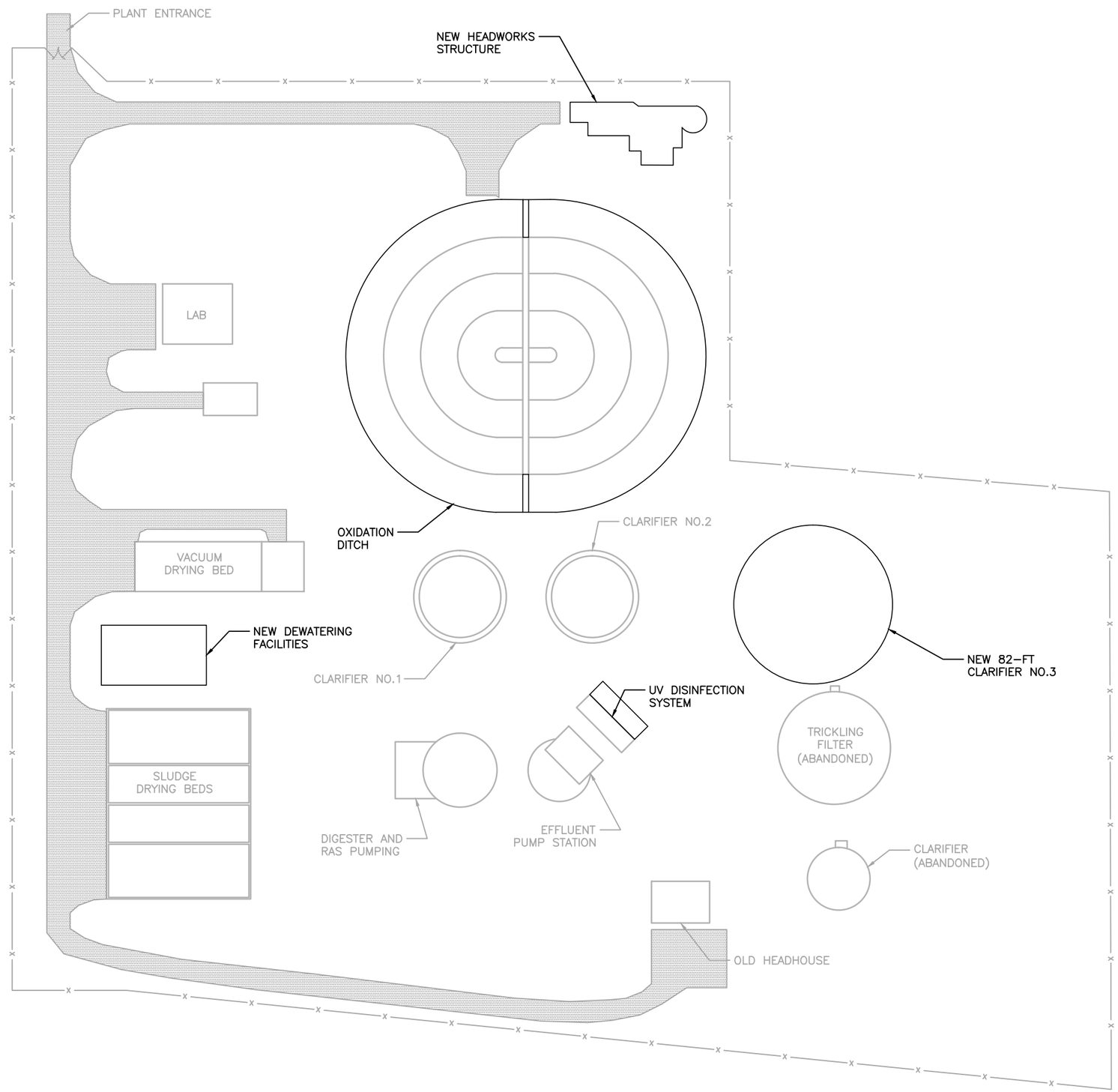
EXHIBIT 8.07-1
5109.012

File: S:\LOU\5100--5199\5109\012\Acad\Figure 8.06-1 – WW Flow Schematic A.dwg Time: Jan 28, 2014 – 3:21pm



ALTERNATIVE A – SITE LOCATION PLAN

0 15' 30' 60'

N

MCGHEE ENGINEERING

ALTERNATIVE A - SITE LOCATION PLAN

CENTRAL CITY WASTEWATER FACILITIES PLAN
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MUHLENBERG COUNTY, KENTUCKY

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EXHIBIT 8.07-2
5109.012

File: S:\LOU\5100--5199\5109\012\Acad\Figure 8.06-2 – Site Location Plan A.dwg Time: Jan 28, 2014 – 3:22pm

Grit Classifier

Number of Grit Classifier	1
Type of Grit Classifier	Inclined Auger
Design Capacity	55 ft^3/hr

Influent Flow Measurement

Number of Meters	1
Type of Meter	Parshall Flume
Size	18-inch
Capacity	15.9 mgd

Oxidation Ditch

Number of Basins	1 (existing with 1 new ring)
Total Effective Aeration Volume	1.5 mil gal
Number of Aerators	6 (4 existing and 2 new)
Existing Aerators	2 at 40 hp and 2 at 20 hp
New Aerators	2 at 30 hp
BOD Loadings	12.5 lbs/1000 ft^3
Hydraulic Detention Time	20 hrs @ ADF

Clarifiers

Number of Units	3 (2 existing small + 1 new large)
Clarifier Diameter	82 feet per larger clarifier
	48 feet per small clarifier
Total Surface Area	8,900 ft^2
Surface Loading Rate	202 gpd/ft^2 @ ADF
	899 gpd/ft^2 @ PHF
Solids Loading Rate (2,500 mg/L MLSS)	
@ 1.8 mgd + 1.8 mgd RAS	8.4 lbs/d/ft^2
@ 8.0 mgd + 2.7 mgd RAS	25.1 lbs/d/ft^2

RAS Pumps (Existing)

Type of Pump	Centrifugal
Number of Pumps	3 (existing)
Design Capacity	700 gpm each
Firm Capacity	1,250 gpm (with 2 pumps in operation)

RAS Pumps (New)

Type of Pump	Submersible
Number of Pumps	2
Design Capacity	1,125 gpm each
Firm Capacity	1.62 mgd

UV Disinfection

Number of Channels	2 (1 existing + 1 new)
Number of UV Disinfection Units	6 (3 banks per channel)
UV Transmission	65%
Total Capacity	10.0 mgd

Effluent Pump Station

Type of Pumps	Turbine
Number of Pumps	5 (2 existing large + 2 existing small + 1 new large)
Design Capacity	1,000 gpm per each small pump
	2,800 gpm per each large pump
Firm Capacity	8.0 mgd
Force Mains	1 force main at 14-inch (existing)
	1 force main at 14-inch (new)

Biosolids Holding (Existing)

Number of Tanks	1
Total Volume	95,000 gallons
Type of Aeration	Coarse Bubble Diffusion

Biosolids Holding Air Supply (Existing)

Number of Blowers	2
Type	Positive Displacement
Blower Capacity (ea.)	400 scfm
Design Mixing	30 scfm/1000 ft^3
Drive Type	Constant Speed

Sludge Dewatering (Existing)

Type	Sludge Drying Beds
Number of Units	4
Surface Area	7500 ft^3

Sludge Dewatering (New)

Type	Belt Filter Press, or similar
Number	1
Size	1.5 meter
Solids Capacity	950 lbs/hr
Liquid Capacity	180 gpm

Sludge Feed Pumps (New)

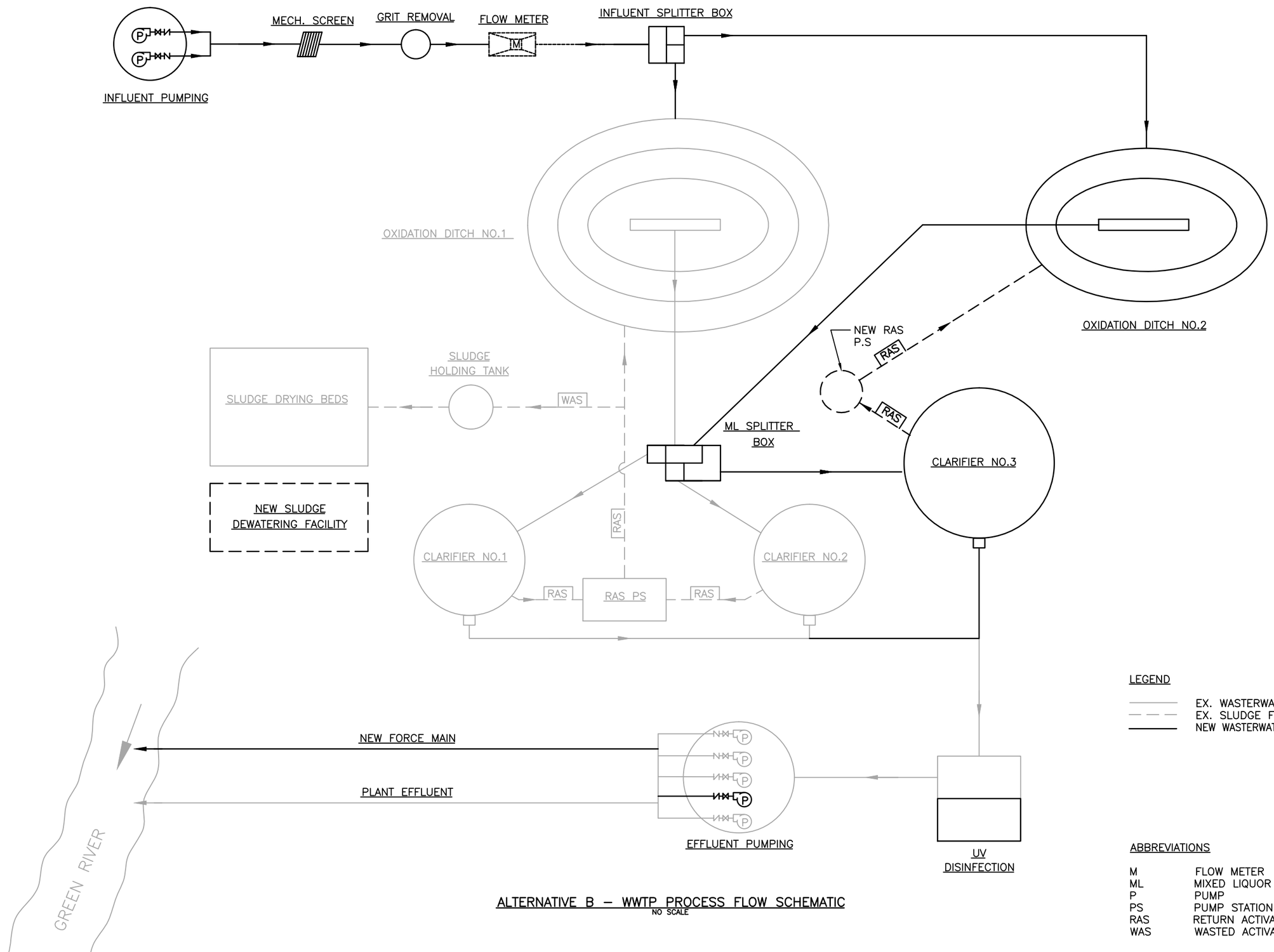
Number	2
Type	Centrifugal
Size	200 gpm
Control	Variable Speed Drive

B. Alternative B–Expand the Central City WWTP to 1.8 mgd by Constructing a Second Oxidation Ditch

Alternative B includes constructing a second oxidation ditch with the effective aeration volume equal to the aeration volume of the fourth ring in Alternative A. A ML splitter box will be constructed in this alternative to divide the ML flow between the new oxidation ditch and existing oxidation ditch. Exhibit 8.07-3 represents the flow schematic for Alternative B while Exhibit 8.07-4 shows the site location plan for this Alternative.

TABLE 8.07-2 ALTERNATIVE B–CONSTRUCT A NEW OXIDATION DITCH

Design Flows		
Average Daily Flow	1.8 mgd	
Peak Hourly Flow	8.0 mgd	
Design Loadings		
BOD_5	170 mg/L	2,500 lbs/day
TSS	150 mg/L	2,300 lbs/day
NH_3-N	17 mg/L	250 lbs/day
Influent Pump Station		
Type of Pumps	Submersible	
Number of Pumps	4	
Design Capacity (Pumps #1 and #2)	700 gpm @ 50 FT	
Design Capacity (Pumps #2 and #3)	2,800 gpm @ 65 FT	
Pump HP (Pumps #1 and #2)	20	
Pump HP (Pumps #2 and #4)	100	
Speed Control	VFD	
Force Main	1-14" DIP (Existing)	
	1-14" DIP (Proposed)	
Influent Screening		
Number of Channels	2	
Number of Mechanically Cleaned Screen	1	
Design Capacity	12.0 mgd	
Number of Manually Cleaned Screen	1	
Design Capacity	12.0 mgd	
Grit Collectors		
Number of Grit Chambers	1 (1 new)	
Collector Type	Vortex	
Design Capacity	12.0 mgd	



ALTERNATIVE B – WWTP PROCESS FLOW SCHEMATIC
NO SCALE

MCGHEE ENGINEERING

ALTERNATIVE B - WWTP PROCESS FLOW SCHEMATIC

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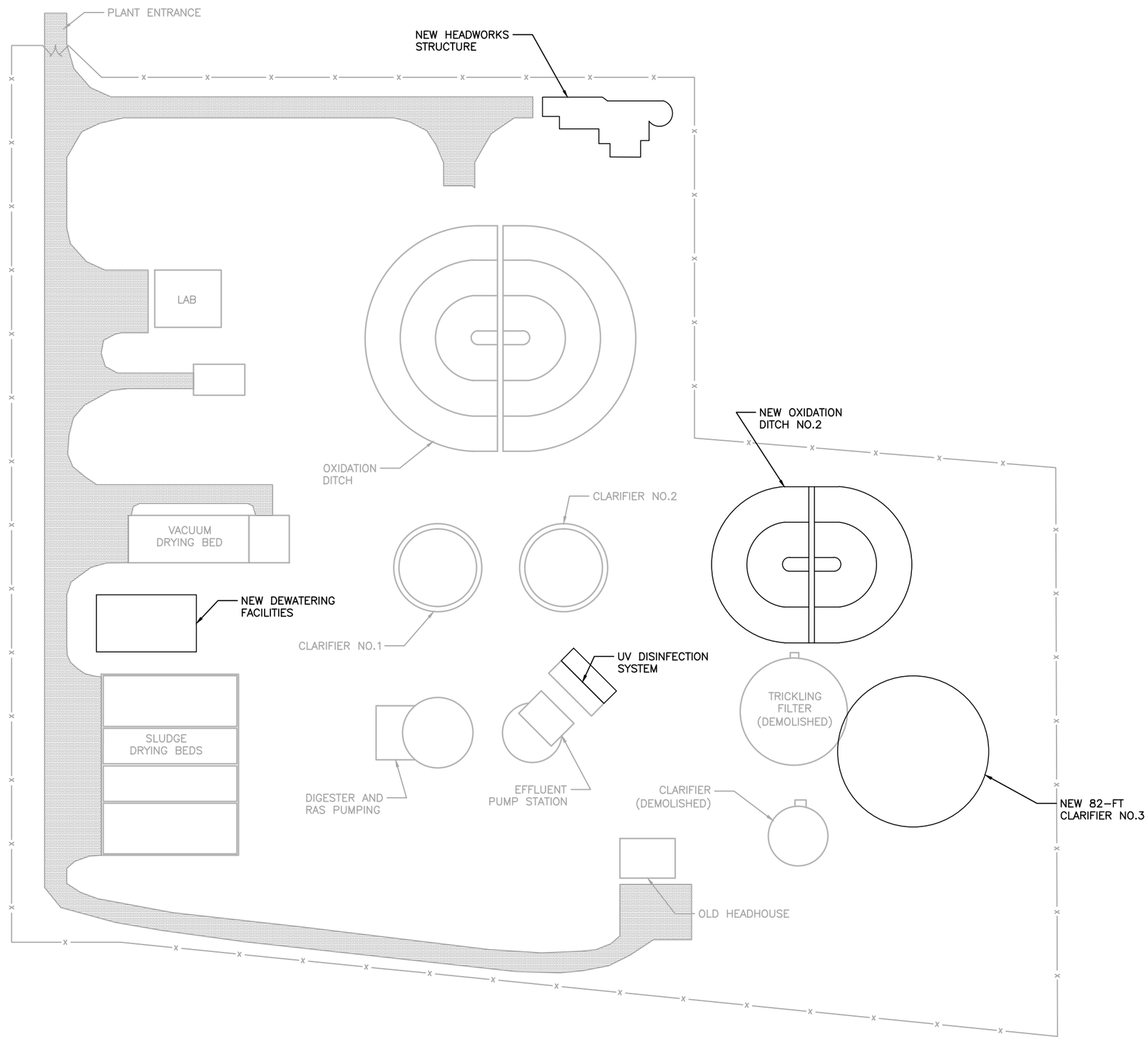
File: S:\LOU\5100--5199\5109\012\Acad\Figure 8.06-3 – WW Flow Schematic B.dwg Time: Jan 28, 2014 – 3:23pm



ALTERNATIVE B – SITE LOCATION PLAN

0 15' 30' 60'

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ALTERNATIVE B - SITE LOCATION PLAN

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5109.012

File: S:\LOU\5100--5199\5109\012\Acad\Figure 8.06-4 – Site Location Plan B.dwg Time: Jan 28, 2014 – 3:24pm

Grit Pumps

Number of Grit Pumps	2 (1+ 1 standby)
Type of Pump	Torque-flow with vortex impeller
Design Capacity	250 gpm (each)

Grit Classifier

Number of Grit Classifier	1
Type of Grit Classifier	Inclined Auger
Design Capacity	55 ft^3/hr

Influent Flow Measurement

Number of Meters	1
Type of Meter	Parshall Flume
Size	18-inch
Capacity	15.9 mgd

Oxidation Ditches

Oxidation Ditch No.1 (existing)	*3-ring Ditch*
Effective Aeration Volume	950,000 gal
Number of Aerators	4 (2 at 20 hp and 2 at 40 hp)
Aerators Control	constant speed
Oxidation Ditch No.2 (new)	*2-ring Ditch*
Effective Aeration Volume	580,000 gallon
Number of Aerators	2
Overall BOD Loading	12.5 lbs/1000 ft^3
Hydraulic Detention Time	20 hrs @ ADF

Clarifiers

Number of Units	3 (2 existing small + 1 new large)
Clarifier Diameter	82 feet per larger clarifier
	48 feet per small clarifier
Total Surface Area	8,900 ft^2
Surface Loading Rate	202 gpd/ft^2 @ ADF
	899 gpd/ft^2 @ PHF
Solids Loading Rate (2,500 mg/L MLSS)	
@ 1.8 mgd + 1.8 mgd RAS	8.4 lbs/d/ft^2
@ 8.0 mgd + 2.7 mgd RAS	25.1 lbs/d/ft^2

RAS Pumps (Existing)

Type of Pump	Centrifugal
Number of Pumps	3 (existing)
Design Capacity	700 gpm each
Firm Capacity	1,250 gpm (with 2 pumps in operation)

RAS Pumps (New)

Type of Pump	Submersible
Number of Pumps	2
Design Capacity	1,125 gpm each
Firm Capacity	1.62 mgd

UV Disinfection

Number of Channels	2 (1 existing + 1 new)
Number of UV Disinfection Units	6 (3 banks per channel)
UV Transmission	65%
Total Capacity	10.0 mgd

Effluent Pump Station

Type of Pumps	Turbine
Number of Pumps	5 (2 exiting large + 2 existing small + 1 new large)
Design Capacity	1,000 gpm per each small pump
	2,800 gpm per each large pump
Firm Capacity	8.0 mgd
Force Mains	1 force main at 14-inch (existing)
	1 force main at 14-inch (new)

Biosolids Holding (Existing)

Number of Tanks	1
Total Volume	95,000 gallons
Type of Aeration	Coarse Bubble Diffusion

Biosolids Holding Air Supply (Existing)

Number of Blowers	2
Type	Positive Displacement
Blower Capacity (ea.)	400 scfm
Design Mixing	30 scfm/1000 ft^3
Drive Type	Constant Speed

Sludge Dewatering (Existing)

Type	Sludge Drying Beds
Number of Units	4
Surface Area	7,500 ft^2

Sludge Dewatering (New)

Type	Belt Filter Press, or similar
Number	1
Size	1.5 meter
Solids Capacity	950 lbs/hr
Liquid Capacity	180 gpm

Sludge Feed Pumps (New)

Number	2
Type	Centrifugal
Size	200 gpm
Control	Variable Speed Drive

8.08 PROJECT COSTS

A. Central City WWTP Expansion Probable Construction Cost

The overall wastewater treatment Alternatives A and B were evaluated with respect to the costs associated with each alternative. Monetary evaluations were conducted for the two alternatives to determine the least cost alternative based on the present worth of the projected construction cost and annual operation and maintenance cost. The total project cost includes 7 percent for general conditions, such as bonds and insurance, and 33 percent for contingencies and technical services. Table 8.08-1 presents the opinion of probable construction cost for the two evaluated alternatives. The detailed opinion of probable construction cost for each alternative is included in Appendix D.

Central City WWTP Proposed Expansion	Construction Cost Opinion[2]	Total Project Cost[1,2]
Alternative A–Expand biological treatment process with adding a 4th ring in existing oxidation ditch.	$7,500,000	$10,835,000
Alternative B–Expand biological treatment process with adding a second oxidation ditch.	$7,930,000	$11,449,000

[1]Includes 7 percent Bonds and Insurance plus 33 percent Construction Contingency and Technical Services.
[2]Fourth Quarter 2014 dollars.

Table 8.08-1 Opinion of Probable Cost for the Proposed Expansion of Central City WWTP[2]

B. Central City WWTP Expansion O&M Cost

The O&M costs are the same for both alternatives. The power consumption for both alternatives are identical since both alternatives used the same extended aeration process. Both alternatives also required the same labor force and generated the same amount of sludge. Therefore, it is suggested to disregard the O&M cost in the present worth comparison.

C. Present Worth Cost-Effective Analysis

Table 8.08-3 summarizes a cost-effective analysis (total present worth) for the two proposed alternatives to expand the Central City WWTP.

Central City WWTP Expansion	Alternative A	Alternative B
Structure, Building, Piping	$3,320,000	$3,530,000
Equipment and Electrical Instrumentation	$4,180,000	$4,400,000
Subtotal Construction Cost	*$7,500,000*	*$7,930,000*
Salvage Values		
Salvage Value in 20 years	($2,090,000)	($2,200,000)
Present Worth of Salvage Value[1]	($788,000)	($829,000)
Total Present Worth[2]	**$6,713,000**	**$7,097,000**

[1]With 5 percent discount rate.
[2]Excludes O&M costs.

Table 8.08-3 Total Present Worth for the Central City WWTP Expansion

8.09 NONMONETARY EVALUATION

The cost-effective analysis previously discussed in this section considers only cost implications of each alternative. In addition to monetary costs, other factors should be considered in evaluating alternatives. These factors are often called nonmonetary factors and they can influence the selection of an alternative. The nonmonetary factors considered are ability to implement, environmental impact, engineering evaluation, public support, and regionalization.

The two alternatives are compared with respect to these factors in the following discussion. Table 8.09-1 presents an overview of this nonmonetary evaluation.

A. Ability to Implement

Alternative A is judged most favorable in ability to implement because it can be placed within the existing constraints on the Central City WWTP site. Alternative B would require removing the existing trickling filter to have room to construct the new clarifier. Alternative B will require the City to purchase additional land in order to meet 200-foot offset requirement from existing structures.

B. Environmental Impact

Both Alternative A and B are expected to have minimal impact on the environment since they will be constructed within the existing site, with the exception of a new force main that will be constructed to parallel the existing force main. The force main is required for each alternative.

C. Engineering Evaluation

The same design criteria were used for developing and evaluating the treatment processes for both alternatives. Both alternatives were judged reliable and there are no significant differences in engineering issues between them. However Alternative B is a simpler design, so it received a more favorable rating than Alternative A.

D. Public Support

A public meeting will be arranged with interested citizens to hear their input and recommendations. No significant difference in public support between the two alternatives is anticipated. The public hearing is required as a part of the Regional Wastewater Facilities Plan.

E. Regionalization

There is no significant difference between the two alternatives in terms of the future expansion or the ability to provide for future regionalization.

Nonmonetary Factor	Alternative A Add 4th ring to existing oxidation ditch	Alternative B Add a second oxidation ditch
Ability to Implement	+1	-1
Environmental Impact	0	0
Engineering Evaluation	0	+1
Public Support	+1	+1
Regionalization	0	0
Total	+2	+1

Note: "+1" indicates alternative is favorable with respect to a given evaluation factor, "0" indicates a neutral ranking, and "-1" indicates alternative is unfavorable with respect to a given evaluation factor.

Table 8.09-1 Evaluation of Nonmonetary Factors

8.10 RECOMMENDED CENTRAL CITY WWTP ALTERNATIVE

Based on the monetary, nonmonetary evaluations, and input from the Central City staff, Alternative A, expanding the Central City WWTP to 1.8 mgd with a new headworks structure, adding another ring to the existing Orbal oxidation ditch, constructing a new 82-foot-diameter clarifier, and expanding the UV disinfection and effluent pump station is the recommended alternative. The alternative also includes several improvements at the treatment facilities such as a new solids handing system and influent flow measurement. This alternative has the lowest capital cost, lowest present worth cost, and best nonmonetary features. Table 8.10-1 illustrates the opinion of probable cost for the recommended alternative.

Central City WWTP Recommended Expansion	Construction Cost Opinion[2]	Total Project Cost[1,2]
Expand the Central City WWTP to 1.8 mgd with a new influent pump station, influent force main, new headworks structure, another ring to the existing oxidation ditch, constructing a new 82-foot-diameter clarifier, and UV disinfection, effluent pump station, effluent force main and miscellaneous improvements at the treatment facilities.	$7,500,000	$10,835,000

[1]Includes 7 percent Bonds and Insurance plus 35 percent Construction Contingency and Technical Services.
[2]Fourth Quarter 2013 dollars.

Table 8.10-1 Opinion of Probable Cost for the Recommended Expansion[2]

8.11 COLLECTION AND CONVEYANCE ALTERNATIVES

The Central City sanitary sewage collection system can be divided into three distinct parts. The oldest part of the collection system is in the downtown area and consists of gravity sewers constructed primarily of vitrified clay pipe with brick manholes. Some newer parts of the gravity collection system are primarily PVC pipe and precast concrete manholes. A third segment of the collection system in some of the newer outlying subdivisions have pressure systems with individual grinder pumps.

As previously discussed, Central City experiences high wet weather flows. Flow monitoring and smoke testing of the system in recent years confirmed the problem was almost entirely contained in the downtown collection system. Central City also had serious problems with the reliability and capacity of some of its lift stations.

To address the I/I in the downtown area, Central City has undertaken two separate pipeline repair and replacement projects. The first project involved excavation and replacement of deteriorated clay lines in some areas and pipe bursting of clay lines in others. This project largely affected a line along the CSX railroad that was identified as being badly deteriorated. The second project involved replacement of sewer lines and manholes in the area of First and Broad Streets. A third project is planned for 2015 that will involve replacement of sewers in the Broad Street area.

The lift station reliability and capacity problem was addressed by refurbishing eight of Central City's seventeen lift stations. These stations were converted from wet well/dry well stations to submersible stations and were provided with enhanced pumping capabilities, standby power, variable speed capability, and provisions for future supervisory control and data acquisition (SCADA) monitoring.

The projects completed to date have cost approximately $2,020,000. As would be expected, the problem with pump station reliability and the overflows associated with it has been solved. The work has not lead to a substantial decrease in peak flows to the WWTP. At this juncture, Central City has elected to spend its money on expansion of the WWTP to accommodate the high wet weather flows rather than continuing to address only collection system repairs.

The collection system work will continue, but the focus will shift from solving the I/I problem at its source to making collection system repairs to address known maintenance and reliability problems. The remaining collection system repairs that are scheduled on Broad Street and in the Downtown area have an estimated cost of $1,110,000.

SECTION 9
CROSS-CUTTER CORRESPONDENCE AND MITIGATION

This Section will review comments and concerns offered by cross-cutter agencies in their review of proposed projects. All referenced correspondence is included in Appendix E.

9.01 UNITED STATES FISH AND WILDLIFE SERVICE (USFWS) REVIEW

A letter was sent to the USFWS on March 17, 2015, requesting a review of the significant concerns for local fish and wildlife resources or habitat with the proposed project. A response was received on May 7, 2015. USFWS identified concerns about the gray bat, Indiana bat, northern long-eared bat, purple cats-paw pearly mussel, fanshell mussel, and rough pigtoe mussel. In order to avoid impacting the various bats' habitats, Central City can make plans to complete a habitat assessment for caves, rock shelters, and underground mines for the project area. Alternatively, Central City can enter into a Conservation Memorandum of Understanding with USFWS to account for the incidental take of Indiana bat and/or northern long-eared bat habitat. Additionally, sediment best management practices should be used and maintained to minimize siltation of streams, as streams represent potential foraging habitat for the gray bat. In regards to the mussel species, USFWS notes that the potential of the project to either directly or indirectly impact the mussels as a result of siltation/sedimentation and contamination should be addressed when evaluating the proposed projects.

9.02 KENTUCKY DEPARTMENT OF FISH AND WILDLIFE RESOURCE (KDFWR) REVIEW

A letter was sent to the KDFWR on March 17, 2015, requesting a review of the significant concerns for local fish and wildlife resources or habitat with the proposed project. A response was received on March 30, 2015, that no federal or state-listed species are known to occur within proximity to the project sites, so the agency has no objections.

9.03 KENTUCKY HERITAGE COUNCIL (KHC) REVIEW

A letter was sent to the KHC on March 17, 2015, requesting a review of the significant cultural or historical concerns with the proposed project. Any concerns expressed will be addressed before beginning construction.

9.04 UNITED STATES ARMY CORPS OF ENGINEERS (USACE) REVIEW

A letter was sent to the USACE on March 17, 2015, requesting a review of the significant concerns for wetlands and other jurisdictional interests with the proposed project. Any concerns expressed will be addressed before beginning construction.

9.05 NATURAL RESOURCE CONSERVATION SERVICE (NRCS) REVIEW

A letter was sent to the NRCS on March 17, 2015, requesting a review of the significant concerns over agricultural resources as a result of the proposed project. A response was received on April 2, 2015, stating the work to be performed is all on existing right-of-ways, easements, existing facilities, or other previously disturbed areas, so the agency does not have any objections or concerns.

9.06 KENTUCKY CLEARINGHOUSE REVIEW

In addition to the agencies listed above, the KDOW will prepare a State Planning and Environmental Assessment Report (SPEAR) that is distributed to the following agencies:

Kentucky Department of Public Health
Kentucky Division for Air Quality
Kentucky Division of Forestry
Kentucky Division of Waste Management
Kentucky Division of Water
Kentucky State Clearinghouse
Kentucky Geological Survey

Comments received from these agencies will be considered in approval of the RFP.

SECTION 10
EVALUATION OF RECOMMENDED REGIONAL FACILITY PLAN

10.01 RECOMMENDED PLAN

The Central City WWTP will be expanded to an average daily treatment capacity of 1.8 mgd and a peak hourly flow capacity of 8.0 mgd by adding a fourth ring to the existing oxidation ditch, adding a new 82-foot-diameter clarifier, adding a new UV disinfection channel, and increasing the capacity of the influent and effluent force mains and pump stations (Alternative A). Alternative A was recommended because it has the lowest capital and present worth costs among the alternatives considered. The construction cost opinion for the WWTP expansion is $7,500,000. Once the construction contingencies, technical services, and bonds and insurance are added, the opinion of probable cost is $10,835,000. Alternative A also had the best nonmonetary features when considering ability to implement, environmental impact, engineering evaluation, public support, and regionalization.

10.02 ENVIRONMENTAL IMPACTS

Expansion of the Central City WWTP will have minimal impact on the environment since the construction activities will occur within the existing WWTP site and on previously disturbed land. Proactive measures for the Central City WWTP expansion will be taken during the construction to minimize noise, dust, truck traffic, and stormwater runoff. Additional requirements for the project resulting from cross-cutter agencies and the clearinghouse will be implemented.

The second WWTP discharge pipeline to the Green River will parallel the existing 14-inch line and be in the same easement. This should lessen the environmental impact of constructing the line. The line will, however, cross suspected wetland areas and is in the range of some known protective species. Design and construction will be coordinated with the appropriate regulatory agencies to assure compliance with applicable requirements.

10.03 INSTITUTIONAL STRUCTURE

Central City has the authority to prepare and implement this RFP since it addresses the wastewater treatment needs within the Central City limits.

10.04 FUNDING PLAN

The projected total project budget is as follows:

Construction		
Completed Projects		
1	Bremen Sewer Extension	$ 640,000
2	Replace 8 Wastewater Lift Stations	$ 1,220,000
3	Second Street & Magnolia Sewer Rehabilitation	$ 90,000
4	First & Broad Street Sewer Replacement	$ 30,000
5	Wastewater Plant Effluent Return & Post Aeration Basin	$ 40,000
	Subtotal - Completed Projects	**$ 2,020,000**
Uncompleted Projects		
6	Wastewater Plant Expansion	$ 7,500,000
7	Broad Street Sewer Replacement	$ 260,000
8	Downtown Area Sewer Repairs	$ 500,000
9	Miscellaneous System-Wide Sewer Repairs	$ 350,000
	Subtotal - Uncompleted Projects	**$ 8,610,000**
	Subtotal - Construction	**$ 10,630,000**
Non-Construction		
	Non-Construction Costs (23%)	$ 2,470,000
	Contingency (10% of future construction)	$ 900,000
	TOTAL	**$ 14,000,000**

Source: McGhee Engineering

Table 10.04-1 Total Preliminary Project Budget

The project will be funded by a combination of grants and loans from federal and state agencies. The tentative sources and amounts are as follows:

Community Development Block Grant	$1,000,000
USDA Rural Development Grant	$3,900,000
USDA Rural Development Loan	$9,100,000
TOTAL	$14,000,000

10.05 USER CHARGE

The project will result in a substantial amount of new debt and increased operating and maintenance costs for the expanded plant and distribution system. The following proforma income statement shows an estimate of these anticipated costs.

PROFORMA INCOME STATEMENT			
	FYE 2013 Audit (GAAP Basis)	Changes Because of Project	After Project
Operating Revenues			
Sewer Usage Charges	$ 637,411.00	$ 640,100.00	$ 1,277,511.00
Other Service Revenues	$ 17,845.00	$ -	$ 17,845.00
Total Sewer Revenues	$ 655,256.00	$ 640,100.00	$ 1,295,356.00
Operating Expenses			
Sewer Plant Operations	$ 190,237.00	$ 65,000.00	$ 255,237.00
Collection System Operations	$ 43,984.00	$ -	$ 43,984.00
Administrative Expense	$ 367,858.00	$ 60,000.00	$ 427,858.00
Total Operating Expenses	$ 602,079.00	$ 125,000.00	$ 727,079.00
Nonoperating Revenues and Expenses			
Debt Repayment	$ (68,460.00)	$ (445,100.00)	$ (513,560.00)
Other	$ 1,000.00	$ -	$ 1,000.00
Total Non-Operating Revenue and Expenses	$ (67,460.00)	$ (445,100.00)	$ (512,560.00)
Net Income Before Depreciation	$ (14,283.00)	$ 70,000.00	$ 55,717.00

Table 10.05-1 Proforma Income Statement

This indicates that the operating revenue will need to approximately double to make the project financially viable. This indicates that a doubling of user rates is required. This information has been communicated to the Central City Municipal Water & Sewer Board and to the City Commission.

Table 10.05-2 shows the existing user rates for Central City Water & Sewer customers.

Usage	Cost per 1,000 gallons
In-town Users	
First 1,000 gallons	$7.19
Up to 6,000 gallons	$3.75
Up to 8,000 gallons	$3.70
Upt to 10,000 gallons	$3.60
Over 10,000 gallons	$3.55
Outside City Limits	
Service Charge (all usages, including no usage)	$10/month
Usage	$7.00

Table 10.05-2 Central City Sewer Rates

The resulting increase in rates will take Central City from having the lowest sewer rates in the Pennyrile Area Development District to having the 17th lowest out of 29 systems. Table 10.05-3 illustrates this.

Rank Cur	Rank Fut	Name	Date of Last Increase	Date of last update	Minimum Bill	Minimum Quantity (Gal.)	1000 Gallons	2000 Gallons	3000 Gallons	4000 Gallons	5000 Gallons	10000 Gallons
1		Central City Water & Sewer (Current)	2/10/10	9/11/13	$ 7.19	1,000	$ 7.19	$10.94	$14.69	$18.44	$22.19	$ 40.54
2	1	Kuttawa Water Department	1/1/13	9/11/13	$ 8.48	1,000	$ 8.48	$12.39	$16.30	$20.21	$24.12	$ 43.67
3	2	Hopkinsville Water Environmental Authority	7/1/13	8/20/13	$ 11.46	2,244	$11.46	$11.46	$15.32	$20.43	$25.53	$ 51.07
4	3	Greenville Utilities Commission	7/1/12	9/3/13	$ 14.04	2,000	$14.04	$14.04	$19.26	$24.48	$29.70	$ 55.80
5	4	HWEA-Pembroke	7/1/13	8/20/13	$ 15.63	2,244	$15.63	$15.63	$18.41	$24.55	$30.68	$ 61.36
6	5	Cadiz Municipal Water	1/1/13	9/3/13	$ 14.52	2,000	$14.52	$14.52	$19.87	$25.21	$30.56	$ 51.51
7	6	Lyon County Water District	11/15/10	8/20/13	$ 15.00	2,000	$15.00	$15.00	$20.30	$25.60	$30.90	$ 57.40
8	7	HWEA-Crofton	8/1/09	8/20/13	$ 12.50	1,122	$12.50	$16.72	$21.54	$26.35	$31.16	$ 55.22
9	8	Guthrie Water Works	6/12/12	9/11/13	$ 20.45	3,000	$20.45	$20.45	$20.45	$26.41	$32.37	$ 62.17
10	9	Marion Water Department	7/1/13	8/20/13	$ 13.64	1,500	$13.64	$16.99	$22.02	$27.05	$31.07	$ 47.15
11	10	Dawson Springs Water & Sewer System	6/1/13	9/3/13	$ 14.97	1,997	$14.97	$14.97	$21.75	$28.53	$35.31	$ 65.86
12	11	Princeton Water/Wastewater	9/1/12	9/3/13	$ 8.97	1,122	$ 8.97	$15.57	$23.09	$30.61	$38.13	$ 75.77
13	12	Powderly Wastewater System	1/1/09	8/20/13	$ 19.98	2,000	$19.98	$19.98	$25.37	$30.76	$36.15	$ 63.10
14	13	Madisonville Light & Water	7/9/08	9/3/13	$ 15.50	2,000	$15.50	$15.50	$23.25	$31.00	$38.75	$ 77.50
15	14	Eddyville Water Department	7/1/04	8/20/13	$ 22.44	2,000	$22.44	$22.44	$27.30	$32.16	$37.02	$ 61.32
16	15	Salem Municipal Water System	1/1/08	8/20/13	$ 10.89	1,000	$16.52	$22.15	$27.78	$33.41	$39.04	$ 67.19
17	16	HWEA-Oak Grove	7/1/12	8/20/13	$ 18.67	1,000	$18.67	$24.12	$29.57	$35.02	$40.47	$ 67.72
	17	Central City Water & Sewer (Estimated Future)	n/a	n/a	$ 14.38	1,000	$14.38	$21.88	$29.38	$36.88	$44.38	$ 81.08
18	18	Smithland Water & Sewer System	6/15/13	8/20/13	$ 23.85	2,000	$23.85	$23.85	$30.68	$37.51	$44.34	$ 70.34
19	19	Elkton Water Works	7/1/12	9/3/13	$ 27.55	2,000	$27.55	$27.55	$32.58	$37.61	$42.94	$ 67.79
20	20	Trenton Water Works	3/1/02	9/3/13	$ 24.48	1,000	$24.48	$28.96	$33.44	$37.92	$42.40	$ 64.80
21	21	Morton's Gap Water Department	9/8/11	8/20/13	$ 17.25	1,000	$17.25	$24.84	$32.43	$40.02	$47.61	$ 85.56
22	22	Earlington Water & Sewer System	7/26/13	9/3/13	$ 21.48	1,000	$21.48	$28.96	$36.44	$43.92	$51.40	$ 88.80
23	23	Nortonville Water Works	8/8/11	9/11/13	$ 35.00	2,000	$35.00	$35.00	$40.00	$45.00	$50.00	$ 75.00
24	24	White Plains Water Department	8/10/09	8/20/13	$ 21.60	1,000	$21.60	$30.03	$38.46	$46.89	$55.32	$ 97.47
25	25	Drakesboro Water Department	4/15/13	9/11/13	$ 24.00	2,000	$24.00	$24.00	$36.00	$48.00	$60.00	$120.00
26	26	Fredonia Water Department	1/1/13	9/3/13	$ 39.88	2,000	$39.88	$39.88	$45.30	$50.72	$56.16	$ 83.30
27	27	Ledbetter Sanitation District	8/9/12	8/20/13	$ 25.21	2,000	$25.21	$25.21	$38.08	$50.95	$63.82	$128.17
28	28	Grand Rivers Water System	1/1/13	9/3/13	$ 16.00	-	$25.50	$35.00	$44.50	$54.00	$63.50	$111.00
29	29	Hanson Water System	2/29/12	8/20/13	$ 29.16	1,000	$29.16	$37.80	$46.44	$55.08	$63.72	$106.92
		Average Charge for Wastewater-Inside City (with Central City Future Rate)					$19.73	$22.58	$28.80	$35.39	$41.95	$ 73.93

This spreadsheet was originally prepared by the Pennyrile Area Development District. It has been modified by McGhee Engineering, Inc. to highlight Central City present and estimated future rates.

Source: McGhee Engineering

Table 10.05-3 Pennyrile Area Development District Monthly Sewer Rates–City and Municipal (2013) Comparison

10.06 IMPLEMENTATION SCHEDULE

This recommended plan identifies the capital projects required to expand the Central City WWTP to comply with the KPDES Permit, as well as sewer replacement and repair projects on Broad Street and in the Downtown area. Central City will begin implementation of these projects immediately. Exhibit 10.06-1 shows the schedule for implementing the recommended projects.

Task	2015				2016				2017				2018			
	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Design		■	■	■												
Approval					■	■										
Bidding and Award						■	■									
Construction								■	■	■	■	■	■			
Commission														■		

Exhibit 10.06-1 Implementation Schedule for Central City WWTP

SECTION 11
DOCUMENTATION OF PUBLIC PARTICIPATION

11.01 PUBLIC HEARING

The approval process for this RFP involves conducting a Public Hearing on the Plan. Citizen comments on the draft plan will be accepted during a 30-day comment period. Central City will address these comments and deliver a final plan to the KDOW for review, comment, and approval.

A public hearing is tentatively planned for July 13, 2015, at 3:30 PM, to allow time for comments to be received from cross-cutter agencies. The hearing will present the findings of this RFP including its impact to users.

An advertisement for the public hearing will be published in the Leader-News and posted to the KDOW Public Notice Web site.

The 30-day public comment period will run from June 10, 2015 to July 13, 2015.

The following public participation documents will be included in Appendix E.

1. Copy of the newspaper advertisement.
2. Attendance sheets from the public hearing.
3. Copy of summary report given at the public hearing.
4. Record of public hearing.
5. Copy of public comments and response summary.

APPENDIX A
AGREED ORDER

Notice of Public Hearing
(Pursuant to 401 KAR 5:006 Sections 4 &5, KRS 24 and 40 CFR 25.5 & 6)

Interested citizens of Central City are invited to a public hearing sponsored by the Central City Municipal Water & Sewer Department. This meeting will start at 3:30 on July 13, 2015 at the City Hall in Central City for the purpose of providing general information to the public regarding the proposed Wastewater Treatment Plant and System upgrades and expansion. The public is invited to attend and comment on the draft plan and its contents as well as project issues such as economic and environmental impacts, service area, alternatives to the project or any other pertinent issues. Verbal and written comments will be accepted at the public hearing. Written comments concerning the plan will also be accepted via mail between June 10, 2015 and July 13, 2015. Written comments should be addressed to Central City Municipal Water & Sewer Department, 214 N 1st St, Central City, KY 42330.

The Central City Municipal Water & Sewer Department has completed a Wastewater Treatment Plant Facility Plan. The Facility Plan details the Recommended Plan for wastewater management within the Central City planning area. The planning area comprises all of Central City and surrounding communities of Bremen and South Carrollton. The recommended plan represents the alternative with the lowest present worth cost, a minimal environmental impact and the highest capability for implementation. The recommended plan calls for an upgrade and expansion of the existing Central City Wastewater Treatment Plant to increase the capacity of wastewater that can be treated. Additionally, the plan includes sewer system improvements within Central City. The draft plan will be available for review at City Hall (214 N 1st St) during normal business hours from June 10 to July 13, 2015.

The Kentucky Department for Local Government is accepting application material under the 2015 Community Development Block Grant (CDBG) Program. Central City intends to apply for assistance for the construction of improvements and expansion of the Central City Wastewater Treatment Plant. A public hearing will be held prior to the submission of the application. The public hearing will be held on July 13, 2015 at 3:30 PM at the City Hall in Central City. The purpose of this hearing is to obtain views on housing and community development needs, review proposed activities, review the proposed application, and solicit public comments. Technical assistance is available to help groups representing low and moderate income persons in developing proposals.

The following information concerning the CDBG program is available for public inspection at the Pennyrile Area Development District, 300 Hammond Drive, Hopkinsville, KY, during regular business hours:

A. Amount of funds available and range of activities that may be undertaken.
B. Estimated amounts of funds proposed to be used for activities benefiting persons of low and moderate income.
C. Plans for minimizing displacement of persons as a result of activities associated with CDBG funds and plans for providing assistance to those persons to be actually displaced as a result of CDBG-funded activities.
D. Records regarding the past use of CDBG funds.
E. A summary of other important program requirements.

Comments on Application
A copy of the CDBG application material will be on file at City Hall (214 N 1st St) for citizens' review and comment during regular business hours from June 10, 2015 - July 13, 2015.

Comments on the proposed application may be submitted to the attention of Central City Municipal Water & Sewer Department, 214 N 1st St, Central City, KY 42330 until the time of the hearing on July 13, 2015.

Discrimination Clause

The City does not discriminate on the basis of race, color, national origin, sex, age, religion or disability, and provides, upon request, reasonable accommodation, including auxiliary aids and services, to afford an individual with a disability an equal opportunity to participate in all services, programs and activities. Any persons requiring special needs assistance should contact David Rhoades at (270) 754-2336 at least five days prior to the meeting. The State TDD number for the hearing impaired is 1-800-648-6057. The Kentucky Rural Development TDD number for the hearing impaired is (859) 224-7422.

EQUAL HOUSING OPPORTUNITY

APPENDIX B
KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

KPDES

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT

PERMIT NO.: KY0023540

AI NO.: 3218

AUTHORIZATION TO DISCHARGE UNDER THE

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

Pursuant to Authority in KRS 224,

Central City Municipal Water & Sewer
214 North 1st Street
Central City, Kentucky 42330

is authorized to discharge from a facility located at

Central City Wastewater Treatment Plant
802 West Whitmer Street
Central City, Muhlenberg County, Kentucky

to receiving waters named

Green River at Latitude 37°19'37.384" Longitude 87°07'26.395" NHD Index 85.4

in accordance with effluent limitations, monitoring requirements and other conditions set forth in this permit.

This permit shall become effective on September 1, 2014.

This permit and the authorization to discharge shall expire at midnight, August 31, 2019.

July 9, 2014

Date Signed

Peter T. Goodmann, Director

Division of Water

DEPARTMENT FOR ENVIRONMENTAL PROTECTION

Division of Water, 200 Fair Oaks Lane, Frankfort, Kentucky 40601

Printed on Recycled Paper

1. EFFLUENT AND MONITORING REQUIREMENTS

1.1. Monitoring Locations

The following table lists the outfalls authorized by this permit, the latitude and longitude of each and the DOW assigned KPDES outfall number.

MONITORING LOCATIONS				
Number	**Type**	**Latitude (N)**	**Longitude (W)**	**Description of Outfall**
001	Effluent	37°19'37.384"	87°07'26.395"	Treated Municipal Wastewater
001	Influent	Headworks		Raw Municipal Wastewater

1.2. Effluent Limitations and Monitoring Requirements

Beginning on the effective date and lasting through the term of this permit discharges from Outfall 001 shall comply with the effluent limitations.

EFFLUENT LIMITATIONS							MONITORING REQUIREMENTS		
Effluent Characteristic	**Loadings (lbs/day)**		**Concentrations (specify units)**				**Monitoring**		**Sample Type**
	Monthly Average	**Weekly Average**	**Minimum**	**Monthly Average**	**Max. Weekly Average**	**Maximum**	**Location**	**Frequency**	
Flow (Design Capacity 1.2 MGD)	Report	Report	N/A	N/A	N/A	N/A	Effluent	Continuous	Recorder
Flow (MGD)	Report	Report	N/A	N/A	N/A	N/A	Influent	Continuous	Recorder
BOD_5	300	450	N/A	30 mg/l	45 mg/l	N/A	Effluent	3/Week	24-Hr Composite
BOD_5	Report	Report	N/A	Report, mg/l	Report, mg/l	N/A	Influent	3/Week	24-Hr Composite
Percent Removal BOD_5	N/A	N/A	N/A	85%	N/A	N/A	N/A	1/Month	Calculated
TSS	300	450	N/A	30 mg/l	45 mg/l	N/A	Effluent	3/Week	24-Hr Composite
TSS	Report	Report	N/A	Report, mg/l	Report, mg/l	N/A	Influent	3/Week	24-Hr Composite
Percent Removal TSS	N/A	N/A	N/A	85%	N/A	N/A	N/A	1/Month	Calculated
Ammonia (as NH_3N)	200	300	N/A	20 mg/l	30 mg/l	N/A	Effluent	3/Week	24-Hr Composite
E. Coli (colonies/100 ml)[1]	N/A	N/A	N/A	130	240	N/A	Effluent	3/Week	Grab
Dissolved Oxygen	N/A	N/A	2.0 mg/l	N/A	N/A	N/A	Effluent	3/Week	Grab
pH (Standard Units)	N/A	N/A	6.0	N/A	N/A	9.0	Effluent	3/Week	Grab
Hardness as mg/l $CaCO_3$	N/A	N/A	N/A	Report, mg/l	Report, mg/l	N/A	Effluent	1/Quarter	24-Hr Composite
Total Recoverable Cadmium	N/A	N/A	N/A	Report, mg/l	Report, mg/l	N/A	Effluent	1/Quarter	24-Hr Composite

EFFLUENT LIMITATIONS							MONITORING REQUIREMENTS		
Effluent Characteristic	Loadings (lbs/day)		Concentrations (specify units)				Monitoring		Sample Type
	Monthly Average	Weekly Average	Minimum	Monthly Average	Max. Weekly Average	Maximum	Location	Frequency	
Total Recoverable Copper	N/A	N/A	N/A	Report, mg/l	Report, mg/l	N/A	Effluent	1/Quarter	24-Hr Composite
Total Recoverable Lead	N/A	N/A	N/A	Report, mg/l	Report, mg/l	N/A	Effluent	1/Quarter	24-Hr Composite
Total Recoverable Zinc	N/A	N/A	N/A	Report, mg/l	Report, mg/l	N/A	Effluent	1/Quarter	24-Hr Composite
Acute Toxicity	N/A	N/A	N/A	N/A	N/A	1.00 TU_a	Effluent	1/Quarter	2 Grabs
Total Phosphorus	N/A	N/A	N/A	Report, mg/l	Report, mg/l	N/A	Effluent	3/Week	24-Hr Composite
Total Nitrogen (mg/l)	N/A	N/A	N/A	Report, mg/l	Report, mg/l	N/A	Effluent	3/Week	24-Hr Composite

[1]The effluent limitations for *Escherichia Coli* are 30 day and 7 day Geometric Means.
[2]This limitation for Total Residual Chlorine is a Daily Maximum.
Total Nitrogen is the summation of the analytical results for Total Nitrates, Total Nitrites, and Total Kjeldahl Nitrogen.

1.3. Standard Effluent Requirements

The discharges to waters of the Commonwealth shall not produce floating solids, visible foam or a visible sheen on the surface of the receiving waters.

Samples and measurements taken in accordance with the requirements of specified Section 1.2 shall be representative of the volume and nature of the monitored discharge and shall be taken at nearest accessible point after final treatment, but prior to actual discharge to or mixing with the receiving waters or wastestreams from other outfalls.

1.4. Whole Effluent Toxicity Testing

The permittee shall initiate, within thirty (30) days of the effective date of this permit, or continue the series of tests described below to evaluate wastewater toxicity of the discharge from Outfall 001.

1.4.1. WET Test Requirements

The permittee shall perform a 48-hour static non-renewal toxicity test with water flea (Ceriodaphnia dubia) and a 48-hour static non-renewal toxicity test with fathead minnow (Pimephales promelas) on 100% effluent (1.00 TU_A) at the frequency specified in Section 1.2.

1.4.2. WET Sampling Requirements

Tests shall be conducted on each of two grab samples collected over the period of discharge, (i.e., discrete sample #1 taken at commencement of discharge, sample #2 taken approximately 12 hours later, sooner if discharge is expected to cease). The elapsed time between the collection of each grab sample and the initiation of each test shall not exceed 36 hours.

Samples shall be iced and maintained at not greater than 6 °C during collection, storage, transport and until used in the test by the laboratory.

1.4.3. WET Serial Dilutions

Effluent concentrations for the tests must include the percent effluent required by the permit and at least four additional effluent concentrations as follows.

Required Percent Effluent	Dilution 1 Percent	Dilution 2 Percent	Dilution 3 Percent	Dilution 4 Percent	Dilution 5 Percent
100	20	40	60	80	100
95	23.5	47.5	95	97.5	100
90	22.5	45	90	95	100
85	21.25	42.5	85	92.5	100
80	20	40	80	90	100
75	18.75	37.5	75	87.5	100
70	17.5	35	70	85	100
65	16.25	32.5	65	82.5	100
60	15	30	60	80	100
55	13.75	27.5	55	77.5	100
50	12.5	25	50	75	100
45	11.25	22.5	45	72.5	100
40	10	20	40	70	100
35	8.75	17.5	35	67.5	100
30	7.5	15	30	65	100
25	6.25	12.5	25	62.5	100
20	5	10	20	60	100
15	3.75	7.5	15	57.5	100
10	2.5	5	10	55	100
5	1.25	2.5	5	50	100

For a required percent effluent of 100%, test concentrations shall be 20%, 40%, 60%, 80% and 100%.

For a required percent effluent less than 100% but greater than or equal to 75%, the test concentrations shall include the required percent effluent, two (2) concentrations below that are based on a 0.5 dilution factor, and two (2) concentrations above: one (1) at mid-point between 100% and the required percent effluent, and one (1) at 100% effluent.

For a required percent effluent less than 75%, test concentrations shall include the required percent effluent, two (2) concentrations below on a 0.5 dilution factor, and two (2) concentrations above the required percent effluent based on a 0.5 dilution factor if possible, one (1) at mid-point between 100% and the required percent effluent, and one (1) at 100% effluent.

Selection of different effluent concentrations must be approved by DOW prior to testing. Controls shall be conducted concurrently with effluent testing using synthetic water.

1.4.4. WET Controls

Controls shall be tested concurrent with effluent testing using synthetic water. The analysis will be deemed reasonable and good only if the minimum control requirements are met:

Control survival is 90% or greater in test organisms held in synthetic water.

Any test that does not meet the control acceptability criteria shall be repeated as soon as practicable within the monitoring period.

Within thirty (30) days prior to initiating an effluent toxicity test, a reference toxicant test must be completed for the method used; alternatively, the reference toxicant test may be run concurrent with the effluent toxicity test.

1.4.5. WET Test Methods

All test organisms, procedures, and quality assurance criteria used shall be in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012 (5th edition), the most recently published edition of this publication, or as approved in advance by DOW.

1.4.6. Reduction to Single Species Testing

After at least six (6) consecutive passing toxicity tests using both, the water flea and the fathead minnow, a request for testing with only the most sensitive species may be submitted to DOW. Upon approval, the most sensitive species may be considered as representative and all subsequent compliance tests may be conducted using only that species unless directed at any time by DOW to change or revert to both.

1.4.7. WET Reporting Requirements

Results of all toxicity tests conducted with any species shall be reported according to the most recent format provided by DOW. Notification of failed test shall be made to DOW within five (5) days of test completion. Test reports shall be submitted to DOW within thirty (30) days of completion. A control chart including the most recent reference toxicant test endpoints for the effluent test method (minimum of five [5], up to twenty [20] if available) shall be part of the report.

1.4.8. WET Test Results

Noncompliance will be demonstrated if the LC_{50} is less than 100 % effluent. If noncompliance occurs in an initial test, the permittee must repeat the test using new grab samples collected approximately twelve (12) hours apart. Sampling must be initiated within ten (10) days of completing the failed test. The second round of testing shall include both species unless approved for only the most sensitive species by DOW.

Results of the second round of testing will be used to evaluate the persistence of the toxic event and the possible need for a Toxicity Reduction Evaluation (TRE).

1.4.9. Accelerated Testing

If the second round of testing also demonstrates noncompliance, the permittee will be required to perform accelerated testing as specified in the following paragraphs.

Complete four (4) additional rounds of testing to evaluate the frequency and degree of toxicity within sixty (60) days of completing the second failed round of testing. Results of the initial and second rounds of testing specified above plus the four (4) additional rounds of testing will be used in deciding if a TRE shall be required.

If results from any two (2) of six (6) rounds of testing show a significant noncompliance with the Toxicity limit, i.e., ≥1.2 times the TU, or results from any four of the six tests show toxicity as defined in Section 1.4.8, a TRE will be required.

The permittee shall provide written notification to DOW within five (5) days of completing the accelerated testing, stating that: (1) toxicity persisted and that a TRE will be initiated; or (2) that toxicity did not persist and normal testing will resume.

Should toxicity prove not to be persistent during the accelerated testing period, but reoccur within twelve (12) months of the initial failure at a level ≥ 1.2 times the TU, then a TRE shall be required.

1.4.10. WET Toxicity Reduction Evaluation (TRE)

Having determined that a TRE is required, the permittee shall initiate and/or continue at least monthly testing with both species until such time as a specific TRE plan is approved by DOW. A TRE plan shall be developed by the permittee and submitted to DOW within thirty (30) days of determining a TRE is required. The plan shall be developed in accordance with the most recent EPA and DOW guidance. Questions regarding this process may be submitted to DOW.

The TRE plan shall include Toxic Identification Evaluation (TIE) procedures, treatability studies, and evaluations of: chemical usage including changes in types, handling and suppliers; operational and process procedures; housekeeping and maintenance activities; and raw materials. The TRE plan will establish an implementation schedule to begin immediately upon approval by DOW, to have duration of at least six (6) months, and not to exceed twenty-four (24) months. The implementation schedule shall include quarterly progress reports being submitted to DOW, due the last day of the month following each calendar quarter.

Upon completion of the TRE, the permittee shall submit a final report detailing the findings of the TRE and actions taken or to be taken to prevent the reoccurrence of toxicity. This final report shall include: the toxicant(s), if any are identified; treatment options; operational changes; and the proposed resolutions including an implementation schedule not to exceed one-hundred-eighty (180) days.

Should the permittee determine the toxicant(s) and/or a workable treatment prior to the planned conclusion of the TRE, the permittee will notify DOW within five (5) days of making that determination and take appropriate actions to implement the solution within one-hundred-eighty (180) days of that notification.

2. STANDARD CONDITIONS

2.1. Schedule of Compliance

The permittee shall attain compliance with all requirements of this permit on the effective date of this permit unless otherwise stated.

2.2. Standard Conditions for KPDES Permit

2.2.1. Other Permits

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.

2.2.2. Sufficiently Sensitive Analytical Methods

Analytical methods utilized to demonstrate compliance with the effluent limitations established in this permit shall be sufficiently sensitive to detect pollutant levels at or below the required effluent limit, i.e. the Method Detection Limit (MDL) shall be at or below the effluent limit. In that instance where an EPA-approved method does not exist that has an MDL at or below the established effluent limitation, the permit shall: (1) use the method specified in the permit; or (2) the EPA-approved method with an MDL that is nearest to the established effluent limit.

2.2.3. Antidegradation

For those discharges subject to the provisions of 401 KAR 10:030, Section 1(3)(b)5, the permittee shall install, operate, and maintain wastewater treatment facilities consistent with those identified as follows: Pump influent, flow meter, screening, grit removal, oxidation ditch, splitter box, two (2) clarifiers, ultraviolet disinfection and pump effluent to outfall. Solids are treated by aerobic digestion, sludge holding tank, sludge drying beds, and hauled to Ohio County Landfill for disposal.

2.2.4. Conditions Applicable to All Permits

The following conditions apply to all KPDES permits.

2.2.4.1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of KRS Chapter 224 and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. Any person who violates applicable statutes or who fails to perform any duty imposed, or who violates any determination, permit, administrative regulation, or order of the cabinet promulgated pursuant thereto shall be liable for a civil penalty as provided at KRS 224.99.010.

2.2.4.2. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for a new permit.

2.2.4.3. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2.2.4.4. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

2.2.4.5. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2.2.4.6. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

2.2.4.7. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

2.2.4.8. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Director upon request, copies of records required to be kept by this permit.

2.2.4.9. Inspection and Entry

The permittee shall allow the Director or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
(3) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
(4) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

2.2.4.10. Monitoring and Records

(1) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(2) Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 401 KAR 5:065 Section 2(10) [40 CFR 503]), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

(3) Records of monitoring information shall include:

(i) The date, exact place, and time of sampling or measurements;
(ii) The individual(s) who performed the sampling or measurements;
(iii) The date(s) analyses were performed;
(iv) The individual(s) who performed the analyses;
(v) The analytical techniques or methods used; and
(vi) The results of such analyses.

(4) Monitoring must be conducted according to test procedures approved under 401 KAR 5:065 Section 2(8) [40 CFR 136] unless another method is required under 401 KAR 5:065 Section 2(9) or (10) [40 CFR subchapters N or O].

(5) KRS 224.99-010 provides that any person who knowingly violates KRS 224.70-110 or other enumerated statutes, or who knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall be guilty of a Class D felony and, upon conviction, shall be punished by a fine of not more than $25,000, or by imprisonment for not more than one (1) year, or both. Each day upon which a violation occurs shall constitute a separate violation.

2.2.4.11. Signatory Requirement

(1) All applications, reports, or information submitted to the Director shall be signed and certified pursuant to 401 KAR 5:060, Section 4 [40 CFR 122.22].

(2) KRS 224.99-010 provides that any person who knowingly provides false information in any document filed or required to be maintained under KRS Chapter 224 shall be guilty of a Class D felony and upon conviction thereof, shall b punished by a fine not to exceed twenty-five thousand dollars ($25,000), or by imprisonment, or by fine and imprisonment, for each separate violation. Each day upon which a violation occurs shall constitute a separate violation

2.2.4.12. Reporting Requirements

2.2.4.12.1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(i) The alteration or addition to a permitted facility may meet one (1) of the criteria for determining whether a facility is a new source in KRS 224.16-050 [40 CFR122.29(b); or

(ii) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under KRS 224.16-050 [40 CFR 122.42(a)(1)].
(iii) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

2.2.4.12.2. Anticipated Noncompliance

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

2.2.4.12.3. Transfers

This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under KRS 224 [CWA; see 40 CFR 122.61; in some cases, modification or revocation and reissuance is mandatory].

2.2.4.12.4. Monitoring Reports

Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(i) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices.
(ii) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 401 KAR 5:065 Section 2(8) [40 CFR 136], or another method required for an industry-specific waste stream under 401 KAR 5:065 Section 2(9) or (10) [40 CFR subchapters N or O], the results of such monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.
(iii) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

2.2.4.12.5. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than fourteen (14) days following each schedule date.

2.2.4.12.6. Twenty-four-Hour Reporting

(i) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within twenty-four (24) hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(ii) The following shall be included as information which must be reported within twenty-four (24) hours under this paragraph.

(A) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See §122.41(g).
(B) Any upset which exceeds any effluent limitation in the permit.
(C) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in the permit to be reported within twenty-four (24) hours.

(iii) The Director may waive the written report on a case-by-case basis for reports under paragraph (l)(6)(ii) of this section if the oral report has been received within twenty-four (24) hours.

2.2.4.12.7. Other Noncompliance

The permittee shall report all instances of noncompliance not reported under Sections 2.2.4.12.1, 2.2.4.12.4, 2.2.4.12.5, and 2.2.4.12.6, at the time monitoring reports are submitted. The reports shall contain the information listed in Section 2.2.4.12.6.

2.2.4.12.8. Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

2.2.4.13. Bypass

2.2.4.13.1. Definitions

(i) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.
(ii) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

2.2.4.13.2. Bypass Not Exceeding Limitations

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Section 2.2.4.13.1.

2.2.4.13.3. Notice

(i) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten (10) days before the date of the bypass.
(ii) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section 2.2.4.12.6.

2.2.4.13.4. Prohibition of Bypass

(i) Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(A) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
(C) The permittee submitted notices as required under Section 2.2.4.13.3.

(ii) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three (3) conditions listed above in Section 2.2.4.13.3.

2.2.4.13.5. Upset

2.2.4.13.5.1. Definition

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2.2.4.13.5.2. Effect of an Upset

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Section 2.2.4.13.5.3 are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

2.2.4.13.5.3. Conditions Necessary for a Demonstration of Upset

A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(i) An upset occurred and that the permittee can identify the cause(s) of the upset;
(ii) The permitted facility was at the time being properly operated; and
(iii) The permittee submitted notice of the upset as required in Section 2.2.4.12.6; and
(iv) The permittee complied with any remedial measures required under Section 2.2.4.4.

2.2.4.13.5.4. Burden of Proof

In any enforcement preceding the permittee seeking to establish the occurrence of an upset has the burden of proof.

2.3. Reporting of Monitoring Results

Monitoring results obtained during each monitoring period must be reported. The completed Discharge Monitoring Report (DMR) for each monitoring period must be submitted no later than the 28th day of the month following the monitoring period for which monitoring results were obtained.

2.3.1. Electronic Submittal

The completed DMR for each monitoring period must be entered into the Division of Water approved electronic system no later than midnight on the 28th day of the month following the monitoring period for which monitoring results were obtained.

For information regarding electronic submittal of DMRs please visit the Division's website at http://water.ky.gov/permitting/Pages/netDMRInformation.aspx or contact the DMR Coordinator at (502) 564-3410.

2.4. Reopener Clause

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved in accordance with 401 KAR 5:050 through 5:080, 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.

This permit may be reopened to implement the findings of a reasonable potential analysis performed by the Division of Water.

This permit shall be reopened if Division of Water determines surface waters are aesthetically or otherwise degraded by substances that:

(a) Settle to form objectionable deposits;
(b) Float as debris, scum, oil, or other matter to form a nuisance;
(c) Produce objectionable color, odor, taste, or turbidity;
(d) Injure, are chronically or acutely toxic to or produce adverse physiological or behavioral responses in humans, animals, fish, and other aquatic life;
(e) Produce undesirable aquatic life or result in the dominance of nuisance species; or
(f) Cause fish flesh tainting.

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

3. SPECIAL CONDITIONS

3.1. Pretreatment Program

At the present time neither the current wastewater treatment system operated by the permittee nor the current users meet the conditions necessitating the development and implementation a pretreatment program. Although current conditions do not warrant a pretreatment program the permittee shall continue to enforce the general and specific prohibitions listed in Sections 3.1.1 and 3.1.2, respectively of this permit. The permittee shall at a minimum conduct annual industrial wastes surveys to determine if there has been changes to the industrial users' discharges that would necessitate the development an implementation of a pretreatment program. In the event the permittee becomes aware of a new industrial user or modification to an existing industrial user the permittee shall require the submission of an industrial waste survey fore evaluation. Should any industrial waste survey indicate that a pretreatment program is required the permittee shall notify DOW within 30 days of this determination and provide a schedule not to exceed one year for development and implementation of the pretreatment program. The permittee shall submit to DOW an annual report by January 28th of the following year detailing the results of the annual and any other industrial waste surveys reviewed.

3.1.1. General Prohibitions

No user is to introduce to a POTW any pollutant or pollutants that will cause pass through or interference even if the user is not subject to National Pretreatment Standards or any national, state, or local requirements. A user shall have an affirmative defense against a violation of the general prohibitions where the user can demonstrate that:

(1) It did not know or have reason to know that its discharge singly or in conjunction with other discharges would result in pass through or interference with the POTW; and
(2) The discharge met the local limit designed to prevent pass through or interference or in the case of no local limit the user's discharge did not substantially change in nature or substance during the occurrence from the pre-occurrence conditions.

3.1.2. Specific Prohibitions

No user is to introduce to a POTW any of the following pollutants:

(1) Pollutants which create a fire or explosion hazard, including but not limited to, wastestreams with a closed cup flashpoint of less than 140 ^{o}F (60 ^{o}C);
(2) Pollutants which will cause corrosive structural damage or have a pH less than 5.0 standard units unless the POTW is designed to accommodate such pH levels;
(3) Solid or viscous pollutants in amounts that would obstruct the flow to the POTW thus resulting in interference;
(4) Any pollutant released in a discharge at such a volume or strength as to cause interference in the POTW;
(5) Heat in amounts that will inhibit biological activity in the POTW thus resulting in interference. In no case heat in such quantities that the temperature at the POTW treatment plant exceeds 104 ^{o}F (40 ^{o}C) unless the POTW requests and the Approval Authority grants alternate temperature limits;
(6) Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through;
(7) 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,
(8) Any trucked or hauled waste except, at discharge points designated by the POTW

3.2. Collection Systems

3.2.1. Operation and Maintenance

3.2.1.1. CMOM Programs

The permittee shall have in place Capacity, Management, Operation and Maintenance (CMOM) Programs that are effective at eliminating SSOs and other unpermitted discharges. The permittee shall submit a completed CMOM Programs Self-Assessment report within two (2) years of the effective date of this permit, which includes the checklist in the "Guide for Evaluation Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems," EPA 305-B-05-002. This document is available at: http://www.epa.gov/npdes/pubs/cmom_guide_for_collection_systems.pdf. The self-assessment shall include an evaluation of relevant CMOM program elements and a schedule for implementation of recommended program improvements.

The CMOM programs and Self-Assessment report shall be available to EEC or its authorized representative for review and copying during on-site inspections. Where the CMOM refers to procedures in other documents, copies of the relevant portions of those documents must be kept with the CMOM.

3.2.2. Monitoring, Recordkeeping, and Reporting

The permittee shall provide estimated volumes of all reported overflows, bypasses, other releases, and unpermitted discharges, in documentation and reporting of overflows to DOW. The method of estimating volume shall be rationally justifiable, and the same method shall be used for all reportable events in the absence of different circumstances.

3.2.3. Sewer Overflow Response Protocol (SORP)

The permittee shall implement a Sewer Overflow Response Protocol (SORP) in compliance with 401 KAR 5:015 for 1) responding to, cleaning up, and/or minimizing the impact of all overflows, including unauthorized discharges; 2) reporting the location, volume, cause and impact of overflows, including CSOs, SSO's and unauthorized discharges, to the Cabinet; and 3) notifying the potentially-impacted public. The permittee shall submit a SORP within one (1) year of the effective date of this permit, which shall include, but not be limited to, the following components.

(1) An overflow response procedure including designated responders for the city, response times, and cleanup methods
(2) A public advisory procedure
(3) A regulatory agency notification procedure
(4) A manhole and pump station inspection schedule

The SORP shall be reviewed by the permittee at least annually and amended if it is determined to be in conflict with 401 KAR 5:015 or that changes in procedures, changes in designated and/or contact personnel, or changes due to regulatory requirements are appropriate. The permittee shall prepare revisions to the SORP to adequately address these provisions or changes and submit the revisions to the cabinet for review and approval and to the Madisonville Regional Office of the Division of Water. The permittee shall implement the revised SORP within 30 days of receiving notification from the cabinet that the proposed changes are acceptable.

The SORP shall be available to EEC or its authorized representative for review and copying during on-site inspections. Where the SORP refers to procedures in other documents, copies of the relevant portions of those documents must be kept with the SORP.

3.3. Best Management Practices

3.3.1. BMP - General Conditions

3.3.1.1. BMP - 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.

3.3.1.2. 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.

3.3.1.3. BMP - 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.

3.3.1.4. BMP - 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.

3.3.1.5. BMP - 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

3.3.1.6. BMP - 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.

3.3.1.7. BMP - 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.

3.3.1.8. BMP - Documentation

The permittee shall maintain a description of the BMP plan at the facility and shall make the plan available upon request to EEC personnel. Initial copies and modifications thereof shall be sent to the following addresses when required by Section 3.3.1.9:

Division of Water
Surface Water Permits Branch
Operational Permits Section

200 Fair Oaks Lane
Frankfort, Kentucky 40601

3.3.1.9. BMP - 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."

3.3.1.10. BMP - 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.

3.3.2. BMP - Specific Conditions

3.3.2.1. BMP - 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.

4. STATE CONDITIONS

4.1. Outfall Signage

The KPDES permit establishes monitoring points, effluent limitations, and other conditions to address discharges from the permitted facility. In an effort to better document and clarify these locations the permittee should place and maintain a permanent marker at each of the monitoring locations.

4.2. Discharge and Monitoring Point Accessibility

As previously stated in Section 2.2.4.9, the permittee shall allow authorized agency representatives to inspect the facility and collect samples to determine compliance. In order for such monitoring to be conducted either by the permittee or authorized agency personnel all monitoring and discharge points required by this permit shall be readily and safely accessible in all weather conditions.

4.3. Certified Operators

Pursuant to 401 KAR 5:010, a treatment plant with a design capacity of more than 50,000 gallons per day, but less than or equal to two (2) million gallons per day shall be under the primary responsibility of a certified operator holding an active Class II, III, or IV treatment certificate.

4.4. Certified Laboratory Requirements

All laboratory analyses and tests required to demonstrate compliance with the conditions of this permit shall be performed by EEC certified general wastewater laboratories and EEC certified field-only laboratories. Compliance with this requirement shall commence on January 1, 2015 for analyses and tests performed by a general wastewater laboratory and January 1, 2016 for field-only wastewater laboratories.

4.5. Monthly Operating Reports

The permittee shall maintain daily process control monitoring reports. These reports shall be summarized monthly and submitted with the DMRs to DOW on forms approved by DOW by the 28th day of the month following the monitoring period.

4.6. Application Monitoring

To ensure that sufficient samples are collected and analyzed DOW is imposing annual sampling for those parameters in Sections A.12, B.6, and Part D (Expanded Effluent Testing) of KPDES Form A. The results of the application monitoring shall be summarized on the renewal application.

4.7. 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 Chapter 45.

5. ABBREVIATIONS, ACRONYMS AND DEFINITIONS

Abbreviation or Acronym	Full Phrase	Definition
MGD	Million Gallons Per Day	A measure of flow
cfs	cubic feet per second	A measure of flow
SU	Standard Units	A measure of pH
mg/l	milligrams per liter	A measure of pollutant concentration (1000 milligrams = 1 gram)
µg/l	micrograms per liter	A measure of pollutant concentration (1000 micrograms = 1 milligram)
^{o}F	Degrees Fahrenheit	A measure of temperature
^{o}C	Degrees Centigrade or Celsius	A measure of temperature
N/A	Not Applicable	
lbs/day	pounds per day	A measure of pollutant loading
Grab	Grab Sample	A sample taken from a wastestream on a one-time basis without consideration of the flow rate of the wastestream and without consideration of time.
24-Hr Composite	24-hour Composite Sample	Sample composed of discrete equal volume aliquots (100 ml minimum) collected every 15 minutes over a 24-hour period and aggregated by an automated sampling device. The aggregate sample will reflect the average water quality of the compositing or sample period.

APPENDIX C
WASTE LOAD ALLOCATION LETTER

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

March 19, 2014

Michael W. McGhee, PE
President
McGhee Engineering, Incorporated
202 Ewing Street
P.O. Box 267
Guthrie, Kentucky 42234

Re: Waste Load Allocation Request
Central City WWTP
KPDES No.: KY0023540
Muhlenberg County, Kentucky

Dear Mr. McGhee:

This is in response to your correspondence dated September 20, 2013 (attached), requesting a waste load allocation (WLA) for expansion of the subject wastewater treatment plant (WWTP) from 1.2 MGD to 1.8 MGD, with a potential to expand up to 3.0 MGD. Discharge is to remain at Longitude 87°07′32″ W and Latitude 37°19′46″ N, approximately National Hydrography Dataset (NHD) mile point (mp) 85.2 of the Green River, segment 03010. The requested WLA information will be utilized in drafting a Regional Wastewater Facilities Plan update.

The division notes that the Green River (NHD mp 71.9 to 94.4) is included on the 2010 303(d) List of impaired waters. The impaired use listed is primary contact recreation (partial support). The pollutant of concern is fecal coliform. The suspected sources are: source unknown. 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. Discharges from an expanded WWTP, in compliance with applicable Kentucky Pollutant Discharge Elimination System (KPDES) permit limitations and requirements, 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 up to 3.0 MGD / Discharge near NHD mp 85.2 of the Green 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
Toxicity	1.0 TUa	1.0 TUa

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 concentration. 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) 564-3410, 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:cs
c: Cindy McDonald, Water Infrastructure Branch
Compliance and Technical Assistance
Branch, Madisonville Section
TEMPO

McGHEE ENGINEERING, INC.

202 Ewing Street, P. O. Box 207
Guthrie, Kentucky 42234
www.mcgheeengineering.com

Phone: (270) 483-9985
Fax: (270) 483-9985

September 20, 2013

RECEIVED
SEP 20 2013
SWP

Courtney Seitz
Kentucky Division of Water
200 Fair Oaks Lane
Frankfort, Kentucky 40601

RE: Central City KY WWTP
KPDES No. KY0023540
Waste Load Allocation Request

Dear Mr. Seitz:

We are in the process of a facilities plan update and plant expansion for the Central City municipal wastewater treatment plant. The plant is currently permitted to discharge 1.2 MGD to the Green River at N37°19'46" & W87°07'32". We do not plan to change the plant or discharge location. A USGS map showing the location of the existing plant and discharge point is enclosed.

We expect to expand the plant to at least 1.8 MDG, or up to as much as 3 MGD. We request that you provide anticipated discharge limits for the expanded plant.

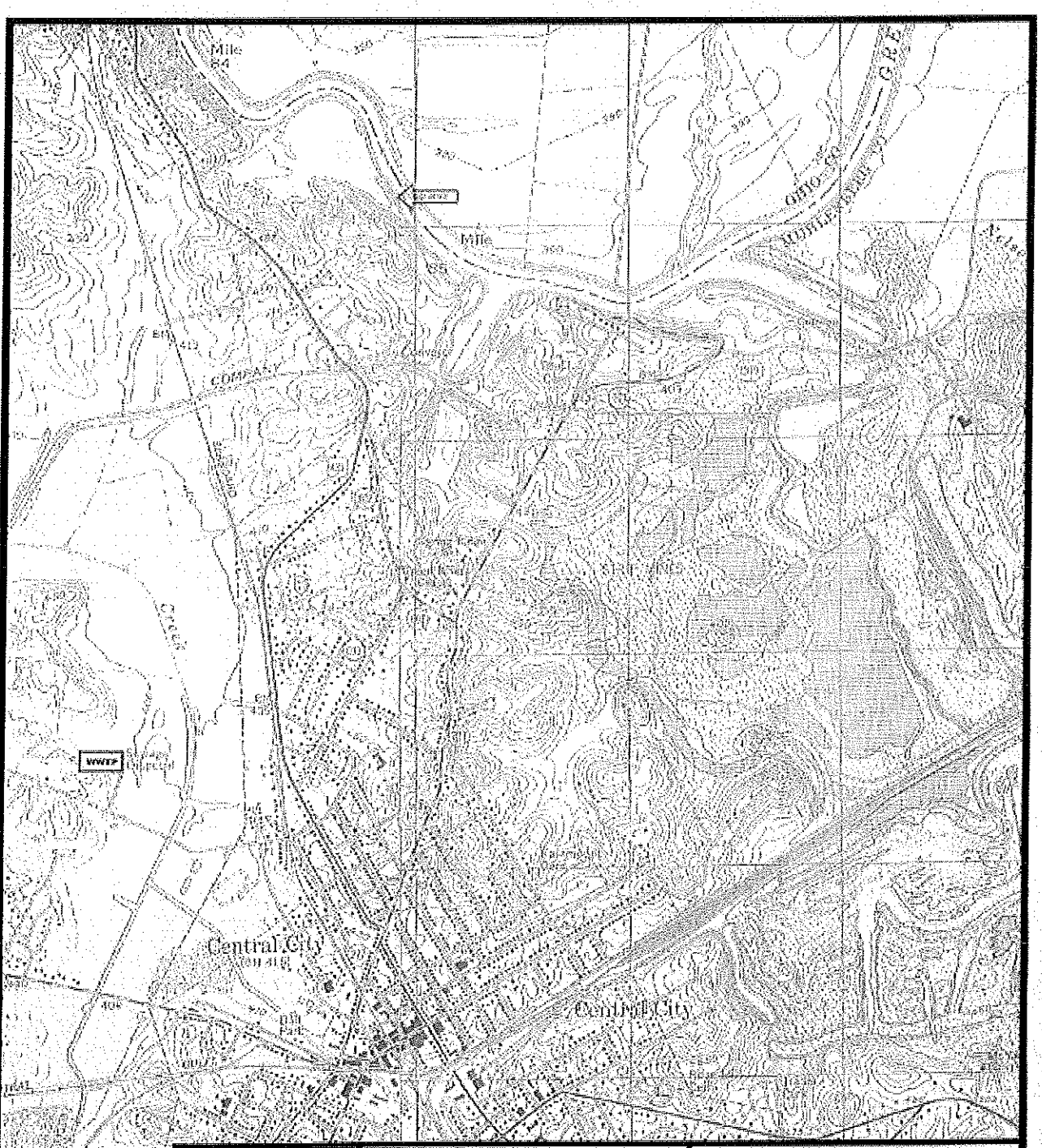
Please contact me if you have any questions.

Sincerely,
McGHEE ENGINEERING, INC.

Michael W. McGhee

Michael W. McGhee, PE
President

cc: Mark Sneve – Strand Associates, Inc.



N

LEGEND

Wastewater Treatment Plant — WWTP

Effluent Discharge Location

Background: USGS "Central City (West & East)" 7.5 Min Topo Quad

CENTRAL CITY WATER & SEWER

Wastewater Treatment Plant Expansion
PLANT & DISCHARGE LOCATIONS

MCGHEE ENGINEERING, INC.
Guthrie, Kentucky

Scale	Drawn By	Date	Page
1"=2,000'	M McGhee	9-19-13	E-1

APPENDIX D
DETAILED OPINION OF PROBABLE CONSTRUCTION COST

CENTRAL CITY, KENTUCKY
PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST
PREPARED BY STRAND ASSOCIATES

PROJECT: ***Central City Facilities Plan***
DATE OF OPINION: 20-Jan-14
ALTERNATIVE A - EXPANSION WITH ADDITIONAL RING TO EXISTING ORBAL OXIDATION DITCH
ALL COST IN DECEMBER 2013 DOLLARS

DESCRIPTION	Units	Unit Price	Installation Markup	Quantities	Cost	
Influent Pump Station						
Excavation and Backfill	LS	$15,000	1.00	1	$15,000	
Concrete Slab on Grade	CY	$600	1.00	33	$19,800	
Concrete Straight Walls	CY	$800	1.00	63	$50,400	
Concrete Elevated Slab	CY	$900	1.00	17	$15,300	
Pumps and Control Equipment	LS	$280,000	1.35	1	$378,000	
Piping	LS	$160,000	1.00	1	$160,000	
Building	SF	$900	1.00	125	$112,500	
Generator	LS	$80,000	1.00	1	$80,000	
Electrical and Controls	LS	$120,000	1.00	1	$120,000	
Site Work	LS	$24,000	1.00	1	$24,000	
					Subtotal	*$975,000*
Influent Force Main						
14-inch Ductile Iron Pipe	LF	$110	1.00	2200	$242,000	
Piping	LS	$14,000	1.25	1	$17,500	
					Subtotal	*$260,000*
Preliminary Treatment Facilities Modification						
Demolition	LS	$10,000	1.00	1	$10,000	
Excavation and Backfill	LS	$20,000	1.00	1	$20,000	
Stone Foundation	LS	$4,000	1.00	1	$4,000	
Grit Chamber Concrete (bottom slab)	CY	$430	1.00	20	$8,600	
Grit Chamber Concrete (straight walls)	CY	$660	1.00	30	$19,800	
Grit Chamber Concrete (elevated slab)	CY	$900	1.00	20	$18,000	
Grit Removal System	LS	$165,000	1.35	1	$222,800	
New Mechanically Clean Screen	EA	$150,000	1.35	1	$202,500	
Parshall Flume	EA	$5,000	1.35	1	$6,800	
Slide Gate	EA	$6,000	1.00	4	$24,000	
Handrails and Grating	LS	$10,000	1.00	1	$10,000	
Electrical and Controls	LS	20%	1.00	1	$109,300	
					Subtotal	*$656,000*
Orbal Oxidation Ditch Modification						
Excavation and Backfill	LS	$10,000	1.00	1	$10,000	
Rock Excavation	LS	$20,000	1.00	1	$20,000	
Concrete (slab)	CY	$430	1.00	381	$164,000	
Concrete (straight walls)	CY	$660	1.00	15	$9,900	
Concrete (curve walls)	CY	$720	1.00	156	$112,300	
Concrete (elevated slab)	CY	$900	1.00	10	$9,000	
Orbal equipment, Weatherhoods, Smart BNR Controls	LS	$448,500	1.35	1	$605,500	
Handrails	LF	$70	1.00	360	$25,200	
Stairs and Grating	LS	$45,000	1.00	1	$45,000	
Electrical and Controls	LS	20%	1.00	1	$200,180	
					Subtotal	*$1,201,000*
Clarifier Splitter Box						
Demolition	LS	$6,000	1.00	1	$6,000	
Concrete (slab)	CY	$430	1.00	15	$6,500	
Concrete (straight walls)	CY	$660	1.00	20	$13,200	
Weir Gates	EA	$6,000	1.35	1	$8,100	
Slide Gate	EA	$6,000	1.35	3	$24,300	
Handrail and Grating	LS	$10,000	1.00	1	$10,000	
Piping	LS	$8,000	1.00	1	$8,000	
					Subtotal	*$76,000*
One 82-ft Secondary Clarifier						
Excavation and Backfill	LS	$15,000	1.00	1	$15,000	
Rock Excavation	LS	$20,000	1.00	1	$20,000	
Concrete (slab)	CY	$430	1.00	210	$90,300	
Concrete (elevated slab)	CY	$900	1.00	28	$25,200	
Concrete (curve walls)	CY	$720	1.00	155	$111,600	
Clarifier Collector Equipment	EA	$180,000	1.35	1	$243,000	
Clarifier Weir and Scum Baffle	EA	$21,000	1.35	1	$28,400	
Clarifier Current Density Baffle	EA	$19,300	1.35	1	$26,100	
Handrail and Grating	LS	$25,000	1.00	1	$25,000	
Electrical and Controls	LS	10%	1.00		$58,460	
					Subtotal	*$643,000*
RAS Pump Station and Scum Pump Station						
RAS Pump Station and Valve Vault	LS	$50,000	1.00	1	$50,000	
RAS Pumps	EA	$24,100	1.35	2	$65,100	
VFD for RAS Pumps	EA	$30,000	1.35	1	$40,500	
Scum Pumps	EA	$12,000	1.35	2	$32,400	
Floor Hatches	EA	$4,000	1.35	1	$5,400	
RAS Flow Meter and Valves	LS	$16,000	1.00	1	$16,000	
Scum Valves	LS	$4,500	1.00	1	$4,500	
Electrical and Controls	LS	15%	1.00	1	$32,085	
					Subtotal	*$246,000*
UV Disinfection						
Excavation and Backfill	LS	$10,000	1.00	1	$10,000	
Concrete (slab)	CY	$430	1.00	10	$4,300	
Concrete (straight walls)	CY	$660	1.00	10	$6,600	
Crushed Stone	LS	$3,000	1.00	1	$3,000	
UV Channel	LS	$298,000	1.00	1	$298,000	
Channel Cover	LS	$10,000	1.00	1	$10,000	
Electrical and Control	LS	15%	1.00	1	$49,785	
					Subtotal	*$382,000*
Effluent Pumping						
Demolition	LS	$6,000	1.00	1	$6,000	
Piping and Valves Modification	LS	$20,000	1.00	1	$20,000	
New Pump	EA	$145,000	1.35	1	$195,800	
Seal Water System	LS	$10,000	1.00	1	$10,000	
Electrical and Control	LS	20%	1.00	1	$46,360	
					Subtotal	*$278,000*
Solids Dewatering System						
Sludge Feed Pumps	EA	$15,000	1.35	2	$40,500	
Polymer Feed System	LS	$30,000	1.00	1	$30,000	
Washed Water System	LS	$20,000	1.00	1	$20,000	
Dewatering Equipment	LS	$350,000	1.00	1	$350,000	
Solids Conveyor	EA	$25,000	1.35	1	$33,800	
Building	SF	$80	1.00	800	$64,000	
Electrical and Control	LS	15%	1.00	1	$80,745	
					Subtotal	*$619,000*
Effluent Force Main						
14-inch Ductile Iron Pipe	LF	$110	1.00	12000	$1,320,000	
Piping	LS	$1	1.25	10000	$12,500	
Outfall Structure	LS	$1	1.00	33000	$33,000	
					Subtotal	*$1,366,000*
MISCELLANEOUS						
Yard Piping	LS	5%	1.00	1	$196,100	
Site Work	LS	3%	1.00	1	$117,700	
Misc metals	LS	2%	1.00	1	$78,400	
HVAC & Plumbing	LS	2%	1.00	1	$78,400	
Emergency Generator	LS	$250,000	1.00	1	$250,000	
Painting	LS	2%	1.00	1	$78,400	
					Subtotal	*$799,000*

SUBTOTAL CONSTRUCTION COST	=	***$7,501,000***
General Conditions (7%)	=	$525,000
PROJECTED CONSTRUCTION COST	=	**$8,026,000**
Contingencies and Technical Services (35%)	=	$2,809,000
TOTAL PROJECT COST	=	**$10,835,000**

CENTRAL CITY, KENTUCKY
PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST
PREPARED BY STRAND ASSOCIATES

PROJECT: ***Central City Facilities Plan***
DATE OF OPINION: 20-Jan-14
ALTERNATIVE B - EXPANSION WITH NEW ORBAL OXIDATION DITCH
ALL COST IN DECEMBER 2013 DOLLARS

DESCRIPTION	Units	Unit Price	Installation Markup	Quantities	Cost	
Influent Pump Station						
Excavation and Backfill	LS	$15,000	1.00	1	$15,000	
Concrete Slab on Grade	CY	$600	1.00	33	$19,800	
Concrete Straight Walls	CY	$800	1.00	63	$50,400	
Concrete Elevated Slab	CY	$900	1.00	17	$15,300	
Pumps and Control Equipment	LS	$280,000	1.35	1	$378,000	
Piping	LS	$160,000	1.00	1	$160,000	
Building	SF	$900	1.00	125	$112,500	
Generator	LS	$80,000	1.00	1	$80,000	
Electrical and Controls	LS	$120,000	1.00	1	$120,000	
Site Work	LS	$24,000	1.00	1	$24,000	
					Subtotal	*$975,000*
Influent Force Main						
14-inch Ductile Iron Pipe	LF	$110	1.00	2200	$242,000	
Piping	LS	$14,000	1.25	1	$17,500	
					Subtotal	*$260,000*
Preliminary Treatment Facilities Modification						
Demolition	LS	$10,000	1.00	1	$10,000	
Excavation and Backfill	LS	$20,000	1.00	1	$20,000	
Stone Foundation	LS	$4,000	1.00	1	$4,000	
Grit Chamber Concrete (bottom slab)	CY	$430	1.00	20	$8,600	
Grit Chamber Concrete (straight walls)	CY	$660	1.00	30	$19,800	
Grit Chamber Concrete (elevated slab)	CY	$900	1.00	20	$18,000	
Grit Removal System	LS	$165,000	1.35	1	$222,800	
New Mechanically Clean Screen	EA	$150,000	1.35	1	$202,500	
Parshall Flume	EA	$5,000	1.35	1	$6,800	
Slide Gate	EA	$6,000	1.00	4	$24,000	
Handrails and Grating	LS	$10,000	1.00	1	$10,000	
Electrical and Controls	LS	20%	1.00	1	$109,300	
					Subtotal	*$656,000*
Oxidation Ditch Splitter Box						
Excavation and Backfill	LS	$10,000	1.00	1	$10,000	
Concrete (slab)	CY	$430	1.00	15	$6,500	
Concrete (straight walls)	CY	$660	1.00	10	$6,600	
Slide Gate	EA	$6,000	1.35	2	$16,200	
Handrail and Grating	LS	$10,000	1.00	1	$10,000	
Piping	LS	$10,000	1.00	1	$10,000	
					Subtotal	*$59,000*
New Orbal Oxidation Ditch						
Excavation and Backfill	LS	$10,000	1.00	1	$10,000	
Rock Excavation	LS	$50,000	1.00	1	$50,000	
Concrete (slab)	CY	$430	1.00	630	$270,900	
Concrete (straight walls)	CY	$660	1.00	78	$51,500	
Concrete (curve walls)	CY	$720	1.00	99	$71,300	
Concrete (elevated slab)	CY	$900	1.00	20	$18,000	
Orbal equipment, Weatherhoods, Smart BNR Controls	LS	$549,300	1.35	1	$741,600	
Handrails	LF	$70	1.00	230	$16,100	
Stairs and Grating	LS	$35,000	1.00	1	$35,000	
Electrical and Controls	LS	20%	1.00	1	$252,880	
					Subtotal	*$1,517,000*
Clarifier Splitter Box						
Demolition	LS	$6,000	1.00	1	$6,000	
Concrete (slab)	CY	$430	1.00	15	$6,500	
Concrete (straight walls)	CY	$660	1.00	20	$13,200	
Weir Gates	EA	$6,000	1.35	1	$8,100	
Slide Gate	EA	$6,000	1.35	3	$24,300	
Handrail and Grating	LS	$10,000	1.00	1	$10,000	
Piping	LS	$8,000	1.00	1	$8,000	
					Subtotal	*$76,000*
One 82-ft Secondary Clarifier						
Demolition of Existing Structures	LS	$50,000	1.00	1	$50,000	
Excavation and Backfill	LS	$15,000	1.00	1	$15,000	
Rock Excavation	LS	$20,000	1.00	1	$20,000	
Concrete (slab)	CY	$430	1.00	210	$90,300	
Concrete (elevated slab)	CY	$900	1.00	28	$25,200	
Concrete (curve walls)	CY	$720	1.00	155	$111,600	
Clarifier Collector Equipment	EA	$180,000	1.35	1	$243,000	
Clarifier Weir and Scum Baffle	EA	$21,000	1.35	1	$28,400	
Clarifier Current Density Baffle	EA	$19,300	1.35	1	$26,100	
Handrail and Grating	LS	$25,000	1.00	1	$25,000	
Electrical and Controls	LS	10%	1.00		$58,460	
					Subtotal	*$693,000*
RAS Pump Station and Scum Pump Station						
RAS Pump Station and Valve Vault	LS	$50,000	1.00	1	$50,000	
RAS Pumps	EA	$24,100	1.35	2	$65,100	
VFD for RAS Pumps	EA	$30,000	1.35	1	$40,500	
Scum Pumps	EA	$12,000	1.35	2	$32,400	
Floor Hatches	EA	$4,000	1.35	1	$5,400	
RAS Flow Meter and Valves	LS	$16,000	1.00	1	$16,000	
Scum Valves	LS	$4,500	1.00	1	$4,500	
Electrical and Controls	LS	15%	1.00	1	$32,085	
					Subtotal	*$246,000*
UV Disinfection						
Excavation and Backfill	LS	$10,000	1.00	1	$10,000	
Concrete (slab)	CY	$430	1.00	10	$4,300	
Concrete (straight walls)	CY	$660	1.00	10	$6,600	
Crushed Stone	LS	$3,000	1.00	1	$3,000	
UV Channel	LS	$298,000	1.00	1	$298,000	
Channel Cover	LS	$10,000	1.00	1	$10,000	
Electrical and Control	LS	15%	1.00	1	$49,785	
					Subtotal	*$382,000*
Effluent Pumping						
Demolition	LS	$6,000	1.00	1	$6,000	
Piping and Valves Modification	LS	$20,000	1.00	1	$20,000	
New Pump	EA	$145,000	1.35	1	$195,800	
Seal Water System	LS	$10,000	1.00	1	$10,000	
Electrical and Control	LS	20%	1.00	1	$46,360	
					Subtotal	*$278,000*
Solids Dewatering System						
Sludge Feed Pumps	EA	$15,000	1.35	2	$40,500	
Polymer Feed System	LS	$30,000	1.00	1	$30,000	
Washed Water System	LS	$20,000	1.00	1	$20,000	
Dewatering Equipment	LS	$350,000	1.00	1	$350,000	
Solids Conveyor	EA	$25,000	1.35	1	$33,800	
Building	SF	$80	1.00	800	$64,000	
Electrical and Control	LS	15%	1.00	1	$80,745	
					Subtotal	*$619,000*
Effluent Force Main						
14-inch Ductile Iron Pipe	LF	$110	1.00	12000	$1,320,000	
Piping	LS	$1	1.25	10000	$12,500	
Outfall Structure	LS	$1	1.00	33000	$33,000	
					Subtotal	*$1,366,000*
MISCELLANEOUS						
Yard Piping	LS	5%	1.00	1	$196,100	
Site Work	LS	3%	1.00	1	$117,700	
Misc metals	LS	2%	1.00	1	$78,400	
HVAC & Plumbing	LS	4%	1.00	1	$78,400	
Emergency Generator	LS	$250,000	1.00	1	$250,000	
Painting	LS	2%	1.00	1	$78,400	
					Subtotal	*$799,000*

SUBTOTAL CONSTRUCTION COST	=	***$7,926,000***
General Conditions (7%)	=	$555,000
PROJECTED CONSTRUCTION COST	=	**$8,481,000**
Contingencies and Technical Services (35%)	=	$2,968,000
TOTAL PROJECT COST	=	**$11,449,000**

APPENDIX E
CROSS-CUTTER CORRESPONDENCE

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

26 March 2015

Strand Associates, Inc.
Attn: Laura M. Singleton, E.I.T
Waterfront Plaza
325 West Main Street, Suite 710
Louisville, KY 40202

RE: Central City Municipal Water & Sewer
Central City Wastewater Treatment Plan Facility Plan

Dear Ms. Singleton:

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 no federally or state - listed species are known to occur within close proximity to the project site. Further, no critical habitat or wildlife management areas are known to occur within the project footprint. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

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,

Dan Stoelb
Wildlife Biologist

Cc: Environmental Section File

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LOUISVILLE, KY

United States Department of Agriculture

NRCS Natural Resources Conservation Service

1925 Old Main Street
Suite 2
Maysville, KY. 41056
Ph: 606-759-5570 ext. 201

March 30, 2015

To: Laura M. Singleton, E.I.T.
Strand Associates, Inc.
325 West Main Street, Suite 710
Louisville, KY 40202

Re: Central City Municipal Water & Sewer
Central City Wastewaster Treatment Facility Plan

Ms. Singleton,

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 or most work is to be performed within the City of Central City, on existing highway right-a-ways, easements, to existing facilities, or other previously disturbed areas which are already considered as converted farmland and not affecting new or additional farmlands. Any areas of new construction, if such sites are present, not on the above named exemptions would not be covered by this determination as these site where not separately identified in the request. This office does not have any additional concerns at this time.

If needed, additional information on the soils of Muhlenburg County, KY is available on-line through USDA's Web Soil Survey for Muhlenburg County, KY.

If this office may be of additional assistance, please do not hesitate to contact my office in Maysville Ky. or contact the NRCS District Conservationist at 270-526-3784.

Steve Jacobs
Resource Soil Scientist, NRCS, Maysville, KY.

cc: Rick Burbridge, NRCS District Conservationist, Morgantown, KY

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Strand Associates, Inc.®
Waterfront Plaza
325 West Main Street, Suite 710
Louisville, KY 40202
(P) 502-583-7020
(F) 502-583-7026

March 17, 2015

Ms. Karen Woodrich
Natural Resource Conservation Service
771 Corporate Drive, Suite 210
Lexington, Kentucky 40503

Re: Central City Municipal Water & Sewer
Central City Wastewater Treatment Plant Facility Plan

Dear Ms. Woodrich:

Strand Associates, Inc.® and McGhee Engineering, Inc. are assisting Central City Municipal Water & Sewer with preparation of the Central City Facility Plan. The plan recommends construction projects to update and expand the wastewater treatment plant over the next 20 year time horizon. The recommended improvements are shown on Figure 1.03-1. The proposed projects include an upgrade of the Whitmer Street Pump Station, installation of a parallel force main from the Whitmer Street Pump Station to the wastewater treatment plant, expansion of the existing wastewater treatment plant (within the existing site) from 1.2 mgd to 1.8 mgd, and expansion of the existing effluent pump station and installation of a parallel effluent force main from the wastewater treatment plant to the Green River. The City plans to upgrade and replace several sewers in the Broad Street and downtown areas. These sewer replacements will follow the existing sewer alignments. The City may add telemetry to the existing pump stations shown on the figure so their operation can be monitored remotely. The force main relocation shown on the figure has already been completed under a separate project.

We are not aware of any agricultural resources that would be impacted by the proposed projects. Most construction activities will occur on the existing wastewater treatment plant site or adjacent to existing infrastructure on previously disturbed lands.

Please review the proposed projects and reply with any concerns over agricultural resources that may be affected. Should you have any questions concerning this matter, please call me at (502) 583-7020.

Sincerely,

STRAND ASSOCIATES, INC.®

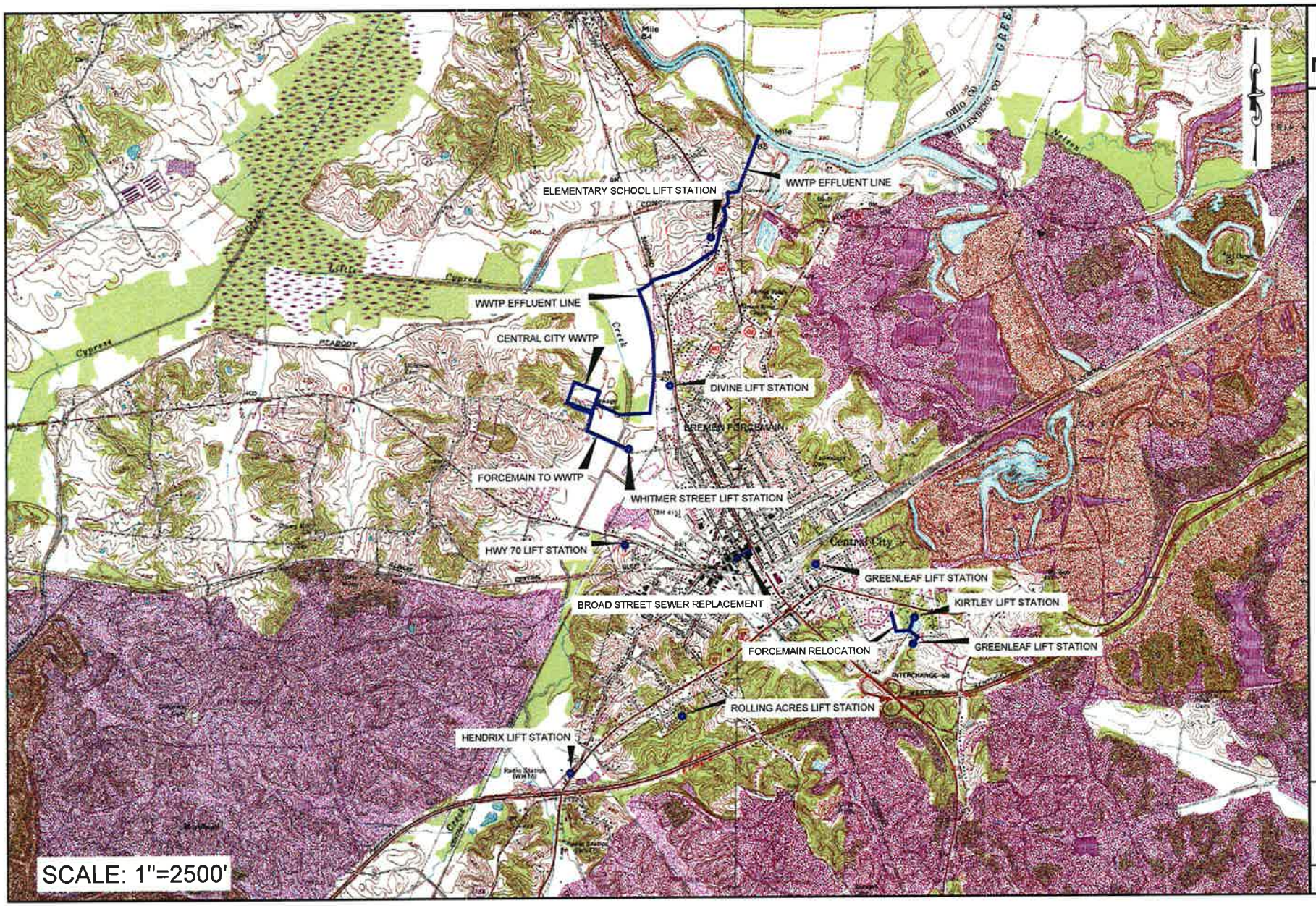
Laura M. Singleton

Laura M. Singleton, E.I.T.

Enclosure(s): Figure 1.03-1 – Central City Wastewater Facilities Plan, Location of Projects

c: Michael McGhee, P.E., McGhee Engineering

LMS:clj\\\strand.com\projects\LOU\5100--5199\5109\012\Wrd\Letters to Agencies\Natural Resource Conservation Service.docx



MCGHEE ENGINEERING

CENTRAL CITY WASTEWATER FACILITIES PLAN
LOCATION OF PROJECTS

CENTRAL CITY WASTEWATER FACILITIES PLAN
CENTRAL CITY
MUHLENBERG COUNTY, KENTUCKY

STRAND ASSOCIATES®

EXHIBIT 1.03-1
5109.012

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

May 5, 2015

Ms. Laura M. Singleton
Strand Associates, Inc.
Waterfront Plaza
325 West Main Street, Suite 710
Louisville, KY 40202

Re: FWS 2015-B-0333; Central City Municipal Water & Sewer, Wastewater Treatment Plant Facility Plan; located in Muhlenberg County, Kentucky

Dear Ms. Singleton:

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.

In accordance with the provisions of the Fish and Wildlife Coordination Act, the Service has reviewed the project regarding the effects the proposed action 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.

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 (*e.g.*; antici[ated development, 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 federally-listed 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 grisescens*	gray bat	E
	Myotis sodalis	Indiana bat	E
	Myotis septentrionalis	northern long-eared bat	T
Mussels	*Epioblasma o. obliquata*	purple catspaw pearlymussel	E
	Cyprogenia stegaria	fanshell	E
	Pleurobema plenum	rough pigtoe	E

** 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.

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.

Indiana bat
Northern long-eared bat

The proposed project is located in "potential habitat" for the Indiana bat and "potential habitat" and "known summer 1 habitat" the northern long-eared bat. These two bat species winter in caves, rockshelters, abandoned underground mines, and other structures. During the summer they roost in trees and forage in and around forested habitat. 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) 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 and/or northern long-eared bat by this office.

(2) Both bat species utilize a wide array of forested habitats, including riparian forests, bottomlands, and uplands for both summer foraging and roosting habitat. Suitable roost trees are greater than 3 inches diameter at breast height (DBH), can be living or dead, and exhibit any of the following characteristics: exfoliating bark, cavities of dead and live trees, broken limbs, broken tops, cracks, and crevices.

To address potential impacts to Indiana bat or the northern long-eared bat summer roosting and foraging habitat, the following options are available:

- The project proponent can modify the proposed project to eliminate or reduce impacts to suitable habitat, thus avoiding impacts. A habitat assessment may useful in determining if suitable summer roosting or foraging habitat is present in the action area of the proposed project.

- The project proponent can survey portions of the project area to determine the presence or likely absence of the species within the project area in an effort to determine if potential effects are likely. A qualified biologist who holds the appropriate collection permits must undertake such surveys in accordance with our most current survey guidance, which is available at the following link:

  https://www.fws.gov/frankfort/indiana_bat_procedures.html

  If any Indiana bats or northern long-eared bats are captured, we request written notification of such occurrence(s) and further coordination and consultation. Survey results cannot be used to support probable absence of a bat species that has already been identified as "known" habitat for that species.

- 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 identifies actions 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 and/or northern long-eared bats. By entering into a Conservation MOA with the Service, Cooperators gain flexibility with regard to the removal of suitable. In exchange for this flexibility, the Cooperator provides recovery-focused conservation benefits to the species through the implementation of minimization and mitigation measures that are described in the Conservation Strategy for Forest-Dwelling Bats in the Commonwealth of Kentucky. For additional information about this option, please contact our office.

Federally listed mussels

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. Several species of federally listed mussels are known to exist in the Green River in Muhlenberg County. 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 the proposed project.

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, Jr.
Field Supervisor

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

May 15, 2015

Ms. Laura M. Singleton, E.I.T
Strand Associates, Inc.
Waterfront Plaza
325 West Main Street, Suite 710
Louisville, KY 40202

Re: Central City Municipal Water & Sewer
Central City Wastewater Treatment Plant Facility Plan

Dear Ms. Singleton:

Thank you for your letter concerning the above-referenced proposed project. A review of our files indicates that the proposed project areas have not been surveyed for archaeological resources. Investigations of projects in similar environmental contexts have resulted in the identification of a large number of sites, some of which have been determined eligible for listing in the National Register.

Therefore, I recommend that the proposed project areas that *extend outside previously disturbed road right of ways* be surveyed by a professional archaeologist and that the resulting report of these investigations be submitted to our office for review and comment. 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. The State Historic Preservation Officer must review and approve the survey reports generated from these surveys.

If any of the above ground elements of the proposed projects are adjacent or within view of structures 50 years of age or older at the time the project is being completed, please submit photos of the structure to our office to determine if further consultation is needed.

Should you have any questions, feel free to contact Nick Laracuente of my staff at 502.564.7005, extension 122.

Sincerely,

Craig A. Potts,
Executive Director and
State Historic Preservation Officer

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