STATE REVOLVING FUND
PROJECT PLAN

ENERGY COST REDUCTION & SEWER OVERFLOW RISK REDUCTION
IN THE COMMERCE TOWNSHIP SANITARY SEWER SYSTEM

CHARTER TOWNSHIP OF COMMERCE
SANITARY SEWER SYSTEM

PREPARED BY:
Giffels-Webster Engineers, Inc.
1025 East Maple, Suite 100
Birmingham, MI 48009
Loren Crandell, PE, Partner
Nikki Jeffries, PE, Project Manager

ON BEHALF OF:
Charter Township of Commerce
2009 Township Drive
Commerce, MI 48390
Thomas Zoner, Supervisor

DRAFT DATED MAY 8, 2012

NOTICE OF PUBLIC HEARING

The Charter Township of Commerce will hold a public hearing regarding the proposed Project Plan for Energy Cost Reduction and Sewer Overflow Risk Reduction in the Commerce Township Sanitary Sewer System for the purpose of receiving comments from interested persons.

The hearing will be held at 7 p.m. on June 7, 2012, at the Commerce Township Hall, 2009 Township Drive, Commerce, MI 48390.

The purpose of the proposed project is: 1) to reduce the risk and severity of future sanitary sewer overflows; and 2) to reduce energy use in the sewer transportation and treatment system.

Project construction will involve:

1) **Newton Road Force Main**: Installation of 9,200 lineal feet of 19" inside diameter polyethylene pipe in easements along the west side of Newton Road from Oakley Park Road to the north property line of Multi Lakes Conservation Association, and in easements across Commerce Township Dodge Park No. 5, between Newton Road and South Commerce Road. An additional 2,300 lineal feet of 2" diameter pressure sewer will be placed along Newton Road.

2) **Treated Effluent Heat Recovery System at Commerce WWTP**: The proposed system will use heat in the treated effluent to heat the buildings at the WWTP.

3) **SCADA System**: Installation of Supervisory Control and Data Acquisition system to monitor and control 28 existing sewer pump stations.

Impacts of proposed project primarily include temporary construction related impacts along Newton Road and in Dodge Park No. 5.

The estimated cost to users of the proposed project is estimated to be $2.00/month

Copies of the plan detailing the proposed projects are available for inspection at the following locations:

- Commerce Township Hall, 2009 Township Drive, Commerce, MI 48390
- Commerce Township Library, 2869 North Pontiac Trail, Commerce, MI 48390
- Commerce Township website: www.commercetwp.com

Copies of the plan detailing the proposed projects may also be available for inspection at the following locations:

- West Bloomfield Township Hall, library, and website
- White Lake Township Hall, library, and website
- Wolverine Lake Village Offices and website
- Novi City Hall Clerk's Office, library, and website

Written comments received before the hearing record is closed on June 7, 2012 will receive responses in the final project plan. Written comments should be sent to Commerce Township Clerk, 2009 Township Drive, Commerce, MI 48390. Questions/comments can also be addressed by calling the Clerk at the Commerce Township offices at 248-624-0110.

TABLE OF CONTENTS

I. PROJECT BACKGROUND

SUMMARY

The Charter Township of Commerce is a 29.8 square mile community located in the western half of Oakland County. Commerce Township is a lake community that contains all or part of 31 lakes, the Huron River, many creeks and streams, and over 3,200 acres of public park land.

The leaders in Commerce Township have long been concerned about the natural resources in the Township, and the effect development could have on these resources. In the 1950's, the Township Board of Trustees went on record supporting sanitary sewers and allocated funds for a study. In 1967, the Township supported planning efforts for the Hannan Road Interceptor. In the 1970's, the Township supported a joint application for a proposed wastewater treatment plant on the Huron River that would serve Commerce Township, White Lake Township, and the Village of Wolverine Lake. In the 1980's, the North Huron Valley/Rouge Valley sewer was proposed to serve Commerce Township, however the design was later revised to exclude Commerce Township. In August of 1988, Commerce Township was issued the NPDES permit for its wastewater treatment plant in Section 36 of the Township. In the meantime, development in the township, particularly around the lakes, continued with on-site septic systems as the primary method of sewage treatment.

The Commerce Township Waste Water Treatment Plant (WWTP) currently treats approximately 2 million gallons per day of municipal waste water, and has a permitted capacity of 8.5 million gallons per day. The WWTP serves all of Commerce Township except for an area south of the Village of Wolverine Lake, between the cities of Walled Lake and Wixom. The WWTP also serves White Lake Township, the Village of Wolverine Lake, approximately 50 homes in West Bloomfield Township, and an area in the northeast portion of the City of Novi, which has the potential for approximately 2000 residential equivalent units.

This Project Plan will detail three improvement projects that Commerce Township is proposing to the existing wastewater treatment plant and collection system. These projects will help Commerce Township reduce the risk and impact of future sanitary sewer overflows, and reduce energy consumption and operational costs of the entire system. The three projects are briefly described below:

Newton Road Force Main: Construction of 9,050 L.F. of 19" HDPE SDR 11 (note: all pipe diameters in this report are nominal inside diameter) sanitary sewer trunk force main through Dodge Park #5 and along the western side of Newton Road. The Newton Road Force main will provide a redundant loop in the existing trunk force main system. This redundant loop will reinforce Commerce Township's trunk force main system, and will make it easier and quicker to bypass a section of force main. The redundant loop will make sanitary sewer overflows resulting from a broken sewer less likely and less severe. Additionally, installing the Newton Road force main will reduce the pressures in the entire trunk force main system, which will, in turn, reduce energy consumption at the pump stations serviced by the trunk force main system.

As part of the Newton Road Force main project, an isolation valve will be installed in the Welch Road force main. This will make it possible to bypass either the Welch Road force main or the Martin Parkway force main. In addition, this project includes approximately 2,285 L.F. of 2" HDPE SDR 11 low-pressure sewer along the western side of Newton Road that will provide service for approximately 20 existing homes.

WWTP Heat Recovery System: The buildings at the WWTP are heated with rooftop natural gas units. The existing rooftop units are designed for twelve (12) air exchanges per hour for many of the building spaces. A significant amount of energy is required to heat this incoming air. The proposed heat recovery system will capture heat from the treated effluent and move it via heat pumps to the make-up air units. This type of system will save the Township approximately $34,000 per year in operations costs.

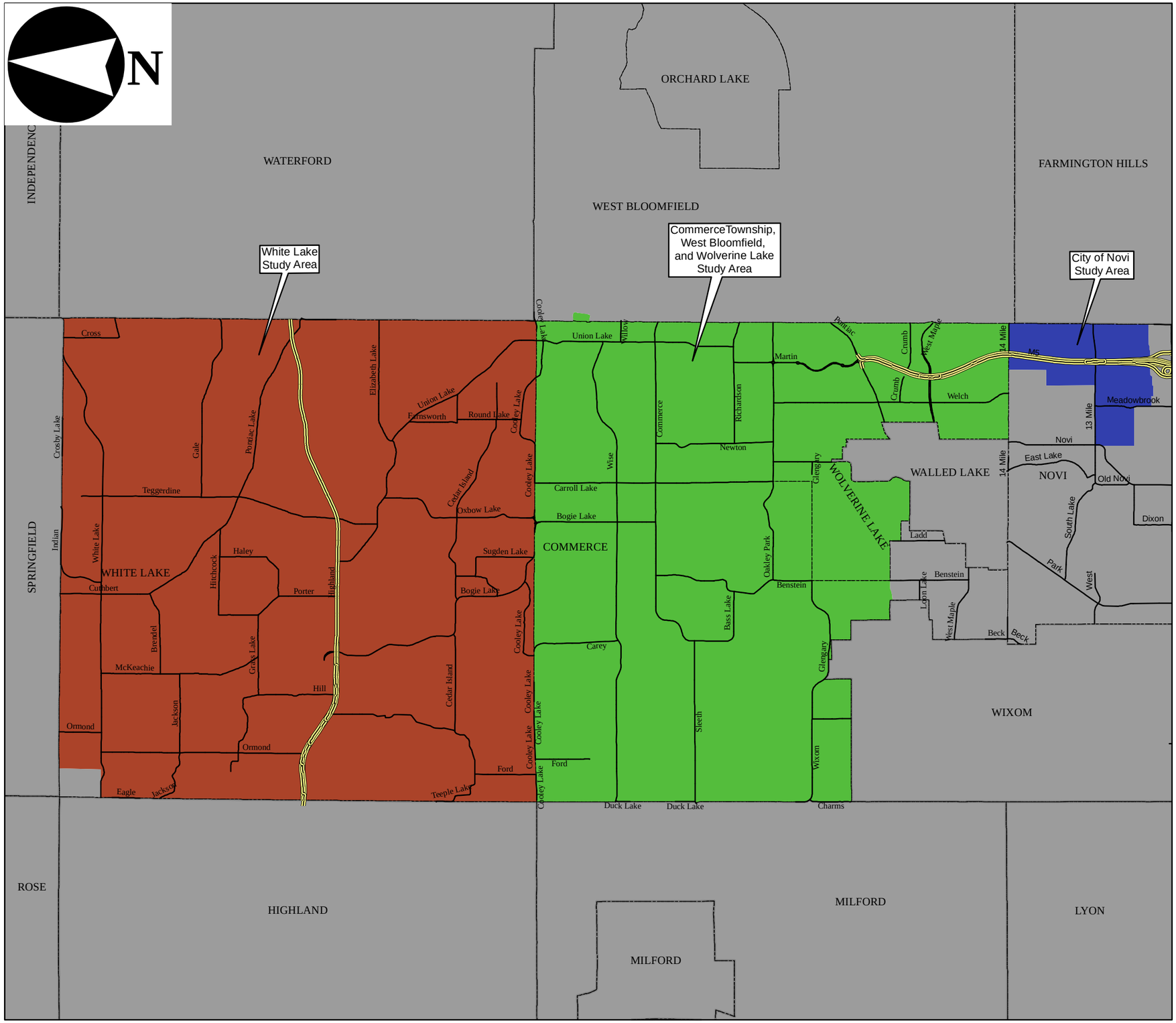
Supervisory Control and Data Acquisition (SCADA) System: Commerce Township has a SCADA system that was designed and installed in the early 1990's. Both the hardware and software of the existing SCADA system is outdated, obsolete, and difficult to maintain. A new and improved SCADA system will make it possible for the system operators (OCWRC) to obtain more information from the pump stations and trunk force main system, access the information from remote and secure locations, and to make changes to the operational controls. The SCADA system will help the township reduce sanitary sewer overflows, improve communication reliability, reduce operational costs and overall energy consumption while helping support facilities information management tasks. The WWTP has already been equipped with an advanced SCADA system which has proven to be both cost effective and useful tool for keeping the WWTP running smoothly.

A. STUDY AREA CHARACTERISTICS

1. **Delineation of the Study Area:** Exhibits A1-A4 depict the Study Area, which is the entire tributary area of the Commerce Township WWTP. It includes all of Commerce Township (except for approximately 2 square miles south of the Village of Wolverine Lake between the cities of Walled Lake and Wixom), plus parts of four neighboring communities. Commerce Township has intergovernmental agreements with the Village of Wolverine Lake, the City of Novi, West Bloomfield Township, and White Lake Township to provide them capacity in the waste water treatment plant and sewage transportation systems. It is important to understand that these intergovernmental agreements do not provide Commerce Township with any rights or responsibilities for providing sewer infrastructure within these neighboring communities, nor does it provide the neighboring communities rights or responsibilities for infrastructure within Commerce Township. Therefore, this Project Plan is focused on the infrastructure needs within Commerce Township that will be necessary to provide sanitary sewer service to the Study Area for the next 20 years.

EXHIBIT A-1

STUDY AREA KEY MAP



See Exhibit A-2

See Exhibit A-3

See Exhibit A-4

Outside of Study Area

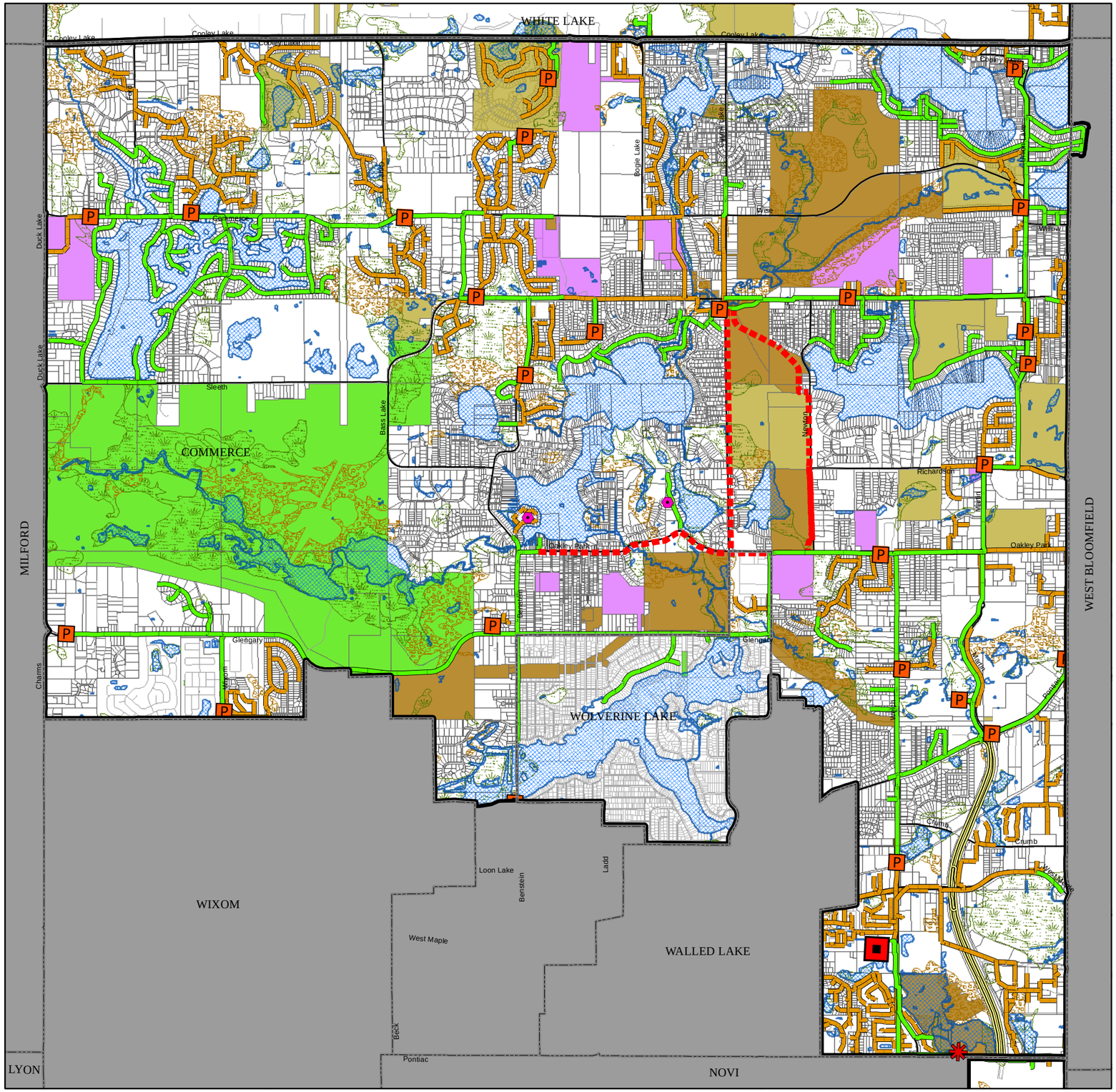
0 5,000 10,000 20,000 Feet

Date: 5/8/2012

Giffels-Webster ENGINEERS

EXHIBIT A-2

STUDY AREA WITHIN COMMERCE TOWNSHIP, WOLVERINE LAKE VILLAGE & WEST BLOOMFIELD



- Pump Station
- Community Septic Field
- WWTP Facility
- Primary Effluent Discharge
- Existing Force Main
- Proposed Force Main
- Existing Gravity Sewer
- Lakes and Streams
- Non-Forested Westland
- Forested Wetland

Recreation Area

- County Park
- Institution, Education, Hospital
- MetroPark
- Municipal Land
- Private Park/Club
- State Park
- Trailway

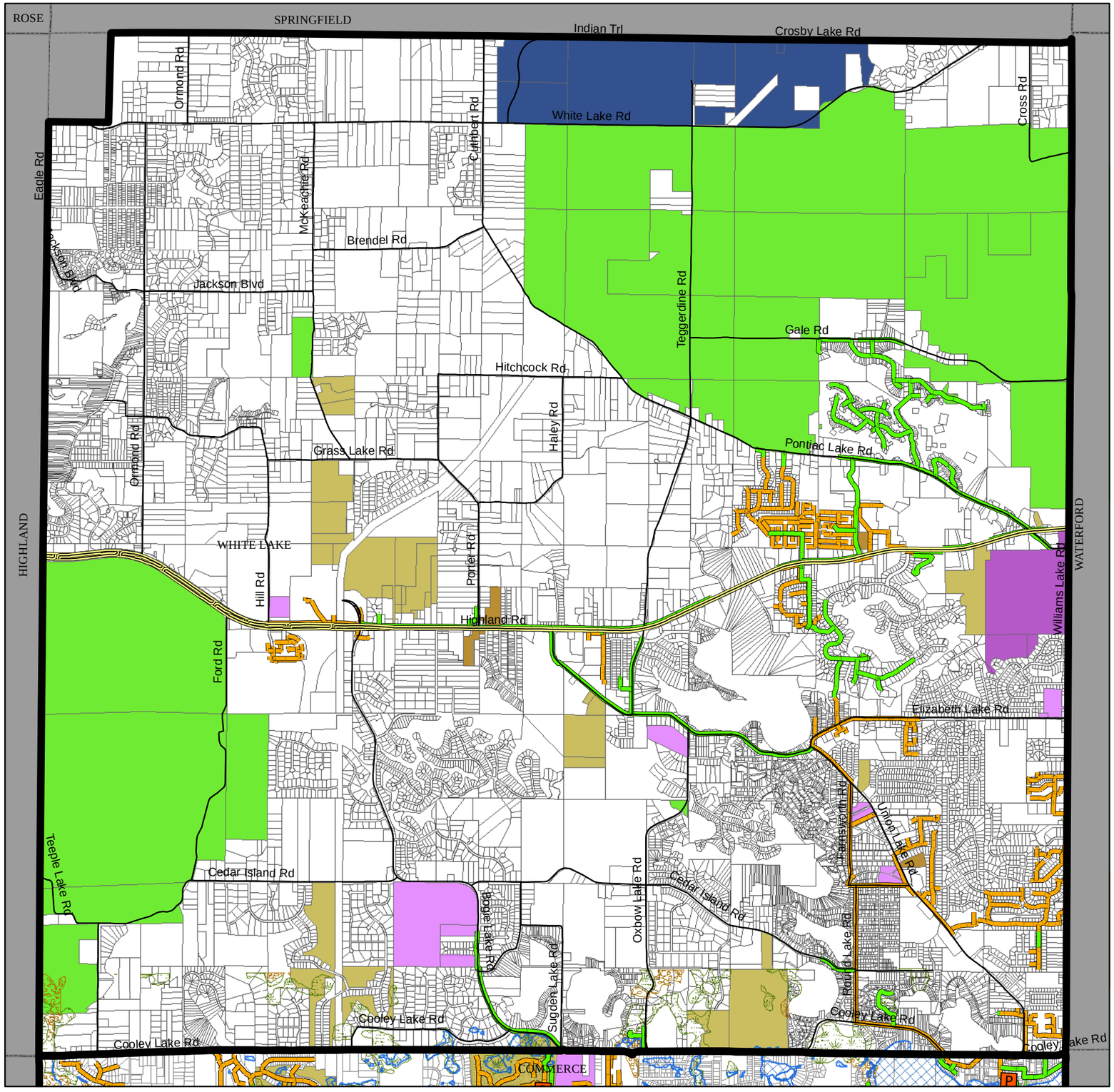
0 2,500 5,000 10,000 Feet

Date: 5/8/2012

Giffels-Webster ENGINEERS

EXHIBIT A-3

STUDY AREA WITHIN WHITE LAKE TOWNSHIP



- Pump Station
- Community Septic Field
- WWTP Facility
- Primary Effluent Discharge
- Existing Force Main
- Existing Gravity Sewer

Recreation Area

- County Park
- Institution, Education, Hospital
- MetroPark
- Municipal Land
- Private Park/Club
- State Park
- Trailway

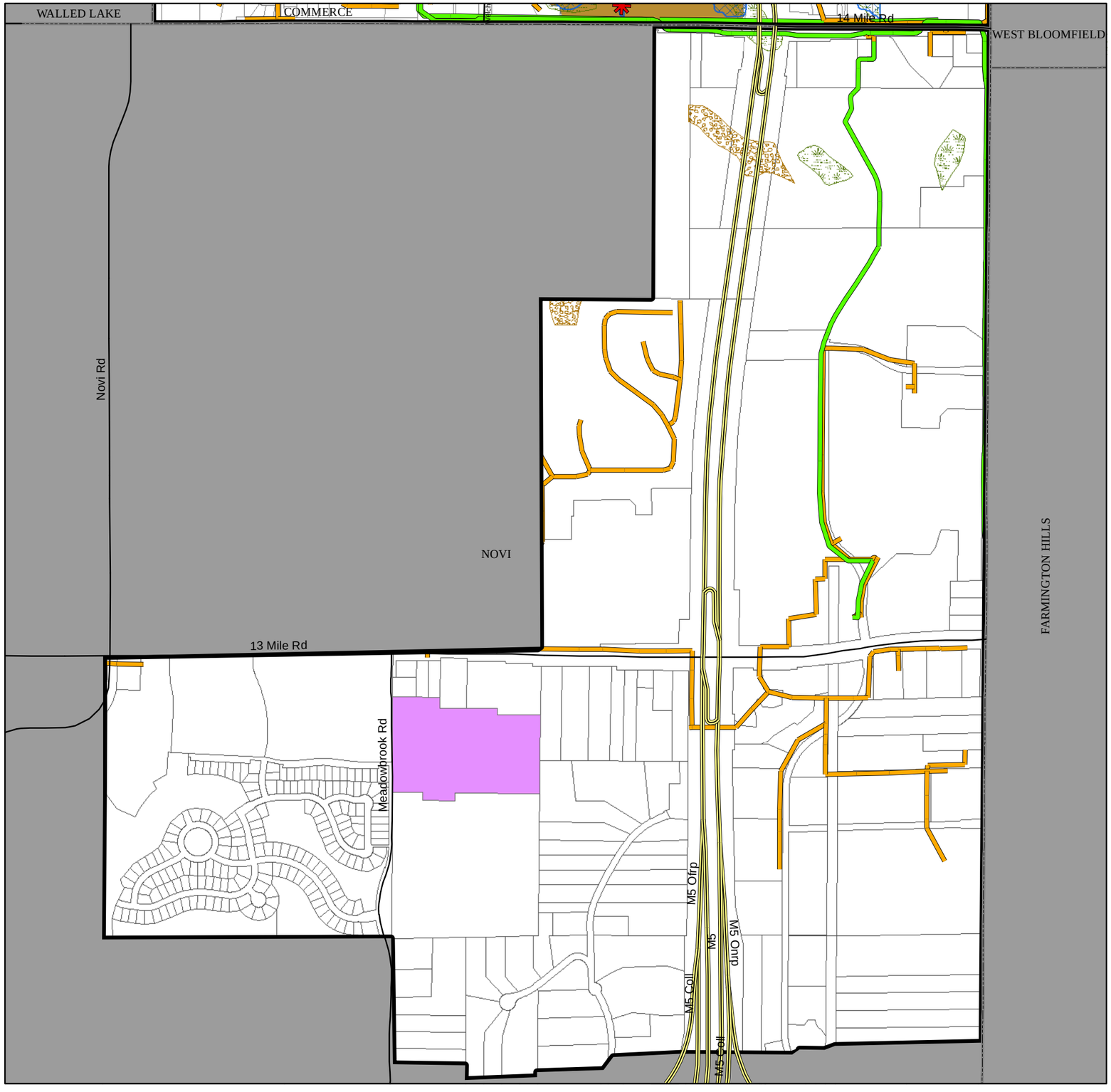
0 2,500 5,000 10,000 Feet

Date: 5/8/2012

GWE Giffels-Webster ENGINEERS

EXHIBIT A-4

STUDY AREA WITHIN THE CITY OF NOVI



- Pump Station
- Community Septic Field
- WWTP Facility
- Primary Effluent Discharge
- Existing Force Main
- Existing Gravity Sewer
- Lakes and Streams
- Non-Forested Westland
- Forested Wetland

Recreation Area

- County Park
- Institution, Education, Hospital
- MetroPark
- Municipal Land
- Private Park/Club
- State Park
- Trailway

0 750 1,500 3,000 Feet

Date: 5/8/2012

Giffels-Webster ENGINEERS

2. **Land Use in the Study Area**
   a. **Commerce Township**: Appendix I includes the existing and future land use plans for Commerce Township. Table 1 below shows the breakdown of land use within the almost 30 square miles of Commerce Township.

Use	Area
Lakes/Wetlands/Rivers	2.9 square miles
Parks/Recreation/Open Space	6.1 square miles
Residential	12.8 square miles
Commercial	1.6 square miles
Industrial	1.4 square miles
Transportation/Utility	2.8 square miles
Governmental/Institutional	1.8 square miles
Agricultural	0.2 square miles

Table 1 – Commerce Township Land Use

There are approximately 13,500 developed residential properties within the township; of these, approximately 3,980 are connected to the sewer system. Most of the residential properties developed before 1990 have on-site septic systems, including most of the residential developments adjacent to the lakes. Commerce Township does not typically install sewers within existing communities unless they are petitioned by the property owners to do so. Additionally, the Township does not require existing properties to connect to a sanitary sewer unless a building is within 200 feet of a sewer and the existing septic system fails. There has been significant interest by residential property owners with on-site septic systems near the lakes to connect to the system, and sewers have been installed in over 20 lake front subdivisions within the last 20 years (see Exhibit C for a list of these communities). As the economy improves, the trend of existing residential properties taking the steps to construct and connect to the sewer system is expected to continue.

The Commerce Township Land Use Master Plan estimates that only 13.7% of the land area in Commerce Township is vacant or agricultural. The Master Plan identifies only eight large properties (six golf courses, the Long family farm, and Holloway Gravel) that are likely to be redeveloped in the next 20 years. Two of the golf courses are already in the process of being redeveloped.

Approximately 3.92 million gallons per day of sewer capacity in the WWTP is allocated for Commerce Township. The remaining 4.6 million gallons per day is allocated to White Lake Township (3.5 MGD), Novi (0.54 MGD), Wolverine Lake (0.53 MGD), and West Bloomfield (0.01 MGD). The Commerce Township Sanitary Sewer Master Plan provides an analysis of the ultimate sewer build-out requirements for Commerce Township. The analysis shows the Township could need 7 million gallons per day within the study area; however 3.75 - 4 million gallons per day is considered a more likely requirement. 7 million gallons per day is based on the assumptions that all properties are developed to their maximum potential, every property connects to the sewer system, and each residential equivalent unit generates 270 gallons per day; whereas, more likely but still conservative assumptions might be 80% of properties connect to the sewer system which develop to 80% of

LAKEFRONT COMMUNITIES WITH SEWERS IN COMMERCE

Bass Lake
- Bass Lake Woods 3
- Bass Lake Grove

Cranberry Lake
- Cranberry Estates No. 1 & 2

Fox Lake
- Cross Creek No. 1 & 2
- River Pine Estates

Long Lake
- Boulevard Sub
- Crescent Island
- Morey's Golfview Sub
- Oakwood Grove
- Switzerland Sub

Lower Straights Lake
- Edgewood Park
- Golfview Addition No. 1
- Lake Pine No. 1
- Lakeside Sub
- Maple Pointe Beach Annex
- North Shores Sub
- Sherman
- Tripp's Middle Straits Lake

North Commerce Lake
- Frank S. Salters Mount Royal Country Club

Lake Sherwood
- Lake Sherwood Nos. 1 – 16
- Lake Sherwood Forest
- Sherwood Acres
- Sherwood Capri Sub
- Trentwood
- Wildwood Forest

South Commerce Lake
- Commerce Lake Estates

Twin Sun Lake
- Twin Sun Lakes Sub

Union Lake
- Double Privilege Sub
- Peninsular Park
- Union Lake Highlands
- Union Lake Sub

Woodbridge Lake
- Woodbridge Lake Estates

their maximum potential, and generate 240 gallons per day per residential equivalent unit. The township realizes that there is a remote possibility sewer capacity could limit development in the distant future (way beyond 20 years).

b. White Lake, Novi, Wolverine Lake & West Bloomfield: The existing and future land use maps for these four neighboring communities can be found in Appendix I. Commerce Township has intergovernmental facility agreements that regulate the duties and responsibilities of Commerce Township to each community. Each agreement requires Commerce Township to provide a specific amount of capacity to the neighboring community. Commerce Township has no duty to provide more capacity than what is specified in each of the agreements, regardless of the existing or future land uses in that neighboring community. Commerce Township has no extra capacity to provide to others, and does not consider an expansion beyond 8.5 million gallons per day as a realistic possibility.

i. White Lake Township (Wastewater Treatment Agreement dated September 1, 1992): This agreement and it's amendments require Commerce Township to provide up to 3.5 million gallons per day of sewer transportation and treatment capacity to White Lake Township at two specified locations - 2.07 MGD at the Eastern Outlet (Cooley Lake Road and Glade Street) and 1.43 MGD at the Western Outlet (Bogie Lake Road at the Township border). The agreement was reviewed and approved by the Michigan Department of Natural Resources as a condition of White Lake receiving an SRF loan.

White Lake Township is similar to Commerce Township in that it is a lake community with a number of public parks and existing residential developments around the lakes. It has a commercial district along the M-59 corridor. Commerce Township's sewer system was designed to take White Lake's sewer flows. White Lake's sewer collection system is divided into two districts - the eastern sewer district (Union Lake Road) is connected to Commerce Township's system through the Eastern Outlet and the western district (Bogie Lake Road) is connected to Commerce Township's system through the Western outlet; however, at this time, there are only a few residential connections discharging to the Commerce system from the Western District, as sewers have not been installed in this district yet. There is currently a plan to extend a sewer north on Bogie Lake Road to the Huron Valley Schools' Campus (Lakeland High School/White Lake Middle School/Lakewood Elementary School) at the intersection of Cedar Island Road. This sewer will allow the campus to abandon its package treatment plant, and will provide some existing residential neighborhoods with access to the sewer system. The Master Plan designates roughly one third of the township as Rural Estates found primarily in areas of the Township that are not planned to receive sanitary sewer service. This includes the Northwest, North Central, Northeast, and Pontiac Lake planning areas.

White Lake Township has approximately 2,417 residential equivalent units (REUs) currently connected to the sewer system, of which 1,218 REUs are residential, and 1,199 REUs are non-residential. This leaves

approximately 10,546 REUs for future use in the Commerce System. White Lake has also had discussions with the Oakland County Water Resources Commissioner about obtaining additional sewer capacity in a sewer that runs through Waterford to the City of Pontiac WWTP.

ii. **City of Novi (Contract for Exchange of Sanitary Sewer Capacity, dated November 1, 1991)**: This agreement requires Commerce Township to provide the City of Novi with up to 540,000 gallons per day of sewer transportation and treatment capacity at a point on Fourteen Mile Road between M-5 and Haggerty Road (In exchange Novi is required to provide Commerce Township with the same amount of sewer transportation and treatment capacity at a point on Pontiac Trail east of Beck Road). Commerce Township's sewers and WWTP are sized for this flow from Novi. The Service Area in the City of Novi is zoned Single Family Residential, Multiple Family Residential and Office/Research and is approximately 50% developed.

iii. **Village of Wolverine Lake (Intergovernmental Waste Water Treatment Agreement dated October 1, 2001)**: Wolverine Lake is a village within the borders of Commerce Township and its residents are residents of both the village and the township. The agreement requires Commerce Township to provide up to 535,000 gallons per day or 1,700 REUs (whichever is lesser) of sewer transportation and treatment capacity and Commerce Township's system is designed to receive Wolverine Lake's sewer flows.

    Wolverine Lake is a lake community that is primarily residential. Approximately 90 percent of the property within the village limits is already developed. The major undeveloped property is in a panhandle shaped property on the east and north sides of the village. The residents of the village have been concerned about affects the existing on-site septic systems may be having on Wolverine Lake. In the past, there were unsuccessful attempts to install sewers throughout the village. But, in recent years, neighborhoods within the village have successfully established special assessment districts to extend sewer service. When the village completes the South Commerce Road Sanitary Force Main project, approximately 1,120 homes will be able to connect to the sewer system.

iv. **West Bloomfield Township (Intergovernmental Agreement for Water and Sewer Service Between West Bloomfield and Commerce Townships dated August 4, 1998)**: This agreement requires Commerce Township to provide sewer transportation and treatment capacity to approximately 50 homes in West Bloomfield that are in Peninsular Park Subdivision. Peninsular Park is a fully developed residential subdivision that is landlocked on a peninsula from the rest of West Bloomfield. Commerce Township's sewer system is designed to take these sewer flows from West Bloomfield.

3. Surface and Ground Waters

a. Surface Waters

i. **Huron River Watershed:** Commerce Township, White Lake Township, West Bloomfield Township, and the Village of Wolverine Lake are all lake communities that contain over 50 lakes. Residential development in these communities is similar in that the lakes are almost completely developed with lake front lots originally serviced by on-site septic systems. Residents in these communities understand that their property values are directly related to the health of the lakes, and have shown interest in extending sewers into these lake front communities. It is an expensive proposition, yet residents have petitioned to have sewers extended into many of these lake front neighborhoods. This trend is expected to continue, especially as the economy improves.

The Huron River runs through Commerce Township and White Lake Township, and the Service Area is almost entirely within the Huron River watershed. According to the Huron River Watershed Council, the Huron River is considered to be the cleanest urban river in Michigan. Downstream of Commerce Township, the river runs through more lakes which are sensitive to phosphorous loading. The sanitary sewer system provides a means to slowly remove faulty on-site septic systems and reduce phosphorous loading in the Huron River. The availability of a sewer system can be a factor in facilitating additional development within the watershed, which can sometimes have negative impacts on the watershed. The areas that will be serviced by the proposed projects in this plan already have sewer service and these projects will do nothing to encourage additional development. These projects will make the sewer system more reliable, less susceptible to sanitary sewer overflows, more energy efficient, and less costly to operate. All of these are considered be positive things for the Huron River watershed.

ii. **Rouge River & Seeley Creek Watersheds**: The Service Area within the City of Novi, and an area of approximately 1.5 square miles in the southeast corner of Commerce Township are within the Rouge River and Seeley Creek watersheds. The Commerce Township WWTP discharges into an unnamed tributary which flows to the Seeley Creek at Fourteen Mile Road between M-5 and Welch Road. This unnamed tributary, associated wetlands and ponds, and the Seeley Creek are the major water features within the Service Area. The upper terminus of the Seeley Creek is near Haggerty Road, approximately one-half mile south of Fourteen Mile Road. There is another small branch of the creek that proceeds west for a short distance into the City of Novi. The Seeley Creek flows through a large wetland between Haggerty Road and Thirteen Mile Road. Downstream of Thirteen Mile Road, and upstream of Twelve Mile Road, the creek becomes more defined, has additional gradient, with riffles and pools. This area is where the Red Side Dace reside. The Red Side Dace is considered an endangered fish species in the State of Michigan. In the course of the NPDES permit process, this fish species was given careful consideration. The NPDES permit has specific provisions that were included to protect the Red Side Dace,

including requirements for a standby treatment train, provisions that prevent cross contamination between treatment trains, limits on the effluent phosphorous and effluent ammonia, requirements for non-domestic user surveys, and a future study to determine the effects of the increased discharge from the WTTP on the Red Side Dace and other aquatic life.

Please see Exhibits A1 – A4 for maps showing the surface waters in the Commerce WWTP Service Area.

b. Ground Waters

i. DWSD System: Commerce Township, West Bloomfield Township, and the City of Novi have public water supplies that are connected to the Detroit Water and Sewer Department's water system, which is a surface water supply. Oakland County owns one public well system at the Huron Valley Hospital in Commerce Township. This well system was originally the source of a public water supply to the Mount Royal Water System that served the Mount Royal Subdivision, Huron Valley Hospital, and some additional subdivisions. Commerce Township has since connected the Mount Royal Water System to its DWSD supplied water system. The well has been kept in service only as a back-up supply. Within the next two years, Commerce Township plans to construct an elevated water storage tank, and will request that Oakland County Water Resources Commission (OCWRC) abandon the well system. There are no other public wells or large industrial wells in these communities. There are many residents, and smaller commercial and industrial users who have private wells.

ii. Public Well Systems: White Lake Township has a public water system supplied with public wells. Huron Valley Schools in White Lake Township also has its own public water system with a ground water supply. Many residents, commercial, and industrial users in White Lake Township get their water from private wells.

The Village of Wolverine Lake has a public water system which utilizes its own ground water supply. None of these projects will have any impact on the existing public well systems.

iii. Impacts: The proposed projects will have the following direct impacts on surface and ground waters within the Service Area:

- The Newton Road Relief Force Main will be constructed approximately 300'-400' from Lower Straits Lake at the eastern boundary of Dodge Park No. 5. Due to the low density of development in this area, and the force main being constructed along the westerly edge of Newton Road, this portion of Lower Straits Lake will remain undisturbed. The proposed force main will be approximately 700 feet west of Reed Lake, at its closest point. The relatively low depth of bury for this force main and the fact that it will be installed by directional drill method makes it unlikely that ground water will be encountered.

- The treated effluent heat recovery system for the wastewater treatment plant will have minimal impacts on nearby water bodies or groundwater. The system will slightly cool the treated effluent during the winter heating months. Commerce Township will need to modify the NPDES permit for the WWTP before proceeding with the proposed heat recovery system.

B. ECONOMIC CHARACTERISTICS

1. **Economic Structure & Major Employers:** Commerce Township's Master Plan, SEMCOG, 2010 U.S. Census data and other sources were reviewed to provide a perspective of Commerce Township's economy and its role in community and infrastructure planning. There are several components representing the majority of Commerce Township's economic viability.

   The land use survey of Commerce Township, conducted in 2002, broke down the commercial and office land uses into the following sections:

   - Neighborhood Commercial – 4.38 acres (0.02% land area)
   - General Commercial – 344.66 acres (1.86% land area)
   - Office – 85.56 acres (0.46% land area)
   - Light Industrial – 521.23 acres (2.82% land area)

   The neighborhood commercial uses accommodate day-to-day neighborhood shopping and service needs. This includes food and drug stores, barbershops, dry cleaners, video rental stores, etc. These uses are located near Commerce Village and Union Lake Village (both are unincorporated name places).

   The general commercial businesses account for the majority of Commerce Township's economic sustainability and private revenue. This includes most retail shopping centers, automotive sales and service, commercial lodging, restaurants, building supply stores, etc. The majority of commercial business establishments, including big-box retail are located in the eastern quarter of the Township along Union Lake Road, Haggerty Road and the M-5 Connector. The further development of commercial businesses is likely to progress in the next 20 years. Based on recent commercial leakage analysis and current consumer demand, the future use of these commercial businesses would most likely be:

   - Shoes & Apparel
   - New & Used Cars
   - Appliances & Computers
   - Sporting Goods
   - Food Stores
   - Drug Stores

Office uses in the Township are used for professional services, such as medical and dental centers, financial institutions, and professional/business offices. The majority of office uses are near the commercial properties located at the eastern quarter of the Township along Union Lake Road, Haggerty Road and the M-5 Connector.

The light industrial uses in the Township are primarily wholesale activities, assembly and light manufacturing operations, and research and development facilities. The majority of the light industrial developments are clustered on the easterly side of the Township. The future development of light-industrial businesses is most likely to consist of high-technology or research and development businesses. Heavy industrial activities are limited to land extraction along Sleeth Road. This gravel pit area could accommodate future residential or commercial uses after the extraction activities are finished.

The health of the Township's economy, and its relationship to Southeast Michigan's economic base is found in *employment by place of work* data collected by the U.S. Census Bureau and projected by SEMCOG. In 2005, the Southeast Michigan Council of Governments reported that 12,203 workers were employed at businesses located in Commerce Township. 72.7 percent of these workers were employed in service or retail trade occupations. Exhibit D shows a detailed breakdown of Commerce Township's employment classification and future growth into 2030.

Exhibit E shows detailed employment information for the residents of Commerce Township. The majority of the Township's residents (approximately 70%) have managerial, professional, sales and office occupations. This is characteristic of the Northern Oakland County region that primarily consists of individuals employed in "white-collar" jobs as office professionals and managers.

The Economic Characteristics for the Service Area within the City of Novi, West Bloomfield Township, White Lake Township, and Village of Wolverine Lake are similar to the conditions described above for Commerce Township. Peninsular Park subdivision in West Bloomfield and Wolverine Lake are geographically surrounded by Commerce Township and economically very similar to Commerce Township. The Service Area within the City of Novi is primarily residential and office/research and thus, also similar to Commerce.

2. **Median Annual Household Income:** The single-most important indicator of socioeconomic prosperity is income. Individual and family household incomes offer an indication on the type of housing that the community can support, as well as the amount of money that is available to purchase other goods and services. Household incomes are the major factor when predicting the number of commercial developments that a community may be able to sustain with favorable occupancy rates. According to the SEMCOG, the reported median household income in 2010 for Commerce Township was $82,691, while Oakland County's was $66,390. Additionally, White Lake's median household income in 2010 was $70,485, Novi's was $80,151, Wolverine Lake's was $70,771, and West Bloomfield's was $97,004.

moderate rate of 37.1%. Retail trade and services are the industrial classes with the most anticipated growth while manufacturing, TCU (transportation, communication and utilities) and agriculture and natural resources employment will level out. The plateauing of agricultural/natural resources and manufacturing is due to the changing face of the area. Decrease of the former is due to the lack of land for such uses within the Township, while a decrease of the latter reflects the decrease of industrial, "blue collar" jobs throughout the state.

Table 4-11
EMPLOYMENT BY INDUSTRIAL CLASS
Commerce Township

Industrial Class	1990	2000	2005	2010	2015	2020	2030
Agr and Nat Res	337	176	172	182	189	197	237
Manufacturing	1,232	1,051	1,223	1,217	1,271	1,298	1,209
TCU[1]	188	276	330	365	404	433	506
Wholesale Trade	288	698	717	793	848	867	906
Retail Trade	1,622	2,572	2,538	2,827	3,079	3,206	3,389
FIRE[2]	347	619	706	771	850	918	1,085
Services	2,374	5,114	5,411	6,063	6,413	6,588	7,054
Public Admin	105	239	268	290	311	322	345
Total Jobs	6,493	10,745	11,365	12,508	13,365	13,829	14,731

Source: U.S. Census 2000, SEMCOG (2005 - 2030 figures are projections)

[1] Technology, Communications, and Utilities
[2] Finance, Insurance, and Real Estate

The projected employment will require a certain amount of land. As shown in Table 4-12, employment figures can be used to determined the amount of acreage needed in the future for industrial, office and retail uses. According to this analysis, an additional 1,606.08 acres will be needed to accomodate the anticipated employment growth for Commerce Township in 2020. The acreage planned for these uses would need to be increased, if the Township decides to attract additional office, commercial or industrial users to the Township.

EXHIBIT D: EMPLOYMENT BY INDUSTRIAL CLASS

Table 4-4
EMPLOYMENT BY OCCUPATION
16 Years and Older
Commerce Township and Oakland County, 2000

	Commerce Township	%	Oakland County	%
Managerial, professional, and related occupations	7,411	40.0%	273,909	44.6%
Service occupations	1,816	9.8%	65,499	10.7%
Sales and office occupations	5,501	29.7%	164,531	26.8%
Farming, fishing, and forestry occupations	16	0.1%	664	0.1%
Construction, extraction, and maintenance occupations	1,563	8.4%	42,648	6.9%
Production, transportation, and material moving occupations	2,227	12.0%	67,126	10.9%
TOTAL	18,534	100%	614,377	100%

Source: U.S. Census 2000

EDUCATIONAL ATTAINMENT

Table 4-5 shows the educational attainment levels for Commerce Township and Oakland County. In 1990, the rate of people in the Township graduating from high school increase by 32.7% whereas the County suffered a 3.3% decrease overall.

As Table 4-5 shows, the Township and the County experienced a dramatic shift in educational attainment from 1990 to 2000. In the Township, the "Not a high school graduate" decreased by 6.7%. The "Graduated from high school" category increased by 32.7% in the ten year period. The "Some college-no degree" and "Bachelors degree or greater" increased by 19.9% and 145.5%, respectively.

Commerce Township had a higher percentage of people that obtained an advanced level of education when compared to the County. The largest variation between the Township and the County was a 102.7% differential in the "Bachelor's Degree or Greater" category. This figure indicates that Township residents pursued higher levels of education and/or residents with higher levels of education relocated to Commerce Township during the ten-year period. At the same time, the number of residents with lower levels of educational attainment decreased by 6.7%.

EXHIBIT E: EMPLOYMENT BY OCCUPATION

3. **Major Economic Characteristics Affecting Growth**: All five communities within the Study Area were impacted by the recent recession. Housing starts declined, foreclosures increased, and businesses have struggled. All four communities are considered desirable places to live because of the natural resources and services within the communities. M-5 was recently extended into Commerce Township, and it now terminates at Pontiac Trail. Commerce Township's DDA owns 330 acres north of the M-5 terminus and has made significant improvements to the property, including the construction of Martin Parkway from the M-5 terminus north to Oakley Park Road. Now that the road construction is complete, the DDA is beginning to market the property. The property was recently re-zoned with a Town Center Overlay District, which allows a mix of residential and non-residential uses. It is expected that this area will begin to develop within the next ten years. Commerce Township also expects that more existing residential communities with on-site septic systems will continue to petition to have sanitary sewers installed in the next 20 years.

C. EXISTING FACILITIES

Exhibit A-2 shows the existing sanitary sewer network, pump stations, and the Commerce WWTP. A brief description of the existing facilities, a history of significant issues related to the facilities, and a summary of Commerce Township's capital improvement plan follows:

1. **Wastewater Treatment Plant:** A private developer constructed the original one million gallon per day activated sludge plant (East Plant), on the existing site in the mid 1980's. The East Plant was designed to service a large private development and a small area in Commerce Township that was tributary to the Rouge River. The East Plant was permitted to discharge treated effluent to the Seeley Drain at Haggerty Road, approximately one-half mile south of Fourteen Mile Road.

   Up until the mid-1980's, Commerce Township had pursued sewer/treatment capacity in regional systems, including the Hannan Road Arm of the Huron River Interceptor, and Huron Valley/Rouge Valley system. Between 1985 and 1988, the regulatory authorities determined that Huron Valley/Rouge Valley system would not qualify for a federal grant if Commerce Township was included in the project. The Township then applied for and received an NPDES permit to discharge 5 million gallons per day of treated effluent to the Seeley Drain (NPDES permit dated August 18, 1988). Commerce Township then entered into an agreement to purchase the existing East Plant plus additional adjacent property. The East Plant was put into operation on November 3, 1992.

   In 1990, the Michigan Department of Natural Resources (MDNR) suggested that White Lake Township pursue an agreement with Commerce Township for sewer service. As a result of this request, in 1991, Commerce Township submitted an NPDES permit application to increase the discharge limit to 8.5 million gallons per day. The MDNR had concerns about increasing the limit to 8.5 million gallons per day due the presence of the Red Side Dace, a fish species that was on the Michigan Official List of Endangered and Threatened Species. An NPDES permit for 8.5 million gallons per day was ultimately issued on November 3, 1994. This permit contained provisions that were recommended by the

Endangered Species Technical Advisory Committee. The NPDES permit was contested by the City of Farmington Hills, and was revised and re-issued on April 19, 1999. In the meantime, Commerce Township constructed a WWTP expansion of 2.4 million gallons per day (North Plant). Single stage oxidation ditches were used in the North Plant expansion.

The NPDES permit was renewed and re-issued on January 13, 2004, and again on October 2, 2006. The 2006 NPDES permit included significant revisions to satisfy continuing concerns about the Red Side Dace: Effluent limits were tightened, and a schedule for constructing an expansion to 8.5 million gallons per day was included. Since this time, the NPDES permit was re-issued on October 19, 2007 and February 21, 2008 to make minor revisions to the construction schedule. The current permit would have expired on October 1, 2011, but is considered valid until the MDEQ acts on Commerce Township's current application to renew the permit.

Commerce Township recently completed construction of another treatment plant expansion that brings the capacity to 8.5 million gallons per day. The new South Plant started operations in the fall of 2010. The plant uses oxidation ditches with 3 stages of biological nutrient removal, clarifiers, tertiary filtration, and UV disinfection. The North Plant oxidation ditches were also upgraded to 3 stage biological nutrient removal. Structures from the East Plant have been incorporated into the new plant, primarily as equalization tanks; however, the East Plant is no longer an independent treatment unit. A site plan drawing of the Commerce WWTP is found in Exhibit F.

The Commerce WWTP is operated by the Oakland County Water Resources Commissioner, and has been in full compliance with its NPDES permit for 8 years with no permit violations since March 2004. The current influent flow is approximately 2 million gallons per day. The plant is essentially a new WWTP with state-of-the-art features making the plant very reliable. The existing WWTP has sufficient capacity for the planned ultimate build-out of the service area.

2. **Sludge Handling**: The new 8.5 million gallon per day WWTP incorporates the following sludge handling processes:

   a. Sludge collected from the clarifiers is re-circulated to its corresponding oxidation ditch at a rate of 50 to 150 percent of the incoming raw waste by the RAS pumps in Building 108.

   b. Periodically, sludge is wasted to one of the four sludge holding tanks where it is aerated to maintain an aerobic state until it is dewatered.

   c. Sludge is dewatered by pumping it from the sludge holding tank to sludge presses which press the sludge and reduce the water content from greater than 95% to less than 85%. The filtrate from the dewatering system flows back to the influent wet well for treatment and the sludge cake is conveyed by a series of conveyors to the sludge building where it is deposited in roll-off containers for transportation to a land fill or can be land applied.

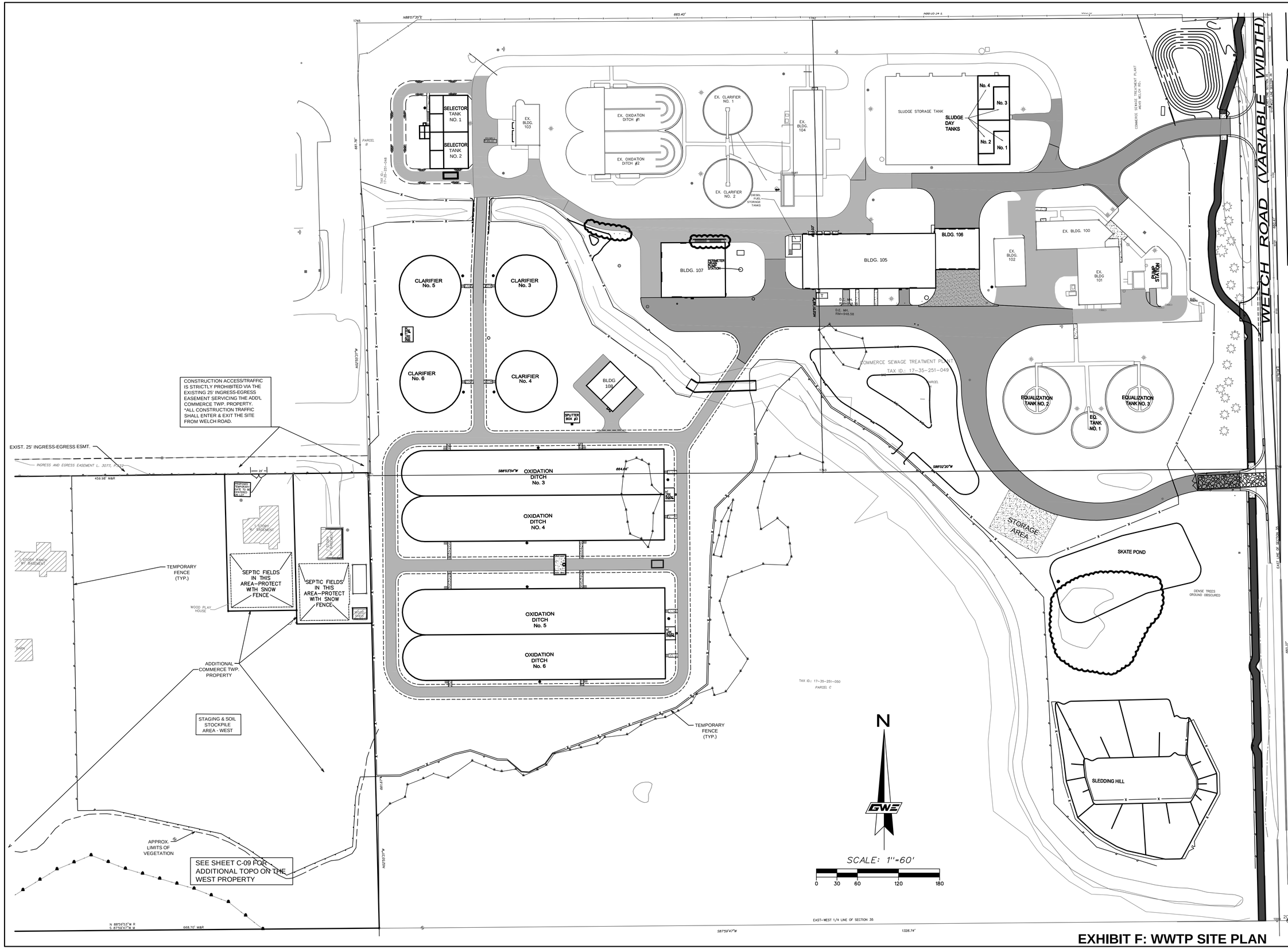


EXHIBIT F: WWTP SITE PLAN

FOR PREVIOUS REVISIONS ISSUES SEE REVISION No. 3 ISSUE

DATE:	REVISION
10/14/08	CONSTRUCTION ISSUE ADDENDUM No. 6
02/17/09	REVISION No. 7
04/06/09	REVISION No. 9
06/30/09	REVISION No. 10
08/18/09	REVISION No. 12
10/20/09	REVISION No. 13
4/12/10	REVISION No. 16
5/17/10	REVISION No. 17
8/23/10	REVISION No. 19
12/13/10	REVISION No. 20

Terms and Conditions for Electronic Data:

This document is provided in electronic format for the referenced project. It is understood and agreed that any use or reuse of original or altered files will be at the user's own risk and kept responsibility. The user agrees that the original files prepared by Giffels-Webster Engineers, Inc. (GWE) are being provided for general information purposes only. Neither the electronic files nor any CAD versions are to be relied on for construction layout purposes. The user expressly indemnifies and holds GWE harmless for any and all claims, suits, liability, demands or other costs arising out of or resulting from the use of these files. The user understands that GWE makes no warranty as to the accuracy of the information provided by the electronic media. Data on electronic media can deteriorate or be modified without the knowledge of GWE. Electronic media viruses are increasing in complexity and growth. GWE advises all users to scan any disc received from outside sources with a current antivirus program. It is understood and agreed that GWE is not responsible for any damages caused by such a virus. If a virus is detected by your system in any media received from GWE it is your responsibility to contact us immediately.

72 HOURS (3 WORKING DAYS) | BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

PRINCIPAL:	L.D.C.
PROJ. MNGR:	T.V.
DESIGN:	JAL
DRAWN:	MJD/J.Z.B.
IND. REVIEW:	--
SECTION:	35 T- 2 -N,R- 8 -E.

PROFESSIONAL SEAL

DEVELOPED FOR:

CHARTER TWP. OF COMMERCE
2840 FISHER AVENUE
COMMERCE TWP.,
OAKLAND COUNTY, MI
(248) 960-7050

Giffels-Webster Engineers, Inc.
ENGINEERS-LAND SURVEYORS
PLANNERS-LANDSCAPE ARCHITECTS
2871 BOND STREET
ROCHESTER HILLS, MI 48309
PHONE (248) 852-3100
FAX (248) 852-6372
407 E. FORT STREET, SUITE 600
DETROIT, MI 48226
PHONE (313) 962-4442
FAX (313) 962-5068
67100 VAN DYKE ROAD
WASHINGTON TOWNSHIP, MI 48095
PHONE (586) 336-9810
FAX (586) 336-9812
EMAIL info@giffelswebster.com
www.giffelswebster.com

SHEET TITLE:

OVERALL SITE PLAN
COMMERCE TOWNSHIP W.W.T.P. EXPANSION
COMMERCE TOWNSHIP, OAKLAND COUNTY, MI

DATE:	03/23/06
SCALE:	1" = 60'
SHEET:	C-02
JOB:	16933.10

d. This program for residual management was submitted for NPDES permit No. MI 0025071 on October 20, 2011

e. The sludge handling system has been designed for the ultimate build-out of the sanitary sewer system.

3. **Collection System**: Commerce Township's sanitary sewer collection system includes the following major components: trunk/lateral gravity sewers, trunk force main system, low pressure sewers, and sewer pump stations. This system relies heavily on force mains and low pressure sewers and was selected after a 1989 sewer master plan summarized the following advantages of a force main system for a lake community such as Commerce Township: a) approximately the same number of pump stations would be required regardless of whether a gravity system or a force main system was installed; b) energy use would be approximately the same for both systems; c) environmental impacts during the construction would be significantly lower because a force main system is only 5 to 10 feet deep as compared to gravity system requiring excavations up to 35 feet deep; d) the force main is generally above the water table which reduces construction costs, and reduces the potential for unwanted infiltration. The following is a description of each of these major components:

   a. Gravity Sewer System: The gravity sewer system consists of approximately 378,000 lineal feet (71.6 miles) of gravity sewers that range in size from 8" diameter to 36" diameter. The gravity sewers are between 5 years and 25 years old; are constructed of reinforced concrete pipe, plastic truss pipe, and solid wall PVC pipe; and are generally considered to be in good to excellent condition (see Appendix A for Capital Improvement Plan). Most gravity sewers were designed for the ultimate build-out capacity for the respective service areas. Township ordinances prohibit footing drains and other sources of storm water from being discharged to the sanitary sewer system. The Township closely monitors inflow and infiltration and has been successful in keeping the system dry: The ratio of average day flow to maximum day flow for 2011 was 0.82.

   b. Trunk Force Main System: The trunk force main system consists of approximately 133,400 lineal feet (25.25 miles) of sewer force mains that range in size from 6" diameter to 24" diameter. The trunk force main system pipes are between 1 year and 22 years old; are constructed of ductile iron pipe and high density polyethylene pipe; and are generally considered to be in good to excellent condition. Anaerobic activity within the force mains results in the sewage having high concentrations of dissolved hydrogen sulfide. Hydrogen sulfide is not corrosive; however, with the right conditions (warm temperatures, aerobic conditions, and moisture) bacteria will metabolize hydrogen sulfide into sulfuric acid. These conditions do not usually exist in a force main, except near the discharge ends of the force mains and perhaps at high points. The force mains in Commerce Township have a lining to protect the inside of the pipe from corrosion related to hydrogen sulfide. Gravity sewers downstream of the force mains, particularly concrete sewers and manholes, are susceptible to corrosion related to hydrogen sulfide, and Commerce Township's gravity system is beginning to have some corrosion issues downstream of the force mains.

The trunk force main system was designed so that redundant loops could be added in the future. The redundant loop design provides two significant advantages:

i. **Ability to Bypass:** The redundant loops provide a means to bypass sections of the force main for repairs. This is an important feature that provides a quick and easy method to operate the system during emergency periods while minimizing the potential for sanitary sewer overflows. Unlike a gravity system, where there are manholes around 400 feet apart, a force main system does not have the necessary structures to make bypass-pumping feasible. Instead, a pump and haul system must be used as a bypass. As flows increase, a pump and haul bypass becomes more difficult and costly, especially in the event of an unplanned sewer failure.

ii. **Pipe Velocities:** The force main design must balance the need for having cleansing velocities in the early low-flow years, while trying to maintain an energy efficient design (which requires relatively low velocities) when the system reaches its ultimate design flow. Adding a redundant loop allows for an energy efficient design that also provides cleansing velocities within a reasonable period of time.

With the exception of some redundant loops, the trunk force main system has been installed and designed for the ultimate build-out capacity of the Study Area. The force main that was recently constructed with Martin Parkway provided a redundant loop for a part of the Welch Road force main, and there are three additional redundant loops that need to be constructed in the future (the Newton Road force main will provide a critical redundant loop and is included as one of the proposed projects in this Project Plan).

c. **Low Pressure Sewer Systems**: The low pressure sewer systems consists of approximately 171,650 lineal feet (32.5 miles) of sewer that ranges in size from 2” diameter to 6” diameter. The system is between 5 years old and 22 years old and is all constructed with high density polyethylene pipe with the exception of a PVC sewer on Union Lake Road, south of Commerce Road. The low pressure sewer systems are considered to be in good to excellent condition, and were designed and constructed for the ultimate design capacity of their respective service areas.

d. **Sewer Pump Stations**: Commerce Township has 28 pump stations within the Study Area. The pump stations are wet well stations with submersible pumps, valve vaults, and weather proof enclosures for electrical power and control systems. The pump stations are between 5 and 22 years old. Most of the pump stations were designed for the ultimate design capacity of their respective tributary areas. Several pump stations have been designed for an initial design flow; with planned improvements for ultimate flows (see Appendix A for the Capital Improvement Plan).

4. **Design Capacity / Existing Flows / Characteristics of Wastes**: Commerce Township maintains a Part 41 Tracking System which tracks the design capacity/design flows/planned improvements of the major sewer facilities in the township (see Appendix B-1 for a copy of this tracking system). The Part 41 Tracking System anticipates certain improvements in the future and these are summarized in the capital improvement plan. Monthly operating reports, found in Appendix B-2, provide typical waste characteristics at the WWTP.

5. **Septage Receiving Facilities / Septage Acceptance Capabilities / Septage Treatment Loadings**: Commerce Township is very conscientious of the Red Side Dace that lives within the Seeley Drain downstream of the WWTP. The township does not wish to receive septage sewage from waste haulers because of concerns the septage could contain wastes harmful to the biological treatment process. Therefore, the WWTP does not have septage receiving facilities.

6. **Location and Description of Major Industrial Discharges**: There are no Significant or Categorical Users connected to Commerce Township's sewer system. The NPDES permit (Part I, Section B.2) requires Commerce Township to submit the results of a Nondomestic User Survey to the MDEQ on an annual basis. This Nondomestic User Survey provides a means for Commerce Township to communicate with its nondomestic users on a regular basis and to determine the waste characteristics coming from these users.

7. **Average and Peak Dry-weather and Wet-weather Flows Received by WWTP and Collection Facilities**: The Monthly Operating Reports for the WWTP (see Appendix B-2) include minimum day, average day, and maximum day flows for each month. A review of the MOR's for 2011 shows that wet-weather flow is not a significant issue.

8. **Documentation of Infiltration and Inflow Problems in the Collection System:** The Monthly Operating Reports show that there is not an inflow and infiltration problem in Commerce Township's sanitary sewer collection system. Commerce Township, along with its consultants and operators, have been diligent in monitoring inflow and infiltration, and tracking down the sources when issues are found.

9. **Combined Sewers**: There are no combined sewers in the Study Area.

10. **System Bypasses and Sanitary Sewer Overflows**: There are no regular system bypasses or sanitary sewer overflows within the Study Area. There have been a few minor sanitary sewer overflows from the collection system that have been reported to the MDEQ (see Appendix B-3). These overflows have resulted from minor failures in the collection system such as faulty air release valves.

11. **Combined Sewer Overflows:** Since there are no combined sewers in the Study Area, there are no combined sewer overflows.

12. **Evaluation of Pump Station Capacity**: Most of the pump stations have been designed for the ultimate design flow of their respective tributary areas. Currently, the actual flows are less than the design flows at the pump stations. There are some pump stations that were designed for future expansions.

Commerce Township tracks the need for the pump station improvements with its Part 41 Tracking System. Planned pump station improvements are included in the capital improvement plan found in Appendix A.

13. **Adequacy of Pump Stations**: Nine of the larger pump stations have permanent on-site natural gas backup generators. The remaining pump stations have at least 2 hours of storage within the wet well/collection system. The Oakland County Water Resources Commissioner (WRC) operates the system and has a fleet of 16 portable generators and can respond to a power outage in less than 2 hours.

    Commerce Township has a Supervisory Control and Data Acquisition (SCADA) system that was installed in the early 1990's. The SCADA system is operated by the WRC, and is outdated and obsolete. The WRC is not able to obtain new parts or software for the existing system and has recommended that Commerce Township replace the system soon.

    The pump station controls are in fair to excellent condition. The WRC maintains the control system, and has included some upgrades in its proposed capital improvement plan. In the long term the control systems will probably be replaced with PLC systems that are integrated with the SCADA system. This will allow the SCADA system to control some pump functions, and will allow for a more efficient operation of the pump stations.

14. **Other Operation and Maintenance problems**: OCWRC's staff have summarized the following operation and maintenance problems

    a. **SCADA System:** There have been multiple system failures because of the obsolete units, extra parts are not readily available and must be special ordered, lots of overtime is being spent on fixing failures, preventative maintenance cannot be scheduled properly, radios are obsolete (Series 1 vs. Series 4 currently on the market), lots of rust and condensation leaks, current system is going to continue to fail and cause sanitary sewer overflows.

    b. **Wastewater Treatment Plant:** The WWTP is brand new and does not currently have any operations and maintenance problems.

15. **Capital Improvement Plan**: See Appendix A for a summary of the Capital Improvement Plan for Commerce Township's sanitary sewer system.

D. NEEDS FOR THE PROJECTS: The needs for each of the three (3) proposed projects within the Commerce Township Wastewater Treatment Plant Service Area are described below:

1. **Description of Specific Project Needs**
    a. **Newton Road Force Main**: There are two primary reasons the Newton Road Force main Project is needed now:

        i. **Redundancy**: The force main will provide a redundant loop in the trunk force main system. This will provide a means to quickly and easily bypass approximately four miles of existing force main when it needs to

be repaired. The existing alternative for an emergency bypass is a pump and haul system. A pump and haul bypass of the existing force main would require up to 100 trips/day with 10,000 gallon tankers. Although a pump and haul bypass of this magnitude is possible, the logistics become difficult, especially in the event of an unplanned failure, and the redundant loop will greatly reduce the risk of a sanitary sewer overflow.

ii. **Energy Efficiency:** The force main will increase the energy efficiency of the existing sewer pump stations. The installation of the Newton Road Force Main will save approximately ?? kilowatt hours over the next 20 years.

b. **Heat Recovery System at WWTP**: There are four buildings at the WWTP which are designed with 12 air exchanges per hour as required by building code. These air exchanges significantly increase the amount of energy required to heat and cool these buildings. To reduce these energy demands, Commerce Township plans to install a heat recovery system that captures heat from the treated effluent and transfers it to these buildings. It is estimated the heat recovery system will reduce operating costs by approximately $34,000 per year. Reducing these operating costs has no negative impact on the treatment process and will free up funds for other uses within Commerce Township's sewer system.

c. **Supervisory Control and Data Acquisition (SCADA) System**: Commerce Township has a SCADA system that was designed and installed in the early 1990's. It was a state-of-the-art SCADA system at the time it was installed, however, both the software and hardware are now obsolete and difficult to maintain as the original manufacturer does not produce the hardware or software anymore and everything must be special ordered. A modern SCADA system will reduce the likelihood of sanitary sewer overflows from the pump stations, reduce manpower operating costs, and reduce energy consumption.

2. **Compliance Status:** Commerce Township is currently in full compliance with the NPDES permit dated February 21, 2008 (Permit #MI0025071) and issued by the Michigan Department of Environmental Quality. An application to renew the NPDES permit is being reviewed by the MDEQ, and the existing permit is valid until the MDEQ takes action on the permit application. This permit authorizes Commerce Township to discharge treated effluent wastewater into water of the state that specifically includes the unnamed tributary to the Seeley Drain. (See Appendix B-4 for a copy of this permit). WWTP Monthly Monitoring Reports have also been included in Appendix B-2.

3. **Orders & Agreements:** Commerce Township is fully compliant with the conditions of its NPDES permit for the WWTP, and there are no active court orders, federal or state enforcement orders, or administrative consent orders related to the WWTP/sewer system. There are several intergovernmental agreements (which have been discussed in detail above) between Commerce Township and its neighboring communities that are pertinent to the needs for the proposed projects:

a. **White Lake Township:** Charter Township of Commerce – Charter Township of White Lake First Amended, and Restated Waste Water Treatment Agreement, dated April 11, 1995

b. **City of Novi:** Contract for Exchange of Sanitary Sewer Capacity, as amended between the Charter Township of Commerce, City of Novi, City of Walled Lake, and County of Oakland dated November 1, 1991

c. **Village of Wolverine Lake:** Charter Township of Commerce – Village of Wolverine Lake Intergovernmental Waste Water Treatment Agreement, dated October 1, 2001

d. **West Bloomfield Township:** Intergovernmental Agreement for Water and Sewer Service to between West Bloomfield and Commerce Townships dated August 4, 1999

4. **Water Quality Problems:** There have been no recent observed point or nonpoint sources of pollution attributed to the existing force main system or outflow from the wastewater treatment plant. As mentioned above, the Newton Road force main will provide a redundant force main system that will greatly reduce the likelihood of sanitary sewer overflows in the event of an unplanned sewer break. The SCADA system will provide a better communications and controls system for the pump stations which will reduce the risk of future sanitary sewer overflows.

5. **Projected Needs for the Next 20 Years:** All population data included as a part of this project plan is provided by the Southeast Michigan Council of Governments (SEMCOG). Appendix H shows the population profiles for Commerce Township and other adjacent communities. The design flow for Commerce Township's sewer system is 270 gallons per day per residential equivalent unit (including inflow and infiltration). This design flow has been approved by the MDEQ in its review of the various Part 41 Permits, and Commerce Township's Part 41 Tracking System, and is in conformance with the Ten State Standards. A copy of the permit tracking system chart is provided in Appendix B-1 for review.

   The proposed projects will not add additional capacity to the existing treatment system. The Commerce Township WWTP has a permitted capacity of 8.5 million gallons per day which exceeds the 20 year design flow of its service area. The Newton Road Force Main does not necessarily add capacity to the sewer transportation system, rather it provides a more efficient and reliable sewer transportation system. The capacity of the Newton Road force main exceeds the 20 year design flow of its service area.

6. **Future Environment without the Proposed Projects:** Each of the proposed projects will have significant positive impacts on the future environment. Without the proposed projects, the following will occur:

   a. **There will be larger and more frequent sanitary sewer overflows**. Sometime in the future, there will be failures in the trunk force main system.

These failures will most likely result in some kind of sanitary sewer overflow. Without the Newton Road force main, the overflow will be much larger. Without the Newton Road force main, it will take time to set up a pump and haul bypass, and in the meantime, the pump stations will fill up and overflow. There is still considerable risk of a sanitary sewer overflow even after the tankers, pumps/equipment, and personnel arrive to institute a pump and haul bypass. Traffic jams and equipment failures to name some obvious risks. Some of the overflows will be into the rivers and lakes that define Commerce Township and some of the overflows may be into basements. The Newton Road force main will allow for a quick and easy bypass by closing only a few valves. This quick and easy bypass will greatly reduce the impact of an unplanned sewer failure.

b. The SCADA system will fail. The new SCADA system will be designed to automatically make pump station control adjustments to reduce the possibility of one pump station being shut out by other pump stations. It will be able to reduce the pump starts and stops for a more efficient system. The SCADA system will also provide prompt warnings/alarms to alert maintenance personnel of problems that may result in a sewer overflow. Additionally, the new system will help the operators perform proactive preventative maintenance rather than emergency corrective maintenance. Another advantage of the SCADA system is that it is a two way communications system, and if there is a failure in the communications system an alarm will be sent. The alternative is an alarm system with one way telephone communications. If the new SCADA system is not installed, the existing system will completely fail, causing the number of SSO's to continue to go up.

c. Energy consumption will go up or remain the same. All three of the proposed projects will help to make the sewer and treatment systems more energy efficient, resulting in fewer indirect air pollution emissions. Without the proposed projects, energy consumption will remain the same or increase.

d. A more efficient and cost effective sewer and treatment system will result in other improvements to the environment:

i. Operations funds will be freed up for other capital improvement projects. These capital improvement projects will make the system more reliable and more readily available to potential customers.

ii. The majority of Commerce Township's future customer base is existing residential homes and nonresidential businesses that are currently served by on-site septic systems. Many of these on-site septic systems are near the lakes and rivers and are not regularly inspected. A more efficient sewer/treatment system should result in lower fees to the customers. Lower fees will help to encourage more customers currently served by on-site septic systems to connect to the sewer system.

E. POPULATION DATA

Per the U.S. Bureau of the Census, the Commerce Township population was a total of 35,874 residents in 2010. These are full time residents with no recorded seasonal populations within the Township. The current estimated population serviced by the Commerce WWTP can be summarized as follows (note that 186.7 gal/day/REU was used to calculate the daily flow from each community based on a known current flow of approximately 2.0 MGD at the WWTP)

1. **Commerce Township**: 7,437.65 REUs (1.389 MGD) or a design population of 20,082 (as of October 2011).

2. **White Lake Township**: 2,416.61 REUs (0.451 MGD) or a design population of 6,525 (as of December 2011).

3. **City of Novi**: 670 REUs (0.125 MGD) or a design population of 1,809 (as of October 2011)

4. **Village of Wolverine Lake**: 169.96 REUs (0.032 MGD) or a design population of 459 (as of December 2011).

5. **West Bloomfield Township**: 18 REUs (0.003 MGD) or a design population of 49 (as of December 2011).

Appendix F shows the total future population (year 2035) in Commerce Township to be 45,042 residents. This value is based on SEMCOG forecast data and the Township's current Master Plan. However, the ultimate Commerce Township population contributing to the Commerce sanitary sewer system will be less due to the 2,000 REUs (design population of 5,400) contributing to the Walled Lake/Novi Wastewater Treatment Plant. The future ultimate design uses per current usage agreements and Part 41 requirements are summarized below:

- **Commerce Township**: 14,445 REUs (3.9 MGD) or a design population of 39,000.

- **White Lake Township**: 12,963 REUs (3.5 MGD) or a design population of 35,000.

- **City of Novi**: 2,000 REUs (0.540 MGD) or a design population of 5,400.

- **Village of Wolverine Lake**: 1,700 REUs (0.535 MGD) or a design population of 4,590.

- **West Bloomfield Township**: 50 REUs (0.01 MGD) or a design population of 135.

These values are based on the wastewater treatment plant's most recent permitted capacity, which is 8.5 MGD. The above volumes also include flow contributions from non-residential users.

F. ENVIRONMENTAL SETTING

1. **Cultural Resources:** Commerce Township was initially settled in 1825 by a group of individuals from New York. In 1832, Rueben Wright and Jonas Higley were the first permanent settlers in the Village of Commerce area. Although the Village is often viewed as a separate entity apart from the Township of Commerce, it is actually a platted subdivision, consisting of twenty-four blocks, laid out gridiron style. Until the Township was built-up, the village was the only developed part of this area, containing a hotel, school, post office, tavern and church. The Village was built around the Huron River, which provided energy for two mills. The first was built by Crossman, Seymour and Hoover in 1837 and operated until 1926. The Commerce Roller Mill is the site of the existing Mill Race Park and contains the excavations for the mill race, mill flume and stone foundations of the mill building. The second mill was built in 1843 by Henry and Jerome Paddock. This mill burned down a few months later and a new mill was built that eventually became a cider mill.

   The first road was laid out in 1833 and was known as the Romeo and Ann Arbor Road. The Village was subsequently built up between 1836 and 1851. The growth of the mills and common town amenities were part of this development.

   Most of the permanent homes remained in the Village until the early 1900's when a trend towards building part-time, summer homes on or near lake frontage spurred the outward growth from Detroit and Pontiac. Permanent homes outside of the Village were not commonplace until the 1960's and 1970's when suburban expansion was prevalent in Southeast Michigan. Water access and usage was the greatest attraction for growth in this area and has helped shape the character of the Township to what it is today.

   There are currently four historical sites that are part of the Michigan State Historical Registry in Commerce Township and within a half mile of the study area. These sites include:

   a. **Byers Farm – 213 East Commerce Road, Marker Number P24432:** This historical site is approximately 1,250 feet north of the proposed Newton Road Force main that is slated to run through Dodge Park No. 5 . The Byers' Homestead consists of one-and-one-half acres of land with the Huron River cutting through the property. The buildings consist of the farm house built sometime prior to 1850, a chicken coop, pantry, outhouse, and a barn used as an antique store. The property is maintained in an original 19th century setting with wagon wheels and assorted farm tools in the yard. No automobiles are driven on the property. All buildings are maintained in excellent condition with no visible modernization. The house is in good condition. The house is the oldest building on the property and was probably built between 1830 and 1850.

   b. **Commerce Village Burying Ground – East Commerce Road, Northwest of Newton Road, Marker Number P24436:** This historical site is approximately 1,800 feet north of the portion of the proposed Newton Road Force Main that intersects the Newton Road right-of-way at the easterly boundary of Dodge Park No. 5. The Commerce Village Burying Ground, also

known as Commerce Village Cemetery, is situated on East Commerce Road near Newton Road in Commerce Township. The original plat of the cemetery defined a tract of land measuring approximately three acres above Hayes Creek. Through the years, the acreage of this cemetery has doubled in size. The tract occupies a scenic position above the creek bottoms and supports a variety of plant species. The cemetery contains a broad range of granite and marble monument types: simple slab headstones and tablets, obelisks, pedestals, cylinders, and urns, and also sculpted trees and several zinc monuments. Funerary motifs represented include clasped hands, praying hands, floral elements such as willows, wheat, roses, lilies, and vines, draped cloaks, open bibles, crosses, and lambs. Common architectural references include columns and gothic pointed arches. In addition, a small flared-eave, front-gabled split fieldstone building with pedimented entry is present. This building is used for storage and maintenance, and reputedly served as a temporary vault at various times over the years

c. **Joseph G. Farr House – 4553 South Commerce Road, State ID Number P972:** This historical site is approximately 450 feet north of the proposed Newton Road Force main portion that intersects South Commerce Road at the westerly boundary of Dodge Park No. 5. The Joseph G. and Mary Farr House maintains architectural significance as an example of an early Greek revival farmhouse in Commerce Township. The house also has historical significance for its association with a local farmer, businessman and lawyer. Farr is believed to have been born in 1806 in New York. Mary, two years younger, was also from New York. The date of their marriage is unknown. Their family included five children, three daughters, Mary S. (b.1833), Ellen (b.1835), and Emily (b.1837), and two sons, Lincoln (b.1840) and Charles (b.1842). This census data suggests Farr moved to Michigan to establish his business alone and returned for his family around 1838 or 1839, since the girls were all born in New York, and the boys were born in Michigan. The earliest records indicating his presence in Commerce Township are the purchases of land parcels totaling over sixteen hundred acres (all in 1836). In 1839, he purchased the eighty acres of which this farmhouse was built.

d. **Jabez Payne – Francis Ingersoll House – 5020 Carroll Lake Road, State ID Number P24439:** This historical site is approximately 1,350 feet north of the proposed Newton Road Force main portion that intersects South Commerce Road at the westerly boundary of Dodge Park No. 5. The Payne-Ingersoll House has historical association with two early Commerce Township pioneers: Jabez Payne and Francis Ingersoll. Harry Nelson Payne, a native of New York State, settled in Bloomfield Township with his wife and five sons in 1827. On May 23, 1832, Harry Nelson Payne purchased 160 acres of land in Commerce Township which he sold to his eldest son, Jabez, in September 1834, for a consideration of $750. Shortly thereafter, Payne constructed the front portion of a frame Greek revival style residence. Payne and his brothers purchased all of Commerce Township's water power in 1835, and in 1836 built the Township's first grist and sawmill, and later donated land for the Township cemetery. In 1855, Payne sold his house to Francis Ingersoll (1814-1905), a native of Wyoming, New York, and a tanner by profession. Ingersoll farmed the land, organized the Baptist Church of Commerce, and served as church deacon for thirty years. He was also an

officer of the local grange and a school superintendent. The Payne-Ingersoll House historically recalls Commerce Township pioneers, and is an example of Greek Revival architecture in Commerce Township.

2. The Natural Environment

a. Climate: Commerce Township receives an average of 30 inches of rain per year. Average annual snowfall is 32 inches. The number of days with any measurable precipitation is 120. On average, there are 178 sunny days per year in Commerce Township. The July high is around 83 degrees. The January low is 16 degrees.

The construction season typically runs from the middle of March to the middle of November. There has been no observed impact of snow melt on the existing system.

b. Air Quality: There is currently no air quality issues within the study area related to the proposed project. In addition, no impacts to air quality are anticipated as a result of the construction of all these projects.

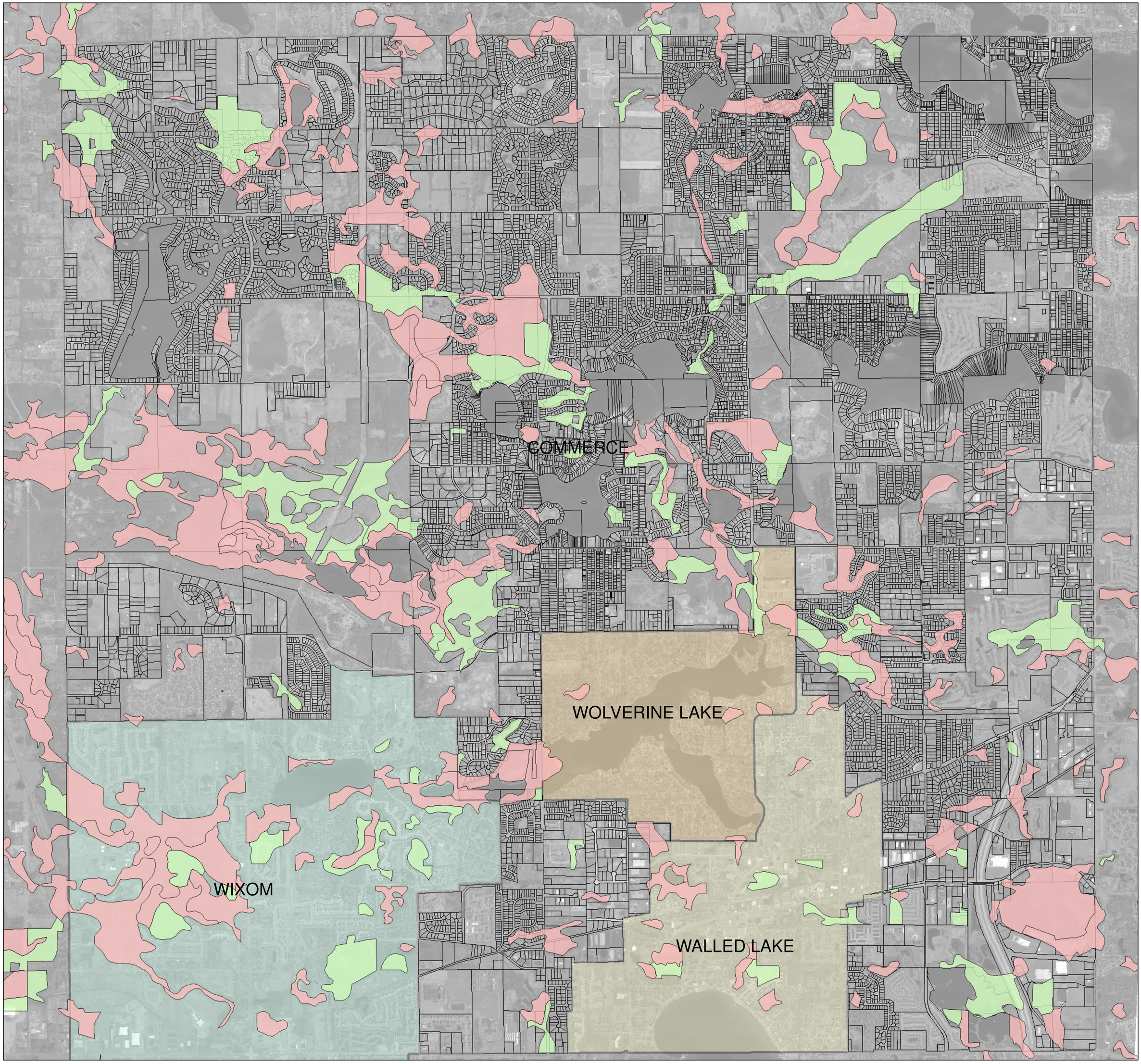
c. Wetlands: Commerce Township has an extensive network of wetlands and woodlands. These generalized wetland areas are identified on National Wetland Inventory maps prepared by the U.S. Department of the Interior. Exhibits A-2 and G depict the Commerce Township wetland inventory to date. High altitude aerial photographs were used to identify wetland areas based on vegetation, visible hydrology and geography. The wetland areas within the Township are emergent, scrub-shrub and forested wetlands. All of these wetland types are of the Palustrine System, which includes all non-tidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in fresh water. The majority of the wetland areas are within Dodge Park No. 5 and other public recreation areas spread throughout the Township.

The Newton Road Force main affects one area of regulated wetland. The area is near the Oakley Park Road and Newton Road intersection. An MDEQ permit has been obtained to open cut this force main through the wetland area for minimal disturbance. The remainder of this force main crosses through Dodge Park No. 5 and the western side of Newton Road was determined to have no regulated wetland characteristics. The wetland permit is 08-63-0039-P and is found in Appendix D.

The treated effluent heat recovery provision for the wastewater treatment plant will not affect any wetland areas. All activities related to this work will remain within the boundaries of the treatment plant.

The SCADA system will not affect any wetland areas. All activities related to this work will be updating existing computer systems at existing sites.

d. Coastal Zones: There are no Great Lake shorelines within the study area.



COMMERCE TOWNSHIP WETLANDS

Giffels-Webster ENGINEERS

Legend

NON-FORESTED WETLANDS FORESTED WETLANDS

N W E S

CHARTER TOWNSHIP OF COMMERCE

EXHIBIT G:
COMMERCE WETLAND MAP

e. **Floodplains:** Floodplains within the study area typically follow the borders of existing lakes (Reed Lake and Lower Straits Lake) and routes of the existing drains (Seeley Drain and Huron River) within the study area. FEMA floodplain maps are included in Appendix C for the study area of the Newton Road Relief Force main and the wastewater treatment plant. These maps show no floodplains within the influence of the proposed work, thus no cut or fill will occur within the FEMA regulated 100-year floodplain is proposed.

f. **Natural or Wild and Scenic Rivers:** There are no wild and scenic rivers within the study area (per the National Wild and Scenic Rivers registry).

g. **Major Surface Waters:** Commerce Township is permanently covered by approximately 1,983 acres of surface water (per 2002 survey measurements). This represents 10.72 percent of the Township. The major surface waters within 0.5 miles of the proposed projects are shown on Exhibit A-2.

h. **Recreation Facilities:** Almost four thousand acres in the Township fall into this category, accounting for over 20 percent of the land in 2002. Exhibits A-2 and H show the recreational lands within Commerce Township. It should be noted that the Eldorado Country Club and the Links at Pinewood Golf Course are in the process of being redeveloped. Approximately 200 acres out of the total 330 acres of this property is being converted into a Downtown Center and mixed-use development, and the remaining 120 acres are being permanently protected from development.

   One state-owned park and eight Township-owned parks offering varying levels of recreation opportunities are available in Commerce Township. They include:

   i. **Bicentennial Park**: Bicentennial Park is a 9.73 acre neighborhood park centrally located behind the old Commerce Township Municipal Building on Fisher Avenue, north of Glengary Road. Developed for recreational purposes in 1976, during the year of the United States Bicentennial, this park features a variety of active recreational facilities. Sporting amenities include one ball field, one soccer field, two sand volleyball courts, two lighted tennis courts, one basketball court and one horseshoe pit. Facilities for younger children include a playscape, swing set and slide. One pavilion is available, along with picnic tables, grills and an outdoor restroom. The park is also served by a internal walking trail.

   ii. **Byer's Homestead Park:** The historically significant Byer's Homestead Park is a small park located on the south side of Commerce Road, situated along the Huron River. In total, this community park comprises 2.76 acres. The property was first settled in 1825 by Abram Walrod, the first European settler in Commerce Township. Many of the historic buildings remain on the site including the primary residence that was built in 1930. The Byer's homestead site was listed on the State register of historic sites on May 28, 1977. In 1998, Commerce Township purchased the property for preservation as a historic and recreational

1 Recreation Inventory

Recreation Lands:

- Township Parks
- Public School Facilities
- Regional Recreation Facilities
- Other Recreation Facilities
- Neighboring Municipal Parks

Existing Trails:

- Trail
- Safety/Side Path
- Bike Lane
- Water Trail
- Park Path

- Roads
- Water Bodies
- Water Features
- Municipal Boundaries

Sources
Roads: TeleAtlas Road Data, 2006
Trail Network: Oakland County GIS, 2008
Recreation Lands: Wade Trim Field Survey of July 2008

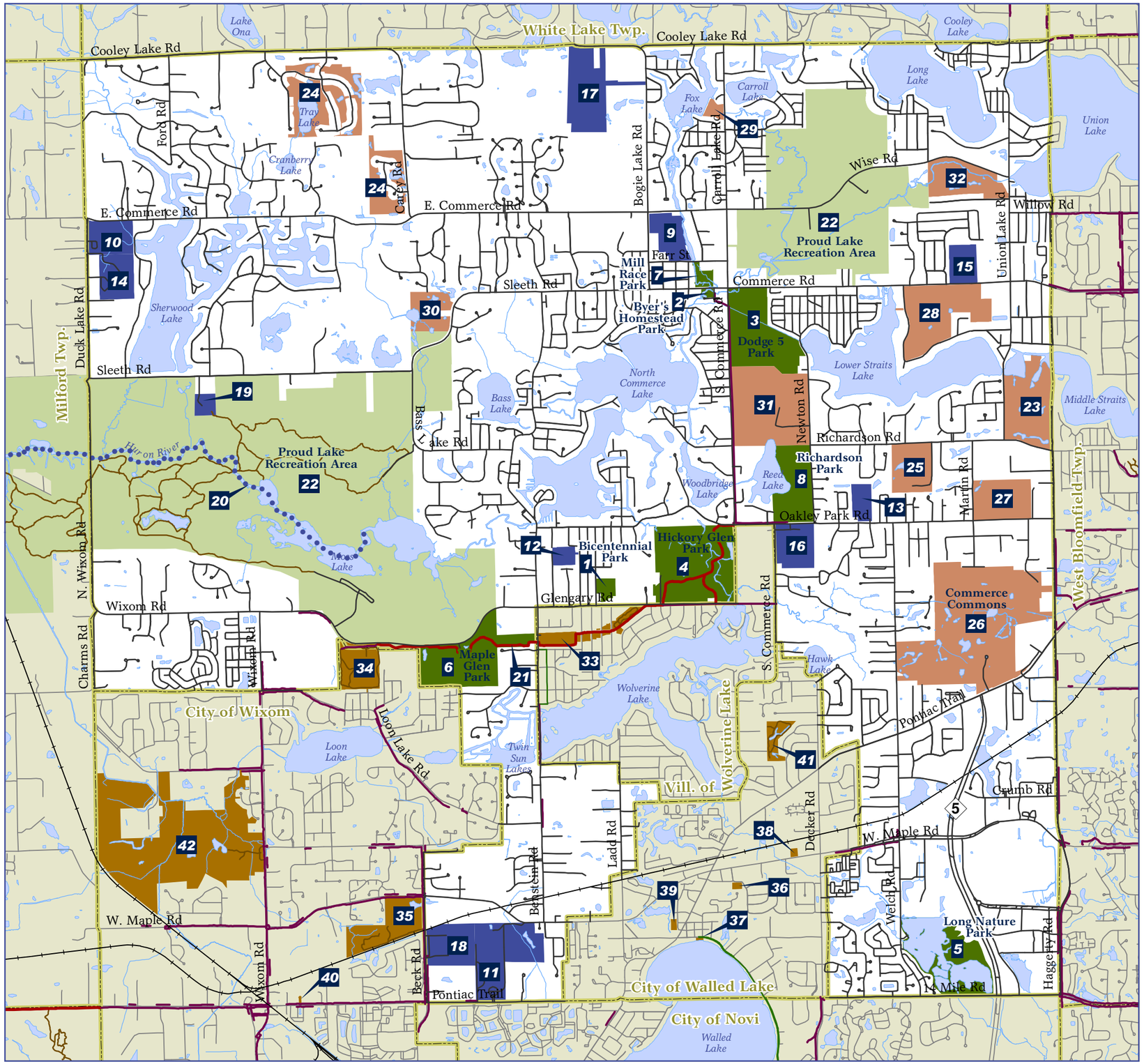
September 2008

N

0 750 1,500 3,000 4,500 Feet

Park Key:

1. Bicentennial Park
2. Byer's Homestead Park
3. Dodge 5 Park
4. Hickory Glen Park
5. Long Nature Park
6. Maple Glen Park
7. Mill Race Park
8. Richardson Park/Community Center
9. Commerce Elementary
10. Country Oaks Elementary
11. Geisler Middle
12. Glengary Elementary
13. Oakley Park Elementary
14. Oak Valley Middle
15. Smart Middle
16. Walled Lake Central High
17. Walled Lake Northern High
18. Walled Lake Western High
19. Walled Lake Outdoor Education Center
20. Huron River Trail
21. Lakes Community Trail
22. Proud Lake State Rec Area
23. Bay Pointe Golf Club
24. Beacon Hill Country Club
25. Birmingham Gun Club
26. Commerce Commons ([Twp-Owned Property and Township Library]
27. Detroit Gun Club
28. Edgewood Country Club
29. Fox Lake Park (Twp-Owned Undeveloped Property
30. Glenlore Golf Club
31. Multi-Lakes Conservation Club
32. Union Lake Golf Club
33. Clara Miller Park
34. Gilbert Willis Park
35. Gunnar Mettala Park
36. Marshall Taylor Mini Park
37. Mercer Beach
38. Pratt Park
39. Riley Park
40. Sibley Square Park
41. Sims Park
42. Wixom Habitat Park



CHARTER TOWNSHIP OF COMMERCE

Five-Year Recreation Master Plan

WadeTrim
COM2001.01T

EXHIBIT H:
PARKS & RECREATION MAP

community amenity. Facilities at the park include the primary residence, barn, duck barn, pantry, storage barn, outhouse, picnic tables, benches, walking path and a wooden bridge over the Huron River.

iii. **Dodge Park No. 5:** Dodge Park No. 5 is a community park encompassing 112.39 acres of heavily wooded land at the southeast corner of Commerce Road and South Commerce Road. The park was donated by the Dodge family to the State of Michigan and became part of the State Park system. During the 1930's, workers from the Civilian Conservation Corps (CCC) participated in a tree planting program at the park, resulting in a dense forest that is still present today.

In the 1990's, Commerce Township purchased the park from the State for preservation as a park site. Access to the park is provided off of Commerce Road, with the recreational facilities concentrated in the northern portion of the park. The park has one volleyball court, one basketball court, a horseshoe pit, a playground and swings. Other related facilities include outdoor bathrooms, picnic tables, and grills. The park recently underwent a construction project that resulted in several new facilities within the central portion of the park, including two adult soccer fields, one play structure, and one pavilion. To serve these facilities, a new access drive and parking lot was constructed with access from South Commerce Road.

iv. **Hickory Glen Park:** The largest of the Township Parks, Hickory Glen occupies 156.54 acres on the north side of Glengary Road in the central portion of the Township. The community park is an active park with many sporting facilities, including seven mid to full-sized ball diamonds, and one full-sized football field. Bleachers and dugouts are found at each ball field while a grandstand, concession stand, handicapped accessible restrooms, and scoreboard are located at the football field. Working in conjunction with the Township, the Lakes Athletic Association maintains the ball diamonds while the Hawks Youth Football league maintains the football field. Other facilities include a playscape, picnic tables, grills and benches. The Lakes Community Trail extends through the park, providing opportunities for walking, jogging and biking. The trail also provides a non-motorized link between Hickory Glen Park and other recreation facilities in the vicinity, including Clara Miller Park, Maple Glen Park, Byer's Homestead, Dodge Park and Richardson Park. In addition to the trail, the members of the Michigan Mountain Bike Association (MMBA) have built and maintain numerous mountain bike trails, serving various skill levels, within Hickory Glen Park.

v. **Robert H. Long Nature Park:** Robert H. Long Nature Park is a 126.02 acre community park located on the northeast corner of 14 Mile Road and M-5 in the southeastern corner of Commerce Township - the "Gateway to Commerce". This nature park affords citizens access to an environmentally significant wetland habitat and offers ample opportunity for the enjoyment of nature and wildlife. Dedicated in 1995, the park

was a cooperative project between Commerce Township, the Township Downtown Development Authority (DDA) and a private developer donation. The major feature of this park is a handicapped accessible crushed limestone trail that encircles Berry Lake. A covered bridge connects the north and south sides of the trail. Other amenities at the nature park include fishing docks, a picnic pavilion, playground, picnic tables, grills, and benches.

vi. **Maple Glen Park:** Maple Glen Park is a 115.26 acre community park located on the south side of Glengary Road in the south central portion of Commerce Township. The park was purchased by the Township in the 1960's and has since been developed primarily for baseball and softball purposes. Currently, two leagues call this park home: the Inter-lakes Girls Softball League and the Commerce Little League. Through generous donations, the two leagues have constructed a total of 15 ball fields of various sizes and provide routine field maintenance. Related amenities at the park include outdoor bathrooms, concessions, maintenance building, two playgrounds, swings, bleachers, picnic tables, grills and benches. The Lakes Community Trail travels through the center of this park, providing linkages to nearby parks including Clara Miller Park and Hickory Glen Park.

vii. **Mill Race Park:** Mill Race Park is a 8.99 acre mini-park located on the north side of Commerce Road, across from the Byer's Homestead Park. Similar to Byer's Homestead, Mill Race Park is also a State registered historical site, formerly occupied by the Commerce Roller Mill. The property was in the original platted village in 1825. The Commerce Roller Mill was built in 1837 and operated for 90 years, serving the farming communities within the area. Processing flour and ground feed for livestock, the mill served as the center of commercial activity in the Township for many years. The site was purchased by the Township and developed for recreational purposes in 1984. Used primarily as a passive open space area and interpretive site, the park features an internal trail network with two covered bridges crossing the Huron River headwaters. Additional facilities include two picnic tables.

viii. **Richardson Community Center & Park:** The Ralph C. Richardson Community Center and Park is a focal point for recreation activity within Commerce Township. The 78.92 acre park and community center is located on the north side of Oakley Park Road in the east central portion of the Township. The majority of the park site is wooded open space and unique prairie, accessed by nature trails, while the active recreation facilities and the community center are all located in the southern portion of the site. Outdoor facilities include one small soccer field, sand volleyball court, two playgrounds, swings, horseshoe pit, picnic tables, grills and benches. The Community Center is a multi-purpose facility used primarily as a senior center and by residents and organizations for special events on a rental basis. Senior activities and programs are held at the center throughout the year such as cards and lunches. One of the unique features of the facility is an outdoor patio that overlooks the rear portion of the park.

ix. **Proud Lake State Recreation Area:** One regional recreation facility is located within Commerce Township: the Proud Lake State Recreation Area. This recreation area encompasses more than 4,700 acres (2,552 of which are within Commerce Township) along the scenic Huron River. The majority of the lands in the recreation area are relatively untouched woodlands; however, several areas within the State Recreation Area have been developed for more active recreational use. Recreational amenities include more than 20 miles of internal hiking, skiing, biking and equestrian trails as well as a boat launch, beach, campground, picnic areas, concessions and shelters. Canoeing, fishing, hunting, and snowmobiling is also allowed in the State Park. The State of Michigan recently put the part of Proud Lake Recreation Area that is in Sections 2 & 11 of Commerce Township (approximately 200 acres) up for sale. Commerce Township was given first rights to purchase the property and recently completed the purchase transaction. As a result the property will remain in public ownership and will continue to be used for recreational purposes.

x. **Other Recreation Facilities:** Aside from the public recreation sites described above, several private recreation facilities are also available in the Township. The most significant of these facilities, from a land use perspective, are Fox Lake Park, Commerce Commons (part of the former Eldorado Country Club and the Links at Pinewood Golf Course adjacent to the new Martin Parkway), the Birmingham Gun Club, Detroit Gun Club and Multi-Lakes Conservation Club. A total of five golf courses are located in Commerce Township. These include:

- Bay Pointe Golf Club
- Beacon Hill Country Club
- Edgewood Country Club
- Glenlore Golf Club
- Union Lake Golf Club

A vast network of hike/bike trails are also part of Commerce Township. These trails include the Huron River Canoe Trail, Lakes Community Trail and the general Township Safety/Side Path System for various roads throughout the Township.

j. **Topography:** Commerce Township's topography is primarily flat with low lake areas and some higher upland hills and meadows. The higher ridged areas of the Township are approximately 1,017 feet above sea level. More rolling topography is prevalent at the northwest corner of the Township. The lowest elevation in Commerce Township is 918 feet above sea level.

k. **Geology:** Geologic characteristics and groundwater resources of Oakland County have been the subject of studies dating from 1906. Andrew Mozola conducted a survey of groundwater resources as a doctoral dissertation in 1953. This work was published by the Geological Survey Division of the Michigan Department of Conservation in 1954 and has been consistently referenced by subsequent researchers.

The majority of Commerce Township lies within an extensive glacial outwash plain trending southwest to northeast through Oakland County. The outwash plain lies between two moraine systems (Fort Wayne and Defiance moraines). The outwash deposits form unconfined aquifers throughout the extent of the outwash plain and form confined aquifers where outwash deposits are buried by finer-textured glacial tills and glacial lakebed clays. In many areas, unconfined aquifers are present in surficial sands overlying deeper confined aquifers. Surface drainage patterns within the outwash plains are described in reports as poorly developed, due to the granular soils and the relatively recent age of the glacial deposits. Some surface water bodies have no distinct surface water inlets or outlets and are expressions of the groundwater surface. Inflow and outflow are through groundwater flow or flow into or out of adjoining wetlands.

The outwash plain is identified by Mozola (1954) as a recharge area for aquifers in central and eastern Oakland County. Precipitation and infiltration, either directly onto permeable soils or by runoff and infiltration from streams and wetlands, recharges surficial aquifers in the outwash plains and recharges buried, confined aquifers underlying the moraines and glacial lake plains to the east of Commerce Township. Subsequent researchers, in preparing environmental assessments for proposed highway alignments, have described the area between Pontiac Trail and M–59 (Highland Road) in Highland, White Lake, and Waterford Townships as a recharge area for aquifers in Oakland County. Each of these sources describes extensive areas of Commerce, Highland, White Lake, and Waterford Townships, covering tens of square miles, as a regional groundwater recharge area.

The proposed study area has the geological characteristics of outwash plain, glacial channel, and recent alluvium: stratified sand and gravel and end moraine till. Exhibit I shows a map of the general geological data for all of Oakland County.

j. **Soils:** Commerce Township's soil characteristics were identified as part of the larger Oakland County Soil Survey conducted in 1967 by the United States Department of Agriculture Soil Conservation Service. Categories of soils with different characteristics and physical properties were identified as part of the survey. This process resulted in a patchwork or jigsaw-like pieces

Oakland County Surface Geology & Hydrology

Oakland County Michigan
L. Brooks Patterson, County Executive

Cranbrook Institute of Science
Michigan's Museum of Natural History

LANDFORMS AND SEDIMENT TYPES

- Outwash Plain, Glacial Channel, Recent Alluvium: Stratified Sand and Gravel
- End Moraine: Till
- Ground Moraine: Till
- Water-Lain Moraine: Till
- Glacial Lake Plain: Sand, Silt, and Clay
- Kame: Stratified Sand, Gravel, and Debris Flow Deposits
- Esker: Stratified Sand and Gravel

ELEVATION RANGES OF GLACIAL LAKE SHORELINE FEATURES
(beach riges and wave-cut terraces)

- Lake Maumee Shoreline (790' - 765')
- Lake Arkona Shoreline (710' - 694')
- Lake Whittlesey Shoreline (740' -735')
- Lake Warren Shoreline (685' - 680')
- Lake Wayne Shoreline (665' - 660')
- Highway
- Major Road
- Railroads
- Lakes & Ponds
- Rivers & Streams
- Municipal Boundaries

N W E S

0 0.5 1 1.5 2 Miles

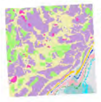
Map Created on May 21, 2003

About the Map...

The surface geology map was created using Geographic Information System (GIS) technology. The first layer is a digital topography model of the county developed with data from Global Positioning System (GPS) satellites. A surface geology layer was draped over the digital topography. The surface hydrology (i.e. rivers and lakes) was then added, followed by highways and municipal boundaries.

An appropriate digital surface geology layer of the entire county at the required scale was not available in the public domain. Therefore a geology model was compiled by using inferences from landform topography and published and unpublished sources. Particular emphasis was placed on the surface map of the County published by USGS geologists Twenter and Knutilla (1972) in a Geological Survey water resources paper.

Twenter, F.R. and Knutilla, R.L., 1972,
Water for a Rapidly Growing Community,
Geol. Survey Water-Supply Paper 2000.

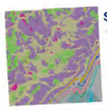


Step 1: Create a digital surface geology map

Field geologists and geographers worked to produce this map of surface geology for Oakland County. The map was converted to digital form using Geographic Information System technology.

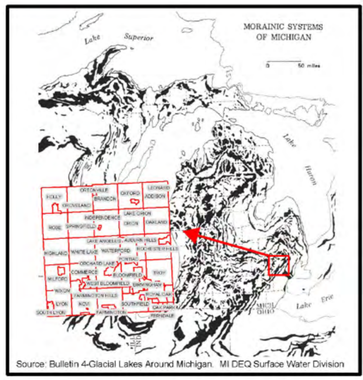
Step 2: Create a digital terrain model

A digital terrain model is created by using horizontal (x, y) and vertical (z) positional data from Global Positioning Systems (GPS). This process uses location data measured using satellites to simulate the topography, or lay of the land.



Step 3: Overlay the geology map on top of the terrain model

The final product is a map of the surface geology deposits draped over the topography. This allows the viewer to see not only the types of deposits, but the shape of the land that is formed.



Source: Bulletin 4-Glacial Lakes Around Michigan. MI DEQ Surface Water Division

Planning & Economic Development Services

Executive Office Building
1200 N. Telegraph Road
Department 412
Pontiac, MI 48341-0412
248.858.0720
www.co.oakland.mi.us

Dennis Toffolo, Director
Community & Economic Development Department

Cranbrook Institute of Science

39221 Woodward Ave.,
Bloomfield Hills, MI 48303-0801
Call toll-free
1.877.GO.CRANBrook
(1.877.462.7262)
www.cranbrook.edu/institute

Dr. Michael Stafford, Director

Surface geology compiled by John M. Zawiskie: Cranbrook Institute of Science, Bloomfield Hills, MI
Email: jzawiskie@cranbrook.edu

Geology GIS data assembled by
Oakland County Planning and Economic Development Services
Environmental Stewardship Program
www.co.oakland.mi.us/peds/program_service/ess.html

GIS base provided by Oakland County Department of Information Technology GIS Utility
www.co.oakland.mi.us/gis/

EXHIBIT I -
OAKLAND COUNTY
SURFACE GEOLOGY

that fit together to portray a larger overall picture of existing soil characteristics. A large number of individual soil types are present in the Township. These individual categories are grouped into several generalized classifications of soils that share similar characteristics.

A total of three soil types are prevalent in the Newton Road Relief Force main construction area:

i. **Spinks Loamy Sand**: 90% of the relief sewer is part of this soil classification. This category of soils occurs in the eastern and central portion of the Township. Soils in this association are well drained and gently sloping to flat. These are sandy and loamy glaciofluvial deposits. These soils occur in the flatter portions of the County. This association is not conducive to flooding or ponding based on the moderate permeability of the soil.

ii. **Arkport Loamy Fine Sand**: 5% of the relief sewer is part of this soil classification. This category of soils is located near Lower Straits Lake and Newton Road. Soils in this association are well drained and gently sloping. These are sandy and loamy glaciofluvial deposits. These soils formed near outwashes and moraine areas of the County. This association is not conducive to flooding or ponding based on the moderate permeability of the soil.

iii. **Ormas Loamy Sand**: The remaining 5% of the relief sewer is part of this soil classification. This category of soils is located near the intersection of Oakley Park Road and Newton Road. Soils in this association are well drained and are from flat to gently sloping. These are sandy and loamy super glacial till over sandy and gravelly glaciofluvial deposits. These soils formed on knolls with ice-contact slopes. This association is not conducive to flooding or ponding based on the moderate permeability of the soil.

One soil type is predominant over the Commerce Township Wastewater Treatment Plant:

i. **Aquents, Sandy, Loamy, and Undulating Soils**: The majority of the wastewater treatment plant is part of this soil classification. Soils in this association are very poorly drained and are found on flat ground ranging from 0%-2% slopes. These are sandy glaciofluvial deposits. These soils formed on knolls on outwash plains and depressions. This association is not conducive to flooding but is subject to ponding if not artificially drained.

k. **Agricultural Resources:** As with many of the suburban communities of Southeastern Michigan, Commerce Township began as a farming village. At the turn of the twentieth century, the Township had all of the attributes of a typical farming community – a mill, tavern, and hotel have been well documented by the Commerce Historical Society. The 1950's were a turning point in the Township's change from agriculture to suburban growth.

According the Master Plan's most recent existing land use study, 418.49 acres (2.26% of the Township area) of agricultural land remains in the Township. Crops that have been cultivated in Commerce Township include corn, soybeans, tomatoes, apples, pumpkins, and other staple crops that are frequently grown and conducive to the climate in the Southeast Michigan area.

l. Fauna and Flora: Existing vegetation of the study area is typical of southeastern Michigan. Maple, birch, aspen, pine, and beech are the predominant tree species found within the Township. Strawberries, raspberries, blueberries, and cranberries are among the fruit-bearing plants and shrubs that grow wild in some areas of the Township.

Wildlife within the Township consists of deer, the common cottontail, snowshoe hare, raccoon, opossum, and various squirrels. Birds such as hawks, robins, blackbirds, sparrows, starlings, cardinals, blue jays, mallard ducks, Canadian geese, blue heron and other seasonal birds or waterfowl are prevalent in the Township. The Red Side Dace is the single threatened marine species found within the study area.

The Red Side Dace is brightly colored, with a wide red stripe extending from the head to the dorsal fin, running along the middle of the body. Above the red stripe, there is a bright yellow stripe, extending from head to tail. Colors are the brightest during spring, gradually fading during late summer and fall. Distinguishing it from other cyprinids, the species has a very large mouth and protruding lower jaw, which is an effective adaptation for capturing prey from below. The specie's maximum length is 12 cm. The lifespan is no greater than 4 years. The species favors slow-moving, cool, and clear headwaters of river system, with copious overhanging riparian vegetation, especially grasses, forbs, and low shrubs. A preferred stream features a succession of riffles, necessary for spawning, and pools, inhabited during the non-breeding season.

The treatment plant effluent temperature must remain at a low enough temperature range so as not to harm this fish's habitat and spawning habits. At this time, the treated effluent heat recovery system will only be utilized for heating during the winter months, thus it will only outlet cool water that is not harmful to the Red Side Dace. It is not anticipated that construction of this project will directly impact the flora and fauna of the Study Area.

m. Unique Features: Commerce Township is very unique in the fact that it has all or part of 31 individual lakes, the Huron River and many creeks and streams that run through it. 9.24 square miles of the total 29.8 square miles of the Township consists of either dedicated park area or water bodies (lakes, streams, ponds, etc.). In addition, over 70% of the useable land in the Township is for residential development, which makes this community ideal for preserving the natural features and sensitive areas in the individual residents' yards and open spaces of these lesser-impacting developments. The recent growth of the DDA district, along the newly-constructed Martin Parkway, will add an efficiently-planned, centralized civic center area, a

newly urbanized, downtown environment, and promote mixed-use development. Furthermore, this promotes a balance of pedestrian-focused development and preservation of existing wetlands as well as other natural elements indigenous to the Township and Oakland County.

II. ANALYSIS OF ALTERNATIVES

A. PROJECT OBJECTIVES

1. **Reduce Sanitary Sewer Overflows**: The main objective of the Newton Road Force Main and SCADA System projects is to reduce sanitary sewer overflows in two ways:

   a. **Failures in the Trunk Force Main System:** The only method currently available to bypass around a broken force main is a pump and haul by-pass, which carries significant risk of sanitary sewer overflows if the flow is too high or the bypass is necessary for too long.

   b. **Obsolete SCADA System:** The risk of future sanitary sewer overflows at pump stations that will result because the existing SCADA system is obsolete, outdated, and difficult to maintain.

2. **Reduce WWTP Energy Costs:** It costs approximately $84,000 per year to heat the South Plant buildings, of which $54,000 is used to heat Building 105. A big component of this cost is the cost for heating the make-up air (12 air exchanges per hour are required for process areas by building codes). The WWTP Heat Recovery System Project will reduce these energy costs by approximately $34,000 per year.

3. **Reduce System Energy Costs:** A secondary objective is to reduce energy costs in the sewer transportation system, if it can be cost effectively accomplished as part of Objective 1.

B. IDENTIFICATION OF POTENTIAL ALTERNATIVES

1. **No Action**: The "No Action" alternative is not considered acceptable for the following reasons:

   a. **Risk of Overflows:** The affected service area in Commerce Township already has sanitary service and is approximately 86% developed. White Lake Township also has sanitary service as provided by the intergovernmental agreement between the Charter Township of Commerce and the Charter Township of White Lake which is approximately 84% developed. Sanitary sewer flows will continue to increase, which will in turn increase the risk of sanitary sewer overflows from the trunk force main system.

   b. **SCADA System Failure:** The existing SCADA system is outdated, obsolete, and can no longer be maintained. It is essential to have a state-of-the-art SCADA system in order to control and monitor the pump stations efficiently. If the current SCADA system is not updated, the system will stop operating, and sanitary sewer overflows will begin to occur due to the failing system.

c. **Operating Costs:** No action means that system operating costs will not be reduced. It also means that operations and maintenance costs will continue to increase in order to operate the current, out-dated SCADA system.

2. **Optimum Performance Of Existing Facilities**

   a. **Truck Force Main System:** The existing trunk force main system has the capacity to transport existing flows and future flows; however, the existing system cannot meet the objective of reducing the risk of future sanitary sewer overflows as described in Section II.A.

   b. **Sanitary Pump Stations:** A state-of-the-art SCADA system will provide a means to optimize the performance of the existing sanitary sewer pump stations and sanitary sewer system. The system will be able to collect real-time energy consumption data, thus allowing management to help identify real, energy savings opportunities. It will support repair or replace decision making by allowing management the tools to analyze the economics of purchasing more efficient motors vs. maintaining the existing less efficient motors. Other energy savings methods are increased operational efficiency by allowing operations staff greater control over wet well on/off control set-points thus allowing more efficient motor runtimes and less start/stop wear and tear on electrical equipment.

   c. **WWTP Heating System:** A heat recovery system will optimize the performance of the heating system at the waste water treatment plant.

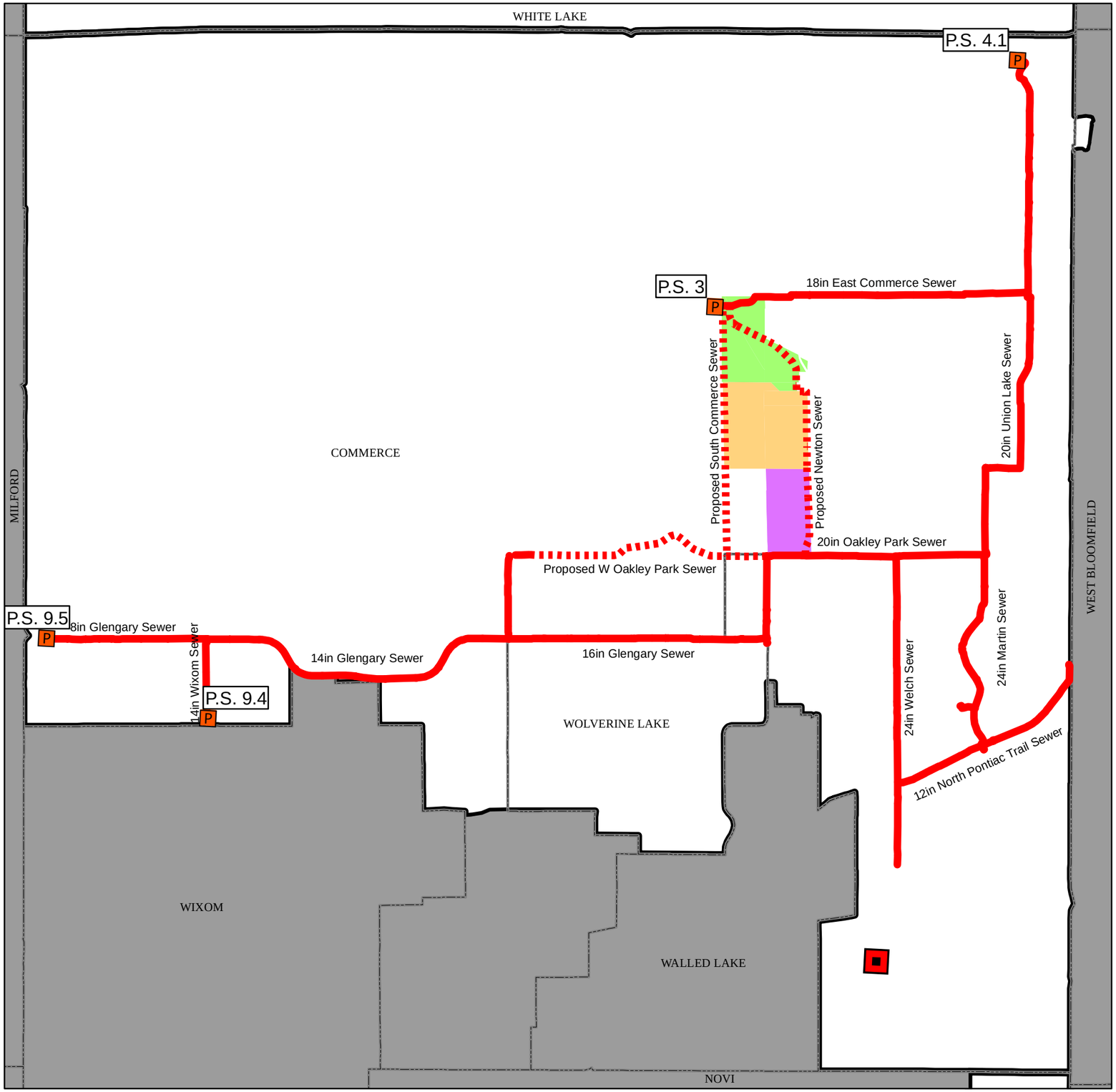
3. **Regional Alternatives**: As described in Section I (Project Background), Commerce Township investigated regional sewer alternatives in the past, but was not able to acquire capacity in a regional sewer system. The Township recently invested $50 million dollars in the Commerce WWTP and a regional system is not considered to be a viable alternative at this time.

4. **Trunk Force Main Redundancy Alternatives** (See Exhibit K for a trunk force main schematic drawing). The following redundant force main alternatives will reduce the risk and severity of future sanitary sewer overflows resulting from a failure in the trunk force main system:

   a. **Newton Road Force Main**: Creates a redundant loop for approximately 4 miles of existing 18” and 20” diameter force main along Commerce Road, Union Lake Road, Richardson Road, Martin Road and Oakley Park Road which carries up to 1 million gallons per day of sewage (average day). The Newton Road route will require approximately 9,050 lineal feet of 19” diameter force main running between and connecting an existing 18” diameter force main near the intersection of Commerce and South Commerce roads, and an existing 19” diameter force main at the intersection of Newton and Oakley Park roads (Note: all pipe sizes are nominal inside diameter.)

EXHIBIT K

COMMERCE TOWNSHIP TRUNK FORCE MAIN SCHEMATIC



Legend

- WWTP Facility
- Primary Pump Station
- Existing Trunk FM
- Proposed Trunk FM
- Dodge Park No. 5
- Multi Lakes Conservation
- Richardson Center

N
W E
S

0 2,500 5,000 10,000 Feet

Date: 5/8/2012

GWE Giffels-Webster ENGINEERS

This route begins at the upstream end with a connection to the existing 18" diameter force main in Commerce Township's Dodge Park No. 5; then runs southeasterly across the Dodge Park No. 5; continuing south along Newton Road; and ending with a connection to the existing 19" diameter force main on Oakley Park Road. The route has one drain crossing and one small wetland crossing on the west side of Newton Road in Commerce Township's Richardson Center. This proposed alternative avoids a major wetland crossing that would be necessary with the South Commerce Road route.

Additionally, this project includes approximately 2,285 lineal feet of low pressure lateral sewer will also be installed along Newton Road to service an existing residential neighborhood.

b. **South Commerce Road Force Main:** Similar to the Newton Road route, this route creates a redundant loop for approximately four miles of existing 18" and 20" diameter force main along Commerce Road, Union Lake Road, Richardson Road, Martin Road, and Oakley Park Road that could carry up to one million gallons per day of sewage (average day). This route will require approximately 8,950 lineal feet of 19" diameter force main running between and connecting an existing 18" diameter force main near the intersection of Commerce and South Commerce roads, and an existing 19" diameter force main at the intersection of Newton and Oakley Park roads

   The South Commerce Road route begins at the upstream end with a connection to the existing 18" diameter force main in South Commerce Road just east of Pump Station No. 3; then runs south along South Commerce Road; then east along Oakley Park Road; and ending with a connection to the existing 19" diameter force main on Oakley Park Road. This route has two significant wetland crossings along South Commerce Road. One crossing is approximately 1,000 feet long and the other approximately 100 feet long.

c. **Isolation Valve on Welch Road Force Main:** The existing force main on Welch Road between Oakley Park Road and Pontiac Trail is approximately 1.5 miles long and carries approximately 1.6 million gallons per day of sewage. A force main was recently constructed in Martin Parkway that can act as a bypass, but an isolation valve must first be installed on the Welch Road force main at Pontiac Trail.

d. **Welch Road Redundant Force Main:** An existing section of 24" diameter force main in Welch Road between Pontiac Trail and Easy Street is approximately 2,500 feet long and carries approximately 1.63 million gallons per day of sewage. The redundant force main will either parallel the existing force main on Welch Road or run down M-5 to Maple Road and then back to Welch Road. This project is considered a lower priority because there is only a 2,500 foot section of main that is currently at risk, and because it is nearer to the waste water treatment plant.

e. **Oakley Park Force Main:** The existing 14" diameter force main on Glengary Road between Benstein Road and South Commerce Road is approximately 8,000 feet long and carries approximately 75,000 gallons per day of sewage. At this time, a pump and haul bypass is considered feasible for this section of force main because of the lower flow. In the future, a redundant force main is planned in Oakley Park Road.

5. **SCADA System Alternatives:** The Oakland County Water Resources Commission (OCWRC) has contracted Tetra-Tech to evaluate the current SCADA system in Oakland County, come up with an implementation plan, and design and construct the new system once funding is in place. OCWRC and Tetra-Tech investigated different design alternatives for the SCADA system. The two major alternatives were the communication system architecture and data communication method.

   a. **Communication System Architectures:** Four communication system architectures were investigated as shown below. The current system utilizes a centralized approach to data collection and computer hardware and the recommended system utilizes a distributed hybrid design that distributes the data collection but retains centralized computer hardware. The distributed hybrid design approach was selected because it offers the best reliability versus cost ratio and offers good system expansion capabilities.

      i. **Centralized** (Centralized servers/Centralized data collectors): Replace old front end processor (FEP) with new FEP (or similar). This system has a low speed communication backbone and is the setup of the current system.

      ii. **Distributed Low Disbursement** (Distributed servers/Distributed data collectors): Low speed communication backbone to five (5) head-end sites, high speed from the five sites back to OCWRC offices.

      iii. **Distributed High Disbursement** (Distributed servers/Distributed data collectors): Low speed communication backbone to 15 head-end sites, high speed from 15 sites back to OCWRC offices.

      iv. **Distributed Hybrid** (Centralized servers/Distributed data collectors): Low speed communication from small sites to ten (10) data collector sites, the ten data collector sites would have some type of master data polling unit (PLC), then communicate via high speed backbone from the 10 data collector sites to OCWRC offices.

   b. **Communication Methods**: Two communication method systems were investigated as shown below.

      i. **New Radio System:** Implementing a new high-speed wireless radio backbone between the distributed sites back to the head-end at the OCWRC offices in Waterford.

ii. **Existing Fiber Optic System:** Utilizing Oakland County owned and already built fiber optic infrastructure called OakNET. The OakNET fiber optic option presents approximately $1million dollars in up-front costs savings throughout the County versus building a high-speed data backbone utilizing high-speed radios. This savings along with the long term expansion opportunities offered by utilizing the OakNET network are why the recommended approach will be to utilize the existing OakNET network.

6. Energy Optimization Alternatives for Heating System at WWTP

a. **Treated Effluent Heat Recovery System:** this system uses heat pumps to move heat from the treated effluent to the buildings' make-up air units. Building 105 consumes approximately 70% of the total natural gas used in the South Plant. Access to the treated Plant Effluent Water (PEW) is readily available in the Ultraviolet Disinfection Room of Building 105. A system that is contained in the building would provide the most efficient construction.

b. **Air-to-Air Heat Exchange System:** An alternative to the system described above is air-to-air heat exchange units that capture heat from the exhaust air from each building.

C. ANALYSIS OF PRINCIPAL ALTERNATIVES

1. Trunk Force Main Redundancy Alternatives

a. **Newton Road Force Main & Welch Road FM Isolation Valve**: Includes the Newton Road force main and the installation of isolation valve in Welch Road force main.

i. **Monetary Evaluation:** See Appendix E for cost estimates and complete monetary breakdown taking into account sunk costs, present worth, salvage value, escalation, interest, mitigation costs and user costs. The Present Worth and User Costs are as follows:

- **Present Worth:** -$1,999,510.00 (See Appendix E-2)
- **User Costs:** $1.76 per month per typical residential unit over the 20 year re-payment period (See Appendix E-7)

ii. **Staging of Construction:** The staging of construction does not apply for this alternative.

iii. **Partitioning of Project:** The partitioning of the project does not apply for this alternative

iv. **Environmental Evaluation:** The Newton Road force main route has similar, but fewer, environmental impacts than the South Commerce Road force main route. These include:

- An un-named public drain that runs across Commerce Township Dodge Park No. 5 between Newton Road and South Commerce Road. The proposed Newton Road force main crosses underneath this drain on South Commerce Road and then runs along the south side of the drain for approximately 1,400 feet in Dodge Park No. 5.

- There is a small wetland crossing on the west side of Newton Road in Commerce Township's Richardson Center.

- Approximately one-half acre of clearing and grubbing is necessary within Dodge Park No. 5 to gain access for construction equipment.

v. **Implementability and Public Participation:** Commerce Township is capable of implementing the proposed project using an SRF loan. Preliminary analysis comparing the costs of SRF versus conventional municipal bonds has been investigated by the township's utility financial planner and it was concluded that the SRF loan is preferred method of financing.

Commerce Township has had extensive discussions with Multi-Lakes Conservation Association who owns property along both the Newton Road and South Commerce Road routes. At one time, there was a proposal to also construct a multi-purpose pathway along with the sewer force main. Multi-Lakes preferred that the pathway be constructed along South Commerce Road, and preferred the sewer force main be constructed in Newton Road. The multi-purpose pathway was constructed in 2009.

In 2009, Commerce Township held a public hearing for a previous version of this Project Plan. The public hearing was advertised in the local paper; however no one from the public attended. On Monday, May 7th, 2012, a Notice of Public Hearing was run in the Oakland Press advertising a public hearing to be held Thursday, June 7th, 2012 for the purpose or receiving public comments on this project. This Project Plan will be available at the Commerce Township hall, library and website for the public's review prior to the Public Hearing.

vi. Technical and Other Considerations

- **Infiltration and Inflow Removal:** The proposed project will not remove infiltration and inflow.

- **Sludge and Residuals:** The proposed project will have no affect on sludge and residuals.

- **Industrial Pretreatment:** The proposed project will have no affect on industrial pretreatment requirements.

- **Growth Capacity:** The proposed project will provide sufficient capacity for the twenty year planning period. This capacity was determined based on projected population and projected uses according to the Township's Master Plan. The WWTP design capacity of 8.5 MGD will provide service for just over 31,000 Residential Equivalent Units (REUs). This trunk force main system was master planned to be constructed in phases. The first phases of the force main system are in service and they provide sufficient capacity to serve regions of both Commerce and White Lake Townships for a limited period of time. As more customers connect to the sewer system, there is a need to complete the second phases of the force main system.

  Part of the second phase includes the Newton Road Force main. This additional branch will provide additional capacity for the ultimate needs of the Township, while also providing redundancy in the system. As mentioned in earlier sections, it will be much easier for the Township to avoid accidental sanitary sewer over flows with a redundant system. All needed permits have been obtained to proceed with this work.

- **Areas Currently Without Sewers:** An analysis of the Service Area in Commerce Township shows that approximately 86% of property is already developed. A proposed small lateral pressure sewer will provide sewer service for the existing residential neighborhoods along the force main route. The Newton Road force main will not provide sewer capacity to areas that do not already have sewer capacity.

- **Reliability:** Both Principal Alternatives provide a means to make the existing trunk force main system more reliable (see Section I.D - Needs for Project for additional information on reliability). The proposed Newton Road alternative provides some additional reliability because the force main does not traverse under any significant wetlands, as repairing a sewer that has been installed under a wetland can be difficult and expensive.

- **Alternative Sites and Routing:** The Principal Alternatives include the two most viable routes for the proposed sewer project.

- **Combined Sewer Overflows:** There are no combined sewers in the Study Area.

- **Contamination of the Project Site:** There are no known contaminated sites along the force main route.

b. South Commerce Road Force Main & Welch Road Isolation Valve: Includes the South Commerce Road force main route and installation of isolation valve in the existing Welch Road force main. The South Commerce Road force main option is very similar to the Newton Road option except as noted below:

i. Monetary Evaluation: See Appendix E for a cost estimate and complete monetary breakdown taking into account sunk costs, present worth, salvage value, escalation, interest, mitigation costs and user costs. The Present Worth and User Costs are as follows:

- **Present Worth:** -$2,252,874.00 (See Appendix E-2)

- **User Costs**: $1.84 per month per typical residential unit over the 20 year re-payment period (See Appendix E-7)

ii. Environmental Evaluation: The South Commerce force main route crosses two significant wetlands along South Commerce Road, while the Newton Road route avoids these wetlands. Having major wetland crossings would make the South Commerce Road route less reliable because repairing a force main in these types of wetlands will be difficult.

2. Heat Recovery Systems at WWTP Alternatives

a. Treated Effluent Heat Recovery System in Building 105

i. Monetary Evaluation See Appendix E for a cost estimate and complete monetary breakdown taking into account sunk costs, present worth, salvage value, escalation, interest, mitigation costs and user costs. The Present Worth and User Costs are as follows:

- **Present Worth**: $111,238.00 (See Appendix E-4)

- **User Cost**: This project will save users approximately $0.05/month per typical residential unit over the 20 year re-payment period (See Appendix E-7)

ii. Staging of Construction: The staging of construction does not apply for this alternative.

iii. **Partitioning of Project:** The partitioning of the project does not apply for this alternative.

iv. **Environmental Evaluation:** There are few environmental impacts of the treated effluent heat recovery system. The system will reduce energy use and thus air pollution. The heat recovery system will cool the treated effluent by an average of three (3) degrees Fahrenheit during the heating season, and the system will not be used during air conditioning season so there will be no increase in effluent temperature during summer months. Cooling the treated effluent during the winter months is not expected to cause any environmental impacts in the downstream receiving waters.

v. **Implementability and Public Participation:** Commerce Township is capable of implementing the proposed project using an SRF loan. Preliminary analysis comparing the costs of SRF versus conventional municipal bonds has been investigated by the township's utility financial planner and it was concluded that the SRF loan is preferred method of financing**.**

In 2009 Commerce Township held a public hearing for a previous version of this Project Plan. The public hearing was advertised in the local newspaper, however no one from the public attended. On Monday, May 7th, 2012, a Notice of Public Hearing was run in the Oakland Press advertising a public hearing to be held Thursday, June 7th, 2012 for the purpose or receiving public comments on this project. This Project Plan will be available at the Commerce Township hall, library and website for the public's review prior to the Public Hearing.

vi. **Technical and Other Considerations**

- **Infiltration and Inflow Removal:** The proposed project will not remove infiltration and inflow.

- **Sludge and Residuals:** The proposed project will have no affect on sludge and residuals.

- **Industrial Pretreatment:** The proposed project will have no affect on industrial pretreatment requirements.

- **Growth Capacity:** The proposed project will have no affect on growth capacity.

- **Areas Currently Without Sewers:** The proposed project will have no impact to areas served by the sewer system.

- **Reliability:** The proposed project will slightly improve the reliability of the heating system because the make-up air unit

burners will operate at lower heat rates, reducing stress on the unit heat exchanges due to lower exhaust temperatures

- **Alternative Sites and Routing:** There are no alternate sites.
- **Combined Sewer Overflows:** There are no combined sewers in the Study Area.
- **Contamination of the Project Site:** There is no known contamination of the project site.

b. Air-to-Air Heat Exchanger: An air to air heat exchange system is similar to the treated effluent heat recovery system except as noted below:

i. Monetary Evaluation: See Appendix E for a complete monetary breakdown taking into account sunk costs, present worth, salvage value, escalation, interest, mitigation costs and user costs. The Present Worth and User Costs are as follows:

- **Present Worth:** $172,892.00 (see Appendix E-4)
- **User Cost:** $0.02 per month per typical residential unit over the 20 year re-payment period (see Appendix E-7)

ii. Technical and Other Considerations: The air-to-air heat exchange system will have a bypass function so that it is disabled during the non-heating season to avoid adding unwanted heat from process equipment to the ventilation air.

3. SCADA System Alternatives

a. Distributed Hybrid System Utilizing Existing Fiber Optic Network

i. Monetary Evaluation: See Appendix E for a complete monetary breakdown taking into account sunk costs, present worth, salvage value, escalation, interest, mitigation costs and user costs. The Present Worth and User Costs are as follows:

- **Present Worth:** -$827,450.00 (see Appendix E-6)
- **User Cost:** $0.02 per month per typical residential unit over the 20 year re-payment period (see Appendix E-7)

ii. Staging of Construction: The staging of construction does not apply for this alternative.

iii. Partitioning of Project: The partitioning of the project does not apply for this alternative

iv. **Environmental Evaluation:** The SCADA system will have a positive impact on the reliability of the sewer transportation system and will reduce the number and severity of future sanitary sewer overflows. The SCADA system will also reduce energy consumption for the sewer transportation system. Additionally, a new SCADA system will reduce the number of operator call-outs, which also reduces energy consumption.

Implementability and Public Participation: Commerce Township is capable of implementing the proposed project using an SRF loan. Preliminary analysis comparing the costs of SRF versus conventional municipal bonds has been investigated by the township's utility financial planner and it was concluded that the SRF loan is preferred method of financing. . On Monday, May 7th, 2012, a Notice of Public Hearing was run in the Oakland Press advertising a public hearing to be held Thursday, June 7th, 2012 for the purpose or receiving public comments on this project. This Project Plan will be available at the Commerce Township hall, library and website for the public's review prior to the Public Hearing.

v. **Technical and Other Considerations**

- **Infiltration and Inflow Removal:** The proposed project will be a tool for monitoring system flows and for identifying areas where inflow and infiltration may be occurring.

- **Sludge and Residuals:** The proposed project will have no affect on sludge and residuals.

- **Industrial Pretreatment:** The proposed project will have no affect on industrial pretreatment requirements.

- **Growth Capacity:** The proposed project will have no affect on growth capacity.

- **Areas Currently Without Sewers:** The proposed project will have no impact to areas not currently served by the sewer system.

- **Reliability:** SCADA system reliability is of paramount importance and the new SCADA system will incorporate the latest technologies to greatly increase system reliability and security versus the current system. The current system is vulnerable to data loss because of its centralized design approach. The new system utilizing the distributed hybrid design approach will achieve greater reliability due to distributing the data collection to ten (10) or more data collection sites thus eliminating a single point of failure that exists with the current system. Additionally, system security will be enhanced by replacing small and medium site radios with radios that have built-in encryption technology and the

distributed approach utilizing the existing OakNET network will achieve much greater network security due to the already developed Oakland County IT security models.

- **Alternative Sites and Routing:** There are no alternate sites.

- **Combined Sewer Overflows:** There are no combined sewers in the Study Area.

- **Contamination of the Project Site:** There are no known areas of contamination on or near the project site.

b. Alternative SCADA Communication Systems: The alternative system architectures and communication methods are very similar to the Distributed Hybrid System with Fiber Optic Network option except as noted below:

i. Monetary Evaluation: See Appendix E for a complete monetary breakdown taking into account sunk costs, present worth, salvage value, escalation, interest, mitigation costs and user costs. Installing a system that utilizes new high-speed wireless radios rather than the existing Oakland County fiber optic network OakNET is much more expensive. The Present Worth and User Costs are as follows:

- **Present Worth:** -$927,450.00 (See Appendix E-6)

- **User Costs**: $0.08 per month per typical residential unit over the 20 year re-payment period (See Appendix E-7)

ii. Reliability: SCADA system reliability is of paramount importance and the new SCADA system will incorporate the latest technologies to greatly increase system reliability and security versus the current system. The current system is vulnerable to data loss because of its centralized design approach. Installing a new centralized system will create the same problems that exist today in regards to data loss even though the technology will be newer.

III. THE SELECTED ALTERNATIVES

A. DESCRIPTION OF SELECTED ALTERNATIVES

To reduce the risk and severity of future sanitary sewer overflows in its sanitary sewer system, Commerce Township proposes to complete the following improvements: 1) Construct the Newton Road Force Main; 2) Install an Isolation Valve in the existing Welch Road Force Main; and 3) Install a state-of-the-art SCADA System. These systems will be designed to optimize energy efficiency of the entire sewer transportation system.

To reduce energy costs for heating and cooling the buildings at the WWTP, Commerce Township proposed to construct a Treated Effluent Heat Recovery System.

1. Relevant Design Parameters

a. Newton Road FM & Welch Road Isolation Valve Basis of Design

i. **Velocity**: The trunk force main system as a whole is designed for peak flows with minimum velocities of 2 feet per second.

ii. **Redundancy**: The system is designed to carry average day flows when any one of the redundant force mains is shut down for service.

iii. **Average Design Flow:** 270 gallons per day per Residential Equivalent Unit (REU).

iv. **Peak Flow:** Peak flows are based on population served per Ten State Standards with a minimum peak flow of 2.5 times average flow.

v. **Pipe Friction:** A Hazen Williams Friction Factor of 120 was used to design the system.

vi. **Maximum Pressure Goal:** 50 pounds per square inch is a system goal that was established to reduce the power required at the pump stations. The goal was also established to reduce wear and tear on the system and to reduce energy consumption. This goal must be weighed against the minimum velocity requirement of 2 ft/sec at peak flow.

vii. **Design Population:** The Commerce Township Land Use Master Plan is the basis for determining design populations in residential areas within Commerce Township. Non-residential areas are generally planned for approximately 3 REU's per acre.

viii. **Isolation Valves:** Isolation valves have been designed with no restrictions (no reducers, and no butterfly valves) so that cleaning pigs can be used to clean the force mains in the future.

b. **WWTP Treated Effluent Heat Recovery System Design Criteria:** ASHRAE design procedures embodied in the Carrier E20-II program which is certified and accepted by the Department of Energy.

c. **SCADA System Design Criteria:** The following organizations have generated standards that are to be used as guides in assuring quality and reliability of components and systems; govern nomenclature; define parameters of configuration and construction in addition to specific details outlined in the Oakland County SCADA Design Criteria.

   i. ISA, Instrumentation, Systems and Automation Society

   ii. UL, Underwriters Laboratories

   iii. AWWA, American Water Works Association

   iv. NEMA, National Electrical Manufactures Association

   v. OSHA, Occupational Safety and Health Administration

   vi. ANSI, American National Standards Institute

   vii. NFPA, National Fire Protection Association

   viii. NIST, National Institute of Standards and Technology

   ix. IEEE, Institute of Electrical and Electronic Engineers

   x. NEC, National Electrical Code(ANSI/NFPA-70)

   The entire SCADA system Design Criteria can be found in Appendix F.

2. Controlling Factors

a. Newton Road Force Main & Welch Road Isolation Valve

   i. Reliability & Redundancy: The existing force main carries approximately 1,000,000 gallons per day, and a pump and haul bypass would require 100 trips per day with 10,000 gallon tankers. The township considers a pump and haul bypass of this magnitude to have too many logistical risks to be reliable in an emergency situation. Thus, there is a need to install the Newton Road Force Main & Welch Road Isolation Valve to reduce the risk of significant sanitary sewer overflows.

   ii. Permits: All necessary permits have already been obtained for the Newton Road Force Main project.

b. WWTP Treated Effluent Heat Recovery System

i. Cost: The solution must be cost effective. A return on investment of 11 years was considered to be a cost effective solution.

ii. Structural and Aesthetic: Existing make-up air unit supports will be checked to verify they are adequate for the additional preheat coil weight. Heat pumps will be located on building interior structural slab on grade. Two roof openings will be required for the re-circulating water piping. Roof top piping and make-up air units are generally hidden from view and remaining equipment is located in the building resulting in essentially no aesthetic impact.

c. SCADA System

i. Reliability: The new SCADA system must provide a reliable system for collecting data from the sewer system, and for providing a means to control certain system operations. It needs to be more reliable than the current system, and require less maintenance by using brand new, state of the art hardware and software.

ii. Cost: The system must be cost effective by requiring less operator call-outs and the ability to operate pumps remotely.

iii. Flexibility: The system must be flexible so that another system operator could take over operations of the sewer treatment and transportation system without replacing any major components of the SCADA system.

3. **Special Assessment Districts:** No Special Assessment Districts are proposed to pay for the capital improvement costs for these projects.

4. **Project Map:** A map of the Newton Road FM project is provided in Exhibit A-2. The WWTP Heat Recovery System Project will be contained to the Commerce WWTP (See Exhibits A-2 and F). The SCADA Project will include work at all existing sanitary pump stations in Commerce Township (see Exhibit A-2 for a map of these pump stations).

5. **Sensitive Features**

a. Wetlands: The Newton Road force main will cross under a 50 foot long stretch of wetland in the Commerce Township owned Richardson Center. The Heat Recovery System and SCADA System projects will have no effect on existing wetlands.

b. Drain & Stream Crossings: The Oakland County Water Resources Commissioner operates a lake level control drainage ditch that runs from Lower Straights Lake, across Commerce Township's Dodge Park No. 5, to the Huron River, just upstream of North Commerce Lake. The force main will parallel the drain for approximately 1,400 feet, and will be

installed by the horizontal directional drill method. The Heat Recovery System and SCADA System projects will not include any construction that crosses a drain or stream.

c. **Wooded Areas:** There are significant wooded areas along the route of the Newton Road force main: a) within the Newton Road right-of-way; b) adjacent to Newton Road in Commerce Township's Richardson Center and the Multi Lakes Association property; and c) in Commerce Township's Dodge Park No. 5. The pipe will be installed by directional drill method in order to avoid having to cut down many of the trees in these wooded areas. The Heat Recovery System and SCADA System projects will have no effect on existing wooded areas.

d. **Downstream Receiving Waters:** The WWTP heat recovery system will slightly change the temperature of the treated effluent that will be discharged to downstream receiving waters. The Newton Road Force Main and SCADA System projects will have no effect on any downstream receiving waters.

6. Mitigation of Environmental Impacts

a. **Horizontal Directional Drilling (HDD):** The Newton Road force main is being installed using the HDD method to preserve the wooded areas and the wetland that it passes through. With this method of construction there should be no impact to the wetland, and only small impacts to the wooded areas.

b. **Trees:** Approximately one-half acre of a wooded area in Commerce Township Dodge Park No. 5 must be cleared in order to gain access for construction equipment for the Newton Road Force Main project.

c. **Soil Erosion and Sedimentation Control**: The HDD construction method greatly reduces the risk of soil erosion and sedimentation issues. Standard Best Management Practices will be used to control soil erosion and sedimentation in excavated areas. Additionally, a Commerce Township Soil Erosion permit will be obtained and the construction site will undergo daily soil erosion inspections.

7. Schedule for Design & Construction

Submit Draft Project Plan to MDEQ	May 9, 2012
Advertise Public Hearing	May 7, 2012
Project Plan Draft on Display	May 8, 2012
Public Hearing	June 7, 2012
Adoption of Project Plan by Twp. Board	June 12, 2012
Final Project Plan Submittal to MDEQ	July 1, 2012

Newton Rd. Force Main/Welch Rd. Isolation Valve

Complete Design/Approval Process	August 1, 2012
Advertise for Bids	October 10, 2012
Bid Date	October 31, 2012
Contract Award	November 13, 2012
Complete Preliminary Contract Requirements (Schedules/Shop Drawings)	January 7, 2013
Begin Construction	April 15, 2013
Substantial Completion	July 1, 2013
Final Contract Completion	December 2, 2013

Treated Effluent Heat Recovery System

Begin Design	October 10, 2012
Complete Design/Approval Process:	April 8, 2013
Advertise for Bids	April 10, 2013
Bid Date	May 1, 2013
Contract Award	June 11, 2013
Complete Preliminary Contract Requirements (Schedules/Shop Drawings)	July 26, 2013
Begin Construction	July 29, 2013
Substantial Completion	November 15, 2013
Final Contract Completion	December 30, 2013

SCADA System: The following timeline assumes that the Commerce Township pump stations would be the first stations to be upgraded within the Oakland County system and that all the head-end programming would occur before implementing the first stations.

Begin Design	September 3, 2012
Begin Programming	October 1, 2012
Complete Design	November 5, 2012
Begin Panel Building	December 3, 2012
Begin Factory Testing	January 21, 2013
Complete Programming/Panel Building/Testing	February 8, 2013
Begin System Installation and Startup	February 11, 2013
Complete System Installation and Startup	April 26, 2013

8. **Cost Summary.** The following construction costs are associated with each project:

a.	Newton Road Force Main & Welch Road Isolation Valve	$2,809,862.00
b.	WWTP Treated Effluent Heat Recovery System	$ 366,706.00
c.	SCADA System	$ 630,200.00

Detailed cost estimates for the Selected Alternatives are included in Appendices E-1, E-3 and E-5. The estimates include all costs associated with the planning, design and construction of the selected alternatives.

B. AUTHORITY TO IMPLEMENT THE SELECTED ALTERNATIVE

Commerce Township is a public charter Township operated under the Michigan Charter Township Act. A seven-member board comprised of a Supervisor, Clerk, Treasurer, and four Trustees govern the Township. The Township will finance, build and own the Newton Road Relief Force Main and the WWTP Heat Recovery System projects solely. Commerce Township's portion of the new SCADA system will be financed solely by Commerce Township and the Oakland County Water Resources Commission. The Oakland County Water Resource Commissioner's Office operates and maintains these systems by contract with the Township.

C. USER COSTS (See Appendix E-7 for a calculation of User Costs for all projects)

1. **Newton Road Force Main:** Increase of $1.76 per month per household for the selected alternative.

2. **WWTP Heat Recovery System:** Decrease of $0.05 per month per household for the selected alternative.

3. **SCADA System:** Increase of $0.02 per month per household for the selected alternative

4. **TOTAL:** Increase of $1.73 per month per household for the three proposed projects.

IV. EVALUATION OF ENVIRONMENTAL IMPACTS

A. ANALYSIS OF THE IMPACTS

1. Direct Impacts

a. Construction Impacts: There will be no significant construction impacts from the Treated Effluent Heat Recovery System, or SCADA system. The Newton Road Force Main will have some construction impacts, namely construction noise, dust, and initial equipment setup. These direct impacts will be short term, and occur only during an approximately 2 month construction period. The following is a discussion of the construction impacts of the Newton Road force main:

i. Construction Methods: The Newton Road Force Main project will be installed by the horizontal directional drilling method to minimize damage to sensitive environmental features. Approximately a half acre of trees will be cleared to provide access for construction equipment in Dodge Park No. 5. There may be an occasional frac-out of drilling fluid from the horizontal directional drilling operations. The drilling fluid is inert material that does not cause permanent damage to the environment. If a frac-out occurs, the drilling fluid will be contained, and then removed from the site.

ii. Endangered Species: There are no rare, threatened, endangered, or special concern species that will be impacted by construction activities.

iii. Archeological & Historical Resources: There are no archeological or cultural resources that will be impacted by construction activities. The Newton Road Force Main will be directionally drilled under what could be considered a historical resource. Dodge Park No. 5 was part of the Civilian Conservation Corps (CCC) plantings of the “New Deal” social service programs spearheaded by President Franklin D Roosevelt during the “Big Depression” of the 1930’s. Historical records show that company SP-3, 1615 completed the “Dodge Bloomer” planting on November 27th, 1933. This planting can still be seen from the Commerce Twp. Dodge 5 Park through Emerald Pines subdivision, across Bay Pointe area and into the West Bloomfield Bloomer Park at Richardson and Green Lake Roads. In the 1990’s the Charter Township of Commerce purchased the State of Michigan’s portion of the park, for the preservation of this open space. The Bloomer Plantings will not be impacted by construction because the pipe will be installed by horizontal directional drill method.

iv. **Air Quality:** The primary localized air quality impacts will be dust and normal exhaust from the construction equipment. The construction methods (horizontal directional drilling) will keep dust and exhaust to a minimum.

v. **Ground & Surface Water:** Ground water impacts will be minimal. Dewatering should not be required due to the shallow depths and the horizontal directional drilling methods. Surface water will be minimally impacted because the construction methods will not cause soil erosion.

vi. **Residential Impacts:** There will be little traffic impact on the residents and businesses along Oakley Park Road, Newton Road and South Commerce Road during the construction process. The force main construction along the north side of Oakley Park Road will commence in the public road right-of-way while the Newton Road portion will be outside of the right-of-way and will not be a hindrance to traffic. Construction work signs and other caution signs along Oakley Park Road and Newton Road will be the extent of the road impacts. Two road crossings are proposed at Oakley Park Road and South Commerce Road. The force main at these crossings will be directionally bored under the road to avoid any traffic conflicts or open cutting in the road right-of-ways.

b. Operational Impacts

i. **Newton Road Force Main**: The new force main will have no operational impacts during normal operations. The force main is being constructed with high density polyethylene pipe with welded joints so there is little likelihood of leaks during normal operations. It is possible that the force main could be accidentally damaged, in which case sewage could flow into adjacent surface waters. The project reduces the risk and severity of accidental sanitary sewer overflows.

ii. **WWTP Treated Effluent Heat Recovery System:** This system will slightly change the temperature of the treated effluent that is discharged to the downstream receiving waters.

iii. **SCADA System:** The SCADA system will have positive operational impacts to the environment. The risk and severity of sanitary sewer overflows will decrease, and the SCADA system will be a tool which will be used to optimize system performance and reduce energy consumption. The new system will also require fewer trips out to the many pump station sites by the sewer operators (Oakland County Water Resources Commissioner).

c. Social Impacts

i. User Costs: User costs will increase by approximately $1.73 per month per household for the selected alternatives.

ii. Employment: The projects will provide employment opportunities during the construction phases.

2. Indirect Impacts

The proposed projects have minimal negative indirect impacts on the environment. The Study Area in Commerce Township is 86% developed and the proposed projects do not provide additional sewer capacity for future development, so changes in population density and land use will not occur. There will not be any negative change in land use, air or water quality, natural setting, cultural resources or aesthetics as a result of these projects.

3. Cumulative Impacts

a. Fiscal Impact: Commerce Township recently completed the construction of a $50 million dollar waste water treatment plant expansion which is being financed over a 30 year period. The proposed projects will raise user costs by an additional $1.73 per month per household.

b. Additional Impacts: No other cumulative impacts are anticipated.

V. MITIGATION

A. GENERAL

As described in Section IV (Evaluation of Environmental Impacts), the majority of the environmental impacts from the proposed projects are direct, short term construction related impacts and are considered minor impacts.

B. SHORT-TERM CONSTRUCTION-RELATED MITIGATION

1. **Construction Methods:** The most significant construction related impacts are being mitigated by requiring the Newton Road Force Main to be installed using the horizontal directional drilling method. The HDD method eliminates most tree clearing; will have no impact at the wetland and drain crossing; and have minimal impacts on traffic operations. The contractor will be required to monitor the HDD operations, contain any frac-outs of drilling fluid, and legally dispose of excess drilling fluids.

2. **Soil Erosion and Sedimentation Control:** Soil erosion will be minimal because of the HDD construction methods being specified for the project. Soil erosion and sedimentation control best management practices will also be required during construction. Disrupted turf areas will restored with seed and mulch.

C. MITIGATION OF LONG-TERM IMPACTS

1. **Newton Road Force Main:** The force main will be constructed of high density polyethylene pipe with fused joints, and the construction specifications will require hydrostatic pressure acceptance tests. These two measures will virtually eliminate the possibility of inadvertent sewage leaks through sewer joints. The sewer will be included in the MISS DIG system, which will greatly reduce the possibility of an underground contractor accidentally damaging the sewer in the future.

2. **WWTP Treated Effluent Heat Recovery System:** Commerce Township will seek the approval of the MDEQ for necessary revisions to the NPDES permit before proceeding with the heat recovery system. This permit revision will address all possible long-term impacts.

3. **SCADA System:** While the SCADA system is being designed, input from the system operators and design engineers will be used to develop a SCADA system that provides the greatest economical solutions for optimizing the operations of the existing sewer system.

D. MITIGATION OF INDIRECT IMPACTS

As stated in Section IV (Evaluation of Environmental Impacts), there are few, if any, negative indirect environmental impacts from the proposed projects. Commerce Township recognizes that undirected growth, facilitated by increased sewer capacity, can be an indirect impact of a sewer project. This section provides a discussion of the policies, ordinances, and actions that Commerce Township and the other communities within the Study Area have taken to plan for and direct growth.

1. Master Planning and Zoning

a. Commerce Township Land Use Master Plan: Commerce Township adopted a its current Land Use Master Plan in 2006, and the Planning Commission is currently in the process of reviewing and updating the Master Plan. The Land Use Master Plan is comprehensive and cannot be effectively summarized in this Project Plan. The Master Plan recognizes that there will be continued pressure to develop the remaining parcels of land and identifies eight parcels of land that could get redeveloped in the next twenty years (Six golf courses, the Long family farm, and Holloway Gravel). Two of the golf courses have since purchased by the Commerce Township DDA and are in the process of being redeveloped. Thus, only six significant parcels of property are available for development. The Commerce Township Sanitary Sewer Master Plan recognizes that these parcels could get redeveloped in the future.

b. Commerce Township Zoning Ordinance: Commerce Township adopted a new zoning ordinance in 2010. The Zoning Ordinance was prepared and adopted for the purpose of providing standards and regulations for land development, use of land and buildings, and all other purposes described in the Michigan Zoning Enabling Act (P.A. 110 of 2006, as amended). It is also the intent of the Zoning Ordinance to carry out the policies of the Charter Township of Commerce Master Plan. The Zoning Ordinance was adopted to protect and promote the public health, safety, comfort, convenience, prosperity, and general welfare of residents and business owners of the Township.

c. White Lake Township Land Use Master Plan: White Lake Township adopted it current Land Use Master Plan in 2011. The Master Plan recognizes White Lake Township as a “Four Seasons Playground” with numerous public and private recreation opportunities available all year round. The first goal that is stated in the Master Plan is “Preserve and protect natural features that define White Lake Township, including wetlands, floodplains, lakes, woodlands and other natural features”. Some other stated goals that relate to sanitary sewers include:

i. Target sensitive lake areas as the first priority properties to receive sanitary sewer services.

ii. Direct higher-density residential development to areas already served by public utilities.

iii. Additional residential development should be timed to coincide with adequate roadway, sewer, and water systems needed to support the development.

Most of the private property has already been developed in White Lake Township. The Master Plan identifies 12.7% of the land as vacant and 2.8% as agricultural. The Master Plan designates roughly one third of the township as Rural Estates found primarily in areas of the Township that are not planned to receive sanitary sewer service. This includes the Northwest, North Central, Northeast, and Pontiac Lake planning areas.

d. **White Lake Township Zoning Ordinance:** White Lake's Zoning Ordinance was adopted in 2011 and provides regulations necessary to implement goals of the Land Use Master Plan.

e. **City of Novi Land Use Master Plan:** The City of Novi Planning Commission adopted a set of 2010 Master Plan for Land Use amendments to update its Master Plan. The Future Land Use Plan designates the Study Area within Novi as primarily Office Research Development & Technology. There is also a small amount of property designated as Utility, Local Commercial, and Mobile Home. The property within the Study Area and west of M-5 is designated as Single Family.

f. **City of Novi Zoning Ordinance**: The Study Area within the City of Novi is zoned Office Service Technology on the east side of M-5 and Residential Acreage on the west side of M-5.

g. **West Bloomfield Township:** There are approximately 50 existing single family homes in Peninsular Park in West Bloomfield that are within the Study Area. No significant change is forecasted for this area.

2. **Preservation of Open Space through Strategic Land Purchases**: In the last 10 years Commerce Township has purchased over 600 acres of land in efforts to protect the overall integrity of the Township and to preserve open space:

   a. **Dodge Park No. 5 in Section 11:** The State of Michigan made a decision to sell approximately 65 acres of property that is part of Dodge Park No. 5. The property was adjacent to Commerce Township's Dodge Park No. 5, and the Land Use Master Plan did not foresee this property being developed. The Township recognized that development of the property could cause an undesired change in an area adjacent to the Commerce Village area. The State provided the Township with the opportunity to purchase the property at the highest and best use appraised value. The Township purchased the property, developed a master plan for the property, and has completed the first phase of development on the property. The first phase included soccer fields, an

entrance drive, and parking. In 2011, the Township held its first series of Concert in the Parks at Dodge Park No. 5, and is planning a second series in 2012.

b. **Proud Lake Recreation Area in Sections 2 & 11:** The State of Michigan made a decision to sell approximately 200 acres of property that was part of the Proud Lake Recreation Area. Neither the Land Use Master Plan nor the Sanitary Sewer Master Plan foresaw this property being developed. The Township recognized that development of this property could have a significant impact on the Township's infrastructure and entered into negotiations to purchase the property from the State of Michigan. The property is now owned by Commerce Township.

c. **Huron Clinton Metro Park Authority (HCMA)/Eldorado Golf Course/Links of Pinewood Golf Course properties in Sections 23 & 24**: The HCMA owned approximately 50 acres of mostly upland in Section 24, and another linear piece of property of mostly wetland in Section 23 that it was going to put up for sale. This happened at about the same time that both the Eldorado Golf Course and the Links of Pinewood Golf Course went up for sale, and a developer had an option to purchase the properties. Commerce Township had not been anticipating that these properties would be developed in the near future, and was concerned about how a development immediately north of the terminus of M-5 would affect traffic and other infrastructure. After performing traffic studies and a water quality assessment, the Commerce DDA entered into negotiations with owners of the golf courses, and eventually purchased the properties. It was not economically feasible for the DDA to continue the golf course operations, so the DDA is in the process of developing the 330 acres of property in Section 24. The DDA has constructed Martin Parkway; restored and/or mitigated over 12 acres of wetland; developed a storm water management system to protect downstream water resources; and permanently protected 110 acres of flood plain from being developed. An additional 20 acres of wetlands/uplands are not in the protected area, but will not be developed. The remaining 200 acres are being marketed for development. The Township has rezoned this area to Town Center Overlay which allows a mix of uses. The Township was also able to purchase 73 acres of the HCMA property in Section 23 which is mostly wetland, and has no immediate plans for this property.

d. **Parks Millage:** In 2004, Township residents approved a Park Improvement and Creation and Acquisition of Open Space Millage to be used for recreation capital improvements and acquisition along with related expenses. The millage was crucial in the Township's efforts purchase the Proud Lake Recreation Area property and to improve Dodge Park No. 5. The Township continues to look for opportunities to purchase key properties for the enjoyment of the Township's residents.

E. Staging of Construction: Commerce Township has made efforts to stage the construction of its sanitary sewer system. The WWTP was constructed in three phases. The Newton Road Force Main project was planned years ago to provide a means to reduce the risk and severity of sanitary sewer overflows, and to provide a means to increase the overall efficiency of the trunk force main system

VI. PUBLIC PARTICIPATION

A. PUBLIC MEETINGS

1. On Friday, June 26, 2009 at 5:00 pm, a public hearing was held in the Charter Township of Commerce Board Meeting Room regarding an earlier draft of the Project Plan. There was no attendance from the public and no public comment was provided on this matter.

2. Multi Lakes Conservation Association is one of the property owners who will be most directly impacted by the proposed project. Commerce Township had discussions with representatives of Multi Lakes and took their concerns into consideration as it evaluated the Newton Road and South Commerce Road routes for the force main.

B. FORMAL PUBLIC HEARING

A formal public hearing will be held on this version of the Project Plan on Thursday, June 7th at 7:00 pm. The following is a summary of the process:

1. **Public Hearing Advertisement:** An advertisement for the public hearing was published in the Oakland Press on May 7, 2012. A copy of the advertisement and an affidavit confirming its publication is included in Appendix G.

2. **Public Hearing Contents & Transcript:** (To be completed after Public Hearing)

3. **Comments Received and Answered:** (To be completed after Public Hearing)

   a. **Attendees:** (To be completed after Public Hearing)

   b. **Comments:** (To be completed after Public Hearing)

   c. **Responses:** (To be completed after Public Hearing)

   d. **Changes:** (To be completed after Public Hearing)

C. ADOPTION OF PROJECT PLAN: Any comments received from the public will be addressed in the final project plan on July 1, 2012.