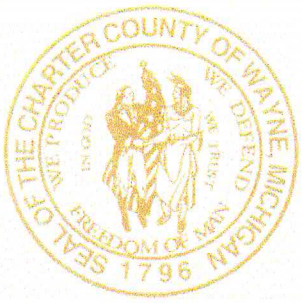
Butler Benton, Jr.
Acting Director



Robert A. Ficano
County Executive

30 June 2009

Mr. Jeffrey Herrold, Senior Project Manager
Michigan Department of Environmental Quality
Water Bureau - Revolving Loan and Operator Certification Section
Constitution Hall
525 West Allegan Street
PO Box 30273
Lansing MI 48909-7773

Subject: State Revolving Fund Loan Program - Project Plan Submittal
Downriver Sewage Disposal System, Wayne County, MI

Dear Mr. Herrold:

On behalf of the 13 communities served by the Downriver Sewage Disposal System (DSDS), Wayne County Department of Environment (DOE) is pleased to submit two copies of this Project Plan for consideration to receive a loan through the Michigan Department of Environmental Quality (MDEQ) State Revolving Fund Loan Program (SRF).

A copy of the draft Project Plan was submitted to you on 17 April 2009. This final version contains the Downriver Joint Management Committee and Wayne County Commission resolutions, changes due to your comments and other required forms and documents.

If you have any questions regarding this submittal, please contact DOE's project manager, Greg Tupancy (gtupancy@co.wayne.mi.us or 313-224-7558) or me (bbenton@co.wayne.mi.us or 313-224-6937). We look forward to your favorable review of this application.

Sincerely,

Butler Benton, Jr.
Acting Director, Department of Environment

Enclosures

CC: Ms. Kelly Cave, Ms. Kerreen Conley, Mr. Firooz Fath-Azam, Mr. Greg Tupancy: WCDOE
Mr. Thomas Maxwell, Ms. Sally Duffy: HRC

Michigan Department of Environmental Quality
Jennifer M. Granholm, Governor
Steven E. Chester, Director

http://www.michigan.gov/deq

Clean Water Revolving Funds
SRF/SWQIF Project Plan Submittal Form

Name of the Project *2009 SRF IMPROVEMENTS TO THE DOWNRIVER SEWAGE DISPOSAL SYSTEM*	**Applicant's Federal Employer Identification Number (EIN)** *38-6004895*
Legal Name of Applicant (The legal name of the applicant may be different than the name of the project. For example, a county may be the applicant for bonding purposes, while the project may be named for the particular village or township it serves.) *Charter County of Wayne / Department of Environment*	**Areas Served by this Project** Counties *Wayne* Congressional Districts *11th, 13th, 14th, 15th,* State Senate Districts *3rd, 5th, 7th, 8th,* State House Districts *12th, 13th, 14th, 16th, 21st, 22nd*
Address of Applicant (Street, PO Box, City, State & Zip) *415 Clifford Street* *7th Floor* *Detroit, MI 48226*	
Brief Description of the SRF Project *Project includes improvements and replacement equipment at the Downriver Wastewater Treatment Facility, and corrective work to the sewers and new SCADA equipment on the collection system, of the Downriver Sewage Disposal System.*	
Estimated Total Cost of the SRF Project *$58,477,000*	**SRF Construction Start Target Date** *July 2010 through 2014*
Brief Description of the SWQIF Project *n/a*	
Estimated Total Cost of the SWQIF Project *n/a*	**SWQIF Construction Start Target Date** *n/a*
Name and Title of Applicant's Authorized Representative *Butler Benton, Jr., Acting Director of Wayne County Department of Environment*	
Address of Authorized Representative (if different from above)	**Telephone** *(313) 224-6937* **FAX** *(313) 224-0045* **E-Mail Address** *bbenton@co.wayne.mi.us*
Signature of Authorized Representative	**Date** 6/22/09
Joint Resolution(s) of Project Plan Adoption/Authorized Representative Designation attached	check here ✔

A final project plan, prepared and adopted in accordance with the Department's *Clean Water Revolving Funds (SRF and SWQIF) Project Plan Preparation Guidance*, must be submitted by July 1st in order for a proposed project to be considered for placement on a Project Priority List for the next fiscal year. Please send your final project plan with this form to:

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY WATER BUREAU
REVOLVING LOAN AND OPERATOR CERTIFICATION SECTION
PO BOX 30273
LANSING MI 48909-7773

2009 FINAL SRF PROJECT PLAN

FOR IMPROVEMENTS TO THE

DOWNRIVER SEWAGE DISPOSAL SYSTEM

PREPARED FOR THE

WAYNE COUNTY DEPARTMENT OF ENVIRONMENT

DRAFT: April 20, 2009

FINAL: June 25, 2009

HUBBELL, ROTH & CLARK, INC.
420 MICHIGAN BUILDING
220 BAGLEY
DETROIT, MI 48226

HRC Job No. 20080550

Somat Engineering, INCORPORATED

Westin Engineering of Michigan, PLLC

HH ENGINEERING LTD.

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APPENDICES:

A. NPDES Permit
B. Cost Estimates
C. Project Planning Correspondence
D. Resolutions
E. Public Hearing Affidavit of Publication
F. Public Hearing Transcript
G. Long-Term Biosolids Plan (updated 2009)

REFERENCES:

1. Wyandotte Wastewater Treatment Plant Final 2004 SRF Project Plan, dated June 2004.
2. Downriver Sewage Disposal System Assessment Report, dated April 2009
3. SEMCOG's Economic and Demographic Outlook for Southeast Michigan Through 2035, dated March 2007

LIST OF FIGURES: Page No.

LIST OF TABLES:

Errata

The following items summarize corrections to the Final 2009 SRF Project Plan, issued on July 1, 2009.

- Page iv and Page 1-1, corrected references for Figure 1-2 match the figure title, "Priority One Projects."
- Page 2-1, Section 2.1, the design storm event was corrected to "100 year-24 hour."
- Page 2-8, Section 2.3.1, corrected description of the Downriver interceptors.
- Page 3-12, Section 3.7.5, changed the last word from "item" to "project."
- Page 3-22, Section 3.11.2, corrected name of the second interceptor to "Downriver Sewage Disposal System."
- Page 4-2, Section 4.4.1, removed extra period from third paragraph.
- Additional correspondence with the MDEQ after publishing of the Final 2009 SRF Project Plan was added to Appendix C.
- In Appendix B, "Cost Estimates," the operation and maintenance cost details in the present worth analyses for each alternative were corrected.

Summary of Changes Since Issue of Draft Report

The following items summarize the modifications made to this Final 2009 SRF Project Plan, since the Draft 2009 SRF Project Plan was issued on April 20, 2009.

- General note: Minor corrections were made to Figure and Table names and cross-references and some additional terms were added to the Glossary. Additional minor corrections were made to fix typographical errors and to provide additional clarification where necessary.
- General note: The label "selected alternative" was added to the paragraph headings in Section 4, "Alternative Analysis," to indicate which of the alternatives was recommended.
- A new Section 4.4.4, "Selected Alternative," was added to end of Section 4.4, "Solids Thickening Complex Renovations" and the bullet list under Section 4.4.1 was revised to clarify what work is included in the selected alternative.
- A new Section 4.5.4, "Selected Alternative," was added to end of Section 4.5, "Secondary System Renovations" and the bullet list under Section 4.5.1 was revised to clarify what work is included in the selected alternative. Also, this section was revised to clarify that there are six existing Secondary Clarifiers and a total of eight existing Return Activated Sludge pumps.
- A new Section 4.6.4, "Selected Alternative," was added to end of Section 4.6, "D-A-F Complex Renovations" and the text under Section 4.6.1 was revised to clarify what work is included in the selected alternative.
- A new Section 4.7.4, "Selected Alternative," was added to end of Section 4.7, "Headworks System Renovations" and the bullet list under Section 4.7.1 was revised to clarify what work is included in the selected alternative.
- A new Section 4.8.7, "Selected Alternative," was added to end of Section 4.8, "DSDS Collection System Renovations," to clarify what work is included in the selected alternative.
- In Section 5, "Recommended Projects," a new Section 5.6 and Table V-3 were added to identify in which SRF fiscal year and quarter each Priority 1 Project will pursue financing. Section 5 was also updated to reflect the Wayne County Commission approval of the resolution for adoption of the Project Plan.
- Section 8, "Public Participation," was updated to include the public hearing information and adoption of the resolution.
- In Appendix B, "Cost Estimates," the present worth analyses for each alternative reviewed were added.
- Additional correspondence received after publishing of the draft 2009 SRF Project Plan was added to Appendix C.
- The final authorized resolution from the Wayne County Commission was added to Appendix D.
- The affidavits of publication for the notices for the public hearing were added to Appendix E.
- The transcript from the public hearing was added to Appendix F.

Section 1 - Introduction and Executive Summary

1.1. Background

The 2009 State Revolving Fund (SRF) Project Plan serves as a proactive road map for Wayne County and the Downriver Communities. The 2009 SRF Project Plan will also ensure that the necessary improvements to the Downriver Sewage Disposal System (DSDS), including the Downriver Wastewater Treatment Facility (DWTF), will be made to allow for low interest funding and ensure reliability and compliance with current and future regulatory requirements. The attached Figure 1-1 (Study Area) and Figure 1-2 (Priority One Projects) show the areas studied and areas to be improved as part of this Plan.

The SRF Program allows communities to obtain low interest loans (currently 2.5%) and has been administered by the Michigan Department of Environmental Quality (MDEQ) for the construction of sewerage facilities since 1988. The first SRF Project Plan for the 13 Downriver Communities in the DSDS was completed in February of 1993 under the direction of the Wayne County Department of Environment (WCDOE) and defined the expansion and improvements required to the DWTF to meet permit requirements. SRF Project Plan supplements were prepared until the early 2000s, when a second SRF Project Plan was completed in June 2004.

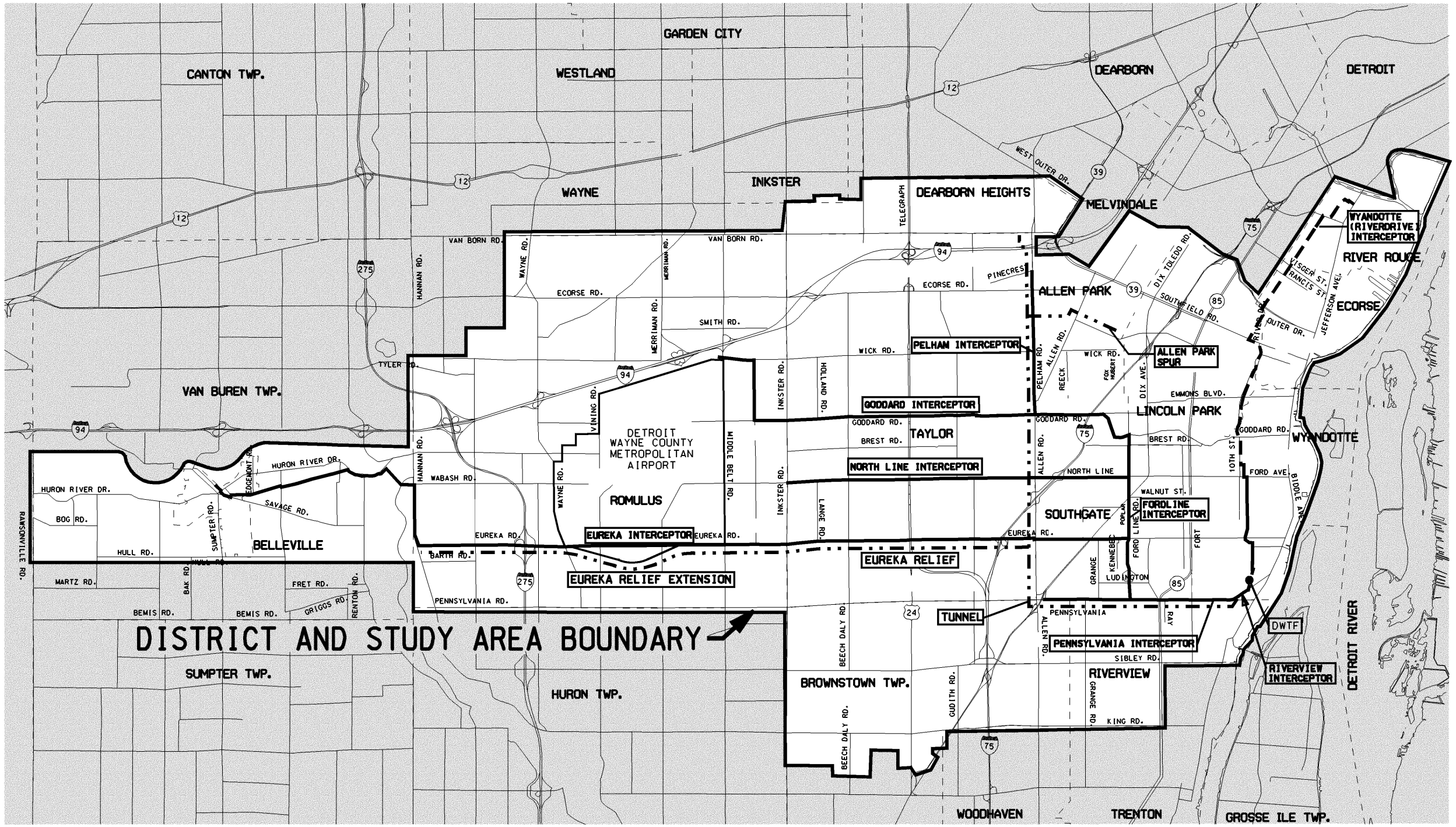
The June 2004 SRF Project Plan evaluated the DWTF needs for the planning period between 2005 and 2025, segregated in five-year planning periods. To date, all of the first five-year projects that were approved either have been constructed, or are in the design or construction phase. Generally, each of the remaining improvements, rehabilitation, or replacement projects for each of the other five-year planning periods are still proposed, but required re-evaluation. These projects and other areas of concern—both DSDS Collection System and the DWTF site—form the basis for this document. This 2009 SRF Project Plan examines the needs of the DSDS for the planning period of 2010 to 2029, with a focus on the projects that are proposed to begin construction during the next five-year planning period of 2010 to 2014, which are identified as Priority One projects.

1.2. Assessment of Facilities and Analysis of Alternatives

The existing DSDS facilities were grouped into three main areas for assessment as follows:

- The collection system, which includes the intercepting and relief system sewers that convey flow from the local communities' collection systems to the DWTF.
- The liquid stream at the DWTF, which includes the processes that remove solids and treat the sewerage flow before discharge in accordance with the facility's permit and water quality standards.
- The solids stream at the DWTF, which includes the facilities that dewater and store the solids removed from the liquid stream. The solids are currently trucked to a landfill for ultimate disposal.

A portion of the collection system sewers were televised and inspected to serve as an indicator of the conditions of the approximately 50-mile entire sewer network. In general, this review showed only minor structural issues were found in a portion of the sewers reviewed. Therefore, the recommended projects for the collection system include point repairs (Priority One, 2010-2014 project), lining a segment of approximately 800 lineal feet of sewer (Priority Two, 2015-2019 project), and improvements to the existing Supervisory Control and Data Acquisition (SCADA) systems (Priority One project.) The SCADA systems record the flow conditions in the collection system sewers and initiate alarms during emergency conditions.



LEGEND

- WYANDOTTE (RIVERDRIVE) INTERCEPTOR (WYI) - 1938 CONSTRUCTION
- DOWNRIVER SEWAGE DISPOSAL SYSTEM INTERCEPTOR (DSDS) - 1962 CONSTRUCTION
- DOWNRIVER REGIONAL STORAGE AND TRANSPORT SYSTEM (DRSTS) - 1998 CONSTRUCTION
- DOWNRIVER WASTEWATER TREATMENT FACILITY (DWTF)

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THE BACKGROUND FOR THIS FIGURE WAS CREATED BY:

Wade-Trim
P.O. Box 10
25274 Northline Road, Taylor, MI 48180
734-947-9700 / 800-482-2864
Fax No. 734-947-9726

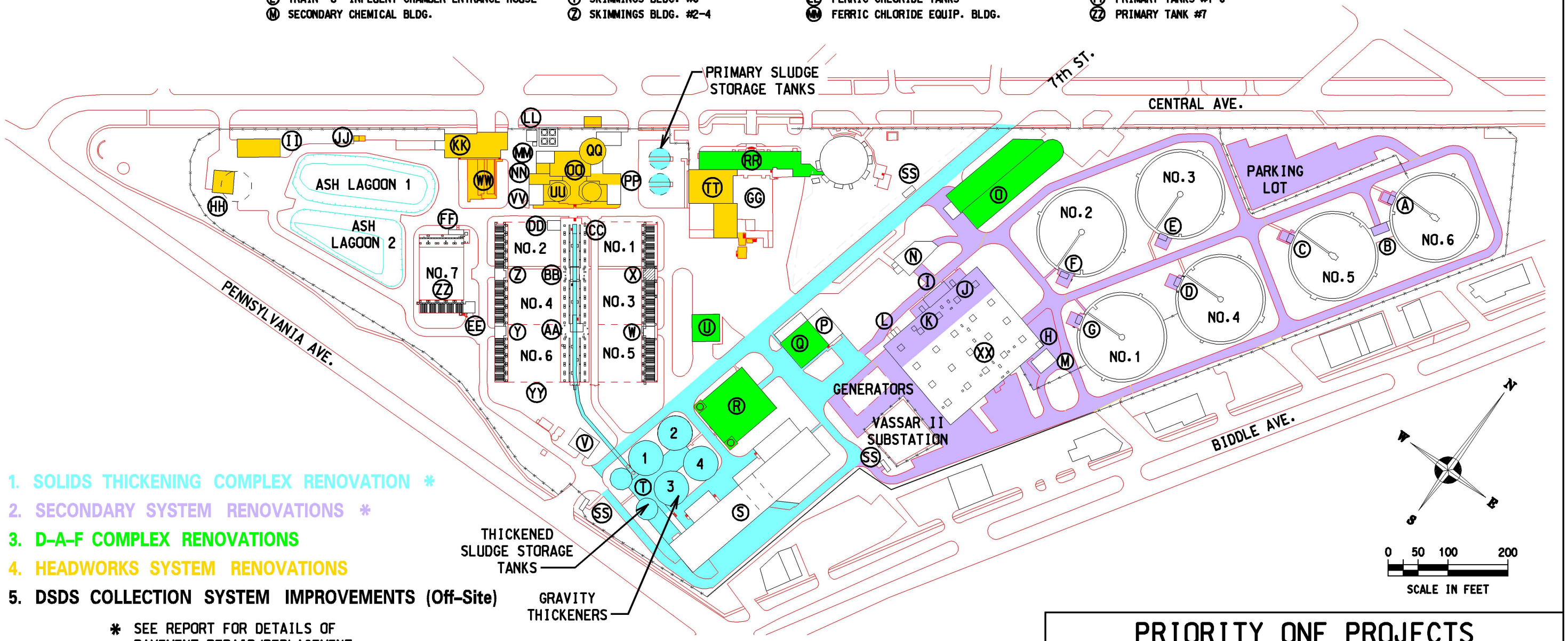
CHECKED: BDH | DATE: 18-Aug-99

STUDY AREA

JOB NO.	HUBBELL, ROTH & CLARK, INC.	FIGURE NO.
20080550	CONSULTING ENGINEERS	1-1
DATE	220 BAGLEY SUITE 420	
APRIL, 2009	DETROIT, MICH. 48226	

DOWNRIVER WASTEWATER TREATMENT FACILITY

- (A) CLARIFIER BLDG. #6
- (B) RETURN ACTIVATED SLUDGE BLDG.
- (C) CLARIFIER BLDG. #5
- (D) CLARIFIER BLDG. #4
- (E) CLARIFIER BLDG. #3
- (F) CLARIFIER BLDG. #2
- (G) CLARIFIER BLDG. #1
- (H) SAMPLE BLDG.
- (I) SECONDARY OXYGEN CONTROL BLDG.
- (J) N. INFLUENT CHAMBER ENTRANCE HOUSE
- (K) S. INFLUENT CHAMBER ENTRANCE HOUSE
- (L) TRAIN "O" INFLUENT CHAMBER ENTRANCE HOUSE
- (M) SECONDARY CHEMICAL BLDG.
- (N) SECONDARY LOW LIFT PUMP STATION
- (O) MAINTENANCE BLDG.
- (P) STOCKROOM #1
- (Q) EMPLOYEE SERVICE BLDG.
- (R) DISSOLVED AIR FLOTATION (DAF) BLDG.
- (S) SOLIDS HANDLING BLDG.
- (T) SOLIDS THICKENING COMPLEX
- (U) MAINTENANCE GARAGE
- (V) SKIMMINGS PUMP BLDG.
- (W) SKIMMINGS BLDG. #5
- (X) SKIMMINGS BLDG. #1-3
- (Y) SKIMMINGS BLDG. #6
- (Z) SKIMMINGS BLDG. #2-4
- (AA) PRIMARY MOTOR CONTROL CENTER #1-6
- (BB) PRIMARY PUMP GALLERY
- (CC) PRIMARY PUMP GALLERY ENTRANCE HOUSE
- (DD) PRIMARY POLYMER BLDG.
- (EE) SKIMMINGS BLDG. #7
- (FF) PRIMARY MOTOR CONTROL CENTER #7
- (GG) ULTRAVIOLET DISINFECTION
- (HH) TUNNEL PUMP STATION
- (II) TUNNEL PUMP STATION ELECT. BLDG.
- (JJ) RECYCLE SAMPLE BLDG.
- (KK) AERATED GRIT BLDG.
- (LL) FERRIC CHLORIDE TANKS
- (MM) FERRIC CHLORIDE EQUIP. BLDG.
- (NN) WEST GRIT BLDG.
- (OO) FINE SCREENS BLDG.
- (PP) EAST GRIT BLDG.
- (QQ) INFLUENT PUMP STATION
- (RR) ADMINISTRATION BLDG.
- (SS) WATER METER BLDG. (3 SHOWN)
- (TT) OLD SOLIDS BLDG.
- (UU) DETRITORS
- (VV) OLD GREASE BURNER BLDG.
- (WW) AERATED GRIT TANKS
- (XX) AERATION TANKS
- (YY) PRIMARY TANKS #1-6
- (ZZ) PRIMARY TANK #7



1. SOLIDS THICKENING COMPLEX RENOVATION *
2. SECONDARY SYSTEM RENOVATIONS *
3. D-A-F COMPLEX RENOVATIONS
4. HEADWORKS SYSTEM RENOVATIONS
5. DSDS COLLECTION SYSTEM IMPROVEMENTS (Off-Site)

* SEE REPORT FOR DETAILS OF PAVEMENT REPAIR/REPLACEMENT

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PRIORITY ONE PROJECTS

JOB NO.	HUBBELL, ROTH & CLARK, INC.	FIGURE NO.
20080550	CONSULTING ENGINEERS	1-2
DATE	220 BAGLEY SUITE 420	
APRIL, 2009	DETROIT, MICH. 48226	

In general, the liquid stream processes at the DWTF have undergone significant rehabilitation and replacement over the past years. The work proposed in this 2009 SRF Project Plan includes the remaining facilities that require replacement and/or improvement.

The solids handling facilities at the DWTF have not had similar renovations, other than to the dewatering operation. All of the pumping, thickening, and mixing equipment is beyond its useful life. Because all this equipment must be replaced, this affords alternate thickening and dewatering processes to be evaluated. These are presented in the "Analysis of Alternatives" section of this Plan.

The alternatives were reviewed for feasibility, cost effectiveness, and environmental impact. The proposed alternatives also build upon the recently completed and current improvement projects at the DWTF.

1.3. Potential "Green" Projects

The "American Recovery and Reinvestment Act of 2009" (ARRA) was signed into law by President Obama on February 17, 2009. The ARRA requires each state to use at least 20% of its ARRA capitalization for "projects to address green infrastructure, water or energy efficiency improvements, or other environmentally innovative projects" through funding called the "Green Project Reserve". Either entire projects, or appropriate identifiable components of larger projects, may be considered for inclusion.

Wayne County is striving to implement "Green" options where applicable and cost effective for the DSDS. The following are examples of green initiatives/projects that are being implemented as part of this 2009 SRF Project Plan:

- The use of biofilters for odor control.
- Any cost-effective materials or equipment that will provide energy savings (e.g. lighting, high-efficiency motors, high-efficiency heating and ventilation equipment, increased insulation "R" factor, etc.)
- Screened Final Effluent (SFE) water will be used in lieu of industrial water, which is potable water that has flowed through a backflow preventer for safety purposes. SFE is water that has been treated by the Facility and will be used for flushing water and other miscellaneous water uses around the DWTF.

1.4. Recommendations

Wayne County has the necessary legal, institutional, financial, and managerial authority and resources to build, operate, and maintain the DSDS. It is recommended that the Wayne County Commission approve and adopt this Plan to ensure improvements necessary for proper operation of the DSDS and to allow for low-interest financing under the Michigan Department of Environmental Quality's State Revolving Fund program.

Table 1-1 summarizes the recommended projects, and associated costs, that will allow for continued operation of the existing DSDS Collection System and the DWTF through the 20-year planning period.

Table 1-1: Recommended Improvement Projects for the DSDS

Priority 1 Projects (FY 2010 to 2014)	Capital Cost
Solids Thickening Complex Renovations	$17,213,000
Secondary System Renovations	$7,516,000
D-A-F Complex Renovations	$6,832,000
Headworks System Renovations	$18,713,000
DSDS Collection System Improvements	$8,173,000
Total Priority 1 Projects	***$58,447,000***
Priority 2 Projects (FY 2015 to 2019)	**Capital Cost**
Secondary Oxygen and Flow Control Improvements	$6,344,000
DSDS Sewer Rehabilitation Improvements	$1,615,000
Dewatering Complex Renovations	$22,121,000
Enhanced BioPhosphorus Removal	$8,777,000
Incineration Complex Renovations	$21,230,000
Total Priority 2 Projects	***$60,087,000***
Priority 3 Projects (FY 2020 to 2024)	**Capital Cost**
Ultraviolet Disinfection System Rehabilitation	$17,226,000
Instrumentation and SCADA System Renovations	$11,491,000
Class B Lime Stabilization Facility	$23,381,000
Total Priority 3 Projects	***$52,098,000***
Priority 4 Projects (FY 2025 to 2029)	**Capital Cost**
Primary Treatment System Renovations	$9,834,000
Headworks and Secondary System Improvements	$34,867,000
Total Priority 4 Projects	***$44,701,000***
TOTAL ALL PROJECTS (FY 2010-2029):	**$215,333,000**

Collection system sewer improvements shown in the table above only account for rehabilitation of the portion of the sewer system reviewed. In addition to these improvements, it is recommended that Wayne County institute an annual inspection and rehabilitation program for the collection system sewers. Based on the age of the system, it is recommended that Wayne County address approximately five miles of sewer each year.

The user costs to finance the projects proposed for the next five-year period have been determined assuming State Revolving Fund financing with a 2.5% interest rate and 20-year debt retirement. Capital and operation, maintenance and replacement costs are included. The user cost to the typical residential user in each community is shown in Table 1-2.

Table 1-2: Cost for Typical Residential DSDS Customer for FY 2010 - 2014 DSDS Improvements

Community	*Annual Cost for Typical Residential Customer**
Allen Park	$30.93
Belleville	$29.07
Brownstown Twp.	$26.09
Dearborn Heights	$27.94
Ecorse	$29.82
Lincoln Park	$30.12
River Rouge	$32.92
Riverview	$27.67
Romulus	$27.07
Southgate	$27.79
Taylor	$26.94
Van Buren Twp.	$25.11
Wyandotte	$25.61

**Based upon 100,000 gallons per year water use.*

Section 2 - Project Background

2.1. Introduction

This 2009 SRF Project Plan was prepared on behalf of Wayne County and the participating Downriver communities for the purpose of obtaining State Revolving Fund (SRF) loans from the Michigan Department of Environmental Quality (MDEQ) for the construction of improvements to the Downriver Sewage Disposal System (DSDS), including the Downriver Wastewater Treatment Facility (DWTF).

The first SRF Project Plan for the 13 Downriver communities in the DSDS was prepared in the early 1990s under the direction of the Wayne County Department of Environment (WCDOE.) The final SRF Project Plan, dated February 1, 1993, defined the expansion and improvements required to the DWTF (formerly called the Wyandotte WWTP) to meet NPDES permit requirements. It also defined the tunnel storage and conveyance requirements to meet the DSDS needs under a 100 year-24 hour design storm.

Out of that 1993 SRF Project Plan, numerous projects were developed, bid and constructed, which include Packages A, B, C, F, G, W and W2 at the DWTF; as well as the Tunnel and Tunnel Pump Station projects, collectively titled the Downriver Regional Storage and Transport System (DRSTS).

SRF Project Plan supplements were prepared until the early 2000s, when a second SRF Project Plan was developed. That Final SRF Project Plan, dated June 2004, evaluated the DSDS needs for the planning period between 2005 and 2025. It defined numerous improvements to the DSDS segregated in five-year planning periods. The 2004 SRF Project Plan included approximately $35M in the first five-year planning period, and totaled approximately $98M for all the recommended improvements (all costs are in 2004 dollars.)

To date, all of the first five-year projects that were approved either have been constructed, are in the design or construction phase, or are soon to be awarded. Generally, each of the remaining improvements, rehabilitation, or replacement projects for each of the other five-year planning periods are still proposed, but require re-evaluation.

These projects and other areas of concern—both inside and outside the DWTF property—form the basis for this document. The 2009 SRF Project Plan examines all of the needs of the DSDS for the planning period of 2010 to 2029, with a focus on the projects that are proposed to begin construction during the next five-year planning period of 2010 to 2015.

2.2. Study Area Characteristics

2.2.1. Delineation of Study Area

The Study Area for this 2009 SRF Project Plan is comprised of all or portions of the 13 communities served by the DSDS. The following is a list of the service area communities:

- City of Allen Park
- City of Belleville
- Brownstown Township (portion)
- City of Dearborn Heights (portion)
- City of Ecorse

- City of Lincoln Park
- City of River Rouge
- City of Riverview
- City of Romulus (portion)
- City of Southgate
- City of Taylor
- Van Buren Township (portion)
- City of Wyandotte

Figure 2-1 shows the Study Area for this 2009 SRF Project Plan.

2.2.2. Land Use in Study Area

Figure 2-2 shows the existing land use for the 13 Downriver communities, from information provided by the Southeast Michigan Council of Governments (SEMCOG).

2.2.3. Surface and Groundwaters

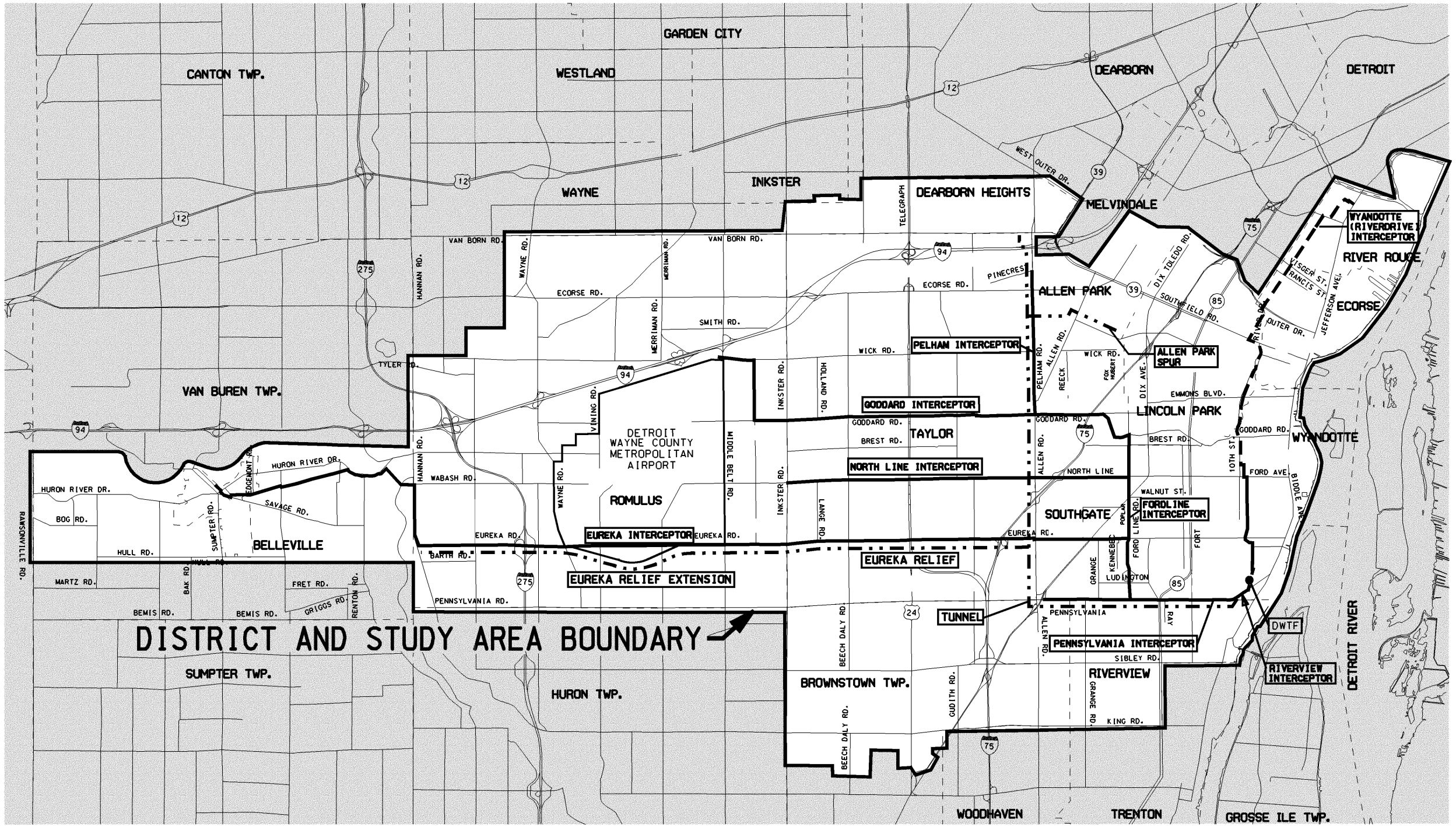
There are large volumes of water available from the Great Lakes and extensive distribution systems in the Downriver service area. Future dependency on groundwater supplies is not anticipated.

All watersheds draining the Study Area are tributary to the Detroit River, which flows into Lake Erie. The primary watershed for the Study Area is the Ecorse Creek watershed, which consists of 27,700 acres. Other drainage basins in the Service Area include the Rouge River watershed, the Huron River watershed, the Frank and Poet Drain, and Whitaker Creek.

Existing water uses of the Detroit River include swimming, fishing, recreational boating, transport shipping, wastewater disposal, and water supply. The water intake for the City of Wyandotte Water Treatment Plant (WTP) is located upstream of the DWTF, approximately 1.7 miles north-northeast, on Van Alstyne Street.

According to the Michigan Department of Environmental Quality (MDEQ), the U.S. waters of the Detroit River are classified as being suitable for cold-water fish, public water supply, navigation, and total body contact recreation. Since it is an integral part of the Great Lakes systems, the Detroit River's water quality is determined by using basically the same water quality standards applied to the Great Lakes.

The uses designated by MDEQ for the Rouge River are industrial water supply, partial body contact, recreation, warm water fish, agricultural water, and navigation. Ecorse Creek is also designated for partial body contact recreation.



LEGEND

- WYANDOTTE (RIVERDRIVE) INTERCEPTOR (WYI) - 1938 CONSTRUCTION
- DOWNRIVER SEWAGE DISPOSAL SYSTEM INTERCEPTOR (DSDS) - 1962 CONSTRUCTION
- DOWNRIVER REGIONAL STORAGE AND TRANSPORT SYSTEM (DRSTS) - 1998 CONSTRUCTION
- DOWNRIVER WASTEWATER TREATMENT FACILITY (DWTF)

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THE BACKGROUND FOR THIS FIGURE WAS CREATED BY:

Wade-Trim
P.O. Box 10
23624 Northline Road, Taylor, MI 48180
734-947-9700 / 800-482-2864
Fax No. 734-947-9726

CHECKED: BDH | DATE: 18-Aug-99

STUDY AREA

JOB NO.	HUBBELL, ROTH & CLARK, INC.	FIGURE NO.
20080550	CONSULTING ENGINEERS	2-1
DATE	220 BAGLEY SUITE 420	
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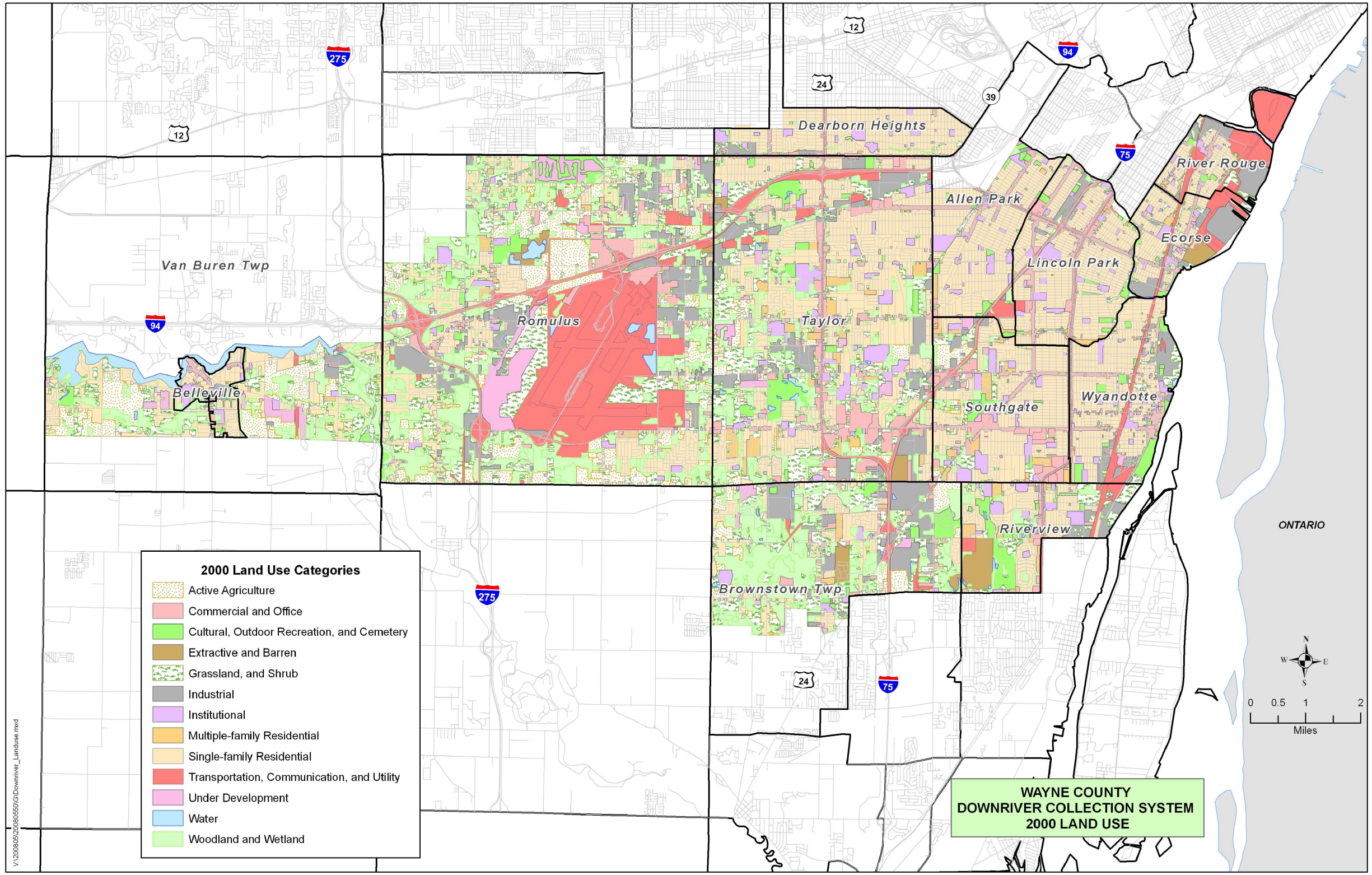

LAND USE

JOB NO.	HUBBELL, ROTH & CLARK, INC.	FIGURE NO.
20080550	CONSULTING ENGINEERS	2-2
DATE	220 BAGLEY SUITE 420	
APRIL, 2009	DETROIT, MICH. 48226	

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2.2.4. Economic Characteristics

Table 2-1 includes the median household incomes for the Downriver communities, and the percentage of households with incomes below the poverty level. This data was obtained from the Census Bureau's 2005-2007 Three-Year Estimates and is reported in 2007-dollars, adjusted for inflation. This data was not available for four communities, and therefore 2000 Census data is included as noted below the table.

Table 2-2 is a summary of the SEMCOG forecast of employment by class in the 13 Downriver communities. It is estimated that the number of jobs will increase approximately 5 percent between the years 2005 and 2035.

Table 2-1: Median Household Income

Community	*Household Income*	*Households in Poverty*
Allen Park	$53,518	4.5%
Belleville*	$44196	3.5%
Brownstown Twp.	$65,237	7.6%
Dearborn Heights	$50,007	9.8%
Ecorse*	$27,142	17.3%
Lincoln Park	$45,288	11.8%
River Rouge*	$29,214	19.1%
Riverview*	$47,623	3.0%
Romulus	$45,218	13.9%
Southgate	$47,709	4.4%
Taylor	$46,692	11.5%
Van Buren Twp.	$56,353	6.8%
Wyandotte	$50,718	7.8%

**2000 Census data used; three-year estimates not made.*

2.2.5. Population Data

The population of the DSDS service area in the year 2000 was estimated to be 283,590 in the 2004 SRF Project Plan. For the Downriver communities that are not completely in the Downriver service area, including Allen Park, Brownstown Township, Romulus, and Van Buren Township, the 2000 population was determined by overlaying Census tracts on the service area.

Population projections for the DSDS service area have been determined for the years 2008 and 2030, based on SEMCOG data with input from Downriver communities. Table 2-3 shows the current population estimate and the 2030 forecast for the service area.

TABLE 2-2: EMPLOYMENT DATA
FOR THE 13 MEMBER COMMUNITIES OF THE DOWNRIVER SEWAGE DISPOSAL SYSTEM (DSDS)

	Allen Park		Belleville		Brownstown Twp.		Dearborn Heights		Ecorse		Lincoln Park		River Rouge	
	2005	2035	2005	2035	2005	2035	2005	2035	2005	2035	2005	2035	2005	2035
Natural Resource and Mining	0	1	0	0	n/a	n/a	0	0	0	0	0	0	0	0
Manufacturing	n/a	n/a	n/a	n/a	306	168	294	148	n/a	n/a	296	153	941	452
Wholesale Trade	153	102	77	44	812	515	310	172	180	118	147	108	77	50
Retail Trade	1,278	936	123	90	489	418	2,569	1,722	216	151	2,358	1,721	185	123
Transportation and Warehousing	1,186	1,199	n/a	n/a	1,973	2,059	248	274	184	219	217	260	206	246
Utilities	n/a	n/a	0	0	n/a	n/a	n/a	n/a	0	0	n/a	n/a	n/a	n/a
Information	52	51	35	24	n/a	n/a	50	31	n/a	n/a	46	37	n/a	n/a
Financial Activities	1,694	1,831	153	150	313	619	819	807	147	129	420	390	109	99
Professional, Scientific, & Technical Services	3,573	3,602	79	70	399	555	478	458	n/a	n/a	382	417	n/a	n/a
Management of Companies & Enterprises	853	601	n/a	n/a	0	1	n/a	n/a	0	1	n/a	n/a	n/a	n/a
Administrative, Support & Waste Services	1,174	1,702	n/a	n/a	407	628	598	770	n/a	n/a	426	480	n/a	n/a
Education Services	870	923	441	481	542	546	1,459	1,524	182	210	895	984	264	296
Health Care & Social Assistance	1,217	4,177	178	556	406	2,722	1,272	3,277	284	434	1,153	1,651	80	143
Leisure & Hospitality	1,562	1,574	322	307	610	781	1,736	1,674	299	307	1,215	1,252	n/a	n/a
Other Services	760	713	292	276	201	228	1,358	1,117	119	140	1,166	1,077	128	127
Public Administration	403	378	n/a	n/a	206	187	n/a	n/a	n/a	n/a	322	334	n/a	n/a
Total Employment	**16,437**	**18,628**	**2,000**	**2,319**	**6,687**	**9,453**	**11,594**	**12,342**	**3,668**	**2,952**	**9,048**	**8,868**	**2,749**	**2,245**

	Riverview		Romulus		Southgate		Taylor		Van Buren Twp.		Wyandotte		Total	
	2005	2035	2005	2035	2005	2035	2005	2035	2005	2035	2005	2035	2005	2035
Natural Resource and Mining	0	0	n/a	n/a	n/a	n/a	0	1	n/a	n/a	0	0	0	2
Manufacturing	254	130	4,861	2,315	69	30	2,563	1,169	2,355	1,042	1,385	723	13,324	6,330
Wholesale Trade	135	94	1,479	1,065	246	159	2,744	1,657	939	631	482	563	7,781	5,278
Retail Trade	371	245	970	657	4,147	2,975	6,918	4,859	1,825	1,234	666	472	22,115	15,603
Transportation and Warehousing	101	122	19,360	21,666	220	300	1,760	2,175	917	978	513	586	26,885	30,084
Utilities	n/a	n/a	n/a	n/a	0	0	n/a	n/a	245	121	n/a	n/a	245	121
Information	n/a	n/a	n/a	n/a	361	302	91	94	n/a	n/a	59	53	694	592
Financial Activities	258	220	2,434	2,284	886	860	1,671	1,858	1,421	1,242	721	692	11,046	11,181
Professional, Scientific, & Technical Services	138	133	940	1,241	435	528	1,189	1,298	3,005	3,399	286	692	10,904	12,393
Management of Companies & Enterprises	0	0	388	248	n/a	n/a	n/a	n/a	505	370	n/a	n/a	1,746	1,221
Administrative, Support & Waste Services	311	384	2,794	4,905	1,005	1,295	3,781	4,722	n/a	n/a	586	853	11,082	15,739
Education Services	548	577	786	809	557	612	2,962	3,035	419	445	1,070	1,169	10,995	11,611
Health Care & Social Assistance	1,452	2,050	531	1,968	1,804	2,683	4,056	9,093	352	1,095	3,332	4,550	16,117	34,399
Leisure & Hospitality	634	555	3,303	3,407	2,958	2,941	3,954	3,826	1,009	1,103	987	1,005	18,589	18,732
Other Services	659	579	1,236	1,331	1,437	1,362	1,386	1,250	275	263	1,427	1,360	10,444	9,823
Public Administration	n/a	n/a	2,224	2,105	n/a	n/a	824	706	301	247	391	426	4,671	4,383
Total Employment	**5,036**	**5,241**	**41,495**	**44,190**	**14,633**	**14,522**	**34,537**	**36,186**	**14,794**	**14,039**	**11,987**	**13,186**	**174,665**	**184,171**

Data from SEMCOG, "Forecasted Employment Data."
"n/a" indicates data was blocked by SEMCOG for confidentiality because a significant portion of employment in the class is by a small number of establishments.

TABLE 2-3: POPULATION DATA
FOR THE 13 MEMBER COMMUNITIES OF THE DOWNRIVER SEWAGE DISPOSAL SYSTEM (DSDS)

	2000 Census Data		Southeast Michigan Council of Governments (SEMCOG) Data with any City Revisions Noted												
	Entire	DSDS	Nov. 2008 Estimate		2010 Forecast		2015 Forecast		2020 Forecast		2025 Forecast		2030 Forecast		
Community	Community	Area**	Community	DSDS Area	Community	DSDS Area	Community	DSDS Area	Community	DSDS Area	Community	DSDS Area	Community	DSDS Area	Notes:
*Allen Park**	*29,376*	*27,240*	*27,682*	*25,669*	*27,111*	*25,140*	*26,415*	*24,494*	*26,191*	*24,287*	*25,946*	*24,059*	*25,775*	*23,901*	
Belleville	3,997	3,997	3,831	3,831	3,860	3,860	3,849	3,849	3,874	3,874	3,935	3,935	3,988	3,988	
*Brownstown Twp.**	*22,989*	*8,280*	*29,653*	*10,680*	*28,740*	*10,351*	*29,383*	*10,583*	*30,837*	*11,107*	*32,474*	*11,696*	*36,393*	*13,108*	
Dearborn Heights*	58,264	20,136	55,939	19,332	54,032	18,673	52,774	18,239	52,753	18,231	52,922	18,290	52,667	18,202	
Ecorse	*11,229*	*11,229*	*10,540*	*10,540*	*9,715*	*9,715*	*9,323*	*9,323*	*9,138*	*9,138*	*8,729*	*8,729*	*8,616*	*8,616*	
Lincoln Park	40,008	40,008	38,009	38,009	36,536	36,536	35,772	35,772	35,549	35,549	35,686	35,686	34,825	34,825	
River Rouge	*9,917*	*9,917*	*9,571*	*9,571*	*7,891*	*7,891*	*7,166*	*7,166*	*7,120*	*7,120*	*7,000*	*7,000*	*6,937*	*6,937*	
Riverview	13,272	13,272	12,204	12,204	12,360	12,360	12,198	12,198	12,030	12,030	11,980	11,980	12,276	12,276	
*Romulus**	*22,979*	*21,535*	*24,409*	*22,875*	*23,434*	*21,961*	*22,730*	*21,302*	*22,718*	*21,290*	*23,994*	*22,486*	*25,852*	*24,227*	
Southgate	30,136	30,136	28,963	28,963	29,348	29,348	28,793	28,793	28,877	28,877	28,880	28,880	28,720	28,720	
Taylor	*65,868*	*65,868*	*63,719*	*63,719*	*61,971*	*61,971*	*60,842*	*60,842*	*59,987*	*59,987*	*60,508*	*60,508*	*60,766*	*60,766*	
Van Buren Twp.*	23,559	3,966	27,960	4,707	28,437	4,787	28,368	4,776	28,994	4,881	31,231	5,258	35,685	6,007	
Wyandotte	*28,006*	*28,006*	*26,047*	*26,047*	*26,113*	*26,113*	*25,742*	*25,742*	*26,254*	*26,254*	*26,276*	*26,276*	*26,212*	*26,212*	*Revised by City to include redevelopment of industrial areas.*
Total	**359,600**	**283,590**	**358,527**	**276,148**	**349,548**	**268,707**	**343,355**	**263,078**	**344,322**	**262,625**	**349,561**	**264,783**	**358,712**	**267,785**	

*Only a portion of the community is within the DSDS Service Area.
**The DSDS Service Area population was listed in the 2004 SRF Project Plan and was determined by overlaying Census tracts on the service area.
The population estimates and forecasts use the same ratios as the SRF 2004 Project Plan for communities with only partially within the DSDS Service Area.

2.3. Existing Facilities

2.3.1. Collection System

The collection system in the DSDS includes local sewer systems in each of the 13 tributary communities. A network of interceptor sewers connects the local sewer systems to the DWTF, as shown in Figure 2-1. The Downriver interceptors include:

- Riverdrive Interceptor, which transports wastewater from the communities of River Rouge, Ecorse, and Lincoln Park, and approximately 90 percent of the wastewater from Allen Park.
- Riverview Interceptor, which transports wastewater from the City of Riverview.
- Pennsylvania Interceptor, which transports wastewater to the DWTF from eight Downriver communities including Belleville, Van Buren Township, Romulus, Taylor, Dearborn Heights, Brownstown Township, Allen Park, and those portions of Southgate served by separated sewers.

Since 1994, local sewer system rehabilitation projects in Riverview, Romulus, Southgate, Taylor, Van Buren Township, Ecorse, Allen Park, and Dearborn Heights have been constructed to remove extraneous rainfall-related flows which overloaded the DSDS. Local relief sewer construction projects have also been completed since 1994 to reduce collection system surcharge and backups at locations where existing sewers had insufficient capacity to handle wet weather flows. Relief sewer projects were constructed in Allen Park, Dearborn Heights, Romulus, Southgate, and Taylor.

2.3.2. Tunnel System

The Downriver Tunnel Storage and Transport System (DTSTS) was constructed between 1999 and 2001. The purpose of the DTSTS was to divert excess wet weather flow from the interceptor system to the tunnel, when the capacity of the existing interceptor system was exceeded. The tunnel system was constructed with components consisting of the following:

- Lower Tunnel, which extends from the DWTF west along Pennsylvania Road to Allen Road, then north along Allen and Pelham Roads to Champaign Road.
- Upper Tunnel, which extends along Pelham Road north from the lower tunnel at Champaign Road.
- Allen Park Tunnel Spur, which extends to the east approximately 8,000 feet from the drop structure of the Upper Tunnel at Champaign Road.
- Eureka Road Relief Sewer and Relief Sewer Extension, which extends west along Eureka Road from the connection to the lower tunnel at Allen Road to Wahrman Road.
- Taylor (Pelham) Basin to Jackson Street Pumping Station Connection, which extends north approximately 2,750 feet from the Taylor (Pelham) Basin under Highway I-94 and along Jackson Avenue and Weddel Avenue to Hanover Avenue.

2.3.3. Downriver Wastewater Treatment Facility

The DWTF utilizes preliminary, primary, secondary, and disinfection treatment processes to treat sewage prior to discharging treated effluent to the Trenton Channel of the Detroit River.

The discharge from the DWTF is authorized under NPDES Permit No. MI0021156. The facility and its operation are further described in Section 3 of the 2009 SRF Project Plan. The following table provides a summary of the discharge limits the DWTF must comply with under its NPDES permit.

Table 2-4: NPDES Permit Limits

Pollutant	***Average Monthly Limits***	***Daily Maximum Limits***
Carbonaceous Biochemical Oxygen Demand (CBOD)	25 mg/l (26,000 lbs./day and 85% BOD_5 min. removal)	40 mg/l[1] (42,000 lbs./day[1])
Total Suspended Solids (TSS)	30 mg/l (31,000 lbs./day and 85% min. removal)	45 mg/l[1] (47,000 lbs./day[1])
Total Phosphorus	1.0 mg/l (1,000 lbs./day)	Not Applicable
Fecal Coliform Bacteria	200 counts/100 ml[2]	400 counts/100 ml[1,2]
Total Mercury	10 ng/l[3] 0.010 lbs/day[3]	Not Applicable
Oil and Grease	10 mg/l (10,000 lbs./day)	Not Applicable
Dissolved Oxygen	Not Applicable	4.0 mg/l (minimum)
PH	Not Applicable	6.0 s.u. (minimum 9.0 s.u. (maximum)

Notes: 1. *7-day average limit.*
2. *Calculated using geometric mean.*
3. *Rolling 12-month average.*

2.4. Environmental Setting

This Section will focus on the general area where the DWTF is located, as well as the DWTF site itself. The majority of the proposed projects will occur at the DWTF site. Projects related to improvements to the collection system will typically not involve any earth-changing activities.

2.4.1. Cultural Setting

There are several historic sites that are listed in the State Register of Historic Sites (SRHS) and/or the National Register of Historic Places (NRHP); however, there are no historic sites located in the immediate vicinity of the DWTF site. The following sites are registered historic sites located within a two-mile radius of the DWTF site.

- Amo-Juchartz House – 434 Plum Street, Wyandotte (SRHS, 3/21/91).
- William Armstrong House – 2234 Biddle Ave., Wyandotte (SRHS, 3/21/91).
- Eureka Iron Works – Northwest corner of Van Alstyne Boulevard and Elm Street, Wyandotte (SRHS, 9/17/57).

- Ford Village Municipal Building – 994 Biddle Avenue, Wyandotte (SRHS, 12/20/89).
- Ford-Bacon House – 45 Vinewood, Wyandotte (SRHS, 2/19/87 and NRHP, 12/1/97).
- George P. MacNichol House – 2610 Biddle Avenue, Wyandotte (SRHS, 11/15/73 and NRHP, 5/24/84).
- Marx House – 2630 Biddle Avenue, Wyandotte (SRHS, 1/16/76 and NRHP, 8/13/76).
- Gustave C. Mehlhose House – 367 Oak Street, Wyandotte (SRHS, 3/21/91).
- Louis Mehlhose House – 355 Oak Street, Wyandotte (SRHS, 3/17/94).
- Michigan Alkali Company Administration Building – 1609 Biddle Street (SRHS, 10/11/90).

2.4.2. Natural Environment

a. Climate

The climate of Wayne County is influenced by the Great Lakes and its location with respect to major storm tracks. The nearest national weather station to the Study Area is located at the Detroit Metropolitan Airport, which monitors climate data.

The average annual temperature is approximately 48.6 degrees F, ranging from a low of 22.9 degrees F in January to a high of 72.3 degrees F in July. Precipitation is distributed quite evenly throughout the year. Total annual precipitation averages 32.62 inches, ranging from a monthly average of 1.74 inches in February to 3.61 inches in June.

Prevailing winds are from the southwest with an average annual speed of 12 miles per hour. These prevailing winds limit the effects of Lake St. Clair to local lake breezes and to storm tracks that blow in from the east.

b. Air Quality

Wayne County, and the entire state of Michigan, currently meet the National Ambient Air Quality standards for carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and PM_{10} (particulates less than 10 micrometers in diameter). However, current monitoring data indicates that portions of Wayne County do not meet the Annual $PM_{2.5}$ National Ambient Air Quality standard (particulates equal or less than 2.5 micrometers in diameter.) The entire Metro-Detroit area is included in the designation. Nine Michigan Counties, including Wayne County, also do not meet the 8-hour Ozone National Ambient Air Quality standard.

c. Wetlands

Relatively small wetland areas exist primarily in the western and southern regions of the Study Area. The ash lagoons located on the western end of the DWTF property are small man-made wetlands. No regulated wetland areas are present on the DWTF site.

d. Coastal Zones

The eastern-most edge of the Study Area is located adjacent to the Detroit River, which serves as the coastal waterway between the United States and Canada. The DWTF site is located approximately 1,200 feet from the shoreline of the Detroit River. Michigan's coastal zone boundary generally extends a minimum of 1,000 feet inland from the Ordinary High Water Mark of the Great Lakes and connecting channels.

e. Floodplains

The floodplain boundaries for 100 and 500-year floods have been mapped for the City of Wyandotte. The DWTF site is not located within delineated floodplain areas.

f. Natural or Wild and Scenic Rivers

No surface waters located in the DSDS Study Area have been designated as natural or wild and scenic rivers.

g. Major Surface Waters

The major surface waters in the DSDS Study Area include Belleville Lake, Huron River, Ecorse Creek, Detroit River, and the Frank and Poet Drain. The only surface water in the vicinity of the DWTF is the Detroit River, which receives the treated effluent from the facility.

h. Topography

The topography of the DWTF site is very flat at an elevation of approximately 581 feet above sea level.

i. Geology

The surface geology of Southeast Michigan is characterized by two broad zones, a lowland zone and hill zone. These zones parallel each other in a northeast-southwest direction through the length of the region. The lowland zone, a belt of low, flat lands, varying in width from 20 to 30 miles, lies between the Great Lakes shoreline and the edge of the zone of hills and valleys. This lowland is composed mainly of clay and sand deposits. The Study Area is located entirely within the lowland zone

j. Soils

According to the U.S. Soil Conservation Service, the soils in the surrounding area of the DWTF are comprised of the Pewamo-Blount association, which are characterized as nearly level and gently sloping, very poorly drained to somewhat poorly drained soils that have a moderately fine-textured and fine-textured subsoil.

k. Agricultural Resources

There is no agricultural land in the vicinity of the DWTF site.

l. Existing Plant/Animal Communities

The existing plant and animal species are typical to urbanized areas. No habitat for animals of economic or sport value is within the Study Area. The Wildlife Division of the MDNR reported that this project should have no impact on any rare or unique natural features.

A review of protected species was also made in November 2008 using the U.S. Fish and Wildlife Service's website for Endangered Species Section 7(a)(2) Consultation Process (www.fws.gov/midwest/endangered/section7/index.html.) Endangered species listed as having a presence in Wayne County include the Indiana bat and Northern riffleshell. Candidate species include the Eastern massasauga and Rayed bean. Threatened species include the Eastern prairie fringed orchid.

Indiana bats hibernate in caves and/or abandoned mines and live in the summer in wooded areas. Eastern massasaugas live in wet areas, including wet prairies, marshes and low areas along rivers and lakes. The Eastern prairie fringed orchid's habitat includes prairies, wetlands, meadows, marshes and bogs. These species will not be impacted by the proposed work because there is no habitat of these types in the vicinity of the DWTF site.

The Northern riffleshell and Rayed bean are kinds mussels that are usually found in small streams or near shoal or riffle areas, and in the shallow, wave-washed areas of glacial lakes. Substrates typically include gravel and sand. These species will not be impacted because the proposed work is all on land; there will be no work performed in the surrounding surface waters. All earthwork will also require proper controls to prevent soil erosion and sedimentation from entering surface waters and will be performed in accordance with all regulatory requirements.

To summarize, the proposed work is located in an urban area where no suitable wildlife habitat is present for the listed species. We therefore conclude that the proposed work will have ―no effect" on the listed species, their habitats, or proposed or designated critical habitat.

2.4.3. Downriver Wastewater Treatment Facility

The existing DWTF property is the location where the primary earth-changing activities will occur. The site is located in an area that can be characterized as quasi-industrial. Across Central Avenue from the facility, between Pennsylvania Avenue and 8th Street, is a BASF Corporation Distribution Center. South of the facility, across Pennsylvania Avenue is an Atofina Chemical Company production facility. The remainder of the DWTF boundary is primarily comprised of either commercial or light industrial, with some residential development inter-mixed. The Wyandotte Shores Golf Course is located east of the DWTF site, across Biddle Avenue.

Section 3 - Need for Project

3.1. References

The following documents and data sources were used in the development of the need for project:

- Wyandotte Wastewater Treatment Plant Final 2004 SRF Project Plan, dated June 2004.
- Downriver Sewage Disposal System Assessment Report, dated April 2009
- SEMCOG's Economic and Demographic Outlook for Southeast Michigan Through 2035, dated March 2007

3.2. Compliance Status

The allowable limits for the discharge from the Downriver Wastewater Treatment Facility (DWTF) authorized under NPDES Permit No. MI0021156 are shown in Table 2-4. The NPDES permit compliance history of the DWTF since January 2004 is shown in Table 3-1. (Compliance history prior to 2004 is provided in the 2004 SRF Project Plan.)

Table 3-1: NPDES Compliance History

Month	***NPDES Permit Parameters Violated***
Jan. 2004 through Dec. 2004	None.
Jan. 2005	Fecal exceeded once.
Feb. 2005	TSS exceeded five times.
Mar. 2005	None.
Apr. 2005	BOD and TSS exceeded four times; phosphorus exceeded once.
May 2005 through Nov. 2005	None.
Dec. 2005	Total Phosphorus limit exceeded once
Jan. 2006	Total Suspended Solids limits were exceeded twice.
Feb. 2006 through Jan. 2009	None.
Summary: 40 of 45 months reviewed were in compliance with NPDES permit.	

3.3. Orders

The DWTF's most recent improvements were constructed under a 1994 Consent Decree entered into by the 13 Downriver Communities, Wayne County, the Ecorse Creek Pollution Abatement Drain No. 1 Drainage District, the Southgate-Wyandotte Relief Drains Drainage District, the United States of America, and the State of Michigan. The improvements were summarized in a 1993 SRF Project Plan, and supplemented by periodic updates through 1998. The proposed projects included in the 2009 SRF Project Plan are not included as part of the 1993 Consent Decree court order.

3.4. Water Quality

The Detroit River extends approximately 32 miles linking Lake St. Clair and Lake Erie. The Detroit River Area of Concern (AOC) includes an area of approximately 700 square miles that drains to the river from both Michigan and Ontario.

The Detroit River AOC is a bi-national AOC that drains approximately 700 square miles of land in Michigan and Ontario. Eleven beneficial use impairments have been identified in the Detroit River. The known causes of impairments include urban and industrial development in the watershed, bacteria, PCBs, PAHs, metals, and oils and greases. Combined sewer overflows (CSOs) and municipal and industrial discharges are major sources of contaminants within the AOC. Stormwater runoff and tributaries in Michigan are also major sources of contaminants. Additional environmental concerns include invasive species, changes in the fish community structure, and reductions in fish and wildlife habitat.

The Detroit River Remedial Action Plan (RAP) Stage I document was originally completed in 1992 to address the water quality issues associated with the Detroit River. In 1996, a RAP update was developed as a bi-national effort led by the Michigan Department of Environmental Quality to address the impairments and water use goals. Approximately 104 recommendations were developed with the goal of restoring and maintaining the integrity of the Detroit River ecosystem to a standard that will provide a safe, clean, and self-sustaining natural environment. In 1999, the Detroit River Canadian Cleanup Committee completed an updated report on the Detroit River AOC, but the report was not ever formally adopted by the parties to the Four Agency Agreement. The RAP was updated again in 2002 to report on restoration activities, new data, and the status of beneficial use impairments. In 2005, the Friends of the Detroit River agreed to become the lead local organization for the Detroit River AOC.

3.5. Projected Needs

3.5.1. Expected Flows and Loadings

Data obtained from SEMCOG indicates that the population in the DWTF service area is anticipated to slightly decrease through 2030, as described in Section 2.2.5.

Based on the previous 2004 SRF Project Plan flow estimate of 65 MGD, and the observed average flow of 52 MGD during 2007, a design average of 65 MGD is appropriate for planning purposes. In fact, the existing primary, secondary and overall plant capacities are well in excess of the proposed design average flows (these are 150, 125, and 225 MGD, respectively.) For the wastewater treatment process evaluation, the accuracy of this design average flow is therefore not critical. A summary of the design flows and loadings is presented in Table 3-2.

Table 3-2: Design Flows and Loadings Summary

Parameter	*2004 SRF Project Plan Value*	*2007 Average Value*
Average Annual Flow (MGD)	65	52
Average BOD Concentration (mg/l)	180	166
Average TSS Concentration (mg/l)	220	226
Average BOD Loading (lbs/day)	97,587	68,300
Average TSS Loading (lbs/day)	119,260	97,200
Maximum Month BOD Loading (lbs/day)	137,100 [1]	85,300
Maximum Month TSS Loading (lbs/day)	143,110	143,800

[1] *Includes 20,000 lbs./day glycol loading.*

The design loadings for the solids handling facilities are based upon the information contained in the Phase I Solids Handling improvements project's basis of design document (prepared by Tetra Tech in December 2007.) The solids handing evaluation will be based on a total dry solids production of 1,286,397 lbs/week (maximum month value.)

3.5.2. Operational Goals

In the summer of 2002, the Wayne County Department of Environment initiated a Comprehensive Assessment and Master Plan Project (CAMPP), which reviewed all operational aspects of its facilities. The objective was to identify and implement efficiencies and cost savings. Cost savings at the DWTF was a primary goal and it was recommended to reduce staff at this facility, but it was also recognized that improvements were necessary to achieve this goal. This 2009 SRF Project Plan will continue to identify improvements that will allow for future automation and associated labor reductions.

3.6. General Assessment of Existing Treatment Facilities

3.6.1. Overview

The Downriver Wastewater Treatment Facility (DWTF) was originally constructed in 1938 as a primary treatment plant with solids incineration. The facility has undergone expansions and upgrades in 1964, 1970, 1975 and 1989. In the early 1990s, a State Revolving Fund (SRF) Project Plan was undertaken and completed in 1993. That 1993 SRF Project Plan recommended the improvements required to accommodate a peak flow of 225 MGD, while meeting National Pollution Discharge Elimination System (NPDES) Permit requirements. From that 1993 SRF Project Plan, numerous improvement expansion projects were constructed, specifically Packages A (1994), B (1995), C (1995), F (1999), G (1995), W (1999) and W2 (2000), as well as nine contracts for the Downriver Regional Storage & Treatment System (DRSTS) (2000). [Note: The above years represent completion of construction.]

A second SRF Project Plan was undertaken in the early 2000s and completed in 2004. From the approved 2004 SRF Project Plan, six projects were recommended and are currently under construction. These are the Emergency Generators General Construction; the Secondary Clarifier Improvements and Ultraviolet (UV) Enclosure Building Project; the Phase I Solids Handling Improvements Project; the Supervisory Control & Data Acquisition (SCADA) Improvements Project; the Fine Screen Facilities Renovation Project; and the Influent Pump Station Wet Well Improvements Project. An additional project, the 2009 Capital Improvements Projects (2009 CIP), which includes improvements at the Influent Pump Station (IPS), the primary treatment facilities, and the secondary system aeration trains and electrical substation, is currently under design.

3.6.2. Capacity

Both the 1993 and 2004 SRF Project Plans evaluated existing and future flow conditions, existing plant facilities, treatment capabilities and deficiencies and recommended improvements to achieve NPDES effluent limitations under future peak flow conditions of 225 MGD. This capacity was formally certified by the DWTF Facility Stress Test report dated May 2004. As a result of these recent and ongoing projects, the current DWTF process capacities are adequate and no additional facilities expansion is required. However, as presented herein, numerous processes have reached their useful life, and where replacement is required, alternate processes and/or improvements have been evaluated.

3.7. Assessment of Existing Liquid Treatment Stream

Process and ancillary equipment is reviewed below. Instrumentation and automation for both the liquid and solid streams assessment are presented later in this Section. This assessment also groups the projects into four, five-year planning periods. Priority 1 improvements are proposed to be implemented within the first five-year period (2010-2014), Priority 2 improvements in the second five-year period (2015-2019), Priority 3 in the third five-year period (2020-2024), and Priority 4 in the last five-year planning period (2025-2030).

3.7.1. Headworks Assessment

a. Influent Junction Chamber

The Influent Junction chamber contains three sluice gates: W901, W902, and W903, and a flap gate which allows overflow to the Southgate Wyandotte Relief Drains Drainage District (S-W District) Pump Station No. 5 under emergency flow conditions. Sluice gates W901 and W902 were replaced in the Package F expansion in the late 1990s. These gates were replaced with cast iron sluice gates and hydraulic actuators. Both of these gates are in good condition and are scheduled to be replaced in a Priority 4 project. However, the hydraulic power pack is scheduled to be replaced with electric actuators in a Priority 1 project, and as a result, the hydraulic actuators to Gates W901 and W902 can be replaced with electric actuator at that time.

Sluice Gate W903 and the flap gate were not replaced, and will be replaced as a Priority 1 project. These gates are necessary to maintaining the control from the 8th and Pennsylvania sewers, and to ensuring reverse flow relief to the S-W District. These gates can be replaced with a cast iron gate similar to Sluice gates W901 and W902. However, the basis of design should consider a stainless steel C501 type sluice gate. The design should consider a stainless steel type flap gate as well. In addition, the new electric actuator will be installed above grade where service and repair is made more accessible. New electric actuators are scheduled for

gates W901 and W902. Because Gates W903 is just outside the DWTF fence, a façade wall and other security features should be constructed to protect the actuator from public access.

b. Coarse Gripper Screen

The coarse gripper type screen was installed in Package F in the late 1990s. The bar screen has 3" openings, is made of galvanized steel and is in very good condition. Thus, it does not need to be replaced until a Priority 4 project or later. The access platform is also in very good condition and does not require any work. However, the gripper mechanism has required higher than expected levels of service and an overhaul is warranted. This gripper rehabilitation will be scheduled in a Priority 1 project and replacement is scheduled in a Priority 4 project.

c. Influent Pump Station

Wet Well.

The Influent Pump Station (IPS) wet well was found to be deficient, and the recommended improvements to the wet well are currently under construction. A hoist used to provide operating support needs to be rehabilitated (if parts are available) or replaced as a Priority 2 project. If replaced, the capacity of this hoist needs to be established during design to meet current maintenance needs.

Motor Room:

Influent Pumps 1 through 6, including the shafts, shaft bearing, and motors were all replaced under Package F in the late 1990s. The pumps are now operating well and are scheduled for rehabilitation as a Priority 4 project. The motors for all six pumps will last through the planning period but are scheduled for rehabilitation in a Priority 2 project.

Currently, Pumps 5 and 6 are operated with variable frequency drives (VFDs). These were also installed under Package F. New bypass contactors will be installed on Pumps 5 and 6 under the 2009 CIP, and new VFDs added for Pumps 3 and 4. Therefore, VFDs for Pumps 5 and 6 are scheduled to be replaced in a Priority 3 project.

Pumps and motors are difficult to remove from the pump station to service. A permanently installed crane would require structural members transferring load to the caisson. This would be very expensive, particularly for the infrequent use. Instead, hatches should be installed above the pumps to facilitate pump and motor removal when the roof is replaced. In addition, an employee service area in the mezzanine is scheduled in a Priority 1 project.

First Level Down (Elevation 571.0'):

The detritor drain line is in bad shape and will be replaced in a Priority 1 project. The compressor is scheduled to be replaced in a Priority 4 project. The power pack for the sluice gates will be replaced in a Priority 1 project with Sluice Gates JC3. A floor topping will be added in a Priority 1 project to eliminate the trip hazards from the protruding bolts.

Second Level Down (Elevation 561.0'):

The magnetic flow meters (mag meters) will be replaced with the remaining mag meters installed under Package F in a Priority 3 project. The compressed air system is scheduled to be replaced in a Priority 4 project.

Third Level Down (Elevation 551.0'):

The sample pump plugs occasionally, and does not provide a consistent and uniform sample, and the VFD does not function properly. The entire sampling system is scheduled for replacement in a Priority 1 project. The emergency float panel and sump pump control panel is scheduled for replacement in a Priority 3 project.

Basement Level (Elevation 537.5'):

The knife gate isolation valves on Pumps 1 through 4 were replaced in the late 1990s under Package F. These are stainless steel knife gates with pneumatic actuators. The influent knife gates to Pumps 5 and 6 are currently being replaced under the Influent Pump Station Wet Well Improvements Project. These valves are scheduled to be replaced under a Priority 4 project or later. The sump pumps and seal water system is scheduled to be replaced in a Priority 4 project.

d. Fine Screens 1 through 4

Fine Screens 1 through 4, and ancillary equipment are being completely renovated under the Fine Screens Facilities Renovations project currently under construction. As a result, no further need of process improvements is required for this area, except for the plate valves, which are scheduled for replacement in a Priority 3 project. The floor is deteriorated in areas and will have a top coat scheduled in a Priority 1 project.

e. Check Valve Vault

Pumps 5 and 6 flow to either Fine Screens 3 and 4 or Fine Screens 5 and 6. Flow diversion is accomplished through the use of plate valves. To prevent flow from the Tunnel Pump Station to Fine Screens 3 and 4, swing check valves were installed under Package F. These check valves are leaking at the hinge and will be replaced as a Priority 1 project. Because the hinge pin cannot be removed because of interference, an alternate check valve style should be installed. In addition, sump pumps were installed in this check valve vault instead of a gravity sewer. The sump pumps can be replaced with a gravity sewer line to the nearby sewer. This is also scheduled as a Priority 1 project.

f. Fine Screens 5, 6 and 7

Fine Screens 5, 6 and 7 were installed under Package F. These screens are the traveling screen type similar to the recently replaced Fine Screens 1 through 4. However, these screens are unique in that they remove screenings from the front of the screens, as opposed to the more conventional backside of the screen. This means of screenings removal was not effective, and a spray wash system was installed to assist with the screenings removal. Because the spray system induced liquids into the screenings, a screw auger compactor was also installed to each screen to help dewater screenings. These screens are in relatively good condition having been installed under Package F, but given the reliability of these screens in the past and the harsh operating environment, these will be replaced in a Priority 1 project. In addition, because of the screen wash requirements, which currently are accomplished using industrial water (IW), SFE can be utilized instead and is scheduled as a Priority 1 project.

g. Grit Removal, Detritors

The Detritors were originally installed in 1962. The grit removal equipment was replaced in Package A, and is scheduled for replacement in a Priority 1 project. The Detritor collector mechanisms and bridge were replaced under Package F. This equipment is in good condition

and does not require replacement until a Priority 4 project. Under Package F, the influent sluice gates were replaced with orifice plates which were sized to provide balanced flow distribution across the seven openings. The openings do not provide the required flow distribution and short-circuiting (to the last orifice plate) occurs. The Detritors will function much better if the influent flow regime is balanced to provide a more even distribution across the Detritors. Modifications to the inlet will be performed in a Priority 1 project. The two effluent slide gates are scheduled to be replaced in a Priority 1 project, as well as rerouting the tank drains.

h. Aerated Grit Facilities

Aerated Grit Tanks 1 and 2 were installed in 1969 and were improved under the Package F expansion project including the new Aerated Grit Tank 3. The grit collector drag out equipment and aeration equipment are in good condition, but are scheduled to be replaced in a Priority 4 project. The opening between the building and the aerated grit tanks allows heat to escape and this will be corrected in a Priority 1 project. The plate valves are scheduled to be replaced in a Priority 3 project. The screenings screw auger was intended to be a washing-compacting type screw auger, but these features were not incorporated into the specification. This type of screw auger is scheduled in a Priority 1 project.

Aerated Grit Tanks 1 and 2 do not have a drain, and new drain valves and yard piping is scheduled in a Priority 1 project. In addition, trench floor drains are needed along the North Building wall and this is scheduled in a Priority 1 project.

Blowers 650, 651, and 652 were installed in 1969 and are at the end of their useful life. These will be replaced as a Priority 1 project. Blower 4 installed in Package F is in good condition and will be replaced as a Priority 4 project.

The Class 1, Division 1 rated H&V equipment does not function and is scheduled for replacement in a Priority 1 project.

i. Grit and Screenings Handling

Grit and screenings are collected at six sites; IPS, TPS, West Screenings Room, East Grit Room, West Grit Room, and the Aerated Grit Facility.

Coarse screenings collected from the IPS gripper screen are collected in a dumpster and when full, driven to the Aerated Grit Facility and deposited in the 30 cubic yard roll-off container. Similarly, coarse screenings collected from the TPS gripper screen are also collected in a dumpster and when full, hauled and deposited in the Aerated Grit Facility roll-off.

Screenings from Fine Screens 1 through 4 are conveyed to the dumpster in the West Screenings Room, and when full, hauled and deposited to the Aerated Grit Facility roll-off dumpster. Grit from the West Detritor is conveyed to the dumpster in the West Grit Room and grit from the East Detritor is conveyed to a dumpster in the East Grit Room. When full, both dumpsters are hauled and deposited to the Aerated Grit Facility roll-off dumpster.

j. Tunnel Pump Station

The Tunnel Pump Station (TPS) was installed under Contract 7 of the DRSTS project. The TPS includes four submersible 25 MGD pumps, gripper coarse screen, flushing system, granular activated carbon (GAC) odor control system, distribution chamber with flap gates and sluice gates SG 5, 6 and 7, sampler system, and the electrical room. The mechanical equipment is in

very good condition and is scheduled for replacement in a Priority 4 project. However, external stairs to the building roof is scheduled in a Priority 1 project.

The GAC odor control media is likely at the end of its useful life. However, this pump station rarely exhibits objectionable odors and the odor control equipment is not currently used. Since replacement carbon will cost approximately $75,000, HRC does not feel it cost-effective to replace this carbon until such times as odor becomes objectionable.

The Class 1, Division 1 rated H&V equipment does not function and is scheduled for replacement in a Priority 1 project.

k. Recycle Return Sampling Building.

This building is non-functional and will be demolished or abandoned in a Priority 1 project.

l. Ferric Chloride Facilities

The Ferric Chloride Facilities feed ferric chloride into the IPS and the TPS wet wells for the purposes of meeting the NPDES phosphorus limitations. The facilities include four 15,000 gallon fiber reinforced plastic (FRP) storage tanks, and the Ferric Chloride Building, which houses ferric chloride flow control valves feeding both wet wells by gravity. These facilities were constructed under Package F and are in good condition. The storage tanks have a lifespan of approximately 15 to 20 years and, therefore, are scheduled to be replaced in a Priority 2 project. When that time comes, the Ferric Chloride Facilities should be coordinated within an enhanced biological phosphorus removal process, also scheduled as a Priority 3 project for the Secondary Treatment System.

3.7.2. Primary Treatment Assessment

a. Primary Treatment Tanks

The Primary Treatment Facilities include the Polymer Feed Facility, seven Primary Sedimentation Tanks, scum handling facilities, sludge pumps and ancillary equipment. Primary Sedimentation Tanks 1 through 5 were installed in 1962, Tank 6 was installed in 1969, and Tank 7 was installed under Package F. Tanks 1 through 6 were recently renovated under the Primary Tank Improvements project completed in 2007. This project included replacing all collectors, drives, chains, as well as building improvements such as doors, windows, roofs, and heating and ventilation (H&V) equipment. Instrumentation and control was also augmented. Tank 7, having been recently completed under Package F, was not a part of that work.

Additional improvements are currently being evaluated and designed under the 2009 CIP project. This work includes replacing all of the influent and isolation sluice and slide gates, weir replacement, channel aeration blowers and diffusers, improvements to the polymer feed system, and improvements and/or replacement of the existing scum collection and handling system. This work also includes tank automation, including the means to identify and determine which tank should be taken in or out of service and automating that process. As a result, all of the equipment is in very good condition and will not require replacement until a Priority 4 project. There are cover plates and grating that will require replacement before that, and are scheduled as a Priority 3 project. The balance pipe is scheduled to be cleaned under a Priority 1 project.

The sludge chopper pumps operate in a severe duty application, and these pumps will not likely last until a Priority 4 project. Therefore, the sludge chopper pumps are scheduled to be replaced under a Priority 3 project. Pump redundancy, new magnetic flow meters and new influent channel drains should be provided at that time. The wall pipes for each of the sludge lines are lead sealed and are scheduled for replacement in a Priority 1 project.

Collector and sludge withdrawal and pumping is currently done on a timer basis. The cross collector operates continuously and sludge collectors are operated on a timed basis, as well as the scum collector. Collector and pump operation is adjusted based on the level of sludge manually determined on each shift via the sludge blanket detectors. Because sludge blanket monitors are unreliable, and timers have worked for over 50 years, maintaining the current timer controls is recommended.

3.7.3. Secondary Treatment Assessment

Secondary Treatment consists of the Control, Bypass and Junction chambers, Low Lift Pump Station, the five high purity oxygen activated sludge aeration trains and six secondary clarifiers.

a. Control, Bypass & Junction Chambers

The Control and Emergency Bypass Chambers control and divert flow to both the Secondary System and UV Disinfection System. The Control and Bypass Chambers were installed in 1975 to divert flow to the newly constructed secondary treatment process. Secondary effluent flows back to the Bypass Chamber then to the Chlorine Contact Chamber. At that time, the Control Chamber gate would also modulate and control flow to the peak capacity of the secondary system. Under Package F, this system was modified to allow for preferential bypass treatment. This was done through an additional Junction Chamber and the Bypass Overflow (Sullivan) weirs. The control scheme has worked very well and does not require modification. The sluice gates installed with the Junction Chamber are in good condition, and are scheduled for replacement in a Priority 4 project. The existing slide gates in the Control and Bypass Chambers were not replaced and are scheduled for a Priority 1 project. The identification numbers for these gates are CC-1, CC-2, BC-1 and BC-2. Gate CC-3 failed in 2008 and was replaced. A new actuator for this gate is being installed under the Emergency Generators General Construction project.

With the advent of the new emergency generators currently being installed, this project will allow flow up to 225 MGD through portions of the DWTF. Secondary treatment will not normally be provided, therefore, controls are required to open the bypass gate to allow for adequate flow through the chamber. This gate modification and control is being done through the emergency generator project and the SCADA improvements. The access platform was not enlarged as part of that project, and will be included in a Priority 1 project.

b. Low Lift Pump Station

The Low Lift Pump Station (LLPS) was renovated under Package W2 in the late 1990s. In addition, the problematic VFDs were replaced in 2007 as a design-build task under the As-Needed Services. Problems with the controls were also addressed and corrected under an As-Needed Services task. As such, the Low Lift Pump Station requires no further work until renovation in a Priority 4 project which will include rebuilding of the four vertical turbine pumps. Replacement of the VFDs is scheduled as a Priority 3 project.

c. Inlet Chambers

There are three inlet chambers housing the influent, RAS and WAS piping, magnetic flow meters control valves. The control valves and actuators for Aeration Trains 1 through 4, installed in 1975, are scheduled for replacement in a Priority 1 project. All the magnetic flow meters were replaced in Package F and are, therefore, a Priority 3 project. The sump pumps are scheduled for replacement in a Priority 4 project.

Balanced flow control to each of the operating aeration trains is essential. Because influent and return activated sludge (RAS) is fed separately, flow control is required to each set per train. This is currently achieved with magnetic flow meters and modulating valve control. The 2004 SRF Project Plan evaluated a splitter box, but the selected method was to revise the control valve strategy to a Master Valve control philosophy. The influent and RAS control valves and actuators for Aeration Trains 1-4 will be replaced in a Priority 1 project.

d. Aeration Trains

Aeration Trains 1 through 4 were installed in 1975 as a high purity activated sludge system. A fifth aeration train (Train 0) was installed under Package F. All of the original sparger diffusers, draft tube, compressors, and controls were also replaced in Tanks 1 through 4 when the fifth tank was added. The new aeration system is a Kruger surface aerator type mixer with high purity oxygen fed into the headspace above the mixers. This equipment is in good condition and is scheduled to be replaced under a Priority 4 project. The purge blower system, LEL panel, oxygen feed and measurement and control equipment and instrumentation are all scheduled to be replaced in a Priority 2 project. The Oasis Aeration Control System equipment has not been replaced since it was installed, and is also scheduled to be replaced in a Priority 2 project.

The 2009 CIP includes structural rehabilitation of the Aeration Trains and replacement of the 1975 vintage electrical substation. It also includes sealing the air leaks in the deck. Installation of an automated SFE wash water system was considered, but is too expensive given the infrequent need.

Consideration was given under the 2004 SRF Project Plan to change the activated sludge process to an enhanced biological phosphorus removal (EBPR) process. Because the existing ferric feed facilities are in good condition, and the plant has used chemical precipitation successfully for many years, we do not recommend converting to a EBPR process until such time as the ferric feed facilities need to be replaced. Therefore, maintaining chemical feed is recommended for the short-term and upgrading to a EBPR process in a Priority 3 project, when the existing ferric feed facilities need to be replaced.

Oxygen and process control programming is being provided under the SCADA Improvements project. Two additional process improvements that are scheduled under a Priority 1 project are:

- Separate the oxygen gas control for Aeration Trains 1 and 2 and Aeration Trains 3 and 4. Currently, Aeration Trains 1 and 2 share an oxygen feed control valve and vent valve making individual train oxygen control difficult. Trains 3 and 4 also share an oxygen feed control valve and vent valve.
- Install dissolved oxygen (D.O.) probes in Stage 1 for improved oxygen control and use efficiency.

As stated above, the oxygen control skid functions well currently, but is scheduled to be replaced in a Priority 2 project. The project will consider alternate locations for the skid,

possibly providing redundancy, and providing connections for liquid supply and gaseous feed in the event of an emergency line failure.

e. Secondary Clarifiers

Secondary Clarifiers 1 through 4 were installed in 1975 and Clarifiers 5 and 6 were installed in 1989. These clarifiers are a suction type sludge withdrawal system with peripheral feed-peripheral discharge flow pattern. The clarifiers have served their useful life and are undergoing replacement in the Secondary Clarifier Improvements and UV Enclosure Building Project currently under construction. Under the design of that project, clarifiers were modeled using computational fluid dynamics as well as physical dye testing, and the annular rings were modified to improve inlet hydraulics. As a result of these modifications, as well as new equipment and structural enhancements, these clarifiers should last the project-planning period.

Dry pit submersible activated sludge (RAS) pumps were installed on Secondary Tanks 1 through 4 in 1991, and conventional end suction centrifugal pumps were used for Tanks 5 and 6 were installed in 1989. All the return activated sludge pumps are scheduled for replacement as a Priority 1 project. All of the steel piping and valves for RAS Pumps 5, 6, and 7 will also be replaced. The VFDs for the pumps will be replaced in a Priority 3 project.

f. Process Control

Sludge blankets in the secondary clarifiers are currently monitored by blanket level sensors, and waste activated sludge is automatically controlled by the mixed liquor suspended solids (MLSS) sensors installed in Aeration Train 2 and the outfall channel. The sensors measure influent and effluent mixed liquor concentrations and data are incorporated into the proprietary sludge waste system, including flow, solids, mean cell residence time, historical wasting rate, and volumes to automate the waste activated sludge process. Other improvements are being provided SCADA Improvements project.

3.7.4. Ultraviolet Disinfection

The chlorine disinfection and sulfur dioxide dechlorination systems were replaced with ultraviolet (UV) disinfection under Package F in the late 1990s. The current UV system is a Trojan UV 4000 System. There are four UV disinfection units with a space for a fifth. Current NPDES disinfection limits are being met and a fifth unit is not required. This system is scheduled for replacement in a Priority 3 project, when the UV system will have reached its useful life. The means of disinfection will be evaluated at that time, given the rapid change in technology in this area. The abandoned flow meter will be removed at that time.

There has been extensive maintenance required to properly operate the UV system. Some of this maintenance is required in the winter months, which can be very difficult to perform. As a result, a UV enclosure building was recommended in the 2004 SRF Project Plan, which is currently under construction in the Secondary Clarifier Improvements and UV Enclosure Building project. This project also corrects channel drainage limitations.

There are upstream and downstream slide gates which are used to isolate the UV disinfection channels. Each gate is equipped with electric motor actuators. Operation of these gates is currently inhibited due to poor seating conditions. This deficiency will be remedied in a Priority 1 project.

3.7.5. Downriver Wastewater Treatment Facility Outfall Pipe

The DWTF 84 inch concrete outfall pipe has been inspected by a remote operated vehicle (ROV) camera. There are no immediate needs or repairs proposed as a result of this survey. However, it is recommended that Wayne County survey the outfall every 5 to 10 years to ensure its structural integrity for future service.

The outfall of the UV chamber needs to be isolated. The stop logs were installed in the original chlorine contact chamber but were eliminated under Package F. These need to be re-established as a Priority 1 project.

3.8. Solids Treatment Stream Assessment

While the liquid stream processes at the DWTF have undergone significant rehabilitation and replacement over the past years, the Solids Handling Complex has not had similar renovations, other than to the dewatering operation. The primary sludge storage, and collectors were installed in 1964 and the gravity thickeners, and sludge plunger pumps are essentially unchanged from the 1975 construction project. The dissolved air flotation devices equipment installed in the mid-1980s has been taken offline and the equipment demolished, and the waste activated sludge is currently being co-thickened with the primary sludge in the gravity thickeners. All of the pumping, thickening, and mixing equipment is beyond its useful life, it is therefore scheduled to be replaced in a Priority 1 project.

3.8.1. Primary Sludge Storage, Transfer and Thickening

The primary sludge handling system includes seven primary sludge chopper pumps, two intermediate collector tanks, two primary collector sludge transfer pumps, and four gravity thickeners.

The current firm capacity of the primary sludge pumps of 1,500 gpm is adequate for the projected maximum primary sludge quantity at design loadings. These pumps were installed under Package F and have been operated less than ten years. Replacement of these pumps is scheduled in a Priority 3 project. As previously presented, pump redundancy and new magnetic flow meters will be provided at that time.

Primary sludge is pumped to the two intermediate sludge storage tanks. From these tanks, stored sludge is directed to gravity thickener tanks for further processing. These storage tanks are well past their useful lives and are scheduled to be replaced in a Priority 1 project. Furthermore, there is a collapse in one line to the transfer pumps. In addition, there is a potential hydraulic bottleneck in this buried sludge piping forcemain, and this line will be replaced, if retained.

Because new mixing equipment piping and other equipment will be needed for these tanks, it may be desirable to bypass these intermediate storage tanks and pump primary sludge directly to the selected biosolids handling approach. The primary sludge transfer operation could be simplified to reduce pumping system requirements

Primary sludge is currently thickened with gravity thickeners. The mechanical components have been in service in excess of 28 years and are beyond the useful equipment life for this type of mechanical system. The mechanisms are scheduled to be replaced in a Priority 1 project.

3.8.2. Waste Activated Sludge Thickening

Waste Activated Sludge (WAS) was processed in the Dissolved Air Flotation (DAF) Building installed in 1985. That facility was difficult to maintain and the DAF process was abandoned in the early 2000s and the equipment removed in 2008. The DWTF currently co-thickens waste activated sludge with primary sludge in the gravity thickeners. Co-thickening WAS and primary sludge is more simple from an operational standpoint but alternate WAS thickening technologies are available.

3.8.3. Dewatering and Disposal

The dewatering system consists of two 40 foot diameter thickened storage tanks, two chopper transfer pumps, two muffin monster grinders, a sludge loop to six 2-meter belt filter presses (BFP), dewatered sludge hoppers, sludge cake pumps, and pump discharge header to the truck bay. The 2004 SRF Project Plan and subsequent Phase I Solids Basis of Design report and design documents recommended replacing two of the oldest belt filter press with centrifuges. This work is currently under construction in the Phase I Solids Handling Improvements project, and includes two Alfa Laval high solids centrifuges, sludge feed pumps, polymer system, and screw auger sludge cake conveyors to the truck bay. The work also includes controls and H&V improvements. This work includes demolition of the two oldest Andritz presses, the sludge hopper, and the sludge cake pumps installed under Package F.

The remaining four belt filter presses installed under Package B in the mid-1990s have another 5 to 10 years of useful life, and are scheduled to be replaced with two to four centrifuges in a Priority 2 project.

3.8.4. Cake Disposal

Four existing multiple hearth incinerators were constructed in 1975, but were taken out of service due to economic, operational, regulatory, and equipment reliability considerations.

The current cost-effective solids disposal means is landfill disposal of dewatered cake. Cake is stored in the roll-off containers and is hauled to the landfill during normal operating hours. The dewatered biosolids are conveyed by the cake pumping system directly to roll-off boxes within the truck bay. The on-site operations - filling, transferring and hauling roll-off containers are all performed by the sludge-hauling contractor. The concentrated load from the steel rollers has badly deteriorated plant roads. Alternative means of storage of biosolids within the system, such as gravel trains, may be appropriate to provide for longer duration dewatering schedules. Storage of biosolids within the facility will be discussed with the sludge-handling contractor should landfill remain the current method of choice.

Alternate solids disposal options are presented in Appendix G, ~~L~~long-Term Biosolids Plan (Updated 2009.)"

3.9. Instrumentation and Automation Assessment

3.9.1. Headworks

a. Influent Junction Chamber

Replace LEL monitoring system and bubbler level monitoring system as a Priority 3 project.

b. Coarse Gripper Screen

The SCADA system will monitor the equipment operation only. Local control is retained. Integrate any process or equipment improvements into the existing SCADA monitoring and control system.

c. Influent Pump Station Wet well

An additional wet well level device is being installed (pressure transducer) as a back up to the bubbler level system under the SCADA Improvement project. The new SCADA PLC program will continue to use the bubbler as the primary level indication and automatically switch to the new backup level signal upon bubbler signal loss or bubbler out of range value. The existing bubbler system should be replaced or rehabilitated as a Priority 3 project and the new pressure transducer should be replaced as required under normal plant maintenance activities.

New seal water flow switches are being added under the SCADA Improvements project on each influent pump seal water line for monitoring and alarming through SCADA if seal water flow is lost.

A new control strategy is being implemented under the SCADA Improvements project to control the wet well elevation between a range of approximately 10 to 14 feet rather than at a fixed elevation, i.e. 12 feet. This change will result in more steady flow rates through the DWTF with the goal of providing near constant flow rates over 24 hours during dry weather days. The strategy relies on use of the available storage capacity of the collection system. The typical dry weather diurnal flow pattern will be leveled by allowing the wet well to rise and fall within acceptable range while a near constant flow is processed by the DWTF. The practice of regular collection system flushing as a Standard Operating Procedure will continue to be employed. This procedure lowers the wet well elevation on a weekly basis to flush the collection system and ensure solids are not settled out in the collection system piping.

The new control strategy will also start and stop pumps automatically to control the wet well within the acceptable level range. The control strategy will ensure that acceptable flow paths are available before starting an influent pump. All downstream process must be SCADA controllable and equipped with feedback devices, e.g. gate open/close limit switches to allow this control strategy to be implemented. The SCADA Improvement project is adding limit switches to the downstream gates and the Fine Screen Improvement project is adding new equipment with the required feedback devices. However, some downstream gates are not included in these two projects and may impact the ability to implement the automatic starting of influent pumps. These downstream devices are recommended for replaced in a Priority 1 project.

d. Fine Screens 1 through 4

The improvements to this equipment are being coordinated with the SCADA Improvements project to provide feedback and limited control of the new fine screen equipment.

e. Check Valve Vault

Under the SCADA Improvement project new gate limit switches are being installed on the valves and position feedback (open and closed limit switches) is provided to SCADA.

f. Fine Screens 5, 6 and 7

SCADA will continue to monitor gate positions and equipment operation. No additional control improvements have been implemented. The three LEL gas monitoring systems and hydrogen sulfide monitoring systems are scheduled to be replaced as a Priority 3 project.

g. Grit Removal Detritors

Equipment improvements identified within this Plan should be integrated into the existing SCADA system.

h. Aerated Grit Facilities

Equipment improvements should be integrated into the existing SCADA system. All gates associated with screening, grit removal and pretreatment flow distribution to the primary treatment process will be equipped with position feedback transmitters and remote control capability to allow SCADA control and SCADA-directed automatic Influent Pump Station pump operation.

i. Tunnel Pump Station

An additional wet well level monitoring device is being installed (pressure transducer) under the SCADA Improvements project, as a back up to the bubbler level system. The new SCADA program will continue to use the bubbler as the primary level indication and automatically switch to the new backup level signal upon bubbler signal loss or bubbler out of range value. The existing bubbler system is in good condition and should be replaced under a priority 3 project.

The existing collection system level signal telemetering system present at the Tunnel Pump Station PLC will be updated as part of a Priority 1 project.

j. Ferric Chloride Facilities

A new control strategy is being implemented under the SCADA Improvement project to control the ferric dosage into the Tunnel Pump Station and Influent Pump Station. Ferric Chloride feed can be adjusted in three modes, constant ferric feed flow rate, flow-paced ferric feed rate, and flow-paced with tuning (trim) based on the Primary Settling Tank effluent phosphorus value as measured by the on-line ChemScan Analyzer. In the last operating mode, ferric feed rate is adjusted if the ChemScan Analyzer measured value is outside the desired control range (2 to 6 mg/L TP).

Under a Priority 1 project, the main influent sample stream should be rerouted and analyzed for phosphorus concentration by the ChemScan Analyzer. This value could be used as a process variable for ferric chloride feed to the influent and tunnel pump station wet wells. The SCADA control strategy would be modified to adjust the ferric chloride dosage in direct relation (pound to pound) to the influent phosphorus loading. Control feedback will be immediate and provide improved process control and chemical savings.

The online Phosphorus/Ammonia (ChemScan) and BOD (STIP) Analyzers located in the Old Administration Building will be replaced as a Priority 1 project.

3.9.2. Primary Treatment Tanks

A new process control strategy is being implemented under the SCADA Improvements project to provide time control of the cross collectors, main collectors, scum collectors and sludge pumps through the SCADA System. Sludge density meters could be provided (assuming the availability of a reliable instrument) to end the pump run cycle upon reaching a low sludge density value. This process improvement holds the potential to lower treatment costs through improve pumping efficiency and reducing dewatering requirements.

The aeration blower controls should be updated to allow individual blower start/stop, lead/lag and fail over through the SCADA System.

3.9.3. Secondary Treatment Assessment

a. Control, Bypass & Junction Chambers

The SCADA Improvements project is retaining the existing control capabilities in this area and is coordinating with the Emergency Generators General Construction project for control of a new gate and monitoring of a high water level transmitter.

b. Low Lift Pump Station

The SCADA Improvements project is retaining the existing control capabilities in this area removing the remote control for this area from the Secondary Treatment Area Control Panel (STACP) PLC. This change does not reduce the control capabilities or control locations available to the operator for the process area. The new control system is configurable to allow control of any process area from any control station connected on the SCADA network.

An additional wet well level device is being installed (pressure transducer) under the SCADA Improvement project as a back up to the bubbler level system. The new SCADA program will continue to use the bubbler as the primary level indication and automatically switch to the new backup level signal upon bubbler signal loss or bubbler out of range value. The existing bubbler system is in good condition and should be replaced under a Priority 3 project.

c. Inlet Chambers

Under the SCADA Improvement project, new primary influent butterfly valve position transmitters are being added to each valve to provide position feedback to SCADA. In addition, the Royce® SS probe is being relocated to the WAS line. The aeration train drain valve operators will be automated under a Priority 1 project to allow a SCADA-initiated aeration train startup and shutdown control strategy being developed under the SCADA Improvements project. The influent and RAS flow meters are currently operational and will be replaced as part of a Priority 3 project.

d. Aeration Trains

New control strategies and improvements are being implemented under the SCADA Improvement project.

- SCADA assisted startup and shutdown of aeration trains
- Addition of new HACH® dissolved oxygen transmitters on Stage 4 of each Aeration Train.
- Oxygen feed control based on dissolved oxygen concentration

- Monitoring and display of the RAS and MLSS concentrations
- Primary influent flow control will be enhanced in a "master valve" control strategy to provide equal flow distribution between all in service aeration trains.

Additional process improvements that are scheduled under a Priority 1 project are:

- Addition of SCADA controlled drain valves

The LEL Monitoring System consists of a purge blower and LEL analyzer system. This system is hardwire interlocked to stop oxygen flow, stop mixer operation, and purge the aeration train gas space with ambient air when a high explosive gas mixture is present. This system is operational but is requiring additional maintenance attention. Due to the critical function this equipment provides, this system will be replaced as a Priority1 project.

e. Oxygen Control

The SCADA Improvements project is retaining the existing control capabilities for the oxygen feed system and adding a new control strategy to adjust the oxygen feed rate based on the D.O. concentration in Stage 4 of each Aeration Train. Feedback lag is expected due to the long detention times in the aeration trains; therefore, this control strategy may only be used to alert the operators when the D.O. values are outside the desired control range.

Additional process improvements that are scheduled under a Priority 1 project are:

- Separate the oxygen gas control for Aeration Trains 1 & 2 and Aeration Trains 3 & 4. Currently, Aeration Trains 1 & 2 share an oxygen feed control valve and vent valve making individual train oxygen control difficult. Aeration Trains 3 & 4 also share an oxygen feed control valve and vent valve.
- Install dissolved oxygen transmitters in Stage 1 of each aeration train for improved dissolved oxygen control and oxygen use efficiency.
- Integrate the process control and equipment improvements into the new SCADA system.

A Priority 2 project will be initiated for replacement of the existing oxygen control valves, vent valves, and piping support systems.

f. Secondary Clarifiers

The SCADA Improvements project is coordinating with the Secondary Clarifier Improvements and UV Enclosure Building project, and providing control and monitoring of the secondary clarifiers. The influent and RAS control strategies are being retained and a new Master Clarifier flow control strategy is being implemented to compensate for the hydraulic imbalances in the distribution piping and equally distribute influent among the secondary clarifiers. The SCADA system monitors the clarifier sludge depth and effluent turbidity and will alert the operator if either parameter is out of the desired control range. A potential control enhancement may be to use these analyzer signals to adjust RAS or influent rates.

New PLCs are being installed as part of the Secondary Clarifier Improvements and UV Enclosure Building project. The PLCs will communicate over the recently installed fiber network and provide remote control of each clarifier. Upon completion of the clarifier improvements, a Priority 1 project will be initiated to remove the abandoned copper communications network between the secondary clarifiers and the aeration trains to free up

conduits and duct banks. In addition, due to the longer implementation schedule of the clarifier improvement project (2 years) a Priority 1 project is required to phase over the portion of clarifiers to the SCADA system that were not completed prior to close out of the SCADA Improvements project.

The clarifier flow meters, scum beach heaters, sludge depth and turbidity meters should be replaced as a Priority 3 project.

g. Flow Balance Improvements

The SCADA Improvements project will implement a Master Clarifier flow control strategy to equally distribute influent among the five aeration trains and the six secondary clarifiers. This control strategy will utilize the existing magnetic flow meter and control valves to equally balance flow among the on-line trains/clarifiers. Final implementation of this strategy on the secondary clarifiers may be required after close out of the SCADA Improvements project.

h. Process Control

The Royce SRT (Sludge Retention Time) Controller calculates the required waste rate based on operator entered Sludge Age set point. The controller measures the MLSS and RAS concentrations and calculates the waste rate to maintain the desired sludge age. The SCADA Improvements project is adding the MLSS and RAS concentration signals to the control system and will alarm if these values are out of range due to improper instrument calibration or process upsets. The RAS probe is being relocated from the RAS line to the WAS line to eliminate the need to manually move the probe when the associated aeration train and RAS line is not in service.

D.O. transmitters are being added to Stage 4 of each Aeration Train to allow for improved D.O. control and alerts of out of range values.

Additional improvements considered is the use of the on-line BOD analyzer to adjust oxygen and RAS flows to the aeration trains when BOD rate-of-change parameters are exceeded indicating a significant rise or fall in BOD concentration from the primary settling tanks. The on-line BOD analyzer should be replaced as a Priority 1 project.

3.9.4. Ultraviolet Disinfection

The SCADA system will monitor the equipment operation only. Local control is retained. Any equipment improvements must be integrated into the SCADA system.

3.9.5. Primary Sludge Storage, Transfer and Thickening

The SCADA Improvements project retains the existing control for these areas and provides some enhancements.

Sludge Transfer Pumping has been enhanced with automatic lead/lag pump selection and lead pump rotation at the end of each pumping cycle. The existing Level Transmitters will be reconfigured to provide backup pump control in the event of PLC failure.

Sludge Thickening Tank control includes flow control of all influent streams, monitoring of level and center drive operation. Lead/Lag pump control with automatic pump fail over. The control strategy and PLC logic created under the SCADA Improvements project cannot be

implemented due to the condition of the solids handling equipment. However, the control logic will exist to implement SCADA control upon completion of the Phase I Solids Handling Improvements project.

The SMACP will be removed from the DAF Building and SMGRI/O will be relocated from the pump gallery to Electrical Building No. 2, under the SCADA Improvements project.

The solids treatment system and odor control system is scheduled for rehabilitation as a Priority 1 project. This work should include decommissioning the transfer tanks, the pumping system and the PSTPCP with direct pumping of primary sludge to the thickeners. Solids Area improvements must be integrated into the SCADA system.

a. Waste Activated Sludge Thickening

The SCADA Improvements project retains the existing WAS flow control strategy. Any project improvements i.e. WAS pump replacement, in this area must be integrated into the SCADA system.

b. Dewatering and Disposal

The Phase I Solids Handling Improvement Project is providing a separate control system for the new equipment installed under this project (centrifuge, conveyors, etc). The dewatering control system will be connected to the SCADA system through the DWTF fiber network for monitoring of dewatering equipment through any SCADA system operator console. Replacement of the control system is expected as a Priority 3 project.

c. Incineration and Disposal

Any project improvements in this area must be integrated into the SCADA system as part of the project work.

3.9.6. Additional Systems

a. General Instrumentation and Automation

The SCADA Improvements Project included an inventory and assessment of SCADA equipment involving a technical evaluation of the condition and utility of the equipment. Through this evaluation, the existing fiber communications network cable, PLCs and control panels were deemed reusable. This equipment is expected to last through the Priority 1 planning phase; and it is recommended that the PLCs and control panels be replaced under a Priority 3 project.

b. Compressed Air System

Any future improvements to this support equipment should be integrated with the existing SCADA System.

c. Screened Final Effluent Water System

Any future improvements to this support equipment should be integrated with the existing SCADA System.

d. Industrial Water Systems

The SCADA Improvements Project will add outputs from these systems to monitor pump run signals and system pressures. Local control is retained. Any future improvements to this support equipment should be integrated with the existing SCADA System.

e. Sampling Systems

The SCADA Improvements Project will add flow sensors and alert lab personnel when sampler supply flow is lost. The samplers have reached their service life and will be replaced as part of a Priority 1 project. The samples will be monitored by the SCADA System and receive the DWTF influent flow value directly from the SCADA network for flow proportional sampling.

f. Electrical Monitoring System

The SCADA Improvements Project is not connecting to the DWTF electric monitoring system. The existing system is not reliable and will be replaced under a Priority 1 project. The replacement system should be monitored by the SCADA System in conjunction with the Emergency Generators with advance control strategies for use during electrical power outages.

g. Maintenance Facility

The SCADA Improvements Project will relocate the employee meeting room from the second floor to the first floor and install a SCADA lab on the second floor adjacent to the Instrument Shop. The HVAC system will be repaired under a Priority 1 project. Building monitoring systems and the security system will be integrated with the existing SCADA System under a Priority 1 project.

3.10. Assessment of Support Facilities

3.10.1. Old Solids Building

a. Main Floor:

The three samplers and sampler pumps will be replaced as part of a sampling system project scheduled in a Priority 1 project. The overhead crane should be rehabilitated in 10 years in a Priority 2 project.

b. Basement:

The wall penetrations into old sludge storage tanks need to be corrected, and the industrial water booster pump system will be replaced in a Priority 1 project.

c. Disinfection and Discharge Area Control Room:

The Trojan control panel will be replaced at the same time as when the new UV units are installed, both in a Priority 3 project.

d. Garage:

The floor structural steel elements and floor hatches are scheduled for replacement in a Priority 2 project.

3.10.2. Maintenance Facility

A maintenance facility was constructed in the mid-1990s as Package C. This maintenance facility includes truck bay, small parts storage, electrician's room, instrumentation tech room, wash down facilities, offices, fabrication area and other areas suitable for maintenance needs. This facility is adequate for the maintenance needs of the DWTF. However, the H&V unit will be replaced in a Priority 1 project. In addition to this facility, there will be a parts storage facility in the old DAF Building, including a hi/lo fork lift truck.

3.10.3. Laboratory

The laboratory facilities were assessed on a walk-through performed on February 26, 2009. New/replacement laboratory equipment that is recommended as a Priority 1 Project is included in the Headworks System Renovations Project.

3.10.4. Compressed Air Systems

Air compressors throughout the DWTF are critical to operating and maintaining equipment. Several of the air compressors and air coolers have corroded and should be replaced with material and equipment suitable for the environment. These are included as a Priority 2 project.

3.10.5. Screened Final Effluent Water System

The existing screened final effluent (SFE) system provides water to the secondary treatment area of the DWTF. A piping system is proposed that would provide SFE water to the preliminary and primary treatment areas of the DWTF. There is a need to interconnect the two systems to provide for a more reliable SFE system in the event the secondary or the preliminary/primary SFE systems are out of service. Additionally, there is a need to provide additional yard hydrants for purposes of flushing the primary tanks when taken out of service for maintenance. This work is included as a Priority 1 project.

3.10.6. Industrial Water System

The original IW piping system in the Solids Handing Building is badly corroded and is scheduled for replacement in a Priority 1 project. The IW booster pump system in the basement of the Old Solids Building area of the DWTF is newer, and is scheduled for replacement in a Priority 3 project.

3.10.7. Sampling Systems

Automatic samplers are installed at the IPS and TPS (raw sewage sample), the basement of the Old Solids Building (primary effluent, secondary effluent, and final effluent) and the Recycle Flow Station. The entire sampling system will be evaluated and replaced in a Priority 1 project.

3.10.8. Phone Communications and Paging System

The existing phone communications and paging system is antiquated and is scheduled for replacement in a Priority 1 project.

3.11. Downriver Sewage Disposal System Collection System

3.11.1. SCADA

The sewage collection system upstream of the DWTF includes the sewers that are described in Section 2.3. Within those facilities, numerous control and instrumentation systems exist to provide the DWTF staff with historical and real-time operating data and control of the off-site facilities through an Operator Interface Terminal, located at the DWTF. Examples of data the SCADA system collects includes the following:

- Rain gauge data
- Sewer flow and depth meter stations
- Profile of the tunnel and hydraulic grade line from DSDS level transmitters
- Status of all overflow gates
- Control set points for DSDS facilities
- Active and Acknowledged Alarms for all DSDS facilities
- Communications Network health information

The existing SCADA system components were reviewed to determine the needs for the project-planning period. It was found that existing SCADA systems needed to be upgraded as part of a Priority 1 project to ensure continued reliability and operation.

3.11.2. Collection System Sewers

Approximately 2% of the collection system, as described in Section 2.3, was televised to assess the sewer pipes' overall conditions. This included 2,943 lineal feet of the Wyandotte (River Drive) Interceptor Sewer, located along 10th Street and River Drive and 3,611 lineal feet of the Downriver Sewage Disposal System Interceptor, located along Electric Avenue and 9th Street. In addition, 15 manholes located along these sections of sewers were inspected for overall condition.

It was found that the sewers and manholes overall were in fair to good condition. Recommended rehabilitation involving mostly point repairs to structural cracks and areas of significant infiltration is scheduled as a Priority 1 project.

Section 4 - Alternative Analysis

4.1. General

Section 3 presented areas of deficiencies and/or replacement of equipment needs to maintain treatment plant performance. This Section includes the presentation and analysis of alternatives to those deficiencies identified as Priority 1 (to be addressed within the next five years) concerns.

Alternatives for the recommended improvements are developed and discussed where appropriate. The alternatives are reviewed for feasibility, cost effectiveness, and environmental impact. Where singular components of a system are to be addressed (motors, gates, pumps, etc.), alternatives may be limited to replacement or rehabilitation. These items are generally included as a common component to the alternatives reviewed for overall system improvement.

The proposed alternatives also build upon the recently completed and current improvement projects at the DWTF. These projects were identified in the approved 2004 SRF Project Plan. In some cases, recommendations presented in this Section are a continuation of work already complete or underway, and therefore options for alternatives are limited.

The Solids Stream projects presented in this Section were developed based on the recommendations of the Long-Term Biosolids Plan (updated 2009), which is included in Appendix G. This Plan reviewed seven alternatives for biosolids handling and disposal at the DWTF. The Plan found that landfilling of dewatered biosolids is currently the most cost-effective option. However, the Plan also cautioned that switching to production of Class B biosolids (for land application and/or landfilling) may be required in the future. The solids handling renovation and improvement projects described in this Section were developed based on these recommendations.

Total project costs for the alternatives are included in this Section, with detailed cost estimates and analyses included in the Appendix B. All costs are in 2009 dollars and include an allowance of for engineering, legal, and administrative costs, and a contingency due to the preliminary nature of the estimates made. The present worth analyses to determine the overall cost-effectiveness of the alternatives use the 2009 Federal discount rate of 4.5%. Salvage value is calculated by using a straight-line depreciation over a 20-year period.

4.2. Regional Alternatives

The capacity of the DSDS sewer system and DWTF is sufficient to satisfy the projected future needs of the Service Area. The options to construct a new regional wastewater treatment facility, or to connect to another existing sewage disposal system, are not feasible due to the size of this system and are not considered further.

4.3. "No Action" Alternative

This alternative was considered for each work item, but was not reviewed in detail because of the existing operational and maintenance issues at the DWTF. The equipment associated with the project reviewed in this Section has served its useful life and/or requires replacement. "No action" would lead to increased maintenance and further deterioration of the equipment until it is no longer functional. Proper operation of these systems is necessary in order for the DWTF to meet its NPDES effluent limitations.

4.4. Solids Thickening Complex Renovations

The entire Solids Thickening Complex requires renovation, starting with the primary sludge pumps for each of the primary sedimentation tanks, and ending with the mechanical mixing of the thickened sludge storage tanks. This project will also continue the Phase I Solids Handling Improvements, which were presented in the 2004 SRF Project Plan and are currently being implemented.

4.4.1. Alternative A, Re-Route Primary Sludge Lines Directly to Thickening Complex *(Selected Alternative)*

The entire Solids Thickening Complex will be renovated, starting with the primary sludge pumps for each of the Primary Sedimentation Tanks, and ending with the mechanical mixing of the Thickened Sludge Storage Tanks.

The existing means of pumping primary sludge to the Primary Sludge Storage Tanks, then pumping to the Gravity Thickening Complex will be eliminated in favor of pumping directly to a new Splitter Box located between the gravity thickeners. The Splitter Box will also accommodate waste activated sludge (WAS) and elutriation water, and will balance the flows to any of the Gravity Thickeners. A bypass flow line directly to the Thickened Sludge Storage Tanks, overflow and drain will also be provided.

The Gravity Thickeners will be completely renovated with state-of-the-art equipment, and covered with air drawn off to a new odor control system. New sludge pumps, piping, valves etc. shall be provided as well as full automation, SCADA integration and process control. Therefore the following would be implemented under this alternative:

- Re-route the primary sludge lines, including Primary Tank 7, directly to Thickening Complex. The route will include additional pipe for the SFE system to reach the Aerated Grit Facility, and spare HDPE pipes to be used as conduits for future utilities.
- Provide a Splitter Box with flow control to each thickener. This includes primary sludge, waste activated sludge (WAS), elutriation water flow control, overflow and drainpipe, and bypass directly to the Sludge Storage Tanks. Replace the existing WAS pumps.
- Replace the existing Gravity Thickener drives, bridges, pickets, etc. equipment. Provide covers for the Gravity Thickeners and Thickened Sludge Storage Tanks. Replace the thickened sludge pumps. Provide new mixing system for the Thickened Sludge Storage Tanks.
- A new Odor Control facility using biofilter technology will be located in the area between the East Storage Tank and the Dewatering Building. The gallery in this area requires expansion to accommodate the existing and planned piping. The pipe gallery to the dewatering complex will be revised to accommodate sludge pipes and all ancillary utilities.
- Abandon the existing sludge lines to the Primary Storage Tanks and Gravity Thickening Complex in-place and re-use as a conduit for SFE and/or electrical utilities. Demolish the Primary Sludge Storage Tanks, collector equipment, and odor control system, and plan selective demolition of the Solids Thickening Complex.
- Provide upgrades to the potable, industrial, and screen final effluent (SFE) water systems, and compressed air system. Provide seal water to all sludge pumps. Replace the sludge yard piping.
- Replace the badly damaged pavement from the concentrated sludge roll-off wheel loads. (The road use changed when incineration was stopped and the pavement in this area was not

designed for these loads.) Replace the site utility piping that is beyond its useful life in the Dewatering Complex area and in areas of proposed pavement replacement.

- Provide an access ramp to the Thickener Complex lower floor, and provide a double-door access to the roof deck from the Dewatering Complex. Provide overhead monorails to facilitate removal of the equipment. The Thickener Complex and gallery would also be refurbished with new paint, doors, handrails, roof, plumbing, H&V, lighting, and miscellaneous electrical and structural repairs.
- Provide sludge blanket depth monitoring of the Primary Clarifiers and Gravity Thickeners and develop automatic sludge pump control logic. Fully integrate the new controls into the existing local area control panels and SCADA.

4.4.2. Alternative B, Keep Existing Pumping Scheme, Replace/Upgrade Equipment

The existing means of pumping primary sludge to the primary sludge storage tanks, then pumping to the gravity thickening complex would remain under this alternative. The existing equipment would be replaced in-kind, and miscellaneous improvements made to allow for continued reliable operation.

4.4.3. Solids Thickening Cost Comparison and Summary

The principal advantage of Alternative A is that the additional pumping is eliminated, as well as the need for the additional sludge storage tank including the collector equipment. Alternative A also eliminates the metering and control valve means of balancing flow to each thickener, in favor of the much simpler splitter box.

Alternative B, however, is the current and familiar scheme and allows all sludge pumps to operate simultaneously without effecting the thickening operation. There is also additional sludge storage (excess) provided under Alternative B.

The life cycle costs for these alternatives are summarized below:

Table 4-1: Solids Thickening Cost Comparison

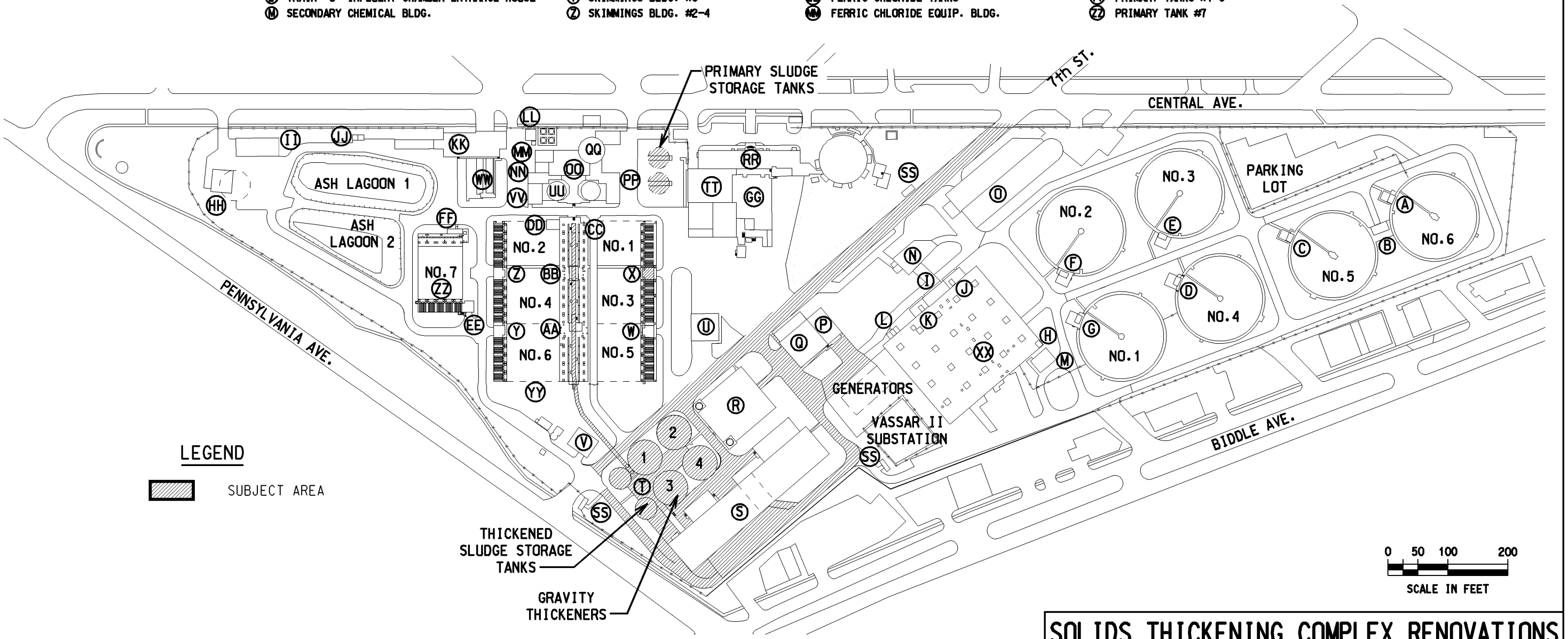
	Alternative A Re-Route Sludge Lines	Alternative B Current Operation
Capital Costs	$2,467,000	$3,963,000
Present Worth of Annual OM&R	$557,000	$1,204,000
Total Present Worth	$2,597,000	$4,920,000

4.4.4. Selected Alternative

Alternative "A" is the selected alternative for the Solids Thickening Complex Renovations Project and includes the elements described in Section 4.4.1. The following figure shows the areas and buildings that are involved in this project.

DOWNRIVER WASTEWATER TREATMENT FACILITY

- (A) CLARIFIER BLDG. #6
- (B) RETURN ACTIVATED SLUDGE BLDG.
- (C) CLARIFIER BLDG. #5
- (D) CLARIFIER BLDG. #4
- (E) CLARIFIER BLDG. #3
- (F) CLARIFIER BLDG. #2
- (G) CLARIFIER BLDG. #1
- (H) SAMPLE BLDG.
- (I) SECONDARY OXYGEN CONTROL BLDG.
- (J) N. INFLUENT CHAMBER ENTRANCE HOUSE
- (K) S. INFLUENT CHAMBER ENTRANCE HOUSE
- (L) TRAIN "O" INFLUENT CHAMBER ENTRANCE HOUSE
- (M) SECONDARY CHEMICAL BLDG.
- (N) SECONDARY LOW LIFT PUMP STATION
- (O) MAINTENANCE BLDG.
- (P) STOCKROOM #1
- (Q) EMPLOYEE SERVICE BLDG.
- (R) DISSOLVED AIR FLOTATION (DAF) BLDG.
- (S) SOLIDS HANDLING BLDG.
- (T) SOLIDS THICKENING COMPLEX
- (U) MAINTENANCE GARAGE
- (V) SKIMMINGS PUMP BLDG.
- (W) SKIMMINGS BLDG. #5
- (X) SKIMMINGS BLDG. #1-3
- (Y) SKIMMINGS BLDG. #6
- (Z) SKIMMINGS BLDG. #2-4
- (AA) PRIMARY MOTOR CONTROL CENTER #1-6
- (BB) PRIMARY PUMP GALLERY
- (CC) PRIMARY PUMP GALLERY ENTRANCE HOUSE
- (DD) PRIMARY POLYMER BLDG.
- (EE) SKIMMINGS BLDG. #7
- (FF) PRIMARY MOTOR CONTROL CENTER #7
- (GG) ULTRAVIOLET DISINFECTION
- (HH) TUNNEL PUMP STATION
- (II) TUNNEL PUMP STATION ELECT. BLDG.
- (JJ) RECYCLE SAMPLE BLDG.
- (KK) AERATED GRIT BLDG.
- (LL) FERRIC CHLORIDE TANKS
- (MM) FERRIC CHLORIDE EQUIP. BLDG.
- (NN) WEST GRIT BLDG.
- (OO) FINE SCREENS BLDG.
- (PP) EAST GRIT BLDG.
- (QQ) INFLUENT PUMP STATION
- (RR) ADMINISTRATION BLDG.
- (SS) WATER METER BLDG. (3 SHOWN)
- (TT) OLD SOLIDS BLDG.
- (UU) DETRITORS
- (VV) OLD GREASE BURNER BLDG.
- (WW) AERATED GRIT TANKS
- (XX) AERATION TANKS
- (YY) PRIMARY TANKS #1-6
- (ZZ) PRIMARY TANK #7



SOLIDS THICKENING COMPLEX RENOVATIONS

JOB NO.	HUBBELL, ROTH & CLARK, INC.	FIGURE NO.
20080550	CONSULTING ENGINEERS	4-1
DATE	220 BAGLEY SUITE 420	
APRIL, 2009	DETROIT, MICH. 48226	

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4.5. Secondary System Renovations

The Secondary System Renovations project includes upgrading the high-purity oxygen feed system, the oxygen feed balance and control to each aeration train, purge blower addition, Return Activated Sludge (RAS) pumps, piping and valves, and miscellaneous process and building improvements.

The eight existing RAS pumps to all six Secondary Clarifiers would also be replaced under both alternatives. The three existing vertical RAS pumps serving Secondary Clarifier Nos. 5 and 6 will be replaced in kind and would include new piping, valves and meters. (This is the only type of pump that can be used given the existing configuration.) Alternatives for the replacement of the five submersible RAS pumps that serve Secondary Clarifier Nos. 1 through 4 are discussed below.

4.5.1. Alternative A, Replacement RAS Pumps using Submersible Pumps (*Selected Alternative*)

This Alternative A includes the following items:

- Improve the existing high-purity oxygen feed system. Revise the oxygen piping and control to each train in order to provide individual train feed control, as well as off gas piping control at the effluent end of each train.
- Provide a redundant blower for the purge blower system and new tank drain valves and actuators.
- The following associated buildings would also be repaired/refurbished (including roof replacement, miscellaneous masonry repairs, replacement doors, painting, plumbing, new H&V and/or new electrical, as needed): Clarifier Building Nos. 1 through 6, Return Activated Sludge Building, and the North and South Influent Chamber Houses. There is also some pavement that requires repair in the Secondary area.
- An Asset Management System and Energy Efficiency Improvements are also included in this project. The Energy Efficiency Improvements project is based on a recommendations made by Johnson Controls, Inc. in order to reduce energy consumption for operational savings. Some of these items are being incorporated with projects resulting from the 2004 SRF Project Plan. Remaining cost-effective items will be included in the Secondary System Renovations project. The Asset Management System is a computerized management system to track the equipment and facilities at the plant. It assists management in determining the lowest life cycle cost for rehabilitating, repairing and/or replacing a plant asset.
- The three existing Return Activated Sludge (RAS) pumps that serve Secondary Clarifier Nos. 5 and 6 would be replaced in kind and would also include new piping, valves and meters.
- The five existing RAS pumps for Secondary Clarifier Nos. 1 through 4 were originally vertical turbines, which required significant maintenance. These were replaced in the early 1990s with dry-pit, submersible pumps, each modified with a suction tube. The selected Alternative A replaces these RAS pumps with similar submersible pumps.
- Miscellaneous instrumentation and control improvements and integration with the SCADA system.

4.5.2. Alternative B, Replacement RAS Pumps using Vertical Turbine Pumps

This Alternative B includes all of the work items from Alternative A, except for the configuration of the replacement RAS pumps that serve Secondary Clarifier Nos. 1 through 4. The only practical alternative to the existing pump configuration is to utilize vertical turbine RAS pumps, similar to the original equipment. This would require removal of the wet well floor hatch, structural support or concrete deck to support the new pumps and modifications to the discharge piping.

4.5.3. Secondary System Renovations Cost Comparison and Summary

The principal advantage of submersible pumps is the ease of replacement; new pumps can simply be re-installed in the same configuration. Five pumps for the four Secondary Clarifiers are provided to allow ease of pump change-out when servicing and for redundancy. The pumps can be removed easily, and taken to the maintenance building for indoor service during winter months.

The cost for replacing the submersible pumps in-kind is less expensive that installing new vertical turbine pumps. Replacement dry pit submersible pumps must be rated for Class I Division I environments. The life cycle costs for these alternatives are summarized below:

Table 4-2: Secondary System Renovations Cost Comparison

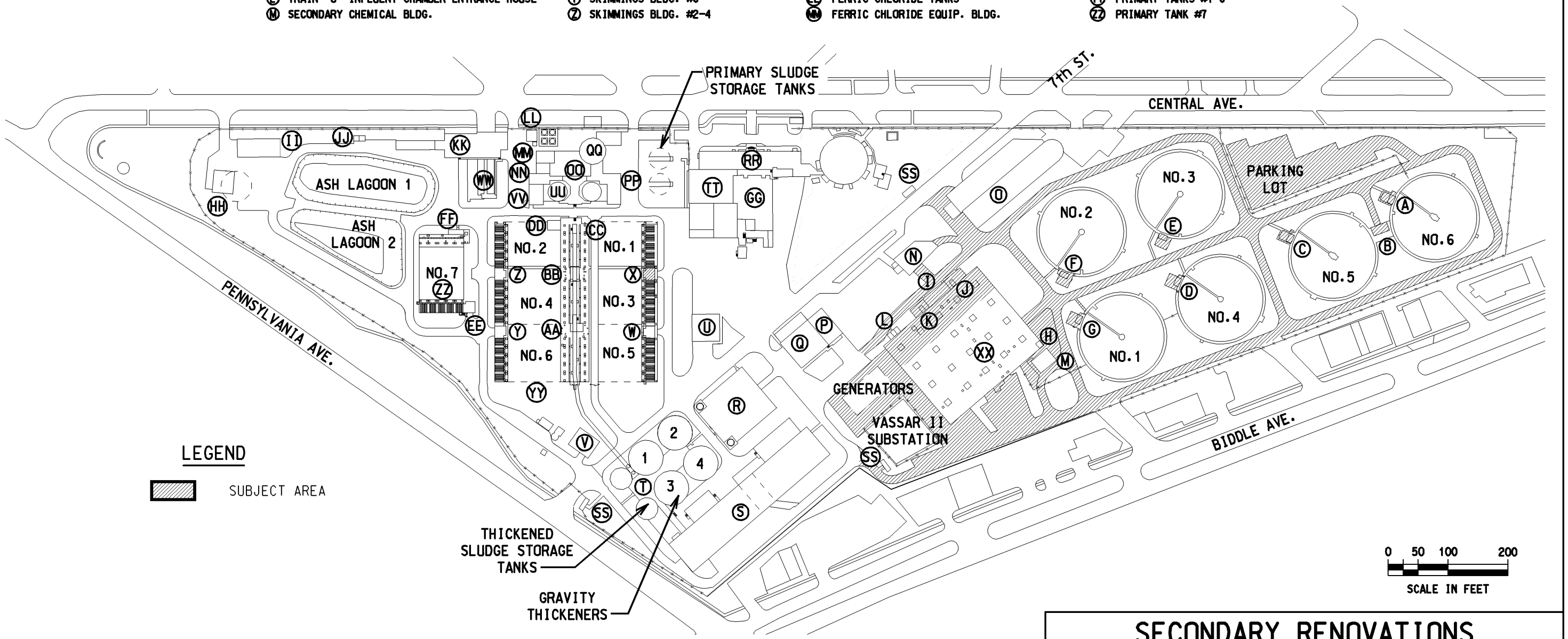
	Alternative A Submersible Pumps	Alternative B Vertical Turbine Pumps
Capital Costs	$1,283,000	$1,715,000
Present Worth of Annual OM&R	$1,156,000	$1,010,000
Total Present Worth	$2,439,000	$2,640,000

4.5.4. Selected Alternative

Alternative "A" is the selected alternative for the Secondary System Renovations Project and includes the elements described in Section 4.5.1. The following figure shows the areas and buildings that are involved in this project.

DOWNRIVER WASTEWATER TREATMENT FACILITY

- (A) CLARIFIER BLDG. #6
- (B) RETURN ACTIVATED SLUDGE BLDG.
- (C) CLARIFIER BLDG. #5
- (D) CLARIFIER BLDG. #4
- (E) CLARIFIER BLDG. #3
- (F) CLARIFIER BLDG. #2
- (G) CLARIFIER BLDG. #1
- (H) SAMPLE BLDG.
- (I) SECONDARY OXYGEN CONTROL BLDG.
- (J) N. INFLUENT CHAMBER ENTRANCE HOUSE
- (K) S. INFLUENT CHAMBER ENTRANCE HOUSE
- (L) TRAIN "O" INFLUENT CHAMBER ENTRANCE HOUSE
- (M) SECONDARY CHEMICAL BLDG.
- (N) SECONDARY LOW LIFT PUMP STATION
- (O) MAINTENANCE BLDG.
- (P) STOCKROOM #1
- (Q) EMPLOYEE SERVICE BLDG.
- (R) DISSOLVED AIR FLOTATION (DAF) BLDG.
- (S) SOLIDS HANDLING BLDG.
- (T) SOLIDS THICKENING COMPLEX
- (U) MAINTENANCE GARAGE
- (V) SKIMMINGS PUMP BLDG.
- (W) SKIMMINGS BLDG. #5
- (X) SKIMMINGS BLDG. #1-3
- (Y) SKIMMINGS BLDG. #6
- (Z) SKIMMINGS BLDG. #2-4
- (AA) PRIMARY MOTOR CONTROL CENTER #1-6
- (BB) PRIMARY PUMP GALLERY
- (CC) PRIMARY PUMP GALLERY ENTRANCE HOUSE
- (DD) PRIMARY POLYMER BLDG.
- (EE) SKIMMINGS BLDG. #7
- (FF) PRIMARY MOTOR CONTROL CENTER #7
- (GG) ULTRAVIOLET DISINFECTION
- (HH) TUNNEL PUMP STATION
- (II) TUNNEL PUMP STATION ELECT. BLDG.
- (JJ) RECYCLE SAMPLE BLDG.
- (KK) AERATED GRIT BLDG.
- (LL) FERRIC CHLORIDE TANKS
- (MM) FERRIC CHLORIDE EQUIP. BLDG.
- (NN) WEST GRIT BLDG.
- (OO) FINE SCREENS BLDG.
- (PP) EAST GRIT BLDG.
- (QQ) INFLUENT PUMP STATION
- (RR) ADMINISTRATION BLDG.
- (SS) WATER METER BLDG. (3 SHOWN)
- (TT) OLD SOLIDS BLDG.
- (UU) DETRITORS
- (VV) OLD GREASE BURNER BLDG.
- (WW) AERATED GRIT TANKS
- (XX) AERATION TANKS
- (YY) PRIMARY TANKS #1-6
- (ZZ) PRIMARY TANK #7



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SECONDARY RENOVATIONS

JOB NO.	HUBBELL, ROTH & CLARK, INC.	FIGURE NO.
20080550	CONSULTING ENGINEERS	4-2
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4.6. D-A-F Complex Renovations

Ten States' Standards includes the following provision (paragraph #54.6) related to wastewater treatment facilities design and planning: "Readily accessible storage space and workbench facilities shall be provided, and consideration shall be given to provision of a garage for large equipment storage, maintenance, and repair."

The DSDS currently stores new and used replacement parts in several areas of the Plant and in leased storage space located off-site. Accessibility and staff efficiency would be improved by consolidating these multiple storage and work areas into one central location, as well as eliminating the costs associated with leasing outside storage. The former D-A-F Building is no longer used for wastewater treatment processes and would be an ideal building to utilize for storage and to provide space for equipment storage, maintenance and repair. Other buildings to be renovated (roofing, painting, plumbing, H&V, new lighting, arch flash study, etc.) include the Maintenance Building, the Employee Service Building, the Maintenance Garage, and the Administration Building. This work is common to both alternatives to allow for continued use of these facilities. See Figure 4-3 for these buildings.

4.6.1. Alternative A, Utilize Former D-A-F Building for the Equipment Repair Facility *(Selected Alternative)*

This would involve utilizing (re-purposing) the existing D-A-F Building for the new Equipment Repair Facility. The D-A-F Building would be rehabilitated into a storage and repair space, which includes floor work, new insulation, masonry repair and sealing, interior and exterior painting, new office walls and ceiling, refurbishing two overhead doors, plumbing, new windows, new doors, mezzanines, materials handling equipment, H&V, plumbing, new fire suppression system, and electrical and SCADA work.

4.6.2. Alternative B, "No Action." Continue to Lease Storage as Needed

This would continue to utilize the current system where no central, organized storage and repair facility is available to the Plant. The DSDS would continue to lease off-site storage. The current cost of leasing the space is approximately $60,000 annually. In addition, it requires approximately double an operator's time to access and utilize this space, due to the additional travel time and coordination effort as compared to utilizing a building on site. Shelving and handling equipment would be added to make this storage space more accessible.

4.6.3. D-A-F Complex Renovations Cost Comparison and Summary

Re-purposing the existing building would provide more localized and organized storage for the DSDS. The life cycle costs for these alternatives are summarized below:

Table 4-3: D-A-F Complex Renovations Cost Comparison

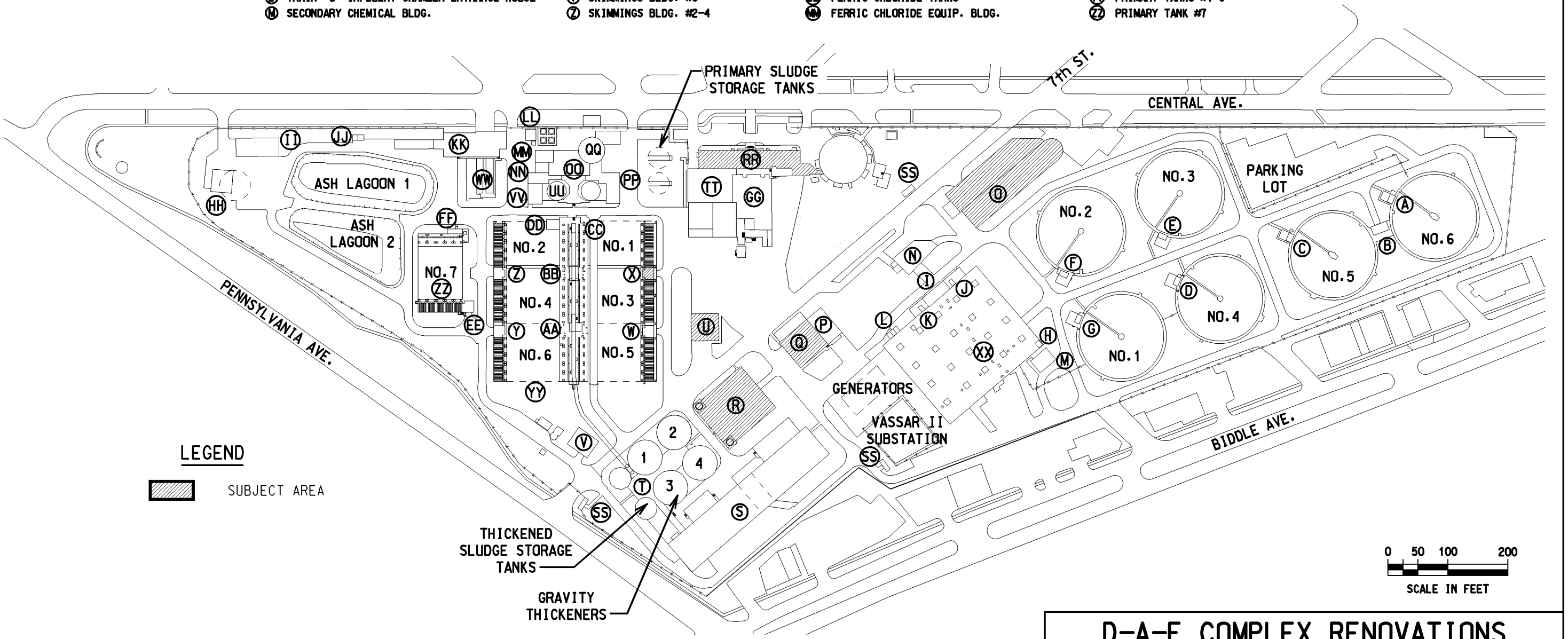
	Alternative A Utilize D-A-F Building	Alternative B Continue Leasing Space
Capital Costs	$2,516,000	$637,000
Present Worth of Annual OM&R	$520,000	$2,110,000
Total Present Worth	$2,568,000	$2,589,000

4.6.4. Selected Alternative

Alternative "A" is the selected alternative for the D-A-F Complex Renovations Project and includes the elements described in Section 4.6.1. The following figure shows the areas and buildings that are involved with this project.

DOWNRIVER WASTEWATER TREATMENT FACILITY

- (A) CLARIFIER BLDG. #6
- (B) RETURN ACTIVATED SLUDGE BLDG.
- (C) CLARIFIER BLDG. #5
- (D) CLARIFIER BLDG. #4
- (E) CLARIFIER BLDG. #3
- (F) CLARIFIER BLDG. #2
- (G) CLARIFIER BLDG. #1
- (H) SAMPLE BLDG.
- (I) SECONDARY OXYGEN CONTROL BLDG.
- (J) N. INFLUENT CHAMBER ENTRANCE HOUSE
- (K) S. INFLUENT CHAMBER ENTRANCE HOUSE
- (L) TRAIN "O" INFLUENT CHAMBER ENTRANCE HOUSE
- (M) SECONDARY CHEMICAL BLDG.
- (N) SECONDARY LOW LIFT PUMP STATION
- (O) MAINTENANCE BLDG.
- (P) STOCKROOM #1
- (Q) EMPLOYEE SERVICE BLDG.
- (R) DISSOLVED AIR FLOTATION (DAF) BLDG.
- (S) SOLIDS HANDLING BLDG.
- (T) SOLIDS THICKENING COMPLEX
- (U) MAINTENANCE GARAGE
- (V) SKIMMINGS PUMP BLDG.
- (W) SKIMMINGS BLDG. #5
- (X) SKIMMINGS BLDG. #1-3
- (Y) SKIMMINGS BLDG. #6
- (Z) SKIMMINGS BLDG. #2-4
- (AA) PRIMARY MOTOR CONTROL CENTER #1-6
- (BB) PRIMARY PUMP GALLERY
- (CC) PRIMARY PUMP GALLERY ENTRANCE HOUSE
- (DD) PRIMARY POLYMER BLDG.
- (EE) SKIMMINGS BLDG. #7
- (FF) PRIMARY MOTOR CONTROL CENTER #7
- (GG) ULTRAVIOLET DISINFECTION
- (HH) TUNNEL PUMP STATION
- (II) TUNNEL PUMP STATION ELECT. BLDG.
- (JJ) RECYCLE SAMPLE BLDG.
- (KK) AERATED GRIT BLDG.
- (LL) FERRIC CHLORIDE TANKS
- (MM) FERRIC CHLORIDE EQUIP. BLDG.
- (NN) WEST GRIT BLDG.
- (OO) FINE SCREENS BLDG.
- (PP) EAST GRIT BLDG.
- (QQ) INFLUENT PUMP STATION
- (RR) ADMINISTRATION BLDG.
- (SS) WATER METER BLDG. (3 SHOWN)
- (TT) OLD SOLIDS BLDG.
- (UU) DETRITORS
- (VV) OLD GREASE BURNER BLDG.
- (WW) AERATED GRIT TANKS
- (XX) AERATION TANKS
- (YY) PRIMARY TANKS #1-6
- (ZZ) PRIMARY TANK #7



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D-A-F COMPLEX RENOVATIONS

JOB NO.	HUBBELL, ROTH & CLARK, INC.	FIGURE NO.
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4.7. Headworks System Renovations

The Headworks System Renovations project includes work to the multiple processes encompassing the headworks area of the DWTF. This includes replacement of sluice and slide gates and or actuators at multiple locations, replacement of Fine Screen Nos. 5, 6 and 7 and conveyance equipment, valve vault improvements, sampling system consolation, industrial water (IW) booster pump skid, and miscellaneous process and building improvements.

Fine Screen Nos. 5, 6, and 7 would also be replaced under both alternatives. Work common to both alternatives include the demolition and replacement of the screenings conveyor. Alternatives for the replacement of the Fine Screens are discussed below.

4.7.1. Alternative A, Replace Fine Screens with Similar Equipment (Duperon FlexRake) *(Selected Alternative)*

This Alternative A includes the following items:

- Replacement of Fine Screen Nos. 5, 6, and 7 with Duperon FlexRake screens nearly identical to Fine Screens 1 through 4, which are currently under construction. Fine Screens 5 and 6 would have a design capacity of 50 MGD, while Fine Screen 7 would be rated for 75 MGD. Work includes demolition and replacement of the screenings conveyor.
- Improve the Junction Chamber located just upstream of the Influent Pump Station (IPS). The improvements will include replacing the Bypass Gate W-903 and actuator, and Bypass Flap Gate JC-4. Install the actuators at grade, and provide for a façade wall, security fence, or other means to protect the actuator. Also replace the actuators and stems for sluice gates W-901 and W-902. Replace slide gates CC-1, CC-2, BC-1 and BC-2 at the Junction, Bypass and Control Chambers.
- Improve the Check Valve Vault, serving Influent Pumping Station Pump Nos. 5 and 6; including replacing the check valves and replacing the sump pump system in the valve pit with a gravity sewer.
- Rehabilitate the gripper to the wet well gripper-type screen.
- Revise the influent channel for the Detritors to balance the flow across each detritor, while minimizing headloss and allowing grit to pass. Replace the Detritor grit collector and conveyance equipment.
- Replace the existing Aerated Grit screw auger with a washing-compacting screw conveyor. Replace Aerated Grit Blower 650, 651 and 652, and associated valves and piping. Replace the effluent gates to Aerated Grit Tank 1 and 2, and provide separate drains to all three tanks.
- Consolidate sampling operations for all permit-required samples into a central location in the Old Solids Building, including new samplers, slop sink, potable and industrial water, piping and valves..
- Provide new sewer vactor truck receiving and discharge station.
- Provide a new Outfall Gate.
- Provide screened final effluent (SFE) to the headworks. Provide a new industrial water Booster Pump System in the Old Solids Building. Replace utilities installed prior to 1970 in the headworks area.

- Demolish existing Recycle Sample Building.
- Refurbish the following buildings associated with these processes (including roof replacement, miscellaneous masonry repairs, replacement doors, painting, new H&V and/or new electrical, as needed): Aerated Grit Building, East and West Grit Buildings, Fine Screens Building, Old Solids Building, Influent Pump Station Building, Tunnel Pump Station Building and Tunnel Pump Station Electrical Building.

4.7.2. Alternative B, Replace Fine Screens with Different Design (Mahr Bar)

This Alternative B includes all of the work items from Alternative A, except the existing Fine Screen Nos. 5, 6, and 7 would be replaced with the Mahr Headworks type screen. This screen is similar to the FlexRake, but is design with a lower bearing assembly.

4.7.3. Headworks System Renovations Cost Comparison and Summary

The principal difference in the two manufacturer's screens is the lower bearing assembly. The Mahr Bar (Alternative B) assembly contains bushings that are submerged, while the FlexRake (Alternative A) has jointed couplings, which eliminates the need for the lower assembly.

The life cycle costs for these alternatives are summarized below:

Table 4-4: Headworks System Renovations Cost Comparison

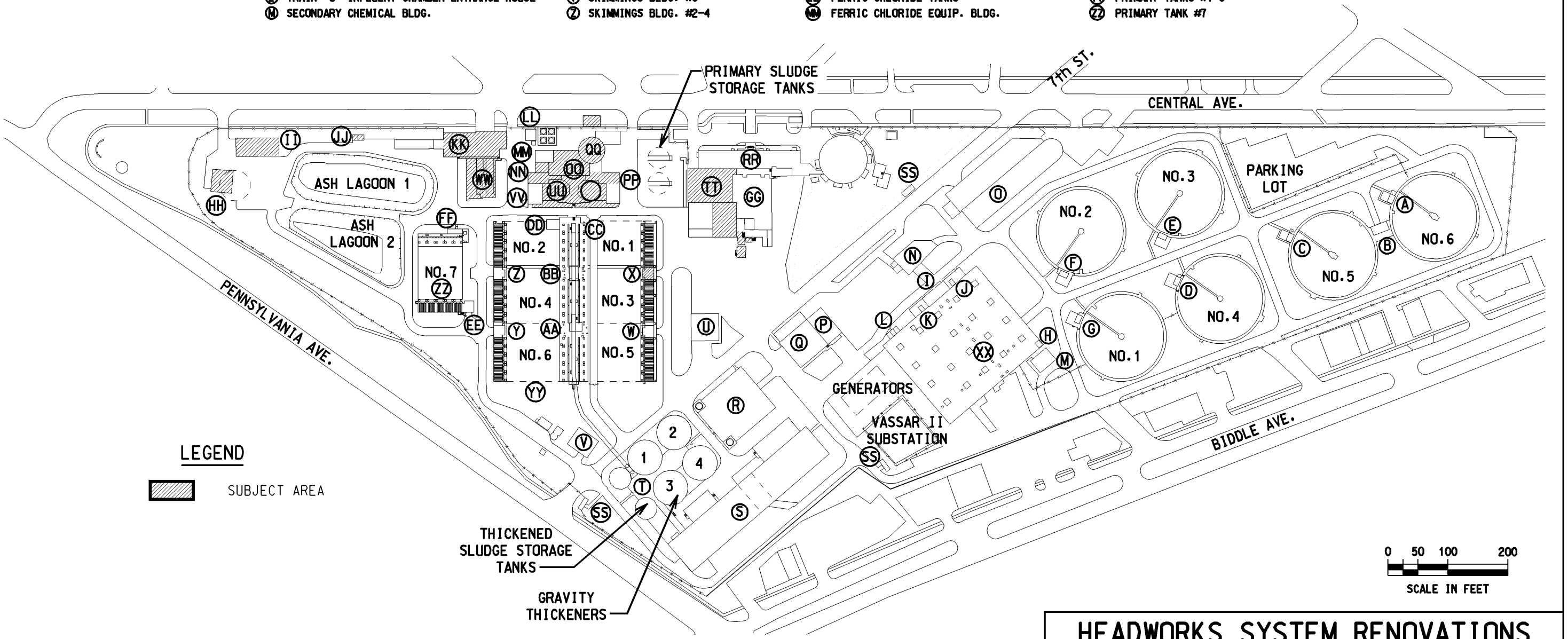
	Alternative A Duperon FlexRake	Alternative B Mahr Bar
Capital Costs	$2,335,000	$2,454,000
Present Worth of Annual OM&R	$207,000	$181,000
Total Present Worth	$2,542,000	$2,635,000

4.7.4. Selected Alternative

Alternative "A" is the selected alternative for the Headworks System Renovations Project and includes the elements described in Section 4.7.1. The following figure shows the areas and buildings that are involved in this project.

DOWNRIVER WASTEWATER TREATMENT FACILITY

- (A) CLARIFIER BLDG. #6
- (B) RETURN ACTIVATED SLUDGE BLDG.
- (C) CLARIFIER BLDG. #5
- (D) CLARIFIER BLDG. #4
- (E) CLARIFIER BLDG. #3
- (F) CLARIFIER BLDG. #2
- (G) CLARIFIER BLDG. #1
- (H) SAMPLE BLDG.
- (I) SECONDARY OXYGEN CONTROL BLDG.
- (J) N. INFLUENT CHAMBER ENTRANCE HOUSE
- (K) S. INFLUENT CHAMBER ENTRANCE HOUSE
- (L) TRAIN "O" INFLUENT CHAMBER ENTRANCE HOUSE
- (M) SECONDARY CHEMICAL BLDG.
- (N) SECONDARY LOW LIFT PUMP STATION
- (O) MAINTENANCE BLDG.
- (P) STOCKROOM #1
- (Q) EMPLOYEE SERVICE BLDG.
- (R) DISSOLVED AIR FLOTATION (DAF) BLDG.
- (S) SOLIDS HANDLING BLDG.
- (T) SOLIDS THICKENING COMPLEX
- (U) MAINTENANCE GARAGE
- (V) SKIMMINGS PUMP BLDG.
- (W) SKIMMINGS BLDG. #5
- (X) SKIMMINGS BLDG. #1-3
- (Y) SKIMMINGS BLDG. #6
- (Z) SKIMMINGS BLDG. #2-4
- (AA) PRIMARY MOTOR CONTROL CENTER #1-6
- (BB) PRIMARY PUMP GALLERY
- (CC) PRIMARY PUMP GALLERY ENTRANCE HOUSE
- (DD) PRIMARY POLYMER BLDG.
- (EE) SKIMMINGS BLDG. #7
- (FF) PRIMARY MOTOR CONTROL CENTER #7
- (GG) ULTRAVIOLET DISINFECTION
- (HH) TUNNEL PUMP STATION
- (II) TUNNEL PUMP STATION ELECT. BLDG.
- (JJ) RECYCLE SAMPLE BLDG.
- (KK) AERATED GRIT BLDG.
- (LL) FERRIC CHLORIDE TANKS
- (MM) FERRIC CHLORIDE EQUIP. BLDG.
- (NN) WEST GRIT BLDG.
- (OO) FINE SCREENS BLDG.
- (PP) EAST GRIT BLDG.
- (QQ) INFLUENT PUMP STATION
- (RR) ADMINISTRATION BLDG.
- (SS) WATER METER BLDG. (3 SHOWN)
- (TT) OLD SOLIDS BLDG.
- (UU) DETRITORS
- (VV) OLD GREASE BURNER BLDG.
- (WW) AERATED GRIT TANKS
- (XX) AERATION TANKS
- (YY) PRIMARY TANKS #1-6
- (ZZ) PRIMARY TANK #7



HEADWORKS SYSTEM RENOVATIONS

JOB NO.	HUBBELL, ROTH & CLARK, INC.	FIGURE NO.
20080550	CONSULTING ENGINEERS	4-4
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4.8. Collection System Improvements

The equipment associated with the collection system SCADA system requires upgrades as described in Section 3. Two alternatives for improvement were reviewed and are described as follows:

4.8.1. Alternative A, Upgrade with Existing RTUs with Newer Model

The various DSDS SCADA sites that monitor and report level, flow, precipitation, gate position, etc. would be upgraded to create a single, integrated control system and to replace existing components that have served their useful lives. This work would include the following:

- Replace existing field instruments. This includes the flow meters, level sensors, rain gauges, position switches, etc.
- At existing small data volume sites, battery backup power supplies would be provided. At the six sites without electrical power, solar panels would be used to provide power to the RTU.
- Replace the existing Telog R33xx Remote Teloger Units (RTUs) with the manufacturer's new model. The RTUs cannot be upgraded and must be replaced with the manufacturer's new product line.
- The new RTUs would be integrated into the DWTF SCADA system using digital cellular communications.

4.8.2. Alternative B, Replace Existing RTUs with Other Programmable Device

This Alternative has the following work items in common with Alternative A:

- Replace existing field instruments at the small data volume sites. This includes the flow meters, level sensors, rain gauges, position switches, etc.
- At existing small data volume sites, battery backup power supplies would be provided. At the six sites without electrical power, solar panels would be used to provide power to the RTU.

The additional work to upgrade the small volume data sites to a single, integrated control system proposed as part of Alternative B includes the following:

- Replace the existing Telog R33xx RTUs with a single, standardized PLC/RTU product at each remote site.
- A new standard enclosure would be provided to house the PLC/RTU and all associated components.

4.8.3. Collection System SCADA Improvements Cost Comparison and Summary

The existing Telog RTUs have been reliable and the WCDOE staff is familiar with the units. The capital and recurring costs for each alternative are similar, and the County may therefore want to conduct a pilot test of each alternative before making a selection. Both alternatives have an estimated project cost of approximately $6,500,000. Figure 4-5 shows the DSDS district boundary and the sewers that are monitored by the SCADA system.

In addition, repair of the segment of the DSDS collection system sewers is required as a Priority 1 project, as described in Section 3. Two alternatives for the sewer repairs were reviewed and are described as follows:

4.8.4. Alternative A, Pressure Grouting *(Selected Alternative)*

This Alternative utilizes pressure grouting to repair the deficient areas found in the recent sewer survey. The work would be performed within the sewer, with no open cut excavation. The cost includes the required bypass pumping.

4.8.5. Alternative B, EPDM/Steel Bands

This Alternative utilizes a repair method such as the proprietary "WEKO-SEAL" product, which is a flexible rubber leak clamp that provides a non-corrodible seal around the inside of the pipe-joint area. Similarly to pressure grouting, the work would be performed within the sewer and the cost includes the required bypass pumping.

4.8.6. Collection System Sewer Improvements Cost Comparison and Summary

The life cycle costs for these alternatives are summarized below:

Table 4-5: Collection System Sewer Improvements Cost Comparison

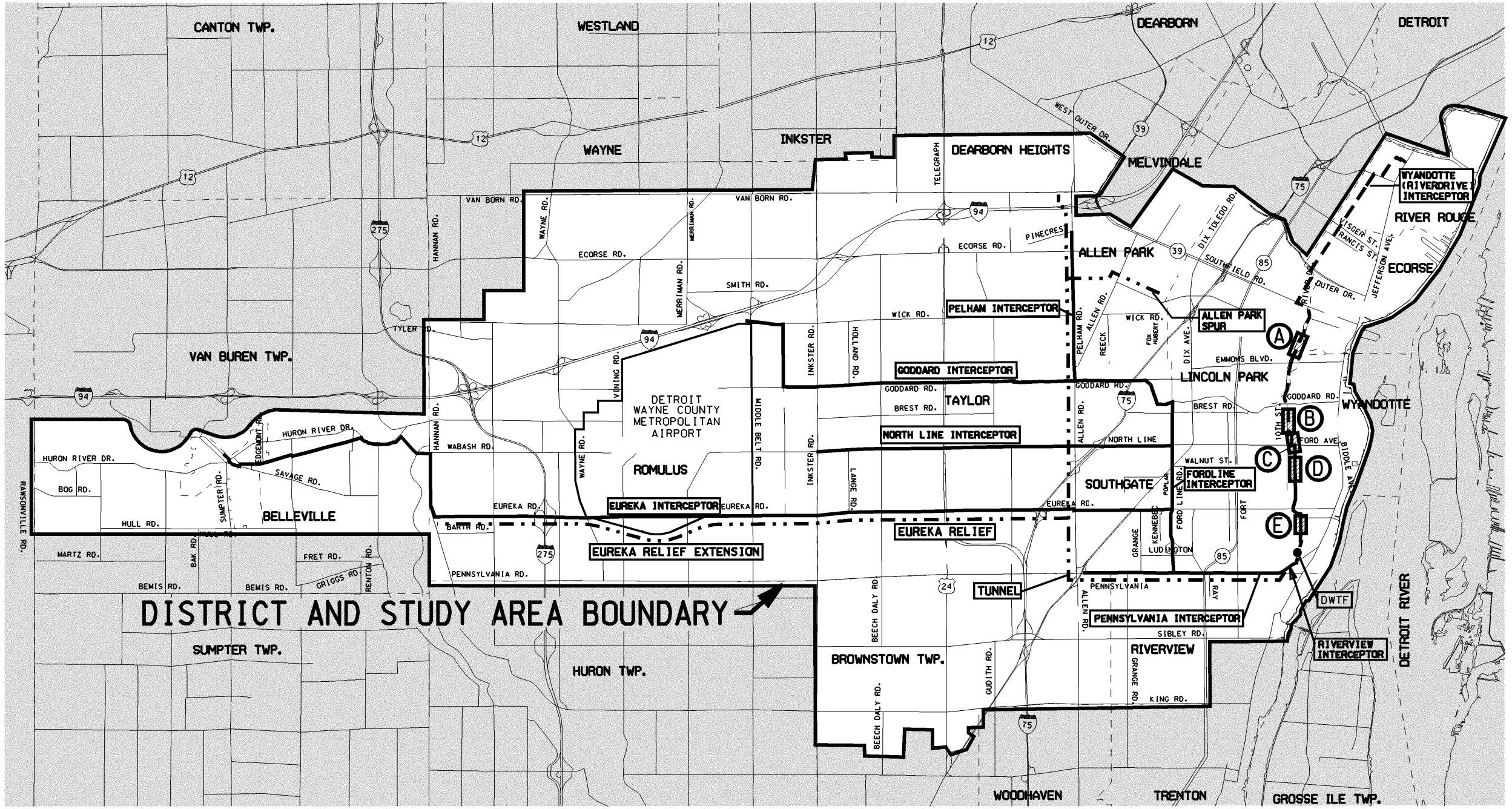
	Alternative A Pressure Grouting	Alternative B EPDM/Steel Bands
Capital Costs	$1,706,000	$2,296,000
Present Worth of Annual OM&R	$40,000	$32,000
Total Present Worth	$1,746,000	$2,328,000

4.8.7. Selected Alternative

Alternative "A" (described in Section 4.8.1) is recommended for the SCADA System improvements. The various DSDS SCADA sites that monitor and report level, flow, precipitation, gate position, etc. would be upgraded to create a single, integrated control system and to replace existing components that have served their useful lives. The project would include the elements described in Section 4.8.1.

Alternative "A" (described in Section 4.8.4) is recommended for the System Repairs. This alternative utilizes pressure grouting to repair the deficient areas found in the recent sewer survey. The work would be performed within the sewer, with no open cut excavation. The repair cost also includes the required cost for bypass pumping.

The following figure shows the portions of the sewer that were surveyed and would be addressed as part of this project.



COLLECTION SYSTEM ASSESSMENTS

Ⓐ WYI – CONTRACT NO. 1
RIVER DR. BETWEEN
EMMON BLVD. AND
NEW YORK AVE.
(APPROX. 832 L.F.)

Ⓑ WYI – CONTRACT NO. 1
10 TH ST. BETWEEN
ALKALI AND GODDARD
(APPROX. 2112 L.F.)

Ⓒ DSDS PART 1 – CONTRACT NO. 6
ELECTRIC AVE. BETWEEN
FORD AVE. AND ALKALI
(APPROX. 758 L.F.)

Ⓓ DSDS PART 1 – CONTRACT NO. 6
9TH ST. BETWEEN VINEWOOD AND
FORD AVE. (APPROX. 1800 L.F.)

Ⓔ DSDS PART 1 – CONTRACT NO. 6
8TH ST. BETWEEN ORCHARD AND
PINE (APPROX. 1053 L.F.)

LEGEND

WYANDOTTE (RIVERDRIVE) INTERCEPTOR (WYI) – 1938 CONSTRUCTION
DOWNRIVER SEWAGE DISPOSAL SYSTEM INTERCEPTOR (DSDS) – 1962 CONSTRUCTION
DOWNRIVER REGIONAL STORAGE AND TRANSPORT SYSTEM (DRSTS) – 1998 CONSTRUCTION
DOWNRIVER WASTEWATER TREATMENT FACILITY (DWTF)
COLLECTION SYSTEM ASSESSMENT LOCATIONS

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THE BACKGROUND FOR THIS FIGURE WAS CREATED BY:
Wade-Trim
P.O. Box 10
25251 Northline Road, Taylor, MI 48180
734-947-9700 / 800-482-2864
FAX No. 734-947-9726
CHECKED: BDH | DATE: 18-Aug-99

COLLECTION SYSTEM ASSESSMENT

JOB NO.		FIGURE NO.
20080550	HUBBELL, ROTH & CLARK, INC.	4-5
DATE	CONSULTING ENGINEERS	
APRIL, 2009	220 BAGLEY SUITE 420 DETROIT, MICH. 48226	

Section 5 - Recommended Projects

5.1. General

The following summarizes the recommended projects that will allow for continued operation of the existing DWTF through the 20-year planning period.

Priority 1 Projects – Years 2010-2014

- Solids Thickening Complex Renovations
- Secondary System Renovations
- D-A-F Complex Renovations
- Headworks System Renovations
- DSDS Collection System Renovations

Priority 2 Projects– Years 2015-2019

- Secondary Oxygen and Flow Control Improvements
- DSDS Sewer Rehabilitation Improvements
- Dewatering Complex Renovations
- Enhanced BioPhosphorus Removal
- Incineration Complex Renovations

Priority 3 Projects – Years 2020-2024

- Ultraviolet Disinfection System Renovations
- Instrumentation and SCADA System Renovations
- Class B Lime Stabilization Facility

Priority 4 Projects – Years 2025-2029

- Primary Treatment System Renovations
- Headworks and Secondary System Improvements

5.2. Monetary Cost Estimates

The following table provides a breakdown of the project costs for each element of the proposed project. Detailed project cost breakdowns are included in Appendix B.

Table 5-1: Cost Summary for Recommended Projects

Priority 1 Projects (FY 2010 to 2014)	Capital Cost
Solids Thickening Complex Renovations	$17,213,000
Secondary System Renovations	$7,516,000
D-A-F Complex Renovations	$6,832,000
Headworks System Renovations	$18,713,000
DSDS Collection System Improvements	$8,173,000
Total Priority 1 Projects	***$58,447,000***
Priority 2 Projects (FY 2015 to 2019)	**Capital Cost**
Secondary Oxygen and Flow Control Improvements	$6,344,000
DSDS Sewer Rehabilitation Improvements	$1,615,000
Dewatering Complex Renovations	$22,121,000
Enhanced BioPhosphorus Removal	$8,777,000
Incineration Complex Renovations	$21,230,000
Total Priority 2 Projects	***$60,087,000***
Priority 3 Projects (FY 2020 to 2024)	**Capital Cost**
Ultraviolet Disinfection System Rehabilitation	$17,226,000
Instrumentation and SCADA System Renovations	$11,491,000
Class B Lime Stabilization Facility	$23,381,000
Total Priority 3 Projects	***$52,098,000***
Priority 4 Projects (FY 2025 to 2029)	**Capital Cost**
Primary Treatment System Renovations	$9,834,000
Headworks and Secondary System Improvements	$34,867,000
Total Priority 4 Projects	***$44,701,000***
TOTAL ALL PROJECTS (FY 2010-2029):	**$215,333,000**

5.3. Authority to Implement Selected Alternative

Wayne County has the necessary legal, institutional, financial, and managerial authority and resources to build, operate, and maintain the wastewater facilities. Implementation of the proposed project requires a resolution of approval and adoption of the 2009 SRF Project Plan by the Wayne County Commission. The Wayne County Commission approved the 2009 SRF Project Plan at the June 18, 2009 meeting. A copy of the approved resolution is included in Appendix D.

5.4. Water Quality Management Plans

The Southeast Michigan Council of Governments (SEMCOG) is the regional planning commission for Wayne County. A copy of the draft 2009 SRF Project Plan was submitted to SEMCOG for their review for consistency with local water quality management plans. Correspondence with SEMCOG is included in Appendix C.

5.5. User Costs

The estimated costs to each of the 13 Downriver communities for the proposed Priority 1 projects (first five years) are presented in the following table, which also provides estimated typical costs per household.

Table 5-2

Cost for Typical Residential DSDS Customer for FY 2010 - 2014 DSDS Improvements

Community	Avg. Flow - 2003-2007 (1,000 gal/year) Base	Excess	% of Total Flow 5 Yr. Ave.	5-Yr Project Cost Share	Annual Capital Cost	Annual O,M&R Cost	Annual Cost per Household (3)
Allen Park	749,172	518,907	6.11%	$3,569,940	$229,001	$2,749	**$30.93**
Belleville	159,970	94,479	1.23%	$716,334	$45,951	$552	**$29.07**
Brownstown Township	465,751	199,071	3.20%	$1,871,629	$120,059	$1,441	**$26.09**
Dearborn Heights	804,214	425,192	5.92%	$3,461,063	$222,017	$2,665	**$27.94**
Ecorse	1,039,393	656,332	8.17%	$4,773,861	$306,229	$3,676	**$29.82**
Lincoln Park	1,477,601	957,990	11.73%	$6,856,758	$439,840	$5,279	**$30.12**
River Rouge	632,775	507,096	5.49%	$3,209,004	$205,848	$2,471	**$32.92**
Riverview	673,051	346,130	4.91%	$2,869,232	$184,053	$2,209	**$27.67**
Romulus	1,992,551	958,447	14.21%	$8,307,748	$532,917	$6,396	**$27.07**
Southgate	1,165,380	606,856	8.54%	$4,989,256	$320,046	$3,841	**$27.79**
Taylor	2,604,276	1,235,098	18.49%	$10,808,736	$693,348	$8,322	**$26.94**
Van Buren Township	242,032	90,447	1.60%	$936,004	$60,042	$721	**$25.11**
Wyandotte	1,540,355	618,413	10.40%	$6,077,435	$389,849	$4,679	**$25.61**
Total	**13,546,520**	**7,214,456**	**100%**	**$58,447,000**	**$3,749,198**	**$45,000**	

(1) Community allocation is based on each community's portion of the total rate year cost.
(2) Annual capital costs and O,M&R costs are based on SRF financing at an interest rate of 2.5%.
(3) Household costs are based on 100,000 gallons per year of water use.

5.6. Schedule

The proposed schedule for implementation of Priority 1 projects is shown in the table below. The proposed year and quarter in which an SRF loan will be sought is included.

Table 5-3: Proposed Schedule for Priority 1 Projects

Priority 1 Projects (FY 2010 to 2014)	SRF Fiscal Year	SRF Financing Quarter
Solids Thickening Complex Renovations	2010	3rd Quarter
Secondary System Renovations	2011	2nd Quarter
D-A-F Complex Renovations	2011	4th Quarter
Headworks System Renovations	2012	4th Quarter
DSDS Collection System Improvements	2013	4th Quarter

Section 6 - Environmental Impacts

6.1. General

Analysis of anticipated environmental impacts resulting from the construction of the proposed project impacts must address beneficial and adverse, short and long term, and irreversible and irretrievable impacts.

6.1.1. Long-Term Impacts

The implementation of the 2009 SRF Project Plan would allow for improved operation of the existing facilities by replacing and upgrading equipment that has served its useful life or has been subject to excessive downtime for maintenance.

No acquisition of private property is required for the implementation of the 2009 SRF Project Plan. The project will be constructed adjacent to and within the existing facilities for economical purposes and in order to minimize any adverse impacts to historic or environmental resources.

6.1.2. Short-Term Impacts

The implementation of the 2009 SRF Project Plan will create indirect and induced employment in other economic sectors of the area and at sites where materials for the construction programs are manufactured. No residents would be displaced because of construction activities.

Construction will take place at the existing facility sites, and there would be heavy traffic to and from the construction sites. Environmental disruption, including noise, soil erosion, fumes, etc., would occur during construction. All of these factors would produce temporary adverse aesthetic impacts.

6.1.3. Irreversible Impacts

The investment in non-recoverable resources committed to the 2009 SRF Project Plan would be traded off for the restored and improved performance of the facilities during the life of the system. The commitment of resources includes public capital, energy, labor, and unsalvageable materials. These non-recoverable resources would be foregone for the provision of the proposed improvements. Construction accidents associated with this project may cause irreversible bodily injuries or death. Accidents may also cause damage to or destruction of equipment and other resources.

Section 7 - Mitigation

7.1. General

The 2009 SRF Project Plan is required to include proposed mitigation of any potential adverse impacts on the environment. As described in Section 6.1, the overall environmental impact of the project will allow for water quality improvement, through continued operation of the DWTF.

7.2. Mitigation of Long-Term Impacts

The potential soil erosion impact would be mitigated through the contractor's required compliance with a program for control of soil erosion and sedimentation, as specified in Part 91 of Michigan Act 451, P.A. of 1994. Areas of any earth-changing activities will be restored to the existing condition.

7.3. Mitigation of Short-Term, Construction-Related Impacts

Environmental disruption will occur during construction. Guidelines will be established for cover vegetation removal, dust reduction, traffic control, and accident prevention. Once construction is completed those short-term effects will stop and the area will be returned to the original conditions insofar as possible.

Section 8 - Public Participation

8.1. General

The 2009 SRF Project Plan was advertised in local papers for each of the 13 communities, which included three separate publications: *The View, The Sunday Press and Guide, and The Sunday News Herald* (see Appendix E.) Copies of the document were available for public review and inspection at the Clerk's Office for the each of the 13 communities (Allen Park, Belleville, Brownstown Twp., Dearborn Heights, Ecorse, Lincoln Park, River Rouge, Riverview, Romulus, Southgate, Taylor, Van Buren Twp., and Wyandotte); at HRC's Detroit office, and at the Wayne County Department of Environment's Detroit office, beginning on April 20, 2009.

Written comments were invited to be sent to the Wayne County Department of Environment, but none were received from the general public as of the close of the public comment period on June 12, 2009. Copies of correspondence related to agency notifications and MDEQ correspondence on the 2009 SRF Project Plan are included in Appendix C.

8.2. Public Hearing

A formal public hearing was held on May 20, 2009 at 1:30 p.m. at the City of Taylor's City Hall to review the work associated with the proposed 2009 SRF Project Plan. The hearing reviewed the information presented in the 2009 SRF Project Plan, including estimated user costs, and provided an opportunity for interested persons to present comments or questions. No comments or questions were received, however. An attendance sheet, a transcript of the hearing, and copies of the slides presented are included in Appendix F.

8.3. Resolution

A resolution by the Wayne County Commission, dated June 18, 2009, adopting the proposed 2009 SRF Project Plan is provided in Appendix D.

Section 9 - Glossary

Term	Description
• 10-year Storm	A storm of a designated duration (ranging from 30 minutes to 24 hours) that has a 10% chance of occurring in a given year.
• 100-year Storm	A storm of a designated duration (ranging from 30 minutes to 24 hours) that has a 1% chance of occurring in a given year.
• AOC	Area of Concern, relates to
• Average Flow	The average quantity of flow that passes a point over a given period of time.
• Biochemical Oxygen Demand (BOD)	A measure of wastewater pollutant strength that quantifies oxygen consumed in a stated period of time, usually 5 days at 20°C. Includes oxygen consumed in ammonia oxidation.
• Bypass	The measurable diversion of raw sewage out of the sewer system.
• cfs	Cubic feet per second.
• CIP	Capital Improvement Projects
• Cost-Effectiveness Analysis	An analysis performed to determine which alternate collection or treatment system would result in the minimum total resource cost to meet the requirements. A cost-effectiveness analysis for a sewer system determines this by comparing with total costs for transportation and treatment of the infiltration/inflow.
• Cost-Effectiveness Guidelines	Developed by EPA to aid grantees in the selection of a system component which will result in the minimum total resources cost over a fixed period of time to meet federal, state, and local requirements.
• CSO	Combined Sewer Overflow. CSOs occur during wet weather events when the capacity of a combined sewerage system (where stormwater and sanitary flows are conveyed in a single pipe) is exceeded.
• Dissolved Air Floatation (DAF)	The separation of flocculated material from liquid by contact with minute bubbles causing the air/floc mass to be buoyed to the surface, leaving behind clarified water.
• Design Flow	The average quantity of wastewater which a treatment facility or collection system component is designed to handle. Usually expressed in millions of gallons per day (MGD) or cubic feet per second (cfs).
• Design Period	Time span over which proposed collector or treatment facilities are expected to be operating; period over which facility costs are amortized.
• Dissolved Oxygen (D.O.)	Molecular (atmospheric) oxygen dissolved in water or wastewater.
• DRSTS	Downriver Regional Storage and Transport System
• Drainage District or Watershed	The tributary area of a particular point on a channel system that contributes storm water runoff upstream of that point.
• DSDS	Downriver Sewage Disposal System

Term	Description
• Elutriation	A process of sludge conditioning whereby the sludge is washed with either fresh water or plant effluent to reduce the demand for conditioning chemicals and to improve the settling and/or filtering characteristics of the solids. Excessive alkalinity is removed during this process.
• Enhanced Biological Phosphorus Removal (EBPR)	A wastewater treatment configuration applied to activated sludge systems for the removal of phosphate.
• Environmental Impact Assessment (EIA)	A preliminary evaluation of the potential environmental impacts (positive and negative) of a proposed federally funded project. It should be submitted as part of a Project Plan.
• Environmental Impact Statement (EIS)	A detailed analysis of the potential environmental impacts of a proposed project required when the EPA Regional Administrator determines that a project is highly controversial or may have significant adverse environmental effects.
• EPA	Environmental Protection Agency
• EPDM	Ethylene-Propylene-Diene, M-class rubber is type of synthetic rubber, or an elastomer, which is characterized by wide range of applications.
• FEMA	Federal Emergency Management Agency.
• Flood	An overflow of lands not normally covered by water that is used or is usable to man. Normally a –flood" is considered as any temporary rise in stream flow and stage that results in significant adverse effects in the vicinity. (See surface runoff for comparison.)
• Floodplain	The relatively flat area or low land adjoining the channel of a river or stream, which has been or may be covered by floodwater. Formally defined as the area that would be flooded during a 100-year storm.
• Floodway	The channel of the stream plus any adjacent flood plain areas that must be kept free of encroachment such that a 100-year flood can be transported without increasing upstream water elevations more than 0.10 feet.
• Force Mains	Pipes used to transport wastewater under pressure against the force of gravity.
• FRP	Fiber-Reinforced Plastic
• GAC	Granular Activated Carbon
• gpd	Gallons per day.
• gpm	Gallons per minute.
• Head	A measure of pressure exerted by a fluid expressed as the height of an enclosed column of the fluid that could be balanced by the pressure in the system.
• Headloss	The difference in water level between the upstream and downstream sides of a treatment process attributed to friction losses.
• HDPE	High Density Polyethylene

Term	Description
• HRC	Hubbell, Roth & Clark, Inc.
• H&V / HVAC	Heating and Ventilation / Heating, Ventilation, and Air Conditioning.
• Hydraulic Gradient	The slope of the hydraulic grade line. This is the slope of the wastewater surface in an open channel or the slope of the water pressure for pipes under pressure.
• Hydrograph	A curve denoting the discharge of flow over a period of time.
• Infiltration/Inflow (I/I)	The total quantity of water from both infiltration and inflow without distinguishing the source.
• Infiltration	The water entering a sewer system from the soil through defective pipes, foundation drains, pipe joints, connections and manhole walls.
• Inflow	The water discharged into a sewer system from roof drains, cooling water discharges, drains from springs and swampy areas, manhole covers, cross-connections from storm sewers and combined sewers, catch basins, storm waters, surface runoff, street wash waters or drainage.
• Influent	The flow entering a treatment process.
• Interceptor	Any pipe, regardless of size that carries wastewater directly to the treatment plant. Generally, they are the largest pipes in the collection system.
• I/O	Input/Output (related to electrical and control devices)
• IPS	Influent Pumping Station
• Industrial Water (IW)	A water service separated from the potable water system by a backflow preventer. The potable water connection is typically a city-water connection.
• JMC	Joint Management Committee
• Lateral	The pipe to which individual houses and business establishments connect to public sewers.
• LEL	Lower Explosive Limit or Lower Exposure Limit
• Lift Station (Pump Station)	A facility within a sanitary sewer system which pumps flows from a lower elevation to a higher elevation.
• Main/Submain	The word —main" is frequently used loosely to indicate a large pipe, which is not a lateral and not an interceptor. If frequently forms one of the larger branches of a complex collection system.
• MDEQ	Michigan Department of Environmental Quality.
• MDNR	Michigan Department of Natural Resources
• MGD	Millions of gallons per day.
• MH	Manhole.
• MLSS	Mixed Liquor Suspended Solids

Term	Description
• National Pollutant Discharge Elimination System (NPDES)	The effluent discharge permit system established under the 1972 Federal Water Pollution Control Administration as part of the Clean Water Act, which places conditions on the type and concentration of pollutants that discharge to a waterway of the United States.
• OM&R	Operation, Maintenance, and Replacement. The MDEQ SRF Project Planning process requires a cost-effectiveness analysis that includes all present and future costs (OM&R) associated with a project to be considered.
• PAH	Polyaromatic Hydrocarbon
• PCB	Polychlorinated Biphenyl
• Peak Flow	The maximum quantity of flow that passes a point over a given period of time.
• PLC	Programmable Logic Controller
• Primary Impacts	Those which can be attributed directly to a proposed action.
• PSTPCP	Primary Solids Transfer Pumps Control Panel
• RAP	Remedial Action Plan
• Return Activated Sludge (RAS)	Settled activated sludge that is returned to mix with raw or primary settled wastewater.
• RTU	Remote Telemetry Unit. It is an electronic device that provides automatic transmission and measurement of data from remote sources by wire or radio or other means.
• Sanitary Sewer	A sewer intended to carry only sanitary and industrial wastewater from residences, commercial buildings, industrial plants, and institutions, including service connections.
• Sanitary Sewer System (Sewage Collection System)	The entire network of sanitary sewers and pumping stations which collect a municipality's wastewater.
• SCADA	Supervisory Control and Data Acquisition
• Secondary Impacts	Those resulting from indirect or induced changes in community land use patterns, population and economic growth, and environmental quality resulting from induced growth.
• SEMCOG	Southeast Michigan Council of Governments
• Service Area	The area which will be serviced by a wastewater treatment system.
• Sewage	Sewage refers to the wastewater from residential, commercial, and industrial establishments, which flows through the pipes to a treatment plant.
• Sewer	Sewer refers to the pipe used to transport wastewater.
• Sewer or Sanitary District	A sewer district is usually either a semi-autonomous governmental unit whose purpose is the provision of sewerage or a special assessment district within which sewerage facilities are provided to residents.

Term	Description
• Screened Final Effluent (SFE)	Effluent from the treatment facility that is screened and may be utilized for flushing and/or other industrial water needs.
• SMACP	Solids Management Area Control Panel
• SMGRI/O	Solids Management Gallery Remote Input/Output Panel
• State Revolving Fund (SRF)	This program was established to provide low cost financing for the construction of publicly owned water pollution control facilities. The program is jointly administered by the Michigan Municipal Bond Authority and the Michigan Department of Environmental Quality.
• Storm Sewer	A sewer intended to carry only storm waters, surface runoff, street wash waters, and drainage.
• S-W District	Southgate-Wyandotte Relief Drains Drainage District
• Surface Runoff	Water that is derived directly from precipitation and passes over the ground into storm sewers and water-courses (see –Flood" for comparison).
• TPS	Tunnel Pump Station
• Trunk Sewer	Generally, a large diameter municipal sewer that collects flow from smaller diameter municipal sewers and discharges to an interceptor sewer.
• Total Suspended Solids (TSS)	The measure of particulate matter suspended in a sample of water or wastewater. After filtering a sample of a known volume, the filter is dried and weighed to determine the residue retained.
• US EPA	The United States Environmental Protection Agency.
• User Charge	Fees levied upon users of a water or wastewater system, based on the volume and/or characteristics of the water.
• Ultraviolet Light (UV)	Light rays beyond the violet region in the visible spectrum; invisible to the human eye. UV light at a wavelength near to 254 nm inactivates microorganisms by directly damaging cellular nucleic acids.
• Variable Frequency Drive (VFD)	A control system that allows frequency of the current applied to a motor to be varied. The motor is connected to a low-frequency source while standing still; the frequency is then increased gradually until motor and pump (or other driven machine) operate at desired speed.
• Waste Activated Sludge (WAS)	Excess activated sludge that is discharged from an activated sludge treatment process.
• Water Quality Criteria	The levels of pollutants that affect the suitability of water for a given use. Generally, water use classification includes: public water supply, recreation, propagation of fish and other aquatic life, agricultural use and industrial use.
• WTP	Water Treatment Plant
• WWTF / WWTP	Wastewater Treatment Facility / Wastewater Treatment Plant

APPENDICES

A. NPDES Permit

B. Cost Estimates

C. Project Planning Correspondence

D. Resolution

E. Public Hearing Affidavits of Publication

F. Public Hearing Transcript

G. Long-Term Biosolids Plan (updated 2009)

Appendix A

NPDES Permit

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

October 2, 2008

Wayne County
Department of Environment
Facilities Management Division
415 Clifford
Detroit, Michigan 48226

Dear Sir/Madam:

SUBJECT: National Pollutant Discharge Elimination System (NPDES); Permit No. MI0021156
Designated Name: Wayne Co-Downriver WWTP

Your NPDES Permit has been processed in accordance with the appropriate state and federal regulations. It contains the requirements necessary for you to comply with state and federal water pollution control laws.

The issuance of this permit does not authorize the violation of any federal, state, or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Environmental Quality (DEQ) permits, or approvals from other units of government as may be required by law.

REVIEW THE PERMIT EFFLUENT LIMITS AND COMPLIANCE SCHEDULES CAREFULLY. These are subject to the criminal and civil enforcement provisions of both state and federal law. Permit violations are audited by the DEQ and the United States Environmental Protection Agency (USEPA), and may appear in a published quarterly noncompliance report made available to agencies and the public.

Your monitoring and reporting responsibilities must be complied with in accordance with this permit. If required by the permit, self-monitoring data shall be reported via the Michigan DEQ Electronic Environmental Discharge Monitoring Reporting (e2-DMR) system. Other reports, notifications, or questions regarding the enclosed permit or the NPDES program should be directed to the following address:

Ms. Hae-Jin Yoon, District Supervisor
Southeast Michigan District Office, Water Bureau, DEQ
27700 Donald Court
Warren, Michigan 48092-2793
Telephone: 586-753-3700, Fax: 586-753-3751

Sincerely,

Daniel Dell (DEA)

Daniel Dell, Acting Chief
Permits Section
Water Bureau
517-241-1346

dd/sea

Enclosure: Permit No. MI0021156
cc/enc: USEPA-Region 5
208 Agency – Southeast Michigan Council of Governments
Mr. Firooz Fath-Azam, Superintendent, Wayne County Wyandotte Wastewater Treatment Plant
Ms. Hae-Jin Yoon, Southeast Michigan District Supervisor, Water Bureau (electronic)
PCS Unit, Water Bureau
File

PERMIT NO. MI0021156

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et seq; the "Federal Act"), Michigan Act 451, Public Acts of 1994, as amended (the "Michigan Act"), Parts 31 and 41, and Michigan Executive Orders 1991-31, 1995-4, and 1995-18,

Wayne County
Department of Environment
Facilities Management Division
415 Clifford
Detroit, Michigan 48226

is authorized to discharge from the **Wayne County Downriver Wastewater Treatment Facility** located at

797 Central Avenue
Wyandotte, Michigan 48192

designated as **Wayne Co-Downriver WWTP**

to the receiving water named the Trenton Channel of the Detroit River in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

This permit is based on a complete application submitted on July 16, 2007.

This permit takes effect on November 1, 2008. The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its effective date this permit shall supersede NPDES Permit No. MI0021156, expiring October 1, 2007.

This permit and the authorization to discharge shall expire at midnight, **October 1, 2012**. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application which contains such information, forms, and fees as are required by the Department by **April 4, 2012**.

Issued September 26, 2008

Daniel Dell

Daniel Dell, Acting Chief
Permits Section
Water Bureau

PERMIT FEE REQUIREMENTS

In accordance with Section 324.3120 of the Michigan Act, the permittee shall make payment of an annual permit fee to the Department for each October 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by January 15 for notices mailed by December 1. The fee is due no later than 45 days after receiving the notice for notices mailed after December 1.

In accordance with Section 324.3132 of the Michigan Act, the permittee shall make payment of an annual biosolids land application fee to the Department if the permittee land applies biosolids. In response to the Department's annual notice, the permittee shall submit the fee, which shall be postmarked no later than January 31 of each year.

CONTACT INFORMATION

Unless specified otherwise, all contact with the Michigan Department of Environmental Quality (the "Department") required by this permit shall be made to the Southeast Michigan District Supervisor of the Water Bureau. The Southeast Michigan District Office is located at 27700 Donald Court, Warren, Michigan 48092-2793, telephone: 586-753-3700, fax: 586-753-3751.

CONTESTED CASE INFORMATION

Any person who is aggrieved by this permit may file a sworn petition with the State Office of Administrative Hearings and Rules of the Michigan Department of Labor and Economic Growth, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Department of Labor and Economic Growth may reject any petition filed more than 60 days after issuance as being untimely.

PART I

Section A. Limitations and Monitoring Requirements

1. Final Effluent Limitations, Monitoring Point 001A – Post Disinfection

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge treated municipal wastewater from Monitoring Point 001A through Outfall 001 and/or Outfall 002. Outfall 001 and Outfall 002 discharge to the Trenton Channel of the Detroit River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration					
Parameter	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units	Frequency of Analysis	Sample Type
Flow	(report)	---	(report)	MGD	---	---	---	---	Daily	Report Total Daily Flow
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	26,000	42,000	---	lbs/day	25	40	---	mg/l	Daily	24-Hr Composite
Total Suspended Solids	31,000	47,000	---	lbs/day	30	45	---	mg/l	Daily	24-Hr Composite
Total Phosphorus (P)	1,000	---	---	lbs/day	1.0	---	---	mg/l	Daily	24-Hr Composite
Ammonia Nitrogen (N)	(report)	---	(report)	lbs/day	(report)	---	(report)	mg/l	Daily	24-Hr Composite
Fecal Coliform Bacteria	---	---	---	---	200	400	---	cts/100 ml	Daily	Grab
Oil and Grease	10,000	---	---	lbs/day	10	---	---	mg/l	Daily	Grab
Total Mercury	(report)	---	---	lbs/day	(report)	---	---	ng/l	Quarterly	Grab
	12-Month Rolling Average				12-Month Rolling Average					
	0.010	---	---	lbs/day	10	---	---	ng/l	Quarterly	Calculation
					Minimum Monthly					
BOD_5 Minimum % Removal	---	---	---	---	85	---	---	%	Monthly	Calculation
Total Suspended Solids Minimum % Removal	---	---	---	---	85	---	---	%	Monthly	Calculation
					Minimum Daily		Maximum Daily			
pH	---	---	---	---	6.0	---	9.0	S.U.	Daily	Grab
Dissolved Oxygen	---	---	---	---	4.0	---	---	mg/l	Daily	Grab

The following design flow was used in determining the above limitations, but is not to be considered a limitation or actual capacity: 125 MGD

PART I

Section A. Limitations and Monitoring Requirements

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Sampling Locations
Samples for $CBOD_5$, total suspended solids, ammonia nitrogen and total phosphorus shall be taken prior to disinfection. Samples for dissolved oxygen, fecal coliform bacteria, and pH shall be taken after disinfection. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.

c. Ultraviolet Disinfection
It is understood that ultraviolet light will be used to achieve compliance with the fecal coliform limitations. If disinfection other than ultraviolet light will be used, the permittee shall notify the Department in accordance with Part II.C.11. - Changes in Facility Operations.

d. Percent Removal Requirements
These requirements shall be calculated based on the monthly (30-day) effluent $CBOD_5$ and total suspended solids concentrations for Monitoring Point 001A and the monthly influent concentrations for approximately the same period. These requirements are in effect for all periods of discharge up to and including the accepted annual average design flow rate of the wastewater treatment plant, currently 125 MGD. As allowed under 40 CFR 133, the permittee may submit a written demonstration to the Department that another design flow rate is appropriate. Upon receipt of written approval from the Department for an alternate design flow rate, and consistent with such approval, these permit requirements shall be in effect for the duration of the permit. The Department may rescind a revised design flow rate at any time upon notification to the permittee.

e. Final Effluent Limitation for Total Mercury
The final limit for total mercury is the Level Currently Achievable (LCA) based on a multiple discharger variance from the water quality-based effluent limit of 1.3 ng/l, pursuant to Rule 323.1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 11 monthly average results then dividing the sum by 12. For facilities with quarterly monitoring requirements for total mercury, quarterly monitoring shall be equivalent to 3 months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for total mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any quarter is less than the LCA, the permittee will be considered to be in compliance for total mercury for that quarter, provided the permittee is also in full compliance with the Pollutant Minimization Program for total mercury, set forth in Part I.A.7. Quarterly samples shall be conducted in the months of February, May, August and November. The Department may approve alternate months upon request.

The permittee may choose to demonstrate that an alternate site-specific LCA is appropriate and request a permit modification. Such request and supporting documentation shall be submitted in writing to the Department. Supporting documentation shall include a minimum of 12 samples taken over a 12-month period in accordance with EPA Method 1631. Upon approval, this permit may be modified in accordance with applicable laws and rules to incorporate the alternate site-specific LCA as the effluent limitation for total mercury.

f. Total Mercury Testing Requirements
The analytical protocol for total mercury shall be in accordance with EPA Method 1631, Revision E, "Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry". The quantification level for total mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

The use of clean technique sampling procedures is strongly recommended. Guidance for clean technique sampling is contained in: EPA Method 1669, *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (Sampling Guidance)*, EPA-821-R96-001, July 1996. Information and data documenting the permittee's sampling and analytical protocols and data acceptability shall be submitted to the Department upon request.

PART I

Section A. Limitations and Monitoring Requirements

2. Final Effluent Limitations, Monitoring Point 001B – Secondary Effluent Prior to Mixing with Secondary Bypass

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, for wet weather periods when the flow rate is greater than 125 MGD, the permittee is authorized to discharge secondary treated municipal wastewater, prior to mixing with flows from the secondary treatment bypass, from Monitoring Point 001B through Monitoring Point 001A and Outfall 001 and/or Outfall 002. Outfall 001 and Outfall 002 discharge to the Trenton Channel of the Detroit River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration				Frequency	Sample
Parameter	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units	of Analysis	Type
low	(report)	---	(report)	MGD	---	---	---	---	Daily	Report Total Daily Flow
arbonaceous Biochemical Oxygen Demand ($CBOD_5$)	---	---	---	---	25	40	---	mg/l	Daily	Calculation
otal Suspended Solids	---	---	---	---	30	45	---	mg/l	Daily	Calculation
otal Phosphorus (as P)	---	---	---	---	1.0	---	---	mg/l	Daily	Calculation
mmonia Nitrogen (as N)	---	---	---	---	(report)	---	(report)	mg/l	Daily	Calculation
					Minimum Monthly					
BOD_5 Minimum % Removal	---	---	---	---	(report)	---	---	%	Monthly	Calculation
otal Suspended Solids Minimum % Removal	---	---	---	---	(report)	---	---	%	Monthly	Calculation

a. Frequency of Analysis

Calculations for Monitoring Point 001B shall be conducted daily during periods of secondary treatment bypass. In order to determine compliance with these effluent limitations, calculations for this monitoring point during wet weather periods may be averaged with monitoring from Monitoring Point 001A from dry weather periods. This may be done at this monitoring point to determine compliance with the 7-day and monthly average requirements for secondary treatment requirements.

During wet weather conditions when secondary treatment is bypassed, 3-portion composite samples representative of the discharge may be taken at Monitoring Point 001C and used in place of the calculations to determine compliance with the effluent limitations.

b. Percent Removal Requirements

These requirements shall be calculated based on the monthly (30-day) effluent $CBOD_5$ and total suspended solids concentrations for Monitoring Point 001C and the monthly influent concentrations for approximately the same period. This requirement is in effect for all periods of discharge exceeding the design flow rate of 125 MGD.

PART I

Section A. Limitations and Monitoring Requirements

3. Final Effluent Limitations, Monitoring Point 001C – Secondary Treatment Bypass

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, for wet weather periods when the flow rate is greater than 125 MGD, the permittee is authorized to discharge primary treated municipal wastewater bypassing secondary treatment from Monitoring Point 001C through Monitoring Point 001A, and Outfall 001 and/or Outfall 002. Outfall 001 and Outfall 002 discharge to the Trenton Channel of the Detroit River. Such discharges are only authorized during wet weather conditions as described in Part I.A.6. of this permit and shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration					
ımeter	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units	Frequency of Analysis	Sample Type
v	(report)	---	(report)	MGD	---	---	---	---	Daily	Calculate Total Daily Flow
DD_5	---	---	---	---	(report)	---	(report)	mg/l	Daily	Composite
ıl Suspended Solids	---	---	---	---	(report)	---	(report)	mg/l	Daily	Composite
monia Nitrogen (as N)	---	---	---	---	(report)	---	(report)	mg/l	Daily	Composite
al Phosphorus (as P)		---	---	---	(report)	---	(report)	mg/l	Daily	Composite

a. Sampling Locations
Samples shall be taken of the primary treatment effluent prior to mixing with flows receiving secondary treatment. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.

b. Composite Samples
Samples shall be representative composites of the secondary treatment bypass flow through Monitoring Point 001C. The composites shall consist of samples, starting at the time of bypass, taken every half hour for the first hour and then every two hours thereafter.

c. Frequency of Analysis
Sampling at Monitoring Point 001C shall be conducted daily when the facility is bypassing around the secondary treatment processes.

PART I

Section A. Limitations and Monitoring Requirements

4. Final Effluent Limitations, Monitoring Point 001D – Primary Treatment

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, for wet weather periods when the flow rate is greater than 150 MGD, the permittee is authorized to discharge preliminary treated municipal wastewater bypassing primary treatment from Monitoring Point 001D through Monitoring Points 001B and 001A, and Outfall 001 and/or Outfall 002. Outfall 001 and Outfall 002 discharge to the Trenton Channel of the Detroit River. Such discharges are only authorized during wet weather conditions as described in Part I.A.6. of this permit and shall be limited and monitored by the permittee as specified below.

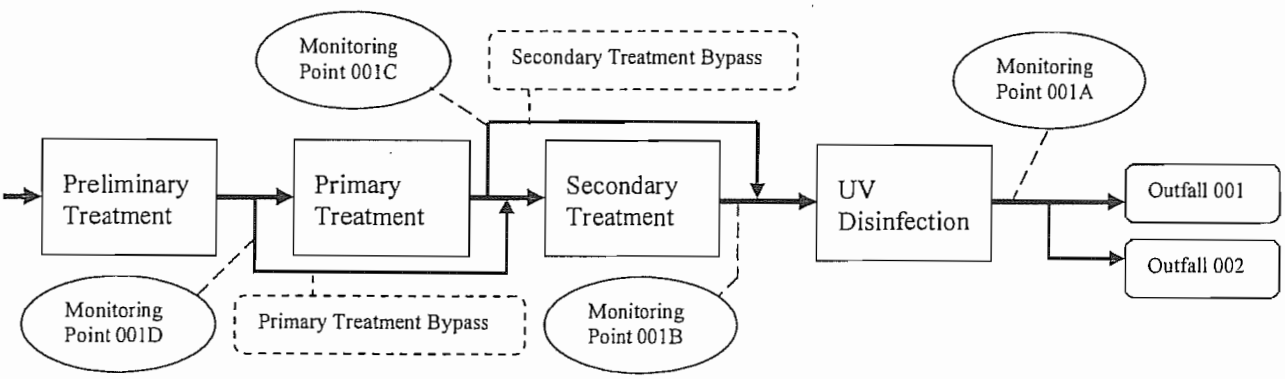
	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration					
rameter	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units	Frequency of Analysis	Sample Type
ɔw	(report)	---	(report)	MGD	---	---	---	---	Daily	Calculate Total Daily Flow

a. Sampling Locations
Samples shall be taken prior to mixing with flows receiving primary treatment. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.

b. Frequency of Analysis
Sampling at Monitoring Point 001D shall be conducted daily when the facility is bypassing around the primary treatment processes.

5. Flow Diagram

Outfall and monitoring point designations and bypass connections are shown for reference. Outfall 001 is the dedicated Downriver Wastewater Treatment Facility outfall. Outfall 002 is the connection to the Southgate/Wyandotte Drainage District outfall.



PART I

Section A. Limitations and Monitoring Requirements

6. Wet Weather Flows

During wet weather conditions when flows through the treatment plant exceed 125 MGD, the permittee is authorized to blend effluent from preliminary treatment and primary treatment with effluent receiving primary treatment and secondary treatment, respectively. The effluent must comply with all the effluent limitations and monitoring requirements in Parts I.A.1-4., except that when the flows through the wastewater treatment plant exceed the design flow rate of 125 MGD, the percent removal limitations for $CBOD_5$ and total suspended solids are waived at Monitoring Point 001A.

a. Preliminary Treatment
All dry weather and wet weather flows shall receive preliminary treatment (screening and grit removal) and disinfection.

b. Primary Treatment
All dry weather and wet weather flows up to and including a flow rate equivalent to 150 MGD shall receive primary treatment. During wet weather conditions, incremental flows greater than a flow rate equivalent to 150 MGD may bypass primary treatment with the stipulation that such flows shall receive secondary treatment.

c. Secondary Treatment
All dry weather flows up to and including the design flow rate of 125 MGD shall receive secondary treatment. During wet weather conditions, incremental flows greater than the design flow rate of 125 MGD may bypass secondary treatment with the stipulation that such flows shall receive preliminary and primary treatment and disinfection as stated in a. and b. above.

7. Pollutant Minimization Program for Total Mercury

The goal of the Pollutant Minimization Program is to maintain the effluent concentration of total mercury at or below 1.3 ng/l. The permittee shall continue to implement the Pollutant Minimization Program approved on May 11, 2004, and modifications thereto, to proceed toward the goal. The Pollutant Minimization Program includes the following:

a. an annual review and semi-annual monitoring of potential sources of mercury entering the wastewater collection system;

b. a program for quarterly monitoring of influent and periodic monitoring of sludge for mercury; and

c. implementation of reasonable cost-effective control measures when sources of mercury are discovered. Factors to be considered include significance of sources, economic considerations, and technical and treatability considerations.

On or before March 31 of each year, the permittee shall submit a status report for the previous calendar year to the Department that includes 1) the monitoring results for the previous year, 2) an updated list of potential mercury sources, and 3) a summary of all actions taken to reduce or eliminate identified sources of mercury.

Any information generated as a result of the Pollutant Minimization Program set forth in this permit may be used to support a request to modify the approved program or to demonstrate that the Pollutant Minimization Program requirement has been completed satisfactorily.

A request for modification of the approved program and supporting documentation shall be submitted in writing to the Department for review and approval. The Department may approve modifications to the approved program (approval of a program modification does not require a permit modification), including a reduction in the frequency of the requirements under items a. & b. if the data indicate that the 12-month rolling average mercury concentration is less than 5 ng/l.

This permit may be modified in accordance with applicable laws and rules to include additional mercury conditions and/or limitations as necessary.

PART I

Section A. Limitations and Monitoring Requirements

8. Treatment System Bypass Evaluation

As a condition of this permit, the permittee shall evaluate the operational conditions of the treatment system during periods when the facility is bypassing secondary treatment. This evaluation shall confirm that the conditions causing secondary treatment bypasses are the result of flows through the secondary treatment processes greater than design conditions, or are the result of existing system operational protocol. The treatment system shall be evaluated to determine the size of the storm event at which bypassing occurs under the current operational protocol, and to what extent the frequency, duration or volume of bypassing can be reduced through modifications to the operational protocol.

a. On or before February 1, 2009, the permittee shall submit an approvable work plan for conducting the evaluation of the wastewater treatment system. The evaluation shall evaluate the capability of the facility to treat wet weather flows up to the 125 MGD design flow without bypass under the current operational protocol, and determine the capability of the treatment system to reduce bypassing under modified operational protocols;

b. On or before May 1, 2009, the permittee shall commence the treatment system evaluation in accordance with the approved work plan.

c. On or before November 1, 2010, the permittee shall complete the treatment system evaluation in accordance with the approved work plan.

d. On or before May 1, 2011, the permittee shall submit an approvable certification that the treatment system has the capacity and the operational protocol to treat wet weather flows up to the design flow of 125 MGD without bypass.

e. If the permittee is unable to certify that the treatment system meets the design conditions, on or before July 1, 2011, the permittee shall submit a corrective action plan and implementation schedule for approval. The corrective action plan shall include a program to make operational and/or structural revisions to the treatment system so that design conditions will be met during periods of secondary treatment bypass.

If the permittee is unable to certify that the treatment system meets the design conditions, this permit may be modified to include the approved schedule for implementing the corrective action plan to make operational and/or structural revisions to the treatment system, as approved by the Department.

PART I

Section A. Limitations and Monitoring Requirements

9. Additional Monitoring Requirements

As a condition of this permit, the permittee shall monitor the discharge from Monitoring Point 001A for the constituents listed below. This monitoring is an application requirement of 40 CFR 122.21(j), effective December 2, 1999. Testing shall be conducted in August 2009, May 2010, March 2011, and October 2011. Grab samples shall be taken for available cyanide, total phenols, and parameters listed under Volatile Organic Compounds. For all other parameters, 24-hour composite samples shall be taken.

Test species for whole effluent toxicity monitoring shall include fathead minnow **and** either *Daphnia magna, Daphnia pulex* or *Ceriodaphnia dubia*. If the permittee has received Department approval to conduct acute toxicity testing using the more sensitive species identified in the toxicity database, the first three (3) tests required above may be performed using the more sensitive species. The last (4^{th}) test shall be conducted using two (2) test species. Testing and reporting procedures shall follow procedures contained in EPA-821-R-02-012, "Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms (Fifth Edition)." When the effluent ammonia nitrogen (as N) concentration is greater than 5 mg/l, the pH of the toxicity test shall be maintained at the pH of the effluent at the time of sample collection. Toxicity test data acceptability is contingent upon the validation of the test method by the testing laboratory. Such validation shall be submitted to the Department upon request.

The results of such monitoring shall be submitted with the application for reissuance (see the cover page of this permit for the application due date). The permittee shall notify the Department within 14 days of completing the monitoring for each month specified above in accordance with Part II.C.5. Additional reporting requirements are specified in Part II.C.10. The permittee shall report to the Department any whole effluent toxicity test results greater than 1.0 TU_A within five (5) days of becoming aware of the result. If, upon review of the analysis, it is determined that additional requirements are needed to protect the receiving waters in accordance with applicable water quality standards, the permit may then be modified by the Department in accordance with applicable laws and rules.

Whole Effluent Toxicity
acute toxicity

Hardness
calcium carbonate

Metals (Total Recoverable), Cyanide and Total Phenols (Quantification levels in parentheses)

antimony (1 µg/l)	arsenic (1 µg/l)	barium (5 µg/l)
beryllium (1 µg/l)	boron (20 µg/l)	cadmium (0.2 µg/l)
chromium (5 µg/l)	copper (1 µg/l)	lead (1 µg/l)
nickel (5 µg/l)	selenium (1 µg/l)	silver (0.5 µg/l)
thallium (1 µg/l)	zinc (5 µg/l)	

available cyanide (2 µg/l) using Method OIA - 1677
total phenolic compounds

Volatile Organic Compounds

acrolein	acrylonitrile	benzene
bromoform	carbon tetrachloride	chlorobenzene
chlorodibromomethane	chloroethane	2-chloroethylvinyl ether
chloroform	dichlorobromomethane	1,1-dichloroethane
1,2-dichloroethane	trans-1,2-dichloroethylene	1,1-dichloroethylene
1,2-dichloropropane	1,3-dichloropropylene	ethylbenzene
methyl bromide	methyl chloride	methylene chloride
1,1,2,2,-tetrachloroethane	tetrachloroethylene	toluene
1,1,1-trichloroethane	1,1,2-trichloroethane	trichloroethylene
vinyl chloride		

PART I

Section A. Limitations and Monitoring Requirements

Acid-Extractable Compounds

p-chloro-m-creso	2-chlorophenol	2,4-dichlorophenol
2,4-dimethylphenol	4,6-dinitro-o-cresol	2,4-dinitrophenol
2-nitrophenol	4-nitrophenol	pentachlorophenol
phenol	2,4,6-trichlorophenol	

Base/Neutral Compounds

acenaphthene	acenaphthylene	anthracene
benzidine	benzo(a)anthracene	benzo(a)pyrene
3,4-benzofluoranthene	benzo(ghi)perylene	benzo(k)fluoranthene
bis(2-chloroethoxy)methane	bis(2-chloroethyl)ether	bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate	4-bromophenyl phenyl ether	butyl benzyl phthalate
2-chloronaphthalene	4-chlorophenyl phenyl ether	chrysene
di-n-butyl phthalate	di-n-octyl phthalate	dibenzo(a,h)anthracene
1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene
3,3'-dichlorobenzidine	diethyl phthalate	dimethyl phthalate
2,4-dinitrotoluene	2,6-dinitrotoluene	1,2-diphenylhydrazine
fluoranthene	fluorene	hexachlorobenzene
hexachlorobutadiene	hexachlorocyclo-pentadiene	hexachloroethane
indeno(1,2,3-cd)pyrene	isophorone	naphthalene
nitrobenzene	n-nitrosodi-n-propylamine	n-nitrosodimethylamine
n-nitrosodiphenylamine	phenanthrene	pyrene
1,2,4-trichlorobenzene		

10. Facility Contact

The "Facility Contact" was specified in the application. The permittee may replace the facility contact at any time, and shall notify the Department in writing within 10 days after replacement (including the name, address and telephone number of the new facility contact).

a. The facility contact shall be (or a duly authorized representative of this person):
- for a corporation, a principal executive officer of at least the level of vice president, or a designated representative, if the representative is responsible for the overall operation of the facility from which the discharge described in the permit application or other NPDES form originates,
- for a partnership, a general partner,
- for a sole proprietorship, the proprietor, or
- for a municipal, state, or other public facility, either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.

b. A person is a duly authorized representative only if:
- the authorization is made in writing to the Department by a person described in paragraph a. of this section; and
- the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the facility (a duly authorized representative may thus be either a named individual or any individual occupying a named position).

Nothing in this section obviates the permittee from properly submitting reports and forms as required by law.

PART I

Section A. Limitations and Monitoring Requirements

11. Untreated or Partially Treated Sewage Discharge Requirements

In accordance with Section 324.3112a of the Michigan Act, if untreated sewage, including sanitary sewer overflows (SSO) and combined sewer overflows (CSO), or partially treated sewage is directly or indirectly discharged from a sewer system onto land or into the waters of the state, the entity responsible for the sewer system shall immediately, but not more than 24 hours after the discharge begins, notify, by telephone, the Department, local health departments, a daily newspaper of general circulation in the county in which the permittee is located, and a daily newspaper of general circulation in the county or counties in which the municipalities whose waters may be affected by the discharge are located that the discharge is occurring.

The permittee shall also annually contact municipalities, including the superintendent of a public drinking water supply with potentially affected intakes, whose waters may be affected by the permittee's discharge of combined sewage, and if those municipalities wish to be notified in the same manner as specified above, the permittee shall provide such notification. Such notification shall also include a daily newspaper in the county of the affected municipality.

At the conclusion of the discharge, written notification shall be submitted in accordance with and on the "CSO/SSO Reporting Form" available via the internet at: **http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3715---,00.html**, or, alternatively for combined sewer overflow discharges, in accordance with notification procedures approved by the Department.

In addition, in accordance with Section 324.3112a of the Michigan Act, each time a discharge of untreated sewage or partially treated sewage occurs, the permittee shall test the affected waters for *Escherichia coli* to assess the risk to the public health as a result of the discharge and shall provide the test results to the affected local county health departments and to the Department. The testing shall be done at locations specified by each affected local county health department but shall not exceed 10 tests for each separate discharge event. The affected local county health department may waive this testing requirement, if it determines that such testing is not needed to assess the risk to the public health as a result of the discharge event. The results of this testing shall be submitted with the written notification required above, or, if the results are not yet available, submit them as soon as they become available. This testing is not required, if the testing has been waived by the local health department, or if the discharge(s) did not affect surface waters.

Permittees accepting sanitary or municipal sewage from other sewage collection systems are encouraged to notify the owners of those systems of the above reporting and testing requirements.

PART I

Section A. Limitations and Monitoring Requirements

12. Monthly Operating Reports

Part 41 of Act 451 of 1994 as amended, specifically Section 324.4106 and associated Rule 299.2953, requires that the permittee file with the Department, on forms prescribed by the Department, reports showing the effectiveness of the treatment facility operation and the quantity and quality of liquid wastes discharged into waters of the state.

On or before December 1, 2008, the permittee shall submit to the Department a treatment facility monitoring program to meet this requirement. Upon approval by the Department the permittee shall implement the treatment facility monitoring program. The reporting forms and guidance are available on the DEQ web site at http://www.michigan.gov/deq/0,1607,7-135-3313_44117---,00.html. The permittee may use alternative operating forms if they are consistent with the approved monitoring program. These forms shall be maintained on site and shall be provided to the Department for review upon request. These treatment facility monitoring records shall be maintained for a minimum of five years.

Section B. Schedule of Compliance

1. Schedule of Compliance Not Required

This section (Section B: Schedule of Compliance) is not needed for this permit.

PART I

Section C. Industrial Waste Pretreatment Program

1. Federal Industrial Pretreatment Program

a. The permittee shall implement the Federal Industrial Pretreatment Program approved on May 1, 1986, as amended through March 28, 2005, and any subsequent modifications approved up to the issuance of this permit. Approval of substantial program modifications after the issuance of this permit shall be incorporated into this permit by minor modification in accordance with 40 CFR 122.63.

b. The permittee shall comply with Rules 323.2301 through 323.2317 of the Michigan Administrative Code (Part 23 Rules), the General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR Part 403), and the approved Federal Industrial Pretreatment Program.

c. The permittee shall have the legal authority and necessary interjurisdictional agreements that provide the basis for the implementation and enforcement of the approved Federal Industrial Pretreatment Program throughout the service area. The legal authority and necessary interjurisdictional agreements shall include, at a minimum, the authority to carry out the activities specified in Rule 323.2306(a).

d. The permittee shall develop procedures which describe, in sufficient detail, program commitments which enable implementation of the approved Federal Industrial Pretreatment Program, 40 CFR Part 403, and the Part 23 Rules in accordance with Rule 323.2306(c).

e. The permittee shall establish an interjurisdictional agreement (or comparable document) with all tributary governmental jurisdictions. Each interjurisdictional agreement shall contain, at a minimum, the following:

1) identification of the agency responsible for the implementation and enforcement of the approved Federal Industrial Pretreatment Program within the tributary governmental jurisdiction's boundaries; and

2) the provision of the legal authority which provides the basis for the implementation and enforcement of the approved Federal Industrial Pretreatment Program within the tributary governmental jurisdiction's boundaries.

f. The permittee shall prohibit discharges that:

1) cause, in whole or in part, the permittee's failure to comply with any condition of this permit or the Michigan Act;

2) restrict, in whole or in part, the permittee's management of biosolids;

3) cause, in whole or in part, operational problems at the treatment facility or in its collection system;

4) violate any of the general or specific prohibitions identified in Rule 323.2303(1) and (2);

5) violate categorical standards identified in Rule 323.2311; and

6) violate local limits established in accordance with Rule 323.2303(4).

g. The permittee shall maintain a list of its nondomestic users that meet the criteria of a significant industrial user as identified in Rule 323.2302(cc).

h. The permittee shall develop an enforcement response plan which describes, in sufficient detail, program commitments which will enable the enforcement of the approved Federal Industrial Pretreatment Program, 40 CFR Part 403, and the Part 23 Rules in accordance with Rule 323.2306(g).

i. The Department may require modifications to the approved Federal Industrial Pretreatment Program which are necessary to ensure compliance with 40 CFR Part 403 and the Part 23 Rules in accordance with Rule 323.2309.

PART I

Section C. Industrial Waste Pretreatment Program

j. The permittee shall not implement changes or modifications to the approved Federal Industrial Pretreatment Program without notification to the Department. Any substantial modification shall be subject to Department public noticing and approval in accordance with Rule 323.2309.

k. The permittee shall maintain an adequate revenue structure and staffing level for effective implementation of the approved Federal Industrial Pretreatment Program.

l. The permittee shall develop and maintain, for a minimum of three (3) years, all records and information necessary to determine nondomestic user compliance with 40 CFR Part 403, Part 23 Rules and the approved Federal Industrial Pretreatment Program. This period of retention shall be extended during the course of any unresolved enforcement action or litigation regarding a nondomestic user or when requested by the Department or the United States Environmental Protection Agency. All of the aforementioned records and information shall be made available upon request for inspection and copying by the Department and the United States Environmental Protection Agency.

m. The permittee shall evaluate the approved Federal Industrial Pretreatment Program for compliance with the 40 CFR Part 403, Part 23 Rules and the prohibitions stated in item f. (above). Based upon this evaluation, the permittee shall propose to the Department all necessary changes or modifications to the approved Federal Industrial Pretreatment Program no later than the next Industrial Pretreatment Program Annual Report due date (see item o. below).

n. The permittee shall develop and enforce local limits to implement the prohibitions listed in item f above. Local limits shall be based upon data representative of actual conditions demonstrated in a maximum allowable headworks loading analysis. An evaluation of whether the existing local limits need to be revised shall be submitted to the Department by August 1, 2009. The submittal shall provide a technical evaluation of the basis upon which this determination was made which includes information regarding the maximum allowable headworks loading, collection system protection criteria, and worker health and safety, based upon data collected since the last local limits review.

The following pollutants shall be evaluated:

1) Arsenic, Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Nickel, Silver, and Zinc;

2) Pollutants that are subject to limits or monitoring in this permit;

3) Pollutants that have an existing local limit; and,

4) Other pollutants of concern which would reasonably be expected to be discharged or transported by truck or rail or otherwise introduced into the POTW.

o. On or before April 1st of each year, the permittee shall submit to the Department, as required by Rule 323.2310(8), an Industrial Pretreatment Program Annual Report on the status of program implementation and enforcement activities. The reporting period shall begin on January 1st and end on December 31st. At a minimum, the Industrial Pretreatment Program Annual Report shall contain the following items:

1) additions, deletions, and any other modifications to the permittee's previously submitted nondomestic user inventory (Rule 323.2306(c)(i));

2) additions, deletions, and any other modifications to the permittee's approved Significant Industrial User List (Rule 323.2306(h));

3) a listing of the names of Significant Industrial Users not inspected by the permittee at least once during the reporting period or at the frequency committed to in the approved Federal Industrial Pretreatment Program;

PART I

Section C. Industrial Waste Pretreatment Program

4) a listing of the names of Significant Industrial Users not sampled for all required pollutants by the permittee at least once during the reporting period or at the frequency committed to in the approved Federal Industrial Pretreatment Program;

5) a listing of the names of Significant Industrial Users without a permit at any time during the reporting period;

6) a listing of the names of nondomestic industrial users in significant noncompliance for each of the criteria as defined in Rule 323.2302(dd)(i)-(viii);

7) proof of publication of all nondomestic users in significant noncompliance in the largest daily newspaper in the permittee's area;

8) a summary of the enforcement activities by the permittee during the report period. This Summary shall include:

a) a listing of the names of nondomestic users which were the subject of an enforcement action;

b) the enforcement action taken and the date the action was taken; and

c) whether the nondomestic user returned to compliance by the end of the reporting period (include date nondomestic user returned to compliance).

9) a listing of the names of Significant Industrial Users who did not submit pretreatment reports in accordance with requirements specified in their permit during the reporting period;

10) a listing of the names of Significant Industrial Users who did not self-monitor in accordance with requirements specified in their permit during the reporting period;

11) a summary of results of all the sampling and analyses performed of the wastewater treatment plant's influent, effluent, and biosolids conducted in accordance with approved methods during the reporting period. The summary shall include the monthly average, daily maximum, quantification level, and number of samples analyzed for each pollutant. At a minimum, the results of analyses for all locally limited parameters for at least one monitoring event that tests influent, effluent and biosolids during the reporting period shall be submitted with each report, unless otherwise required by the Department. Sample collection shall be at intervals sufficient to provide pollutant removal rates, unless the pollutant is not measurable; and

12) any other relevant information as requested by the Department.

PART I

Section D. Residuals Management Program

1. Residuals Management Program for Land Application of Biosolids

A permittee seeking authorization to land apply bulk biosolids or prepare bulk biosolids for land application shall develop and submit a Residuals Management Program (RMP) to the Department for approval. Effective upon Department approval of the permittee's RMP, the permittee is authorized to land apply bulk biosolids or prepare bulk biosolids for land application in accordance with the requirements established in R323.2401 through R323.2418 of the Michigan Administrative Code (Part 24 Rules) which can be obtained via the internet (http://www.michigan.gov/deq/ and on the left side of the screen click on Water, Biosolids & Industrial Pretreatment, Biosolids then click on Biosolids laws and Rules Information which is under the Laws & Rules banner in the center of the screen). The permittee's approved RMP, and any approved modifications thereto, are enforceable requirements of this permit. Incineration, landfilling and other residual disposal activities shall be conducted in accordance with Part II.D.7. of this permit.

a. RMP Approval and Implementation

A permittee seeking approval of an RMP shall submit the RMP to the Department at least 180 days prior to the land application of biosolids. The permittee may utilize the RMP Electronic Form which can be obtained via the internet (http://www.michigan.gov/deq/ and on the left side of the screen click on Water, Biosolids & Industrial Pretreatment, Biosolids then click on RMP Electronic Form which is under the Downloads banner in the center of the screen) or obtain detailed requirements from the Department. The RMP shall become effective and shall be implemented by the permittee upon written approval by the Department.

b. Annual Report

On or before October 30 of each year, the permittee shall submit to the Department an annual report for the previous fiscal year of October 1 through September 30. At a minimum, the report shall contain:

1) a certification that current residuals management practices are in accordance with the approved RMP, or a proposal for modification to the approved RMP; and

2) a completed Biosolids Annual Report Form which can be obtained via the internet (http:/www.michigan.gov/deq/ and on the left side of the screen click on Water, Biosolids & Industrial Pretreatment, Biosolids then click on Biosolids Annual Report Form which is under the Downloads banner in the center of the screen) or from the Department.

c. Modifications to the Approved RMP

Prior to implementation of modifications to the RMP, the permittee shall submit proposed modifications to the Department for approval. The approved modification shall become effective upon the date of approval. Upon written notification, the Department may impose additional requirements and/or limitations to the approved RMP as necessary to protect public health and the environment from any adverse effect of a pollutant in the biosolids.

d. Recordkeeping

Records required by the Part 24 Rules shall be kept for a minimum of five years. However, the records documenting cumulative loading for sites subject to cumulative pollutant loading rates shall be kept as long as the site receives biosolids.

PART II

Section A. Definitions

This list of definitions may include terms not applicable to this permit.

Acute toxic unit (TU_A) means $100/LC_{50}$ where the LC_{50} is determined from a whole effluent toxicity (WET) test which produces a result that is statistically or graphically estimated to be lethal to 50% of the test organisms.

Bioaccumulative chemical of concern (BCC) means a chemical which, upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor of more than 1000 after considering metabolism and other physiochemical properties that might enhance or inhibit bioaccumulation. The human health bioaccumulation factor shall be derived according to R 323.1057(5). Chemicals with half-lives of less than 8 weeks in the water column, sediment, and biota are not BCCs. The minimum bioaccumulation concentration factor (BAF) information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the biota-sediment accumulation factor (BSAF) methodology. The minimum BAF information needed to define an inorganic chemical as a BCC, including an organometal, is either a field-measured BAF or a laboratory-measured bioconcentration factor (BCF). The BCCs to which these rules apply are identified in Table 5 of R 323.1057 of the Water Quality Standards.

Biosolids are the solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. This includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

Bulk biosolids means biosolids that are not sold or given away in a bag or other container for application to a lawn or home garden.

Chronic toxic unit (TU_C) means 100/MATC or $100/IC_{25}$, where the maximum acceptable toxicant concentration (MATC) and IC_{25} are expressed as a percent effluent in the test medium.

Class B Biosolids refers to material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PSRP) in accordance with the Part 24 Rules. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying.

Daily concentration is the sum of the concentrations of the individual samples of a parameter divided by the number of samples taken during any calendar day. If the parameter concentration in any sample is less than the quantification limit, regard that value as zero when calculating the daily concentration. The daily concentration will be used to determine compliance with any maximum and minimum daily concentration limitations (except for pH and dissolved oxygen). When required by the permit, report the maximum calculated daily concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the Discharge Monitoring Reports (DMRs).

For pH, report the maximum value of any individual sample taken during the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs and the minimum value of any individual sample taken during the month in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. For dissolved oxygen, report the minimum concentration of any individual sample in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Daily loading is the total discharge by weight of a parameter discharged during any calendar day. This value is calculated by multiplying the daily concentration by the total daily flow and by the appropriate conversion factor. The daily loading will be used to determine compliance with any maximum daily loading limitations. When required by the permit, report the maximum calculated daily loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMRs.

Department means the Michigan Department of Environmental Quality.

Detection Level means the lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.

EC_{50} means a statistically or graphically estimated concentration that is expected to cause 1 or more specified effects in 50% of a group of organisms under specified conditions.

PART II

Section A. Definitions

Fecal coliform bacteria monthly is the geometric mean of the samples collected in a calendar month (or 30 consecutive days). The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMRs.

Fecal coliform bacteria 7-day is the geometric mean of the samples collected in any 7-day period. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Flow Proportioned sample is a composite sample with the sample volume proportional to the effluent flow.

Grab sample is a single sample taken at neither a set time nor flow.

IC_{25} means the toxicant concentration that would cause a 25% reduction in a nonquantal biological measurement for the test population.

Interference is a discharge which, alone or in conjunction with a discharge or discharges from other sources, both:
1) inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
2) therefore, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or, of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act. [This definition does not apply to sample matrix interference.]

Land Application means spraying or spreading biosolids or a biosolids derivative onto the land surface, injecting below the land surface, or incorporating into the soil so that the biosolids or biosolids derivative can either condition the soil or fertilize crops or vegetation grown in the soil.

LC_{50} means a statistically or graphically estimated concentration that is expected to be lethal to 50% of a group of organisms under specified conditions.

Maximum acceptable toxicant concentration (MATC) means the concentration obtained by calculating the geometric mean of the lower and upper chronic limits from a chronic test. A lower chronic limit is the highest tested concentration that did not cause the occurrence of a specific adverse effect. An upper chronic limit is the lowest tested concentration which did cause the occurrence of a specific adverse effect and above which all tested concentrations caused such an occurrence.

MGD means million gallons per day.

Monthly frequency of analysis refers to a calendar month. When required by this permit, an analytical result, reading, value or observation must be reported for that period if a discharge occurs during that period.

Monthly concentration is the sum of the daily concentrations determined during a reporting month (or 30 consecutive days) divided by the number of daily concentrations determined. The calculated monthly concentration will be used to determine compliance with any maximum monthly concentration limitations. When required by the permit, report the calculated monthly concentration in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMRs.

For minimum percent removal requirements, the monthly influent concentration and the monthly effluent concentration shall be determined. The calculated monthly percent removal, which is equal to 100 times the quantity [1 minus the quantity (monthly effluent concentration divided by the monthly influent concentration)], shall be reported in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

PART II

Section A. Definitions

Monthly loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined in the reporting month (or 30 consecutive days). The calculated monthly loading will be used to determine compliance with any maximum monthly loading limitations. When required by the permit, report the calculated monthly loading in the "AVERAGE" column under "QUANTITY OR LOADING" on the DMRs.

National Pretreatment Standards are the regulations promulgated by or to be promulgated by the Federal Environmental Protection Agency pursuant to Section 307(b) and (c) of the Federal Act. The standards establish nationwide limits for specific industrial categories for discharge to a POTW.

No observed adverse effect level (NOAEL) means the highest tested dose or concentration of a substance which results in no observed adverse effect in exposed test organisms where higher doses or concentrations result in an adverse effect.

Noncontact Cooling Water is water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product or finished product.

Nondomestic user is any discharger to a POTW that discharges wastes other than or in addition to water-carried wastes from toilet, kitchen, laundry, bathing or other facilities used for household purposes.

Partially treated sewage is any sewage, sewage and storm water, or sewage and wastewater, from domestic or industrial sources that is treated to a level less than that required by the permittee's National Pollutant Discharge Elimination System permit, or that is not treated to national secondary treatment standards for wastewater, including discharges to surface waters from retention treatment facilities.

Pretreatment is reducing the amount of pollutants, eliminating pollutants, or altering the nature of pollutant properties to a less harmful state prior to discharge into a public sewer. The reduction or alteration can be by physical, chemical, or biological processes, process changes, or by other means. Dilution is not considered pretreatment unless expressly authorized by an applicable National Pretreatment Standard for a particular industrial category.

POTW is a publicly owned treatment works.

Quantification level means the measurement of the concentration of a contaminant obtained by using a specified laboratory procedure calculated at a specified concentration above the detection level. It is considered the lowest concentration at which a particular contaminant can be quantitatively measured using a specified laboratory procedure for monitoring of the contaminant.

Quarterly frequency of analysis refers to a three month period, defined as January through March, April through June, July through September, and October through December. When required by this permit, an analytical result, reading, value or observation must be reported for that period if a discharge occurs during that period.

Regional Administrator is the Region 5 Administrator, U.S. EPA, located at R-19J, 77 W. Jackson Blvd., Chicago, Illinois 60604.

Significant industrial user is a nondomestic user that: 1) is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; or 2) discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater); contributes a process wastestream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the permittee as defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's treatment plant operation or violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

PART II

Section A. Definitions

Significant Materials Significant Materials means any material which could degrade or impair water quality, including but not limited to: raw materials; fuels; solvents, detergents, and plastic pellets; finished materials such as metallic products; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (see 40 CFR 372.65); any chemical the facility is required to report pursuant to Section 313 of Emergency Planning and Community Right-to-Know Act (EPCRA); polluting materials as identified under the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code); Hazardous Wastes as defined in Part 111 of the Michigan Act; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Tier I value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier I toxicity database.

Tier II value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier II toxicity database.

Toxicity Reduction Evaluation (TRE) means a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

Water Quality Standards means the Part 4 Water Quality Standards promulgated pursuant to Part 31 of Act No. 451 of the Public Acts of 1994, as amended, being Rules 323.1041 through 323.1117 of the Michigan Administrative Code.

Weekly frequency of analysis refers to a calendar week which begins on Sunday and ends on Saturday. When required by this permit, an analytical result, reading, value or observation must be reported for that period if a discharge occurs during that period.

Yearly frequency of analysis refers to a calendar year beginning on January 1 and ending on December 31. When required by this permit, an analytical result, reading, value or observation must be reported for that period if a discharge occurs during that period.

24-Hour Composite sample is a flow proportioned composite sample consisting of hourly or more frequent portions that are taken over a 24-hour period.

3-Portion Composite sample is a sample consisting of three equal volume grab samples collected at equal intervals over an 8-hour period.

7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days in a reporting month divided by the number of daily concentrations determined. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations. When required by the permit, report the maximum calculated 7-day concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

7-day loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined during any 7 consecutive days in a reporting month. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations. When required by the permit, report the maximum calculated 7-day loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMRs.

PART II

Section B. Monitoring Procedures

1. Representative Samples

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations promulgated pursuant to Section 304(h) of the Federal Act (40 CFR Part 136 - Guidelines Establishing Test Procedures for the Analysis of Pollutants), unless specified otherwise in this permit. Requests to use test procedures not promulgated under 40 CFR Part 136 for pollutant monitoring required by this permit shall be made in accordance with the Alternate Test Procedures regulations specified in 40 CFR 136.4. These requests shall be submitted to the Chief of the Permits Section, Water Bureau, Michigan Department of Environmental Quality, P.O. Box 30273, Lansing, Michigan, 48909-7773. The permittee may use such procedures upon approval.

The permittee shall periodically calibrate and perform maintenance procedures on all analytical instrumentation at intervals to ensure accuracy of measurements. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Control/Quality Assurance program.

3. Instrumentation

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring instrumentation at intervals to ensure accuracy of measurements.

4. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information: 1) the exact place, date, and time of measurement or sampling; 2) the person(s) who performed the measurement or sample collection; 3) the dates the analyses were performed; 4) the person(s) who performed the analyses; 5) the analytical techniques or methods used; 6) the date of and person responsible for equipment calibration; and 7) the results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Department.

PART II

Section C. Reporting Requirements

1. Start-up Notification

If the permittee will not discharge during the first 60 days following the effective date of this permit, the permittee shall notify the Department within 14 days following the effective date of this permit, and then 60 days prior to the commencement of the discharge.

2. Submittal Requirements for Self-Monitoring Data

Part 31 of Act 451 of 1994, as amended, specifically Section 324.3110(3) and Rule 323.2155(2) of Part 21 allows the Department to specify the forms to be utilized for reporting the required self-monitoring data. Unless instructed on the effluent limitations page to conduct "Retained Self Monitoring" the permittee shall submit self-monitoring data via the Michigan DEQ Electronic Environmental Discharge Monitoring Reporting (***e2-DMR***) system.

The permittee shall utilize the information provided on the ***e2-Reporting*** website @ **http://secure1.state.mi.us/e2rs/** to access and submit the electronic forms. Both monthly summary and daily data shall be submitted to the department no later than the **20th day of the month** following each month of the authorized discharge period(s).

3. Retained Self-Monitoring Requirements

If instructed on the effluent limits page to conduct retained self-monitoring, the permittee shall maintain a year-to-date log of retained self-monitoring results and, upon request, provide such log for inspection to the staff of the Water Bureau, Michigan Department of Environmental Quality. Retained self-monitoring results are public information and shall be promptly provided to the public upon request.

The permittee shall certify, in writing, to the Department, on or before January 10th of each year, that: 1) all retained self-monitoring requirements have been complied with and a year-to-date log has been maintained; and 2) the application on which this permit is based still accurately describes the discharge.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

Monitoring required pursuant to Part 41 of the Michigan Act or Rule 35 of the Mobile Home Park Commission Act (Act 96 of the Public Acts of 1987) for assurance of proper facility operation shall be submitted as required by the Department.

5. Compliance Dates Notification

Within 14 days of every compliance date specified in this permit, the permittee shall submit a written notification to the Department indicating whether or not the particular requirement was accomplished. If the requirement was not accomplished, the notification shall include an explanation of the failure to accomplish the requirement, actions taken or planned by the permittee to correct the situation, and an estimate of when the requirement will be accomplished. If a written report is required to be submitted by a specified date and the permittee accomplishes this, a separate written notification is not required.

PART II

Section C. Reporting Requirements

6. Noncompliance Notification

Compliance with all applicable requirements set forth in the Federal Act, Parts 31 and 41 of the Michigan Act, and related regulations and rules is required. All instances of noncompliance shall be reported as follows:

a. 24-hour reporting - Any noncompliance which may endanger health or the environment (including maximum daily concentration discharge limitation exceedances) shall be reported, verbally, within 24 hours from the time the permittee becomes aware of the noncompliance. A written submission shall also be provided within five (5) days.

b. other reporting - The permittee shall report, in writing, all other instances of noncompliance not described in a. above at the time monitoring reports are submitted; or, in the case of retained self-monitoring, within five (5) days from the time the permittee becomes aware of the noncompliance.

Written reporting shall include: 1) a description of the discharge and cause of noncompliance; and 2) the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

7. Spill Notification

The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state, unless the permittee has determined that the release is not in excess of the threshold reporting quantities specified in the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code), by calling the Department at the number indicated on the first page of this permit, or if the notice is provided after regular working hours call the Department's 24-hour Pollution Emergency Alerting System telephone number, 1-800-292-4706 (calls from out-of-state dial 1-517-373-7660).

Within ten (10) days of the release, the permittee shall submit to the Department a full written explanation as to the cause of the release, the discovery of the release, response (clean-up and/or recovery) measures taken, and preventative measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.

8. Upset Noncompliance Notification

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset, shall notify the Department by telephone within 24-hours of becoming aware of such conditions; and within five (5) days, provide in writing, the following information:

a. that an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. that the permitted wastewater treatment facility was, at the time, being properly operated; and

c. that the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with this permit.

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

PART II

Section C. Reporting Requirements

9. Bypass Prohibition and Notification

a. Bypass Prohibition - Bypass is prohibited unless:

1) bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2) there were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass; and

3) the permittee submitted notices as required under 9.b. or 9.c. below.

b. Notice of Anticipated Bypass - If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least ten (10) days before the date of the bypass, and provide information about the anticipated bypass as required by the Department. The Department may approve an anticipated bypass, after considering its adverse effects, if it will meet the three (3) conditions listed in 9.a. above.

c. Notice of Unanticipated Bypass - The permittee shall submit notice to the Department of an unanticipated bypass by calling the Department at the number indicated on the first page of this permit (if the notice is provided after regular working hours, use the following number: 1-800-292-4706) as soon as possible, but no later than 24 hours from the time the permittee becomes aware of the circumstances.

d. Written Report of Bypass - A written submission shall be provided within five (5) working days of commencing any bypass to the Department, and at additional times as directed by the Department. The written submission shall contain a description of the bypass and its cause; the period of bypass, including exact dates and times, and if the bypass has not been corrected, the anticipated time it is expected to continue; steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass; and other information as required by the Department.

e. Bypass Not Exceeding Limitations - The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of 9.a., 9.b., 9.c., and 9.d., above. This provision does not relieve the permittee of any notification responsibilities under Part II.C.10. of this permit.

f. Definitions

1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

10. Notification of Changes in Discharge

The permittee shall notify the Department, in writing, within 10 days of knowing, or having reason to believe, that any activity or change has occurred or will occur which would result in the discharge of: 1) detectable levels of chemicals on the current Michigan Critical Materials Register, priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, or the Pollutants of Initial Focus in the Great Lakes Water Quality Initiative specified in 40 CFR 132.6, Table 6, which were not acknowledged in the application or listed in the application at less than detectable levels; 2) detectable levels of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information; or 3) any chemical at levels greater than five times the average level reported in the complete application (see the first page of this permit for the date(s) the complete application was submitted). Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the compliance schedules.

PART II

Section C. Reporting Requirements

11. Changes in Facility Operations

Any anticipated action or activity, including but not limited to facility expansion, production increases, or process modification, which will result in new or increased loadings of pollutants to the receiving waters must be reported to the Department by a) submission of an increased use request (application) and all information required under Rule 323.1098 (Antidegradation) of the Water Quality Standards or b) by notice if the following conditions are met: 1) the action or activity will not result in a change in the types of wastewater discharged or result in a greater quantity of wastewater than currently authorized by this permit; 2) the action or activity will not result in violations of the effluent limitations specified in this permit; 3) the action or activity is not prohibited by the requirements of Part II.C.12.; and 4) the action or activity will not require notification pursuant to Part II.C.10. Following such notice, the permit may be modified according to applicable laws and rules to specify and limit any pollutant not previously limited.

12. Bioaccumulative Chemicals of Concern (BCC)

Consistent with the requirements of Rules 323.1098 and 323.1215 of the Michigan Administrative Code, the permittee is prohibited from undertaking any action that would result in a lowering of water quality from an increased loading of a BCC unless an increased use request and antidegradation demonstration have been submitted and approved by the Department.

13. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall submit to the Department 30 days prior to the actual transfer of ownership or control a written agreement between the current permittee and the new permittee containing: 1) the legal name and address of the new owner; 2) a specific date for the effective transfer of permit responsibility, coverage and liability; and 3) a certification of the continuity of or any changes in operations, wastewater discharge, or wastewater treatment.

If the new permittee is proposing changes in operations, wastewater discharge, or wastewater treatment, the Department may propose modification of this permit in accordance with applicable laws and rules.

14. Operations and Maintenance Manual

Part 41 of Act 451 of 1994, as amended, specifically Section 324.4104 and associated Rule 299.2957, allow the Department to require an Operations and Maintenance (O&M) manual for the wastewater treatment facility. An up-to-date copy of the O&M manual shall be kept at the wastewater treatment facility. Upon request a copy of the O&M manual shall be provided to the Department. The Department may review the manual in whole or in part at their discretion and require modifications to it if portions are determined to be inadequate.

At a minimum, the O&M manual should include the following information: permit standards, description and operation information for all equipment, staffing information, laboratory requirements, record keeping requirements, maintenance plan for equipment, emergency operating plan, safety program information and copies of all pertinent forms, as-built plans, and manufacturer's manuals.

Certification of the existence and accuracy of the operations and maintenance manual is required to be submitted to the Department at least sixty days prior to startup of a new wastewater treatment plant. Submittal of re-certifications will also be required sixty days prior to start up of any substantial improvements or modifications made at the wastewater treatment plant.

PART II

Section D. Management Responsibilities

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of the Michigan Act and/or the Federal Act and constitutes grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of an application for permit renewal.

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

2. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified at the appropriate level for the facility certification by the Department, as required by Sections 3110 and 4104 of the Michigan Act. Permittees authorized to discharge storm water shall have the storm water treatment and/or control measures under direct supervision of a storm water operator certified by the Department, as required by Section 3110 of the Michigan Act.

3. Facilities Operation

The permittee shall, at all times, properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures.

4. Power Failures

In order to maintain compliance with the effluent limitations of this permit and prevent unauthorized discharges, the permittee shall either:

a. provide an alternative power source sufficient to operate facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit; or

b. upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the surface waters or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

6. Containment Facilities

The permittee shall provide facilities for containment of any accidental losses of polluting materials in accordance with the requirements of the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code). For a Publicly Owned Treatment Work (POTW), these facilities shall be approved under Part 41 of the Michigan Act.

PART II

Section D. Management Responsibilities

7. Waste Treatment Residues

Residuals (i.e. solids, sludges, biosolids, filter backwash, scrubber water, ash, grit, or other pollutants or wastes) removed from or resulting from treatment or control of wastewaters, including those that are generated during treatment or left over after treatment or control has ceased shall be disposed of in an environmentally compatible manner and according to applicable laws and rules. These laws may include, but are not limited to, the Michigan Act, Part 31 for protection of water resources, Part 55 for air pollution control, Part 111 for hazardous waste management, Part 115 for solid waste management, Part 121 for liquid industrial wastes, Part 301 for protection of inland lakes and streams, and Part 303 for wetlands protection. Such disposal shall not result in any unlawful pollution of the air, surface waters or groundwaters of the state.

8. Right of Entry

The permittee shall allow the Department, any agent appointed by the Department or the Regional Administrator, upon the presentation of credentials:

a. to enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect process facilities, treatment works, monitoring methods and equipment regulated or required under this permit; and to sample any discharge of pollutants.

9. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Act and Rule 2128 (Rule 323.2128 of the Michigan Administrative Code), all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department and the Regional Administrator. As required by the Federal Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Act and Sections 3112, 3115, 4106 and 4110 of the Michigan Act.

PART II

Section E. Activities Not Authorized by This Permit

1. Discharge to the Groundwaters

This permit does not authorize any discharge to the groundwaters. Such discharge may be authorized by a groundwater discharge permit issued pursuant to the Michigan Act.

2. Facility Construction

This permit does not authorize or approve the construction or modification of any physical structures or facilities. Approval for such construction for a POTW must be by permit issued under Part 41 of the Michigan Act. Approval for such construction for a mobile home park, campground or marina shall be from the Water Bureau, Michigan Department of Environmental Quality. Approval for such construction for a hospital, nursing home or extended care facility shall be from the Division of Health Facilities and Services, Michigan Department of Consumer and Industry Services upon request.

3. Civil and Criminal Liability

Except as provided in permit conditions on "Bypass" (Part II.C.9. pursuant to 40 CFR 122.41(m)), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond the permittee's control, such as accidents, equipment breakdowns, or labor disputes.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Federal Act except as are exempted by federal regulations.

5. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Federal Act.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Environmental Quality permits, or approvals from other units of government as may be required by law.

Appendix B

Cost Estimates

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 1A

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**2009 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**SRF Project Plan**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	SUB-TOTAL
	PRIORITY 1 PROJECTS (2010 - 2014)	
FY 2010		
1.1	Solids Thickening Complex Renovations	$17,213,000
	Subtotal:	**$17,213,000**
FY 2011		
1.2	Secondary System Renovations	$7,516,000
1.3	D-A-F Complex Renovations	$6,832,000
	Subtotal:	**$14,348,000**
FY 2012		
1.4	Headworks System Renovations	$18,713,000
	Subtotal:	**$18,713,000**
FY 2013		
1.5	DSDS Collection System Improvements	$8,173,000
	Subtotal:	**$8,173,000**
	PRIORITY 1 SUBTOTAL	**$58,447,000**
	PRIORITY 2 PROJECTS (2015 - 2019)	
2.1	Secondary Oxygen and Flow Control Improvements	$6,344,000
2.2	DSDS Sewer Rehabilitation Improvements	$1,615,000
2.3	Dewatering Complex Renovations	$22,121,000
2.4	Enhanced BioPhosphorus Removal	$8,777,000
2.5	Incineration Complex Renovations	$21,230,000
	PRIORITY 2 SUBTOTAL	**$60,087,000**
	PRIORITY 3 PROJECTS (2020 - 2024)	
3.1	UV Disinfection System Renovations	$17,226,000
3.2	Instrumention and SCADA System Renovations	$11,491,000
3.3	Class B Lime Stabilization Faciltiy	$23,381,000
	PRIORITY 3 SUBTOTAL	**$52,098,000**
	PRIORITY 4 PROJECTS (2025 - 2029)	
4.1	Primary Treatment System Renovations	$9,834,000
4.2	Headworks and Secondary Improvements	$34,867,000
	PRIORITY 4 SUBTOTAL	**$44,701,000**
	ENGINEER'S OPINION OF PROJECT COST	**$ 215,333,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 1B

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**2009 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Solids Thickening Complex Renovations** **Priority 1**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Paving	1	LS	$ 164,000	$164,000
2	Sludge yard piping	1,200	LF	$ 120	$144,000
3	Site utilities	1	LS	$ 529,000	$529,000
4	Site restoration	1	LS	$ 100,000	$100,000
				Subtotal:	**$937,000**
DIV. 03	**CONCRETE**				
1	Structural Renovations to tanks	6	EA	$ 50,000	$300,000
2	Splitter Box	1	LS	$ 600,000	$600,000
3	Odor Control Building	1,800	SF	$ 335	$603,000
				Subtotal:	**$1,503,000**
DIV. 04-10	**ARCHITECTURAL**				
1	Sludge Storage Pump Gallery	1	LS	$ 116,200	$116,000
				Subtotal:	**$116,000**
DIV. 11	**EQUIPMENT**				
1	Gravity Thickeners	4	EA	$ 205,000	$820,000
2	WAS Pumps	2	EA	$ 70,000	$140,000
3	Splitter Box Gates	5	EA	$ 41,000	$205,000
4	Sludge Pumps	6	EA	$ 71,000	$426,000
5	Gallery Piping	900	LF	$ 120	$108,000
6	Valves	24	EA	$ 21,000	$504,000
7	Storage Tank Mixing	2	EA	$ 171,000	$342,000
8	Odor Control and Covers	6	EA	$ 170,000	$1,020,000
9	Demolition	1	LS	$ 470,000	$470,000
				Subtotal:	**$4,035,000**
DIV. 15	**MECHANICAL**				
1	H&V Equipment	1	LS	$ 50,000	$50,000
2	Plumbing	1	LS	$ 201,750	$202,000
				Subtotal:	**$252,000**
DIV. 16	**ELECTRICAL**				
1	MCCs, Lighting, Arc Flash & Labeling	1	LS	$ 806,300	$806,000
2	I&C, Automation and SCADA Integration	1	LS	$ 190,000	$190,000
				Subtotal:	**$996,000**
			TRADES SUBTOTAL		**$7,839,000**
	CONTRACTUAL REQUIREMENTS				
DIV. 00	General Conditions	15%			$1,176,000
DIV. 01	General Requirements	7.5%			$588,000
	Contingencies	40%			$3,136,000
				Subtotal:	**$12,739,000**
	PROJECT COSTS				
	Engineering	25%			$3,185,000
	Force Account	3%			$382,000
	Annual Cost Adjustment	3.5%	per yr.	7.1%	$907,000
				TOTAL	**$17,213,000**
	Adjustment of Costs from ENR CCI	1.00			$ 17,213,000
ENGINEER'S OPINION OF PROJECT COST					**$ 17,213,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 1C

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**2009 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Secondary System Renovations** **Priority 1**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Site restoration	1	LS	$ 25,000	$25,000
2	Paving	1	LS	$ 78,000	$78,000
				Subtotal:	**$103,000**
DIV. 04-10	**ARCHITECTURAL**				
1	Clarifier Building Nos. 1 thru 6	1	LS	$ 94,200	$94,000
2	Return Activated Sludge Building	1	LS	$ 24,600	$25,000
3	N. and S. Influent Chamber Houses	1	LS	$ 27,200	$27,000
				Subtotal:	**$146,000**
DIV. 11	**EQUIPMENT**				
1	Purge Blower and Piping	1	LS	$ 128,000	$128,000
2	Drain Valves and O2 Control Valves	1	LS	$ 152,800	$153,000
3	RAS Pumps	8	EA	$ 153,000	$1,224,000
4	RAS Piping and Valves	1	LS	$ 225,000	$225,000
5	Sump Pumps Systems	8	EA	$ 34,000	$272,000
6	Demolition	1	LS	$ 75,000	$75,000
				Subtotal:	**$2,077,000**
DIV. 15	**MECHANICAL**				
1	H&V Equipment	1	LS	$ 65,000	$65,000
2	Plumbing	1	LS	$ 125,000	$125,000
				Subtotal:	**$190,000**
DIV. 16	**ELECTRICAL**				
1	MCCs, Lighting, Arc Flash & Labeling	1	LS	$ 383,000	$383,000
2	Asset Management System	1	LS	$ 250,000	$250,000
3	Energy Efficiency Improvements	1	LS	$ 150,000	$150,000
4	I&C, Automation and SCADA Integration	1	LS	$ 32,000	$32,000
				Subtotal:	**$815,000**
				TRADES SUBTOTAL	**$3,331,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$500,000
DIV. 01	General Requirements	7.5%			$250,000
	Contingencies	40%			$1,332,000
	SUBTOTAL			**Subtotal:**	**$5,413,000**
	PROJECT COSTS				
	Engineering	25%			$1,353,000
	Force Account	3%			$162,000
	Annual Cost Adjustment	3.5%	per yr.	10.9%	$588,000
				TOTAL	**$7,516,000**
	Adjustment of Costs from ENR CCI	1.00			$7,516,000
ENGINEER'S OPINION OF PROJECT COST					**$ 7,516,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 1D

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**2009 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**D-A-F Complex Renovations** **Priority 1**	By:	**JMG**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Demolition	1	LS	$ 67,000	$67,000
2	Misc. Site Work	1	LS	$ 107,000	$107,000
				Subtotal:	**$174,000**
DIV. 04-10	**ARCHITECTURAL**				
1	D.A.F. Building	1	LS	$ 889,000	$889,000
2	Maintenance Building	1	LS	$ 420,000	$420,000
3	Employee Service Building	1	LS	$ 78,400	$78,000
4	Maintenance Garage	1	LS	$ 46,400	$46,000
5	Administration Building	1	LS	$ 260,700	$261,000
				Subtotal:	**$1,694,000**
DIV. 15	**MECHANICAL**				
1	H&V Equipment	1	LS	$ 304,000	$304,000
2	Plumbing	1	LS	$ 71,000	$71,000
				Subtotal:	**$375,000**
DIV. 16	**ELECTRICAL**				
1	MCCs, Lighting, Arc Flash & Labeling	1	LS	$ 966,700	$967,000
2	SCADA Integration	1	LS	$ 15,000	$15,000
				Subtotal:	**$982,000**
				TRADES SUBTOTAL	**$3,225,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$484,000
DIV. 01	General Requirements	7.5%			$242,000
	Contingencies	30%			$968,000
	SUBTOTAL			**Subtotal:**	**$4,919,000**
	PROJECT COSTS				
	Engineering	25%			$1,230,000
	Force Account	3%			$148,000
	Annual Cost Adjustment	3.5%	per yr.	10.9%	$535,000
				TOTAL	**$6,832,000**
	Adjustment of Costs from ENR CCI	1.00			$6,832,000
ENGINEER'S OPINION OF PROJECT COST					**$ 6,832,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 1E

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**2009 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Headworks System Renovations** **Priority 1**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Site Utilities	1	LS	$ 634,000	$634,000
2	Detritor Drain lines	2	EA	$ 15,000	$30,000
3	Aerated Grit Drain lines	3	EA	$ 15,000	$45,000
4	Site restoration	1	LS	$ 75,000	$75,000
				Subtotal:	**$784,000**
DIV. 03	**STRUCTURAL**				
1	Floor Topping	4	EA	$ 10,000	$40,000
2	Wall Penetrations	1	LS	$ 15,000	$15,000
				Subtotal:	**$55,000**
DIV. 04-10	**ARCHITECTURAL**				
1	Gate Façade Wall	1	LS	$ 50,000	$50,000
2	Aerated Grit Building	1	LS	$ 350,200	$350,000
3	W. and E. Grit Buildings	1	LS	$ 200,800	$201,000
4	Fine Screens Building	1	LS	$ 107,800	$108,000
5	Old Solids Building	1	LS	$ 524,000	$524,000
6	Influent Pump Station	1	LS	$ 130,200	$130,000
7	Tunnel Pump Station	1	LS	$ 28,800	$29,000
8	Tunnel Pump Station Electrical Building	1	LS	$ 28,800	$29,000
9	Recycle Sample Building Demolition	1	LS	$ 15,000	$15,000
				Subtotal:	**$1,436,000**
DIV. 11	**EQUIPMENT**				
1	Sluice Gates	10	EA	$ 51,000	$510,000
2	Slide Gates	8	EA	$ 43,000	$344,000
3	Gripper Rehabilitation	1	LS	$ 68,000	$68,000
4	Detritor System Improvements	2	EA	$ 170,000	$340,000
5	Check Valves	2	EA	$ 31,000	$62,000
6	Fine Screens 5, 6 and 7	3	EA	$ 315,000	$945,000
7	Air Blowers and Piping	3	EA	$ 51,000	$153,000
8	SFE Recycling Water System	1	LS	$ 114,000	$114,000
9	IW Booster System	1	LS	$ 85,000	$85,000
10	Sample System Renovations	1	LS	$ 255,000	$255,000
11	Sump Pumps Systems	4	EA	$ 31,000	$124,000
12	Laboratory Analytical Equiment	1	LS	$ 591,000	$591,000
13	Demolition	1	LS	$ 100,000	$100,000
				Subtotal:	**$3,691,000**
DIV. 14	**CONVEYORS**				
1	Screen and Hoist	1	LS	$ 128,000	$128,000
2	Fine Screen Conveyors	1	LS	$ 255,000	$255,000
3	Washing-Compacting Screw Auger	1	LS	$ 128,000	$128,000
				Subtotal:	**$511,000**
DIV. 15	**MECHANICAL**				
1	H&V Equipment	1	LS	$ 399,000	$399,000
2	Plumbing	1	LS	$ 125,000	$125,000
				Subtotal:	**$524,000**
DIV. 16	**ELECTRICAL**				
1	MCCs, Lighting, Arc Flash & Labeling	1	LS	$ 921,900	$922,000
2	Paging/Communications System	1	LS	$ 50,000	$50,000
3	I&C, Automation and SCADA Integration	1	LS	$ 94,000	$94,000
				Subtotal:	**$1,066,000**
				TRADES SUBTOTAL	**$8,067,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$1,210,000
DIV. 01	General Requirements	7.5%			$605,000
	Contingencies	40%			$3,227,000
	SUBTOTAL			**Subtotal:**	**$13,109,000**
	PROJECT COSTS				
	Engineering	25%			$3,277,000
	Force Account	3%			$393,000
	Annual Cost Adjustment	3.5%	per yr.	14.8%	$1,934,000
				TOTAL	**$18,713,000**
	Adjustment of Costs from ENR CCI	1.00			$18,713,000
ENGINEER'S OPINION OF PROJECT COST				**$**	**18,713,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 1F

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**2009 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**DSDS Collection System Improvements** **Priority 1**	By:	**EJW**
BASIS OF ESTIMATE:		Ck'd by:	**KD**
		CCI: Time of Est.	**8,534**
		CCI: Current	**8,534**

[X] Report [ ] Design [ ]
[ ] 50% [ ] 90% [X] Final

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 16	**ELECTRICAL**				
1	Field Instrumentation	1	LS	$ 2,021,000	$2,021,000
2	OIT, Notebooks, and Server	1	LS	$ 120,000	$120,000
3	New RTUs	1	LS	$ 138,000	$138,000
4	Electrical Power	1	LS	$ 57,000	$57,000
5	Programming, Training, Documentation	1	LS	$ 376,000	$376,000
6	Collection System Sewers & Manhole Repairs	1	LS	$ 715,000	$715,000
				Subtotal:	**$3,427,000**
			TRADES SUBTOTAL		**$3,427,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$514,000
DIV. 01	General Requirements	7.5%			$257,000
	Contingencies	40%			$1,371,000
	SUBTOTAL			**Subtotal:**	**$5,569,000**
	PROJECT COSTS				
	Engineering	25%			$1,392,000
	Force Account	3%			$167,000
	Annual Cost Adjustment	3.5%	per yr.	18.8%	$1,045,000
				TOTAL	**$8,173,000**
	Adjustment of Costs from ENR CCI	1.00			$8,173,000
ENGINEER'S OPINION OF PROJECT COST				**$**	**8,173,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 2A

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Secondary Oxygen and Flow Control Improvements**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Paving and Site Utilities	1	LS	$ 75,000	$75,000
2	Oxygen Piping	1,200	LF	$ 120	$144,000
3	Site restoration	1	LS	100,000	$100,000
				Subtotal:	**$319,000**
DIV. 11	**EQUIPMENT**				
1	Oasis Skid Replacement	1	EA	$ 170,000	$170,000
2	Purge Blower System	1	LS	$ 425,000	$425,000
3	Control Valves	11	EA	$ 77,000	$847,000
4	IPS Motor Rehabilitation	6	EA	$ 50,000	$300,000
5	Demolition	1	LS	$ 50,000	$50,000
				Subtotal:	**$1,792,000**
DIV. 16	**ELECTRICAL**				
1	Electrical, Power, & Controls	1	LS	$ 268,800	$269,000
2	I&C, Automation and SCADA Integration	1	LS	$ 134,400	$134,000
				Subtotal:	**$403,000**
			TRADES SUBTOTAL		**$2,514,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$377,000
DIV. 01	General Requirements	7.5%			$189,000
	Contingencies	40%			$1,006,000
	SUBTOTAL			**Subtotal:**	**$4,086,000**
	PROJECT COSTS				
	Engineering	25%			$1,022,000
	Force Account	3%			$123,000
	Annual Cost Adjustment	3.5%	per yr.	27.2%	$1,113,000
				TOTAL	**$6,344,000**
	Adjustment of Costs from ENR CCI	1.00			$6,344,000
ENGINEER'S OPINION OF PROJECT COST					**$ 6,344,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 2B

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**2009 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**DSDS Sewer Rehabilitation Improvements**	By:	**EJW**
BASIS OF ESTIMATE:		Ck'd by:	**KD**
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 16	**ELECTRICAL**				
1	Collection System Sewers & Manhole Repairs	1	LS	$ 640,800	$641,000
				Subtotal:	**$641,000**
			TRADES SUBTOTAL		**$641,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$96,000
DIV. 01	General Requirements	7.5%			$48,000
	Contingencies	40%			$256,000
	SUBTOTAL			**Subtotal:**	**$1,041,000**
	PROJECT COSTS				
	Engineering	25%			$260,000
	Force Account	3%			$31,000
	Annual Cost Adjustment	3.5%	per yr.	27.2%	$283,000
				TOTAL	**$1,615,000**
	Adjustment of Costs from ENR CCI	1.00			$1,615,000
ENGINEER'S OPINION OF PROJECT COST					**$ 1,615,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 2C

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Dewatering Complex Renovations**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Miscellaneous Site Improvments	1	LS	$ 25,000	$25,000
				Subtotal:	**$25,000**
DIV. 03	**CONCRETE**				
1	Structural Renovations to tanks	6	EA	$ 50,000	$300,000
2	Splitter Box	1	LS	$ 600,000	$600,000
				Subtotal:	**$900,000**
DIV. 04-10	**ARCHITECTURAL**				
1	Dewatering Building Improvements	1	LS	$ 800,000	$800,000
				Subtotal:	**$800,000**
DIV. 11	**EQUIPMENT**				
1	Thickened Sludge Feed Pumps and Grinders	4	EA	$ 168,000	$672,000
2	Centrifuges	2	EA	$ 1,690,000	$3,380,000
3	Polymer System	1	LS	$ 428,000	$428,000
4	Piping and Valves	1	LS	$ 200,000	$200,000
5	Demolition	1	LS	$ 125,000	$125,000
				Subtotal:	**$4,805,000**
DIV. 14	**CONVEYING EQUIPMENT**				
1	Screw Augers	2	EA	$ 221,000	$442,000
				Subtotal:	**$442,000**
DIV. 15	**MECHANICAL**				
1	Plumbing	1	LS	$ 240,250	$240,000
				Subtotal:	**$240,000**
DIV. 16	**ELECTRICAL**				
1	MCCs, Lighting, Arc Flash & Labeling	1	LS	$ 1,122,750	$1,123,000
2	SCADA	1	LS	$ 190,000	$190,000
				Subtotal:	**$1,313,000**
				TRADES SUBTOTAL	**$8,525,000**
	CONTRACTUAL REQUIREMENTS				
DIV. 00	General Conditions	15%			$1,279,000
DIV. 01	General Requirements	7.5%			$639,000
	Contingencies	40%			$3,410,000
				Subtotal:	**$13,853,000**
	PROJECT COSTS				
	Engineering	25%			$3,463,000
	Force Account	3%			$416,000
	Annual Cost Adjustment	3.5%	per yr.	31.7%	$4,389,000
				TOTAL	**$22,121,000**
	Adjustment of Costs from ENR CCI	1.00			$ 22,121,000
ENGINEER'S OPINION OF PROJECT COST					**$ 22,121,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 2D

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Enhanced BioPhosphorus Removal**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Site restoration	1	LS	$ 10,000	$10,000
				Subtotal:	**$10,000**
DIV. 03	**CONCRETE**				
1	Modifications to First Train	5	EA	$ 25,000	$125,000
2	Baffle Walls	5	EA	$ 32,000	$160,000
				Subtotal:	**$285,000**
DIV. 11	**EQUIPMENT**				
1	Mixers	10	EA	$ 55,000	$550,000
2	Relocation of surface aerators	5	EA	$ 10,000	$50,000
3	Selector return pumps	5	EA	$ 181,000	$905,000
4	Ferric Chloride Facilities Renovations	1	LS	$ 650,000	$650,000
5	Demolition	5	EA	$ 10,000	$50,000
				Subtotal:	**$2,205,000**
DIV. 15	**MECHANICAL**				
1	Modifications to Oxygen piping and valves	5	EA	$ 30,000	$150,000
2	Return flow piping and valves	5	EA	$ 45,250	$226,000
				Subtotal:	**$376,000**
DIV. 16	**ELECTRICAL**				
1	Power and Controls	5	EA	$ 47,200	$236,000
2	I&C and SCADA Integration	1	LS	$ 175,000	$175,000
				Subtotal:	**$411,000**
				TRADES SUBTOTAL	**$3,287,000**
	CONTRACTUAL REQUIREMENTS				
DIV. 00	General Conditions	15%			$493,000
DIV. 01	General Requirements	7.5%			$247,000
	Contingencies	40%			$1,315,000
				Subtotal:	**$5,342,000**
	PROJECT COSTS				
	Engineering	25%			$1,336,000
	Force Account	3%			$160,000
	Annual Cost Adjustment	3.5%	per yr.	36.3%	$1,939,000
				TOTAL	**$8,777,000**
	Adjustment of Costs from ENR CCI	1.00			$ 8,777,000
ENGINEER'S OPINION OF PROJECT COST					**$ 8,777,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 2E

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Incineration Complex Renovations**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Site restoration	1	LS	$ 25,000	$25,000
				Subtotal:	**$25,000**
DIV. 03	**CONCRETE**				
1	Truck Bay Improvements	1	LS	$ 315,000	$315,000
2	Sludge Storage Tanks	2	EA	$ 144,000	$288,000
				Subtotal:	**$603,000**
DIV. 04-10	**ARCHITECTURAL**				
1	Incineration Building	1	LS	$ 1,263,600	$1,264,000
				Subtotal:	**$1,264,000**
DIV. 11	**EQUIPMENT**				
1	Truck Bay	1	LS	$ 728,000	$728,000
2	Demolition	1	LS	$ 450,000	$450,000
				Subtotal:	**$1,178,000**
DIV. 14	**CONVEYING EQUIPMENT**				
1	Conveyors	1	EA	$ 3,505,000	$3,505,000
				Subtotal:	**$3,505,000**
DIV. 15	**MECHANICAL**				
1	H&V Equipment	1	LS	$ 200,000	$200,000
2	Plumbing	1	LS	$ 58,900	$59,000
				Subtotal:	**$259,000**
DIV. 16	**ELECTRICAL**				
1	MCCs, Lighting, Arc Flash & Labeling	1	LS	$ 927,750	$928,000
2	SCADA	1	LS	$ 190,000	$190,000
				Subtotal:	**$1,118,000**
			TRADES SUBTOTAL		**$7,952,000**
	CONTRACTUAL REQUIREMENTS				
DIV. 00	General Conditions	15%			$1,193,000
DIV. 01	General Requirements	7.5%			$596,000
	Contingencies	40%			$3,181,000
				Subtotal:	**$12,922,000**
	PROJECT COSTS				
	Engineering	25%			$3,231,000
	Force Account	3%			$388,000
	Annual Cost Adjustment	3.5%	per yr.	36.3%	$4,689,000
				TOTAL	**$21,230,000**
	Adjustment of Costs from ENR CCI	1.00			$ 21,230,000
ENGINEER'S OPINION OF PROJECT COST					**$ 21,230,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 3A

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**UV Disinfection System Renovations**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Civil Site Work	1	LS	$ 60,900	$61,000
				Subtotal:	**$61,000**
DIV. 03	**CONCRETE**				
1	Concrete	1	LS	$ 852,700	$853,000
				Subtotal:	**$853,000**
DIV. 04-10	**ARCHITECTURAL**				
1	General Architectural	1	LS	$ 487,200	$487,000
				Subtotal:	**$487,000**
DIV. 11	**EQUIPMENT**				
1	UV Equipment	1	LS	$ 3,471,600	$3,472,000
				Subtotal:	**$3,472,000**
DIV. 15	**MECHANICAL**				
1	Plumbing	1	LS	$ 304,500	$305,000
				Subtotal:	**$305,000**
DIV. 16	**ELECTRICAL**				
1	Power, and I&C	1	LS	$ 913,600	$914,000
				Subtotal:	**$914,000**
				TRADES SUBTOTAL	**$6,092,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$914,000
DIV. 01	General Requirements	7.5%			$457,000
	Contingencies	40%			$2,437,000
	SUBTOTAL			**Subtotal:**	**$9,900,000**
	PROJECT COSTS				
	Engineering	25%			$2,475,000
	Force Account	3%			$297,000
	Adjustment for Future Cost Index	3.5%	per yr.	46.0%	$4,554,000
				TOTAL	**$17,226,000**
	Adjustment of Costs from ENR CCI	1.00			$17,226,000
	ENGINEER'S OPINION OF PROJECT COST				**$ 17,226,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 3B

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Instrumention and SCADA System Renovations**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 15	**MECHANICAL**				
1	Plate Valves	5	EA	$ 30,000	$150,000
				Subtotal:	**$150,000**
DIV. 16	**ELECTRICAL**				
1	SCADA Replacement	1	LS	$ 1,331,000	$1,331,000
2	Field Instruments Replacement	1	LS	$ 1,040,000	$1,040,000
3	VFDs	1	LS	$ 1,520,000	$1,520,000
				Subtotal:	**$3,891,000**
			TRADES SUBTOTAL		**$4,041,000**
	CONTRACTUAL REQUIREMENTS				
DIV. 00	General Conditions	15%			$606,000
DIV. 01	General Requirements	7.5%			$303,000
	Contingencies	40%			$1,616,000
				Subtotal:	**$6,416,000**
	PROJECT COSTS				
	Engineering	25%			$1,604,000
	Force Account	3%			$192,000
	Annual Cost Adjustment	3.5%	per yr.	51.1%	$3,279,000
				TOTAL	**$11,491,000**
	Adjustment of Costs from ENR CCI	1.00			$ 11,491,000
ENGINEER'S OPINION OF PROJECT COST					**$ 11,491,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 3C

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Class B Lime Stabilization Faciltiy**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Site restoration	1	LS	$ 25,000	$25,000
				Subtotal:	**$25,000**
DIV. 03	**CONCRETE**				
1	Foundation/Floor modifications	1	LS	$ 50,000	$50,000
				Subtotal:	**$50,000**
DIV. 04-10	**ARCHITECTURAL**				
1	Miscellanesous Structural Steel	1	LS	$ 125,000	$125,000
				Subtotal:	**$125,000**
DIV. 11	**EQUIPMENT**				
1	Lime Silo	1	LS	$ 175,000	$175,000
2	Lime Handling Equipment	1	LS	$ 761,000	$761,000
3	Primary Sludge Pumps	8	EA	$ 40,000	$320,000
4	Demolition	1	LS	$ 40,000	$40,000
				Subtotal:	**$1,296,000**
DIV. 14	**CONVEYING EQUIPMENT**				
1	Conveyors	2	EA	$ 743,000	$1,486,000
				Subtotal:	**$1,486,000**
DIV. 15	**MECHANICAL**				
1	H&V Equipment	1	LS	$ 200,000	$200,000
2	Plumbing	1	LS	$ 25,000	$25,000
				Subtotal:	**$225,000**
DIV. 16	**ELECTRICAL**				
1	MCCs, Lighting, Arc Flash & Labeling	1	LS	$ 194,400	$194,000
2	SCADA Integration	1	LS	$ 97,200	$97,000
				Subtotal:	**$291,000**
				TRADES SUBTOTAL	**$3,498,000**
	CONTRACTUAL REQUIREMENTS				
DIV. 00	General Conditions	15%			$525,000
DIV. 01	General Requirements	7.5%			$262,000
	Contingencies	40%			$1,399,000
				Subtotal:	**$12,680,000**
	PROJECT COSTS				
	Engineering	25%			$3,170,000
	Force Account	3%			$380,000
	Annual Cost Adjustment	3.5%	per yr.	56.4%	$7,151,000
				TOTAL	**$23,381,000**
	Adjustment of Costs from ENR CCI	1.00			$ 23,381,000
ENGINEER'S OPINION OF PROJECT COST					**$ 23,381,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 4A

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Primary Treatment System Renovations**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Civil Site Work	1	LS	$ 56,000	$56,000
				Subtotal:	**$56,000**
DIV. 03	**CONCRETE**				
1	Concrete	1	LS	$ 48,000	$48,000
				Subtotal:	**$48,000**
DIV. 04-10	**ARCHITECTURAL**				
1	General Architectural	1	LS	$ 419,000	$419,000
				Subtotal:	**$419,000**
DIV. 11	**EQUIPMENT**				
1	Drive and Collector Equipment	1	LS	$ 1,699,000	$1,699,000
				Subtotal:	**$1,699,000**
DIV. 15	**MECHANICAL**				
1	H&V and Plumbing	1	LS	$ 382,000	$382,000
				Subtotal:	**$382,000**
DIV. 16	**ELECTRICAL**				
1	I&C, Automation and SCADA Integration	1	LS	$ 401,000	$401,000
				Subtotal:	**$401,000**
				TRADES SUBTOTAL	**$3,005,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$451,000
DIV. 01	General Requirements	7.5%			$225,000
	Contingencies	40%			$1,202,000
	SUBTOTAL			**Subtotal:**	**$4,883,000**
	PROJECT COSTS				
	Engineering	25%			$1,221,000
	Force Account	3%			$146,000
	Adjustment for Future Cost Index	3.5%	per yr.	73.4%	$3,584,000
				TOTAL	**$9,834,000**
	Adjustment of Costs from ENR CCI	1.00			$9,834,000
	ENGINEER'S OPINION OF PROJECT COST				**$ 9,834,000**

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Table 4B

Engineer's Opinion of Project Costs

OWNER	**Wayne County Department of Environment**	Est. Date	**4/1/2009**
PROJECT	**DR-4 SRF Project Plan**	Project No.	**20080550.24**
WORK:	**Headworks and Secondary Improvements**	By:	**THS**
BASIS OF ESTIMATE:		Ck'd by:	
[X] Report [ ] Design [ ]		CCI: Time of Est.	**8,534**
[ ] 50% [ ] 90% [X] Final		CCI: Current	**8,534**

NO.	ITEM	QUAN.	UNIT	UNIT PRICE	SUB-TOTAL
DIV. 02	**CIVIL / SITE**				
1	Civil Site Work	1	LS	$ 723,940	$724,000
				Subtotal:	**$724,000**
DIV. 03	**CONCRETE**				
1	Concrete	1	LS	$ 1,447,880	$1,448,000
				Subtotal:	**$1,448,000**
DIV. 04-10	**ARCHITECTURAL**				
1	General Architectural	1	LS	$ 1,964,980	$1,965,000
				Subtotal:	**$1,965,000**
DIV. 11	**EQUIPMENT**				
1	Process Equipment	1	LS	$ 4,136,800	$4,137,000
				Subtotal:	**$4,137,000**
DIV. 15	**MECHANICAL**				
1	H&V and Plumbing	1	LS	$ 517,100	$517,000
				Subtotal:	**$517,000**
DIV. 16	**ELECTRICAL**				
1	Power, and I&C	1	LS	$ 1,551,300	$1,551,000
				Subtotal:	**$1,551,000**
				TRADES SUBTOTAL	**$10,342,000**
	Contractual Requirement				
DIV. 00	General Conditions	15%			$1,551,000
DIV. 01	General Requirements	7.5%			$776,000
	Contingencies	40%			$4,137,000
	SUBTOTAL			**Subtotal:**	**$16,806,000**
	PROJECT COSTS				
	Engineering	25%			$4,202,000
	Force Account	3%			$504,000
	Adjustment for Future Cost Index	3.5%	per yr.	79.5%	$13,355,000
				TOTAL	**$34,867,000**
	Adjustment of Costs from ENR CCI	1.00			$34,867,000
ENGINEER'S OPINION OF PROJECT COST					**$ 34,867,000**

SOLIDS THICKENING RENOVATIONS, ALTERNATIVE A - RE-ROUTE SLUDGE LINES

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Civil	$	332,629	50	$	250,000
Structural		1,385,955	50		1,041,000
Equipment & Installation		609,820	20		610,000
Electrical and I&C		138,596	20		139,000
TOTAL CAPITAL COST	**$**	**2,467,000**		$	2,040,000
		PRESENT WORTH OF SALVAGE VALUE		$	427,000

ANNUAL OPERATION AND MAINTENANCE COST

Power and Staff	$	20,700
Mechanical Maintenance		22,100
TOTAL ANNUAL O, M & R COST	$	42,800

PRESENT WORTH OF O&M COST	$	557,000
PRESENT WORTH	**$**	**2,597,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**200,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

SOLIDS THICKENING RENOVATIONS, ALTERNATIVE B - CURRENT OPERATION

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Civil	$	528,862	50	$	397,000
Structural		461,888	50		347,000
Equipment & Installation		2,383,343	20		2,383,000
Electrical and I&C		588,907	20		589,000
TOTAL CAPITAL COST	**$**	**3,963,000**		$	3,716,000
		PRESENT WORTH OF SALVAGE VALUE		$	247,000

ANNUAL OPERATION AND MAINTENANCE COST

Power and Staff	$	40,800
Mechanical Maintenance		51,700
TOTAL ANNUAL O, M & R COST	$	92,500

PRESENT WORTH OF O&M COST	$	1,204,000
PRESENT WORTH	**$**	**4,920,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**378,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

SECONDARY SYSTEM PROJECT, ALTERNATIVE A - SUBMERSIBLE PUMPS

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Structural	$	0	50	$	0
Equipment & Installation		1,165,315	20		1,165,000
Electrical and I&C		117,685	20		118,000
TOTAL CAPITAL COST	**$**	**1,283,000**		$	1,283,000
PRESENT WORTH OF SALVAGE VALUE				$	0

ANNUAL OPERATION AND MAINTENANCE COST

Power and Staff	$	66,000
Mechanical Maintenance		22,900
TOTAL ANNUAL O, M & R COST	$	88,900

PRESENT WORTH OF O&M COST	$	1,156,000
PRESENT WORTH	**$**	**2,439,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**188,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

SECONDARY SYSTEM PROJECT, ALTERNATIVE B - VERTICAL TURBINE PUMPS

PRESENT WORTH ANALYSIS

CAPITAL COST	PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)	NET PW (PW - SALVAGE VALUE[(2)])
Structural	$ 342,076	50	$ 257,000
Equipment & Installation	1,204,198	20	1,204,000
Electrical and I&C	168,726	20	169,000
TOTAL CAPITAL COST	**$ 1,715,000**		$ 1,630,000
	PRESENT WORTH OF SALVAGE VALUE		$ 85,000

ANNUAL OPERATION AND MAINTENANCE COST

Power and Staff	$	63,300
Mechanical Maintenance		14,300
TOTAL ANNUAL O, M & R COST	$	77,600

PRESENT WORTH OF O&M COST	$	1,010,000
PRESENT WORTH	**$**	**2,640,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**203,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

D-A-F COMPLEX RENOVATIONS, ALTERNATIVE A - UTILIZE D-A-F BUILDING

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Arch/Structural	$	1,884,680	50	$	1,416,000
Mech., H&V		122,960	20		123,000
Electrical and I&C		508,800	20		509,000
TOTAL CAPITAL COST	**$**	**2,516,000**		$	2,048,000
PRESENT WORTH OF SALVAGE VALUE				$	468,000

ANNUAL OPERATION AND MAINTENANCE COST

Staff	$	40,000
TOTAL ANNUAL O, M & R COST	$	40,000

PRESENT WORTH OF O&M COST	$	520,000
PRESENT WORTH	**$**	**2,568,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**197,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

D-A-F COMPLEX RENOVATIONS, ALTERNATIVE B - CONTINUE LEASING SPACE

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Arch/Structural	$	637,000	50	$	479,000
Equipment & Installation			20		0
Electrical and I&C			20		0
TOTAL CAPITAL COST	**$**	**637,000**		$	479,000
PRESENT WORTH OF SALVAGE VALUE				$	158,000

ANNUAL OPERATION AND MAINTENANCE COST

Leasing Costs	$	80,000
Staff		80,000
Additional fuel costs		2,000
TOTAL ANNUAL O, M & R COST	$	162,000

PRESENT WORTH OF O&M COST	$	2,110,000
PRESENT WORTH	**$**	**2,589,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**199,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

HEADWORKS SYSTEM PROJECT, ALTERNATIVE A - DUPERON FLEXRAKE

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Structural	$	0	50	$	0
Equipment & Installation		2,030,134	20		2,030,000
Electrical and I&C		304,866	20		305,000
TOTAL CAPITAL COST	**$**	**2,335,000**		$	2,335,000
PRESENT WORTH OF SALVAGE VALUE				$	0

ANNUAL OPERATION AND MAINTENANCE COST

Power & Maintenance	$	15,900
TOTAL ANNUAL O, M & R COST	$	15,900

PRESENT WORTH OF O&M COST	$	207,000
PRESENT WORTH	**$**	**2,542,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**195,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

HEADWORKS SYSTEM PROJECT, ALTERNATIVE B - MAHR BAR

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Structural	$	0	50	$	0
Equipment & Installation		2,135,119	20		2,135,000
Electrical and I&C		318,881	20		319,000
TOTAL CAPITAL COST	**$**	**2,454,000**		$	2,454,000
PRESENT WORTH OF SALVAGE VALUE				$	0

ANNUAL OPERATION AND MAINTENANCE COST

Power & Maintenance	$	13,900
TOTAL ANNUAL O, M & R COST	$	13,900

PRESENT WORTH OF O&M COST	$	181,000
PRESENT WORTH	**$**	**2,635,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**203,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

COLLECTION SYSTEM SCADA, UPGRADE EXISTING RTUs

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Capital Cost of System	$	6,468,000	20	$	6,468,000
TOTAL CAPITAL COST	**$**	**6,468,000**		$	6,468,000
PRESENT WORTH OF SALVAGE VALUE				$	0

ANNUAL OPERATION AND MAINTENANCE COST

Recurring Costs for System		1,950
TOTAL ANNUAL O, M & R COST	$	1,950

PRESENT WORTH OF O&M COST	$	30,000
PRESENT WORTH	**$**	**6,498,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**500,000**

Notes:

(1) March 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

COLLECTION SYSTEM STRUCTURAL REPAIR, ALTERNATIVE A - PRESSURE GROUTING

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Capital Cost of System	$	1,706,000	20	$	1,706,000
TOTAL CAPITAL COST	**$**	**1,706,000**		$	1,706,000
PRESENT WORTH OF SALVAGE VALUE				$	0

ANNUAL OPERATION AND MAINTENANCE COST

Recurring Costs for System		3,000
TOTAL ANNUAL O, M & R COST	$	3,000

PRESENT WORTH OF O&M COST	$	40,000
PRESENT WORTH	**$**	**1,746,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**134,000**

Notes:

(1) March 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

COLLECTION SYSTEM STRUCTURAL REPAIR, ALTERNATIVE B - EPDM

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Capital Cost of System	$	2,296,000	20	$	2,296,000
TOTAL CAPITAL COST	**$**	**2,296,000**		$	2,296,000
PRESENT WORTH OF SALVAGE VALUE				$	0

ANNUAL OPERATION AND MAINTENANCE COST

Recurring Costs for System		2,500
TOTAL ANNUAL O, M & R COST	$	2,500

PRESENT WORTH OF O&M COST	$	32,000
PRESENT WORTH	**$**	**2,328,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**179,000**

Notes:

(1) March 2009 ENR 20 Cities CCI = 8534

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

Appendix C

Project Planning Correspondence

Robert A. Ficano
County Executive

3 September 2009

Mr. Osama Khaimi, Senior Environmental Engineer
Michigan Department of Environmental Quality-Water Bureau
Southeast Michigan District Office
27700 Donald Court
Warren, MI 48092-2793

Re: 2009 Final SRF Project Plan
Wayne County Downriver Sewage Disposal System

Dear Mr. Khaimi:

I am writing in response to your 16 July 2009 letter (attached) outlining review comments on the 2009 Final State Revolving Fund Project Plan for the Wayne County Downriver Sewage Disposal System ("Project Plan"). Our responses to your comments (shown below in *italics*) are shown below.

1. *In the last paragraph on page 1-1 of the Project Plan it stated that a segment of approximately 800 lineal feet of sewer will be scheduled for lining as a Priority 2 project. This task was not identified on page 3-2 of the Project Plan. Please explain the reasons for lining a section of 800 feet of the River Drive Interceptor and list the types of defects that were observed during the inspection of this interceptor. In addition, it is not understood how the overall condition of the Regional Collection System was evaluated for defects when only 2% of the system was televised, and the televising was conducted in only one major interceptor that serves the eastern communities of the Downriver System. Please explain the criteria utilized for evaluating approximately 50 miles of the Regional Collection System for I/I and other defects.*

   In addition, on page 1-5, the Project Plan recommends that Wayne County address approximately 5 miles of sewers each year in terms of inspection and rehab program. We believe that this is inadequate due to the length of the sewer network of approximately 50 miles which translates to a 10-year rehab cycle. We recommend that the inspection and rehab be made on a 5-year cycle to insure that developing defects can be addressed at their infancy stage before they deteriorate and become very costly to repair.

   Response: The collection system needs are briefly discussed on Page 3-22 of the Project Plan. The Priority 2 lining project was not discussed in detail because it is recommended for implementation in FY2016, in the second 5-year planning period of the overall 20-year plan.

   In the portion of the Downriver Sewage Disposal System Interceptor (1962 construction brick sewer) televised, the video survey found locations with dripping water, displaced/missing bricks, circumferential cracks, encrustation, and missing mortar at brick joints. There was also a short length of concrete sewer where aggregates were observed to be exposed and the sewer is highly deteriorated, with roots of vegetation protruding through the cracks.

In the portion of the Wyandotte (River Drive) Interceptor Sewer (1938 construction concrete sewer) televised, the video revealed that the crown of the pipe is eroded, exposing the aggregate in the concrete. There were a few areas where the erosion has also caused the steel reinforcement to be exposed. There were also locations observed where there is active infiltration through apparent cracks and pinholes, and built-up "encrustation."

These deficiencies were reviewed to determine what repairs are required to maintain the structural integrity of the sewer. The repair areas were classified as Priority 1 or 2 projects, based on the severity of the conditions encountered.

The areas televised were selected to provide an insight into the overall system by including sewers of both major construction periods (1930s and 1960s) and both types of material (brick and concrete.) The 10-year rehabilitation cycle was recommended based on the overall condition of the sewer and manholes reviewed, which were generally in fair to good condition, excluding the lengths of sewer proposed to be lined.

2. *On page 2-1, please revise the 25-year, 24-hour storm to 100-year, 24-hour storm.*

   From the 1993 Project Plan, the design storm was shown as a 100-year, 24-hour event. The current Project Plan cited it incorrectly as you have noted, and it will be changed.

3. *Page 2-8, the major interceptors should be listed as in the draft Project Plan. The Riverview Interceptor serves only the City of Riverview but not other western interceptors. Pennsylvania Interceptor is the only interceptor that receives flow from other major interceptors serving the western downriver communities. Please revise.*

   We apologize for the confusion and agree that the collection system is as shown in the draft Project Plan and repeated below.

   The Downriver interceptors include:

   - Riverdrive Interceptor, which transports wastewater from the communities of River Rouge, Ecorse, and Lincoln Park, and approximately 90 percent of the wastewater from Allen Park.
   - Riverview Interceptor, which transports wastewater from the City of Riverview.
   - Pennsylvania Interceptor, which transports wastewater to the DWTF from eight Downriver communities including Belleville, Van Buren Township, Romulus, Taylor, Dearborn Heights, Brownstown Township, Allen Park, and those portions of Southgate served by separated sewers.

4. *Page 3-5 – Sampling Pumps. Please provide the justification as to why the entire sampling system is scheduled for replacement as a Priority 1 project, knowing that the sampling system was recently replaced under Package F.*

   Prior to the Package F improvements at the Downriver Wastewater Treatment Facility (DWTF), all of the samples collected within the DWTF were pumped to a sampler area in the Old Solids Building. At that location, each sample stream could be observed, providing a quick visual check of DWTF conditions. Under Package F, the raw influent sampler was moved to the Influent Pump Station,

where a submersible sample pump sends a sample to the refrigerated sampler three floors down. The raw influent sample can no longer be readily observed and if the sample line plugs, the variable frequency drive for the pump does not function as intended. In addition, the other samplers within the DWTF are approaching 20 years of age, and should be replaced. We would like to re-establish all the samplers in one location to facilitate real time observation of the samples, and install new sampling equipment. While the sample pumps (installed under Package F) have not yet reached their useful life and we may be able to continue to use them for a longer period than the other sample pumps, we have included the cost for replacing all of the sample pumps at the DWTF within the Project Plan to provide a conservative estimate for this item.

5. *Page 3-6 – Fine Screens 3 & 4 Swing Check Valves. These swing check valves were installed under Package F in 1999 and they are not due for replacement as a Priority 1 project. This should be a maintenance item and be scheduled for replacement at the end of its useful life.*

   The swing check valves for the Fine Screen process are installed in a vault. It has been revealed that there is very little room between the valves and the walls of the vault. The swing check valves leak at the shaft and the leak cannot be serviced unless the entire valve is hoisted from the vault, a difficult and time consuming process. These swing check valves need to be replaced with an alternate style of check valve that is repairable within the tight confines of the check valve vault.

6. *Page 3-6 – Fine Screens 5, 6 & 7. These screens were replaced under Package F in 1999. They should not be due for replacement as a Priority 3 project but as a Priority 4 at the end of their 20 years useful life.*

   The screens were installed in 1999 and with a 20 year projected life, they will have reached their useful life in the year 2019. The Project Plan shows them scheduled for replacement under the Priority 3 replacement period of 2020-2024, which is consistent with the planned 20-year useful life.

7. *Page 3-7 – Aerated Grit Facilities. Please explain why the Class 1, Division 1 rated H&V equipment does not function. Also, provide the date when the H&V equipment was installed.*

   The aerated grit H&V equipment was installed under Package F in 1999. The Class 1, Division 1 H&V equipment needs to be replaced because they have deteriorated due to the corrosive nature of the Class 1, Division 1 atmosphere. We intend to replace the electric unit heaters with steam heat, as we have excess capacity in the boiler and steam heat is much more efficient than electric heat.

8. *Page 3-8 – Tunnel Pump Station. Please explain why the replacement of the external stairs is a Priority 1 project if it was constructed in year 2000. The stairs should have been maintained on a regular basis.*

   The proposed stairs were not constructed with the original Tunnel Pump Station in 2000 and are thus a new item.

9. *Page 3-8 – Tunnel Pump Station. Please explain why the Class 1, Division 1 rated H&V equipment installed in year 2000 does not function and is scheduled for replacement as a Priority 1 project.*

   The Tunnel Pump Station H&V equipment was installed under Contract 7 of the Downriver Regional Storage and Transport System project in 2000. The fiber reinforced plastic (FRP) fan blower suffered

from repeated stress from fan wheel imbalance and finally failed. Replacement is scheduled as a Priority 1 Project because proper ventilation is essential in the Class 1, Division 1 environment.

10. *Page 3-12 – Isolation of the outfall of the UV Chamber. Please explain why contradicting decisions were made to remove and then reinstall the stop logs. Such contradicting decisions translate into wasting funds that can be used to fix some other problems or issues at the plant.*

    We agree wholeheartedly with the statement regarding wasting funds. The stop logs were not eliminated as stated in the Project Plan, but were removed and stored for future use. During storage, the stop logs unfortunately have become warped to the point that they can no longer be used. This deterioration happened over a prolonged period and was not obvious. We feel that a having a ready means to isolate the outfall is a very important aspect of DWTF operations, should any emergency repairs to the outfall be needed.

We hope that our responses have addressed your concerns. Please contact me at 313-224-8282 or kcave@co.wayne.mi.us if you have any further questions or require any additional information.

Very truly yours,

Kelly A. Cave, P.E.
Director, Water Quality Management Division
Wayne County Department of Public Services

Attachment

cc: Ms. Kerreen Conley, Wayne County DPS
Mr. Firooz Fath-Azam, P.E., Wayne County DPS
Mr. Greg C. Tupancy, P.E., Wayne County DPS
Mr. Pete Roth, P.E., HRC
Mr. Tim Sullivan, P.E., HRC
Mr. Tom Maxwell, P.E., HRC
Ms. Sally Duffy, P.E., HRC
Mr. Jeffrey Herrold, MDEQ
Mr. Phil Argiroff, P.E., District Supervisor, MDEQ

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SOUTHEAST MICHIGAN DISTRICT OFFICE

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

July 16, 2009

Mr. Greg Tupancy, P.E.
Wayne County Department of Environment
Water Quality Management Division
415 Clifford, 7th Floor
Detroit, Michigan 48226

Dear Mr. Tupancy:

Subject: 2009 Final State Revolving Fund Project Plan
Wayne County Downriver Sewage Disposal System

The following are our comments generated from reviewing the Final Project Plan submitted on July 2, 2009.

1. In the last paragraph on page 1-1 of the Project Plan it is stated that a segment of approximately 800 lineal feet of sewer will be scheduled for lining as a Priority 2 project. This task was not identified on page 3-2 of the Project Plan. Please explain the reasons for lining a section of 800 feet of the River Drive Interceptor and list the types of defects that were observed during the inspection of this interceptor. In addition, it is not understood how the overall condition of the Regional Collection System was evaluated for defects when only 2% of the system was televised, and the televising was conducted in only one major interceptor that serves the eastern communities of the Downriver System. Please explain the criteria utilized for evaluating approximately 50 miles of the Regional Collection System for I/I and other defects.

   In addition, on page 1-5, the Project Plan recommends that Wayne County address approximately 5 miles of sewers each year in terms of inspection and rehab program. We believe that this is inadequate due to the length of the sewer network of approximately 50 miles which translates to a 10-year rehab cycle. We recommend that the inspection and rehab be made on a 5-year cycle to insure that developing defects can be addressed at their infancy stage before they deteriorate and become very costly to repair.

2. On page 2-1, please revise the 25-year, 24-hour storm to 100-year, 24-hour storm.

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4. Page 3-5 – Sampling Pumps. Please provide the justification as to why the entire sampling system is scheduled for replacement as a Priority 1 project, knowing that the sampling system was recently replaced under package F.

5. Page 3-6 – Fine Screens 3 & 4 Swing Check Valves. These swing check valves were installed under Package F in 1999 and they are not due for replacement as a Priority 1 project. This should be a maintenance item and be scheduled for replacement at the end of its useful life.

6. Page 3-6 – Fine Screens 5, 6 & 7. These screens were replaced under Package F in 1999. They should not be due for replacement as a Priority 3 project but as a Priority 4 at the end of their 20 years useful life.

7. Page 3-7 – Aerated Grit Facilities. Please explain why the Class 1, Division 1 rated H&V equipment does not function. Also, provide the date when the H&V equipment was installed.

8. Page 3-8 – Tunnel Pump Station. Please explain why the replacement of the external stairs is a Priority 1 project if it was constructed in year 2000. The stairs should have been maintained on a regular basis.

9. Page 3-8 – Tunnel Pump Station. Please explain why the Class 1, Division 1 rated H&V equipment installed in year 2000 does not function and is scheduled for replacement as a Priority 1 project.

10. Page 3-12 – Isolation of the outfall of the UV Chamber. Please explain why contradicting decisions were made to remove and then reinstall the stop logs. Such contradicting decisions translate into wasting funds that can be used to fix some other problems or issues at the plant.

If you have any questions, please feel free to contact me at the number listed below.

Sincerely,

Osama Khaimi
Senior Environmental Engineer
Public Wastewater & Drinking Water Unit
Water Bureau
586-753-3778

cc: Ms. Kelly Cave - Wayne County DOE
Ms. Kerreen Conley - Wayne County DOE
Mr. Firooz Fath - Azam - Wayne County FMD
Mr. Jeffrey Herrold - MDEQ
Mr. Phil Argiroff - MDEQ

:wpdocs\downriver\wwtf\2009 project plan\review comments 15-7-09

SEMCOG . . . Equipping local government leaders for the future
established 1968
Southeast Michigan Council of Governments
535 Griswold Street, Suite 300 • Detroit, Michigan 48226-3602 • 313-961-4266 • Fax 313-961-4869
www.semcog.org

June 23, 2009

Sally Duffy
Hubbell, Roth & Clark, Inc.
220 Bagley/420 Michigan Building
Detrit, MI 48226

RE: Application for assistance from Michigan Dept of Environmental Quality, State Revolving Fund for a project entitled "2009 Draft SRF Project Plan for Improvements to Downriver Sewage Disposal System for Wayne County Dept of Environment"
Regional Clearinghourse File No.: EN 090912

Dear Ms Duffy:

SEMCOG, the Southeast Michigan Council of Governments, has processed a review for the above application according to intergovernmental review procedures established in Presidential Executive Order 12372 and assumed in the Michigan Federal Project Review System.

As the designated regional planning agency for Southeast Michigan, we notified the following local government agencies of your project: SEMCOG/Environmental Programs; Huron Charter Township; Grosse Ile Township; City of Wyandotte; City of Woodhaven; City of Trenton; City of Taylor; City of Southgate; City of Romulus; City of Rockwood; City of Riverview; City of River Rouge; City of Melvindale; City of Lincoln Park; City of Gibraltar; City of Flat Rock; City of Ecorse; City of Dearborn Heights; City of Dearborn; City of Allen Park; and Brownstown Charter Township.

As of this date, SEMCOG/Environmental Programs has submitted written comments, which are attached. We will forward additional comments, if any, for your information and attention.

SEMCOG's staff has reviewed the application materials which you submitted and finds that your project does not conflict with areawide plans.

Sincerely,
William Parkus

William Parkus
Regional Review Office

cc: SEMCOG/Environmental Programs

SEMCOG

MEMO

Southeast Michigan Council of Governments
535 Griswold Street, Suite 300
Detroit, Michigan 48226
(313) 961-4266
Fax (313) 961-4869
www.semcog.org

May 20, 2009

TO: File (EN 090912)

FROM: William Parkus

SUBJECT: Draft Downriver Sewage Disposal System SRF Project Plan
Regional Clearinghouse Code: EN 090912
Wayne County/Hubbell, Roth & Clark, Inc.

Background
Wayne County's Downriver Sewage Disposal District is composed of 13 communities. Those Communities are: Allen Park, Belleville, Brownstown Township, Dearborn Heights, Ecorse, Lincoln Park, River Rouge, Riverview, Romulus, Southgate, Taylor, Van Buren Township and Wyandotte.

The Downriver Wastewater Treatment Plant has sufficient capacity to meet the needs of it customer communities. However, numerous process equipment and instrumentation have reached the end of their useful life and need to be replaced.

The collection system of the Downriver Sewage Disposal System has been investigated. Numerous interceptor sewers within Wyandotte were video investigated and are in need of being rehabilitated. In addition, electronic SCADA components around the disposal district are beginning to fail and need to be replaced.

Proposed Project
The project plan proposes a series of projects over the next 19 years (FY 2010 to 2029) to improve and upgrade the Downriver Wastewater Treatment Facility, rehabilitate interceptors (beginning) in Wyandotte, and replace failing SCADA components throughout the sewage disposal district.

Total estimated project cost: $215,333,000

Staff Finding
SEMCOG Staff has reviewed the above referenced SRF project plan and finds it to be consistent with the *Water Quality Management Plan for Southeast Michigan.*

SEMCOG policies limit the use of state and federal funds for sewer system improvement projects to predominantly addressing health problems, not funding growth. For a project to be consistent with the *Water Quality Management Plan* it must be located inside an eligible sewer funding service area. Such is the case here.

The population projections used in the SRF project plan are, for the most part, consistent with SEMCOG's 2035 Regional Development Forecast. However, Wyandotte's population has been increased by 1,350 people over the 20 year planning period to account for a number of proposed midrise developments along the Detroit River. However, no increase in capacity of the Downriver Sewer System is being proposed in this project plan that may require the sizing of system facilities based on projected populations. Therefore, we find the project to be consistent with the *Water Quality Management Plan for Southeast Michigan.*

Kurt L. Heise
Director

Robert A. Ficano
County Executive

June 1, 2009

Mr. Jeffrey Herrold, Senior Project Manager
Michigan Department of Environmental Quality
Environmental Science and Services Division
Constitution Hall
525 West Allegan Street
PO Box 30457
Lansing MI 48909-7957

Re: 2009 Draft State Revolving Fund (SRF) Project Plan
Wayne County Downriver Sewage Disposal System

Dear Mr. Herrold:

I am writing in response to your May 11, 2009 letter (attached) outlining initial review comments on the draft 2009 State Revolving Fund Project Plan for the Wayne County Downriver Sewage Disposal System ("Project Plan"). Wayne County and our engineering consultant, Hubbell Roth and Clark (HRC), began work developing the Project Plan in November of last year. For the part of the Project Plan for the Downriver Wastewater Treatment Facility (DWTF), my instructions to the team were to "assess every square inch inside the fence, from the top of the tallest building to the utilities underground". We also included in our work an inspection of the system outfall to the Detroit River, for the first time since it was constructed in 1964. Finally, we assessed parts of the upstream interceptor system in order that we could submit, for the first time ever, a complete Project Plan for the entire Downriver Sewage Disposal System (DSDS), instead of our traditional plan limited to the DWTF. While we expected that the draft Project Plan was not perfect and that you and perhaps others at MDEQ would provide comments to help us refine the document, your comment that the draft Project Plan is "primarily a list of desired equipment replacements rather than a viable Project Plan" was both baffling and very disappointing after the amount of work completed assessing our system and preparing the Project Plan document.

Given the thoroughness of our work, we feel confident that the information you desire is within the 190-page Project Plan document but perhaps not in a location or format that gave it the prominence required to facilitate your review. We would prefer to meet with you to discuss your concerns about the document, but knowing that you currently have a very heavy workload, we are also offering our written responses below, corresponding to the numbered comments from your letter.

DEPARTMENT OF ENVIRONMENT • WATERSHED MANAGEMENT DIVISION
415 GUILFORD • DETROIT, MICHIGAN 48226
(313) 224-3620 • FAX (313) 224-7678

1. In many cases, why the recommended improvements are needed to maintain discharge permit compliance is not properly documented.

   Response: The sole purpose of the Downriver Sewage Disposal System (DSDS) is to transport and treat wastewater in compliance with the NPDES discharge permit issued for the system. We believe that every element of the DSDS is needed for discharge permit compliance, and thus improvements to elements of the DSDS recommended in the Project Plan are needed for discharge permit compliance.

   The majority of the improvements presented in the Project Plan involve the Downriver Wastewater Treatment Facility, which at a treatment capacity of 225 million gallons per day is Michigan's second largest wastewater treatment facility. There are elements of the DWTF still in operation that date back to the original construction of the facility in 1938 as a primary treatment plant with solids incineration. Various equipment and facilities are currently at or in many cases, beyond their service life.

   As we have learned the hard way in the past, continuous planned improvements to the DWTF are necessary to ensure that the system continues to operate reliably, with no decline in effluent quality. Failure to plan, finance, design and construct improvements in a timely manner will, in the aggregate, result in declining efficient operating hours, increasing equipment and process shutdowns, and eventually a decline in effluent quality. It is also the County's intention that continued improvements and automation of our facilities will help reduce future labor requirements and provide additional cost savings to our customers.

   Section 3 of the Project Plan describes the need for the projects by identifying the numerous deficiencies throughout the system by major system element as follows:
   - 3.6. General Assessment of Existing Treatment Facilities
   - 3.7. Assessment of Existing Liquid Treatment Stream
   - 3.8. Solids Treatment Stream Assessment
   - 3.9. Instrumentation and Automation Assessment
   - 3.10. Assessment of Support Facilities
   - 3.11. Downriver Sewage Disposal System Collection System

   Each major system element is integrated with the DWTF and entire DSDS. Each element and the overall system is dependent upon all of its support and ancillary components to properly treat wastewater. While these ancillary components may not directly treat wastewater, each one is an essential indirect element to the process of treating wastewater. Depending upon the specific component, each one may protect process equipment from the elements or environment, may promote ease of operations or maintenance, may monitor or indicate potential problems to avert, or may simply lower annual operating costs, a goal for institutions and industry alike. Thus, the needs presented in Sections 3.6 – 3.11 are typically a combination of equipment and facility replacement.

   In nearly all cases, the DWTF equipment and facilities in each major system element have been serviced and/or repaired numerous times, have reached or exceeded their useful service

life, and replacement is necessary as repair is no longer a viable option. An example would be a roof that was put in place 25 years ago and has passed its useful service life. Repairs have been made to coping, flashing, etc. These roofs now require replacement not maintenance. Built up membrane roofs are estimated to have a 20 year service life. All of the recommended roof replacements have surpassed this criterion.

Please note that most of the improvements recommended in this Project Plan were also included as priority 2, 3 and 4 recommendations in the Final SRF Project Plan for the DWTF dated June 2004, which was approved by MDEQ. As noted previously in this letter, this 2009 SRF Project Plan has also expanded the initial 2004 plan to include a survey and recommendations for the collection system so as to present a complete Project Plan for the entire DSDS.

2. Alternatives are outlined, but a course of action is not selected.

Response: The needs for improvements to the DSDS were summarized and subsequently prioritized. For each system element prioritized to be addressed in the next five years (i.e., Priority 1 Projects), the recommended action and comparable alternatives are presented in Section 4 of the Project Plan. Section 5 of the Project Plan includes the recommended projects, program costs and user costs.

Information regarding alternatives and the selection of the recommended alternative is available, but upon review we agree that it may be more obvious to the reader if it is presented differently. Therefore, we have prepared a summary of the selected alternative for each Priority 1 (2010-2014) project, as shown below. If you find this presentation of the information helpful, we propose to include it within the "cost comparison and summary" subsection of Section 4 for each project as noted below.

a. Solids Thickening Complex Renovations (*To be added to the end of Section 4.4.3*)

Alternative A is the selected alternative for the Solids Thickening Complex Renovations Project and includes the following elements:

- Re-route the primary sludge lines, including Primary Tank 7, directly to Thickening Complex. The route will include additional pipe for the SFE system to reach the Aerated Grit Facility, and spare HDPE pipes to be used as conduits for future utilities.
- Provide a Splitter Box with flow control to each thickener. This includes primary sludge, waste activated sludge (WAS), elutriation water flow control, overflow and drainpipe, and bypass directly to the Sludge Storage Tanks. Replace the existing WAS pumps.
- Replace the existing Gravity Thickener drives, bridges, pickets, and related equipment. Provide covers for the Gravity Thickeners and Thickened Sludge Storage Tanks. Replace the thickened sludge pumps. Provide new mixing system for the Thickened Sludge Storage Tanks.

- A new Odor Control facility using biofilter technology will be located in the area between the East Storage Tank and the Dewatering Building. The gallery in this area requires expansion to accommodate the existing and planned piping. The pipe gallery to the dewatering complex will be revised to accommodate sludge pipes and all ancillary utilities.
- Abandon the existing sludge lines to the Primary Storage Tanks and Gravity Thickening Complex in-place and re-use as a conduit for SFE and/or electrical utilities. Demolish the Primary Sludge Storage Tanks, collector equipment, and odor control system, and plan selective demolition of the Solids Thickening Complex.
- Provide upgrades to the potable, industrial and screened final effluent (SFE) water systems, and compressed air system. Provide seal water to all sludge pumps. Replace the sludge yard piping.
- Replace the badly damaged pavement from the concentrated sludge roll-off wheel loads. (The road use changed when incineration was stopped and the pavement in this area was not designed for these loads.) Replace the site utility piping that is beyond its useful life in the Dewatering Complex area and in areas of proposed pavement replacement.
- Provide an access ramp to the Thickener Complex lower floor, and provide a double-door access to the roof deck from the Dewatering Complex. Provide overhead monorails to facilitate removal of the equipment. The Thickener Complex and gallery would also be refurbished with new paint, doors, handrails, roof, plumbing, heating and ventilation (H&V), lighting, and miscellaneous electrical and structural repairs.
- Provide sludge blanket depth monitoring of the Primary Clarifiers and Gravity Thickeners and develop automatic sludge pump control logic. Fully integrate the new controls into the existing local area control panels and the DWTF Supervisory Control and Data Acquisition (SCADA) system.

b. Secondary System Renovations (*To be added to the end of Section 4.5.3*)

Alternative A is the selected alternative for the Secondary System Renovations Project and includes the following items:

- Improve the existing high-purity oxygen feed system. Revise the oxygen piping and control to each train in order to provide individual train feed control, as well as off gas piping control at the effluent end of each train.
- Provide a redundant blower for the purge blower system and new tank drain valves and actuators.
- The following associated buildings would also be repaired/refurbished (including roof replacement, miscellaneous masonry repairs, replacement doors, painting, plumbing, new H&V and/or new electrical, as needed): Clarifier Building Nos. 1 through 6,

Return Activated Sludge Building, and the North and South Influent Chamber Houses. There is also some pavement that requires repair in the Secondary area.

- An Asset Management System and Energy Efficiency Improvements are also included in this project. The Energy Efficiency Improvements project is based on a recommendations made by Johnson Controls, Inc. in order to reduce energy consumption for operational savings. Some of these items are being incorporated with projects resulting from the 2004 SRF Project Plan. Remaining cost-effective items will be included in the Secondary System Renovations project. The Asset Management System is a computerized management system to track the equipment and facilities at the plant. It assists management in determining the lowest life cycle cost for rehabilitating, repairing and/or replacing a plant asset.
- Return Activated Sludge (RAS) pumps to all seven Secondary Clarifiers will also be replaced. The replacement pumps will be similar to the existing equipment for Secondary Clarifiers 5 and 6, and would also include new piping, valves and meters.
- The RAS pumps for Secondary Clarifiers 1 through 4 were originally vertical turbines, which required significant maintenance. These were replaced in the early 1990s with dry-pit, submersible pumps, each modified with a suction tube. The selected Alternative A replaces these RAS pumps with similar submersible pumps.
- Miscellaneous instrumentation and control improvements and integration with the SCADA system.

c. D-A-F Complex Renovations ***(To be added to Section 4.6.3)***

Alternative A is the selected alternative for the D-A-F Complex Renovations Project and consists of utilizing (re-purposing) the former D-A-F Building for the new Equipment Repair Facility. The D-A-F Building would be rehabilitated into a storage and repair space, which includes floor work, new insulation, masonry repair and sealing, interior and exterior painting, new office walls and ceiling, refurbishing two overhead doors, plumbing, new windows, new doors, mezzanines, materials handling equipment, H&V, plumbing, new fire suppression system, and electrical and SCADA work.

d. Headworks System Renovations ***(To be added to Section 4.7.3)***

Alternative A is the selected alternative for the Headworks System Renovations Project and includes the following items to be implemented:

- Replacement of Fine Screen Nos. 5, 6, and 7 with Duperon FlexRake screens nearly identical to Fine Screens 1 through 4, which are currently under construction. Fine Screens 5 and 6 would have a design capacity of 50 MGD, while Fine Screen 7 would be rated for 75 MGD. Work includes demolition and replacement of the screenings conveyor.
- Improve the Junction Chamber located just upstream of the Influent Pump Station (IPS). The improvements will include replacing the Bypass Gate W-903 and

actuator, and Bypass Flap Gate JC-4. Install the actuators at grade, and provide for a façade wall, security fence, or other means to protect the actuator. Also replace the actuators and stems for sluice gates W-901 and W-902. Replace slide gates CC-1, CC-2, BC-1 and BC-2 at the Junction, Bypass and Control Chambers.

- Improve the Check Valve Vault, serving Pumps 5 and 6; including replacing the check valves and replacing the sump pump system in the valve pit with a gravity sewer.
- Rehabilitate the gripper to the wet well gripper-type screen.
- Revise the influent channel for the Detritors to balance the flow across each detritor, while minimizing head loss and allowing grit to pass. Replace the Detritor grit collector and conveyance equipment.
- Replace the existing Aerated Grit screw auger with a washing-compacting screw conveyor. Replace Aerated Grit Blower 650, 651 and 652, and associated valves and piping. Replace the effluent gates to Aerated Grit Tank 1 and 2, and provide separate drains to all three tanks.
- Consolidate sampling operations for all permit-required samples into a central location in the Old Solids Building, including new samplers, slop sink, potable and industrial water, piping and valves.
- Provide new sewer vactor truck receiving station.
- Provide a new Outfall Gate.
- Provide screened final effluent (SFE) to the headworks. Provide a new industrial water Booster Pump System in the Old Solids Building. Replace utilities installed prior to 1970 in the headworks area.
- Demolish existing Recycle Sample Building.
- Refurbish the following buildings associated with these processes (including roof replacement, miscellaneous masonry repairs, replacement doors, painting, new H&V and/or new electrical, as needed): Aerated Grit Building, East and West Grit Buildings, Fine Screens Building, Old Solids Building, Influent Pump Station Building, Tunnel Pump Station Building and Tunnel Pump Station Electrical Building.

e. DSDS Collection System Renovations *(To be added as a new Section 4.8.7)*

Improvements to the DSDS Collection System are recommended as follows:

- Alternative A (described in Section 4.8.1) is recommended for the SCADA System Improvements. The various DSDS SCADA sites that monitor and report level, flow, precipitation, gate position, etc. would be upgraded to create a single, integrated control system and to replace existing components that have served their useful lives. The project would include the following:

- Replace existing field instruments. This includes the flow meters, level sensors, rain gauges, position switches, etc.
- Replace the existing Telog R33xx Remote Teloger Units (RTUs) with the manufacturer's new model. The RTUs cannot be upgraded and must be replaced with the manufacturer's new product line.
- The new RTUs would be integrated into the DWTF SCADA system using digital cellular communications.

- Alternative A, Pressure Grouting (described in Section 4.8.4) is recommended for System Repairs. This alternative utilizes pressure grouting to repair the deficient areas found in the recent sewer survey. The work would be performed within the sewer, with no open cut excavation. The repair cost also includes the required cost for bypass pumping.

3. Recommended changes to implement an alternative are outlined, but a rationale for their selection is not discussed.

   Response: We are unsure what you meant by this statement. If you could elaborate on what information you desire, we would be pleased to provide it.

4. The cost-effectiveness analyses of alternatives do not conform to program requirements.

   Response: The cost-effectiveness evaluation completed for each recommended Priority 1 project is attached for your review. These evaluations were completed according to DEQ program requirements. We propose to include this information in Appendix B of the Project Plan.

5. A clear and complete description of the components that are to comprise each annual project is not provided.

   Response: See the description provided in response to Item 2 above, which we plan to incorporate into Section 4. Also, please refer to the detail provided in the cost estimates in Appendix B.

6. Schedules for the implementation of individual projects are not provided; only each five-year interval is presented, not the particular year and quarter in which an SRF loan will be sought for a given project.

   Response: The fiscal year (FY) that each project is to be constructed is shown in Table 1A of the Cost Estimates presented in Appendix B. We should have also included the information in Section 5, and will do so in the final Project Plan submittal.

The proposed year and quarter in which an SRF loan will be sought for each Priority 1 Project is as follows:

a.	Solids Thickening Complex Revisions	FY 2010 – Qtr 3
b.	Secondary System Renovations	FY 2011 – Qtr 2
c.	D-A-F Complex Renovations	FY 2011 – Qtr 4
d.	Headworks System Renovations	FY 2012 – Qtr 4
e.	DSDS Collection System Improvements	FY 2013 – Qtr 4

I am hopeful that the information presented in this letter, and the proposed revisions to the final Project Plan, will address the deficiencies in the plan. As I previously stated, we strongly believe that meeting with you would be the most efficient way to address your concerns about the draft Project Plan for the Downriver Sewage Disposal System. We would be pleased to meet with you at your office or via conference call at your earliest convenience. Please contact me at 313-224-8282 or kcave@co.wayne.mi.us if you would like to arrange such a meeting or if you have any further questions or require any additional information.

Very truly yours,

Kelly A. Cave, P.E.
Chief Engineer, Department of Environment

cc: Wayne County DOE: G. Tupancy, F. Fath-Azam, Kerreen Conley
HRC: P. Roth, T. Sullivan, T. Maxwell, S. Duffy
MDEQ: Osama Khaimi

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

May 11, 2009

Ms. Kelly A. Cave, Chief Engineer
Wayne County Department of Environment
415 Clifford Street, 7th Floor
Detroit, Michigan 48226

Dear Ms. Cave:

Subject: April 2009 Draft State Revolving Fund (SRF) Project Plan
Wayne County Downriver Sewage Disposal System

Our office has reviewed the draft project plan recently submitted on your behalf by Ms. Sally Duffy of Hubbell, Roth & Clark, Inc. This document is primarily a list of desired equipment replacements rather than a viable SRF project plan. In its current state, we would be unable to prioritize annual projects noted in the plan for SRF funding. Major deficiencies include:

1. In many cases, why the recommended improvements are needed to maintain discharge permit compliance is not properly documented.

2. Alternatives are outlined, but a course of action is not selected.

3. Recommended changes to implement an alternative are outlined, but a rationale for their selection is not discussed.

4. The cost-effectiveness analyses of alternatives do not conform to program requirements.

5. A clear and complete description of the components that are to comprise each annual project is not provided.

6. Schedules for the implementation of individual projects are not provided; only each five-year interval is presented, not the particular year and quarter in which an SRF loan will be sought for a given project.

Please also note that many of the recommended work items presented in the draft plan will not be eligible for SRF funding (e.g., collection system point repairs, non-process-related architectural modifications, HVAC unit repairs, routine building demolitions, etc.).

Please call me if you have any questions or contact me at herroldj@michigan.gov.

Sincerely,

Jeffrey E. Herrold, Senior Project Manager
Revolving Loan and Operator Certification Section
Environmental Science and Services Division
517-335-1977

cc: Ms. Sally Duffy, HRC, Bloomfield Hills
Mr. Osama Khaimi, DEQ-Water Bureau, SEMDO

SEMCOG . . . Equipping local government leaders for the future
established 1968
Southeast Michigan Council of Governments
535 Griswold Street, Suite 300 • Detroit, Michigan 48226-3602 • 313-961-4266 • Fax 313-961-4869
www.semcog.org

Regional Clearinghouse Code: EN 090912

May 05, 2009

Sally Duffy
Hubbell, Roth & Clark, Inc.
220 Bagley/420 Michigan Building
Detrit, MI 48226

This is to acknowledge receipt of your complete application which you have submitted for review, according to Michigan Federal Project Review System guidelines developed in response to Presidential Executive Order 12372 - Intergovernmental Review of Federal Programs - or according to other state or federal guidelines.

Funding Agency/Program: Michigan Dept of Environmental Quality, State Revolving Fund

Project Title: 2009 Draft SRF Project Plan for Improvements to Downriver Sewage Disposal System for Wayne County Dept of Environment

Please direct any questions you may have concerning this review to the following SEMCOG staff person: **William Parkus, Regional Review Office, at (313) 324-3305.**

A Regional Clearinghouse review will be completed by **Jun 04, 2009**, within the federal time limits.

The following agencies will be contacted for their comments during the review period:

SEMCOG/Environmental Programs; Huron Charter Township; Grosse Ile Township; City of Wyandotte; City of Woodhaven; City of Trenton; City of Taylor; City of Southgate; City of Romulus; City of Rockwood; City of Riverview; City of River Rouge; City of Melvindale; City of Lincoln Park; City of Gibraltar; City of Flat Rock; City of Ecorse; City of Dearborn Heights; City of Dearborn; City of Allen Park; and Brownstown Charter Township

Please supply them with appropriate information, if requested, to expedite the review process.

JENNIFER GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF HISTORY, ARTS AND LIBRARIES
LANSING

MARK HOFFMAN
ACTING DIRECTOR

April 21, 2009

CHIP HECKATHORN
SECTION CHIEF MFS-EAD
MICHIGAN DEPARTMENT OF
ENVIRONMENTAL QUALITY
P O BOX 30457
LANSING MI 48909

RE: ER-940025 Wayne County Downriver Sewage Disposal System SRF Project, Section 32, T3S, R11E, Wyandotte, Wayne County (EPA)

Dear Mr. Heckathorn:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the additional information for the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that **no historic properties are affected** within the area of potential effects of this undertaking.

The views of the public are essential to informed decision making in the Section 106 process. Federal Agency Officials or their delegated authorities must plan to involve the public in a manner that reflects the nature and complexity of the undertaking, its effects on historic properties and other provisions per 36 CFR § 800.2(d). We remind you that Federal Agency Officials or their delegated authorities are required to consult with the appropriate Indian tribe and/or Tribal Historic Preservation Officer (THPO) when the undertaking may occur on or affect any historic properties on tribal lands. **In all cases**, whether the project occurs on tribal lands or not, Federal Agency Officials or their delegated authorities are also required to make a reasonable and good faith effort to identify any Indian tribes or Native Hawaiian organizations that might attach religious and cultural significance to historic properties in the area of potential effects and invite them to be consulting parties per 36 CFR § 800.2(c-f).

This letter evidences the EPA's compliance with 36 CFR § 800.4 "Identification of historic properties", and the fulfillment of the EPA's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected".

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking. If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.

If you have any questions, please contact Brian Grennell, Environmental Review Specialist, at (517) 335-2721 or by email at ER@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Martha MacFarlane Faes
Environmental Review Coordinator

for Brian D. Conway
State Historic Preservation Officer

MMF:BGG

Copy: Sally Duffy, HRC, Inc.

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

Principals
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Thomas E. Biehl
Walter H. Alix
Peter T. Roth
Michael D. Waring
Keith D. McCormack
Curt A. Christeson
Thomas M. Doran

Chief Financial Officer
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Nancy M.D. Faught
Jonathan E. Booth
Michael C. MacDonald
Marvin A. Olane
Richard F. Beaubien
William R. Davis
Daniel W. Mitchell
Jesse B. VanDeCreek
Robert F. DeFrain
Marshall J. Grazioli
Thomas D. LaCross

March 17, 2009

John Skubinna
MDEQ – ESSD
Pollution Prevention Section
Compliance Assistance Unit
P.O. Box 30457
Lansing, MI 48909-7957

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

Dear Mr. Skubinna:

We have received your letter, dated February 2, 2009, regarding our request for a review of the above referenced location as part of the MDEQ's SRF Project Planning process. The following additional information is offered in response to your letter.

Since our original correspondence with your office, we have better defined the scope of the proposed work. The majority of the proposed work will be performed at the existing WWTF site, located in Wyandotte, Michigan. The work that will be performed on the collection system (the sewerage system outside the WWTF property limits), consists of upgrades to existing instrumentation and control systems (rain gauges, flow meters, etc.) that will not require any earth-changing activities.

The earth-changing activities at the WWTF site will consist of excavation, backfill and restoration to access existing utilities at the site and pavement replacement. The majority of the improvement work will actually occur within the existing buildings and structures (equipment replacement and upgrades).

Our original application is attached to this letter for your reference. Please inform us of your findings at your earliest convenience. If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Sally L. Duffy, P.E.

/sld
Attachment

HRC; File
Y:\200805\20080550\Design\Corrs\010Ltr_DEQ_response.doc

555 Hulet Drive, PO Box 824
Bloomfield Hills, Michigan 48303-0824
Telephone 248 454 6300 Fax 248 454 6312
www.hrc-engr.com

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Robert F. DeFrain
Marshall J. Grazioli
Thomas D. LaCross

March 17, 2009

State of Michigan
State Historic Preservation Office
P.O. Box 30740
702 W. Kalamazoo St.
Lansing, MI 48909-8240

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan
SHPO Project No. ER-940025

HRC Job No. 20080550.02

Attn: Mr. Brian G. Grennell, Environmental Review Specialist

Dear Mr. Grennell:

We have received your letter, dated January 16, 2009, regarding our request for a review of the above referenced location as part of the MDEQ's SRF Project Planning process. We offer the following additional information that you requested:

Provide detailed description of proposed work at the WWTF:
The work will include renovation and improvements to the existing wastewater treatment facility. Specifically, equipment associated with the solids handling, and preliminary and secondary treatment systems will be replaced. The majority of this work will be performed within the existing buildings and structures on site (replacement of existing equipment, ect.) The earth-changing activities at the WWTF site will consist of excavation, backfill and restoration to access existing utilities at the site and pavement replacement. This facility is generally not accessed by the public and is located in an existing industrial area. There are very few trees on the site and only minimal lawn areas, which generally provide cover over below-grade facilities.

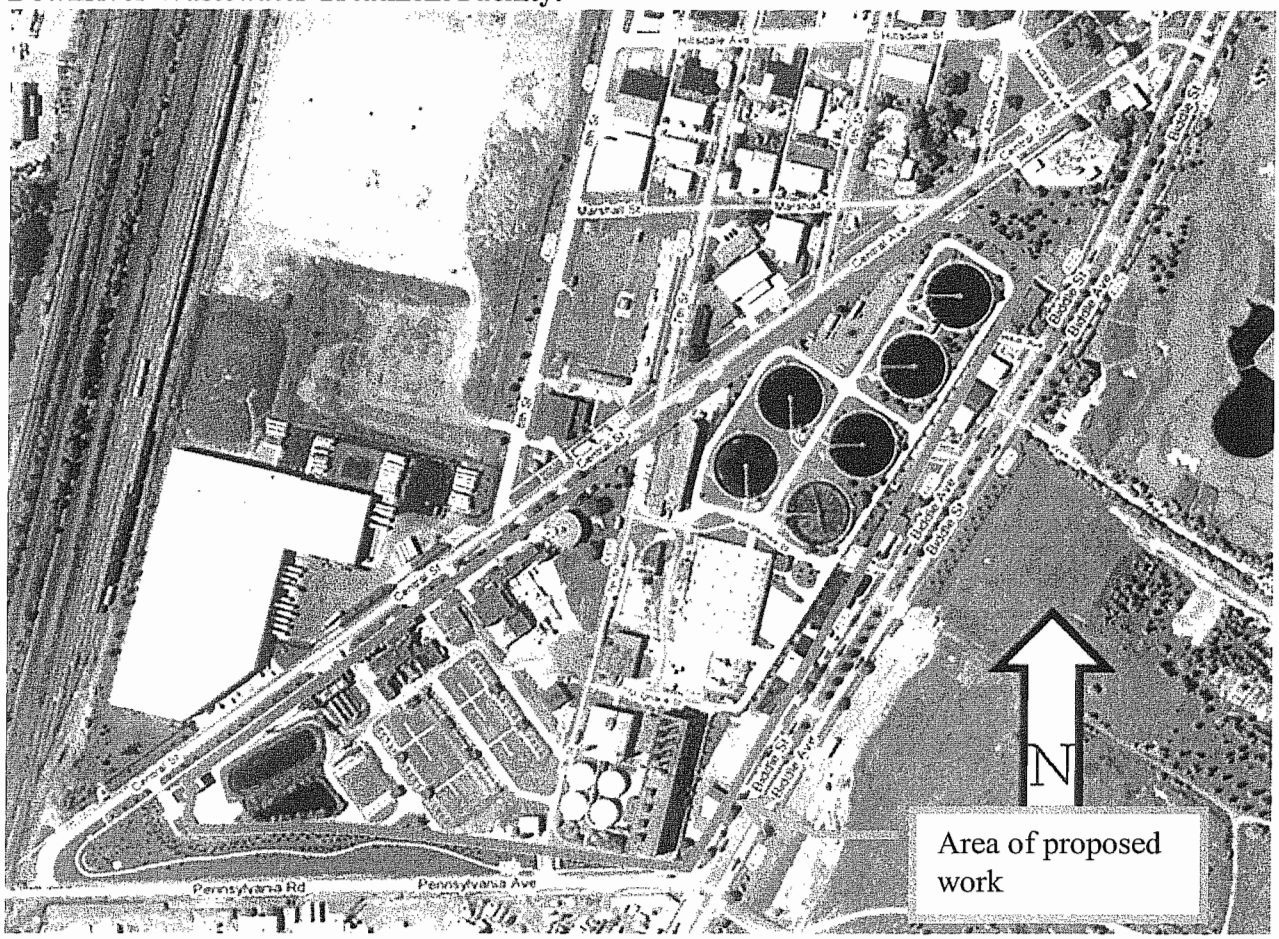
The undertaking **will not** alter, directly or indirectly, any of the characteristics of any historic properties. The project **will not** diminish the integrity of any property's location, design, setting, materials, workmanship, feeling, or association. **There are no foreseeable effects** caused by the undertaking that may occur later in time. The proposed project is in keeping with the site's existing use and context. The site will be restored to their existing uses and there will be no discernable change to the physical, visual, auditory, and sociocultural climates of the project sites.

555 Hulet Drive, PO Box 824
Bloomfield Hills, Michigan 48303-0824
Telephone 248 454 6300 Fax 248 454 6312
www.hrc-engr.com

HRC

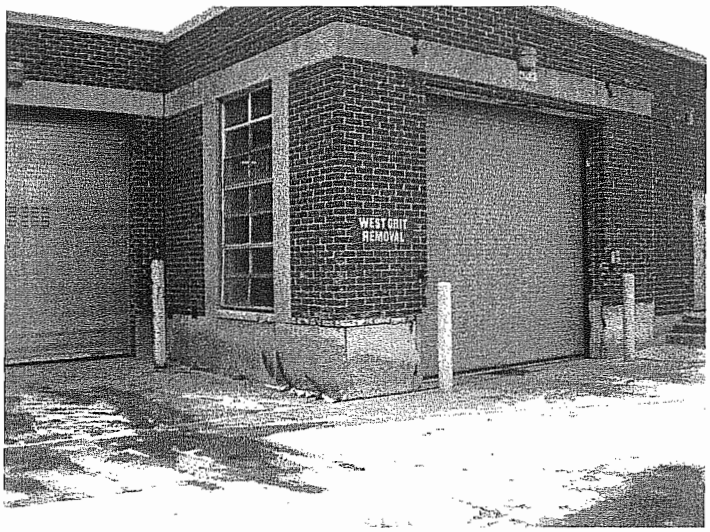
Photos:

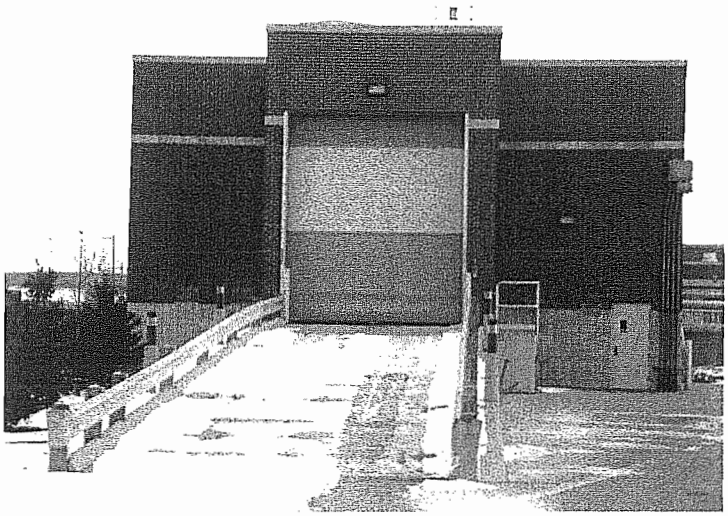
Downriver Wastewater Treatment Facility:



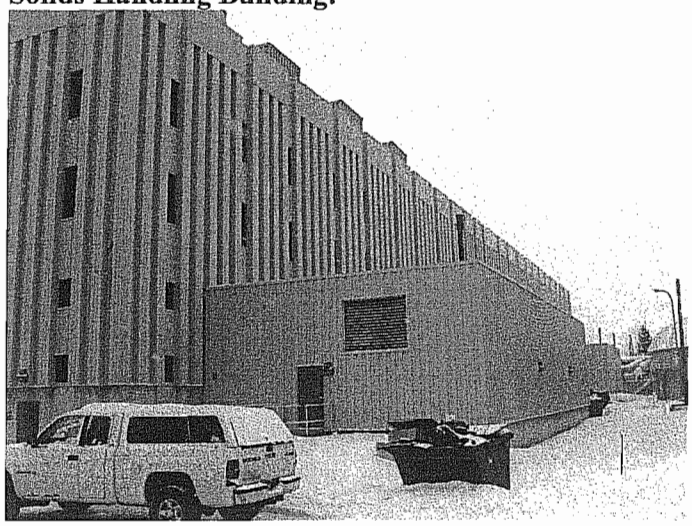
HRC

Preliminary Treatment Buildings:





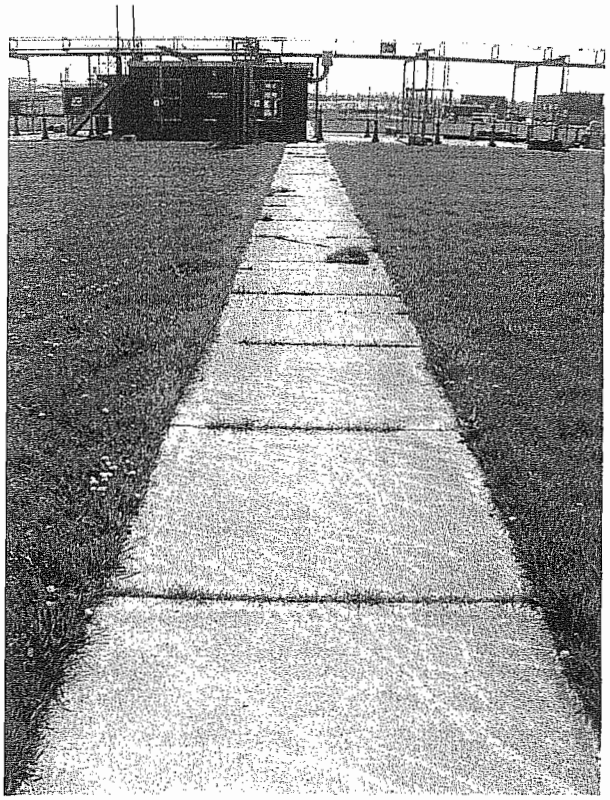
Solids Handling Building:

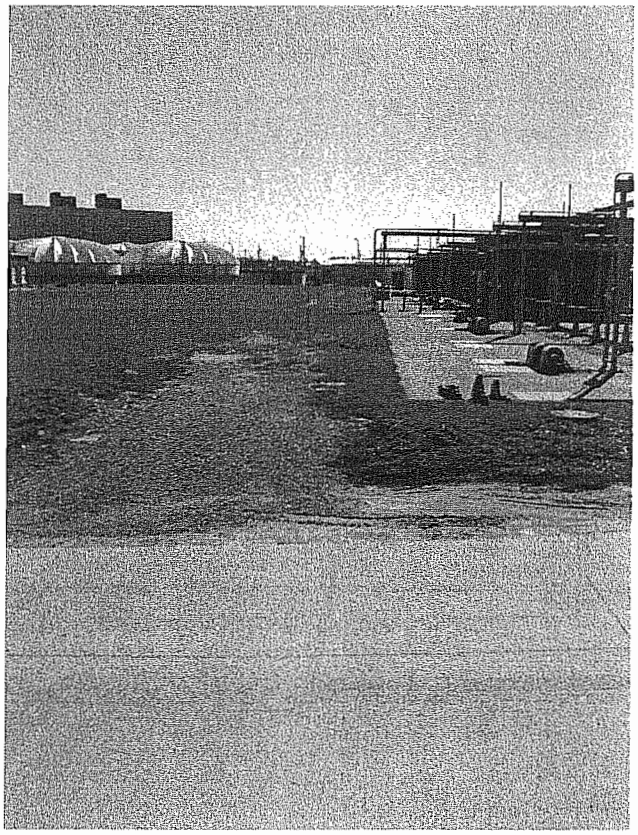


Secondary Treatment Building:

HRC

Sidewalk and Road in Utility Area:





Our original application is attached to this letter for your reference. Please inform us of your findings at your earliest convenience. If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Sally L. Duffy, P.E.

/sld
Attachment

HRC; File

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

February 2, 2009

Ms. Sally Duffy, P.E.
Hubbell, Roth, and Clark, Inc.
555 Hulet Drive
P.O. Box 824
Bloomfield Hills, Michigan 48303

Dear Ms. Duffy:

I have reviewed your correspondence of January 7, 2009, regarding proposed Downriver Sewage Disposal System, Wayne County, Michigan, for possible resource issues relative to Land and Water Management Division (LWMD) programs.

The materials provided are inadequate for review to determine whether proposed improvements will impact regulated land features administered through LWMD. Please submit plans that specify the location of the sanitary sewer improvements.

Numerous streams, floodplains, and wetlands are present along the sanitary and relief sewer routes. Many of the streams are regulated under Part 301 Inland Lakes and Streams of the Natural Resources and Environmental Protection Act 1994 PA 451, as amended (NREPA). Many of the wetlands are regulated under Part 303, Wetland Protection, of the NREPA, and floodplains are regulated under the State's Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the NREPA. Permits may or may not be required for proposed sewer improvements depending upon their location, and the specific nature of the improvements.

To determine if wetlands regulated under Part 303, will be involved in the proposed project, it is recommended that you have conducted a Level 2 or 3 wetland assessment early in the planning process and include the results with any application for permit. Additional information regarding wetlands and the wetland assessment program is available on line at www.michigan.gov/deqwetlands.

If you have any further questions regarding these findings please contact me at 517-241-8370 or by email at skubinnj@michigan.gov, or you may contact the LWMD field representative Mr. Jeremy Richardson in our Southeast Michigan District office at 586-753-3867 or by email at richardsonj1@michigan.gov.

Sincerely,

John Skubinna
Compliance Assistance Specialist
Environmental Science and Services Division

Enclosures
cc/enclosures: Mr. Chip Heckathorn, DEQ
Mr. Jeremy Richardson, DEQ

STATE OF MICHIGAN
JENNIFER GRANHOLM
GOVERNOR
DEPARTMENT OF HISTORY, ARTS AND LIBRARIES
LANSING
MARK HOFFMAN
ACTING DIRECTOR

January 16, 2009

SALLY DUFFY
HUBBELL ROTH & CLARK INC
555 HULETT DRIVE
P O BOX 824
BLOOMFIELD HILLS MI 48303-0824

RE: ER-940025 Wayne County Downriver Sewage Disposal System SRF Project, Section 32, T3S, R11E, Wyandotte, Wayne County (EPA)

Dear Ms. Duffy:

We have received your request for review of the above-cited undertaking at the location noted above. The information that you have sent has prompted us to ask for additional details. Please send the following information so that we may complete our review:

- Please submit a **detailed** description of the work that will be undertaken at the Wastewater Treatment Plant. Include any information about landscape alteration such as sidewalk or tree removals.
- Please submit photographs of locations where work will take place.

Please note that the Section 106 review process cannot proceed until we are able to consider the information requested above. This letter does not clear the project. If you have any questions, please contact Name, Environmental Review Specialist, at (517) 335-2721 or by email at ER@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for your cooperation.

Sincerely,

Brian G. Grennell
Environmental Review Specialist

for Brian D. Conway
State Historic Preservation Officer

JRH:BGG

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

LANSING

JENNIFER M. GRANHOLM
GOVERNOR

REBECCA A. HUMPHRIES
DIRECTOR

February 9, 2009

Ms. Sally Duffy
Hubbell, Roth and Clark, Inc.
PO Box 824
Bloomfield Hills, MI 48303-0824

RE: **Proposed improvements to Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility**

Dear Ms Duffy:

The location of the proposed project was checked against known localities for rare species and unique natural features, which are recorded in a statewide database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features at a site. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Department of Natural Resources, Wildlife Division. The presence of threatened or endangered species does not preclude activities or development, but may require alterations in the project plan. *Species may be present that have not been recorded in the database.*

The following is a summary of the results of the review in Wayne County, sections 32, T3S R11E plus Downriver area:

> The project should have no impact on rare or unique natural features at the locations specified above if it proceeds according to the plans provided. Please contact me for an evaluation if the project plans are changed.

Thank you in for your coordination in addressing the protection of Michigan's natural resource heritage. Responses and correspondence can be sent to: Michigan Department of Natural Resources, Wildlife Division – Natural Heritage Program, PO Box 30180, Lansing, MI 48909. If you have further questions, please call me at 517-373-1263 or e-mail at SargentL@michigan.gov .

Sincerely,

Lori G. Sargent
Endangered Species Specialist
Wildlife Division

Little Traverse Bay Bands of Odawa Indians
Archives, Records and Cultural Preservation Department
7500 Odawa Circle, Harbor Springs, Michigan 49740
(231) 242-1450 phone (231) 242-1455 fax

January 13, 2009

Sally L. Duffy, P.E.
Hubbell, Roth & Clark, INC.
555 Hulet Drive
P.O. Box 824
Bloomfield Hills, MI 48303-0824

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility State Revolving Loan (SRF) Project Plan

Dear Ms. Duffy:

At this time, we do not have any information concerning the presence of any Indian Traditional Cultural Properties, Sacred Sites, or Other Significant Properties in the designated area of the proposed construction site in Wayne County, MI. This is not to say that such site does not exist, just this office does not have any available information indicating that a site is present using our current documentation of the area. If contact could be made with the closest tribe, that being the Huron Band of Potawatomi Indians, they could possibly provide more information.

However, this office would be more then willing to assist, if in the future or during construction, there is an inadvertent discovery of Native American human remains or burial objects. I have enclosed a Site Reference Form that our office uses in the event of a discovery in order to speed the process. Please contact me if you have any further question or requests. I can be reached at (231)242-1453.

We thank you for including our tribe in your plans.

Miigwetch (thank you)

Winnay Wemigwase

Winnay Wemigwase
Director
Archives/Records and Cultural Preservation
Little Traverse Bay Band of Odawa Indians

Site Reference Form

Date of Discovery:_____ Today's Date:_____

Owner/Site Representative:_____
Street Address: _____
City: _____State:_____Zip:_____
Location: _____
Phone:_____Fax:_____

Site Information:
Street Address:_____
City:_____State:_____Zip:_____

Location and Circumstance of Discovery: Time of Discovery:_____am/pm

_____

_____

_____

_____

Contacts Made:
Law Enforcement Department:_____
Investigating Officer:_____
Phone:_____Fax:_____
Date of police report:_____Time on report:_____am/pm

Other contacts (w/phone #):

_____

_____

Native American Burial (please circle) yes_____ no_____
Confirmed by:_____ Phone:_____Fax:_____
Release Status:_____

Little Traverse Bay Bands of Odawa Indians Tribal NAGPRA Contacts:

Eric Hemenway
Research & Repatriation Assistant
(231) 242-1527ph/ ehemenway@ltbbodawa-nsn.gov

Winnay Wemigwase
Director, Archives/Records &Cultural Preservation
(231) 242-1453ph/ wwemigwase@ltbbodawa-nsn.gov

7500 Odawa Circle, Harbor Springs, Michigan 49740

Little River Band of Ottawa Indians
Tribal Historic Preservation
375 River Street
Manistee, MI 49660
1-888-723-8288

March 4, 2009

Hubbell, Roth & Clark, Inc.
555 Hulet Drive
Bloomfield Hills, MI 48303

Dear Ms. Duffy:

The Tribe has received your Letter of January 7, 2009, referencing Wayne County Department of Environment Downriver Sewage Disposal System and requesting a determination as to whether or not the proposed project will affect Indian religious sites. Thank you for ensuring that we received notification. This letter is the Tribe's formal answer to your request.

In reply to the above cited letter, I can reply by stating that the site listed is located in a region of the state of Michigan that Little River Band of Ottawa Indians did not occupy significantly. Further, after a careful review of our information the Little River Band of Ottawa Indians has determined there that this project will not affect any religious, cultural or historic Little River Band of Ottawa Indians sites of which we are currently aware.

The Tribe would, however, appreciate work stopping and being contacted should there be something of a cultural, religious or historic nature discovered so as to assist in mitigation of the discovered site.

Signed

Jonnie Sam II, Director
Historic Preservation Department
Little River Band of Ottawa Indians

HUBBELL, ROTH & CLARK, INC
Consulting Engineers

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George E. Hubbell
Thomas E. Biehl
Walter H. Alix
Peter T. Roth
Michael D. Waring
Keith D. McCormack
Curt A. Christeson
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Marshall J. Grazioli
Thomas D. LaCross
Dennis J. Benoit

January 7, 2009

Sault Ste. Marie Tribe of Chippewa
523 Ashmun
Sault Ste. Marie, MI 49783
Attn: Cecil E. Pavlat Sr.

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

Ladies and Gentlemen:

Hubbell, Roth & Clark, Inc. is presently working for the Wayne County Department of Environment on a Project Plan for improvements to the existing Downriver Sewage Disposal System (DSDS.) The work includes improvements and repairs to the existing sewers and the existing Downriver Wastewater Treatment Facility (DWTF.)

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Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Sally L. Duffy, P.E.
/sld
Attachment
pc: MDEQ-ESSD; J. Herrold
HRC; File

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Bloomfield Hills, Michigan 48303-0824
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January 7, 2009

Saginaw Chippewa Indian Tribe of MI
6650 E. Broadway
Mt. Pleasant, MI 48858
Attn: William Johnson

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

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January 7, 2009

Pokagon Band of Potawatomi
P.O. Box 180
Dowagiac, MI 49047
Attn: Mark Parrish

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State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

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January 7, 2009

Nottawaseppi Band of Huron Potawatomi
2221 1 ½ Mile Road
Fulton, MI 49052
Attn: RoAnn Beebe

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HRC Job No. 20080550.02

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January 7, 2009

Match-e-be-nash-shee-wish Band of Potawatomi Indians
P.O. Box 218
Dorr, MI 49323
Attn: Ed Pigeon

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

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January 7, 2009

Little Traverse Bay Band of Odawa
7500 Odawa Circle
Harbor Springs, MI 49740
Attn: Winnay Wemigwase

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January 7, 2009

Little River Band of Ottawa Indians
375 River Street
Manistee, MI 49660
Attn: Jay Sam

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State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

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January 7, 2009

Lac Vieux Desert Band of Lake Superior Chippewa Indians
P.O. Box 249
Watersmeet, MI 49969
Attn: Giiwegiizhigookway Martin

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HRC Job No. 20080550.02

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January 7, 2009

Keweenaw Bay Indian Community
16429 Beartown Road
Baraga, MI 49908
Attn: Summer Sky Cohen

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

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January 7, 2009

Hannahville Potawatomi Indian Community
14911 Hannahville B-1 Road
Wilson, MI 49896
Attn: Earl Meshigaud

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January 7, 2009

Grand Traverse Band of Ottawa and Chippewa Indians
2605 NW Bayshore Drive
Peshawbetown, MI 49682
Attn: Robert Kewaygoshkum

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

Ladies and Gentlemen:

Hubbell, Roth & Clark, Inc. is presently working for the Wayne County Department of Environment on a Project Plan for improvements to the existing Downriver Sewage Disposal System (DSDS.) The work includes improvements and repairs to the existing sewers and the existing Downriver Wastewater Treatment Facility (DWTF.)

The Project Plan will be submitted to the Michigan Department of Environmental Quality for prioritization of a State Revolving Fund loan. We are contacting you to seek input whether there is any religious and cultural significance to historic properties in the area of potential effects and to invite you to make any associated comments.

The attached map identifies the locations of the various DSDS components. The majority of the work is proposed to occur at the existing DWTF site, located in Wyandotte, Michigan. Additional improvements may be made to the existing sewer system (cleaning, lining, and/or structural repairs.) This work, if necessary, would include only a minimal amount of ground-disturbing activities. The existing sewers are located in the roadway and utility right-of-ways, in previously disturbed grounds. All sites will be restored to their existing uses and there will be no discernable change to the physical, visual, auditory, and sociocultural climates of any of the project sites.

Please inform us of your findings at your earliest convenience. If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Sally L. Duffy, P.E.
/sld
Attachment
pc: MDEQ-ESSD; J. Herrold
HRC; File

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555 Hulet Drive, PO Box 824
Bloomfield Hills, Michigan 48303-0824
Telephone 248 454 6300 **Fax** 248 454 6312
www.hrc-engr.com

HUBBELL, ROTH & CLARK, INC
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Thomas D. LaCross
Dennis J. Benoit

January 7, 2009

Grand River Band of Ottawa Indians
P.O. Box 2937
Grand Rapids, MI 49501
Attn: Ron Yob

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

Ladies and Gentlemen:

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January 7, 2009

Burt Lake Band of Ottawa & Chippewa Indians
P.O. Box 206
Brutus, MI 49716
Attn: Curtis Chambers

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

Ladies and Gentlemen:

Hubbell, Roth & Clark, Inc. is presently working for the Wayne County Department of Environment on a Project Plan for improvements to the existing Downriver Sewage Disposal System (DSDS.) The work includes improvements and repairs to the existing sewers and the existing Downriver Wastewater Treatment Facility (DWTF.)

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January 7, 2009

Bay Mills Indian Community
12214 W. Lakeshore Drive
Brimley, MI 49715-9320
Attn: Wanda Perron

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

Ladies and Gentlemen:

Hubbell, Roth & Clark, Inc. is presently working for the Wayne County Department of Environment on a Project Plan for improvements to the existing Downriver Sewage Disposal System (DSDS.) The work includes improvements and repairs to the existing sewers and the existing Downriver Wastewater Treatment Facility (DWTF.)

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Thomas D. LaCross

January 7, 2009

John Skubinna
MDEQ – ESSD
Pollution Prevention Section
Compliance Assistance Unit
P.O. Box 30457
Lansing, MI 48909-7957

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

Dear Mr. Skubinna:

Hubbell, Roth & Clark, Inc. is presently working for the Wayne County Department of Environment on a Project Plan for improvements to the existing Downriver Sewage Disposal System (DSDS.) The work includes improvements and repairs to the existing sewers and the existing Downriver Wastewater Treatment Facility (DWTF.)

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Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Sally L. Duffy, P.E.

/sld
Attachment

HRC; File
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555 Hulet Drive, PO Box 824
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January 7, 2009

Endangered Species Specialist
MDNR Wildlife Division, Natural Heritage Program
P.O. Box 30180
Lansing, MI 48909

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility
State Revolving Loan (SRF) Project Plan

HRC Job No. 20080550.02

Ladies and Gentlemen:

Hubbell, Roth & Clark, Inc. is presently working for the Wayne County Department of Environment on a Project Plan for improvements to the existing Downriver Sewage Disposal System (DSDS.) The work includes improvements and repairs to the existing sewers and the existing Downriver Wastewater Treatment Facility (DWTF.)

The Project Plan will be submitted to the Michigan Department of Environmental Quality for prioritization of a State Revolving Fund loan. We are contacting you to seek input whether any species of fauna or flora listed or proposed to be listed in the Michigan Natural Features Inventory as endangered or threatened, or the critical habitat of such species, is found in the vicinity of the proposed project and to invite you to make any associated comments.

The attached map identifies the locations of the various DSDS components. The majority of the work is proposed to occur at the existing DWTF site, located in Wyandotte, Michigan. Additional improvements may be made to the existing sewer system (cleaning, lining, and/or structural repairs.) This work, if necessary, would include only a minimal amount of ground-disturbing activities. The existing sewers are located in the roadway and utility right-of-ways, in previously disturbed grounds. All sites will be restored to their existing uses and there will be no discernable change to the physical, visual, auditory, and sociocultural climates of any of the project sites.

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HUBBELL, ROTH & CLARK, INC.

Sally L. Duffy, P.E.

/sld
Attachment

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555 Hulet Drive, PO Box 824
Bloomfield Hills, Michigan 48303-0824
Telephone 248 454 6300 **Fax** 248 454 6312
www.hrc-engr.com

STATE HISTORIC PRESERVATION OFFICE
Application for Section 106 Review

SHPO Use Only					
☐ IN	Received Date ____ / ____ / ____	Log In Date ____ / ____ / ____			
☐ OUT	Response Date ____ / ____ / ____	Log Out Date ____ / ____ / ____			
	Sent Date ____ / ____ / ____				

Submit one copy for each project for which review is requested. This application is required. Please type. Applications must be complete for review to begin. Incomplete applications will be sent back to the applicant without comment. Send only the information and attachments requested on this application. Materials submitted for review cannot be returned. Due to limited resources we are unable to accept this application electronically.

I. GENERAL INFORMATION

☒ THIS IS A NEW SUBMITTAL ☐ THIS IS MORE INFORMATION RELATING TO ER#

a. Project Name: Wayne County Downriver Sewage Disposal System SRF Project Plan
b. Project Address (if available): various locations, see Attachment "A"
c. Municipal Unit: Wayne County County: Wayne
d. Federal Agency, Contact Name and Mailing Address (*If you do not know the federal agency involved in your project please contact the party requiring you to apply for Section 106 review, not the SHPO, for this information.*): US EPA, Region 5, Andrew Lausted (see Attachment "A")
e. State Agency (if applicable), Contact Name and Mailing Address: MDEQ-ESSD, Jeff Herrold, see Attachment "A"
f. Consultant or Applicant Contact Information (if applicable) *including mailing address*: Hubbell, Roth & Clark, Inc., Sally Duffy (see Attachment "A")

II. GROUND DISTURBING ACTIVITY (INCLUDING EXCAVATION, GRADING, TREE REMOVALS, UTILITY INSTALLATION, ETC.)

DOES THIS PROJECT INVOLVE GROUND-DISTURBING ACTIVITY? ☒ YES ☐ NO (If no, proceed to section III.)

Exact project location must be submitted on a USGS Quad map (portions, photocopies of portions, and electronic USGS maps are acceptable as long as the location is clearly marked).

a. USGS Quad Map Name: Wyandotte (for potential ground disturbing work, see Attachment "A" .)
b. Township: T3S Range: R11E Section: 32
c. Description of width, length and depth of proposed ground disturbing activity: See Attachment "A"
d. Previous land use and disturbances: Yes, approx. half of the plant was constructed in 1938. The rest was part of a major addition in 1964. Several improvement projects occurred in the late 1990s.
e. Current land use and conditions: Wastewater Treatment Facility, property entirely developed.
f. Does the landowner know of any archaeological resources found on the property? ☐ YES ☒ NO
   Please describe:

III. PROJECT WORK DESCRIPTION AND AREA OF POTENTIAL EFFECTS (APE)
Note: Every project has an APE.

a. Provide a detailed written description of the project (plans, specifications, Environmental Impact Statements (EIS), Environmental Assessments (EA), etc. **cannot** be substituted for the written description): See Attachment "A"
b. Provide a localized map indicating the location of the project; road names must be included and legible.
c. On the above-mentioned map, identify the APE.
d. Provide a written description of the APE (physical, visual, auditory, and sociocultural), the steps taken to identify the APE, and the justification for the boundaries chosen. See Attachment "A"

IV. IDENTIFICATION OF HISTORIC PROPERTIES

a. List and date **all** properties 50 years of age or older located in the APE. If the property is located within a National Register eligible, listed or local district it is only necessary to identify the district: See Attachment "A"
b. Describe the steps taken to identify whether or not any **historic** properties exist in the APE and include the level of effort made to carry out such steps: See Attachment "A"
c. Based on the information contained in "b", please choose one:
   - ☒ Historic Properties Present in the APE
   - ☐ No Historic Properties Present in the APE
d. Describe the condition, previous disturbance to, and history of any historic properties located in the APE: See Attachment "A"

V. PHOTOGRAPHS

Note: All photographs must be keyed to a localized map.

a. Provide photographs of the site itself.
b. Provide photographs of all properties 50 years of age or older located in the APE (faxed or photocopied photographs are not acceptable).

VI. DETERMINATION OF EFFECT

☐ No historic properties affected based on [36 CFR § 800.4(d)(1)], please provide the basis for this determination.

☒ No Adverse Effect [36 CFR § 800.5(b)] on historic properties, explain why the criteria of adverse effect, 36 CFR Part 800.5(a)(1), were found not applicable.

☐ Adverse Effect [36 CFR § 800.5(d)(2)] on historic properties, explain why the criteria of adverse effect, [36 CFR Part 800.5(a)(1)], were found applicable.

Please print and mail completed form and required information to:

State Historic Preservation Office, Environmental Review Office, Michigan Historical Center, 702 W. Kalamazoo Street, P.O. Box 30740, Lansing, MI 48909-8240

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Thomas D. LaCross

Attachment A

Re: Wayne County Downriver Sewage Disposal System and Wastewater Treatment Facility Project Plan, Application 106 Review

Ladies and Gentlemen:

Hubbell, Roth & Clark, Inc. is presently working Wayne County Department of Environment on a Project Plan for improvements to the existing Downriver Sewage Disposal System (DSDS.) The work includes improvements and repairs to the existing sewers and the existing Downriver Wastewater Treatment Facility (DWTF.) The Project Plan will be submitted to the Michigan Department of Environmental Quality's Environmental Services and Science Division (MDEQ-ESSD) for prioritization of a State Revolving Fund loan. The following additional information is provided as an attachment to the Application for Section 106 Review, in accordance with the National Historic Preservation Act of 1996:

I. GENERAL INFORMATION:

Federal Agency Contact:
Mr. Andrew Lausted, 312-886-0189
US EPA Region 5
77 W. Jackson Blvd.
Chicago, IL 60604

State Agency Contact:
Mr. Jeff Herrold, 517-335-1977
MDEQ, Revolving Loan Section
P.O. Box 30457
Lansing, Michigan 48909-7957

This Project Plan is being prepared as part of the State Revolving Fund loan program.

Consultant Contact Person:
Ms. Sally Duffy
Hubbell, Roth & Clark, Inc.
555 Hulet Drive
PO Box 824
Bloomfield Hills, MI 48303
Phone: 248-454-6583, Fax: 248-338-2592
Email: sduffy@hrc-engr.com

II. GROUND DISTURBING ACTIVITY:

There is a minimal amount of ground disturbing activity associated with this project. At the location of the Downriver Wastewater Treatment Facility, roads, sidewalks and/or equipment pads may be replaced and excavation performed to access existing buried utilities and structures. All areas will be restored to their existing uses.

Any sewer repair work, if required, will take place below-grade, within the existing structures and will involve cleaning, lining, and structural repairs. The existing sewers are located within in the existing roadway or utility right-of-ways and have been previously disturbed. There will be minimal ground disturbance and no change to the streetscape view of any historic properties.

III. PROJECT WORK DESCRIPTION AND AREA OF POTENTIAL EFFECTS (APE)

Project Work Description:

The proposed work includes the following specific tasks:

- x

Description of the APE:

The Area of Potential Effects (APE) is limited to the Downriver Wastewater Treatment Facility (DWTF) site and the utility rights-of-way where the existing Downriver Sewage Disposal System (DSDS) sewers are located. The APE is limited to these areas because no new facilities are proposed outside the DWTF property. Any work to be performed on the existing DSDS sewers would be performed within the existing structures and would not be visible from the ground surface.

IV. IDENTIFICATION OF HISTORIC PROPERTIES:

Research was performed to determine the location of historical features. This included using the State's website to map all State and Federally-registered sites and reviewing additional information available from Wayne County and the included municipalities. The following list provides all of the registered sites, along with other sites of local interest. Any historic features within the APE are shown on the attached location maps.

Allen Park:
Aaron Greeley / St. Cosme Line
Road Informational Designation
16850 Southfield
State Register listed, P25002

Historical Museum
Englewood Ave. & Park Ave.

Belleville:
French Landing Dam and
Powerhouse
12100 Haggerty Road
State Register listed, P25393

Franklin L. Robbe House
12955 Haggerty Road
State Register listed, P25395

Belleville Area Museum
405 Main Street
State Register listed

Detroit:
West Jefferson Avenue Bridge
Jefferson Avenue over Rouge River
National Register listed, P25591

Ford Hunger March Site
10520 Fort St.
State Register listed, P25110

Ecorse:
Steamer Columbia Ship
Nicholson Terminal and Dock
National Historic Landmark,
National Register listed, P561

Lincoln Park:
Historical Museum
1335 Southfield Rd.
Not registered

Riverview:
Nike Missile site D-54
14100 Civic Park Drive

Romulus:
Merrill-Morris House
13880 Huron River Drive South
State Register listed, P25346

Romulus Historical Park
11120 Hunt Street

Romulus (cont.):
Romulus Wesleyan Church
Pullens Corner / Five Points

Southgate:
Southgate Historical Museum
14120 Toledo Dix Rd.

Taylor:
John Sell Farmstead House
20904 Northline Road
State Register listed, P25351

Sandhill Cemetery
Telegraph and Pardee Roads
State Register listed, P25349

Taylor Heritage Park
12111 Pardee

Taylor Methodist Episcopal Church
22395 Eureka Road
State Register listed, P25352

Taylor Township Cemetery
Golden Ridge and McKinley Rds.
State Register listed, P25348

Wyandotte:
Ford Village Municipal Building
994 Biddle Avenue
State Register listed, P25367

Amo-Juchartz House
434 Plum Street, Wyandotte
State Register listed, P25365

William and Amelia Kuehn Glinke
House
434 Cherry Street
State Register listed, P711

Gustave C. Mehlhose House
367Oak Street
State Register listed, P25371

Louis Mehlhose House
355 Oak Street
State Register listed, P3225

Eureka Iron Works
Northwest corner Van Alstyne
Boulevard and Elm Street
State Register listed, P25366

Wyandotte (cont.):
George P. MacNichol House
(Wyandotte Historical Museum)
2610 Biddle Avenue
National Register listed, State
Register listed, P25369

Marx House
2630 Biddle Avenue, Wyandotte
National Register listed, State
Register listed, P25370

Ford-Bacon House
45Vinewood
National Register listed, State
Register listed, P25368

William Armstrong House
2234 Biddle Avenue
State Register listed, P25364

Michigan Alkali Company (BASF)
Administration Building
1609 Biddle Street
State Register listed, P25372

Ford Village Municipal Building
994 Biddle Avenue
State Register listed, P25367

V. PHOTOGRAPHS:

See the attached photo sheets.

VI. DETERMINATION OF EFFECT:

This project will not have any adverse effect on the nearby historic properties.

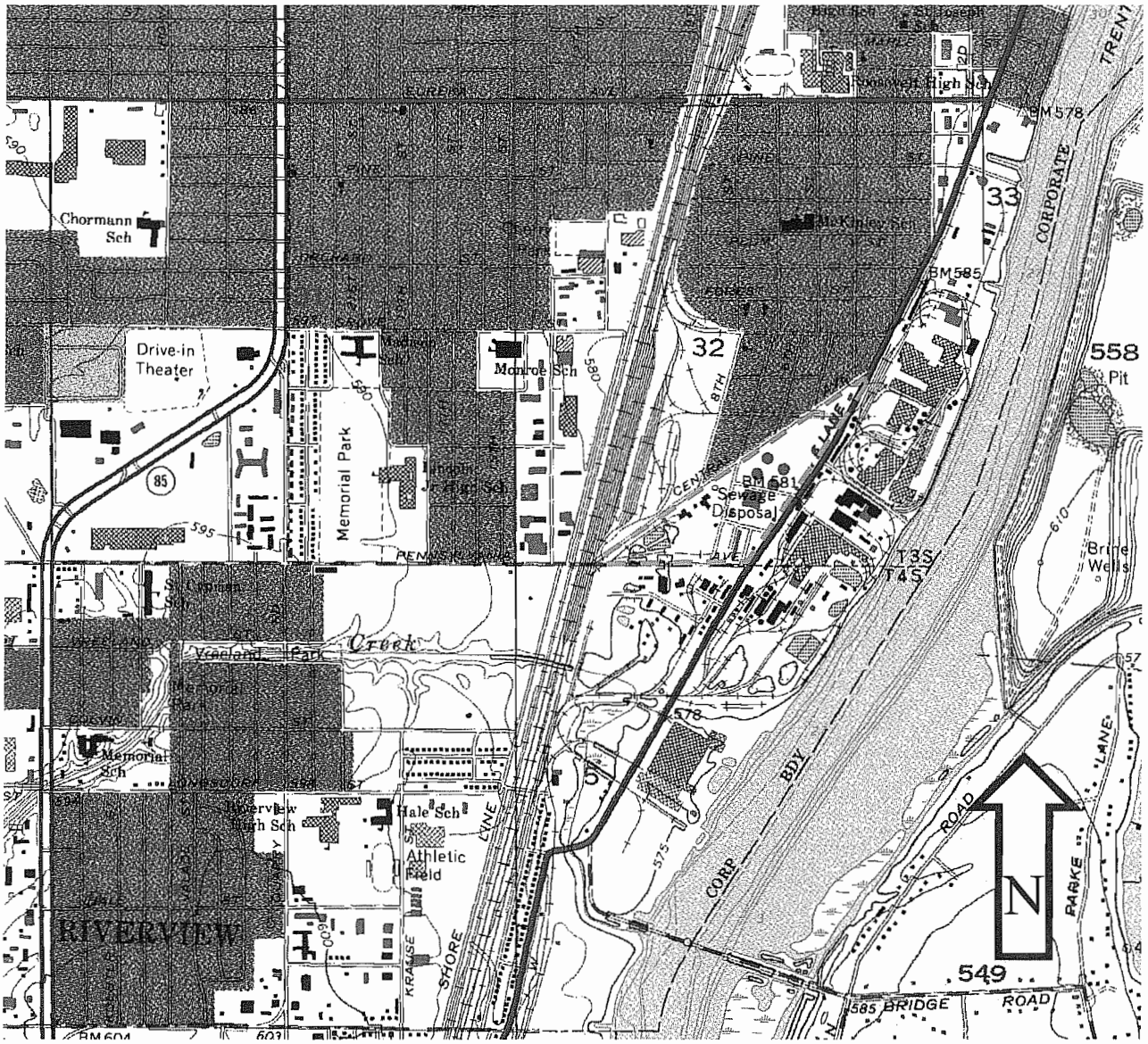
The undertaking **will not** alter, directly or indirectly, any of the characteristics of the historic properties. The project **will not** diminish the integrity of any property's location, design, setting, materials, workmanship, feeling, or association. There are **no** foreseeable effects caused by the undertaking that may occur later in time. The proposed project is in keeping with all of the sites' existing uses and context. All sites will be restored to their existing uses and there will be no discernable change to the physical, visual, auditory, and sociocultural climates of the project sites.

The majority of the work will be located on the property of the Downriver Wastewater Treatment Facility (DWTF). This site is located in an industrial area, not typically seen by residents. The site was originally developed in 1938, with major addition and renovation projects taking place in the 1960s and 1990s. The property is entirely developed. There are no historic features within the immediate vicinity (see the attached location maps.)

Any sewer repair work, if required, will take place below-grade, within the existing structures and will involve cleaning, lining, and/or structural repairs. The existing sewers are located within in the existing roadway or utility right-of-ways and have been previously disturbed. There will be minimal ground disturbance and no change to the streetscape view of any historic properties. All areas will be restored to their existing conditions. The pre and post-construction climate of the APE therefore will not be altered.

A temporary impact to the area will be experienced due to the increased noise, traffic, and work activity associated with construction. However, this will be mitigated by limiting construction activity on nights and weekends, requiring periodic cleaning and maintenance of the sites to protect the public and prevent excessive dust or debris, and having all activity comply within the City and State Building Codes.

Wyandotte, Michigan USGS Quadrangle
Wayne County, Michigan
T3S, R11E Area Map



Downriver Wastewater Treatment Facility limits

HRC
HUBBELL, ROTH & CLARK, INC
Consulting Engineers

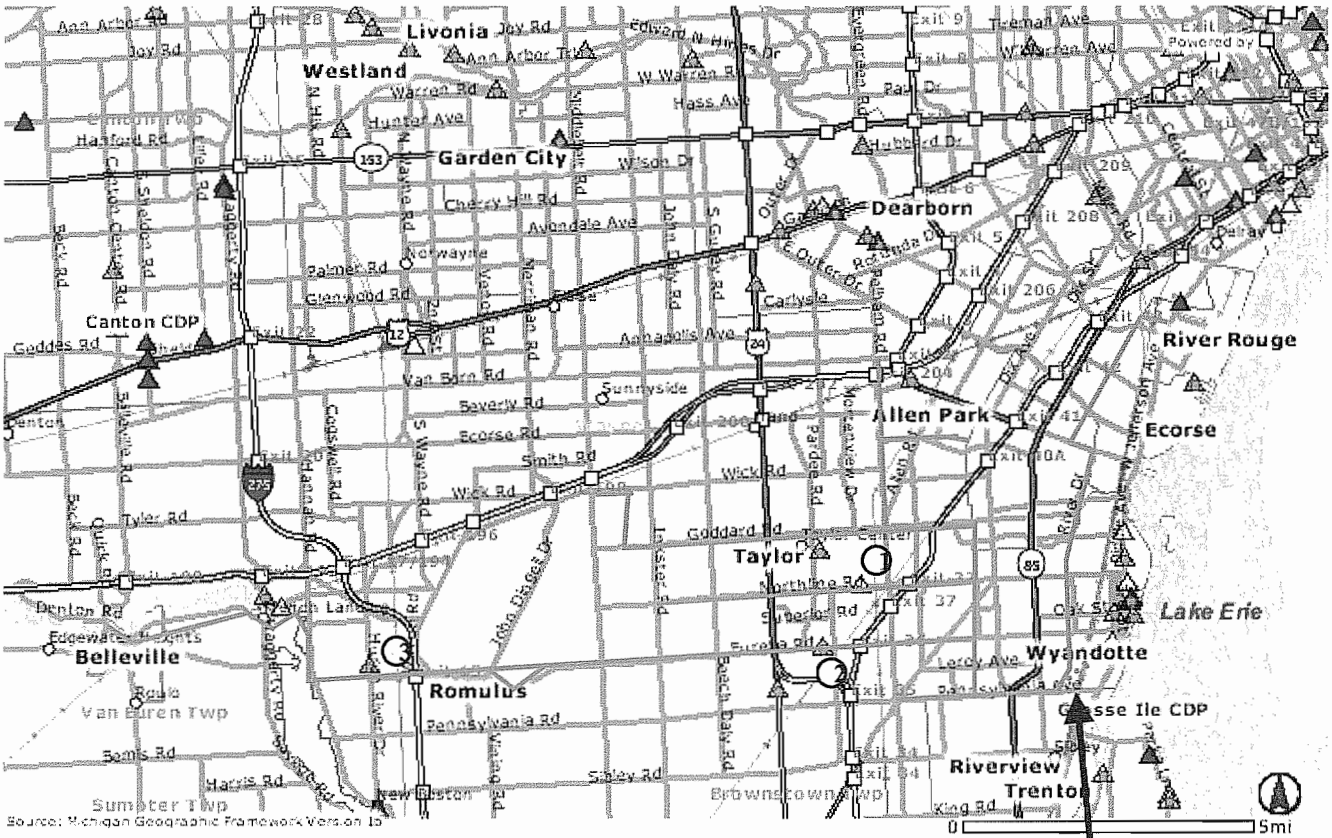
LOCATION MAP DWTF

WAYNE COUNTY DOWNRIVER SEWAGE DISPOSAL SYSTEM
PROJECT PLAN

Job No. 20080550
Date January 2009
Figure No. 1

\\20070808\design\corrs\locationmap.ppt

Wyandotte, Michigan USGS Quadrangle
Wayne County, Michigan



Downriver Sewage Disposal System sewers

See Figure No. 3 for Downriver Wastewater Treatment Facility limits

Historic Features within APE:

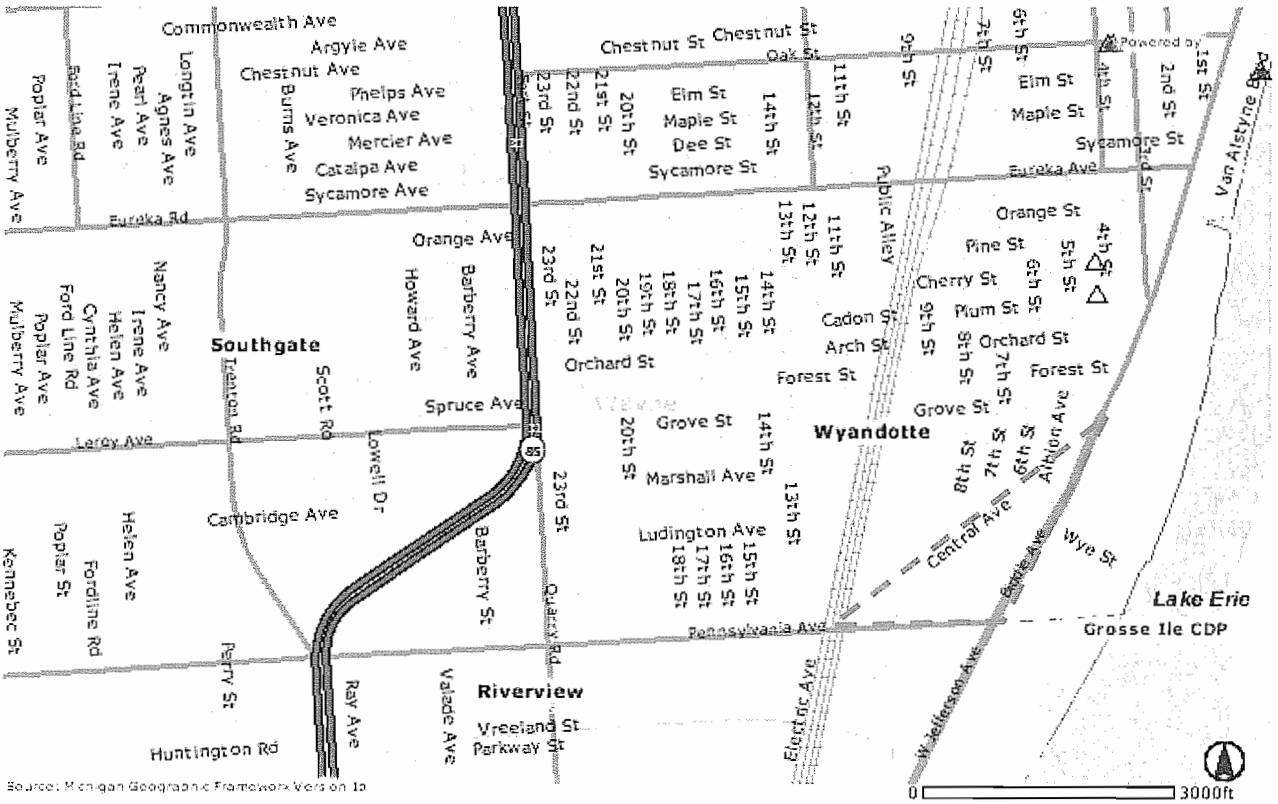
1. John Sell Farmstead House, State Register listed, P25351
2. Taylor Methodist Episcopal Church, State Register listed, P25352
3. Merrill-Morris House, State Register listed, P25346

The above image was obtained from the State's "Historic Properties Online" website at: http://www.mcgi.state.mi.us/hso/

HRC HUBBELL, ROTH & CLARK, INC Consulting Engineers	**REGISTERED HISTORICAL SITES**	Job No. 20080550
		Date January 2009
	WAYNE COUNTY DOWNRIVER SEWAGE DISPOSAL SYSTEM PROJECT PLAN	Figure No. 2

\\20070808\design\corrs\locationmap.ppt

Wyandotte, Michigan USGS Quadrangle
Wayne County, Michigan
T3S, R11E Area Map



Source: Michigan Geographic Framework Version 10a

Downriver Wastewater Treatment Facility limits

The above image was obtained from the State's "Historic Properties Online" website at:
http://www.mcgi.state.mi.us/hso/

HRC HUBBELL, ROTH & CLARK, INC Consulting Engineers	**REGISTERED HISTORICAL SITES**	Job No. 20080550
		Date January 2009
	WAYNE COUNTY DOWNRIVER SEWAGE DISPOSAL SYSTEM PROJECT PLAN	Figure No. 3

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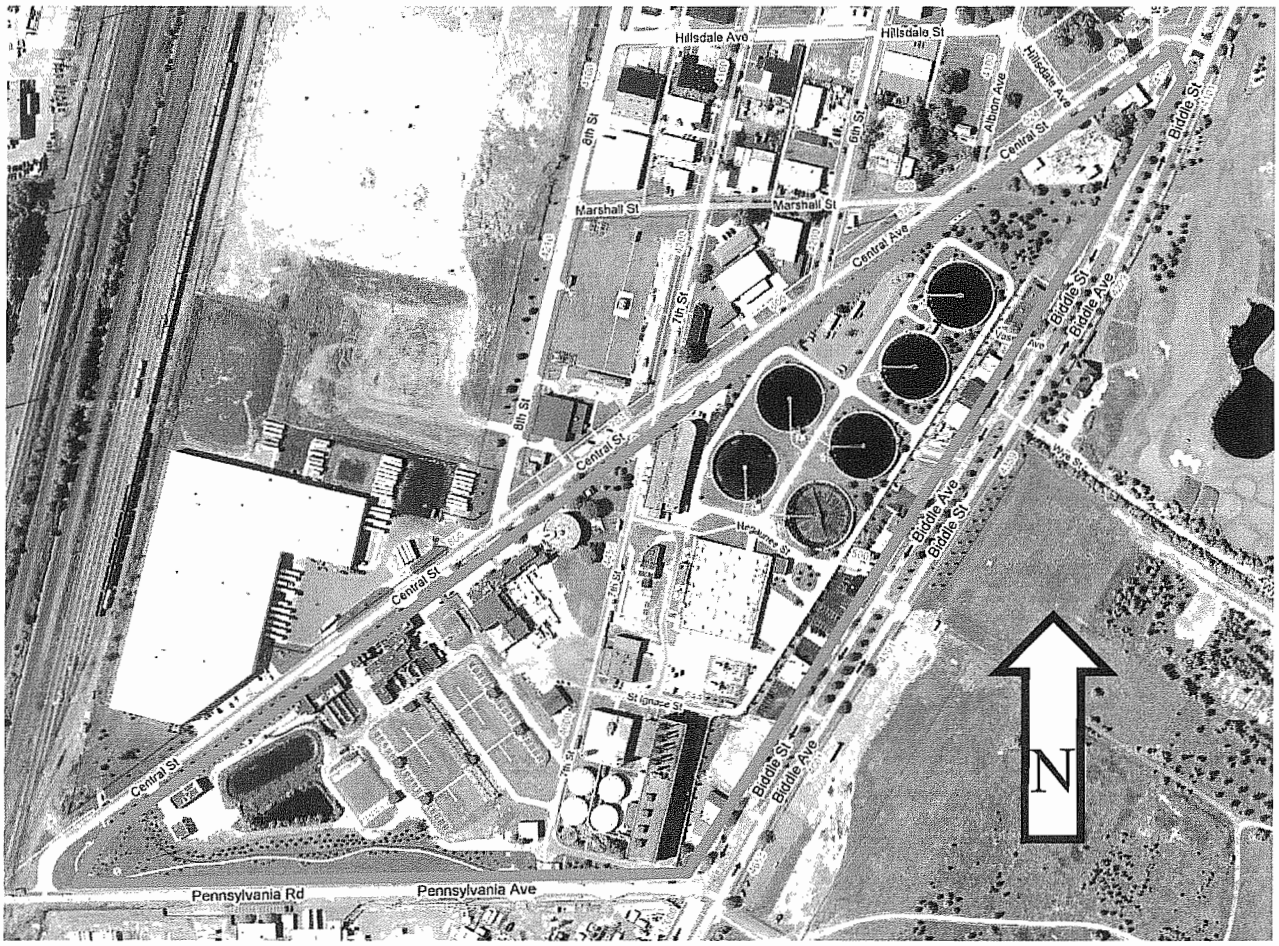
Wyandotte, Michigan USGS Quadrangle
Wayne County, Michigan
T3S, R11E Area Map



Downriver Wastewater Treatment Facility limits

HRC HUBBELL, ROTH & CLARK, INC Consulting Engineers	**DWTF PHOTOS**	Job No. 20080550
		Date January 2009
	WAYNE COUNTY DOWNRIVER SEWAGE DISPOSAL SYSTEM PROJECT PLAN	Figure No. 4

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Appendix D

Resolution

CERTIFICATION

STATE OF MICHIGAN)
)
CHARTER COUNTY OF WAYNE)

I, Joyua A. Bouldes, Acting Clerk of the County Commission for the Charter County of Wayne, State of Michigan, do hereby certify that the attached Resolution No. 2009-322, *authorizing the submittal of the Project Plan for the Downriver Sewage Disposal System to the Clean Water State Revolving Loan Program administered by the Michigan Department of Environmental Quality,* was duly adopted by the Wayne County Commission at the FIFTH DAY EQUALIZATION SESSION on the EIGHTEENTH DAY of June, 2009 by the following vote:

YEAS: Commissioners Bell, Blackwell, Cox, Gebhardt, Killeen, Leland, McNamara, Palamara, Ware, Webb, Woronchak, Vice-Chair Pro Tempore Varga, Vice-Chair Williams, Chairman Boike -- 14

NAYS: None

NOT VOTING: None

ABSTAIN: None

EXCUSED: Commissioner Parker -- 1

I further certify that the attached Resolution is a true, correct, and complete transcript of the original of said Resolution appearing on file and of record in my office and that said meeting was conducted and public notice of said meeting was given pursuant to and in full compliance with the Open Meetings Act, being Act 267, Public Acts of Michigan, 1976, as amended, and that the minutes of said meeting were kept and will be or have been made available as required by said Act.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Seal of the County of Wayne this 25th day of June, 2009 A.D.

Joyua A. Bouldes

JOYUA A. BOULDES
ACTING CLERK OF THE COMMISSION
CHARTER COUNTY OF WAYNE, MI

RESOLUTION

No. 2009-322

By Commissioner Killeen and Co-sponsored by Commissioner Varga

WHEREAS, the Charter County of Wayne recognizes the need to regularly make improvements to its existing wastewater treatment and collection systems to ensure their reliability and compliance with current and future regulatory requirements; and

WHEREAS, submittal of a Project Plan to the Michigan Department of Environmental Quality is necessary for any wastewater system improvements within the Project Plan to be eligible for funding under the Clean Water State Revolving Fund Loan program; and

WHEREAS, the Charter County of Wayne authorized Hubbell, Roth & Clark, Inc. (of Detroit) to prepare a Project Plan for the Downriver Sewage Disposal System (including the Downriver Wastewater Treatment Facility) to identify, evaluate and recommend the construction of necessary improvements to ensure the reliability of the Downriver Sewage Disposal System and its compliance with current and future regulatory requirements; and

WHEREAS, said Project Plan was presented at a Public Hearing held on May 20, 2009 and all public comments have been considered and addressed; and

WHEREAS, the Joint Management Committee for the Downriver Sewage Disposal System approved submission of said Project Plan to the Michigan Department of Environmental Quality at their meeting held on May 21, 2009; and

WHEREAS, the projects recommended for construction during the first five years ("Priority 1 Projects") total $58,447,000; and

WHEREAS, application will be made to the State Revolving Fund to provide loans for the Priority 1 Projects, and said loans will be repaid by the participating communities participating in the Downriver Sewage Disposal System; and

WHEREAS, construction of the proposed improvements for the Downriver Sewage Disposal System will not impact the Wayne County General Fund; and

WHEREAS, said Project Plan must be submitted to the Michigan Department of Environmental Quality no later than July 1, 2009;

Now therefore be it

RESOLVED, that the Wayne County Commission this 18th day of June, 2009 formally adopts the Project Plan for the Downriver Sewage Disposal System and agrees to implement the selected alternatives for the Priority 1 Projects as directed by the Downriver Joint Management Committee; and be it further

RESOLVED, that the Director of the Wayne County Department of Environment, a position currently held by Kurt L. Heise, is designated as the authorized representative for all activities associated with construction of improvements for the Downriver Sewage Disposal System identified in said Project Plan, including the submittal of said Project Plan as the first step in applying to the State of Michigan for a revolving fund loan to assist in the implementation of the selected alternatives for improvements to the Downriver Sewage Disposal System.

(2009-70-023)

Appendix E

Public Hearing Affidavits of Publication

NOTICE OF PUBLIC HEARING

The County of Wayne will hold a public hearing on an application for the Downriver Sewage Disposal System (DSDS) to the Michigan Department of Environmental Quality for the funding assistance through the State Revolving Fund (SRF) Program. The County is proposing improvements to the Downriver Wastewater Treatment Facility and the DSDS Collection System. The Public Hearing is being held for the purpose of receiving comments from interested persons.

The hearing will be held at 1:30 p.m. on May 20, 2009 at the City of Taylor Council Chambers located at 23555 Goddard Road, Taylor, MI 48180.

The proposed project consists of improvements to the Downriver Sewage Disposal System (DSDS), including the Downriver Wastewater Treatment Facility (DWTF). In summary, the DSDS improvements include Supervisory Control and Data Acquisition (SCADA) and rehabilitation of portions of the collection system. The plan also includes improvements to the DWTF's liquid stream and solids handling systems to continue to comply with the communities' National Pollutant Discharge Elimination System (NPDES) permit requirements.

If the SRF application is successful, the County plans to begin construction of the above noted improvements in 2010. Sanitary sewer service for customers will be unaffected by the proposed improvements. Construction activities will be localized to the subject facilities, with little or no impact to traffic.

The estimated annual cost per household for the projects to be implemented between 2010 and 2014, for residents of the service area, is presented below:

Community	Annual Cost per Household	Community	Annual Cost per Household	Community	Annual Cost per Household
Allen Park	$30.93	Lincoln Park	$30.12	Taylor	$26.94
Belleville	$29.07	River Rouge	$32.92	Van Buren Twp.	$25.11
Brownstown Twp.	$26.09	Riverview	$27.67	Wyandotte	$25.61
Dearborn Heights	$27.94	Romulus	$27.07		
Ecorse	$29.82	Southgate	$27.79		

The 2009 SRF Project Plan detailing the proposed projects is available for inspection at the Clerk's Office for the following communities: Allen Park, Belleville, Brownstown Twp., Dearborn Heights, Ecorse, Lincoln Park, River Rouge, Riverview, Romulus, Southgate, Taylor, Van Buren Twp., and Wyandotte. The 2009 SRF Project Plan is also available for inspection at Hubbell, Roth & Clark, Inc., 420 Michigan Building, 220 Bagley, Detroit, Michigan, and at the Wayne County Department of Environment, 415 Clifford, 7th Floor, Detroit, Michigan, beginning on April 20, 2009.

Written comments received before the hearing record is closed on June 12, 2009 will receive responses in the final project plan. Written questions should be sent to:

Downriver Sewage Disposal System 2009 SRF Project Plan
c/o Wayne County Department of Environment
415 Clifford, 7th Floor
Detroit, MI 48226
Attention: Greg Tupancy, P.E.

AFFIDAVIT OF PUBLICATION

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c/o Wayne County Department of Environment
415 Clifford, 7th Floor
Detroit, MI 48226
Attention: Greg Tupancy, P.E.

Published April 19, 2009

STATE OF MICHIGAN,

County of Wayne ss.

KIM FRETTER, being duly sworn deposes and says the annexed printed copy of a notice was taken from

Sunday Press & Guide

a newspaper printed and circulated in said State and County, and that said notice was published in said newspaper on

the 19th of April

A.D. 2009 that s_he is the Representative of said newspaper and knows well the facts stated herein.

Kim Fretter

Subscribed and sworn to before me this 20th day

day of April A.D. 2009

Mary Anne Coghlan

Notary Public Wayne County, Michigan
MARY ANNE COGHLAN
State of Michigan
My Commission Expires 2-27-2014

My Commission Expires on

PRINTER'S BILL

Folios Insertions

Notary Fees

Total

HERITAGE NEWSPAPERS
ONE HERITAGE PLACE, Ste. 100
SOUTHGATE, MI 48195
(734) 246-0800

AFFIDAVIT OF PUBLICATION

NOTICE OF PUBLIC HEARING

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Attention: Greg Tupancy, P.E.

Published April 19, 2009

STATE OF MICHIGAN,

County of Wayne ss.

Kim Fretter, being duly sworn

deposes and says the annexed printed copy of a notice was taken from

The Sunday News-Herald

a newspaper printed and circulated in said State and County, and that said notice was published in said newspaper on

the 19th of April

A.D. 2009 that s_he is the Representative of said newspaper and knows well the facts stated herein.

Kim Fretter

Subscribed and sworn to before me this 20th day

day of April A.D. 2009

Mary Anne Coghlan

Notary Public Wayne County, Michigan
MARY ANNE COGHLAN
State of Michigan
My Commission Expires 2-27-2014

My Commission Expires on

PRINTER'S BILL

____Folios____Insertions_____

Notary Fees_____

Total

HERITAGE NEWSPAPERS
ONE HERITAGE PLACE, Ste. 100
SOUTHGATE, MI 48195
(734) 246-0800

AFFIDAVIT OF PUBLICATION

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c/o Wayne County Department of Environment
415 Clifford, 7th Floor
Detroit, MI 48226
Attention: Greg Tupancy, P.E.

Published April 16, 2009

STATE OF MICHIGAN,

County of Wayne ss.

Lorraine L. Logsdon, being duly sworn

deposes and says the annexed printed copy of a notice was taken from

Belleville View

a newspaper printed and circulated in said State and County, and that said notice was published in said newspaper on

the 16th of April

A.D.2009 Representative of said newspaper and knows well the facts stated herein.

Lorraine L Logsdon

Subscribed and sworn to before me 16th

day of April A.D.2009

Mary Anne Coghlan

Notary Public Wayne County, Michigan

My Commission Expires on MARY ANNE GOGHLAN State of Michigan My Commission Expires 2-27-2014

PRINTER'S BILL

____Folios____Insertions_____

Notary Fees_____

Total

HERITAGE NEWSPAPERS
ONE HERITAGE PLACE, Ste. 100
SOUTHGATE, MI 48195
(734) 246-0800

Appendix F

Public Hearing Transcript

MAY 20, 2009
PUBLIC HEARING

SIGN IN SHEET
2009 SRF PROJECT PLAN
FOR IMPROVEMENTS TO THE
DOWNRIVER SEWAGE DISPOSAL SYSTEM

NAME	ADDRESS	TELEPHONE
GREG TUPANCY	415 CLIFFORD, DETROIT, MI 48226	313-224-7558
BUTLER BENTON	" "	313-224-6937
PETER T. ROTH	555 HULET AVE, BLOOMFIELD HILLS, MI 48303-0824	248-535-3305

Wayne County Sewage Disposal System
Project Plan for Improvements

Public Hearing Presentation
May 20, 2009

HRC
HUBBELL, ROTH & CLARK, INC.
Consulting Engineers

INTRODUCTION

- **Reason for Project Plan:**
  - Make application for State Revolving Fund (SRF) assistance
  - SRF Program is administered by Michigan Department of Environmental Quality (MDEQ)
  - Secure ability to obtain a low interest loan (currently 2.5%)
  - Loan will be used to finance improvements to the existing Downriver Sewage Disposal System (DSDS)
  - Project Plan submittal deadline is July 1, 2009 in order to receive funding

Overview
Project Plan
Cost
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Questions

HRC

DOWNRIVER SEWAGE DISPOSAL SYSTEM

- **The Downriver Sewage Disposal System (DSDS) serves:**
  - City of Allen Park, City of Belleville, Brownstown Township (portion), City of Dearborn Heights (portion), City of Ecorse, City of Lincoln Park, City of River Rouge, City of Riverview, City of Romulus (portion), City of Southgate, City of Taylor, Van Buren Township (portion), City of Wyandotte
- **The DSDS includes:**
  - The Downriver Wastewater Treatment Facility (DWTF) that treats sewage flows in accordance with its NPDES permit
  - Sanitary Interceptor and Relief sewers that convey flow from the local community sewers to the DWTF
  - The Downriver Tunnel Storage and Transport System (DTSTS) that provides relief of the interceptors during wet weather events

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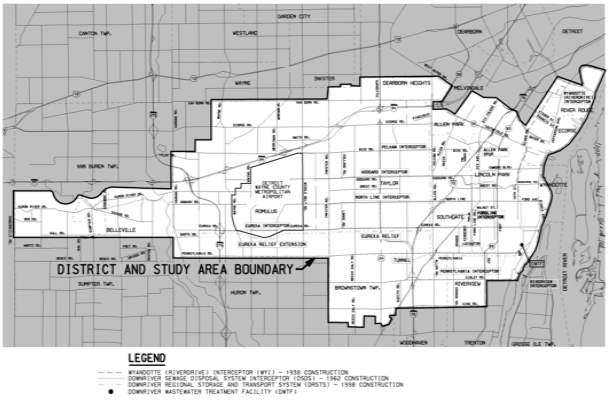
Questions

HRC

DOWNRIVER SEWAGE DISPOSAL SYSTEM SERVICE AREA



Overview
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Questions

DWTF BACKGROUND

- 1938
  - Primary treatment plant with solids incineration
- 1964-1989
  - Expansions and upgrades to Facility
- 1993
  - Projects to increase DWTF's peak capacity to 225 MGD and for the Downriver Tunnel Storage & Transport System (DTSTS)
- 2004
  - Second Project Plan completed that recommended improvement projects scheduled through 2024

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2009 SRF PROJECT PLAN

- Proactive Road Map for DSDS
- 20 Year Assessment of DSDS Facilities builds upon the 2004 SRF Plan
- SRF Funding for Priority 1 Projects (2010-2014):
  - Solids Thickening Complex Renovations
  - Secondary System Renovations
  - D-A-F Complex Renovations
  - Headworks System Renovations
  - DSDS Collection System Improvements

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PROJECT PLAN ALTERNATIVES

- General Alternative—No Action
  - Not considered because equipment would continue to require excessive maintenance and eventually become unusable
  - Ultimately would impact DWTF's ability to meet MDEQ discharge permit requirements
- Regional Alternatives
  - The DWTF is adequately sized for future capacity and its size limits possibilities for connection to other facilities

Overview
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PROJECT PLAN ALTERNATIVES

- Alternatives for the proposed projects were also reviewed in the following:
  - Approved 2004 SRF Project Plan.
  - Long-Term Biosolids Plan (updated 2009)
- The proposed projects build upon the recently completed and current improvement projects at the DWTF.

SOLIDS THICKENING COMPLEX

Overview
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- **Solids Thickening Complex Renovations**
  - Continuation of improvements started and planned for as part of the 2004 Project Plan (Phase II).
  - Remaining equipment dates to 1960s and 1970s and is beyond useful life.
  - Re-routes primary sludge lines directly to the Thickening Complex, which reduces the amount of pumping required and eliminates need for an additional sludge storage tank.
  - Also includes repair and improvement to the associated buildings and utilities.

SECONDARY SYSTEM

Overview
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Questions

- **Secondary System Renovations**
  - Includes upgrading the high-purity oxygen feed system, the oxygen feed balance and control to each aeration train, purge blower addition, Return Activated Sludge (RAS) pumps, piping and valves, and miscellaneous process and building improvements.
  - Replaces equipment dating from 1975.
  - Also includes repairs and improvements to the Clarifier Building Nos. 1 through 6, Return Activated Sludge Building, and the North and South Influent Chamber Houses.

D-A-F COMPLEX RENOVATIONS

Overview
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- **D-A-F Complex Renovations**
  - Includes converting the former Dissolved Air Flotation Building to an equipment storage and maintenance facility.
  - Will eliminate need to lease storage space off site.
  - Other buildings are past their planned service lives and are in need of repair. Repairs include roofing, painting, plumbing, H&V, masonry, electrical, etc.
  - Buildings to be updated include the Maintenance Building, the Employee Service Building, the Maintenance Garage, and the Administration Building.

HEADWORKS SYSTEM

Overview
Project Plan
Cost
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Questions

- **Headworks System Renovations**
  - This includes replacement of sluice and slide gates, replacement of Fine Screen Nos. 5, 6 and 7 and conveyance equipment, valve vault improvements, detritor channel improvements and sampling system consolidation.
  - Also includes repair/improvement to related buildings and utilities.

Overview
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COLLECTION SYSTEM

- **Collection System Improvements**
  - **Approximately 2% of the overall sewer network was televised and areas of needed repair documented.**
  - **Structural repairs will be made to the 60" and 72" diameter sewers, originally constructed between 1938 and 1962.**
  - **Project also includes replacement of the Collection System SCADA System.**
  - **The SCADA System provides reporting and control of the conditions in the sewers (flow, level, gate position, etc.)**

Overview
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Questions

PRIORITY ONE PROJECT COSTS

NO.	ITEM		SUB-TOTAL
PRIORITY 1 PROJECTS (2010 - 2014)			
FY 2010			
1.1	Solids Thickening Complex Renovations		$17,213,000
		Subtotal:	$17,213,000
FY 2011			
1.2	Secondary System Renovations		$7,516,000
1.3	D-A-F Complex Renovations		$6,832,000
		Subtotal:	$14,348,000
FY 2012			
1.4	Headworks System Renovations		$18,713,000
		Subtotal:	$18,713,000
FY 2013			
1.5	DSDS Collection System Improvements		$8,173,000
		Subtotal:	$8,173,000
		PRIORITY 1 SUBTOTAL	$58,447,000

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ANNUAL USER COSTS TYPICAL RESIDENTIAL CUSTOMER

- **User costs are based only on funding priority 1 projects (2010 to 2014)**
- **Funding is based on an SRF loan for 20 years at 2.5% interest**
- **User costs will increase approximately $25 to $33 per year for a "typical" household**

Overview
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Questions

IMPACTS OF SELECTED PROJECTS

- **Short-Term Impacts:**
  - **Positive Impacts**
    - **Create indirect and induced employment during construction**
  - ***Negative* Impacts**
    - **Noise, soil erosion, dust and fumes, and increased traffic due to construction activities**
- **Long-Term Impacts:**
  - **Positive Impacts**
    - **Will reduce maintenance costs**
    - **Enhance quality of the Detroit River**
  - ***Negative* Impacts**
    - **None**

Overview
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Questions

IMPACTS OF SELECTED PROJECTS

- Irreversible Impacts:
  - Non-recoverable resources committed to project are traded off to provide necessary repair and replacement of aging and worn-out structures and equipment
  - Protect and enhance the quality of the receiving water during the lifetime of the system
  - Resources include public capital, energy, labor and materials
  - Possible construction damage or accidents

Overview
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MITIGATION OF IMPACTS

- Mitigation of Short-Term, Construction-Related Impacts
  - Establishing guidelines for vegetation removal, dust reduction, and traffic control
  - Obtain and comply with soil erosion and sedimentation control permit
- Mitigation of Long-Term Impacts
  - Operation of system will be periodically reviewed to optimize processes and reduce energy consumption

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PROJECT PLAN SCHEDULE

- KEY DATES

April 16th -	Technical and Finance Meeting
April 20th -	Public Hearing Ad & Draft Project Plan available for public review
May 20th -	Public Hearing (Taylor City Hall 1:30)
May 21st -	JMC Mtg (Taylor City Hall 9:00)
May 26th -	Wayne Co Committee Env, Drains & Sewers (600 Randolph, Detroit 9:30)
June 4th -	Wayne County Commission Resolution Approval (600 Randolph, Detroit 10:00)
July 1st -	SRF Project Plan submittal to MDEQ

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QUESTIONS?

- Please approach podium and state name and address for the record

GO WINGS!

2009 SRF PROJECT PLAN

PUBLIC HEARING

2009 SRF PROJECT PLAN FOR IMPROVEMENTS TO THE DOWNRIVER SEWAGE DISPOSAL SYSTEM

WEDNESDAY
MAY 20, 2009
1:30 P.M.

TAYLOR CITY HALL
COUNCIL CHAMBERS

ON THE RECORD REPORTING & VIDEO
24626 Michigan Avenue • Dearborn, Michigan 48124
(313) 274-2800 • Fax (313) 274-2802

2009 SRF PROJECT PLAN

- - -

MR. TUPANCY: The public hearing we are about to conduct is being held to review the Wayne County's Downriver Disposal System. This meeting is required by the State for the County to obtain low interest loans through the State Revolving Fund Loan Program. A public notice was listed in the Sunday News Herald, the View and the Sunday Press and the Guide 30 days in advance of this meeting. A copy of the project plan has been available for public review at the Clerk's office at all of the 13 downriver communities and at the Wayne County building.

The purpose of this meeting is to receive comments from citizens and interested parties. All comments today will be transcribed and go on the record. Mr. Pete Roth of Hubbell, Roth and Clark is with us today to give a brief summary of the project plan, and then the hearing will be opened for public discussion. We also have a sign-in sheet that is required to record attendance, so please sign in. I'll leave it on the table.

I will now turn the podium to Pete Roth to discuss the plan.

MR. ROTH: As Greg mentioned, we're here to discuss and review the 2009 SRF Project Plan for the

Downriver Sewage Disposal System. The reasons for the Project Plan, the State Revolving Fund has an assistance program that requires us to develop a plan where we consistently prepare the plan, the document requirements, we evaluate alternatives, we project costs and we look at the needs of the facility as a whole and rank those needs and solutions to those needs.

Under that program that is administered by the State of Michigan, it is part of their funding criteria. That funding criteria puts you in a loan program -- a low interest loan program, I should clarify. That loan program is currently at 2.5 percent.

These loans are used to finance improvements, and this will be for the existing Downriver Sewage Disposal System. If you don't know where that's located, it used to be known as the Wyandotte Plant. That's at Biddle and Pennsylvania and Central Avenues in the City of Wyandotte.

The Project Plan submittal deadline is July 1st, 2009 in order to receive the funding. The Project Plan will be submitted to the State Department of Environmental Quality.

The Downriver Sewage Disposal System, it serves 13 communities; some of them in their entirety, others, a portion of the community. They're listed up

there.

The system includes the waste water treatment plant that I just mentioned, and that treatment plant, I should note, is regulated under the NPDES permit system, and they've been in compliance with that permit for quite a few years now. So they're very proud of that, as they should be, over the fine job that they do at the plant.

The system also consists of the Sanitary Interceptor and Relief sewers that convey flow from the local community to the Downriver Wastewater Treatment Facility.

Also part of the system is the Downriver Tunnel Storage and Transport System. That provides relief of the interceptors during wet weather events. So it serves to handling all of the rain, excessive flows. We can store it in the tunnel system and then transport it to the plant for future treatment.

This is a figure of the service area of the 13 communities that are serviced. There's about 270,000 people that live within the service area.

Background about the Downriver Wastewater Treatment Facility, it was originally constructed in 1938. The primary treatment was solids incineration. There were major expansions in the period of 1964 to

1989, upgrades and improvements of treatment technology. 1993, there was a project to increase the plant capacity to 225 MGD and to include the Downriver Tunnel Storage and Transport System.

2004 was the second project plan completed that recommended improvements to the facility scheduled through 2024, and that leads us to the current project in 2009.

That plan provides us with a proactive road map for the facility moving forward. It provides us with a 20-year assessment of the facilities and builds upon the 2004 plan. So some of the items in the 2004 plan that recognize these future needs, we are incorporating currently in our 2009 project plan.

Since it's a 20-year planning period, we're specifically narrowing down our plan to the five-year planning period of 2010 to 2014, I should say, and recognize what we call Priority 1 Projects. Those are the projects we will carry forward with -- hope to carry forward with and will be asking the State for SRF loan assistance.

Those projects are listed as the Solids Thickening Complex Renovations, the Secondary System Renovations, D-A-F Complex Renovations -- and D-A-F stands for Dissolved Air Flotation. That was a large

building that housed certain equipment that is since obsolete -- the Headworks System Renovations, Collection System Improvements.

Within the project plan we evaluated, as a team with our colleagues at Wayne County Department of the Environment, several alternatives as we went through. One of the alternatives is the general alternative of no action. We did not consider that as viable because much of the equipment was nearing or at the end if its useful service life, and by not replacing the equipment and improving the operation, ultimately it impacted the ability to meet the MDEQ discharge permit requirements as mandated by the Federal Government and the State of Michigan.

We looked at regional alternatives. We found that the plant and its current size and configuration was adequate for the projected operation, and whether they were finding this trending of the population according to SEMCOG to be adequate respective to timing for the next four years.

The alternatives for the proposed projects were also reviewed from the 2004 project plan. As a team, we sat down and reviewed the need for those projects, what was recommended so we could see if they still fill the future projected needs.

We updated the previous Biosolids Plan, updated it to 2009 status. The proposed projects build upon the recently completed and current improvements at the downriver facilities, and as we go through each of the individual projects, the first one is Solids Thickening Complex Renovations. It provided continuation of improvements started and planned for as part of the 2004 Project Plan, Phase II.

Remaining equipment in that complex dates back to the '60s and '70s. As an automobile owner, I would say that's pretty darn good service, since it's 2009, and it's obviously at the end of useful service life. Waste treatment plants are always stuff on service.

Part of the project involves re-routes of primary sludge lines directly to the Thickening Complex, resulting in a more efficient operation and we will be able to eliminate the need for additional sludge storage tanks in the operation of the plant.

The project also includes repair and improvements to the associated buildings and utilities. Again, many of the components are beyond their normal useful service lives.

Secondary system: This project includes the upgrade of the high-purity oxygen feed system. The oxygen feed balance is going to be modified to control

each aeration train, purge blower addition, return activated sludge pumps, piping and valves and miscellaneous process and building improvements.

The Secondary System Renovations also includes replacing equipment dating back to 1975, includes repairs and improvements to the Clarifier Buildings 1 through 6 and Return Activated Sludge Building and the North and South Influent Chamber Houses.

D-A-F Complex Renovations includes converting the former Dissolved Air Flotation Building to an equipment storage and maintenance facility. It will eliminate the need to lease storage space offsite. It provides ready access to parts for a more efficient operation.

Other buildings on-site associated with this project, which are also past their planned and useful service life, they require repairs including roofs, painting, plumbing, HVAC, masonry, electrical, et cetera.

The buildings included in this package are the Maintenance Building, the Employee Service Building, the Maintenance Garage and the Administration Building.

Headworks System Renovation includes replacement of sluice and slide gates, replacement of fine screen numbers 5, 6 and 7 and conveyance equipment,

valve vault improvements, detritor channel improvements, and sampling system consolidation. It also includes repair and improvement to related buildings and utilities.

Collection System Improvements: In our project planning, we reviewed approximately 2 percent and pipe reviewed 2 percent of the overall sewer system collective system, and televising -- an assessment of those televised tapes, and we noted some areas needing repair and were documented.

Structural repairs were made to the 60 and 72-inch diameter sewers originally constructed between 1938 and 1962. Again, very good service life, I would say.

The project also includes replacement of the Collection SCADA System, and the SCADA System will provide reporting and control of conditions in the sewers, flow, level, gate position, et cetera, to the operators at the plant. Again, resulting in a more efficient operation and better control models of the system and how it was behaving.

All those projects come down to a cost spreadsheet, and for -- we've budgeted across the planning period from 2010 to 2013 to try to even out the cost flow demand to the entity.

2010, Solids Thickening Complex Renovations project was projected at $17,213,000. We have two projects in 2011, Secondary System Renovations projected at $7,516,000 and the D-A-F Complex Renovations projected at $6,832,000 for a total in the fiscal year of 2011 of $14,348,000.

In fiscal year 2012, we have one project listed, Headworks System Renovations, projected cost $18,713,000. Lastly, in the fiscal year of 2013, the Downriver Collection System Improvements at a cost of $8,173,000. The total project cost estimate, $58,447,000.

User costs: Breaking down the project costs down to the individual users and basing those costs on a 2.5 percent interest loan -- that could change, but usually these sorts of projects are very low cost loans. The spread amongst the users would be an additional 25 to $33 dollars per year for a typical household.

Impacts of the selected projects. Short-term impacts: Positive impacts, create indirect and induced employment during construction. Negative impacts, noise, soil erosion, dust and fumes and increased traffic due to the construction activities.

Those of you who may know the site will recognize that the area to the north is a light

industrial area, the area to the south is heavy industry with chemical plants, so as far as noise, soil erosion, dust, fumes, those should not be a huge impact to the surrounding environment, and they will be indicated during the construction.

Long-term impacts, positive impacts will reduce maintenance costs to the facilities, enhance water quality to the Detroit River -- discharge quality that is. Negative impacts, we did not recognize any in the project plan.

Irreversible impacts, the nonrecoverable resources committed to the project are traded off to provide necessary repair and replacement of the aging and worn out structures and equipment, protect and enhance the quality of receiving water during the lifetime of the system. Resources include public capital, energy, labor and materials. There's always the possibility of construction damage or accidents, and those items are mitigated as much as possible through the planning process.

Some of those mitigation measures may include establishing guidelines for vegetation removal, dust reduction and traffic control, et cetera. Obviously, we need to obtain and comply with all the ordinances and with soil erosion and sedimentation control.

Mitigation of long-term impacts, operation of system will be periodically reviewed to optimize processes and reduce energy consumption.

Scheduling the Project Plan: Key dates, April 16th we met with the Technical and Finance Committee, or the JMC, that's the Joint Management Committee representing the Downriver Community.

April 20th, we placed on file a draft of the Project Plan that was put on deposit with all the clerks in the 13 communities.

May 20th, that's today, we are conducting the public hearing.

May 21st, tomorrow, we have a meeting in front of the JMC to review the project plan.

May 26th, Wayne County has a meeting with the Environment, Drains and Sewers Committee.

June 4th, the Project Plan will go before the County Commission for resolution.

July 1st, SRF project plan will be submitted to MDEQ for data requirements.

With that, I think we're at the end. Questions? Comments?

MR. TUPANCY: Seeing no one here, it's 1:55, no comments to be entered, I guess, in the public record.

Meeting adjourned.

(Proceeding concluded at 1:55 p.m.)

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STATE OF MICHIGAN)
) SS.
COUNTY OF OAKLAND)

CERTIFICATE OF NOTARY PUBLIC

I, Pamela J. Smith, a duly commissioned and qualified Notary Public within and for the County of Oakland, State of Michigan, do hereby certify that the proceeding on Wednesday, May 20, 2009 contained herein was taken down by me in machine shorthand; transcribed upon a computer under my personal supervision, and is a true and correct transcript of the whole of the proceeding.

I do further certify that I have delivered the original transcript into the possession of GREG C. TUPANCY.

I do further certify that I am not connected by blood or marriage with any of the parties; their attorneys; that I am not an employee of any of them; nor interested directly or indirectly in the matter in controversy, as counsel, attorney, or otherwise.

IN WITNESS WHEREOF, I have hereunto set my hand at Ferndale, County of Oakland, State of Michigan, this 26th day of May, 2009.

Pamela J. Smith, CSR-6580
Notary Public, Oakland County, Michigan
My Commission expires: October 11, 2014

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Appendix G

Long-Term Biosolids Plan (updated 2009)

LONG TERM BIOSOLIDS PLAN

FOR THE

DOWNRIVER WASTEWATER TREATMENT FACILITY

2009 SRF PROJECT PLAN

WAYNE COUNTY DEPARTMENT OF ENVIRONMENT

FINAL: July 1, 2009

DRAFT: February 23, 2009

HRC Job No. 20080550

HUBBELL, ROTH & CLARK, INC.
220 MICHIGAN BUILDING
220 BAGLEY
DETROIT, MI 48226

Table of Contents

Section I - Introduction

A. Background

As part of the Downriver Sewage Disposal System, the Downriver Wastewater Treatment Facility (DWTF) was originally designed to incinerate the primary and waste activated sludges produced by treating sewage from the 13 Downriver communities it serves. Because of the economics, air quality requirements, and other concerns, incineration was abandoned in the late 1990s in favor of landfilling. The dissolved air flotation thickeners were abandoned in the early 2000s, and from that point forward the DWTF co-thickens the primary and waste activated sludge (WAS), dewaters the thickened sludge with up to six Belt Filter Presses (BFPs), and disposes of the cake via landfill (formerly to Carleton Farms and now to Vienna Junction landfill in Monroe County.)

The 2004 SRF Project Plan recommended centrifugal dewatering in place of the current BFPs, starting with the two older presses. The Basis of Design Report, Solids Handling Phase I, dated December 14, 2007, recommended replacing these Andritz BFPs with two high-solids centrifuges capable of producing approximately 4,000 pounds per hour (dry solids) of up to 30 percent dry cake, as well as numerous other support and ancillary equipment improvements. The recommendations from that report were designed and bid in the Phase I Solid Improvements Project (Phase I Solids), which is currently under construction. In addition to this Phase I Solids project, a Project Plan Update for Fiscal Year 2008 Long Term Biosolids Plan for the DWTF dated March 20, 2008 was prepared. That plan evaluated five alternatives to biosolids deposal, and concluded that landfilling was still the most cost-effective solution. However, it cautioned that the landfilling options were becoming increasingly risky, and that alternate provisions would likely be required.

Landfilling of biosolids is cost-sensitive to landfill proximity. There are currently four landfills in Wayne County that could theoretically receive biosolids. However, none of these will currently take biosolids from the DWTF for various reasons, including agreements with their host communities, and a consent agreement with the Michigan Department of Environmental Quality (MDEQ.) Landfill owners and the MDEQ are concerned with not only odors, but the potential for spilling solids during transport, and increased production of methane gas. As a result, it is imperative that a long-term reliable disposal method is planned for the project planning period.

B. Objectives of the Study

The objectives of this Long Term Biosolids study are to evaluate the feasibility of the current means of disposal, and to also evaluate options should landfills refuse to accept DWTF biosolids. The goal is to select the most suitable means of disposing biosolids from the DWTF in the SRF planning period, and to include the required facilities in the Project Plan. The options evaluated to reach these objectives are

- Land filling Dewatered sludge (current practice)
- Land filling Class B sludge
- Land Application of Class A Biosolids
- Land Application of Class B Biosolids
- Incineration
- Digestion, Drying and Fuel
- Composting

C. Phase I and II Solids Improvements

As identified above, improvements to the solids handling facilities were evaluated in the 2004 SRF Project Plan, and designed and bid in the Phase I Solids project. That project recommended landfilling dewatered biosolids, with production based on a 16-hour per day, six days per week operating schedule. Specific Phase I Solids improvements include:

- Replacing two older belt filter presses with high-solids centrifuges.
- Making improvements to the Heating, Ventilation, and Air Conditioning (HVAC) systems.
- Installing polymer storage and feed systems to assist in the dewatering of biosolids.
- Improving solids handling process automation and incorporating the systems into the plant-wide Systems Control and Data Acquisition (SCADA) system.

The 2009 SRF Project Plan recommends additional improvements including the following. However, the final recommendations will be contingent on the findings presented herein:

- Complete renovation of the existing gravity thickener complex to co-thicken primary and waste activated sludge.
- Renovate the buildings and provide odor control.
- Installing at least two additional centrifuges for sludge dewatering, including sludge pumping conveyance, polymer, and ancillary equipment
- Automating the additional biosolids processes and integrating them into the SCADA system.

D. Biosolids Mass Balance

The conceptual design and cost for the options presented herein need to be developed from a preliminary mass-balance load. The mass balance loads are presented below:

Table I-1: Biosolids Mass Balance Loads

	Average Month	Maximum Month
Solids Production per Week [1]	1,027,179	1,286,397
Production Schedule [1]	16, 6	16, 6
Solids Production per day	171,197	214,400
Cake solids	25%	25%
Wet Cake (lbs/day) [2]	650,547	814,718
Wet Cake (tons/day)	325.3	407.4
Wet Cake(CY/day)	367.7	460.5
Rolls-offs per day [3]	12.3	15.3

Notes:
1. From the Phase I Solids Basis of Design Report (16, 6 represents 16 hours per day, 6 days per week)
2. Assumes 95% capture
3. Based on a 30 CY container

Section II - Phase II Solids Handling Improvements

A. Description of Alternatives

The following sections describe the various alternatives for biosolids treatment and disposal. All alternatives are considered to be in addition to facilities described in the 2004 Project Plan. Eight alternatives were reviewed, which include the following:

- Alternative 1: Disposal of dewatered biosolids in a landfill (No Action—this is the current method)
- Alternative 2: Disposal of Class B biosolids in a landfill
- Alternative 3: Land application of Class A biosolids
- Alternative 4: Land application of Class B biosolids
- Alternative 5: Incineration
- Alternative 6: Integrated Biomass to Energy (IBES), with sludge drying
- Alternative 7: Integrated Biomass to Energy (IBES), with sludge dewatering
- Alternative 8: Composting

1. Alternative 1: Landfill Dewatered Biosolids

As previously mentioned, the current DWTF disposal method is landfilling, and was the selected alternative in both the 2004 SRF Project Plan and the 2008 Long Term Biosolids Report. However, there is increasing uncertainty associated with this disposal alternative. The 2009 SRF Project plan recommends improvements to the solids handling complex including new gravity thickeners, sludge storage tank mixers, dewatering centrifuges and ancillary process equipment and building improvements. However, these upgrades are common to all alternatives and are therefore not included in the cost analysis. The principal cost for this disposal option is the hauling and disposal (O&M) cost.

The Carleton Farms Landfill in Wayne County was used for disposal of solids after incineration was discontinued. However, due to a consent agreement with the MDEQ, Carleton Farms ceased to accept the DWTF dewatered biosolids. Biosolids are now hauled to the Vienna Junction landfill in Monroe County for disposal. Because of the significant increase in hauling distance, the costs have risen from approximately $21 per ton in 2004 to $47 per ton today. This price includes the on-site management of storage roll-off containers, and trucking and disposal to the landfill. This work is competitively bid every three years; the current service is provided by the EQ Company.

Since odor, transportation and other issues will continue with transporting and landfilling municipal sludge, continued acceptance of dewatered biosolids at landfills is not guaranteed in the future. (Note: Stabilized sludges may be acceptable for landfilling, such as discussed under the Class B alternative below.) In order to continue landfilling, it is possible that landfills farther from the DWTF may need to be utilized, which increases hauling costs. It is also possible that landfills that agree to accept dewatered biosolids may increase tipping fees under the pretext that the material is undesirable and/or creates objectionable conditions at the landfill. Therefore, additional alternatives are considered below.

2. Alternative 2: Landfill of Class B Stabilized Biosolids

While many landfills have stopped accepting untreated dewatered biosolids, disposal of Class B biosolids is a valid option because the stabilization process makes it more acceptable (or less objectionable) than untreated biosolids. The benefits of Class B biosolids is reduced pathogens, lower odors, higher solids (less free water) content, and reduced vector attraction.

Class B biosolids can be produced by anaerobic digestion or alkaline stabilization. Anaerobic digestion is explored in Alternative Nos. 6 and 7, and is significantly more technologically advanced and offers other advantages over conventional aerobic digestion. Conventional aerobic digestion also requires significant space to accommodate the 15 or more days of storage.

Alkaline stabilization involves using lime, or an alternate alkaline material, to raise the pH of the biosolids for minimal periods of time, which makes the environment unsuitable for pathogens. In order to achieve the vector attraction reduction criteria for Class B biosolids using lime stabilization, the pH must be greater than 12 standard units (s.u.) for two consecutive hours and remain above 11.5 s.u. for an additional 22 hours without further lime addition. Approximately 25% of the dry solids is the amount of lime required to reach a pH of 12.

This alternative requires installing lime storage, feed and mixing equipment; conditioned sludge storage facilities; and odor control equipment. These systems would be installed in the Incinerator Building, with the sludge conveyed to the lime stabilization area by modifying the Phase I Solids screw augers. Once the pH and time element are satisfied in the storage tanks, the lime-stabilized sludge would be conveyed to trucks for landfilling, again using screw augers. Odor control is also required for ammonia control. In addition, significant improvements are required to the building.

Landfill disposal costs are still required, and will be higher, given that the total solids landfilled will increase due to the addition of lime. It is possible that the unit disposal costs could decrease if landfills closer to the DWTF are willing to take the Class B solids.

3. Alternative 3: Land Application of Class A Stabilized Biosolids

Land application of stabilized biosolids is a very green disposal option that is used extensively in less urban areas of the state. Biosolids can be stabilized to either a Class A or B biosolids criteria, then land-applied at agronomic rates to controlled supplement nutrient requirements for crop production while limiting adverse materials such as heavy metals, mercury, and other constituents. (Domestic sludge is generally low in the adverse constituents, and because industry in the Downriver communities has decreased over the years, the quality of the DWTF sludge is expected to be very suitable for land application.)

Typically, sludge is land applied as a liquid biosolid slurry, directly injecting it into soil. This reduces odors and decreases vector transmission. Dewatered biosolids can also be land-applied, but this requires additional tilling after application to cover the material.

Land application can only occur on un-frozen soil. Therefore sludge is seasonally applied and stored during off-season periods. Typically, 120 to 180 days are required for winter storage, and the requirements for liquid storage are vastly higher than similar storage volumes for dewatered sludges. At the DWTF, a 30 million gallon tank would be required to provide storage for 120 days of liquid disposal of sludge. Because of the limited site area for the facility, liquid storage is not practical. Therefore, land application of Class A dewatered biosolids will be considered.

Typical methods of producing Class A biosolids are composting, thermal drying, and/or alkaline pasteurization. Composting involves adding a bulking agent to the biosolids, and because of the additional green benefits to this option, it is discussed as a separate option in this section. Thermal drying can provide a Class A sludge by raising the temperature to 130°C for 30 minutes. The heat is also used to drive off water content. Sludge drying is also evaluated in the IBES process presented below.

Similar to the Class B sludge discussion above, alkaline (lime) stabilization can be utilized to achieve a high-quality biosolids product for general-purpose application as a soil amendment material. To produce Class A biosolids, the Class B pH requirements need to be met, and the biosolids temperature must be raised to greater than 70°C for a minimum of 30 minutes. When processed, Class A biosolids have no detectable presence of pathogens, are subjected to fewer regulatory restrictions in terms of use or disposal, and have fewer odors than Class B biosolids. However, Class A solids are much more costly to produce.

We envision that a private solids management firm could be contracted to receive the Class A biosolids and be responsible for storing and land applying the biosolids in compliance with the applicable rules and regulations. Class A biosolids may also be used as daily cover at landfills, which may provide another cost-effective location for disposal if necessary.

4. Alternative 4: Land Application of Class B Stabilized Biosolids

Land application of Class B biosolids involves the mixing of dewatered biosolids with lime or alkaline material but at about half of the volume required to achieve Class A biosolids. Also, Class B biosolids are not required to be maintained at a temperature greater than 70°C for a minimum of 30 minutes, as required for Class A biosolids, to guarantee pasteurization. Since less lime and no heat are required to produce Class B biosolids, it is less expensive than producing Class A biosolids. As described under the land application of Class A biosolids alternative, composting and thermal drying are not feasible and would not be utilized to produce Class B biosolids at the DWTF.

As with Class A biosolids, a private solids management firm could be contracted to receive the Class B biosolids and land apply the biosolids in compliance with the applicable rules and regulations. This management firm would also provide storage of the biosolids during the winter. The landfill costs is the same as for Class A biosolids, therefore, there is no economic advantage to processing biosolids to Class A requirements if the chosen disposal alternative is land application by a private management firm.

There are several different alkaline addition processes that could be utilized to achieve similar end product materials. The technology could be installed in the building area occupied by the existing incinerators.

5. Alternative 5: Incineration

While the incinerators were abandoned in the late 1990s, this alternative still has merit. Generally, O&M costs are lower for incineration than other options, principally because chemical, hauling and disposal costs are not required. In addition, natural gas requirements for incineration are largely minimal due to the energy content of the sludge. Another advantage is that odors would not be an issue, and the new technology combustion process achieves air quality compliance for discharge gases and particulates. The biggest drawback is the extremely high capital costs for this alternative—it is by far the most expensive option from a capital cost

perspective. Another strong disadvantage with incineration is the negative public perception, which will include the issue of burning sludge in someone's backyard, to being the antithesis of green technology.

The existing incineration facility would be completely demolished, save for the structural elements. New fluidized bed incineration would be installed in the same position as the existing centrifuges. Dewatered sludge would be conveyed or pumped to each incinerator, and the ash pumped to the existing ash lagoons, whereby the ash would be dredged periodically and disposed of in a landfill. Extensive improvements to the existing incinerator building are required. An air permit will be necessary, and is anticipated to be a lengthy (and expensive) process.

As discussed above, the capital costs are very high, but O&M costs are relatively low and should be relatively stable because there are few external variable costs involved such as energy, chemical, and handling.

6. Alternative 6: Integrated Biomass to Energy (IBES) with Sludge Drying

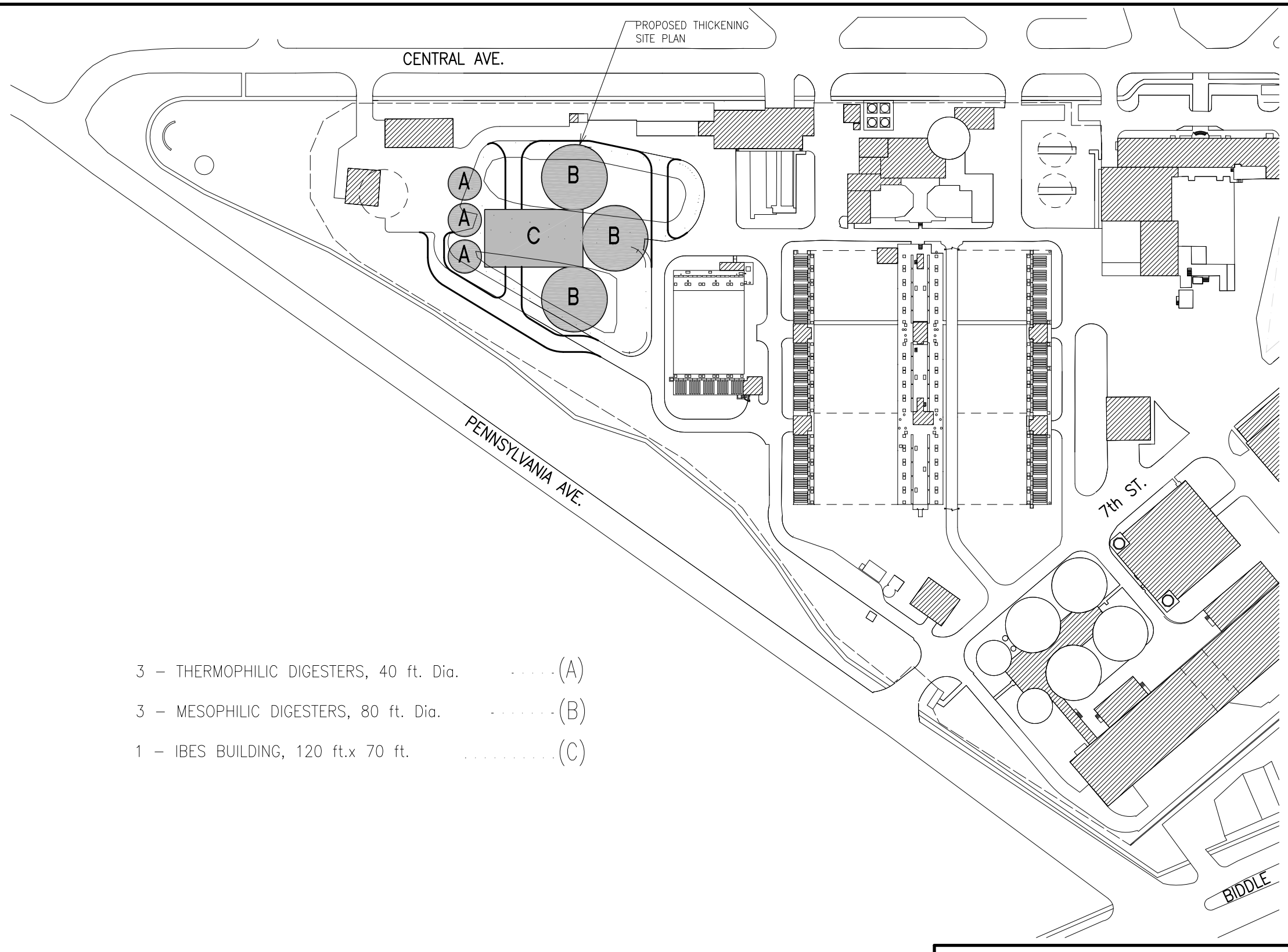
Under this alternative, a new two-phase anaerobic digestion system would be constructed at a new site to be purchased. The proposed system would be a proprietary Integrated Biomass to Energy System (IBES), and would produce Class A biosolids as well as utilize Combined Heat and Power (CHP) to create electrical and heat energy. The biosolids digestion system is a patented Two Phase Anaerobic Digestion (2PAD) System consisting of three thermophilic anaerobic digesters that would provide a total of two days hydraulic retention time followed by three mesophilic anaerobic digesters with a total hydraulic retention time of ten days at maximum month flow. Each thermophilic digester would be 319,000 gallons, and each mesophilic digester would be 1,692,000 gallons. A conceptual site layout is presented in Figure 1-8A.

Prior to digestion, the co-settled primary and waste activated biosolids would be thickened to 5% dry solids, from its current average 2.9% dry solids, by using three, two-meter gravity belt thickeners. The thickened biosolids would be pumped to a feed sequencing tank from which 5% thickened biosolids would be pumped to the 2PAD digestion system.

After digestion, the biosolids would be dewatered to 30% dry solids using the existing four belt filter presses and two new centrifuges. The dewatered biosolids would be reduced to 90% dry solids using a biosolids dryer. A portion of the dried biosolids could be used as fuel for the Wyandotte Municipal Services electric power plant. The remainder of the dried biosolids would be landfilled.

The anaerobic digestion process produces methane gas. In the IBES process, the methane gas produced during digestion would be used as fuel for five, 540 kW reciprocating engines to generate electricity. Approximately 2000 kW of electricity would be generated at the design biosolids flow. Additionally, the heat contained within the exhaust gas generated from the reciprocating engines would be used to pre-heat the boiler water used for heating the sludge.

Additional equipment required includes biosolids transfer pumps, digestion system heat exchangers, gas mixers, digester recirculation pumps, heating system boiler, biosolids conditioning for thickening and dewatering, digester gas flare, electrical, instrumentation and controls and SCADA. The equipment would be housed in a new building approximately 16,800 square feet located at the new site.



3 – THERMOPHILIC DIGESTERS, 40 ft. Dia. ..... (A)

3 – MESOPHILIC DIGESTERS, 80 ft. Dia. ..... (B)

1 – IBES BUILDING, 120 ft.x 70 ft. ..... (C)

HRC

IBES CONCEPTUAL SITE PLAN

JOB NO.	HUBBELL, ROTH & CLARK, INC.	SHEET NO.
20080550	CONSULTING ENGINEERS	1–8A
DATE	220 BAGLEY SUITE 420	
FEB. 2009	DETROIT, MICH. 48226	

There would be significant operating cost savings with the implementation of this alternative. These savings would be achieved through the generation of electricity from the biogas, and use of exhaust heat for preheating boiler feed water that effectively lowers the requirement for natural gas to fire the boiler. It is also planned that the dried biosolids (90% TS) would be used as an alternative fuel at the Wyandotte Municipal Services electric power plant, and that the DWTF would be paid a price for the biosolids use as fuel. One of the requirements of the Wyandotte Municipal Services power plant is that the dried biosolids must be suitable for human contact, which requires the generation of Class A biosolids.

7. Alternative 7: Integrated Biomass to Energy (IBES) with Sludge Dewatering

This alternative is similar to the IBES alternative described above although the biosolids would only be dewatered to 30% dry solids using the existing belt filter presses and centrifuges. The dewatered biosolids would then be either land applied during the summer months (April through October) and landfilled during the winter months (November through March).

The IBES process would create electricity from the methane gas produced during the anaerobic digestion of biosolids. However, the additional step of drying the biosolids for use as fuel would not be included.

8. Alternative 8: Composting

Composting is considered to be the "greenest" of the alternatives presented in this report. However, composting of biosolids is currently implemented on a very limited basis, especially for facilities comparable in size to the DWTF.

The two primary methods of composting include "in vessel" and "static pile." In vessel composting takes place in a closed container equipped with ventilation and mechanical mixing. It generally requires less labor and land area than static pile composting. However, it requires a significant investment for the containment and equipment. Static pile composting is done on open land, where the materials are mixed using large front-end loaders. It requires more land and labor than in vessel composting. Based on the volumes of material required to process, this facility would require full-time operating staff.

A review of case studies and published data for composting indicated that overall costs associated with in-vessel composting were approximately 1.9 times higher than for static pile. Therefore, our analysis focused on static pile. As detailed in the table included in the appendix, the cost for static pile composting would be approximately $92 per wet ton. This does not include the cost of the land required to perform the composting. The Facility only has about 1.3 acres in the area of the Ash Lagoon that could be converted to this use, but there is a 20-acre nominal land requirement for the process. See Figure 1-8B for a conceptual site plan.

The static pile composting land requirement of approximately 20 acres includes the land to adequately store and mix the piles, as well as to store the finished product for sale. Because there would be no demand for the finished product during the winter months, the required land area could be as much as 30 to 40 acres, based on storing approximately six months of finished product. As a side note, should the area not be adequate for storage due to atmospheric problems, or a lack of demand for the finished product, DWTF would have to resort to landfill disposal, which would be significantly more costly to dispose of than the original sludge, as the volume per dry ton is increased due to the added fillers.

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COMPOSTING CONCEPTUAL SITE PLAN

JOB NO.	HUBBELL, ROTH & CLARK, INC.	SHEET NO.
20080550	CONSULTING ENGINEERS	1–8B
DATE	220 BAGLEY SUITE 420	
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HRC

B. Cost Effectiveness of Alternatives

The capital costs; operation, maintenance and replacement (OM&R) costs; present worth; and annual equivalent costs for each of alternatives presented are included in the appendix. A summary of these costs is provided below:

Table II-1: Summary of Costs for the Eight Alternatives

	Alternative 1: Landfill Dewatered Biosolids	Alternative 2: Landfill Class B Biosolids	Alternative 3: Land Apply Class A Biosolids	Alternative 4: Land Apply Class B Biosolids
Capital Costs	$ 0	$ 18,758,643	$ 19,266,133	$ 15,189,899
Annual OM&R Costs	$ 3,083,720	$ 4,032,549	$ 4,999,097	$ 3,873,759
Present Worth of Salvage Value	$ 0	$ 1,092,000	$ 1,092,000	$ 1,092,000
Equiv. Annual Present Worth	$ 3,084,000	$ 5,391,000	$ 6,396,000	$ 4,958,000
Net Present Worth	$ 40,110,000	$ 70,127,000	$ 83,205,000	$ 64,488,000

	Alternative 5: Incineration	Alternative 6: IBES with Drying	Alternative 7: IBES with Dewatering	Alternative 8: Composting
Capital Costs	$ 133,885,538	$ 64,250,000	$ 61,610,000	$ 42,490,000
Annual OM&R Costs	$ 2,934,052	$ 2,884,195	$ 3,213,930	$ 6,494,000
Present Worth of Salvage Value	$ 1,018,000	$ 3,899,000	$ 3,629,000	$ 10,571,000
Equiv. Annual Present Worth	$ 13,483,000	$ 7,524,000	$ 7,671,000	$ 116,393,000
Net Present Worth	$ 169,823,000	$ 97,868,000	$ 99,788,000	$ 116,393,000

Notes:

Net Present Worth is the sum of capital costs and OM&R costs, less 20 year salvage value.

Present Worth Costs are based on Straight Line Depreciation and no inflation.

Cost is based on a study period of 20 years and a discount rate of 4.50%.

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C. Recommended Alternative

As shown above, the most cost-effective solution for disposing the DWTF biosolids is the continuation of landfilling operations. We recommend that this practice continue as long as the landfills are available and willing to accept un-stabilized municipal biosolids. However, because the long-term reliability of this option is unknown, we also recommend inclusion of Class B stabilized biosolids (Alternative Nos. 2 or 4, depending on future land availability and landfill options) in the SRF Project Plan.

APPENDIX

APPENDIX 1 – DETAILED COSTS FOR ALL ALTERNATIVES

ALTERNATIVE 1 - LANDFILL DEWATERED BIOSOLIDS

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Civil / Site Work	$	0	50	$	0
TOTAL CAPITAL COST	**$**	**0**		$	0
PRESENT WORTH OF SALVAGE VALUE				$	0

ANNUAL OPERATION AND MAINTENANCE COST

Landfill cake	$	2,936,123
Maintenance		147,596
Labor		0
TOTAL ANNUAL O, M & R COST	$	3,083,720

PRESENT WORTH OF O&M COST	$	40,110,000
PRESENT WORTH	**$**	**40,110,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**3,084,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8549

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

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ALTERNATIVE 2 - LANDFILL OF CLASS B STABILIZED BIOSOLIDS

PRESENT WORTH ANALYSIS

CAPITAL COST	PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)	NET PW (PW - SALVAGE VALUE[(2)])
Demolition	$ 4,390,996	50	$ 3,299,000
Building Renovations	4,148,516	20	4,149,000
Equipment & Installation	7,357,643	20	7,358,000
Process, Mechanical, Electrical	2,861,488	20	2,861,000
TOTAL CAPITAL COST	**$ 18,758,643**		$ 17,667,000
	PRESENT WORTH OF SALVAGE VALUE		$ 1,092,000

ANNUAL OPERATION AND MAINTENANCE COST

Electricty	$ 21,085
Lime/alkaline admixture	588,277
Landfill cake	3,119,631
Maintenance	187,587
Labor	115,969
TOTAL ANNUAL O, M & R COST	$ 4,032,549

PRESENT WORTH OF O&M COST	$ 52,460,000
PRESENT WORTH	**$ 70,127,000**
AVERAGE ANNUAL EQUIVALENT COST	**$ 5,391,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8549

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
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ALTERNATIVE 3 - LAND APPLICATION OF CLASS A STABILIZED BIOSOLIDS

PRESENT WORTH ANALYSIS

CAPITAL COST	PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)	NET PW (PW - SALVAGE VALUE[(2)])
Demolition	$ 4,390,996	50	$ 3,299,000
Building Renovations	4,148,516	20	4,149,000
Equipment & Installation	8,242,629	20	8,243,000
Process, Mechanical, Electrical	2,483,992	20	2,484,000
TOTAL CAPITAL COST	**$ 19,266,133**		$ 18,175,000
	PRESENT WORTH OF SALVAGE VALUE		$ 1,092,000

ANNUAL OPERATION AND MAINTENANCE COST

Electricty	$ 26,357	
Lime/alkaline admixture	1,338,911	
Land application	2,928,122	
Land application permit	223,548	
Maintenance	250,222	
Labor	231,937	
TOTAL ANNUAL O, M & R COST	$ 4,999,097	
	PRESENT WORTH OF O&M COST	$ 65,030,000

PRESENT WORTH	**$**	**83,205,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**6,396,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8549

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

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ALTERNATIVE 4 - LAND APPLICATION OF CLASS B STABILIZED BIOSOLIDS

PRESENT WORTH ANALYSIS

CAPITAL COST	PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)	NET PW (PW - SALVAGE VALUE[(2)])
Demolition	$ 4,390,996	50	$ 3,299,000
Building Renovations	4,148,516	20	4,149,000
Equipment & Installation	4,788,194	20	4,788,000
Process, Mechanical, Electrical	1,862,194	20	1,862,000
TOTAL CAPITAL COST	**$ 15,189,899**		$ 14,098,000
	PRESENT WORTH OF SALVAGE VALUE		$ 1,092,000

ANNUAL OPERATION AND MAINTENANCE COST

Electricty	$	21,085
Lime/alkaline admixture		588,277
Land application		2,743,391
Land application permit		159,465
Maintenance		187,587
Labor		173,953
TOTAL ANNUAL O, M & R COST	$	3,873,759

PRESENT WORTH OF O&M COST	$	50,390,000
PRESENT WORTH	**$**	**64,488,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**4,958,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8549

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

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ALTERNATIVE 5 - INCINERATION

PRESENT WORTH ANALYSIS

CAPITAL COST	PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)	NET PW (PW - SALVAGE VALUE[(2)])
Demolition	$ 4,390,996	50	$ 3,374,000
Building Renovations	5,002,467	20	5,002,000
Equipment & Installation	104,199,121	20	104,199,000
Process, Mechanical, Electrical	20,292,954	20	20,293,000
TOTAL CAPITAL COST	**$ 133,885,538**		$ 132,868,000
	PRESENT WORTH OF SALVAGE VALUE		$ 1,018,000

ANNUAL OPERATION AND MAINTENANCE COST

Electricty	$ 467,037
Natural gas	73,798
Fluidized bed sand	15,814
Landfill ash	353,276
Maintenance	1,338,856
Labor	579,843
Air Monitoring	105,426
TOTAL ANNUAL O, M & R COST	$ 2,934,052

	PRESENT WORTH OF O&M COST	$ 36,955,000
PRESENT WORTH		**$ 169,823,000**
AVERAGE ANNUAL EQUIVALENT COST		**$ 13,483,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8549

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

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ALTERNATIVE 6 - Integrated Biomass to Energy with Sludge Drying

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Sitework & Structural	$	15,672,000	50	$	11,773,000
Equipment & Installation		36,860,000	20		36,860,000
Process, Mechanical, Electrical		11,718,000	20		11,718,000
TOTAL CAPITAL COST	**$**	**64,250,000**		$	60,351,000
		PRESENT WORTH OF SALVAGE VALUE		$	3,899,000

ANNUAL OPERATION AND MAINTENANCE COST

Labor		390,000
Electricity		295,120
Natural Gas		1,054,000
Polymer		120,000
Maintenance Costs		1,462,400
Landfill excess dried biosolids		600,425
Electricity Savings		-1,034,100
Dried Biosolids Fuel Savings		-3,650
TOTAL ANNUAL O, M & R COST	$	2,884,195

PRESENT WORTH OF O&M COST	$	37,517,000
PRESENT WORTH	**$**	**97,868,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**7,524,000**

Notes:

(1) January 2009 ENR 20 Cities CCI = 8549

(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

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ALTERNATIVE 7 - Integrated Biomass to Energy with Sludge Dewatering

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Sitework & Structural	$	14,586,000	50	$	10,957,000
Equipment & Installation		35,850,000	20		35,850,000
Process, Mechanical, Electrical		11,174,000	20		11,174,000
TOTAL CAPITAL COST	**$**	**61,610,000**		$	57,981,000
		PRESENT WORTH OF SALVAGE VALUE		$	3,629,000

ANNUAL OPERATION AND MAINTENANCE COST

Labor		260,000
Electricity		258,230
Natural Gas		105,400
Polymer		30,000
Maintenance Costs		1,402,000
Landfill dewatered (30%) 5 months		987,000
Land apply dewatered (31%) 7 months		1,205,400
Electricty Savings		-1,034,100
TOTAL ANNUAL O, M & R COST	$	3,213,930

PRESENT WORTH OF O&M COST	$	41,807,000
PRESENT WORTH	**$**	**99,788,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**7,671,000**

Notes:

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(2) Cost is based on a study period of 20 years and a discount rate of 4.50%
Present Worth Costs are based on Straight Line Depreciation and no inflation.

ALTERNATIVE 8 - COMPOSTING, AERATED STATIC PILE

PRESENT WORTH ANALYSIS

CAPITAL COST		PRESENT WORTH[(1)]	SERVICE LIFE (YEARS)		NET PW (PW - SALVAGE VALUE[(2)])
Civil / Sitework	$	42,490,000	50	$	31,919,000
TOTAL CAPITAL COST	**$**	**42,490,000**		$	31,919,000
PRESENT WORTH OF SALVAGE VALUE				$	10,571,000

ANNUAL OPERATION AND MAINTENANCE COST

Labor	$	6,494,000
TOTAL ANNUAL O, M & R COST	$	6,494,000

PRESENT WORTH OF O&M COST	$	84,474,000
PRESENT WORTH	**$**	**116,393,000**
AVERAGE ANNUAL EQUIVALENT COST	**$**	**8,948,000**

Notes:

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Present Worth Costs are based on Straight Line Depreciation and no inflation.