Detroit Water and Sewerage Department

Wastewater Master Plan

DWSD Project No. CS-1314

Capital Improvement Program in Macomb County

Technical Memorandum
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Capital Improvement Program in Macomb County

1. Introduction

The DWSD service area is comprised of a number of sewer districts including the Macomb Sanitary District (MSD). DWSD owns and operates major sewer systems and appurtenances in Macomb County. The Macomb Sanitary District (MSD), shown in Figure 1, encompasses most of Macomb County and is operated by the Macomb County Public Works Office. The west branch of the DWSD interceptor system, known as the Oakland Arm, meets with the east branch, known as Romeo Arm, forming the Corridor Interceptor. The 12' 9" diameter interceptor extends from 15 Mile Road to the Northeast wastewater pumping station located in Detroit. The Oakland Arm runs from the intersection of 15 Mile Road and Dodge Park to Utica Road and then along Utica Road to M-59. At M-59, the Oakland Arm branches northwest and west. The northwest branch is still called the Oakland Arm. The western branch is called the Avon Arm. The Romeo Arm follows 15 Mile Road east to Garfield Road, then north along Garfield to 18 Mile Road. At the corner of 15 Mile and Garfield, a branch was provided to the east for the Interim Lakeshore Arm. The Northeast Pump Station serves Macomb County and Clinton-Oakland Sewer District in Oakland County. DWSD owns and operates the Clintondale Pump Station, which serves the Lakeshore Interceptor for MSD.

2. Current CIP Program in Macomb County

2.1 DWSD Contract PCI-45

1. This project included the construction of a 16,108 feet of 84-inch diameter sanitary sewer interceptor by tunneling 40 feet beneath the ground surface. This sewer replaced a 24" diameter force main and pump station.

2. A stop gate and access hatch were constructed at the connection between the new and existing interceptor section with a 7-foot diameter inlet and a 9-foot outlet with an invert elevation of 45 feet below surface to hold the sewage back to allow physical inspections and repairs. The gate has an overflow weir built in to prevent flooding of the basements upstream, if the stop gate were to ever become stuck in the down position. The Gate would also serve for flushing the interceptor upstream and downstream.

3. Inspection and repair of the Romeo Arm Interceptor south of 18 Mile Road was completed to rehabilitate the interceptor's damage from hydrogen sulfide. Rehabilitation consisted of water blasting the Interceptor and repairing the concrete with shotcrete, and installing a 900-foot polyurethane liner that covered the top 300 degrees or so from water line to water line at low flow. In 2001, a physical inspection of 3700 feet found bubbling in the liner, mostly along the sides just above the edge of the liner. Immediately beyond the end of the liner, approximately 350 feet of the exposed concrete pipe had received

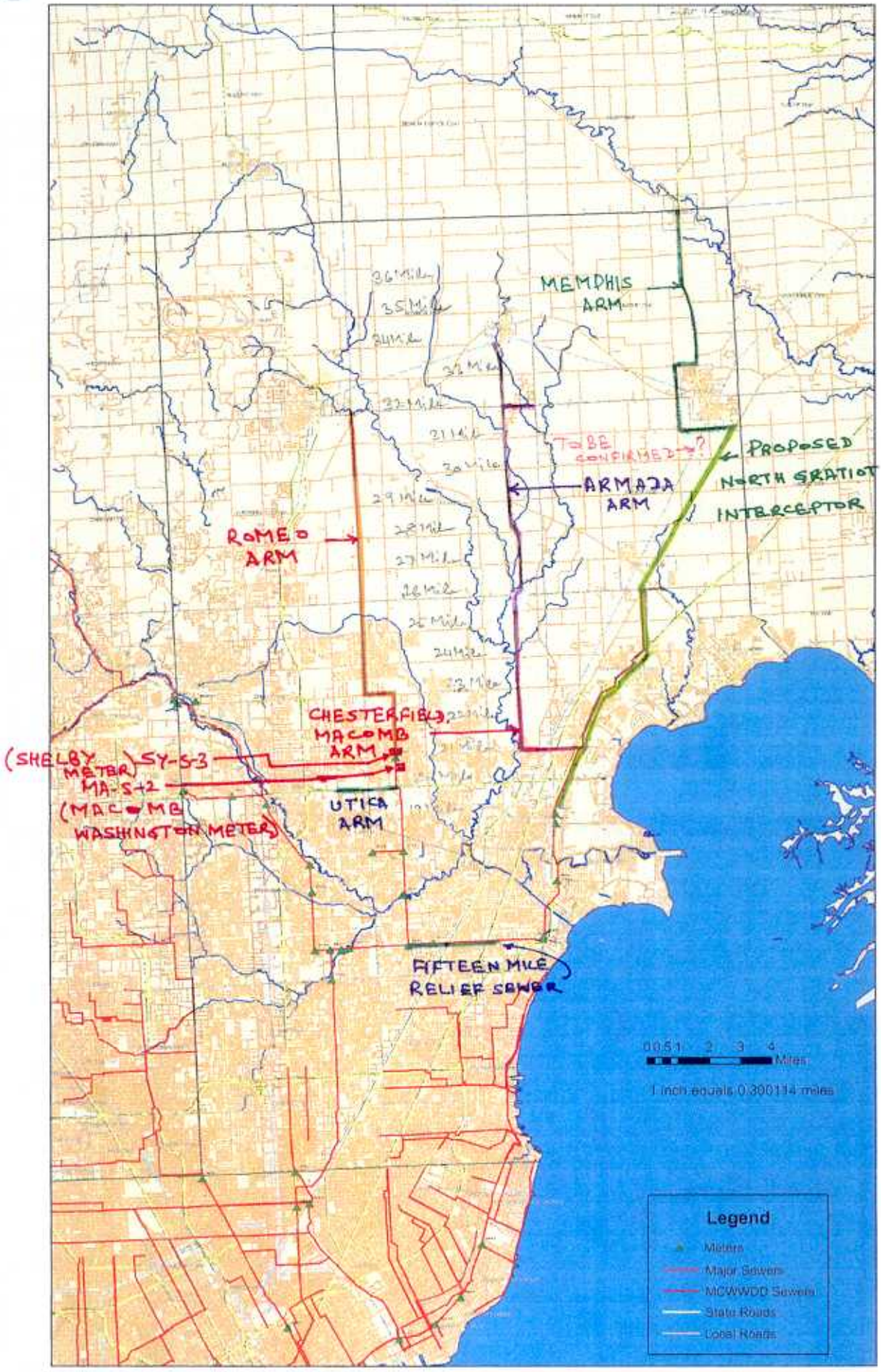
MEMPHIS ARM
TO BE CONFIRMED?
PROPOSED NORTH SRATIOT INTERCEPTOR
ARMADA ARM
ROMEO ARM
CHESTERFIELD MACOMB ARM
(SHELBY METER) SY-S-3
MA-S-2
(MACOMB WASHINGTON METER)
UTICA ARM
FIFTEEN MILE RELIEF SEWER
0 0.5 1 2 3 4 Miles
1 inch equals 0.300114 miles
Legend
Meters
Major Sewers
MCWWDD Sewers
State Roads
Local Roads

Figure 1

substantial damage, including heavy spalling and flaking that appears to be extensive enough to be of structural concern. Interestingly, the damaged section was very close in length to the worst section of damage at 18 Mile immediately south of the discharge point for the 24-inch forced main before Jay Dee Construction installed the liner in 1984. One of the lessons learned from this inspection is that liners do not solve the problems associated with hydrogen sulfide, they just move it further downstream. Thirty-seven hundred feet of the Garfield Interceptor is scheduled to be repaired from south of 18 Mile Road in the first quarter of 2003 by repairing of the liner, water blasting and repairing approximately 350 feet of damaged concrete with shotcrete, and spot patching the remaining sections of pipe as needed.

4. Construction of stop gate on 15 Mile Road west of Garfield Road. A stop gate and access hatch are under construction on the Romeo Arm Interceptor along the south side of 15 Mile Road just west of Garfield Road. The purpose of the stop gate is to hold back the sewage for short periods of time to allow physical inspections and repairs and allow flushing of the interceptor section downstream of the gate.

3. Proposed CIP Projects for Macomb County

3.1 North Gratiot Interceptor

Macomb County Office of Public Works Commissioner is preparing the design documents for the construction of a relief sewer of various sizes along Gratiot Avenue at a cost of $40 million.

4. Recommended CIP Projects for Macomb County

4.1 Northern Macomb County Wastewater Treatment Plant Feasibility Study

SDA is currently conducting a feasibility study on Northern Macomb County wastewater master planning. The preliminary results indicate the possibility of proposing a 5-MGD wastewater treatment plant for the five communities of Washington, Romeo, Ray, Bruce, and Armada. The estimated cost of design and construction would be approximately $30 million. The capacity of this treatment plant would need to increase to 6.2 MGD in the year 2030.

4.2 Stop Gates

The construction of three stop gates at the following locations is proposed to provide temporary storage upstream of the stop gate and to allow inspection and flushing of the sediments deposited downstream of the stop gate:

1. Lakeshore Interceptor, Meter MB-60 (CH-S-5)
2. Oakland Arm Interceptor, Meter MB-25 (UT-S-1)
3. Oakland Arm Interceptor, Just downstream of Meters CV-1 and CV-3 (i.e., at the boundary of Macomb County)

The total cost of construction will be approximately $5.1 M.

4.3 Preliminary Sanitary Sewer Interceptor Extension Plan Report 1997

The following interceptor sewers are recommended in the Preliminary Sanitary Sewer Interceptor Extension Plan Report 1997 (Figure 1):

1. Memphis Arm
2. Armada Arm
3. Chesterfield Macomb Arm
4. Romeo Arm from 21 Mile Road to 32 Mile Road
5. Utica Arm
6. 15 Mile Road Relief Interceptor

4.4 Inspection and Cleaning

Regular inspection and cleaning are important to maintain the transport capacity of the interceptor sewers. New development in Macomb County would require additional transport capacity in the interceptor system in future; however, with the passage of time, the sediment deposits and build-up of sludge in the interceptors would reduce the carrying capacity of interceptors and produce more hydrogen sulfide. Therefore, it is recommended that a regular program of inspection and cleaning should be undertaken to maintain the carrying capacity of the interceptors and remove the sludge that is a potential source of hydrogen sulfide.

Based upon our discussion with personnel involved in the operation and maintenance of wastewater collection systems in DWSD and consulting engineering, the interceptors should be inspected after each 5-year period and cleaned after each 10-year period. The guidelines prepared by Water Environment Federation (Source: Wastewater Collection Systems Management, Fifth Edition, Manual of Practice No. 7, 1999) are presented in Table 1.

Table 1 Example of Long Term Inspection Benchmarking

Item	Checks	Frequency
Manholes	Subject to flow conditions and lateral shift conditions	3-5 years
Sewer Lines	Sound pipe, good flow characteristics	5-8 years
	Pipe with minor defects, good flow characteristics	3-5 years
	Pipe with minor defects, poor flow characteristics	1-3 years
	Pipe with significant defects, poor flow characteristics	Annually

4.5 Rehabilitation

The rehabilitation requirements of the interceptor sewers depends upon many factors including the following:

1. Method of construction (i.e., open cut, pipe jacking, and tunneling) can be important in establishing the rehabilitation requirements of an interceptor system. The construction of joints and water tightness (i.e., sources of infiltration) can vary greatly with different methods of construction.

2. Progressive infiltration can be a major source of sewer failures requiring rehabilitation.

3. Unstable geotechnical/ soil conditions could lead to unequal settlement of sewers resulting in sewer failures.

4. Changes in hydrogeological regimes and groundwater recharge and discharge conditions or groundwater fluctuations can lead to changes in uplift pressures resulting in sewer failures. New construction can also cause changes in hydrogeological regimes and dewatering requirements.

5. Hydrogen sulfide damage.

6. If the conflicts of different utilities are not identified properly during construction, the existing interceptor sewer structures can be damaged to the extent that rehabilitation is required.

Based on our understanding of the Macomb County Interceptor System, it is assumed that 10% of the interceptor sewers would require rehabilitation either by shotcrete or slip lining over the next fifty years. DWSD is expected to install odor control units in Macomb County that might reduce the rehabilitation requirements of the interceptor system. The North Gratiot Interceptor is expected to be constructed by 2005. Since this would be a new interceptor, it is not expected that the interceptor would require major rehabilitation over the next fifty years, however, it is estimated that 2.5% of the total length would be rehabilitated due to one or more of the reasons described above.

5. DWSD Meters in Macomb County

DWSD has informed that all the Meter Chambers have been renovated last year (2001-2002) with the latest technology available in regards to structural, mechanical, electrical and instrumentation requirements. Therefore, it is expected that no improvement would be required in the next forty to fifty years; however, the fast changing technology may necessitate an upgrading of the DWSD meters.

Macomb County Master List
and
Recommendations Summary

CS-1314 Wastewater Master Plan - Macomb County Master List and Recommendations Summary

Facility Name	Type	Owned by	Inspection, and Condition Survey Conducted By	Date and Contract No.	Description of Inspection Findings	Source of Info	Recommendations	Notes on	
								Schedule	Cost (2003)
2'-0" Lakeshore Interceptor along the 26 Mile Road.	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-42-A. Installed in 1989. Age is 13 yrs.	Unable to obtain inspection reports	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Relief Sewer - North Gratiot Avenue Interceptor	2003-2006	$40,000,000
3'-6" Lakeshore Interceptor. H.B. Joy Road and I-94 to 21Mile Road and I-94.	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-42-A. Installed in 1987. Age is 15 yrs.	Unable to obtain inspection reports	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Relief Sewer - North Gratiot Avenue Interceptor	2003-2006	Included in above cost
11'-0" Lakeshore Interceptor	Interceptor	DWSD	DWSD Field Engineering (Entering Personnel: G. Pegross, G. Edwards, M. Smith) 12/12/93	Contract No. PCI-14. Installed in June 1972. Age is 30 yrs.	Unable to obtain inspection reports	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Relief Sewer - North Gratiot Avenue Interceptor	2003-2006	Included in above cost
11'-0" Lakeshore Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-13. Installed in March 1972. Age is 30 yrs.	Unable to obtain inspection reports	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Relief Sewer - North Gratiot Avenue Interceptor	2003-2006	Included in above cost

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								Schedule	**Cost (2003)**
8'-0" Oakland Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-10A and 10-B. Installed in September 1970. Age is 32 yrs.	Not inspected due to high flow in sewer.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Install stop gate at Meter CV-3 to hold the sewage back to allow for physical inspection. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for stop gate installation 2) Year 2003 for inspection 3) Year 2020 for rehab	1) $2,975,000 for stop gate 2) $178,100 for inspection 3) $2,983,800 for rehab
8'-9" Oakland Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-9. Installed in December 1969. Age is 33 yrs.	Not inspected due to high flow in sewer.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Conduct Physical Sewer System Inspection every 20 years once stop gate in installed upstream. 2) Repair sewer with shot crete	1) Year 2003 for inspection 2) Year 2019 for rehab	1) $146,200 for inspection 2) $2,678,700 for rehab
9'-6" Oakland Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-8. Installed in March 1969. Age is 33 yrs.	Not inspected due to high flow in sewer.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Conduct Physical Sewer System Inspection every 20 years once stop gate in installed upstream. 2) Repair sewer with shot crete	1) Year 2003 for inspection 2) Year 2019 for rehab	1) $143,600 for inspection 2) $2,856,500 for rehab

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								Schedule	**Cost (2003)**
3'-6" Avon Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-11A. Installed in 1974. Age is 28 yrs.	Unable to obtain inspection reports	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Conduct Sewer System Inspection every 20 Years by Televising Sewer 2) Install Cured-In-Place Pipe Liner	1) Year 2003 for inspection 2) Year 2024 for lining rehab	1) $11,500 for inspection 2) $161,500 for rehab
2'-0" Garfield/Romeo Arm Interceptor	Forcemain	DWSD	DWSD Field Engineering	Contract No. PCI-26. Installed in ?. Age is ? yrs.	N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	Forcemain was decommissioned on 11/26/02.	N/A
7'-0" Garfield/Romeo Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-45. Installed in December 2002. Age is 0 yrs.	Interceptor was fully commissioned on 11/26/02	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Conduct Physical Sewer System Inspection every 20 years. 2) Repair sewer with shot crete	Shelby Township flow was diverted on October 1, 2002. Macomb and Washington flows are scheduled to be diverted in December 2002.	1) $131,100 for inspection 2) $1,921,100 for rehab

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								Schedule	**Cost (2003)**
9'-0" Garfield/Romeo Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering (Entering Personnel: M. Abdullah, D.Davis, C. Mitchell, K. Robinson) 9/17/00, 10/1/00, 4/29/01, 9/16/01, 9/23/01, 9/30/01 & 10/7/01. SDA (2001)	Contract No. PCI-24. Installed in March 1974. Age is 28 yrs.	1.) 1,555 feet of sludge deposition (6" to 14" buildup); 2.) 896 feet of sludge deposition (8" to 10" buildup); 3.) 1,574 feet of spalling. Cement is peeling and scaling off the walls. Bubbling of the liner has occurred. Some video inspection was taken and still pictures at 50' intervals.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Clean existing sludge deposition. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for cleaning 2) Year 2003 for inspection 3) Year 2024 for rehab	1) $201,000 for cleaning 2) $58,800 for inspection 3) $1,109,200 for rehab
11'-0" Garfield/Romeo Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering (Entering Personnel: M. Abdullah, D.Davis, C. Mitchell, K. Robinson) 10/15/00, 10/22/00, 10/29/00, 11/19/00 & 2/24/01	Contract No. PCI-12A. Installed in December 1970. Age is 32 yrs.	1.) 3,875 feet of sludge deposition (8" to 10" buildup); 2.) 3,193 feet sludge deposition (10" to 18" buildup); 3.) 1,967 feet of sludge deposition (26" buildup); 4.) 1,637 feet of spalling. Scaling extends from arch of sewer to the spring line in the inspected area showing excessive peeling of inner lining/layer of sewer wall. Standing water throughout the pipe.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Clean existing sludge deposition. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for cleaning 2) Year 2003 for inspection 3) Year 2020 for rehab	1) $623,100 for cleaning 2) $182,400 for inspection 3) $4,201,900 for rehab
5'-0" Fifteen Mile Road Interceptor	Forcemain from Clintondale Pump Station to Ellen St. and Gravity from Ellen St. to Garfield Road.	DWSD	DWSD Field Engineering (Entering Personnel: M. Abdullah, D.Davis) 3/25/01	Contract No. PCI-15B and 15C. Installed in March 1972. Age is 30 yrs.	Started at Little Mack going west bound. The sewer is in good shape some small pitted spots along the walls of the sewer at the start. 6 to 8 inches of water all the way through the sewer. Heavy deposits of sludge throughout pipe.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Conduct Physical Sewer System Inspection every 20 years. 2) Repair sewer with shot crete	1) Year 2003 for inspection 2) Year 2022 for rehab	1) $58,500 for inspection 2) $681,900 for rehab

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								Schedule	Cost (2003)
8'-0" Repair to Romeo Arm Interceptor in Fifteen Mile Road	11'-0" Fifteen Mile Road Interceptor was repaired resulting in a 8'-0" diameter sewer between Garfield Road & Edison Corridor Interceptor.	DWSD	DWSD Field Engineering	Contract No. PCI-37. Installed in 1984. Age is 18 yrs.	Unable to obtain inspection reports	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Conduct Physical Sewer System Inspection every 20 years. (Will be included in the inspection of the 11'-0" Garfield/ Romeo Arm Interceptor)	Every 20 Years	N/A
12'-9" Edison Corridor Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-5, PCI-6, and PCI-7. Installed in December 1969. Age is 33 yrs.	Potential Sludge Deposition. On-going problem with hydrogen sulfide. Provide odor control.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	1) Clean existing sludge deposition. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for cleaning 2) Year 2003 for inspection 3) Year 2019 for rehab	1) $1,148,400 for cleaning 2) $336,100 for inspection 3) $8,975,800 for rehab
9'-0" Repair to Edison Corridor Interceptor from Red Run Drain to Fifteen Mile Road.	Interceptor	DWSD	DWSD Field Engineering	Contract No. CS-858. Installed in 1981. Age is 21 yrs.	Unable to obtain inspection reports	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Conduct Sewer System Inspection every 20 years. (Will be included in the inspection of the 12'-9" Edison Corridor Interceptor)	Every 20 Years	N/A
Garfield Pump Station (21 Mile and Garfield Roads)	20.0 cfs Pump Station	DWSD	Existing	Contract No. PCI-26. Installed in 1974 as a temporary pump station. Age is 28 yrs.	Unknown	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Decommissioned in November 2002. Scheduled to be adandoned.	N/A	N/A

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								Schedule	Cost (2003)
Clintondale Pump Station (3475 Union Lake Road, Mt. Clemens)	80.0 cfs (firm capacity) Pump Station. Three pumps @ 40 cfs/pump. There is a provision to install one additional pump.	DWSD	Existing	Contract No.PCI 218. Installed in 1973 as a temporary pump station. Age is 29 yrs.	Unknown	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Installation of odor control equipment recommended.	2003	$250,000
Northeast Sewage Pump Station (11000 E. Eight Mile, Detroit) 8 Mile Road and Mt. Elliot.	259.0 cfs Pump Station	DWSD	Existing	Contract No. PCI-216. Installed in 1968 ?. Age is ? yrs.	Unknown	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	Decommissioned in November 2002. Scheduled to be adandoned.	N/A	N/A
4'-6" North Gratiot Interceptor from Joy Road & I-94 to 21 Mile Road and I-94. (Phase 1)	Interceptor	MCOPW	Proposed		New construction. Proposed 54" gravity.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County SSIE Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map. 5. MCOPW North Gratiot Interceptor sewer	N/A	Design Phase continuing - November 2002	Estimated Cost: $18,500,000
2'-6" North Gratiot Interceptor from 21 Mile Road and I-94 along the route of Lakeshore Interceptor to Gratiot Avenue. (Phase 2 & 3.)	Forcemain	MCOPW	Proposed		New construction. Proposed 30" force main & 36" gravity.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County SSIE Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map. 5. MCOPW North Gratiot Interceptor sewer	N/A	Design Phase continuing - November 2002	Estimated Cost: $10,550,000

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								Schedule	Cost (2003)
2'-6" to 3'-0" North Gratiot Interceptor from Gratior Avenue at 25 1/2 Mile to 26 1/2 Mile along Gratiot Avenue. (Phase 4 & 5.)	Interceptor	MCOPW	Proposed		New construction. Proposed 30" gravity.	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County SSIE Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map. 5. MCOPW North Gratiot Interceptor sewer	N/A	Design Phase continuing - November 2002	Estimated Cost: $2,250,000.00
Various sizes North Gratiot Interceptor from Gratior Avenue at 26 1/2 Mile Road to 31 Mile Road along Gratiot upto Lenox Township limit. (Phase 6A & 6B.)	Interceptor	MCOPW	Proposed		New construction. Proposed various sizes (gravity).	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County SSIE Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map. 5. MCOPW North Gratiot Interceptor sewer	N/A	Design Phase continuing - November 2002	Estimated Cost: $8,550,000
21" Utica Arm Interceptor from M-59 / Garfield to M-59 / Schoenherr.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $14,300,000
6'-6" Chesterfield / Macomb Arm Interceptor from H.B. Joy Road / I-94 to 23 Mile Road and North Avenue.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $44,300,000

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								Schedule	**Cost (2003)**
2'-3" Chesterfield / Macomb Arm Interceptor from 23 Mile Road and North Avenue to Chesterfield / Macomb limits..	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Included in 6'6" Chesterfield/Macomb Arm.
5'-6" Romeo Arm Interceptor from 21 Mile and Garfield Roads to 23 Mile and Hayes Roads.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $16,300,000
5'-0" Romeo Arm Interceptor from 23 Mile and Hayes Roads to 26 Mile and Hayes Roads.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $14,800,000
3'-0" Romeo Arm Interceptor from 26 Mile and Hayes Roads to 29 Mile and Hayes Roads.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $16,400,000* *includes 29 Mile and Hayes Roads to 32 Mile and Hayes Roads.
2'-6" Romeo Arm Interceptor from 29 Mile and Hayes Roads to 32 Mile and Hayes Roads.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	See 3'0" Romeo Arm Interceptor

CS-1314 Wastewater Master Plan - Macomb County Master List and Recommendations Summary									
Facility Name	**Type**	**Owned by**	**Inspection, and Condition Survey Conducted By**	**Date and Contract No.**	**Description of Inspection Findings**	**Source of Info**	**Recommendations**	**Notes on**	
								Schedule	**Cost (2003)**
5'-6" Armada Arm Interceptor from 23 Mile Road and North Avenue to 26 Mile Road and North Avenue.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $25,600,000
4'-6" Armada Arm Interceptor from 26 Mile Road and North Avenue to 29 Mile Road and North Avenue.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $26,700,000*
4'-0" Armada Arm Interceptor from 29 Mile Road and North Avenue to 32 Mile Road and North Avenue.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	*Included in 4'6" Armada Arm
3'-6" Armada Arm Interceptor from 32 Mile Road and North Avenue to Armada Village and North Avenue.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	*Included in 4'6" Armada Arm
3'-0" Armada Arm Interceptor from 323 Mile Road and North Avenue to East Branch of Coon Creek.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	*Included in 4'6" Armada Arm

CS-1314 Wastewater Master Plan - Macomb County Master List and Recommendations Summary									
Facility Name	**Type**	**Owned by**	**Inspection, and Condition Survey Conducted By**	**Date and Contract No.**	**Description of Inspection Findings**	**Source of Info**	**Recommendations**	**Notes on**	
								Schedule	**Cost (2003)**
2'-3" Armada Arm Interceptor from East Branch of Coon Creek and 32 Mile / Omo Road.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	*Included in 4'6" Armada Arm
3'-0" Memphis Arm Interceptor from 31 Mile / Lowe Plank to 32 Mile / Lowe Plank.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $17,800,000
2'-0" Memphis Arm Interceptor from 32 Mile / Lowe Plank to Memphis City limits.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	*Included in 3'0" Memphis Arm
6'-0" 15 Mile Road Relief Interceptor from Garfield Road to Maynard Street.	Interceptor	MCOPW	Proposed		N/A	1. DWSD - Basic Requirements Report for Oakland-Macomb Interceptor System, 1968. 2. MCPWC - Macomb County Sanitary Sewer Interceptor Extension Plan, 1997. 3. Personal communitions. 4. DWSD Interceptors Map.	N/A	TBD	Estimated Cost: $20,800,000
Meter Chamber, MB-60 CH-S-5	DWSD Meter Chamber	DWSD	Existing	PCI-42A		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-12 HR-S-1	DWSD Meter Chamber	DWSD	Existing	PC-262B		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			

CS-1314 Wastewater Master Plan - Macomb County Master List and Recommendations Summary									
Facility Name	Type	Owned by	Inspection, and Condition Survey Conducted By	Date and Contract No.	Description of Inspection Findings	Source of Info	Recommendations	Notes on	
								Schedule	Cost (2003)
Meter Chamber, MB-11 HR-S-2	DWSD Meter Chamber	DWSD	Existing	PC-262B		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-10 HR-S-3	DWSD Meter Chamber	DWSD	Existing	PC-262A		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-6 CT-S-2	DWSD Meter Chamber	DWSD	Existing	PC-262A		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-32 CT-S-4	DWSD Meter Chamber	DWSD	Existing	PC-291		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-9 FR-S-1	DWSD Meter Chamber	DWSD	Existing	PC-261		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-4 CT-S-1	DWSD Meter Chamber	DWSD	Existing	PC-261		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-5 CT-S-3	DWSD Meter Chamber	DWSD	Existing	PC-289		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-24 ST-S-6	DWSD Meter Chamber	DWSD	Existing	PC-289		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-63 MA-S-1 (?)	DWSD Meter Chamber	DWSD	Existing	In Garfield Pump Station		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
SY-S-3	DWSD Meter Chamber	DWSD	Existing	PCI-45		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
MA-S-2	DWSD Meter Chamber	DWSD	Existing	PCI-45		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-21 ST-S-5	DWSD Meter Chamber	DWSD	Existing	PC-262A		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-26 ST-S-4	DWSD Meter Chamber	DWSD	Existing	PC-262B		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			

CS-1314 Wastewater Master Plan - Macomb County Master List and Recommendations Summary									
Facility Name	Type	Owned by	Inspection, and Condition Survey Conducted By	Date and Contract No.	Description of Inspection Findings	Source of Info	Recommendations	Notes on	
								Schedule	Cost (2003)
Meter Chamber, MB-20 ST-S-2	DWSD Meter Chamber	DWSD	Existing	PC-239A		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-22 ST-S-3	DWSD Meter Chamber	DWSD	Existing	PC-239A		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-23 ST-S-1	DWSD Meter Chamber	DWSD	Existing	PC-239A		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-25 UT-S-1	DWSD Meter Chamber	DWSD	Existing	PC-239B		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-16 SY-S-1	DWSD Meter Chamber	DWSD	Existing	PC-279		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			
Meter Chamber, MB-17 SY-S-2	DWSD Meter Chamber	DWSD	Existing	C-435		1. Personal communitions. 2. DWSD Interceptors Map. 3. CDM GIS Maps			

Macomb County Sanitary Sewer Inspection, Condition Survey and Recommendations Summary

CS-1314 Wastewater Master Plan - Macomb County Sanitary Sewer Inspection, Condition Survey, and Recommendations Summary											
Facility Name	**Type**	**Owned by**	**Inspection, and Condition Survey Conducted By**	**Contract No. and Date**	**Age (as of 2002)**	**Description of Inspection Findings**	**Source of Info**	**Recent Work Completed**	**Recommendations**	**Notes on**	
										Schedule	**Cost (2003)**
2'-0" Lakeshore Interceptor. H.B. Joy Road and I-94 to 21Mile Road and I-94.	Interceptor	Macomb County Public Works	DWSD Field Engineering	Contract No. PCI-42A. Installed Nov. 1989	13 Years	Unable to obtain inspection reports	WWMP Task B - Interceptor Profile	Lined 183 feet of sewer. Installed Feb. 1998	1) Conduct Sewer System Inspection every 20 Years by Televising Sewer 2) Install Cured-In-Place Pipe Liner	1) Year 2009 for inspection 2) Year 2039 for lining rehab	1) $500 for inspection 2) $4,600 for rehab
3'-6" Lakeshore Interceptor. H.B. Joy Road and I-94 to 21Mile Road and I-94.	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-42-A. Installed in 1987.	15 Years	Unable to obtain inspection reports	WWMP Task B - Interceptor Profile	Lined 367 feet of sewer. Installed Feb. 1998	1) Conduct Sewer System Inspection every 20 Years by Televising Sewer 2) Install Cured-In-Place Pipe Liner	1) Year 2007 for inspection 2) Year 2037 for lining rehab	1) $40,400 for inspection 2) $568,500 for rehab
11'-0" Lakeshore Interceptor	Interceptor	DWSD	DWSD Field Engineering (Entering Personnel: G. Pegross, G. Edwards, M. Smith) 12/12/93	Contract No. PCI-14. Installed in June 1972.	30 Years	12"-18" of sludge throughout pipe. 8"-12" of flow throughout pipe. Sewer is in good condition, structurally no cracking or signs of failure.	WWMP Task B - Interceptor Profile & DWSD Sewer System Inspection Report	N/A	1) Clean existing sludge deposition. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for cleaning 2) Year 2003 for inspection 3) Year 2022 for rehab	1) $319,100 for cleaning 2) $93,400 for inspection 3) $2,150,800 for rehab

CS-1314 Wastewater Master Plan - Macomb County Sanitary Sewer Inspection, Condition Survey, and Recommendations Summary											
Facility Name	Type	Owned by	Inspection, and Condition Survey Conducted By	Contract No. and Date	Age (as of 2002)	Description of Inspection Findings	Source of Info	Recent Work Completed	Recommendations	Notes on	
										Schedule	Cost (2003)
11'-0" Lakeshore Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-13. Installed in March 1972.	30 Years	Not inspected due to high flow in sewer.	WWMP Task B - Interceptor Profile	N/A	1) Install stop gate at Meter MB-60 to hold the sewage back to allow for physical inspection. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for stop gate installation 2) Year 2003 for inspection 3) Year 2022 for rehab	1) $2,975,000 for stop gate 2) $94,400 for inspection 3) $2,175,200 for rehab
8'-0" Oakland Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-10A and 10-B. Installed in September 1970.	32 Years	Not inspected due to high flow in sewer.	WWMP Task B - Interceptor Profile	N/A	1) Install stop gate at Meter CV-3 to hold the sewage back to allow for physical inspection. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for stop gate installation 2) Year 2003 for inspection 3) Year 2020 for rehab	1) $2,975,000 for stop gate 2) $178,100 for inspection 3) $2,983,800 for rehab
8'-9" Oakland Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-9. Installed in December 1969.	33 Years	Not inspected due to high flow in sewer.	WWMP Task B - Interceptor Profile	N/A	1) Conduct Physical Sewer System Inspection every 20 years once stop gate in installed upstream. 2) Repair sewer with shot crete	1) Year 2003 for inspection 2) Year 2019 for rehab	1) $146,200 for inspection 2) $2,678,700 for rehab

CS-1314 Wastewater Master Plan - Macomb County Sanitary Sewer Inspection, Condition Survey, and Recommendations Summary											
Facility Name	Type	Owned by	Inspection, and Condition Survey Conducted By	Contract No. and Date	Age (as of 2002)	Description of Inspection Findings	Source of Info	Recent Work Completed	Recommendations	Notes on	
										Schedule	Cost (2003)
9'-6" Oakland Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-8. Installed in March 1969.	33 Years	Not inspected due to high flow in sewer.	WWMP Task B - Interceptor Profile	N/A	1) Conduct Physical Sewer System Inspection every 20 years once stop gate in installed upstream. 2) Repair sewer with shot crete	1) Year 2003 for inspection 2) Year 2019 for rehab	1) $143,600 for inspection 2) $2,856,500 for rehab
3'-0" Avon Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-11A. Installed in 1979. Contract No. PCI-11B. Installed in 1974	23 Years 28 Years	Unable to obtain inspection reports	WWMP Task B - Interceptor Profile	N/A	1) Conduct Sewer System Inspection every 20 Years by Televising Sewer 2) Install Cured-In-Place Pipe Liner	1) Year 2003 for inspection 2) Year 2024 & 2029 for lining rehab	1) $23,900 for inspection 2) $288,500 for rehab
3'-6" Avon Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-11A. Installed in 1974. Contract No. PCI-11B. Installed in 1974	28 Years	Unable to obtain inspection reports	WWMP Task B - Interceptor Profile	N/A	1) Conduct Sewer System Inspection every 20 Years by Televising Sewer 2) Install Cured-In-Place Pipe Liner	1) Year 2003 for inspection 2) Year 2024 for lining rehab	1) $11,500 for inspection 2) $161,500 for rehab

CS-1314 Wastewater Master Plan - Macomb County Sanitary Sewer Inspection, Condition Survey, and Recommendations Summary											
Facility Name	Type	Owned by	Inspection, and Condition Survey Conducted By	Contract No. and Date	Age (as of 2002)	Description of Inspection Findings	Source of Info	Recent Work Completed	Recommendations	Notes on	
										Schedule	Cost (2003)
4'-0" Avon Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-11A. Installed in 1979. Contract No. PCI-11B. Installed in 1974	23 Years 28 Years	Unable to obtain inspection reports	WWMP Task B - Interceptor Profile	N/A	1) Conduct Sewer System Inspection every 20 Years by Televising Sewer 2) Install Cured-In-Place Pipe Liner	1) Year 2003 for inspection 2) Year 2024 & 2029 for lining rehab	1) $8,900 for inspection 2) $143,200 for rehab
2'-0" Garfield/Romeo Arm Interceptor	Forcemain	DWSD	DWSD Field Engineering	Contract No. PCI-26. Installed in ?.	? Years	N/A	WWMP Task B - Interceptor Profile	Forcemain was decommissioned on 11/26/02.	N/A	N/A	N/A
7'-0" Garfield/Romeo Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-45. Installed in November 2002.	0 Years	N/A	WWMP Task B - Interceptor Profile	Interceptor was fully commissioned on 11/26/02	1) Conduct Physical Sewer System Inspection every 20 years. 2) Repair sewer with shot crete	1) Year 2022 for inspection 2) Year 2052 for rehab	1) $131,100 for inspection 2) $1,921,100 for rehab

CS-1314 Wastewater Master Plan - Macomb County Sanitary Sewer Inspection, Condition Survey, and Recommendations Summary											
Facility Name	**Type**	**Owned by**	**Inspection, and Condition Survey Conducted By**	**Contract No. and Date**	**Age (as of 2002)**	**Description of Inspection Findings**	**Source of Info**	**Recent Work Completed**	**Recommendations**	**Notes on**	
										Schedule	**Cost (2003)**
9'-0" Garfield/Romeo Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering (Entering Personnel: M. Abdullah, D.Davis, C. Mitchell, K. Robinson) 9/17/00, 10/1/00, 4/29/01, 9/16/01, 9/23/01, 9/30/01 & 10/7/01. SDA (2001)	Contract No. PCI-24. Installed in March 1974.	28 Years	1.) 1,555 feet of sludge deposition (6" to 14" buildup); 2.) 896 feet of sludge deposition (8" to 10" buildup); 3.) 1,574 feet of spalling. Cement is peeling and scaling off the walls. Bubbling of the liner has occurred. Some video inspection was taken and still pictures at 50' intervals.	WWMP Task B - Interceptor Profile & DWSD Sewer System Inspection Report	Lined 1,000 feet of sewer (CS-928). Completed in 1985.	1) Clean existing sludge deposition. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for cleaning 2) Year 2003 for inspection 3) Year 2024 for rehab	1) $201,000 for cleaning 2) $58,800 for inspection 3) $1,109,200 for rehab
11'-0" Garfield/Romeo Arm Interceptor	Interceptor	DWSD	DWSD Field Engineering (Entering Personnel: M. Abdullah, D.Davis, C. Mitchell, K. Robinson) 10/15/00, 10/22/00, 10/29/00, 11/19/00 & 2/24/01	Contract No. PCI-12A. Installed in December 1970.	32 Years	1.) 3,875 feet of sludge deposition (8" to 10" buildup); 2.) 3,193 feet sludge deposition (10" to 18" buildup); 3.) 1,967 feet of sludge deposition (26" buildup); 4.) 1,637 feet of spalling. Scaling extends from arch of sewer to the spring line in the inspected area showing excessive peeling of inner lining/layer of sewer wall. Standing water throughout the pipe.	WWMP Task B - Interceptor Profile & DWSD Sewer System Inspection Report	N/A	1) Clean existing sludge deposition. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for cleaning 2) Year 2003 for inspection 3) Year 2020 for rehab	1) $623,100 for cleaning 2) $182,400 for inspection 3) $4,201,900 for rehab
5'-0" Fifteen Mile Road Interceptor	Forcemain from Clintondale Pump Station to Ellen St. and Gravity from Ellen St. to Garfield Road.	DWSD	DWSD Field Engineering (Entering Personnel: M. Abdullah, D.Davis) 3/25/01	Contract No. PCI-15B and 15C. Installed in March 1972.	30 Years	Started at Little Mack going west bound. The sewer is in good shape some small pitted spots along the walls of the sewer at the start. 6 to 8 inches of water all the way through the sewer. Heavy deposits of sludge throughout pipe.	WWMP Task B - Interceptor Profile & DWSD Sewer System Inspection Report. Meeting with Shirleen Ryan on 12/9/02.	1.) 48 feet of Coal Tar Epoxy Protective Lining 45 mils; 2.) 5,550 feet of Coal Tar Epoxy Protective Lining 45 mils.	1) Conduct Physical Sewer System Inspection every 20 years. 2) Repair sewer with shot crete	1) Year 2003 for inspection 2) Year 2022 for rehab	1) $58,500 for inspection 2) $681,900 for rehab

CS-1314 Wastewater Master Plan - Macomb County Sanitary Sewer Inspection, Condition Survey, and Recommendations Summary											
Facility Name	Type	Owned by	Inspection, and Condition Survey Conducted By	Contract No. and Date	Age (as of 2002)	Description of Inspection Findings	Source of Info	Recent Work Completed	Recommendations	Notes on	
										Schedule	Cost (2003)
5'-0" Fifteen Mile Road Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-12A. Installed in 1973.	29 Years	Unable to obtain inspection reports	WWMP Task B - Interceptor Profile	N/A	1) Conduct Physical Sewer System Inspection every 20 years. 2) Repair sewer with shot crete	1) Year 2003 for inspection 2) Year 2023 for rehab	1) $122,900 for inspection 2) $1,287,000 for rehab
8'-0" Repair to Romeo Arm (Fifteen Mile Road) Interceptor	11'-0" Fifteen Mile Road Interceptor was repaired resulting in a 8'-0" diameter sewer between Garfield Road & Edison Corridor Interceptor.	DWSD	DWSD Field Engineering	Contract No. PCI-37. Installed in 1984.	18 Years	Unable to obtain inspection reports	WWMP Task B - Interceptor Profile	65 feet of Coal Tar Epoxy Protective Lining 45 mils	Conduct Physical Sewer System Inspection every 20 years. (Will be included in the inspection of the 11'-0" Garfield/ Romeo Arm Interceptor)	Every 20 Years	N/A
12'-9" Edison Corridor Interceptor	Interceptor	DWSD	DWSD Field Engineering	Contract No. PCI-5, PCI-6, and PCI-7. Installed in December 1969.	33 Years	Potential Sludge Deposition. On-going problem with hydrogen sulfide. Provide odor control.	WWMP Task B - Interceptor Profile. Meeting with Shirleen Ryan on 12/9/02.	11,170 feet of High Pressure Grout Injection behind tunnel lining. Completed 10/84 - 11/86.	1) Clean existing sludge deposition. 2) Conduct Physical Sewer System Inspection every 20 years. 3) Repair sewer with shot crete	1) Year 2003 for cleaning 2) Year 2003 for inspection 3) Year 2019 for rehab	1) $1,148,400 for cleaning 2) $336,100 for inspection 3) $8,975,800 for rehab

CS-1314 Wastewater Master Plan - Macomb County Sanitary Sewer Inspection, Condition Survey, and Recommendations Summary											
Facility Name	**Type**	**Owned by**	**Inspection, and Condition Survey Conducted By**	**Contract No. and Date**	**Age (as of 2002)**	**Description of Inspection Findings**	**Source of Info**	**Recent Work Completed**	**Recommendations**	**Notes on**	
										Schedule	**Cost (2003)**
9'-0" Repair to Edison Corridor Interceptor from Red Run Drain to Fifteen Mile Road.	Interceptor	DWSD	DWSD Field Engineering	Contract No. CS-858. Installed in 1981.	21 Years	Unable to obtain inspection reports	WWMP Task B - Interceptor Profile	Lined 2,500 feet of sewer	Conduct Sewer System Inspection every 20 years. (Will be included in the inspection of the 12'-9" Edison Corridor Interceptor)	Every 20 Years	N/A

CS-1314 Wastewater Master Plan - Macomb County Sanitary Sewer Inspection, Condition Survey, and Recommendations Summary											
Facility Name	Type	Owned by	Inspection, and Condition Survey Conducted By	Contract No. and Date	Age (as of 2002)	Description of Inspection Findings	Source of Info	Recent Work Completed	Recommendations	Notes on	
										Schedule	Cost
Garfield Pump Station (21 Mile and Garfield Roads)	20.0 cfs Pump Station	DWSD	DWSD Field Engineering	Contract No. PCI-26. Installed in 1974 as a temporary pump station.	28 Years	Unknown	PCI-45	Decommissioned in November, 2002. Scheduled to be abandoned	Decommissioned in November, 2002. Scheduled to be abandoned	N/A	N/A
Clintondale Pump Station (3475 Union Lake Road, Mt. Clemens)	80.0 cfs (firm capacity) Pump Station. Three pumps @ 40 cfs/pump. There is a provision to install one additional pump.	DWSD	DWSD Field Engineering	Contract No. PC-218. Installed in 1973 as a temporary pump station.	29 Years	Unknown	Odor control report	Odor problem investigation.	Installation of odor control equipment recommended.	2003	$250,000
Northeast Sewage Pump Station (11000 E. Eight Mile, Detroit) 8 Mile Road and Mt. Elliot.	259.0 cfs Pump Station	DWSD	DWSD Field Engineering	Contract No. PCI-216. Installed in 1968 (?).	? Years	Unknown	DWSD inspection report	Decommissioned in November, 2002. Scheduled to be abandoned	Decommissioned in November, 2002. Scheduled to be abandoned	N/A	N/A

CIP Project List
by
Category
(Interceptors, Trunk Sewers, and Odor Control)

CS-1314 Wastewater Master Plan - CIP Project List by Category

Category: Interceptors & Trunk Sewers

Project No.	Project Name	Start Year	End Year	Duration (years)	Cost/ Year	Project Cost	Cost Allocation by Decade				
							2003-2010	2011-2020	2021-2030	2031-2040	2041-2050
EXISTING CIP PROJECTS											
CS-1288	Romeo Arm Interceptor in Garfield Road (SDS 2003-2007 CIP)	1997	2004	7	$ 160,114	$ 1,120,800	$ 177,000	$ -	$ -	$ -	$ -
PCI-45	Romeo Arm Interceptor in Garfield Road from 18 Mile Road to 21 Mile Road. Construction of Meter Chambers SY-S-3 and MA-S-2. Stop Gates at 18 Mile Road & Garfield and 15 Mile Road and Garfield Road (SDS 2003-2007 CIP)	2000	2004	4	$ 7,000,000	$ 28,000,000	$ 5,631,000	$ -	$ -	$ -	$ -
PC-687	Clinton Twp./City of Fraser Control Facilities: 15 Mile Road & Hayes (NE & SE corners), and 15 Mile Road and Little Mack Ave.	2003	2005	2	$ 1,000,000	$ 2,000,000	$ 2,000,000	$ -	$ -	$ -	$ -
Design	Clintondale Pumping Station Improvements	2000	2002	2.5	$ 400,000	$ 1,000,000	$ 800,000	N/A	N/A	N/A	N/A
Construction	Clintondale Pumping Station Improvements	2002	2003	1	$ 13,000,000	$ 13,000,000	$ 13,000,000				
CS-1111 Task 7	Master Sewer Meters - Clinton Township (SDS 2003-2007 CIP)	2003	2003	0.5	$ 46,000	$ 23,000	$ 23,000				
TOTAL EXISTING PROJECTS						$ 45,143,800	$ 21,631,000	$ -	$ -	$ -	$ -

CS-1314 Wastewater Master Plan - CIP Project List by Category

Category: Interceptors & Trunk Sewers

Project No.	Project Name	Start Year	End Year	Duration (years)	Cost/ Year	Project Cost	Cost Allocation by Decade				
							2003-2010	2011-2020	2021-2030	2031-2040	2041-2050
NEW PROJECTS											
1	Phase I: 54" Gravity. North Gratiot Interceptor Sewer (NGIS) [60" and 66" diameter sewers are also being analyzed during the design phase] It is to parallel 42" Lakeshore interceptor from H.B. Joy and I-94 to H.B. Joy and 21 Mile Road.	2003	2005	2	$9,224,000	$18,448,000	$18,448,000	$ -	$ -	$ -	$ -
2	Phase 2: 30" Forcemain. North Gratiot Interceptor Sewer (NGIS). 21 Mile to 25½ Mile (Force Main and Pump Station).	2003	2005	2	$4,523,500	$9,047,000	$9,047,000	$ -	$ -	$ -	$ -
3	Phase 3: 36" Gravity. North Gratiot Interceptor Sewer (NGIS). 25½ Mile to North Bay Connection.	2003	2005	2	$755,000	$1,510,000	$1,510,000	$ -	$ -	$ -	$ -
4	Phase 4: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). North Bay Connection to 26 Mile Road along Gratiot Avenue.	2003	2005	2	$545,000	$1,090,000	$1,090,000	$ -	$ -	$ -	$ -

CS-1314 Wastewater Master Plan - CIP Project List by Category

Category: Interceptors & Trunk Sewers

Project No.	Project Name	Start Year	End Year	Duration (years)	Cost/ Year	Project Cost	Cost Allocation by Decade				
							2003-2010	2011-2020	2021-2030	2031-2040	2041-2050
NEW PROJECTS											
5	Phase 5: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). 26 Mile Road to New Haven Road along Gratiot Avenue. The project cost includes the New Haven meter ($125,000) and the Lenox meter ($300,000)	2003	2005	2	$577,200	$1,154,400	$1,154,400	$ -	$ -	$ -	$ -
6A	Phase 6A: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). New Haven Road to Township limits (27½ Mile Road) along Gratiot Avenue.	2003	2005	2	$1,044,000	$2,088,000	$2,088,000	$ -	$ -	$ -	$ -
6B	Phase 6B: Various Gravity Sizes. North Gratiot Gravity Interceptor Sewer (NGIS). 27½ Mile Road to 31 Mile Road along Gratiot Avenue.	2003	2005	2	$3,231,000	$6,462,000	$6,462,000	$ -	$ -	$ -	$ -
CS-1292	Clintondale Pump Station Odor Control	2003	2003	1	$74,000	$74,000	$74,000	$ -	$ -	$ -	$ -
CS-1292	Reimold Avenue and Coleridge Avenue (extended) Meter Chamber Odor Control, MB-11 HR-S-2	2003	2003	1	$ 37,000	$ 37,000	$ 37,000	$ -	$ -	$ -	$ -

CS-1314 Wastewater Master Plan - CIP Project List by Category

Category: Interceptors & Trunk Sewers

Project No.	Project Name	Start Year	End Year	Duration (years)	Cost/ Year	Project Cost	Cost Allocation by Decade				
							2003-2010	2011-2020	2021-2030	2031-2040	2041-2050
NEW PROJECTS											
CS-1292	Meter Chamber Odor Control, MB-6 CT-S-2 Union Lake Road and Sorrentino Court upstream of Clintondale Pump Station	2003	2003	1	$ 37,000	$ 37,000	$ 37,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-32 CT-S-4 Fifteen Mile Road and Kelly Road	2003	2003	1	$ 29,000	$ 29,000	$ 29,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-9 FR-S-1 Fifteen Mile Road and Garfield Road South of 15 Mile Road	2003	2003	1	$ 29,000	$ 29,000	$ 29,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-4 CT-S-1 Garfield Road and Clinton River Road	2003	2003	1	$ 37,000	$ 37,000	$ 37,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-5 CT-S-3 Garfield Road and 18 Mile Road	2003	2003	1	$ 37,000	$ 37,000	$ 37,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-21 ST-S-5 Fifteen Mile Road and Schoenherr Road	2003	2003	1	$ 37,000	$ 37,000	$ 37,000	$ -	$ -	$ -	$ -

CS-1314 Wastewater Master Plan - CIP Project List by Category

Category: Interceptors & Trunk Sewers

Project No.	Project Name	Start Year	End Year	Duration (years)	Cost/ Year	Project Cost	Cost Allocation by Decade				
							2003-2010	2011-2020	2021-2030	2031-2040	2041-2050
NEW PROJECTS											
CS-1292	Meter Chamber Odor Control, MB-26 ST-S-4 Fourteen Mile Road and Detroit Edison Corridor	2003	2003	1	$ 37,000	$ 37,000	$ 37,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-20 ST-S-2 Fifteen Mile Road and Dodge Park Road	2003	2003	1	$ 29,000	$ 29,000	$ 29,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-22 ST-S-3 Dodge Park Road and Sorrento Boulevard	2003	2003	1	$ 37,000	$ 37,000	$ 37,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-23 ST-S-1 Utica Road and Dodge Park Road	2003	2003	1	$ 37,000	$ 37,000	$ 37,000	$ -	$ -	$ -	$ -
CS-1292	Meter Chamber Odor Control, MB-25 UT-S-1 Utica Road and Nichols Street	2003	2003	1	$ 29,000	$ 29,000	$ 29,000	$ -	$ -	$ -	$ -
TOTAL NEW PROJECTS					$ 20,385,700	$ 40,285,400	$ 40,285,400	$ -	$ -	$ -	$ -
ALL CIP PROJECTS					$ 20,385,700	$ 85,429,200	$ 61,916,400	$ -	$ -	$ -	$ -

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - 2'-0" Lakeshore Interceptor (INSPECTION)
Source of Funds Macomb County - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Televise 2'-0" diameter sewer - H.B. Joy Road and I-94 to 21 Mile Road and I-94 (PCI-42A)	163	ft	A - Table 2.7.1	$ 1.59	$ 259
	Sewer Installed: 1989					
	Inspection Recomm'd: 2009, 2029					
Subtotal						$ 259
	Contractor Overhead & Profit (25%)					$ 65
	Total Construction					$ 324
	Contingency (30%)					$ 97
	Engineering, Legal, Administrative, Management (20%)					$ 65
	Total Project Cost					$ 486

Notes:

** Source of cost information coded as follows:

A = Tech Memo - Cost Estimating Guideline for Conveyance Facilities: List table number.

B = Tech Memo - Cost Estimates for Treatment Facilities: List table number.

C = Other source - list source on attached page and attach supporting information.

Conceptual Project Estimate for CIP (Inspection, Rehabilitation, and Odor Control)

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - 2'-0" Lakeshore Interceptor (REHAB)
Source of Funds Macomb County - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Install 2'-0" Cured-In-Place Pipe Liner (PCI-42A)	17	ft	C.4	$ 144.00	$ 2,448
	Sewer Installed: 1989					
	Rehab Recomm'd: 2039					
	Sewer Length: 163 feet					
Subtotal						$ 2,448
	Contractor Overhead & Profit (25%)					$ 612
	Total Construction					$ 3,060
	Contingency (30%)					$ 918
	Engineering, Legal, Administrative, Management (20%)					$ 612
	Total Project Cost					$ 4,590

Notes:

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Other Source

C.4 Spalding DeDecker Associates Memorandum dated 1/29/03 from George Nichols
Re: Cost estimates for Cured-In-Place Pipe liner.

MEMORANDUM

- Surveying
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- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence Since 1954

DATE: January 29, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: George P. Nichols, PE GPN

RE: Cost Estimates for Cured-In-Place Pipe (CIPP) Liner

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for CIPP rehabilitation of the interceptors in Macomb County. Based on our analysis, a generic cost estimate of pipeline construction and repair methods indicate a cost for Cured-In-Place Pipe to be $6/inch diameter/foot of sewer. Therefore, the following table provides an estimate for performing the CIPP process on different size sewers:

Size	Cost/foot
12"	$72.00
24"	$144.00
36"	$216.00
42"	$252.00
48"	$288.00

Please be advised that these prices are based on typical CIPP projects performed throughout the United States. These prices may vary based on the site and ground conditions, age of pipe, and geographical location.

cc: File

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CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Lakeshore Interceptor (INSPECTION)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Televise 3'-6" diameter sewer - H.B. Joy Road and I-94 to 21 Mile Road and I-94 (PCI-42A)	12,885	ft	A - Table 2.7.1	$ 1.79	$ 23,064
	Sewer Installed: 1987					
	Inspection Recomm'd: 2007, 2027					
2.0	Clean 11'-0" dia. Sewer (PCI-14)	11,472	ft	A - Table 2.7.2	$ 15.89	$ 182,290
3.0	Inspect 11'-0" dia. Sewer (PCI-14)	11,472	ft	C.1	$ 4.65	$ 53,345
	Sewer Installed: 1972					
	Inspection Recomm'd: 2003, 2023					
4.0	Inspect 11'-0" dia. Sewer (PCI-13)	11,600	ft	C.1	$ 4.65	$ 53,940
	Sewer Installed: 1972					
	Inspection Recomm'd: 2003, 2023					
Subtotal						$ 312,639
	Contractor Overhead & Profit (25%)					$ 78,160
	Total Construction					$ 390,799
	Contingency (30%)					$ 117,240
	Engineering, Legal, Administrative, Management (20%)					$ 78,160
	Total Project Cost					$ 586,198

Notes:

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C = Other source - list source on attached page and attach supporting information.

Other Source

C.1 Spalding DeDecker Associates calculation spreadsheet for Macomb County Interceptor Inspection dated 1/24/03 from Maria Sedki

MEMORANDUM

- Surveying
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- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 24, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: Maria Sedki, PE

RE: Macomb County Interceptor Inspection

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for the inspection of the following interceptors in Macomb County:

- Lakeshore Interceptor
- Oakland Interceptor
- Romeo/Garfield Interceptor
- 15 Mile Interceptor
- Edison Interceptor

Based on our analysis, the fee to physically enter and inspect the interceptors is approximately $4.65 per lft of large diameter pipe (5 ft in diameter and greater). Please refer to the attached table for a summary of the inspection fees per interceptor.

The fee includes standard confined space entry equipment, the inspection of the interceptor, and a report summarizing the findings of the inspection. The fee does not include however, any coring and structural analysis of the interceptor sewer nor does it include bypass pumping or flow maintenance upstream of the interceptor being inspected.

Please be advised that the inspection fee is preliminary and did not include a detailed review of each interceptor. Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection.

cc: File
George Nichols, PE

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Macomb County Interceptor Inspection

MS00003

Preliminary Inspection Fees

Interceptor	Diameter (ft)	Length (ft)	Preliminary Inspection Fee	Preliminary Inspection Days	Cost/lft
Lakeshore Interceptor	11'-0"	23,100 lft	$106,550.00	10 days	$4.61
Oakland Interceptor	8'-0", 8'-9", 9'-6"	21900, 18000, 17700 = 57600 lft	$249,828.00	24 days	$4.34
Romeo/Garfield Interceptor	7'-0", 9'-0", 11'-0"	16100, 7200, 22400 = 45700 lft	$210,050.00	20 days	$4.60
15 Mile Interceptor	5'-0"	15,000 lft	$83,789.00	7 days	$5.59
Edison Interceptor	12'-9"	41,300 lft	$195,186.00	18 days	$4.73
	Total	**182,700**	**$845,403.00**		

Conclusion: Use an average of $4.65/lft when estimating large diameter pipe inspection costs
Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Lakeshore Interceptor (REHAB)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Install 3'-6" Cured-In-Place Pipe Liner (PCI-42A)	1,289	ft	C.4	$ 252.00	$ 324,828
	Sewer Installed: 1987					
	Rehab Recomm'd: 2037					
	Sewer Length: 12,885 feet					
2.0	Repair 11'-0" dia. Sewer with shot crete (PCI-14)	39,620	sft	C.3	$ 31.02	$ 1,229,012
	Sewer Installed: 1972					
	Rehab Recomm'd: 2022					
	Sewer Length: 11,472 feet					
3.0	Repair 11'-0" dia. Sewer with shot crete (PCI-13)	40,070	sft	C.3	$ 31.02	$ 1,242,971
	Sewer Installed: 1972					
	Rehab Recomm'd: 2022					
	Sewer Length: 11,600 feet					
4.0	Install stop gate at Meter MB-60	1.0	ea	C.2	$ 1,700,000.00	$ 1,700,000
Subtotal						$ 4,496,812
	Contractor Overhead & Profit (25%)					$ 1,124,203
	Total Construction					$ 5,621,015
	Contingency (30%)					$ 1,686,304
	Engineering, Legal, Administrative, Management (20%)					$ 1,124,203
	Total Project Cost					$ 8,431,522

Notes:

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Other Source

C.2 Spalding DeDecker Associates Memorandum dated 1/21/03 from Charles Groover
Re: Recommendations concerning New Stop Gates in Macomb County Sewer Master Plan

C.3 Spalding DeDecker Associates Memorandum dated 1/27/03 from Charles Groover
Re: Cost Estimate for Shot Crete Repairs

C.4 Spalding DeDecker Associates Memorandum dated 1/29/03 from George Nichols
Re: Cost estimates for Cured-In-Place Pipe liner.

MEMORANDUM

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SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence Since 1954

DATE: January 21, 2003

TO: Dr. S.P. Singh
George Nichols

FIRM NAME: SDA

FROM: Charles Groover

RE: Recommendations concerning New Stop Gates in Macomb County Sewer Master Plan

JOB NO.: MS00003.01

The DWSD Interceptor system covers a wide area and performs a critical function. Its failure is not an option and DWSD has experienced unexpected sewer damage in the past due to difficulty inspecting different legs of the Interceptor system on a periodic basis.

The key to being able to perform inspections is constructing stop gates at strategic points along the sewer so that the sewage can be stored upstream for a period of a few hours while inspections are accomplished downstream. Although there is no set spacing, the stop gates currently being constructed by DWSD are typically at least 3 miles apart.

After reviewing the Interceptor system within Macomb County and discussions with Shirleen Ryan, Chief of the DWSD Inspection Department and Dennis Kopp and Tom LaCross of SDA, I believe there are 3 locations that will benefit from the addition of a new stop gate. Those locations are listed below and shown on the attached map:

- Lakeshore Interceptor, Meter MB-60
- Oakland Arm Interceptor, Meter MB-25
- Oakland Arm Interceptor, just downstream of Meters CV-1 and CV-3

Typical construction costs for a stop gate are $1.7M for a total construction cost of $5.1M to construct the 3 proposed gates. This number is based on the cost to construct a stop gate at 15 Mile Road on an existing Interceptor.

Currently, all stop gates are manually operated and DWSD uses a crane or large boom truck to raise and lower the gates. Automating the gates would reduce the number of people needed and simplify the inspection process, making it easier and more likely that the stop gates will be used regularly. However, the maintenance costs for automated gates should be evaluated.

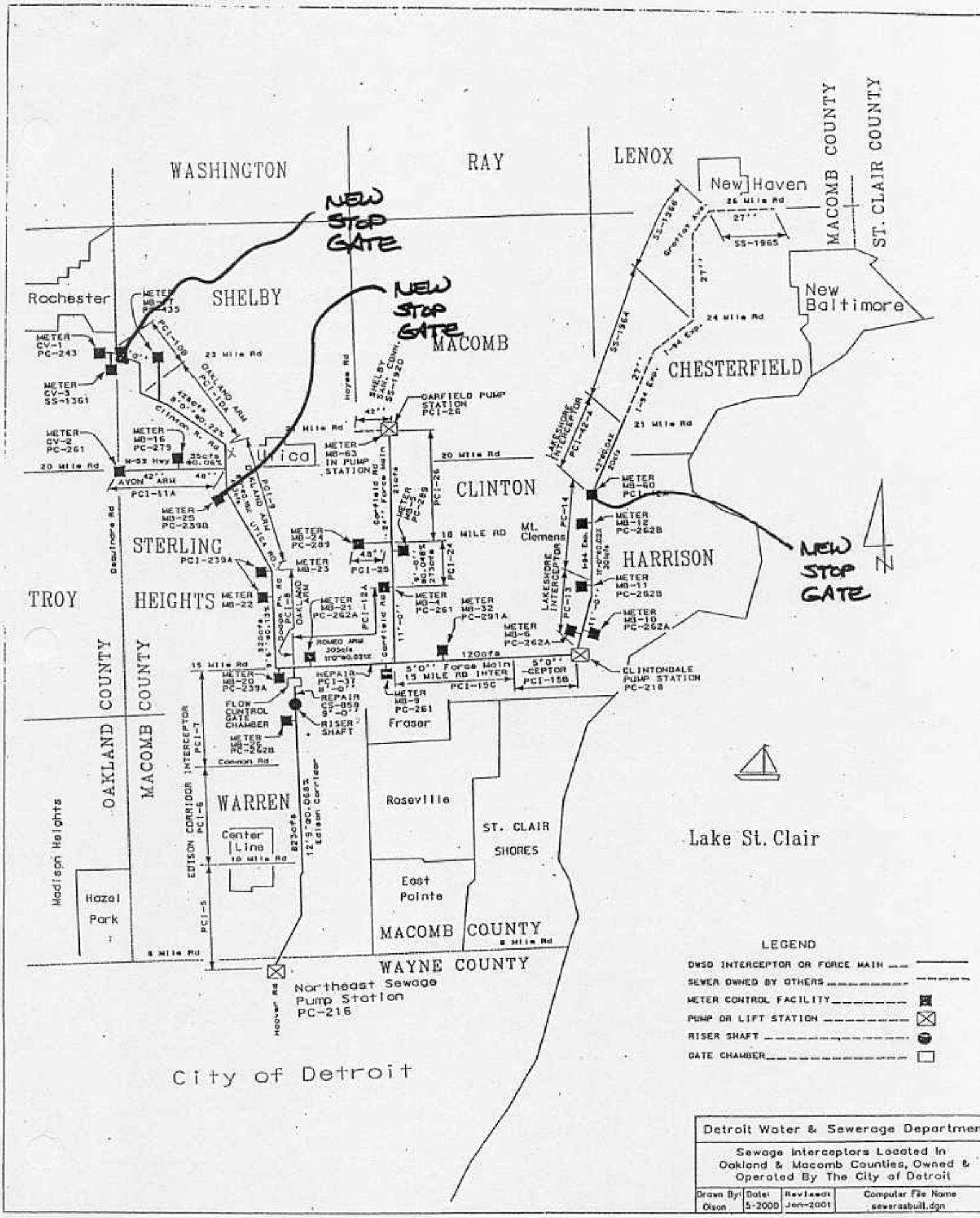
The Oakland Arm Interceptor extends into Oakland County all the way to Pontiac. Discussions with Shirleen Ryan at DWSD's Field Engineering Inspection Section indicate that they can't inspect that leg because the Interceptor is always full. Further, because this arm supports Oakland County, any growth in Oakland County will impact the capacity of this arm in Macomb County. Consequently, consideration should be given to increasing the capacity within the Oakland Arm Interceptor. In addition, additional stop gates further northwest along the Oakland Arm Interceptor in Oakland County should also be considered.

At Meter CV-1, DWSD is considering increasing the meter size from a 5-foot flume to a 10-flume. This meter has experienced problems with hydraulic jumps since it was constructed. In order to replace the flume, a by-pass line around the meter needs to be constructed. This should be considered and might be able to be accomplished as part of the project to install a new stop gate.

Inspections should be conducted no less than every 5 years and checklists should be developed to document findings accurately and consistently. In this case, inspection should be defined to mean physically walking the length of the section being inspected. Documentation should include photographs and notes. On a 5-year cycle, it is unlikely that the same person would inspect an Interceptor more than once, so documentation needs to be designed to capture rate of decay or failure in a consistent manner. In the case of serious problems, DWSD may see the problem twice or even just once before action is required. Multi-million dollar decisions are likely to be made, at least in part, on the basis of these inspection reports.

Please call me at 313-967-4700, ext 1217 if you have any questions or comments.

cc: File
M Hamood
D Kopp


WASHINGTON
RAY
LENOX
New Haven
MACOMB COUNTY
ST. CLAIR COUNTY
NEW STOP GATE
NEW STOP GATE
NEW STOP GATE
Rochester
SHELBY
MACOMB
New Baltimore
CHESTERFIELD
Utica
CLINTON
Mt. Clemens
HARRISON
STERLING HEIGHTS
TROY
OAKLAND COUNTY
MACOMB COUNTY
WARREN
Center Line
Roseville
ST. CLAIR SHORES
East Pointe
Fraser
Hazel Park
Madison Heights
MACOMB COUNTY
WAYNE COUNTY
Northeast Sewage Pump Station PC-216
City of Detroit
Lake St. Clair
GARFIELD PUMP STATION PC1-26
CLINTONDALE PUMP STATION PC-218
METER CV-1 PC-243
METER CV-3 SS-1361
METER CV-2 PC-261
METER MB-16 PC-279
METER MB-25 PC-239B
METER MB-63 IN PUMP STATION
METER MB-24 PC-289
METER MB-23
METER MB-22
METER MB-21 PC-262A
METER MB-4 PC-261
METER MB-32 PC-291A
METER MB-6 PC-262A
METER MB-60
METER MB-12 PC-262B
METER MB-11 PC-262B
METER MB-10 PC-262A
METER MB-20 PC-239A
METER MB-9 PC-261
METER MB-26 PC-262B
FLOW CONTROL GATE CHAMBER
RISER SHAFT
REPAIR CS-858
REPAIR PC1-37
5'0" Force Main 15 MILE RD INTER PC1-15C
5'0" -CEPTOR PC1-15B
LAKESHORE INTERCEPTOR PC1-42-A
LAKESHORE INTERCEPTOR PC-13
LAKESHORE INTERCEPTOR PC-14
OAKLAND ARM PC1-10A
OAKLAND ARM PC1-9
UTICA RD.
AVON ARM PC1-11A
ROMEO ARM
EDISON CORRIDOR INTERCEPTOR PC1-7
EDISON CORRIDOR PC1-6
PC1-5
Hayes Rd
Garfield Rd
Dequindre Rd
Hoover Rd
Common Rd
Clinton R. Rd
Gratiot Ave.
SS-1966
SS-1965
SS-1964
SHELBY SAN. CONN. SS-1920
23 Mile Rd
24 Mile Rd
21 Mile Rd
20 Mile Rd
18 MILE RD
15 Mile Rd
10 Mile Rd
8 Mile Rd
26 Mile Rd
LEGEND
DWSD INTERCEPTOR OR FORCE MAIN
SEWER OWNED BY OTHERS
METER CONTROL FACILITY
PUMP OR LIFT STATION
RISER SHAFT
GATE CHAMBER
Detroit Water & Sewerage Departmen
Sewage Interceptors Located In Oakland & Macomb Counties, Owned & Operated By The City of Detroit
Drawn By: Olson
Date: 5-2000
Revised: Jan-2001
Computer File Name sewerasbuilt.dgn

MEMORANDUM

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- Transportation Engineering
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SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence Since 1954

DATE: January 27, 2003

TO: Dr. S. P. Singh, P. E.
George Nichols, P. E.

FIRM NAME: SDA

FROM: Charles Groover, P.E.

RE: Cost Estimate for Shot Crete Repairs

JOB NO.: MS00003.D1

Below is an estimate per square foot to make Sauereisen repairs to an existing sewer assumed to be large enough for men to enter it to make the repairs. The Sauereisen materials are a cement based product that is similar to shotcrete but is hand applied in this case.Let me know if you need additional information.

Set up traffic control, access shaft, and ventilate for a sewer line 45 feet deep with existing shaft in place	$187,860 lump sum $3.77 per square foot for job of approximately 50,000 square feet
Cost to clean	$5.82 per square foot for a job of approximately 50,000 square feet
Cost to patch with Sauerlesen F-120, 210 products	$19.48 per square foot to patch an area with approximately 22,000 square feet

Note: Patch depth was 0.7 inches thick on average. However, the depth would vary with depth of damage from no depth to maybe 1½ - 2 inches. Costs would go up some due to materials and labor but not linearly because of the high set up costs.

Remove traffic control, ventilation, close up shaft and repave	$97,301.50 lump sum $1.95 per square foot for job of approximately 50,000 square feet
Overall estimate	**$31.02 per square foot for job of approximately 50,000 square feet**

cc: File
M Hamood
M Balon

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SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 29, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: George P. Nichols, PE GPN

RE: Cost Estimates for Cured-In-Place Pipe (CIPP) Liner

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for CIPP rehabilitation of the interceptors in Macomb County. Based on our analysis, a generic cost estimate of pipeline construction and repair methods indicate a cost for Cured-In-Place Pipe to be $6/inch diameter/foot of sewer. Therefore, the following table provides an estimate for performing the CIPP process on different size sewers:

Size	Cost/foot
12"	$72.00
24"	$144.00
36"	$216.00
42"	$252.00
48"	$288.00

Please be advised that these prices are based on typical CIPP projects performed throughout the United States. These prices may vary based on the site and ground conditions, age of pipe, and geographical location.

cc: File

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Oakland Arm Interceptor (INSPECTION)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Inspect 8'-0" diameter sewer (PCI-10A and 10-B)	21,884	ft	C.1	$ 4.65	$ 101,761
	Sewer Installed: 1970					
	Inspection Recomm'd: 2003, 2023					
2.0	Inspect 8'-9" diameter sewer (PCI-9)	17,960	ft	C.1	$ 4.65	$ 83,514
	Sewer Installed: 1969					
	Inspection Recomm'd: 2003, 2023					
3.0	Inspect 9'-6" diameter sewer (PCI-8)	17,639	ft	C.1	$ 4.65	$ 82,021
	Sewer Installed: 1969					
	Inspection Recomm'd: 2003, 2023					
Subtotal						$ 267,296
	Contractor Overhead & Profit (25%)					$ 66,824
	Total Construction					$ 334,120
	Contingency (30%)					$ 100,236
	Engineering, Legal, Administrative, Management (20%)					$ 66,824
	Total Project Cost					$ 501,180

Notes:

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Other Source

C.1 Spalding DeDecker Associates calculation spreadsheet for Macomb County Interceptor Inspection dated 1/24/03 from Maria Sedki

MEMORANDUM

- Surveying
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- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 24, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: Maria Sedki, PE

RE: Macomb County Interceptor Inspection

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for the inspection of the following interceptors in Macomb County:

- Lakeshore Interceptor
- Oakland Interceptor
- Romeo/Garfield Interceptor
- 15 Mile Interceptor
- Edison Interceptor

Based on our analysis, the fee to physically enter and inspect the interceptors is approximately $4.65 per lft of large diameter pipe (5 ft in diameter and greater). Please refer to the attached table for a summary of the inspection fees per interceptor.

The fee includes standard confined space entry equipment, the inspection of the interceptor, and a report summarizing the findings of the inspection. The fee does not include however, any coring and structural analysis of the interceptor sewer nor does it include bypass pumping or flow maintenance upstream of the interceptor being inspected.

Please be advised that the inspection fee is preliminary and did not include a detailed review of each interceptor. Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection.

cc: File
George Nichols, PE

SPALDING DEDECKER ASSOCIATES, INC.
220 WEST CONGRESS, SUITE 400 DETROIT, MI 48226
PHONE (313) 967-4700 FAX (313) 967-4707
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TRENTON

Macomb County Interceptor Inspection

MS00003

Preliminary Inspection Fees

Interceptor	Diameter (ft)	Length (ft)	Preliminary Inspection Fee	Preliminary Inspection Days	Cost/lft
Lakeshore Interceptor	11'-0"	23,100 lft	$106,550.00	10 days	$4.61
Oakland Interceptor	8'-0", 8'-9", 9'-6"	21900, 18000, 17700 = 57600 lft	$249,828.00	24 days	$4.34
Romeo/Garfield Interceptor	7'-0", 9'-0", 11'-0"	16100, 7200, 22400 = 45700 lft	$210,050.00	20 days	$4.60
15 Mile Interceptor	5'-0"	15,000 lft	$83,789.00	7 days	$5.59
Edison Interceptor	12'-9"	41,300 lft	$195,186.00	18 days	$4.73
	Total	**182,700**	**$845,403.00**		

Conclusion: Use an average of $4.65/lft when estimating large diameter pipe inspection costs
Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Oakland Arm Interceptor (REHAB)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Install stop gate at Meter CV-3	1.0	ea	C.2	$ 1,700,000.00	$ 1,700,000
2.0	Install stop gate at Meter MB-25	1.0	ea	C.2	$ 1,700,000.00	$ 1,700,000
3.0	Repair 8'-0" dia. Sewer with shot crete (PCI-10A & 10B)	54,965	sft	C.3	$ 31.02	$ 1,705,014
	Sewer Installed: 1970					
	Rehab Recomm'd: 2020					
	Sewer Length: 21,884 feet					
4.0	Repair 8'-9" dia. Sewer with shot crete (PCI-9)	49,345	sft	C.3	$ 31.02	$ 1,530,682
	Sewer Installed: 1969					
	Rehab Recomm'd: 2019					
	Sewer Length: 17,960 feet					
5.0	Repair 9'-6" dia. Sewer with shot crete (PCI-8)	52,620	sft	C.3	$ 31.02	$ 1,632,272
	Sewer Installed: 1969					
	Rehab Recomm'd: 2019					
	Sewer Length: 17,639 feet					
Subtotal						$ 8,267,969
	Contractor Overhead & Profit (25%)					$ 2,066,992
	Total Construction					$ 10,334,961
	Contingency (30%)					$ 3,100,488
	Engineering, Legal, Administrative, Management (20%)					$ 2,066,992
	Total Project Cost					$ 15,502,441

Notes:

** Source of cost information coded as follows:

A = Tech Memo - Cost Estimating Guideline for Conveyance Facilities: List table number.

B = Tech Memo - Cost Estimates for Treatment Facilities: List table number.

C = Other source - list source on attached page and attach supporting information.

Other Source

C.2 Spalding DeDecker Associates Memorandum dated 1/21/03 from Charles Groover
Re: Recommendations concerning New Stop Gates in Macomb County Sewer Master Plan

C.3 Spalding DeDecker Associates Memorandum dated 1/27/03 from Charles Groover
Re: Cost Estimate for Shot Crete Repairs

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 21, 2003

TO: Dr. S.P. Singh
George Nichols

FIRM NAME: SDA

FROM: Charles Groover

RE: Recommendations concerning New Stop Gates in Macomb County Sewer Master Plan

JOB NO.: MS00003.01

The DWSD Interceptor system covers a wide area and performs a critical function. Its failure is not an option and DWSD has experienced unexpected sewer damage in the past due to difficulty inspecting different legs of the Interceptor system on a periodic basis.

The key to being able to perform inspections is constructing stop gates at strategic points along the sewer so that the sewage can be stored upstream for a period of a few hours while inspections are accomplished downstream. Although there is no set spacing, the stop gates currently being constructed by DWSD are typically at least 3 miles apart.

After reviewing the Interceptor system within Macomb County and discussions with Shirleen Ryan, Chief of the DWSD Inspection Department and Dennis Kopp and Tom LaCross of SDA, I believe there are 3 locations that will benefit from the addition of a new stop gate. Those locations are listed below and shown on the attached map:

- Lakeshore Interceptor, Meter MB-60
- Oakland Arm Interceptor, Meter MB-25
- Oakland Arm Interceptor, just downstream of Meters CV-1 and CV-3

Typical construction costs for a stop gate are $1.7M for a total construction cost of $5.1M to construct the 3 proposed gates. This number is based on the cost to construct a stop gate at 15 Mile Road on an existing Interceptor.

Currently, all stop gates are manually operated and DWSD uses a crane or large boom truck to raise and lower the gates. Automating the gates would reduce the number of people needed and simplify the inspection process, making it easier and more likely that the stop gates will be used regularly. However, the maintenance costs for automated gates should be evaluated.

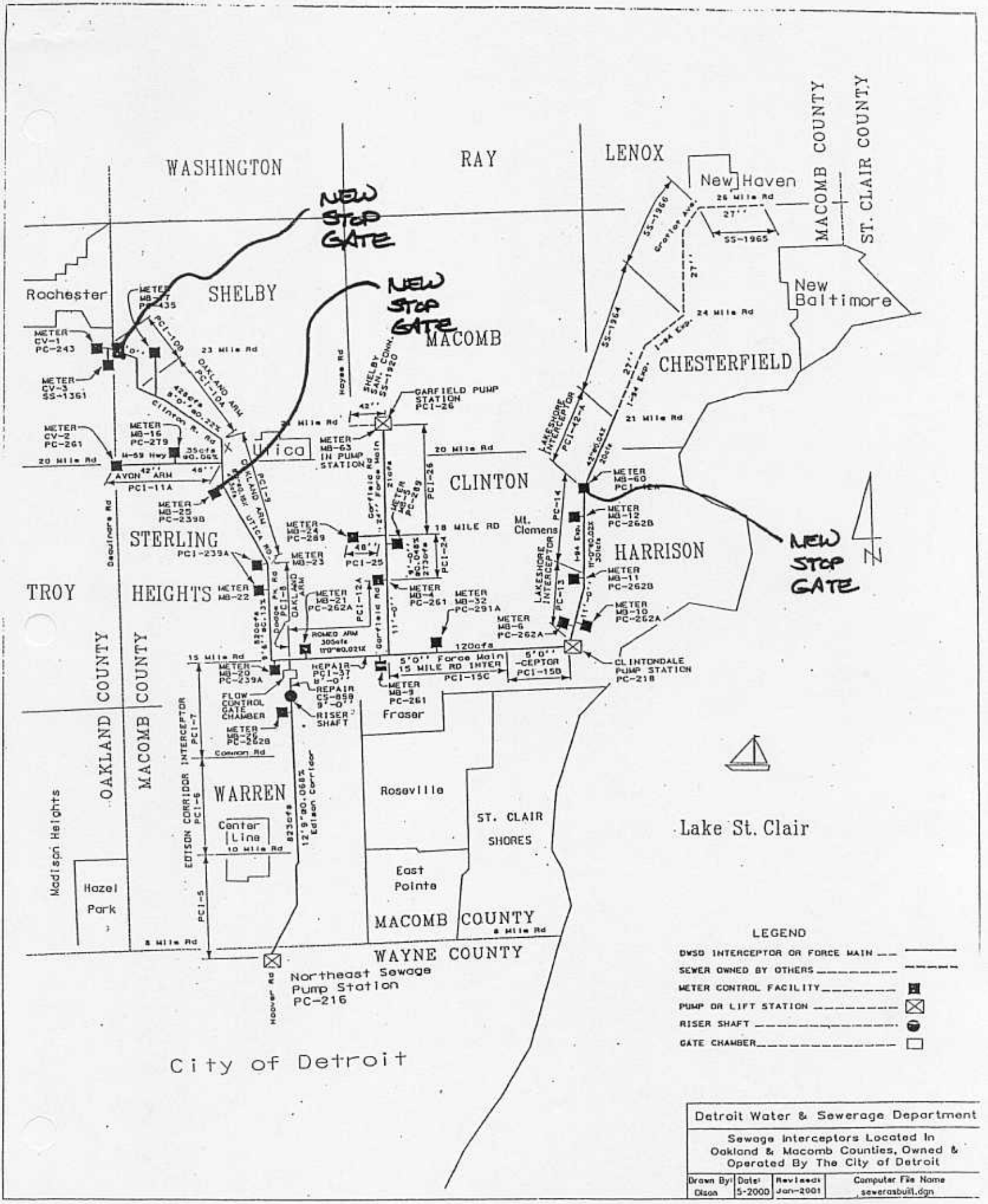
The Oakland Arm Interceptor extends into Oakland County all the way to Pontiac. Discussions with Shirleen Ryan at DWSD's Field Engineering Inspection Section indicate that they can't inspect that leg because the Interceptor is always full. Further, because this arm supports Oakland County, any growth in Oakland County will impact the capacity of this arm in Macomb County. Consequently, consideration should be given to increasing the capacity within the Oakland Arm Interceptor. In addition, additional stop gates further northwest along the Oakland Arm Interceptor in Oakland County should also be considered.

At Meter CV-1, DWSD is considering increasing the meter size from a 5-foot flume to a 10-flume. This meter has experienced problems with hydraulic jumps since it was constructed. In order to replace the flume, a by-pass line around the meter needs to be constructed. This should be considered and might be able to be accomplished as part of the project to install a new stop gate.

Inspections should be conducted no less than every 5 years and checklists should be developed to document findings accurately and consistently. In this case, inspection should be defined to mean physically walking the length of the section being inspected. Documentation should include photographs and notes. On a 5-year cycle, it is unlikely that the same person would inspect an Interceptor more than once, so documentation needs to be designed to capture rate of decay or failure in a consistent manner. In the case of serious problems, DWSD may see the problem twice or even just once before action is required. Multi-million dollar decisions are likely to be made, at least in part, on the basis of these inspection reports.

Please call me at 313-967-4700, ext 1217 if you have any questions or comments.

cc: File
M Hamood
D Kopp



Detroit Water & Sewerage Department

Sewage Interceptors Located In Oakland & Macomb Counties, Owned & Operated By The City of Detroit

Drawn By:	Date:	Revised:	Computer File Name
Olson	5-2000	Jan-2001	sewerasbuilt.dgn

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 27, 2003

TO: Dr. S. P. Singh, P. E.
George Nichols, P. E.

FIRM NAME: SDA

FROM: Charles Groover, P.E.

RE: Cost Estimate for Shot Crete Repairs

JOB NO.: MS00003.D1

Below is an estimate per square foot to make Sauereisen repairs to an existing sewer assumed to be large enough for men to enter it to make the repairs. The Sauereisen materials are a cement based product that is similar to shotcrete but is hand applied in this case.Let me know if you need additional information.

Set up traffic control, access shaft, and ventilate for a sewer line 45 feet deep with existing shaft in place	$187,860 lump sum $3.77 per square foot for job of approximately 50,000 square feet
Cost to clean	$5.82 per square foot for a job of approximately 50,000 square feet
Cost to patch with Saueriesen F-120, 210 products	$19.48 per square foot to patch an area with approximately 22,000 square feet

Note: Patch depth was 0.7 inches thick on average. However, the depth would vary with depth of damage from no depth to maybe 1½ - 2 inches. Costs would go up some due to materials and labor but not linearly because of the high set up costs.

Remove traffic control, ventilation, close up shaft and repave	$97,301.50 lump sum $1.95 per square foot for job of approximately 50,000 square feet
Overall estimate	**$31.02 per square foot for job of approximately 50,000 square feet**

cc: File
M Hamood
M Balon

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CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Avon Arm Interceptor (INSPECTION)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Televise 3'-0" diameter sewer (PCI-11A and 11-B)	7,626	ft	A - Table 2.7.1	$ 1.79	$ 13,651
	Sewer Installed: 1979 & 1974					
	Inspection Recomm'd: 2003, 2023					
2.0	Televise 3'-6" diameter sewer (PCI-11A and 11-B)	3,656	ft	A - Table 2.7.1	$ 1.79	$ 6,544
	Sewer Installed: 1974					
	Inspection Recomm'd: 2003, 2023					
3.0	Televise 4'-0" diameter sewer (PCI-11A and 11-B)	2,839	ft	A - Table 2.7.1	$ 1.79	$ 5,082
	Sewer Installed: 1979 & 1974					
	Inspection Recomm'd: 2003, 2023					
Subtotal						$ 25,277
	Contractor Overhead & Profit (25%)					$ 6,319
	Total Construction					$ 31,596
	Contingency (30%)					$ 9,479
	Engineering, Legal, Administrative, Management (20%)					$ 6,319
	Total Project Cost					$ 47,394

Notes:

** Source of cost information coded as follows:

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B = Tech Memo - Cost Estimates for Treatment Facilities: List table number.

C = Other source - list source on attached page and attach supporting information.

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Avon Arm Interceptor (REHAB)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Install 3'-0" Cured-In-Place Pipe Liner (PCI-11A and 11-B)	763	ft	C.4	$ 216.00	$ 164,808
	Sewer Installed: 1979 & 1974					
	Rehab Recomm'd: 2029, 2024					
	Sewer Length: 7,626 feet					
2.0	Install 3'-6" Cured-In-Place Pipe Liner (PCI-11A and 11-B)	366	ft	C.4	$ 252.00	$ 92,232
	Sewer Installed: 1974					
	Rehab Recomm'd: 2024					
	Sewer Length: 3,656 feet					
3.0	Install 4'-0" Cured-In-Place Pipe Liner (PCI-11A and 11-B)	284	ft	C.4	$ 288.00	$ 81,792
	Sewer Installed: 1979 & 1974					
	Rehab Recomm'd: 2029, 2024					
	Sewer Length: 2,839 feet					
Subtotal						$ 338,832
	Contractor Overhead & Profit (25%)					$ 84,708
	Total Construction					$ 423,540
	Contingency (30%)					$ 127,062
	Engineering, Legal, Administrative, Management (20%)					$ 84,708
	Total Project Cost					$ 635,310

Notes:

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Other Source

C.4 Spalding DeDecker Associates Memorandum dated 1/29/03 from George Nichols
Re: Cost estimates for Cured-In-Place Pipe liner.

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence Since 1954

DATE: January 29, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: George P. Nichols, PE GPN

RE: Cost Estimates for Cured-In-Place Pipe (CIPP) Liner

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for CIPP rehabilitation of the interceptors in Macomb County. Based on our analysis, a generic cost estimate of pipeline construction and repair methods indicate a cost for Cured-In-Place Pipe to be $6/inch diameter/foot of sewer. Therefore, the following table provides an estimate for performing the CIPP process on different size sewers:

Size	Cost/foot
12"	$72.00
24"	$144.00
36"	$216.00
42"	$252.00
48"	$288.00

Please be advised that these prices are based on typical CIPP projects performed throughout the United States. These prices may vary based on the site and ground conditions, age of pipe, and geographical location.

cc: File

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Garfield/Romeo Arm Interceptor (INSPECTION)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Inspect 7'-0" diameter sewer (PCI-45)	16,100	ft	C.1	$ 4.65	$ 74,865
	Sewer Installed: 2002					
	Inspection Recomm'd: 2022, 2042					
2.0	Inspect 9'-0" diameter sewer (PCI-24)	7,225	ft	C.1	$ 4.65	$ 33,596
3.0	Clean 9'-0" dia. Sewer (PCI-24)	7,225	ft	A - Table 2.7.2	$ 15.89	$ 114,805
	Sewer Installed: 1974					
	Inspection Recomm'd: 2003, 2023					
4.0	Inspect 11'-0" diameter sewer (PCI-12A)	22,405	ft	C.1	$ 4.65	$ 104,183
5.0	Clean 9'-0" dia. Sewer (PCI-12A)	22,405	ft	A - Table 2.7.2	$ 15.89	$ 356,015
	Sewer Installed: 1970					
	Inspection Recomm'd: 2003, 2023					
Subtotal						$ 683,465
	Contractor Overhead & Profit (25%)					$ 170,866
	Total Construction					$ 854,332
	Contingency (30%)					$ 256,299
	Engineering, Legal, Administrative, Management (20%)					$ 170,866
	Total Project Cost					$ 1,281,497

Notes:

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B = Tech Memo - Cost Estimates for Treatment Facilities: List table number.

C = Other source - list source on attached page and attach supporting information.

Other Source

C.1 Spalding DeDecker Associates calculation spreadsheet for Macomb County Interceptor Inspection dated 1/24/03 from Maria Sedki

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence Since 1954

DATE: January 24, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: Maria Sedki, PE

RE: Macomb County Interceptor Inspection

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for the inspection of the following interceptors in Macomb County:

- Lakeshore Interceptor
- Oakland Interceptor
- Romeo/Garfield Interceptor
- 15 Mile Interceptor
- Edison Interceptor

Based on our analysis, the fee to physically enter and inspect the interceptors is approximately $4.65 per lft of large diameter pipe (5 ft in diameter and greater). Please refer to the attached table for a summary of the inspection fees per interceptor.

The fee includes standard confined space entry equipment, the inspection of the interceptor, and a report summarizing the findings of the inspection. The fee does not include however, any coring and structural analysis of the interceptor sewer nor does it include bypass pumping or flow maintenance upstream of the interceptor being inspected.

Please be advised that the inspection fee is preliminary and did not include a detailed review of each interceptor. Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection.

cc: File
George Nichols, PE

Macomb County Interceptor Inspection

MS00003

Preliminary Inspection Fees

Interceptor	Diameter (ft)	Length (ft)	Preliminary Inspection Fee	Preliminary Inspection Days	Cost/lft
Lakeshore Interceptor	11'-0"	23,100 lft	$106,550.00	10 days	$4.61
Oakland Interceptor	8'-0", 8'-9", 9'-6"	21900, 18000, 17700 = 57600 lft	$249,828.00	24 days	$4.34
Romeo/Garfield Interceptor	7'-0", 9'-0", 11'-0"	16100, 7200, 22400 = 45700 lft	$210,050.00	20 days	$4.60
15 Mile Interceptor	5'-0"	15,000 lft	$83,789.00	7 days	$5.59
Edison Interceptor	12'-9"	41,300 lft	$195,186.00	18 days	$4.73
	Total	**182,700**	**$845,403.00**		

Conclusion: Use an average of $4.65/lft when estimating large diameter pipe inspection costs
Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Garfield/Romeo Arm Interceptor (REHAB)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Repair 7'-0" dia. Sewer with shot crete (PCI-45)	35,388	sft	C.3	$ 31.02	$ 1,097,736
	Sewer Installed: 2002					
	Rehab Recomm'd: 2052					
	Sewer Length: 16,100 feet					
2.0	Repair 9'-0" dia. Sewer with shot crete (PCI-24)	20,432	sft	C.3	$ 31.02	$ 633,801
	Sewer Installed: 1974					
	Rehab Recomm'd: 2024					
	Sewer Length: 7,225 feet					
3.0	Repair 11'-0" dia. Sewer with shot crete (PCI-12A)	77,404	sft	C.3	$ 31.02	$ 2,401,072
	Sewer Installed: 1970					
	Rehab Recomm'd: 2020					
	Sewer Length: 22,405 feet					
Subtotal						$ 3,034,873
	Contractor Overhead & Profit (25%)					$ 758,718
	Total Construction					$ 3,793,591
	Contingency (30%)					$ 1,138,077
	Engineering, Legal, Administrative, Management (20%)					$ 758,718
	Total Project Cost					$ 5,690,386

Notes:

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Other Source

C.3 Spalding DeDecker Associates Memorandum dated 1/27/03 from Charles Groover
Re: Cost Estimate for Shot Crete Repairs

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence Since 1954

DATE: January 27, 2003

TO: Dr. S. P. Singh, P. E.
George Nichols, P. E.

FIRM NAME: SDA

FROM: Charles Groover, P.E.

RE: Cost Estimate for Shot Crete Repairs

JOB NO.: MS00003.D1

Below is an estimate per square foot to make Sauereisen repairs to an existing sewer assumed to be large enough for men to enter it to make the repairs. The Sauereisen materials are a cement based product that is similar to shotcrete but is hand applied in this case.Let me know if you need additional information.

Set up traffic control, access shaft, and ventilate for a sewer line 45 feet deep with existing shaft in place	$187,860 lump sum $3.77 per square foot for job of approximately 50,000 square feet
Cost to clean	$5.82 per square foot for a job of approximately 50,000 square feet
Cost to patch with Saueriesen F-120, 210 products	$19.48 per square foot to patch an area with approximately 22,000 square feet

Note: Patch depth was 0.7 inches thick on average. However, the depth would vary with depth of damage from no depth to maybe 1½ - 2 inches. Costs would go up some due to materials and labor but not linearly because of the high set up costs.

Remove traffic control, ventilation, close up shaft and repave	$97,301.50 lump sum $1.95 per square foot for job of approximately 50,000 square feet
Overall estimate	**$31.02 per square foot for job of approximately 50,000 square feet**

cc: File
M Hamood
M Balon

SPALDING DEDECKER ASSOCIATES, INC.
220 WEST CONGRESS, SUITE 400 DETROIT, MI 48226
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TRENTON

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Fifteen Mile Road Interceptor (INSPECTION)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Inspect 5'-0" diameter forcemain & gravity sewer (PCI-15B & 15C)	8,005	ft	A - Table 2.7.1	$ 4.17	$ 33,381
	Sewer Installed: 1972					
	Inspection Recomm'd: 2003, 2023					
2.0	Inspect 5'-0" diameter sewer (PCI-12A)	15,095	ft	C.1	$ 4.65	$ 70,192
	Sewer Installed: 1973					
	Inspection Recomm'd: 2003, 2023					
Subtotal						$ 103,573
	Contractor Overhead & Profit (25%)					$ 25,893
	Total Construction					$ 129,466
	Contingency (30%)					$ 38,840
	Engineering, Legal, Administrative, Management (20%)					$ 25,893
	Total Project Cost					$ 194,199

Notes:

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Other Source

C.1 Spalding DeDecker Associates calculation spreadsheet for Macomb County Interceptor Inspection dated 1/24/03 from Maria Sedki

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 24, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: Maria Sedki, PE

RE: Macomb County Interceptor Inspection

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for the inspection of the following interceptors in Macomb County:

- Lakeshore Interceptor
- Oakland Interceptor
- Romeo/Garfield Interceptor
- 15 Mile Interceptor
- Edison Interceptor

Based on our analysis, the fee to physically enter and inspect the interceptors is approximately $4.65 per lft of large diameter pipe (5 ft in diameter and greater). Please refer to the attached table for a summary of the inspection fees per interceptor.

The fee includes standard confined space entry equipment, the inspection of the interceptor, and a report summarizing the findings of the inspection. The fee does not include however, any coring and structural analysis of the interceptor sewer nor does it include bypass pumping or flow maintenance upstream of the interceptor being inspected.

Please be advised that the inspection fee is preliminary and did not include a detailed review of each interceptor. Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection.

cc: File
George Nichols, PE

Macomb County Interceptor Inspection

MS00003

Preliminary Inspection Fees

Interceptor	Diameter (ft)	Length (ft)	Preliminary Inspection Fee	Preliminary Inspection Days	Cost/lft
Lakeshore Interceptor	11'-0"	23,100 lft	$106,550.00	10 days	$4.61
Oakland Interceptor	8'-0", 8'-9", 9'-6"	21900, 18000, 17700 = 57600 lft	$249,828.00	24 days	$4.34
Romeo/Garfield Interceptor	7'-0", 9'-0", 11'-0"	16100, 7200, 22400 = 45700 lft	$210,050.00	20 days	$4.60
15 Mile Interceptor	5'-0"	15,000 lft	$83,789.00	7 days	$5.59
Edison Interceptor	12'-9"	41,300 lft	$195,186.00	18 days	$4.73
	Total	**182,700**	**$845,403.00**		

Conclusion: Use an average of $4.65/lft when estimating large diameter pipe inspection costs
Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Fifteen Mile Road Interceptor (REHAB)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Repair 5'-0" dia. Sewer with shot crete (PCI-15B & 15C)	12,560	sft	C.3	$ 31.02	$ 389,611
	Sewer Installed: 1972					
	Rehab Recomm'd: 2022					
	Sewer Length: 8,005 feet					
2.0	Repair 5'-0" dia. Sewer with shot crete (PCI-12A)	23,707	sft	C.3	$ 31.02	$ 735,391
	Sewer Installed: 1973					
	Rehab Recomm'd: 2023					
	Sewer Length: 15,095 feet					
Subtotal						$ 1,125,002
	Contractor Overhead & Profit (25%)					$ 281,251
	Total Construction					$ 1,406,253
	Contingency (30%)					$ 421,876
	Engineering, Legal, Administrative, Management (20%)					$ 281,251
	Total Project Cost					$ 2,109,379

Notes:

** Source of cost information coded as follows:

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B = Tech Memo - Cost Estimates for Treatment Facilities: List table number.

C = Other source - list source on attached page and attach supporting information.

Other Source

C.3 Spalding DeDecker Associates Memorandum dated 1/27/03 from Charles Groover
Re: Cost Estimate for Shot Crete Repairs

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 27, 2003

TO: Dr. S. P. Singh, P. E.
George Nichols, P. E.

FIRM NAME: SDA

FROM: Charles Groover, P.E.

RE: Cost Estimate for Shot Crete Repairs

JOB NO.: MS00003.D1

Below is an estimate per square foot to make Sauereisen repairs to an existing sewer assumed to be large enough for men to enter it to make the repairs. The Sauereisen materials are a cement based product that is similar to shotcrete but is hand applied in this case.Let me know if you need additional information.

Set up traffic control, access shaft, and ventilate for a sewer line 45 feet deep with existing shaft in place	$187,860 lump sum $3.77 per square foot for job of approximately 50,000 square feet
Cost to clean	$5.82 per square foot for a job of approximately 50,000 square feet
Cost to patch with Saueriesen F-120, 210 products	$19.48 per square foot to patch an area with approximately 22,000 square feet

Note: Patch depth was 0.7 inches thick on average. However, the depth would vary with depth of damage from no depth to maybe 1½ - 2 inches. Costs would go up some due to materials and labor but not linearly because of the high set up costs.

Remove traffic control, ventilation, close up shaft and repave	$97,301.50 lump sum $1.95 per square foot for job of approximately 50,000 square feet
Overall estimate	**$31.02 per square foot for job of approximately 50,000 square feet**

cc: File
M Hamood
M Balon

SPALDING DEDECKER ASSOCIATES, INC.
220 WEST CONGRESS, SUITE 400 DETROIT, MI 48226
PHONE (313) 967-4700 FAX (313) 967-4707
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OFFICES:
DETROIT
ROCHESTER HILLS
TRENTON

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Edison Corridor Interceptor (INSPECTION)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Clean 12'-9" dia. Sewer (PCI-5, PCI-6, PCI-7)	41,296	ft	A - Table 2.7.2	$ 15.89	$ 656,193
2.0	Inspect 12'-9" dia. Sewer (PCI-5, PCI-6, PCI-7)	41,296	ft	C.1	$ 4.65	$ 192,026
	Sewer Installed: 1969					
	Inspection Recomm'd: 2003, 2023					
Subtotal						$ 192,026
	Contractor Overhead & Profit (25%)					$ 48,007
	Total Construction					$ 240,033
	Contingency (30%)					$ 72,010
	Engineering, Legal, Administrative, Management (20%)					$ 48,007
	Total Project Cost					$ 360,050

Notes:

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B = Tech Memo - Cost Estimates for Treatment Facilities: List table number.

C = Other source - list source on attached page and attach supporting information.

Other Source

C.1 Spalding DeDecker Associates calculation spreadsheet for Macomb County Interceptor Inspection dated 1/24/03 from Maria Sedki

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 24, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: Maria Sedki, PE

RE: Macomb County Interceptor Inspection

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for the inspection of the following interceptors in Macomb County:

- Lakeshore Interceptor
- Oakland Interceptor
- Romeo/Garfield Interceptor
- 15 Mile Interceptor
- Edison Interceptor

Based on our analysis, the fee to physically enter and inspect the interceptors is approximately $4.65 per lft of large diameter pipe (5 ft in diameter and greater). Please refer to the attached table for a summary of the inspection fees per interceptor.

The fee includes standard confined space entry equipment, the inspection of the interceptor, and a report summarizing the findings of the inspection. The fee does not include however, any coring and structural analysis of the interceptor sewer nor does it include bypass pumping or flow maintenance upstream of the interceptor being inspected.

Please be advised that the inspection fee is preliminary and did not include a detailed review of each interceptor. Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection.

cc: File
George Nichols, PE

Macomb County Interceptor Inspection

MS00003

Preliminary Inspection Fees

Interceptor	Diameter (ft)	Length (ft)	Preliminary Inspection Fee	Preliminary Inspection Days	Cost/lft
Lakeshore Interceptor	11'-0"	23,100 lft	$106,550.00	10 days	$4.61
Oakland Interceptor	8'-0", 8'-9", 9'-6"	21900, 18000, 17700 = 57600 lft	$249,828.00	24 days	$4.34
Romeo/Garfield Interceptor	7'-0", 9'-0", 11'-0"	16100, 7200, 22400 = 45700 lft	$210,050.00	20 days	$4.60
15 Mile Interceptor	5'-0"	15,000 lft	$83,789.00	7 days	$5.59
Edison Interceptor	12'-9"	41,300 lft	$195,186.00	18 days	$4.73
	Total	**182,700**	**$845,403.00**		

Conclusion: Use an average of $4.65/lft when estimating large diameter pipe inspection costs
Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No. Task D.1 - CIP Development
Project Name Interceptor Sewer in Macomb County
Project Location Macomb County - Edison Corridor Interceptor (REHAB)
Source of Funds DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Repair 12'-9" dia. Sewer with shot crete (PCI-5, PCI-6, PCI-7)	165,345	sft	C.3	$ 31.02	$ 5,129,002
	Sewer Installed: 1969					
	Rehab Recomm'd: 2019					
	Sewer Length: 41,296 feet					
Subtotal						$ -
	Contractor Overhead & Profit (25%)					$ -
	Total Construction					$ -
	Contingency (30%)					$ -
	Engineering, Legal, Administrative, Management (20%)					$ -
	Total Project Cost					$ -

Notes:

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B = Tech Memo - Cost Estimates for Treatment Facilities: List table number.

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Other Source

C.3 Spalding DeDecker Associates Memorandum dated 1/27/03 from Charles Groover
Re: Cost Estimate for Shot Crete Repairs

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence Since 1954

DATE: January 27, 2003

TO: Dr. S. P. Singh, P. E.
George Nichols, P. E.

FIRM NAME: SDA

FROM: Charles Groover, P.E.

RE: Cost Estimate for Shot Crete Repairs

JOB NO.: MS00003.D1

Below is an estimate per square foot to make Sauereisen repairs to an existing sewer assumed to be large enough for men to enter it to make the repairs. The Sauereisen materials are a cement based product that is similar to shotcrete but is hand applied in this case.Let me know if you need additional information.

Set up traffic control, access shaft, and ventilate for a sewer line 45 feet deep with existing shaft in place	$187,860 lump sum $3.77 per square foot for job of approximately 50,000 square feet
Cost to clean	$5.82 per square foot for a job of approximately 50,000 square feet
Cost to patch with Saueriesen F-120, 210 products	$19.48 per square foot to patch an area with approximately 22,000 square feet

Note: Patch depth was 0.7 inches thick on average. However, the depth would vary with depth of damage from no depth to maybe 1½ - 2 inches. Costs would go up some due to materials and labor but not linearly because of the high set up costs.

Remove traffic control, ventilation, close up shaft and repave	$97,301.50 lump sum $1.95 per square foot for job of approximately 50,000 square feet
Overall estimate	**$31.02 per square foot for job of approximately 50,000 square feet**

cc: File
M Hamood
M Balon

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CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No.	Task D.1 CIP Development
Project Name	Interceptor Sewer in Macomb County
Project Location	Macomb County - North Gratiot Interceptor of Various Sizes
Start Year	2005
End Year	2055
Duration (years)	50
Source of Funds	DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Phase I: 54" Gravity. North Gratiot Interceptor Sewer (NGIS) from H.B. Joy and I-94 to H.B. Joy and 21 Mile Road.	13,100	ft	C.1	$ 4.65	$ 60,915
	Sewer to be Installed: 2005					
	Inspection Recomm'd: 2025, 2045					
2.0	Phase 2: 30" Forcemain. North Gratiot Interceptor Sewer (NGIS). 21 Mile to 25½ Mile (Force Main and Pump Station).	30,850	ft	A - Table 2.7.1	$ 1.79	$ 55,222
	Sewer to be Installed: 2005					
	Inspection Recomm'd: 2025, 2045					
3.0	Phase 3: 36" Gravity. North Gratiot Interceptor Sewer (NGIS). 25½ Mile to North Bay Connection.	2,570	ft	A - Table 2.7.1	$ 1.79	$ 4,600
	Sewer to be Installed: 2005					
	Inspection Recomm'd: 2025, 2045					
4.0	Phase 4: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). North Bay Connection to 26 Mile Road along Gratiot Avenue.	2,350	ft	A - Table 2.7.1	$ 1.79	$ 4,207
	Sewer to be Installed: 2005					
	Inspection Recomm'd: 2025, 2045					
5.0	Phase 5: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). 26 Mile Road to New Haven Road along Gratiot Avenue. The project cost includes the New Haven meter ($125,000) and the Lenox meter ($300,000)	1,750	ft	A - Table 2.7.1	$ 1.79	$ 3,133
	Sewer to be Installed: 2005					
	Inspection Recomm'd: 2025, 2045					
6A	Phase 6A: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). New Haven Road to Township limits (27½ Mile Road) along Gratiot Avenue.	6,200	ft	A - Table 2.7.1	$ 1.79	$ 11,098
	Sewer to be Installed: 2005					
	Inspection Recomm'd: 2025, 2045					
6B	Phase 6B: Various Gravity Sizes. North Gratiot Gravity Interceptor Sewer (NGIS). 27½ Mile Road to 31 Mile Road along Gratiot Avenue.	22,200	ft	A - Table 2.7.1	$ 1.79	$ 39,738
	Sewer to be Installed: 2005					
	Inspection Recomm'd: 2025, 2045					
	Heavy Cleaning	79,020	ft	A - Table 2.7.2	$ 15.89	$1,255,628
	Subtotal					$1,434,540
	Contractor Overhead & Profit (25%)					$ 358,635
	Total Construction					$1,793,175
	Contingency (30%)					$ 537,952
	Engineering, Legal, Administrative, Management (20%)					$ 358,635
	Total Project Cost					$2,689,762

Notes:

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Other Source

C.1 Spalding DeDecker Associates calculation spreadsheet for Macomb County Interceptor Inspection dated 1/24/03 from Maria Sedki

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence Since 1954

DATE: January 24, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: Maria Sedki, PE

RE: Macomb County Interceptor Inspection

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for the inspection of the following interceptors in Macomb County:

- Lakeshore Interceptor
- Oakland Interceptor
- Romeo/Garfield Interceptor
- 15 Mile Interceptor
- Edison Interceptor

Based on our analysis, the fee to physically enter and inspect the interceptors is approximately $4.65 per lft of large diameter pipe (5 ft in diameter and greater). Please refer to the attached table for a summary of the inspection fees per interceptor.

The fee includes standard confined space entry equipment, the inspection of the interceptor, and a report summarizing the findings of the inspection. The fee does not include however, any coring and structural analysis of the interceptor sewer nor does it include bypass pumping or flow maintenance upstream of the interceptor being inspected.

Please be advised that the inspection fee is preliminary and did not include a detailed review of each interceptor. Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection.

cc: File
George Nichols, PE

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TRENTON

Macomb County Interceptor Inspection

MS00003

Preliminary Inspection Fees

Interceptor	Diameter (ft)	Length (ft)	Preliminary Inspection Fee	Preliminary Inspection Days	Cost/lft
Lakeshore Interceptor	11'-0"	23,100 lft	$106,550.00	10 days	$4.61
Oakland Interceptor	8'-0", 8'-9", 9'-6"	21900, 18000, 17700 = 57600 lft	$249,828.00	24 days	$4.34
Romeo/Garfield Interceptor	7'-0", 9'-0", 11'-0"	16100, 7200, 22400 = 45700 lft	$210,050.00	20 days	$4.60
15 Mile Interceptor	5'-0"	15,000 lft	$83,789.00	7 days	$5.59
Edison Interceptor	12'-9"	41,300 lft	$195,186.00	18 days	$4.73
	Total	**182,700**	**$845,403.00**		

Conclusion: Use an average of $4.65/lft when estimating large diameter pipe inspection costs
Each section needs to be evaluated with sewer drawings prior to establishing actual costs for inspection

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No.	Task D.1 CIP Development
Project Name	Interceptor Sewer in Macomb County
Project Location	Macomb County - North Gratiot Interceptor of Various Sizes
Start Year	2005
End Year	2055
Duration (years)	50
Source of Funds	DWSD - 100%

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1.0	Phase I: 54" Gravity. North Gratiot Interceptor Sewer (NGIS) from H.B. Joy and I-94 to H.B. Joy and 21 Mile Road.	13,100	ft			
2	Phase 2: 30" Forcemain. North Gratiot Interceptor Sewer (NGIS). 21 Mile to 25½ Mile (Force Main and Pump Station).	30,850	ft			
3	Phase 3: 36" Gravity. North Gratiot Interceptor Sewer (NGIS). 25½ Mile to North Bay Connection.	2,570	ft			
4	Phase 4: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). North Bay Connection to 26 Mile Road along Gratiot Avenue.	2,350	ft			
5	Phase 5: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). 26 Mile Road to New Haven Road along Gratiot Avenue. The project cost includes the New Haven meter ($125,000) and the Lenox meter ($300,000)	1,750	ft			
6A	Phase 6A: 30" Gravity. North Gratiot Gravity Interceptor Sewer (NGIS). New Haven Road to Township limits (27½ Mile Road) along Gratiot Avenue.	6,200	ft			
6B	Phase 6B: Various Gravity Sizes. North Gratiot Gravity Interceptor Sewer (NGIS). 27½ Mile Road to 31 Mile Road along Gratiot Avenue.	22,200	ft			
	Rehabilitation 2.5%	1,976	ft	C.4	$ 45.00	$ 88,898
	Subtotal					$ 88,898
	Contractor Overhead & Profit (25%)					$ 22,224
	Total Construction					$ 111,122
	Contingency (30%)					$ 33,337
	Engineering, Legal, Administrative, Management (20%)					$ 22,224
	Total Project Cost					$ 166,683

Notes:

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C.4 Spalding DeDecker Associates Memorandum
Interceptor Rehabilitation dated 1/30/03 from George Nichols

MEMORANDUM

- Surveying
- Land Development
- Urban Infrastructure
- Municipal Engineering
- Construction Engineering
- Operations & Maintenance
- Transportation Engineering
- GPS Rental & Training

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

DATE: January 29, 2003

TO: S.P. Singh, PE, PhD

FIRM NAME: SDA

FROM: George P. Nichols, PE GPN

RE: Cost Estimates for Cured-In-Place Pipe (CIPP) Liner

JOB NO.: MS00003

Per your request, we have developed a preliminary cost estimate for CIPP rehabilitation of the interceptors in Macomb County. Based on our analysis, a generic cost estimate of pipeline construction and repair methods indicate a cost for Cured-In-Place Pipe to be $6/inch diameter/foot of sewer. Therefore, the following table provides an estimate for performing the CIPP process on different size sewers:

Size	Cost/foot
12"	$72.00
24"	$144.00
36"	$216.00
42"	$252.00
48"	$288.00

Please be advised that these prices are based on typical CIPP projects performed throughout the United States. These prices may vary based on the site and ground conditions, age of pipe, and geographical location.

cc: File

CS-1314 Wastewater Master Plan - Conceptual Project Estimate for CIP

Category: Interceptors & Trunk Sewers

Estimate by: SDA

Project No.	DWSD CS-1292
Project Name	Odor Control in Macomb County
Project Location	Given below
Start Year	2003
End Year	2003
Duration (years)	1
Source of Funds	DWSD

No.	Item Description	Quantity	Unit	Cost Source**	Unit Amount	Total Cost
1	Clintondale Pump Station Odor Control	1	number	CS-1292 Task Order Nos. 33 & 34 Final Draft Report	$ 74,000	$ 74,000
2	Reimold Avenue and Coleridge Avenue (extended) Meter Chamber Odor Control, MB-11 HR-S-2	1			$ 37,000	$ 37,000
3	Meter Chamber Odor Control, MB-6 CT-S-2 Union Lake Road and Sorrentino Court upstream of Clintondale Pump Station	1			$ 37,000	$ 37,000
4	Meter Chamber Odor Control, MB-32 CT-S-4 Fifteen Mile Road and Kelly Road	1			$ 29,000	$ 29,000
5	Meter Chamber Odor Control, MB-9 FR-S-1 Fifteen Mile Road and Garfield Road South of 15 Mile Road	1			$ 29,000	$ 29,000
6	Meter Chamber Odor Control, MB-4 CT-S-1 Garfield Road and Clinton River Road	1			$ 37,000	$ 37,000
7	Meter Chamber Odor Control, MB-5 CT-S-3 Garfield Road and 18 Mile Road	1			$ 37,000	$ 37,000
8	Meter Chamber Odor Control, MB-21 ST-S-5 Fifteen Mile Road and Schoenherr Road	1			$ 37,000	$ 37,000
9	Meter Chamber Odor Control, MB-26 ST-S-4 Fourteen Mile Road and Detroit Edison Corridor	1			$ 37,000	$ 37,000
10	Meter Chamber Odor Control, MB-20 ST-S-2 Fifteen Mile Road and Dodge Park Road	1			$ 29,000	$ 29,000
11	Meter Chamber Odor Control, MB-22 ST-S-3 Dodge Park Road and Sorrento Boulevard	1			$ 37,000	$ 37,000
12	Meter Chamber Odor Control, MB-23 ST-S-1 Utica Road and Dodge Park Road	1			$ 37,000	$ 37,000
13	Meter Chamber Odor Control, MB-25 UT-S-1 Utica Road and Nichols Street	1			$ 29,000	$ 29,000
	Subtotal					$ 486,000
	Contractor Overhead & Profit (25%)					$ 121,500
	Total Construction					$ 607,500
	Contingency (30%)					$ 182,250
	Engineering, Legal, Administrative, Management (20%)					$ 121,500
	Total Project Cost					$ 911,250

Notes:

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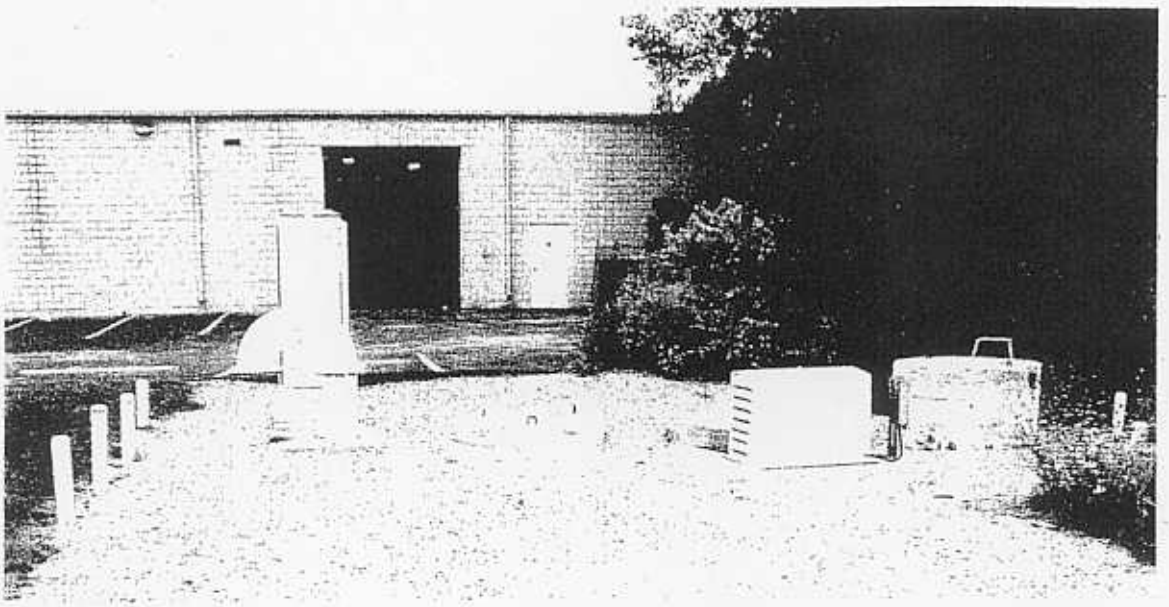
C = Other source - list source on attached page and attach supporting information.

CS-1292 As-Needed Engineering Services



Odor Control Investigation in Macomb County Task Order Nos. 33 & 34

(Final Draft Report)

October 14, 2002

WATER & SEWERAGE DEPT. DETROIT

SPALDING DeDECKER ASSOCIATES, INC.

FINAL DRAFT

Table 10A: Calculated Air Flow Requirements for Carbon Adsorption Systems for the Investigated Sites.

Site		Air Flow (cfm)	
		Calculated Requirements	Commercially Available Model
1	Clintondale Pump Station. Located on the West side of Union Lake Road and South of Shook Road in Clinton Twp.	1457	1600
2	Garfield Pump Station located at the Southeast corner of 21 Mile Road and Garfield Road intersection (to be demolished after the existing 24" force main is replaced by 7' diameter gravity sewer).	Garfield Pump Station is scheduled to be abandoned in Mid-October. It is expected that there may not be an odor problem after the abandonment, however, in consideration of high level of hydrogen sulfide at these locations, appropriate odor control program is recommended for implementation to control the corrosion of concrete sewer pipes. The appropriate treatment technology should be evaluated after the abandonment of the Garfield Pump Station.	
2 (i)	Access Wet Well		
2 (ii)	Upstream Manhole of the Garfield Pump Station on the 36" influent sewer		
2 (iii)	Manhole in front of the Garfield Pump Station Gate on the existing 24" sewer		

FINAL DRAFT

Table 10A: Calculated Air Flow Requirements for Carbon Adsorption Systems for the Investigated Sites.

Site		Air Flow (cfm)	
		Calculated Requirements	Commercially Available Model
2(iv)	Upstream Manhole of the Garfield Pump Station at the southwest corner of Garfield and 21 Mile Roads on the existing 21" sewer		
3	15 Mile Road and Kelly Road. Located on the North side of 15 Mile Road, East of Simon Road and South of Whalen Road	180	300
4	15 Mile Road and Garfield Road located on the East side of Garfield Rd. South of 15 Mile Rd.	250	300
5	14 Mile Road and Detroit Edison Corridor located on the North side of 14 Mile Road and west of DE Corridor	510	800
6	Utica Road and Nichols Street. Located on the West side of Utica Road and South of Nichols Street	260	300
7	Union Lake Road and Sorrentino Court upstream of Clintondale P.S. Located on the West side of Union Lake Road and South of Shook Road	360	800

FINAL DRAFT

Table 10A: Calculated Air Flow Requirements for Carbon Adsorption Systems for the Investigated Sites.

Site		Air Flow (cfm)	
		Calculated Requirements	Commercially Available Model
8	15 Mile Road and Schoenherr Road located on the North side of 15 Mile Road and West of Schoenherr Road	400	800
9	15 Mile Road and Dodge Park Road located on the South side of 15 Mile Road and East of Dodge Park Road	270	300
10	Dodge Park Road and Sorrento Blvd. located on the Northeast corner of Sorrento Blvd. and Dodge Park Road	560	800
11	Utica Road and Dodge Park Road located on the Northwest corner of Utica Road and Dodge Park Road	460	800
12	Reimold Avenue and Coleridge Avenue (extended). Located on the West side of Reimold Ave. at intersection of Coleridge Ave. projected line	450	800

Table 10A: Calculated Air Flow Requirements for Carbon Adsorption Systems for the Investigated Sites.

Site		Air Flow (cfm)	
		Calculated Requirements	Commercially Available Model
13	Garfield Road and Clinton River Road located on the Northwest corner of Garfield Road and Clinton River Road intersection	390	800
14	Garfield Road and 18 Mile Road located on the East side of Garfield Road South of 18 Mile Road	390	800

Capital Cost Estimate:

There would be 1 unit of 1600 cfm @ $74,000.00, 4 units of 300 cfm @ $29,000.00, and 8 units of 800 cfm @ $37,000.00. The total capital cost of 13 carbon adsorption units would be $486,000.00.

Operating Cost Estimate:

The design criteria and operating costs are developed using the following information for carbon adsorption system: