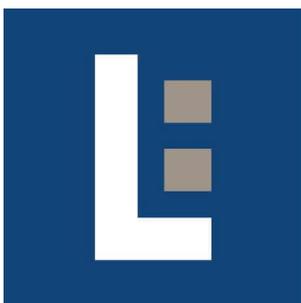




Durand Eastman Beach Outfall Project
City Project # 14329
NYDOS Contract C006967

Prepared for
City of Rochester
Department of Environmental Services
City Hall Room 300B, 30 Church Street
Rochester, New York 14614



Lu Engineers
175 Sullys Trail, Suite 202
Pittsford, New York 14534
585.385.7417 (p)
585.385.3741 (f)
luengineers.com



December 12, 2014

James McIntosh, P.E., City Engineer
City of Rochester
Bureau of Architecture and Engineering
City Hall Room 300B
30 Church Street
Rochester, NY 14614

**Subject: Durand Eastman Beach Outfall Project
City Project #14329**

Dear Jim;

Lu Engineers looks forward to the next step in improving the water quality at Durand Eastman Beach. Our team has worked with the City of Rochester and Monroe County for nearly eight years at this site. We started with the Durand Eastman Park Beach Master Plan and most recently completed the Sherry Swamp Tributary Water Quality Improvement Project.

We completed an emergency culvert inspection of the Lakeshore Boulevard over Sherry Swamp Outfall in 2013. The inspection report findings are attached to our proposal.

We believe that our experience in the Durand Beach Watershed along with our knowledge of necessary improvements needed to enhance the performance of the water quality system, are integral to this project. This experience will allow us to build necessary water quality improvements into the design of the culvert replacement.

We understand the City of Rochester's proposal scoring methodology deducts points for not having our main office within the City limits. Lu Engineers is committed to moving our main office to the City at the end of our current lease which expires in 2016. We are currently in negotiations with a developer and intend to make a formal commitment within the next six weeks. Upon completion of the negotiations, we will forward our letter of intent to Steve Golding and Karen Altman who have been assisting us with this effort.

Thank you for considering Lu Engineers for this contract. Please contact me if you have questions on the content of this proposal.

Sincerely,



Steve Campbell, CHMM
Environmental Division Director

Project Team

Lu Engineers is an employee-owned corporation established in 1980. Our team of professionals specializes in civil, transportation, and environmental engineering. We serve federal, state, and local governments and a large assortment of private industries and developers.

Our services include: wastewater and sanitary sewer systems; engineering surveys and mapping; grading and drainage; road and airfield pavements; environmental assessment and mitigation; wetland delineation and mitigation; environmental compliance audits; Phase I and II asbestos and hazardous material inventory, management and planning; air emission inventory and permitting; preparation of estimates for construction; technical specifications and construction bid documents; schedules and phasing plans; construction monitoring and quality assurance.

Lu Engineers has played an integral role in the improvements of Durand Eastman Beach. Our team has provided environmental engineering and natural resource services at Durand Eastman Beach which include the watershed evaluation, development of the Master Plan, the water quality treatment system, and the Water Quality Improvement Project for Sherry Swamp. We also conducted an emergency culvert inspection in 2013

Shumaker Consulting Engineering & Land Surveying, D.P.C. (SCE) is a certified Women-Owned Business Enterprise (WBE) offering professional services to public and private sector clients throughout the northeastern United States. SCE's services include engineering, environmental, geomatics/survey & mapping and construction review. SCE will provide utility upgrades and replacement

Ravi Engineering and Land Surveying, L.S., P.C. (Ravi) is a consulting firm providing structural, environmental and geotechnical engineering, land surveying, and construction inspection services. They are certified as an MBE / DBE firm. Ravi has a staff of 70 engineers, environmental scientists, professional surveyors and inspectors with experience on municipal planning and design projects. Ravi will provide surveying & mapping support on this project. We have worked with Ravi on numerous projects throughout Monroe County and have an excellent working relationship with them.

Key Personnel

Robert Hutteman, PE Project Manager: Mr. Hutteman's 25 years of professional experience has been widely varied. In addition to his primary role as a structural engineer for various culvert, bridge, and building projects, he has functioned as a construction inspector, team leader/assistant team leader for biennial and interim bridge inspections. Bob inspected the Lakeshore Boulevard over Sherry Swamp Outlet in 2013. Bob will be the Project Manager for the Durand Eastman Beach Outfall Project.

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Steve Campbell, CHMM, Client Manager Mr. Campbell is the Project Manager for our Environmental Term Contract with the City of Rochester. He has worked with the City's Department of Environmental Services for over 20 years. For this project he will provide contract administration, client relations, personnel and resource management, budgeting, and technical guidance.

Susan Hilton, PE, Environmental Engineer Ms. Hilton has nearly 20 years of experience as a Civil and Environmental Engineer. Sue has worked with the City of Rochester and Monroe County to improve the water quality issues at Durand Eastman Beach. She works with numerous municipalities in Upstate New York to improve water quality. She will assist with the design and coordinate all system improvements to ensure water quality is maintained during the culvert replacement.

Bryan Bancroft, M.P.S., CPESC, Environmental Engineer: Mr. Bancroft's experience in the environmental field, focuses on Stormwater/Erosion and Sediment Control, Wetland Delineation and Permitting, and Environmental Review Policy (NEPA and SEQR related issues). Bryan has provided environmental engineering and natural resource services at Durand Eastman Beach which include the watershed evaluation, development of the Master Plan, the water quality treatment system, and the Water Quality Improvement Project for Sherry Swamp. Bryan will complete all required agency permits and hydraulic analysis.

Project Understanding

The City of Rochester wishes to replace a deteriorated culvert section that connects Sherry Swamp to Lake Ontario. The existing 72" riveted plate corrugated metal plate pipe is heavily deteriorated and required emergency repair work in 2014 due to a structural failure of the culvert. Lu Engineers performed an inspection of the culvert in 2013 and is very familiar with the culvert condition and the many issues that will impact its replacement. These issues include;

- The culvert is fairly deep, approximately fifteen feet below grade. Excavation protection will be required to protect adjacent structures and Lakeshore Blvd. during construction.
- The upstream section of the culvert is maintained by Monroe County. Coordination with the County will be required.
- A 42" sewer main crosses the culvert. The sewer main is encased in concrete over the culvert and supporting or bypassing the sewer main during construction will need to be coordinated with Monroe County Department of Environmental Services.
- The knowledge of the recently installed water quality system will be impacted by the proposed work. Coordination will be required.
- Maintaining pedestrian and bicycle traffic will be needed.
- Securing the required environmental permits.



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Lu Engineers has a complete understanding of the potential issues impacting this project because of our involvement with the water quality system design and recent culvert inspection. Our proposed project approach effectively addresses each of these issues.

Project Approach

Based on the results of our 2013 inspection, we recommend that the 100 foot culvert section connecting the two existing manholes be replaced with a new 81” span by 59” rise pipe arch. The pipe arch provides the same hydraulic capacity as the existing culvert and with the lower rise, can pass under the existing sewer main. The new pipe arch will need to connect to the 72” diameter CMP maintained by Monroe County and the existing cast-in-place concrete arch that outfalls to Lake Ontario. The connection of the existing culvert at these two locations is made with a large manhole structure.

The manhole structures consist of laid brick and are severely deteriorated. The large diameter of the culvert sections makes a new precast manhole replacement structure unfeasible. The purpose of the manholes is to allow the culvert to change alignment and to provide access points for future maintenance. We would consider eliminating one of the manhole structures to save project costs. Connecting the pipe arch to the 72” pipe and the concrete arch will require specialized details. Two connection alternatives include using a concrete collar or fabricating a transition section of culvert pipe out of steel plates. The 100 foot section of culvert under Lakeshore Boulevard has one foot of sediment build up along its invert. This material should be removed during construction while access to the pipe is available. This would improve the hydraulic capacity of the pipe and help reduce the sediment load taken in by the water quality system. Removing the sediment will also allow more thorough inspections of the culvert in the future. During our 2013 inspection, the County culvert was found to be in fair condition with no significant distortions.

The weir located at the inlet end of the culvert is in poor condition. The concrete is deteriorated and water is seeping through the joint between the concrete and the steel sheet piling compromising the integrity of the weir. We will evaluate the condition of the weir and provide recommendations for its repair. At this time, we are not certain as to which agency is responsible for the weir’s maintenance, but during the survey and mapping phase of the project, we will identify the responsible agency.



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Monroe County Department of Environmental Services owns and maintains a 42” diameter concrete sewer main that crosses over the culvert. During the installation of the sewer main, the top of the existing culvert was “crushed” downward approximately two feet to allow the sewer to maintain grade over the culvert. This section of sewer main is encased in concrete. The sewer main will need to be supported during construction or bypass pumping will be required. Coordination with DES will be very important.



Since the water quality treatment system for the Sherry Swamp Outfall at Durand Beach has been constructed and in operation, we have learned that changes could be made to the system to reduce maintenance requirements and improve operational performance of the system. These changes will involve impacts to the culvert. While the contractors will be making improvements to the culvert, it is recommended to incorporate any modifications to the treatment system at the same time.

The treatment system takes water from the invert of the culvert and it flows by gravity to a pump station. The pump station pumps storm water to a pretreatment unit and then onto the treatment unit. After treatment, the treated water flows by gravity back to the culvert. The storm water that is drawn off the bottom of the culvert can be storm water from Sherry Swamp or depending on the lake level, can be water from Lake Ontario that backflows into the culvert. There needs to be enough flow in the culvert and the Lake level low enough, for the treatment unit to draw in water from Sherry Swamp and discharge it to Lake Ontario. When flows are lower and the lake level is high, there is a potential for the treatment unit water to recycle. The recycling storm water is not problematic; it just isn't the most efficient way to operate the system. Drawing water from the lower level of the culvert introduces debris into the system. The pump station has a wastewater pump in it which has been designed to pass a 3” solid. So, debris from the bottom of the culvert is being passed through the pump and is ending up in the pretreatment unit. The pretreatment unit is catching the debris but additional maintenance will be necessary by the City in order to maintain the system.



The solution to stop the water from recycling and limiting the amount of debris and sediments in the treatment system is to collect storm water from the surface of Sherry Swamp and send it directly, via dedicated pipe, to the treatment unit. Taking water from the surface of the swamp will limit the amount of debris screened by the pre-treatment unit, thus reducing the maintenance requirements. If the water is taken from the swamp directly to the treatment system, treated and discharged without the ability to recycle, the City will not spend the money to treat water that has been previously treated. We recommend that any proposed modifications to the water quality system be incorporated with the culvert repair contract.

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The existing pedestrian and bicycle traffic will need to be maintained during construction. During the culvert repair work completed in 2014, the pedestrian and bicycle traffic was maintained to the north of the construction area. This approach keeps the pedestrian traffic away from the vehicular traffic along Westshore Boulevard and provides a higher level of safety for the trail users. The culvert repair will require significant coordination with the regulatory agencies regarding permits.

Water/Wetland Permits

This project involves Sherry Swamp Tributary (O-114). Tributary O-114 is designated as a class B stream by the NYSDEC. This project will involve the “in-kind” replacement of the existing culvert at this location. Due to the classification of O-114, replacement of the culvert will require an Article 15 Protection of Waters Permit for Stream Disturbance.

One State Wetland, State Wetland RH-16, is located across Lakeshore Boulevard from the project culvert. Due to the proximity of State Wetland RH-16 (also known as Sherry Pond), a small portion of the project culvert is located within the regulated adjacent area of State Wetland RH-16. The southernmost manhole of the project culvert is located in the adjacent area. If work on the culvert is required within the regulated adjacent area of the wetland, an Article 24 State Wetland Permit will be required for the project.

The project will also require a Water Quality Certification pursuant to section 401 of the Clean Water Act and 6NYCRR part 608.

The culvert replacement is covered under U.S. Army Corps of Engineers Section 404 Nationwide Permit number 3 for Maintenance. The project involves the replacement of a currently serviceable structure. The proposed culvert replacement includes only minor changes in materials, and construction techniques, which are necessary to accommodate changes in safety standards. The culvert length, size and invert elevations will not change as a result of the culvert replacement.

This project will not involve items identified in the Specific Regional Conditions of Nationwide Permit 3. Note that the General Conditions of the 2012 Nationwide Permit Program must be met in order to comply with Section 404.

Hydraulics and Culvert Capacity

It is not anticipated that a hydraulic analysis of the culvert and contributing drainage area will be conducted for the culvert replacement. The existing culvert does not have a history of flooding related to being undersized, and recent improvements to the Tributary O-114 watershed further reduce the peak flows of the stream.

These improvements included the construction of an off-line water quality detention basin, as well as the restoration of the stream channel, which resulted in a wider, vegetated stream with increased hydraulic capacity. The basin receives diverted stream flow during storm events, which are then released gradually, back in to the improved stream channel, reducing impacts to the receiving water bodies. Based on these improvements to the system immediately upstream from the project culvert, and our knowledge of the existing culvert, an in-kind replacement of the culvert will likely be warranted.

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Project Staffing

<i>Phase 1. Preliminary Investigation</i>		
<i>Team Member</i>	<i>Title</i>	<i>Hours</i>
Steve Campbell	Contract Manager	2
Robert Hutteman	Project Manager	14
Susan Hilton	Environmental Engineer	1
Jason Messenger	Project Engineer	18
Ravi	Surveyor	40
Total Hours: 69		
<i>Phase 2. Design, Program and Schematic Preliminary Design</i>		
Steve Campbell	Contract Manager	18
Robert Hutteman	Project Manager	18
Susan Hilton	Environmental Engineer	40
Jason Messenger	Project Engineer	40
Bryan Bancroft	Environmental Engineer	48
Shumaker	Utility Relocation	24
Total Hours: 188		
<i>Phase 3. Final Design</i>		
Steve Campbell	Contract Manager	12
Robert Hutteman	Project Manager	16
Susan Hilton	Environmental Engineer	63
Jason Messenger	Project Engineer	58
Bryan Bancroft	Environmental Engineer	32
Ravi	Surveyor	8
Shumaker	Utility Relocation	12
Total Hours: 201		
<i>Phase 4. Bidding</i>		
Robert Hutteman	Project Manager	4
Jason Messenger	Project Engineer	6
Total Hours: 10		
<i>Phase 5. Construction</i>		
Steve Campbell	Contract Manager	12
Robert Hutteman	Project Manager	25
Jason Messenger	Project Engineer	12
Total Hours: 49		
<i>Construction Inspection (based on 90 day schedule)</i>		
Sean Schumacher	Construction Inspection	450
Total Hours: 450		

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Basic Services Fee

Phase 1. Preliminary Investigation	
Lu Engineers	\$3,000
Ravi	\$4,000
Lump Sum	\$7,000
Phase 2. Design, Program and Schematic Preliminary Design	
Lu Engineers	\$15,000
Shumaker	\$ 2,500
Lump Sum	\$ 17,500
Phase 3. Final Design	
Lu Engineers	\$15,000
Shumaker	\$ 2,500
Ravi	\$ 1,000
Lump Sum	\$ 16,000
Phase 4. Bidding Phase	
Lu Engineers	\$2,000
Lump Sum	\$2,000
Phase 5 Construction Phase	
Lu Engineers	\$5,500
Lump Sum	\$5,500
Total Phase 1-5	\$48,000
Construction Inspection (Additional Services)	
Lu Engineers	\$36,000
Lump Sum	\$36,000

Estimated Direct Expensed

Fringes and Supplemental Benefits	\$1,000
Printing	\$1,500
Total	\$2,500

Our total project cost, including estimated direct expenses is \$50,500.

Lu Engineers and our subconsultants will comply with the Rochester Living Wage Ordinance pursuant to Section 8A-18 of the Rochester Municipal Code.

Mr. Campbell began his career in 1987 at EPA Headquarters in Washington D.C. and has been at Lu Engineers since 1999 and Environmental Division Director since 2009. He is currently the Project Manager for our Environmental Term Contracts with the Cities of Rochester and Watertown. Mr. Campbell provides direction on all phases of environmental work from air sampling to evaluation of employee exposures to comprehensive air, soil, water and groundwater testing for EPA/NYSDEC environmental cleanup projects.

Project Experience

City of Rochester Environmental Term Contract, Rochester, NY

- ◆ Contract Manager
 - Completed asbestos surveys for all city-owned buildings
 - Developed a comprehensive Asbestos Management Plan
 - Completed over 150 environmental projects under this term agreement
 - Projects have included soil, water and groundwater testing, asbestos identification and abatement, mold and lead surveys, soil vapor intrusion testing and mitigation

Durand Eastman Park, Sherry Swamp Tributary Water Quality Improvement Project

- ◆ Project Manager
 - Responsible for client relations and management of personnel and resources
 - Identified potential immediate and future park facility needs
 - Provided oversight of wetland delineation and preparation of the Wetland Delineation Report (wetlands consisted of multiple cover types)
 - Oversaw the design of an off-line Water Quality Basin that acted as mitigation for wetland impacts identified during the permitting process
 - Oversaw the preparation of design plans, specifications and cost estimate for the project, covering features such as excavation, grading, piping, structures, landscaping, stormwater pollution prevention plan (SWPPP), and sediment and erosion control practices.

Durand Beach Water Quality Treatment System

- ◆ Project Manager
 - Responsible for client relations and management of personnel and resources
 - Assisted with coordination with NYSDEC regarding the proposed project to modify the existing culvert and construct the water quality treatment system
 - Managed communication with vendors and subcontractors to evaluate water treatment systems designed to reduce e-coli discharges into Lake Ontario
 - Quality Control on design documents and bid specifications and construction oversight

Durand Eastman Park Master Plan

- ◆ Project Manager
 - Responsible for client relations and management of personnel and resources
 - Oversight of delineations of wetlands, ponds and tributaries adjacent to Lakeshore Boulevard
 - Oversight of assessment of all tributary outfalls along Durand Beach and documented associated watershed condition, flows and cover types
 - Quality control on all documents provided to the City including the Environmental Impact Statement (EIS) and the Final Master Plan
 - Evaluated potential e-coli sources that had the ability to impact Durand Beach water quality

Durand Eastman Park Watershed Evaluation

- ◆ Project Manager
 - Responsible for client relations and management of personnel and resources
 - Review and field observation of watersheds contributing to stormwater flow at Durand Beach Park
 - Record review and coordination with municipal agencies in an effort to determine pollutant sources contributing to the causes for repeated beach closure
 - Quality Control for all reports, mapping, permit applications and regulatory correspondence



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(585) 385-3741—fax
www.luengineers.com



Education

B.S., General Science, 1987

Groundwater Hydrogeology and
Environmental Remediation,
Graduate Level Studies

Certifications

Certified Hazardous Materials
Manager (CHMM)

OSHA 40-Hour Hazardous Waste
Site Operations and Emergency
Response (HAZWOPER)
Certification

OSHA/Emergency Response
Incident Command
US Department of Transportation
Hazardous Materials

Mr. Hutteman's 25 years of professional experience has been widely varied. In addition to his primary role as a structural engineer for various culvert, bridge, and building projects, he has functioned as a construction inspector, team leader/assistant team leader for biennial and interim bridge inspections. Bob inspected the Lakeshore Boulevard over Sherry Swamp Outlet in 2013. Bob will be the Project Manager for the Durand Eastman Beach Outfall Project.

Project Experience

Durand Eastman Beach Outfall

◆ ***Project Manager***

- Emergency culvert inspection project
- Led the culvert inspection team
- Responsible for following all confined space protocol
- Presented the results of the inspection in an Inspection Report that outlined the needed culvert repairs, utility conflicts, permitting requirements, and construction costs

Schlegel Road Culvert Replacement, Webster, NY, MCDOT

◆ ***Principal-In-Charge***

- Provided design services for the replacement of a concrete box culvert
- Project requirements included preliminary and final design, hydraulic analysis, maintenance and protection of traffic, utility coordination and environmental permitting

Culvert Replacements, Region 4, NYSDOT

◆ ***Project Manager***

- Provide design services on culvert replacements in various counties of NYSDOT Region 4
- Work included survey and mapping, preliminary design, environmental compliance, detailed design, final PS&Es, and project management

Culvert & Wall Repair or Replacement, Region 6, NYSDOT

◆ ***Project Manager***

- Provided oversight of surveying, landscape architecture and hazardous/materials investigation for culvert repair or replacement projects
- Survey services included topographic survey, right-of-way mapping, hydraulic cross sections for the sixteen culvert sites located within various counties in Region 6
- Over 20 property acquisition maps were prepared

Gouverneur Riverwalk Pedestrian Bridge, Village of Gouverneur, St. Lawrence County

◆ ***Project Manager***

- Provided design services on the \$1.2 million pass-through Gouverneur Riverwalk Pedestrian Bridge
- This project installed 2,500 feet of sidewalk along a state highway that provided a safe pedestrian link between the Village and the Village parks
- The project included the construction of a 240 foot span pedestrian bridge spanning the Oswegatchie River connecting Harry L. Mills Memorial Park with the Riverview Recreation Park
- The trail system and bridge are enjoyed by walkers, bicyclists, hikers, and other non-motorized users
- The completed trail system connects seven major activity centers within the Village



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Education

B.S., Civil Engineering, 1989
University of Buffalo

B.S., Physics, 1987
State University
College of Buffalo

Certifications

Professional Engineer, NY,
License No. 072062

Associations

Association of Bridge
Construction & Design (ABCD)

American Council of Engineering
Companies (ACEC)

Ms. Hilton has nearly 20 years of experience as a Civil and Environmental Engineer. Sue has worked with the City of Rochester and Monroe County to improve the water quality issues at Durand Eastman Beach. She works with numerous municipalities in Upstate New York to improve water quality. She will assist with the design and coordinate all system improvements to ensure water quality is maintained during the culvert replacement.

Project Experience

Durand Beach Water Quality Treatment System, Rochester, NY

- ◆ Project Manager
 - Performed Construction Administration and over site of the installation of the treatment unit at Durand Beach
 - Reviewed contractor shop drawings for the project
 - Advised the City on proposed change orders and payment applications

Durand Beach Water Quality Basin, Monroe County, NY

- ◆ Project Manager
 - Performed Construction Administration and over site of the construction of the X acre water quality basin located upstream of Sherry Swamp.
 - Advised Monroe County on the handling of potentially contaminated soil encountered while excavating the basin.
 - Reviewed contractor shop drawings for the project.
 - Advised the County on proposed change orders and payment applications.

Monroe County Pump Station Term Contract, Monroe County, NY

- ◆ Project Manager
 - Design of modifications to the Rocky Coast Pump Station forcemain to allow for installation of an air relief valve.
 - Selecting replacement pumps and interior painting at Lake/Merrill Street Pump Station.
 - Improved aesthetics by lowering station to grade at the Forestview Pump Station.
 - Selected replacement pumps for the station.
 - Currently working on station modifications to install a flow meter, new energy efficient pumps, piping and valves at the Elmwood Avenue Pump Station.

Charlotte Pump Station Rehabilitation, Rochester, Monroe County, NY

- ◆ Project Engineer
 - Selected and specified new dry-pit submersible pumps, adjustable frequency drives, sewage grinder, activated carbon odor control system, miscellaneous piping valves, site improvements, mag meter, sump pumps and wet well modifications.
 - Coordinated work with architectural, HVAC and electrical subconsultants.
 - Prepared Design Report along with plans, specifications and an engineer's cost estimate.

McEwen Drive Pump Station Improvements, Webster, Monroe County, NY

- ◆ Project Engineer
 - Selected and specified replacement pumps, new adjustable frequency drives, odor control system and upgrade of the flow metering system and power supply.
 - Investigated installation of a sewage grinder, review of hydraulics and pump operations and building facade upgrades.
 - Prepared Design Report along with plans, specifications and an engineer's cost estimate.

Orchard Whitney Brownfield Site, Rochester, NY

- ◆ Project Manager
 - Prepared plans and specifications for the asbestos removal and building demolition of the 7 story high rise building on the site.
 - Reviewed contractor submittals and answered questions during construction.
 - Provided over site of the asbestos air and project monitoring activities for the project.



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Education

B.S., Chemical Engineering
1993
Clarkson University

Certifications

Professional Engineer, NY
License No. 079942

NYSDOL Asbestos Designer

NYSDOL Asbestos Inspector

OSHA 40-Hour
Hazardous Waste Site Operations
and Emergency Response
(HAZWOPER) Certification

Mr. Bancroft's experience in the environmental field, focuses on Stormwater/Erosion and Sediment Control, Wetland Delineation and Permitting, and Environmental Review Policy (NEPA and SEQR related issues). Bryan has provided environmental engineering and natural resource services at Durand Eastman Beach which include the watershed evaluation, development of the Master Plan, the water quality treatment system, and the Water Quality Improvement Project for Sherry Swamp. Bryan will complete all required agency permits and hydraulic analysis.

Project Experience

Durand Eastman Park, Sherry Swamp Tributary Water Quality Improvement Project

- ◆ Project Engineer/Wetland Biologist
 - Identified potential immediate and future park facility needs (i.e. siltation, stream drainage improvements)
 - Conducted wetland delineation and preparation of Wetland Delineation Report
 - Delineated wetlands including multiple cover types: forested, emergent, shrub/scrub, perennial streams
 - Submitted all required applications for permits to USACE and NYSDEC
 - Provided solutions to address sediment deposition that resulted in near-vertical banks (i.e. cut back banks and introduce native plantings)
 - Assisted in design of an off-line Water Quality Basin that acted as mitigation for wetland impacts identified during the permitting process
 - Assisted in preparation of design plans, specifications and cost estimate for the project, covering features such as excavation, grading, piping, structures, landscaping, stormwater pollution prevention plan (SWPPP), and sediment and erosion control practices.

Durand Beach Water Quality Treatment System

- ◆ Permitting Specialist
 - Coordinated with NYSDEC regarding the proposed project to modify the existing culvert and construct the water quality treatment system
 - Successfully obtained Article 15 Stream Disturbance permitting from NYSDEC on an accelerated schedule to complete the project

Durand Eastman Park Master Plan

- ◆ Wetland Delineator/Natural Resources Specialist
 - Conducted wetland delineations of wetlands, ponds and tributaries adjacent to Lakeshore Boulevard
 - Assessed all tributary outfalls along Durand Beach and documented associated watershed condition, flows and cover types

Durand Eastman Park Watershed Evaluation

- ◆ Natural Resources Technician
 - Assisted in the review of watersheds contributing flow to Durand Beach Park
 - Assisted in record review and coordination with Municipal agencies in an effort to determine pollutant sources contributing to the causes for repeated beach closure



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Education

MPS, Water & Wetland Resources, 2005

BS, Environmental Management, 2002

Certifications

Certified Professional in Erosion and Sediment Control (CPESC)

OSHA 40-Hour Hazardous Waste Site Operations and Emergency Response (HAZWOPER) Certification



While providing construction inspection services for the City of Rochester's Durand Eastman Park Beach Water Quality Improvement project, Lu Engineers noted that existing culvert connecting Sherry Swamp and Lake Ontario was in poor condition and may be impacted by the water quality improvement project's construction.

Lu Engineers performed an emergency culvert inspection and developed repair recommendations. The recommended repair alternative was to replace approximately 100 feet of existing culvert with a new corrugated plate arch. This alternative was chosen to avoid conflicts with an existing 42" diameter sewer main.

An Inspection Report was prepared outlining recommended repairs, utility conflicts, hydraulic analysis, required environmental permits, and construction costs.

Contact

Robert Hutteman, PE
President
585.385.7417 ext. 220
rhutteman@luengineers.com



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Pittsford, NY 14534
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Lu Engineers was the Prime Consultant for the Durand Eastman Park Master Plan (“Plan”). The Plan focused on improving water quality for Durand Beach and site and building infrastructure improvements for the project area.

We prepared a comprehensive master plan program to include all improvements required to achieve project goals and meet regulatory approvals including: options for in-stream treatment for water quality improvements, option for diversion/retention of stream outfalls, parking capacity ranges, and building programs. This work was all completed based on our comprehensive evaluation of the Durand Park watershed.

Lu Engineers prepared a site analysis map overlay and summary, consisting of the proposed program of improvements, the findings of the site inventory, agency and public input. The site analysis included conclusions about opportunities of the project area, constraints, potential impacts and key project issues related to siting and development of the program of improvements and achievement of project goals and objectives.

Lu Engineers provided RPR services for the installation of the filtration system for the Durand Beach Water Quality Improvement project.



Client: City of Rochester
Contact: Joann Beck
Phone: 585.428.6828
Completion Date: 2013



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Lu Engineers performed an emergency culvert inspection and developed repair recommendations. The recommended repair alternative was to replace approximately 100 feet of existing culvert with a new corrugated plate arch. This alternative was chosen to avoid conflicts with an existing 42" diameter sewer main.

An Inspection Report was prepared outlining recommended repairs, utility conflicts, hydraulic analysis, required environmental permits, and construction costs.

Contact

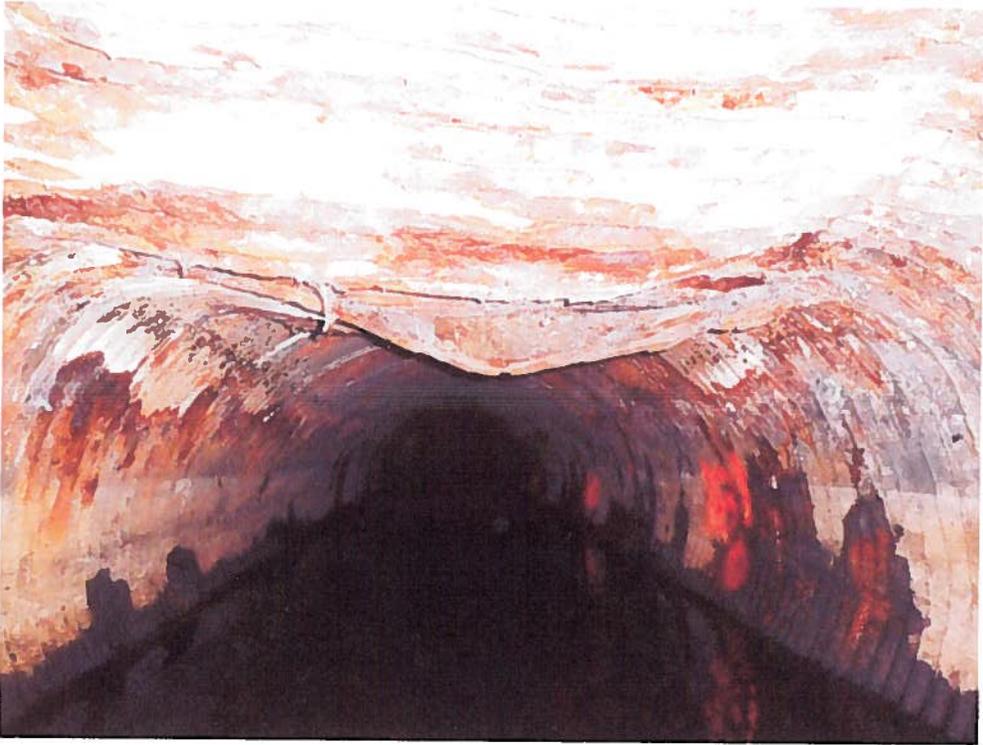
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President
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585.385.3741 (f)
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**Lakeshore Boulevard over
Sherry Swamp Outfall**

CITY OF ROCHESTER



City of Rochester, NY

CULVERT INSPECTION REPORT

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CHAPTER I - INTRODUCTION

Lu Engineers is currently providing construction inspections services for the City of Rochester's Durand Eastman Park Beach Water Quality Improvements Project. During the construction phase of this project, the condition of the six foot diameter corrugated metal pipe (cmp) was observed to be in poor condition. Based on the poor condition of the culvert, the City of Rochester requested Lu Engineers to perform an inspection of the culvert and to provide repair recommendations under a supplemental agreement to their current construction inspection services agreement. This report provides a detailed description of the existing culvert condition, recommended repair alternatives and a probable opinion of construction costs.

CHAPTER II - PROJECT IDENTIFICATION AND CONDITIONS

A. Project Identification

The purpose of this Inspection Report is to summarize the inspection findings and to provide repair recommendations to extend the service life of the culvert.

B. Existing Condition and Needs

1. Culvert Geometry

The existing culvert provides an outfall for Sherry Swamp, located south of Lakeshore Boulevard, and discharges into Lake Ontario. The existing culvert is 230 feet in length and is comprised of three different culvert sections. The upstream section is a 72" bolted plate cmp and is 100 feet in length. The inlet is controlled by a weir structure. This upstream section is within the right-of-way of Lakeshore Boulevard and Monroe County DOT has maintenance responsibility for this section.

The middle section of the culvert is 80 feet in length and has a manhole at each end. This section of culvert is a 72" riveted plate cmp. The middle section runs at a 30 degree skew from the upstream culvert section. The upstream manhole and the first ten feet of this section fall within the right-of-way and the Monroe County DOT has maintenance responsibility. The remainder of this middle section, 70 feet and the second manhole structure, are located on City property and fall under the maintenance responsibility of the City.

The third culvert section is a cast-in-place concrete arch culvert and is at a 45 degree skew from the middle culvert section. The arch has dimensions of 7'-0" width by 7'-8" rise. This culvert section is approximately 50 feet in length and was observed to be in good condition. This section of culvert was not part of the project scope and therefore not inspected.

For a plan view of the culvert see Appendix "A".

2. Existing Condition

a. Upstream Culvert Section, (Sta 0+00 to 1+00)

The weir located at the inlet end is covered with debris. The structural concrete supporting the weir structure is deteriorated and spalling. Steel sheet piling provides a headwall across the inlet end. On the west face of the inlet, water is bypassing the weir through a gap between the sheet piling and weir structure.

The bottom of the cmp is covered with approximately six to twelve inches of sediment. The bottom of the pipe was not visible for inspection and its condition could not be visually documented. At ten foot intervals, a 5/8" diameter steel rod was driven through the silt to the cmp invert. At no location could the rod be driven through the invert of the cmp using a two pound hammer.

The pipe is covered with surface corrosion along the bottom half of the pipe. The crest of the pipe is also covered with surface corrosion. A few of the nuts, (5%), have

significant section loss and disintegrate when struck with a two pound hammer. No significant section loss, (greater than 50%), was observed within the upstream section.

The upstream section of the cmp generally has a good alignment and no significant pipe distortions were observed. No string-line measurements were taken within this section to quantify pipe distortions.

Groundwater infiltration was observed along the bottom third of the pipe at a number of locations along the east and west walls of the culvert. The inside surface of the pipe was wet and at a few locations, a small stream of water was visible. Below is a list of locations where water infiltration was observed.

Station	West Wall	East Wall
0+10 to 0+15	X	X
0+18		X
0+20 to 0+30	X	
0+22		X
0+25		X
0+30 to 0+40	X	X
0+45	X	X
0+55	X	X
0+72	X	X
0+85	X	X
0+93		X

b. Middle Culvert Section, (Sta 1+00 to 1+80)

The middle section of culvert spans 70 feet between the two manhole structures, and then has a 10' length between the second manhole structure to the cast-in-place concrete arch culvert section. The 72" diameter riveted plate cmp is heavily corroded and has numerous areas of 100% section loss. The section loss is present along the bottom half of the culvert between the water surface and spring-line of the culvert.

Areas of section loss were observed at the following locations;

Station 1+05	100% section loss over a 2' long x 1' high area on the west wall
Station 1+15	100% section loss over a 1' diameter area on the west wall
Station 1+25	100% section loss in pipe on east wall, over 6 corrugations
Station 1+30	100% section loss in west wall, 1' diameter
Station 1+35	100% section loss in west wall, 1' diameter
Station 1+60	100% section loss in east wall
Station 1+60	100% section loss along west wall, over a 15' length

The bottom of the cmp is covered with approximately six to twelve inches of sediment. The bottom of the pipe was not visible for inspection and its condition could not be visually documented. At ten foot intervals, a 5/8" diameter steel rod was driven through the silt to the cmp invert. At no location could the rod be driven through the invert of the cmp using a two pound hammer.

Groundwater infiltration was observed along the bottom third of the pipe at a number of locations along the east and west walls of the culvert. The inside surface of the pipe was wet and at a few locations, a small stream of water was visible. Below is a list of locations where water infiltration was observed.

Station	West Wall	East Wall
1+10	X	
1+17		X
1+25	X	X
1+43	X	X

The top of the cmp is caved in between 1'-6" to 2'-0" at station 1+25. This is approximately under the location where the sanitary sewer crosses over the culvert. The top seam of the culvert is spread apart approximately 6" exposing the backfill material above the culvert. During the inspection a transit and level rod were used to vertically locate the sanitary sewer and the top of the culvert. It was determined that the invert of the sanitary sewer is 6" to 12" lower than the top of the culvert.

The majority of the culvert barrel, (95%), is covered with corrosion. The heaviest, most severe corrosion is adjacent to the waterline over a three foot height. This corrosion has lead to areas of 100% section loss.

Manhole #1 is located at station 1+00 and provides for a change in the culvert alignment. The manhole is comprised of laid brick and a 9" thick cast-in-place roof slab. Above the roof slab, a 4'-0" diameter by 3'-6" tall precast manhole structure allows access to the culvert. The manhole has a 6'-9" dimension in the north/south direction and is 6'-3" in the east/west direction.

Manhole #1 is in poor condition. The north wall has been displaced 2'-0" into the manhole exposing the earth fill material and compromising the support of the roof slab. A full height vertical crack was observed in the west wall face of the structure.

Manhole #2 is located at station 1+70 and provides a change in culvert alignment and connection to the cast-in-place arch section. The manhole is 6'-6" square and is made up of laid brick and cast-in-place walls. It appears that the cast-in-place concrete was a repair to the structure. The wood forming is still in place along the interior of the manhole. The structure has a 9" thick cast-in-place roof slab and a precast concrete riser to grade. A 24" cmp enters the manhole from the southwest and appears to have been plugged 20' from the manhole. This manhole is in poor condition.

Two 1-1/2" diameter steel pipes run through the entire length of culvert. We believe the pipes may have been previously used as a water supply. The pipes terminate at station 0+10 and are just resting on the culvert invert.

C. Hydrology/Hydraulics

The existing culvert appears to provide adequate hydraulic capacity. The capacity of the culvert is influenced by the level of Lake Ontario. There is no recent history of flooding due to the culvert size. The high water mark in the culvert is 1'-6" below the crest of the culvert.

A detailed hydraulic analysis is not part of the project scope. Any proposed alternative would match the capacity of the existing culvert section.

A smooth lined corrugated plastic pipe was considered as a possible alternative. However, based on a preliminary analysis it was determined that due to the short length of the culvert, the improved hydraulics of a smooth interior pipe does not yield any increase flow capacity.

D. Environmental Considerations

1) SEQR Classification

This culvert project would be classified as a Type II project in accordance with 6NYCRR Part 617, State Environmental Quality Review (SEQR) Act. The City of Rochester would act as the lead agency. In accordance with 6NYCRR Part 617.5(c)(2), the project is classified as: ". . . replacement, rehabilitation or reconstruction of a structure or facility, in kind, on the same site, including upgrading buildings to meet building or fire codes, unless such action meets or exceeds any of the thresholds in section 617.4 of this Part"

This project is identified as one that will not have a significant effect on the environment, and as such, further environmental review under SEQR is not required.

2) Surface Waters/Wetlands

One State Wetland, State Wetland RH-16, is located across Lakeshore Boulevard from the project culvert. Due to the proximity of State Wetland RH-16 (also known as Sherry Pond), a small portion of the project culvert is located within the regulated adjacent area of State Wetland RH-16. The southernmost manhole of the project culvert is located in the adjacent area.

This project involves Sherry Swamp Tributary (O-114). Tributary O-114 is designated as a class B(t) stream by the NYSDEC. This project will involve the "in-kind" replacement of the existing culvert at this location. Due to the classification of O-114, replacement of the culvert will require an Article 15 Protection of Waters Permit for Stream Disturbance.

The project will require a Water Quality Certification pursuant to section 401 of the Clean Water Act and 6NYCRR part 608.

The culvert replacement is covered under U.S. Army Corps of Engineers Section 404 Nationwide Permit number 3 for Maintenance. The project involves the replacement of a currently serviceable structure. The proposed culvert replacement includes only

minor changes in materials, and construction techniques, which are necessary to accommodate changes in the safety standards. The culvert length, size and invert elevations will not change as a result of the culvert replacement.

This project will not involve items identified in the Specific Regional Conditions of Nationwide Permit 3. Note that the General Conditions of the 2012 Nationwide Permit Program must be met in order to comply with Section 404.

Anticipated Permits and Approvals

The proposed project will require the following permits and approvals for construction and operation of the facility:

<i>Permit Required</i>	<i>Regulatory Agency</i>
Section 404 Nationwide Permit 3, Maintenance	United State Army Corps of Engineers
Section 401 Water Quality Certification	New York State Department of Environmental Conservation
Article 15 Stream Disturbance Permit	New York State Department of Environmental Conservation
Utility Relocation	Affected Utility Owner

E. **Utility Inventory**

The following utility companies own facilities within the project limits that may have the potential to be affected by the construction of this project:

- Monroe County Pure Waters, Sanitary Sewer.

CHAPTER III - ALTERNATIVES

A. Alternatives Considered

The two alternatives considered to restore the structural capacity of the culvert and reduce future maintenance costs are;

1. Culvert Rehabilitation
 - 1A. Culvert Repair
 - 1B. Slip Lining
2. Culvert Replacement

A description of the scope and feasibility of each alternative is as follows:

Alternative 1 - Culvert Rehabilitation

Alternative 1-A:

Repair of the existing culvert would require the installation of new plate sections at locations of severe section loss. This would require excavating the pipe to install the new plate sections. This alternative will not be considered further since its construction cost will be similar to the culvert replacement alternative.

Alternative 2-B:

Slip lining consists of the installation of a new pipe within the existing pipe. Due to the deformation of the existing pipe at the sanitary sewer crossing, slip lining with a new pipe is not a feasible alternative unless the sanitary sewer is relocated. Slip lining can also consist of the installation of a protective lining material to protect the host pipe material. The existing culvert has extensive section loss which has reduced its structural capacity. Slip lining does not provide any additional structural support. Slip lining the culvert with a new lining material is not a feasible alternative and will no longer be considered.

Alternative 3 - Culvert Replacement

This alternative will replace the existing culvert along the same vertical and horizontal alignment and is the recommended feasible alternative. This alternative will involve removal of the 72" cmp pipe and replace it with an 81" span by 59" rise pipe arch. The pipe arch provides the same flow capacity as the existing culvert. The pipe arch will pass under the sanitary sewer without requiring relocation. The existing sanitary manhole to the west will need to be supported with steel sheet piling during construction. The existing 42" diameter concrete sanitary sewer line will also need to be temporarily supported during construction or bypass pumping used to maintain sewer flow.

Steel sheet piling will be used to provide excavation protection during the culvert replacement. Based on site constraints and existing features, the lay back of the excavation is not a feasible alternative.

Manholes no. 1 and no. 2 both need repair and or replacement. After discussing the manhole dimensions with a local precast concrete facility, it was determined that due to the large diameter and

size of the manhole, precast would not be an economical alternative. Cast-in-place concrete structure/vault with precast risers is a feasible alternative. The structures could be cast on site and then set in place to limit the dewatering duration. The rehabilitation of manhole no. 1 is not feasible since it will likely be damaged beyond feasible repair during the excavation process.

Manhole no. 2 has been repaired previously and could possibly be rehabilitated. It is our recommendation that details and specifications be prepared to replace both manholes, and if during construction rehabilitation of manhole no. 2 is a feasible alternative, a change order be executed.

B. Utility, right-of-way, and M&PT concerns

The culvert replacement will impact Monroe County Pure Waters 42" sanitary sewer main. The City of Rochester's recently installed water quality system will also be impacted by the culvert replacement.

All the proposed work can be accomplished without the need for additional right-of-way or easements.

Traffic along Lakeshore Boulevard can be maintained without any disruptions. The excavation will need to be supported with steel sheet piling due to its close proximity to the edge of travel lane. Temporary concrete barriers will be required to protect the work area from vehicle traffic.

C. Cost Estimate

1. Costs

The total estimated culvert replacement cost based upon NYSDOT weighted average bid prices is \$440,000.

APPENDIX A

Culvert Plan

Culvert Inspection Report

LAKESHORE BOULEVARD OVER SHERRY SWAMP
OUTFALL
CULVERT REPLACEMENT

CITY OF ROCHESTER
MONROE COUNTY

APPENDIX B

Inspection Photographs

Culvert Inspection Report

LAKESHORE BOULEVARD OVER SHERRY SWAMP
OUTFALL
CULVERT REPLACEMENT

CITY OF ROCHESTER
MONROE COUNTY



**Culvert Inspection Report
Lakeshore Boulevard over Sherry Swamp Outlet**



Photo # 1: Manhole no. 1, north wall displaced inward, no longer supporting roof slab



Photo # 2: West wall, sta. 1+05, 100% section loss in cmp, water infiltration



Culvert Inspection Report
Lakeshore Boulevard over Sherry Swamp Outlet



Photo # 3: Sta. 1+25, Collapse of culvert at sanitary sewer location, water infiltration



Photo # 4: Sta. 1+30, East wall, 100% section loss, water infiltration, top of culvert displaced inward



**Culvert Inspection Report
Lakeshore Boulevard over Sherry Swamp Outlet**



Photo # 5: Sta. 1+60 to sta. 1+70, West wall, 100% section loss, water infiltration



Photo # 6: Sta. 1+60, West wall, 100% section loss, water infiltration



Culvert Inspection Report
Lakeshore Boulevard over Sherry Swamp Outlet



Photo # 7: Sta. 1+70, Manhole no. 2, east wall, forming left in place from previous repair

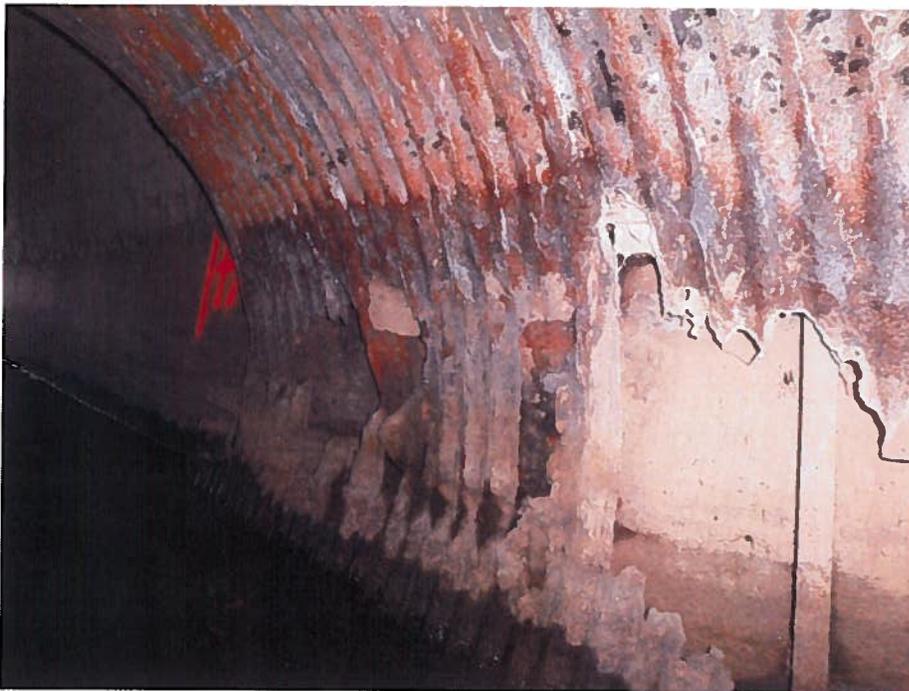


Photo # 8: Sta. 1+70 to sta. 1+77 East wall, transition from manhole no. 2 to C.I.P. arch



Culvert Inspection Report
Lakeshore Boulevard over Sherry Swamp Outlet



Photo # 9: East wall from sta. 0+85 looking towards manhole no. 1, corrosion, water infiltration



Photo # 10: Sta. 0+55, East wall, water infiltration, corrosion



Culvert Inspection Report
Lakeshore Boulevard over Sherry Swamp Outlet



Photo # 11: Sta. 0+55, West wall, water infiltration, corrosion



Photo # 12: Sta. 0+55 to sta. 0+65, East wall, water infiltration, corrosion



Culvert Inspection Report
Lakeshore Boulevard over Sherry Swamp Outlet



Photo # 13: Culvert inlet, weir cover by debris



Photo # 14: Sta. 0+10 to sta. 0+20, east wall, water infiltration, corrosion around circumference

APPENDIX C

Opinion of Probable Costs

Culvert Inspection Report

LAKESHORE BOULEVARD OVER SHERRY SWAMP
OUTFALL
CULVERT REPLACEMENT

CITY OF ROCHESTER
MONROE COUNTY

**LAKESHORE BOULEVARD OVER SHERRY SWAMP OUTLET
CULVERT REPLACEMENT**

OPINION OF PROBABLE COSTS

Work Item		Unit	Est Qty	Est Unit Cost	Est Amount
Trench Excavation		CY	1500	\$35	\$52,500
Dewatering/sediment control		LS	1	\$50,000	\$50,000
Select Backfill		CY	650	\$40	\$26,000
Subbase Stone, trail		CY	25	\$50	\$1,250
Steel Sheet Piling/soldier pile wall		SF	6800	\$20	\$136,000
Asphalt, trail		T	40	\$100	\$4,000
81" by 59" cmp pipe arch		LF	75	\$500	\$37,500
Temporary support of Sanitary Sewer		LS	1	\$15,000	\$15,000
Manhole No. 1, C.I.P. replacement		LS	1	\$25,000	\$25,000
Manhole No. 2 rehabilitation		LS	1	\$15,000	\$15,000
Topsoil		CY	100	\$35	\$3,500
Seed/Mulch		SY	1000	\$2	\$2,000
			SubTotal		\$367,750
Mobilization	4%				\$14,710
Subtotal					\$382,460
Contingency	15%				\$57,369
Construction Cost					\$439,829
Engineering, Bids, specs., & Plans					\$37,500
Total Project Cost					\$477,329

Date of Estimate: October, 2013