

MEMO 21-51

RECEIVED  
 OCT 29 2021  
 CITY OF GROSSE POINTE WOODS  
 CLERK'S DEPARTMENT

TO: Bruce Smith, City Administrator  
 FROM: Frank Schulte, Director of Public Services *F.S.*  
 DATE: October 27, 2021  
 SUBJECT: Sewer System Evaluation Strategy and Budget

On Thursday, July 15, 2021, there was a Town Hall Meeting as a result of the June 25 rain event. At that meeting City Council requested the Department of Public Works and the city's engineering firm, Anderson, Eckstein and Westrick, Inc., to provide the City of Grosse Pointe Woods with a sewer evaluation strategy plan.

In order to evaluate how the Grosse Pointe Woods sewer system reacts to large rainfalls, the proposed plan is to install 14 level sensors in interceptors and local sewers in the most affected areas of the city from the June 25 rain event. The level sensors will be able to read flow and will have cellular capabilities. These devices will be linked to a supervisory control and data acquisition (SCADA) system. The SCADA system will be web based, which will provide real time monitoring of the city's sewer system during rain events and will be linked to the Torrey Road Pump Station, which will also receive an updated SCADA system.

We believe it will take years to evaluate how the sewer system reacts to large rainfalls. Attached is the Sewer System Evaluation Strategy and map showing the locations of the level sensors and diagram of the placement in interceptors and local sewers. Below is the proposed initial budget for the first year and the estimated annual costs after the first year is completed.

Purchase Level Sensor Monitoring Equipment	\$148,000.00
Purchase Remote Supervisory Control and Data Acquisition (SCADA) System Incorporation Equipment	\$150,000.00
Contingency for Purchase of Equipment	\$50,000.00
<b>Total Equipment</b>	<b>\$348,000.00</b>
Equipment Installation and Maintenance (Engineering Fees)	\$35,000.00
Data Collection, Modeling and Presentation (Engineering Fees)	\$72,000.00
<b>Total Engineering</b>	<b>\$107,000.00</b>
<b>Total for First Year</b>	<b>\$455,000.00</b>
<b>Estimated Annual Costs (After First Year)</b>	<b>\$115,000.00</b>

I am recommending City Council to move forward with the Sewer Evaluation Strategy and Budget provided by Anderson, Eckstein and Westrick, Inc., 51301 Schoenherr Rd., Shelby Twp., MI 48315, in the amount of \$455,000.00 for the first year and \$115,000.00 for annual costs after the first year.

This is not a budgeted item in the 2021/2022 fiscal year budget and requires budget amendments from the Water/Sewer Fund Balance account no. 592-000-697.000 into the water/sewer contractual services account no. 592-537-818.000 in the amount of \$107,000.00 and the water/sewer equipment account no. 592-537-977.000 in the amount of \$348,000.00.

I do not believe any benefit will accrue to the City by seeking further bids. Council consideration.

*Bruce Smith*  
 \_\_\_\_\_  
 Bruce Smith, City Administrator

*10/28/2021*  
 \_\_\_\_\_  
 Date

Fund Certification: Account numbers and amounts have been verified as presented.

*Shawn Murphy*  
 \_\_\_\_\_  
 Shawn Murphy, Treasurer/Comptroller

*10-28-2021*  
 \_\_\_\_\_  
 Date



**ANDERSON, ECKSTEIN & WESTRICK, INC.**  
**CIVIL ENGINEERS - SURVEYORS - ARCHITECTS**

2121 University Blvd., Suite 200, The Woodlands, TX 77380  
713.261.1100 | Fax: 713.261.1101

## MEMORANDUM

**TO:** Frank Schulte, Director of Public Services

**FROM:** Scott Lockwood, PE, City Engineer

**DATE:** October 27, 2021

**SUBJECT:** Sewer System Evaluation Strategy and Budget

As we have been discussing since the rain event on June 25, 2021 and as requested by City Council at the Town Hall Meeting on July 15, 2021 we have put together costs and a preliminary plan in order to evaluate how your sewer system reacts to large rainfalls. Attached is a Sewer System Evaluation Summary which details the proposed steps to start to get a more thorough understanding of the system's reaction to rain events. In summary, we suggest the City budget the following amounts in order to commence with the evaluation:

1. Purchase Monitoring Equipment:	\$148,000
2. Remote Scada Incorporation:	\$150,000
3. Equipment Installation and Maintenance:	\$35,000
4. Data Collection, Modeling and Presentation:	\$72,000
5. Contingency:	<u>\$50,000</u>
Total	\$455,000

Please note, the evaluation will evolve as data is received. In other words, as we see how the system reacts to rain events, we will mobilize monitoring equipment in order to complete micro analysis in certain locations of the City. Also, the evaluation is dependent on consistent, heavy rainfalls, so it is very hard to determine how long it will take until we have conclusive information.

If the Council concurs with the suggested strategy we recommend \$455,000 be budgeted this year in order to commence with this work. It is anticipated subsequent years will require an estimated budget of \$115,000 to continue evaluation.

Please contact me with any questions or comments.

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**ANDERSON, ECKSTEIN & WESTRICK, INC.**  
**CIVIL ENGINEERS - SURVEYORS - ARCHITECTS**

11000 Grandview Road, Suite 100, Grandview, MO 64030  
816.424.1100 | [www.aew-inc.com](http://www.aew-inc.com)

## **SEWER SYSTEM EVALUATION SUMMARY**

### **INTRO:**

On June 25, 2021 the City of Grosse Pointe Woods and the surrounding communities experienced a rain event of historic magnitude. Hundreds of basements flooded as a result of this event in the City of Grosse Pointe Woods. The purpose of this letter is to summarize the rain event and present recommendations to the City of Grosse Pointe Woods.

### **RAINFALL:**

Three rain gauges are located within the city of Grosse Pointe Woods. The rain gauges are located at the Torrey Road Pump Station (TRPS), the Milk River Pump Station and Retention Treatment Basin (MRPS & RTB), and near Allard Road and Mack Avenue.

Within a 24-hour period, the rain gauges at MRPS & RTB, Allard and Mack, and TRPS recorded 4.08 (>25-year storm), 4.28 (>25-year storm), and 6.00 (>200-year storm) inches of rain respectively. According to NOAA Atlas 14, these 24-hour rainfall totals correspond to greater than a 25-year storm, 25-year storm, and 200-year storm respectively.

During the 3-hour period between 11:20 PM on June 25 and 2:20 AM on June 26, the rain gauges at MRPS & RTB, Allard and Mack, and TRPS received 2.33, 2.99, and 5.30 inches of rain respectively. According to NOAA Atlas 14, these 3-hour rainfall totals correspond to greater than a 10-year storm, 25-year storm, and 1,000-year storm respectively.

Based on the rainfall data in and around the City of Grosse Pointe Woods, the most intense rainfall was concentrated to the southern portion of the City of Grosse Pointe Woods.

## FLOODING:

The locations of basement flooding were primarily concentrated in the southern portion of the City of Grosse Pointe Woods. This area corresponds with the area of highest intensity rainfall. This area also corresponds with the TRPS service area.

## OPERATIONS:

The TRPS operated for the entire duration of the rain event. TRPS was operated manually by city staff in order to maximize the capacity of the pump station. All pumps ran continuously from 12:30 AM to 5:00 AM on June 26, 2021.

Sanitary flow from Harper Woods was diverted to the TRPS at 12:00 AM on June 26, 2021. At the time of diversion, the flow rate was recorded at 12.6 cfs.

During the event, the MRPS & RTB operated at firm capacity (6 storm pumps running) continuously for over 100 minutes. The RTB began discharging to Lake St. Clair at 12:40 AM on June 26, 2021 until 4:11 AM on June 26, 2021. The storage volume of the RTB is 19 million gallons. The calculated volume discharged during this event was 239.2 million gallons.

## RECOMMENDATIONS:

The following is a summary of our recommendations for the City of Grosse Pointe Woods as a result of the June 25, 2021 rain event. Estimated costs for each recommendation are included separately.

### *Temporary Level Sensors*

It is our recommendation that the City of Grosse Pointe Woods install a series of temporary level sensors throughout the combined sewer system. This will provide valuable data on how the sewer system responds to rain events. Installing temporary level sensors will also allow the City of Grosse Pointe Woods to more effectively identify areas of concern for planning improvements.

Figure 1 shows the proposed locations for the temporary level sensors. Four of the locations are along the larger diameter, interceptor sewers. The intent of these level sensors is to provide an estimated hydraulic grade line (HGL) along the profile of the interceptor sewers. Figure 2 shows

an example profile view of an interceptor sewer illustrating how level sensors can help estimate the HGL.

Seven of the locations are on local sewers immediately upstream of their connections to the interceptor sewers. The intent of these level sensors is to compare the HGL in the local sewer to the estimated HGL in the interceptors in order to determine if upstream issues are a result of the localized area or the interceptor sewers. Figure 3 shows an example profile view at these level sensors and how they are connected to the interceptor sewers.

The frequency with which the level sensors produce useful data is dependent on the quantity and magnitude of rainfall events that occur within the service area while the level sensors are in place. It is recommended that the City of Grosse Pointe Woods incorporate level monitoring into their annual budget to account for monitoring performance of the sewer system continuously.

#### *SCADA Improvements*

It is recommended that the City of Grosse Pointe Woods upgrade their existing SCADA system to receive:

- Data recorded by the proposed, temporary level sensors.
- Data recorded by the rain gauge at TRPS.
- Operational data from TRPS, including but not limited to pump status, pump runtime, and wet well level.

With these SCADA upgrades, all of the city's available data relevant to the combined sewer system can be remotely monitored and accessed from a web-based system. The operations of the TRPS and the combined sewer system can be more efficiently evaluated and compared to local rainfall data during and after rain events.

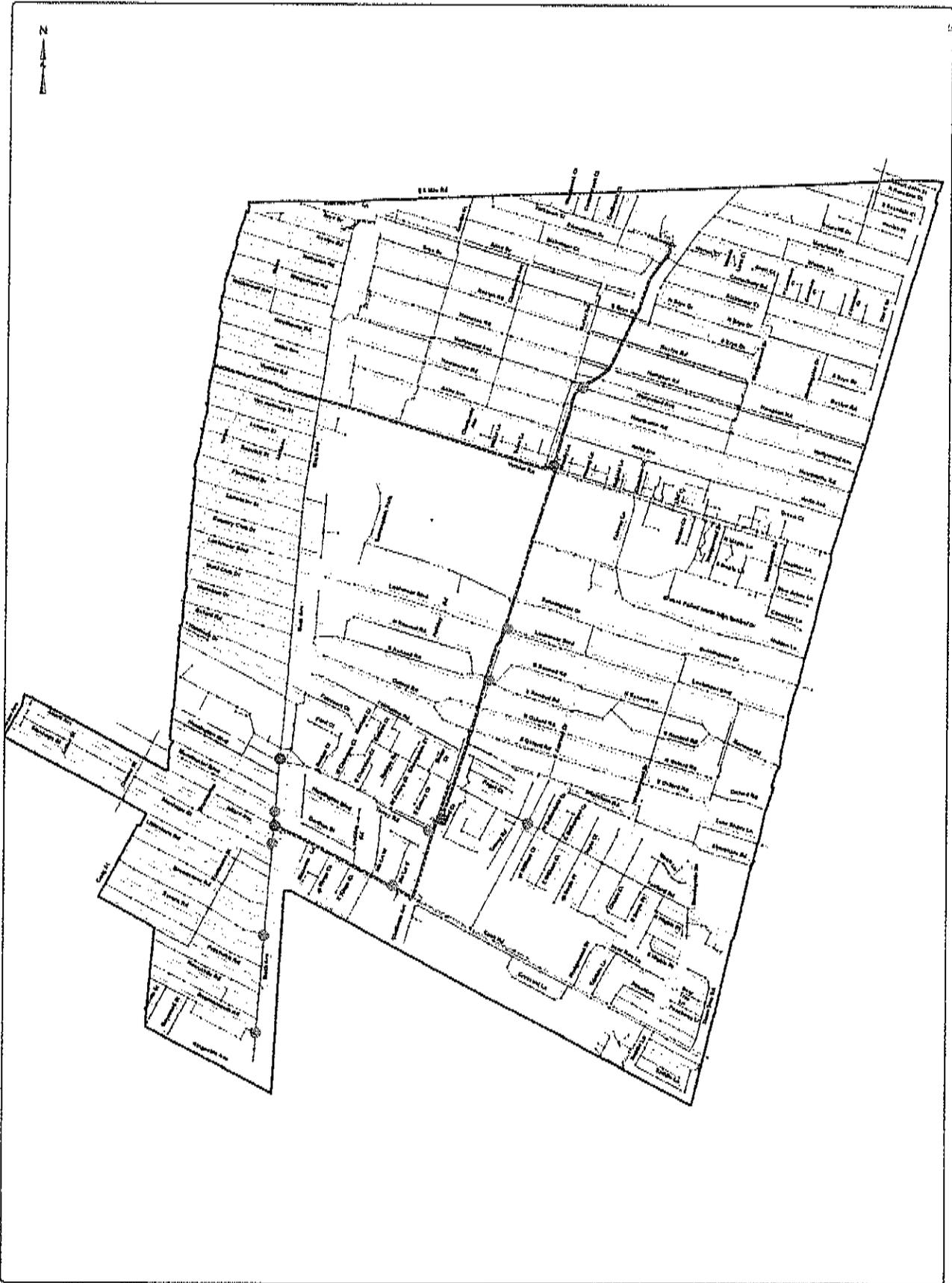
#### *Data Review*

It is recommended that the City of Grosse Pointe Woods incorporate in their annual budget, the cost for routine review and presentation of data collected after significant rain events.

#### *Preliminary Modeling*

It is recommended that the City of Grosse Pointe Woods develop a preliminary model of the combined sewer system. The preliminary model should represent the physical geometry of the larger diameter sewers within the system. Development of a preliminary model will improve

understanding of the existing system. The preliminary model will also provide the ability to simulate flow conditions in order to identify possible areas of concern. With a preliminary model of the large diameter sewers, the City of Grosse Pointe Woods will be in a position, going forward, to further expand the model, to include hydrologic representation of service areas, and to engage in model calibration efforts. It is recommended that the City of Grosse Pointe Woods incorporate modeling efforts into their annual budget to account for continuous development and improvement of the model.



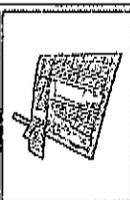
Level Sensor - Interceptor Sewer  
 Level Sensor - Local Sewer


**ANDERSON, ECKSTEIN AND WESTRICK, INC.**  
 CONSULTING SURVEYING ARCHITECTS

PROJECT: 1170-1171  
 SHEET: 1170-1171-01  
 DATE: 11/15/11

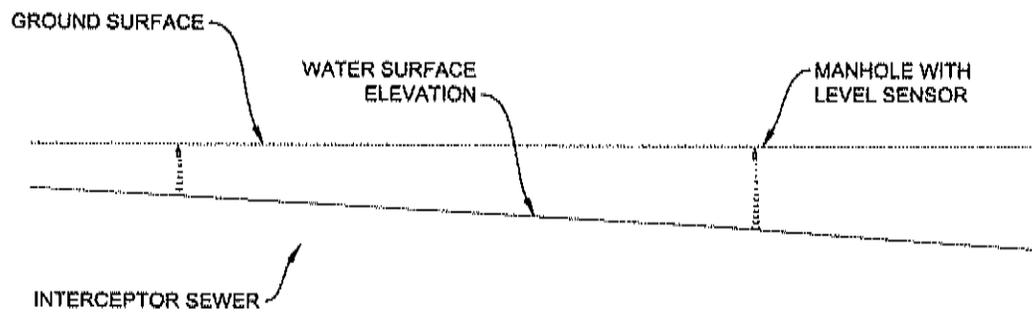

  
**City of Grosse Pointe Woods**

**Figure 1 - Proposed Level Sensor Locations**

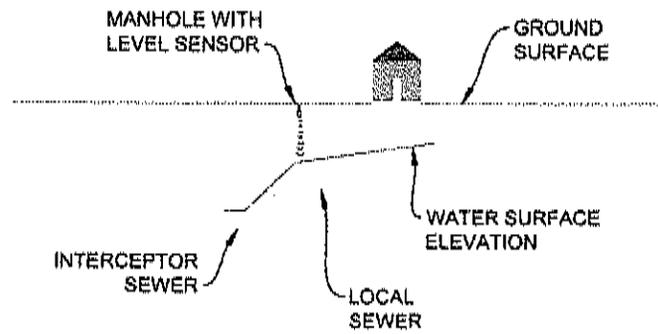


REFERENCE SHEET NUMBER INDEX	PAGE FRAME INDEX
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**CAUTION**  
 This plan is intended for use only for the project and site shown hereon. It is not to be used for any other purpose without the written consent of Anderson, Eckstein and Westrick, Inc. All rights reserved.



**FIGURE 2**



**FIGURE 3**