The Joint-Venture Team

City of Midland:
1. Joe Sova – Utilities Director
2. Joshua Fredrickson, P.E. – City Engineer
3. Shane Bjorge, P.E. – Asst. City Engineer
4. Patrick Frazee – WWTP Superintendent
5. Katie Guyer – Communications Coordinator
6. Heather Holzinger – Budget Analyst/Account Supervisor

Hubbell, Roth & Clark
1. Keith McCormack, P.E. – Partner in Charge
2. Tom Maxwell, P.E. – Program Manager
3. Jennifer Morreale, P.E., CFM – Sr. Project Engineer
4. Dan Royal, P.E. – Project Engineer
5. Brian McElroy – GIS

OHM Advisors
1. Greg Kacvinsky, P.E. - Project Manager
2. Craig Schripsema, P.E. – Manager
3. Nancy Russell, F.E. – Project Engineer (Stormwater)
4. Erica Morgan – Project Engineer (AMM - Wastewater)
5. Alye Hannum, P.E. – Project Modeler (Stormwater)

Work Performed To Date

- Team Scope
  1. Evaluate June 2017 Event
  2. Model Storm and Sanitary Sewer Systems
  3. Develop CIP to Address System Deficiencies
  4. Phase 2 Development
  5. Draft Report
Draft Storm & Sanitary Report

- www.cityofmidlandmi.gov/sewerstudy

- Then scroll down just below the Tridge picture
Work Performed To Date

- **Team Scope**
  1. Evaluate June 2017 Event
  2. Model Storm and Sanitary Sewer Systems
  3. Develop CIP to Address System Deficiencies
  4. Phase 2 Development
  5. Draft Report
  6. Present Report to City Council
Draft Storm & Sanitary Report

- [www.cityofmidlandmi.gov/sewerstudy](http://www.cityofmidlandmi.gov/sewerstudy)
- Then scroll down…

Watch: City Council Action Related to Sewer Study
Click the links below to access meeting video and documents presented to Midland City Council related to the sewer study.

- **July 17, 2017** - Council Approval to Seek Consultants for Sewer Study (20:49 mark)
- **October 16, 2017** - Council Approval of HRC & OHM to Conduct Study (18:35 mark)
- **October 18, 2017** - Presentation of Sewer Study Proposal (PPT FILE)
- **April 23, 2018** - Public Comment on Receive & File of Sewer Study Update (1:23:00 mark)
- **June 11, 2018** - Preliminary Study Findings Discussed at Council (30:00 mark)
Key Points

1. June 2017 Storm Event → ~ 82-Year Event
   • 1.2% chance of occurrence
   • Significant stormwater and sanitary flooding occurred from this event
2. Three major watersheds combine and flow through the City of Midland
   • 2 major sources of stormwater flooding
     1) Local → More Control with local Stormwater projects
     2) Watersheds → Less Control

3. Storm sewer design → 10-Year Event
   • Allows up to ~ 5 inches of surface flooding
   • Prioritize projects where surface flooding could impact sanitary sewers
   • Recommendations
     • Initiate storm sewer Capital Improvement Plan
     • Prioritize projects to those having greatest impact
       • Replace four culverts along Snake Creek
       • Replace storm sewers in areas with greatest flood potential
       • Identify areas for flood storage (stormwater detention) to reduce impact on peak flows
3. Storm Sewer Recommendations (con’t)

- General Operation & Maintenance Recommendations:
  
  - 3-year sewer televising/inspection program
  
  - Identify structural problems and repair, rehabilitate, or replace as necessary
  
  - Where possible, storm sewer replacement should coincide with street repaving projects
3. Storm Sewer Recommendations (con’t)

- Priority 1 Projects: $29 million
- Other projects: $50 million
- “other” projects less critical but still necessary to achieve desired Level of Service

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**Key Points**

**FUNDING STORMWATER INFRASTRUCTURE**

All underground infrastructure requires dedicated revenue to maintain service to utility customers. In Michigan, almost all cities have no source of funding for storm sewers.
Key Points

4. The sanitary sewer system is complex
   - Originally Combined Sewer System
   - 1995 Separate Sanitary and Storm sewer system Completed
   - Sanitary System Characteristics
     - 14,013 Acre Service Area
     - 42 Pump Stations
     - 4,436 Manholes
     - 135,000 feet FM (4” to 42” diameter)
     - 1.1 Million feet of Gravity Sewer (6” to 48”)
     - WWTP (18 MGD Treatment/ 70 MGD Conveyance)
     - 3 Existing Sanitary Storage Facilities (47.3 MG)

Key Points

5. Sanitary sewer design → 25-Year Event
   - Sources of Excess Flow (I/I)
Sources of Infiltration and Inflow (I/I)

(AKA Rainfall Dependent Infiltration/Inflow (RDII))

**Infiltration Sources**

1. Broken Lateral
2. Root Intrusion (Main or Lateral)
3. Faulty Lateral Connection
4. Cracked or Broken Pipe
5. Deteriorated Manhole

**Inflow Sources**

1. Roof Drain Connection
2. Footing Drain Connection
3. Uncapped Clean-Out
4. Storm Cross-Connection
5. Faulty Manhole Cover or Frame

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Groundwater contributes to surface water (gaining stream)

**Infiltration Sources**

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Sanitary Sewer System Improvements

- **Multiple Potential Solutions:**
  1. **RDII Reduction**
     - Footing Drain Disconnection
     - Other I/I Removal
       - Flood Proofing Flood-Prone Structures
       - Other I/I Removal
  2. **Improved Conveyance**
     - Increase Sewer Capacity
       - New Larger Sewer
       - Parallel Sewer
     - Increased Pump Station Capacity
  3. **Storage**
     - Sanitary Retention Tank
     - Large Pipe

Removes flow from the system
Transfers peak flow downstream
Removes effect of peak flow from system, eventually all flow is conveyed downstream
Sanitary Sewer System Improvements

RDII Reduction – Footing Drain Disconnection

Connected Footing Drain Schematic

Sanitary Sewer System Improvements

RDII Reduction – Footing Drain Disconnection

Connected Footing Drain Schematic
Sanitary Sewer System Improvements

RDII Reduction – Footing Drain Disconnection

[Image showing exterior disruption with text: Overall exterior disruption. Approximately a 10’ x 5’ excavation.]

Sanitary Sewer System Improvements

RDII Reduction – Footing Drain Disconnection

[Image showing basement disruption with text: Overall view of disruption to the basement. Floor is sawcut at cleanouts and at sump pump location.]
Sanitary Sewer System Improvements

RDII Reduction – Footing Drain Disconnection

Note...All homes built since 1987 have been built this way (with a sump pump)
Sanitary Sewer System Improvements

RDII Reduction – Flood Proofing Structures

Includes work such as raising manholes, installing water-tight manhole covers, grouting and lining pipes and manholes.

Leaky joint in a community (not Midland) next to a waterbody.
Sanitary Sewer System Improvements

RDII Reduction – Flood Proofing Structures

Joint → Post-Grouting
Sanitary Sewer System Improvements

RDII Reduction – Sealing Leaks in Pipes and Manholes

Old Broken Pipe

New Liner

Sanitary Sewer System Improvements

RDII Reduction – Sealing Leaks in Pipes and Manholes

Image of a manhole being sealed with a new liner.
Sanitary Sewer System Improvements

Improved Conveyance (i.e. Bigger Pipes)
Sanitary Sewer System Improvements

Improved Conveyance (i.e. Pump Station Improvements)

City of Midland
Storm and Sanitary Sewer Study
Public Outreach Meeting
July 25, 2018
July 31, 2018

Sanitary Sewer System Improvements

Improved Conveyance (i.e. Pump Station Improvements)

City of Midland
Storm and Sanitary Sewer Study
Public Outreach Meeting
July 25, 2018
July 31, 2018
Sanitary Sewer System Improvements

Storage

City of Midland
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Sanitary Sewer System Improvements

Storage

City of Midland
Storm and Sanitary Sewer Study
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July 25, 2018
July 31, 2018
Sanitary Sewer System Findings

- Volume 3 -

Section 7 - Capital Improvement Plan

A. Capital Improvement Introduction

Collection system improvements generally fall into three categories as follows:

1. RDII Reduction
2. Improved Conveyance
3. Storage

Each improvement category provides various potential advantages and disadvantages. Depending on the situation, a single improvement category may provide an adequate solution, or combination of categories may be necessary to provide an adequate solution. Each improvement category is described as follows:

Multiple Potential Solutions:

1. RDII Reduction
   • Footing Drain Disconnection
   • Other I/I Removal

2. Improved Conveyance
   • Increase Sewer Capacity
   • New Larger Sewer
   • Parallel Sewer
   • Increased Pump Station Capacity

3. Storage
   • Sanitary Retention Tank

Sanitary Sewer Improvement/Future Study Locations

<table>
<thead>
<tr>
<th>Priority 1 Areas</th>
<th>Priority 2 Areas</th>
<th>Phase 2 - Future Study/Investigations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Fortune Rd Interceptor</td>
<td>9 Wilson Dr</td>
<td>Gibson St.</td>
</tr>
<tr>
<td>2 Whittwood Dr</td>
<td>10 Gibson Rd</td>
<td>North Canyon Dr.</td>
</tr>
<tr>
<td>3 Sylvan Pump Station</td>
<td>11 East St. Andrews Rd</td>
<td>Sylvan Pass</td>
</tr>
<tr>
<td>4 Morningside Pump Station</td>
<td>12 East St. Andrews Rd</td>
<td>Crescent Dr.</td>
</tr>
<tr>
<td>5 Jefferson Pump Station</td>
<td></td>
<td>Sturgis Court</td>
</tr>
<tr>
<td>6 Sylvan Lane</td>
<td></td>
<td>*Pump Station Inspections</td>
</tr>
<tr>
<td>7 Amherst Ave</td>
<td></td>
<td>*Flood prone structure inspections</td>
</tr>
<tr>
<td>8 Jefferson Ave</td>
<td></td>
<td>*Miscellaneous</td>
</tr>
</tbody>
</table>

* Areas are not included in Figure 6-13
Sanitary Sewer System Findings

Table 6-1: Model Results Categories

<table>
<thead>
<tr>
<th>Priority 1 Areas</th>
<th>Priority 2 Areas</th>
<th>Phase 2 - Future Study/Investigations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perrine Road Interceptor</td>
<td>Wilson Drive</td>
<td>Gibson Street</td>
</tr>
<tr>
<td>Waterwood Drive</td>
<td>Adams Road</td>
<td>North Campus Drive</td>
</tr>
<tr>
<td>Sylvan Pump Station</td>
<td>East Sunset Road</td>
<td>Sylvan Pines</td>
</tr>
<tr>
<td>Moorland Pump Station</td>
<td>East St. Andrews Road</td>
<td>Crescent Drive</td>
</tr>
<tr>
<td>Jefferson Pump Station</td>
<td>Norwich Court</td>
<td></td>
</tr>
<tr>
<td>Sylvan Lane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sturgeon Avenue</td>
<td></td>
<td>*Pump Station Inspections</td>
</tr>
<tr>
<td>Jefferson Avenue</td>
<td></td>
<td>*Road Prone Structure Improvements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Miscellaneous</td>
</tr>
</tbody>
</table>

* items are not included in Figure 6-12

- Alt A – RDII Reduction (via Footing Drain Disconnection)
- Alt B – Improved Conveyance
- Alt C – Storage

Alt D – Combination

Sanitary Sewer System Findings

Table 7-2: Summary of CIP Alternatives Reviewed

Alt A, Alt B, Alt C, Alt D – Combination
Sanitary Sewer System Findings

Table 7-3: Summary of CIP Alternatives Estimated Costs

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Lowest Cost Alternative</th>
<th>Estimated Cost Range</th>
<th>FDD Estimated Cost Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>($ Million)</td>
<td>(FD @ 5 GPM)</td>
</tr>
<tr>
<td>Perrine Rd</td>
<td>Alt B - Sewer Replacement/Relief</td>
<td>$9.9</td>
<td>$10.4</td>
</tr>
<tr>
<td>Sylvan PS</td>
<td>Alt B - Sewer Replacement/Relief</td>
<td>$10.3</td>
<td>$11.6</td>
</tr>
<tr>
<td>Jefferson PS</td>
<td>Alt B - Pump Station Imps.</td>
<td>$1.4</td>
<td>$1.4</td>
</tr>
<tr>
<td>Sylvan Lane</td>
<td>Alt B - Sewer Replacement/Relief</td>
<td>$3.3</td>
<td>$4.7</td>
</tr>
<tr>
<td>Sturgeon Ave</td>
<td>Alt B - Sewer Replacement/Relief</td>
<td>$2.0</td>
<td>(1)</td>
</tr>
<tr>
<td>Jefferson Ave</td>
<td>Alt B - Sewer Replacement/Relief</td>
<td>$1.2</td>
<td>$2.4</td>
</tr>
<tr>
<td>Wilson Dr</td>
<td>Alt C - Off-Line Storage</td>
<td>$1.8</td>
<td>(1)</td>
</tr>
<tr>
<td>Adams Dr</td>
<td>Alt A - FDD - Low (GPM)</td>
<td>$1.3</td>
<td>$1.3</td>
</tr>
<tr>
<td>East Sugnet Rd</td>
<td>Alt B - Sewer Replacement/Relief (2)</td>
<td>$0.2</td>
<td>$1.0</td>
</tr>
<tr>
<td>East St. Andrews Rd</td>
<td>Alt A - FDD - Low (GPM)</td>
<td>$0.3</td>
<td>$0.3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>$34.4</strong></td>
<td><strong>$35.7</strong></td>
</tr>
</tbody>
</table>

Notes:
(1) FDD is not a feasible alternative based on area and limited number of FDs available to disconnect from system.
(2) This Alternative requires additional filed investigation under Phase 2.
Sanitary Sewer Improvement Financing

- APPROXIMATE INCREASE per average RESIDENTIAL user (on quarterly sewer bill)

<table>
<thead>
<tr>
<th>Project Cost</th>
<th>Approximate INCREASE to Individual Sewer Bill</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5,000,000</td>
<td>Monthly: $1.33</td>
</tr>
<tr>
<td>$10,000,000</td>
<td>Monthly: $3.00</td>
</tr>
<tr>
<td>$25,000,000</td>
<td>Monthly: $7.00</td>
</tr>
<tr>
<td>$35,000,000</td>
<td>Monthly: $9.67</td>
</tr>
<tr>
<td>$50,000,000</td>
<td>Monthly: $13.67</td>
</tr>
<tr>
<td>$75,000,000</td>
<td>Monthly: $20.67</td>
</tr>
</tbody>
</table>

Assumes 25-year Bond at 4% interest

(Approximately) an additional $4 per quarter for every $5 million
(for average residential users)

Sanitary Sewer System Findings

<table>
<thead>
<tr>
<th>Priority 1 Areas</th>
<th>Priority 2 Areas</th>
<th>Phase 2 - Future Study/Investigations</th>
</tr>
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<tbody>
<tr>
<td>Perrier Road Interceptor</td>
<td>Wilson Drive</td>
<td>Gilson Street</td>
</tr>
<tr>
<td>Winterwood Drive</td>
<td>Adams Road</td>
<td>North Campan Drive</td>
</tr>
<tr>
<td>Sylvan Pump Station</td>
<td>East Saginaw Road</td>
<td>Sylvan Pines</td>
</tr>
<tr>
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<td>Crescent Drive</td>
</tr>
<tr>
<td>Jefferson Pump Station</td>
<td>Norwich Court</td>
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</tr>
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</tr>
</tbody>
</table>

* Items are not included in Figure 6-12

Evaluate → Investigate → Improvement
Evaluate → Investigate → Improvement

1. Additional detailed local evaluation may reveal/highlight other areas for improvements.
2. More data collected will aid in further improving the system model.
3. Priority 1 and 2 project sizing will be confirmed and may be reduced.
4. Phase 2 improvements may further reduce the size and cost of a priority project.
5. Reducing project sizing will likely lead to reduced project costs.
6. Conversely, more detailed information may lead to larger projects more adequately sized to handle the design event.
Priority Areas AND Phase 2

Evaluate

Meter Study

3 to 4 years to perform these activities

Improvement

Investigate

Flood Proof Flood-Prone Structures
Manhole Rehab
Sanitary Sewer Rehab
Pump Station Investigation
SCADA Investigation
Manhole Inspections
Smoke Testing
Dye Testing
Sewer Televising
Downspout Survey
Outfall Survey

Major Construction Projects to Follow

SCADA Implementation
Pump Station Improvements
Sanitary Storage Construction
Footing Drain Disconnection
Final Note

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Event Frequency</th>
<th>Chance of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical storm sewer design → 10-Year Event</td>
<td>10% chance of occurrence</td>
<td></td>
</tr>
<tr>
<td>Sanitary sewer design → 25-Year Event</td>
<td>4% chance of occurrence</td>
<td></td>
</tr>
<tr>
<td>June 2017 Storm Event → 82-Year Event</td>
<td>1.2% chance of occurrence</td>
<td></td>
</tr>
</tbody>
</table>

Improvements reduce the impact of surface flooding and the frequency of basement flooding; however, it is generally impossible to completely eliminate the impact of surface flooding and occurrence of basement flooding as there will always be a larger event that can exceed the selected design.

Downtown Flooding along the Tittabawassee  
Source: Midland Daily News, June 25, 2017

Anticipated Next Steps

1. July 2018 - Public meetings (Next One is 7/31/18 at Dow High School at 6:00 pm)
2. August 7 – Deadline for Public Comments

bit.ly/sewersurvey2018
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2. August 7 – Deadline for Public Comments
3. August/September 2018 – Finalize Report
4. August/September – Council Approval
5. 2018 thru 2022 – Bolster Investigations in Priority Areas and Phase 2 Study Areas
6. 2018 thru 2022 – Bolster I/I Removal
7. thru 2023 – Model Refinements and Refine Original Study Capital Improvements
8. 2023 thru ???? - Construct Major Capital Improvements

Community Resilience

In YouTube, search for City of Midland and Subscribe
Questions? Question Format

Please line up behind microphone and state:

1. First and Last Name
2. Address
3. Indicate if Question/comment is related to Storm, Sanitary or both
4. Question/Comment

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