Clean Water Lakewood Orientation

COMBINED SEWER OVERFLOWS

Lakewood’s “Unique” Sewer System
- It was not built as one system
- It’s an amalgamation of many subsystems over many years
- Built in a pre-World War II environment
- Public health was the primary objective when it was created; environmentalism came later
- Most Importantly: the system performed as designed

SEWER TYPES- What does your house tie into?

COMBINED
Single-pipe system that collects both storm water and sanitary water.

ISSUE: During large storm system overflows to Lake and River to protect basements from flooding.

OVER-UNDER
Two-pipe system that collects storm water in a pipe directly above a sanitary pipe. A plate is placed between the pipes that allowed access for maintenance.

ISSUE: Old invert plates leak. Design allows exchange of flow between pipes, acting more like a combined system.

SEPARATE
Two-pipe system that collects storm water in a pipe that is not connected to the sanitary system. There are two separate manholes.

ISSUE: Best practice for sewer design. System need to be maintained to ensure groundwater doesn’t enter the sanitary pipe through cracks or leaking joints.

1933 Forest Cliff- Filter Bed - End of Street before direct discharge
## CLEAN WATER LAKEWOOD ORIENTATION

### Schedule and Roles

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>Began developing sewer plan according to permit requirement</td>
</tr>
<tr>
<td>2006</td>
<td>Plan completed</td>
</tr>
<tr>
<td>2007-2009</td>
<td>Plan not officially approved; OEPA &amp; USEPA asks for re-characterization study on Lakewood's sewers</td>
</tr>
<tr>
<td>2011-2014</td>
<td>Hydraulic and hydrologic sewer model developed. West End CSO Elimination project in design.</td>
</tr>
<tr>
<td>2014</td>
<td>New permit issued, requiring updated plan and a high-rate treatment (HRT) facility at the treatment plant</td>
</tr>
<tr>
<td>2015</td>
<td>New plan submitted, Clean Water Lakewood key in plan creation</td>
</tr>
<tr>
<td>2016</td>
<td>Improvements worth $277 million estimated in plan; submitted &amp; reviewed by OEPA &amp; USEPA.</td>
</tr>
<tr>
<td>2017-2018</td>
<td>Refinement of plan options, evaluation of additional alternatives, affordability. Completion of West End CSO Elimination project completed. Eliminating CSO-053 and 054. Completion Lake Ave. storm improvements to reduce CSO flow at CSO-058.</td>
</tr>
<tr>
<td>2019</td>
<td>Updated plan due to OEPA &amp; USEPA. Begin HRT Construction.</td>
</tr>
<tr>
<td>2022</td>
<td>HRT Facility to be up and running</td>
</tr>
</tbody>
</table>

### Who’s involved?

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Hall</td>
<td>Communicating to Lakewood residents about Ohio and US EPA requirements. Coordinating city, resident, consultant and partner resources to comply with the Clean Water Act. Advocating affordability for residents to EPA.</td>
</tr>
<tr>
<td>Consultants</td>
<td>Guiding the creation of an affordable and sustainable overflow control plan to comply with EPA enforcement of the Clean Water Act.</td>
</tr>
<tr>
<td>OPWC and OWDA</td>
<td>Ohio Public Works Commission and EPA’s Ohio Water Development Authority provide grants and loans awarded on project merit.</td>
</tr>
<tr>
<td>You</td>
<td>Getting informed and involved.</td>
</tr>
</tbody>
</table>
An aging water and sewer system take a lot of time and investment to maintain. Below are photos of existing repair or replacement projects the City has completed. Inspections often find problem areas that are near failure and need to be replaced, but the City also responds to many emergency situations caused by aging pipes that have failed.

**Collapsed Segmented Tile Storm Sewer**

**100 yr old Tuberculated watermain Replaced**

**Rehabilitating 84” Egg Shaped Sewer installed in early 1900's**

**Rehabilitating infrastructure for the next century Outfall Repair Photos**

**BEFORE**

**AFTER**
Clean Water Lakewood Orientation
SYSTEM OVERFLOWS

Lake Erie Contributing Area (LEWS)
- LEWS-1150: 62 activations
- LEWS-1225: 61 activations
- LEWS-1195: 67 activations
- LEWS-1150: 82 activations
- LEWS-1135: 72 activations

Rocky River Contributing Area (RRES)
- RRES-1145: 63 activations
- RRES-1160: 77 activations
- RRES-1145: 62 activations
- LEWS-1195: 20 activations
- LEWS-1135: 69 activations
- LEWS-1070: 69 activations
- LEWS-1045: 69 activations
- LEWS-1040: 69 activations
- LEWS-1055: 69 activations
- LEWS-1295: 13 activations
- LEWS-1225: 61 activations
- LEWS-1150: 82 activations

OVERFLOW STATISTICS
LOW
Pollutants
Volume
HIGH
Clean Water Lakewood Orientation
PERCENT CAPTURE

2018 Sewer System Performance:
- Collects & treats 10x our average daily dry weather volumes of approx. 4 million gallons per day (MGD)
- Collects & treats 85% of all dry and wet weather volume
- Approved projects will take us to 88% of all dry and wet weather volume by 2023

$60 Million Investments in the Past 10 Years
- Expanded the collection system
- Expanded the waste water treatment system
- Pilot Project: public & private property source control
In addition: Updated code to require stormwater control on any development that disturbs 8,000 sq. ft. or more

$23 Million High Rate Treatment
- New High Rate Treatment Plant (HRT) has been designed, funded, and bid
- HRT Facility is scheduled to go live in 2022
- Total capture and treatment to 88%

Technology categories considered for the integrated plan
- Green infrastructure—increasing the ability for the land to infiltrate the water, vs having it runoff the impervious surface
- Gray infrastructure—building bigger pipes, storage basins, or treatment plants
- Source control—working to decrease the leakiness between the sanitary and stormwater systems
Clean Water Starts at My House
Pilot Study Images

Pilot study including 100 homes on Eldred, Atkins and Delaware Avenues
• Aiming to significantly reduce rain water from entering sanitary sewer
• Work is being done on sewers in the street as well as on private property
• Aiming for at least a 35% reduction in storm water entering sanitary pipe

What have we learned from pilot study thus far?
• The old pipes are often cracked and clogged
• Cracked pipes cause interaction between the storm and sanitary laterals even after the clogs are flushed out
• Water from roofs most often ends up in sanitary sewer

What is being done to remove excess water?
• Cleaning laterals, relining as needed
• Replacing pipes along perimeter of house that receive stormwater only
• Connecting driveway drains to storm sewer
• Installing sump pump if needed

Example of stormwater entering sanitary system
Installing pipes along perimeter of home
Manhole separation in pilot study

Construction on private property
Post-construction view
Nature Can Help Keep Lake Erie and the Rocky River Clean!

GREEN INFRASTRUCTURE

Commercial Green Infrastructure

Residential Green Infrastructure Examples

Tree Benefits

For every 5% of tree canopy cover added to a community, stormwater runoff is reduced by approximately 2%

– United States Forest Service

- Using USFS research, during a 1-inch rainstorm over 12 hours, the interception of rain by the canopy of the urban forest in Lakewood reduces surface runoff by about 12%.
- Trees slow stormwater runoff, decreasing the amount of stormwater storage needed and reduce the cost of water treatment.
- Lakewood’s present tree canopy manages approximately 7 million cubic feet of stormwater, valued at $14 million using a conservative $2 per cubic foot stormwater retention capacity construction costs.

Percent Tree Canopy is 28.5% today.
Our goal is to increase it to 33.5% by 2035.

We need YOU to achieve our tree canopy goals!
Consider planting a tree in your yard this spring!
What Project Should Be Our Priority for the First Five Years?

<table>
<thead>
<tr>
<th>Project</th>
<th>Outfalls</th>
<th>Solution</th>
<th>Level of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RRES1160</td>
<td>Storage Tank</td>
<td>4 per typical year</td>
</tr>
<tr>
<td>B</td>
<td>LEWS 1040, 1035, 1195</td>
<td>Storage Tank and Pipes</td>
<td>4 per typical year</td>
</tr>
<tr>
<td>C</td>
<td>RRES 1145, LEWS 1180, LEWS 1070</td>
<td>Public/Private Source Control and System modifications</td>
<td>0 per typical year &amp; 2 year storm</td>
</tr>
</tbody>
</table>

### Average Annual Pollution Discharge

- **A**: None
- **B**: None
- **C**: None

### Level of Disruption

- **A**: None
- **B**: None
- **C**: None

### Amount of Private Property Improvements

- **A**: None
- **B**: None
- **C**: None

Conceptual Projects, Subject to Change and Regulatory Review
WHAT IS OUR NEXT STEP?
Map of potential solution set

These potential projects are subject to ongoing regulatory review.
What does affordable mean to you?

BILLING & PROJECT COSTS

Water and Sewer Billing Explained

- How do we currently pay for sewer projects?
  - Funded primarily through user rates and charges, not taxes
  - Customers are billed using a volumetric rate based on how much water they use
- Must consider long-term cost and revenue projections
  - Operating expenses increasing faster than inflation
  - Capital Reinvestment
    - Taking care of the infrastructure we already have
    - Regulatory compliance

Clean Water Lakewood Cost Estimate

- Integrated Plan estimated costs (over the next 15-20 years)
  - Maintaining our existing facilities and infrastructure: $150 million
  - High Rate Treatment Facility (in progress): $23 million
  - Other system improvements for compliance: current estimate $300 million+

Cost Estimate 2019 - 2023

Typical residential water & sewer bill: approx. $81 per month

Approved annual increase expected to monthly customer bills over the next 5 years to support investment in the existing infrastructure, the new High Rate Treatment Facility, and approximately $25 million in additional projects.

Estimated $323 million in total compliance costs

7.8% per year
Approx. $7.50 per month per year
What does affordable mean to you?

RATE STRUCTURE

We are considering updating the rate structure (how you are charged for service) for 2019 – 2023 to include both a volumetric rate (existing) and a fixed fee (new) to meet these revenue needs. There are two options for adding a fixed fee.

Option 1. Volumetric Rate + Fixed Monthly Charge
- Every customer pays the same amount per bill
- Can be broken into separate fixed charges
  - Billing charge (e.g. $2 per bill)
  - Compliance charge (e.g. $10 per bill)

Option 2. Volumetric Rate + Impervious Area Charge
- A fixed monthly charge calculated based on the amount of impervious area on your property
  - Driveways
  - rooftops
  - Sidewalks
  - Parking lots

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**Example**

<table>
<thead>
<tr>
<th>Sample Bills: Illustrative Purposes Only</th>
<th>Residential</th>
<th>Non-Residential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Apartment</td>
<td>Typical House</td>
</tr>
<tr>
<td><strong>Current Structure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volumetric Charge</td>
<td>$ 43.91</td>
<td>$ 87.82</td>
</tr>
<tr>
<td><strong>Option 1: Volumetric Rate + Fixed Monthly Charge</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Fee</td>
<td>$ 5.00</td>
<td>$ 5.00</td>
</tr>
<tr>
<td>Volumetric Charge</td>
<td>$ 39.87</td>
<td>$ 82.65</td>
</tr>
<tr>
<td>Total Bill</td>
<td>$ 44.87</td>
<td>$ 87.65</td>
</tr>
<tr>
<td>Difference from Current</td>
<td>2.2%</td>
<td>-0.2%</td>
</tr>
<tr>
<td><strong>Option 2: Volumetric Rate + Impervious Area Charge</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impervious Area Charge</td>
<td>$ 2.50</td>
<td>$ 5.00</td>
</tr>
<tr>
<td>Volumetric Charge</td>
<td>$ 40.80</td>
<td>$ 83.54</td>
</tr>
<tr>
<td>Total Bill</td>
<td>$ 43.30</td>
<td>$ 88.54</td>
</tr>
<tr>
<td>Difference from Current</td>
<td>-1.4%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

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**Rate Structure Options**

**Option 1. Fixed Monthly Charge**
- Benefits
  - Simple to administer
  - Provides limited equity
- Drawbacks
  - May impact low & fixed-income households the most

**Option 2. Impervious Area Charge**
- Benefits
  - Most fair for wet-weather related costs
  - Can be hard to understand
- Drawbacks
  - Includes non-utility customers (e.g. parking lots)
  - Can scale to program costs
  - Greater administrative requirements
  - Consistent with regional trend (NEORSD)
  - May impact low & fixed-income households