



**Street & Drainage Advisory Taskforce
October 2023
Presentation**

Agenda: Streets & Drainage Advisory Task Force

- August Rainfall Event
 - How much water fell on Lakeside?
 - Property Owner Drainage Submissions
 - What Caused the Damage?
 - Unique Lakeside Drainage Challenges
- Design Discussions
- Next Steps

Questions welcomed at any time during the presentation

August Rainfall Event

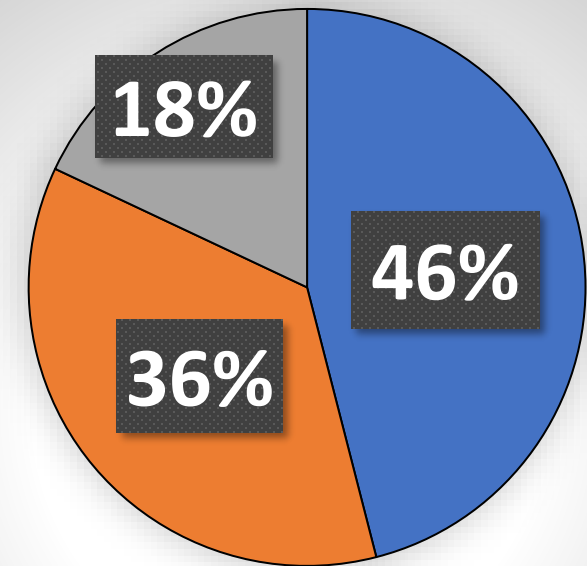
- An unprecedented rainfall event hit the Lakeside area August 23 and August 24.
 - Reported rainfall totals ranged from 5" (Lakeside homeowner rain gauge) to 8.6" (East Harbor State Park).
 - This was a one in 500-year to one in 1,000-year event per National Oceanic and Atmospheric Administration data.
 - Many Lakeside properties suffered damage.

Runoff Quantities

Rough estimate of total accumulation from 8" of rainfall is 33 million gallons

- Runoff from natural surfaces: 46%
15.2 million gallons (of which 8.5 million gallons became runoff)
- Runoff from homes/buildings: 36%
12.0 million gallons (all of which became runoff)
- Runoff from road surfaces: 18%
5.9 million gallons (all of which became runoff)

Total Runoff



- Natural Surfaces
- Homes/Buildings
- Road Surfaces

Runoff Quantities

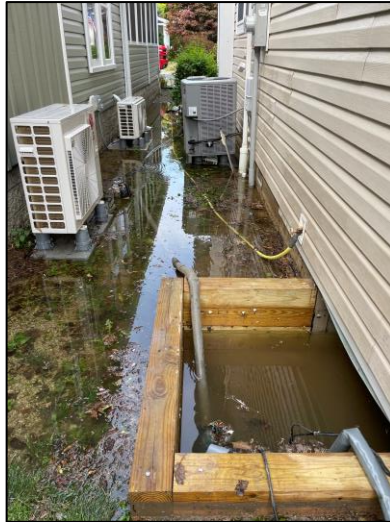
- The Lakeside built environment, buildings and roads, produces 68% of the runoff volume from any storm event or approximately **26.4 million gallons** for this storm.

The pool holds 141,125 gallons. This volume of water is 233 times larger.



Property Owner Drainage Submissions

- More than 70 drainage problems were submitted to Lakeside by community members.



What Caused the Damage?

- Damage occurred by one of the following:
 - Sanitary sewer backup.
 - Subsurface water intrusion.
 - Surface water.

Sanitary Sewer Damage

- Sanitary sewers backed up and flowed into basements.
- Ottawa County owns and operates the sanitary sewer system.
 - The west “half” was constructed in 1992 and the east “half” in 1997.
- Ottawa County is aware of system wide and Lakeside problems. Working aggressively to:
 - Reduce inflow - water entering through manholes, sump pumps, and illegal connections.
 - Reduce infiltration - water entering through pipe joints and cracks and manholes.

Sanitary Sewer Damage (Continued)

- This storm produced so much I&I that the sanitary sewer blew at least one manhole lid off the casting near the East Second Street gate.
- The pump stations in the Ottawa County system also reached maximum capacity and overflowed into the lake.
- The County's general recommendation is to avoid having connections to the sewer system in basements.
- The Sanitary Engineer's office will provide free backflow preventers to prevent backflow.
 - **However, the property owner would pay for the installation.**

Subsurface Water Damage

- Water flowing in soil and fractured rock entered basements through floors and walls.
 - Lakeside is underlain with fractured rock at varying depths.
 - Surface water seeps into the fractures and then moves through the rock to the lake.
 - This same water can enter basements through floors and walls if there is adequate pressure or through sump pits that are open to the fractured rock.
 - Sumps open to rock or pumps with inadequate capacity permit water to enter basements.

Surface Water Damage

- Surface water intrusion was due to rainfall runoff from roads, buildings and grounds and over capacity storm sewers.
 - Lakeside has some storm sewers including portions of the abandoned sanitary sewer system which discharges into the lake.
 - Lakeside does not have typical storm sewers with curbs and inlets.
 - Storm sewers are typically designed for a 10-year storm. Any flow over this results in overflow.

Unique Lakeside Drainage Design Challenges

- Lakeside presents unique stormwater runoff design challenges.
 - Very few curbed streets.
 - 100' of elevation change from SR 163 to the lake.
 - Limestone escarpment running from the southwest to the northeast that impacts topography and construction cost.
 - Rock is close to the ground surface.

SDA Design Considerations

- Looking to provide road-based drainage solutions for a 10-20-year design storm while keeping assessment funding reasonable.
 - Reviewing existing storm sewers and making repairs.
 - Adjusting street profiles to better direct runoff.
 - Using crowned or inversed crowned pavements.
 - Discharging water into shafts drilled in rock.
 - Retention basins designed for a 25-year storm.
 - Spot curb & catch basins, bio-swales, bio-retention, pervious pavers.
 - Meeting with property owners to review existing drainage issues and to offer suggestions.

Design Status Updates

- Survey work is underway from the face to face of houses.
- Existing utilities are being located.
- Property owner drainage comments are being reviewed by CDE.
- Directed CDE to include roadway drainage concerns more actively in their design.

Construction still targeted to begin fall 2024

Next Steps

- Continued SDA drainage discussions.
- Work with CDE to review and incorporate cost effective drainage improvements.
- Considering adding Oak or other similarly impacted streets to Phase 1.
 - Known long term past known drainage issues
 - Test various drainage control tools.
- Continued coordination with Lakeside staff to determine the scope of Phase 1 and drainage solutions.

End