

City of Two Harbors



Inflow & Infiltration: Ramifications, Sources & Potential Solutions July 10, 2017

Presented By:
Luke Heikkila, City of Two Harbors
Paul Johnson, City of Two Harbors
Brian Guldán, Bolton and Menk, Inc.



Topics

- Sources of I&I
- Ramifications of I&I
- What is the City Doing to Address I/I
- What can Residents do to Help Address I/I



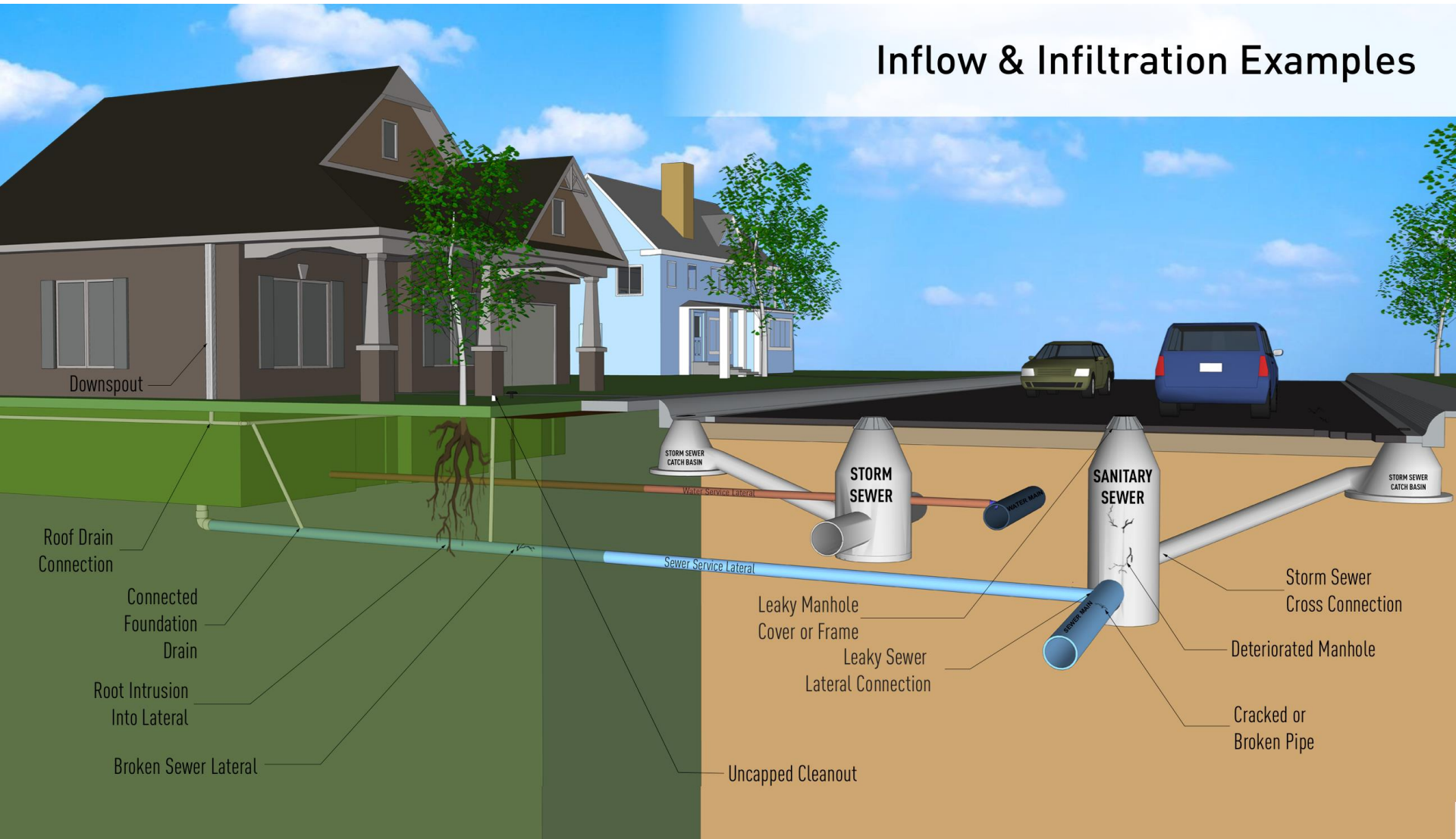
Definition

Clear water entering the sanitary sewer system

- Inflow is water entering the sanitary sewer system through improper, direct connections (sump pumps, roof lead, storm sewer cross connections)
- Infiltration is water entering the sanitary sewer through leaks in the sanitary sewer system



Inflow & Infiltration Examples



Examples of I&I



Examples of I&I



Examples of I&I





Backwash Flow Trend



Feb 19
20:26:37

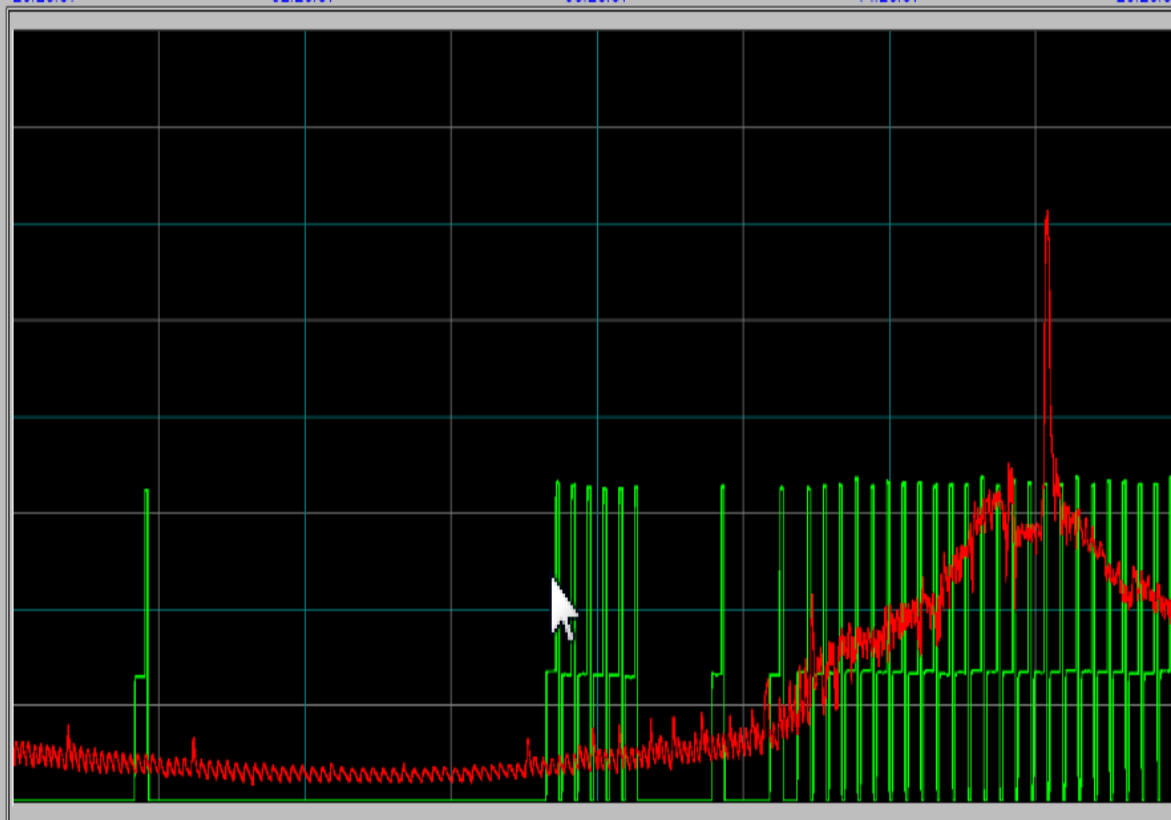
Feb 20
02:26:37

Feb 20
08:26:37

Feb 20
14:26:37

Feb 20
20:26:37

10,000
8,750
7,500
6,250
5,000
3,750
2,500
1,250
0



Time Range

15 Minutes

1 Hour

1 Day

1 Week

20:26:37

20:26:37

20:26:37

Zoom In

1d

Zoom Out

20:26:37

1 Week

1 Day

2 minutes

12 Hours

6 Hours



What is The City of Two Harbors Doing to Address I/I

- \$127,000 Budgeted over the Next 5 Years for Manhole Covers



Solid Manhole Lids



I&I Manhole Barriers

- Internal/External Chimney
- Striker
- HDPE Rings



What is The City of Two Harbors Doing to Address I/I

- \$127,000 Budgeted Over the Next 5 Years for Manhole Covers
- Televising Entire Collection System Over Next 5 Years.
- Sump Pump Education and Ordinances
 - Free Sump Pump Inspection by City Staff (218-834-8813)
- Smoke Testing (July 19 – 21, 2017)



Smoke Test Demonstration



Smoke Testing



Smoke coming out of ground. Logical place for a possible manhole or uncapped end of pipe.



Smoke Testing



Smoke coming out of ground at clean out. Pipe is obviously broken and not capped.



Smoke Testing



PVC clean out above ground with smoke present.



What can Two Harbors Residents do to Address I/I?

- Check your home for incorrect sump pump or storm drain connections to the sanitary sewer. Contact City at 218-834-8813 for a free inspection.
- Alert the City if you observe a flooded manhole cover.
- Inform your neighbors and friends about I/I
- Check City Website for Updates and More Information on I/I



In Closing....

- Two Harbors has 31 Miles of Water Distribution System Piping and 24 Miles of Sanitary Sewer.
- Current Replacement Cost = 15 Million (Water)
= 15 Million (Sewer)
- Maximum Life Span = 100 years
- Replace 1% per year = \$300,00 per year



THANK YOU!

