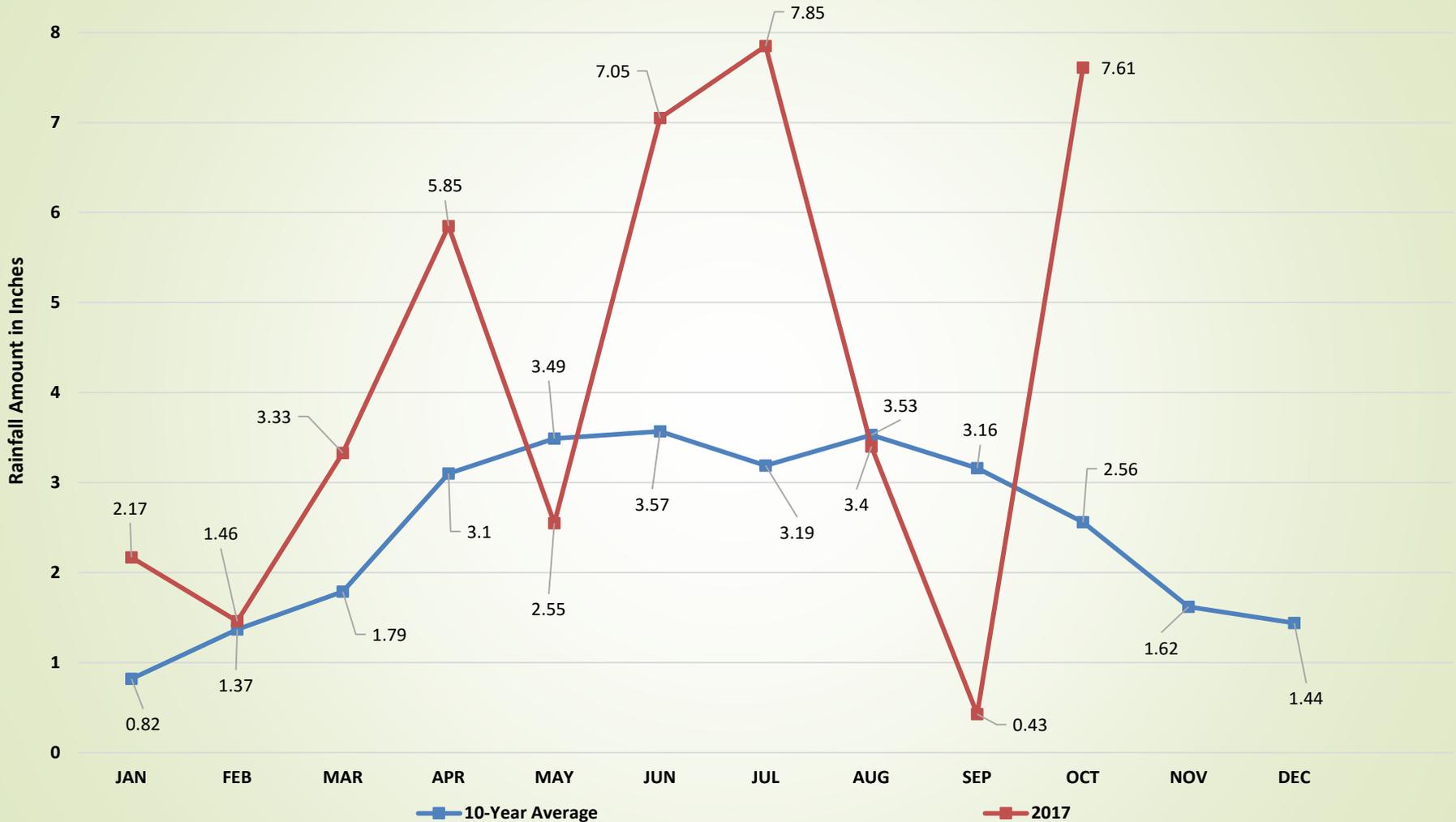


The City of Lake Forest Public Works Committee Flooding & Storm Sewer Review



2017 Lake Forest Monthly Rainfall



Rainfall Intensities

Storm Duration	2-year	5-year	10-year	25-year	50-year	100-year
1 hour	1.31	1.60	1.84	2.20	2.50	2.82
2 hour	1.54	1.93	2.23	2.73	3.16	3.64
3 hour	1.68	2.07	2.40	2.93	3.39	3.89
6 hour	1.95	2.40	2.79	3.44	4.03	4.70
12 hour	2.24	2.74	3.17	3.89	4.53	5.25
24 hour	2.57	3.14	3.62	4.41	5.11	5.88
2 day	3.04	3.71	4.20	4.94	5.53	6.13
3 day	3.29	3.94	4.40	5.09	5.63	6.17
5 day	3.77	4.42	4.84	5.43	5.86	6.26
10 day	4.68	5.42	5.89	6.55	7.03	7.46

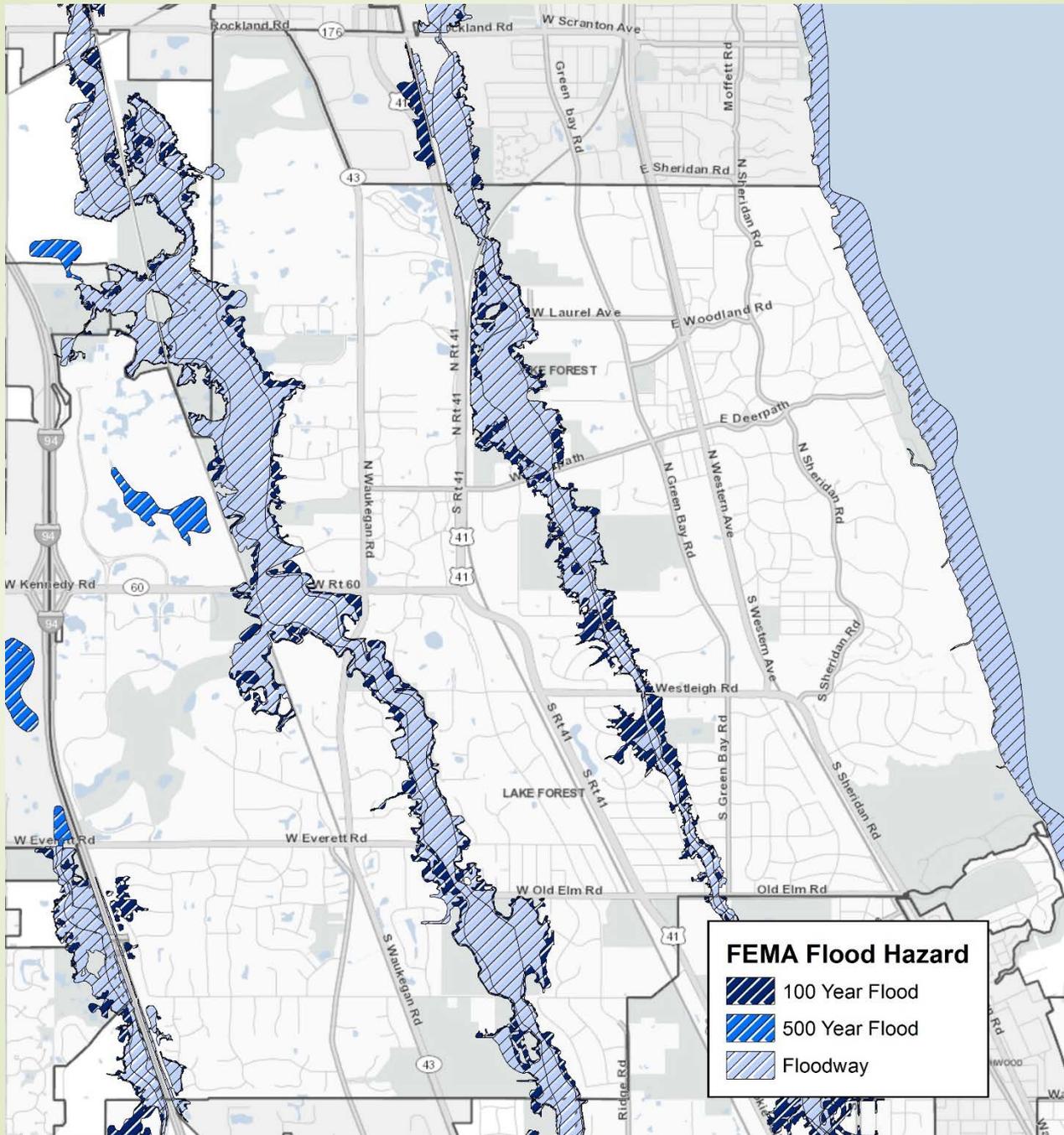
Rainfall Comparison Summary

	2010	2013	2014	2017	2017
Event Date	May 11 – 13	April 17 – 18	May 12 – 13	July 12 - 13	October 14
Rainfall Total	5.55"	4.95"	3.31"	6.70"	3.71" (WP) 3.41" (MS)
Duration	-	-	-	14 Hours	2.45" in one Hour
Basement Flooding Incidents Reported	126	18	5	138	61
Basement Flooding Debris at Curbside (not reported)	-	-	-	316	23
Street Flooding Incidents	58	31	26	50	55
Yard Flooding Incidents	29	28	6	15	2
TOTAL REPORTED INCIDENTS	213	77	37	203	141

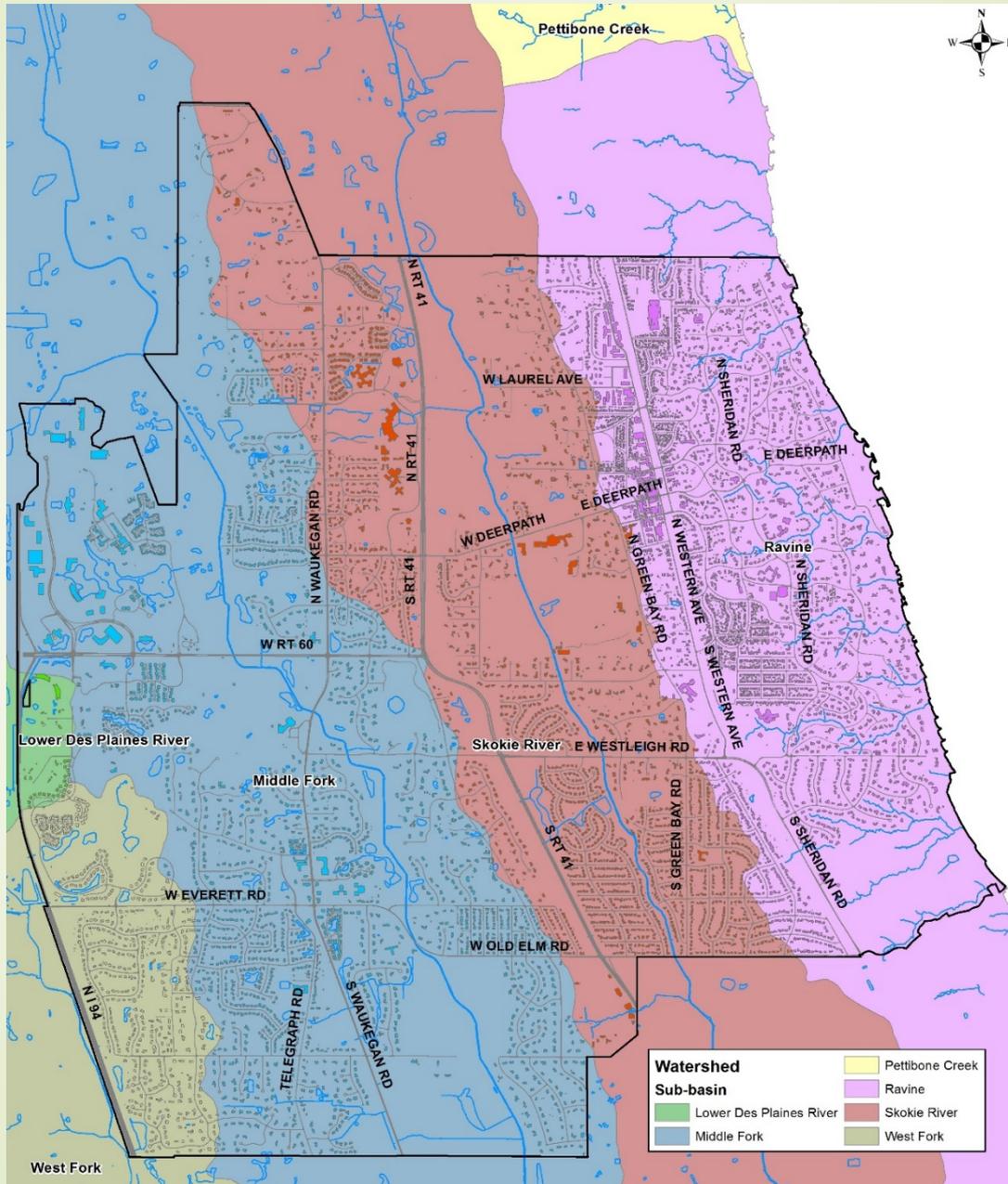
City Storm Sewer System

- ▶ 219 miles of storm sewer
 - ▶ 8 fulltime employees maintain the storm sewer along with their other regular responsibilities
- ▶ Designed to handle 10-year storm events
- ▶ Storm Sewer Studies completed in October 1991, March, 2002, November, 2014
- ▶ Eight storm sewer projects 2001-2011; currently one project scheduled every three years, Most recent completed project \$1.2 Million
- ▶ Estimated Costs to Increase Size City Storm Sewer

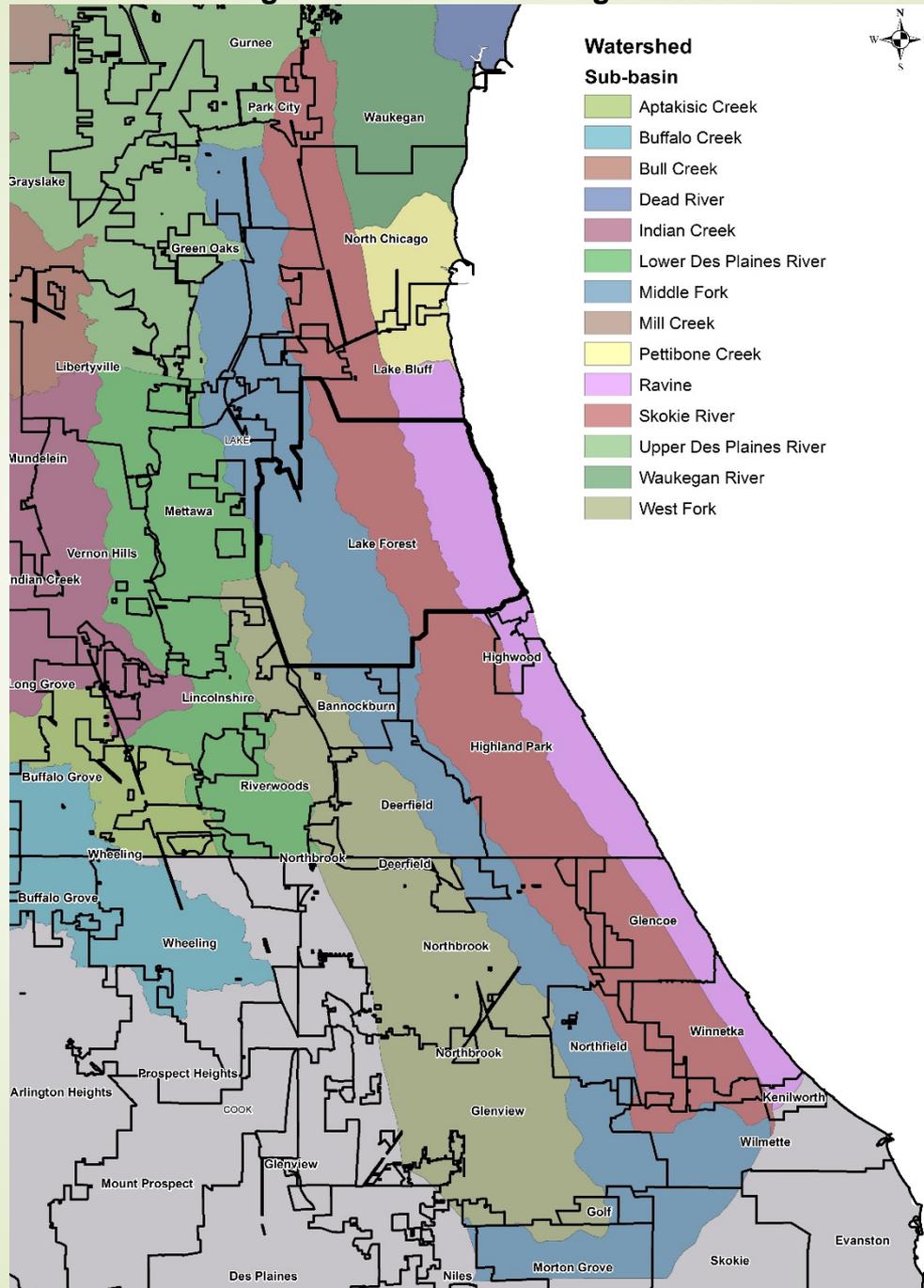
Event Type	Estimated Cost	Estimated Cost Per Household (6,700)
50-Year	\$559,000,000	\$83,432.83
100-Year	\$640,000,000	\$95,522.38



Lake Forest Overland Flooding Routes



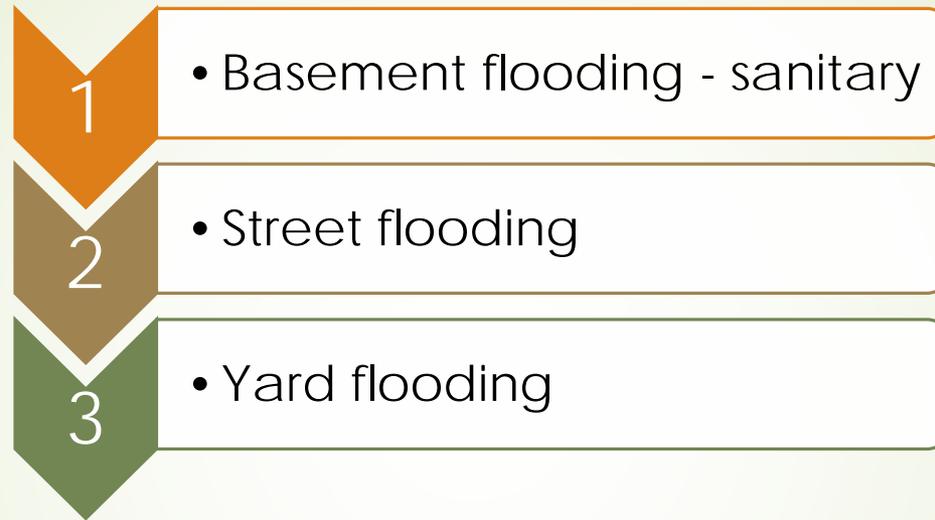
Regional Overland Drainage Routes





Outfall Discharge Location Versus Creek Water Level Location

City Stormwater Policy



Stormwater policy can be found:

- ▶ On the City's website under Government/Public Works/Water & Sewer
- ▶ Approved by City Council on March 7, 2016
- ▶ Stormwater Management Policy Flyer is available as a handout

Flooding Consultations

- ▶ Free home and property inspection by representatives from the City's Water & Sewer and Engineering Sections
 - ▶ Contact Jimmy Lockefer, Public Works Management Analyst, at (847)-810-3542
- ▶ Total consultations completed since July 12, 2017 - **92**

Summary of Findings

Event	Basement Window Well	Basement Floor Drain	Basement Sump Pump	Basement Foundation Seepage	Yard	Total Consultations ¹
July 12	13	11	6	25	19	64
Oct 14	5	10	8	6	6	28

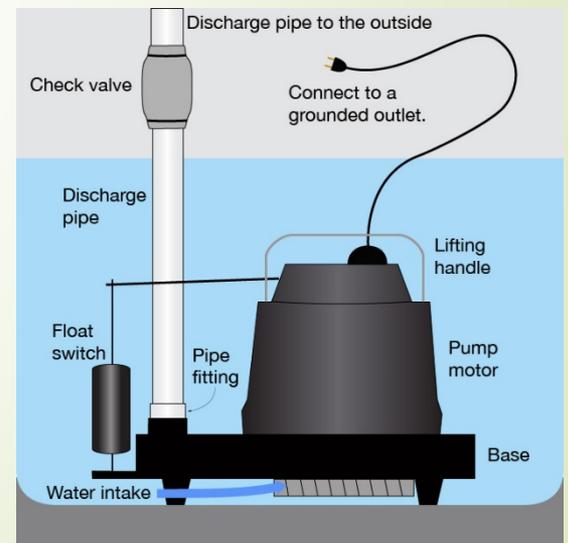
¹Some consultations meetings had multiple areas of flooding types (I.E. yard, basement window and basement foundation entry could all be found during one consultation)

Homeowner Floodproofing Measures

Basement Floodproofing

Homeowner Recommendations

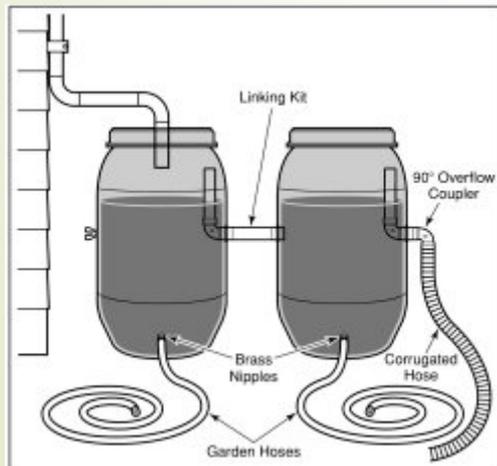
- ▶ Add a backup battery powered sump pump
- ▶ If tied to the storm sewer confirm sump pump discharge has air gap
- ▶ Verify sump pump discharges away from foundation
- ▶ Remove debris from window well drains
- ▶ Cover window wells
- ▶ Televise and rod (if necessary) sanitary lateral
- ▶ Consider installing a sanitary lateral check valve



* Handouts are also available that further show and explain these recommendations

Yard Flooding Recommendations

- ▶ Regrade property to keep water away from home
- ▶ Install swales to direct water to drain around home
- ▶ Rain Gardens
- ▶ Rain Barrels
- ▶ Permeable Driveways / Patios



A rain barrel is used to collect rooftop runoff using a gutter/downspout system

* Handouts are also available that further show and explain these recommendations

Available Handouts

- ▶ City of Lake Forest Stormwater Management Policy Flyer
- ▶ Lake County Loan Assistance
- ▶ Flooding \$750 Tax Credit Sheet
- ▶ Basement Flood Proofing Diagrams
 - ▶ Overland Flooding
 - ▶ Groundwater Infiltration
 - ▶ Sanitary Sewer Backup
 - ▶ Home Protected
- ▶ “Flood Insurance Basics”
 - ▶ 10/19/2017 Lake County SMC Homeowners Floodproofing Expo & Workshop Presentation
- ▶ Rain Gardens
- ▶ Rain Barrels
- ▶ Bioswales
- ▶ Permeable Driveways & Patios

Questions and Comments