# Village of Downers Grove
# Stormwater Master Plan Update

## Appendix D

## Technical Memorandum

## Community Drainage and Flooding Survey Results

# *TECHNICAL MEMORANDUM:*

# COMMUNITY DRAINAGE & FLOODING SURVEY RESULTS

***for the***

# Village of Downers Grove, Illinois

**April 2006**

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## 1. Purpose

The Village of Downers Grove sent out a community drainage and flooding survey in 2005 to gather information from residents on a number of issues relating to stormwater in the Village. The information in this survey was used to help pinpoint areas throughout the Village which have infrastructure improvement needs, as well as help the Village determine the best way to fund future improvements.

## 2. Methodology

The Village of Downers Grove developed and mailed a survey to 16,929 addresses. Responses were received from 6,123 addresses, a 36% response rate. However, the data collected does reflect only about one-third of the residences in the Village and the responses provided may be limited in scope and, at times, conflicting. Despite these limitations, the survey results provide useful data for identifying stormwater problems and concerns.

Survey results were entered into a Microsoft Access® database. To determine concentrations of problem areas, resident responses were mapped using ArcMap software with Village of Downers Grove GIS files. Addresses were georeferenced using available data.

This technical memo summarizes the findings of the survey. Results from this survey will be used in the Stormwater Master Plan to identify problem areas in the Village, infrastructure needs, and recommended improvements for future years.

# 3. Results

Results are divided into three categories:

(1) Background information, which gives basic information on the respondent.
(2) Problem Area Identification, which identifies areas of specific flooding problems.
(3) Funding preferences, which outlines respondents' preferences for paying for future improvements and unfunded federal mandates.

## 3.1. Background Information

### 3.1.1. Years at Address

**Question: Years of residency at present address?**

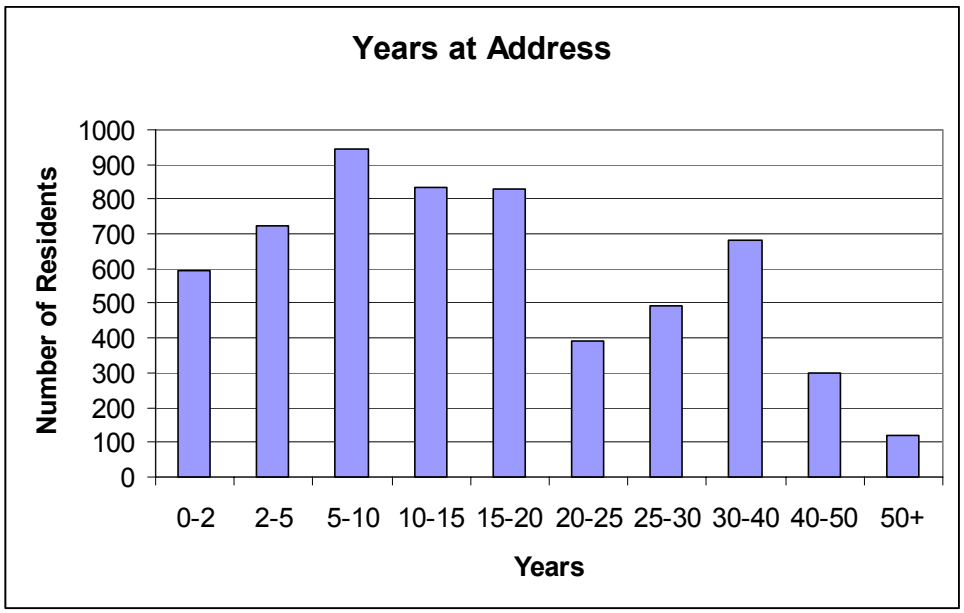



**Figure 1 - Length of Residency**

The average length of residency is 17.6 years; the median length of residency is 15 years.

Approximately 40% of the residents answering the survey were living in their homes during the 1987 flooding event, 65% during the 1996 flooding, 68% during the 1997 flooding, and 82% during the 2001 flooding event.

### 3.1.2. Foundation Type

**Question:** **On what foundation type is your house built?**
**Do you have a footing drain sump pump?**
**What type of sump pump backup system do you have?**

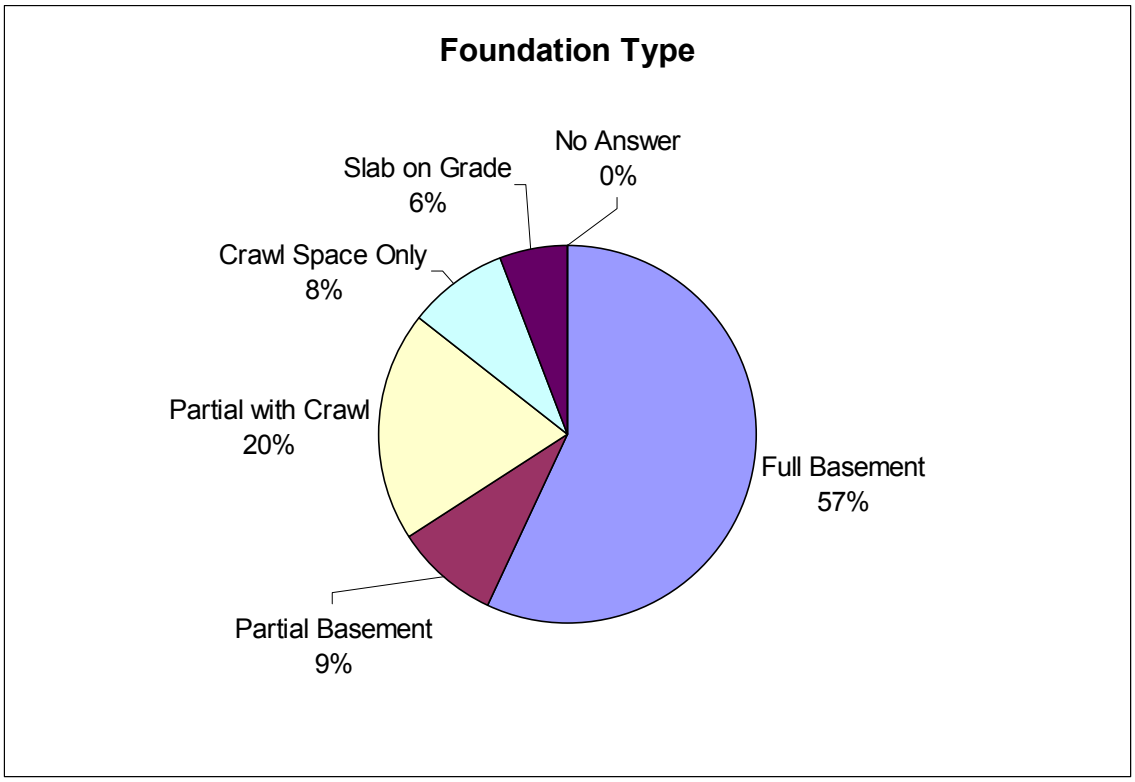



**Figure 2 - Foundation Type**

Of those with a full basement, partial basement, or partial basement with crawl space, 67.7% have a footing drain sump pump.

Of those with a sump pump:

- 33.8% have a battery backup;
- 5.0% have a water pressure backup;
- 61.1% had no backup or were unsure whether they did or not.

## 3.2. Problem Areas

Residents were asked to report instances of flooding in basements, structures, streets, yards, and septic drain fields. Historical flooding events occurred in 1987, 1996, 1997 and 2001, and results are summarized for these storms. Results are also summarized for the year 2004, since many residents wrote in as having flooding this year.

### 3.2.1. Basement Flooding

**Question: By year, list depth and damage cost for basement flooding in your house, if known (do not include sanitary sewer/ septic system backup).**

For all years, 1,258 individual residences reported basement flooding. Results from the years with major flooding are summarized below.

| Year | # Incidents | Average Depth |
|---|---|---|
| 1987 | 335 | 4.8” |
| 1996 | 381 | 5.3” |
| 1997 | 358 | 3.3” |
| 2001 | 343 | 2.5” |
| 2004 | 294 | 5.2” |

**Table 1 - Basement Flooding Summary**

Of the all reported flooding instances for the five years listed,

- Approximately 71% of incidents occurred in a home with a sump pump.
- Of those with a sump pump, approximately 54% also had a backup. This is compared to 39% of residences with a sump pump village-wide.
- Comments suggest that most basement flooding has been due to prolonged power outages.

Residents have reported that the ComEd transformer located west of Springside Avenue becomes flooded, and that instances of transformer flooding correspond to periods of power outages.

Two locations within the Village show a predominance of basement flooding:

(1) Valley View area, east and west of Main Street
(2) Tributary area to St. Joseph Creek

The above areas are highlighted on Figure 4. In the Valley View area, resident comments suggest the primary cause of flooding is sump pump failure due to power outages. In the St. Joseph Creek area, the comments suggest that basement seepage is the primary issue.

**Question: By what primary route(s) did the water enter the basement?**

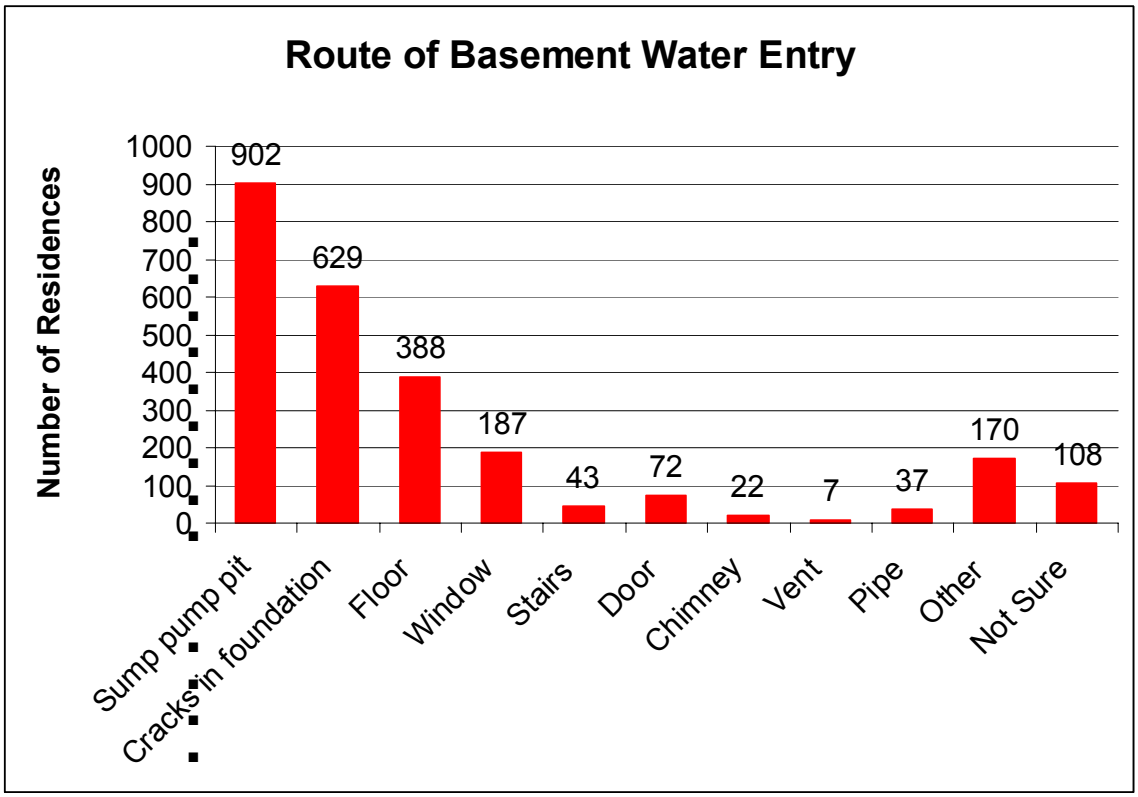


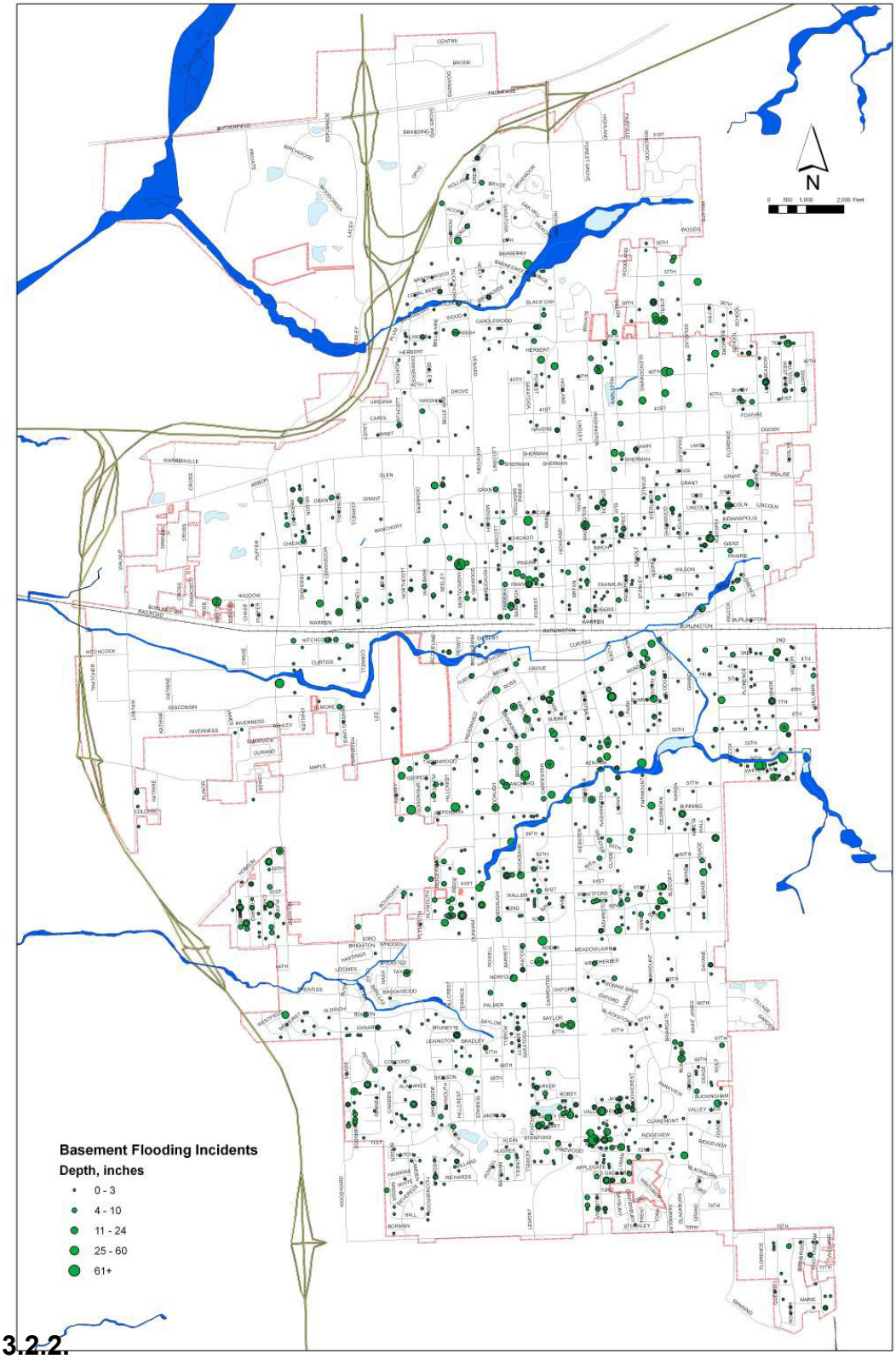

**Figure 3 – Route of Basement Water Entry**

1,860 unique residences reported a method of water entry into their basement. This is 48% more residences than responded to the question about depth and damage due to basement flooding. One possibility for this discrepancy may be that flooding and/or damage may not have been severe enough for the resident to feel the need to report it. The number of responses reported in the bar chart is greater than 1,860 because many residents responded with more than one means of entry.

902 residents, or 35% of the total, responded *sump pump pit* as being the cause of flooding. The second greatest response was *cracks in foundation*, with 25% of responses.

Responses such as *window, stairs*, and *door* would suggest that the water is entering the basement from overland flow. This does not appear to be a major issue, since only a total of 12% of the responses indicated one of these means of entry.

Power outages in the area are the likely cause of flooding from the *sump pump pit*. Groundwater flow is the likely source of flooding when *cracks in foundation* and *window* were mentioned.




3.2.2.

**Figure 4 - Basement Flooding, All Years**

### 3.2.3. Major Flooding of Structures

**Question: By year, list depth and estimated damage cost for each such occurrence when floodwater entered your house at or above the ground floor (do not include basement).**

For all years, 79 individual residences reported structure flooding. Results from the years with major flooding are summarized in Table 2 and Figure 6.

| Year | # Incidents | Average Depth |
|---|---|---|
| 1987 | 23 | 4.5” |
| 1996 | 26 | 4.1” |
| 1997 | 22 | 3.7” |
| 2001 | 22 | 2.4” |
| 2004 | 16 | 6.3” |

**Table 2 - Structure Flooding**

**Question: By what primary route(s) did the water enter the house above ground level?**

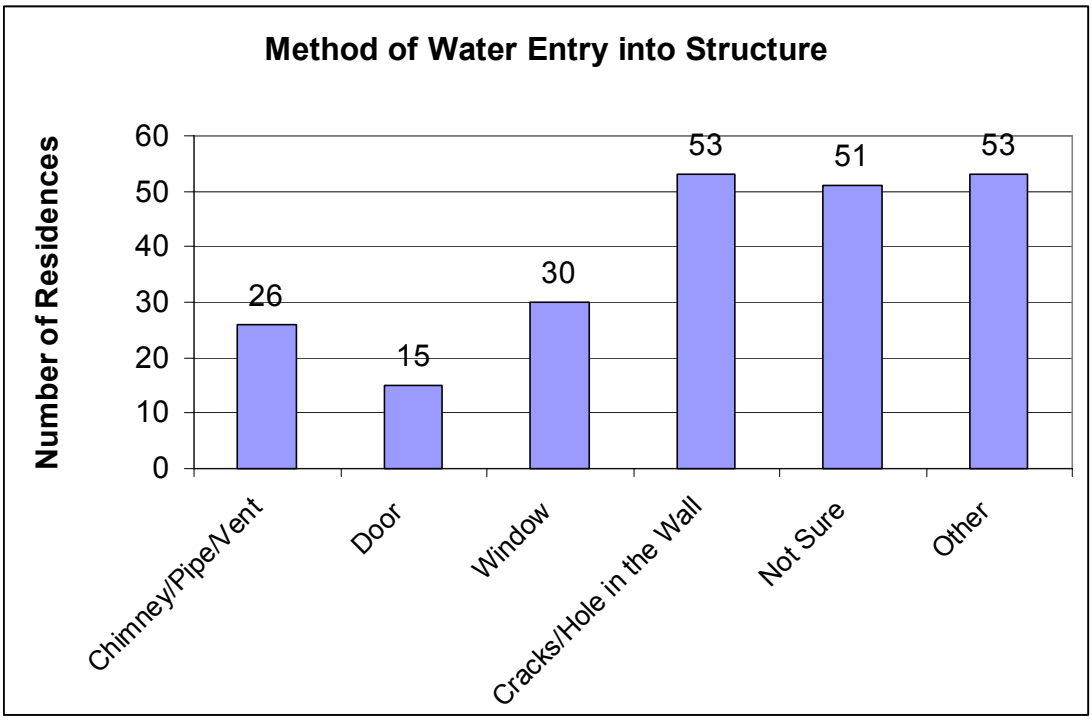



**Figure 5 - Water Entry Locations**

- Approximately 26% of the reported incidents occurred by water entering through a door or window, 10% through cracks, and 6% through the

chimney, vent or pipe. 23% reported other. The remainder (36%) either were not sure or did not answer.

- 115 unique residences reported garage flooding.

| Year | # Incidents | Average Depth |
|---|---|---|
| 1987 | 35 | 5.4” |
| 1996 | 30 | 3.3” |
| 1997 | 32 | 2.6” |
| 2001 | 46 | 2.4” |
| 2004 | 28 | 2.6” |

**Table 3- Garage Flooding**

22 residences reported flooding of over 6 inches in their house or garage. Five of these residences are in an LPDA, and five of the properties abut a creek.

Eight of the residences are in an overland flow path, which may be contributing the water to their property. Two of the residences claim their flooding is from the retention pond west of Main Street near Valley View. Only two of the residences did not have a readily visible explanation for their flooding problems.

As can be expected, structures in LPDAs or near a floodway will experience the most flooding. The remaining flooded structures are scattered about the Village.

One area, in the upstream watersheds of the southwest branch of St. Joseph Creek and Prentiss Creek, has numerous reports of house flooding. This area, bound by Maple, Belmont, 63rd, and Dunham, is partially unincorporated. The area has steep topography leading to numerous LPDAs.

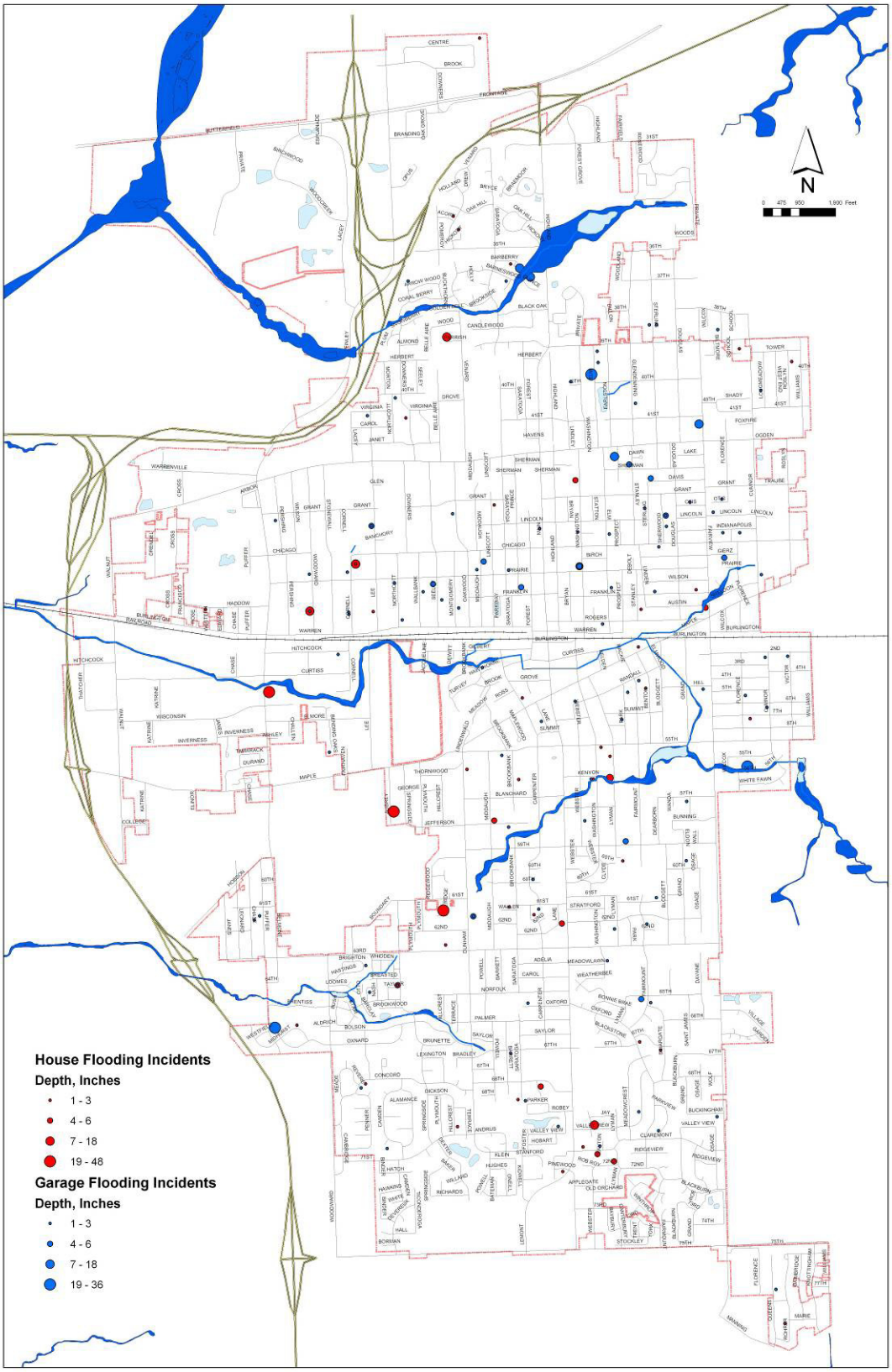



**Figure 6 - Structure Flooding, All Years**

### 3.2.4. Street/Driveway Flooding

**Question: By year, list maximum depth of street or driveway flooding which caused your driveway or street to be impassable. Also estimate private property damage cost caused by this event (including automobiles).**

For all years, 256 individual residences reported street or driveway flooding. Results from the years with major flooding are summarized in Table 4 and Figure 7.

| Year | # Incidents | Average Depth |
|---|---|---|
| 1987 | 105 | 8.8” |
| 1996 | 122 | 9.3” |
| 1997 | 113 | 8.5” |
| 2001 | 129 | 8.3” |
| 2004 | 40 | 8.8” |

**Table 4- Street/Driveway Flooding**

Area 1 – Barneswood Drive

The flooding in and around Barneswood Drive is related to the flooding of Lacey Creek. Parts of the roadway are in the floodway. There is a possible restriction at the crossing at Barneswood; further investigation is needed. Residents report that floodwaters tend to drain slowly, causing damage.

Area 2 – St. Joseph’s Creek near Lee Avenue, Gilbert Avenue and railroad tracks

Numerous reports of flooding occur within the floodway and floodplain of St. Joseph’s Creek. One report of flooding occurs at the outlet of the trunk sewer which travels under Montgomery and outlets on the south side of the railroad tracks into the creek.

Area 3 – 56$^{th}$ east of Fairview

Reports of flooding, located mainly near 100-year floodplain. Residents have reported flooding of the retention pond located east of the Williams (outside of Village limits).

Area 4 – Penner Place

Severe property damage has occurred during past storm events. Residents report during a heavy storm, water in the cul-de-sac did not drain, causing approximately 2-3 feet of water in the street.

Area 5 – Vicinity of Springside and Richards

Street flooding has been reported on Springside north of Richards. The same homes reporting street flooding have commented that the ComEd transformer located in the back of their lots will flood during heavy rain events.

Area 6 – Vicinity of Maple Avenue/Carpenter Street/Lane Place

Flooding has been reported on Carpenter Street and Lane Place; contours suggest that these are local low spots that collect overland flow. The natural flow path in the area is towards a ditch which runs northwesterly towards St. Joseph's Creek. Maple Avenue and Carpenter Street cut off this natural flow path, which may be contributing to the ponding.

Area 7 – Fairmount Avenue from 65$^{th}$ to Oxford

There is a local low spot on Fairmount Avenue, which is the likely source of ponding.

Area 8 – Valley View area

There are numerous complaints in this area, generally along Claremont and Valley View. Most resident comments pertain to maintenance issues, indicating that inlets need to be cleaned of leafy debris more frequently. Other comments indicate that the retention pond located on Valley View south of Robey and west of Main will overflow and back up, causing flooding.

Area 9 – 5200-5300 block Benton

This area is unsewered. Residents report that water ponds, mainly at the low spot on Benton.

Area 10 – Vicinity of Glendenning from 39$^{th}$ to 41$^{st}$

This area exhibits overland flow leading to ponding. A local low spot sits south of the Glendenning and 39$^{th}$ Street intersection, and appears to be the source of some resident complaints.

The remainder of the complaints are scattered throughout the Village. Neighborhoods without storm sewers tend to generate complaints. In addition, the Village's topography, which consists of many small depressional areas, causes local low spots throughout the Village where water ponds and cannot drain.

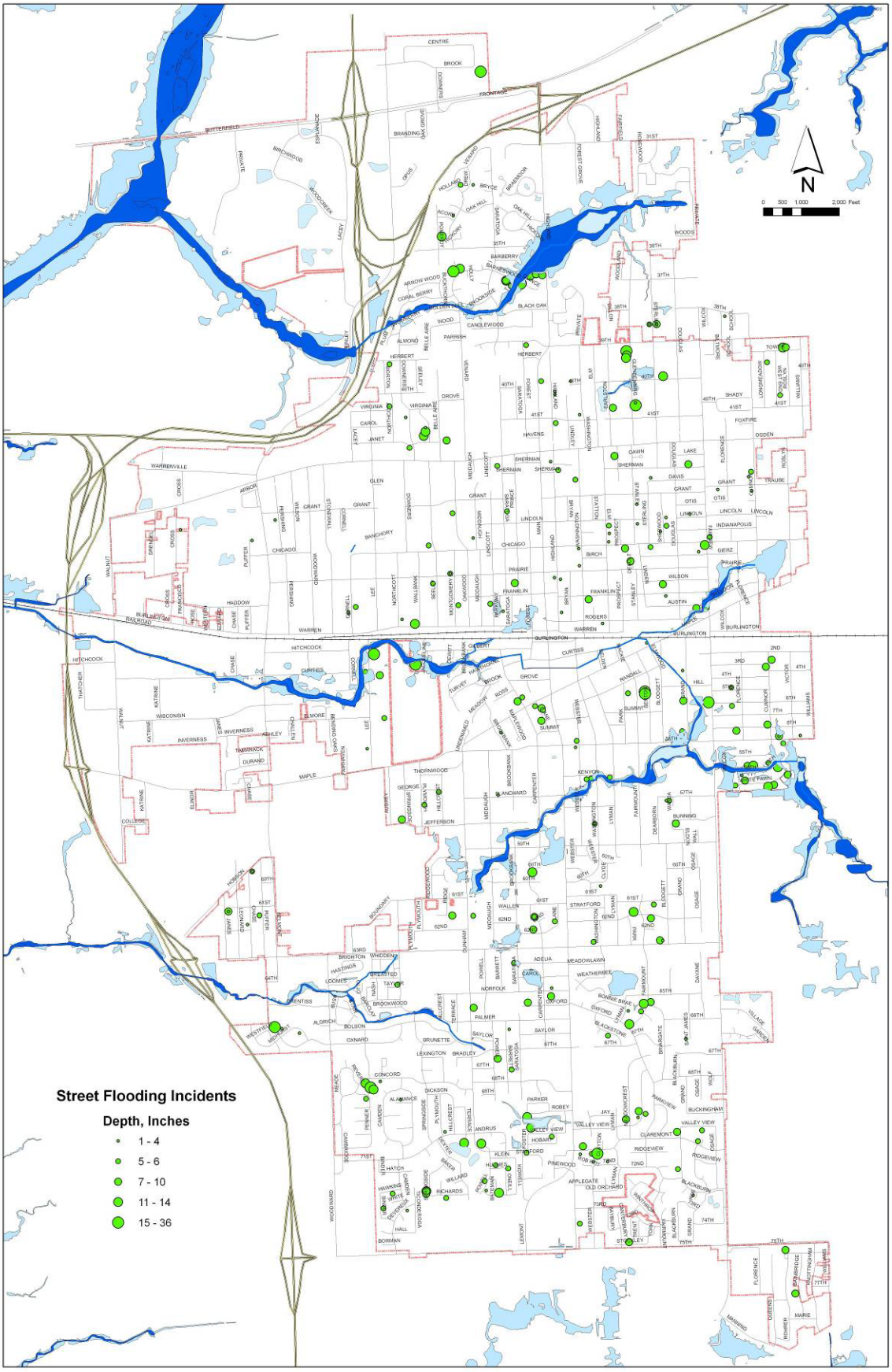



**Figure 7 - Street Flooding**

### 3.2.5. Yard Flooding

**Question: By year, list the maximum depth and estimated damage cost caused by yard flooding (do not include flooding within limits of a detention basin).**

For all years, 624 individual residences reported yard flooding. Results from the years with major flooding are summarized in Table 5 and Figure 8.

| Year | # Incidents | Average Depth |
|---|---|---|
| 1987 | 215 | 6.5” |
| 1996 | 300 | 6.9” |
| 1997 | 304 | 6.2” |
| 2001 | 388 | 5.5” |
| 2004 | 144 | 5.8” |

**Table 5 - Yard Flooding**

**Question: What is the average number of days each year that your yard is unusable due to wet conditions (if not 100% sure, estimate).**

749 surveys responded with a number of unusable yard days per year. Data is summarized in Table 6 and Figure 9.

| Unusable Yard Days | No. of Respondents |
|---|---|
| 200-365 | 14 |
| 100-199 | 28 |
| 50-99 | 43 |
| 25-49 | 69 |
| 10-24 | 186 |
| 1-9 | 197 |
| 0 | 212 |

**Table 6 - Unusable Yard Days**

Yard flooding is a predominant complaint in the Village. Many homes fall within the 100-year floodplain or a local poor drainage area. Natural flow paths are easily cut off by roadways or residential landscape features, causing a redirection of stormwater. Many residents report ponding in their backyards due to local low spots in the back of their and neighbors’ properties.

Five areas have been identified as having either a concentrated number of resident responses or relatively high volumes of flooding.

Area 1 – Neighborhood located north of Maple and south of Ogden

This large area is predominantly served by storm sewer. According to resident comments and local contour mapping, overland flow paths appear to be blocked by residences, causing a redirection of water. The area has numerous low pockets which collect water.

Topographic maps suggest that, historically, a branch of St. Joseph Creek ran down the approximate location of Stanley Avenue to Franklin Street. This area is now sewered, and numerous LPDAs and resident responses to flooding are located along this corridor. Figure 10 depicts the area.

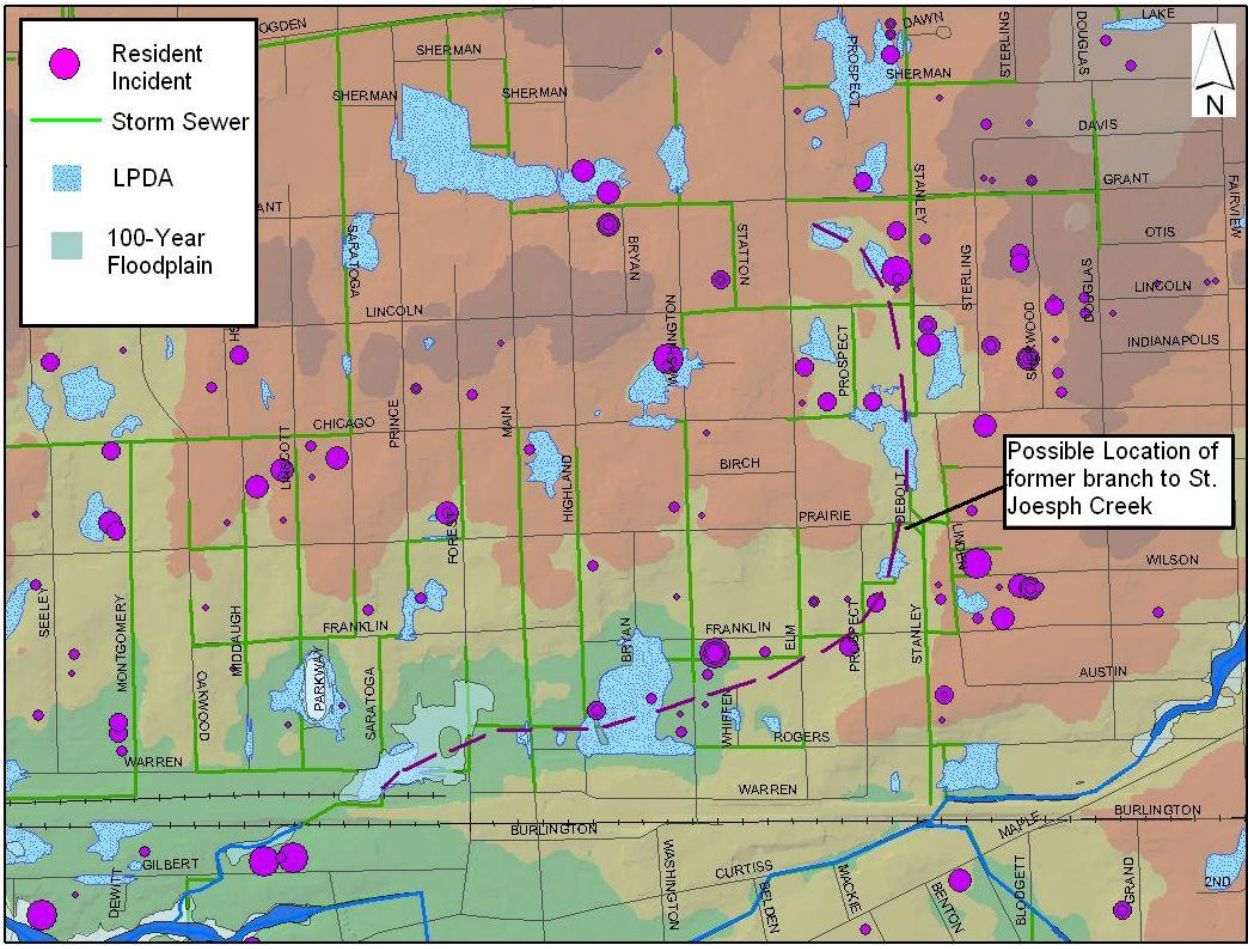



**Figure 10**
**Yard Flooding Incidents – St. Joseph Creek Watershed, North of Railroad Tracks**

Area 2 – St. Joseph Creek, Southeast Branch

Residents report ponding at low spots in their backyards. There are multiple reports of the retention pond east of Victor Street overflowing. Numerous residences are located within or abutting the 100-year floodplain.

Area 3 – St. Joseph Creek, Southwest Branch west of Main Street

Residents report ponding due to lack of relief to the creek. Also, overland flow paths cause flooding at some residences.

Area 4 – Vicinity of Lyman and Fairmound

Residents have reported ponding in the area; this is possibly due to overland flow which ponds at a low spot in residents' backyards. This area is also in the 100-year floodplain and an LPDA.

Area 5 – Vicinity of Webster Street, 71st to 73rd Street

This area exhibits flooding of residents' backyards, potentially due to overland flows ponding in backyard low spots.

Area 6 – Main Branch St. Joseph Creek, Belmont to Carpenter Street

Yard flooding is reported in the area. Flooding due to the creek (areas are in 100-year floodplain) and lack of positive drainage along railroad embankment.

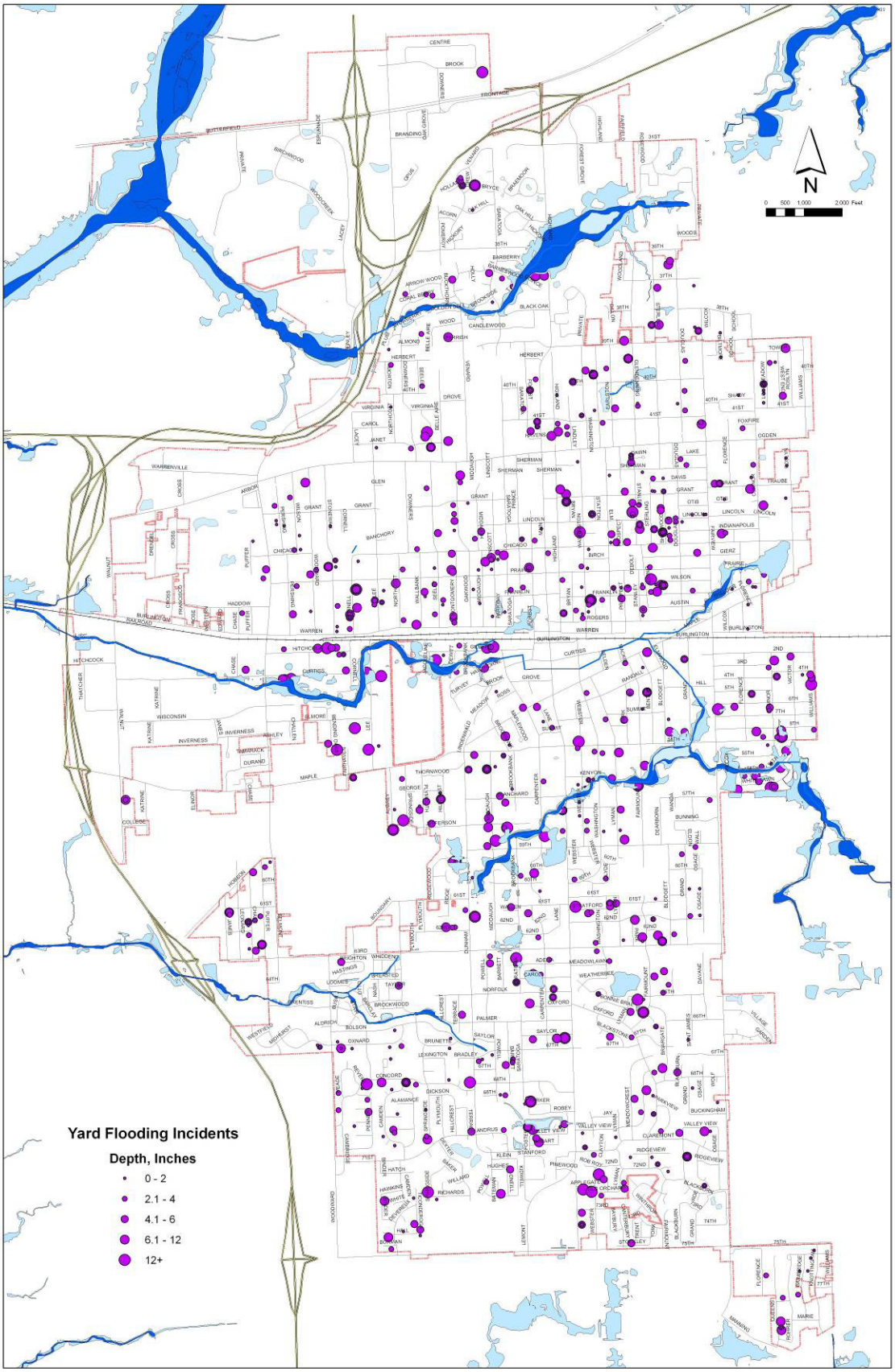



**Figure 8 - Yard Flooding, All Years**

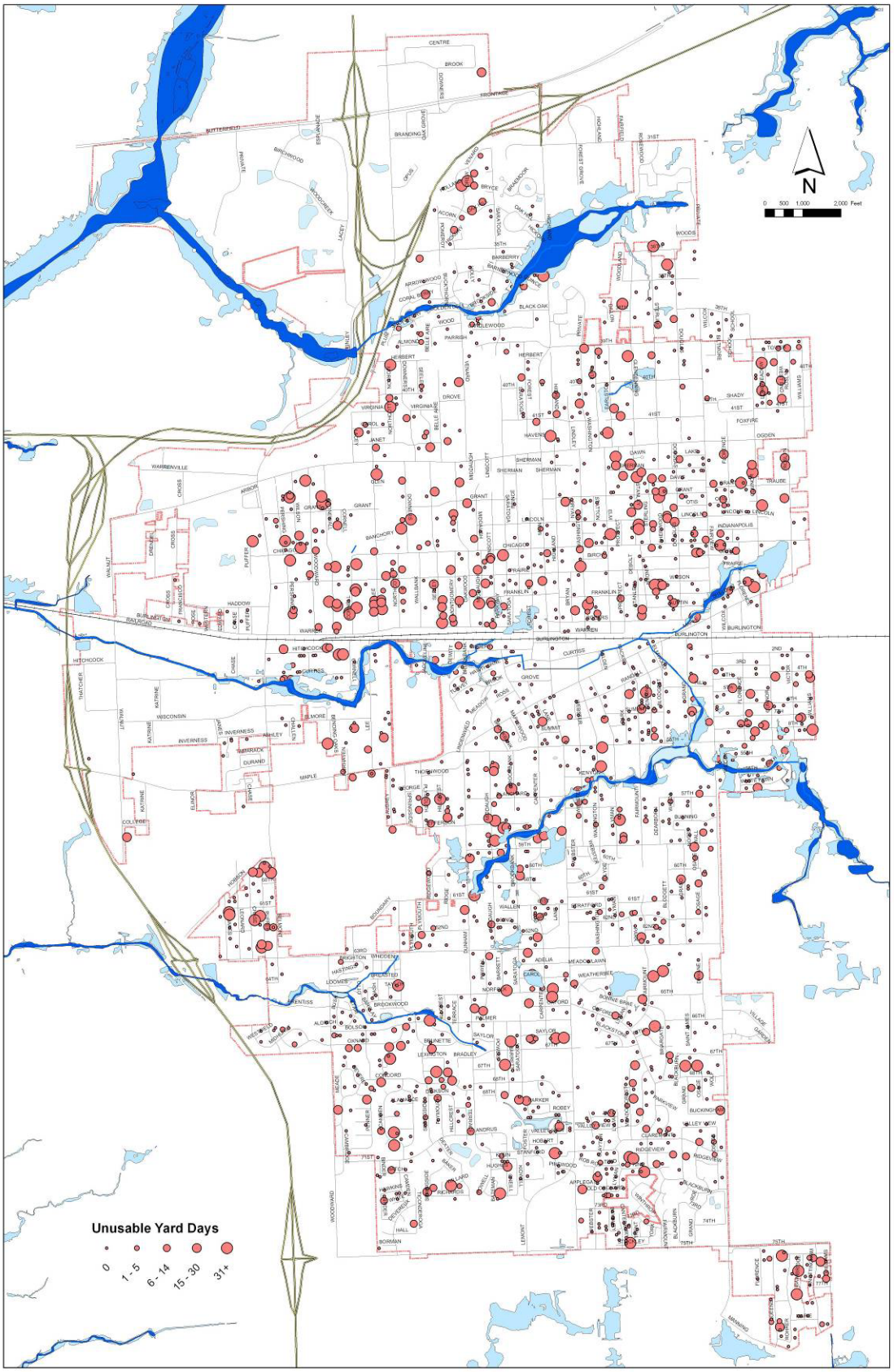



**Figure 9 - Unusable Yard Days per Year**

### 3.2.6. Septic Drain Field Flooding

**Question: By year, list maximum flooding depth and estimated damage cost caused by stormwater flooding over your septic drain field for each occurrence.**

For all years, 87 individual residences reported septic drain field flooding. Results from the years with major flooding are summarized in Table 7 and Figure 11.

| Year | # Incidents | Average Depth |
|---|---|---|
| 1987 | 29 | 5.1” |
| 1996 | 34 | 4.8” |
| 1997 | 33 | 4.1” |
| 2001 | 44 | 3.5” |
| 2004 | 24 | 4.3” |

**Table 7 - Septic Field Flooding**

The areas throughout the Village received the majority of reports of septic field flooding.

Area 1 – Hobson Triangle, bound by Hobson, Belmont and 63rd.

This area has the highest concentration of flooding reports. This area also includes the unincorporated area directly to the east, bound by Maple on the north and 63rd on the south.

Area 2 – Neighborhood bound by Herbert on the north, Ogden on the south, Lee on the west and Venard on the east.

This area is along a small tributary to Lacey Creek. Numerous LPDAs are located throughout the neighborhood.

Area 3 – Neighborhood bound by Chicago on the north, Warren on the south, Saratoga on the west an Fairview on the east.

Most reports of flooding in this area are located within or near LPDAs.

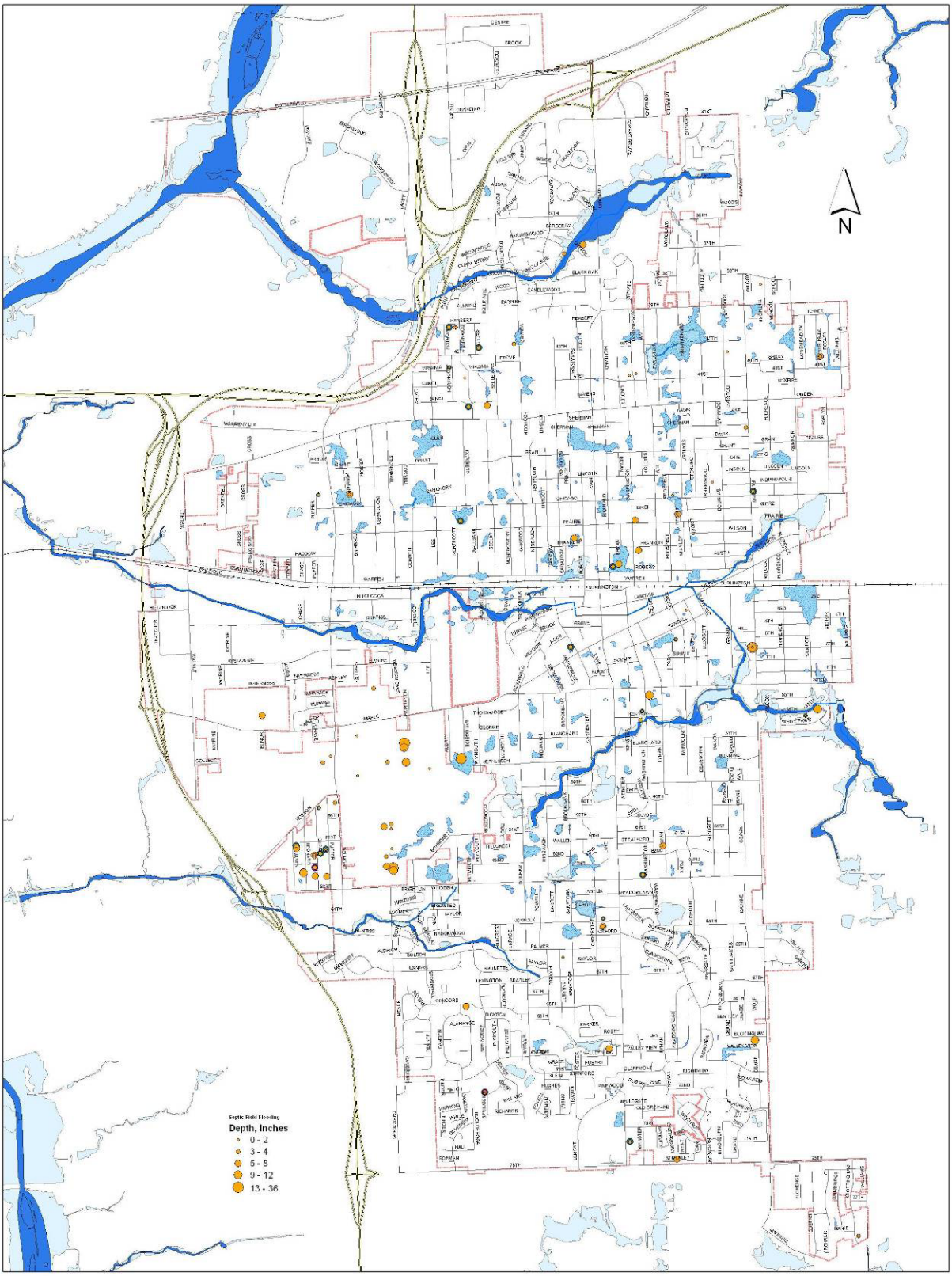



**Figure 11- Septic Field Flooding, All Years**

## 3.3. Funding Solutions

### 3.3.1. Preferred Funding Method

**Question: Unfunded federal water quality mandates (e.g. Clean Water Act) are increasing the funding pressures on local and state governments throughout the nation. What is your preferred funding method to address these new costs?**

- **Dedicated monthly user fee, based on the estimated quantity of stormwater runoff from properties**
- **Dedicated property tax, based on property value**
- **Dedicated sales tax**
- **Other:**

Of 6,047 responses available, 5,915 residents reported a preference in funding for stormwater and flooding issues.

| Funding Preference | % of Respondents |
|---|---|
| Monthly User Fee | 28% |
| Sales Tax | 20% |
| Property Tax | 13% |
| None | 30% |
| Other | 6% |
| No Answer | 2% |
| Unsure | <1% |
| Any/All/Combination | <1% |

**Table 7- Funding Preference**

Of the three options provided, residents preferred a monthly user fee slightly more than a sales tax, which was the second most popular option. A dedicated property tax was the least favorable, and also generated many negative comments. Figure 12illustrates the distribution of responses.

30% of respondents indicated "none" as their preferred funding method. This indicates residents that wrote in "none", not those who did not respond to the question. Numerous residents replied that either they did not have a problem so did not feel the need to pay to fix the problem, or they did not agree with funding unfunded federal mandates.

Numerous residents indicated they did not fully understand all the options. Some residents commented they would like more information available, or possibly a meeting held on the subject.

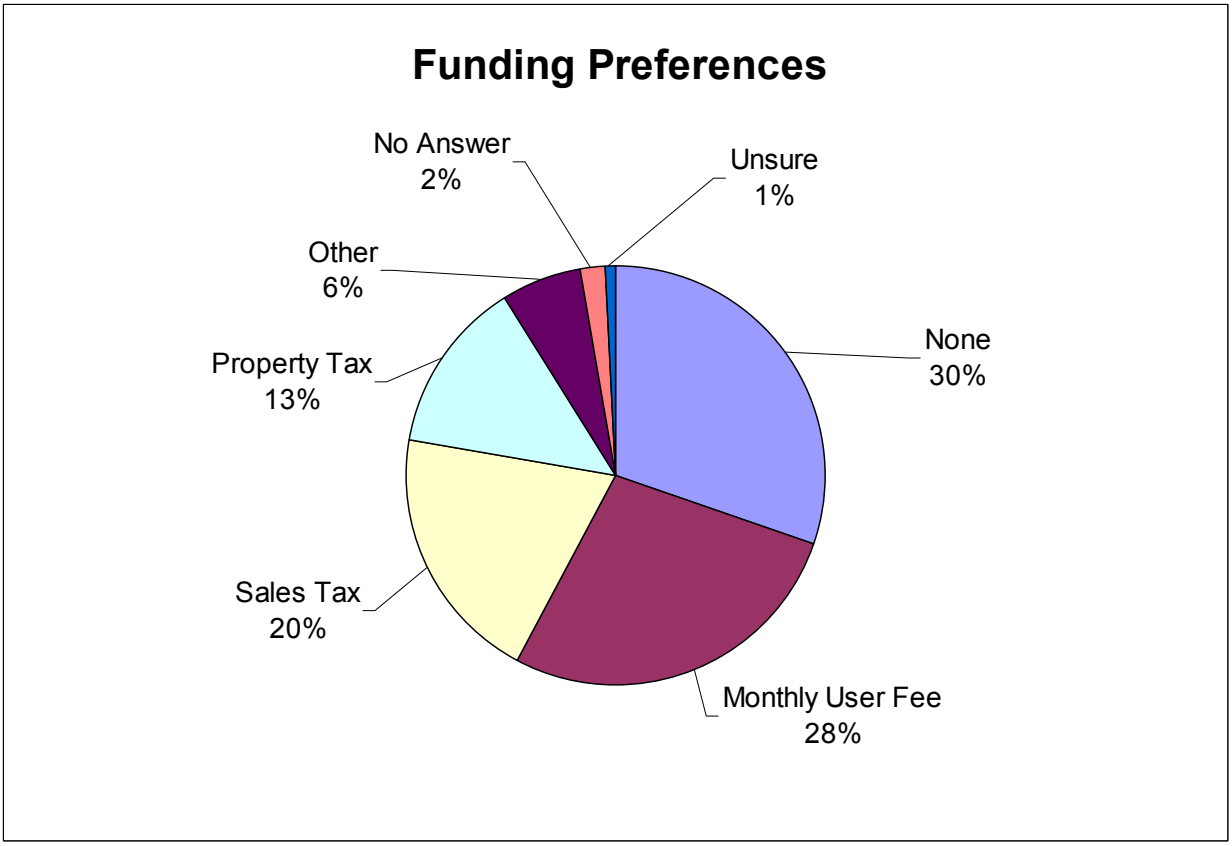



**Figure 12 - Funding Preferences**

### 3.3.2. Preferred Fee Type

**Question: If you would be willing to support a fee or dedicated tax to solve public drainage problems and reduce flooding probability, which type would you prefer?**

- **Dedicated monthly user fee, based on the estimated quantity of stormwater runoff from properties**
- **Dedicated property tax, based on property value**
- **Dedicated sales tax**

Of 6,032 responses available, 5,996 residents indicated a preferred fee type. Results were similar to the question for preferred funding method; 28% prefer a monthly user fee, 22% prefer a dedicated sales tax and 13% prefer dedicated property tax. 35% prefer "none", which was written in even though an "Other" option was not made available. Figure X-X illustrates the results.

| Fee Type | % of Respondents |
|---|---|
| Monthly User Fee | 28% |
| Sales Tax | 22% |
| Property Tax | 13% |
| None | 35% |
| Other | 1% |
| No Answer | 1% |
| Unsure | <1% |
| Any/All/Combination | <1% |

**Table 8 - Fee Type Preferences**

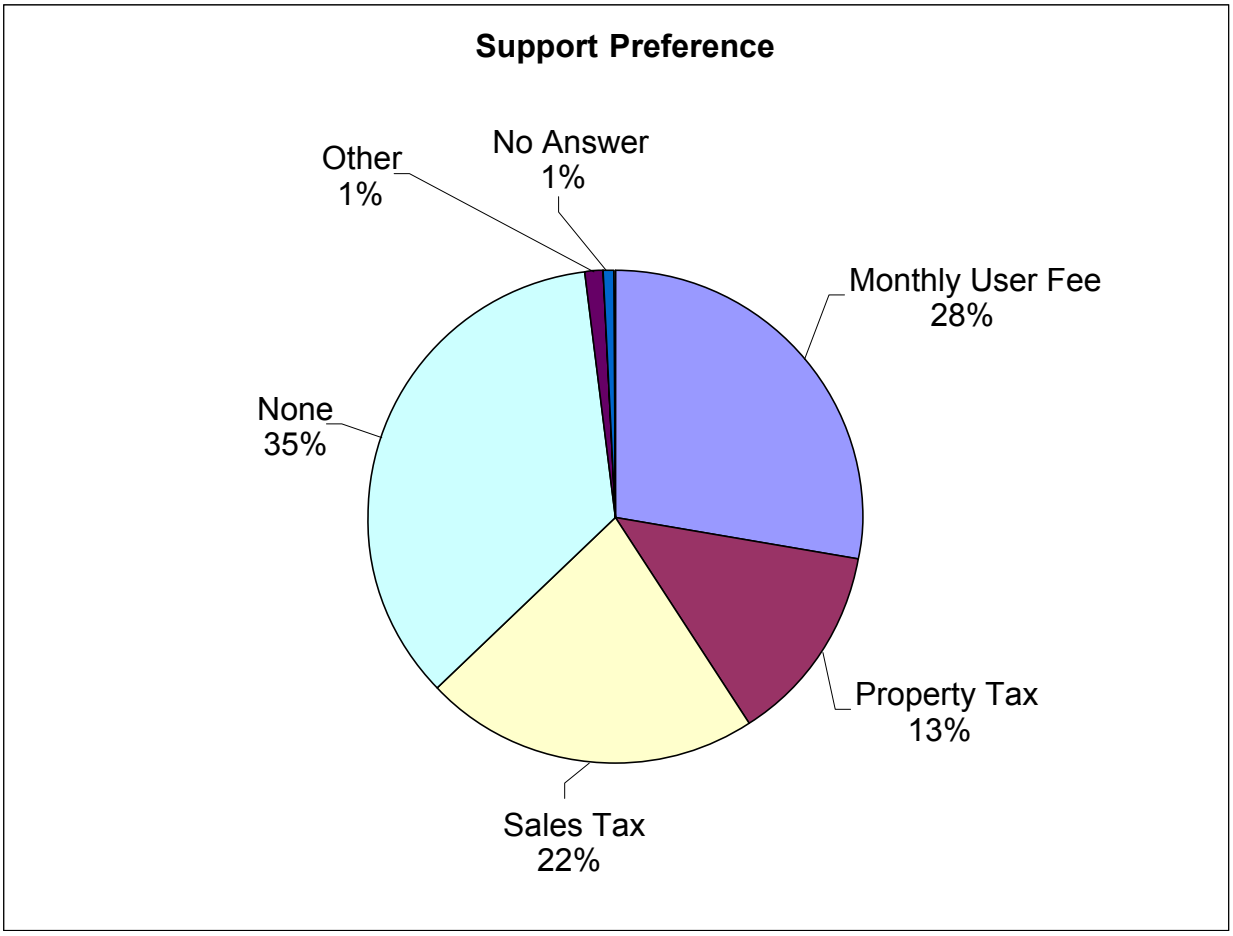



**Figure 3 - Support Preference**

### 3.3.3. Funding Priority Issues

**Question: Select the top 3 issues from the following list and rank them according to recommended funding priority. 1 = the highest priority; 3 = the lowest.**

Of 6,020 responses available, 5,223 respondents indicated a first priority, 4525 indicated a second priority and 4797 indicated a third priority. The total numbers and percent break down can be found in Table10 and Figure 14

| Issue | # Voted as 1st Priority | # Voted as 2nd Priority | # Voted as 3rd Priority |
|---|---|---|---|
| **Surface Water Quality** | 854 (14.2) | 879 (14.6) | 623 (10.3) |
| **Ground Water Quality** | 1025 (17.0) | 707 (11.7) | 558 (9.3) |
| **Creek/Pond Health** | 332 (5.5) | 453 (7.5) | 819 (13.6) |
| **Basement Flooding** | 1296 (21.5) | 675 (11.2) | 464 (7.7) |
| **Garage Flooding** | 114 (1.9) | 216 (3.6) | 381 (6.3) |
| **Primary Structure Flooding** | 506 (8.4) | 378 (6.3) | 535 (5.9) |
| **Street/Driveway Flooding** | 535 (8.9) | 579 (9.6) | 651 (10.8) |
| **Yard Flooding** | 377 (6.3) | 448 (7.4) | 586 (9.7) |
| **Septic Field Flooding** | 184 (3.1) | 190 (3.2) | 362 (6.0) |
| **No Answer/No Opinion** | 797 (13.2) | 1495 (24.8) | 1223 (20.3) |

**Table 10**
**Top Three Priority Stormwater Issues**

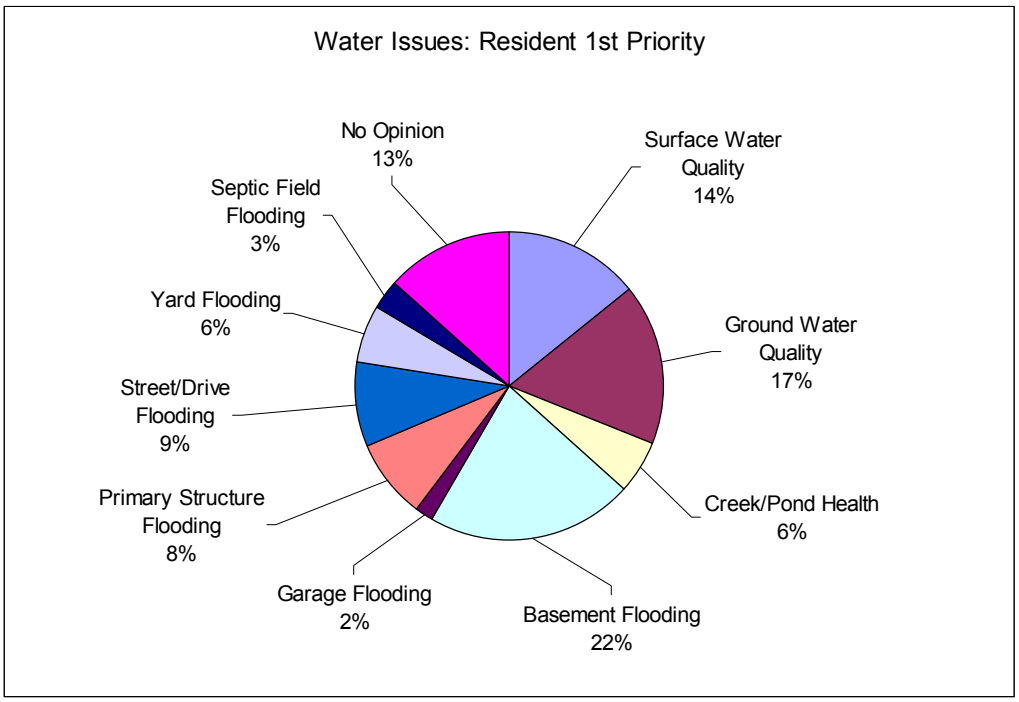



**Figure 14 – First Prioirty Stormwater Issues**

Basement flooding was ranked as the Number 1 priority issue in the Village, with 22% of respondents indicating this choice as their first priority, and 40% of respondents indicating this choice in their top three.

The next highest priority items among residents are groundwater and surface water quality. Groundwater quality had 17% of respondents indicating this as their number 1 priority and 38% listing it in their top three. At the time the survey was taken, public notice was being given to address possible contamination of private wells on the west end of the Village. This may have temporarily skewed residents' priorities. 14% of residents indicated surface water quality as their first priority, and 39% placed it in the top three.

Flooding of structures or infrastructure, aside from basements, was found to be the lowest priority. 10% indicated primary structure or garage flooding as their first priority, 9% of respondents indicated street/driveway flooding, and 9% indicated yard or septic field flooding.

## 4. Conclusion

The Community Drainage and Flooding Survey provides valuable information to the Village of Downers Grove concerning flooding issues throughout the area.

- The biggest flooding concern pertains to basement flooding. Residents acknowledge that most of the flooding is due to extended power outages, and is not the fault of the Village. While many residents have back up systems for their sump pumps, power outages have lasted for extended periods where the battery backup has also died.

- Reports of flooding instances are scattered throughout the Village. While there are some areas that have a higher concentration of responses than others, there is no one predominant location in the Village towards which complaints are directed.

- Many instances of flooding occur either on properties situated along the Village's creeks or within their 100-year floodplains, or they occur in already-identified local poor drainage areas.

- Many flooding problems are related to the topology of the Village, which consists of mildly steep flowpaths leading to pockets of low areas with no natural drainage outlet.

- Residents indicate that many incidents of street flooding can be alleviated by routine street sweeping and seeing that debris is out of the gutters and inlet structures, particularly in the fall.

- Resident comments suggest that those living in the Village are very concerned about the potential effects of residential redevelopment and increased impervious area.

- Residents are generally unwilling to support unfunded mandates, expressing feelings that the Village should not be expected to pay, or that residents without problems should not have to pay for those who do. Further education to explain the choices was requested.