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Flooding, Drainage, and Sewer Problems in the City of Valparaiso

February 2009

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Educating a New Generation of Civic
Leaders and Making a Difference in
Northwest Indiana

Flooding, Drainage, and Sewer Backups in Valparaiso

Introduction

Mathew Kras, the City of Valparaiso's Stormwater Engineer, asked the Community Research and Service Center to help the City of Valparaiso conduct and analyze a survey on problems related to the flooding that occurred in early September, 2008 in the City. Working with the City and CRSC staff, as well as students in a Political Science research methods class, we developed a questionnaire, a complete copy of which is included in Appendix, designed to answer several questions.

1. At your current residence, have you had any problems with drainage or sewer backups?
2. What kind of problems have you had related to drainage or sewer backups?
3. How serious would you say the problems have been?
4. How often would you say the type of problems indicated above occur?
5. What have you done to try and solve the flooding problem.
6. If you have made changes, have they solved your problem?
7. Have you had any other problems or are there any other comments you would like to make about drainage and sewer problems?
8. In order to understand where the problems are, give us your name and address and phone number and how long you have lived in your current residence.

The surveys were distributed to approximately 12,000 households along with their city water bills. (Some of these households are located outside of the city limits.) Respondents were allowed to complete a mail copy or were given the option of completing the survey online. A link to the online survey also was placed on the City of Valparaiso webpage. A total of 1835 households responded with about 324 of those completing the survey online and the rest mailing back the completed questionnaire. While we received a large number of responses, the response rate falls around 20% and that is something that should be considered in interpreting the results. The data likely will provide a fairly accurate picture of problems because it is likely that those persons with problems responded and those without problems did not. However, some problems may have been overlooked because renters who pay the water bill may be less aware of actual water problems that would be handled by the landlord. Overall, given the large number of responses from all areas of the City, the data should provide a useful picture of the types and extent of problems related to the flooding.

All responses were coded and keyed into a dataset for analysis. The addresses for each response were also put into a different file to be used for creating maps of areas with and without problems. These maps are all available online for closer inspection at:
<http://www.valpo.edu/organization/copc/flooding>.

Results

Respondents were asked, “At your current address, have you had any problems with drainage or sewer backups?” Responses are reported in **Table 1**. Of those surveyed, slightly under half (48.0%) of respondents claimed that they had had a problem with drainage or sewer backup. Over half of respondents (50.9%) claimed they had no problems with drainage or sewer flooding. A map of these responses is presented in Map 1 on the following page.

Table 1
Problems with Drainage or Sewer Backups
Valparaiso Residents

Response	n	Percentage
Yes	880	48.0%
No	934	50.9%
Missing	21	1.1%
Total	1835	100.0%

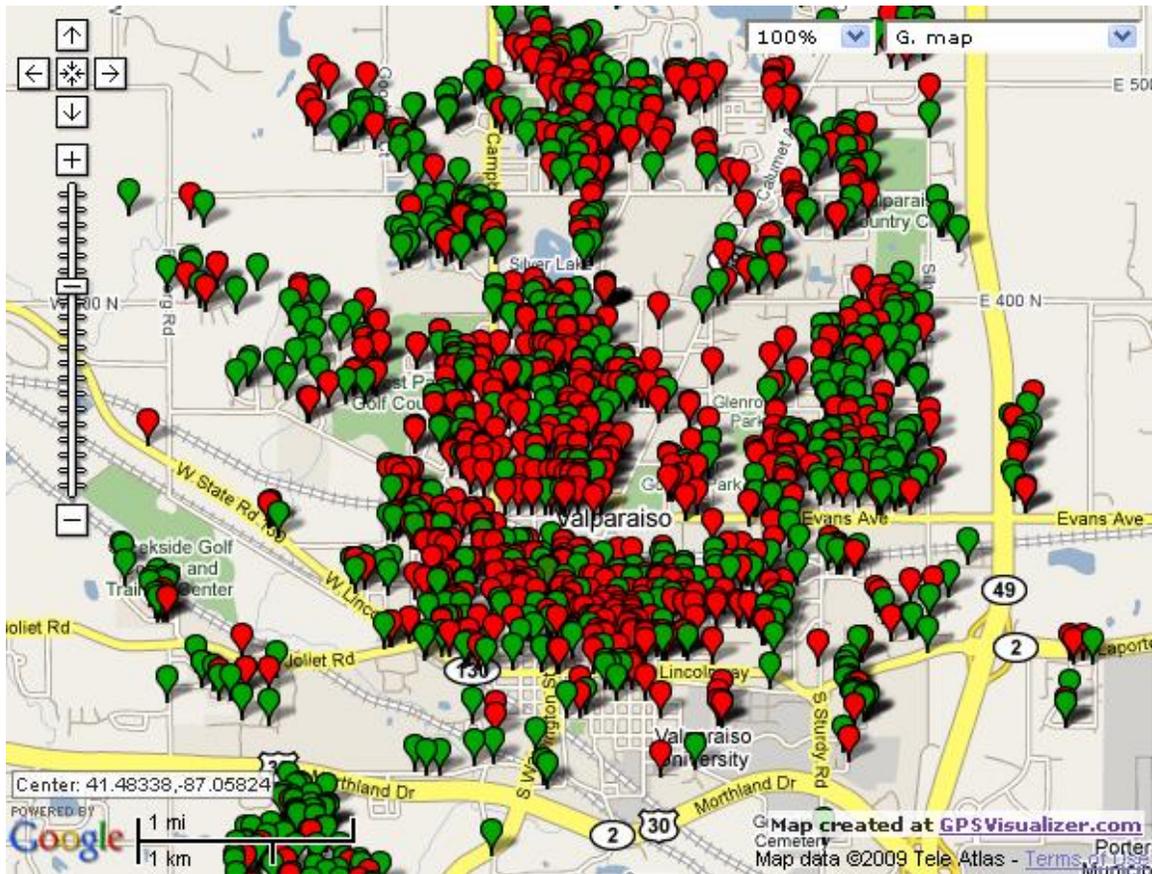
Respondents were also asked about what kinds of flooding problems they had experienced. Table 2 lists the number of respondents who reported sanitary sewer backup compared to the number of respondents who reported only other kinds of problems. These results are also shown in Map 2. A total of 277, or just over 30% of respondents who reported some sort of problem, reported a problem with sanitary sewer backups.

Table 2
Sanitary Sewer Backup Versus
Other Problems

	n	%
Sanitary Sewer Backup	277	31.5%
Other Problems Only	603	68.5%
Total	880	

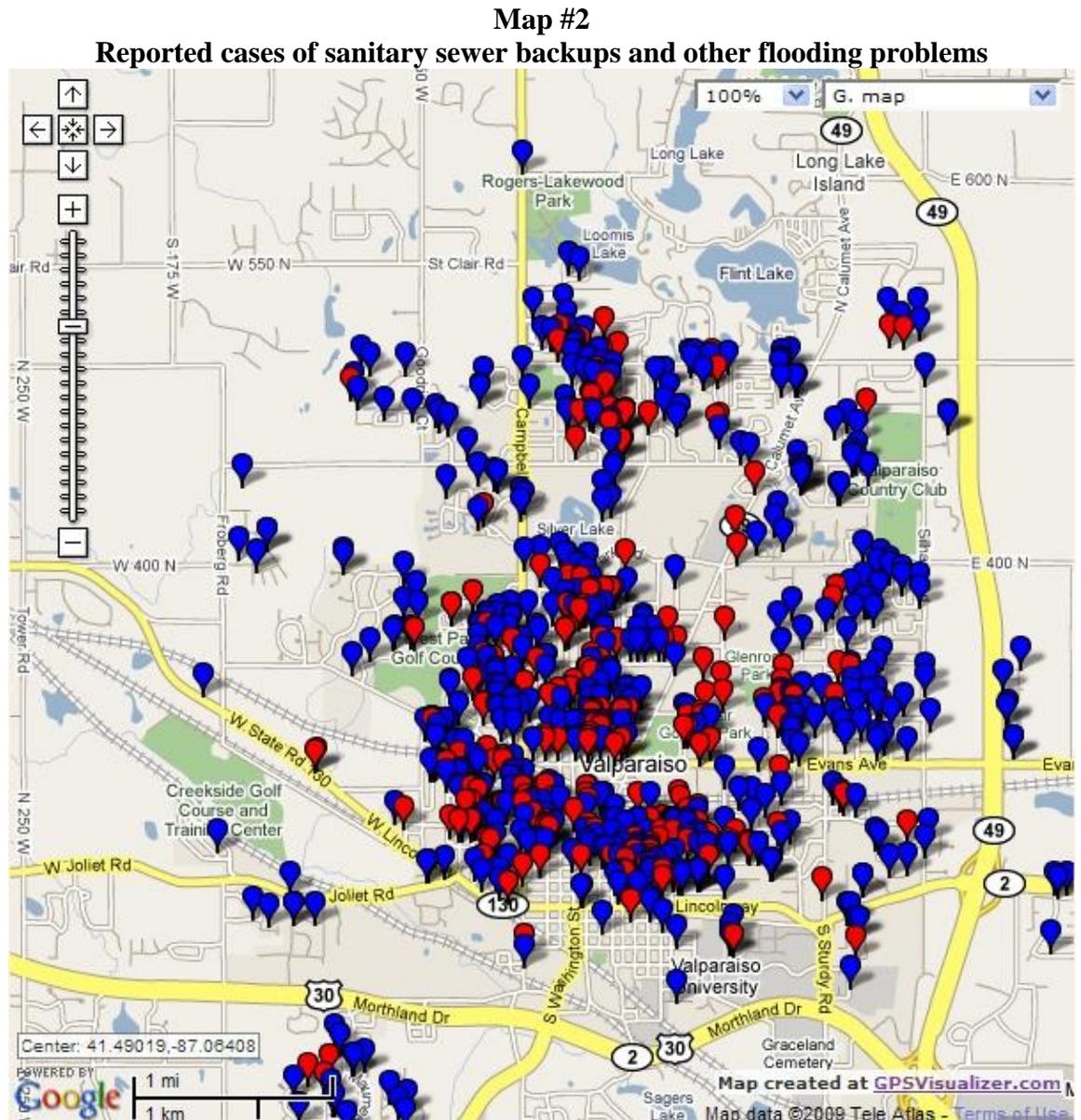
Map 1: Problems with Drainage and Sewage. Map 1 identifies the location of the residents who reported they had any kind of flooding problem. Red markers indicate reported problems, and green indicates that they did not have any problems. All maps included in this report are also available online at: <http://www.valpo.edu/organization/copc/flooding>. The online versions allow for zooming in and magnification of any area.

Map 1 Problems with Drainage and Sewage



KEY: Red tab = Problem reported
Green tab = No problem reported

Map 2: Sanitary Sewer Backup versus Other Problems. Map 2 plots locations where sanitary sewer backups were reported in red, and locations where only other kinds of problems were reported in blue.



KEY: Red = Reported Sanitary sewer backup
Blue = Reported only other kinds of flooding problems

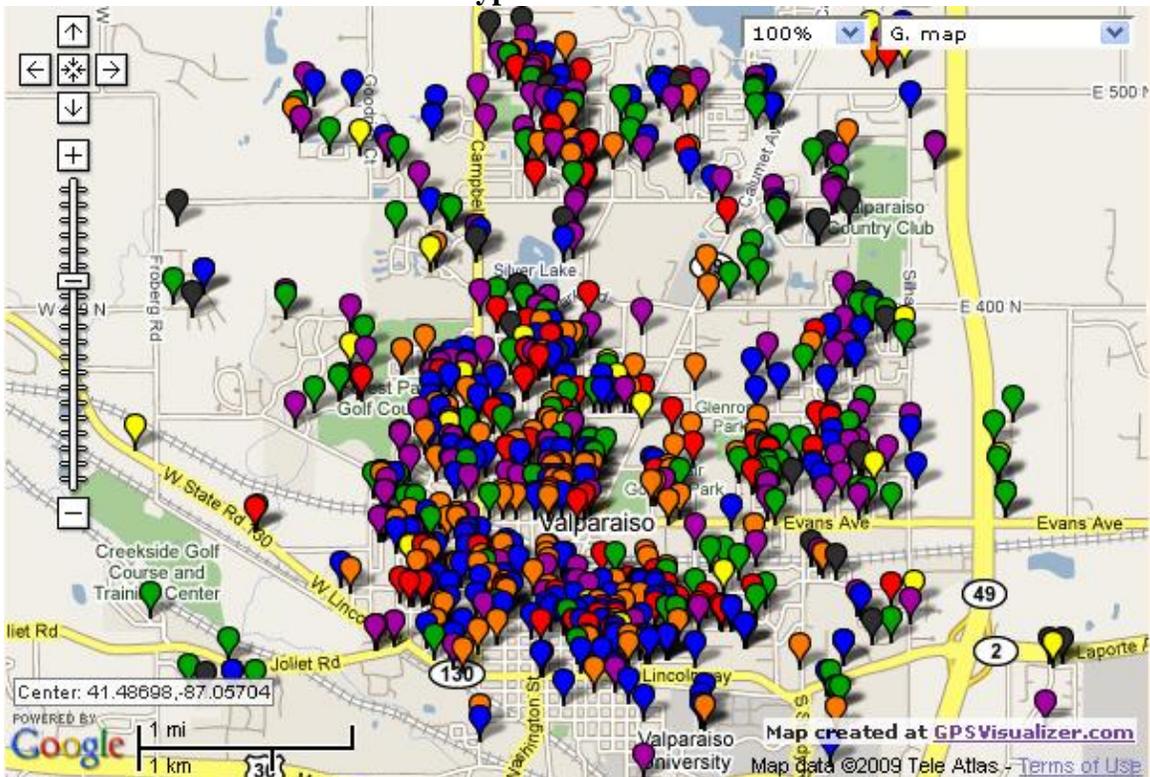
Table 3 presents the data indicating what types of problems respondents reported having. Considering only those persons who indicated they had problems, 31.6% had sewer backup problems, 15.7% had problems with water entering through doors or windows, 56.5% had basement seepage problems, 18.9% had problems with their sump pump, and 25.2% had some other type of problem. A map of these problems is presented in Map 3.

Table 3
Types of Drainage or Sewage Problems
Respondents with Flooding Problems

Type of Problem	Yes	%
Sewer Backup	277	31.6%
Water entering through Windows or Doors	138	15.7%
Seepage into Basement	495	56.5%
Sump Pump Failure	166	18.9%
Other	221	25.2%

Map 3: Types of Problems. Map 3 presents the location of various types of problems reported by Valparaiso residents. Red indicates only a sanitary sewer backup problem, orange indicates a combination of a sanitary sewer problem and some other problem(s), yellow indicates water entered the house through windows or doors only, blue indicates a problem of seepage through basement walls or floors only, black indicates a problem with sump pump failure only, green indicates some other type of flooding problem, and purple indicates multiple problems with flooding not including problems with sanitary sewer backup.

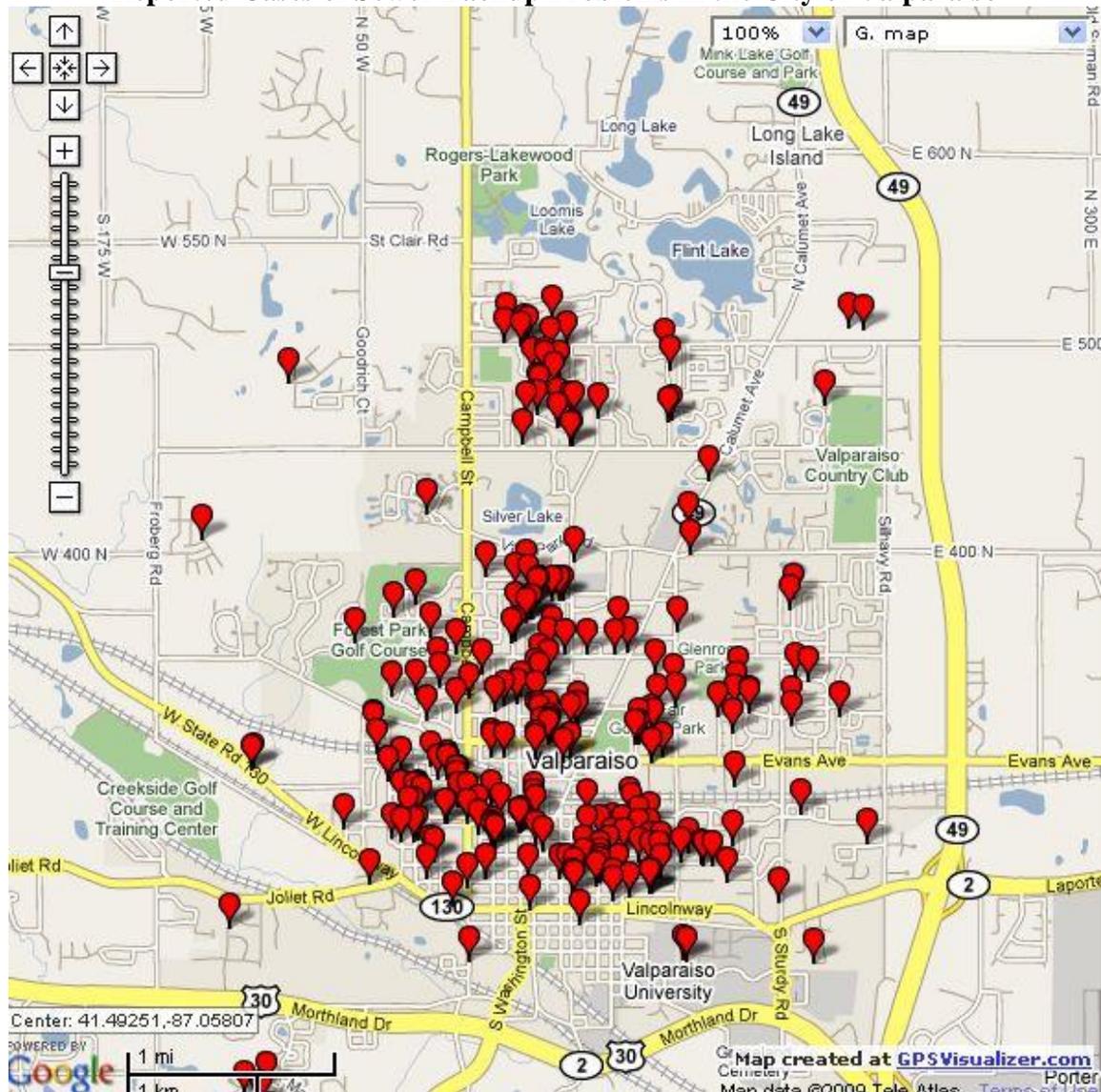
**Map 3
Types of Problems**



- KEY:**
- Red** = Sanitary sewer backup only
 - Orange** = Sanitary sewer and other problem(s)
 - Yellow** = Water entering house through windows or doors only
 - Blue** = Seepage through basement walls or floors only
 - Black** = Sump pump failure only
 - Green** = Other problem only
 - Purple** = Multiple problems (not including Sanitary Sewer backup)

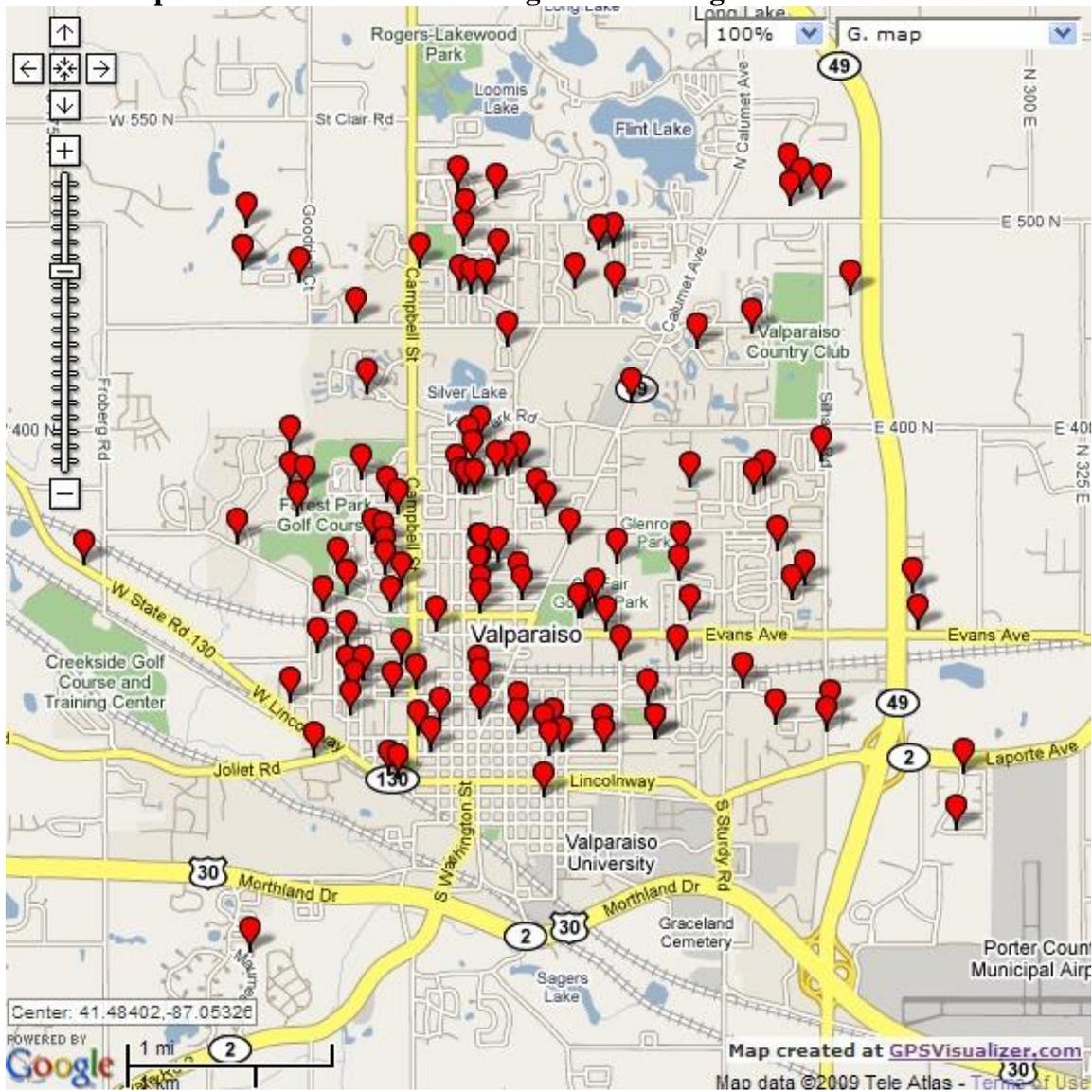
Map 4–8 breaks down the data in Table 3 and Map 3 by the types of problems that residents reported. Each map presents reports of a particular type of flooding problem. Map 4 demonstrates only reports of sanitary sewer backup into home.

Map 4
Reported Cases of Sewer Backup Problems in the City of Valparaiso



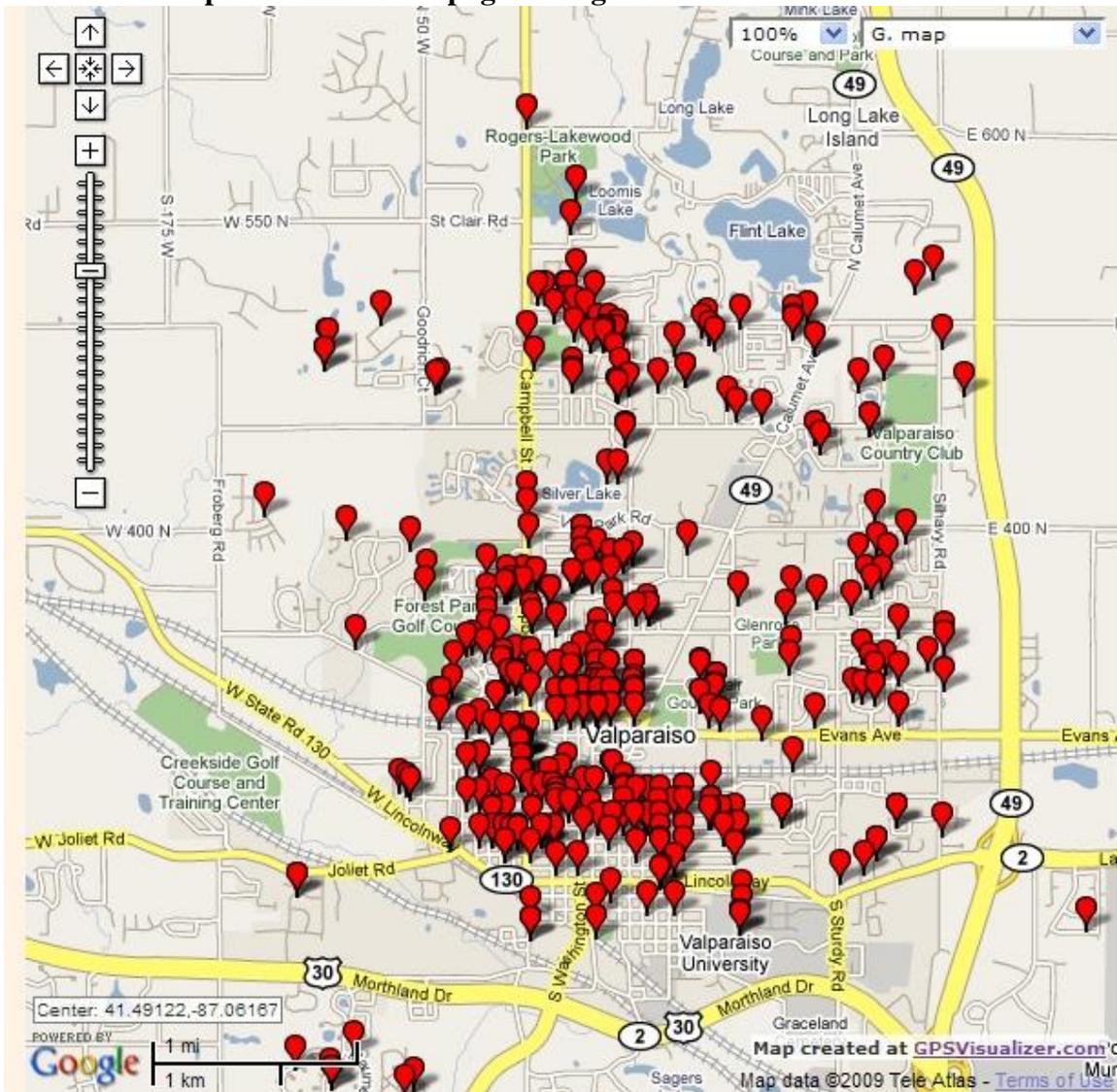
Map 5 plots reported cases of water entering homes through doors and windows.

Map #5 Reported cases of water entering homes through windows or doors



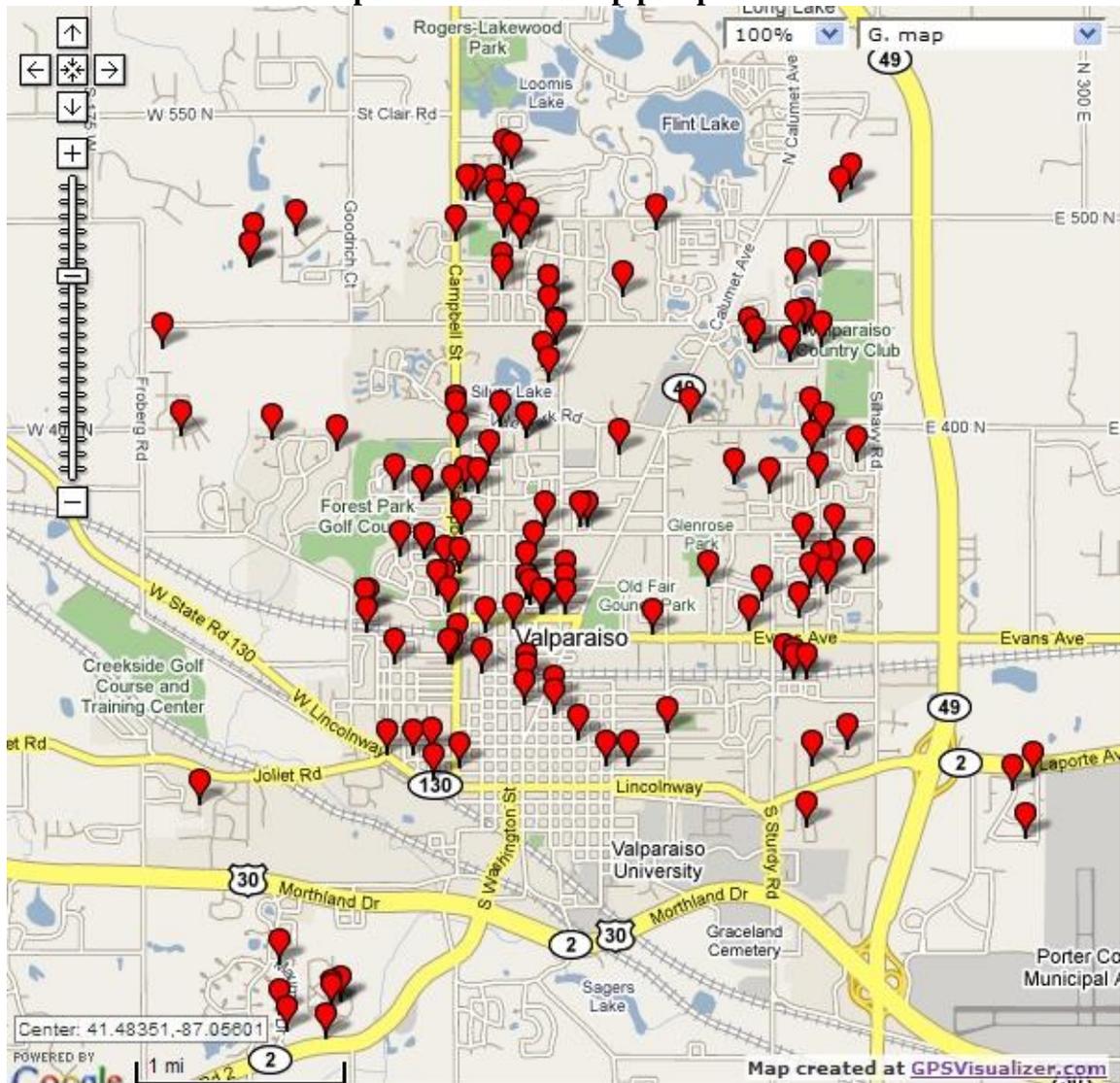
Map 6 plots reported cases of water seepage through basement walls and floors.

Map #6 Reported cases of seepage through basement walls or floors



Map 7 plots reported cases of sump pump failure in the city.

Map #7 Reported cases of sump pump failure



Map 8 plots all other reported flooding problems reported by residents.

Map #8 Other reported cases of flooding problems in the City of Valparaiso

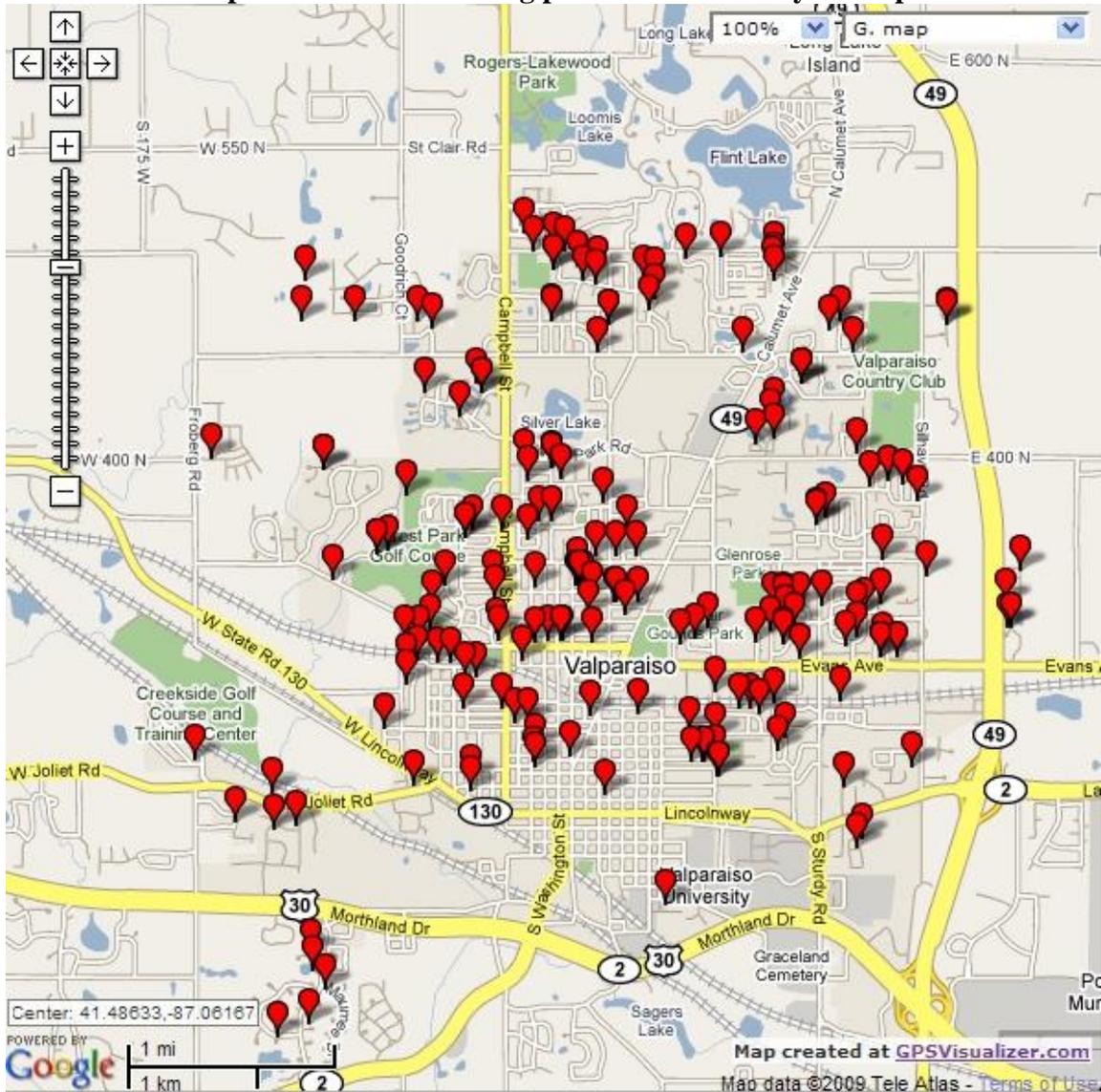


Table 9 demonstrates how serious residents considered their flooding problems to be. Considering only those persons who indicated they had problems, 22.5% reported very serious problems, 25.3% reported serious problems, 29.9% reported somewhat serious problems, and 22.3% reported only minor problems. These responses are demonstrated in Map 9.

Table 9
Seriousness of Valparaiso Residents'
Flooding Problems

Response	n	Percentage
Very	193	22.5%
Serious	217	25.3%
Somewhat	256	29.9%
Minor	191	22.3%
Total	857	100.0%

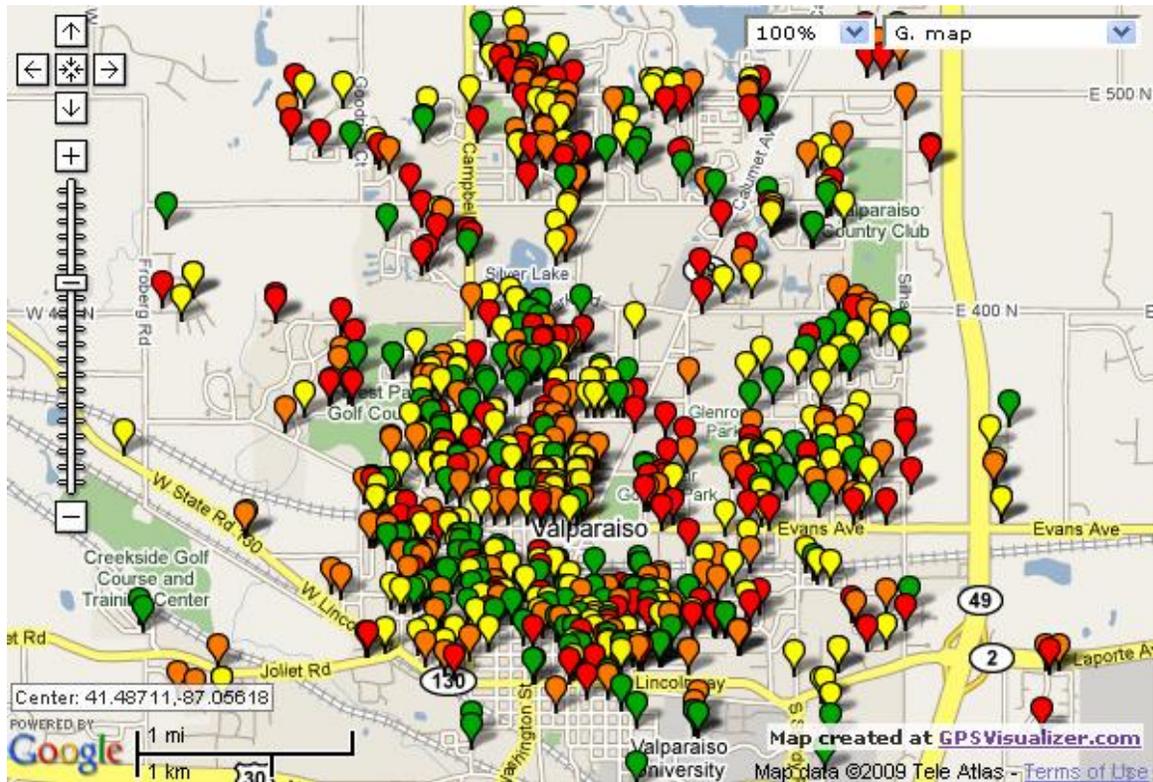
Table 10 presents the reported frequency of flooding problems experienced by Valparaiso residents. Considering only those persons who indicated they had problems, 37.3% experienced problems several times per year, 24.6% experienced problems on a yearly basis, 18.8% experienced problems every couple of years, and 19.4% experienced problems only every 5-10 years. The seriousness of the problems is presented in Map 10.

Table 10
Frequency of the Problems
Valparaiso Residents

Response	n	Percentage
Several per year	312	37.3%
Yearly	206	24.6%
Couple years	157	18.8%
5-10 years	162	19.4%
Total	837	100.0%

Map 9: The Seriousness of Flooding. Map 9 presents the data on the location of the most serious problems. Red indicates very serious problems, orange indicates serious problems, yellow indicates somewhat serious problems, and green indicates only minor problems.

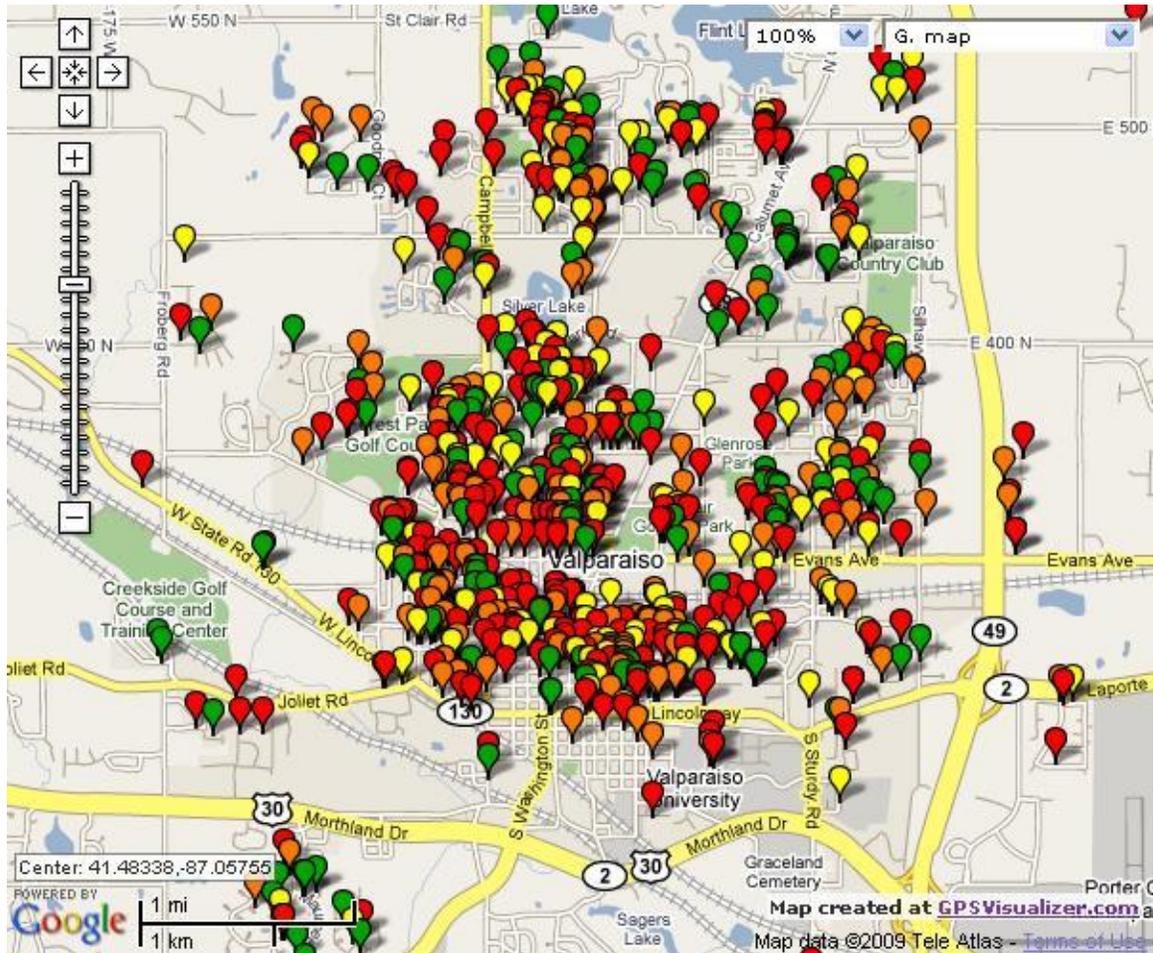
Map 9
Reported Seriousness of Flooding



KEY: Red = Very Serious
Orange = Serious
Yellow = Somewhat serious
Green = Minor

Map 10: The Frequency of Flooding. Map 10 presents information on the frequency of reported flooding problems. Red indicates several times per year, orange indicates at least once per year, yellow once every couple of years, and green once every 5-10 years at most.

**Map 10
Frequency of Flooding**



KEY: Red = Several times a year
 Orange = At least once a year
 Yellow = Once every couple of years
 Green = Once every 5 to 10 years at most

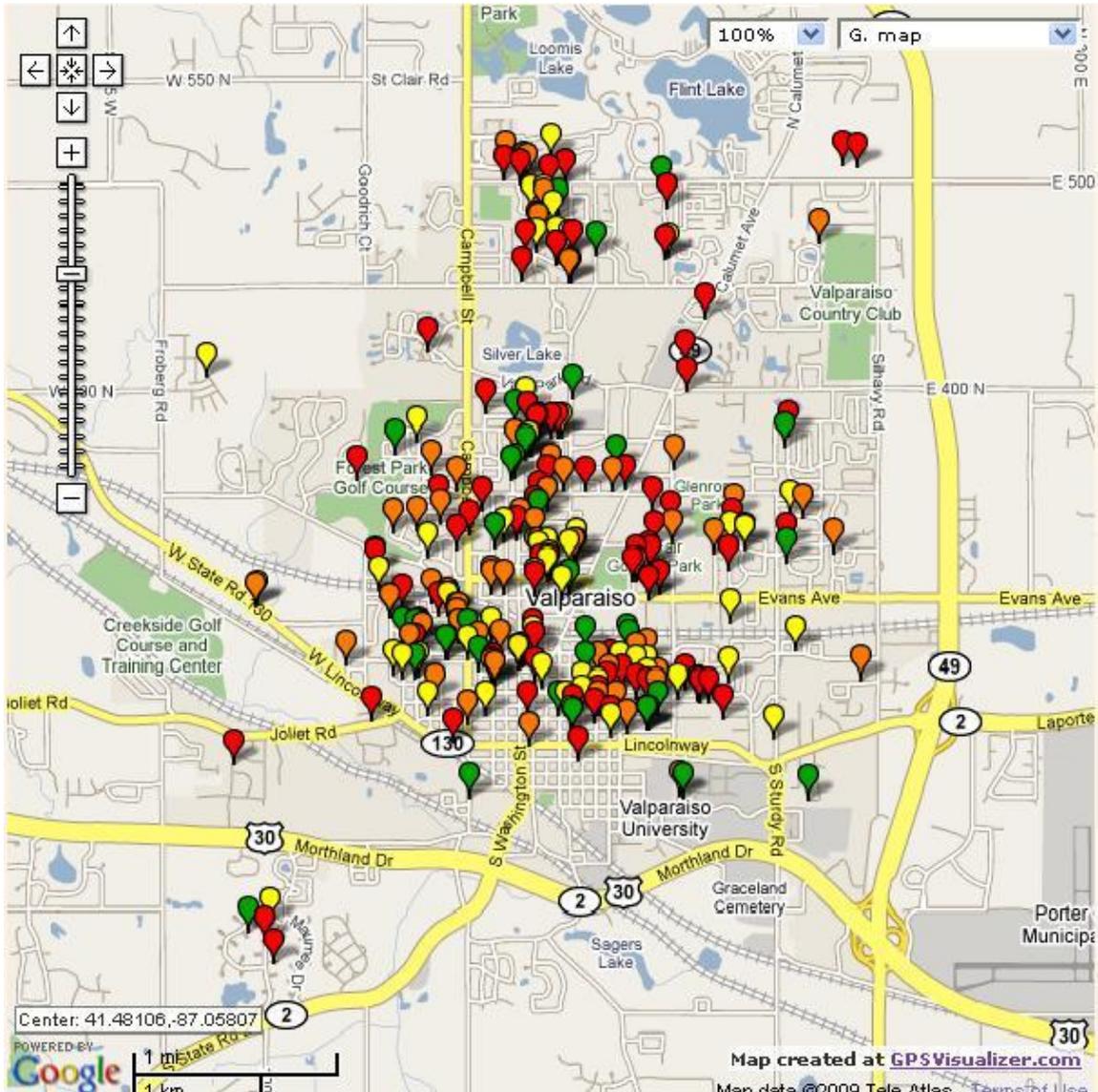
Table 11 focuses on data only for residents who reported that they had experienced sanitary sewer backups into their homes. Most respondents (35.9%) claimed that they had very serious problems, 26.0% said they had a serious problem, 23.8% said their problem was somewhat serious, 13.9% said their problem was minor. A map of the seriousness of the sewer backup problems is presented in Map 11.

Table 11
 Seriousness of Sewer Backup
 Valparaiso Residents

Response	N	%
Very Serious	98	35.9
Serious	71	26
Somewhat Serious	65	23.8
Minor	38	13.9
No Response	1	0.40%

Map 11: Seriousness of Sewer Backups. Map 11 presents data on the locations of sewer backup problems by how serious they were reported to be. Red indicates very serious sewer backup problems, orange serious problems, yellow somewhat serious problems, and green indicates only minor sewer backup problems.

Map 11
Seriousness of Sewer Backups



KEY: Red = Very serious
 Orange = Serious
 Yellow = Somewhat serious
 Green = Minor

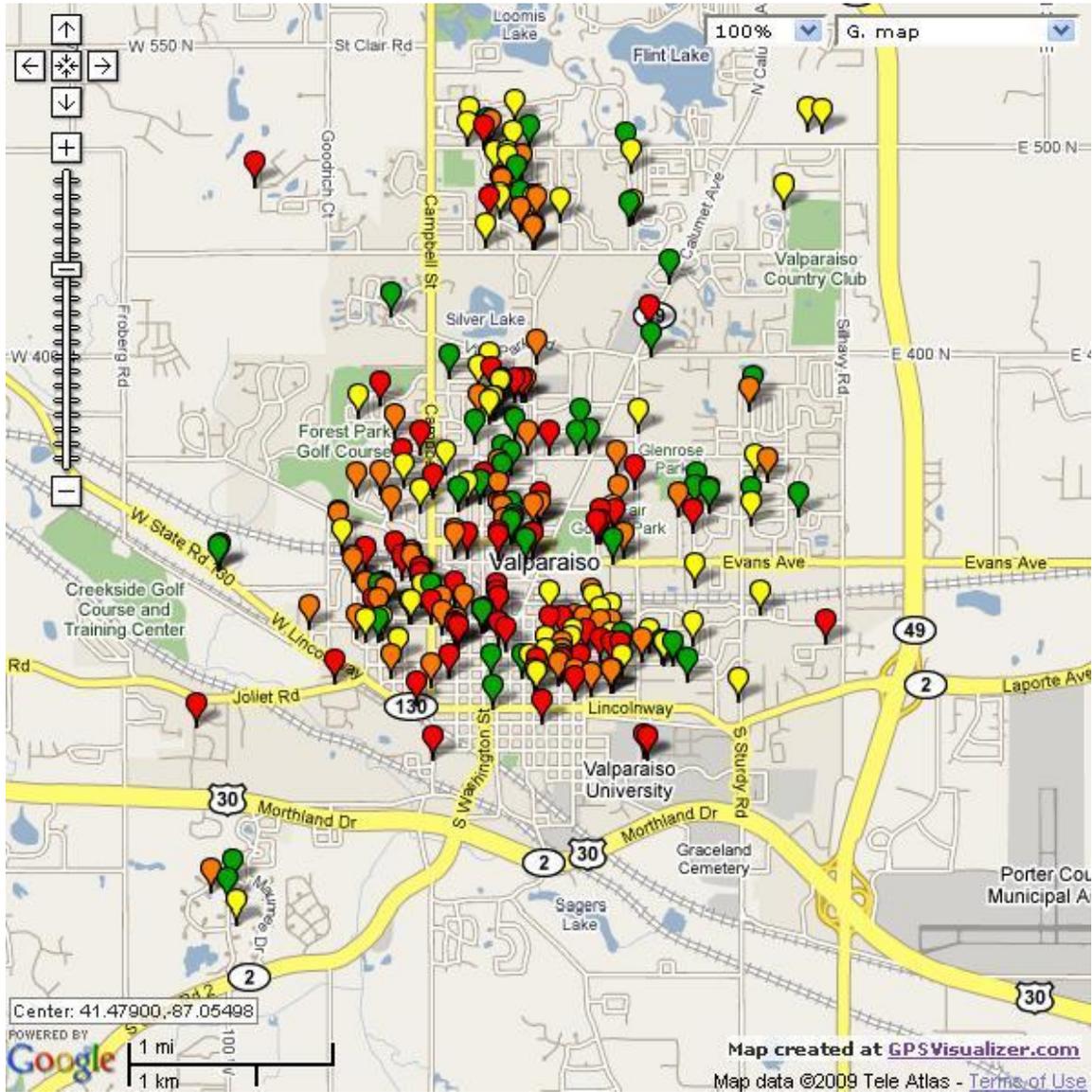
Table 12 shows the frequency of sewer backup problems. Respondents were asked about the frequency of their sewer problems as indicated in **Table 12**: 28.5% said they had several backup problems per year, 24.5% said once a year, 22.7% said that backups happened every couple of years, and 20.2% said they experienced sewer backup problems only every 5–10 years. The frequency of sewer backup problems is presented in Map 11.

Table 12
Frequency of the Sewer Backup
Valparaiso Residents

Response	n	Percentage
Several per year	79	28.5%
Yearly	68	24.5%
Couple years	63	22.7%
5-10 years	56	20.2%
Missing	11	4.0%
Total	277	100.0%

Map 13: Frequency of Sanitary Sewer Backup Problems. Map 13 presents information on the frequency of reported sewer backup problems. Red indicates several times per year, orange indicates at least once per year, yellow once every couple of years, and green once every 5-10 years at most.

**Map 13
Frequency of Sanitary Sewer Backup Problems**



KEY: Red = Several times a year
 Orange = At least once a year
 Yellow = Once every couple of years
 Green = Once every 5 to 10 years at most

Table 3

Types of Drainage or Sewage Problems
Valparaiso Residents with Flooding Problems

Type of Problem	Yes	Percentage responding "Yes"	n
Water entering through windows or doors	138	15.7%	877
Sewer Backup	277	31.6%	876
Seepage into Basement	495	56.5%	876
Sump Pump Failure	166	18.9%	877
Other	221	25.2%	876

Table 14 presents the data for the methods that residents have tried to solve their various water and flooding problems. Of those surveyed, 4.9% had installed a back flow preventer or check valve, 2.0% had installed a stand pipe, 5.5% had installed a drain plug, 20.1% had installed a sump pump, 31.2% had reconfigured their downspouts, 9.0% had reconfigured their sump pump's discharge, 17.2% had regraded their yard, 26.1% had done something different and 10.0% had done nothing.

Table 14
Methods tried to solve flooding problems
Valparaiso Residents

Method Used	Yes	Percentage responding "Yes"	n
Installed a back flow preventer or check valve	60	4.9%	1230
Installed stand pipe over floor drain	24	2.0%	1230
Installed drain plug	67	5.5%	1228
Installed a sump pump	248	20.1%	1231
Reconfigured downspouts	383	31.2%	1229
Reconfigured sump pump discharge	110	9.0%	1229
Regraded yard	211	17.2%	1230
Other	321	26.1%	1229
Nothing	123	10.0%	1230