

Appendix C: Problem Investigation

HR Green engineers brought the survey responses into ArcGIS Pro, a GIS software. Responses were geolocated to the address; each survey response became a point on the map. Every survey response received in Phase 1 was reviewed by HR Green engineers. The responses were grouped geographically for further evaluation.

Determining if a Concern is a Private Matter. Determining whether a stormwater concern is a private matter is an important part of the stormwater planning process. A stormwater concern may warrant coordination with the appropriate infrastructure owner if one of the following conditions is met:

- ▶ The tributary drainage area is significant. The exact minimum threshold varies by problem type, but a common rule of thumb is 3 acres.
- ▶ The solution would need to pass through more than one property, requiring permission from more than one property owner and typically requiring a public entity to own and maintain the new system.
- ▶ The problem causes damage to a main structure such as a house or business. Generally, yard flooding and erosion that does not threaten a structure are not considered public problems.

Selecting Locations for Further Investigation. Next, HR Green developed a system to determine the areas to investigate further. Each response point was given a severity value based on the problem type and frequency. Higher severity values were given to problems that affect houses, while lower severity values were given to problems that affect only the yard. The severity weightings are shown in Appendix C1.

HR Green then completed an analysis called kernel density, which takes the severity value at each point and applies a search radius. This analysis highlights locations of high severity problems that are near each other. This analysis results in a heat map; a portion of which is shown in Figure 4. The full map can be found in Appendix C2.



Figure 4: A Portion of the Heat Map Developed for Sunset Hills

Using the heat map, over 20 locations throughout Sunset Hills were selected for further investigation. First, a desktop analysis of the area was completed. This includes looking at the drainage area size, site grading, and existing storm infrastructure in ArcGIS Pro while also thoughtfully reading again through the survey responses and reviewing photos and video from the resident, if provided.

Site Visits. Once the desktop analysis was complete, HR Green engineers completed site visits to better understand the stormwater problem and to validate the concerns. The engineers took photos, observed drainage patterns, looked for indications of flooding or erosion, and spoke with residents in some cases. It was also determined whether adjacent problems are related. For example, a house with basement backups could be next door to a house with overland basement flooding. The solution to those problems would likely be separate.

The following areas were visited:

- Cinema Lane
- Claire Gempp Davidson Memorial Conservation Area
- Crestwick Drive
- Doverhill Drive
- Eddie and Park Road
- Forest Path Drive
- Fox Bridge Estates Pond
- Hadley Hill Road
- Mentz Hill Road
- Meppen Drive
- Nancy Eschbach Park
- Oleander Court
- Roanna Lane
- Rotherwood Court
- Rott Road
- Shadow Lane
- Southgate Lane
- Tapawingo Place
- Tioga Court
- Twillwood Drive
- Watson Trail Park
- Weber Hill Road
- Woodpark Drive
- W Watson Road
- W Watson Road Bioretention Basin



Photo 2: HR Green Engineer Observing Creek Erosion in Sunset Hills



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Appendix C1: Severity Weightings Used to Develop Heat Map

*Citywide Stormwater Master Plan
City of Sunset Hills, Missouri*

Appendix C1: Severity Weightings Used to Develop Heat Map

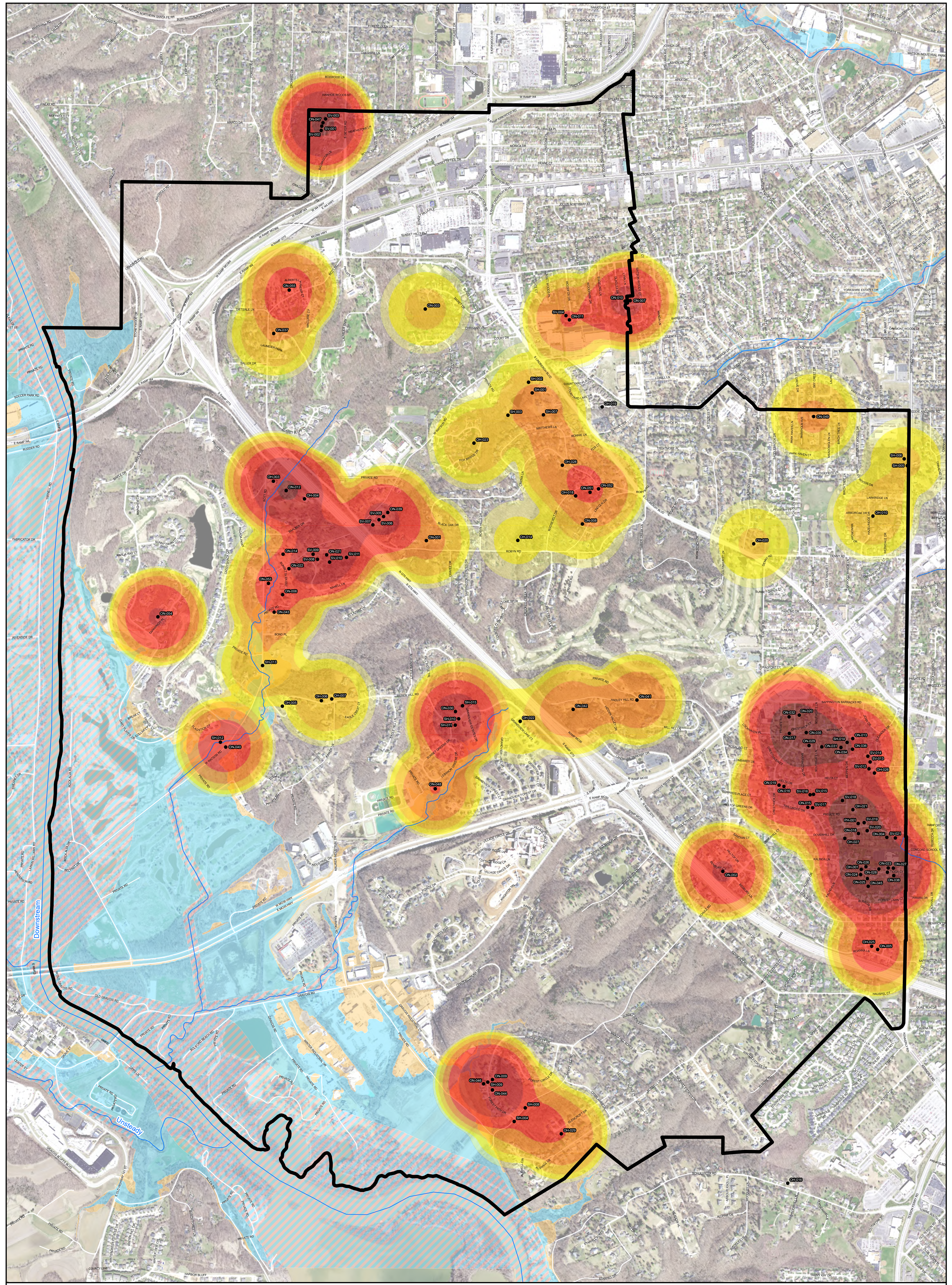
Erosion Type	Points
Yard	6
Street	18
Non habitable structure	39
Habitable structure	60

Flooding Type	Never	Rarely (1-2 times in past 10 years)	Occasionally (Every 1-2 years)	Often (Multiple times per year)
Yard	0	2	4	6
Street	0	6	12	18
Non habitable structure	0	13	26	39
Basement of habitable structure	0	20	40	60
First floor of habitable structure	0	30	60	90



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Appendix C2: Heat Map



- Phase 1 Responses

Severity
Based On Initial Data Collected

High
Low

Current Effective Flood Zones

- Regulatory Floodway
- 1.0% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

Sunset Hills Boundary

0 1,500 Feet
1 inch equals 750 feet

Sunset Hills
Sunset Hills Stormwater Master Plan
**Appendix C2:
Heat Map**