

7.0 CITY OF CHANHASSEN

The City of Chanhasen is located north of the Minnesota River in northeastern Carver County; however, only the southernmost portion of the city lies within the LMRWD boundary. The City of Chanhasen includes portions of the Minnesota River Valley bluffs, creating a considerable amount of topographic relief within the city.

The 2008 Inventory identified 60 gullies within the City of Chanhasen. Upon review of the 2008 data, 34 were determined to be outside the District, and two sites were found to be inapplicable to the 2020 gully condition assessment and removed from the dataset. One of the two N/A sites was a photograph of piezometers and the other site was a photograph of the Assumption Creek bank erosion, not a gully. Of the remaining 24 gully locations, 14 appeared to be pipe outfall locations (**Figure 68**).

During the 2020 field season, the team collected 36 locations within the LMRWD boundaries, including three locations that could not be located and/or accessed and one location (L286) that described caged riprap along a stream but did not correspond to a gully (**Figure 69**).

7.1 Previous Restoration Efforts

The City of Chanhasen completed the stabilization of Ravine 2 in 2014, restoring the stream and gully downstream of Pioneer Trail that had been determined to have severe erosion (Gerhardt and Sticha 2010).

7.2 Field Survey Discussion

The area did not present difficult access conditions nor issues with private property access. Road closures from construction of new subdivisions prevented access to Great Plains Boulevard, and the hydrologic changes resulting from the developments remain to be seen. Groundwater seeps and streams seem to have created most of the gullies, and in some sites unstable drainage features exacerbated the erosion.

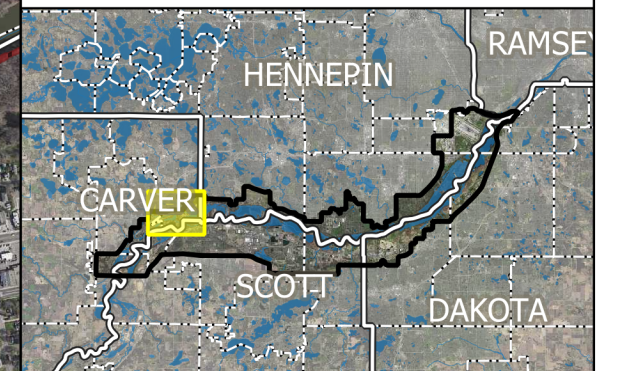
**Figure 68:
Chanhasen 2008
Inventory Locations**



LEGEND

- 2008 Gully Inventory Waypoints
 - Inside LMRWD
 - Outside LMRWD Boundary
 - ✘ Non-Applicable Points
 - Outside Chanhasen
 - ◆ MnDNR Spring Inventory
 - ◇ Calcareous Fens
 - Public Waters
 - Public Waterbodies
- LMRWD Overlay Districts
 - High Value Resource Area Overlay District
 - Steep Slopes Overlay District [SSOD]
- Political Boundaries
 - Chanhasen
 - LMRWD Boundary
 - Cities, Townships, Unincorporated Areas
 - County Boundaries

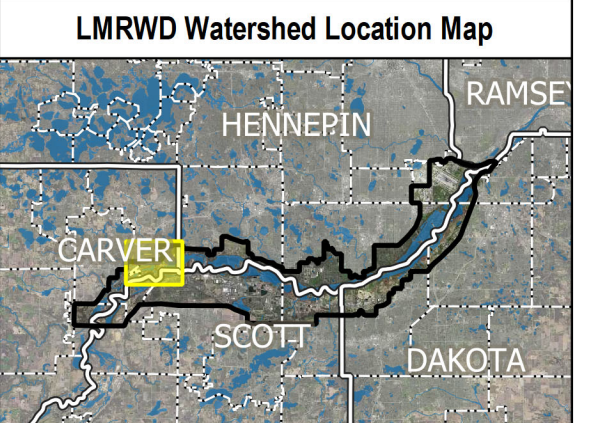
LMRWD Watershed Location Map



**Figure 69:
Chanhasen 2020
Survey Locations**



- LEGEND**
- 2020 Pipe Outfall Surveys
 - 2020 Combination Surveys
 - 2020 Gully Surveys
 - 2020 Inaccessible Waypoints
 - 2020 Non-Applicable Waypoints
 - MnDNR Spring Inventory
 - Calcareous Fens
 - Public Waters
 - Public Waterbodies
 - LMRWD Overlay Districts**
 - High Value Resource Area Overlay District
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 - County Boundaries



7.3 Findings

The team noted current and recently finished road construction along Flying Cloud Drive. As a result, they recorded a large number of new pipe outfalls draining underneath and around the highway. Many of these pipe outfalls looked stable and drained into retention ponds. The team noted that two pipe outfalls will require maintenance soon (**Figure 70**).

Chanhassen shared similar land characteristics with cities along the western area of the watershed district. Steep slopes, as well as an upwelling of groundwater seeps and streams, seemed to cause most of the gullies, and in some sites unstable drainage features exacerbated the erosion. Most of the gullies surveyed in Chanhassen were rated as having high erosion potential. Within Chanhassen, the field team assessed gullies in three main areas. Unnamed groundwater-fed streams between Trails End Road and Deerbrook Drive accounted for many of the most severe gully sites in Chanhassen. In the Chanhassen portion of the Richard T. Anderson Conservation Area, the field team found two gullies with high erosion potential receding right up to the edge of residential property. Finally, gullies with high erosion potential were found along the slopes of Bluff Creek Park (**Figure 71**).

7.4 Chanhassen Gully Progression

Using 2008 benchmark data, we found that most of the gullies in Chanhassen have increased in severity of their erosion potential when compared to the 2020 assessments. The total number of gullies have stayed relatively the same, although there are more in the high erosion potential category in 2020 compared to 2008. **Table 7-1** provides an overall summary of the erosion potential within the City of Chanhassen in both 2008 and 2020.

Table 7-1: City of Chanhassen Gully Erosion Potential Summary

	2008 Benchmark Condition	2020 Condition
High Erosion Potential	6	10
Moderate Erosion Potential	0	1
Low Erosion Potential	4	1
	10	11

To better assess the erosion progression of an individual site, the change in erosion potential is mapped in **Figure 72**. Priority was placed on sites that increased in severity, going from low to high or moderate erosion potential. In the City of Chanhassen, two sites increased from low to high erosion potential, and three were newly identified as having high erosion potential. Again, the more appropriate ranking of the

sites in the 2020 study may be attributed in part to improved data collection rather than any significant progressive change in conditions.

The details of the individual erosion progression are shown on **Figure 72**. Most of the gullies within the City of Chanhassen were located near the Eden Prairie border, and all were rated as having high erosion potential due to the severity of the erosion present at these locations. **Figure 72** details the total erosion progression in Chanhassen.

Only one gully, L432, was found to have decreased in erosion potential from 2008, from high to moderate potential. In the 2008 Inventory a long section of bare, exposed soil along a stream bank. In 2020, the field team noted that the patch of bare soil seemed to be cutting down deeper into the hillslope. However, the length and depth of the gully did not warrant a high erosion potential rating. The gully does not look to have stabilized; but based on the picture provided, the erosion seemed to be contained to a smaller area than in 2008.

7.5 Chanhassen High-Priority Sites

The high-priority gully sites within the City of Chanhassen can be broken up into three locations, as seen in **Figure 72**.

- **HPR 10:** This region is located on an eastern portion of the Bluff Creek Park watershed and contains gullies that are along the same hillslope, share similar characteristics, and are geographically close. HPR 10 is not located within the LMRWD boundaries.
- **HPR 11:** This region is located within a stream along the Minnesota River Bluffs LRT Regional Trail accessed from Trails End Road, and these sites all share similar characteristics and the same drainage basin.
- **HPR 12:** This is the Chanhassen portion of the Richard T. Anderson Conservation Area, and the sites in this region also share similar characteristics and access conditions.

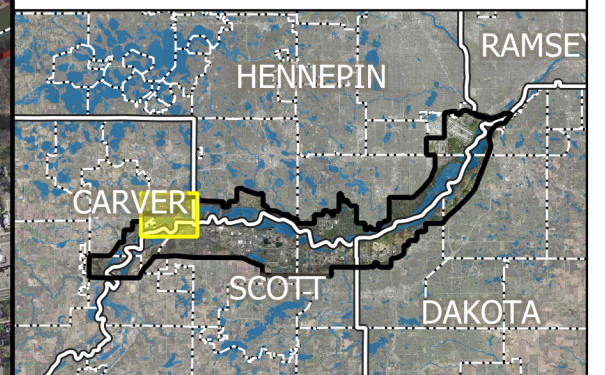
**Figure 70:
Chanhasen 2020
Pipe Outfall
Conditions**



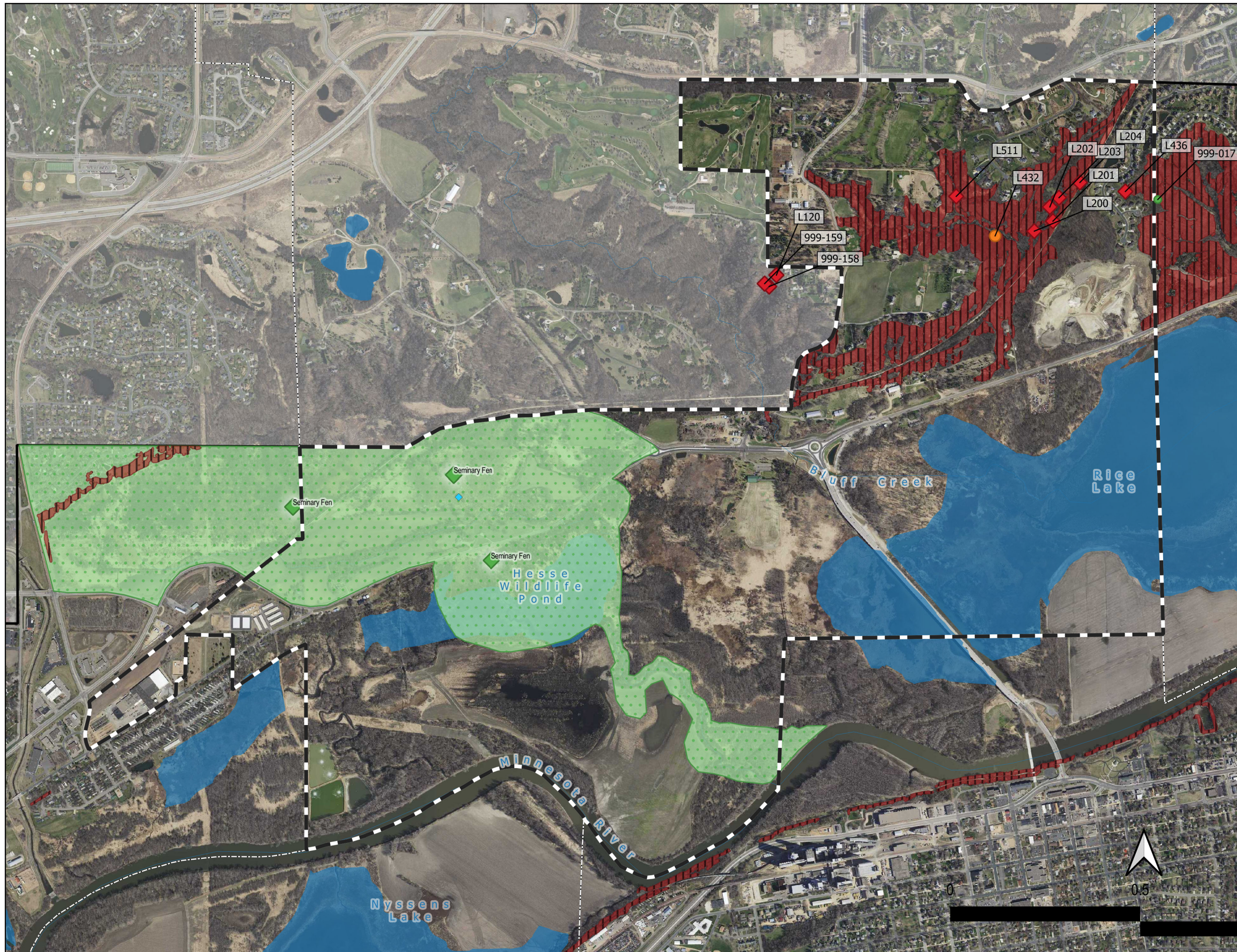
LEGEND

- 2020 Pipe Outfalls
- ▲ Needs Immediate Attention
 - ▲ Potential/Future Repair Needed
 - △ Good Condition/No Repair Needed
 - ◆ MnDNR Spring Inventory
 - ◆ Calcareous Fens
 - Public Waters
 - Public Waterbodies
- LMRWD Overlay Districts
- High Value Resource Area Overlay District
 - Steep Slopes Overlay District [SSOD]
- Political Boundaries
- ▭ Chanhasen
 - ▭ LMRWD Boundary
 - ▭ Cities, Townships, Unincorporated Areas
 - ▭ County Boundaries

LMRWD Watershed Location Map



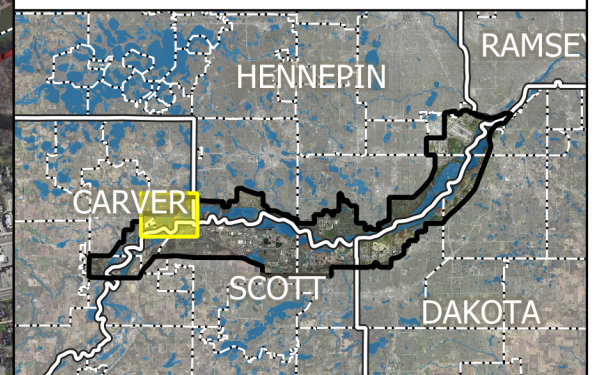
**Figure 71:
Chanhasen 2020
Gully Conditions**



LEGEND

- 2020 Gully Condition
 - ◆ High Erosion Potential
 - Moderate Erosion Potential
 - Good Condition/No Repair Needed
 - ◆ MnDNR Spring Inventory
 - ◆ Calcareous Fens
- Public Waters
 - Public Waters
 - Public Waterbodies
- LMRWD Overlay Districts
 - High Value Resource Area Overlay District
 - Steep Slopes Overlay District [SSOD]
- Political Boundaries
 - ▭ Chanhasen
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LMRWD Watershed Location Map



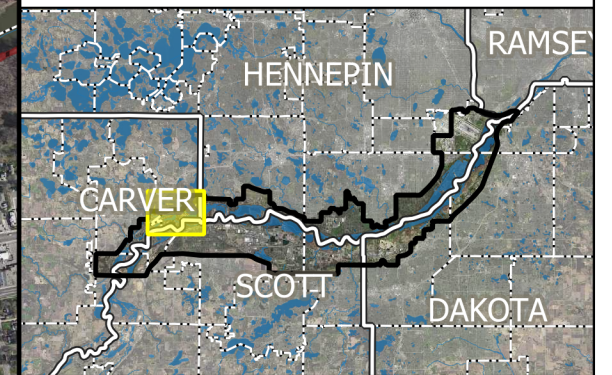
**Figure 72:
Chanhassen Erosion
Progression and HPRs**



LEGEND

- High Priority Region
- Erosion Progression (2008 --> 2020)
- Low --> High
- Moderate --> High
- High --> High
- New Site High
- Low --> Moderate
- Moderate --> Moderate
- New Site Moderate
- Low --> Low
- New Site Low
- Improved
- Non-Gully
- Public Waters
- Public Waterbodies
- High Value Resource Area Overlay District
- Steep Slopes Overlay District
- Chanhassen
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

LMRWD Watershed Location Map



7.5.1 HPR 10

HPR 10 is located right outside of the LMRWD boundaries along Creekwood Street (**Figure 73**). This region consists of three gullies and one pipe outfall. Gullies 999-158 and 999-159 were not included in the gully count for Chanhassen because they are located out of bounds of the LMRWD. Information on this section is provided and recommended to be given to Riley-Purgatory-Bluff Creek Watershed District, which is the district in which the waypoints are located. Possible collaboration with the LMRWD may help in restoration efforts.

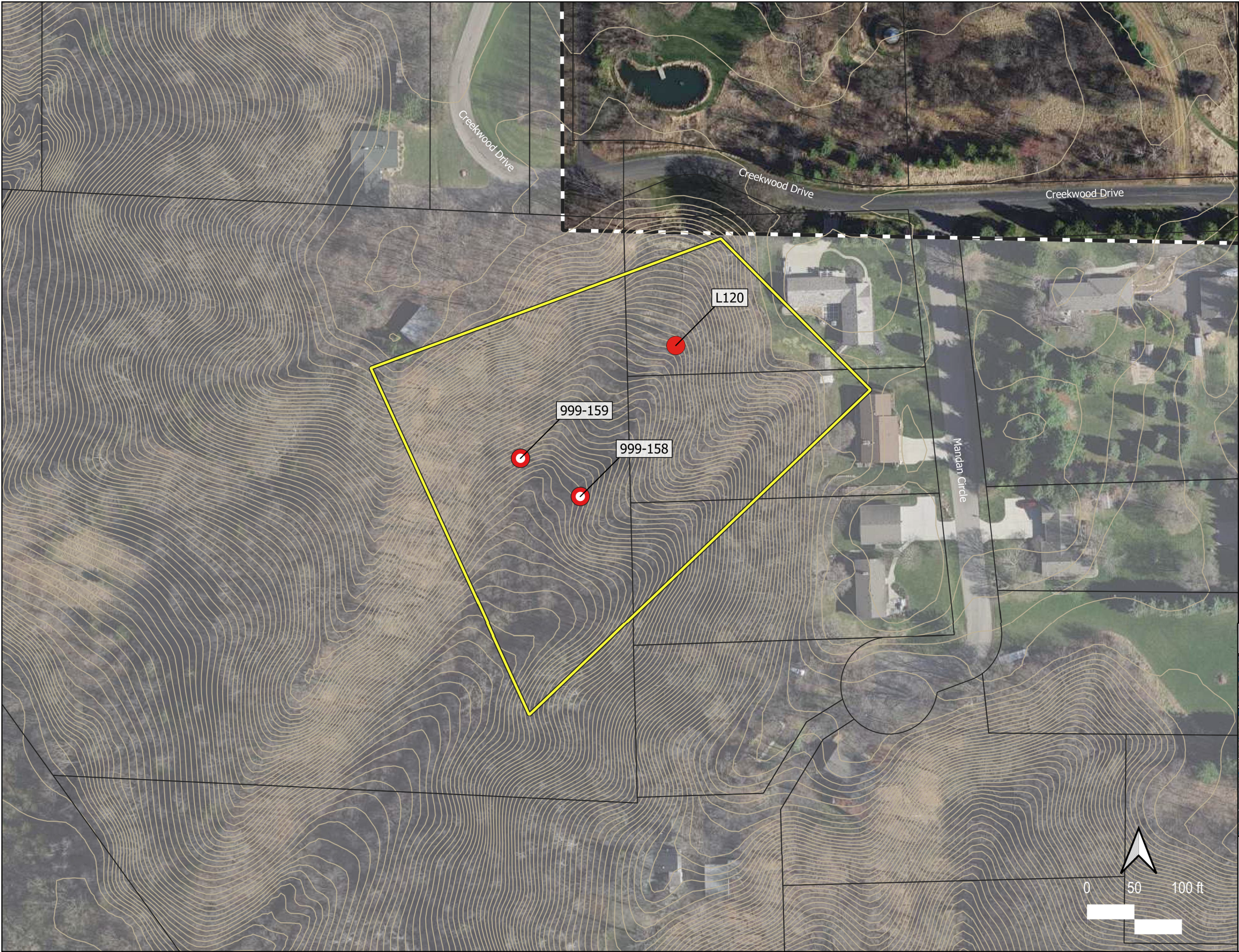
Gully 999-158 is connected to Gully L120, whose head cut forms around pipe outfall 999-157. Gully 999-159 is located north of and is parallel to the two-gully system. The field team recorded each gully as a separate feature; however, the 2008 report seemed to have grouped the system together in one waypoint.

In 2008, this gully system was recorded as “severe erosion in two parallel gullies,” and the photo from the 2008 report shows evidence of overhanging banks and bare soil (**Figure 74a**). The description of the gully system in the 2008 report is consistent with the significant erosion found by the 2020 field team.


















When visited in the field, all three gullies in the region exhibited signs of overhanging banks, channel incision, and unstable V-shaped banks consisting of bare soil. Since the 2008 report, no stabilization seems to have occurred in the region. **Figure 74b** provides a view looking upstream at erosion and slumping along the banks at the head cut, where pipe outfall 999-157 discharged into Gully L120.

At the time of the site visit, the field team noted a low amount of standing water in pipe outfall 999-157, and the unstable drainage feature caused severe downstream erosion in Gully L120. Although L120 flattened before the knickpoint that formed the head cut of Gully 999-158, water draining into L120 likely also caused the destabilization of Gully 999-158. Parallel to the two-gully system, the field team did not find a conclusive cause for Gully 999-159. However, an area of groundwater seepage was noted upstream from the head cut; although no water was noted in the gully channel at the time of the field visit, the seepage may have contributed to the destabilization of the soil.

**Figure 73:
Chanhassen High-
Priority Region No. 10**



LEGEND

-  High Priority Region
- High Priority Sites**
-  Low --> High
-  Moderate --> High
-  High --> High
-  New Site High
- Other 2020 Locations**
-  Surveyed Gully
-  Surveyed Pipe Outfall
-  Carver Co. 2-ft Contours
-  MnDNR Spring Inventory
-  Public Waters
-  Public Waterbodies
-  High Value Resource Area Overlay District
-  Steep Slopes Overlay District
-  Chanhassen
-  LMRWD Boundary
-  Cities, Townships, Unincorporated Areas
-  County Boundaries

LMRWD Watershed Location Map

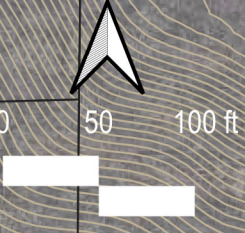
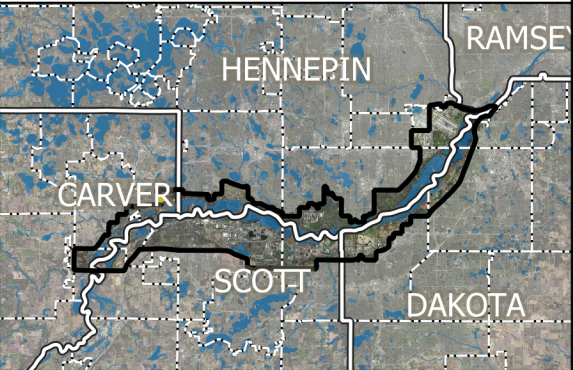


Figure 74. Comparison of gully sites between 2008 (a) and 2020 (b). The 2008 picture shows an unspecified angle of the gully. The 2020 picture shows an upstream view toward the head cut and unstable pipe outlet.



7.5.2 HPR 11

HPR 11 is located parallel to the Minnesota River Bluffs LRT Regional Trail. This cluster contains six gullies: L204, L203, L202, L201, L200, and L511 (**Figure 75**). Site L204 is the head cut of a gully that widens as more groundwater seeps contribute to the growing stream channel. Groundwater seeps first emerge at Gully L203. Gully L201 is an offshoot of this stream channel formed by an unstable drainage feature and connects to the main channel downstream from Gully L202. Gully L511 is a separate channel perpendicular to the other sites.

Sites L202, L200 and L511 shared similar characteristics because each contained a significant groundwater stream; moderate levels of water were noted at the time of the visit. The depths ranged from medium to deep, but they all had a medium bottom width and U-shaped channels consisting of bare, sandy soil. Significant sections of overhanging banks, slumping, and overall active erosion were noted at all three sites.

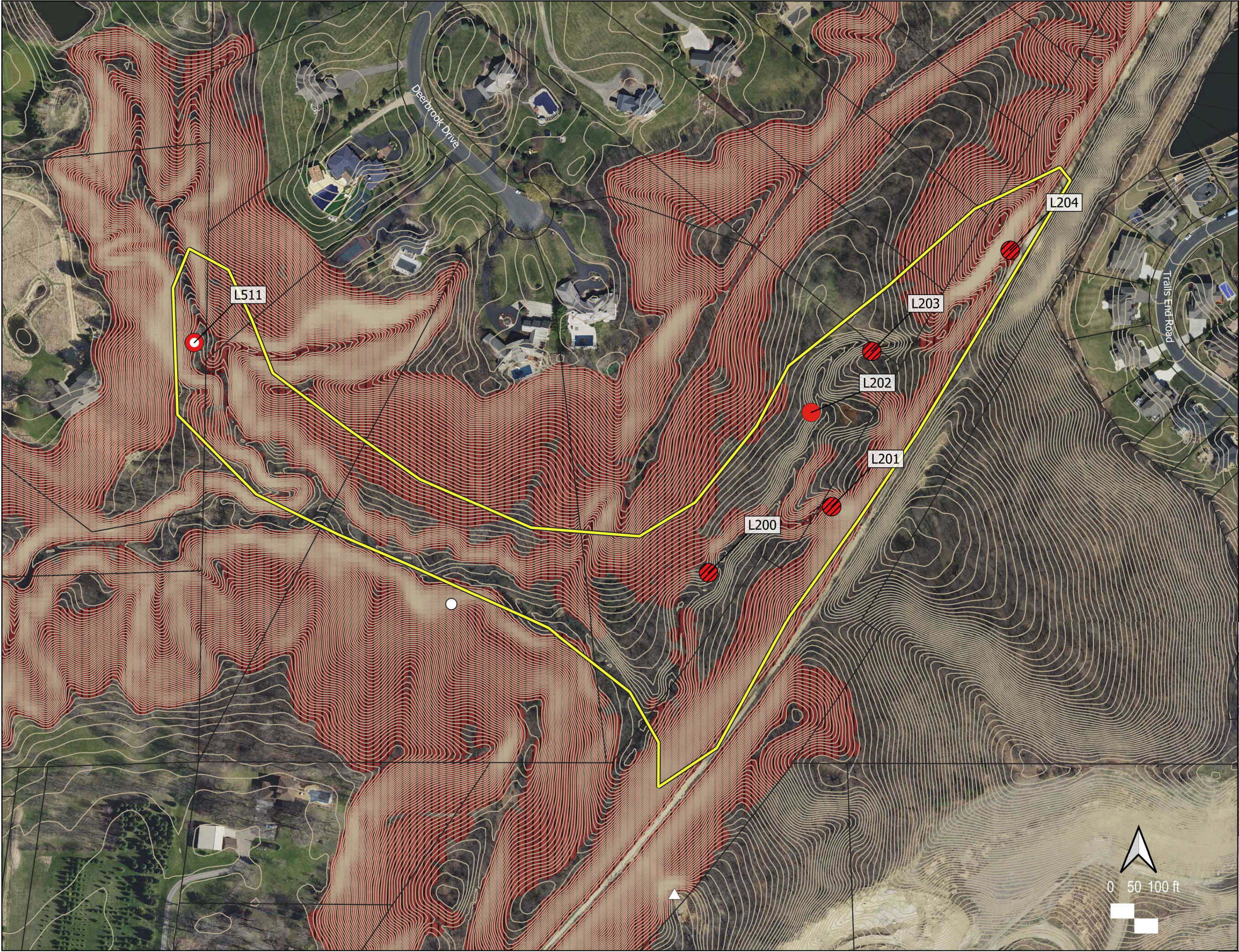
At the northern part of the cluster, Gully L204 began with a steep, vertical right bank showing exposed soil at the head cut. The initial cause of erosion at Site L204 was unknown. This gully continued into Gully L203, where, although obstructed by vegetation, the 2020 field team found significant areas of slumping, bare soil, and incision. They described this site as a deep trapezoid-shaped gully. A small groundwater seep first emerged at Site L203, then merging with a large section of ferrous groundwater seeps at Site L202 that seemed to destabilize the rest of the channel.

Besides groundwater, steep slopes throughout the area and remnants of small landslides may also be contributing to instability around this region (Jennings 2016).

Site L201 was destabilized by a severely hanging pipe outfall. A large pile of concrete riprap did not look to be successfully stabilizing the head cut, which consisted of overhanging banks receding from the pipe outfall. This site shared characteristics such as its deep depth and bare, sandy banks with the other gullies within this cluster. Possible groundwater seeps were noted near the toe of L201 and, along with steep slopes, may be exacerbating erosion from the pipe outfall.

In 2008, four of the sites in the HPR were rated as having high erosion potential, and one site was noted as having low erosion potential. Gully L511 was a new location visited by the team; no previous benchmarking data was therefore available. **Figure 76** (below) depicts Site L203, which was noted as having “extreme erosion” in the 2008 report. A similarly incised channel with bare sandy banks was found during the 2020 inventory, although a clear view was blocked by tree debris and vegetation.

**Figure 75:
Chanhasen High-
Priority Region No. 11**



- LEGEND**
- High Priority Region
 - High Priority Sites
 - Low --> High
 - Moderate --> High
 - High --> High
 - New Site High
 - Other 2020 Locations
 - Surveyed Gully
 - Surveyed Pipe Outfall
 - Carver Co. 2-ft Contours
 - MnDNR Spring Inventory
 - Public Waters
 - Public Waterbodies
 - High Value Resource Area Overlay District
 - Steep Slopes Overlay District
 - Chanhasen
 - LMRWD Boundary
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LMRWD Watershed Location Map

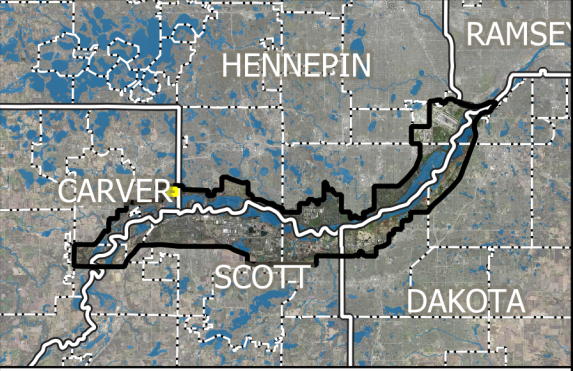


Figure 76. Similar characteristics and active erosion around Gully L203 in 2008 (a) and 2020 (b). Deep incision not seen at time of the visit, possibly blocked by vegetation.



Based on the benchmark assessment, Gully L202 progressed from low to high erosion potential. In the 2008 Inventory, the previous field team only noted the spring and a sulfur smell. Based on the minimal erosion in the pictures, it was considered to have low erosion potential during the benchmark analysis. In 2020 the field team noted the same region of groundwater seeps, but severe slumping and downstream erosion nearby led to a high erosion potential rating. Based on the limited pictures of the 2008 report, the stream reach around L200 appears to have heavily eroded along the banks ([Figure 77](#)). The same slumping, bare banks, and overhanging roots continued at Site L200, which was noted in both 2008 and 2020 as having high erosion potential.

Figure 77. Progression of low erosion potential to high erosion potential at Site L202. Photo 'a': 2008, looking upstream; Photo 'b': 2020, looking downstream.



7.5.3 HPR 12

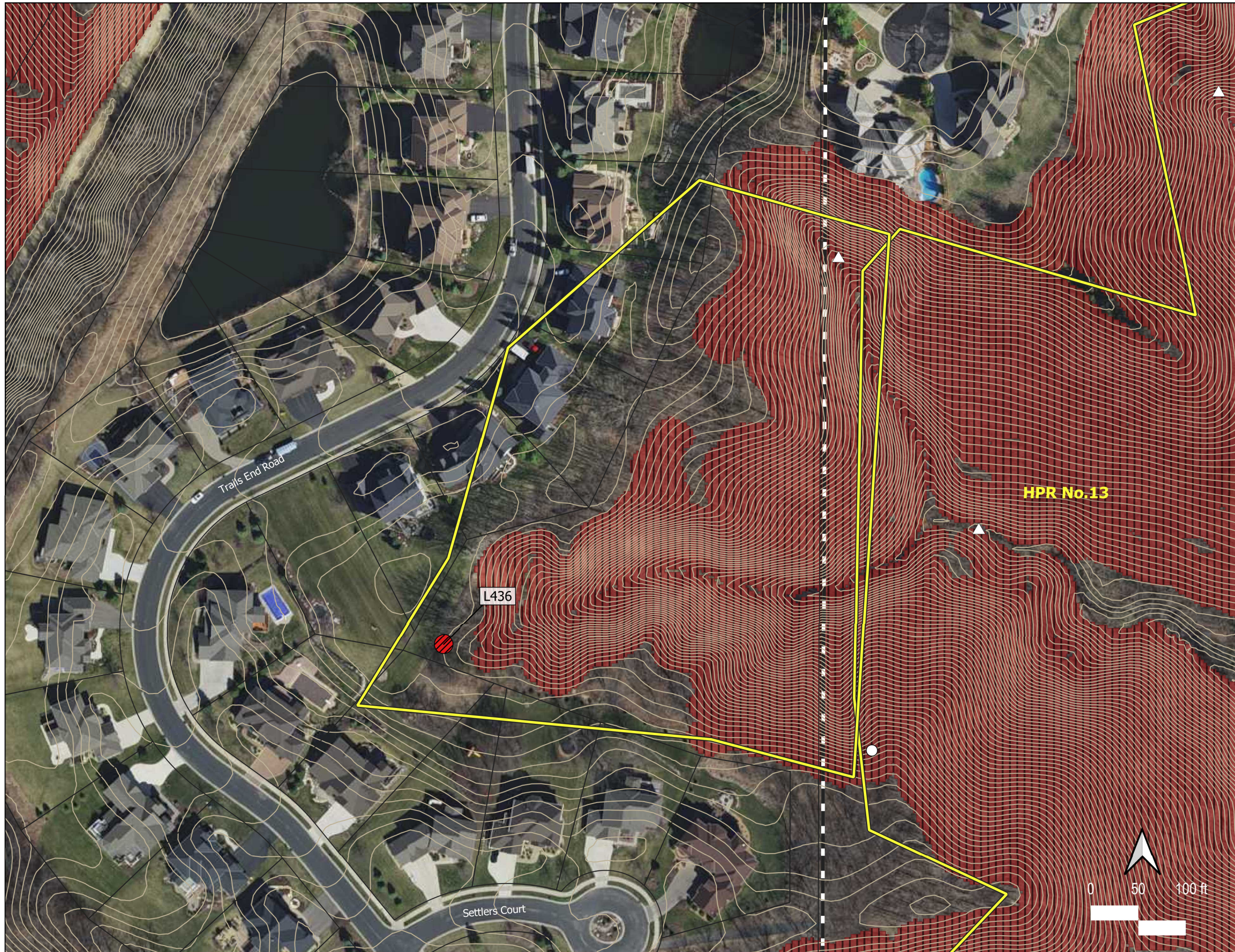
HPR 12 includes gullies L436 and L435 (**Figure 78**). Both gullies lie within the Richard T. Anderson Conservation Area. The gullies are directly connected to HPR 13 in Eden Prairie, and this area provides a potential collaboration opportunity between Eden Prairie and Chanhassen for restoration projects.

Both gullies in this region are branches that connect at a confluence point to a stream at Site 999-165, which lies in HPR 13. The two gullies each consisted of a V-shaped channel with bare soil along the gully bottoms and little to no vegetation along the banks. Sand made up the general material of the gullies. Gully L436 shifted to a U-shaped channel near the head cut, and fallen tree debris was thrown in to stabilize the area. The groundwater seep also extended farther back into Gully L436 than in Gully L465.


















Slope and channel incision were apparent causes for both gullies. A dense canopy was a possible cause for L435, while groundwater contributed to erosion in L436. Problem indicators in both gullies included degradation, loss of bank vegetation, incision, slumping, overhanging banks, and leaning trees. The field team noted that large sections of soil appeared to have recently slumped off along the banks of L436. The previous report noted the proximity of Site L435 to a new development, and a nearby house was visible from the head cut. Gully L435 backed right onto residential property, and at the time of the visit, a tree in the channel seemed to have been recently uprooted. Without intervention, severe erosion is likely to continue along both branches.

In 2008, the field team noted “severe” and “extreme” erosion at each of the gully sites. Based on the previous comments and photos, the 2008 sites received a high erosion potential rating during the desktop analysis. The 2020 site analysis remained consistent and both sites again received a high erosion potential rating. **Figure 79** and **Figure 80** provide side-by-side comparisons of erosion progression within each gully.

**Figure 78:
Chanhasen High-
Priority Region No. 12**



LEGEND

-  High Priority Region
- High Priority Sites
 -  Low --> High
 -  Moderate --> High
 -  High --> High
 -  New Site High
- Other 2020 Locations
 -  Surveyed Gully
 -  Surveyed Pipe Outfall
 -  Carver Co. 2-ft Contours
 -  MnDNR Spring Inventory
 -  Public Waters
 -  Public Waterbodies
 -  High Value Resource Area Overlay District
 -  Steep Slopes Overlay District
 -  Chanhasen
 -  LMRWD Boundary
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LMRWD Watershed Location Map

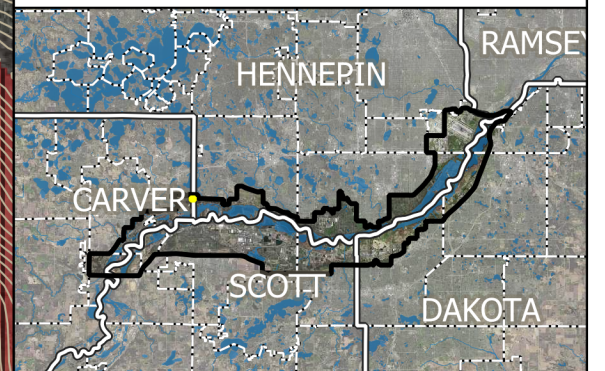


Figure 79. Comparison of Gully L436 in 2008 (a) and 2020 (b).



Figure 80. Comparison of Gully L435 in 2008 (a) and 2020 (b)

