

Fire Station Location Analysis

Initial Report: 1/18/2024



Data Used in the Analysis:

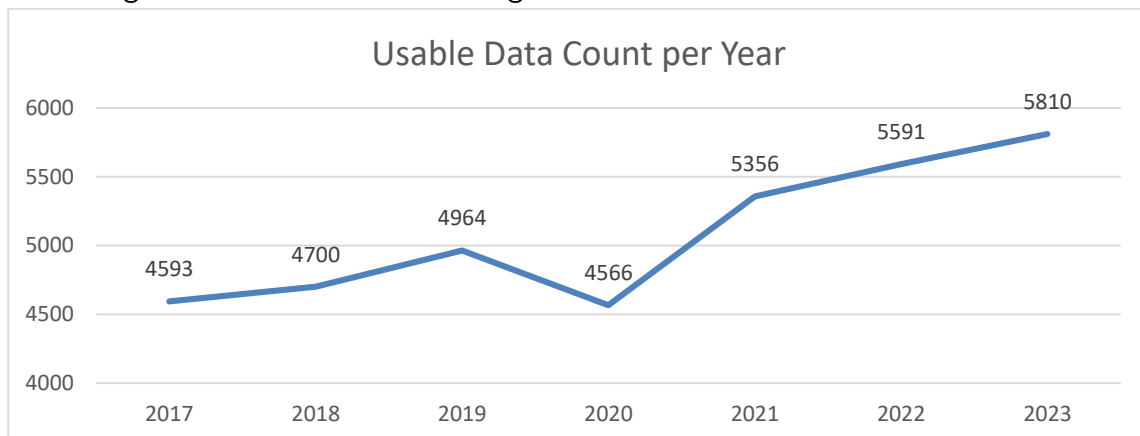
- Fire Incidents from 1/1/2017-12/31/2023 provided by the Fire Department.
 - 35,580 total priority runs that could be mapped
- Existing Streets GIS layer provided by SEMCOG and updated to include newly built streets, one way indicator, and speed limit for existing streets.
 - Used in baseline drive time analysis.
- Proposed Streets GIS layer updated to include proposed streets: Lee BeGole Dr connection to Crescent Blvd, new roundabout on 11 Mile Rd at Lee BeGole Dr, and new street between 11 Mile Rd and Grand River Ave.
 - Used in each scenario analysis that includes proposed fire stations.
- Fire Stations GIS layer that includes existing stations and proposed stations.

Variables:

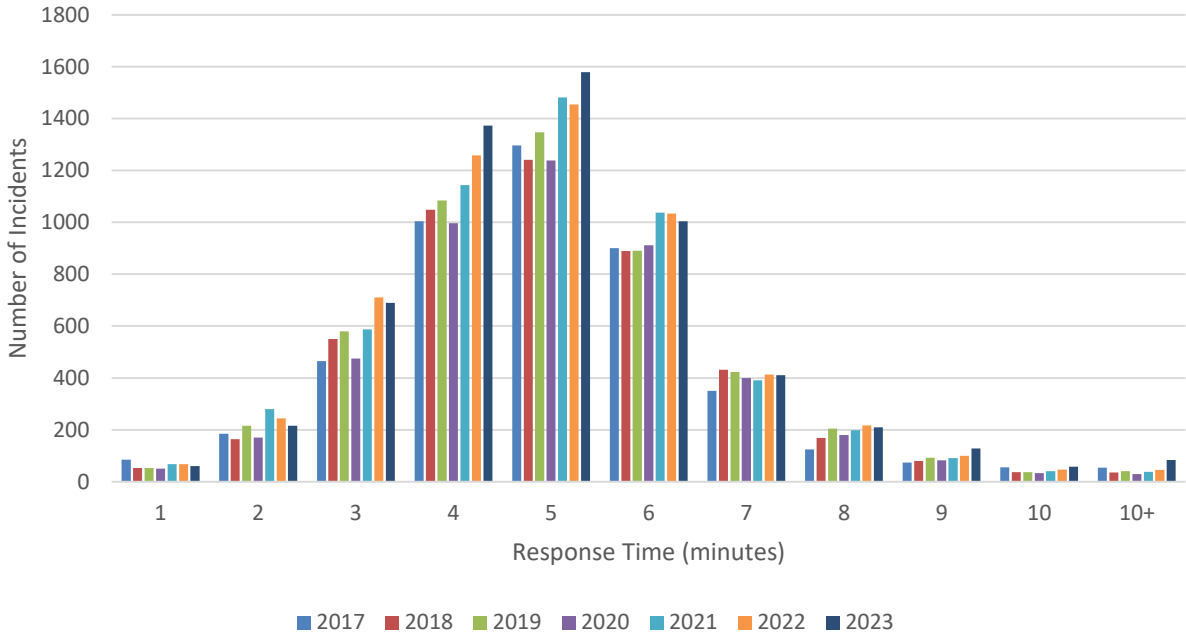
- Posted speed limit.
- Routes allowed outside city limits.
- Freeway use allowed.
- U-turns are allowed at road dead-ends only.
- Average turn-out time assigned to each station:
 - Station 1 = 1:59 minutes
 - Station 2 = 1:55 minutes
 - Station 3 = 1:52 minutes
 - Station 4 = 1:49 minutes
 - Proposed Stations = 1:54 minutes

Fire Incident Analysis:

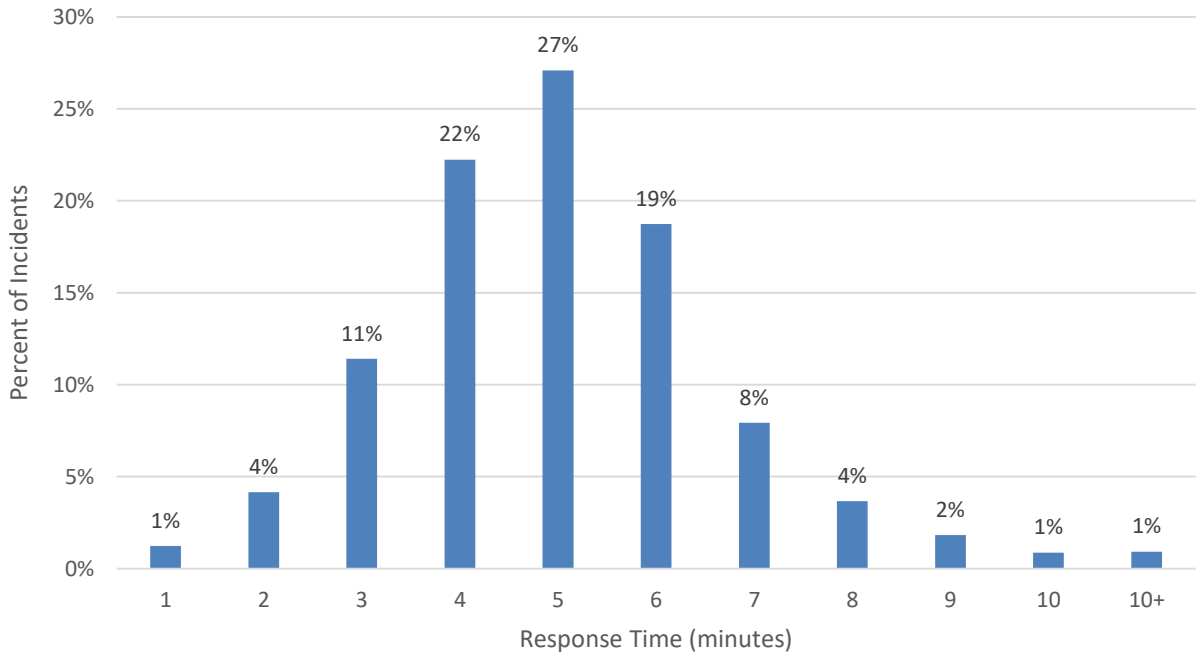
The following charts illustrate the existing conditions based on the fire incident data:

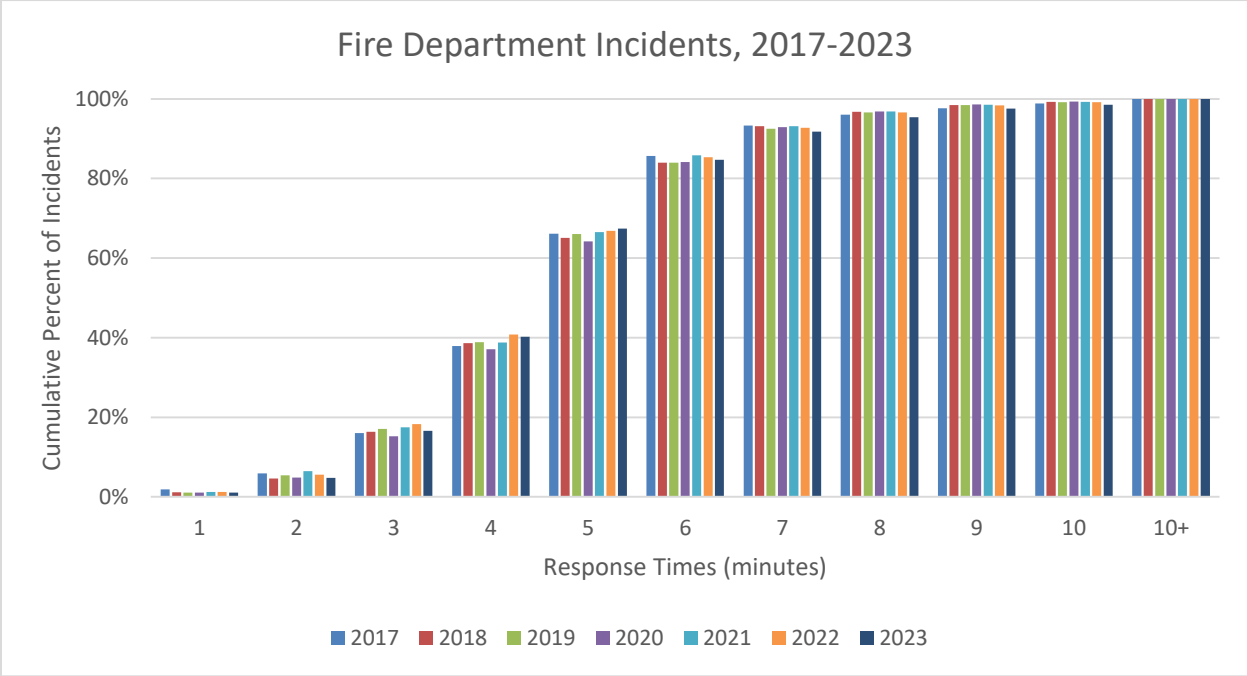
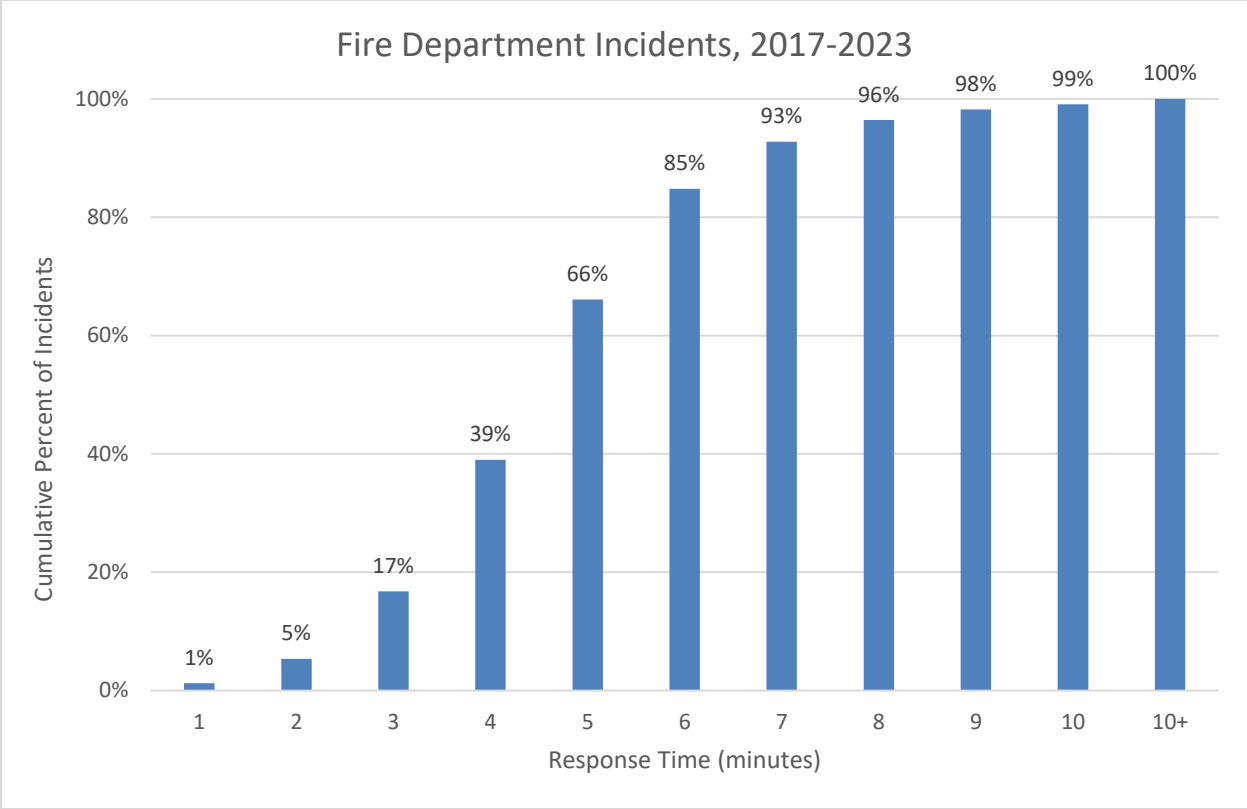


Fire Department Incidents, 2017-2023



Fire Department Incidents, 2017-2023

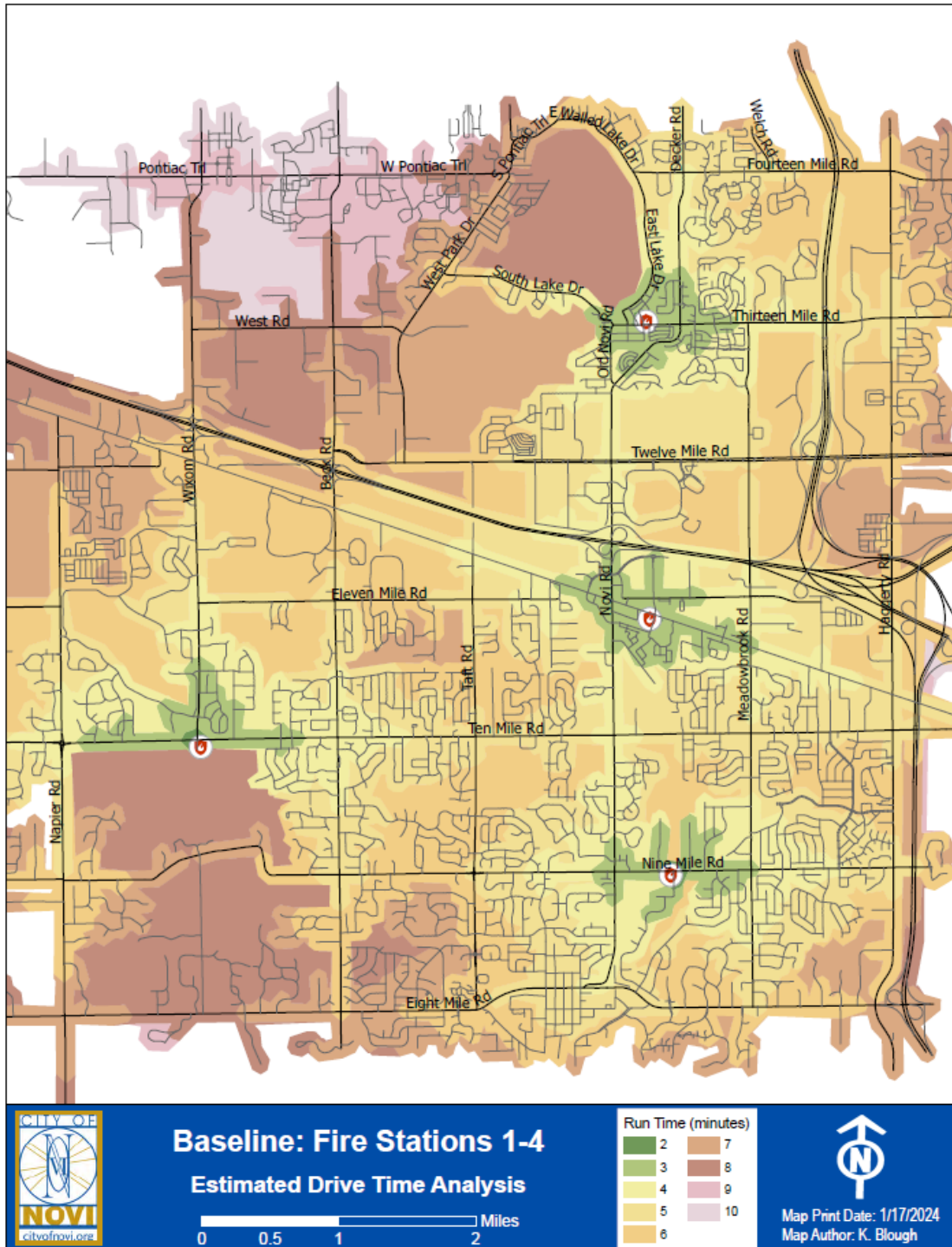




Baseline Drive Time Analysis:

- Existing Fire Stations 1-4

A drive time analysis produces polygons that represent *estimated* response time based on the variables described on Page 1. The resulting map shows how long it takes to reach all parts of the city from the four existing fire stations.



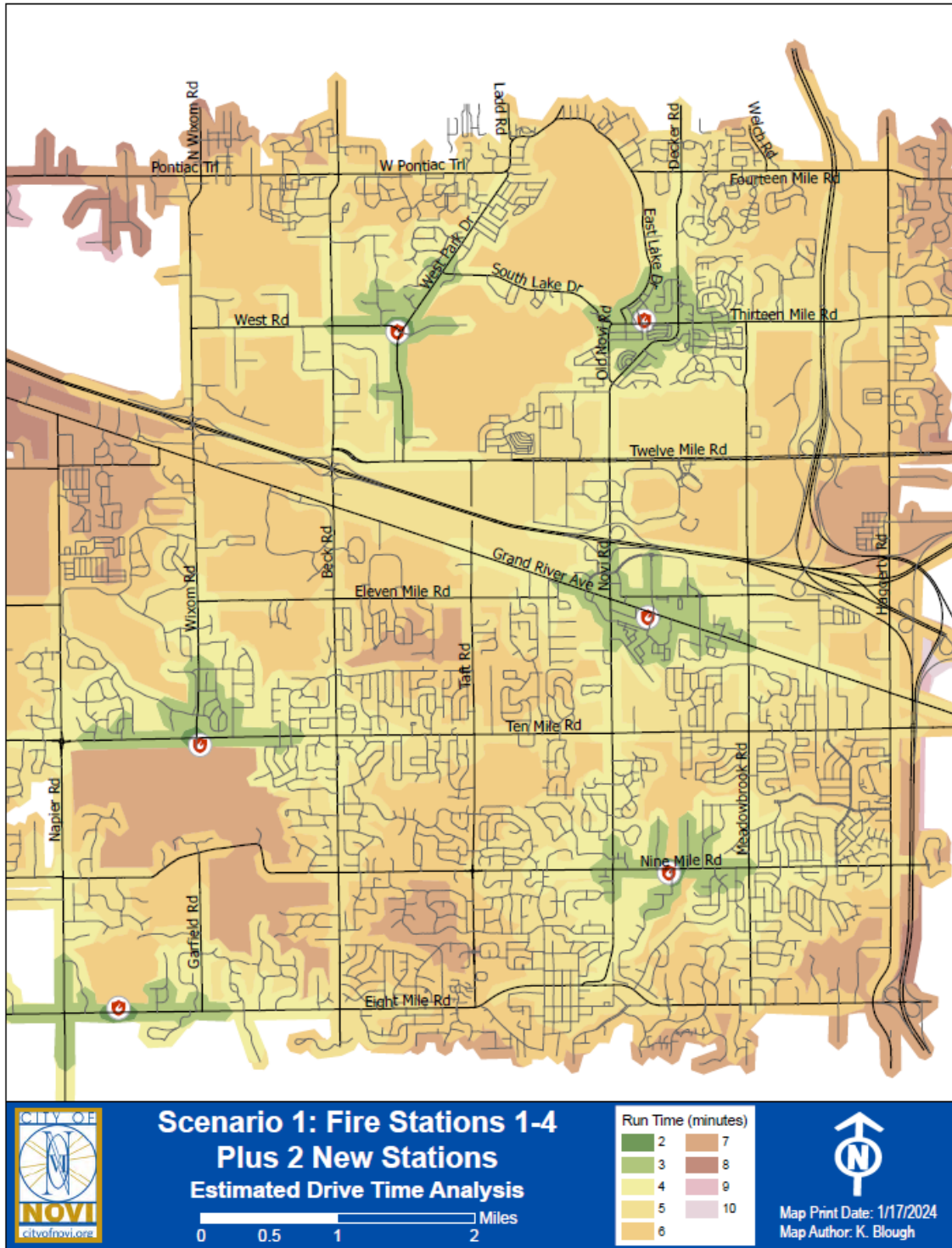
Model Validity:

Since a drive time analysis produces estimated run times, it is important to understand if the model reflects the actual run times as accurately as possible. The average run time for incidents located within each drive time area was calculated and summarized in the table below.

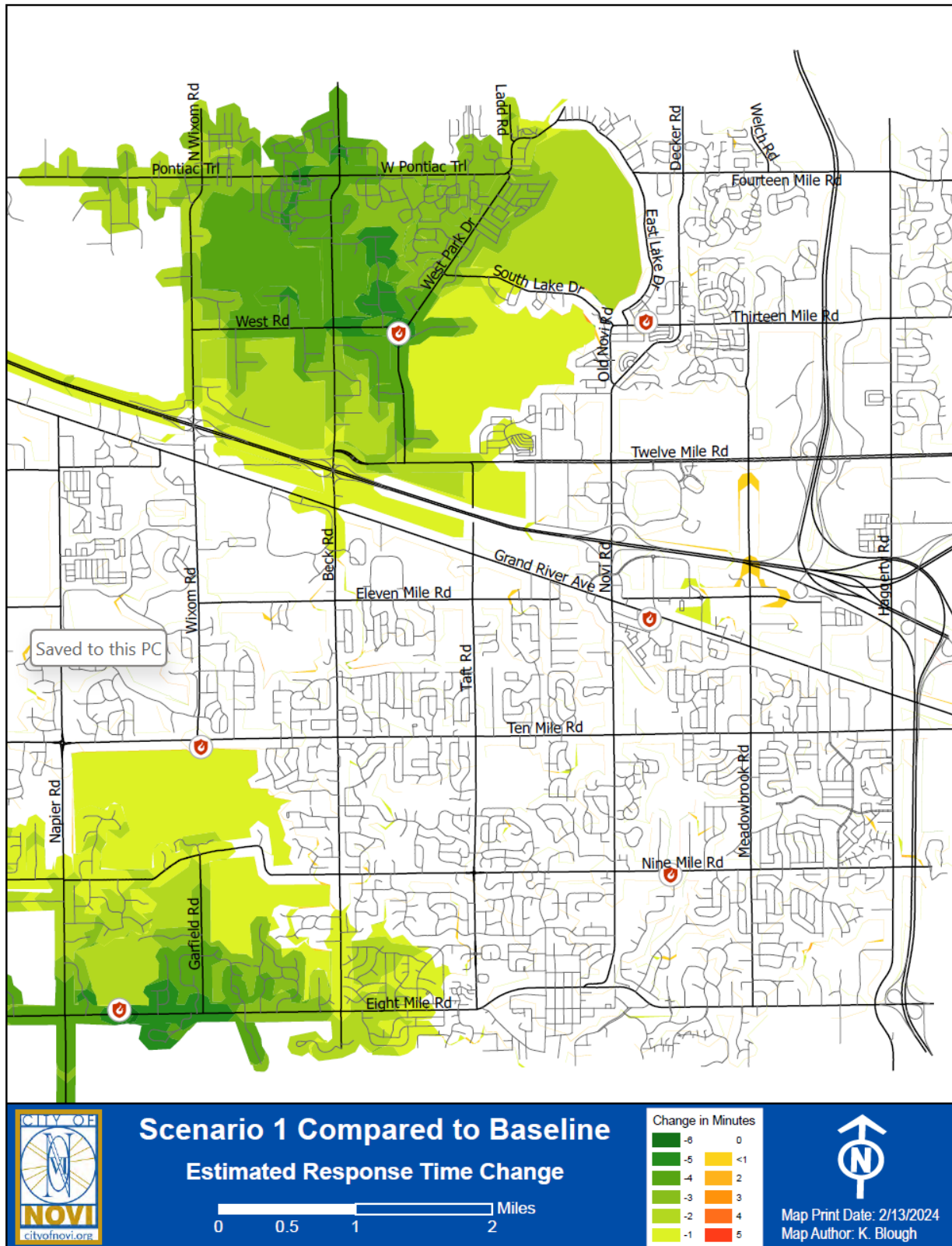
Drive Time Area Minutes	Actual Incident Average Minutes
2	3.74
3	3.58
4	4.31
5	4.94
6	5.42
7	6.56
8	6.40
9	7.88

Scenario 1 Drive Time Analysis:

- Existing Fire Stations 1-4
- Two Proposed Fire Stations:
 - West Rd at West Park Dr
 - Eight Mile Rd East of Napier Rd

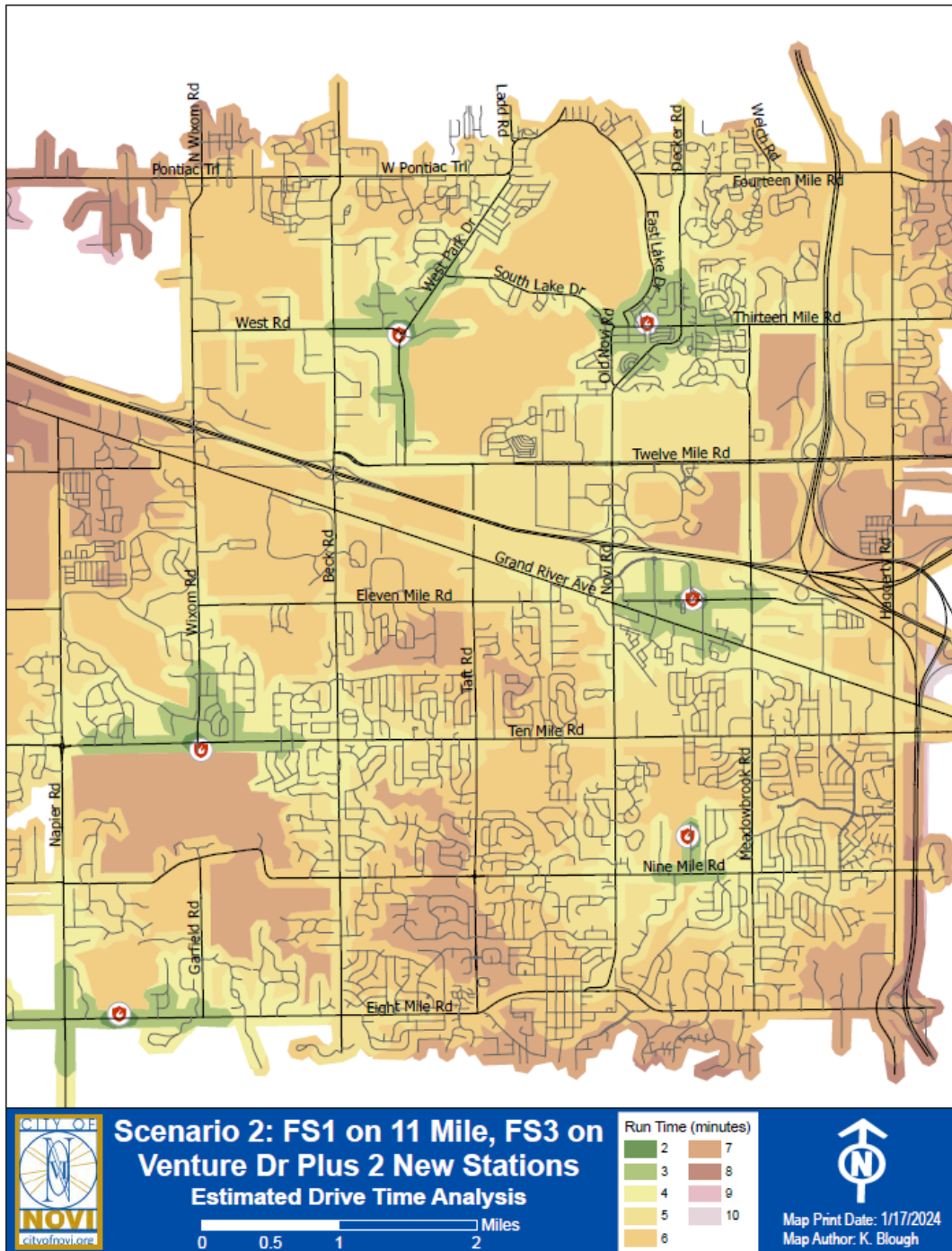


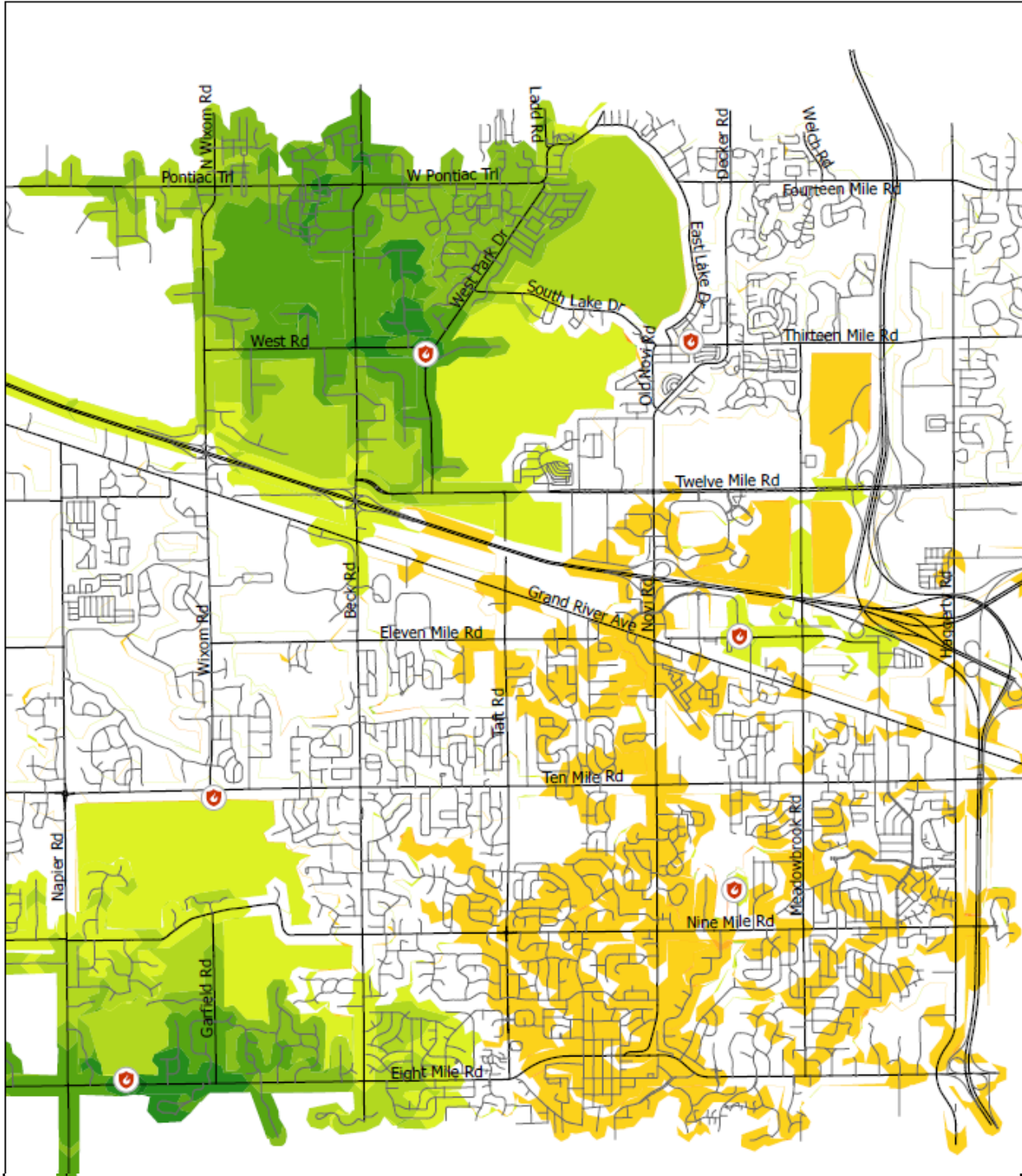
Comparing the drive time areas created by the scenario variables to the baseline polygons shows where the results vary, either decreasing or increasing the response times. Note: The areas where response times increase by more than 2 minutes are located at the edge of the map and are so small that they are not visible on the map.



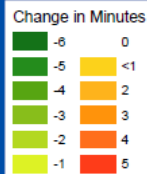
Scenario 2 Drive Time Analysis:

- Existing Fire Stations 2 & 4
- Four Proposed Fire Stations:
 - Fire Station 1 – Eleven Mile Rd at Lee BeGole Dr
 - Fire Station 3 – Venture Dr
 - West Rd at West Park Dr
 - Eight Mile Rd East of Napier Rd





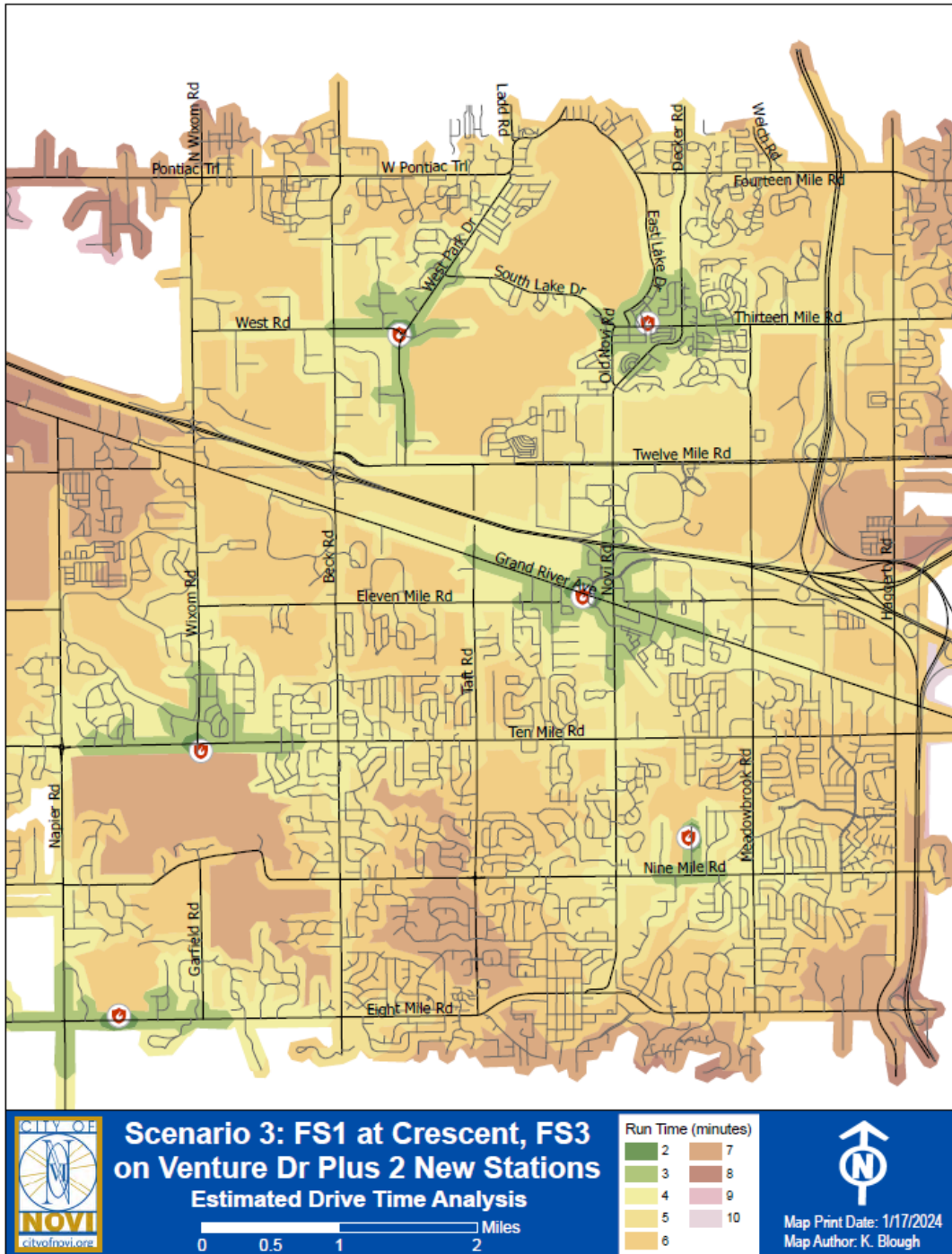
Scenario 2 Compared to Baseline Estimated Response Time Change

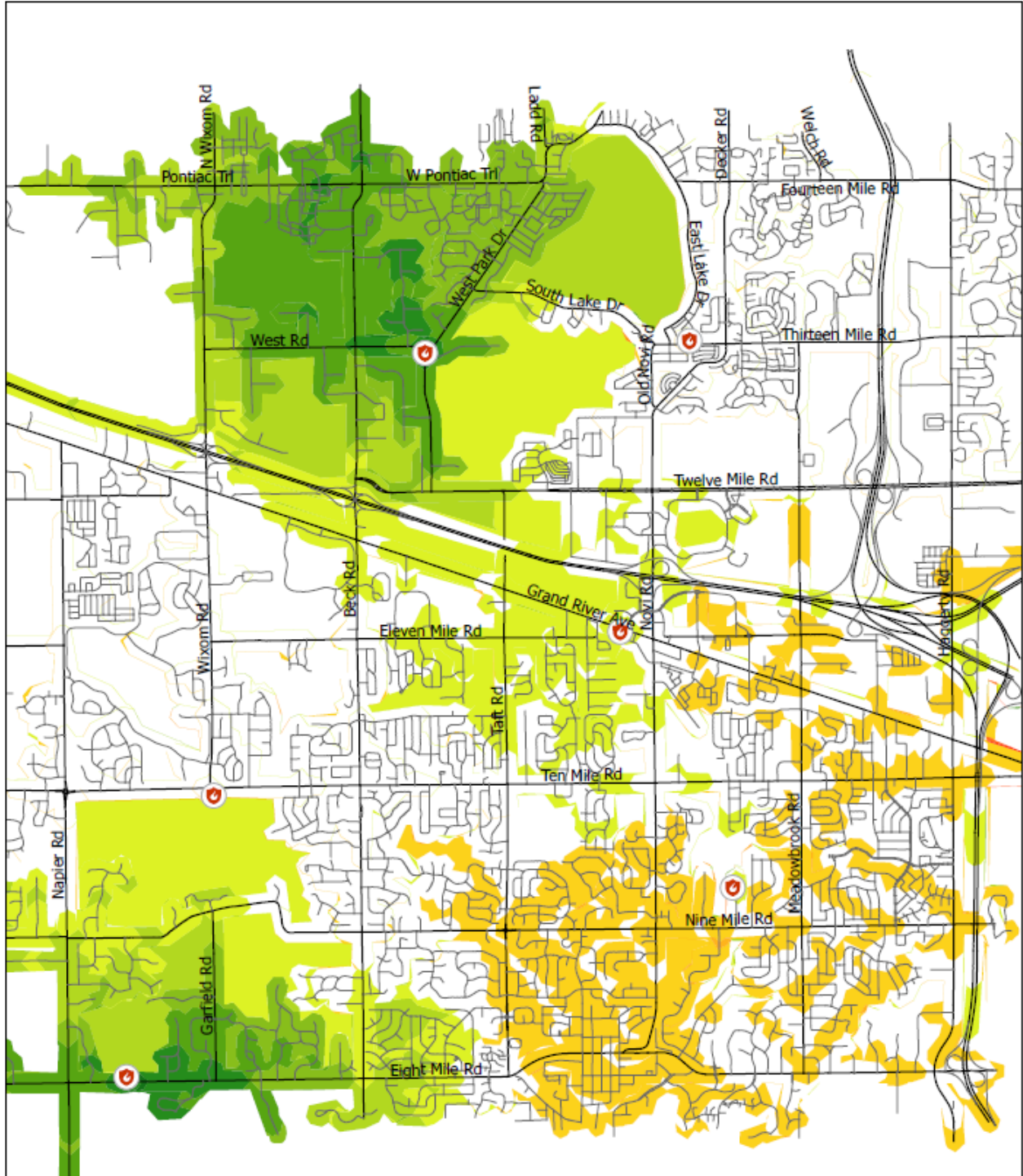


Map Print Date: 2/13/2024
Map Author: K. Blough

Scenario 3 Drive Time Analysis:

- Existing Fire Stations 2 & 4
- Four Proposed Fire Stations:
 - Fire Station 1 – Grand River Ave at Crescent Blvd
 - Fire Station 3 – Venture Dr
 - West Rd at West Park Dr
 - Eight Mile Rd East of Napier Rd





Scenario 3 Compared to Baseline Estimated Response Time Change



Change in Minutes	
-6	0
-5	<1
-4	2
-3	3
-2	4
-1	5



Map Print Date: 2/13/2024
Map Author: K. Blough

Scenarios Summary:

Each fire incident was assigned a new response time based on each scenario's drive time areas. The number of incidents per scenario response time is summarized in the chart below.

