Fire Station Site Selection

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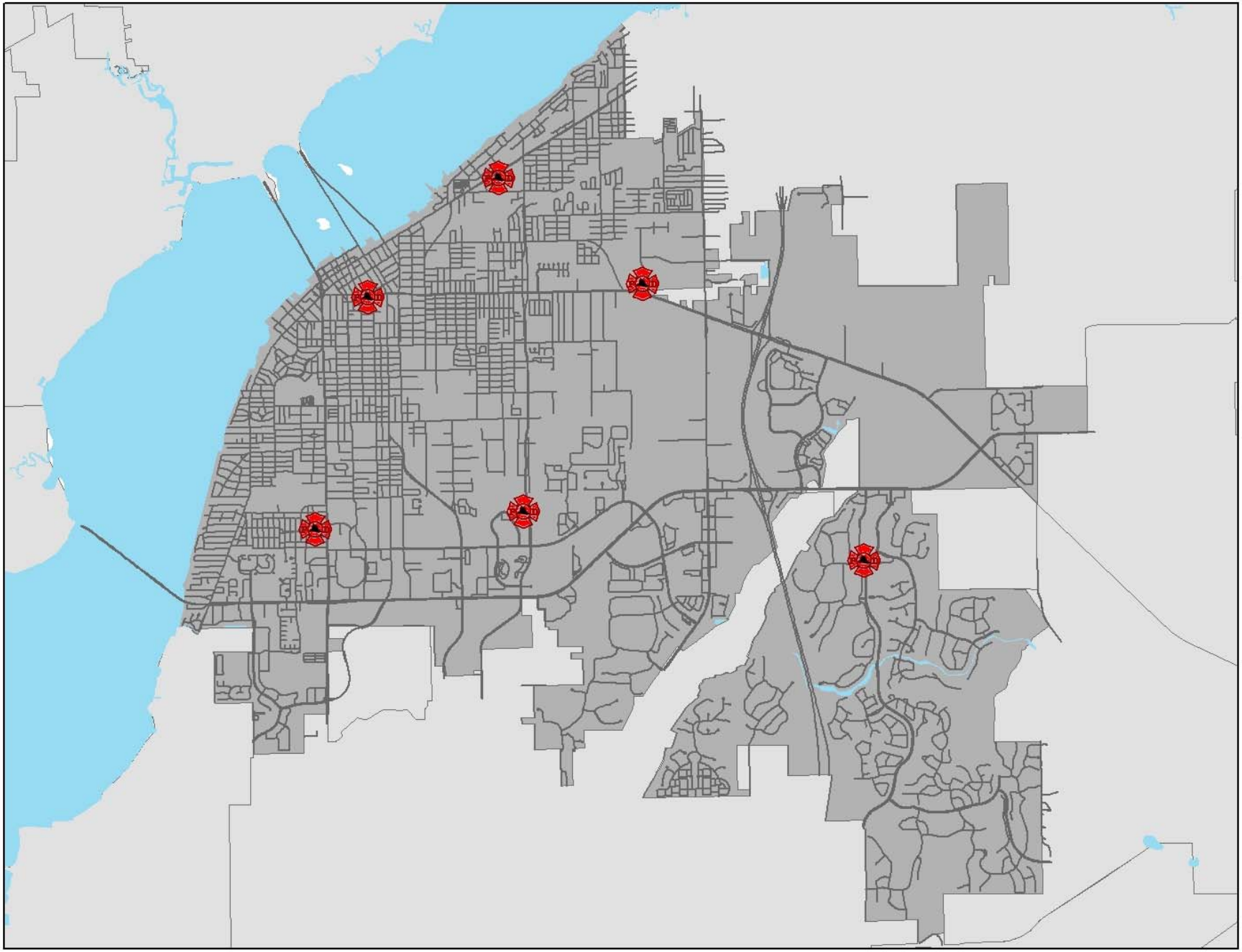
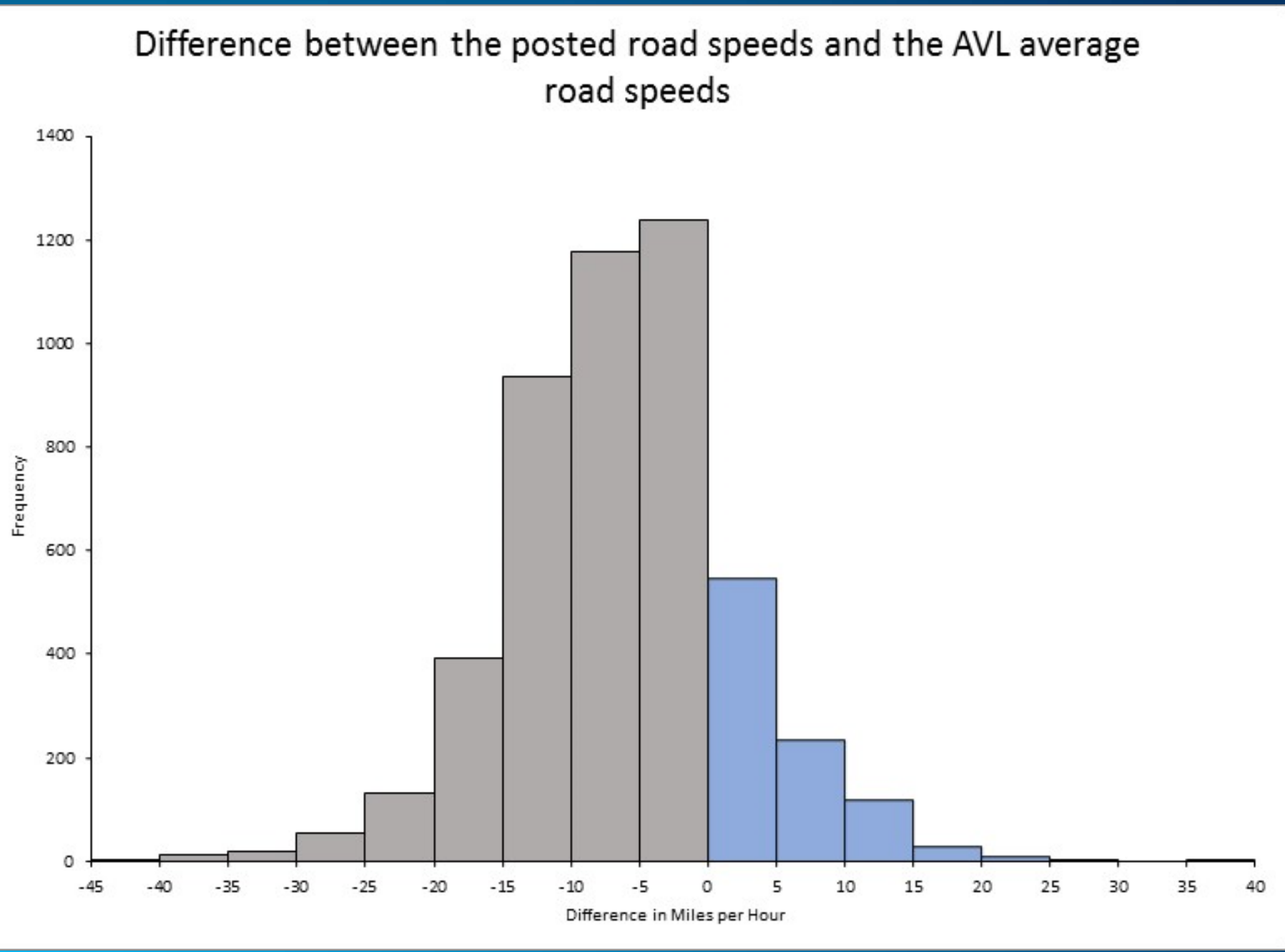


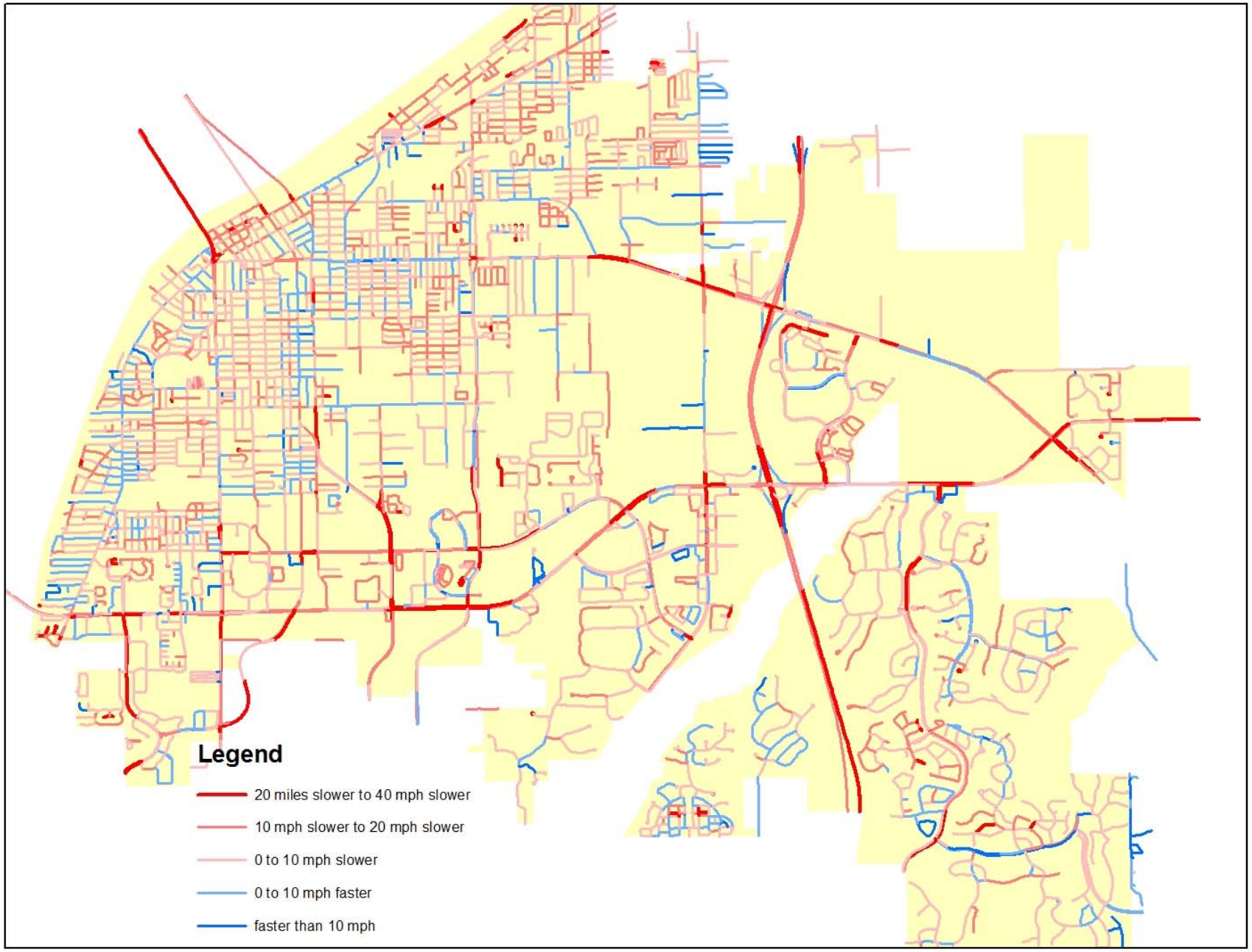
Fire Department Question # 1

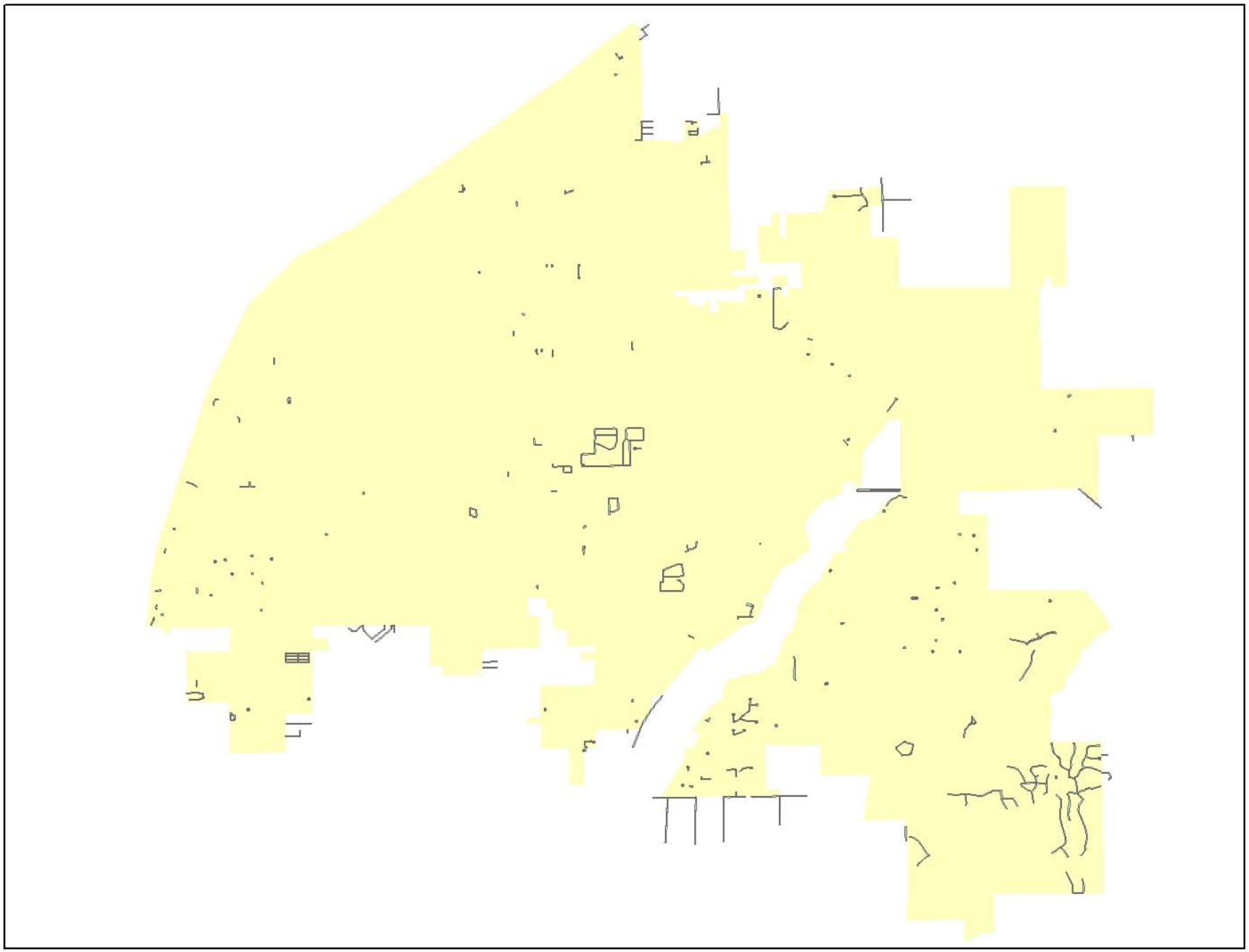
- **Where should the city add a new fire station to increase the level of coverage?**

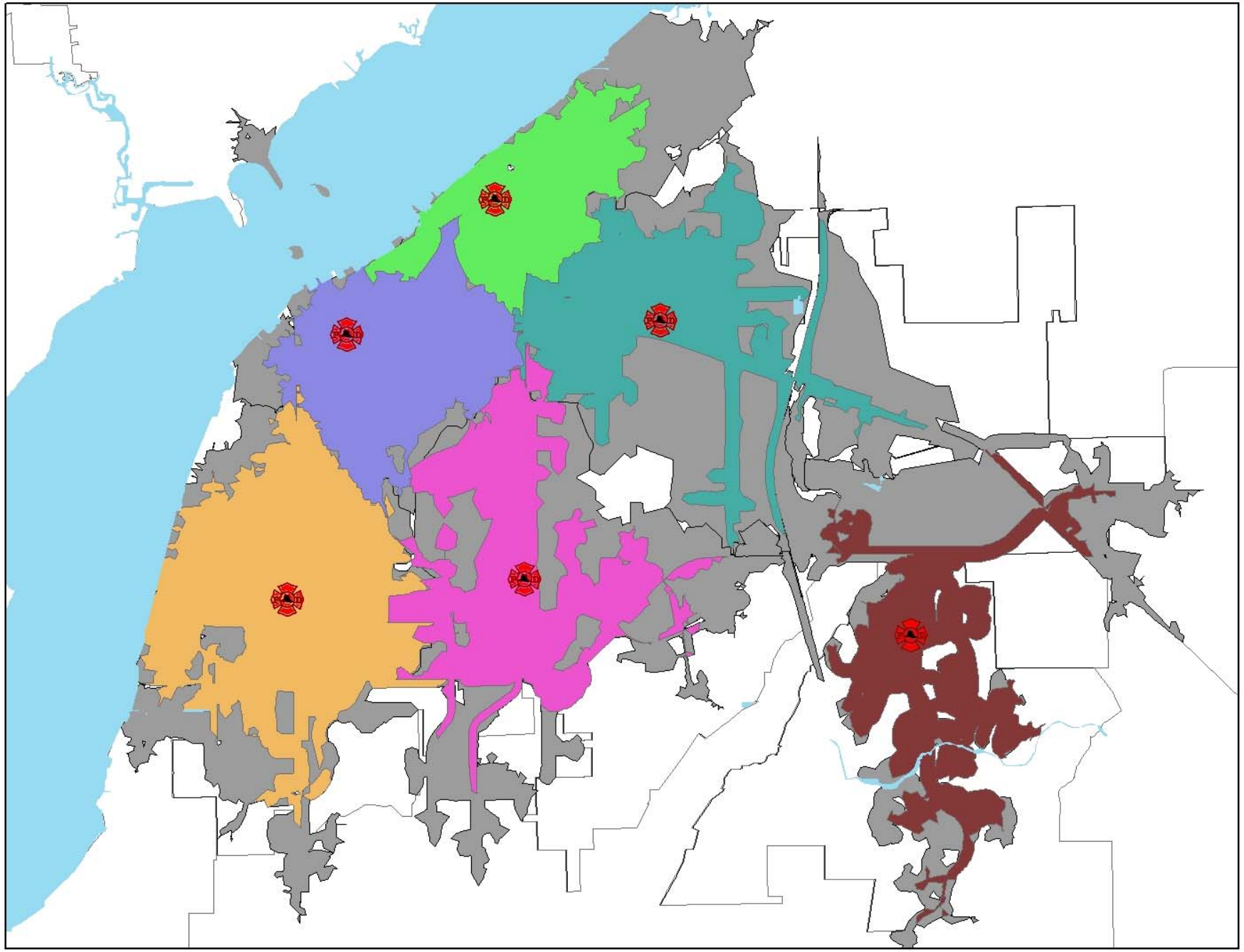
```
SELECT
  RTRIM(CallSign) AS [CallSign]
, Latitude
, Longitude
, Speed
FROM HISTORY_201501_3
WHERE UnitStatus = 'ER'
AND Speed > 0
AND CallSign NOT LIKE 'M__'
AND CallSign NOT LIKE 'MC%'
AND Callsign NOT LIKE
'LAR10_'
AND CallSign NOT LIKE
'FBA3_'
AND CallSign NOT LIKE
'%BC%'
AND Callsign NOT LIKE
'%PG%'

UNION ALL
Etc. etc.
```

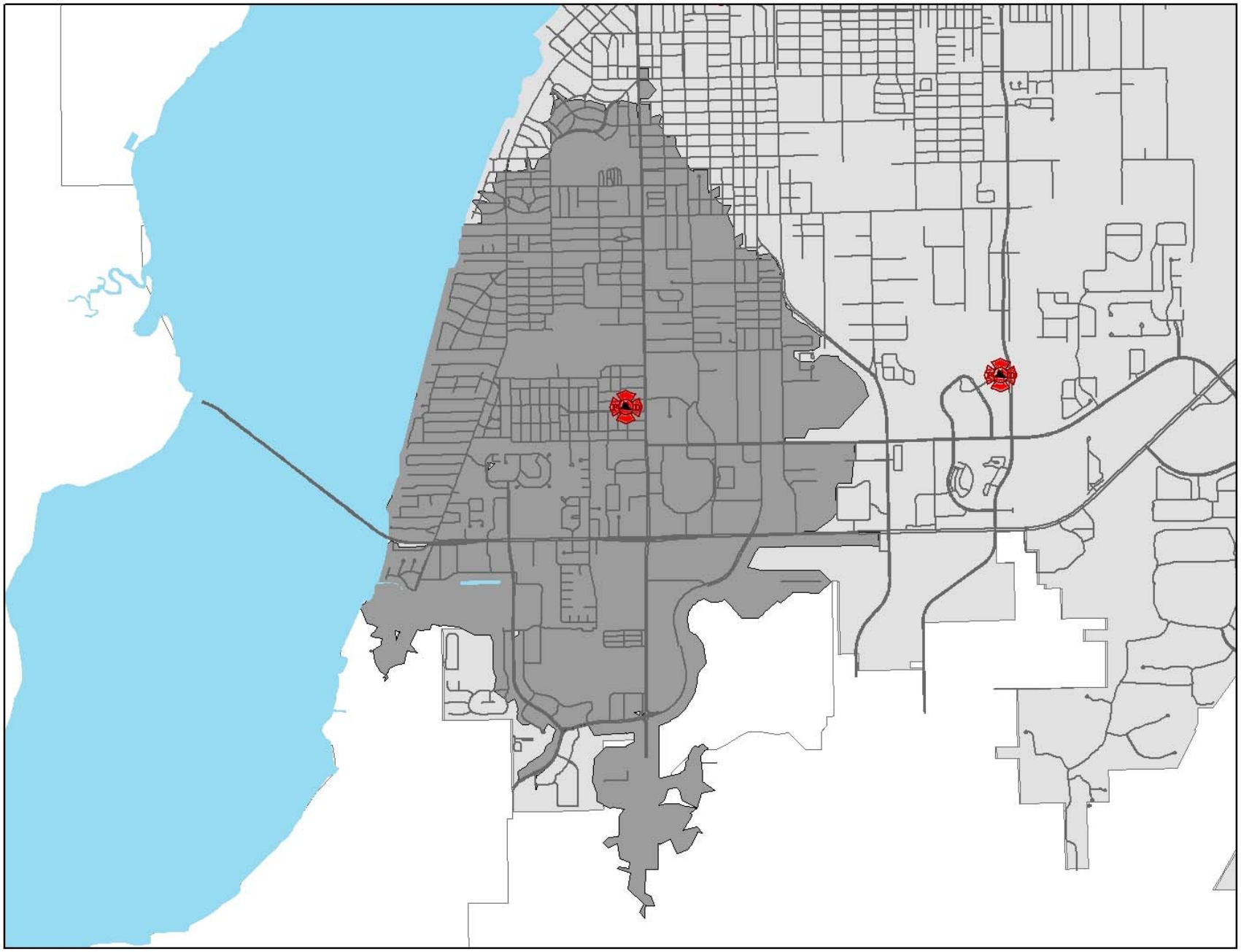
```
SELECT
  I_EventNumber
, PUN_UnitID
, DATEDIFF(SECOND, IIU_tEnroute, IIU_tArrive) AS
[ResponseTime]
, I_MapX
, I_MapY
, ITI_TypeID
, ITI_TypeText
, CASE
  WHEN LEFT(ITI_TypeID, 2) LIKE '[1-9][A-Z]' THEN
LEFT(ITI_TypeID, 1)
  WHEN LEFT(ITI_TypeID, 2) LIKE '[1-9]' AND
LEN(ITI_TypeID) = 1 THEN LEFT(ITI_TypeID, 1)
  WHEN LEFT(ITI_TypeID, 2) LIKE '[1-9][0-9]' THEN
LEFT(ITI_TypeID, 2)
  END AS [MPDSCard]
FROM IIncidentUnitSummary
LEFT OUTER JOIN PUnit ON IIU_kUnit = PUN_Unit_PK
LEFT OUTER JOIN IIncident ON IIU_kIncident =
I_Incident_PK
LEFT OUTER JOIN ITypeInfo ON I_kTypeInfo =
ITI_TypeInfo_PK
WHERE PUN_UnitAGency = 'FM'
AND DATEPART(YEAR, IIU_tDispatch) = 2016
AND PUN_UnitID NOT LIKE '%PG%'
AND PUN_UnitID NOT LIKE '%BC%'
```

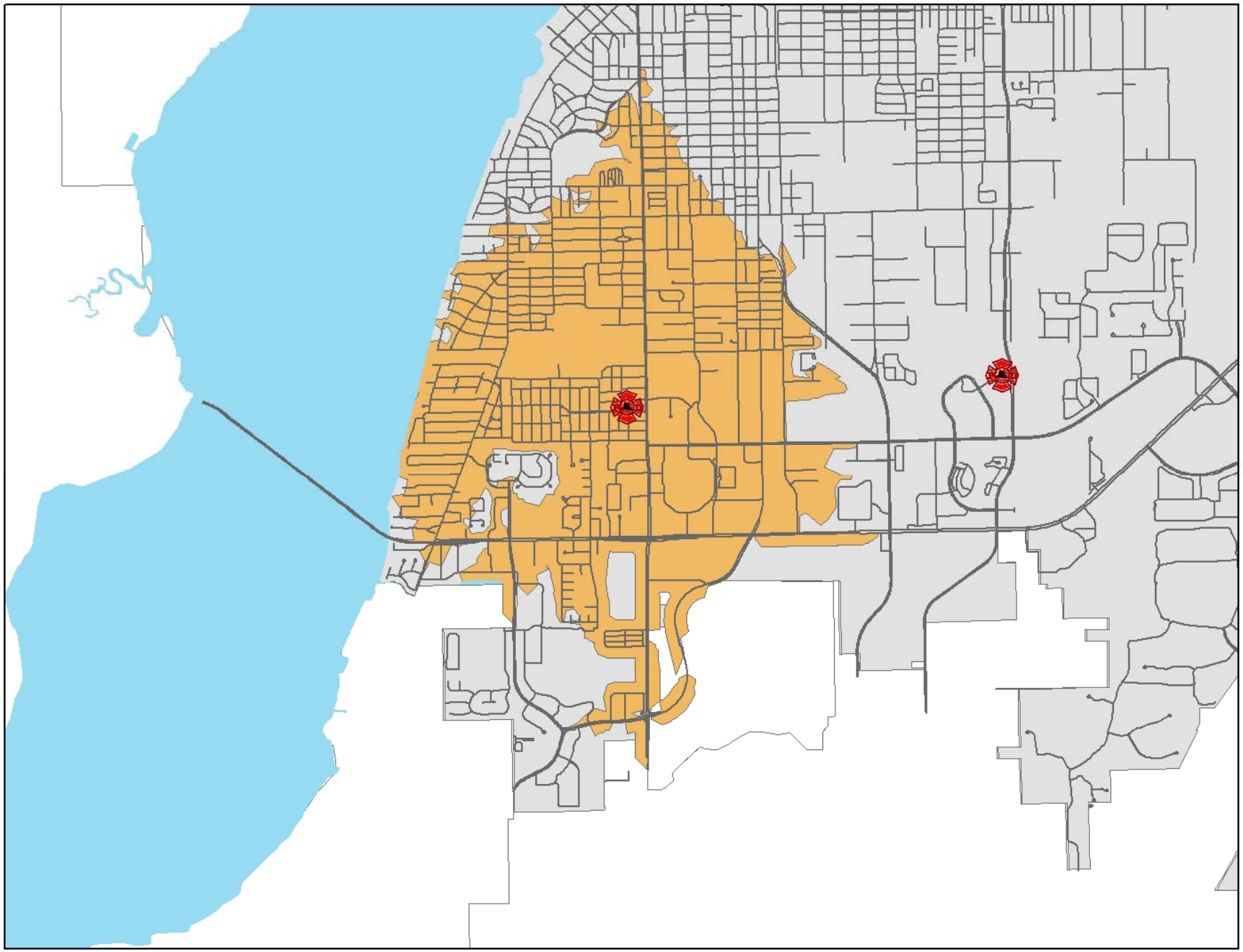

Difference between the posted road speeds and the AVL average road speeds
Frequency
1400
1200
1000
800
600
400
200
0
-45
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
Difference in Miles per Hour

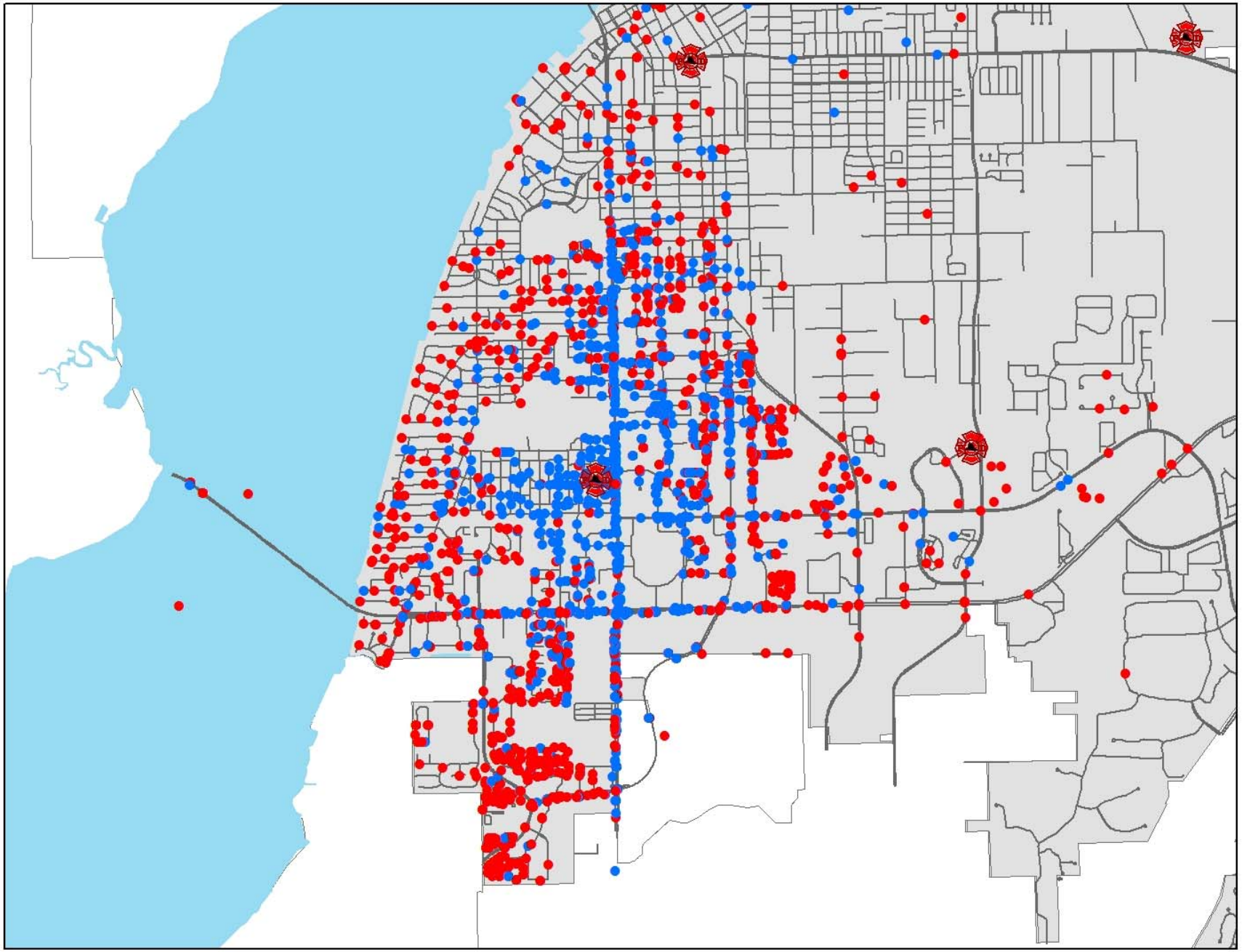

Legend
20 miles slower to 40 mph slower
10 mph slower to 20 mph slower
0 to 10 mph slower
0 to 10 mph faster
faster than 10 mph

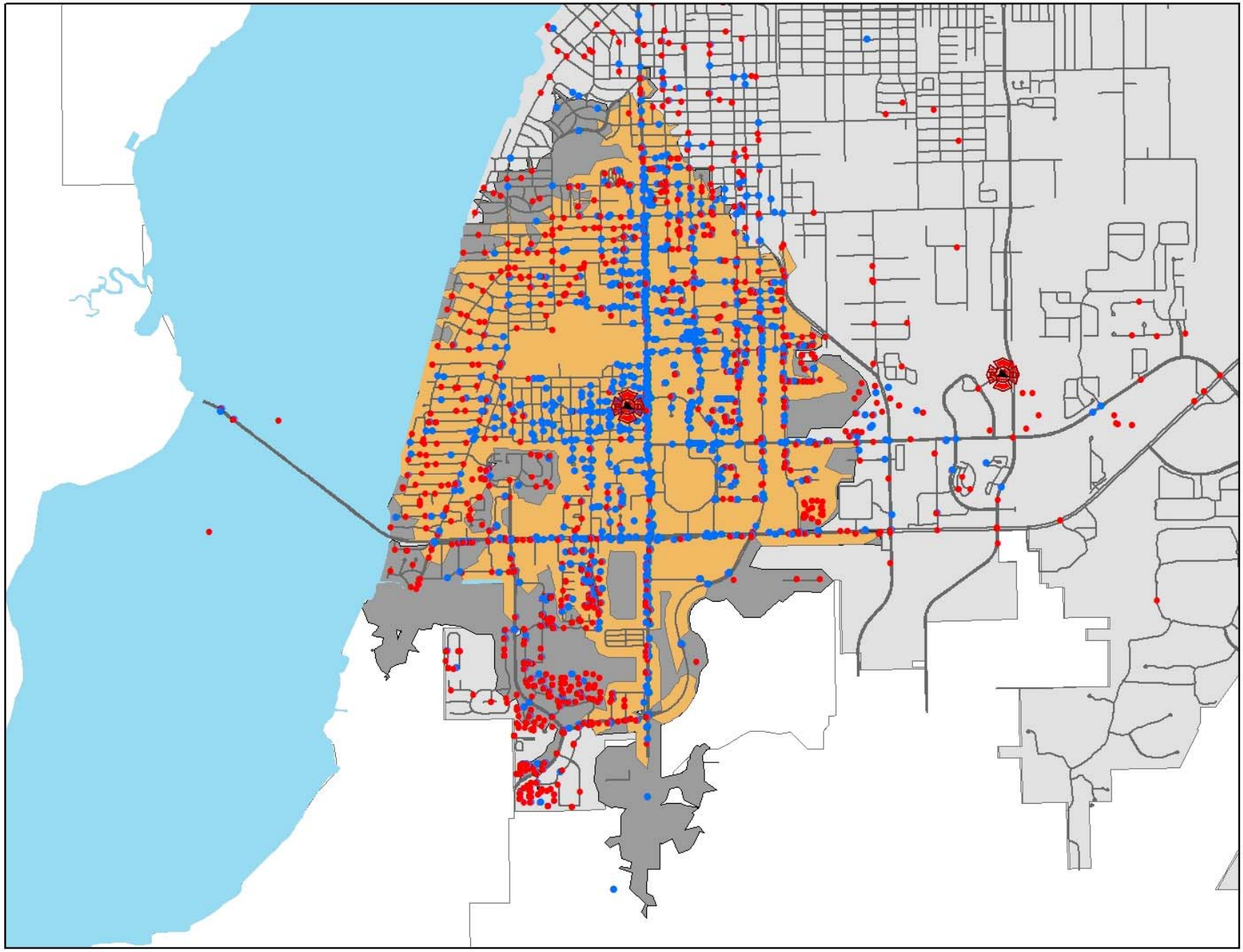


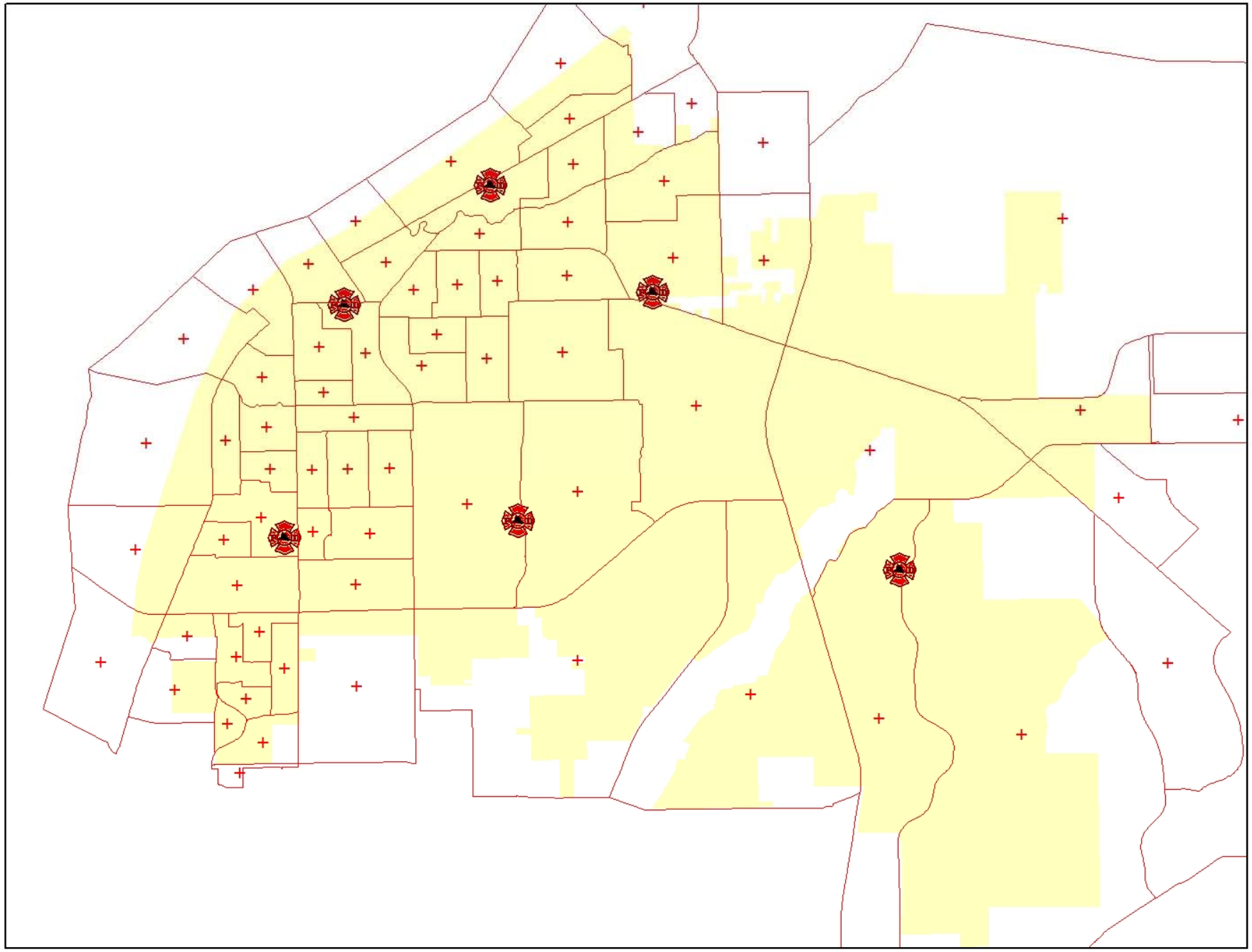


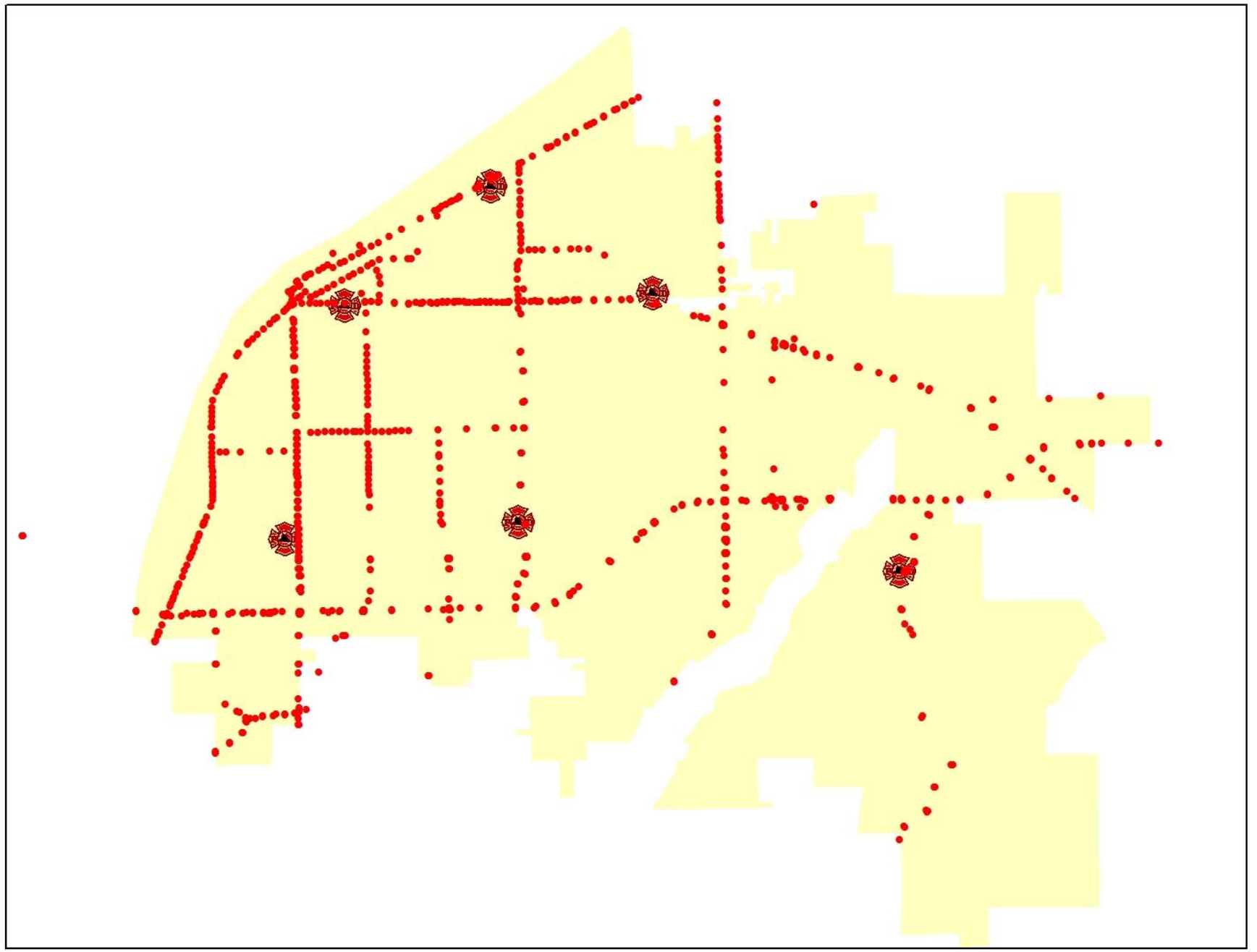


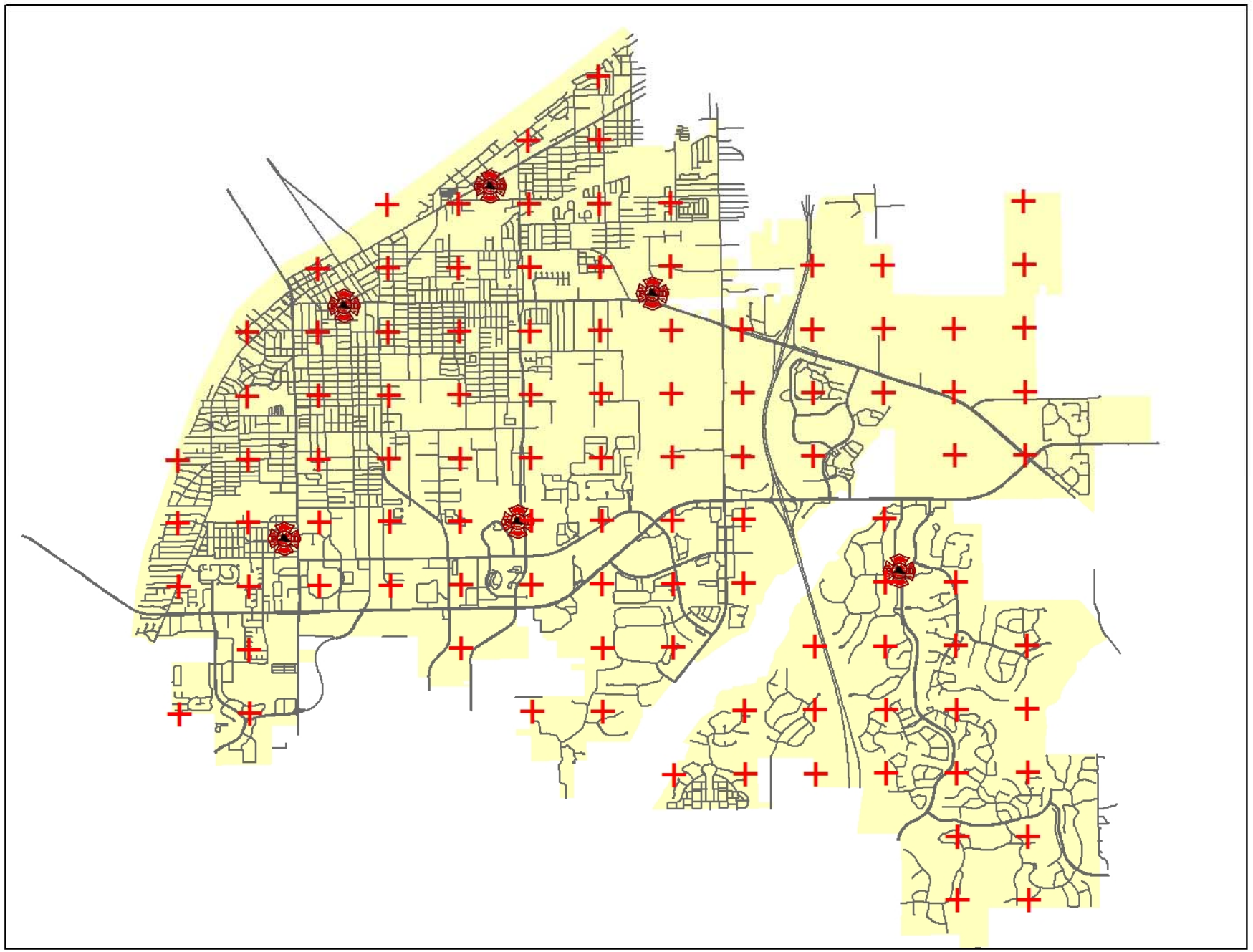












Layer Properties

Accumulation | Attribute Parameters | Network Locations

General | Layers | Source | Analysis Settings | Advanced Settings

Advanced Settings

Problem Type: Minimize Facilities

Facilities To Choose: 1

Impedance Cutoff: 4

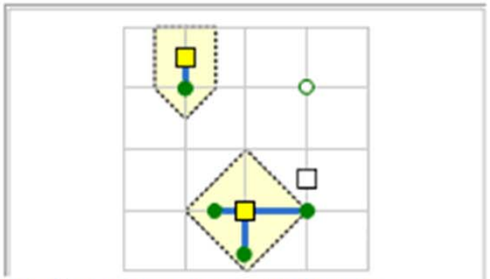
Impedance Transformation: Linear

Impedance Parameter: 1

Target Market Share (%): 10

Default Capacity: 1

Problem Type Description

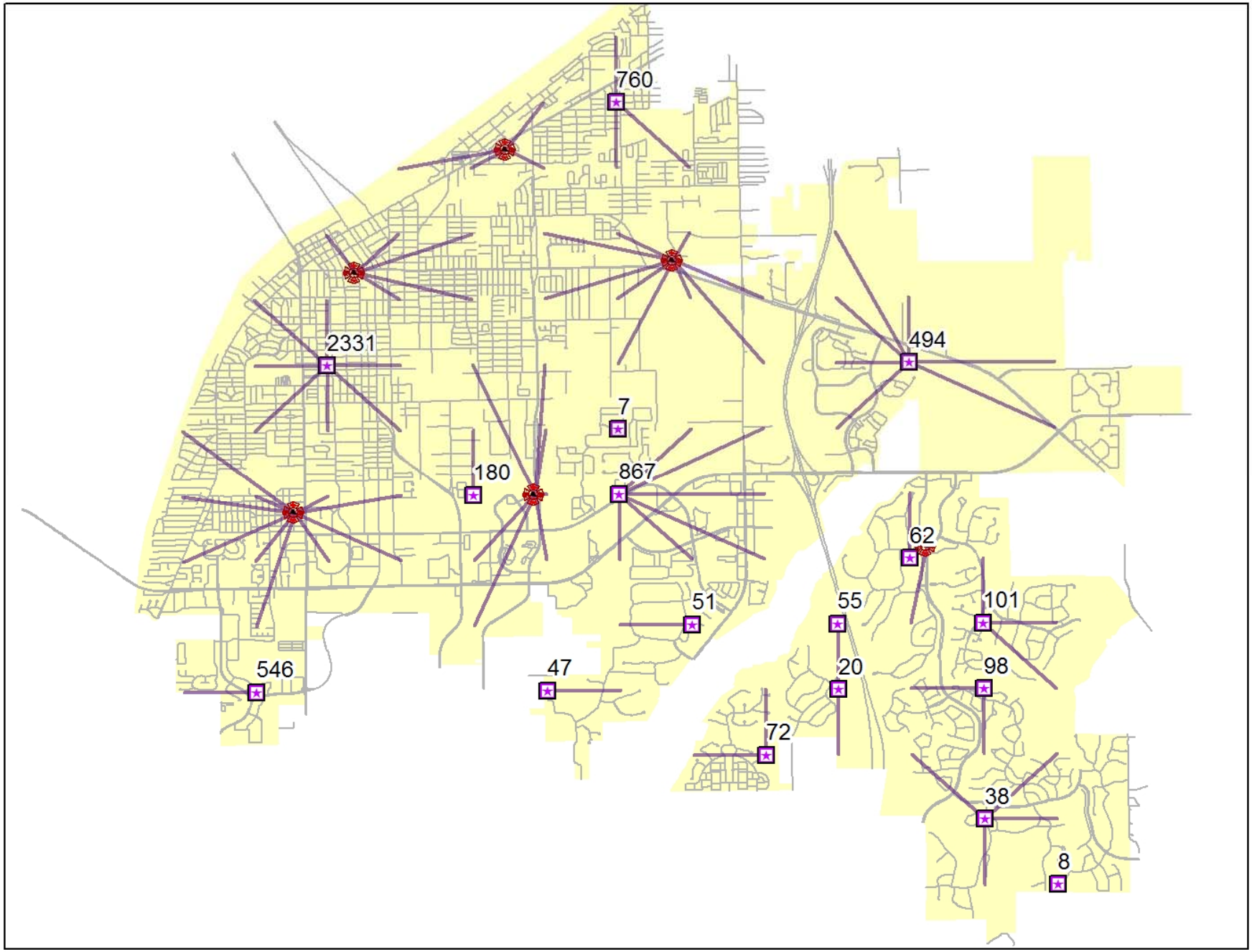


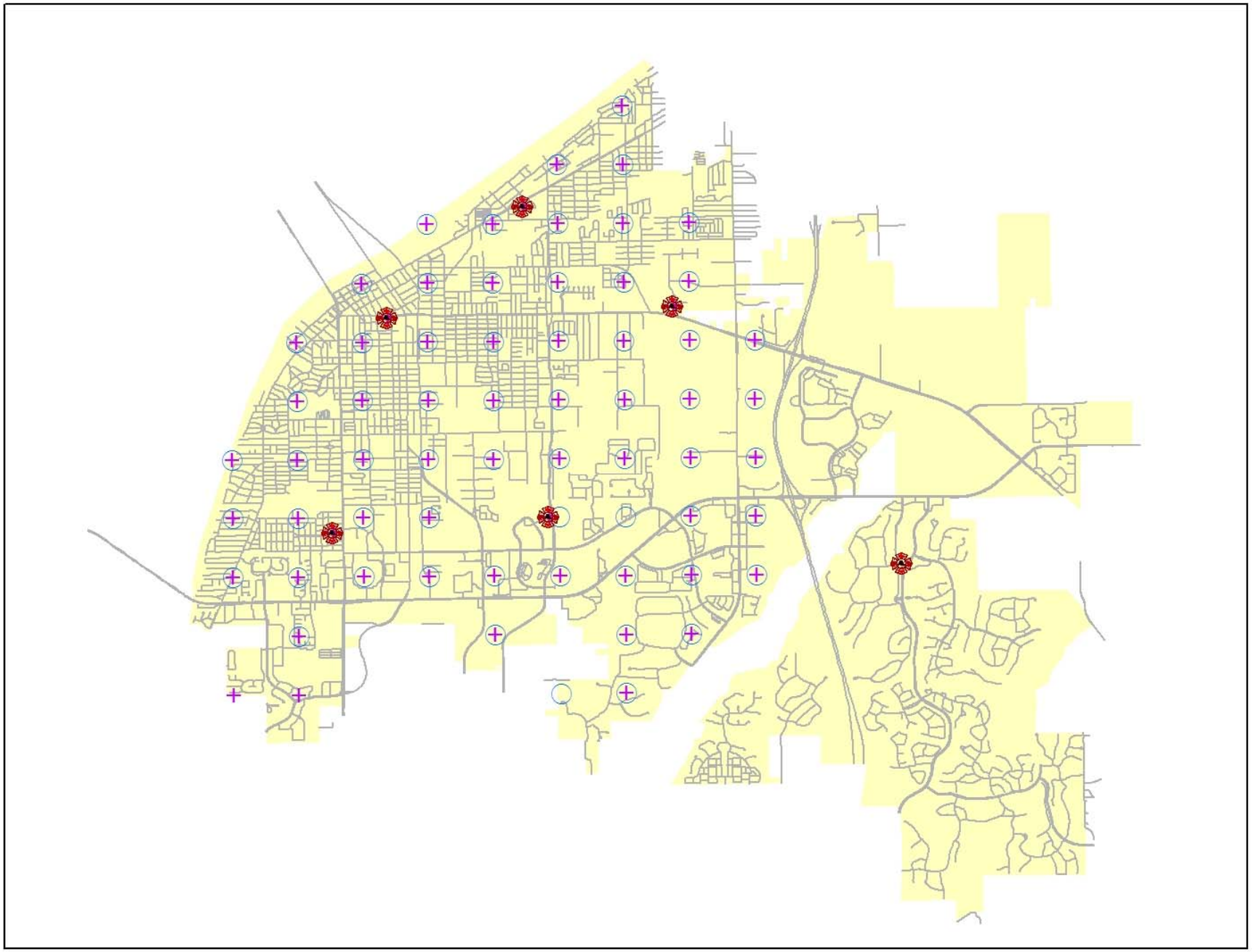
Maximize Coverage / Minimize Facilities

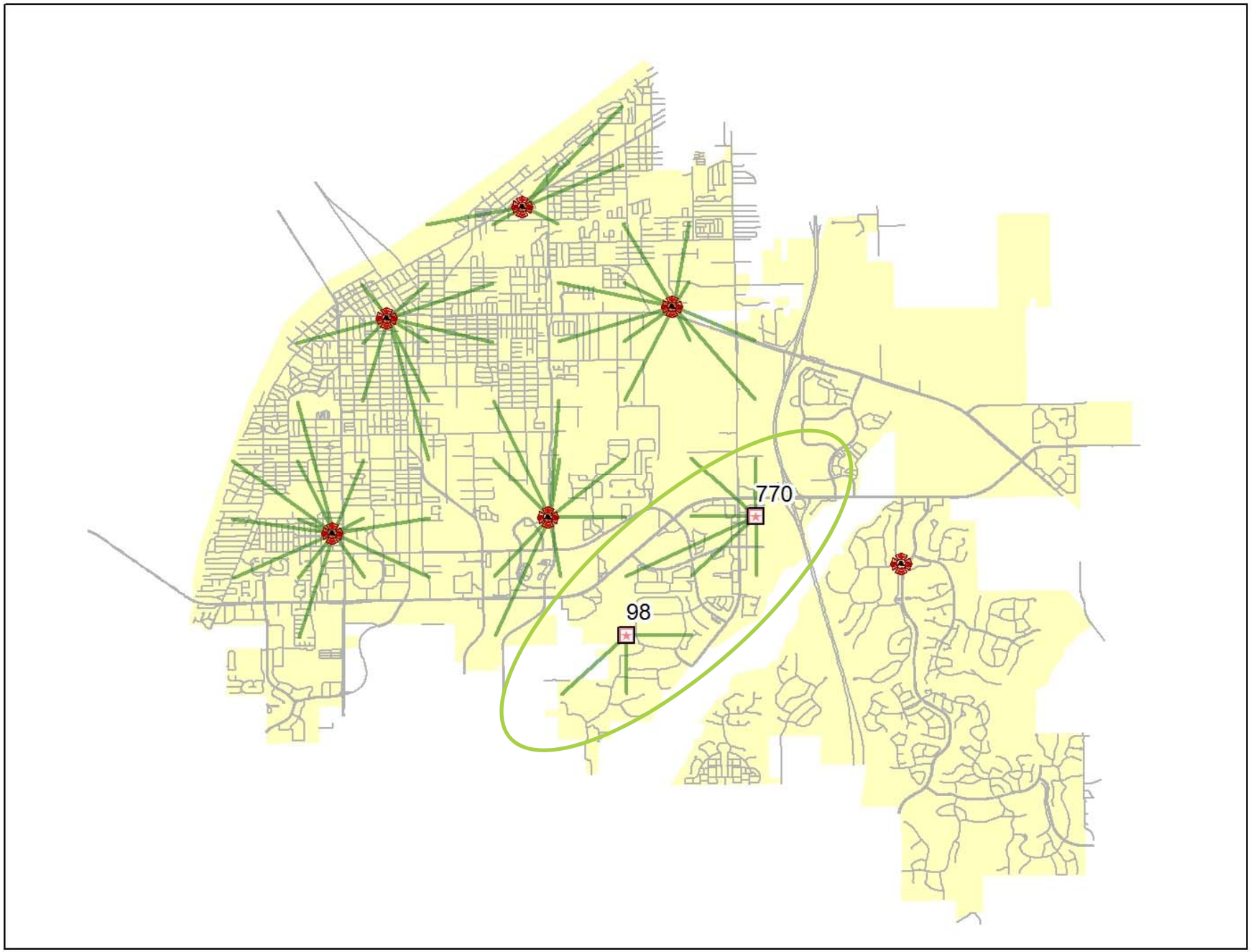
This option solves the fire station location problem. It chooses the minimum number of facilities needed to cover all or the greatest amount of demand within a specified impedance cutoff.

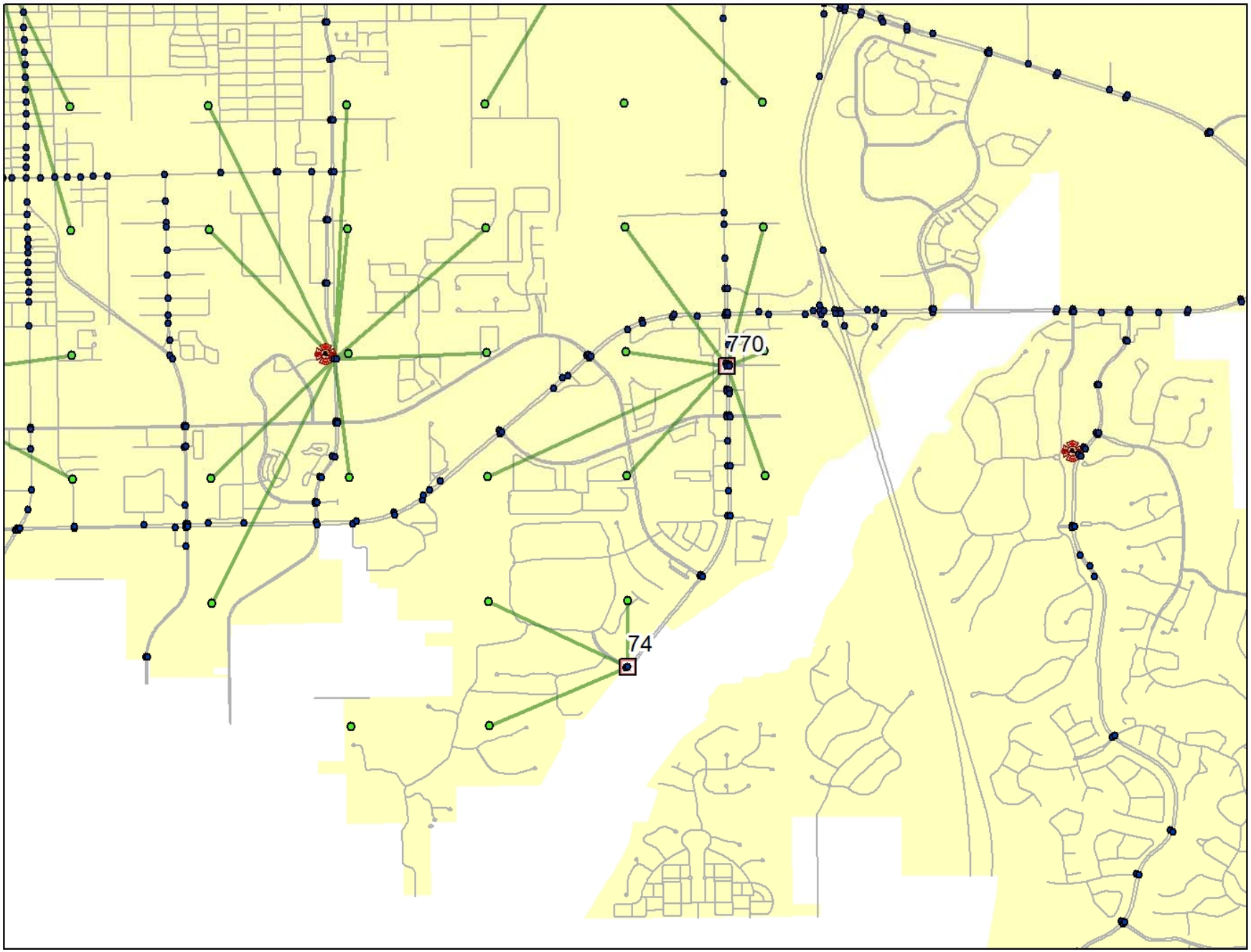
About the location-allocation analysis layer

OK | Cancel | Apply


760
2331
494
7
180
867
62
51
55
101
546
47
20
98
72
38
8

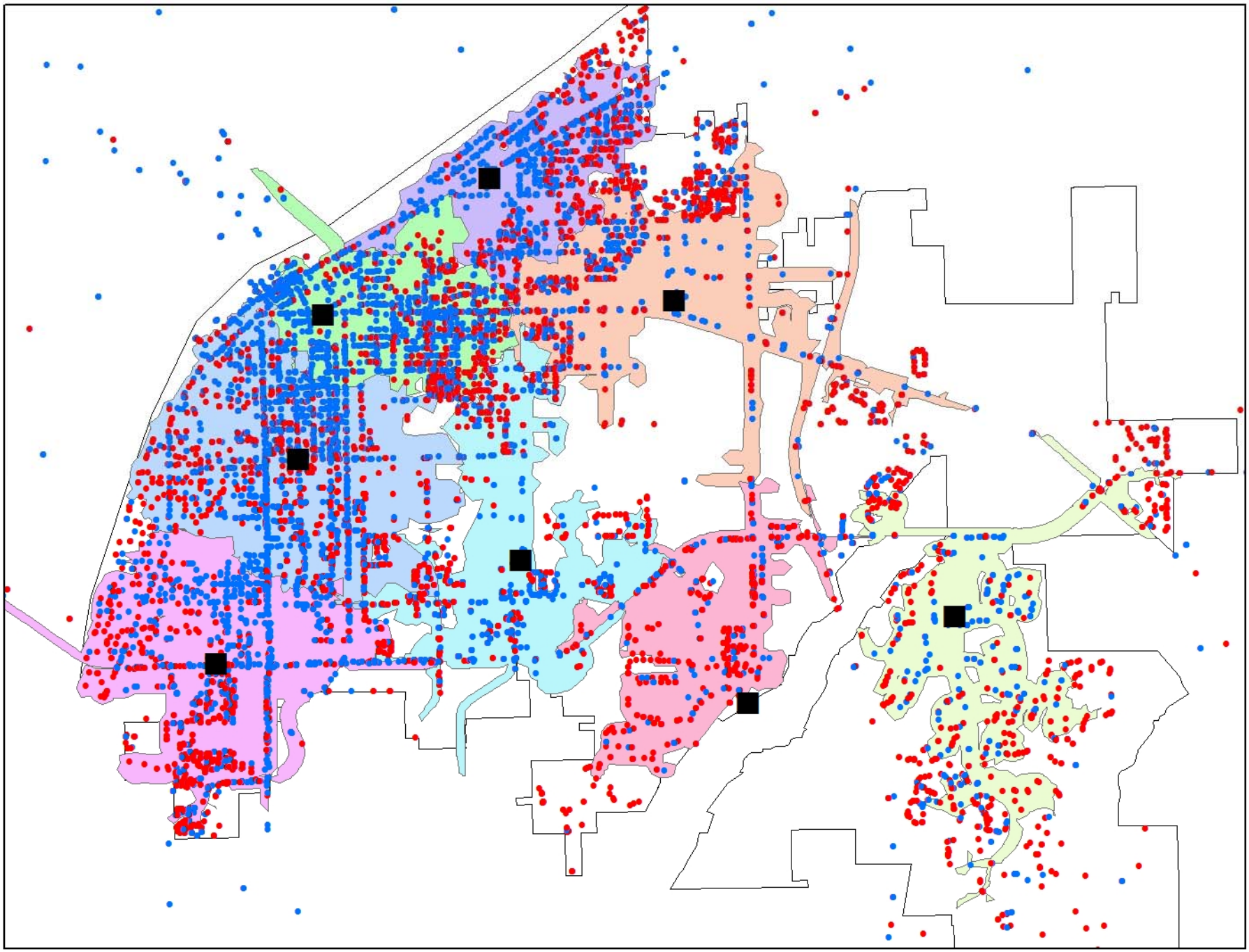



770
98


770
74

Fire Department Question # 2

- Split the fire house in the urban corridor into two stations. Where should these two stations be located?



Final Thoughts

- The devil is in the details.
  - Using posted road speeds leads to an over-estimation of speeds
- Analytics can only get you so far.
- Take the Network Analyst results and plug them into a simulation model.
- Ground truth the model. Map out past responses.
- Python is great not just for geo-processing, but for statistical analysis.
- If your municipality is considering building a new fire house it will spend a million dollars. Go ahead and spend $2500 for the Network Analyst extension and test it out. It will be money well spent.