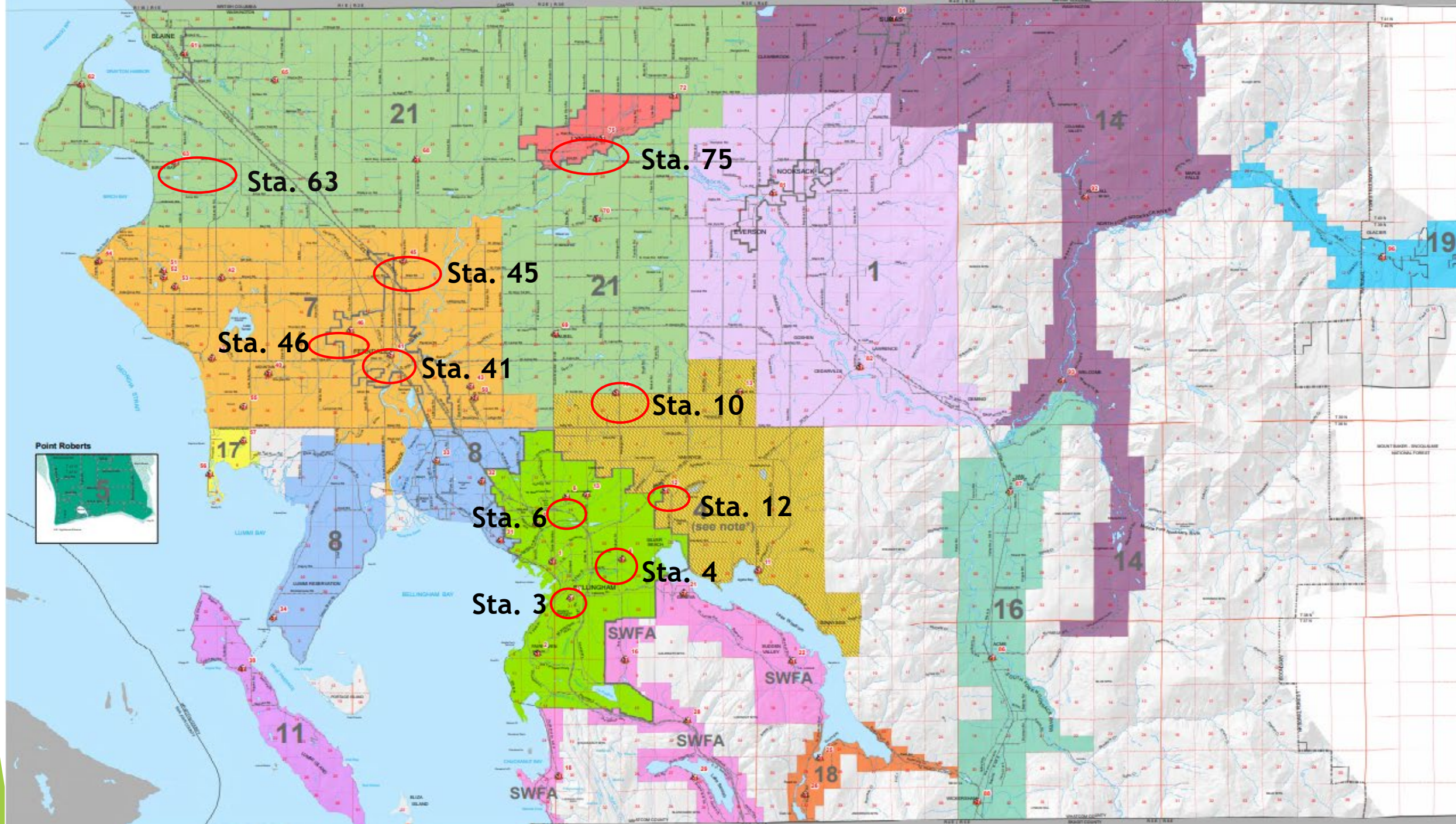


5th Medic Unit

Deployment Plan For 5th Medic Unit



Goals of Implementation

Modify medic deployment to have a balance between the following:

1. Call distribution among medic units
 - ▶ Balanced call volume to best utilize resources
 - ▶ Equalize/Decrease Call Volume in the City
2. Improved response times to the largest amount of citizens
 - ▶ Improved response times to population clusters
 - ▶ Improve Unit Reliability in East County

Assumptions

Models incorporate the most recent dispatching optimizations.

- 26 Charlie modifications
- M1 and M2 Split between St3 and St6

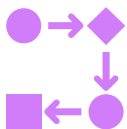
Model adds 10% call volume to ALS units for upgrades

- Historically ALS units are added to 9%-11% of calls that they are not initially dispatched on
- Model adds 10% call volume to ALS units for upgrades

Drop in Center Move

- Center Moved to Cornwall Ave

Base Improvements



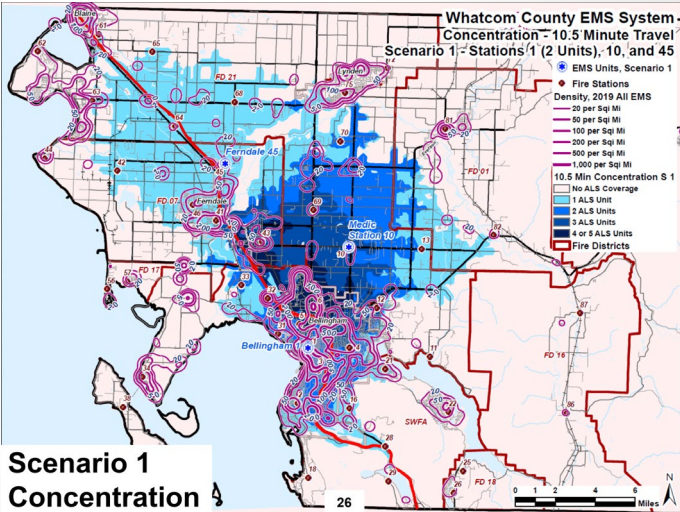
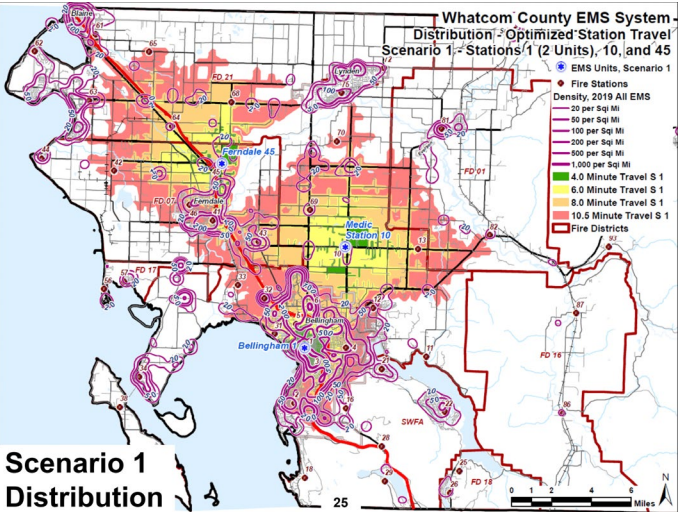
These are changes that if made improve all models.

Restructure EMS Zones

Move Medic 45 to Station 41

The models presented here assume these changes are made

The changes are not required to select deployment option.



Scenario 1 Statistics

Scenario Interval	Sta 01 First on Scene S01	Sta 10 First on Scene S01	Sta 45 First on Scene S01	All First on Scene S01	Sta 01 Transport S01	Sta 10 Transport S01	Sta 45 Transport S01	All Transport S01
4.0 Minutes	2,488	160	191	2,839	1,273	101	116	1,490
6.0 Minutes	6,215	401	569	7,185	3,282	229	316	3,827
8.0 Minutes	9,345	1,384	1,339	12,068	4,936	788	685	6,409
10.5 Minutes	10,944	1,857	2,349	15,150	5,789	1,055	1,226	8,070
Over 10.5 Minutes				6,302				3,183
0.0 - 4.0 Minutes	2,488	160	191	2,839	1,273	101	116	1,490
4.0 - 6.0 Minutes	3,727	241	378	4,346	2,009	128	200	2,337
6.0 - 8.0 Minutes	3,130	983	770	4,883	1,654	559	369	2,582
8.0 - 10.5 Minutes	1,599	473	1,010	3,082	853	267	541	1,661
Over 10.5 Minutes				6,302				3,183
0.0 - 4.0 Minutes	11.60%	0.75%	0.89%	13.23%	11.31%	0.90%	1.03%	13.24%
4.0 - 6.0 Minutes	17.37%	1.12%	1.76%	20.26%	17.85%	1.14%	1.78%	20.77%
6.0 - 8.0 Minutes	14.59%	4.58%	3.59%	22.76%	14.70%	4.97%	3.28%	22.94%
8.0 - 10.5 Minutes	7.45%	2.20%	4.71%	14.37%	7.58%	2.37%	4.81%	14.76%
Total	51.02%	8.66%	10.95%	70.62%	51.44%	9.38%	10.89%	71.71%
0.0 - 4.0 Minutes	11.60	0.75	0.89	13.23	11.31	0.90	1.03	13.24
4.0 - 6.0 Minutes	4.34	0.28	0.44	5.06	4.46	0.28	0.44	5.19
6.0 - 8.0 Minutes	1.82	0.57	0.45	2.85	1.84	0.62	0.41	2.87
8.0 - 10.5 Minutes	0.93	0.28	0.59	1.80	0.95	0.30	0.60	1.85
Total	18.70	1.88	2.37	22.94	18.56	2.10	2.49	23.15

Restructure EMS Zones

Base Improvements EMS Zones

- Current EMS Zones
- EMS zones are not used for response times.
- EMS Zones are used to equalize calls among medic units

Base Improvements - EMS Zones

2019 Incident Count by Travel Area – Selected Stations

Station Number	Agency	Status	4 Minute Travel	4 Min Rank	8 Minute Travel	8 Min Rank	10.5 Min Travel	10.5 M Rank	Sum Score	Sum Rank
6	Bham FD	BLS	2,613	2	9,790	1	12,425	1	4.75	1
3	Bham FD	BLS	3,083	1	9,713	2	12,052	4	9.50	2
5	Bham FD	BLS	1,971	4	9,454	4	12,177	2	12.00	3
1	Bham FD	ALS/BLS	2,496	3	9,526	3	11,864	5	14.25	4
4	Bham FD	BLS	1,454	5	9,442	5	12,132	3	15.75	5
31	FD 8	BLS	478	10	6,667	6	10,092	6	26.50	6
2	Bham FD	BLS	842	7	4,074	7	8,459	9	29.25	7
12	FD 4	BLS	255	14	2,841	8	9,110	7	34.50	8
43	FD 7	BLS	317	12	2,634	10	6,167	11	41.00	9
41	FD 7	BLS	845	6	1,833	12	4,497	14	42.00	10
69	NWFR	BLS	217	15	2,801	9	5,224	12	44.25	11
10	WC EMS	ALS	160	18	2,553	11	6,314	10	46.75	12
45	FD 7	ALS	189	17	1,340	15	9,110	8	47.75	13
46	FD 7	BLS	420	11	1,348	14	1,959	15	51.00	14
21	SWRFA	BLS	194	16	1,454	13	5,185	13	51.75	15
63	NWFR	BLS	483	9	1,163	17	1,952	16	54.25	16
75	Lynden	BLS	518	8	1,184	16	1,475	18	55.00	17
61	NWFR	BLS	257	13	1,099	18	1,615	17	61.00	18
42	FD 7	BLS	43	19	482	19	1,294	19	71.25	19

17

EMS Zones - Changes

- Divide Bellingham into 4 quadrants
 - Quadrant
- Everything outside those quadrants first due medic is determined by closest ALS unit to that fireblock
- EMS Zones With Fireblocks
- Effectively improves ALS response times county wide ~20-30 seconds
- Equalizes calls between medics for north and west Whatcom county
- Provides flexibility for medic deployments

Current Locations



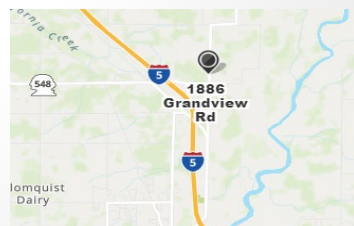
Station 3/ Medic 3



Station 6/ Medic 6

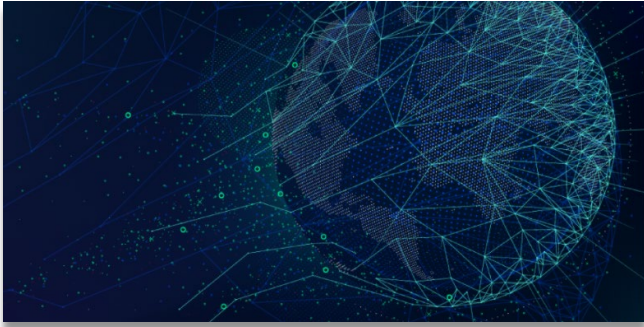


Station 10/ Medic 10



Station 45/ Medic 45

Models - What are they?



Based On Real Data

Real calls are used as the base then expanded on to fit future realities



Simulation

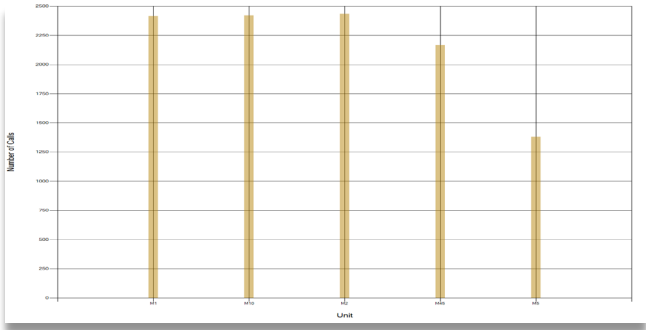
Using GIS, Routing, Dispatch Rules, Station locations, traffic, etc.



Model Accuracy

Models only match what *should* happen.

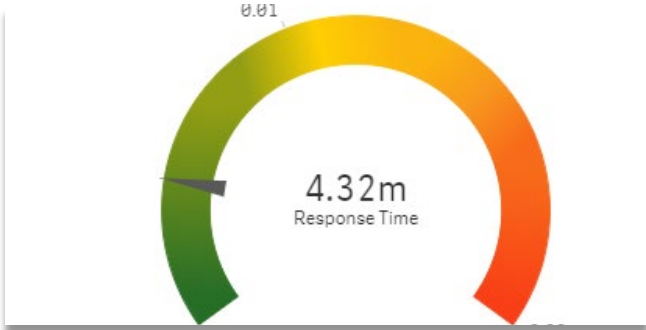
Models - What we compare



Call Volume

The number of calls individual medic units are dispatched to.

Delta: The difference between the busiest medic and the least busy medic



Response Time

The average response times for medics when they arrive.

Scenario 1 Statistics

Scenario/Interval	Scenario 1			Scenario 2			Scenario 3		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
0-5 Minutes	1,000	1,500	1,250	1,200	1,800	1,500	1,000	1,500	1,250
5-10 Minutes	1,200	1,800	1,500	1,500	2,200	1,800	1,200	1,800	1,500
10-15 Minutes	1,500	2,200	1,800	1,800	2,800	2,200	1,500	2,200	1,800
15-20 Minutes	1,800	2,800	2,200	2,200	3,500	2,800	1,800	2,800	2,200
20-25 Minutes	2,200	3,500	2,800	2,800	4,500	3,500	2,200	3,500	2,800
25-30 Minutes	2,800	4,500	3,500	3,500	5,500	4,500	2,800	4,500	3,500
30-35 Minutes	3,500	5,500	4,500	4,500	6,500	5,500	3,500	5,500	4,500
35-40 Minutes	4,500	6,500	5,500	5,500	7,500	6,500	4,500	6,500	5,500
40-45 Minutes	5,500	7,500	6,500	6,500	8,500	7,500	5,500	7,500	6,500
45-50 Minutes	6,500	8,500	7,500	7,500	9,500	8,500	6,500	8,500	7,500
50-55 Minutes	7,500	9,500	8,500	8,500	10,500	9,500	7,500	9,500	8,500
55-60 Minutes	8,500	10,500	9,500	9,500	11,500	10,500	8,500	10,500	9,500
60-65 Minutes	9,500	11,500	10,500	10,500	12,500	11,500	9,500	11,500	10,500
65-70 Minutes	10,500	12,500	11,500	11,500	13,500	12,500	10,500	12,500	11,500
70-75 Minutes	11,500	13,500	12,500	12,500	14,500	13,500	11,500	13,500	12,500
75-80 Minutes	12,500	14,500	13,500	13,500	15,500	14,500	12,500	14,500	13,500
80-85 Minutes	13,500	15,500	14,500	14,500	16,500	15,500	13,500	15,500	14,500
85-90 Minutes	14,500	16,500	15,500	15,500	17,500	16,500	14,500	16,500	15,500
90-95 Minutes	15,500	17,500	16,500	16,500	18,500	17,500	15,500	17,500	16,500
95-100 Minutes	16,500	18,500	17,500	17,500	19,500	18,500	16,500	18,500	17,500
100-105 Minutes	17,500	19,500	18,500	18,500	20,500	19,500	17,500	19,500	18,500
105-110 Minutes	18,500	20,500	19,500	19,500	21,500	20,500	18,500	20,500	19,500
110-115 Minutes	19,500	21,500	20,500	20,500	22,500	21,500	19,500	21,500	20,500
115-120 Minutes	20,500	22,500	21,500	21,500	23,500	22,500	20,500	22,500	21,500
120-125 Minutes	21,500	23,500	22,500	22,500	24,500	23,500	21,500	23,500	22,500
125-130 Minutes	22,500	24,500	23,500	23,500	25,500	24,500	22,500	24,500	23,500
130-135 Minutes	23,500	25,500	24,500	24,500	26,500	25,500	23,500	25,500	24,500
135-140 Minutes	24,500	26,500	25,500	25,500	27,500	26,500	24,500	26,500	25,500
140-145 Minutes	25,500	27,500	26,500	26,500	28,500	27,500	25,500	27,500	26,500
145-150 Minutes	26,500	28,500	27,500	27,500	29,500	28,500	26,500	28,500	27,500
150-155 Minutes	27,500	29,500	28,500	28,500	30,500	29,500	27,500	29,500	28,500
155-160 Minutes	28,500	30,500	29,500	29,500	31,500	30,500	28,500	30,500	29,500
160-165 Minutes	29,500	31,500	30,500	30,500	32,500	31,500	29,500	31,500	30,500
165-170 Minutes	30,500	32,500	31,500	31,500	33,500	32,500	30,500	32,500	31,500
170-175 Minutes	31,500	33,500	32,500	32,500	34,500	33,500	31,500	33,500	32,500
175-180 Minutes	32,500	34,500	33,500	33,500	35,500	34,500	32,500	34,500	33,500
180-185 Minutes	33,500	35,500	34,500	34,500	36,500	35,500	33,500	35,500	34,500
185-190 Minutes	34,500	36,500	35,500	35,500	37,500	36,500	34,500	36,500	35,500
190-195 Minutes	35,500	37,500	36,500	36,500	38,500	37,500	35,500	37,500	36,500
195-200 Minutes	36,500	38,500	37,500	37,500	39,500	38,500	36,500	38,500	37,500
200-205 Minutes	37,500	39,500	38,500	38,500	40,500	39,500	37,500	39,500	38,500
205-210 Minutes	38,500	40,500	39,500	39,500	41,500	40,500	38,500	40,500	39,500
210-215 Minutes	39,500	41,500	40,500	40,500	42,500	41,500	39,500	41,500	40,500
215-220 Minutes	40,500	42,500	41,500	41,500	43,500	42,500	40,500	42,500	41,500
220-225 Minutes	41,500	43,500	42,500	42,500	44,500	43,500	41,500	43,500	42,500
225-230 Minutes	42,500	44,500	43,500	43,500	45,500	44,500	42,500	44,500	43,500
230-235 Minutes	43,500	45,500	44,500	44,500	46,500	45,500	43,500	45,500	44,500
235-240 Minutes	44,500	46,500	45,500	45,500	47,500	46,500	44,500	46,500	45,500
240-245 Minutes	45,500	47,500	46,500	46,500	48,500	47,500	45,500	47,500	46,500
245-250 Minutes	46,500	48,500	47,500	47,500	49,500	48,500	46,500	48,500	47,500
250-255 Minutes	47,500	49,500	48,500	48,500	50,500	49,500	47,500	49,500	48,500
255-260 Minutes	48,500	50,500	49,500	49,500	51,500	50,500	48,500	50,500	49,500
260-265 Minutes	49,500	51,500	50,500	50,500	52,500	51,500	49,500	51,500	50,500
265-270 Minutes	50,500	52,500	51,500	51,500	53,500	52,500	50,500	52,500	51,500
270-275 Minutes	51,500	53,500	52,500	52,500	54,500	53,500	51,500	53,500	52,500
275-280 Minutes	52,500	54,500	53,500	53,500	55,500	54,500	52,500	54,500	53,500
280-285 Minutes	53,500	55,500	54,500	54,500	56,500	55,500	53,500	55,500	54,500
285-290 Minutes	54,500	56,500	55,500	55,500	57,500	56,500	54,500	56,500	55,500
290-295 Minutes	55,500	57,500	56,500	56,500	58,500	57,500	55,500	57,500	56,500
295-300 Minutes	56,500	58,500	57,500	57,500	59,500	58,500	56,500	58,500	57,500
300-305 Minutes	57,500	59,500	58,500	58,500	60,500	59,500	57,500	59,500	58,500
305-310 Minutes	58,500	60,500	59,500	59,500	61,500	60,500	58,500	60,500	59,500
310-315 Minutes	59,500	61,500	60,500	60,500	62,500	61,500	59,500	61,500	60,500
315-320 Minutes	60,500	62,500	61,500	61,500	63,500	62,500	60,500	62,500	61,500
320-325 Minutes	61,500	63,500	62,500	62,500	64,500	63,500	61,500	63,500	62,500
325-330 Minutes	62,500	64,500	63,500	63,500	65,500	64,500	62,500	64,500	63,500
330-335 Minutes	63,500	65,500	64,500	64,500	66,500	65,500	63,500	65,500	64,500
335-340 Minutes	64,500	66,500	65,500	65,500	67,500	66,500	64,500	66,500	65,500
340-345 Minutes	65,500	67,500	66,500	66,500	68,500	67,500	65,500	67,500	66,500
345-350 Minutes	66,500	68,500	67,500	67,500	69,500	68,500	66,500	68,500	67,500
350-355 Minutes	67,500	69,500	68,500	68,500	70,500	69,500	67,500	69,500	68,500
355-360 Minutes	68,500	70,500	69,500	69,500	71,500	70,500	68,500	70,500	69,500
360-365 Minutes	69,500	71,500	70,500	70,500	72,500	71,500	69,500	71,500	70,500
365-370 Minutes	70,500	72,500	71,500	71,500	73,500	72,500	70,500	72,500	71,500
370-375 Minutes	71,500	73,500	72,500	72,500	74,500	73,500	71,500	73,500	72,500
375-380 Minutes	72,500	74,500	73,500	73,500	75,500	74,500	72,500	74,500	73,500
380-385 Minutes	73,500	75,500	74,500	74,500	76,500	75,500	73,500	75,500	74,500
385-390 Minutes	74,500	76,500	75,500	75,500	77,500	76,500	74,500	76,500	75,500
390-395 Minutes	75,500	77,500	76,500	76,500	78,500	77,500	75,500	77,500	76,500
395-400 Minutes	76,500	78,500	77,500	77,500	79,500	78,500	76,500	78,500	77,500
400-405 Minutes	77,500	79,500	78,500	78,500	80,500	79,500	77,500	79,500	78,500
405-410 Minutes	78,500	80,500	79,500	79,500	81,500	80,500	78,500	80,500	79,500
410-415 Minutes	79,500	81,500	80,500	80,500	82,500	81,500	79,500	81,500	80,500
415-420 Minutes	80,500	82,500	81,500	81,500	83,500	82,500	80,500	82,500	81,500
420-425 Minutes	81,500	83,500	82,500	82,500	84,500	83,500	81,500	83,500	82,500
425-430 Minutes	82,500	84,500	83,500	83,500	85,500	84,500	82,500	84,500	83,500
430-435 Minutes	83,500	85,500	84,500	84,500	86,500	85,500	83,500	85,500	84,500
435-440 Minutes	84,500	86,500	85,500	85,500	87,500	86,500	84,500	86,500	85,500
440-445 Minutes	85,500	87,500	86,500	86,500	88,500	87,500	85,500	87,500	86,500
445-450 Minutes	86,500	88,500	87,500	87,500	89,500	88,500	86,500	88,500	87,500
450-455 Minutes	87,500	89,500	88,500	88,500	90,500	89,500	87,500	89,500	88,500
455-460 Minutes	88,500	90,500	89,500	89,500	91,500	90,500	88,500	90,500	89,500
460-465 Minutes	89,500	91,500	90,500	90,500	92,500	91,500	89,500	91,500	90,500
465-470 Minutes	90,500	92,500	91,500	91,500	93,500	92,500	90,500	92,500	91,500
470-475 Minutes	91,500	93,500	92,500	92,500	94,500	93,500	91,500	93,500	92,500
475-480 Minutes	92,500	94,500	93,500	93,500	95,500	94,500	92,500	94,500	93,500
480-485 Minutes	93,500	95,500	94,500	94,500	96,500	95,500	93,500	95,500	94,500
485-490 Minutes	94,500	96,500	95,500	95,500	97,500	96,500	94,500	96,500	95,500
490-495 Minutes	95,500	97,500	96,500	96,500	98,500	97,500	95,500	97,500	96,500
495-500 Minutes	96,500	98,500	97,500	97,500	99,500	98,500	96,500	98,500	97,500

► Medic Unit Base Response Times

► Average of All Calls/4 Medic Units.

► Goal is to reduce response times both locally and regionally. (System/vs/Individual Units)

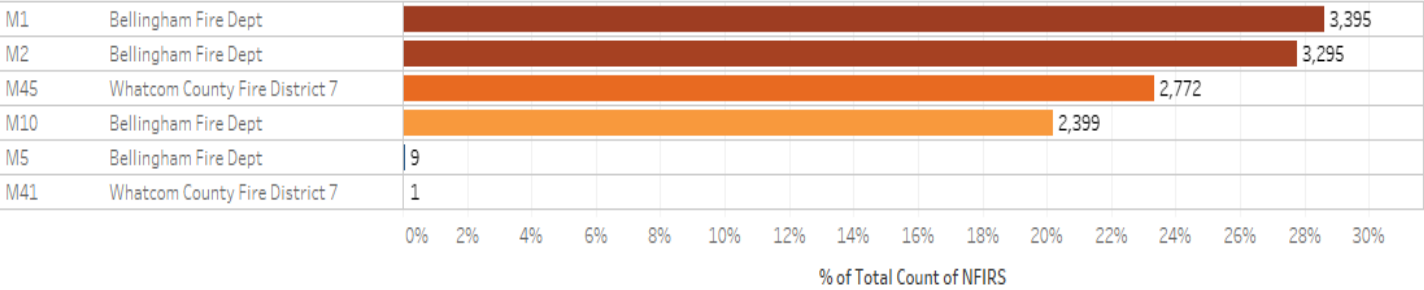
Unit	Response Time (Minutes)
M1	8.09
M2	10.07
M10	19.82
M45	17.84
Average	13.13

Baseline Model

- Call Volume by Medic Unit 2019

Call Volume by Medic Unit 2020

(NFIRS) ALS Unit Runs: 2020



Unit	Calls
M1	3263
M2	3378
M10	2462
M45	2498

Model 1 - Magically Equal Units

- ▶ Modeled to demonstrate a perfect distribution of medic calls.
- ▶ Central location “near” Station 6
- ▶ This is not realistic but demonstrates where Whatcom County is at with regards to medic volume

Unit	Miles Traveled	Hours Committed	Utilization	Calls
M1	43832.38	2025.16	23.12	2342
M10	43618.21	2022.47	23.09	2343
M2	43903.03	2028.16	23.15	2342
M45	44303.45	2037.32	23.26	2342
M5	43694.67	2024.27	23.11	2343

M45 to St 41- Response Time



M45 at St 45 - Baseline Mode Performance

13.13 minute response county wide

17.8 minute average response time for M45



M45 at St41

12.8 Minutes county wide

16.04 minute average response time for M45

Impact Map by Drive Time to Call Density

Model 2 - M5 at St 75

M5 Placed at
St 75

All other
medics left in
place

M45 : St 41
M10 : M10
M1 : St 3
M2 : St 6

Model 2 - M5 at Station 75

Hours and Utilization Details

Unit	Miles Traveled	Hours Committed	% Utilization	Utilization Details
M1	24496.07	1937.88	22.12	3149
M10	26069.54	1119.24	12.78	1160
M2	23815.22	1868.20	21.33	2887
M45	53333.8	2110.93	24.10	2015
M5	45286.38	1661.82	18.97	1585

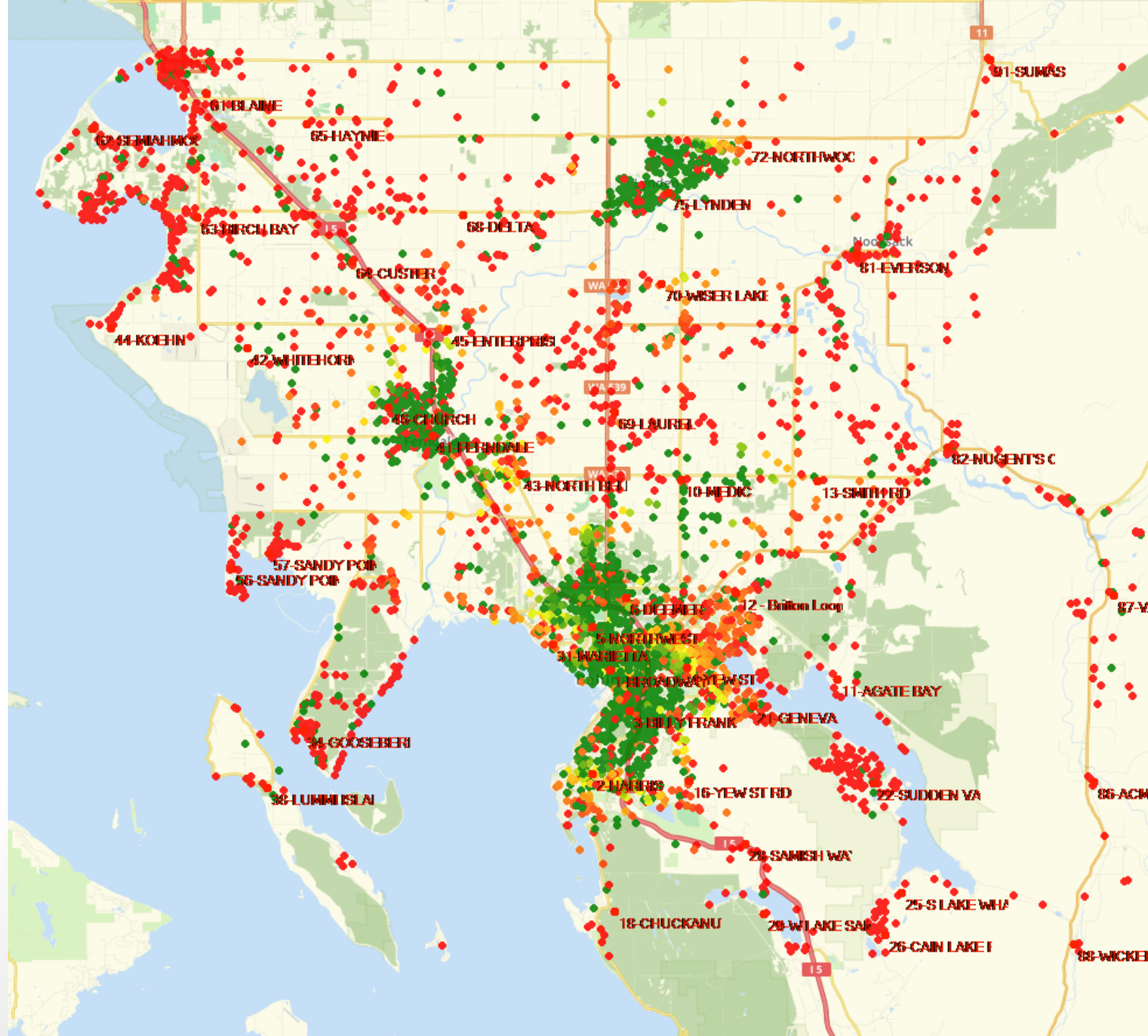
Model 2 Medic 5 at Station 75

Response Time Predictions

Unit	Response Time (Minutes)
M1	7.77
M10	17.33
M2	8.65
M45	15.38
M5	16.21
Average	11.70

M5 at St75

< 08 Min Call Clusters



Model 3 - M5 at St 75. M10 at St 4

M5 at
Station 75

M10 Moved
to Station 4

M1 : St 3
M2 : St 6
M45 : St 41

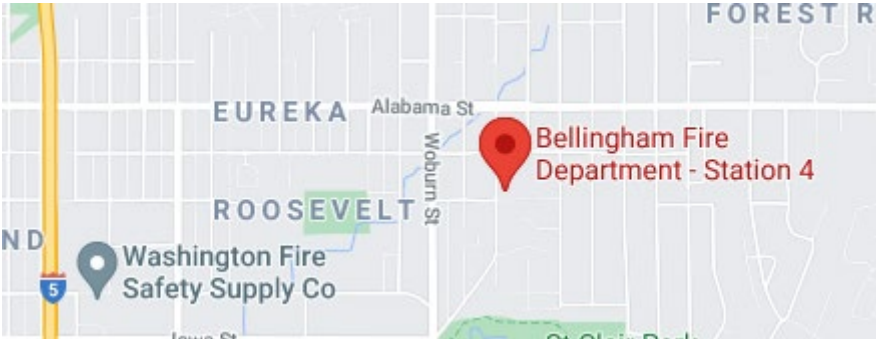
Model 3-Medic 5 at Station 75
Medic 10 at Station 4

Predicted Utilization and Call Volume

Unit	Miles Traveled	Hours Committed	% Utilization	Calls
M1	20253.87	1613.99	18.42	2659
M10	29103.16	1893.12	21.61	2773
M2	24345.42	1667.91	19.04	2423
M45	59073.86	2340.50	26.72	2241
M5	52654.18	1922.55	21.95	1808



2306 Yew Street



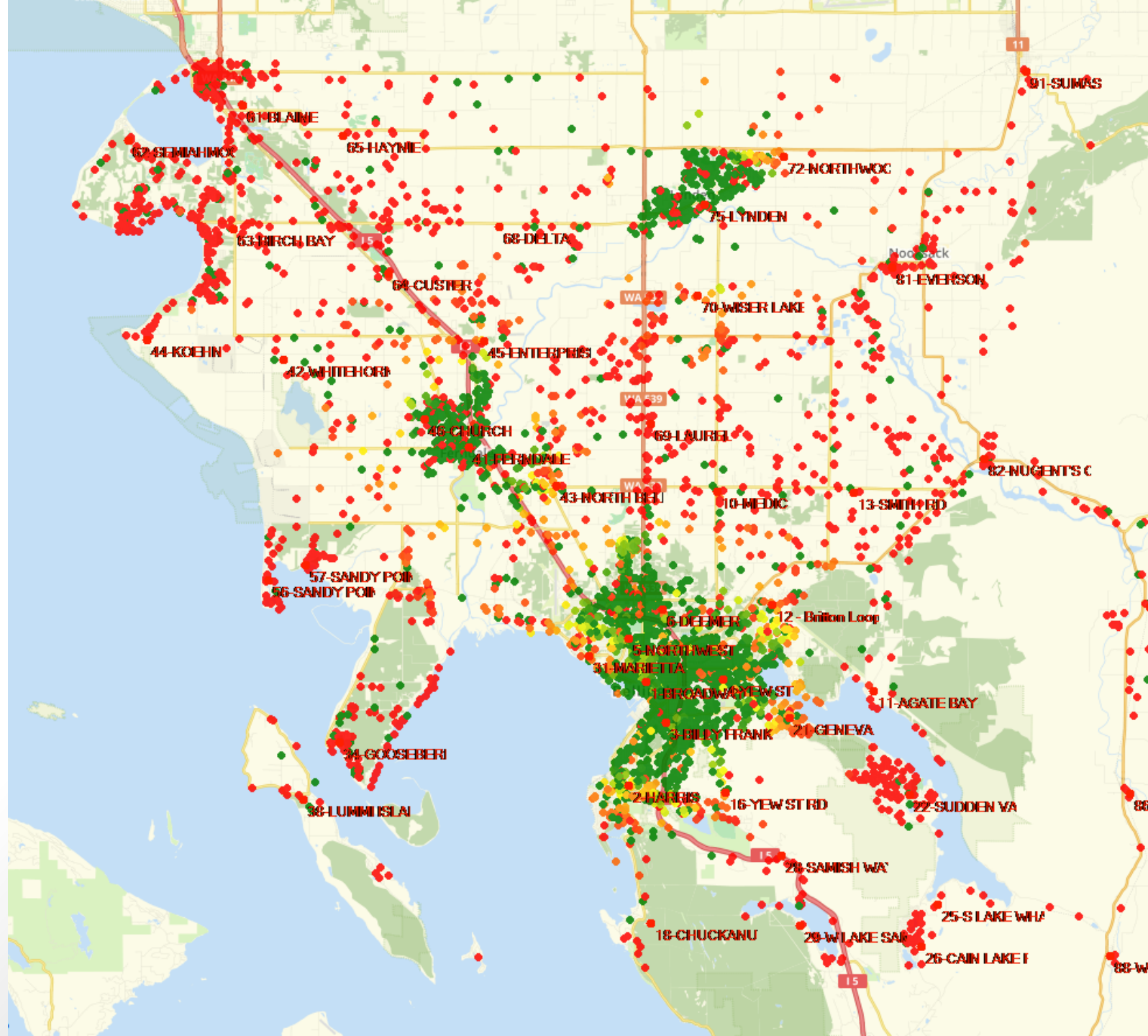
Model 3-Medic 5 at Station 75
Medic 10 at Station 4

Predicted Response Times

Unit	Response Time (Minutes)
M1	7.45
M10	9.98
M2	9.00
M45	15.41
M5	16.98
Totals:	11.30

M5 at St75
M10 at St4

Map



Model 4 - M5 at St 12.

M5 at
Station 12

M1 : St3
M2 : St 6
M10 : M10
M45 : St 41

Medic 5 at Station 12

Predicted Utilization

Unit	Miles Traveled	Hours Committed	% Utilization	Calls
M1	19369.61	1654.50	18.89	2809
M10	59169.66	2221.69	25.36	2099
M2	22349.21	1536.10	17.54	2265
M45	63240.57	2487.53	28.40	2360
M5	30692.19	1762.37	20.12	2366

Medic 5 at Station 12

Predicted Response Times

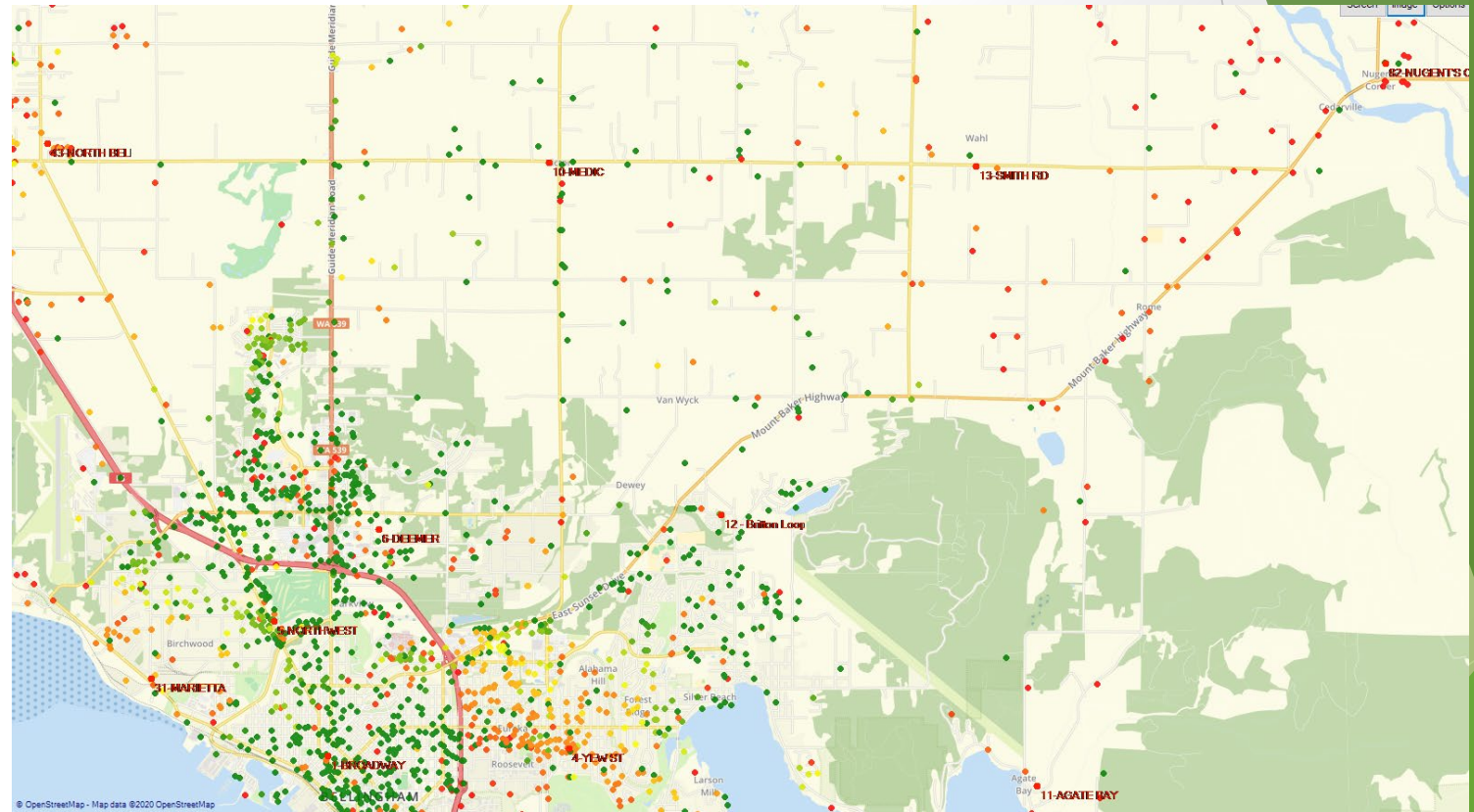
- ▶ M1 : St3
- ▶ M2 : St 6
- ▶ M10 : M10
- ▶ M45 : St 41

Unit	Response time (Minutes)
M1	6.85
M10	20.67
M2	8.60
M45	15.72
M5	12.56
Average	12.51

M5 at Station 12

Predicted Call Clusters

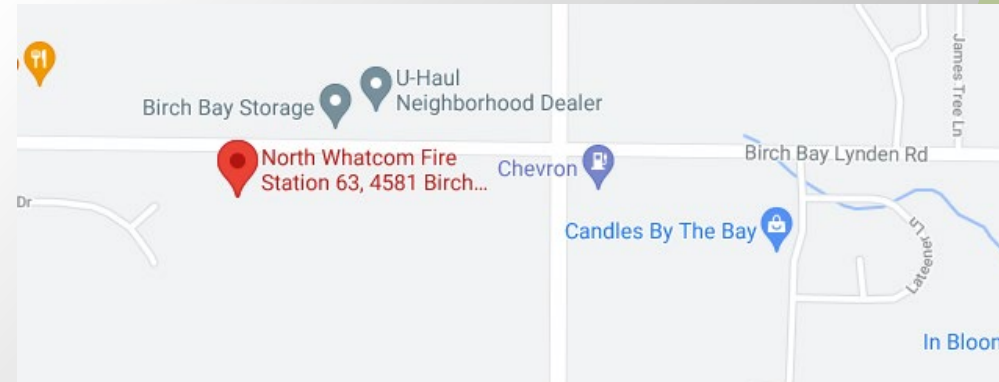
- ▶ M1 : St3
- ▶ M2 : St 6
- ▶ M10 : M10
- ▶ M45 : St 41



Model 6 - M5 at 63

M5 at Station 63

M1 : St 3
M2 : St 6
M10 : M10
M45 : St 41



Medic 5 at Station 63
Predicted Utilization and Call Volume

Unit	Miles Traveled	Hours Committed	% Utilization	Calls
M1	29643.11	2206.52	25.19	3508
M10	54046.48	2138.33	24.41	2122
M2	29873.12	2180.51	24.89	3282
M45	38495.23	1690.11	19.29	1760
M5	38082.38	1393.90	15.91	1200

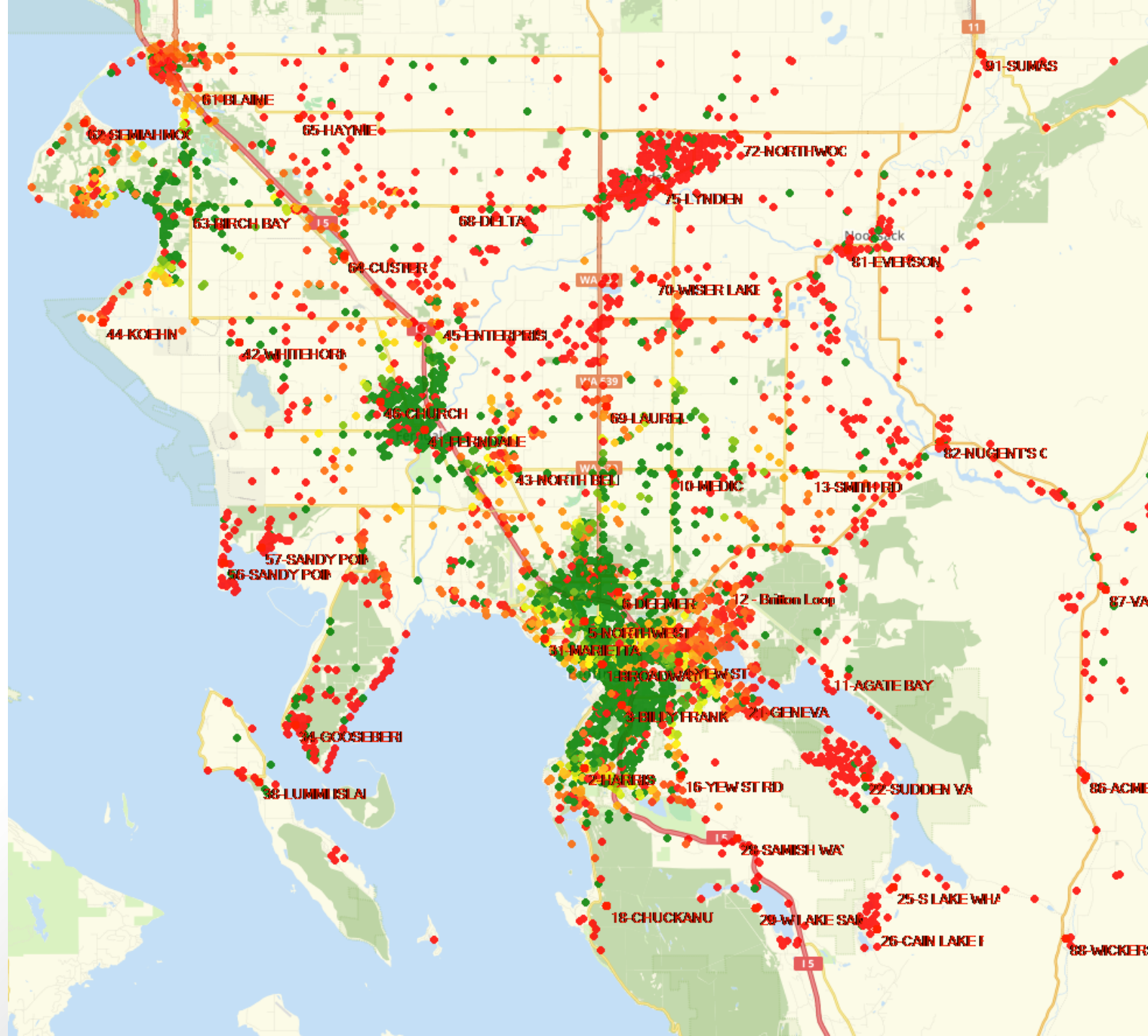
Medic 5 at Station 63
Predicted Response Times

Unit	Response Time (Minutes)
M1	8.28
M10	19.41
M2	9.25
M45	12.68
M5	13.50
Average:	11.72

M5 at St63

Call Clusters

M1 : St 3
M2 : St 6
M10 : St 10
M45 : St 41



Model 5 - M5 at 75. M10 at St 12

M5 at
Station 75

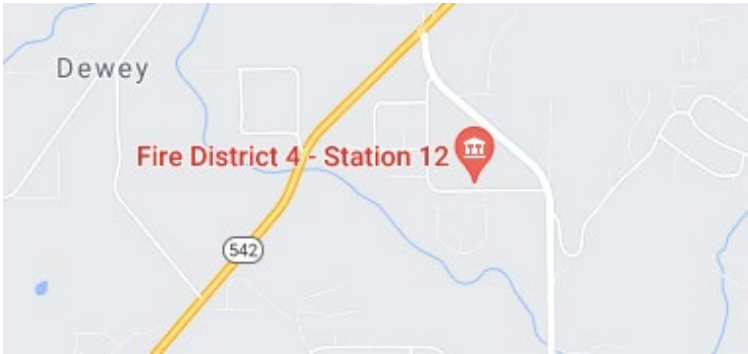
M10 at
Station 12

M1 : St 3
M2 : St 6
M45 : St 41

Medic 5 at Station 75/Medic 10 at Station 12 (Britton Loop Rd.)

Predicted Utilization and Call Volume

Unit	Miles Traveled	Hours Committed	% Utilization	Calls
M1	20692.15	1705.68	19.47	2857
M10	35358.71	1943.86	22.19	2537
M2	24716.01	1678.87	19.17	2440
M45	59406.83	2352.23	26.85	2248
M5	52477.91	1922.76	21.95	1817

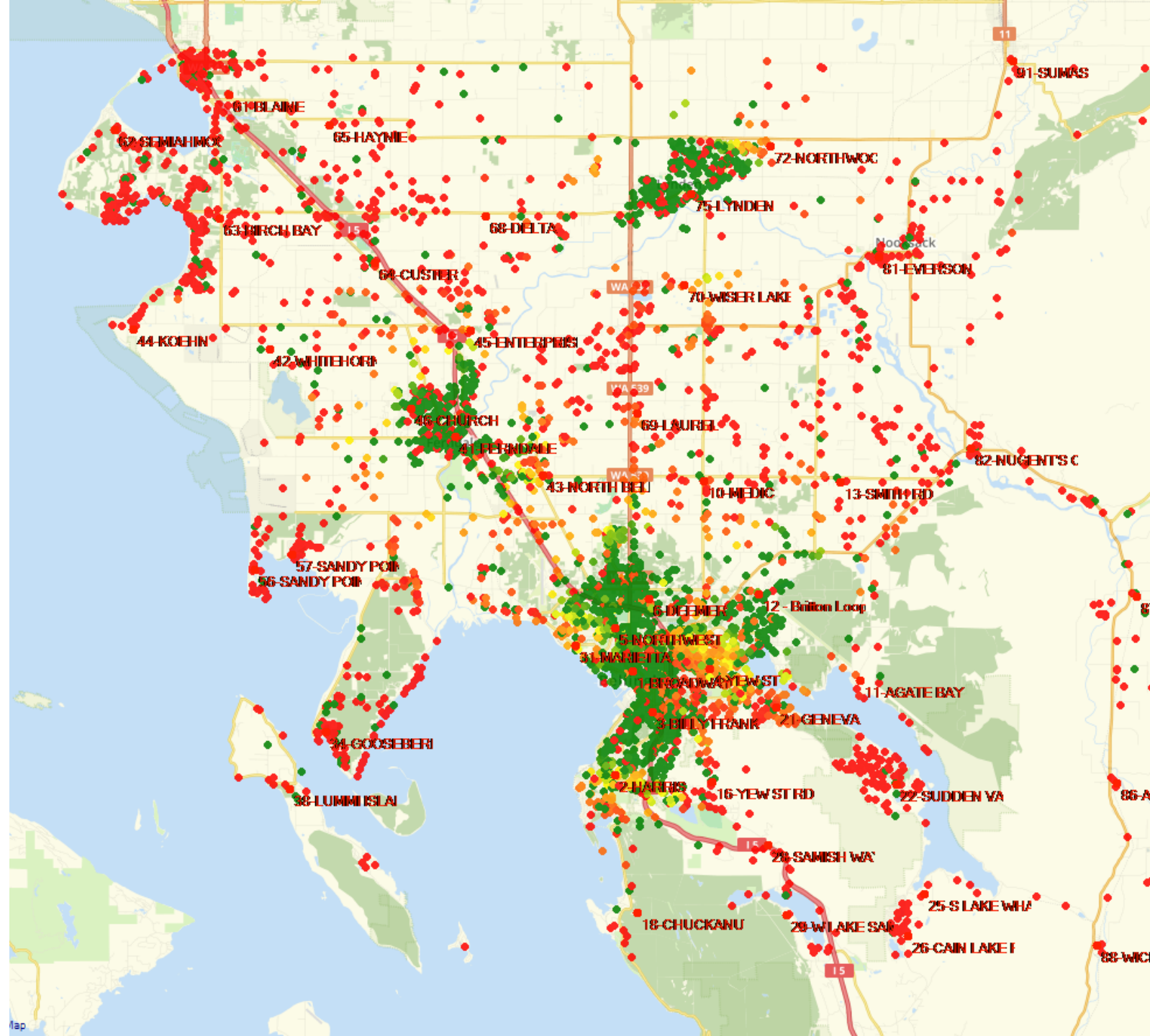


Medic 5 at Station 75/Medic 10 at Station 12 (Britton Loop Rd.)
Predicted Response Times

Unit	Response Time (Minutes)
M1	7.16
M10	13.09
M2	9.06
M45	15.44
M5	16.83
Average:	11.86

Medic 5 at St75
M10 at St12

Call Clusters



EOB Recommendation

- ▶ **Preferred Option 5** - This scenario supports the goal of reducing call volume for M1 and M2 and decreased travel time for Medic 10 when responding to the central Bellingham areas. Medic 10 provides better coverage to the Cordata region and Mt. Baker in the winter from the Britton Loop Station. Medic 45 at Station 46 provides optimal coverage to the Lummi Reservation and will gain call volume where M1 and M2 previously responded. A Medic unit at Station 75 will provide quicker service to the Everson, Sumas and Kendall areas (Peaceful Valley). Call volume for the north unit will be slightly less than other Medic Units however it does create capacity for the reasons noted. This also locates M45 and M10 at a Fire Station with upgrades to living quarters along with other efficiencies. (Consider a 12-Hour Unit)