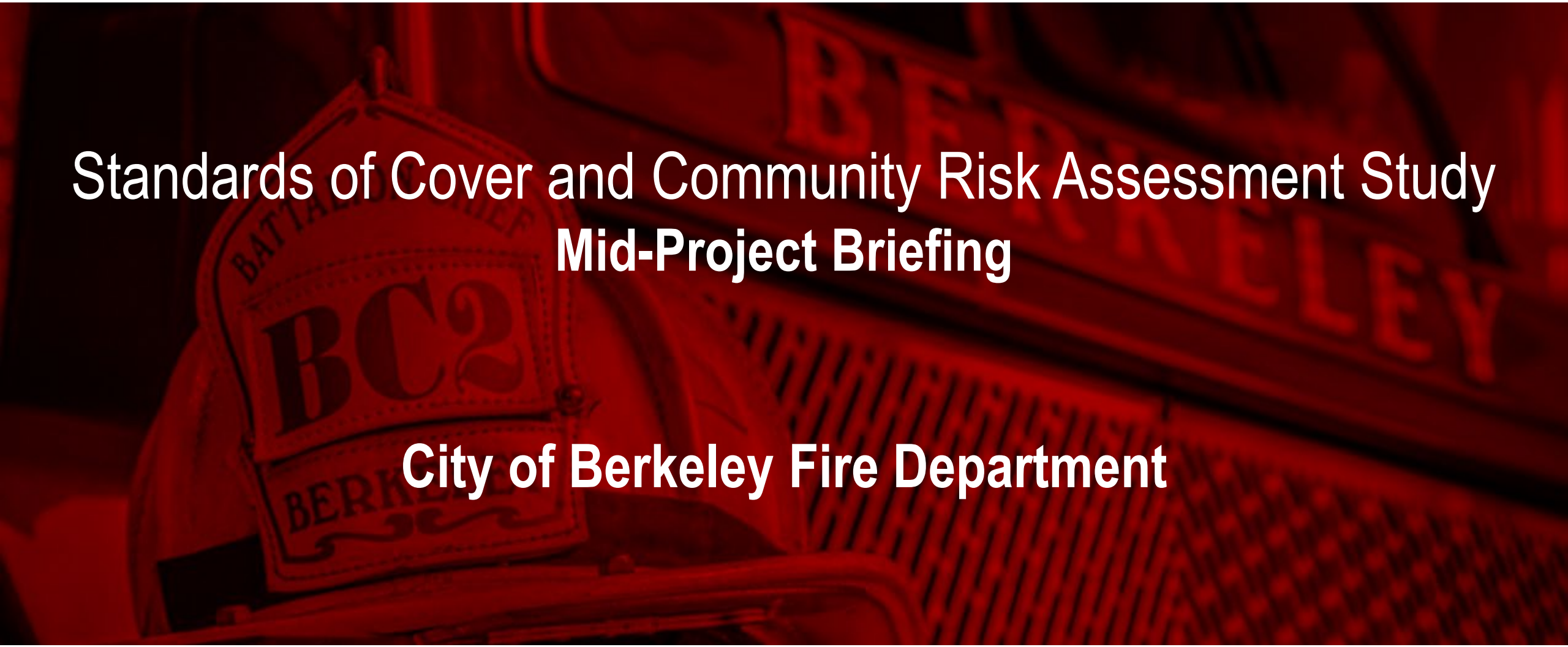


Standards of Cover and Community Risk Assessment Study
Mid-Project Briefing

City of Berkeley Fire Department

April 6, 2022

Today's Briefing

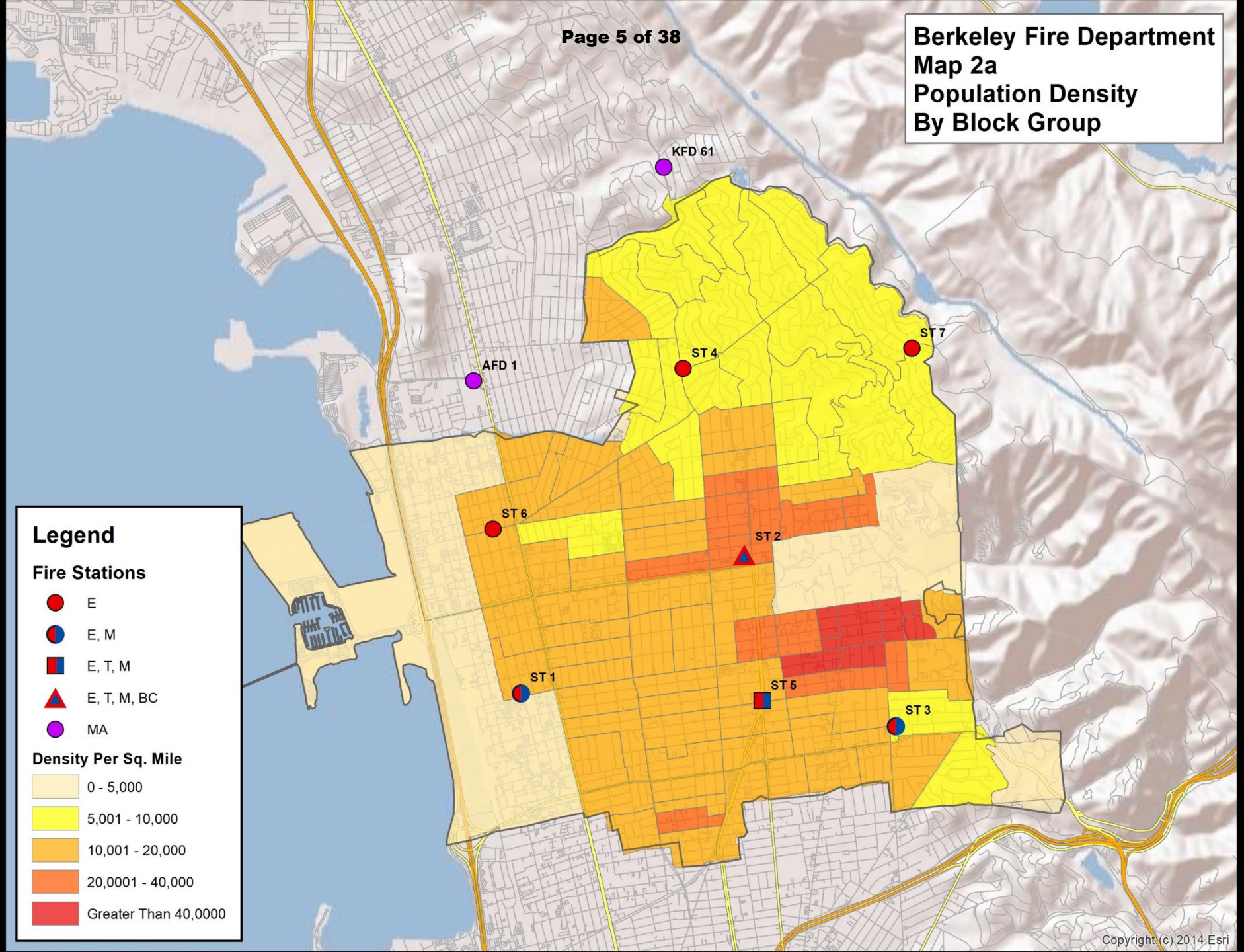
- Understand the analysis work conducted
- Review deployment findings and recommendations
- Questions, public comment, and Council discussion

Risk Assessment

Values at Risk

- **People**
  - Resident population: +/- 119,619
  - Daytime population: +/- 144,863 (+**21**%)
  - 2040 forecast: 141,000 (+**18**%)
- **Buildings**
  - More than 51,000 residential housing units
- **Economic resources**
  - +/- 7,000 businesses
  - +/- 98,000 employees
- Many infrastructure **critical facilities**
- Many **cultural**, **historic**, and **natural** resources

Berkeley Fire Department
Map 2a
Population Density
By Block Group



Risk Assessment Methodology

- Identify/quantify key **values at risk** by fire station area
- Identify **hazards to be evaluated** related to Berkeley services
- Determine **probability** of a hazard occurrence
  - Based on prior service demand by hazard type
- Identify *probable* **impact severity** of a hazard occurrence
- Determine ***overall risk*** by hazard and battalion
  - Based on ***probability of occurrence*** *and* ***impact severity***

Risk Assessment Impact Severity

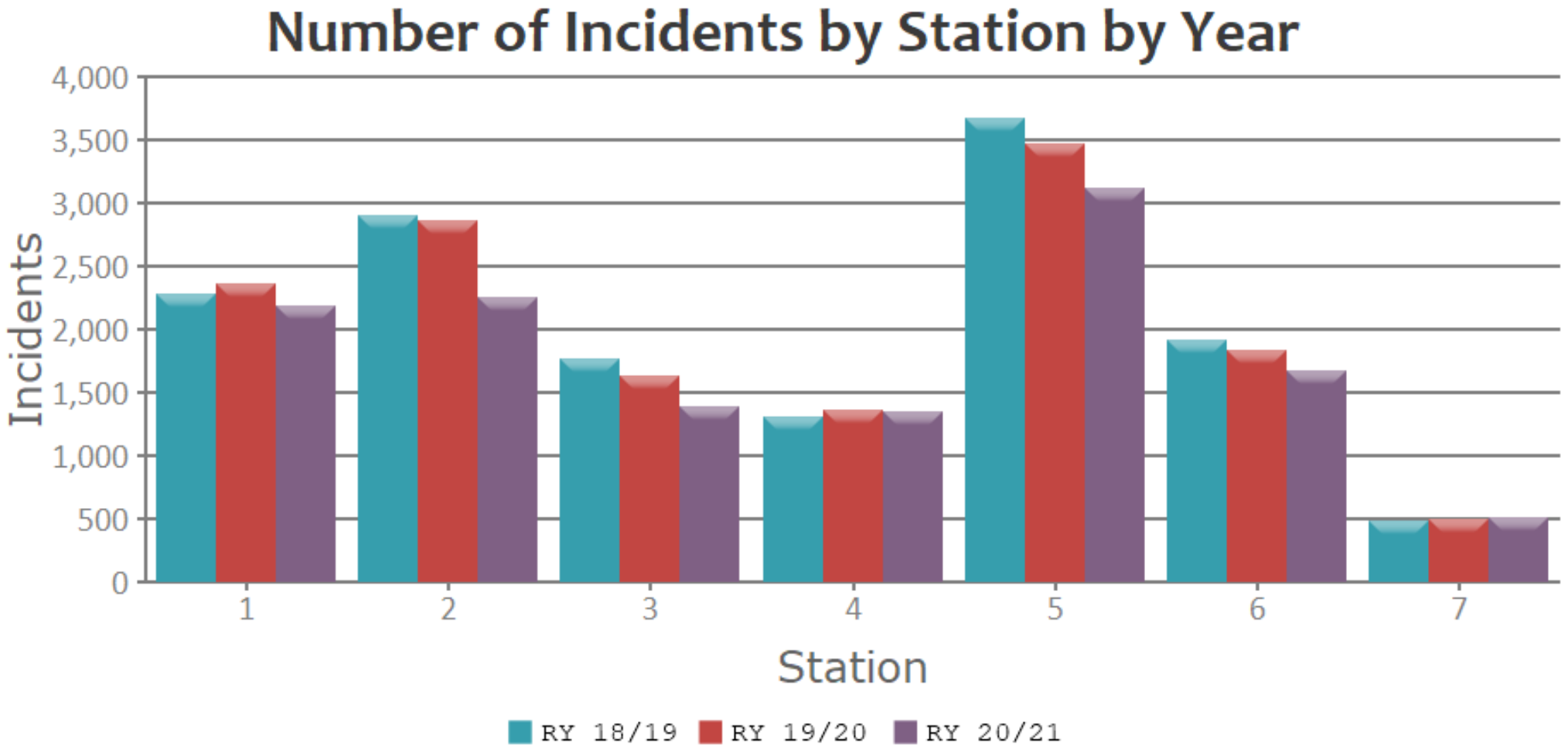
Impact Severity Category	Characteristics
Insignificant	• No injuries or fatalities • No to few persons displaced for short duration • Little or no personal support required • None to inconsequential damage • None to minimal community disruption • No measurable environmental impacts • None to minimal financial loss • No wildland Fire Hazard Severity Zones (FHSZs)
Minor	• Few injuries; no fatalities; minor medical treatment only • Some displacement of persons for less than 24 hours • Some personal support required • Some minor damage • Minor community disruption of short duration • Small environmental impacts with no lasting effects • Minor financial loss • No wildland FHSZs
Moderate	• Medical treatment required; some hospitalizations; few fatalities • Localized displacement of persons for fewer than 24 hours • Personal support satisfied with local resources • Localized damage • Normal community functioning with some inconvenience • No measurable environmental impacts with no long-term effects, or small impacts with long-term effect • Moderate financial loss • Less than 25% of area in *Moderate* or *High* wildland FHSZs
Major	• Extensive injuries; significant hospitalizations; many fatalities • Large number of persons displaced for more than 24 hours • External resources required for personal support • Significant damage • Significant community disruption; some services not available • Some impact to environment with long-term effects • Major financial loss with some financial assistance required • More than 25% of area in *Moderate* or *High* wildland FHSZs; less than 25% in *Very High* wildland FHSZs
Catastrophic	• Large number of severe injuries requiring hospitalization; significant fatalities • General displacement for extended duration • Extensive personal support required • Extensive damage • Community unable to function without significant external support • Significant impact to environment and/or permanent damage • Catastrophic financial loss; unable to function without significant support • More than 50% of area in *High* wildland FHSZs; more than 25% of area in *Very High* wildland FHSZs

Summary Risk Analysis

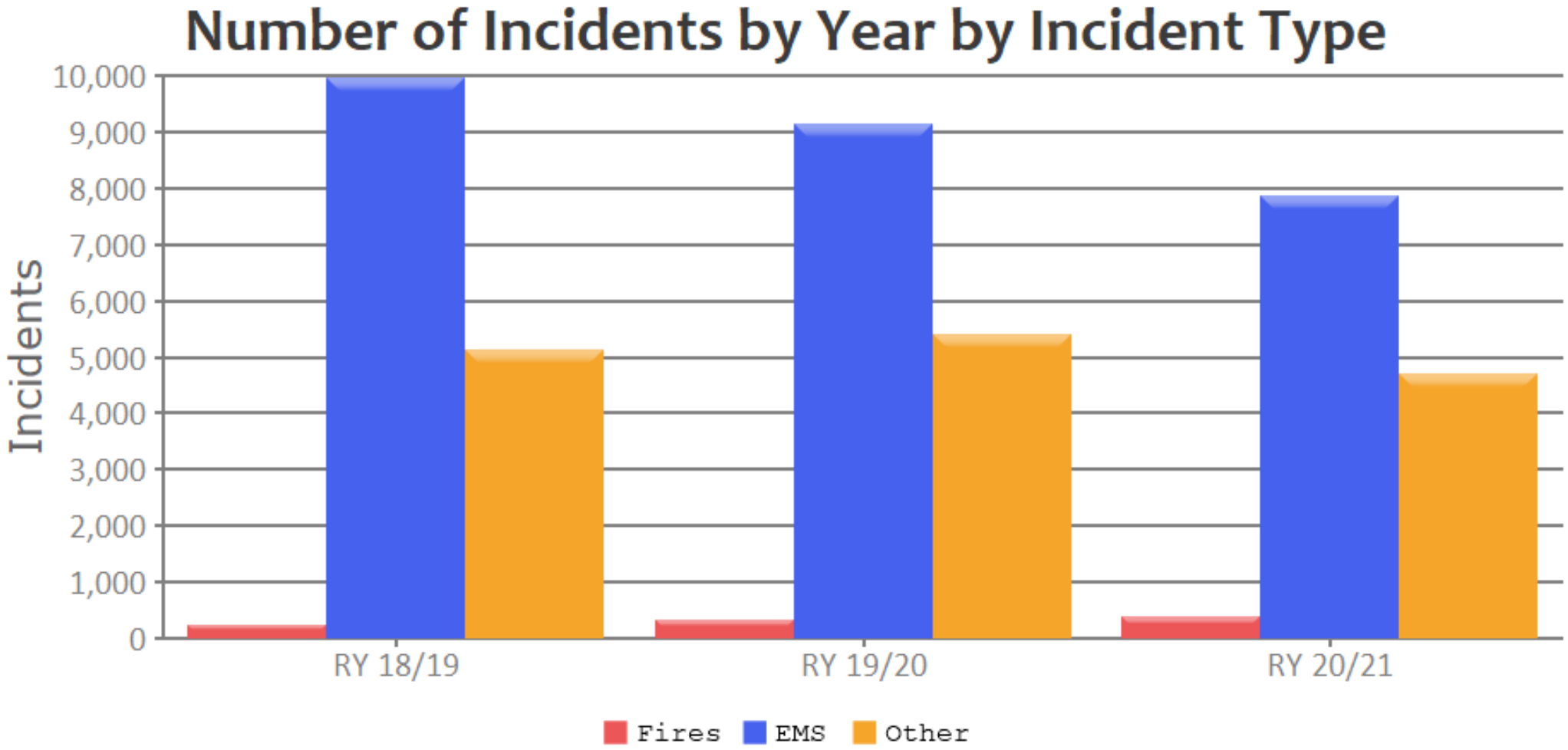
Hazard		Risk Planning Zone						
		Sta. 1	Sta. 2	Sta. 3	Sta. 4	Sta. 5	Sta. 6	Sta. 7
1	Building Fire	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*
2	Vegetation/Wildland Fire	*Low*	*Extreme*	*Extreme*	*Extreme*	*Moderate*	*Low*	*Extreme*
3	Medical Emergency	*High*	*High*	*High*	*High*	*High*	*High*	*High*
4	Hazardous Materials	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*
5	Technical Rescue	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*
6	Marine Incident	*Moderate*	*Low*	*Low*	*Low*	*Low*	*Moderate*	*Low*

Service Demand

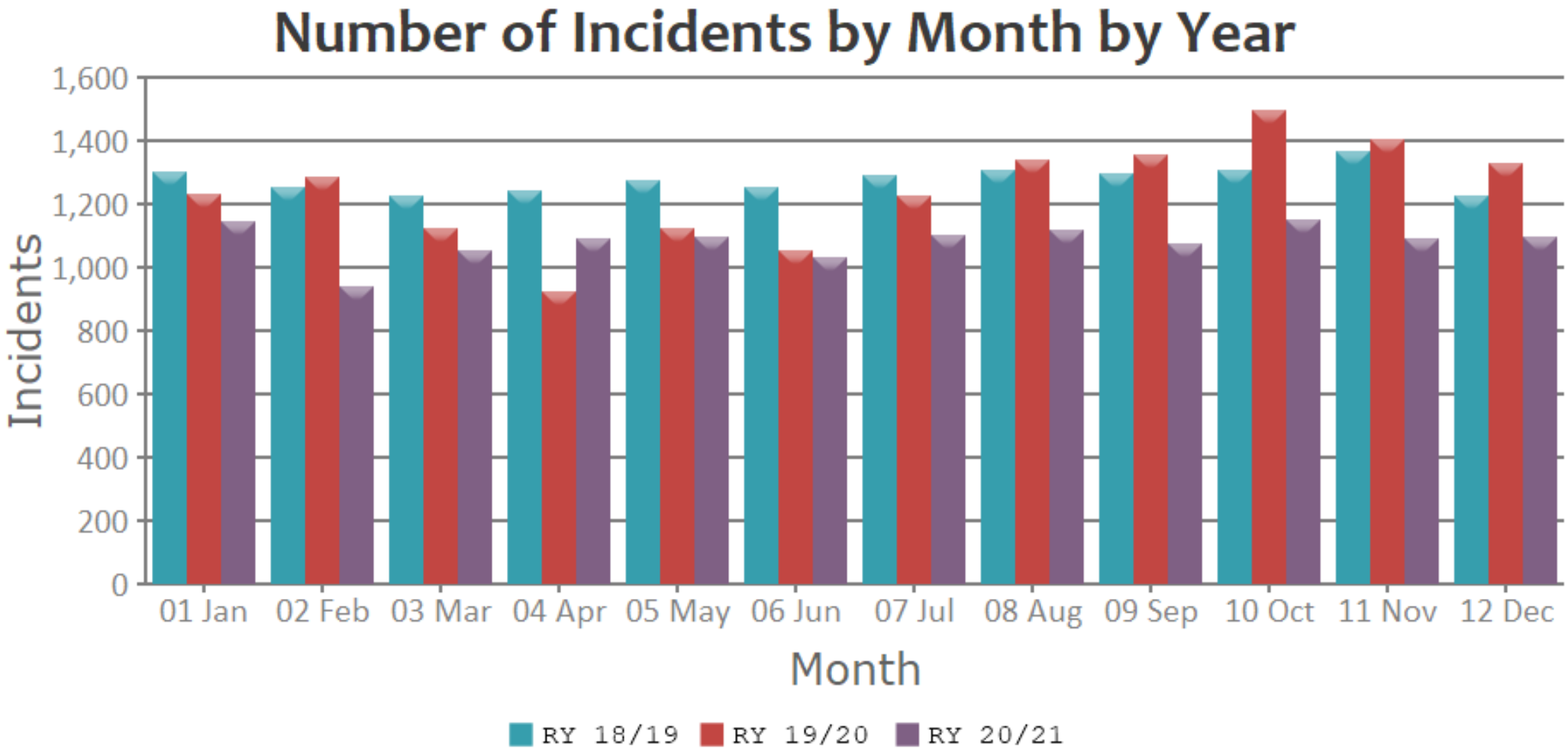
Service Demand by Station by Year



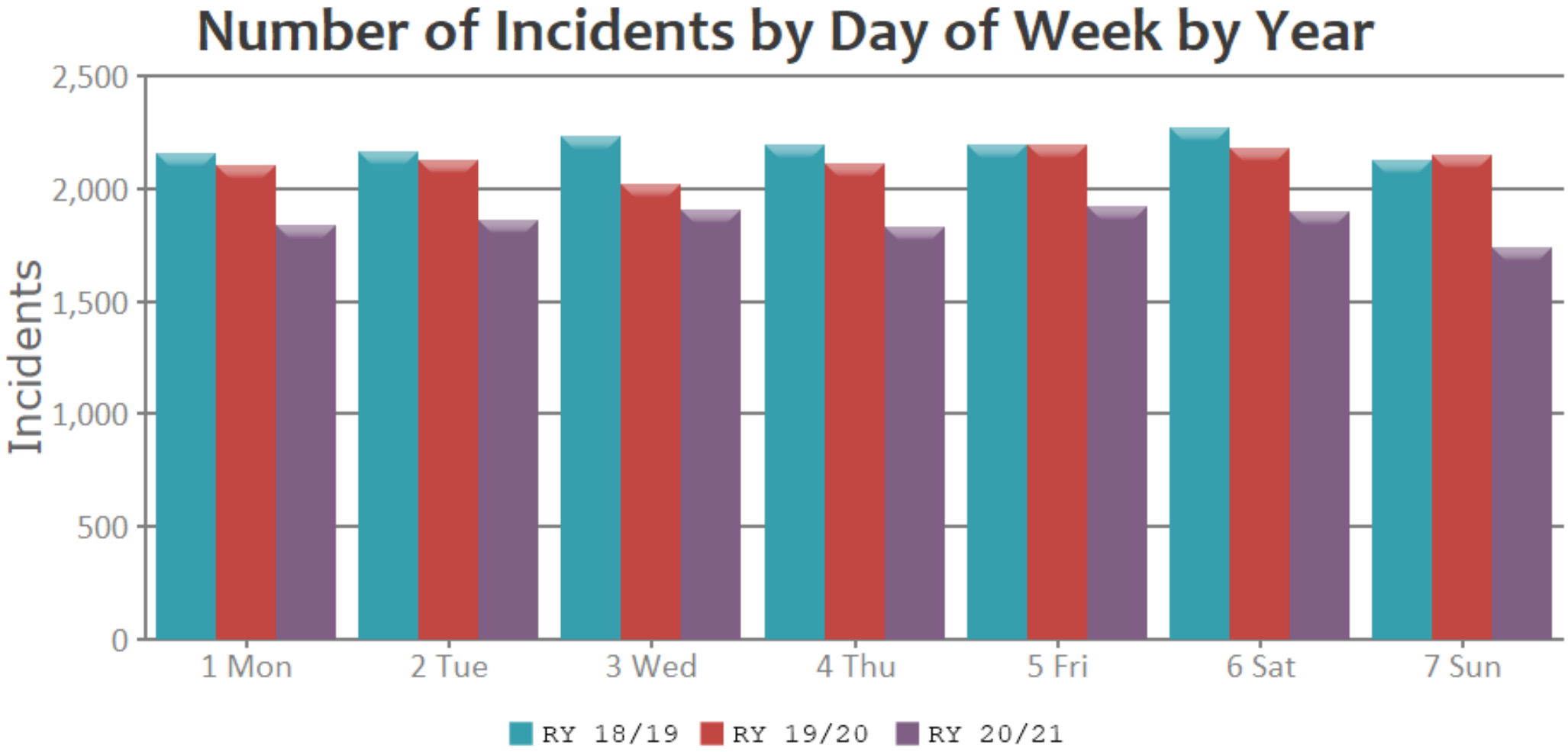
Service Demand by Incident Type



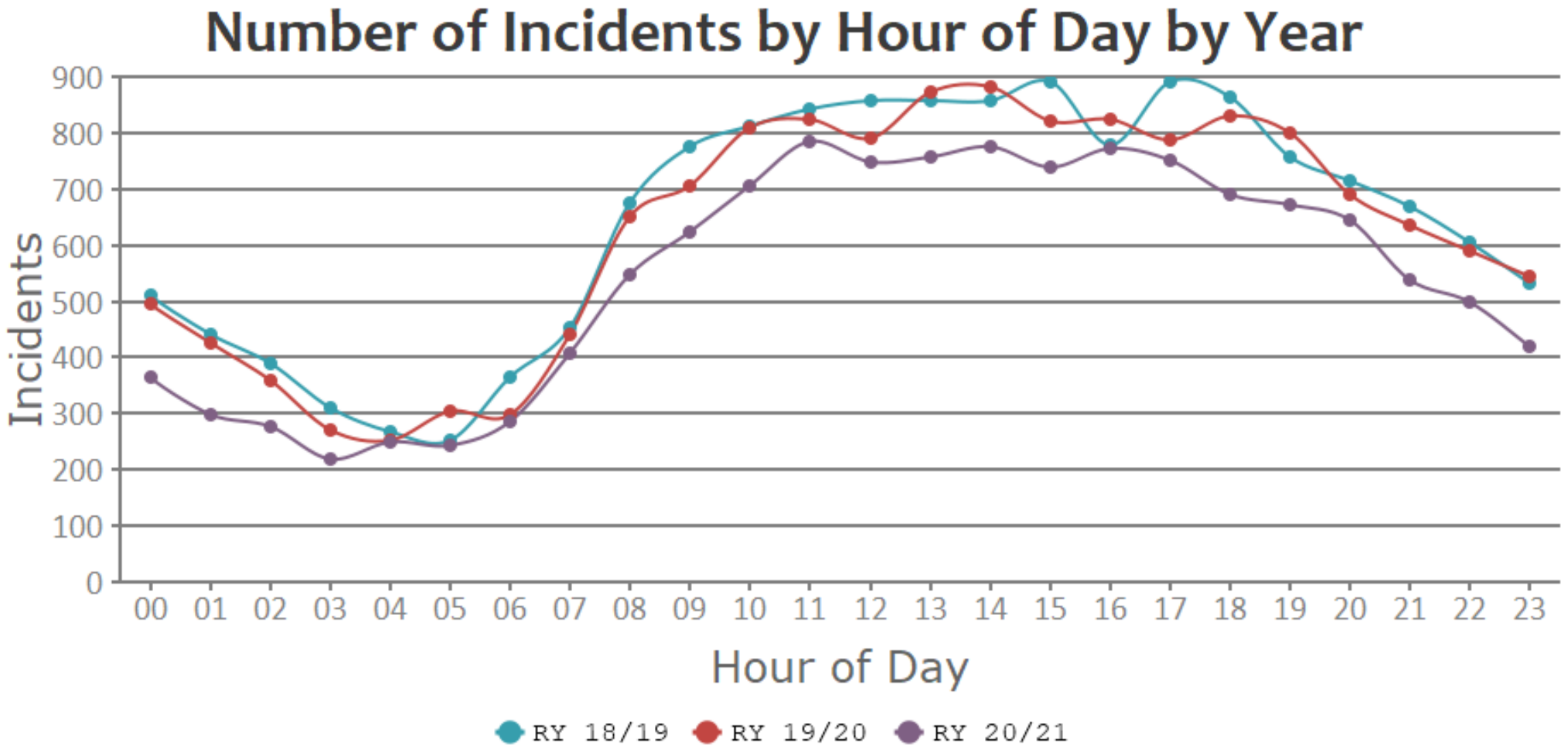
Service Demand by Month



Service Demand by Day of Week



Service Demand by Time of Day



Station Demand by Hour of Day (2020/21)

Hour	Station 5	Station 1	Station 2	Station 6	Station 4	Station 3	Station 7
00:00	21.74%	11.41%	16.63%	7.31%	8.65%	10.09%	0.20%
01:00	28.69%	7.89%	12.51%	11.30%	4.72%	9.36%	3.37%
02:00	16.63%	9.43%	9.42%	11.91%	7.34%	7.92%	1.89%
03:00	12.94%	5.73%	12.75%	6.95%	8.09%	4.70%	2.06%
04:00	11.73%	13.08%	10.10%	10.18%	6.15%	6.81%	1.69%
05:00	18.04%	6.47%	12.14%	4.66%	9.92%	4.62%	2.21%
06:00	10.51%	13.17%	9.45%	14.55%	8.50%	5.18%	2.89%
07:00	26.58%	23.15%	23.63%	13.70%	14.34%	8.93%	6.29%
08:00	31.99%	32.88%	22.55%	16.48%	21.16%	12.99%	8.69%
09:00	50.11%	34.29%	27.28%	20.21%	22.31%	11.88%	4.35%
10:00	51.53%	40.86%	34.06%	20.78%	21.47%	15.59%	8.74%
11:00	58.42%	35.57%	41.15%	30.88%	25.81%	21.49%	6.69%
12:00	49.57%	33.68%	32.07%	26.06%	23.79%	17.48%	5.85%
13:00	51.45%	41.97%	32.32%	23.90%	31.00%	24.68%	5.00%
14:00	51.21%	38.36%	31.16%	30.24%	30.13%	16.52%	10.40%
15:00	42.32%	33.61%	29.72%	29.15%	18.03%	16.48%	6.96%
16:00	52.54%	34.13%	30.53%	27.48%	25.85%	18.63%	10.64%
17:00	41.14%	33.18%	36.27%	21.31%	19.09%	18.21%	8.04%
18:00	32.67%	30.22%	30.25%	22.83%	18.58%	17.90%	10.74%
19:00	34.88%	28.75%	25.35%	26.03%	21.19%	15.74%	8.21%
20:00	26.52%	29.77%	24.02%	20.44%	16.03%	14.12%	7.31%
21:00	33.19%	19.78%	20.77%	17.04%	10.90%	13.61%	6.10%
22:00	26.09%	20.26%	17.93%	12.35%	8.98%	12.54%	4.79%
23:00	17.09%	18.52%	13.91%	17.47%	12.53%	8.43%	3.85%

Unit-Hour Utilization – Engines (2020/21)

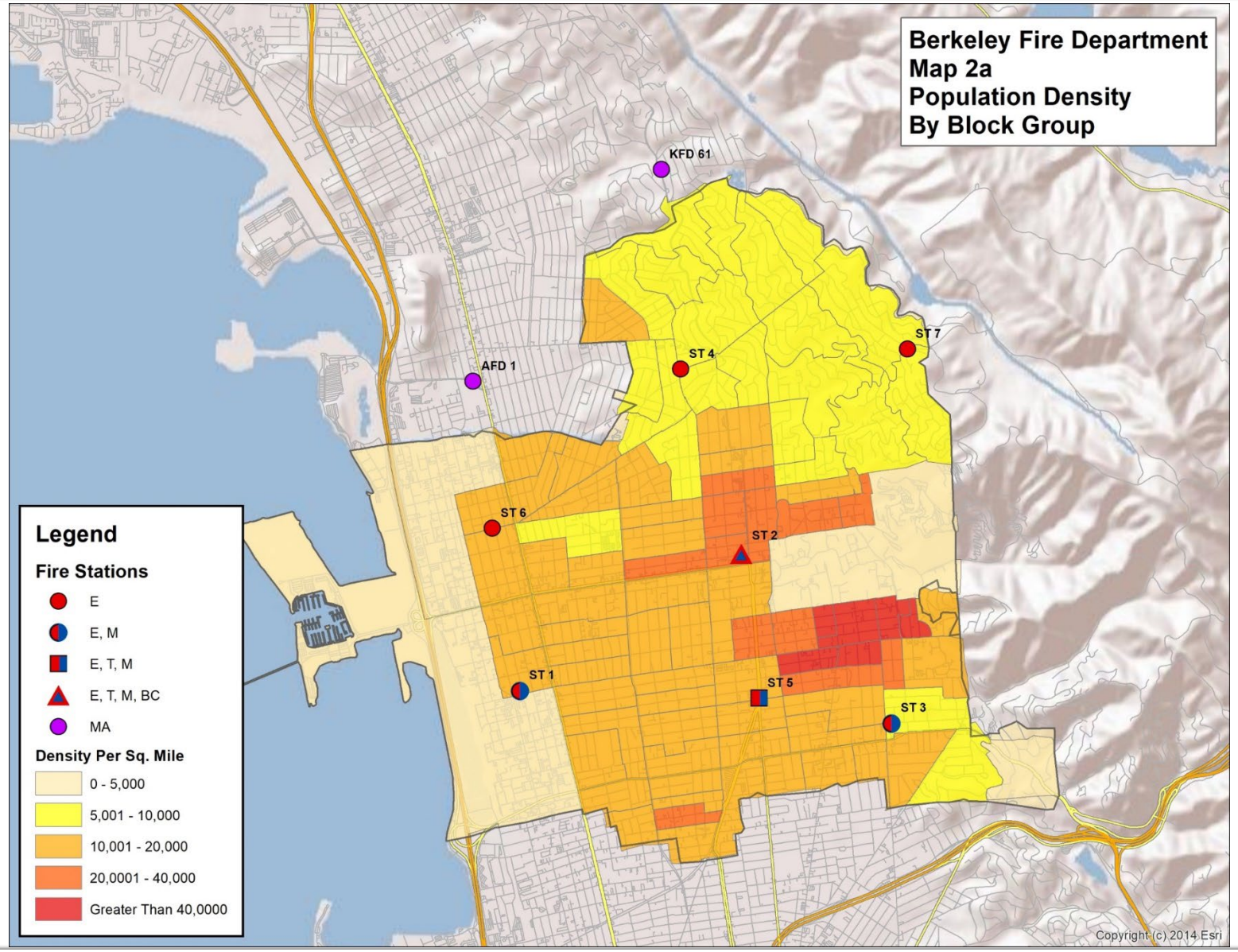
Hour	Engine 5	Engine 1	Engine 2	Engine 6	Engine 4	Engine 3	Engine 7
00:00	23.23%	15.11%	17.16%	9.62%	10.14%	11.33%	0.58%
01:00	25.88%	10.21%	15.51%	11.19%	6.41%	9.09%	3.37%
02:00	18.81%	12.81%	10.79%	11.12%	9.66%	7.74%	3.56%
03:00	13.47%	6.63%	12.40%	6.71%	7.76%	4.40%	2.06%
04:00	11.55%	13.59%	10.26%	10.62%	7.61%	7.62%	1.69%
05:00	15.01%	6.44%	7.62%	3.69%	9.87%	4.93%	2.59%
06:00	11.08%	19.01%	10.05%	9.78%	13.02%	5.63%	3.00%
07:00	25.01%	21.97%	20.84%	18.37%	13.97%	8.97%	6.10%
08:00	30.47%	31.19%	22.80%	20.58%	20.92%	13.10%	5.44%
09:00	38.00%	31.75%	22.75%	28.75%	21.67%	14.57%	5.65%
10:00	41.58%	42.32%	28.32%	23.47%	25.77%	19.88%	11.49%
11:00	52.86%	31.20%	35.07%	41.62%	28.02%	23.70%	7.28%
12:00	49.05%	28.41%	31.70%	34.37%	20.78%	18.56%	9.29%
13:00	53.48%	43.37%	30.66%	31.32%	31.70%	29.91%	7.95%
14:00	45.24%	43.90%	39.12%	34.42%	36.53%	25.40%	15.68%
15:00	38.09%	38.93%	32.49%	31.93%	20.30%	18.31%	7.38%
16:00	47.27%	34.35%	34.50%	28.96%	22.18%	20.99%	12.14%
17:00	44.46%	33.94%	34.26%	22.25%	22.90%	20.69%	8.62%
18:00	32.84%	31.45%	30.75%	22.85%	23.40%	20.74%	11.46%
19:00	29.80%	30.92%	25.06%	29.59%	21.39%	18.51%	10.09%
20:00	25.59%	32.76%	23.66%	24.96%	20.72%	15.76%	9.20%
21:00	29.23%	20.37%	20.49%	18.23%	12.64%	12.76%	6.77%
22:00	26.99%	21.79%	16.67%	12.63%	9.51%	12.90%	4.69%
23:00	19.81%	24.27%	15.45%	21.47%	16.11%	8.64%	3.85%

Unit-Hour Utilization – Ladder Trucks (2020/21)

Hour	Truck 5	Truck 2
00:00	6.87%	5.07%
01:00	4.84%	4.42%
02:00	4.63%	3.45%
03:00	1.68%	1.41%
04:00	3.10%	3.53%
05:00	1.95%	2.76%
06:00	4.25%	6.36%
07:00	3.96%	7.08%
08:00	7.73%	11.87%
09:00	20.38%	14.38%
10:00	24.35%	18.19%
11:00	26.10%	15.98%
12:00	14.58%	13.39%
13:00	23.15%	20.47%
14:00	20.43%	13.91%
15:00	16.57%	12.32%
16:00	22.90%	13.25%
17:00	24.16%	12.88%
18:00	14.36%	13.44%
19:00	11.24%	8.43%
20:00	9.11%	11.14%
21:00	6.00%	6.70%
22:00	6.74%	7.34%
23:00	4.05%	8.37%

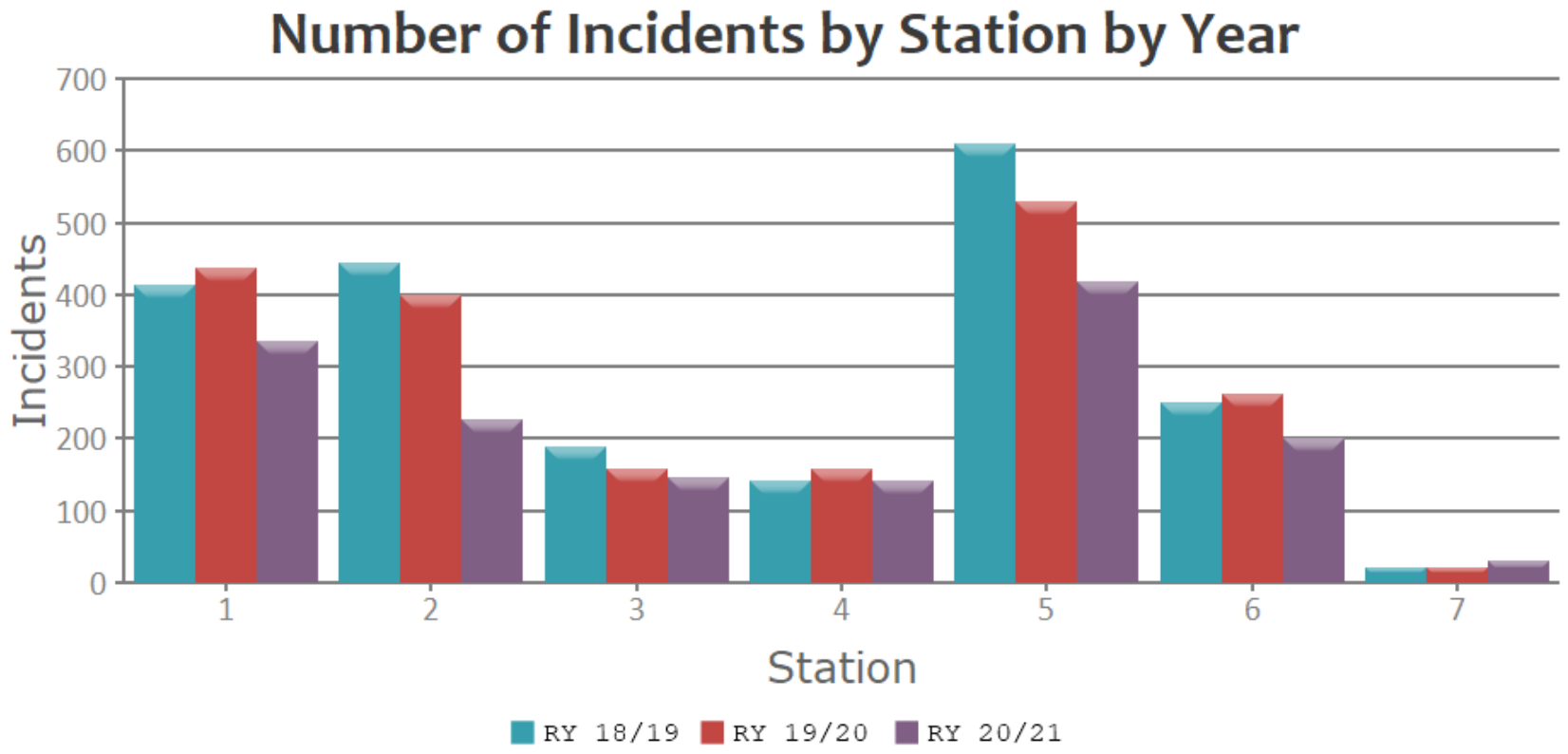
Unit-Hour Utilization – Ambulances (2020/21)

Hour	M5	M2	M1	M3
00:00	22.87%	17.48%	12.56%	9.32%
01:00	22.85%	15.75%	19.46%	9.27%
02:00	17.34%	16.40%	17.53%	7.35%
03:00	13.61%	16.98%	10.92%	4.04%
04:00	8.71%	14.86%	18.86%	6.86%
05:00	13.06%	14.24%	8.26%	3.46%
06:00	8.95%	13.17%	16.14%	2.94%
07:00	25.50%	34.83%	33.70%	12.56%
08:00	48.33%	29.77%	33.16%	15.43%
09:00	44.71%	39.61%	38.97%	27.70%
10:00	48.82%	45.75%	42.94%	33.54%
11:00	51.40%	60.08%	41.92%	34.01%
12:00	49.60%	55.48%	42.34%	27.61%
13:00	51.46%	44.70%	54.43%	42.82%
14:00	65.37%	47.39%	56.38%	36.85%
15:00	45.36%	37.26%	52.01%	28.99%
16:00	52.28%	54.10%	44.79%	36.74%
17:00	41.93%	46.57%	42.89%	27.86%
18:00	48.24%	46.87%	35.45%	25.95%
19:00	31.61%	34.82%	42.09%	19.44%
20:00	30.19%	34.40%	38.01%	15.91%
21:00	22.49%	30.65%	26.78%	17.02%
22:00	26.16%	22.41%	23.65%	11.37%
23:00	21.09%	26.63%	25.70%	6.88%



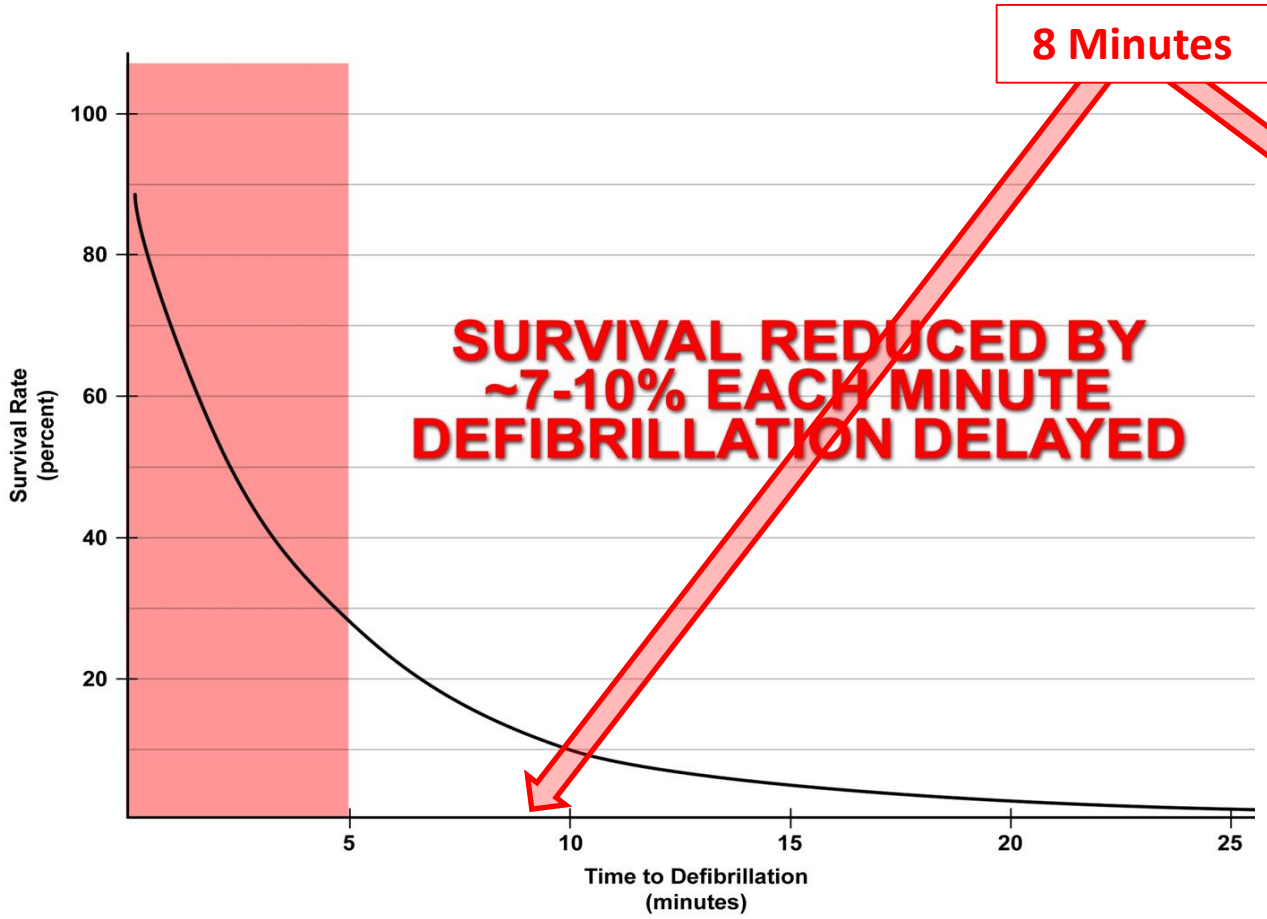
Simultaneous Incident Activity

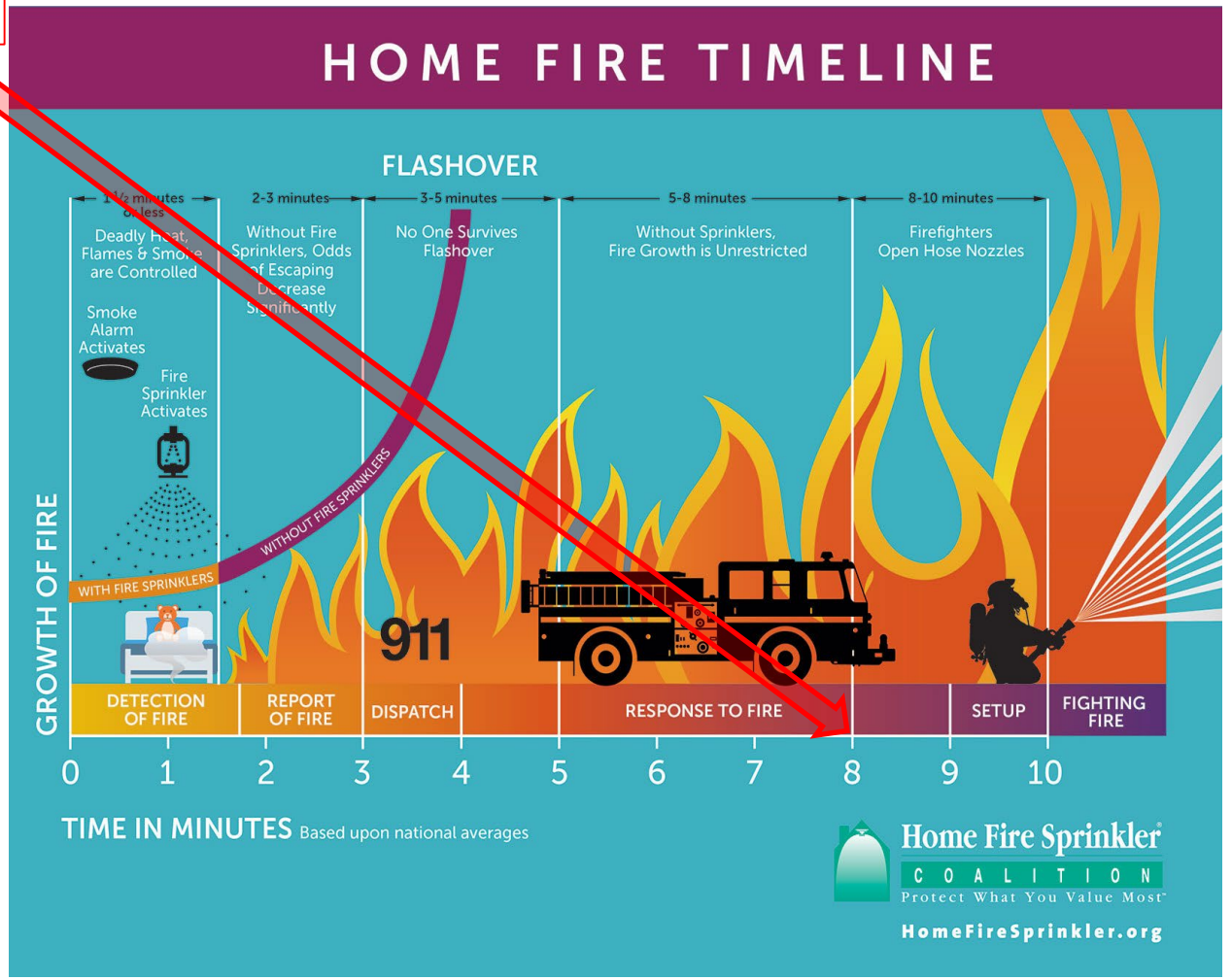
- 2 or more simultaneous incidents: **77.31%**
- 3 or more simultaneous incidents: **47.18%**
- 4 or more simultaneous incidents: **23.49%**



Response Time Performance

Emergency Timeline Targets





Response Performance to Fire/EMS Calls (2020/21)

Response Component	Best Practice		90th Percentile Performance	Time Difference
	Time	Reference		
Call Processing / Dispatch	1:30	NFPA	**2:29***	**+ 0:59**
Crew Turnout	2:00	Citygate	**2:05**	**+ 0:05**
First-Due Travel	4:00	NFPA Citygate	**5:53**	**+ 1:53**
First Unit Call to Arrival	7:30	Citygate	**9:32**	**+ 2:02**
1st Alarm Travel	8:00	NFPA Citygate	**15:24**	**+ 7:24**
1st Alarm Call to Arrival	11:30	Citygate	**17:28**	**+ 5:58**

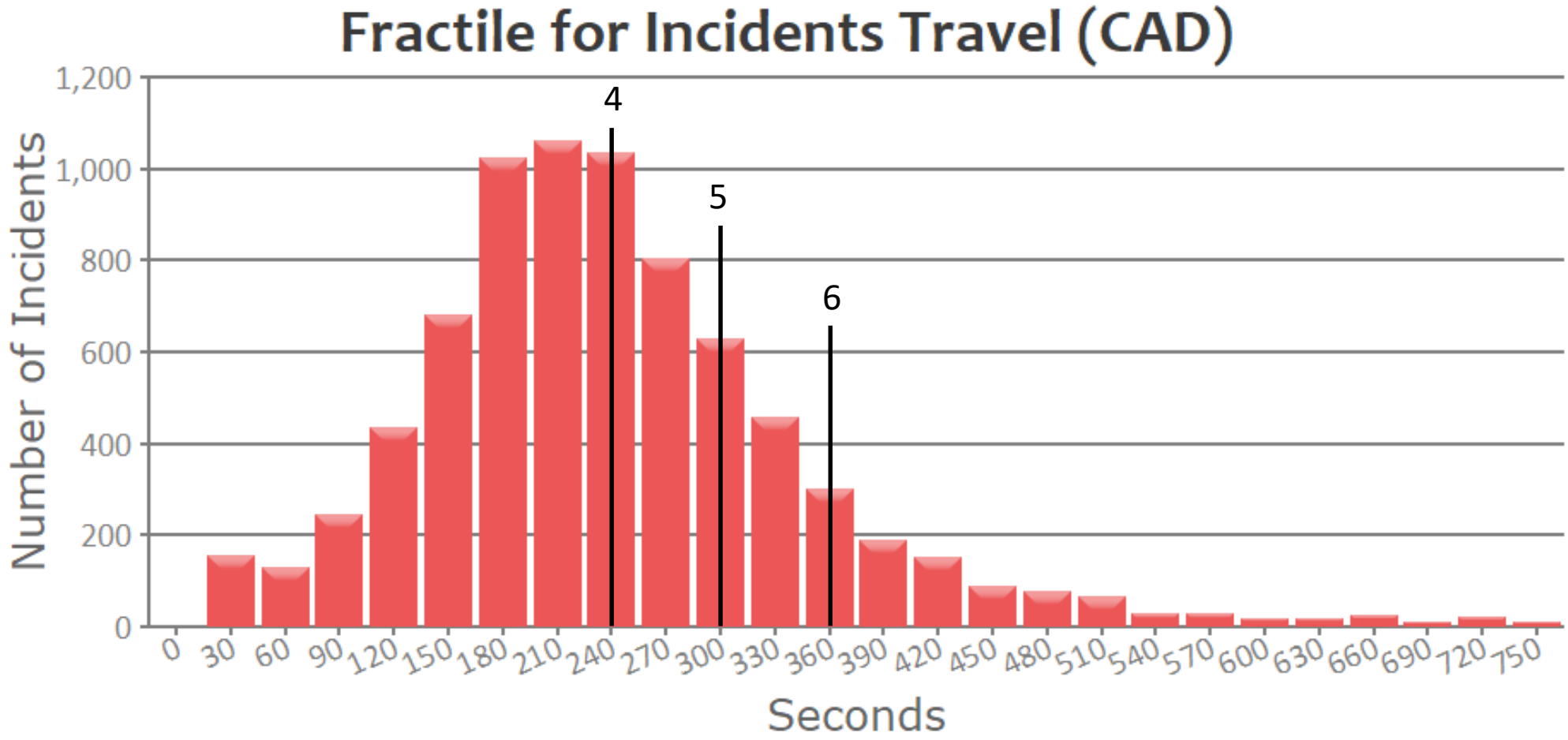
** Dispatch time **does not include** 9-1-1 call answered to first data entry keystroke*

Travel Time at 90% to Fire/EMS Calls

Station	RY 20/21
Department-Wide	**5:53**
Station 1	6:19
Station 2	5:13
Station 3	5:23
Station 4	6:51
Station 5	5:09
Station 6	6:18
Station 7	8:05

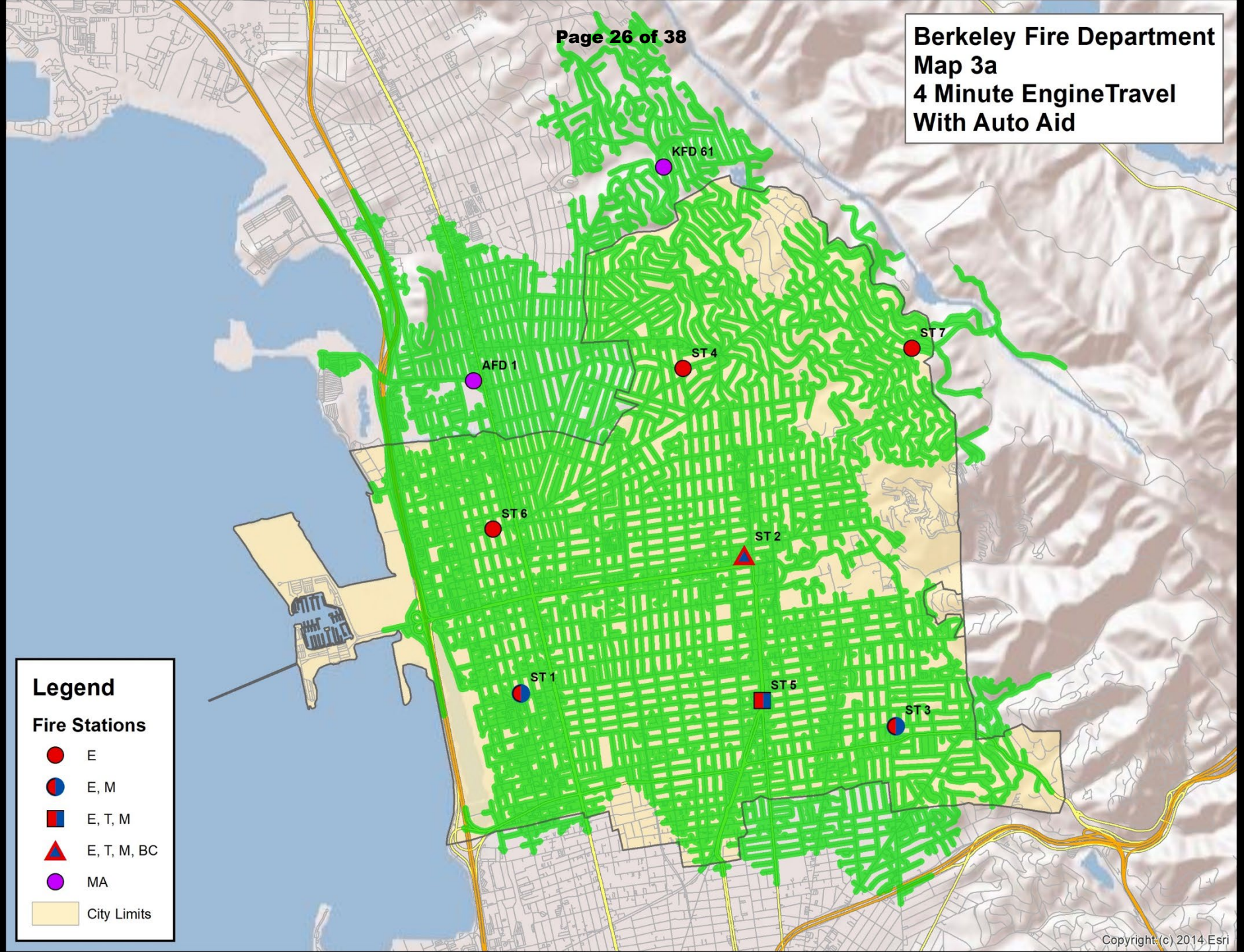
Best practice is **4:00** minutes

Travel Time by Minute at 90% to Fire/EMS Calls

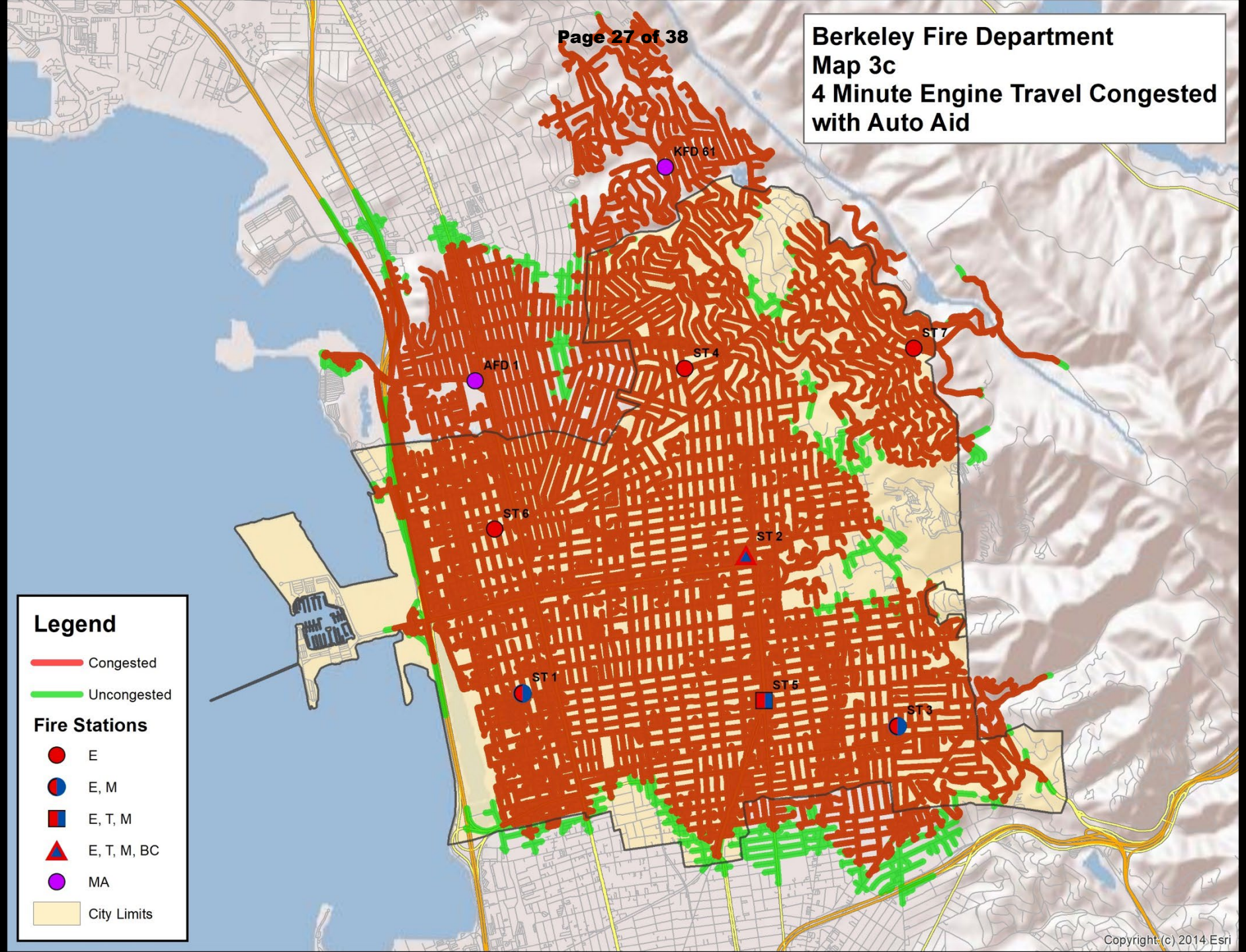


Geographic Coverage Analysis

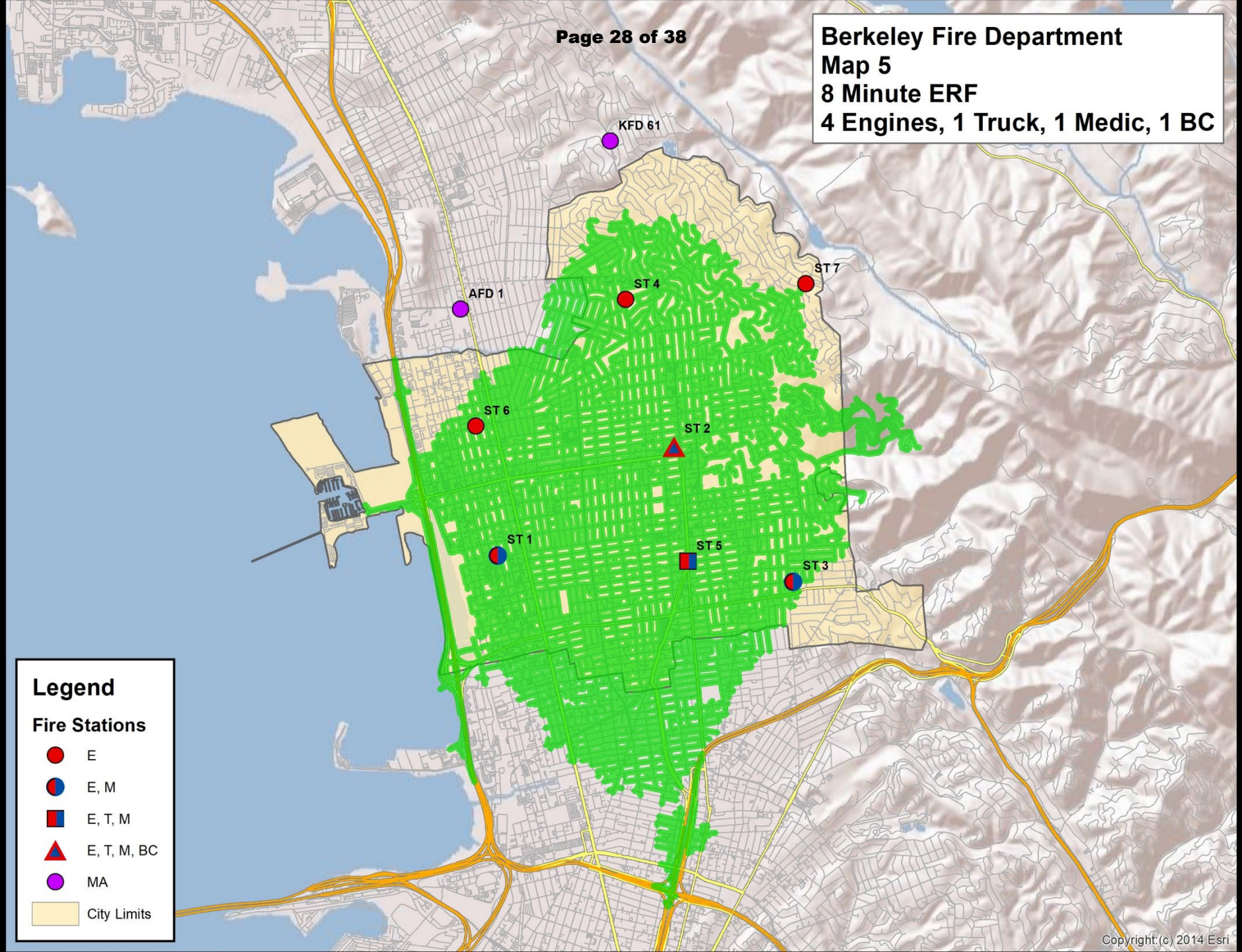
Berkeley Fire Department
Map 3a
4 Minute EngineTravel
With Auto Aid

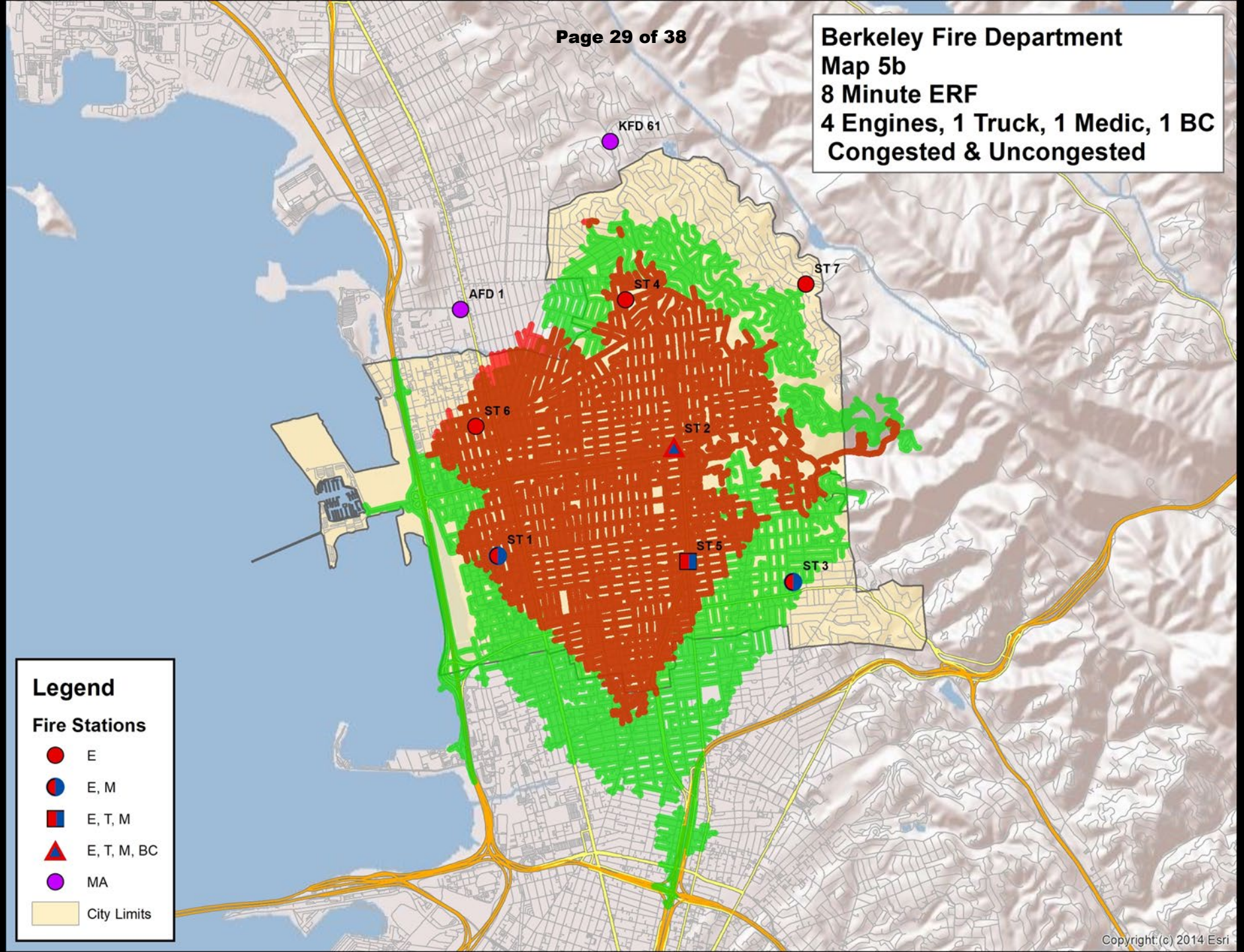


Berkeley Fire Department
Map 3c
4 Minute Engine Travel Congested with Auto Aid

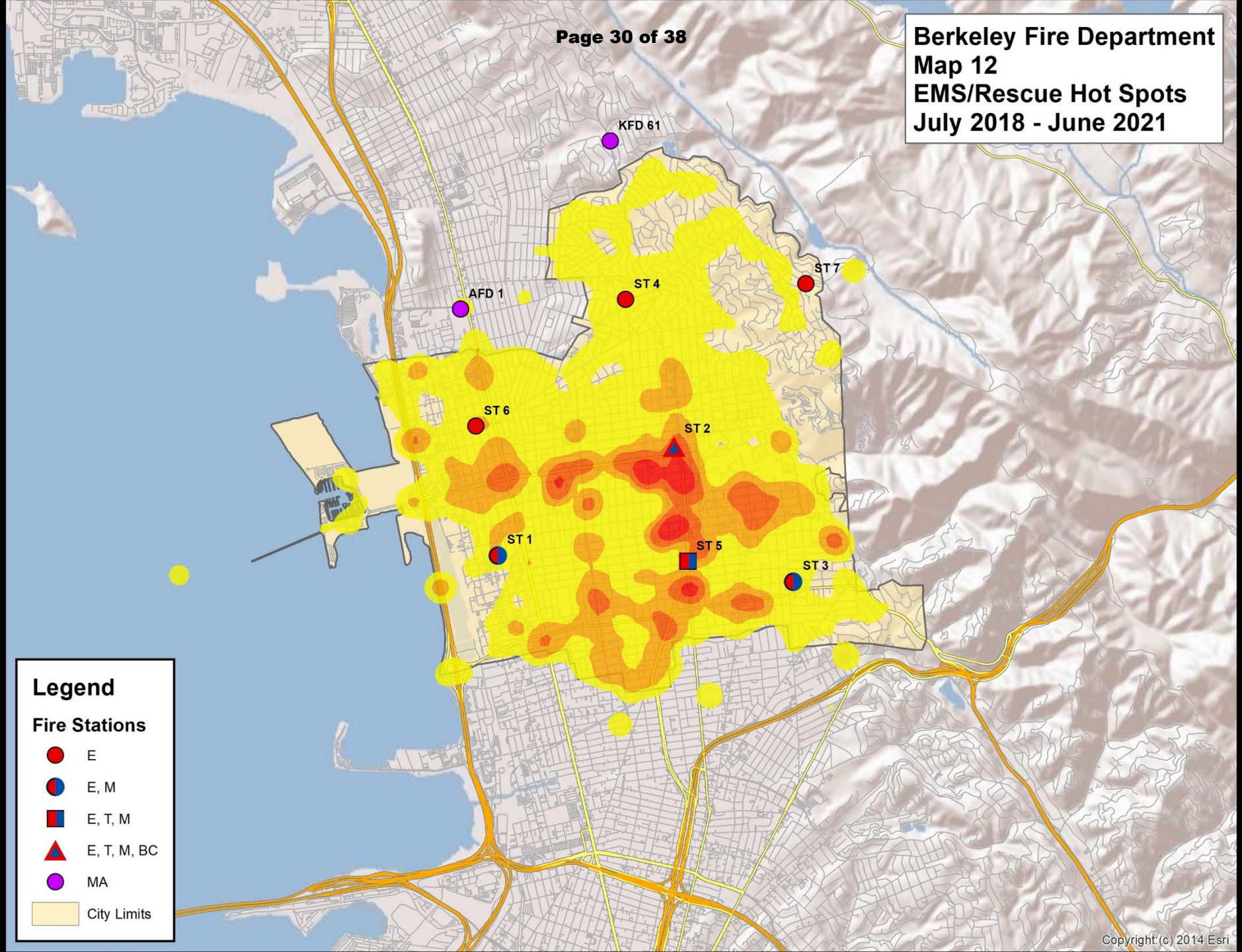


Berkeley Fire Department
Map 5
8 Minute ERF
4 Engines, 1 Truck, 1 Medic, 1 BC

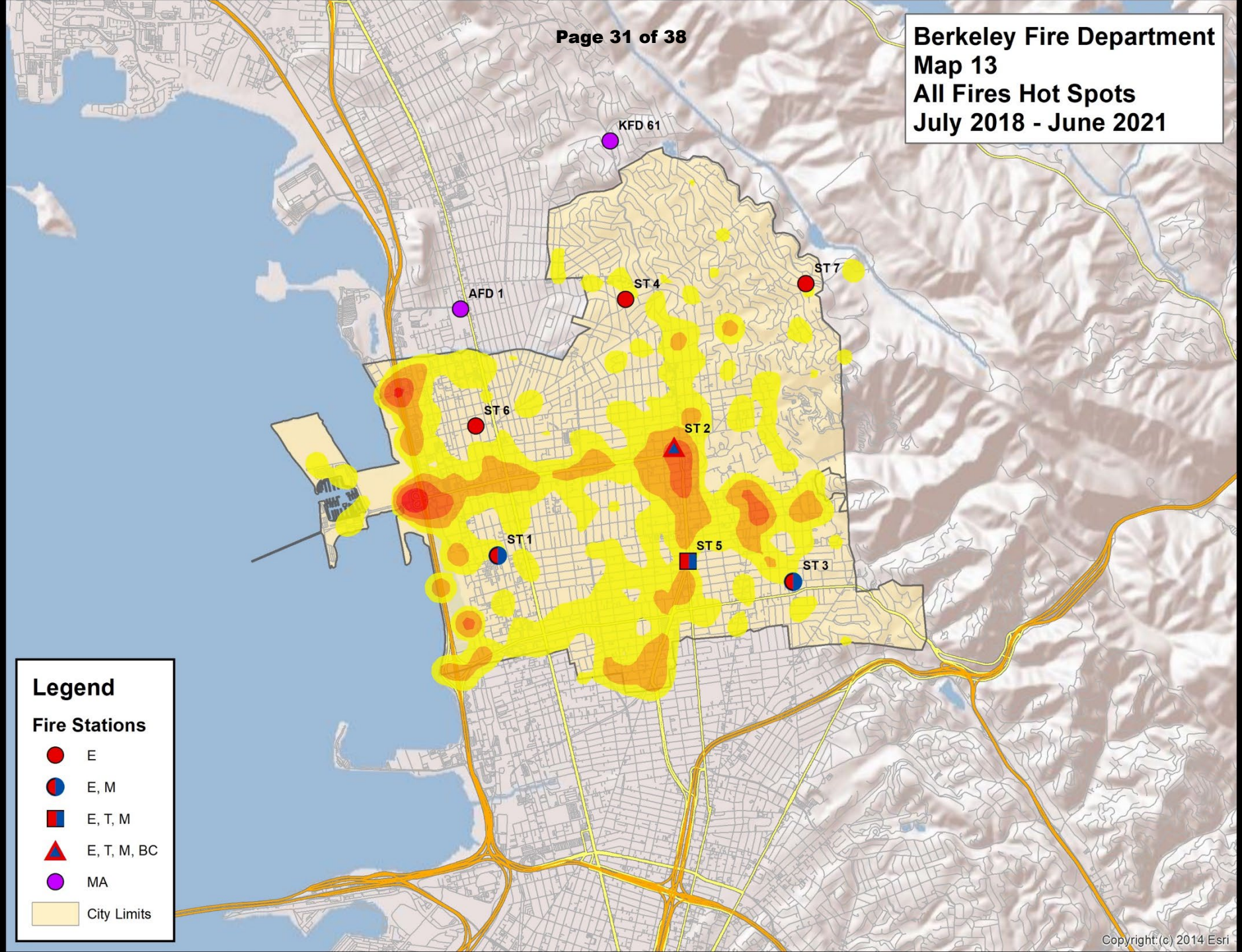



Berkeley Fire Department
Map 5b
8 Minute ERF
4 Engines, 1 Truck, 1 Medic, 1 BC
Congested & Uncongested
KFD 61
AFD 1
ST 4
ST 7
ST 6
ST 2
ST 1
ST 5
ST 3
Legend
Fire Stations
E
E, M
E, T, M
E, T, M, BC
MA
City Limits
Copyright (c) 2014 Esri

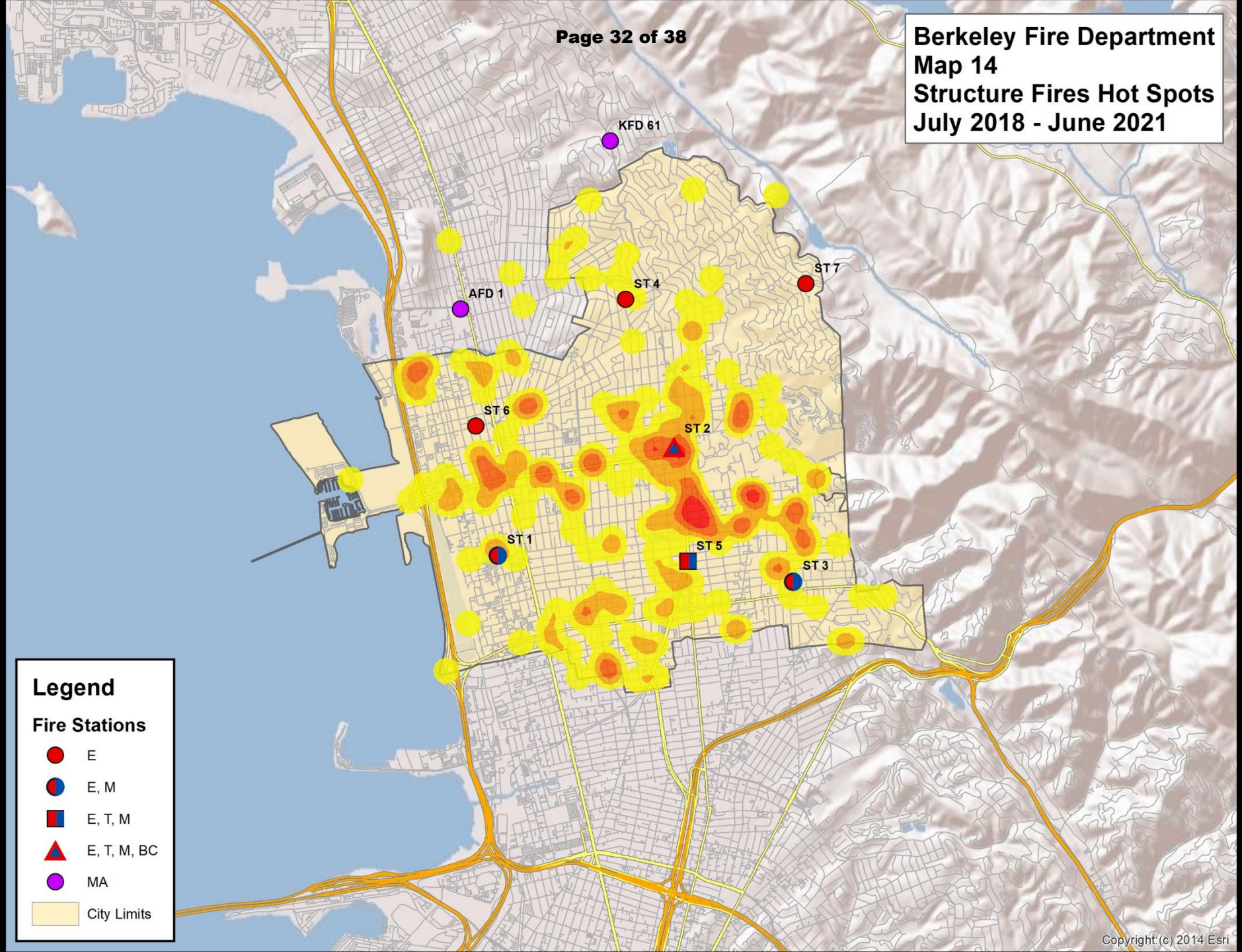
Berkeley Fire Department
Map 12
EMS/Rescue Hot Spots
July 2018 - June 2021



Berkeley Fire Department
Map 13
All Fires Hot Spots
July 2018 - June 2021



Berkeley Fire Department
Map 14
Structure Fires Hot Spots
July 2018 - June 2021



Road Mile Coverage

Travel Time Measure	Total Public Road Miles	Miles Covered Non-Congested	Percent of Total Miles Covered	Miles Covered Congested	Percent of Total Miles Covered	Percent Difference
4:00-Minute 1st-Due	327	**285**	**87%**	**274**	**84%**	-3.36%
8:00-Minute ERF	327	**257**	**79%**	**172**	**53%**	-25.99%

ERF = 4 Engines, 1 Truck, 1 Medic Unit, 1 Battalion Chief

Deployment Summary

- Time of day and day of week indicate need for 24/7/365 minimum service
- Dispatch time needs urgent improvement
- Crew turnout times need modest improvement
- Travel time is excessive, more so when multiple units are needed
  - Streets layout, hills, traffic congestion, traffic calming, and simultaneous incidents
- Physical station locations are adequate
- Engine and ambulance crew utilization hourly is at *excessive* saturation and needs *immediate* attention
- Low-acuity EMS demand is lengthening travel time and causing high crew workloads

Deployment Recommendations

- The expanded ambulance program to start later this year is essential
- The City needs a minimum of six full-time ambulances
- The City needs to implement a non-fire unit alternative response team for non-acute, non-9-1-1 *medical* calls
- Mental health patients need their own appropriate clinical response – the City's envisioned Specialty Care Unit (SCU)

Deployment Recommendations

- 9-1-1 fire/EMS dispatch times must shorten to best practices
- Implement the recommendations of the 9-1-1 dispatch center study when complete to enable pre-arrival instructions and Medical Priority Dispatch for non-acute response
- If the alternative non-acute programs do not substantially lower demand on engine crews, then the City needs at least three added peak-hour engine crews, 10 hours per day, weekdays

Next Steps

- **Near Term**
  - Discuss how the added ambulances already in progress can be used more to add capacity, not only provide paramedic relief
  - Fund costs and implementation for medical priority dispatch
  - Implement several low-acuity EMS non-9-1-1 response teams
  - Citygate to prepare a full project report with exhibits
- **Longer Term**
  - Ensure engines and ladder crews still have capacity for fire/rescue incidents during periods of high EMS incidents
  - Consider a heavy rescue squad in the western City

Discussion