



AFTER ACTION REVIEW

2700 MIDDLEFIELD RD. 8 ALARM FIRE

JUNE 3RD, 2024

PRESENTED BY: MENLO PARK FIRE PROTECTION DISTRICT

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Purpose and Intent of this After Action Review

Through the course of a facilitated discussion between key stakeholders, the purpose of this review is to identify significant successes and challenges during the fire response and provide recommendations as appropriate. Successes, challenges, and recommendations may be in planning, operations, administration, or management, which could be addressed at the agency or county level to improve future incident response. In accordance with standard AAR principles, individual names have not been credited to specific comments. Agency affiliation has been included to the extent needed to give constructive context to the discussion points.

Incident Synopsis

On the morning of Monday, June 3rd, 2024, a fire occurred in a large housing complex under construction located at 2700 Middlefield Road in the North Fair Oaks community of Redwood City, CA. (*Figure 1, Figure 2, and Figure 3*). Initially, a full assignment was dispatched at 1014 hours on incident #MF24-4511 for a report of possible insulation on fire in a building. Engine 3, Engine 5, Engine 9, Truck 9, and Battalion 3 responded to the incident. En route, Battalion 3 balanced the response to a structure fire assignment at 1018 hours, adding Engine 6, Battalion 1, Engine 4 (RIC), Squad 409, and AMR Medic 22.

Engine 3, the first arriving engine company, was on scene at 1019 hours, established Middlefield IC, and reported a six-story building under construction with smoke showing from the 5th floor of the Alpha/Delta corner, a completed evacuation, and a hydrant on site. Engine 9 and Squad 409 arrived and made interior access to the 5th floor to initiate an offensive fire attack with a 2 ½" handline while additional arriving personnel advanced two handlines to the podium on the Delta side and began a transitional fire attack. Meanwhile, Engine 3 began fire attack with a master stream deck gun on the Alpha side of the building. Battalion 3 arrived and assumed Middlefield IC and requested a 2nd alarm. Battalion 1 arrived and was assigned as Division 5 Supervisor while Truck 9 positioned its apparatus anticipating a possible future transition to a defensive fire attack mode. Battalion 101 arrived and was assigned as the Deputy IC to provide support and depth at the Incident Command Post. Ultimately, the first alarm resources were unable to contain the fire, and all personnel were removed from inside the structure and off the Delta side podium, and a defensive fire attack strategy was implemented.

Once the incident strategy changed from an offensive to a defensive mode, Division 5 was dissolved and Division Alpha was established. Master stream ground monitors were placed into operation on the Alpha side of the building while Truck 9 set up for an aerial master stream operation on the Alpha/Delta corner. Two additional truck companies were requested to access the Charlie and Delta sides and prepare for aerial master stream operations. Additionally, three engine companies were requested to the area of Westmoreland Ave. to locate additional water supplies and set up ground monitor master stream devices on the Charlie side by placing supply lines across the inactive Caltrain railroad tracks. Division Delta was established with Battalion 11 as the Division Supervisor as the incident grew in size. Ultimately, Division Alpha and Division

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Delta would supervise all operations in Divisions Alpha, Charlie, and Delta for the duration of the incident.

While defensive fire attack operations were underway in Divisions Alpha, Charlie, and Delta, multiple fire companies gained interior access to the uninvolved building (known as Building A) under construction directly adjacent to the fire building and began protecting that exposure by directing hose streams from the interior of Building A towards the main fire building (Building B). This would then be designated as the Alpha Exposure Division with CH3B as the Division Supervisor and played a critical role in preventing that building from becoming involved.

As the main fire rapidly progressed through the building and advanced toward the residential neighborhoods directly to the east, multiple companies were moved into place to attack the fire and prevent it from spreading to the nearby homes. This would be designated as Division Bravo with Battalion 2 as the Division Supervisor and became the priority focus of fire attack operations, preventing the fire from impacting the residential homes in the areas of Pacific Ave., Calvin Ave., Curtis Ave., and Dumbarton Ave. Multiple master stream appliances and 2 ½" handlines were placed into operation in an aggressive effort to suppress the fire and contain it to the building of origin before spreading to the adjacent neighborhood. Division Bravo ultimately accomplished its operational objective and was successful in containing the fire to the main building and preventing spread to the nearby residences.

To ensure that any exposure threats to the residential properties in the neighborhood adjacent to the main fire were quickly identified and mitigated, a Community Protection Group was established with Battalion 5 as the Division Supervisor. Multiple engine, truck, water tender, and squad companies were mobilized in an organized effort to patrol, locate, and extinguish any spot fires that ignited using a structure defense strategy. A SCCO Mutual Aid Strike Team was also deployed to this area to assist with structure defense operations. The Structure Protection Group was highly effective in their coordinated efforts and successfully prevented any residential structure fires as a result of exposure to the main building fire also while suppressing multiple spot fires in the area before they spread.

In addition to the aggressive fire suppression efforts during this incident, several other incident command and logistical support functions were accomplished. CH1A established a staging area on Middlefield Rd., who worked directly with the IC and Deputy IC to coordinate resource ordering and resource assignment. A Medical Group and Rehab Unit was established by American Medical Response, which began preparing for any first responder or civilian injuries as well as crew feeding needs. A team of two UAS pilots began overhead air operations from early on in the incident providing valuable real-time intel to the IC that enhanced his situational awareness and aided in decision-making processes. A Fire Investigation Task Force was deployed consisting of 17 fire investigators and a representative from the ATF. Multiple single-resource fire personnel played integral roles in filling various positions that helped support the overall operation. County resources, in conjunction with out-of-county resources, brought this incident under control and without any loss of life, injuries, or residential homes destroyed.



Figure 1. Fire conditions prior to the arrival of the first alarm assignment.



Figure 2. Fire conditions at the approximate arrival time of the first alarm assignment.



Figure 3. Fire conditions shortly after the arrival of the first alarm.

Incident Location

The Middlefield Fire occurred at 2700 Middlefield Rd. in the North Fair Oaks community of Redwood City, CA. (*Figure 4*). The property, known as Middlefield Junction, is accessed from Middlefield Rd. at the San Mateo County Fair Oaks Health Clinic entrance. Residential neighborhoods are located to the north, south, and east, with industrial buildings to the west of the incident site. Middlefield Rd. is the main roadway to the north, and the Caltrain railroad lies along the property's southwest edge. Building B, the fire building, sits on the southernmost end of the property, and Building A, the unaffected building, is located directly to the north. San Mateo County's Fair Oaks Health Clinic is located to the north of Building A (*Figure 5*).

Menlo Park Fire Protection District was the Authority Having Jurisdiction (AHJ) due to the incident location which was at the edge of the jurisdictional boundary between Menlo Park Fire Protection District and Redwood City Fire. Due to the location of the incident and proximity to Fire Station #9, Battalion 3 was the Battalion Chief dispatched on the initial full assignment based on station ordering and would, therefore, be the first in BC and become Middlefield IC.

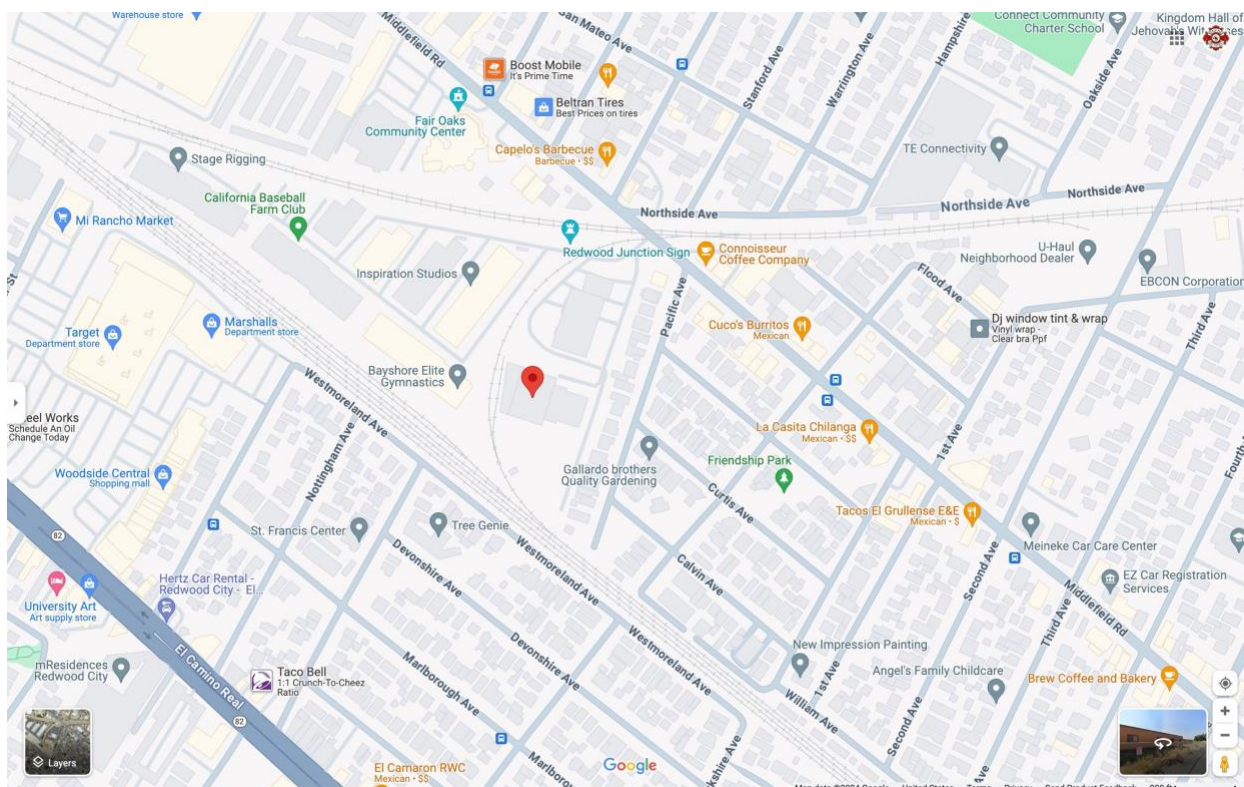


Figure 4. Google Maps shows the location of the incident and the surrounding vicinity.



Figure 5. Aerial view of the incident location illustrating the Fair Oaks Health Clinic, Building A, and Building B (from north to south).

Building Construction

Middlefield Junction is a \$155 million affordable housing project that was under construction at the time of the incident. The complex consisted of two separate structures: Building A, the unaffected building, on the north side of the lot, and Building B, the fire building, on the south side of the lot. Both buildings rested on a total lot size of 137,462.78 square feet.

Building B (*Figure 6*), the fire building, included 104 units totaling 171,706 square feet. Building B was a five-story over podium structure comprised of Type 3A over Type 1A construction for a total of six stories standing 65 feet in height. A temporary FDC feeding the standpipe was in place during the construction phase as required per the California Fire Code (*Figure 7*).

Building B was in what is commonly referred to as the ‘rough frame’ phase of construction. The contracted construction company bases its schedule on phases, whereas each contractor would have the availability to areas based on the location and access of the materials being installed. The internal wood framing, exterior siding, windows, and roofing were being completed to provide environmental protection suitable for other trades to continue their work inside the building in a weather-safe and code-compliant environment. Items being hung or attached to the uppermost parts of the structural framing go first, which then allows the next trade on the schedule to perform their work with clearance, location, and priority in relationship to the timeline of the job. At the time of the fire, the project was in the process of completing the

roofing membrane, penetrations needed for electrical, sprinklers, plumbing, and HVAC, adding insulation, and applying the materials needed to complete these tasks in relation to the work location in which it was performed.



Figure 6. Middlefield Junction Building B.



Figure 7. Temporary FDC for Building B located at the Alpha/Bravo corner.

Building A (*Figure 8*), the unaffected building, is located directly to the north of Building B and was designated as the Alpha Exposure Division during the incident. Building A included 75 units totaling 104,282 square feet. Building A is a four-story over podium structure comprised of Type 5A over Type 1A construction for a total of five stories standing 55 feet in height. A temporary FDC feeding the standpipe is in place during the construction phase as required per the California Fire Code.



Figure 8. Middlefield Junction Building A.

Incident Weather

Weak high pressure was over Redwood City at the suspected time of initiation, while a weak cold front was dissipating over the North Bay. As a result of the weak weather pattern at the surface, weather stations in the area of the structure fire, as of 10 a.m., were showing light surface winds from the Northwest, generally less than 10 knots, and temperatures in the mid to upper 60s. By noon the same weather stations had surface winds from the West-Northwest around 10-15 knots with temperatures in the upper 60s to around 70°. Atmospheric model data indicated the winds a couple thousand feet above ground level could be as high as 25 knots out of the Northwest. As the cold front sagged into the fire region during the afternoon hours a few of these winds mixed down to the surface in the form of an occasional wind gust from the Northwest, as seen in the attached image shown (*Figure 9*) in mph. It should be noted that shoreline complexity along with mountain influence can cause shifting wind directions by the minute. While the overall wind flow was from the Northwest direction, observations show that West-Southwest around to North were experienced at sites in the region. In addition to the general weather regime, a fire that burns extremely hot can cause air to rise rapidly, creating an area of low pressure at the surface (in and immediately adjacent to the fire). This in turn can yield a nano-climate for weather, causing locally influenced winds in both speed and direction. Once away from the immediate fire, this nano-climate would surrender to the broadscale pattern and local micro-climates.

Credit: Weather abstract provided by Brian Garcia from the National Weather Service SF Bay Area/Monterey.

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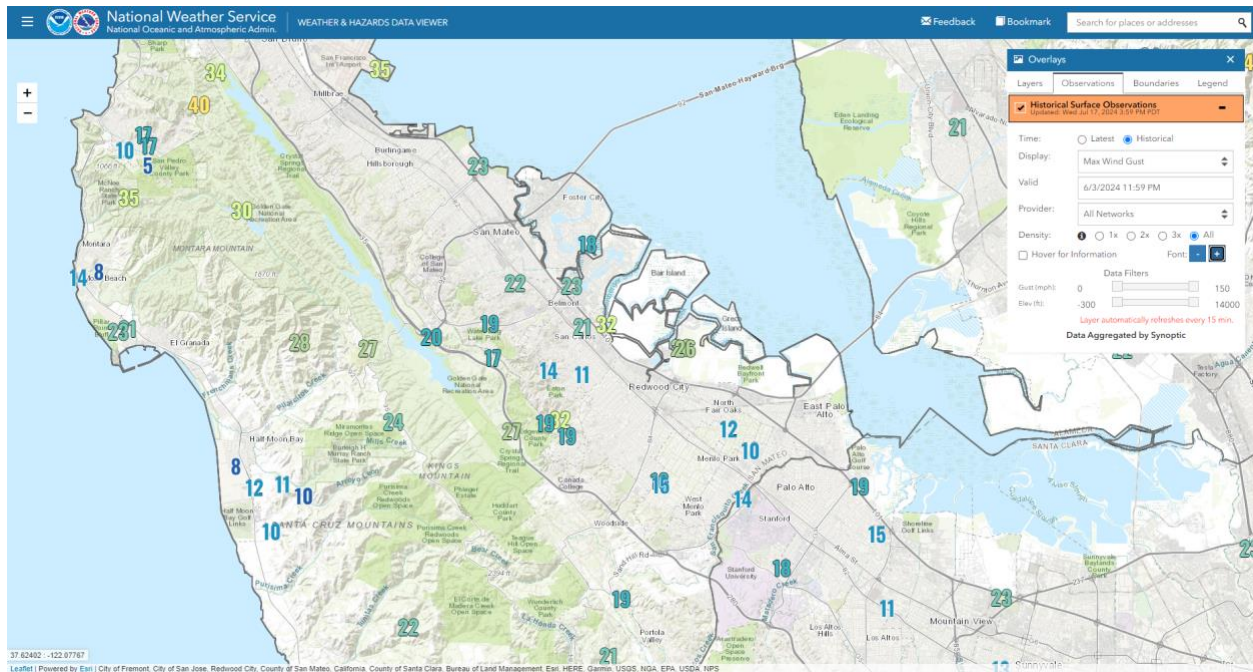


Figure 9. Historical surface observations for June 3rd, 2024. Image provided courtesy of the National Weather Service SF Bay Area/Monterey.

Alarm Dispatch & Move-Up Assignments

Initial Full Assignment (10:14:13): T9 E5 E3 E9 BC3

Balance of 1st Alarm (10:18:04): E6 BC1 E4(RIC) SQ409(Self-Attached) M22

2nd Alarm (10:22:37): T2 E7 E1 E77 BC101 BC2 BS9

3rd Alarm (10:29:14): T23 E10 E16 E13 BC5 OESC T4(Self-Attached)

Move-ups following 3rd alarm:

E20 to FS77 10:34:46

E19 to FS03 10:35:24

E10 to FS10 10:35:35

E11 to FS77 10:38:53 (E11 came available and E20 was canceled on their move-up)

4th Alarm (10:47:25): E2 E11 E12 BC11

Move-ups following 4th alarm:

E14 to FS77 10:49:43

E19 to FS03 10:50:51

E18 to FS12 10:50:51

E15 to FS04 10:59:30

BC8 to FS09 10:53:50

T21 to FS09 11:00:18

5th Alarm (11:02:29): BS17 E19 E14 E15 SQ401(Self-Attached)

Move-ups following 5th alarm:

E20 to FS77 11:04:32

E18 to FS06 11:04:53

E27 to FS12 11:05:19

E26 to FS14 11:06:36

6th Alarm (11:12:03): E18 E20 E27

Move-ups following 6th alarm:

E23 to FS12 11:15:22

E26 to FS06 11:15:41

E28 to FS15 11:17:28

7th Alarm (11:18: 42): E26 E23 E8

Move-ups following 7th alarm:

PAE63 to FS77 11:22:17

E33 to FS03 11:23:01

E25 to FS06 11:30:47

E38 to FS08 11:31:03

8th Alarm (11:32:03): E25 E38 E24

Move-ups following 8th alarm:

E32 to FS08 11:34:28

E34 to FS06 11:37:38

E35 to FS09 11:39:43

T34 to FS09 11:52:15

E94 to FS10 12:01:35

E41 to FS14 11:56:27

Additional Resources

Mutual Aid Strike Teams:

2306A: M Krisman/STEN(SCC) E1(SJS) E52(MTV) E77(CNT) E82(CNT) E73(CNT)

2307A: P. Chung/STEN(SJS) E42(SNY) E86(MLP) E95(SNC) E9(SJS) E14(SJS)

Special Call Apparatus:

T17 T21 WT108 WT156 WT157 WT158 FT61 HT(UTF)

Single Resource Overhead:

CH1 CH2 CH3 CH8 CH1A CH11A CH17A CH1B CH3B TO1 TO3 TO1A TO3B UAS-1

Fire Investigation Task Force:

PR1 PR1B PR1C PR1D PR1E PR2 PR2B PR2C PR3A PR3B PR3C PR3D PR3E PR5A PR5B PR5C PR5F
PR16 ATF

American Medical Response:

M60 S12 AMR101

San Mateo County Department of Emergency Management:

OES3 OES55 OES56

Incident Command System

Incident Commander/Deputy Incident Commander

Incident Command (IC) was initially established by Engine 3 upon their arrival on scene and then assumed by Battalion 3 (BC Balton) upon his arrival. The Incident Command Post (*Figure 10*) was located in the southwest corner of San Mateo County's Fair Oaks Health Clinic parking lot at 2700 Middlefield Rd. Recognizing the potential magnitude of the incident, Battalion 3 assigned Battalion 101 (BC Martin) as the Deputy Incident Commander. Battalion 3 and Battalion 101 identified that information and communications were coming into the ICP rapidly, which was proving to be unmanageable for one IC to safely and effectively handle alone. The IC and Deputy IC divided command responsibilities for radio traffic, resource assignment, and resource tracking, and, as a team, effectively managed all resources and radio communications (see *Figure 11* for the ICS organizational chart).



Figure 10. Incident Command Post.

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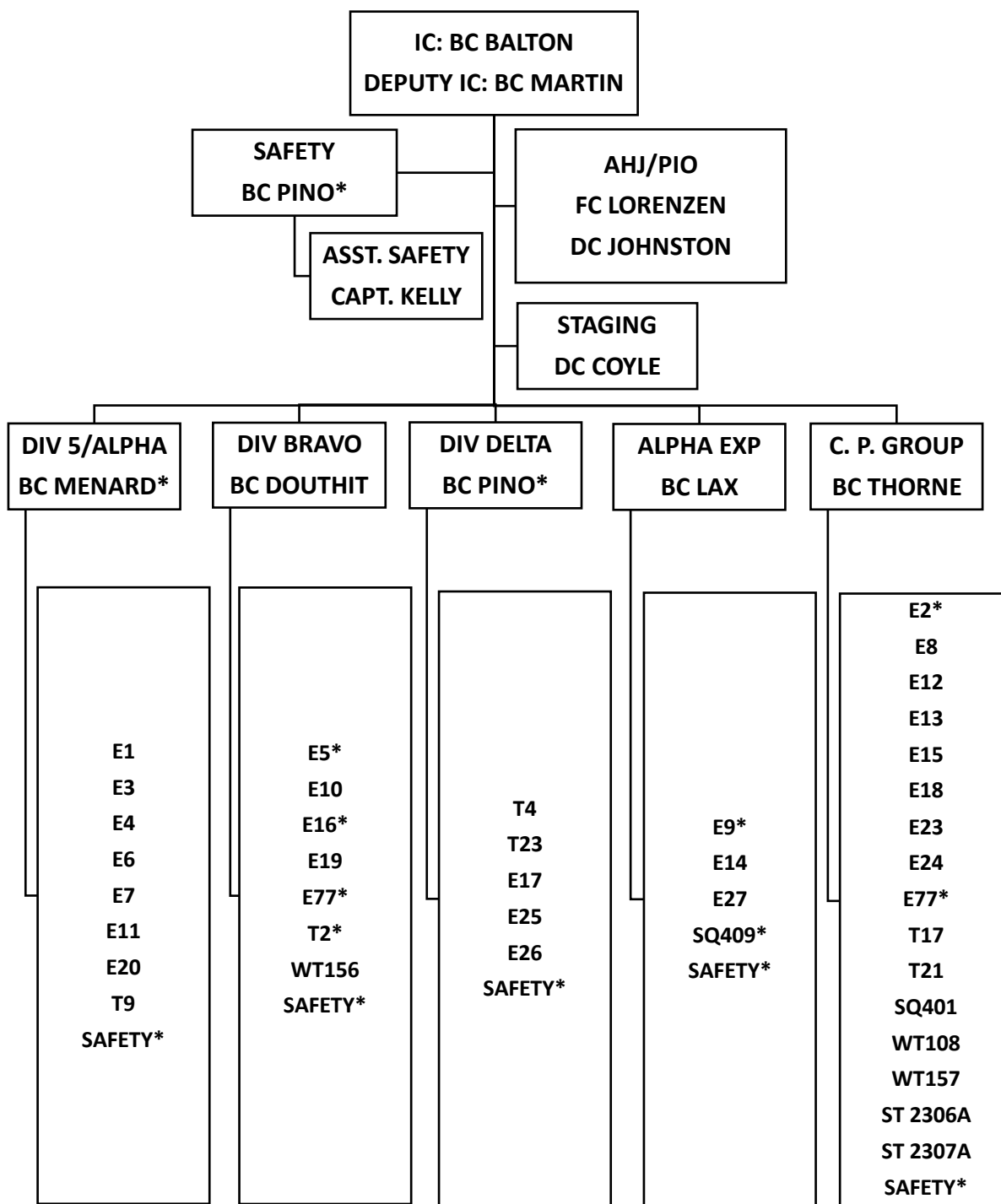


Figure 11. Incident Command System org chart for the Middlefield Fire incident.

*Several apparatus and single resources were assigned to more than one division/group throughout the incident. Additionally, one Safety Officer and one Assistant Safety Officer covered all divisions.

Safety Officers

The Incident Safety Officer (ISO) was initially assigned to TO1A (Capt. Kelly). BC11 (BC Pino) was assigned ISO upon his arrival and TO1A became the Assistant Safety Officer. As the incident grew in complexity, BC11 was reassigned as Division Delta and TO1A reassumed the role of Incident Safety Officer. TO1A would remain as the ISO for the duration of the event and was responsible for overall incident safety in all divisions of the fire.

Division 5

Division 5 was assigned to Battalion 1 (BC Menard) upon his arrival on the first alarm. First-arriving companies gained interior access to the building via an internal staircase located off the podium (open space on top of the first floor parking garage) on the Delta side. Crews advanced to the 5th floor and set up for an interior fire attack but soon retreated after discovering that the fire was too far advanced for offensive operations.

Meanwhile, fire companies were advancing handlines up to the podium on the Delta side and initiating a fire attack from the structure's exterior (*Figure 12*) while Engine 3 was deploying its master stream deck gun on the Alpha side. This exterior fire attack attempted to keep the fire contained to the Alpha/Bravo corner of the building. Following approximately 10 minutes of exterior fire attack from the Alpha and Delta corners, Division 5 made the determination that the fire was rapidly advancing down the Alpha and Delta sides of the structure, and for safety reasons and potential building collapse, all personnel needed to be removed from the vicinity of the building. All handlines on the Delta side podium were abandoned, and fire personnel moved away from the structure and prepared for defensive operations.



Figure 12. Initial exterior fire attack efforts towards Division 5 from the Delta side podium.

Division Alpha

Following the decision to transition from an offensive to a defensive strategy, Division 5 was dissolved and Division Alpha was established by Battalion 1. Division Alpha coordinated defensive fire attack operations on the Alpha side of the building (*Figure 13*) and then along the Delta and Charlie sides until Division Delta was established. Ultimately, there were three aerial master streams and four ground monitor master streams in operation in Divisions Alpha, Charlie, and Delta.



Figure 13. Division Alpha.

Division Bravo

Division Bravo (*Figure 14*) was assigned to Battalion 2 (BC Douthit) with an operational objective of a defensive fire attack on the east side of Building B to prevent extension into the adjacent residential neighborhood. This division would become one of the top operational priorities of the incident as it posed the greatest direct exposure threat to residential homes. Aerial master streams, ground monitor master streams, and 2 ½" handlines were utilized to hold the fire to the building of origin and prevent extension to the adjacent homes.



Figure 14. Division Bravo from the Alpha/Bravo corner.

Division Charlie

Division Charlie (*Figure 15*) was never assigned a division supervisor; however, this side of the building was covered by Division Alpha and Division Delta throughout the incident. Division Charlie was the structure's south side along the Caltrain railroad tracks. In this division, one truck company operated an aerial master stream, and two engine companies supplied ground monitor master streams from hydrants located on Westmoreland with supply lines laid across the railroad tracks. Prior to operating in this area, all train services needed to be stopped by Caltrain and PG&E de-energized the high voltage OCS lines for the safety of fire personnel operating in this division.

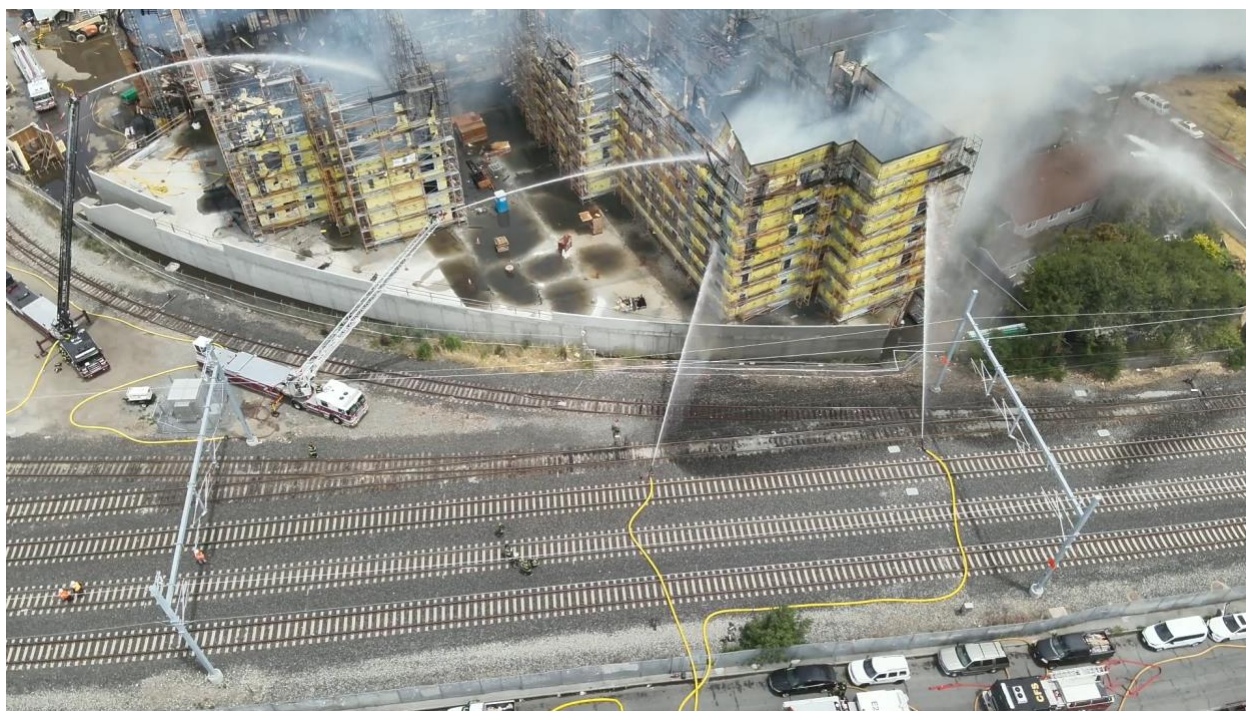


Figure 15. Division Charlie

Division Delta

Division Delta (*Figure 16*) was assigned to Battalion 11 (BC Pino) as the fire progressed and Division Alpha was outside his span of control and thus unable to adequately supervise both divisions and all of the assigned resources working in those areas. Division Delta supervised Charlie and part of the Delta sides of the structure and shared some resources with Division Alpha. Division Delta established and supervised multiple master stream appliances that attempted to suppress the fire on the Charlie side and prevent it from progressing to the Bravo side.

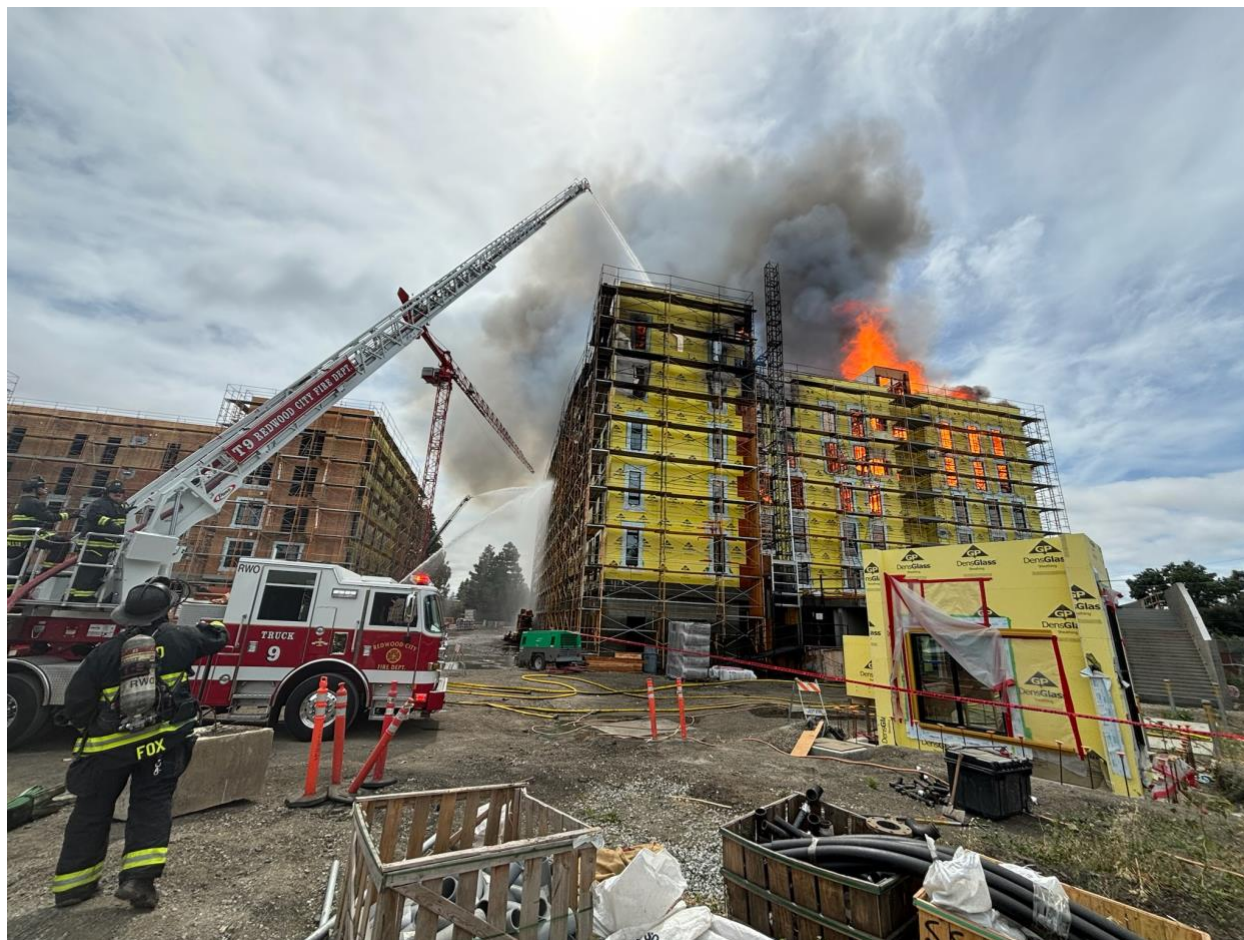


Figure 16. Division Delta.

Community Protection Group

The Community Protection Group was assigned to Battalion 5 (BC Thorne) with the primary objective of protecting structures in the neighborhoods directly to the east and southeast of the main fire behind Division Bravo (*Figure 17*). Multiple master stream appliances were put in place along Pacific Ave. to protect homes from the radiant heat from the Bravo side while engine, truck, and squad companies conducted tactical patrols of the neighborhood and extinguished multiple spot fires as they ignited. The geographic area was defined as Pacific Ave., to the Caltrain tracks, to Middlefield Rd., to Berkshire Ave.



Figure 17. Community Protection Group performing structure defense on Pacific Ave.

Alpha Exposure Division

The Alpha Exposure Division was assigned to CH3B (BC Lax). Engine companies were positioned inside Building A with multiple handlines directed towards Building B (*Figure 18*). This was a critical operation as it was key in preventing Building A from becoming involved.



Figure 18. Alpha Exposure Division operating 3 handlines from Building A (left) onto Building B (right).

Staging

Staging Area Manager (SAM) was assigned to Chief 1A (DC Coyle) and designated as Middlefield Staging. Middlefield Staging was located on Middlefield Rd., which law enforcement shut down between Woodside Rd. and 5th Ave. Following the 4th alarm, Middlefield IC tasked Middlefield Staging with ordering additional alarms as needed to maintain a full alarm assignment available in staging at all times. Middlefield Staging played an active role in selecting and deploying resources to all divisions of the incident upon direction from the IC and Deputy IC. Additionally, Middlefield Staging worked directly with the Community Protection Group (BC5) to help coordinate resource needs and tracking.

Medical Group/Rehab Unit

American Medical Response personnel established a Medical Group and Rehabilitation Unit. Two AMR transport units and two AMR Supervisors responded to the incident and quickly set up these critical support functions. S12 (Supervisor Sylvia Ruby) was assigned as the Medical Group Supervisor and AMR101 (Operations Manager Deanna Sanchez) established the

Rehabilitation Unit (*Figure 19*). These support functions were maintained throughout the duration of the event.

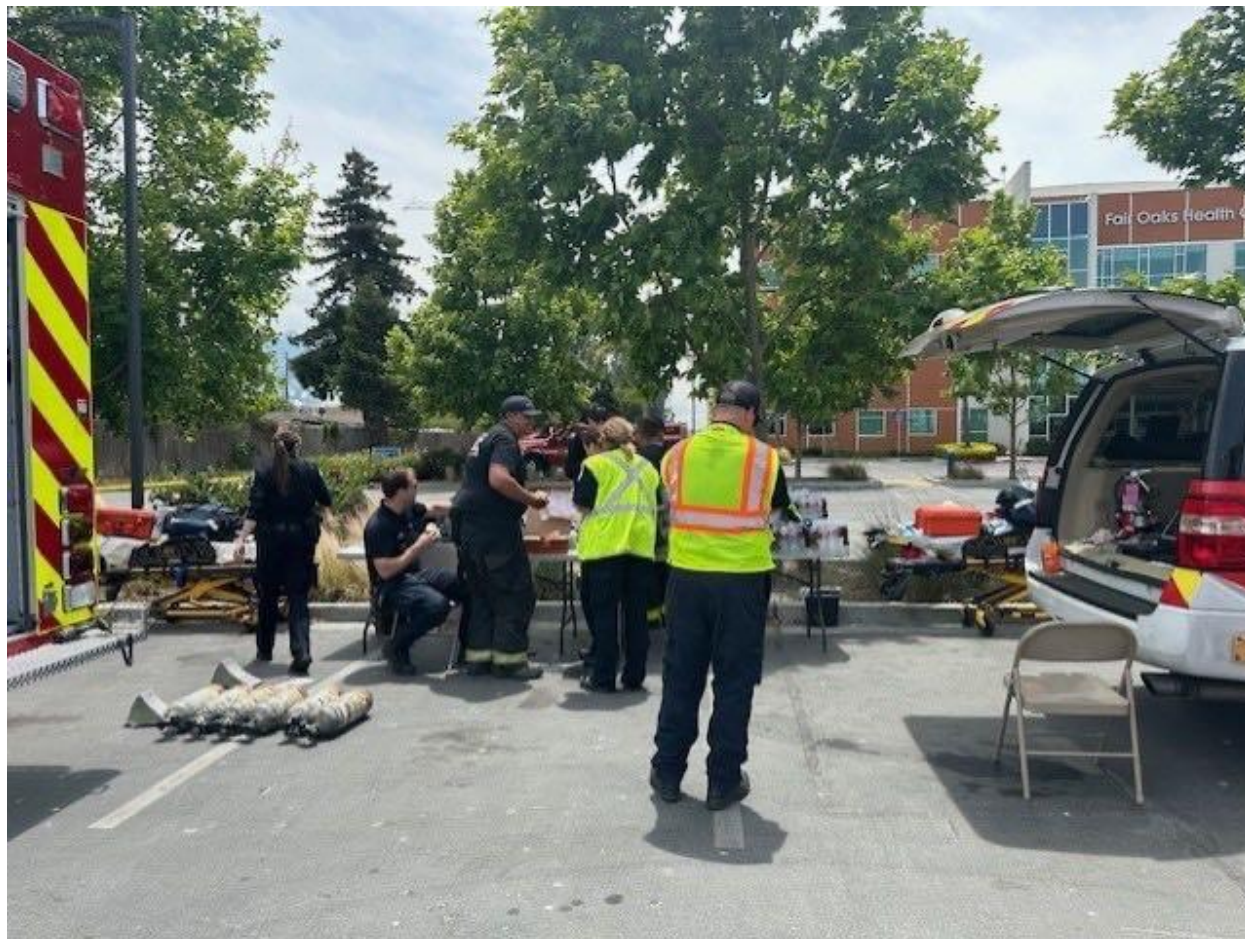


Figure 19. Rehabilitation Unit set up by AMR101.

Fire Investigation Task Force

PR1 (DC Johnston) and PR1E responded to the incident and arrived on scene at approximately 1025 hours. Early contact was initiated with employees in the construction trailer at the job site, where initial interviews were conducted with key personnel to determine who was in the area of origin and obtain their statements. While PR1 was conducting interviews, PR1E met with the foremen to determine if they had accountability for their employees and confirmed that the building was fully evacuated. This information was provided to Middlefield IC after confirmation of complete employee accountability.

Based on the magnitude of the incident, a San Mateo County Fire Investigation Task Force was requested through PSC. This task force would eventually consist of 17 fire investigators from various San Mateo County fire agencies. The Task Force assembled in the Redwood Junction parking lot and was given their assignments. Additionally, due to the possible nature of the

incident, an agent from the Bureau of Alcohol, Tobacco, and Firearms (ATF) was requested for additional support.

Accountability for all Task Force personnel was conducted as they reported to the incident by documenting their arrival time and assignments. With ongoing fire suppression efforts taking place at Building B, fire investigation teams were sent out to the adjacent neighborhood to investigate each CAD incident to determine if there were any actual structure fires and associated damages. This aided in obtaining an early account of additional damage assessments in the community that included documentation and photographs that were completed prior to the end of the day.

Photo and interview teams were assembled to document the scene and the residential community while obtaining interviews from witnesses, construction workers, and first-arriving fire companies. This was beneficial as these interviews were integral to the investigation process and helped to determine possible cause and origin. Additionally, these teams proved valuable by having critical community damage assessments completed early on allowing for follow-up documentation to be completed promptly.

Members of the Menlo Park Fire Protection District's CERT program provided immediate and long-term rehabilitation services. These included food, water, shade, and rest areas for the personnel assigned to fire from early on in the incident and through the following six days of fire watch.

As the incident de-escalated, collaboration with the SMC Sheriff's office allowed for the scene to be secured for the ongoing investigation process. This was accomplished by the Sheriff's Office controlling access to the site with a check-in and check-out procedure in place. The security of the scene was further maintained over the duration of the next seven days with the presence of fire extinguishing hot spots and performing fire watch on a 24-hour basis. Following the incident, the Fire Investigation Task Force has conducted meeting three days a week to compile reports, interviews, and follow-up for the determination of cause and origin.

Along with the many accomplishments and successes experienced during this investigative process, some valuable lessons were learned that should be captured for future events. First, it was discovered that not all fire investigators received the Fire Investigation Task Force page-out notification, and most noticed the callout on Tablet Command, which prompted their response. Second, it is essential that investigators are activated as soon as possible to obtain key evidence and interviews early on during large-scale fires. Next, assemble break-out teams for damage assessment early on in the event to aid in the recovery process. Finally, scene security for the investigation needs to be confirmed and handled by law enforcement and fire investigators.

Timeline of Events

The following is an approximate timeline of events. All times and assignments were collected from CAD, Tablet Command, personnel testimonials, and radio transmission recordings.

1012: Initial notification to PSC. CAD incident created

1014: Full assignment dispatched: E3 E5 E9 T9 BC3

1018: BC3 balances to a structure fire assignment: E6 E4(RIC) BC1 M22 SQ409

1019: E3 arrives, establishes Middlefield IC, and reports a 6-story wood frame structure with smoke showing, evacuation of construction workers, and hydrant on site. E3 sets up their deck gun for a master stream application on the fire in Division 5. E3, E7, and E6 crews then advance a 2 ½" handline and 1 ¾" handline to the podium on the Delta side and initiate fire attack

1019: E5 arrives and establishes a water supply to E3 and then assists with advancing handlines to the podium on the Delta side. E5, with the assistance of E7, then supplied water to T9 from a Bravo side hydrant. E5 was then assigned to Division Bravo and assisted with setting up a ground monitor master stream operation

1019: BC3 arrives and assumes Middlefield IC. The ICP is located on the southwest corner of the Fair Oaks Health Clinic parking lot

1019: E9 arrives and begins to gain access to the interior stairwell on the Delta side podium to attempt an offensive interior fire attack on Division 5. Following the transition to defensive operations, E9 relocated to the Alpha Exposure Division to assist with fire attack and exposure protection

1021: T9 arrives and spots near E3 and deploys handlines from E3 to the podium on the Delta side and begins a transitional fire attack. T9 also prepares its aerial ladder for water tower operations. T9 then deploys aerial master stream on the Alpha/Delta corner

1022: Middlefield IC requests a 2nd alarm

1022: SQ409 arrives and joins up with E9 making access to the interior stairwell on the Delta side and proceeds to Division 5 for interior fire attack

1024: E7 arrives and assists E5 with water supply to T9 and then assists with fire attack from the Delta side podium

1025: E6 arrives and assists with fire attack from the Delta side podium. Following the transition to defensive operations, E6 set up a ground monitor master stream in Division Alpha before being reassigned to deploy a handline in the Alpha Exposure Division

1025: BC1 arrives and does a face-to-face with Middlefield IC. BC1 is assigned Division 5 supervisor with E3, E5, E9, E6, T9, and SQ409 working for him

1027: E4 arrives and is assigned to Division 5 as RIC. A 360 is completed and RIC is established

1027: BC101 arrives and checks in with Middlefield IC. BC101 assumes the role of Deputy IC at the ICP

1028: E1 arrives and is assigned to Division 5 and assists with fire attack

1029: Middlefield IC requests 3rd alarm

1030: Middlefield IC updates PSC that water is on the fire and the incident is using up resources quickly

1031: PG&E Electric advises they have a 25-minute ETA

1031: CH3B arrives and assigned as Alpha Exposure Division supervisor

- 1032:** CH1A arrives and is assigned as Middlefield Staging
- 1032:** T2 arrives and reports to staging. Assigned to Division Bravo for aerial master stream operations. T2 later reassigned to the Community Protection Group for structure defense with aerial master stream operations
- 1032:** E10 arrives and reports to staging. Assigned to Division Bravo
- 1032:** T23 arrives and reports to staging. Later assigned to Division Delta for aerial master stream operations near the Charlie/Delta
- 1032:** E16 arrives and reports to staging. Then assigned to supply T2 in Division Bravo. After T2 was reassigned, E16 puts a 2 ½" handline in place in the Alpha Exposure Division
- 1032:** E13 arrives and reports to staging. Assigned to the Community Protection Group
- 1032:** BC5 arrives and reports to staging. Then assigned to patrol neighborhoods to the east of the incident. BC5 would eventually become the Community Protection Group Supervisor
- 1032:** E77 arrives and is assigned to supply E3 with an additional supply line. Reassigned to Division Bravo for fire attack and then reassigned to the Community Protection Group and attached to ST 2306A
- 1034:** TO1A arrives and is assigned as Safety Officer. Responds into the scene and ties in with Division 5. TO1A remains as a Safety Officer for the duration of the incident covering Alpha, Bravo, and Delta Divisions
- 1037:** Division B created. Additional tactical channel requested and Tac 16 assigned
- 1037:** TO1 arrives and is assigned to assist at the ICP tasked with arranging meals and setting up Rehab. TO1 was then reassigned to assist BC5 with patrolling the neighborhoods
- 1040:** BC2 arrives and is assigned as Division Bravo Supervisor
- 1045:** Strategy change from offensive to defensive operations. Division 5 dissolved and Division Alpha was established. BC1 assumes Division Alpha
- 1047:** Middlefield IC requests 4th alarm. Following the request for a 4th alarm, Middlefield IC directs Middlefield Staging to request additional alarms as needed to keep a Full Assignment available in staging at all times
- 1048:** T4 arrives and is assigned to Division Alpha for water tower master stream operations. E20 would provide a water supply to T4
- 1048:** E12 arrives and is assigned to tactical patrol in the area of Calvin Ave. Later assigned to the Community Protection Group
- 1049:** Report of an additional fire starting at Dumbarton/Calvin
- 1049:** E11 arrives and is assigned to supply water to T23 for water tower master stream operations in Division Alpha
- 1050:** E2 arrives and assigned to tactical patrol in the area of Pacific/Curtis. Later assigned to the Community Protection Group
- 1051:** BS9 arrives and reports to staging
- 1051:** Community Protection Group established. BC5 assigned as Group Supervisor
- 1051:** E2 assigned to investigate fire at Dumbarton/Calvin
- 1051:** Report of an additional fire starting at Calvin/Pacific
- 1052:** E2 & E12 assigned to investigate fire at Calvin/Pacific
- 1056:** T23 and E11 were assigned to Division Alpha for an aerial master stream from the Charlie/Delta corner. E11 supplies water to T23

- 1058:** PG&E PSS arrives and reports to Middlefield IC who requests that electrical power be shut off to the construction site and neighborhoods adjacent to the incident
- 1102:** Middlefield Staging requests 5th alarm
- 1104:** Report of unknown fire on Marlborough
- 1105:** Chief Johnson declares high call volume. Notifications made by PSC
- 1105:** Report of tree on fire at 280 1st Ave.
- 1106:** BC11 arrives and is assigned as Incident Safety Officer. Later reassigned as Division Delta supervisor and TO1A becomes Incident Safety Officer
- 1106:** SQ401 arrives and is assigned to the Community Protection Group. Tasked with patrolling the neighborhood and extinguishing spot fires
- 1108:** Middlefield Staging informs PSC that the incident could go to 8 alarms
- 1109:** Request made for an all stop of railroad traffic both freight and Caltrain
- 1112:** Middlefield Staging requests 6th alarm
- 1112:** E14 & E19 arrive. E14 assigned to Division Alpha and E19 assigned to Division Bravo
- 1114:** Caltrain stops all train activity including passenger and freight
- 1118:** Middlefield Staging requests 7th alarm
- 1118:** Report of another fire starting at Calvin & Dumbarton
- 1119:** E15, E18, & E20 arrive and report to staging. E15 and E18 assigned to the Community Protection Group tasked with supplying water to T2 for aerial master stream operations
- 1119:** CH8 en route to PSC Dispatch to provide additional support and supervision
- 1120:** Middlefield Staging requests 2 Initial Attack Mutual Aid Strike Teams from Santa Clara County
- 1123:** Middlefield Staging special call request for 2 additional truck companies. T17 & T21 dispatched
- 1124:** SCCO starting 2 Strike Teams to report to Middlefield Staging
- 1125:** PG&E cuts power to the transformer for the Caltrain high-voltage OCS lines
- 1126:** E26 & BS17 arrived. E17 responds to the incident in tandem with BS17. E26 and E17 assigned to Division Alpha to establish ground monitor master stream operations across the railroad tracks on the Charlie side
- 1126:** T4 and E20 assigned to Division Alpha for aerial master stream operations along the Delta side. E20 supplies water to T4
- 1129:** E27 arrives and reports to staging. Assigned to Alpha Exposure Division and places a 2 ½" handline in operation with E14
- 1129:** Region 2 notified of incident and status
- 1132:** Middlefield Staging requests 8th alarm
- 1132:** E23, E26, & T21 arrive and report to staging. E23 assigned to the Community Protection Group tasked with extinguishing spot fires and exposure protection with ground monitor master stream operations. E26 assigned to Division Delta and tasked with ground monitor master stream operations across the railroad tracks on the Charlie side. T21 assigned to the Community Protection Group performing door-to-door investigations
- 1132:** PR1 requests Fire Investigation Task Force
- 1134:** E19 assigned to Division Bravo to relay pump to E16 who was supporting hoselines in Division Bravo and Alpha Exposure Division
- 1134:** E15 assigned to the Community Protection Group

1137: E8 arrives and reports to staging. Assigned to the Community Protection Group tasked with tactical patrol and augmenting water supply to E12

1142: Report of additional fire between 2nd and 3rd Ave.

1143: Report of a residence catching on fire on 2nd Ave.

1144: E25 & T17 arrive. T17 is assigned to Community Protection Group. E25 is assigned to Division Delta tasked with establishing ground monitor master stream operations across the railroad tracks on the Charlie side with E26 and E17

1148: Report of a fire starting at 2804 Curtis

1148: Middlefield Staging requests ETA for SCCO Strike Team and advises that the incident may need to balance to a 9th alarm

1151: E24 arrives and is assigned to the Community Protection Group tasked with establishing a supplemental water supply to E12 and extinguishing spot fires

1159: Report of a tree on fire at 241 Dumbarton

1208: Report of fire spreading to the west side of the railroad tracks south of Target

1210: E38 arrives and reports to staging. E38 would not be given an operational assignment

1225: Hose tender requested. UTF

1229: SCCO Mutual Aid Strike Teams arrive. ST 2306A is assigned to the Dumbarton Structure Protection Group with MNL E77. ST 2307A stages within the Community Protection Group

1236: WT108 arrives and assigned to the Community Protection Group to provide relay pumping to E15

1239: E77 assigned to scout for spot fires along Dumbarton

1244: WT156, WT157, & WT158 arrive and report to Middlefield Staging. WT156 assigned to Division Bravo and WT157 assigned to the Community Protection Group

1252: Report of another fire at 1st/William St.

1253: Report of another fire at 296 1st Ave.

1255: ST 2306A assigned to stage at Chavez Market after mitigating fires on William/1st

1632: Chief Johnson declares SMC is no longer in high call volume

1652: Transfer of Middlefield IC from BC3 to BC101. BC3 released from incident

1700: Incident transitions into fire watch mode until 06/10/2024 at 0800

Exposure Concerns & Residential Evacuations

As the Middlefield Fire grew in size and intensity and began progressing through Building B toward the residential neighborhoods to the east, evacuations were initiated and fire suppression efforts focused heavily on protecting residential structures and properties (*Figure 20*). A total of 18 residential properties reported impacts as a direct result of the main fire. These impacts involved small grass fires, fence fires, broken windows, Gazebo damage, stairway damage, shed fires, roof damage, tree fires, vehicle damage, and damaged outside items. There were two vacant lots where small spot fires ignited, which were quickly extinguished. The Community Protection Group successfully prevented any residential structure fires from occurring as a result of exposure to the main fire.

In coordination with the San Mateo County Sheriff's Office, the San Mateo County Department of Emergency Management (DEM) evacuated residents in the affected neighborhoods directly to the east of the main fire. An evacuation center for local residents was set up at the Veteran's Memorial Center at 1455 Madison Ave. in Redwood City. Chief 3 (FC Iverson) coordinated evacuation center operations by contacting the Redwood City Director of Parks and Recreation, requesting that a temporary evacuation center be established for potentially displaced residents due to the evacuation order. Additional notifications were made to SMC Public Safety Communications (PSC) and SMC Department of Emergency Management (DEM) via Chief 8 (FC Pucci), who had responded to the SMC PSC dispatch center. The evacuation center provided assistance to approximately 12 displaced residents and supplied them with food, water, restrooms, and charging stations for their electronic devices.



Figure 20. Residential structure defense on Pacific Ave.

Public Safety Communications

San Mateo County Public Safety Communications (PSC) personnel were critical in supporting the Middlefield Fire incident. The following accounts of the event from their experience provide valuable insight into the complexities and challenges that a dispatch center faces when handling a greater-alarm structure fire incident.

At approximately 1012 hours on June 3rd, 2024, San Mateo County PSC received a call for a full assignment response at a construction site located at 2700 Middlefield Rd. in the community of North Fair Oaks. Due to the initial reports and the size of the construction project, the responding Battalion Chief requested an upgrade to a structure fire assignment. When arriving on scene, the IC quickly called for a 2nd alarm response within minutes of the incident. The incident quickly escalated to a third and subsequently to an eight-alarm fire. During this time, the PSC team worked seamlessly together and displayed their knowledge, skills, and abilities to the highest level.

Primary Dispatcher Account: Shanel Campana, Fire South

- Dispatch recommendations were quick and we had to trust the station ordering recommendations. AVL would likely have provided a much more accurate dispatch of “closer units”, as once we started the move-ups, CAD could only gauge the next due by where CAD was showing them enroute to, not actually where they were responding from.
- Alarm escalations went well and there was adequate time between alarm levels to evaluate move-ups. Deccan/LiveMUM was only used for the 1st/2nd alarm, then all move-ups were calculated and performed manually.
- Preferred moves were not always used for the move-ups, and another dispatcher was helping assist with cover-ins. Unfortunately, as soon as units were moved for cover, they were dispatched to the next alarm level, creating the need for another move-up (this happens in any greater alarm but was intensified by the magnitude of the incident).
- Requests from the IC were verbalized appropriately to request Caltrain cease traffic in the area and cut power. Cal Water was requested by the IC to boost water supply, and started upon request. PG&E was automatically started at the 2nd alarm with no prompting from the IC.
- There were no verbal requests over the air to start Palo Alto Fire, but they called our center to advise they had coverage for FS02.
- BC11 did a great job promptly requesting we move TA incident that was dispatched on Hwy 92 from Command 11 to Command 51 to offload the radio traffic for his incident.
- CH8's (Fire Chief Pucci) presence in the center was appreciated (there is some feedback on this below).
- Dispatcher Campana used extreme care in verbalizing only pertinent priority traffic on Control 1 and Command 11.

Challenges and Lessons Learned:

- CH8 was a great resource, especially being familiar with the district and the needs of the IC. CH8 was working with an alternate dispatcher for move-ups. This caused some confusion for the primary dispatcher as move-ups were being initiated/adjusted without the primary dispatcher being aware. There was also redundancy in the work occurring as the primary dispatcher was evaluating moves, and CH8 was giving directives to the alternate dispatcher. This caused move-ups to be changed and left the primary dispatcher having to decipher what was being done by those working in another pod. In the future, if a Chief Officer responds to PSC and adjusts the normal “rules” of move-ups, ensure the other dispatchers are aware to prevent redundant efforts and confusion.
- Units were training in the area of 280, and no communication from the training BC or units they were attempting to clear to assist with the alarm escalations. She assumed they were dedicated to the training site and would not be clearing, so she made move-up recommendations using units that were available, only to have units in training advise they were now available for coverage/of the incident. Had she known this earlier, she could have predicted her move up better. We assume there was no ill intent from those training, but rather a “we aren’t sure how quickly we can clear training, so maybe we don’t say anything till we know for sure?”
- There was a communication issue with SCCO regarding the two requested initial attack strike teams. They dispatched the request as immediate need rather than initial attack, which prompted them to form up and delayed the response.
- Reserve engines were being upstaffed and put in service to provide coverage, which caused confusion for the dispatcher.
- There were no verbal requests over the air to start an initial attack strike team (it is believed Chief Myers, as the FMC, made that call to the center). This was not an issue, but the information was not given to the primary dispatcher, so it was unclear where the request originated.
- The dispatcher agreed, it would have been better to utilize PAF units for the incident rather than station coverage so we could tell when they were in district and see them on AVL.
- We would love to compare what the response would have looked like using AVL and actual locations. It will take some time to compile, but it would be interesting to look into.

Recommendations and Future Discussion Topics:

- UAS usage and the impact to air traffic. Knowing locations, having open communications between the operators, emergency communications if we need air support or Life Flight for an injury. County-wide UAS policy and call-out procedures.
- Bringing back PSC’s IDT program in the future to support the IC on scene.
- Use a BC or other qualified Chief Officer in the dispatch center for greater alarms, EOC activations, and large-scale events. If we have a Chief Officer in PSC during a large-scale event, we should inform the County Chiefs and Deputies to use the Chief Officer in PSC as the point of contact instead of calling the dispatch center. By doing so, the Chief

Officer can answer coverage questions and respond to other requests. This will reduce the incoming phone traffic so the dispatchers can focus on the radio traffic.

Throughout the event, the PSC Team managed the following:

- Over 66 In-County Fire Units
- Two Initial Attack Strike Teams from Santa Clara County
- Water Tender Group Response
- Fuel Support Unit
- Hose Support Unit
- Ten Mutual Aid Law Units
- Over 35 Law Enforcement Units on the Patrol Primary
- Four Dedicated EMS Units
- Between 10:00 and 16:32, our team received 524 calls and made 147 outbound calls, for a total of 671 calls processed per the ECATS report.
- Between 10:12 and 16:32, our team processed 319 CAD incidents (65 Fire Incidents, 51 EMS incidents, and 203 Police incidents).

Unmanned Aircraft Support

From early on in the incident, Unmanned Aircraft Systems (UAS) were utilized throughout the duration of the event to provide continuous real-time overhead imagery of the fire. This imagery enhanced the IC's situational awareness and aided in guiding decision-making processes relating to the status and progress of the fire (*Figure 21*). In total, three different agencies, MPFD, RCFD, and SMCSO, utilized UAS resources to capture the incident and provide imagery to the ICP.

Upon arrival, MPFD UAS-1 met with the SMCSO pilot, who was already operational with their UAS, and a deconfliction plan was developed. Collaborating with the RCFD pilot, a coordinated plan was formulated among all UAS pilots to provide uninterrupted aerial overwatch flights. Live video footage and high-resolution thermal imaging were streamed to the ICP and the utilization of two fire agency UAS pilots allowed for constant aerial coverage of the incident scene. The aerial footage from the blended UAS team greatly augmented the situational awareness of the IC and enhanced the safety of the personnel at the scene and the safety of the surrounding neighborhoods and residents. In the subsequent days, multiple UAS flights were conducted by various MPFD UAS pilots to direct master streams, identify hot spots, conduct interior inspections of the parking structure, and document the incident scene.

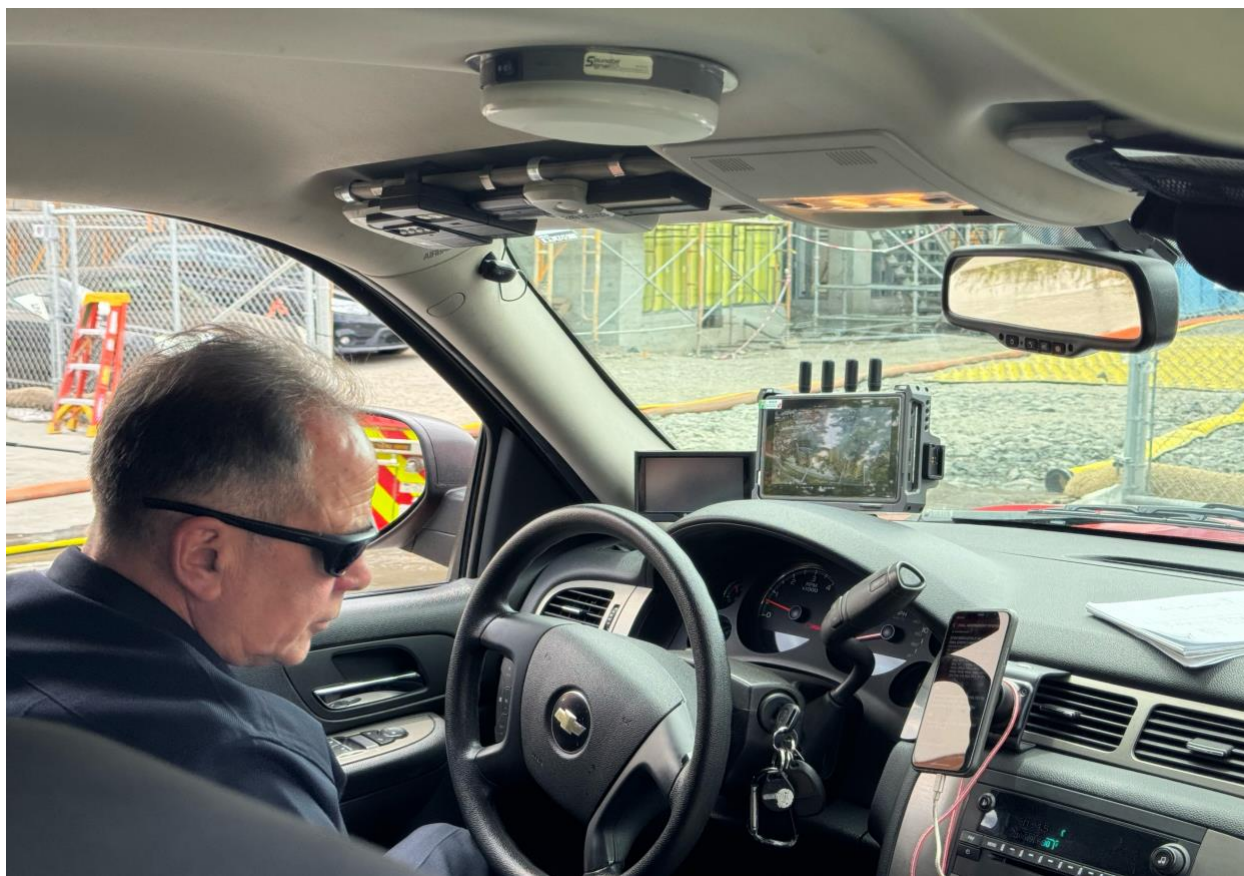


Figure 21. Middlefield IC equipped with real-time overhead UAS imagery from a DJI HDMI wireless monitor.

Nongovernmental Organizations

American Medical Response

American Medical Response (AMR) responded to the Middlefield Fire incident with two ground ALS transport units and two supervisors. Medic 22 was attached to the initial structure fire response, and then Medic 60, S12, and AMR101, also responded. Upon the arrival of S12, a check-in with Middlefield IC was conducted and the second transport unit was requested for standby. S12 then updated the San Mateo County EMS Director (Travis Kusman) on the situation. Simultaneously, the AMR scheduler began polling to staff extra units so the county system would not be affected should there be a need for additional units to stand by at the Middlefield incident. AMR was able to upstaff three extra transport units to assist with county call volume.

S12 was designated as the Medical Group Supervisor, and upon the arrival of AMR101, a more robust rehabilitation unit was created. Effective communications were established between S12 and Middlefield IC as S12 was equipped with a fire radio set to the appropriate tactical channel. Initially, as fire personnel began rotating through, there was some confusion as to the location of the rehabilitation unit because there was also food and water being provided at a different

location on the other side of the railroad tracks and personnel were traveling back and forth between the two locations. AMR personnel remained on scene supporting both the Medical Unit and Rehab Unit until their release from the incident. M22 was released from the incident at 1508, AMR101 was released at 1654, and S12 and M60 were released at 1735.

California Water Service

Upon learning of the incident, the Cal Water Operations Manager reported the fire to Bear Gulch management and the District Manager, advising that Cal Water would respond to assist the fire department if necessary. Two Cal Water foremen were sent to stage in the immediate area to provide assistance as needed. Cal Water staff and an Electrical Maintenance Technician were contacted to monitor the SFPUC connections and prepare to possibly adjust the regulators depending on the demand. Cal Water Operations Manager arrived on the scene at 1055 hours and met with Middlefield IC, advising that he would be stationed on-site and available for any requests of Cal Water services. The director of Cal Water was advised of the situation at 1112 hours. Two Cal Water foremen assisted fire personnel in locating additional fire hydrants within Redwood Junction. At 1158 hours, Cal Water personnel adjusted all regulators and were advised that SFPUC was en route to the Atherton connection to verify if their valves were in operation should the need arise to open the connection. At each SFPUC connection, water pressure was increased by 10-20 psi to accommodate more flow for firefighting operations (*Figure 22*). Approximately nine fire hydrants were used throughout the incident which included seven Cal Water hydrants and the two private hydrants located on the property. During the peak of demand in the water system, Cal Water estimates that approximately 2500-5000 gpm was flowing and the total volume of water used for the operation is estimated to be 960,000 gallons.

Following notification that the fire had been contained, Cal Water personnel monitored the system and started to restore the regulators to their normal settings. Two hydrants could not be shut down due to mechanical failure and operator error, requiring Cal Water to respond. This meant that engine companies could not disconnect and retreat, possibly affecting evacuations and/or apparatus access. After Cal Water responded to these locations, it was determined that one hydrant was not shut off due to operator error, and the other one needed Cal Water personnel to operate the valve at the street to shut it down. Cal Water reported that there was no damage to any of the water mains as a result of the total demand on the system.

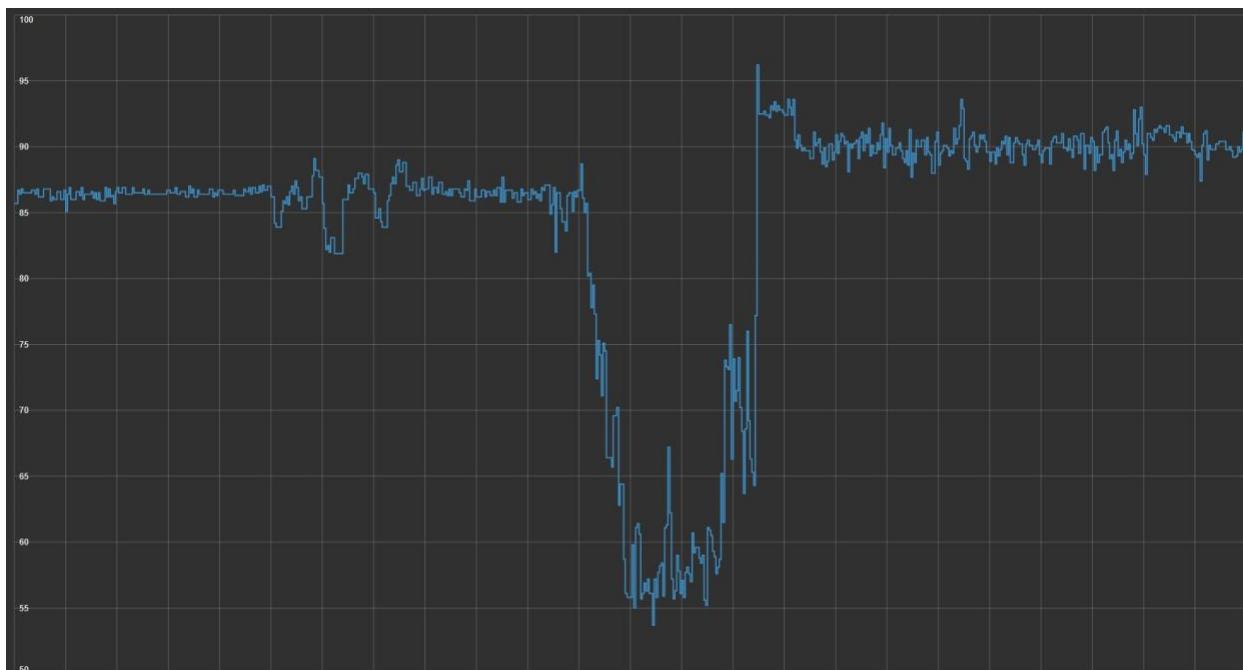


Figure 22. Pressure readings at one of the Cal Water SFPUC connections on June 3rd illustrate the pressure drop when engines started pulling from the hydrants. Cal Water raised pressure to accommodate more flow once they saw the decrease in pressure. Image provided courtesy of the California Water Service.

Caltrain

Early on in the incident, a concern was the status of the Caltrain railroad service system and the need to have an all-stop of train activity in both directions due to the fire's close proximity to the railroad tracks and the safety of the crews working near and eventually on, them. Middlefield IC requested that Caltrain shut down all train services, which was done and confirmed through PSC. Shortly thereafter, the need to run supply lines over the tracks to master stream ground monitors on the Charlie side was identified, and the safety concern shifted to the 25K high-voltage Overhead Catenary System (OCS) electrification lines. Additionally, it was unknown how the OCS lines would react to the radiant heat from the fire, so a priority traffic message was sent to Middlefield IC requesting that the OCS lines be de-energized. PG&E was notified and quickly cut power to the transformer for these lines making the area safe for fire personnel to operate.

Pacific Gas & Electric

Pacific Gas & Electric (PG&E) was notified of the Middlefield Fire incident at 1035 hours and arrived on scene at 1058 hours. PG&E met with Middlefield IC, who requested that electrical power to the construction site and the neighborhoods to the east of the incident be disconnected. PG&E personnel located the site transformer and determined it to be unsafe to operate due to the proximity to the active fire. The decision was then made to drop sections of the circuit, including the fire location, to safely de-energize the active fire scene. Line Recloser (LR) 287558 on the Redwood 1104 circuit was opened at 1127 hours, dropping load around the

scene for approximately 1589 customers. As the incident progressed, PGE was asked to investigate dropping power to the Caltrain Overhead Catenary System (OCS) Electrified train circuit. PG&E determined after talking with Cal Train that it was faster to have Cal Train shut down the system, which they promptly executed. When the scene was determined to be under control, the PGE restoration supervisor discussed options for re-energizing around the scene with Middlefield IC, with consideration given to active firefighting still in progress. It was determined that an open point Switch (SW) SW8409 could be opened, leaving Pacific Ave. de-energized and allowing PGE to pick up approximately 1514 customers. Following containment of the fire, at approximately 1340 hours, Middlefield IC approved the re-energization to non-impacted portions of the neighborhoods except for those on Pacific Ave. that were directly adjacent to the fire building. At 1425 hours, LR287558 was closed, picking up the load. The load side of SW8409 remained out until 2300 hours when a Troublemaker dispatched to the area confirmed with Middlefield IC that firefighting operations were in the mop-up phase, and there was no longer an overhead hazard. SW8409 was closed at 2303 hours, picking up the remaining 75 customers. PG&E Gas Service representatives shut off gas service to approximately 12 homes on Pacific Ave. directly to the east of the fire on the Bravo side.

Incident Strengths & Successes

The Middlefield Fire incident challenged emergency response personnel on many levels. The fire was ultimately contained to the building of origin, with no fatalities, injuries, damage to Building A, and only minimal damage to nearby properties. It is important that this AAR captures the many incident strengths and successes experienced so that they can be memorialized for future events.

Incident Command

1. Middlefield IC determined early on that assistance would be needed at the ICP. BC101 was assigned as the Deputy IC, a critical decision that led to the incident's overall success. BC3 and BC101 worked seamlessly together in an unconventional IC structure that allowed for constant flexibility and the utilization of the "Planning P" to stay ahead of a rapidly expanding incident.
2. Accountability was maintained throughout the incident by utilizing a clear Incident Command System and a decentralized command structure with Division Supervisors accounting for their own resources.
3. IC balanced the full assignment to a structure fire response en route and requested a second alarm three minutes after his arrival. IC requested additional alarms to avoid being resource-deprived, thus always staying ahead of the rapidly evolving incident.
4. After requesting the fourth alarm, Middlefield IC directed Middlefield Staging to order additional alarms as needed to maintain a full alarm assignment available in staging at all times. This incident command success decentralized command and empowered the Staging Area Manager to determine when to order additional resources, thus freeing up the IC to focus on other priorities.

Operations

1. The various fire agencies collaborated effectively and seamlessly as one cohesive team, likely because they had similar P&Ps, SOGs, and previous interagency training.
2. When the strategy changed from offensive to defensive operations, RIC4 remained disciplined in their assignment, recognizing that a potential building collapse could require a RIC deployment.
3. Following the transition from offensive to defensive operations, E9 and SQ409 determined that deploying exposure protection lines into the Alpha exposure building was critical. This was an operational success, as it effectively prevented Building A from becoming involved.

4. Establishing a Community Protection Group assigned to patrol and respond to exposure issues in the nearby neighborhoods was a critical decision that directly prevented further community damage and loss.
5. Utilizing 2 ½" supply lines as opposed to 5" LDH for ground monitor master stream operations was advantageous given the water pressure challenges.
6. It was necessary and beneficial to utilize water tenders to augment the water supply system and help provide and maintain effective fire streams.
7. Division Supervisors were realistic about their resource needs and made unneeded resources available in staging for reassignment to other divisions where they were needed.
8. Early utilization of Unmanned Aircraft Systems (UAS) provided the IC with an overhead view of the incident and real-time fire conditions. This enhanced his situational awareness and thus improved the IC's ability to predict future probabilities and resource needs. Additionally, UAS provided logistical intelligence to the IC, particularly identifying the best route of travel for ladder trucks to access the Charlie and Delta sides outside the property's boundaries.
9. Firefighter rehab and medical monitoring was established early on in the incident by AMR and supported throughout the duration of the event by Menlo Park Fire Prevention personnel.

Communications

1. Division/Group supervisors have reported smooth, effective radio communications with the ICP. This was directly the result of Middlefield IC designating a Deputy IC and Division/Group Supervisors having face-to-face communications with their crews rather than using the tactical radio channels.
2. Chief 8 responded to the SMC Public Safety Communications Center to provide operational oversight and guidance. This should be highlighted as an industry best practice to deploy an experienced Chief Officer to the dispatch center during a large-scale incident.
3. Early recognition that additional tactical channels would be required was critical, resulting in less congestion on the initial tactical channel. Tac 15, Tac 16, and VFire 22 would be assigned to this incident.
4. Middlefield Staging recognized that the SCCO Mutual Aid Strike Teams could not access our SMC tactical channels and, therefore, determined that they would be best utilized in the Community Protection Group rather than assigned to an active division or station

coverage. To address this, VFire 22 was assigned and monitored by Middlefield Staging and MNL E77 was attached to ST 2306A for common radio communications.

Unmanned Aircraft Systems

1. Locating UAS pilot operations in close proximity to the ICP allowed for direct communications with the IC that did not require the utilization of a tactical radio channel.
2. The decision for both fire agency UAS pilots to utilize the same make and model aircraft streamlined functional operations, thus permitting the sharing of batteries and other resources.
3. Two fire agency UAS pilots operating together allowed for continuous and uninterrupted operations, thus providing seamless situational awareness.
4. The use of a DJI HDMI wireless monitor assigned to UAS-1 provided peer-to-peer video streaming to the IC that did not require a TV monitor or the use of Tablet Command on the iPad.
5. UAS-1 served as a valuable on-scene resource that provided the necessary equipment and supporting cable options to stream the video footage to the IC. Additionally, it could process data collection, create orthomosaics of the incident scene in near real-time, provide a chain of custody for security, and serve as a rehab location for the aircraft and pilots.
6. UAS were utilized by truck companies to scout available ingress and egress options suitable for ladder truck access to the Charlie and Delta sides of the building, quickly determining multiple access points and routes to advance truck company operations.

Incident Challenges & Lessons Learned

As with any large-scale emergency incident, while the many strengths and successes should be highlighted, there are opportunities for learning and improvement. This section intends to capture the challenges and lessons learned from the lived experiences of the personnel who responded to the incident. It is not designed to find fault or place blame on any individual, company, or operation but rather to identify real-world challenges encountered during a large-scale event to provide an opportunity to plan and prepare for future incidents.

Incident Command

1. The Middlefield Fire involved a large six-story building under construction, with fire advancement that was not immediately obvious from the exterior to first-arriving companies. With stairwells not clearly identifiable, it was challenging for crews to gain interior access to the fire, and the offensive strategy might have needed to shift to a defensive one from earlier on in the incident.
2. Identifying exposures early on in a large fire is essential and needs to be considered with all large defensive fires.
3. Some command staff positions, particularly Incident Safety Officers and Staging Area Managers, were not easily identifiable. This was a concern on the fireground as it was not readily obvious to personnel who the Incident Safety Officer(s) were. Utilizing ICS vests would have helped resolve this issue as well as broadcasting over the tactical channels who designated as the Safety Officer(s) were.
4. Addressing the diminishing water supply issues earlier in the incident would help establish sufficient GPM sooner for a fire of this magnitude. Having a water department representative present at the ICP is an important consideration during an event of this size to assist in locating additional hydrants and increasing available water pressure.
5. Eliminating power to the Caltrain high-voltage OCS power lines was critical for gaining access to the Charlie side of the structure and initiating master stream operations on and around the railroad tracks directly underneath and near those power lines. The request to de-energize the OCS lines could have been made sooner and early identification of this hazard is critical.
6. Recognize that there are no truck companies assigned to alarm levels after the 4th alarm. When additional truck companies were needed, they were special called which resulted in a delay in their response.
7. Designating the Community Protection Group as a group instead of a branch or division could have presented a challenge if another significant incident had occurred, such as a

working structure fire. This would have made it difficult for that supervisor to manage the IWI utilizing proper ICS.

Operations

1. Several apparatus were initially spotted inside the collapse zone. This was partly due to personnel not being able to visualize the extent of fire involvement from their direction of approach. Additionally, given the height of the building (65'), if the apparatus were to spot outside the collapse zone (approximately 100' away), it could be difficult for master stream appliances to reach the fire.
2. The first arriving engine company should complete a 360 and develop a concise plan, including locating the interior stairwell for fire attack. Companies should work together to get one large attack line into operation on the fire floor. Utilizing deck gun master streams should be for fire above the 3rd floor to provide more time to set up for an interior fire attack. Exterior handlines were ineffective in knocking down fire on the 4th and 5th floors.
3. The first arriving company should attempt to contact the RP or job foreman and retain them as needed to obtain information about the building, the location of the fire, and the best access points. The RP, job foreman, or other on-site employees may be able to provide fire personnel with valuable information, especially about buildings that responders may be unfamiliar with.
4. The scaffolding, overhead energized power lines, and the construction crane were safety concerns for fire personnel as it was unknown how they would react once exposed to heat and flame. While every effort was made to keep firefighters out of the collapse zone, failure of the scaffolding, power lines, or crane collapse could have presented serious problems. Many companies reported using lookouts or a "bird dog" and established an emergency plan for a building collapse, crane failure, or power lines down.
5. Multiple engine companies reported having challenges supplying adequate water pressure to the ground and aerial master streams due to inadequate hydrant pressures and obtaining water from the same grid. This was especially the case when the aerial master streams utilized larger smooth bore tip-sizes such as 2" or 2 ¼". Using 1 ½" or 1 ¾" tips might have been more effective when the water supply system was under high demand.
6. Several engine companies reported that relay pumping would have been advantageous for overcoming the challenges of obtaining adequate water pressure when supplying master stream appliances, especially with long supply lays. Additionally, non-effective hoselines needed to be shut down to increase available pressure to more essential master streams.

7. Several fire apparatus, particularly truck companies, were hindered or limited in accessing certain areas due to previously charged LDH supply lines. Later in the incident, this also became an issue when some apparatus needed to be moved back from the fire building due to the radiant heat and potential collapse. Additionally, engines not being utilized as pumping apparatus should stage out and walk in so as not to block other essential apparatus from accessing the scene.
8. Temporary FDCs were in place in both buildings (A and B). While no functional sprinklers existed, these dry FDCs would supply the standpipes for interior firefighting operations. A large sign was posted at the Alpha/Bravo corner of Building B indicating the presence of the temporary FDC near the sign; however, first-arriving companies approached from the Alpha/Delta corner and were initially unaware of the temporary FDC. If offensive interior firefighting operations had been the continued strategy, pumping to these FDCs would have been necessary.
9. Personnel operating in the Community Protection Group experienced prolonged exposure to smoke, resulting in respiratory symptoms following the incident and might consider using SCBAs or other forms of respiratory protection.
10. A ground monitor master stream appliance supplied by 5" LDH was charged without being secured with a safety strap, contradicting the manufacturer's recommendations and posing a safety concern. Additionally, the ground monitor was set up within the established collapse zone by an engine company with the Division Supervisor's approval which was against the Safety Officer's direction. At the time, it was unknown to the Division Supervisor who the Safety Officer was further supporting the need to have Safety Officers clearly identified.
11. When placing an order for Mutual Aid Strike Teams, ensure the request specifies whether they are needed as Initial Attack (IA) versus Immediate Need (IN). In this situation, the intent was for IA Strike Teams to respond code 3 directly to the incident without a rendezvous at an off-site location.
12. Two malfunctioning fire hydrants would not shut off, preventing companies from disconnecting their supply lines, thus requiring Cal Water to respond. This could have impeded the evacuations of residents or apparatus ingress/egress. Consideration should be given to utilizing a Hebert hose clamp if available to overcome this issue.
13. E17 responded in tandem with BS17, which created the visual perception that E17 was an available resource in staging when, in reality, BS17 was assigned to the incident and E17 was not. When E17 was given an operational assignment, they were not listed in CAD as an assigned incident resource, and thus, there was no accountability for E17 in Tablet Command. Once recognized, E17 could have been added into TC for accountability.

14. E27 was directed to travel on foot from staging to their assigned area in the Community Protection Group, thus leaving the E27 apparatus in staging. This created the visual perception that E27 was an available resource in staging when, in reality, the crew was assigned to and working in a division. E27 could have been relocated outside the staging area to alleviate any confusion.
15. When supervisors send their resources through rehab, decon, and medical monitoring, they should inform those resources if they are to report back to their assignment afterward or report to staging for reassignment/demob once they are finished with rehab, decon, and medical monitoring. Division/Group Supervisors should provide clear direction to their resources on this.
16. When a staging area has been established at an incident, resources arriving at the incident should check in with the Staging Area Manager upon their arrival. When being released from the incident, they should check out with the Staging Area Manager prior to departure.
17. While rehabilitation and medical monitoring units were established, they might not have been utilized to the desired extent for evaluating firefighter health and cancer reduction objectives prior to reassignments or release from the incident.
18. There was some confusion related to the rehab unit as there were two separate locations where food was being distributed. To eliminate this confusion, establishing one specific location for crew feeding would have been preferable.
19. Truck officers should consider utilizing the UAS video feed on Tablet Command to assist in the precise positioning of master stream water applications during defensive operations.
20. Consider activating the South Bay Incident Management Team for large-scale incidents by requesting through PSC.

Communications

1. Several resources described some challenges associated with the large volume of radio traffic on the tactical channel early in the incident. This resulted in some situations where the charging of supply lines was delayed due to an inability to transmit on the tactical channel.
2. Due to increased radio traffic on the tactical channels, some companies resorted to using cell phones to communicate, particularly with engine company operators during relay pumping operations. Whenever possible, use visual line-of-sight communications.

3. The SCCO Mutual Aid Strike Teams experienced some challenges, as they were unable to access some SMC radio frequencies. This eliminated the option of utilizing those resources for station and district coverage. Providing training in neighboring counties as part of MACS 441 would address this issue.
4. When a resource is activated out of staging, the Staging Area Manager should provide that resource with the division or group they are being assigned to, the identifier of the Division/Group Supervisor, the tactical channel they will be using, and directions to their assignment. Ex: "E15 you are assigned to the Community Protection Group who is BC5 on Tac 16. Go south on Middlefield, turn right on Pacific, and continue to Curtis. Respond on Tac 16."

Unmanned Aircraft Systems

1. Airspace deconfliction was pronounced on this prolonged and high-profile incident. In addition to the SMCSO UAS pilot, interaction occurred with a UAS pilot from NBC News to coordinate a deconfliction strategy.
2. UAS response and personnel accountability could be enhanced through the utilization of 2-way Tablet Command resource management.
3. A large-scale incident of this size benefitted from having a dedicated Visual Observer (VO) and CO-Pilot.
4. While the main priority of the UAS operations was the building fire, attention should also be given to the other areas impacted by the fire, such as the Community Protection Group. UAS operations could have included searching for spot fires and providing ground resources with wind information from various altitudes.
5. Establish, identify, and utilize a dedicated UAS launch and recovery area for additional first responder and public safety while also letting the public know that aircraft operations are underway.

Recommendations for Future Incidents

One of the most important reasons for conducting an AAR is to capture the strengths, successes, challenges, and lessons learned from an incident and transform them into practical and actionable recommendations for future practice. Based upon the information from the previous sections, this section intended to capture the key points from the emergency responder's lived experiences and provide recommendations that can be considered for implementation during future large-scale incidents.

Incident Command

1. Assign a Deputy IC to the ICP early during a large-scale incident and determine a division of labor and individual responsibilities. A fire of this magnitude can quickly overwhelm a single IC, and establishing a Deputy IC can greatly enhance the capabilities and effectiveness of the ICP.
2. When an incident escalates and additional alarms are needed, establish a staging area with a Staging Area Manager (SAM). Consider delegating ordering additional alarms to the SAM to maintain a full assignment available in staging at all times. Additionally, consider a better way to identify the SAM such as ICS vests, vehicle magnets, or other signage such as a "sandwich board" sign.
3. Division/Group supervisors should carry a clipboard or notepad to track their resources in addition to using Tablet Command so they have a backup if the technology fails.
4. Consider making the Community Protection Group either a Division or a Branch in anticipation of a possible significant event, such as another structure fire. This would allow the supervisor to manage that incident better using ICS.
5. Develop standardized trigger points in the Greater Alarm Plan. Example: Following a 4th alarm a Chief Officer responds to PSC, county automatically goes into high call volume, hose and fuel tenders are attached to the incident, and the Water Tender Group is notified.
6. Consider utilizing Incident Command System identification vests during a large-scale incident, particularly for IC, Safety, Division/Group Supervisor, and Staging positions. Consider equipping all SMC Chief officer vehicles with ICS vest kits similar to the Field Incident Command Vest Kit by Disaster Management Systems. Assign a single-resource to distribute ICS vests.
7. When anticipating an extended incident, attempt to arrange crew feeding earlier. Logistical arrangements to have food and water delivered to crews working in different divisions need to be considered, as they might be unable to return to rehab for an extended period of time.

Operations

1. LCES should be utilized during large-scale defensive firefighting operations when there is potential for building collapse, construction crane failure, and/or threat from overhead energized power lines.
2. Remember that everyone is a safety officer. When a safety concern is expressed, personnel should always look for the safest way to accomplish a task, even if it requires additional time or it is determined that the task is too dangerous or there is too much risk for it to be completed.
3. With a large-scale incident spanning multiple divisions, consider attempting to assign additional Safety Officers. Ideally, there would be one overall Incident Safety Officer with Assistant Safety Officers assigned to each division.
4. Ensure confirmation and re-confirmation that all train services have been shut down and overhead high-voltage OCS electrification lines have been de-energized before operating on or near the railroad tracks. This includes both commuter and freight services. Consider going direct with PG&E when it is necessary to de-energize the high-voltage Cal Train OCS lines as they were able to quickly disconnect power to that transformer.
5. Before charging LDH supply lines, ensure that those lines will not impede access for additional arriving companies. Take the time needed to move LDH supply lines to the side of the road for apparatus ingress/egress. Additionally, consider where apparatus not being utilized are staged so as not to impede access for other essential apparatus.
6. For large-scale fire incidents, take the time to spot apparatus for current and future fire conditions and apparatus usage.
7. Notify the water company early when there will be a significant demand on the water supply system so they can increase the pressure. Conversely, notify them when operations are winding down so they can decrease the pressure to avoid damage to water mains and valves.
8. When the water grid system is taxed, switch to smaller tip sizes on master stream devices, utilize relay pumping, and attempt to utilize hydrants from a different grid.
9. If available, utilize hose tenders with relay pumping from water sources in nearby neighborhoods to supplement the water supply.
10. When making dry barrel 5" hydrant connections, utilize gated shutoffs on the other 2 ½" discharge ports for future needs.

11. Consider establishing a “Water Supply Group” staffed with a BC or Fire Captain and a representative from the water company who can respond in a smaller vehicle to travel the area, assess the water supply, and make necessary adjustments.
12. Provide fire service personnel with training on moving “big water,” covering topics such as relay pumping and “welling the hydrant.”
13. Provide fire service personnel with additional training on commercial and defensive firefighting operations.
14. If possible, rotate personnel in areas subject to prolonged smoke exposure. Additionally, consider requesting HM14, or equivalent resource, to set up remote air quality monitoring for crews working extended periods in smoke conditions.
15. Utilize PD and SO for traffic control to prevent vehicles from damaging supply lines and attack lines. Fire apparatus may need to block roadways if law enforcement personnel are unavailable.
16. Provide UAS support in each division of a large-scale incident to provide intel to the Division Supervisor. UAS support in the Community Protection Group could have helped detect fires on roofs and reduced the number of apparatus and personnel needed to accomplish this objective.
17. Establish a system to ensure that all personnel are rotated through rehab and medical monitoring so they are provided adequate food, hydration, and proper medical screening prior to reassignment or release from the incident. Additionally, decontamination measures should be performed prior to departure from the incident.

Communications

1. Conduct training on radio discipline and understand what transmissions are most necessary early on in an incident to address the challenge of overwhelming the initial tactical channel with non-essential radio traffic. Practice with crews on only broadcasting essential messages and having situational awareness when critical radio traffic is being transmitted.
2. Request additional tactical channels early on in a large-scale incident and assign each Division its own tactical channel.
3. Consider obtaining a cache of portable radios pre-programmed with SMC frequencies to provide to incoming Mutual Aid Strike Teams to ensure they have common communications when given operational assignments.

Unmanned Aircraft Systems

1. Develop a plan with stakeholder agencies to establish an SOP for airspace deconfliction that includes news agencies with manned and unmanned air assets, CHP, and the USCG.
2. A formal SOP for dispatching UAS resources should be created along with a more standardized system for alerting UAS resources for improved response times and the benefits associated with establishing overhead aerial footage early on in an incident.
3. Equip UAS resources with 2-way Tablet Command capabilities for resource accountability and tracking.
4. During a large-scale incident, if multiple UAS resources are available, assign one UAS resource to each division for enhanced situational awareness.

Future Discussion Topics

Beyond the recommendations made in the previous section, this incident presented additional topics that might be addressed and evaluated at both the agency and county levels. No recommendations are provided in this section as these discussion topics may be agency-specific or require changes to policies, procedures, and/or guidelines that necessitate further review. These are a few examples of topics that came to light during the incident that warrant further investigation and research.

District & Station Coverage/Deccan

When a large-scale incident occurs, the necessary resources must be available to support the incident needs while also providing adequate district and station coverage capable of handling the unrelated emergency calls that occur. During this incident, cover-in assignments began following the 3rd alarm, with the first cover assignment initiated at 1034 hours. As Menlo Park Fire and Redwood City Fire quickly became depleted of apparatus that were being assigned to the incident, resources from the north were sent to cover the southern districts. As additional alarms were requested for the incident, those resources assigned to cover districts became the closest apparatus to the incident and thus were reassigned to the fire. This resulted in significant coverage gaps that continued through the 8th alarm. Menlo Park Fire, for example, went 37 minutes without an available engine company in the Fire District.

One topic for possible discussion is how San Mateo County determines and coordinates cover assignments and the availability of resources assigned to a cover assignment to be reassigned to an incident. As was the case during this incident, when a resource was assigned to cover a district, it was quickly reassigned to the incident and, therefore, unavailable to fulfill the intended District coverage. While this meant that the closest resources were assigned to the additional alarm levels of the fire, it resulted in continued coverage gaps for unrelated emergency calls. Station and district coverage during large-scale incidents should be further discussed at the county level.

Emergency Callback Procedures

One solution for addressing significant drawdown levels during a large-scale event is to utilize emergency callback procedures for off-duty personnel. Recalling off-duty personnel to up-staff reserve apparatus during a large-scale incident is critical to providing ongoing district coverage and supporting the long-term needs of the incident. Fire agencies might discuss emergency callback procedures and determine if any changes or improvements are necessary.

During this event, Menlo Park Fire successfully recalled a firefighter who was a local resident and trained as an Adjutant (the person responsible for filling daily staffing and creating the daily roster) who responded in and initiated emergency callback procedures. This resulted in the successful up-staffing of three additional ALS engine companies that could fill the gaps and help improve Fire District coverage. These three engine companies were not utilized as part of the response to the Middlefield Fire incident but rather specifically assigned to handle the

unrelated emergency calls in the Fire District. Future discussions on emergency callback procedures might involve evaluating the current system and determining if there are more timely and effective methods and procedures for notifying off-duty personnel of a major event and the need to recall available off-duty personnel.

Reserve Apparatus Readiness

The ability to up-staff reserve apparatus during a drawdown period depends heavily on off-duty personnel being available to staff extra units and the operational readiness levels of non-frontline apparatus. Reserve apparatuses should be equipped with the minimum required tools and equipment to operate as a frontline unit without needing to locate additional items necessary for in-service status. Additionally, these units need to be placed into service as quickly as possible and thus should be maintained to a level where there is minimal delay in getting them response-ready.

Menlo Park Fire, for example, successfully up-staffed three ALS engine companies to respond to emergency calls unrelated to the fire; however, personnel experienced varying levels of reserve apparatus operational readiness. This resulted in significant delays in getting some of these extra units into service and thus slowed the process of providing district coverage. Some of the challenges that led to a delay in reserve apparatus operational readiness related to equipment needs that included SCBAs, EMS supplies and medications, 2-Way Tablet Command capabilities, and issuing apparatus cell phones. Future discussions might address the operational readiness level at which reserve apparatuses should be equipped and maintained and the associated costs.

Incident Command System Identification Vests

One of the challenges experienced during this large-scale incident that required multiple single-resource support personnel was easily identifying individuals serving in command-level positions. While San Mateo County requires all command vehicles to be equipped with ICS identification vests, it is possible that only Battalion Chief vehicles may be equipped with them, and not all Chief Officers carry them in their vehicles. Future discussion on this issue could address the need for all Chief Officers to be equipped with ICS vests and designate one individual to distribute these vests during large-scale incidents to ensure that all command-level personnel are easily identifiable. Furthermore, consideration should be given to a county-wide standardized ICS vest system to ensure consistency when multiple agencies are working together on the same incident.

Participating Agencies

IN GRATITUDE FOR CONTRIBUTING AGENCIES:

Menlo Park Fire Protection District
Redwood City/San Carlos Fire Department
Woodside Fire Protection District
Central County Fire Department
San Mateo Consolidated Fire Department
San Mateo County Fire Department
South San Francisco Fire Department
La Honda Fire Brigade
Kings Mountain Volunteer Fire Brigade
Santa Clara County Fire Department
San Jose Fire Department
Santa Clara City Fire Department
Milpitas Fire Department
Mountain View Fire Department
Sunnyvale Department of Public Safety
American Medical Response
San Mateo County Sheriff's Office
California Highway Patrol
Menlo Park Police Department
Redwood City Police Department
East Palo Alto Police Department
San Mateo County Public Safety Communications
San Mateo County Department of Emergency Management
American Red Cross
Caltrain
California Water Service
Pacific Gas & Electric
Bureau of Alcohol, Tobacco, and Firearms

Conclusion

The fire at 2700 Middlefield Rd. on the morning of Monday, June 3rd, 2024, would become the largest single-building structure fire in the history of San Mateo County. Eight alarms, 27 engine companies, 6 aerial ladder truck companies, 6 battalion chiefs, 4 water tenders, 2 squad units, 2 breathing support units, 2 mutual aid strike teams, 18 single resources, 17 fire investigators, 3 SMC DEM resources, 2 AMR transport units, 2 AMR supervisors, and multiple law enforcement personnel, would ultimately be called upon to mitigate the incident. In total, 51 fire apparatus and over 200 emergency service personnel would respond to the incident.

This unprecedented event required incredible leadership, coordination, collaboration, communication, and interagency teamwork among all first responders and involved stakeholders. Remarkably, the main fire was contained to the building of origin, with no fatalities or injuries to first responders or civilians and minimal exposure damage to nearby residential structures and properties. The many personnel who responded to or were involved in this incident should be commended for their professional and tireless actions, which resulted in the best possible outcome, given the tremendous potential for greater impact and harm.

This After Action Review intended to tell the story of the fire, highlight the many incident strengths and successes, identify the challenges and lessons learned, provide recommendations for future consideration, and present topics that warrant further discussion. It is meant to be a training and educational tool to help better prepare emergency response personnel for future large-scale events.