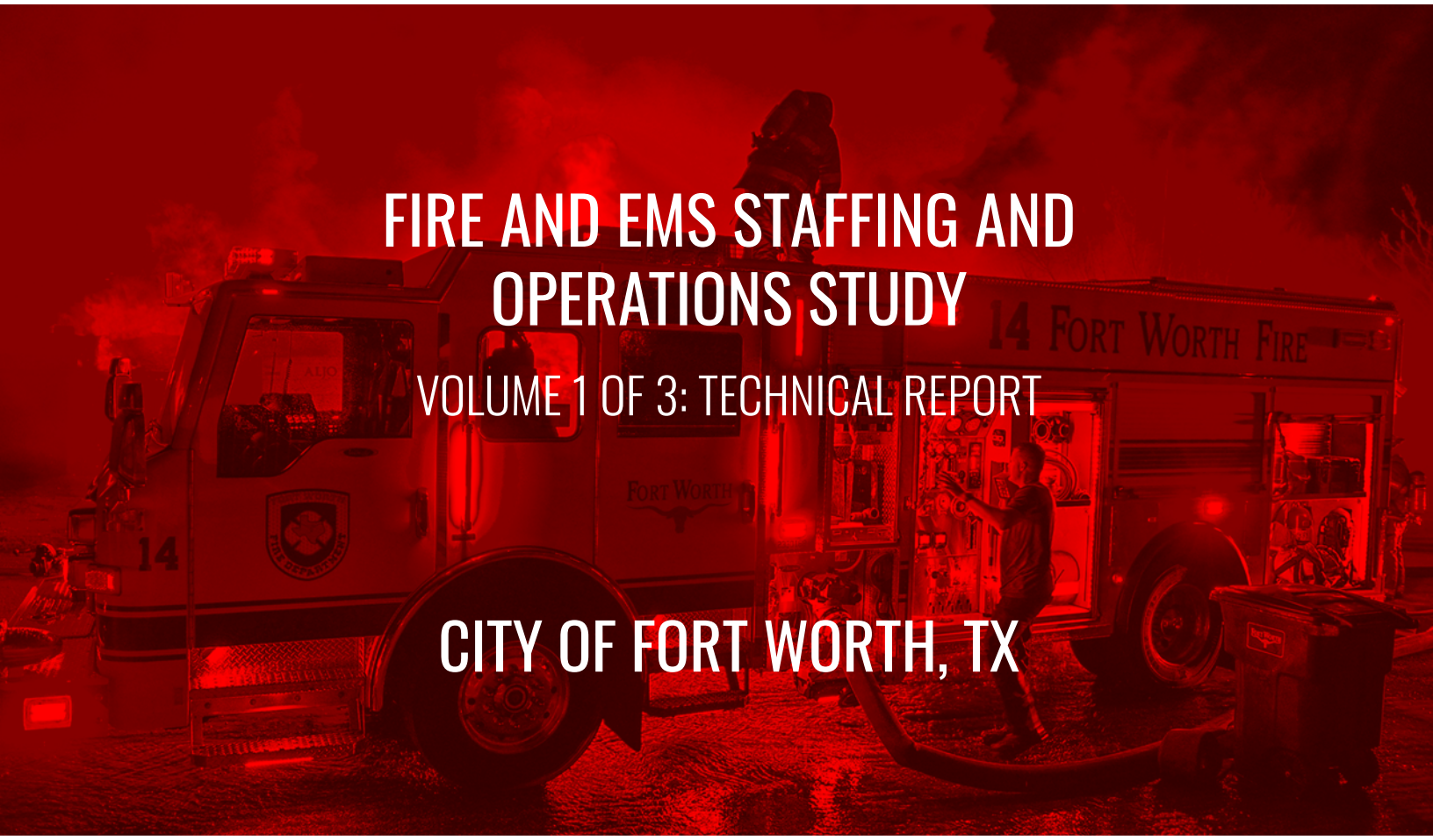
CITYGATE ASSOCIATES, LLC
PUBLIC SAFETY SERVICES



FIRE AND EMS STAFFING AND OPERATIONS STUDY

VOLUME 1 OF 3: TECHNICAL REPORT

CITY OF FORT WORTH, TX

AUGUST 23, 2022

CITYGATE ASSOCIATES, LLC
WWW.CITYGATEASSOCIATES.COM
600 COOLIDGE DRIVE, SUITE 150
FOLSOM, CA 95630
PHONE: (916) 458-5100
FAX: (916) 983-2090

FORT WORTH®

This page was intentionally left blank

TABLE OF CONTENTS

VOLUME 1 of 3 – Technical Report (This Volume)

Section **Page**

Executive Summary 3
Policy Choices Framework 3
Citygate's Overall Observations of Fort Worth's Fire Crew Deployment 4
Fire and Ambulance Deployment Challenges 6
Challenge #1: North City Station Coverage – Station 45 and Planning for Future Growth 6
Challenge #2: Paramedic Service Delivery Times – MedStar and Fire 7
Challenge #3: Dispatch Processing-Time Improvement – Three Dispatch Centers 8
Combined Response Time Results 9
Challenge #4: Adopt Outcome-Driven Response Time Measures 10
Fire Headquarters Staffing and Support Program Challenges 14
Challenge #5: Fire Headquarters Staffing and Budgeting for Overtime 15
Budgeting for Overtime and the Use of Loaned Positions 16
Recommended Headquarters Staffing and Services Improvements Summary 17
Next Steps 18
Immediate to Near-Term 18
Longer-Term 18

Section 1—Introduction and Background 23
1.1 Report Organization 23
1.1.1 Goals of the Report 24
1.2 Project Scope of Work 24
1.2.1 Standards of Coverage (Deployment) Services Reviews 24
1.2.2 How the Project Research was Conducted 24
1.3 Fort Worth Fire Overview 25

Section 2—Standards of Coverage Introduction 31
2.1 Standards of Coverage Review Processes 31
2.2 Standards of Coverage Elements 31

Section 3—Deployment Goals, Measures, and Risk Assessment 37
3.1 How Does Fort Worth Deliver Existing Fire Crew Deployment Services? 37
3.1.1 Existing Response Time Policies and Goals – What Are the Department's Goals? 37
3.1.2 Existing Outcome Expectations 38
3.2 Risk Assessment 41
3.2.1 Values to Be Protected 41
3.2.2 Overview of Values at Risk and Hazards in Fort Worth 42
3.2.3 Hazard Identification 46
3.2.4 Risk Assessment Summary 47
3.2.5 Time Frames for Outcomes 48
3.3 Existing Fort Worth Fire Department Deployment 51
3.3.1 Existing Deployment Situation – What Fort Worth Currently Has in Place 51

Section 4—Staffing and Geo-Mapping Analysis 55
4.1 Critical Task Time Measures – What Must Be Done Over What Time Frame to Achieve the Stated Outcome Expectation? 55
4.1.1 Firefighting Critical Tasks 55
4.1.2 Emergency Medical Services Critical Tasks 57
4.1.3 Critical Task Analysis and ERF Size 58
4.2 Distribution and Concentration Studies—How the Location of First-Due and First-Alarm Resources Affects the Outcome 60
4.2.1 Base Maps – Existing Coverage 60
4.2.2 Coverage Scenarios for Growth Areas 65
4.2.3 Road Mile Coverage Measures 66
4.2.4 Impacts of Growth 68
4.2.5 GIS Mapping Findings 71

Section 5—Statistical Analysis 75
5.1 Historical Effectiveness and Reliability of Response – What Statistics Say About the Existing System's Performance 75
5.1.1 Data Set Identification 75
5.2 Service Demand 76
5.2.1 Incident Quantities by Incident Types 79
5.2.2 Incident Quantities by Property Use 81
5.2.3 Simultaneous Analysis 82
5.2.4 Unit-Hour Utilization 86
5.2.5 High Incident Demand Areas and Staffing Per Crew 89
5.2.6 Staffing per Unit 91
5.3 Distribution Response Time Performance 93
5.3.1 Call Processing 93
5.3.2 Turnout 95
5.3.3 Travel 96
5.3.4 Call to Arrival 100
5.3.5 Distribution and Concentration Measurements for Building Fires 102

Section 6—Multiple Dispatch Centers Analysis 107
6.1 The Evolution of Emergency Dispatch in Fort Worth 107
6.2 Call-Processing and Dispatch Today 107
6.2.1 Exploring Alternatives 109
6.2.2 Economic Considerations 111

Section 7—MedStar Paramedic Service Delivery Analysis 115
7.1 MedStar Background and Services 115
7.2 MedStar Agency Response Time Reports 117
7.3 Citygate Study Measures 122
7.4 Fort Worth Fire Capabilities 128
7.5 MedStar Economics 129

Section 8—Firefighting Deployment Evaluation and Recommendations 137
8.1 Overall Fire and EMS Deployment Evaluation 137
8.1.1 Challenge #1: North City Fire Station Coverage – Station 45 and Planning for Future Growth 138

8.1.2 Challenge #2: Paramedic Service Delivery Times – MedStar and Fire 139
8.1.3 Challenge #3: Dispatch Processing-Time Improvement – Three Dispatch Centers..... 140
8.2 Recommended Deployment Improvements 142

Section 9—Administrative Support Services Capacity Review 149
9.1 Assessment Methodology 150
9.2 Fire Department Administrative Support Organization and Loaned Positions Analysis 151
9.2.1 Loaned Positions Overview 153
9.3 Use of Overtime and Loaned Positions Economics 154
9.4 Three Fiscal Themes 155
9.4.1 Fiscal Theme 1 155
9.4.2 Fiscal Theme 2 155
9.4.3 Fiscal Theme 3 155
9.5 General Summary 156
9.5.1 Revenues and Expenditures 158
9.5.2 Overtime 158
9.5.3 Other Salary/Benefit-Related Costs 161
9.5.4 Non-Salary-Related Costs and Revenues 161
9.5.5 Loaned Positions Impacts 161
9.6 Fire Chief's Office 163
9.6.1 Key Programs and Responsibilities 163
9.6.2 Staffing and Workload Assessment 163
9.6.3 Summary 164
9.7 Fire Administration Bureau 164
9.7.1 Administrative Services Section 165
9.7.2 Grant Management and Procurement Section 167
9.7.3 Fire Information Technology and Data Analytics Section 168
9.7.4 Fire Administration Bureau Summary Findings and Recommendations 168
9.8 Fire Operations Bureau 170
9.8.1 Fire Operations Administration Section 170
9.8.2 Special Operations Section 171
9.8.3 Fire Operations Bureau Administration Summary 176
9.9 Executive Services Bureau 178
9.9.1 Community Risk Reduction Section 178
9.9.2 Fire Prevention Section 180
9.9.3 Fire Investigations / EOD Section 184
9.9.4 Hiring Section 187
9.9.5 Professional Standards Section 188
9.9.6 Executive Services Summary 190
9.10 Support Services, Logistics, and Communications Bureau 193
9.10.1 Educational Services Section 194
9.10.2 Logistics Section 202
9.10.3 Fire Alarm Office 204
9.10.4 Air Shop / SCBA Section 207
9.10.5 Fire Vehicle Services Section 209
9.10.6 Office of Emergency Management 215
9.10.7 Support Services, Logistics, and Communications Bureau Summary 217
9.11 Administrative Support Services Capacity Review Summary 221

9.11.1 Overall Findings and Recommendations 221

Section 10—Next Steps and List of Findings and Recommendations 231
10.1 Next Steps 231
10.1.1 Immediate to Near-Term 231
10.1.2 Longer-Term 231
10.2 Findings and Recommendations 231
10.2.1 Findings 231
10.2.2 Recommendations 237

Appendices

Appendix A—Fort Worth Incident Response Statistical Analysis – Unit-Hour Utilization

Appendix B—Fort Worth 9-1-1 Emergency Call Pathway Management

Table of Tables

Table 1—Fort Worth Fire Department Response Time Summary 6
Table 2—MedStar Priority 1 Performance – Fort Worth 8
Table 3—Fort Worth Police 9-1-1 Center Call-Processing Time Before Transfer to Fire or MedStar 9
Table 4—Call to First-Unit Arrival Police 9-1-1 Plus Fire or MedStar 10
Table 5—Loan Positions Review Needed – Priority 1 17
Table 6—Standards of Coverage Process Elements 32
Table 7—Fire Services Deployment Simplified 32
Table 8—Key Demographic Data – City of Fort Worth 43
Table 9—Overall Risk by Incident Type 50
Table 10—Current Daily Minimum Staffing per Unit – 44 Fire Stations 51
Table 11—Resources Dispatched to Common Risk Types 52
Table 12—First Alarm Working Structure Fire – 27 Personnel 56
Table 13—Cardiac Arrest – Engine Crew (Four Personnel) and Paramedic Ambulance (Two Personnel) 58
Table 14—Road Mile Coverage of 4,671 Miles – First-Due and ERF 67
Table 15—Battalion Assignment of Each Fire Station 75
Table 16—Incident Quantity by Year by Incident Type (Greater Than 500 Total) 79
Table 17—Incidents: Quantity – Reporting Year by Property Use 81
Table 18—Percentage of Simultaneous Incidents by Number of Simultaneous Incidents –20/21 82
Table 19—Simultaneous Incident Activity by Station 84
Table 20—Unit-Hour Utilization – 10 Busiest Engine Companies – RY 20/21 87
Table 21—Unit-Hour Utilization – 10 Busiest Truck/Quint Companies – 20/21 88
Table 22—Top Ten Workload Stations Analysis 89
Table 23—Four-Firefighter Staffing by Population in US Cities 92
Table 24—Call Processing Analysis – 90 Percent Performance 94
Table 25—Turnout Analysis – 90 Percent Performance 95
Table 26—Travel Analysis – 90 Percent Performance 97
Table 27—First-Due Unit Travel Time Analysis 98
Table 28—Call to Arrival Analysis – 90 Percent Performance by Battalion 100
Table 29—Distribution Overall Travel Time Analysis – ERF – Four Engines, One Truck, and Two Battalion Chiefs 103
Table 30—ERF Response Group Call to Arrival (Class A) 104

Table 31—Fort Worth Police 9-1-1 Center Call-Processing Time Before Transfer to Fire or MedStar 110
Table 32—MedStar Priority 1 Performance – Fort Worth 122
Table 33—MedStar Priority 1 RY 17/18 123
Table 34—MedStar Priority 1 RY 20/21 124
Table 35—Call to Arrival Response Times – Medstar Versus Fire by Zip Code 125
Table 36—Previous MedStar Five-Year Economic Forecast 131
Table 37—MedStar Mobile Healthcare Turnover – FY 21/22 132
Table 38—Call to First Unit Arrival Police 9-1-1 Plus Fire or MedStar 141
Table 39—Fire Department Administrative Support Organization Staffing Summary 153
Table 40—Headquarters "Loaned Positions" Summary (March 2022) 154
Table 41—Fire Department General Fund Financial Activity and Forecast – FY 22 157
Table 42—Additional Funding Needed for FTE Capacity by Priority – Fire Chief's Office 164
Table 43—Additional Funded FTE Needed by Priority – Fire Administration Services Bureau 170
Table 44—9-1-1 Call Summary in Fort Worth Homeless Corridor 174
Table 45—Additional Funded FTE Needed by Priority – Fire Operations Bureau Administration 176
Table 46—Recommended Funded Loaned Positions by Priority – CRR Section 179
Table 47—Occupancy Inspection Summary (2019–2021) 181
Table 48—Workload Summary – Fire Prevention Section (2019–2021) 182
Table 49—Additional Funded FTE Needed by Priority – Fire Prevention Section 183
Table 50—Additional Funded FTE Needed by Priority – Fire Investigations / EOD 187
Table 51—Recommended Additional FTE Needs by Priority – Hiring Section 188
Table 52—Recommended Additional FTE Needs by Priority – Professional Standards Section 190
Table 53—Additional Funded FTE Needs by Priority – Executive Services Bureau 191
Table 54—Recruit Fire Trainee Academy Summary (2019-2022) 196
Table 55—Recommended Additional FTE Needed by Priority – Educational Services Section 202
Table 56—Additional Funded FTE Needed by Priority – Logistics Section 204
Table 57—Primary Workload Summary by Year – Fire Alarm Office 206
Table 58—Additional Funded FTE Needs by Priority – Fire Alarm Office 207
Table 59—Fire Fleet Summary 212
Table 60—Grant-Funded Staffing Needs by Priority – OEM 217
Table 61—Additional Funded FTE Needs by Priority – Support Services, Logistics, and Communications Bureau 218
Table 62—Loaned Positions Needed by Priority 228

Table of Figures

Figure 1—Fractile Response Time Chart 39
Figure 2—Building Fire Progression Timeline 48
Figure 3—Survival Rate versus Time to Defibrillation 49
Figure 4—Comprehensive Plan – Projected Population Growth Over Time by Density 69
Figure 5—Comprehensive Plan – Future Land Use 70
Figure 6—Number of Incidents by Reporting Year 76
Figure 7—Number of Incidents by Reporting Year by Incident Type 77
Figure 8—Number of Incidents by Month by Reporting Year 77
Figure 9—Number of Incidents by Day of Week by Reporting Year 78
Figure 10—Number of Incidents by Hour of Day by Reporting Year 78
Figure 11—Number of Incidents by Battalion by Reporting Year 79

Figure 12—Number of Simultaneous Incidents by Battalion 84
Figure 13—Workload Analysis by Station 90
Figure 14—Fractile for Incidents Call Processing (CAD) – 90 Percent Performance – 2020 94
Figure 15—Turnout Performance in 15-Second Increments – 20/21 96
Figure 16—Fractile for Incidents Travel in 30-Second Increments – RY 20/21 97
Figure 17—Call to First-Arrival Performance in 30-Second Increments – RY 20/21 102
Figure 18—Emergency Call Flow Chart 108
Figure 19—MedStar Response Time Reliability and Average Response Time Performance 118
Figure 20—MedStar Key Performance Indicators 119
Figure 21—MedStar System-Wide Average Response Times by Percentage 119
Figure 22—MedStar System-Wide Average Response Times 120
Figure 23—MedStar Response Time Reliability 120
Figure 24—MedStar Priority 1 Response Time Reliability 121
Figure 25—Differences Delta – MedStar and Fire 126
Figure 26—Fort Worth Service Area Balanced Calls 127
Figure 27—MedStar Billing Rates Versus Collection Rates 130
Figure 28—Fire Department Administrative Support Organization 152
Figure 29—Overtime Budget versus Actual – FY 19–FY 22 159
Figure 30—Overtime Hours by Type – FY 17–FY 21 160
Figure 31—Organization Chart – Fire Chief's Office 163
Figure 32—Organization Chart – Fire Administration Bureau 165
Figure 33—Organization Chart – Fire Operations Bureau Administration 170
Figure 34—Special Operations Organizational Chart 171
Figure 35—Executive Services Bureau Organization Chart 178
Figure 36—Organization Chart – Fire Prevention Section 180
Figure 37—Organization Chart – Fire Investigations / EOD Section 184
Figure 38—Organization Chart – Support Services, Logistics, and Communications Bureau 194
Figure 39—Organization Chart – Educational Services Section 195
Figure 40—Organization Chart – Logistics Section 203
Figure 41—Organization Chart – Fire Alarm Office 205
Figure 42—Organization Chart – Air Shop/SCBA Section 208
Figure 43—Organization Chart – Fire Vehicle Services Section 210
Figure 44—Reserve Engine Availability (February 2021–March 2022) 213
Figure 45—Reserve Aerial Apparatus Availability (February 2021–March 2022) 214
Figure 46—Organization Chart – Office of Emergency Management 216

VOLUME 2 of 3 – Map Atlas (Separately Bound)

VOLUME 3 of 3 – Risk Assessment (Separately Bound)

Executive Summary

16
PANTHER

EXECUTIVE SUMMARY

The City of Fort Worth (City) retained Citygate Associates, LLC (Citygate) to conduct a Fire and EMS Staffing and Operations Study of its Fire Department (Department). The assessment includes a comprehensive review of all Department services: whether the services should be provided by the Department; if they are being provided in the most efficient manner; the needs of each community service area; and the Department's organizational structure, communications, staffing levels, management practices, training, and regulatory framework. Additionally, the City requested a review and evaluation of the MedStar ambulance system's interoperability with the Department.

This report is presented in three volumes. The Technical Report (**Volume 1**) includes: this Executive Summary, which contains a summary of our analysis and suggested next steps; Sections 1–8, which contain the deployment and SOC portions of the study; Section 9, which focuses on the headquarters service capacity review; and Section 10, which discusses next steps and summarizes the findings and recommendations. A Map Atlas of deployment coverage measures is provided in **Volume 2**, and a comprehensive Community Risk Assessment is provided in **Volume 3**.

Throughout this report, Citygate makes key findings and, where appropriate, specific action item recommendations. Overall, there are 53 key findings and 42 specific action item recommendations. While this summary cannot discuss every single issue in depth, all are important, or they would not have been included in the Final Report. The scope of this study was large and required data-driven analysis of two major themes—Fire and EMS crew deployment, and all Fire headquarters programs requiring staffing and support to operate a Department serving the 13th largest city in America.

POLICY CHOICES FRAMEWORK

As a reminder to the reader, there are no mandatory federal or state regulations directing the level of fire service response times and outcomes. The level of service provided, and any resultant costs, is the choice of local communities in the United States. The body of regulations on the fire service suggests that if fire services are provided, they must be provided with the safety of the firefighters and the pubic in mind. Thus, there is often a constructive tension between the desired level of fire services and the level that can be funded, and many communities may not have the level of fire services they desire. The City's investments in fire services over the past decades serve as its baseline commitment today.

This study identifies that additional investment in fire services is still necessary, with expanded and additional services from the Department as the City continues to evolve. The fundamental policy choices that drive a city's investment in fire services are derived from two key questions:

1. What outcomes are desired for the emergencies to which the Department responds? Is the desire to keep a building fire to the room, building, or block of origin, and to provide emergency medical care in time to lessen the possibility of preventable death and severe disability?

2. Should equitable response time coverage be provided to all neighborhoods with similar risks (building types and population density) to protect? Once desired outcomes are determined, the fire and emergency medical services (EMS) first responder and MedStar ambulance deployment can then be designed to cover the most geography in the fewest minutes to meet the stated outcome goals. In a large city with multiple neighborhoods such as Fort Worth, it must be determined whether similarly populated areas should receive similar response time performance from both a fire *and* ambulance services unit.

CITYGATE'S OVERALL OBSERVATIONS OF FORT WORTH'S FIRE CREW DEPLOYMENT

Citygate finds that the Department is well organized to accomplish its mission to serve a diverse urban population across a varied municipal land-use pattern. The Department is using best practices and is data driven. Citygate found a caring, committed workforce that is *strongly dedicated* to their City and agency using best practices as possible to anticipate and meet the risks to be protected in the City. In conducting this study, Citygate received outstanding cooperation from the Department, MedStar, and City executives. City leadership should consider this review a best practices tune-up for a well performing agency. Yes, the Department is challenged by City growth and the City is challenged by the costs of what the Fire Department needs. There are solutions to these issues, and some will take more than one fiscal year to correct. City leadership can use this study as a master plan to drive policy choices over the next several years.

The City is marked by a diversity of populations, land use, and public road patterns that, in some areas, is geographically challenging to the provision of prompt Fire and EMS response times. The rivers, open spaces, and/or a lack of major cross-connecting roadways all hamper quick routing in some areas. Population drives service demand, and development brings population. As different areas develop and increase in population density, the Department's firefighting and ambulance services will need adjustment just to *maintain*, much less *improve*, response times equitably across all neighborhoods—more so when simultaneous incidents occur at peak hours of the day.

Throughout the City, while the substantial growth in EMS incidents over the past decade seems all-consuming, for the foreseeable future there will always be the need for both a first-due Fire unit and multiple-unit Effective Response Force (ERF) response consistent with current best practices to limit the risk of fire damage to only part of an affected building and keep wildland fires small within the initial response force's capabilities. Stated this way, *all neighborhoods need a stand-by and readily available firefighting force* that can respond when fires break out, regardless of peak-

hour EMS workload. As demonstrated by the recent winter freeze and current extreme heat emergencies, there is also a need for a strong fire department during natural disasters, as the vulnerable members of the City's population will need help from first responders.

Throughout the deployment sections of this report, Citygate has conducted in-depth analysis of response times, station locations, dispatching, types of fire apparatus and MedStar's paramedic ambulance deployment. This analysis is based on a combination of geographic information system (GIS) mapping and incident statistics to support Citygate's opinions and overall deployment findings and recommendations.

The effective deployment of fire and ambulance units across the City is challenged by four issues that make cost-effective deployment more difficult:

- Growth in the north City and along almost all other edge areas for effective fire station response times.
- First paramedic delivery, given MedStar's paramedic ambulance response times.
- Lengthy dispatch processing times given the interplay of three dispatch centers.
- The need for specific, outcome-driven service goals adopted by the City Council to drive investment, improvements, and accountability.

Response times should be established around the acceptable risk tolerance of the City and the outcomes desired. If this is the goal, the City should implement the recommendations in this study to add appropriate deployment resources. Doing so will stabilize and improve response times given current population and employment growth projections.

Fire services deployment, simply stated, is about the **speed** and **weight** of the response. **Speed** calls for first-due, all-risk intervention units (engines, ladder trucks, ambulances, and specialty units such as technical rescue) strategically located across a jurisdiction responding within an effective travel time to control routine-to-moderate emergencies and prevent them from escalating to greater size or complexity, which unnecessarily depletes resources as multiple requests for service occur. **Weight** concerns multiple-unit response for more serious emergencies, such as a room-and-contents building fire, a multiple-patient medical incident, a vehicle accident with extrication required, or a heavy-rescue incident. In these situations, enough firefighters must be assembled within a reasonable timeframe to safely control the emergency and keep it from escalating.

Citygate's analysis of prior response statistics and use of geographic mapping tools reveals that the City does not currently deliver best practice response times across all areas of the City by either Fire or MedStar. The current deployment system cannot completely meet best practices for the geography and incident demands. The Fire Department's current deployment system performance

is described in detail by the maps provided in **Volume 2** and the corresponding text explanation beginning in Section 4.2 of this volume.

FIRE AND AMBULANCE DEPLOYMENT CHALLENGES

Challenge #1: North City Station Coverage – Station 45 and Planning for Future Growth

The road networks outside of the core City use curvilinear streets in design with more limited major cross-connecting roadways. Open spaces and unannexed areas bisect the outer City areas. Fire station locations in such curvilinear road networks need tighter station-to-station spacing as the units cannot cover as many public street miles as quickly as they can in a core City grid road network.

If desired outcomes include limiting building fire damage to only part of the inside of an affected building and/or minimizing permanent impairment from a medical emergency, then initial units should arrive within **7:30** minutes and a multiple-unit ERF (First Alarm) should arrive within 11:30 minutes of 9-1-1 notification at the Police Department's 9-1-1 communications center, all at **90 percent** or better reliability. Total response time to emergency incidents includes three separate components: (1) 9-1-1 call processing/dispatch time, (2) crew turnout time, and (3) travel time. Recommended best practices and Citygate's experience for these response components are 1:30 minutes, 2:00 minutes, and 4:00/8:00 minutes respectively for first-due and multiple-unit ERF responses in urban areas.

The following table summarizes the Department's performance response times:

Table 1—Fort Worth Fire Department Response Time Summary

Response Component	Best Practice		20/21 – 90th Percentile Performance	Performance versus Best Practice
	Time	Reference		
Call Processing / Dispatch	1:30	NFPA	**1:32***	+ 0:02
Crew Turnout	2:00	Citygate	**3:01**	+ 1:01
First-Due Travel	4:00	NFPA Citygate	**6:33**	+ 2:33
First Unit Call to Arrival	7:30	Citygate	**10:21***	+ 2:51
First Alarm Travel – Class A	8:00	NFPA Citygate	**18:41**	+ 10:41
First Alarm Call to Arrival – Class A	11:30	Citygate	**21:51***	+ 10:21

*Does not include Police 9-1-1 call processing time

The City has been planning for two additional fire stations. Station 45 in the north City will open in September 2022. The City has purchased land for Station 46 in the southwest City. The City and Department were awaiting this study to make a final decision on staffing and unit types for this station. Based on Citygate's geographic mapping and response statistics studies, Citygate finds the north City needs three unit types at Station 45—an engine, a quint/ladder, and a Battalion Chief. The station was built to accommodate this. These additions will significantly improve first-unit, multiple-unit ERF, and command chief travel time coverage in that part of the City.

This study also reviewed the City's growth and land use plans, with most growth projected to be in the City's edge areas outside of the loop. The City should not expect that new Station 45, or yet-to-be-designed Station 46 in the far southwest corner of the City, will be sufficient. The City should enable a Department and City planning team to work with developers to understand, at a neighborhood level, how much growth can be expected to occur, and when. The City should adopt trigger point measures for when there are too many populations—residential or business—beyond the reasonable reach of a fire station, so the next needed station is envisioned, the parcel obtained, and the building designed and constructed to open when the trigger point is crossed, not well afterwards. The same, ongoing planning will also synchronize the timing to purchase apparatus and hire additional staffing.

With the addition of Stations 45 and 46, the near-term physical fire stations are adequate pending a deeper growth analysis. The Department needs to understand the multiple factors driving slow response times into its response planning for added stations due to growth. In addition, this study identifies 10 existing fire station areas that are approaching incident workload saturation. As existing station areas become too busy, the next logical deployment addition would be two-firefighter squads for low-acuity EMS and non-fire incident call responses *at peak hours of the day* on an alternative work schedule.

Challenge #2: Paramedic Service Delivery Times – MedStar and Fire

The growth of the City over the last decade or so has strained the MedStar ambulance system to provide a paramedic ambulance within the time frame to even begin paramedic-level intervention before a serious medical event results in catastrophic harm. MedStar's current response time coverages are not equitable to all neighborhoods, all the time, and are not as responsive as other major American paramedic ambulance systems, where the ambulance is the only paramedic provider. In Fort Worth, the Fire Department responds Citywide with a Basic Life Support (BLS) level of care at minimum. Paramedic Advanced Life Support (ALS) first responder care is provided in limited areas.

MedStar's response goal for the highest Priority 1 incidents is 11:00 minutes at **85 percent** compliance from the time MedStar *receives* (at its separate communications center) a 9-1-1 call from the Police Department communications center.

Table 2—MedStar Priority 1 Performance – Fort Worth

Measure	RY 18/19	RY 19/20	RY 20/21
Dispatch	1:23	2:22	2:31
Crew Turnout	0:23	0:25	0:22
Travel time	10:20	10:18	11:11
Call to Arrival	**12:22**	**13:01**	**14:16**

The Fire Department is also slow to respond, but given 44 stations at present, it has a station in most neighborhoods and arrives well before MedStar, as the data in this study identifies. Given the economic and population growth planned in what is soon to be a million-resident City, the much quicker delivery of a first paramedic should be considered.

In our analysis of MedStar operations, Citygate found that two options exist for improvement: (1) add ambulance coverage to deliver 11:00-minute call to arrival at **90 percent** performance *Citywide*, and/or (2) take the partial firefighter paramedic force which already exists and immediately begin the deployment of a fire engine-based paramedic first response, a very common model across the country. Doing so leverages the City's investment in staffing four firefighters per unit, leverages the City's existing costs in stations and apparatus, and does not require MedStar to find the revenues to significantly grow its 9-1-1 ambulance deployment fleet or to deploy two paramedics to critical patients. The few times a second paramedic is needed on a trip to the hospital, the Fire paramedic would go, still leaving a three-person fire engine for other responses.

For special incident response, community events, and to support its own personnel safety at major incidents, the Fire Department has grown a modest paramedic capacity. With little new expense, the Department can field 20–25 paramedic fire engines in harder-to-serve edge neighborhoods as soon as possible. Growing the program will require a larger investment in paramedic equipment, personnel, and eventual equipment replacement.

Challenge #3: Dispatch Processing-Time Improvement – Three Dispatch Centers

The City uses three emergency communication centers—Police for answering 9-1-1 calls, a Fire Department center, and a MedStar center. Thus, in the City there are three separate communication/dispatch centers that a 9-1-1 call must navigate. Each of the three electronic computer dispatching systems is electronically linked, and once an incident is started by either the Police or Fire center, that incident can be "sent" to the other centers for dispatching.

EMS is the largest volume of fire department events, so EMS 9-1-1 callers are routed to MedStar by the Police 9-1-1 call taker. The Police dispatcher can stay on the line and co-listen for Police unit needs. Once MedStar has run through its decision process as to what to send, the incident is electronically sent to fire, if a fire unit is needed. If the 9-1-1 call is first answered by fire as the

Police center is too busy to answer, they must send the caller to MedStar. In some instances, a caller could be questioned by one dispatcher, but have one or two others also listening.

The following dispatch processing times show the performance by communications center. The Police process is excessive and only the Fire center comes close to best practice performance *once it gets the call.* MedStar needs time to triage the medical needs, but even for Priority 1 incidents they are too slow.

Table 3—Fort Worth Police 9-1-1 Center Call-Processing Time Before Transfer to Fire or MedStar

Center	3-Year 90% Performance	Low	High	Best Practice or Citygate Goal[1]
Police—All Transferred Incidents	2:42	1:33	3:26	0:30[2]
MedStar—Priority 1 Urgent *Completed Incidents*	2:13	1:23	2:31	1:30
Fire—All Fire and EMS incidents, Not "Other"	1:32	1:13	1:47	1:30[3]
90% Total *(if all three dispatch centers had to transfer and dispatch based on the Low or High)*	-	3:58	6:17	2:00

[1] Citygate goal based on NFPA's previous, more realistic measure of 1:30 minutes + up to 30 seconds for Police 9-1-1
[2] NFPA 1221; 2019 Ed. 30 seconds for answer and transfer; 60 seconds for Police event processing
[3] NFPA 1710; 2020 Ed. Fire/EMS Deployment Alarm processing 65 seconds

The resulting system is complicated, has expensive technology overlaps, and—based on all the available dispatch processing time data—is significantly slower than national best practice advice. Together the three dispatch centers can add enough time that even if each one was to best practices, cumulatively, they are slow, and the lost time cannot be made up in driving faster or adding more fire engines and ambulances.

COMBINED RESPONSE TIME RESULTS

The times reported in the previous Fire and MedStar sections are from *when they received the call from the Police communications center*. If their 90 percent Priority 1 performance is added to Police 9-1-1 processing time, then the City's true customer service to the public would measure in the low-to-mid teens in minutes. However, for both deadly medical events and fires that are already serious when called in, *the first unit needed should be arriving to begin to understand and slow the escalation of an emergency within 7:30–8:30 minutes from 9-1-1 answer.*

Based on the previous three-agency response time analysis, the total Priority 1 response times from Police 9-1-1 answer are listed in the following table, along with the impacts modest time savings could deliver. These times are for RY 20/21 without new Fire Station 45 open.

Table 4—Call to First-Unit Arrival Police 9-1-1 Plus Fire or MedStar

Agency	RY 20/21 Fire & Medstar Received to First Arrival	Police 9-1-1 Transfer Processing 3-Year 90%	Total
Fire	10:21	2:42	**13:03**
Medstar	14:16	2:42	**16:58**
Fire saves 1:00 minute turnout time *and* Police transfer to 30 seconds	9:21	0:30	**9:51**
Medstar with Police at 30 seconds	**14:16**	**0:30**	**14:46**

In the MedStar analysis section of this report, the response times by zip code were compared between Fire and MedStar. In 27 zip codes that had a large data sample size for both Fire and MedStar, from October 2020 through September 2021—on average, and across all areas—Fire arrived 6:00 minutes *before* Medstar.

In Citygate's experience with multiple states, for critical (Priority 1) patient care in urban areas, the time for EMS deployment ranges from 8:00–12:00 minutes for *call to arrival* of a fire station paramedic or an ambulance system paramedic. Most urban systems strive for 10:00 minutes or less for the arrival of the first paramedic. In Dallas, the system utilizes fire engine paramedics with a response time goal of 9:00 minutes or less to 90 percent of incidents. At this point in 2022, they are reporting compliance at 84 percent. In Austin, without using fire department paramedics, the paramedic ambulance system goal is 9:59 minutes 91 percent of the time, and recently, their 2021 performance was at 85.6 percent. Austin also expects the fire unit with an EMT to arrive within 8:00 minutes 85 percent of the time, and in 2021, they delivered at 76 percent.

These response systems' rigorous response times revolve around critical life and death calls and the time to flashover when a fire is consuming the room of origin and spreading both vertically and horizontally to other rooms or compartments. In Citygate's experience, urban systems also strive for equity of access for all neighborhoods of similar population density to offer the same response time access to a prompt paramedic level of care.

It will take the addition of planned Stations 45 and 46 plus significant efforts to reduce all critical dispatches to 90–120 seconds, but the Department can deliver first responder services to most neighborhoods in the near-term in the 9:00-minute range.

Challenge #4: Adopt Outcome-Driven Response Time Measures

While the City's budget document contains some Fire-Department-submitted response time measures, the City Council has not separately adopted fire, EMS, and specialty response performance goals that are sufficiently specific to include the beginning time measure from the point of the Police dispatch receiving the 9-1-1 phone call, nor do the current goals reflect risks

and outcome expectations. Clarifying deployment goals will meet the best practice recommendations of the Commission on Fire Accreditation International. More importantly, clear, measurable goals will guide the Council and public discussion on funding Fire and EMS not only around cost, but first and foremost, about people-centric positive outcomes in emergencies.

Given the importance and high cost of field deployment services, the following is a complete list of the Deployment study's recommendations.

Recommendation #1: **Adopt City Council Deployment Measure Policies**: The Council should consider adopting complete performance measures that begin with Police 9-1-1 call answer and end with the Fire Department and/or an ambulance arriving at the emergency incident. The measures of time should be designed to save patients and to keep small but serious fires from becoming more complex or damaging. With this is mind, Citygate recommends the following outcome-based measures for the major emergency types:

1.1: Geographic Distribution of Fire Stations: To treat medical patients and control small fires, the first-due unit should arrive within 8:30 minutes, 90 percent of the time, from receipt of the 9-1-1 call in the fire dispatch center. This equates to a 90-second dispatch time, 2:00-minute company turnout time, and 5:00-minute travel time.

1.2: Multiple-Unit Effective Response Force for Serious Emergencies: To confine fires near the room of origin and to treat up to five medical patients at once, a multiple-unit response of a *minimum* of three engines, one quint/ladder truck, and one Battalion Chief, totaling a minimum of 17 personnel, should arrive within 11:30 minutes from the time of 9-1-1 call receipt in fire dispatch, 90 percent of the time. This equates to 90-second dispatch time, 2:00-minute company turnout time, and 8:00-minute travel time spacing for multiple units.

1.3: Hazardous Materials Response: To minimize or halt the release of a hazardous substance so it has minimal impact on the community, the Department needs to maintain its hazardous materials response as designed to protect the community from hazards associated with uncontrolled release of hazardous and toxic materials. The first responder unit should arrive to investigate a hazmat release at the operations level within 8:30 minutes, 90 percent of the time, which equates to a 90-second

dispatch time, 2:00-minute company turnout time, and 5:00-minute travel time in urban population areas. After assessment and scene evaluation is completed, a determination will be made whether to request additional resources.

1.4: Technical Rescue: To respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue, the first-due company in urban to suburban areas to arrive for assessment of the rescue should achieve a 5:00-minute travel time, 90 percent of the time. Additional resources capable of initiating a rescue should be assembled within a total response time of 11:30 minutes, 90 percent of the time, with the result being a safe and complete rescue/extrication to ensure delivery of patients to a definitive care facility.

Recommendation #2: Reduce fire turnout times through training and data feedback for crew accountability, to 2:00 minutes or less, 90 percent of the time.

Recommendation #3: Reduce dispatch processing time for acute emergencies to 90 seconds or less, 90 percent of the time, from the time of 9-1-1 call answer.

3.1: Immediately task the three dispatch centers to improve existing technology and dispatcher workflows to reduce call-processing time.

3.2: Conduct an in-depth operational and fiscal analysis of merging the three dispatch centers into a consolidated Fort Worth emergency 9-1-1 and non-emergency 3-1-1 center.

Recommendation #4: Given the Department's service needs in the north City, open new Station 45 with an engine company, a quint/ladder company, and a Battalion Chief for improved northern area incident command.

Recommendation #5: Task Medstar and the Fire Department to continue dispatch reprioritization efforts that reduce the number of non-life-threatening complaints categorized as Priority 1 calls, so the system can focus on getting the right resources to the most critical calls in the fastest time possible.

Recommendation #6: The City, Fire Department, and Medstar need to grow their positive, but presently small, programs to deliver compassionate care, social,

and mental health services without unduly burdening the 9-1-1 response forces.

Recommendation #7: The City Council should consider tasking MedStar and the Department to immediately study and analyze the cost of:

7.1: Increasing Medstar paramedic ambulance coverage to 90 percent of Priority 1 incidents to 9:50 minutes from the time of 9-1-1 answer at the Police Department, and/or

7.2: The Fire Department implementing paramedic engine first responders with existing resources to work with MedStar paramedics in the most difficult to reach neighborhoods, and then expand the program to all City fire stations.

7.3: In either choice, consider the long-term economic and personnel-related sustainability. If public funds are needed to increase MedStar ambulance coverage, determine whether a need exists for governance changes so the City Council can control the use of general revenues.

Recommendation #8: Direct Fire, Planning, and Fiscal staffs to design and return to Council in no more than six months a new trigger-point threshold for adding fire stations concurrent with City growth, and not long after growth has already taken place.

8.1: Given this study's understanding of City growth, consider a trigger point of more than 10,000 residents in a contiguous area beyond a 5:00-minute *travel* time from a station, or in commercial-only areas, when there are more than 5,000 employees (or others) in a contiguous area beyond an 8:00-minute *travel* time from a station.

Recommendation #9: The Department needs to monitor workloads and response times per unit, and when Unit-Hour Utilization exceed 30 percent for several hours at a time, add peak-hour two-firefighter squads as low-acuity incident responders.

Recommendation #10: For the risks to be protected and the large station areas, the City should continue the practice of staffing 24/7/365 primary fire engines and quints/ladders with four firefighters per crew.

FIRE HEADQUARTERS STAFFING AND SUPPORT PROGRAM CHALLENGES

As an element of this Fire and EMS Staffing and Operations Staffing Study, Citygate was tasked to review and evaluate the Department's administrative and support staffing allocated to the various Department bureaus and functions, as well as the capital equipment, technology, and facilities needed to support those functions.

For overall fire department administration, the National Fire Protection Association (NFPA) recommends, in part, "the [department] shall have a leader and organizational structure that facilitates efficient and effective management of its resources to carry out its mandate as required [in its mission statement]."[1] Best practices recommend a management organization and headquarters programs with adequate staffing capacity to provide a properly trained, equipped, and supported response force to ensure prompt response and safe, competent service delivery. Compliance regulations for fire services operation are increasing, so the proper hiring, training, and supervision of operational personnel requires a significant leadership and general management commitment.

Additionally, in the State of Texas, the provision of public agency fire services is highly regulated by state law through the Texas Commission on Fire Protection[2] (TCFP). Through this process, fire service best practices, organizational standards, and recommendations have the force of Administrative Law. Therefore, all government agencies that utilize their employees to provide firefighting services must comply with TCFP requirements.

Citygate reviewed the Department's current headquarters support organization and evaluated lines of authority, span of control, and workload capacity gaps. Citygate then formulated findings relative to that evaluation and provided recommendations for consideration by City and Department executive management to improve the overall efficacy of the Department's headquarters organization.

It should be noted that, at the start of this review, the Department's headquarters / administrative support organization included 60 personnel that were administratively reassigned from fire station operations to provide the staffing capacity needed to meet workload demand and expectations. Beginning in April 2022, some of these personnel were temporarily transferred back to the Fire Operations Bureau to reduce overtime costs in that bureau. This review evaluated workload capacity and staffing *prior* to any of the Spring 2022 personnel transfers back to the Fire Operations Bureau.

In summary, while Department and City staff offered insights, opinions, and recommendations, the review to follow represents Citygate's independent perspective. Citygate also balances

[1] NFPA 1201 – Standard for Providing Emergency Services to the Public (2015 Edition).
[2] https://www.tcfp.texas.gov/about/our-mission

administrative needs—first, against safety for personnel and the public they serve, and second, against compliance with appropriate county, state, and federal regulations.

Challenge #5: Fire Headquarters Staffing and Budgeting for Overtime

Citygate's analysis and review found many headquarters units using loan positions to maintain workload to regulations and customer service expectations. It seems easy for any community to constrain headquarters expenses and keep fire stations open; however, at some point the risks of failure of safety and the care of the public are *increased with a lack of training, equipment, leadership, and quality oversight.*

In reviewing all Fire headquarters' 19 business sections organized into four bureaus, Citygate found the necessary business, technical, and logistics services required to keep 44 fire stations open 24/7/365 while also meeting federal and state training and safety regulations. However, the staffing included "loan" positions from the fire station staffing ranks, as will be explained in Section 9 of this study.

Most of the facilities and equipment is in good condition and has received adequate funding over time. Three standout exceptions to this statement are the condition of the Fire Communications building, the fire apparatus repair facility, and the number and quality of the reserve fire engine fleet.

Citygate also identified in the staffing review a few key positions as "single points of failure," where only one person is trained for a complex set of duties and does not have an adequate, cross-trained backup. The Department needs to increase its wildland fire training and certifications, which while making good progress on, in the "new normal" for wildfire, are essential to complete. Fire prevention and fire investigation programs are at or just over maximum capacity, yet the City is still growing. These programs serve to prevent fires and other hazardous incidents via engineering (codes/inspections), education, and enforcement. They are necessary programs to continue to deliver at the quantity Fort Worth needs.

The fire apparatus reserve fleet is small, older, and not fully equipped. To its credit, the City made a larger advance purchase of fire apparatus to catch up, but due to pandemic delays the new units could take up to two years to deliver. In the meantime, the current units should be fully equipped to respond as maintenance replacements or surge units during catastrophic emergencies.

The other significant headquarters issue is the staffing for and the location of the City's Office of Emergency Services for Citywide disaster preparedness and response coordination. During the preparation of this study, some of the grant funding for the staff in this unit was discontinued, resulting in the loss of three positions when the current grant cycle ends. Given the size of Fort Worth, Citygate believes this is a critical public safety function and, as such, should not be a responsibility assigned to either the Police or Fire Department. Citygate recommends the function be transferred to the City Manager's Office, and a fully credentialed Emergency Manager with

experience and skills for the scope of Fort Worth's services be hired to have direct access and report to the City Manager.

Budgeting for Overtime and the Use of Loaned Positions

Citygate's use of overtime analysis identified four basic themes that have collectively resulted in significant underfunding of Department personnel costs in FY 22 for the *existing* levels of service.

Theme 1: The Department has consistently underbudgeted overtime by using small-percentage, year-over-year increases instead of accurately modeling the actual drivers of overtime. This systemic underfunding of overtime has not been well understood due to the City budget process allowing personnel expense balancing using funds from vacancies.

Theme 2: For a very long time, and since before the appointment of current City and Department leadership, the Department has used the practice of "loaning" frontline fire station staff to Department headquarters functions in lieu of adequately and permanently funding the needed headquarters positions. The "loaned" positions increase overtime where the fire station assignment must be backfilled by regular or overtime fire personnel.

Theme 3: Backfill overtime for fire station positions significantly increased due to the pandemic along with other changes to the use of earned sick leave. Using Department staff forecast estimates and the information originally submitted to Citygate, the FY 22 year-end net salary and benefits cost deficit is anticipated to be approximately $19.5 million, consisting of approximately $16.6 million of underbudgeted overtime, and approximately $14.5 million in underbudgeted other salary and benefit areas. This deficit is partially offset by anticipated salary savings of approximately $9.9 million.

Theme 4: The practice of "loaning" frontline fire station staff to Department headquarters functions in lieu of *permanently* funding the needed headquarters positions should have been a temporary, one- or two-year stopgap solution.

The "loaned" positions increase overtime where the fire station personnel assignment must be backfilled by overtime fire personnel when staffing reaches minimums due to firefighters using earned leave or Departmental vacancies such as retirements. However, over many years, this practice in Fort Worth has grown to 60 positions loaned to headquarters functions. These drivers of overtime have not been modeled well in the Fire Department overtime budget process as the loan program worked on the premise of fiscal neutrality given vacant position offsetting salary and benefit savings. This worked—*until the onset of the COVID-19 pandemic.* At that point, a combination of vacancies; new pandemic programs, such as testing; along with increased use of

workers' compensation sick leave all combined to drive overtime past the point that salary and benefit savings could cover all the loaned positions.

Citygate's review of the headquarters programs staffing included a review of every loaned position and, if necessary, possible additional positions over time as the City grows, to meet the demands on Department services. The following table shows Citygate's recommended priority for loaned positions to be studied for resolution of permanent funding or to constrain some programs. Such in-depth analysis will also allow for longer term policy consideration. Also, while conducting the in-depth headquarters staffing review, the City should also undertake a more detailed study of the use of non-sworn personnel.

The following table summarizes the loan personnel considered Priority 1 (important to maintain regulatory and needed services at current levels) for further review:

Table 5—Loan Positions Review Needed – Priority 1

Bureau/Office	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels
Loaned Positions	**38**
Fire Chief's Office	0
Fire Administration Services Bureau	0
Fire Operations Bureau	0
Executive Services Bureau	11
Support Services, Logistics, and Communications Bureau	27

Recommended Headquarters Staffing and Services Improvements Summary

Headquarters findings and recommendations can be briefly summarized as:

- The headquarters services and programs provided by the Department are all appropriate to the 13th largest city in the nation and to Fort Worth's risks to be prepared for and proceed against.
- Headquarters programs are not overstaffed. The loaned positions are all serving *valuable* functions. If they are not made permanent, services and programs will have to be curtailed. The Department will also have to add more specialized positions in headquarters to maintain services commensurate with the City's growth.

- The Department needs to build a robust, multifaceted overtime request model that can far more accurately and transparently deliver budget requests.
- The Department's business services must separate some fiscal duties and increase the staffing to reduce single point failure in workers' compensation and payroll hours processing.
- Obtain the funding to equip all reserve fire apparatus for use without needing to transfer equipment from front-line units under repair or from the warehouse stores.
- The Department's fleet and information technology staffs can better integrate and make use of centralized City services.

NEXT STEPS

As a first step, the City Council should adopt updated, clearly measurable response time goals for the Department based on best practices, starting with the 9-1-1 call receipt in Police dispatch. The Council needs to require regular reporting to provide accountability for the Department to meet its goals. The goals identified in Recommendation #1 are consistent with both national best practices and the risks to be protected in Fort Worth. Measurement and planning, as Fort Worth continues to evolve, will be necessary for the Department to meet these goals.

Based on this evaluation, Citygate offers these next steps to move the Department forward.

Immediate to Near-Term

- Adopt a set of updated response time policies.
- Direct staff to significantly lower dispatch-processing time within the three current centers' technology and procedures.
- Improve first paramedic response times to all neighborhoods by directing the deployment of the already available firefighter paramedics *as soon as possible.*
- Staff new Fire Station 45 with an engine, a quint/ladder, and a Battalion Chief as fast as the staff can be hired and promoted.
- Study for permanent funding the loaned positions by priority and study additional positions against customer service needs. Final funding and program delivery should include Council policy direction.

Longer-Term

- Establish a Fire and Planning Department team to model ongoing growth against the Department's deployment goals for added fire stations and/or units.

- Adopt a Council policy that identifies a trigger point for adding fire stations coinciding with population growth and new neighborhoods.

This page was intentionally left blank

Section 1

Introduction and Background

PECAN STREET
1
FORT WORTH

SECTION 1—INTRODUCTION AND BACKGROUND

Citygate Associates, LLC's (Citygate) detailed work product for the City of Fort Worth (City) Fire Department (Department) is presented in this volume. Citygate's scope of work and corresponding Work Plan were developed consistent with Citygate's Project Team members' experience in fire administration. Citygate utilizes various National Fire Protection Association (NFPA) publications as best practice guidelines, along with best practices from the criteria of the Commission on Fire Accreditation International (CFAI) and the Texas Commission on Fire Protection (TCFP).

1.1 REPORT ORGANIZATION

This report is comprised of three volumes. The Map Atlas is found in **Volume 2** and the Risk Assessment is found in **Volume 3**. **Volume 1** consists of the following sections:

Executive Summary: A summary of our analysis and suggested next steps.

Section 1 **Introduction and Background**: An introduction to the Department and background facts.

Section 2 **Standards of Coverage Introduction**: An introduction to the SOC (deployment) process and methodology used by Citygate in this review.

Section 3 **Deployment Goals, Measures, and Risk Assessment**: An in-depth examination of the Department's ability to deploy firefighters and apparatus to meet the risks, expectations, and emergency needs of its constituents.

Section 4 **Staffing and Geo-Mapping Analysis**: A review of: (1) the critical tasks that must be performed to achieve the City's desired fire and emergency medical services (EMS) emergency outcomes; and (2) the Department's existing fire station and apparatus locations as well as needed future locations.

Section 5 **Statistical Analysis**: A statistical data analysis of the Department's incident responses.

Section 6 **Multiple Dispatch Centers Analysis**: An analysis of the City's three dispatch centers and their interaction and impact on incident response.

Section 7 **MedStar Paramedic Service Delivery Analysis**: A review of paramedic ambulance response times and coordination with the Fire Department.

Section 8 **Firefighting Deployment Evaluation and Recommendations**: An integrated summary of deployment priorities and an overall deployment recommendation.

Section 9 **Headquarters Service Capacity Review**: A review of the administration, technical services, support, and logistics programs.

Section 10 **Next Steps**: A summary of recommended next steps and a list of all findings and recommendations.

1.1.1 Goals of the Report

Following observation and analysis, this study will cite findings and make recommendations, if appropriate, that relate to each finding. Findings and recommendations are numbered sequentially. Section 10 of this report brings attention to the highest priority needs and recommended next steps.

This document provides technical information about the way fire services are provided and legally regulated and the way the Department currently operates. This information is presented in the form of recommendations and policy choices so the City Council can determine how to proceed within the normal policy and budget-setting processes.

1.2 Project Scope of Work

1.2.1 Standards of Coverage (Deployment) Services Reviews

The scope of this SOC deployment review includes the following elements:

- Conducting a comprehensive analysis of community risks.
- Understanding and modeling staffing, stations, and apparatus needed to protect the identified risks.
- Evaluating the Department's interoperability with MedStar
- Using the incident response time analysis program StatsFD™ to review the incident response statistics of historical performance.
- Using the geographic mapping response time measurement tool, FireView™ to measure fire unit driving coverages from the City's current fire stations.
- Updating performance goals for City Council adoption consistent with the local risks to be protected, national best practices, and guidelines from the NFPA and the CFAI.

1.2.2 How the Project Research was Conducted

Citygate's methodology included:

- Obtaining hundreds of records and data sets—approximately 1.8 gigabytes in all.
- Issuing questionnaires to headquarters staff managers and conducting over 24 primary Fire and (as appropriate) City staff interviews, with many more for follow-ups and clarifications.

- Deep statistical research from prior incident electronic data.
- Geographic coverage modeling.
- Estimating the additional capacity needed, if any, to close identified service capacity gaps and eliminate or minimize any single points of failure.
- Recommending structural changes to improve overall organizational efficacy, communications, coordination, and supervisory span of control.

In summary, while Department and City staff offered insights, opinions, and recommendations, the analysis to follow represents Citygate's independent perspective. Citygate also balances administrative needs—first, against safety for personnel and the public they serve, and second, against compliance with appropriate county, state, and federal regulations.

1.3 Fort Worth Fire Overview

This review of the Department's field services deployment must be completed in the context of the risks and areas served by the Department. While the Department exists to provide firefighting and rescue services, the provision of First Responder EMS by the Department now dominates emergency incident volume, as illustrated in reporting year (RY) 20/21, when **59.15 percent** of all incidents were medical emergencies. For the first three years of the four-year data study period, the Department responded to just under 120,000 incidents annually. In RY 20/21, there was an increase to over 132,000 incidents, most of which was likely due to COVID-19.

The following facts[3] illustrate the City's service area and resultant services system:

- 952,357 residents (as of July 1, 2022)
- Estimated total employment of 455,011
- Total Appraised Value of $116.9 billion
- 350 square miles
- 190,822 acres of wildland open spaces
- Nearly 350,000 dwelling units
- 1,193 high-risk building uses
- 275 Critical infrastructure facilities
- Dozens of tourist venues, many with worldwide status

[3] City of Fort Worth 2021 ACFR

- Large, nationally significant employers
- A total City General Fund budget of $832 million for fiscal year (FY) 2022
- 44 fire stations with 39 staffed engine companies
- Three ladder truck companies
- Thirteen quint pumper/ladder trucks
- Four aircraft rescue firefighting units
- One squad, one rehabilitation / personal protection equipment apparatus, one paramedic support unit
- Nineteen wildland fire engines and two water tenders
- Seven Battalion Chiefs and one Shift Commander / Operations Deputy Chief for daily incident command
- Fire station personnel cross-trained to respond in specialty apparatus, such as rescue and hazardous materials units, support units, all-terrain vehicles, five and zodiac rescue boats
- Daily staffing of 244 fire station line personnel

All response personnel are trained to either the Emergency Medical Technician (EMT) level, capable of providing Basic Life Support (BLS) pre-hospital emergency medical care, the Advanced Emergency Medical Technician (AEMT) level, capable of providing some advanced pre-hospital medical interventions as authorized by the Medical Director, or the EMT-Paramedic (Paramedic) level, capable of providing Advanced Life Support (ALS) pre-hospital emergency medical care. Ground paramedic ambulance service is provided by the Metropolitan Area EMS Authority (MAEMSA), known as MedStar Mobile Healthcare.

Response personnel are also trained to the US Department of Transportation Hazardous Materials First Responder Operations level to provide initial hazardous material incident assessment, hazard isolation, and support for the Department's Hazardous Materials Response Team. The Department has 120 personnel trained to the Hazardous Materials Technician level, with a minimum daily staffing level of 20 technicians to cross-staff the Department's Type-1 Hazardous Materials Response Units as needed.[4]

All response personnel are further trained to the Confined Space Awareness level, with 111 personnel trained to the Urban Search and Rescue (USAR) Technician level for confined space,

[4] Source: Fort Worth Fire Department 2020 Annual Report.

rope rescue, structural collapse, and other heavy rescue operations, with a minimum daily staffing level of 12 technicians to cross-staff the Department's two heavy rescue squads at Stations 14 and 38. Many of the Department's USAR Technicians also serve on the FEMA Texas Task Force 1.[5]

In addition, the Department maintains two Swiftwater and Underwater Search and Rescue Teams, with a minimum daily staffing of four Swiftwater Technicians per team for water-related search, rescue, and recovery operations.

[5] Source: Fort Worth Fire Department 2020 Annual Report.

This page was intentionally left blank

Section 2

Standards of Coverage Introduction

SECTION 2—STANDARDS OF COVERAGE INTRODUCTION

2.1 STANDARDS OF COVERAGE REVIEW PROCESSES

The core methodology used by Citygate in the scope of its deployment analysis work is the *Community Risk Assessment: Standards of Cover* 5th and 6th editions, which is a systems-based approach to fire crew deployment as published by the CFAI. This approach uses local risk and demographics to determine the level of protection best fitting an agency's service area needs.

The SOC method evaluates deployment as part of the self-assessment process of a fire agency. This approach uses risk and community expectations on outcomes to help elected officials make informed decisions on fire and EMS first responder deployment levels. Citygate has adopted this methodology as a comprehensive tool to evaluate fire station locations. Depending on the needs of the assessment, the depth of the components may vary.

In the United States, there are no federal or state government requirements for a minimum level of fire services. Fire services levels are an issue for each community to consider and fund in protecting its risks as it chooses. For example, in Fort Worth the City's Collective Bargaining Agreement with its firefighters calls for the staffing of engines and ladder units with four personnel each. Rather than a one-size-fits-all prescriptive formula, the SOC systems approach to deployment allows for local determination. In this comprehensive approach, each agency can match local needs (risks and expectations) with the costs of various levels of service. In an informed public policy debate, a governing board "purchases" the fire and emergency medical service levels the community needs and can afford.

While working with multiple components to conduct a deployment analysis is admittedly more work, it yields a much better result than using only a singular component. For instance, if only travel time is considered and frequency of multiple calls is not considered, the analysis could miss over-worked companies. If a risk assessment for deployment is not considered and deployment is based only on travel time, a community could under-deploy to incidents.

2.2 STANDARDS OF COVERAGE ELEMENTS

The SOC process consists of the following eight elements.

Table 6—Standards of Coverage Process Elements

Element	Meaning
1. Existing Deployment Policies	Reviewing the deployment goals the agency currently has in place.
2. Community Outcome Expectations	Reviewing the expectations of the community for response to emergencies.
3. Community Risk Assessment	Reviewing the assets at risk in the community.
4. Critical Task Study	Reviewing the tasks that must be performed and the personnel required to deliver the stated outcome expectation for the Effective Response Force (ERF).
5. Distribution Study	Reviewing the spacing of first-due resources (typically engines) to control routine emergencies.
6. Concentration Study	Reviewing the spacing of fire stations so that building fires can receive sufficient resources in a timely manner (First Alarm Assignment or ERF).
7. Reliability and Historical Response Effectiveness Studies	Using prior response statistics to determine the percent of compliance the existing system delivers.
8. Overall Evaluation	Proposing Standards of Coverage statements by risk type as necessary.

Fire services deployment, simply stated, is about the **speed** and **weight** of the attack. **Speed** calls for first-due, all-risk intervention units (engines, ladder trucks, and specialty units such as technical rescue and ambulances) strategically located across an agency's service area responding in an effective travel time. These units are tasked with controlling moderate emergencies without the incident escalating to second alarm or greater size, which would unnecessarily deplete the agency's resources as multiple requests for services occur. **Weight** is about multiple-unit response for serious emergencies, such as a room-and-contents structure fire, a multiple-patient incident, a vehicle accident with extrication required, or a heavy-rescue incident. In these situations, enough firefighters must be assembled within a reasonable timeframe to safely control the emergency and keep it from escalating.

This deployment design paradigm is reiterated in the following table.

Table 7—Fire Services Deployment Simplified

Element of Attack	Meaning	Purpose
***Speed* of Attack**	Travel time of first-due, all-risk intervention units strategically located across a jurisdiction.	Controlling moderate emergencies without the incident escalating in size or complexity.
***Weight* of Attack**	Number of firefighters in a multiple-unit response for serious emergencies.	Assembling enough firefighters within a reasonable time frame to safely control the emergency.

Thus, small fires and medical emergencies require a single- or two-unit response (engine and specialty unit) with a quick response time. Larger incidents require more crews. In either case, if the crews arrive too late or the total personnel sent to the emergency are too few for the emergency type, they are drawn into a losing and more dangerous battle. The science of fire crew deployment is to spread crews out across a community for quick response to keep emergencies small with positive outcomes without spreading the crews so far apart that they cannot amass together quickly enough to be effective in major emergencies.

This page was intentionally left blank

Section 3

Deployment Goals, Measures, and Risk Assessment

SECTION 3—DEPLOYMENT GOALS, MEASURES, AND RISK ASSESSMENT

3.1 HOW DOES FORT WORTH DELIVER EXISTING FIRE CREW DEPLOYMENT SERVICES?

3.1.1 Existing Response Time Policies and Goals – What Are the Department's Goals?

SOC ELEMENT 1 OF 8*
EXISTING DEPLOYMENT POLICIES
**Note: This is an overview of Element 1. Details are provided in Section 3.3.*

The City has not adopted response time performance measures by formal City Council policy or in the Providing Safe Community element of the City's Comprehensive General Plan. The Department does, however, list performance measures in its section of the City's adopted budget. The Council would meet the best practice recommendations from the CFAI by adopting specific, outcome-driven response time goals by hazard.

In the Department's FY 22 budget submittal, on page 122, the following incident response time performances—which are partially consistent with national best practices—are reported:

- Fire center call processing: **64** seconds
- Fire turnout: **80** seconds
- EMS turnout: **60** seconds
- Fire and EMS travel time: **4:00** minutes
- First alarm response: **8:00** minutes

A total response time goal from 9-1-1 answer to first-unit arrival is not listed for various hazard types. Using the previous times, a possible total response time goal for first-unit call to arrival is **6:24 minutes**. Further, there are no goals listed for an ERF or First Alarm for multiple units to serious events such as a building fire. A best practice recommendation from the NFPA and CFAI is to adopt such goals.

The City has a long history of striving to provide a level of service that is evidenced in the number and types of fire companies and minimum daily staffing. Thus, even without formal City Council response time goals, the Department has requested funding for a level of service to meet the City's needs.

This report will assist City leadership in improving the specificity of its response time goals. Nationally recognized standards and best practices call for a response timeline with several important measurements that include a definition of all aspects of response time. In this SOC

assessment, Citygate recommends revised response-time goals to include dispatch processing, crew turnout, and road travel time equaling *total response time* to all risks, including fire, EMS, hazardous materials, and technical rescue responses. The goals are consistent with the CFAI and NFPA systems approach to response.

Per the current NFPA Standard 1221 for dispatching, 9-1-1 emergency calls without language barriers to the most acute calls should be dispatched in 60 seconds, 90 percent of the time. Prior versions of this best practice were 90 seconds, absent language barriers. As for crew turnout time, for years the NFPA and CFAI have believed, without extensive research, that turnout could take 60 to 90 seconds. In Citygate's experience with hundreds of fire services clients in the past 20 years, it is very difficult to don the protective clothing mandated by the Occupational Safety and Health Administration (OSHA), be seated, and have a seat belt secured in less than 2:00 minutes, 90 percent of the time. These times are also challenged by some station designs and the differences between waking and sleeping hours.

As for travel time, since the NFPA first published its recommended Standard 1710 for career fire services deployment, the travel time goal in urban areas has been 4:00 minutes. However, this time was a goal as part of an overall response time measure. The 4:00-minute travel time was "believed possible" across a traditional grid, right-angle road network. There was no empirical research on differing road network designs or topography. In Citygate's experience, few clients can deploy to meet a 4:00-minute travel time outside of urban core downtown areas *with a grid street network and adequate fire station spacing*.

3.1.2 Existing Outcome Expectations

SOC ELEMENT 2 OF 8
COMMUNITY OUTCOME EXPECTATIONS

The SOC process begins by reviewing existing emergency services outcome expectations. This entails determining the purpose for which the response system exists and if the governing body adopted any response performance measures. If so, the time measures used must be understood and good data must be collected.

The current national best practice is to measure percent completion of a goal (e.g., 90 percent of responses) instead of an average measure. Mathematically this is called a fractile measure.[6] This practice is used because an average measure only identifies the central or middle point of response time performance for all calls for service in the data set. Using an average makes it impossible to

[6] A *fractile* is that point below which a stated fraction of the values lies. The fraction is often given in percent; the term percentile may then be used.

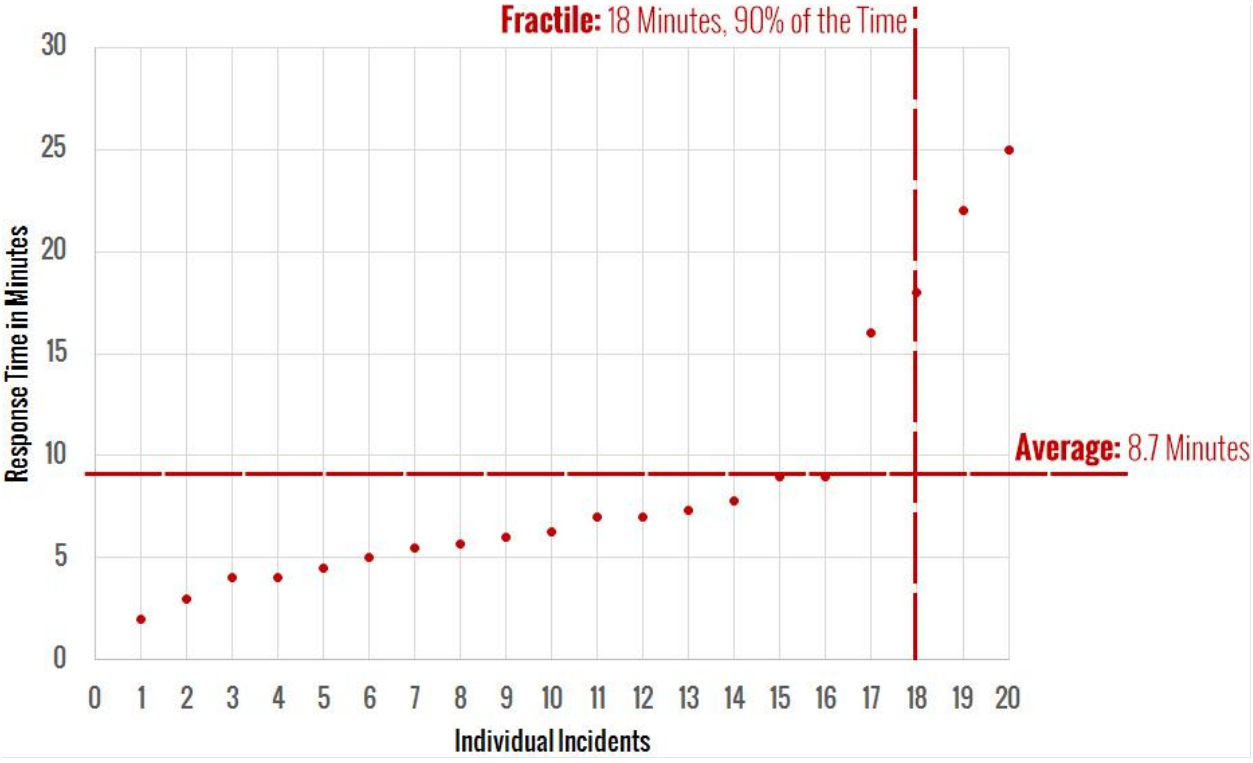
know how many incidents had response times that were significantly above or nominally above the average.

For example, Figure 1 shows response times for a fictitious fire agency. This agency is small and receives 20 calls for service each month. Each response time has been plotted on the graph from shortest to longest response time.

Figure 1 shows that the average response time is 8.7 minutes. However, the average response time fails to properly account for four calls for service with response times far exceeding a threshold in which positive outcomes could be expected. In fact, it is evident that 20 percent of responses are far too slow, and this jurisdiction has a potentially life-threatening service delivery problem. Average response time as a measurement tool for fire services is simply not sufficient. This is a significant issue in larger cities if hundreds or thousands of calls are answered far beyond the average point.

By using the fractile measurement with 90 percent of responses in mind, this small jurisdiction has a response time of 18:00 minutes, 90 percent of the time. This fractile measurement is far more accurate at reflecting the service delivery situation of this small agency.

Figure 1—Fractile Response Time Chart



More importantly within the SOC process, positive outcomes are the goal, and from that, crew size and response time can be calculated to allow efficient fire station spacing (distribution and

concentrations). Emergency medical incidents have the most severe time constraints. The brain can only live between 4:00 and 8:00 minutes without oxygen. Heart attacks, other trauma events that cause severe blood loss, or a respiratory emergency can all cause oxygen deprivation to the brain; drowning, choking, trauma constrictions, or other similar events have the same effect. In a building fire, a small incipient fire can grow to involve the entire room in 8:00 to 10:00 minutes. If fire services response is to achieve positive outcomes in severe emergency medical situations and incipient fire situations, *all* responding crews must arrive, assess the situation, and deploy effective measures before brain death occurs or the fire leaves the room of origin.

Thus, from the time of 9-1-1 receiving the call, an effective deployment system is *beginning* to manage the problem within a 7:00- to 8:00-minute total response time. This is right at the point that brain death is becoming irreversible, and the fire has grown to the point of leaving the room of origin and becoming very serious. Thus, the Department needs a first-due response goal that is within a range that can give hope for a positive outcome. It is important to note that the fire or medical emergency continues to deteriorate from the time of inception, not the time the fire engine starts to be driven on the response route. Ideally, the emergency is noticed immediately, and the 9-1-1 system is activated promptly. This step of awareness—calling 9-1-1 and giving the dispatcher accurate information—takes, in the best of circumstances, 1:30 minutes. Crew notification and travel time then take additional minutes. Once arrived, the crew must walk to the patient or emergency, assess the situation, and deploy its skills and tools. Even in easy-to-access situations, this step can take 2:00 minutes or more. This time frame may be increased considerably due to long driveways, apartment buildings with limited access, multiple-story apartments or office complexes, or shopping center buildings such as those found in parts of the City.

Unfortunately, there are times the emergency becomes too severe, even before the 9-1-1 notification or the Department's response, for the responding crew to reverse; however, when an appropriate response time policy is combined with a well-designed system, only issues like bad weather, poor traffic conditions, or multiple emergencies will slow the response system down. Consequently, a properly designed system will give 9-1-1 callers the delivery of a positive outcome response for their tax-dollar expenditure.

For this report, total response time is the sum of the dispatch processing, crew turnout, and road travel time steps. This is consistent with the recommendations of the CFAI.

While the City's budget document contains some Fire Department-submitted response time measures, City Council has not separately adopted Fire, EMS, and specialty response performance goals that are sufficiently specific to include the beginning time measure from the point of the Police dispatch receiving the 9-1-1 phone call.

Finding #1: Apart from budget measures, the City Council has not separately adopted fire, EMS, and specialty response performance goals, including sufficiently specific specialty response goals for all-risk emergencies that specify the beginning time measure from the point that Police communications dispatch receives the 9-1-1 phone call, nor do the current goals reflect risks and outcome expectations. Clarifying deployment goals will meet the best practice recommendations of the CFAI.

3.2 RISK ASSESSMENT

The third element of the SOC process is a community risk assessment. This section summarizes the very detailed Risk Assessment contained in **Volume 3** of this study.

SOC ELEMENT 3 OF 8
COMMUNITY RISK ASSESSMENT

Within the context of an SOC review, the objectives of a community risk assessment are to:

- Identify the values at risk to be protected within the community or service area.
- Identify the specific hazards with the potential to adversely impact the community or service area.
- Quantify the overall risk associated with each hazard.
- Establish a foundation for current/future deployment decisions and risk-reduction / hazard mitigation planning and evaluation.

A *hazard* is broadly defined as a situation or condition that can cause or contribute to harm. Examples include fire, medical emergency, vehicle collision, earthquake, flood, etc. *Risk* is broadly defined as the *probability of hazard occurrence* in combination with the *likely severity of resultant impacts* to people, property, and the community.

3.2.1 Values to Be Protected

Broadly defined, *values at risk* are those tangibles of significant importance or value to the community or jurisdiction potentially at risk of harm or damage from a hazard occurrence. Values at risk typically include people, critical facilities/infrastructure, buildings, and key economic, cultural, historic, and natural resources.

3.2.2 Overview of Values at Risk and Hazards in Fort Worth

Citygate's evaluation of the values at risk and hazards likely to impact the Department's demand for services yields the following conclusions.

People

Residents, employees, visitors, and travelers in a community or jurisdiction are vulnerable to harm from a hazard occurrence. Particularly vulnerable are specific at-risk populations, including those unable to care for themselves or self-evacuate in the event of an emergency. At-risk populations typically include children younger than 10 years of age, the elderly, people housed in institutional settings, households below the federal poverty level, and people living unsheltered. The following table summarizes key demographic data.

Table 8—Key Demographic Data – City of Fort Worth

Demographic	2021
Population	**935,508***
Under 10 Years	15.90%
10–14 Years	7.50%
15–64 Years	65.50%
65–74 Years	6.80%
75 Years and Older	4.20%
Median Age	33.2
Daytime Population	934,643
Housing Units	**352,672**
Owner-Occupied	55.10%
Renter-Occupied	37.60%
Vacant	7.30%
Average Household Size	2.80
Median Home Value	$221,162
Ethnicity	
White	56.40%
Hispanic/Latino (Counted as White)	36.10%
Black / African American	21.10%
Asian	4.70%
Other	17.80%
Diversity Index	81.5
Education (Population over 24 Years of Age)	**585,373**
High School Graduate or Equivalent	83.70%
Undergraduate Degree	31.20%
Graduate/Professional Degree	10.30%
Employment (Population over 15 Years of Age)	**472,774**
In Labor Force	93.70%
Unemployed	6.30%
Median Household Income	$64,147
Population below Poverty Level	13.60%
Disabled Population	7.20%
Population without Health Insurance Coverage	20.40%

* City of Fort Worth Council Memo from Planning & Data Analytics citing latest U.S. Census measures

Source: ESRI and U.S. Census Bureau

Of note from the previous table is the following:

- Nearly 27 percent of the population is under 10 years or over 65 years of age.
- Of the population 15 years of age or older, 94 percent is in the workforce; 6 percent are unemployed.
- Median household income is slightly more than $64,000.
- The population below the federal poverty level is 13.6 percent.
- Over 20 percent of the population does not have health insurance coverage.

The City's population is projected to increase by 31 percent to more than 1.2 million people by 2045.[7]

Buildings

The City has more than 350,000 residential housing units and a large inventory of other buildings housing manufacturing, research, technology, offices, professional services, retail sales, restaurants/bars, motels, churches, schools, storage, government facilities, healthcare facilities, and other occupancy types.[8]

Critical Infrastructure / Key Resources

The US Department of Homeland Security defines Critical Infrastructure / Key Resources as those physical assets essential to the public health and safety, economic vitality, and resilience of a community, such as lifeline utilities infrastructure, telecommunications infrastructure, essential government services facilities, public safety facilities, schools, hospitals, airports, etc. As summarized in **Volume 3,** across all Station Area Risk Profiles, City staff identified 275 critical facilities and infrastructure. A hazard occurrence with significant impact severity affecting one or more of these facilities would likely adversely impact critical public or community services.

Economic Resources[9]

As the thirteenth largest city in the United States—and the second largest city in the Dallas–Fort Worth metroplex, with a population approaching one million people and an area approaching 350 square miles—the City has a robust, diverse economy, with leading business sectors including aerospace, aviation, defense and security, energy, financial services, food processing, information technology, life sciences, manufacturing, and transportation and logistics. Major employers include:

[7] Source: City of Fort Worth Planning and Data Analytics presentation (February 28, 2022).
[8] Source: Esri Community Analyst – Community Profile (2021).
[9] Source: City of Fort Worth FY 2021 Comprehensive Annual Financial Report, Table 20.

- American Airlines
- Lockheed Martin
- Fort Worth Independent School District
- Naval Air Station Fort Worth Joint Reserve Base
- JPS Health Network / John Peter Smith Hospital
- City of Fort Worth
- Burlington Northern Santa Fe LLC
- Tarrant County College
- Alcon Laboratories, Inc.
- Bell Helicopter-Textron, Inc.
- Cook Children's Healthcare System
- Harris Methodist Hospital
- Tarrant County Government

Natural Resources

Significant natural resources to be protected within the City include:

- Lake Worth
- Marion Sansom Park
- Trinity River
- River Legacy Parks
- Fort Worth Nature Center and Refuge
- Tandy Hills Natural Area / Stratford Nature Area

Cultural/Historic Resources

As a vibrant, multicultural city and part of the number one tourist destination in Texas, welcoming more than nine million visitors annually, the City boasts a large inventory of cultural and historic resources, including the historic Stockyards, Billy Bob's Texas, Mule Alley, Sundance Square Entertainment District, Cultural District, Botanic Garden, and the Fort Worth Zoo.

Special/Unique Resources

The following facilities are special or unique resources to be protected:

- BNSF Railway Company Intermodal Facility
- Fort Worth Meachum International Airport and Alliance Airport
- Texas Christian University
- Texas Motor Speedway
- Will Rogers Memorial Center

3.2.3 Hazard Identification

Citygate utilizes prior risk studies where available, fire and non-fire hazards as identified by the CFAI, and agency/jurisdiction-specific data and information to identify the hazards to be evaluated for this study. The 2020 Tarrant County Hazard Mitigation Action Plan identifies the following nine natural hazards likely to impact the county:

1. Drought
2. Earthquake
3. Expansive soils
4. Extreme heat
5. Flooding (including dam failure)
6. Thunderstorms (including hail, wind, and lightning)
7. Tornadoes
8. Wildfires
9. Winter storms

The Tarrant County Hazard Mitigation Action Plan further identifies technological hazards, including hazardous material events, infectious disease outbreaks, national security hazards, nuclear accidents, power failure, and telecommunications failure.

The City ranked the nine natural hazards as follows:[10]

1. Thunderstorm

[10] City of Fort Worth Annex (Annex L) to the 2020 Tarrant County Hazard Mitigation Action Plan.

2. Flooding
3. Winter storms
4. Tornado
5. Wildfire
6. Extreme heat
7. Drought
8. Expansive soils
9. Earthquake

Although the Department has no legal authority or responsibility to mitigate any hazards other than possibly for wildfire, it does provide services related to many hazards, including fire suppression, emergency medical services, technical rescue, and hazardous materials response.

The CFAI groups hazards into fire and non-fire categories. The identification, qualification, and quantification of the various fire and non-fire hazards are important factors in evaluating how resources are or can be deployed to mitigate those risks.

3.2.4 Risk Assessment Summary

Citygate's evaluation of the values at risk and hazards likely to impact the City yields the following:

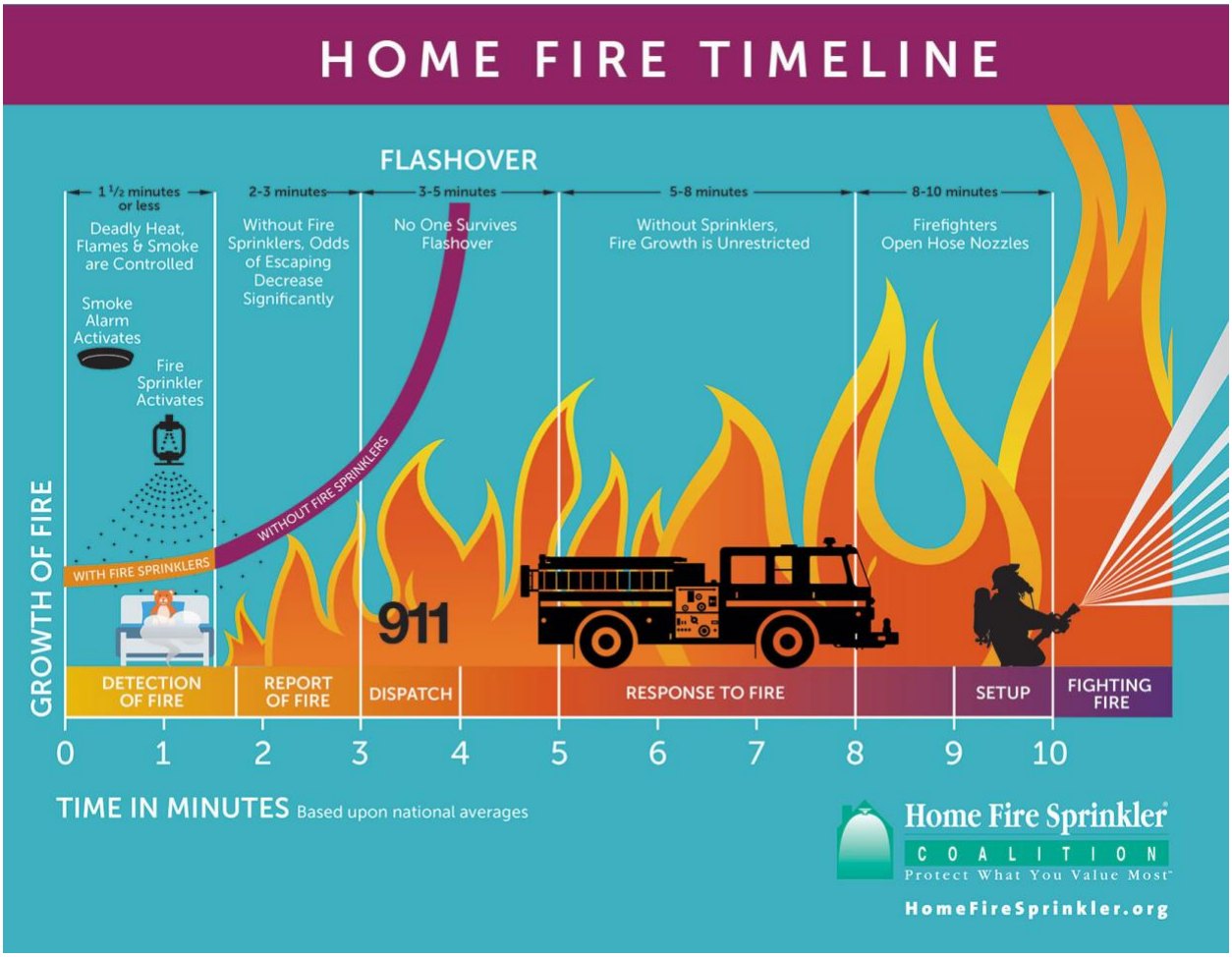
1. The Department serves a very diverse urban population with densities ranging from less than 1,000 to more than 18,000 people per square mile over a varied urban land use pattern.
2. The City's population is projected to projected to increase by 31 percent to more than 1.2 million people by 2045.
3. The City has a large inventory of residential and non-residential buildings to protect.
4. The City also has significant economic and other resource values to be protected, as identified in this assessment.
5. The Department's Emergency Management Office has multiple mass emergency notification options available to effectively communicate emergency information to the public in a timely manner.
6. The City's risk for seven hazards related to emergency services provided by the Department range from **Low** to **Extreme**, as summarized in Table 9.

3.2.5 Time Frames for Outcomes

In setting outcome-based response time goals for the two primary incident types of building fires and medical emergencies, it is important to understand: what is the time-to-care need? Some incidents, such as small hazardous materials spills or non-acute EMS, are not immediate need priorities.

The following figure illustrates the building fire progression timeline. It shows that flashover—which is the point at which an entire room is heated after the first open flame begins to the point at which all combustible objects in that room reach their ignition temperature and burn immediately—can occur as early as 3:00–5:00 minutes from the initial start of an open flame. Human survival in a room after flashover is extremely improbable. The open flame burning point (not smoldering) may have already occurred when 9-1-1 is first dialed, and this is even more likely if occupants were not in the building or there were no smoke detectors or other automatic detection devices.

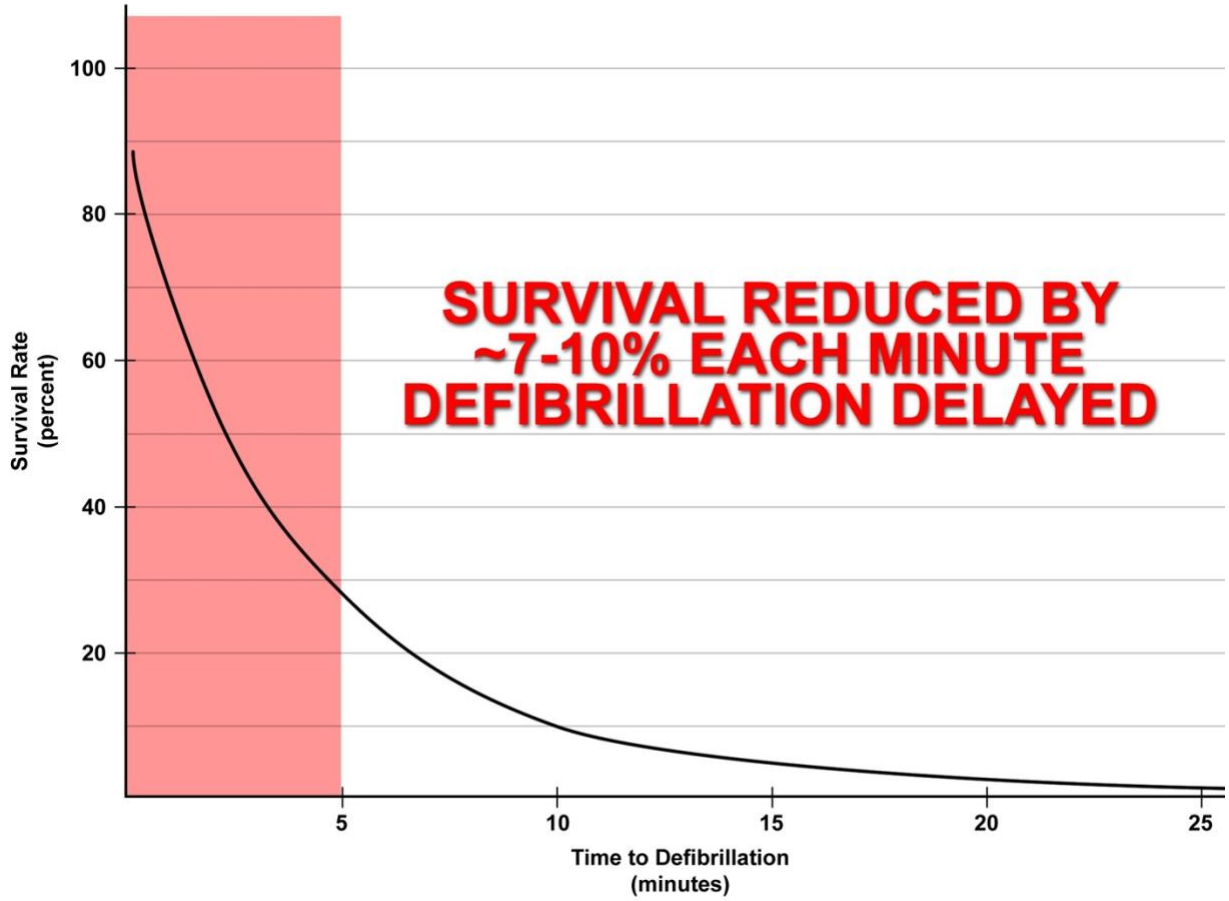
Figure 2—Building Fire Progression Timeline



Source: http://www.firesprinklerassoc.org.

The next figure illustrates the reduced survivability of a cardiac arrest victim as time to defibrillation increases. While early defibrillation is one factor in cardiac arrest survivability, other factors can influence survivability as well, such as early CPR and pre-hospital ALS mechanical and pharmaceutical interventions.

Figure 3—Survival Rate versus Time to Defibrillation



To this time curve, the pre-arrival steps of dispatch and turnout time have to be added. Thus, if flashover or brain death is well under way at the eighth minute, the entire system must work to deliver service accordingly. In addition, the first unit wheels stop is not representative of the time to actually reach a patient or apply water to a fire—both of which occur after a team arrives and gains access to begin mitigations. Thus, the response time calculations for urban best practice outcomes pivot off these time curves.

The following table summarizes this project's overall risk assessment for the City:

Table 9—Overall Risk by Incident Type

Hazard		Sub-Hazard Type	Risk Rating
1	Building Fire	Single-Family Residential	***High***
		Multi-Family Residential	***High***
		Commercial/Industrial	***High***
		High-Rise	***High***
2	Vegetation/Wildfire	Grass/Vegetation (<1 acre)	***Low***
		Brush (<5 acres)	***Moderate***
		Wildfire/WUI (<25 acres)	***High***
		Wildfire/WUI (>25 acres)	***High***
3	Medical Emergency	BLS only	***Low***
		BLS/ALS	***High***
		ALS	***High***
		Mass Casualty Incident	***High***
		Weapon Mass Destruction	***Extreme***
4	Hazardous Materials	Alarm/Odor Investigation	***Low***
		Hazmat Level 1	***Moderate***
		Hazmat Level 2	***High***
		Hazmat Level 3	***High***
		Hazmat Level 4	***Extreme***
5	Technical Rescue	Elevator Rescue	***Low***
		Trauma / Pin-In	***Moderate***
		Low Angle Rope Rescue	***Moderate***
		Confined Space / Trench Rescue / High Angle Rescue	***Moderate***
		Building Collapse / Natural Disaster	***High***
6	Marine Incident	Water Rescue	***Low***
		Boat Fire/Rescue	***Moderate***
		Marina Fire	***High***
7	Aviation Incident	ARFF Alert 1	***Low***
		ARFF Alert 2	***Moderate***
		ARFF Alert 3	***High***

3.3 EXISTING FORT WORTH FIRE DEPARTMENT DEPLOYMENT

3.3.1 Existing Deployment Situation – What Fort Worth Currently Has in Place

SOC ELEMENT 1 OF 8*
EXISTING DEPLOYMENT POLICIES
**Note: Continued from Section 3.1.*

As the City has not adopted sufficiently specific fire and emergency medical service response time policies, this assessment will benchmark the Department against the response time recommendations of NFPA Standard 1710 for career fire services deployment, as well as the Department's self-reported goals:

- Travel time of 4:00 minutes for the first-due unit to all types of emergencies.
- Travel time of 8:00 minutes for multiple units needed at serious emergencies (First Alarm).

The Department's current daily staffing plan is summarized in the following table.

Table 10—Current Daily Minimum Staffing per Unit – 44 Fire Stations

Primary Units	Minimum Staffing Per Unit	Extended Minimum
39 Engine Companies	4	156
4 Aerial Ladder Trucks	4	16
13 Quint Pumper / Aerial Ladder Units	4	52
6 Aircraft Rescue Fire Fighting (ARFF) Units	varies	6
1 Squad	4	4
1 Rehabilitation / Personal Protective Equipment Unit	1	1
1 Paramedic Support	1	1
7 Battalion Chiefs	1	7
1 Shift Commander	1	1
Total Minimum 24/7/365 Fire Crew Staffing		**244**

These daily personnel also "cross-staff" other specialty response units: nineteen wildland fire engines; two water tenders for non-hydrant areas; technical rescue units; hazardous materials units; and support and rehabilitation / breathing air refill units.

This total daily staffing is adequate for the immediate response needs of the most built-up, urban areas of the City without the mandatory use of neighboring agency automatic aid forces for daily typical incident types.

Services Provided

The Department provides an all-risk response, providing the public with services that include structure, wildland, and marine incidents, Basic and Advanced Life Support (BLS and ALS) first responder EMS, technical rescue, and hazardous materials response, as well as other services.

Given these risks, the Department's Emergency Communication center uses a tiered approach of dispatching different types of apparatus to each incident category. The center selects the closest and most appropriate resource type for each incident. As an example, the following table shows the resources dispatched to common risk types.

Table 11—Resources Dispatched to Common Risk Types

Risk Type	Minimum Number and Type of Resources Sent	Initial Department Personnel Sent
One-Patient EMS	1 Engine or Ladder Truck	4
Auto Fire	1 Engine	4
Building/Residential Fire	4 Engines, 1 Truck/Quint, GEAR-1, MEDIC 1, 1 Air/Lighting, 2 Battalion Chiefs, 2 Investigators	27
Commercial Building Fire	4 Engines, 2 Trucks/Quints, GEAR-1, MEDIC 1, 1 Air/Lighting, 2 Battalion Chiefs	29
High Rise Building Fire	5 Engines, 2 Trucks/Quints, Squad 2 or Additional Engine, GEAR-1, MEDIC 1, 1 Air/Lighting, 3 Battalion Chiefs, 1 Shift Technician, 1 Shift Commander	40
Brush/Wildland Fire	2 Engines, 3 Brush Trucks, 3 Accompanying Engines, 1 Battalion Chief	21
Technical Rescue	3 Engines, 1 Ladder Truck, 1 Rescue, 2 Battalion Chiefs	22
Hazardous Materials Spill, Initial	2 Engines	8

Section 4

Staffing and Geo-Mapping Analysis

HANDLEY HOUNDS

SECTION 4—STAFFING AND GEO-MAPPING ANALYSIS

4.1 CRITICAL TASK TIME MEASURES – WHAT MUST BE DONE OVER WHAT TIME FRAME TO ACHIEVE THE STATED OUTCOME EXPECTATION?

SOC ELEMENT 4 OF 8
CRITICAL TASK TIME STUDY

SOC studies use task time information to determine the number of firefighters needed within a time frame to accomplish the desired fire control objective on moderate residential fires and modest emergency medical incidents.

4.1.1 Firefighting Critical Tasks

The Department's ERF, or First Alarm Assignment, to initial reports of a residential structure fire in urban areas includes four engines, one ladder or quint truck, two Battalion Chiefs, a GEAR-1 rehabilitation unit, a Paramedic Coordinator, and two Fire Investigators for a total ERF of **27** personnel.

The following table shows what a force of 27 can accomplish. The larger the force (**weight** of attack), the faster the tasks are completed.

Scenario: *The following is a simulated one-story residential working structure fire with no rescue situation. Responding companies received dispatch information as typical for a witnessed fire. Upon arrival, they were told approximately 1,000 square feet of the home was involved in fire.*

Table 12—First Alarm Working Structure Fire – 27 Personnel

Company Level Tasks
First Arriving Engine and Ladder
1. Stretch the 200-foot, 1¾-inch hose line to the point of access for search and rescue.
2. Operate the pump to supply water and attach hydrant supply line.
3. Assume command of initial operations.
4. Conduct search and rescue.
Second Arriving Engine
1. If necessary, lay in a hydrant supply line.
2. Stretch a second 200-foot hose line as a back-up line and for fire attack.
3. Establish two-in/two-out safety team.
Third Arriving Engine
1. Forcible entry if needed, primary rescue search if needed.
2. Ladder the building.
3. Ventilation of the structure.
Fourth Arriving Engine
1. Assist with rescue as/if needed. Secure utilities.
2. Staff the Rapid Intervention Crew.
3. Remove any obstructions or debris that would hinder fire ground operations.
First Arriving Battalion Chief
1. Establish exterior command and initial scene safety.
Second Arriving Battalion Chief
1. Scene Safety Officer.
Specialty Units
1. Medic and GEAR-1 support and two Fire Investigators.

Grouped together, these duties form an ERF or First Alarm Assignment. These duties and the running clock time it takes to conduct them were well studied by the National Institute of Standards and Technology (NIST).[11] These tasks must be performed simultaneously and effectively to achieve the desired outcome; arriving on-scene does not stop the escalation of the emergency. While firefighters accomplish these tasks, the incident progression clock keeps running.

[11] Report on Residential Fireground Field Experiments, National Institute of Standards and Technology Technical Note #1661, April 2010.

Fire spread in a structure can double in size during its *free-burn* period before firefighting starts. Many studies have shown that a small fire can spread to engulf an entire room in fewer than 6:00 to 8:00 minutes after free burning has started. Once the room is completely superheated and involved in fire (known as flashover), the fire will spread quickly throughout the structure and into the attic and walls. For this reason, it is imperative that fire attack and search commence before the flashover point occurs if the outcome goal is to keep the fire damage in or near the room of origin. In addition, flashover presents a danger to both firefighters and any occupants of the building.

4.1.2 Emergency Medical Services Critical Tasks

The Department responded to 78,292 EMS incidents of all types in RY 20/21. These incidents included car accidents, childbirths, strokes, heart attacks, difficulty breathing, falls, and many other medical emergencies.

Some EMS calls require treatment for more than one patient. These calls include vehicle accidents, chemical exposures, construction or industrial accidents, and any other event that occurs with several people in proximity. Patient conditions can range from minor cuts and bruises to life-threatening injuries.

The following critical task table reviews the tasks required on a critical response to a single illustrative cardiac arrest incident.

Table 13—Cardiac Arrest – Engine Crew (Four Personnel) and Paramedic Ambulance (Two Personnel)

Task	Personnel Required	Type of Treatment Administered
Compressions	**1–2**	Compression of chest to circulate blood
Ventilate/oxygenate	**1–2**	Bag-valve-mask, apply O_2
Airway control	**1–2**	Manual techniques/intubation/cricothyrotomy
Defibrillate	**1–2**	Electrical defibrillation of dysrhythmia
Establish I.V.	**1–2**	Peripheral or central intravenous access
Interpret ECG	**2**	Identify type and treat dysrhythmia
Administer drugs	**1**	Administer appropriate pharmacological agents
Patient charting	**1–2**	Record vitals, treatments administered, etc.
Hospital communication	**1–2**	Receive treatment orders from physician
Scene management	**1**	Safety, security, and communications
Quality assurance	**1**	Medical Service Officer oversight
Treat en route	**2–3**	Continue to treat/monitor/transport patient
Total	**6**	

4.1.3 Critical Task Analysis and ERF Size

What does a deployment assessment derive from a critical task analysis? The total task needs (as displayed in Table 12 and Table 13) to stop the escalation of an emergency must be compared to outcomes. When flashover occurs after approximately 6:00 to 8:00 minutes of free burning, the entire room is engulfed, the structure becomes threatened, and human survival near or in the fire room becomes impossible. Additionally, brain death begins to occur within 6:00 to 8:00 minutes of the heart having stopped. Thus, the ERF must arrive in time to stop these catastrophic events from worsening.

The Department, given its size, is staffed with enough firefighters to deliver multiple ERFs of 29 firefighters, without the use of automatic aid, to a building fire. Mitigating an emergency event is a team effort once the units have arrived. This refers to the **weight** of response; if too few personnel arrive too slowly, the emergency will worsen instead of improving. The outcome times will be longer with less desirable results if the arriving force is later or smaller.

The quantity of staffing and the arrival time frame can be critical in a serious fire. Fires in older and/or multiple-story buildings could well require the initial firefighters needing to rescue trapped or immobile occupants. If a lightly staffed force arrives, it cannot simultaneously conduct rescue and firefighting operations.

Fires and complex medical incidents require that the other units arrive in time to complete an effective intervention. Time is one factor that comes from *proper station placement*. Good performance also comes from *adequate staffing* and training. In the critical tasks identified previously, the Department can perform well in terms of staffing. However, in situations where fire stations are spaced too far apart, such as when one unit must cover another unit's area or multiple units are needed, these units can be too far away.

Previous critical task studies conducted by Citygate and the NIST concur with NFPA Standard 1710 that all units must arrive with 17 or more firefighters within 11:30 minutes from the time of call at a residential room-and-contents structure fire to be able to *perform the tasks of rescue, fire attack, and ventilation simultaneously and effectively*.[12]

The staffing per unit is also critical. For structural firefighting, the OSHA two-in/two-out safety policy requires that firefighters enter atmospheres that are immediately dangerous to life and health (such as building fires) in teams of two while two more firefighters are outside and immediately ready to rescue them should trouble arise. With an urban best practice staffing of four per engine or ladder/quint company, the Department can immediately start firefighting or rescue to save lives without waiting for the second-due unit to arrive. This is even more important in the growing, outer areas of the City where stations are spaced farther apart.

If fewer firefighters arrive, most likely the search team will be delayed, as will ventilation. The attack lines will only consist of two firefighters, which does not allow for rapid movement above the first-floor deployment. Rescue is conducted with only two-person teams; thus, when rescue is essential, other tasks are not completed in a simultaneous, timely manner. Effective deployment is about the **speed** *(travel time)* and the **weight** *(firefighters)* of the attack.

Twenty-six initial firefighters could handle a moderate-risk, confined house fire; however, even an ERF of 20 firefighters (four engines, one truck/quint) will be seriously slowed if the fire is above the first floor, in a low-rise apartment building, or in a commercial/industrial building. This is where the capability to add units to the standard response (as the City does) becomes important.

The fact that the Department's First Alarm plan (ERF) delivers 29 total personnel to a moderate risk building fire reflects the City's goal to confine serious building fires to or near the room of origin. This is a typical desired outcome in built-out areas and requires more firefighters more quickly than the typical rural outcome of keeping the fire contained to the parcel of origin.

The Department's current physical response to building fires is, in effect, the City's de facto deployment measure to built-up urban/suburban areas. Thus, this becomes the baseline policy for the deployment of firefighters.

[12] NIST Technical Note 1661, Report on Residential Fireground Field Experiments (April 2010).

4.2 Distribution and Concentration Studies—How the Location of First-Due and First-Alarm Resources Affects the Outcome

SOC Element 5 of 8
DISTRIBUTION STUDY

SOC Element 6 of 8
CONCENTRATION STUDY

The City is currently served by 44 fire stations fielding engine companies, ladder/quint truck companies, specialty units, and Chief Officers for incident command. It is appropriate to understand what the existing stations do and do not cover, if there are any coverage gaps needing additional stations, and what, if anything, to do about them.

In brief, there are two geographic perspectives to fire station deployment:

- **Distribution** – the spacing of first-due fire units to manage routine emergencies.
- **Concentration** – the clustering of fire stations in proximity of each other so that building fires can receive sufficient resources from multiple stations quickly. This is known as the ERF or, more commonly, the First Alarm Assignment.

To analyze first-due fire unit travel time coverage, Citygate uses a geographic mapping tool to measure theoretical travel time over the street network. For this calculation, Citygate used the base map and street travel speeds calibrated to actual fire company travel times from previous responses to simulate real-world coverage. A second model was built that uses traffic congestion data to slow the fire unit responses at peak traffic periods. Using these tools, Citygate ran several deployment tests and measured impacts on various parts of the Department's service area. The first-due unit travel time measure initially used was 4:00 minutes and 8:00 minutes for multiple units over the road network, which is consistent with the benchmark recommendation in NFPA Standard 1710 and desirable outcomes in critical emergencies.

In all the geographic information system (GIS) models described, care was taken to include into the model as many of the newest streets as possible. The following described maps can be found in **Volume 2**.

4.2.1 Base Maps – Existing Coverage

Map #1—General Geography and Station Locations

Map #1 shows the existing City fire station locations. This is a reference map for the maps that follow. The station symbols and legend describe the primary response apparatus assigned to each station.

Map #2—Risk Planning Zones

This study uses each fire station's primary response area for risk assessment understanding. In large departments such as Fort Worth, primary response areas serve as measurement areas for the listing of risks and response times.

Map #2a—Population Density

This map shows current population densities in the City. Zoning across the communities allows for differing population clusters. For EMS events in particular, population drives 9-1-1 requests for medical assistance. It is important to understand where the highest population density areas are in relation to the actual incident demand to be mapped later in this series.

Map #3a to e Series—First-Due Unit Distribution: 4:00-Minute Engine Travel

Using green street segments, Map Series #3 shows in east and west views the *distribution* of fire stations per a response goal of a 4:00-minute *travel* time recommended for best practice emergency outcomes. Therefore, green indicates the locations an engine could reach within this time *assuming* it is in its station and encounters no unusual traffic delays. In addition, the computer mapping tool uses actual fire company speed limits per roadway type. Thus, the green projection is realistic for engines with normal traffic conditions.

Given the design of the road network, topographical barriers, and the current fire station locations, it is apparent there are significant gaps in coverage of the public streets when applying a 4:00-minute travel time goal for each station.

Also mapped at 4:00 minutes are the effects of traffic congestion and automatic/mutual aid from adjoining agencies. Severe traffic congestion can hamper fire unit travel time even with traffic signal preemption technology. The impact is the largest in the more travelled major road and commercial corridors.

The purpose of this geographic mapping is to determine response time coverage across a community's geography to balance station locations. This geographic mapping design is then checked against actual dispatch time data, which reflects real response times. There should be some overlap between station areas so that a second-due unit has a chance of an adequate response time when it covers a call in another fire company's first-due area. The last two maps in the series show the positive effect by adding new Fire Stations 45 and 46.

The *travel* time to 90 percent of the core fire and EMS incidents is 6:33 minutes Department-wide in RY 20/21. This is supported by the GIS model that shows that 4:00 minutes for travel does not fully cover the road network, which is further compounded during periods of traffic congestion.

Map #3f and g—First-Due Unit Distribution: 5:00-Minute Engine Travel

Map #3f shows the street segments covered by a 5:00-minute first-due unit coverage including planned fire stations 45 and 46. The positive impact of just one more minute of travel at 5:00 minutes is significant, as will be discussed further in Section 4.2.4.

Map #3h—First-Due Unit Distribution: 5:00-Minute Engine Travel Over Population Density

This map shows 5:00 minutes travel including the two planned station across the current population density. As can be seen in this map, at 5:00 minutes travel with two more fire stations, most of the most densely populated areas of the City are reached by a first responder.

Map #4—ISO 1.5-Mile Travel Coverage Areas

This map set displays the Insurance Services Office (ISO) requirement that stations cover a 1.5-mile *distance* response area. Depending on the road network in an agency, the 1.5-mile measure usually equates to a 3:30- to 4:00-minute travel time. However, a 1.5-mile measure is a reasonable indicator of station spacing and overlap. The more conservative ISO coverage also does not cover many of the public road miles and has many of the same gaps as the 4:00-minute travel time model. In some areas, the ISO coverage is closer to the 4:00-minute travel time model, due to tighter fire station spacing.

Map #5a and b—Citywide Residential Building Fire – ERF – 8:00-Minute Travel Concentration (First Alarm)

The first map set in Map Series #5 shows the *concentration*, or massing, of fire crews for serious fire or rescue calls. Building fires require 17 or more firefighters to a house fire or 28 personnel to a smaller commercial building fire (per NFPA Standard 1710)[13] arriving within a reasonable time frame to work together and effectively stop the escalation of an emergency. Otherwise, if too few firefighters arrive, or if they arrive too late in the fire's progress, the result is a greater-alarm fire, which is more dangerous to the public and the firefighters.

The concentration map displays the Department's ability to initially send a *minimum* of four engines, one ladder/quint truck, and two Battalion Chief units to residential building fires within an 8:00-minute travel time (11:30 minutes from 9-1-1 dispatch receipt). This measure ensures that a *minimum* of 22 personnel (four firefighters per engine and ladder truck, plus two command chiefs) can arrive on scene to work *simultaneously* and effectively to begin to stop the spread of a serious building fire.

[13] NFPA 1710, 2020 Edition, Section 5.2.4.1.1.

This map set shows where the Department's current fire station system should deliver the ERF. As can be seen, delivering this coverage is quite challenging, except where the "core stations" can respond inward to the center of a multiple-station area.

The limiting factor in this coverage is the fourth engine and second Battalion Chief. Map #5a measures the coverage with three engines, one ladder truck and one chief officer for an ERF of 17-personnnel, which meets the minimums recommended by NFPA Standard 1710 and Citygate. This can be considered an *initial* ERF in 8:00 minutes of travel time. While the minimum ERF is better, it only covers the older, core areas of the City.

Map #5b shows only the four-engine, 8:00-minute travel time coverage. While the coverage is still only of the core of the City, it is slightly better, showing that the limiting factor to the full ERF model is the less well spaced ladder/quint trucks and battalion chiefs.

The next two map series will show the ERF coverage by the separate units of ladder/quints, and battalion chiefs.

Map #6a and b—Ladder Trucks – 8:00-Minute Travel

This map set shows the streets covered in an 8:00-minute travel time by only the City's four aerial trucks (no pump or water) and the quints that operate a shorter ladder and have a pump and water for firefighting from the Map #5 series. Map #6 shows the limited coverage of the four aerial ladders as they are all located in the core of the City.

Map #6a shows the coverage of the aerial ladder truck plus the quint units. In this coverage model, 78.5 percent of the City is reached within 8:00 minutes of travel time.

Finally, Map #6b shows the improved quint truck coverage by adding a quint to new Station 45. Doing so significantly enhances quint/ladder coverage in the north City, and the Citywide measure increases to 82.5 percent.

Map #7—One Battalion Chief – 8:00-Minute Travel

This map shows the single Battalion Chief coverage. As the map makes clear, the coverage does not extend to the newer, outer areas of the City.

Map #8—All Incident Locations

This map shows the exact location for all incident types across a four-year period. It is apparent that there is a need for fire services on almost every developed street segment of the service area.

Map #9—Emergency Medical Services and Rescue Incident Locations

This map shows only the emergency medical and rescue call locations. With most of the calls for service being emergency medical, virtually all areas of the City need emergency medical services coverage.

Map #10—All Fire Type Locations

This map identifies the location of all fires in the City for the four-year assessment period. All fires include any type of fire call, from auto to dumpster to building. There are obviously fewer fires than medical or rescue calls. Despite this, it is evident that all first-due engine districts experience fires, although the fires are more concentrated where the buildings are older or more densely spaced due to zoning and historic growth. Major road arterials can also be seen due to the occurrence of vehicle fires.

Map #11—Structure Fire Locations

This map shows all structure fire locations. While the structure fire quantity is a smaller subset of the total fire quantity, there are two meaningful findings from this map. First, there are still structure fires in every fire station district. The location of many of the building fires parallels the areas where it is more common to find older and higher-risk building types. These areas and buildings pose a significant fire- and life-loss risk to the communities. Second, fires in the more complicated building types must be controlled quickly or losses can be very significant; thus, again, the core area must have an available, effective multiple-unit response capacity.

Map #12—Emergency Medical Services and Rescue Incident Location Densities

This map examines by mathematical density where clusters of EMS incident activity occurred. The darkest color plots the highest concentration of all incidents and shows the location of frequent workload, which is more meaningful than simply mapping the locations of all EMS incidents (as was done for Map #9).

This perspective is important because the deployment system must include an overlap of units to ensure the delivery of multiple units when needed for serious incidents or to handle simultaneous calls for service. It is obvious there are multiple areas that generate a much higher demand for emergency medical services. Therefore, crew workload planning must consider actual incident demand by hour, and not just population density in general.

Map #13—All Fire Location Densities

This map is similar to Map #10 but shows the hot spots of activity for *all* types of fires. As with EMS incidents, fire density is more concentrated in the more highly populated, most developed, and older areas of the City.

Map #14—Structure Fire Densities

This map shows only the building fire workload by density. While density is greater in the oldest areas, most station areas have smaller clusters of structure fires in a four-year period, pointing to the need for a successful ERF to building fires in every battalion.

4.2.2 Coverage Scenarios for Growth Areas

Given the 4:00-minute travel time coverage gaps of the existing station network—as evidenced in both the normal and congested travel maps and the historical incident response travel time records in Section 5—Citygate modeled improvements to the Department's deployment of resources.

Scenario 1—8:00-Minute Truck/Quint Travel Time – Quint 31 Moved to new Station 45

Tested here is the impact of moving quint 31 to new Station 45. While the coverage around Station 45 is improved, the truck/quint coverage is removed just northeast and south of Station 31. Both created gaps have significant risks and the area just above Station 31 has a serious structure fire rate. As such, Citygate would **not** recommend this move.

Scenario 2—8:00-Minute Battalion Chief Travel Time – Add Battalion Chief at new Station 45

Given the lack of Battalion Chief coverage in the north City, this scenario tests adding a Battalion Chief at the new station. Doing so significantly increases north City, single Battalion Chief coverage. The Citywide single Battalion Chief coverage improves from 50.2 percent to 58.8 percent. As such, Citygate does recommend adding this resource.

Scenario 3—Resultant 8:00-Minute ERF Travel Time – Quint 31 Retained, Quint and Battalion Chief Added to New Station 45

Given the improved coverage of adding a quint and Battalion Chief to new Station 45, this map adds these resources and measures the resultant Citywide ERF. The result is no substantial ERF improvement due to the lack of fourth engine coverage at 8:00 minutes in the north City.

Scenario 4—8:00-Minute, Four-Engine Travel Time – Engine Added to New Station 45

Given the result of Scenario 3, this test also adds an engine to new Station 45. At 8:00-minute ERF with the quint and Chief also being added at Station 45, the ERF coverage just starts to emerge in small spots on the road network southeast of Station 45. The measurable increase in road miles Citywide is just 0.7 percent.

Scenario 4b—Travel Time Per Minute – Four Engines – Engine Added to New Station 45

To discover at what minute the ERF substantially improves with the engine added at Station 45, this map shows the coverage added per minute from the eighth to the eleventh minute. The result is increased substantially in the ninth and nineteenth minute. Based on this, Citygate would add an engine to Station 45 along with a quint and Battalion Chief.

Scenario 5—8:00-Minute ERF Travel Time – Quint 31 Retained and Engine, Quint, and Battalion Chief Added to new Station 45

Given the three units added to Station 45, this map measures the results of any ERF improvement using the heavier coverage in Map #5—four engines, one truck/quint, and two Battalion Chiefs.

The coverage is not improved due to the lack of a second chief officer in the north City within 8:00 minutes travel.

Scenario 6—8:00-Minute ERF Travel Time – Minimum ERF of Three Engines, One Ladder/Quint, and One Battalion Chief

This scenario includes a new Station 45 with all three units added, and then looks at a minimum ERF of 17 immediate response personnel Citywide. The coverage over that of a four-engine ERF expands to much of the core City and up to (and a little past) Station 45. These additions to Station 45 improve the three-engine ERF model by 4.7 percent from Map #5a, from 44 percent to 48.7 percent Citywide.

4.2.3 Road Mile Coverage Measures

In addition to the visual views of coverage provided by maps, the GIS software allows the miles of public streets covered at 4:00, 5:00, or 8:00 minutes to be measured. The following table provides these metrics to compare the existing normal coverage to congested coverage.

Table 14—Road Mile Coverage of 4,671 Miles – First-Due and ERF

Map No.	Response Component	Miles Covered	Percentage of Miles Covered
3	4:00-Minute First-Due Engine Travel	2,711	**58.0%**
3a	4:00-Minute First-Due Engine Travel with Auto Aid	2,903	**62.2%**
3c	4:00-Minute First-Due Engine Travel with Auto Aid (Congested)	2,623	**56.2%**
3d	4:00-Minute First-Due Engine Travel with Auto Aid and Planned Stations	3,006	**64.4%**
3e	4:00-Minute First-Due Engine Travel with Auto Aid and Planned Stations (Congested)	2,720	**58.2%**
3f	5:00-Minute First-Due Engine Travel with Auto Aid and Planned Stations	3,858	**82.6%**
3g	5:00-Minute First-Due Engine Travel with Auto Aid and Planned Stations (Congested)	3,626	**77.6%**
4	1.5-Mile ISO Travel Distance	2,228	**47.7%**
5	8:00-Minute ERF Travel, 4 Engines, 2 Battalion Chiefs, 1 Truck/Ladder	607	**13.0%**
5a	8:00-Minute ERF Travel, 3 Engines, 1 Battalion Chief, 1 Truck/Ladder	2,057	**44.0%**
5b	8:00-Minute 4-Engine Coverage	1,991	**42.6%**
6	8:00-Minute Truck Travel	1,205	**25.8%**
6a	8:00-Minute Truck and Quint Travel	3,669	**78.5%**
6b	8:00-Minute Truck and Quint Travel Including Planned Stations	3,855	**82.5%**
7	8:00-Minute Battalion Chief Travel	2,346	**50.2%**
Scenario 1	8:00-Minute Truck and Quint Travel, Quint 31 Moved to Station 45	3,714	**79.5%**
Scenario 2	8:00-Minute Battalion Chief Travel, Battalion Chief Added to Station 45	2,746	**58.8%**
Scenario 3	8:00-Minute ERF Travel, 4 Engines, 2 Battalion Chiefs, 1 Truck/Ladder, Battalion Chief Added to Station 45, Quint Added to Station 45	607	**13.0%**
Scenario 4	8:00-Minute, 4-Engine Coverage, Engine Added to Station 45	2,023	**43.3%**
Scenario 4b	8:00–11:00-Minute 4-Engine Coverage, Engine Added to Station 45	3,544	**75.9%**
Scenario 5	8:00-Minute ERF Travel, 4 Engines, 2 Battalion Chiefs, 1 Truck/Ladder, Station 45 Super Station	619	**13.3%**
Scenario 6	8:00-Minute ERF Travel, 3 Engines, 1 Battalion Chief, 1 Truck/Ladder, Station 45 with 3 Units	2,275	**48.7%**

The current fire station spacing for first-due units, including nearby mutual aid, only covers 62.2 percent of the City's public road miles. The fire station spacing in the northern and edge areas of the City is simply too large. This dynamic was created decades ago as areas were developed or annexed into the City. As growth occurred, additional fire stations were not spaced as tightly as they had been in the older, urban core of the City. This is not an unusual finding in the growth

pattern of western cities. Adding just two more fire stations only increases coverages to 64.4 percent.

At present, without added stations, traffic congestion only imposes about a 6 percent reduction. The City's Road network is not seriously hampered by traffic congestion. Citygate has seen traffic congestion in other metropolitan clients range from 15–25 percent. The difficulties to efficiently provide single first-due fire station coverage in Fort Worth are due more to curvilinear streets than they are traffic, a right-angle grid system, or open spaces.

As for multiple-unit ERF coverage, the coverage is weak at 13 percent uncongested, and is principally limited by the arrival of the fourth engine and second Battalion Chief. By adding an engine, quint and Battalion Chief to Station 45 and using a three-engine ERF model for station spacing, Citywide ERF coverage is increased to 48.7 percent. The outer edges of the City cannot improve for ERF coverage further until growth drives infill fire stations outside of the central core and west of Saginaw and Haslet.

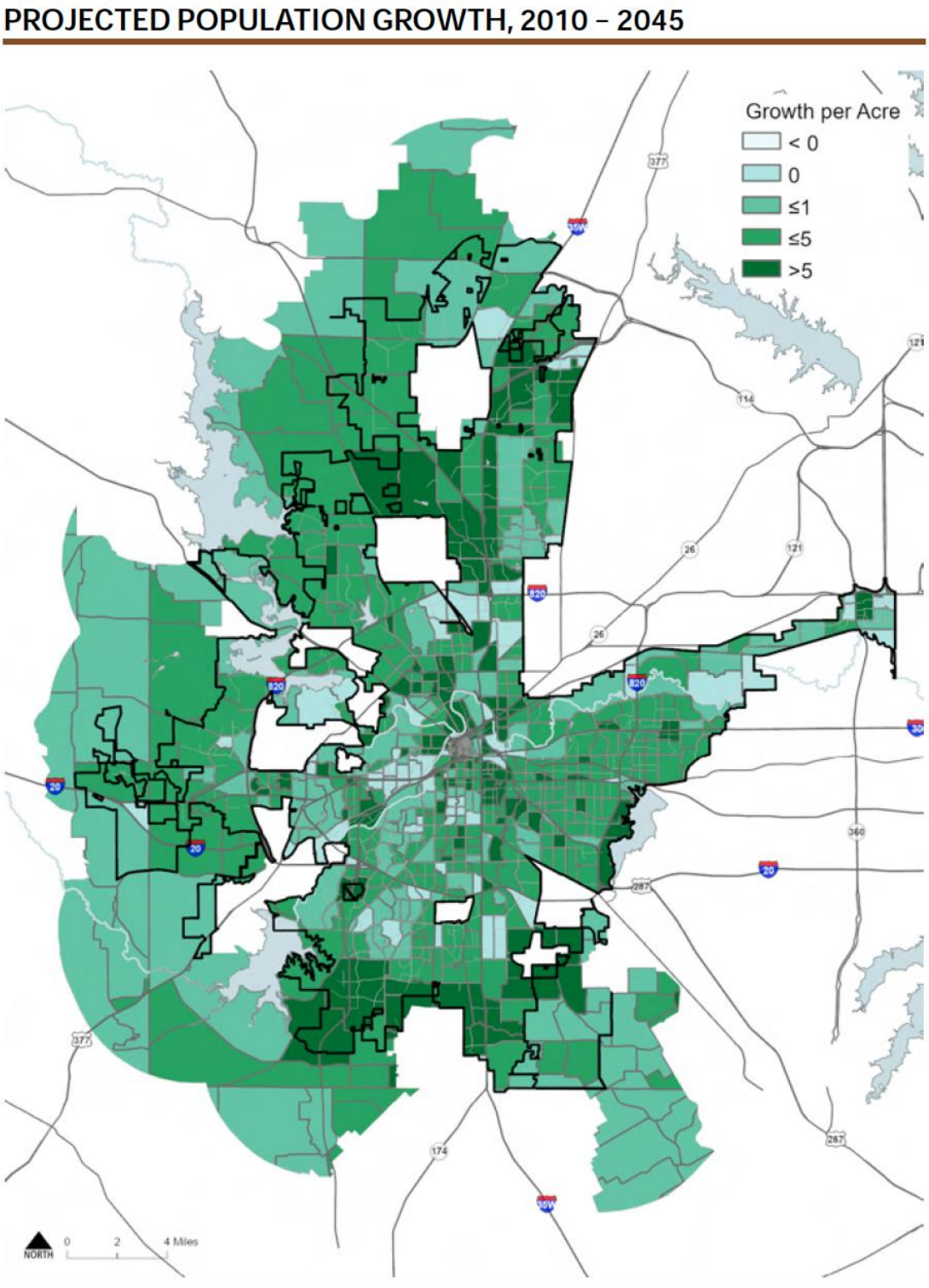
However, the effect of using a Citywide **5:00**-minute travel time goal for the first unit is *significant* and increases first-due unit coverage to 82.6 percent.

4.2.4 Impacts of Growth

In a memo to the City Council on May 31, 2022, staff told the Council that the U.S. Census Bureau recently released population estimates as of July 1, 2021. According to those estimates, the City's population had grown to 935,508, ranking it 13th in the United States. The City grew by over 190,684 persons since the 2010 Census base estimate, equating to 25 percent growth since 2010. The data further projected that Fort Worth is currently the fastest growing large city (over 500,000 population) in the United States, with 1.9 percent growth during the year, followed by San Antonio at 1.2 percent.

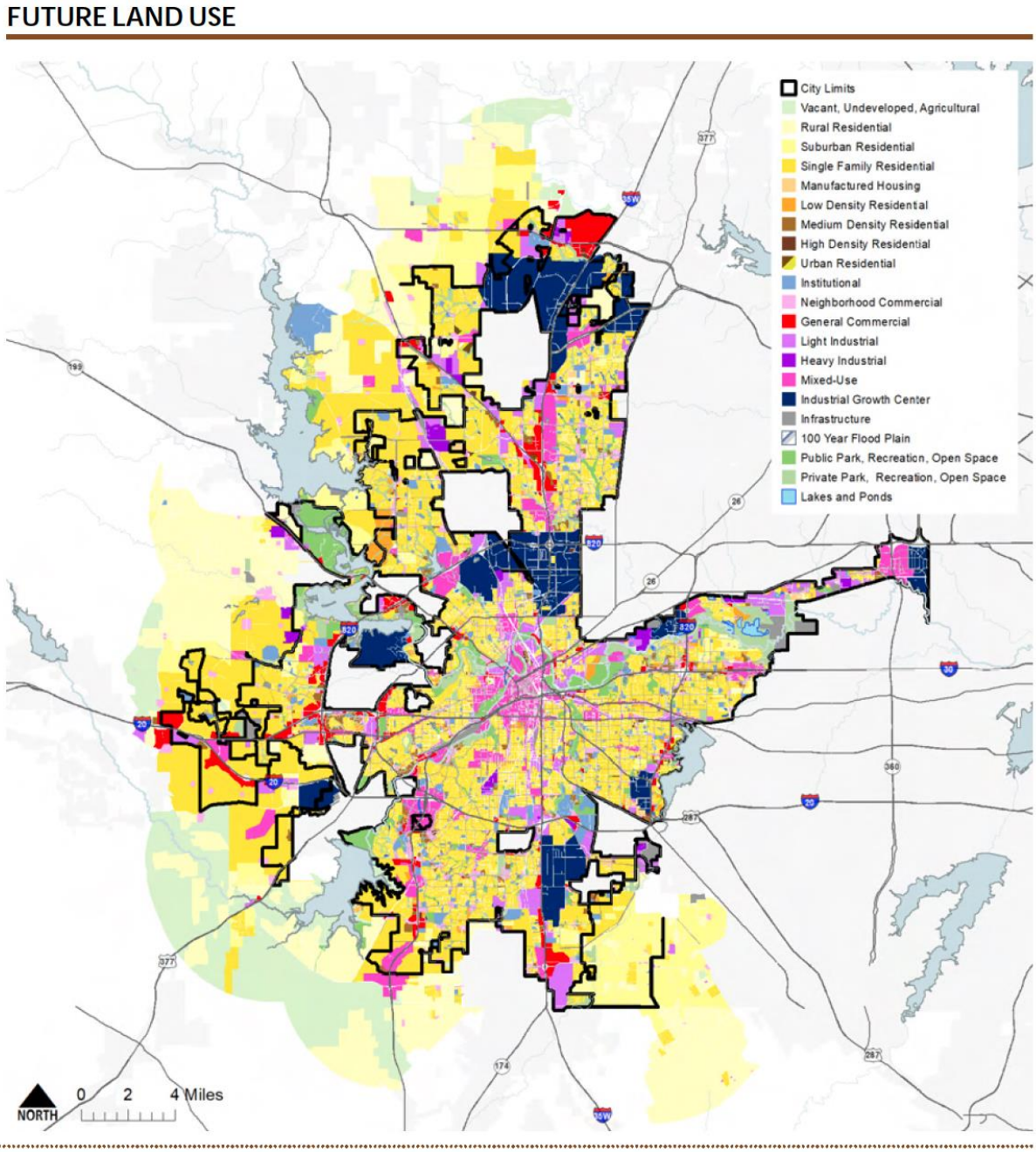
Given the planned growth potential in the City, this project reviewed the City's Comprehensive Plan Population trends and Land Uses allowed by zoning. The following two maps identify where ongoing growth is both likely to be placed and at what density:

Figure 4—Comprehensive Plan – Projected Population Growth Over Time by Density



Source: North Central Texas Council of Government Demographic Forecast, 2015.

Figure 5—Comprehensive Plan – Future Land Use



These expected growth patterns indicate that the most intense growth in the City will fall outside the loop where the station spacing is the thinnest.

4.2.5 GIS Mapping Findings

Finding #2: There are significant gaps in first-unit coverage of public streets within a 4:00-minute travel time from a station.

Finding #3: Delivering a large ERF coverage is challenging except where the "core stations" can respond inwardly to the center of a multiple-station area.

Finding #4: The uncongested single ladder/quint truck coverage at 78.5 percent is substantial and can be improved to 82.5 percent by adding a quint to new Station 45.

Finding #5: Given the road network and topography of the City with open space areas, first-due unit coverage at 4 minutes is challenging. However, the impact of using a **5:00**-minute travel time goal for fire station spacing is *significant*. The first-due unit uncongested coverage increases to 82.6 percent with the inclusion of planned Fire Stations 45 and 46.

Finding #6: The impacts of growth on the fire station system are going to be most significant outside of the loop, where fire station placement is weakest, and these impacts must be carefully projected for the eventual addition of more fire stations and crews.

This page was intentionally left blank

Section 5

Statistical Analysis

2
CHIEF
3
CHIEF
FORT WORTH FIRE DEPARTMENT

SECTION 5—STATISTICAL ANALYSIS

5.1 HISTORICAL EFFECTIVENESS AND RELIABILITY OF RESPONSE – WHAT STATISTICS SAY ABOUT THE EXISTING SYSTEM'S PERFORMANCE

SOC ELEMENT 7 OF 8
RELIABILITY & HISTORICAL RESPONSE EFFECTIVENESS STUDIES

The maps described in Section 4 show the GIS-projected response coverage given perfect conditions with no competing calls and all units in place. Examination of the actual response time data provides a picture of coverage in the real world of simultaneous calls, rush hour traffic conditions, units out of position, and delayed travel time for events such as periods of severe weather.

5.1.1 Data Set Identification

The Department provided NFIRS 5 and records management system apparatus response data for the period October 1, 2017, through September 30, 2021. Over the four years of the study data, there were 488,051 unique fire incidents and 634,704 apparatus responses.

Data was assembled into the following four fiscal reporting years (RY):

- **RY 17/18** 10/1/2017 – 9/30/2018
- **RY 18/19** 10/1/2018 – 9/30/2019
- **RY 19/20** 10/1/2019 – 9/30/2020
- **RY 20/21** 10/1/2020 – 9/30/2021

For purposes of this analysis, local incidents were associated with 44 fire stations. These fire stations are organized into seven battalions. The following table shows the battalions and the stations assigned to each battalion.

Table 15—Battalion Assignment of Each Fire Station

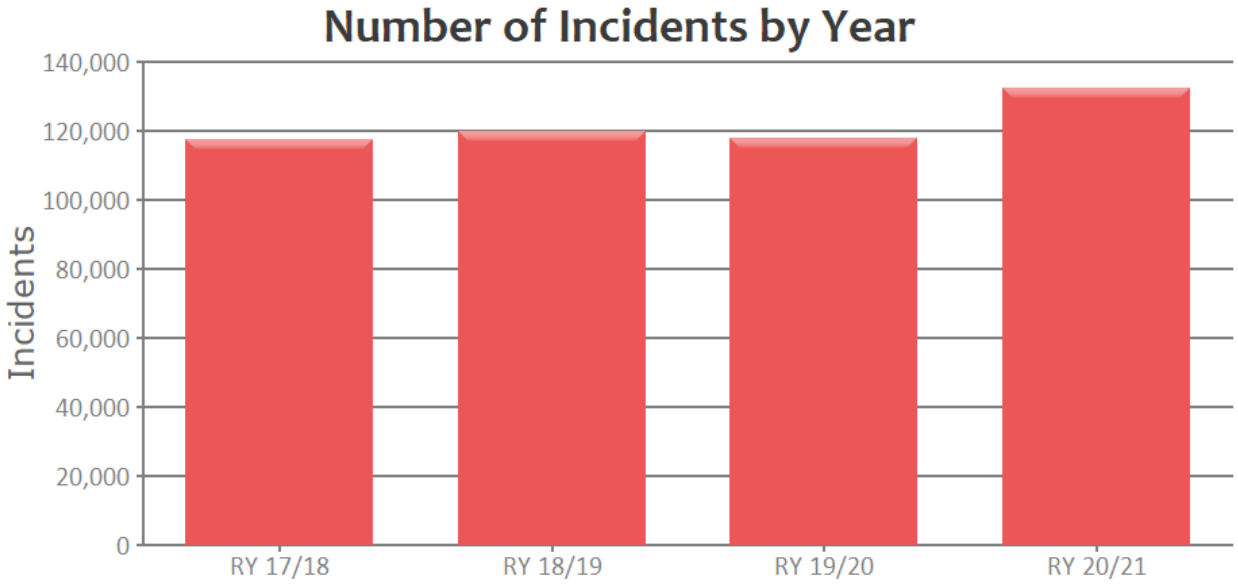
Battalion	Assigned Stations
Battalion 1	Stations 4, 10, 17, 21, 28, 29, 36, 42
Battalion 2	Stations 1, 2, 5, 6, 8, 18
Battalion 3	Stations 12, 13, 15, 25, 40, 44
Battalion 4	Stations 3, 7, 22, 24, 27, 33
Battalion 5	Stations 16, 23, 26, 30, 32, 39, 43
Battalion 6	Stations 11, 34, 35, 37, 38, 41
Battalion 7	Stations 9, 14, 19, 20, 31

5.2 SERVICE DEMAND

In RY 20/21, the Department responded to 132,361 incidents. During this period, the Department had a daily demand of 362.63 incidents, of which 2.24 percent were fire incidents, 59.15 percent were EMS incidents, and 38.61 percent were other incident types. During this same period, there were 171,177 apparatus responses to incidents by the Department and other agencies, which results in an average of 1.29 apparatus responses per incident.

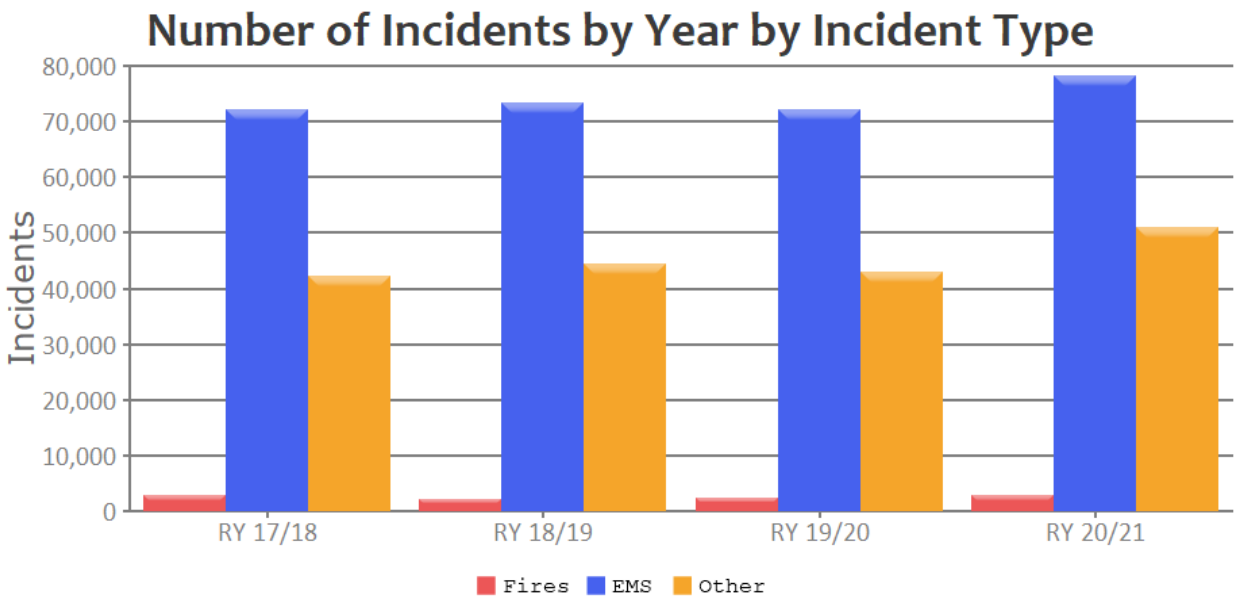
For the first three years of the four-year study period, the Department responded to less than 120,000 incidents annually. In RY 20/21, there was an increase to over 132,000 incidents, most of which was likely due to COVID-19.

Figure 6—Number of Incidents by Reporting Year



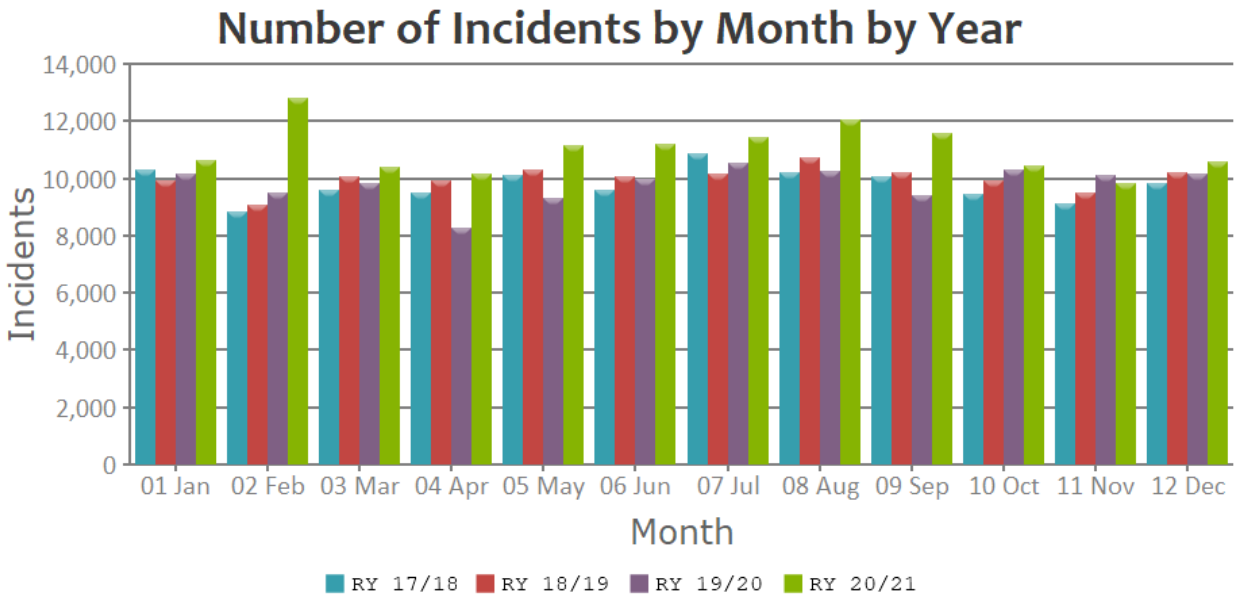
The following figure illustrates the number of incidents by incident type. RY 20/21 saw a significant increase in the number of EMS and other incident types, again reflective of the pandemic.

Figure 7—Number of Incidents by Reporting Year by Incident Type



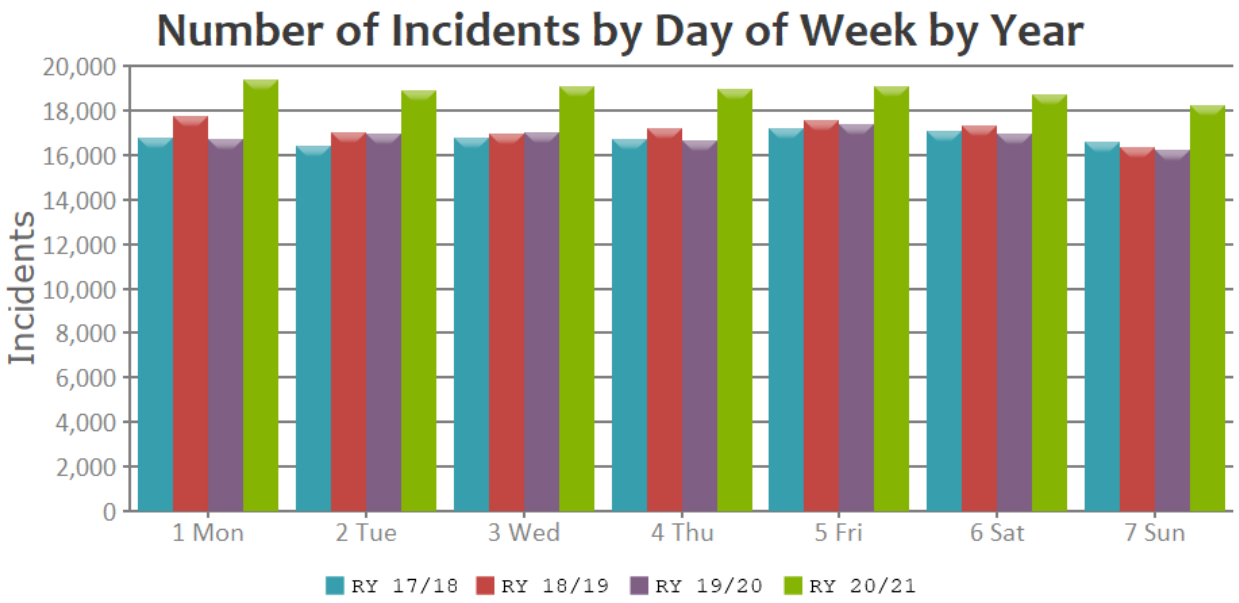
The number of incidents tends to be fairly consistent month to month, with a slight increase in activity in the summer.

Figure 8—Number of Incidents by Month by Year



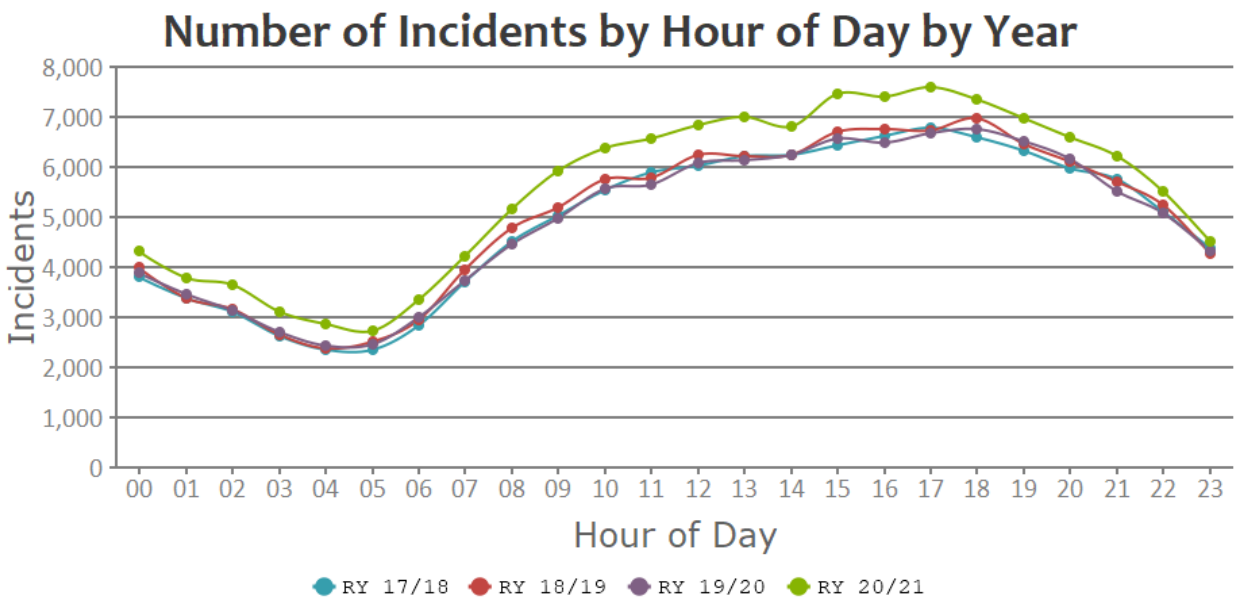
The number of incidents by day of week tends to be fairly steady, with a slight increase on Friday and Monday.

Figure 9—Number of Incidents by Day of Week by Reporting Year



The following figure breaks down incidents by hour of the day by reporting year. RY 20/21 shows an increased volume of incidents throughout the day.

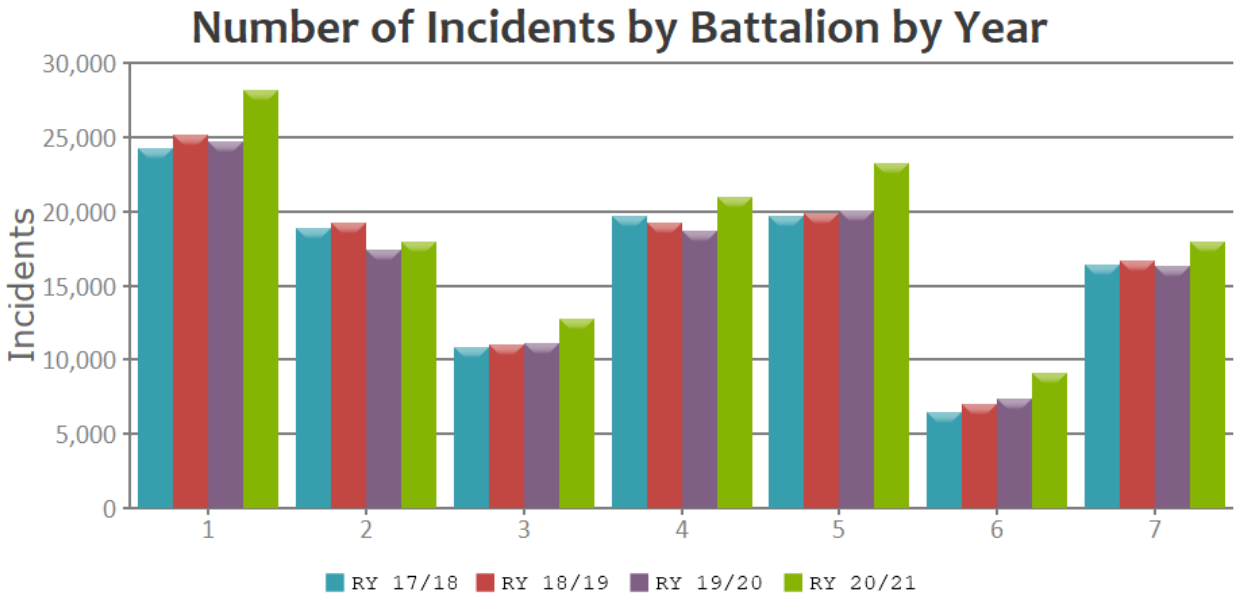
Figure 10—Number of Incidents by Hour of Day by Reporting Year



Finding #7:	The Department's time-of-day, day-of-week, and month-of-year calls for service demands occur in consistent, predictable patterns. The service demand is always sufficiently high in all fire station areas to require an all-day, year-round response system.

The following figure breaks down the number of incidents by battalion by reporting year. Battalions 1 and 5 had the largest increase in incident activity in RY 20/21.

Figure 11—Number of Incidents by Battalion by Reporting Year



5.2.1 Incident Quantities by Incident Types

The following table ranks incident types by quantity. EMS incidents rank high. Incidents canceled en route also rank high on the list. Building fires rank in 22nd place by volume.

Table 16—Incident Quantity by Year by Incident Type (Greater Than 500 Total)

Incident Type	RY 17/18	RY 18/19	RY 19/20	RY 20/21	Total
311 Medical assist, assist EMS crew	50,244	52,546	51,933	47,540	202,263
321 EMS call, excluding vehicle accident with injury	15,646	13,947	13,570	23,343	66,506
611 Dispatched and canceled en route	12,954	15,064	13,520	15,435	56,973
622 No incident found on arrival of incident address	6,770	6,877	6,509	7,380	27,536
324 Motor vehicle accident no injuries	4,529	5,253	5,121	5,376	20,279

Incident Type	RY 17/18	RY 18/19	RY 19/20	RY 20/21	Total
554 Assist invalid	3,650	3,790	3,947	4,739	16,126
552 Police matter	3,111	3,170	3,383	3,941	13,605
735 Alarm system sounded due to malfunction	1,954	1,978	1,897	2,290	8,119
553 Public service	1,253	1,499	1,517	2,155	6,424
511 Lock-out	1,266	1,375	1,330	1,488	5,459
322 Vehicle accident with injuries	1,353	1,179	1,091	1,494	5,117
510 Person in distress, other	1,202	1,094	1,271	1,486	5,053
463 Vehicle accident, general cleanup	826	1,092	1,204	1,443	4,565
745 Alarm system sounded, no fire – unintentional	830	830	911	1,246	3,817
412 Gas leak (natural gas or LPG)	695	630	698	723	2,746
743 Smoke detector activation, no fire – unintentional	591	628	727	730	2,676
531 Smoke or odor removal	614	548	578	705	2,445
522 Water or steam leak	347	317	350	1,416	2,430
151 Outside rubbish, trash, or waste fire	525	462	564	813	2,364
740 Unintentional transmission of alarm, other	437	485	554	688	2,164
551 Assist police or other governmental agency	475	455	520	594	2,044
111 Building fire	490	436	445	519	1,890
733 Smoke detector activation due to malfunction	490	453	415	484	1,842
131 Passenger vehicle fire	463	419	444	489	1,815
143 Grass fire	647	193	356	362	1,558
444 Power line down	378	493	368	293	1,532
730 System malfunction, other	331	293	295	481	1,400
651 Smoke scare, odor of smoke	361	382	338	292	1,373
445 Arcing, shorted electrical equipment	355	318	331	305	1,309
744 Detector activation, no fire – unintentional	257	260	261	310	1,088
911 Citizen complaint	662	217	91	63	1,033
154 Dumpster or other outside trash receptacle fire	231	184	246	278	939
561 Unauthorized burning	247	197	232	229	905
142 Brush, or brush and grass mixture fire	272	115	158	182	727
353 Removal of victim(s) from stalled elevator	151	177	214	184	726
741 Sprinkler activation, no fire – unintentional	182	87	73	272	614
661 EMS call, party transported by non-fire agency	199	164	126	125	614
323 Motor vehicle/pedestrian accident (MV Ped)	155	122	126	151	554
621 Wrong location	154	133	131	113	531

5.2.2 Incident Quantities by Property Use

The following table lists incidents by reporting year by NFIRS 5 *Property Use with more than 1,000 incidents total*. Residential dwellings and streets rank high on the list.

Table 17—Incidents: Quantity – Reporting Year by Property Use

Property Use	RY 17/18	RY 18/19	RY 19/20	RY 20/21	Total
419 One- or two-family dwelling	38,995	39,532	41,055	45,628	**165,210**
429 Multi-family dwellings	19,037	19,137	19,775	23,519	**81,468**
963 Street or road in commercial area	8,943	9,414	8,018	8,535	**34,910**
965 Vehicle parking area	5,975	6,344	6,187	6,548	**25,054**
961 Highway or divided highway	5,503	5,852	5,551	5,994	**22,900**
962 Residential street, road, or residential driveway	4,256	4,225	3,911	4,125	**16,517**
311 24-hour care nursing homes, 4 or more persons	2,320	2,594	2,657	3,113	**10,684**
960 Street, other	2,252	2,298	2,648	2,534	**9,732**
449 Hotel/motel, commercial	1,635	1,752	1,700	2,237	**7,324**
400 Residential, other	1,520	1,292	1,605	2,019	**6,436**
900 Outside or special property, other	1,025	1,020	1,458	2,194	**5,697**
500 Mercantile, business, other	1,028	1,104	1,004	1,294	**4,430**
459 Residential board and care	1,000	1,086	1,028	1,031	**4,145**
511 Convenience store	1,022	1,022	936	1,041	**4,021**
519 Food and beverage sales, grocery store	835	939	849	846	**3,469**
439 Boarding/rooming house, residential hotels	853	825	696	814	**3,188**
599 Business office	920	796	642	639	**2,997**
161 Restaurant or cafeteria	787	846	641	722	**2,996**
931 Open land or field	753	470	616	648	**2,487**
460 Dormitory type residence, other	687	596	645	406	**2,334**
936 Vacant lot	516	498	530	655	**2,199**
700 Manufacturing, processing	514	488	484	593	**2,079**
215 High school/junior high school/middle school	583	569	447	424	**2,023**
938 Graded and cared-for plots of land	613	403	389	379	**1,784**
571 Service station, gas station	374	404	448	530	**1,756**
340 Clinics, doctors' offices, hemodialysis centers	389	446	387	501	**1,723**
891 Warehouse	416	382	386	466	**1,650**
213 Elementary school, including kindergarten	486	427	312	363	**1,588**
331 Hospital – medical or psychiatric	367	359	395	396	**1,517**
131 Church, mosque, synagogue, temple, chapel	449	442	254	298	**1,443**

Property Use	RY 17/18	RY 18/19	RY 19/20	RY 20/21	Total
213 Elementary school, including kindergarten	486	427	312	363	**1,588**
331 Hospital – medical or psychiatric	367	359	395	396	**1,517**
131 Church, mosque, synagogue, temple, chapel	449	442	254	298	**1,443**
173 Bus station	283	333	437	328	**1,381**
321 Mental retardation/development disability facility	418	358	298	290	**1,364**
300 Health care, detention, and correction, other	332	350	237	304	**1,223**

5.2.3 Simultaneous Analysis

Simultaneous incidents occur when other incidents are underway at the time a new incident begins. In RY 20/21, there was at least one incident underway about 98.40 percent of the time.

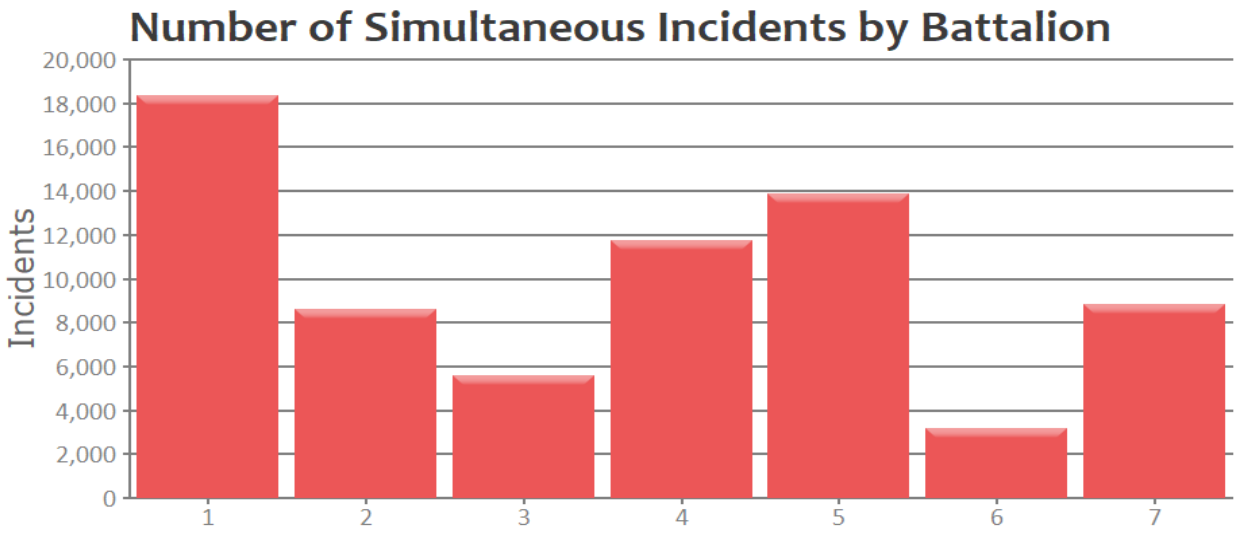
Table 18—Percentage of Simultaneous Incidents by Number of Simultaneous Incidents – 20/21

Number of Simultaneous Incidents	Percentage
1 or more	98.40%
2 or more	93.22%
3 or more	83.90%
4 or more	71.13%
5 or more	56.87%
6 or more	42.95%
7 or more	30.87%
8 or more	21.41%
9 or more	14.50%
10 or more	9.80%
11 or more	6.90%
12 or more	5.20%
13 or more	4.18%
14 or more	3.60%
15 or more	3.27%
16 or more	3.07%
17 or more	2.91%
18 or more	2.79%

Number of Simultaneous Incidents	Percentage
19 or more	2.68%
20 or more	2.59%
21 or more	2.49%
22 or more	2.40%
23 or more	2.31%
24 or more	2.22%
25 or more	2.14%
26 or more	2.06%
27 or more	2.00%
28 or more	1.93%
29 or more	1.86%
30 or more	1.79%
31 or more	1.73%
32 or more	1.67%
33 or more	1.62%
34 or more	1.57%
35 or more	1.51%
36 or more	1.47%
37 or more	1.42%
38 or more	1.38%
39 or more	1.33%
40 or more	1.29%
41 or more	1.25%
42 or more	1.22%
43 or more	1.18%
44 or more	1.14%
45 or more	1.09%
46 or more	1.04%
47 or more	0.99%

The following figure shows the number of simultaneous incidents by battalion.

Figure 12—Number of Simultaneous Incidents by Battalion



In a metropolitan fire department, simultaneous incidents in different station areas have very little operational consequence. However, when simultaneous incidents occur within a single station area, there can be significant delays in response times.

Table 19—Simultaneous Incident Activity by Station

Station	Simultaneous Incidents
26	1,122
23	973
31	943
24	939
16	862
17	848
14	672
22	529
5	409
37	373
12	361
29	313
36	305

Station	Simultaneous Incidents
2	281
13	268
4	252
8	245
1	244
21	218
42	215
7	196
40	193
27	159
3	148
38	144
20	131
10	107
15	101
30	90
28	84
9	76
39	76
32	64
6	62
33	61
25	60
19	55
18	45
41	25
11	11
34	9
35	8

Finding #8:	Battalions 1 and 5 have the greatest number of simultaneous single-station incidents. This is one of the reasons travel times remain longer than desired.

5.2.4 Unit-Hour Utilization

The unit-hour utilization (UHU) percentage for apparatus is calculated by two primary factors: the number of responses and the duration of responses.

What should the maximum utilization percentage on a firefighting unit be? When crews on a 24-hour shift must also pay attention to apparatus checkout, station duties, training, public education, paperwork, as well as required physical training and meal breaks, Citygate believes the maximum commitment UHU per hour across the normal workday should not exceed 30 percent. Beyond that, the most important duty to suffer will be training hours and employee health and wellness.

For a dedicated unit, such as an ambulance or low-acuity unit *working less than* a 24-hour shift, UHU can rise to 40 to 50 percent at a maximum. At that UHU level, Peak Activity Units (PAUs) must then have additional duty days specifically for training, during which they are not responding to incidents, to meet their annual requirements for continuing education and training hours. The following table summarizes UHU for the 10 busiest Department engine companies. The busiest engines are listed first. **Appendix A** of this study contains the list for all engines and ladder/quint companies.

Table 20—Unit-Hour Utilization – 10 Busiest Engine Companies – RY 20/21

Hour	E29	E31	E26	E22	E24	E23	E16	E17	E37	E07
00:00	14.65%	11.74%	11.47%	15.81%	14.52%	17.57%	12.08%	15.21%	10.67%	10.98%
01:00	12.05%	13.20%	10.40%	11.20%	13.26%	11.90%	10.25%	15.85%	10.43%	11.20%
02:00	12.07%	11.93%	9.52%	10.82%	12.83%	13.67%	10.16%	14.14%	10.20%	9.81%
03:00	9.83%	10.57%	8.94%	12.46%	10.59%	11.72%	10.35%	9.01%	9.52%	9.26%
04:00	10.45%	8.48%	9.80%	8.51%	5.55%	4.05%	8.65%	5.63%	7.50%	10.51%
05:00	8.98%	10.68%	9.99%	11.17%	7.14%	4.00%	7.48%	6.14%	6.82%	9.31%
06:00	11.17%	11.51%	9.76%	12.23%	7.18%	3.61%	10.07%	6.68%	9.46%	11.41%
07:00	13.85%	14.48%	14.79%	12.74%	12.21%	12.91%	12.28%	12.51%	12.73%	12.07%
08:00	15.02%	12.97%	16.40%	14.94%	13.96%	14.45%	16.16%	14.33%	13.89%	13.69%
09:00	16.33%	14.69%	18.68%	13.37%	19.16%	14.94%	15.59%	16.27%	13.74%	13.96%
10:00	17.70%	16.00%	18.82%	18.29%	18.43%	14.63%	17.47%	16.89%	15.29%	15.16%
11:00	18.08%	19.92%	21.28%	18.12%	17.92%	15.70%	18.66%	20.08%	17.22%	14.48%
12:00	20.71%	18.75%	19.65%	18.59%	20.21%	17.28%	18.83%	17.58%	14.76%	16.29%
13:00	23.66%	18.76%	22.29%	16.84%	18.26%	18.64%	17.08%	15.59%	22.09%	16.73%
14:00	17.68%	22.60%	24.75%	16.22%	19.61%	17.60%	19.81%	17.01%	18.73%	17.92%
15:00	23.51%	22.85%	22.89%	20.97%	25.97%	21.59%	19.85%	21.52%	21.46%	18.95%
16:00	23.91%	22.22%	22.63%	23.48%	20.87%	21.27%	20.40%	18.91%	21.91%	20.19%
17:00	21.74%	22.93%	23.21%	21.78%	22.44%	25.96%	22.18%	20.44%	27.06%	21.12%
18:00	22.74%	22.72%	21.22%	23.56%	21.52%	20.85%	20.24%	19.89%	21.06%	19.70%
19:00	21.35%	22.35%	20.06%	21.52%	19.63%	21.58%	18.89%	18.14%	19.25%	19.86%
20:00	21.56%	20.51%	20.33%	21.53%	20.84%	23.47%	17.63%	18.42%	17.54%	18.27%
21:00	18.31%	20.58%	17.53%	17.74%	18.00%	22.52%	17.70%	18.61%	16.64%	17.54%
22:00	17.60%	17.97%	16.74%	17.29%	15.66%	16.38%	16.23%	15.89%	15.76%	17.23%
23:00	14.53%	13.25%	10.06%	13.83%	14.21%	16.93%	13.24%	11.67%	11.06%	12.01%

The following table summarizes UHU for the 10 busiest Department truck/quint companies. The busiest trucks/quints are listed first.

Table 21—Unit-Hour Utilization – 10 Busiest Truck/Quint Companies – 20/21

Hour	Q13	Q33	Q42	Q17	Q23	Q24	Q26	Q31	Q16	T01
00:00	7.15%	6.84%	3.39%	5.13%	4.72%	3.19%	2.57%	3.07%	2.16%	2.01%
01:00	11.82%	5.62%	3.19%	3.62%	2.18%	3.50%	2.06%	2.89%	0.86%	1.96%
02:00	5.33%	6.53%	3.98%	5.18%	2.63%	1.92%	1.78%	2.42%	1.15%	2.95%
03:00	5.44%	6.88%	4.91%	4.01%	2.26%	2.14%	1.73%	2.89%	2.02%	1.78%
04:00	5.02%	6.33%	3.38%	6.84%	10.20%	6.45%	1.15%	1.76%	2.19%	1.49%
05:00	4.04%	5.55%	4.79%	8.41%	11.57%	6.47%	2.33%	3.08%	1.17%	2.32%
06:00	5.17%	6.22%	5.54%	6.30%	7.27%	6.06%	2.30%	3.06%	2.83%	3.67%
07:00	6.17%	6.82%	6.34%	4.21%	3.04%	2.39%	2.71%	3.10%	2.76%	1.70%
08:00	7.45%	5.68%	9.51%	6.42%	3.98%	4.22%	5.47%	4.32%	4.44%	3.40%
09:00	11.81%	7.39%	8.07%	6.89%	5.69%	6.89%	6.68%	4.88%	7.56%	3.21%
10:00	11.28%	6.59%	9.95%	9.29%	6.23%	7.81%	7.06%	5.94%	7.78%	2.62%
11:00	14.08%	5.19%	9.07%	8.60%	4.97%	5.11%	7.73%	7.04%	5.57%	4.13%
12:00	9.84%	7.43%	10.20%	6.85%	6.86%	9.06%	7.57%	6.39%	7.87%	2.80%
13:00	10.28%	8.05%	9.20%	5.70%	5.53%	4.99%	8.61%	5.09%	5.92%	3.02%
14:00	12.49%	10.86%	9.67%	6.91%	6.05%	6.65%	8.13%	5.78%	6.70%	4.20%
15:00	12.35%	9.09%	8.71%	8.33%	7.57%	8.45%	8.91%	8.32%	7.26%	3.49%
16:00	12.58%	9.10%	9.67%	8.43%	7.05%	8.40%	8.46%	7.06%	6.54%	5.81%
17:00	14.63%	9.53%	10.60%	10.41%	6.50%	8.55%	10.87%	9.26%	7.73%	6.50%
18:00	11.93%	11.09%	10.25%	12.70%	6.93%	9.75%	9.50%	8.63%	10.03%	4.97%
19:00	10.86%	8.18%	10.04%	8.30%	6.48%	7.08%	7.26%	9.21%	7.12%	5.79%
20:00	10.95%	9.12%	8.31%	6.20%	7.47%	6.70%	6.28%	6.51%	4.59%	3.65%
21:00	10.79%	7.44%	8.23%	4.67%	7.28%	6.05%	4.23%	6.36%	5.93%	2.64%
22:00	9.03%	8.95%	7.22%	5.13%	4.64%	3.25%	4.00%	4.92%	5.78%	3.08%
23:00	8.35%	6.97%	4.88%	3.68%	3.63%	3.78%	3.02%	3.34%	2.80%	1.93%

Finding #9: The engine and truck/quint company unit-hour utilization measures for daylight hours are not yet close to (nor exceeding) 30 percent. Based on this measure alone, no station immediately needs a second or third "reliever" company.

5.2.5 High Incident Demand Areas and Staffing Per Crew

To develop a deeper understanding for workload per crew measures, it is necessary to combine them with the rate of simultaneous incidents, the population served, and the response time of a second-due cover unit if a busy engine is already managing an incident when another occurs in its service area. To evaluate this in the City, this study looked at the ten engines with the highest UHU rates. In the table to follow, other metrics were added for simultaneous rate, population, square miles, population density, response times, and the Battalion area.

The table begins by listing engines in order of highest to lowest UHU. Next, quints/ladders are ranked high to low as some engines are in double stations with a quint/ladder. The demographic data is from City GIS and fire-planning staff and was provided in Excel format. Citygate did not originally obtain these numbers and did not change them. The first-due and second-due response times are from this study.

As the table is read from left to right, color codes are used to evaluate whether a station's apparatus were in one, two, or three of the first columns. If an area had units with all three factors present, that area merits careful attention for further decay in response times.

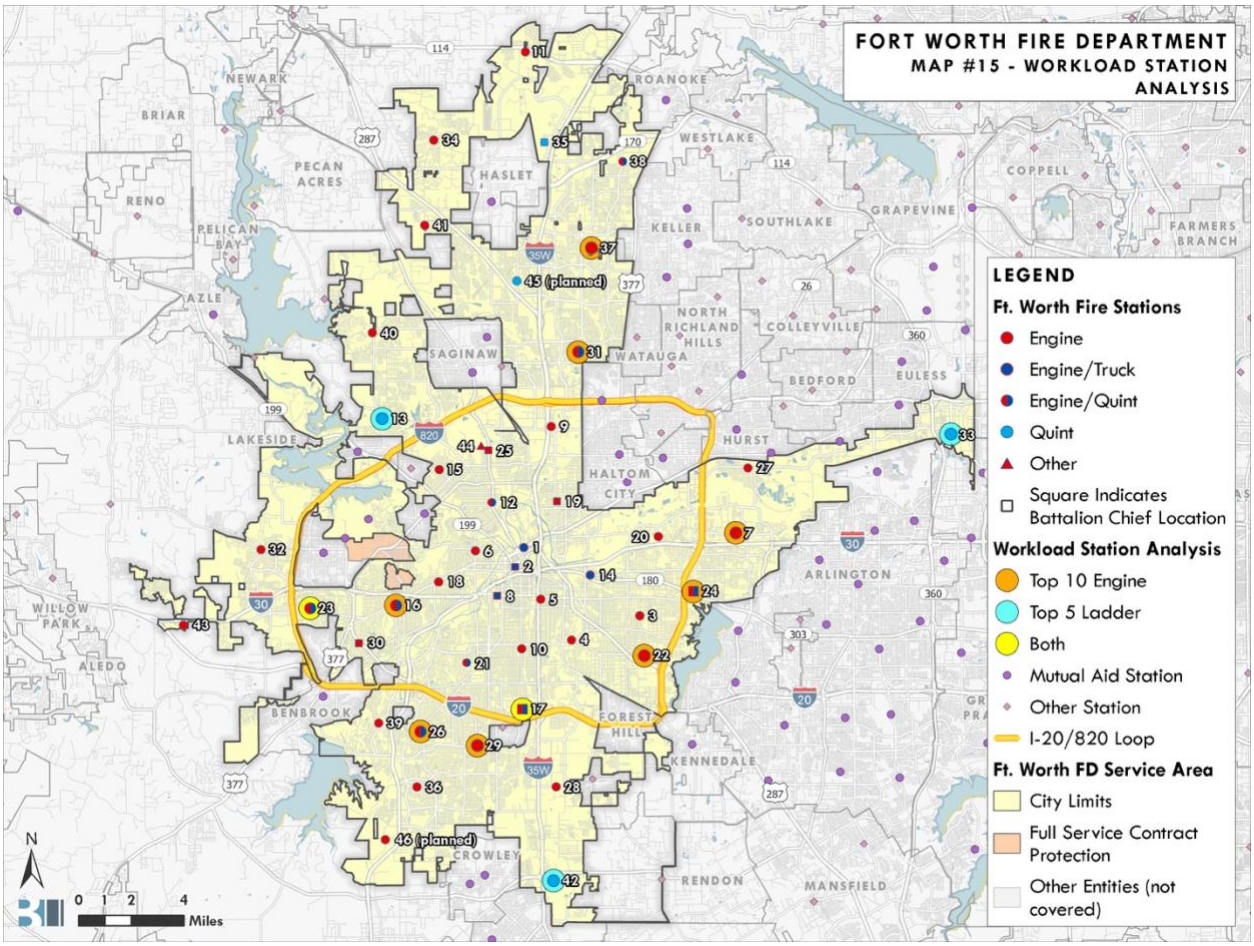
Table 22—Top Ten Workload Stations Analysis

High to Low (Engines UHU)	High to Low (Ladders UHU)	High to Low (Station Simultaneous Incidents)	Resident Population	Station Area (Sq. Mi.)	Resident Population Density	First-Due 4:00 Min. 90%	Second-Due Time	Battalion
E29	**Q13**	**26**	50,713	9.52	5,327	5:29	7:14	1
E31	**Q33**	**23**	66,240	12.91	5,130	9:04	11:05	7
E26	**Q42**	**31**	26,224	5.57	4,706	6:28	8:12	5
E22	**Q17**	**24**	25,687	8.84	2,904	6:48	9:31	4
E24	**Q23**	**16**	20,211	5.89	3,431	6:20	7:48	4
E23		**17**	22,538	7.24	3,112	6:30	8:22	5
E16		**14**	24,300	8.71	2,789	6:15	7:28	5
E17		**22**	24,653	8.01	3,077	6:17	7:46	1
E37		**5**	66,096	13.56	4,874	8:51	10:54	3
E7		**37**	28,528	9.52	2,997	6:51	9:17	4

Red = 3 impacts | **Orange** = 2 impacts | **Black** = 1 impact

Station areas 23 and 17 appear in all three columns. Stations 31, 26, 22, 24, 16, and 37 appear in two columns. The remaining units are only listed once. The following map locates these top ten areas of workload.

Figure 13—Workload Analysis by Station



It is apparent from the high-workload units review and their locations that:

- The ten highest-workload engines are near or outside "the loop," have station areas that are too large, and have slow second-cover unit times.
- Five of the top ten unit-hour utilization engines are in the top ten station areas for resident population.
- Four of the top ten unit-hour utilization engines are in the top ten station areas for population density.
- Outer area units are already stressed and have weak second-unit times for OSHA two-in/two-out standard for firefighting.

- Inside the loop are the largest-hazard buildings and the highest quantity of structure fires.
- The current system depends on both the **speed** and **weight** of the attack to deliver enough staffing to be effective.

5.2.6 Staffing per Unit

Since starting four-firefighter-per-crew staffing on some units in 2003, the Department has staffed its engine and ladder companies with four personnel each, consistent with the urban area recommendations in NFPA Standard 1710 for compliance with the OSHA two-in/two-out rule for interior fire attack, and to provide better first-unit immediate skills and firefighter safety without depending on the second-due unit. This becomes all the more important when observing the wide spacing of the outer stations in the City and the locations of the 10 busiest units with their large service populations.

Citygate looked at all units Citywide to determine if a mix of four and three-firefighter staffing could be safely used. Given the second-due times Citywide, and the population sizes in fire station areas, Citygate could find only three engines (#4, #13 and #28) with lighter workload, risk, populations, and very good second-due unit cover times. Saving three positions per day (nine FTEs total) is not worth the increased risk to those station areas by having three-firefighter crews that are not capable of immediate interior fire attack as per OSHA two-in/two-out policy.

Another question which arises is how does the City compare to *other* large agencies when considering staffing per unit? In the following table (ranked by population), all departments serving a population similar to or larger than Fort Worth's staff with four firefighters per company.

Table 23—Four-Firefighter Staffing by Population in US Cities

Rank	City	Population (2021*)	4-Firefighter Staffing
1	New York	8,467,513	YES
2	Los Angeles	3,849,297	YES
3	Chicago	2,696,555	YES
4	Houston	2,288,250	YES
5	Phoenix	1,624,569	YES
6	Philadelphia	1,576,251	YES
7	San Antonio	1,451,853	YES
8	San Diego	1,381,611	YES
9	Dallas	1,288,457	YES
10	San Jose	983,489	YES
11	Austin	964,177	YES
12	Jacksonville	954,614	YES
13	**Fort Worth**	**935,508**	**YES**
14	Columbus	906,528	Partial @ 14 Hours
15	Indianapolis	882,039	YES
16	Charlotte	879,709	YES
17	San Francisco	815,201	YES
18	Seattle	733,919	YES
19	Denver	711,463	YES
20	Oklahoma City	687,725	YES

*U.S. Census Bureau, Population Division / Fort Worth Council Report

Finding #10: While no unit has excessive workload at this time, in addition to the long-term planning for added stations, the Department could also need infill companies where workload measures (such as UHU) are excessive, and the response time of a second-due cover unit is too long. Both types of planning should begin with a focus on the top ten busiest areas, as identified in this study.

Finding #11: The City is meeting urban best practices by staffing with four firefighters per unit and given workloads, risks, and large station areas, maintaining this staffing level is necessary.

Finding #12: As Station areas become too busy, the next logical deployment addition would be two-firefighter squads for low-acuity EMS and other, non-fire incident types of call responses *at peak hours of the day on an alternative work schedule.*

5.3 DISTRIBUTION RESPONSE TIME PERFORMANCE

This sub-section reports performance for the first apparatus to arrive on the scene of emergency incidents. Measurements are the number of minutes and seconds necessary for 90 percent completion of:

- Call processing
- Turnout
- Travel
- Dispatch to arrival
- Call to arrival

Each one of these components starts with a year-to-year comparison followed by a graph breaking down compliance with a stated goal by hour of day. For these measurements, the station area is defined by the home station of the first apparatus to arrive on the scene.

5.3.1 Call Processing

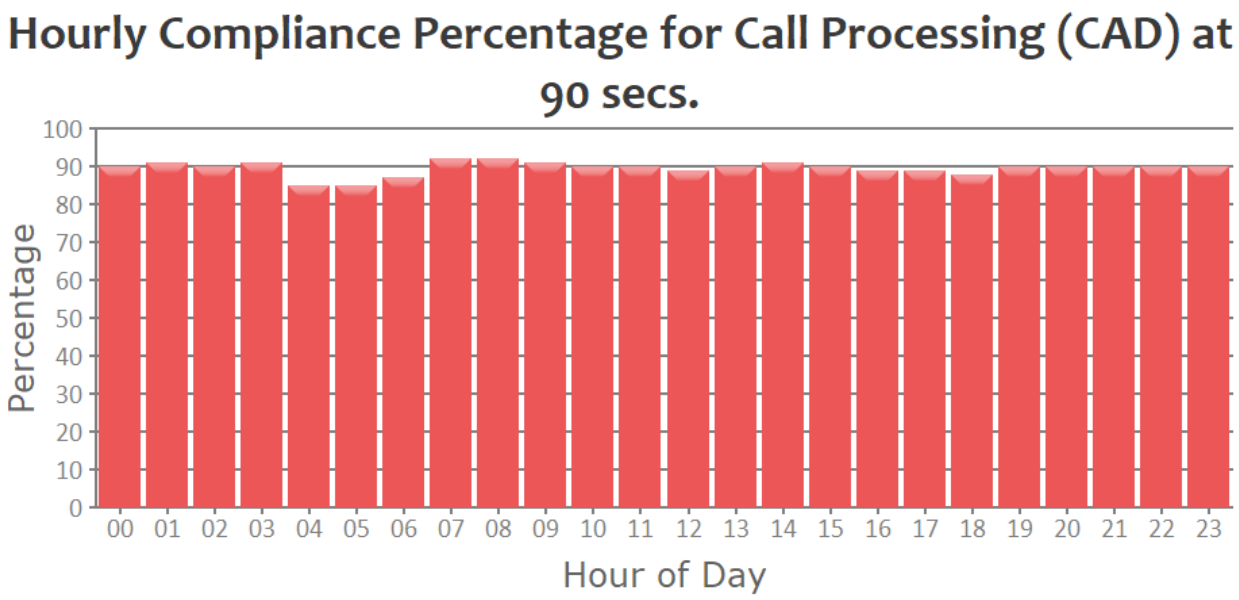
The following table shows that 90 percent call-processing performance improved from 2016 to 2017, and in 2018 remained just within the goal of 90 seconds. This data is only for the fire dispatch center. It does **not** include Police 9-1-1 call-processing time before a call is transferred to the Fire Department's dispatch center. Police data will be handled in a separate section to follow along with that of the MedStar communications center.

Table 24—Call Processing Analysis – 90 Percent Performance

Battalion	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Department-Wide	**01:32**	**01:13**	**01:25**	**01:43**	**01:47**
Battalion 1	01:27	01:08	01:22	01:31	01:43
Battalion 2	01:40	01:17	01:29	01:59	01:55
Battalion 3	01:23	01:06	01:12	01:32	01:43
Battalion 4	01:33	01:13	01:26	01:42	01:51
Battalion 5	01:39	01:21	01:33	01:50	01:49
Battalion 6	01:18	01:02	01:06	01:19	01:38
Battalion 7	01:33	01:17	01:28	01:42	01:43

The following figure illustrates hourly compliance by percent of compliance with a 90-second call-processing standard. The figure shows a fairly flat compliance meeting the 90-second performance standard.

Figure 14—Fractile for Incidents Call Processing (CAD) – 90 Percent Performance – 2020



Finding #13: Call-processing times of 1:47 minutes to 90 percent of Fire and EMS incidents are only 17 seconds slower than Citygate's recommendation of 1:30 minutes where no language or location identification barriers exist. Modest workflow improvements can easily improve this measure to 1:30 minutes.

5.3.2 Turnout

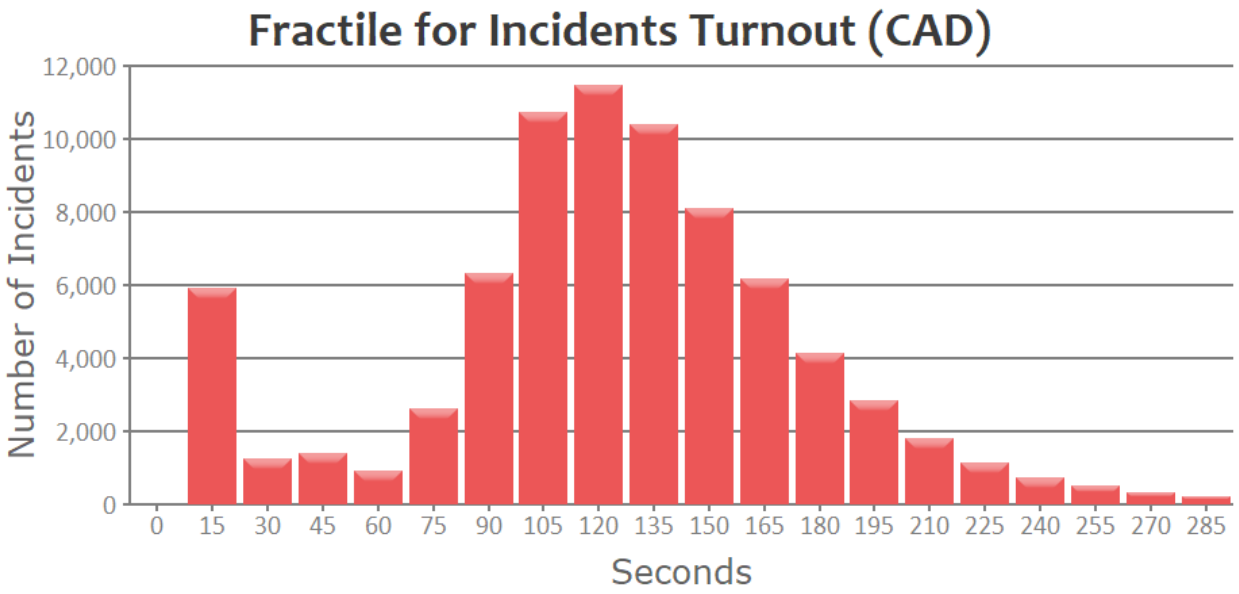
Turnout measures the time from apparatus notification until apparatus start traveling to the scene as automatically logged by the automatic vehicle-locating system. A 2:00-minute goal is used for measurement. This goal is being missed by nearly a minute. All that is needed to remedy this is a refocused effort on prompt turnout times.

Table 25—Turnout Analysis – 90 Percent Performance

Battalion	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Department-Wide	**2:57**	**2:55**	**2:51**	**2:59**	**3:01**
Battalion 1	2:52	2:52	2:48	2:50	2:56
Battalion 2	2:43	2:40	2:39	2:45	2:46
Battalion 3	2:52	2:52	2:45	2:54	2:56
Battalion 4	3:08	3:11	3:01	3:12	3:10
Battalion 5	2:58	2:55	2:52	3:02	3:02
Battalion 6	3:17	3:02	3:07	3:20	3:28
Battalion 7	2:57	2:56	2:50	3:01	3:02

The following figure illustrates fractile turnout performance. There are a few incidents with the time from dispatch to unit responding at 15 seconds or less. This may well indicate dispatches which have occurred when an apparatus was already on the road. Performance peaks at 120 seconds. There remain many emergency incidents that take longer than 2:00 minutes to respond.

Figure 15—Turnout Performance in 15-Second Increments – 20/21



While the CFAI and the NFPA best practice advice recommends 60 to 80 seconds (fire or EMS) for turnout, it is a standard rarely met in practical experience. Crews hear the dispatch message and don the appropriate personal protective clothing mandated by OSHA for the type of emergency. Due to this and the floorplan design of some stations, Citygate has long recommended that agencies can reasonably achieve a 2:00-minute crew turnout to 90 percent of emergency incidents. Turnout times are also slowest during sleeping hours. Citygate suggests agencies adopt a split turnout time goal of 1:30 minutes during waking hours and 2:00 minutes during overnight hours.

Finding #14: Turnout times of 3:01 minutes for 90 percent of Fire and EMS incidents are significantly longer than the 2:00 minutes recommended by Citygate and require a focused improvement effort.

5.3.3 Travel

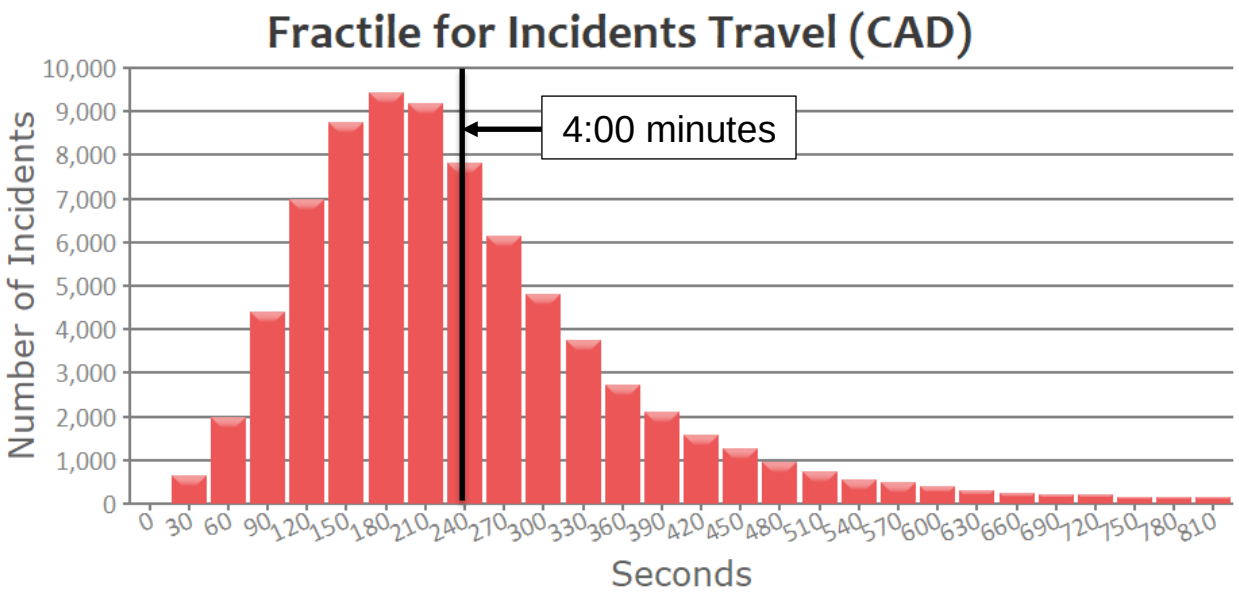
Travel measures time to travel to the scene of the emergency. In most urban and suburban fire departments, a 4:00-minute travel time, 90 percent of the time, is considered the best practice goal to achieve desired outcomes. Overall, travel times are greater than 6:00 minutes. Battalion 2 has the best performance with 90 percent performance being reached at 4:44 minutes.

Table 26—Travel Analysis – 90 Percent Performance

Battalion	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Department-Wide	**6:09 (284,417)**	**5:53 (67,865)**	**5:52 (70,708)**	**6:15 (69,888)**	**6:33 (75,956)**
Battalion 1	5:52 (62,402)	5:47 (15,066)	5:32 (15,534)	5:56 (15,101)	6:12 (16,701)
Battalion 2	4:44 (43,868)	4:38 (10,973)	4:35 (11,790)	4:49 (10,564)	4:53 (10,541)
Battalion 3	6:42 (26,904)	6:25 (6,343)	6:47 (6,453)	6:41 (6,689)	6:50 (7,419)
Battalion 4	6:18 (48,247)	6:00 (11,510)	6:05 (11,904)	6:18 (12,053)	6:40 (12,780)
Battalion 5	5:42 (48,863)	5:20 (11,487)	5:30 (11,711)	5:49 (12,094)	6:03 (13,571)
Battalion 6	8:05 (15,092)	7:57 (3,083)	7:36 (3,576)	8:19 (3,824)	8:16 (4,609)
Battalion 7	6:34 (39,041)	6:12 (9,403)	6:13 (9,740)	6:36 (9,563)	7:11 (10,335)

The following figure illustrates fractile travel performance. The peak segment for travel performance is 180 seconds, or 3:00 minutes. However, there is a very slow decrease in volume after the 180-second (4:00-minute) mark. This indicates that while many incidents can be reached at or under 4:00 minutes, there are still a significant number of incidents that require much longer travel times.

Figure 16—Fractile for Incidents Travel in 30-Second Increments – RY 20/21



Travel Times by Station Area

The following table shows the 90 percent travel time by each fire station area for the first-due unit from *any station.*

Table 27—First-Due Unit Travel Time Analysis

Station/Battalion	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Department-Wide	**06:09**	**05:53**	**05:52**	**06:15**	**06:33**
Battalion 1	**05:52**	**05:47**	**05:32**	**05:56**	**06:12**
Station 04	05:41	05:32	05:46	05:26	06:02
Station 10	04:49	04:25	04:33	04:58	05:10
Station 17	05:55	06:19	05:38	05:43	05:54
Station 21	06:01	05:22	05:22	06:19	06:49
Station 28	07:06	07:12	06:27	06:59	07:27
Station 29	05:07	04:52	04:53	05:13	05:29
Station 36	06:23	05:56	05:35	06:42	06:53
Station 42	06:17	06:13	06:30	06:07	06:20
Battalion 2	**04:44**	**04:38**	**04:35**	**04:49**	**04:53**
Station 01	05:19	05:06	05:05	05:29	05:31
Station 02	04:12	04:12	03:57	04:08	04:43
Station 05	04:16	03:59	04:07	04:20	04:29
Station 06	05:06	04:35	05:07	05:27	05:15
Station 08	04:36	04:49	04:44	04:24	04:30
Station 18	05:45	06:21	05:53	05:30	05:13
Battalion 3	**06:42**	**06:25**	**06:47**	**06:41**	**06:50**
Station 12	05:03	05:05	04:57	04:57	05:11
Station 13	07:35	07:04	07:37	07:38	07:49
Station 15	06:35	06:27	06:52	06:18	06:47
Station 25	06:37	06:34	06:45	06:31	06:36
Station 40	07:33	07:23	07:18	07:47	07:47
Battalion 4	**06:18**	**06:00**	**06:05**	**06:18**	**06:40**
Station 03	05:02	04:34	04:51	05:16	05:35
Station 07	06:18	05:39	05:45	06:32	06:49
Station 22	06:00	05:48	05:33	06:10	06:26
Station 24	06:00	06:04	05:53	05:47	06:11
Station 27	09:25	09:47	09:29	09:18	09:00
Station 33	08:13	08:02	08:20	07:43	08:29
Battalion 5	**05:42**	**05:20**	**05:30**	**05:49**	**06:03**
Station 16	05:39	05:09	05:24	05:58	05:55

Station/Battalion	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Station 23	05:36	05:11	05:22	05:31	06:11
Station 26	05:44	05:21	05:32	05:47	06:07
Station 30	05:20	05:05	05:12	05:16	05:41
Station 32	06:48	06:23	06:45	06:42	07:01
Station 39	05:31	05:19	05:10	05:57	05:32
Battalion 6	**08:05**	**07:57**	**07:36**	**08:19**	**08:16**
Station 11	07:39	08:46	07:16	06:45	07:26
Station 34	06:13	06:03	06:10	06:10	06:24
Station 35	09:36	09:42	08:33	10:04	09:39
Station 37	08:12	07:58	07:32	08:33	08:24
Station 38	07:31	06:58	07:15	07:52	07:52
Station 41	08:37	08:20	07:58	08:34	09:21
Battalion 7	**06:34**	**06:12**	**06:13**	**06:36**	**07:11**
Station 09	07:48	07:34	07:25	07:51	08:08
Station 14	04:45	04:35	04:41	04:47	04:57
Station 19	05:03	04:23	04:46	05:12	05:28
Station 20	05:31	05:28	05:30	05:25	05:41
Station 31	08:14	07:47	07:42	08:24	08:55

Impact of Freeway Travel Times

Given the large number of highways in the City, an analysis of RY 20/21 travel compliance by battalion with responses to highway incidents was conducted, and highway incidents were subtracted from the previously cited Citywide measures. Only Battalion 7 shows a performance increase—of 15 seconds—by removing highway incidents. Based on this analysis, Citygate determines that longer travel times are not due to a high volume of slower responses onto highways with restricted access.

Overall

NFPA Standard 1710 recommends a 4:00-minute travel time goal in urban and suburban areas. However, given the topography and open spaces in the City, as shown in the GIS mapping analysis section of this report, this goal is not achievable to 90 percent of the road network in a way that is cost-effective.

Finding #15: The Department's fire unit travel times are higher than the NFPA's urban best practice recommendation of 4:00 minutes, but the City's station spacing is challenged with a difficult road network and open spaces. A 5:00-minute travel time to 90 percent of the public road network, as the GIS models in this study indicate, would be more feasible for the physical spacing of added fire stations.

5.3.4 Call to Arrival

Call to arrival measures time from receipt of the request for assistance until the apparatus arrives on the scene. A best-practice-based goal for the Department would be 1:30 minutes for Department call processing, 2:00 minutes for crew turnout, and 4:00 minutes for travel, for a total of 7:30 minutes, or 450 seconds.

The following table illustrates that the Department does not meet this goal due to crew turnout and travel taking significantly longer than the goal recommended by NFPA Standard 1710.

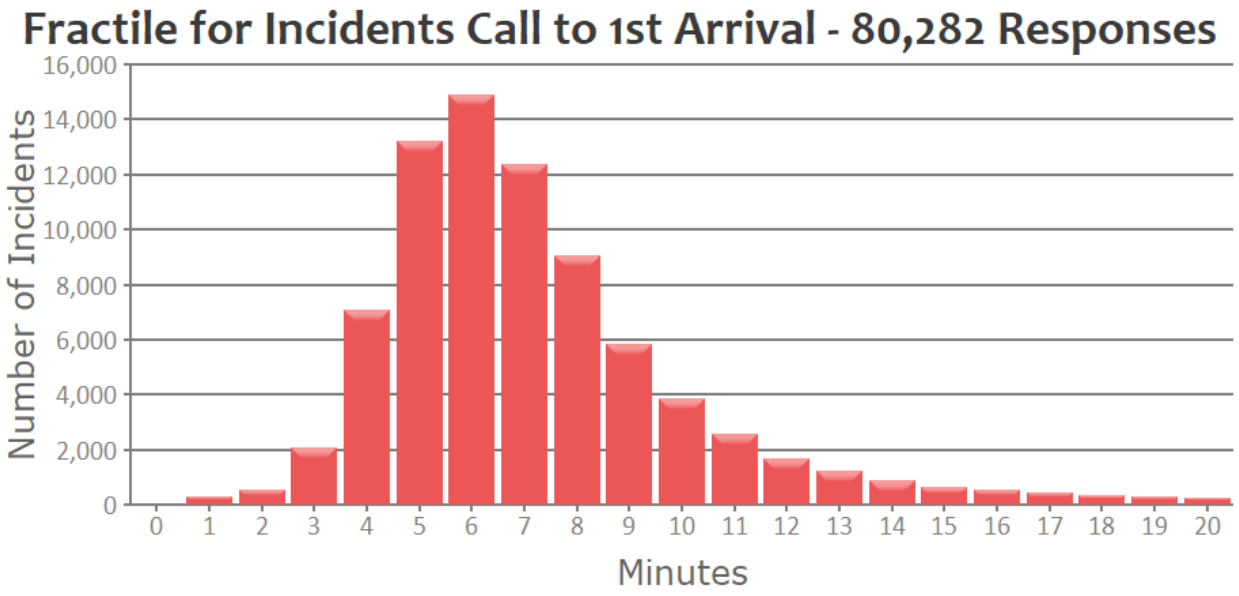
Table 28—Call to Arrival Analysis – 90 Percent Performance by Battalion

Battalion/Station	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Department-Wide	**09:33 (296,277)**	**08:47 (73,477)**	**09:02 (73,339)**	**09:54 (71,634)**	**10:21 (77,827)**
Battalion 1	**09:09**	**08:34**	**08:41**	**09:22**	**09:53**
Station 04	09:00	08:35	08:50	08:57	09:47
Station 10	08:00	07:17	07:36	08:44	08:43
Station 17	09:05	08:49	08:47	09:00	09:49
Station 21	09:19	07:59	08:19	10:00	10:30
Station 28	10:27	10:26	09:33	10:33	11:05
Station 29	08:03	07:26	07:47	08:08	08:46
Station 36	09:49	08:51	09:08	10:29	10:22
Station 42	09:58	09:14	10:24	09:53	10:01
Battalion 2	**07:59**	**07:11**	**07:37**	**08:34**	**08:33**
Station 01	08:42	08:01	08:13	09:09	09:08
Station 02	07:18	06:47	06:58	08:20	09:09
Station 05	07:42	06:30	07:09	08:21	08:16
Station 06	08:08	07:17	08:00	08:41	08:38
Station 08	07:53	07:16	07:47	07:55	08:04
Station 18	08:36	08:52	08:37	08:49	08:22

Battalion/Station	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Battalion 3	**09:52**	**09:12**	**09:40**	**10:07**	**10:21**
Station 12	08:06	07:27	07:50	08:27	08:45
Station 13	10:36	09:55	10:34	10:48	10:51
Station 15	09:44	09:15	09:47	09:38	10:21
Station 25	09:43	09:19	09:28	09:54	10:10
Station 40	11:06	10:48	10:21	11:36	11:16
Battalion 4	**09:52**	**09:09**	**09:23**	**10:07**	**10:42**
Station 03	08:13	07:22	07:54	08:36	09:11
Station 07	09:59	09:09	09:04	10:25	10:53
Station 22	09:50	09:00	08:59	10:16	10:51
Station 24	09:12	08:45	08:53	09:23	09:42
Station 27	12:59	13:00	12:40	13:05	12:50
Station 33	12:14	12:00	12:06	11:59	12:40
Battalion 5	**09:09**	**08:23**	**08:40**	**09:27**	**09:55**
Station 16	09:02	08:10	08:33	09:38	09:36
Station 23	09:05	08:17	08:38	09:04	10:14
Station 26	08:59	08:23	08:29	09:12	09:31
Station 30	08:42	08:02	08:19	08:53	09:37
Station 32	10:19	09:18	10:19	10:31	10:56
Station 39	09:27	08:45	08:46	10:11	10:02
Battalion 6	**11:38**	**10:48**	**10:46**	**12:10**	**12:17**
Station 11	10:41	10:59	10:37	10:16	10:48
Station 34	09:43	09:03	09:50	09:58	09:37
Station 35	12:36	12:47	11:14	12:47	12:56
Station 37	11:50	10:33	10:35	12:30	12:35
Station 38	10:51	09:54	10:45	11:26	11:11
Station 41	12:37	11:49	11:19	13:01	13:12
Battalion 7	**10:01**	**09:10**	**09:20**	**10:25**	**10:56**
Station 09	11:39	10:38	11:20	11:49	12:54
Station 14	07:41	07:10	07:26	07:50	08:21
Station 19	08:33	07:13	08:14	08:58	09:29
Station 20	08:56	08:32	08:23	09:39	09:14
Station 31	11:50	10:54	10:49	12:24	12:40

The following figure illustrates fractile call to arrival performance. The peak segment is 6:00 minutes. The right-shifted figure indicates a slow decrease in the number of longer arrival time increments.

Figure 17—Call to First-Arrival Performance in 30-Second Increments – RY 20/21



Finding #16: First-due unit call to arrival times to Fire and EMS incidents at 10:21 minutes in RY 20/21 are longer than a best practice-based goal of 7:30 minutes. However, this includes 1:00 minute of turnout time to be reduced and new Station 45 is not yet in operation.

5.3.5 Distribution and Concentration Measurements for Building Fires

Moving from first-due unit analysis to multiple units for building fires, a fire department should not spread its stations so far apart that it cannot amass an ERF or First Alarm to serious, emerging building fires. Best practices recommendations for the ERF in urban areas is that all the needed units arrive within an 8:00-minute travel time. When 1:30 minutes for dispatch and 2:00 minutes for turnout are added, the call receipt to ERF arrival time becomes 11:30 minutes.

For a typical house fire, minimum best practices recommend a force of 17 or more firefighters, including at least one chief officer for command and safety functions. The City is a metropolitan area consisting of many diverse risk types. The current Department ERF for a residential building fire is four engines, one ladder truck, two Battalion Chiefs, and support and investigation personnel

for a total of **27** personnel. These numbers provide for faster and safer on-scene multiple task completion.

However, for the Department to deliver four engines, one ladder truck, and two Battalion Chiefs in an 8:00-minute travel time or less to 90 percent of the service area is very challenging. The ERF measure is primarily a concern of station spacing. As this study's GIS analysis shows, the limiting factor to an 8:00-minute ERF travel time is the fourth engine and second chief officer.

For the following analysis, Citygate modeled travel times for the Department's current minimum ERF response of four engines, one ladder truck, and one Battalion Chief. Since the Department staffs engines and ladder trucks with four personnel each, the Department's ERF can deliver 22 firefighters so that critical firefighting tasks can be performed simultaneously and effectively until specialty support personnel arrive. Citygate's recommended travel time for this level of an ERF is 8:00 minutes.

There were 1,887 Class A (medium-risk) building fire incidents to be evaluated for ERF over the four-year study period. Incidents beyond the following outlier limits were eliminated from the analysis:

- Travel time exceeding 25:00 minutes
- Dispatch to arrival time exceeding 30:00 minutes
- Call to arrival time exceeding 30:00 minutes

There were 502 medium-risk building fire incidents over the four-year study period that met the ERF criteria. After eliminating the outliers, 456 ERF building fire incidents were analyzed.

Table 29—Distribution Overall Travel Time Analysis – ERF – Four Engines, One Truck, and Two Battalion Chiefs

Battalion	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Department-Wide	**19:25 (456)**	**21:05 (50)**	**15:54 (53)**	**19:26 (160)**	**18:41 (193)**
Battalion 1	20:03 (97)	19:25 (14)	13:30 (9)	21:23 (35)	20:03 (39)
Battalion 2	17:13 (88)	14:58 (9)	14:23 (10)	16:11 (34)	20:52 (35)
Battalion 3	16:56 (55)	15:52 (4)	16:29 (4)	15:46 (20)	16:56 (27)
Battalion 4	16:54 (110)	21:49 (10)	12:16 (12)	16:48 (38)	17:22 (50)
Battalion 5	15:52 (70)	21:34 (12)	15:52 (15)	12:35 (16)	12:37 (27)
Battalion 6	20:24 (11)	21:05 (1)	20:06 (3)	20:12 (2)	20:24 (5)
Battalion 7	17:09 (25)	-	-	14:32 (15)	17:09 (10)

Table 30—ERF Response Group Call to Arrival (Class A)

Battalion	Overall	RY 17/18	RY 18/19	RY 19/20	RY 20/21
Department-Wide	**21:36 (456)**	**22:36 (50)**	**19:03 (53)**	**20:40 (160)**	**21:51 (193)**
Battalion 1	22:06 (97)	21:54 (14)	15:21 (9)	22:20 (35)	22:06 (39)
Battalion 2	21:26 (88)	18:12 (9)	16:34 (10)	18:07 (34)	22:40 (35)
Battalion 3	20:36 (55)	22:19 (4)	19:29 (4)	17:51 (20)	20:17 (27)
Battalion 4	19:29 (110)	24:00 (10)	13:19 (12)	18:44 (38)	18:38 (50)
Battalion 5	18:24 (70)	23:15 (12)	17:53 (15)	16:24 (16)	14:46 (27)
Battalion 6	22:36 (11)	22:36 (1)	21:38 (3)	22:16 (2)	22:39 (5)
Battalion 7	18:27 (25)	-	-	15:37 (15)	18:27 (10)

A six-unit ERF within an 8:00-minute travel time is challenging anywhere in the City due to the distances the fourth engine and second Battalion Chief must cover.

Finding #17: An ERF of four engines, one ladder truck / quint, and two Battalion Chiefs reached 90 percent of building fires in 20/21 with a travel time of 18:41 minutes. This occurs due to the Department's standard response of 22 firefighters, which is greater than a minimum best practice ERF of 17 firefighters in 8:00 minutes travel time.

Section 6

Multiple Dispatch Centers Analysis

SECTION 6—MULTIPLE DISPATCH CENTERS ANALYSIS

6.1 THE EVOLUTION OF EMERGENCY DISPATCH IN FORT WORTH

In the United States, it is common policy for police communication centers to answer the initial 9-1-1 phone call. In large, urban city and county areas, it is not uncommon for the actual fire dispatch center to be separate from the 9-1-1 police center. This is the case in Fort Worth, as the Fire center is in a separate physical location and operates a different, Fire Department-centric Computer-Aided Dispatch (CAD) system.

As the MedStar system evolved, MedStar wanted to implement unit-type response prioritization along with life-saving, dispatcher-provided pre-arrival instructions. MedStar implemented its own physically separated dispatch center and chose an EMS-centric CAD system to support the call-prioritizing process along with the dispatching of ambulances.

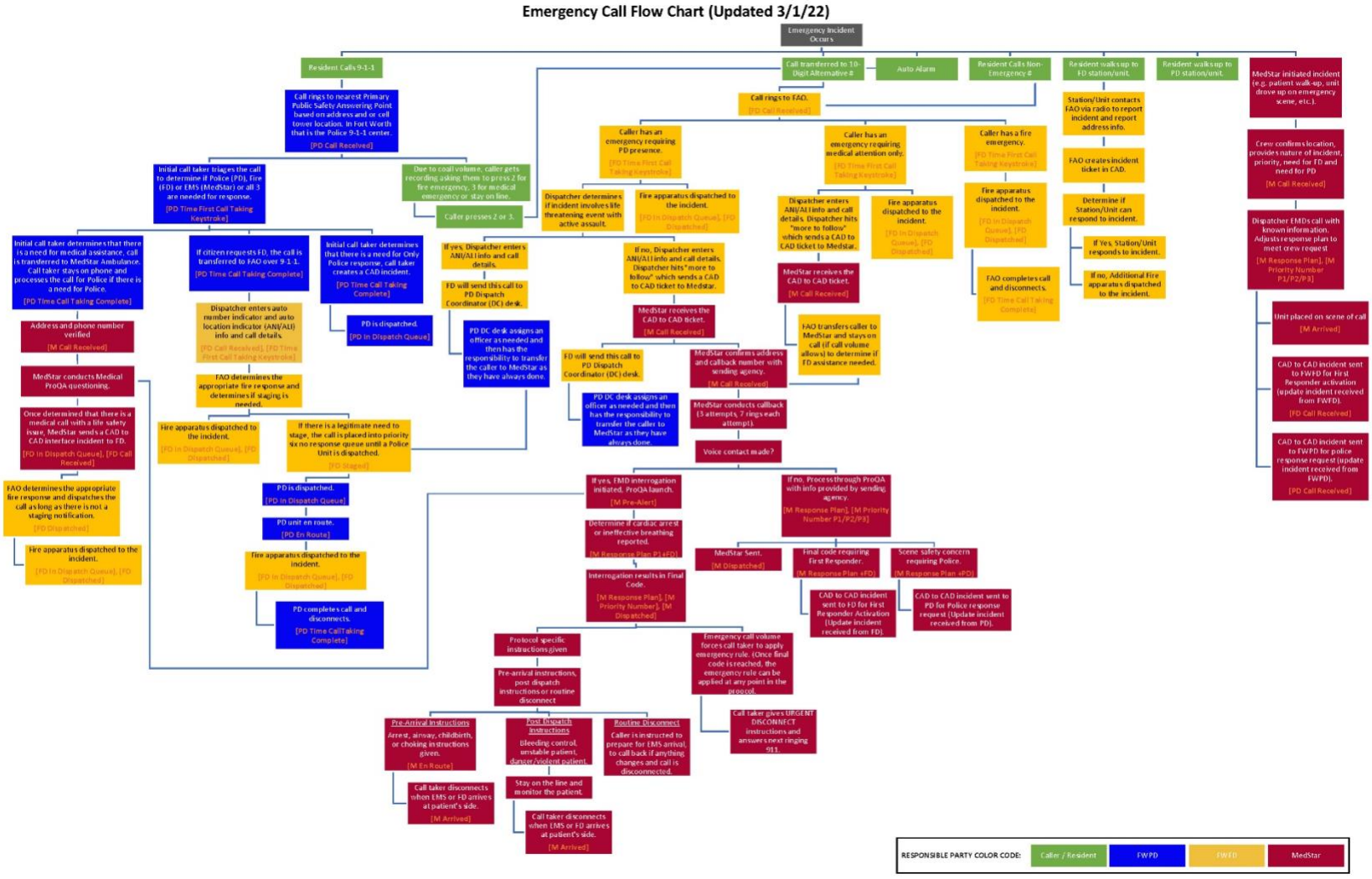
In late 2020 and early 2021, due to staffing shortages and higher call volumes in the Police center, a 9-1-1 caller could be routed immediately to Fire if the Police could not answer quickly. That workflow evolved in late 2021 to allow a 9-1-1 caller to press "1" for Police or "2" for Fire if the caller knew what they needed. At present, a third choice for MedStar is not possible in the countywide 9-1-1 system.

Thus, in the City there are three separate communication/dispatch centers that a 9-1-1 call must navigate. Each of the three CAD systems is electronically linked, and once an incident is started by either the Police or Fire center, that incident can be "sent" to the other centers for dispatching. As for EMS events, most 9-1-1 callers are routed to MedStar by the Police 9-1-1 call taker. The Police dispatcher can stay on the line and co-listen for Police unit needs. Once MedStar has run through its decision process regarding what to send, the incident is electronically sent to Fire if a Fire unit is needed. If the 9-1-1 call is first answered by Fire, they must send the caller to MedStar. In some instances, a caller could be questioned by one dispatcher, but have one or two others also listening.

6.2 CALL-PROCESSING AND DISPATCH TODAY

The following figure represents a call-processing flow chart of both human and software-based steps that could occur in the City. It is also attached as a full-page image in **Appendix B**. The use of this flow chart is not for it to be read, but to illustrate the complexity of three dispatch centers handling both emergency and non-emergency calls.

Figure 18—Emergency Call Flow Chart[14]



Why is the processing of 9-1-1 calls important to a fire service study? Customer service begins with someone seeing a problem and calling 9-1-1. From that point to the arrival of the first response unit, in the caller's mind, the customer service clock is running. They want help. The system serving them should be designed to get help to the customer in a time frame consistent with stopping the escalation of the emergency to avoid serious losses per a city's adopted service goal.

Based on this, dispatching time (for two decades now) has been part of "total response" in the best practices of the CFAI and NFPA Standard 1710. In Fort Worth, the Department lists in its budget document a dispatch time goal of 64 seconds. The wording in the budget or Department's annual reports does not state whether the 64 seconds is a 90 percent goal or an "average" goal. MedStar, in its partner agency response time reports to their Board of Directors, and to individual agencies such as Fort Worth, reports "average response time," and there is no citation to indicate if dispatch time is included. However, MedStar Board policy, like Fire, is to measure time from the first CAD keystroke when an incident is created. City Police do not have a specific transfer time policy but intend to process quickly.

6.2.1 Exploring Alternatives

Based on reports from the agency and available documentation, most if not all average response times include the dispatch time as the start of the timekeeping measure. Many agencies in the United States still only report response time from crew notification, not from 9-1-1 answer. The agency reports in the City do not specify clock start, so it is impossible for the reader to know if the time cited included Fire and/or MedStar processing. Either way, the measures never included the 9-1-1 Police center times.

This lack of clarity in reporting to elected officials and the public caused this project to do a very deep data analysis of all three dispatch CAD record sets and that of the Tarrant County 9-1-1 call logs that can track when a center goes off-hook to listen. There was strong cooperation from all agencies and several record sets were re-exported and re-analyzed. City and MedStar technical staff found that, in some instances, the CAD programming of standard response time reports did not always take the first, best-available time record, and that some unit on-scene records were different due to cancelations while en route to an incident.

After these considerable efforts over several months, the following table, agreed to by the agencies, best represents dispatch time processing from the best, earliest record (time stamp in CAD parlance) to the time the first Fire or MedStar unit reported at the scene. In some instances during this research, staff understanding was challenged and improved as the research obtained and measured the best available data. In the end, all three agencies accepted these results as accurate for the date range measured.

Table 31—Fort Worth Police 9-1-1 Center Call-Processing Time Before Transfer to Fire or MedStar

Center	3-Year 90% Performance	Low	High	Best Practice or Citygate Goal[1]
Police—All Transferred Incidents	2:42	1:33	3:26	0:30[2]
MedStar—Priority 1 Urgent *Completed Incidents*	2:13	1:23	2:31	1:30
Fire—All Fire and EMS incidents, Not "Other"	1:32	1:13	1:47	1:30[3]
90% Total *(if all three dispatch centers had to transfer and dispatch based on the Low or High)*	-	3:58	6:17	2:00

[1] Citygate goal based on NFPA's previous, more realistic measure of 1:30 minutes + up to 30 seconds for Police 9-1-1
[2] NFPA 1221; 2019 Ed. 30 seconds for answer and transfer; 60 seconds for Police event processing
[3] NFPA 1710; 2020 Ed. Fire/EMS Deployment Alarm processing 65 seconds

While it is possible that some incidents are so clear as to be immediately understood as high-priority, there are not clear policies across *all* three dispatch centers to train and, using quality improvement, hold dispatchers to a clear, multiple-agency total customer goal. Centers are certainly flooded with low-priority calls, but if a serious EMS or Fire call needs all three dispatch centers to coordinate, as a low total estimate, the centers are consuming 3:58 minutes that cannot be offset by driving faster or placing more crews on the streets. If a patient is facing dire circumstances, or a fire is already in the open flame free-burn phase, then every minute matters.

However, only the Fire Department is close to best practices—both when it directly receives a 9-1-1 call (rather than the Police) and when MedStar sends a CAD-to-CAD incident dispatch request. The Police Center data indicates that questions regarding the need for a Police response are, in the aggregate, delaying the rapid transfer of calls to Fire or MedStar.

As EMS is the largest volume of Fire's incidents, all their calls must clear MedStar. Even if the Police transferred to MedStar in 30 seconds, the combination of MedStar and Fire on Priority 1 calls can still total 2:36 minutes, well beyond a best practice.

The use of medical call priorities (triage) makes sense where multiple types of units can potentially respond. However, running the entire, scripted, best practices set of questions takes time. While a dispatch center can value a focus on handling acute incidents quickly, it still takes time. In other cases, there are possible language, cultural, and education barriers to someone describing why they need help *accurately and quickly.*

In Fort Worth, the bulk of EMS incidents are a first or second priority requiring not only the best choice of ambulance, but also a Fire Department resource. As most calls get both agencies most of the time, all three call centers must refocus technology, personnel procedures, and quality control to come substantially closer to best practice measures to ensure the processes work. It is

beneficial to not send fire apparatus or a paramedic ambulance that is *clearly* not needed. But if that determination cannot be made rapidly, it is better neighborhood customer service to send a fire unit or a paramedic ambulance and cancel it when the nature of an emergency incident is better understood. If a triage mistake is made at dispatch for an acute call, there is no way to get lost time back. Having a percentage of cancelled responses is a better safety net for the public being served.

6.2.2 Economic Considerations

Finally, it is important to understand the *economics* of the three-dispatch system have not been studied. Three agencies are operating in different locations and have the expense of three distinct multimillion-dollar CAD and data/phone systems, information technology support, and quality control oversight. It would serve the agencies well to study the economic and operational feasibility of merging these dispatch centers. In a single center, a new class of general 9-1-1 call takers and *priority incident dispatchers* could handle the acute calls to start the response before transferring the acute incident to a tactical incident dispatcher for Police, Fire or MedStar. Other large Citygate clients maintain a much faster dispatch performance than Fort Worth. There is no compelling reason that the City cannot materially improve.

Finding #18: The City's public safety dispatch-processing times from 9-1-1 answer are significantly longer than best practices or for acute need customer service.

This page was intentionally left blank

Section 7

MedStar Paramedic Service Delivery Analysis

STOP
17
MEDSTAR

SECTION 7—MEDSTAR PARAMEDIC SERVICE DELIVERY ANALYSIS

7.1 MEDSTAR BACKGROUND AND SERVICES

As part of this study, Citygate was tasked to broadly look at the inter-relationship of EMS ambulance service with MedStar. After a series of private ambulance company contracts in the 1970s and 1980s, Fort Worth started an Ambulance Authority that other surrounding cities wanted to join. The agencies then created the "Area Metropolitan Ambulance Authority" in 1988 via a shared governance Interlocal Cooperation Act—as provided for in Chapter 791 of the Texas Government Code. The Authority is managed by an independent Board of Directors totaling nine, four of which are residents of Fort Worth who serve at the pleasure of the City Council. A fifth Director is a resident of the Authority Service area elected by the agencies other than Fort Worth. The sixth member is the Fort Worth Fire Chief. The seventh member is appointed from the First Responder Advisory Board, and finally, the Emergency Physicians Advisory Board appoints two of its physician members. The Board of Directors hires the Chief Executive Officer, the General Counsel, and the Medical Director.

In 1988, the population of Fort Worth was approximately 400,000 residents. After years of private ambulance operations, it was cost effective for the metro area to form a version of a public utility model. 34 years later, EMS, health care, health insurance, and local government economics have all materially changed. Additionally, a huge rise in the volume of 9-1-1 EMS calls has occurred as healthcare insurance in America became too expensive for many, forcing populations to use 9-1-1 and emergency room systems as their health care.

Citygate was not tasked to audit MedStar or how it plans for scheduled deployment. Our study does, however, analyze the system's performance in relation to response time goals by adopted measures and the coordination of patient care with the Fort Worth Fire Department.

MedStar today is an approximately $65 million dollar enterprise with approximately 422 employees. MedStar, not the Department, provides the first paramedic to an incident, typically via an ambulance. The Department provides first responder services when requested by MedStar via EMT Firefighters. MedStar has developed and is innovating with several non-ambulance care programs to better meet the needs of the public who do not need emergency medical care. One of these programs is a Medicare pilot program to pay for patients being cared for and taken somewhere other than an emergency room. These efforts are necessary, and such programs are what most every urban city in America is implementing to lower its 9-1-1 ambulance and emergency room volumes.

As did its private predecessors, MedStar exists, first and foremost, to provide paramedic-level ambulance care and transport. To accomplish this, MedStar needs to deploy a fleet of ambulances 24/7/365 to handle the expected historical volume of ambulance calls. In addition, MedStar

ambulances provide transportation (critical or not) to health care agencies needing to transfer patients to a more suitable facility. MedStar deploys ambulances, specialty units, and paramedics in this interwoven manner to cover both 9-1-1 and other transportation requests.

Advanced Life Support (ALS) Ambulances – Staffed by at least one advanced paramedic and an EMT. They respond to 9-1-1 **or** interfacility transfer calls.

Basic Life Support (BLS) Ambulances – Staffed by two basic EMTs. They respond to BLS interfacility calls or 9-1-1 calls identified as only needing a BLS response.

Critical Care Paramedic – Typically, two to three personnel during the day and one at night. They respond in single units.

ALS Supervisors – Two single-person units 24/7/365.

Mobile Integrated Health Paramedics/EMTs – Single response vehicle numbers peak at four during daytime hours, with a minimum of one on the weekends. Night volume is generally nonexistent and does not provide MHP coverage past 10 pm as the CCPs fill this role.

Quick Response Vehicles – One to two quick response unit / part-time supervisors.

To provide these services, MedStar's Board sets response time and service goals as recommended by its multi-stakeholder System Performance Committee. The most recent adopted goals were set on December 14, 2016:

- First unit at scene measured from first key stroke to wheels stop.
- Fractile measures for "system response time performance measure accountability."
- Average measures for "simplicity and understanding, with the goal of minimizing extended response times."

Priority 1: 11:00 minutes at 85 percent compliance (most severe cases)

Priority 2: 13:00 minutes at 85 percent compliance

Priority 3: 17:00 minutes at 85 percent compliance (least severe 9-1-1 cases)

Priority 4: 60:00 minutes at 85 percent compliance (non-9-1-1 ambulance transfers)

It is important to understand that in Fort Worth, the Fire and Police Departments do **not** deploy paramedics as primary first responders. Rather, MedStar deploys paramedics via ambulances. When a Fire Department EMT first responder arrives to begin basic care, they must wait for ALS paramedic care from MedStar. Fort Worth Fire does deliver some paramedic care via its fire units, and when they arrive, they start ALS care before the arrival of the ambulance.

For the review of response times, the City first provided CAD data from Police, Fire, and MedStar for the four data years in this study—the period from October 1, 2017, through September 30, 2021. This data set contained all the agencies' unit IDs and response time records that were modeled. At the beginning of the analysis, the Citygate, City, and MedStar teams looked at the time stamp records and agreed in writing as to what the Citygate analysis would use.

At the mid-project review, when City and MedStar staffs reviewed the results, MedStar felt that, while the overall call to arrival data for them appeared correct, the dispatch time and crew turnout data segments did not. As a follow up, Citygate and MedStar's database analyst pulled a fresh set of data for three years—RY 18/19, RY 19/20, and RY 20/21. Due to changes in the MedStar CAD that affected the original analysis, RY 17/18 was dropped.

As the new data project was conducted, other MedStar CAD programming questions were identified such as what a time stamp represented if during the call to on-scene processing units were cancelled or changed. MedStar and Citygate agreed to the time stamps and (separately and jointly) reprocessed the response time data for the three years focusing solely on Priority 1 emergencies. After this adjustment, MedStar staff indicated that their results produced findings either identical to or within a variation of +/- three seconds of Citygate.[15]

The Medstar response times, summarized as follows, will be identified as either MedStar's own reporting to its stakeholders, or belonging to the previously cited joint data set completed in early July 2022.

7.2 MedStar Agency Response Time Reports

MedStar reports response time externally to stakeholders as both averages and as percent of goal completion. The following is a response time report from the June 2022 MedStar Board of Directors meeting. Fort Worth is the fifth city listed.

[15] Whitney Agreement of Results July 9, 2022.

Figure 19—MedStar Response Time Reliability and Average Response Time Performance[16]

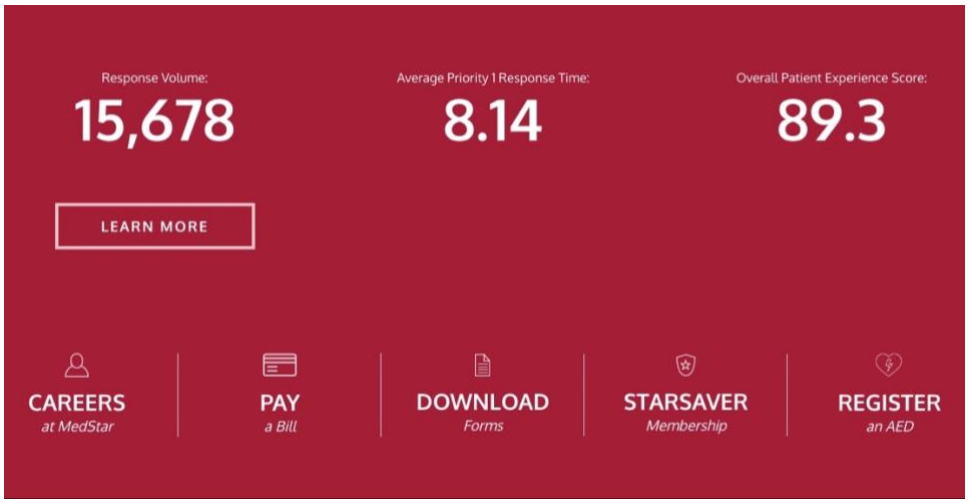
Period: May 2022

		Current Month							100 Response Compliance Period		
Member City	Pri	Calls	On Scene	Avg RT	Late Responses	On Time %	Extended Responses Count	%	Compliance Calculated Responses	Late Responses	On Time %
Blue Mound	1	6	6	00:07:28	0	100.0%	0	0.0%	49	10	79.6%
	2	11	10	00:10:44	4	63.6%	0	0.0%	89	12	86.5%
	3	1	1	00:08:53	0	100.0%	0	0.0%	38	5	86.8%
Total Blue Mound		18	17								
Burleson	1	107	104	00:07:31	16	85.0%	3	2.8%	107	16	85.0%
	2	169	153	00:09:14	27	84.0%	8	4.7%	169	27	84.0%
	3	129	99	00:09:29	14	89.1%	4	3.1%	129	14	89.1%
	4	90	90	00:33:15	6	93.3%	3	3.3%	163	9	94.5%
Total Burleson		495	446								
Edgecliff Village	1	6	6	00:06:54	1	83.3%	0	0.0%	61	8	86.9%
	2	12	12	00:08:26	2	83.3%	0	0.0%	45	7	84.4%
	3	5	5	00:09:30	0	100.0%	0	0.0%	53	3	94.3%
Total Edgecliff Village		23	23								
Forest Hill	1	56	54	00:09:18	12	78.6%	3	5.4%	56	12	78.6%
	2	78	72	00:09:45	10	87.2%	0	0.0%	170	19	88.8%
	3	47	38	00:09:44	4	91.5%	1	2.1%	130	10	92.3%
	4	1	1	00:27:54	0	100.0%	0	0.0%	1	0	100.0%
Total Forest Hill		182	165								
Fort Worth	1	3338	3184	00:08:13	510	84.7%	68	2.0%	3338	510	84.7%
	2	5417	5161	00:08:59	633	88.3%	107	2.0%	5417	633	88.3%
	3	3749	3380	00:10:13	357	90.5%	83	2.2%	3749	357	90.5%
	4	1228	1221	00:25:56	45	96.3%	13	1.1%	1228	45	96.3%
Total Fort Worth		13732	12946								
Haltom City	1	93	90	00:09:17	31	66.7%	5	5.4%	186	50	73.1%
	2	145	137	00:09:56	28	80.7%	4	2.8%	145	28	80.7%
	3	98	81	00:10:01	6	93.9%	0	0.0%	98	6	93.9%
	4	5	4	00:28:06	0	100.0%	0	0.0%	6	0	100.0%
Total Haltom City		341	312								
	1	12	12	00:06:48	1	91.7%	0	0.0%	88	26	70.5%

[16] Source: MedStar

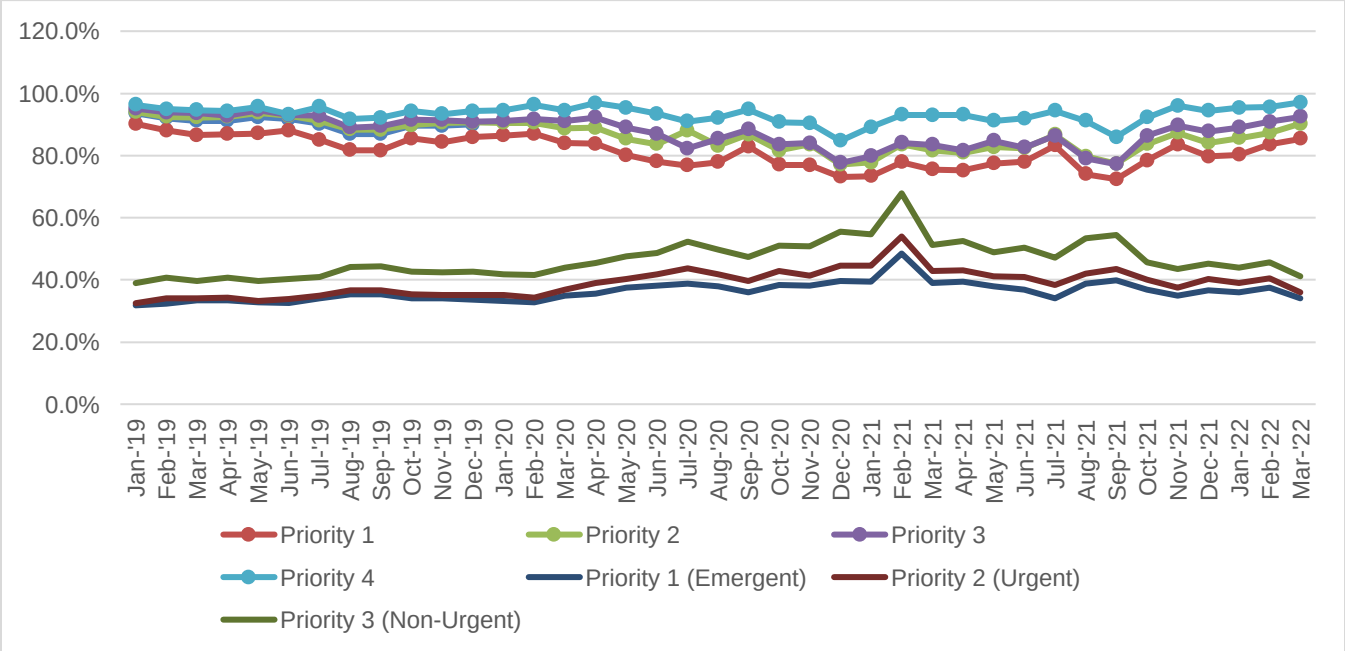
MedStar reports response time as an average in minutes on its website.

Figure 20—MedStar Key Performance Indicators[17]



MedStar also provided an Excel file with multiple data measures including those pertaining to the City. The following data metrics are from the Fort Worth tab of an Excel file named "Member City Reliability ending March 2020."

Figure 21—MedStar System-Wide Average Response Times by Percentage



[17] Source: MedStar website

Figure 22—MedStar System-Wide Average Response Times

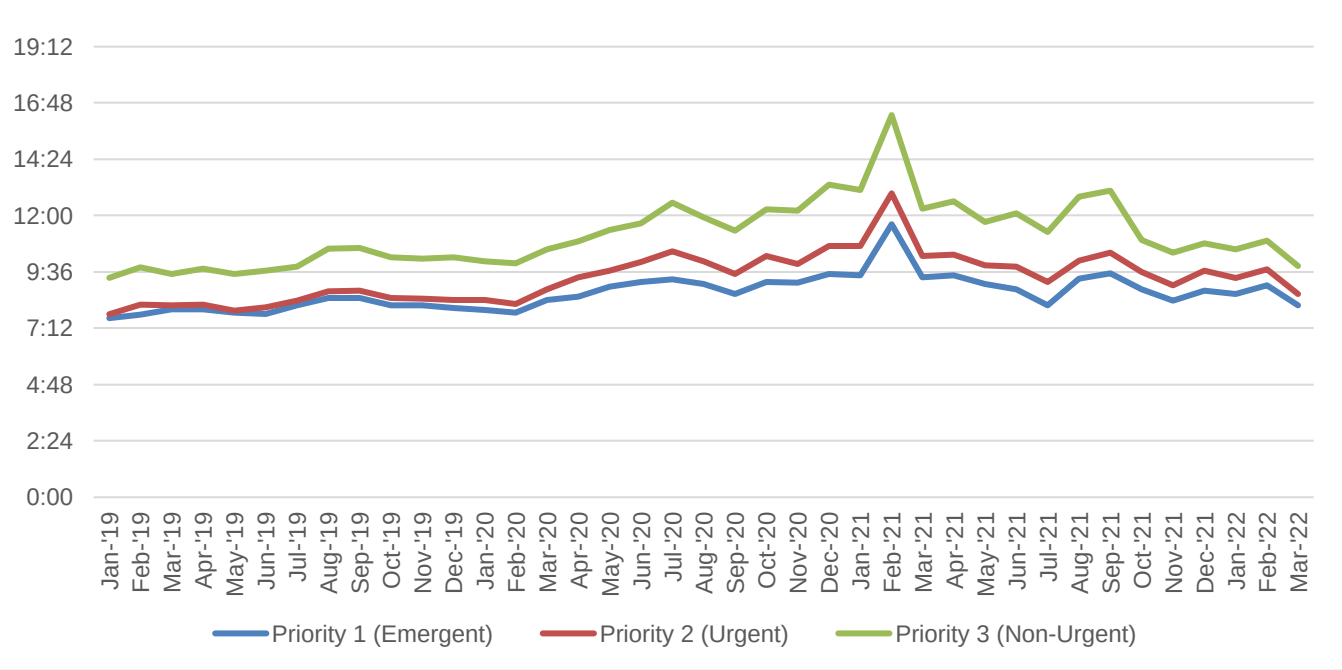


Figure 23—MedStar Response Time Reliability

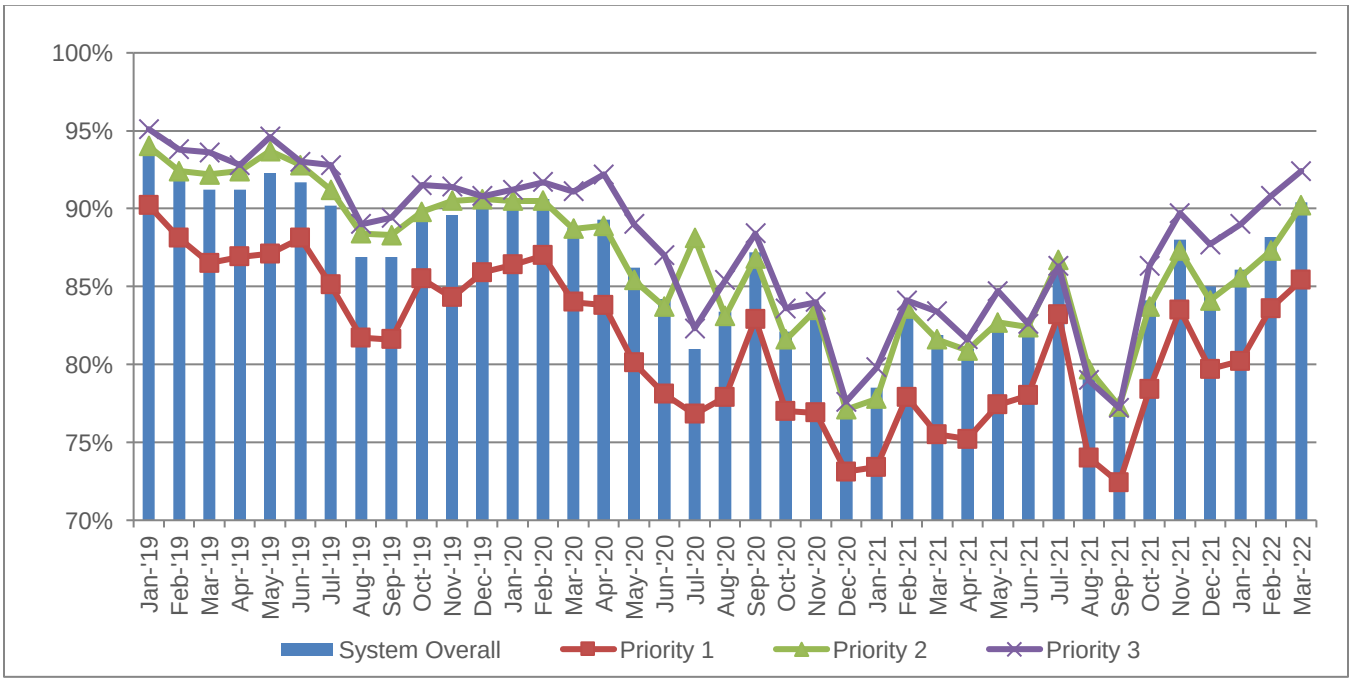
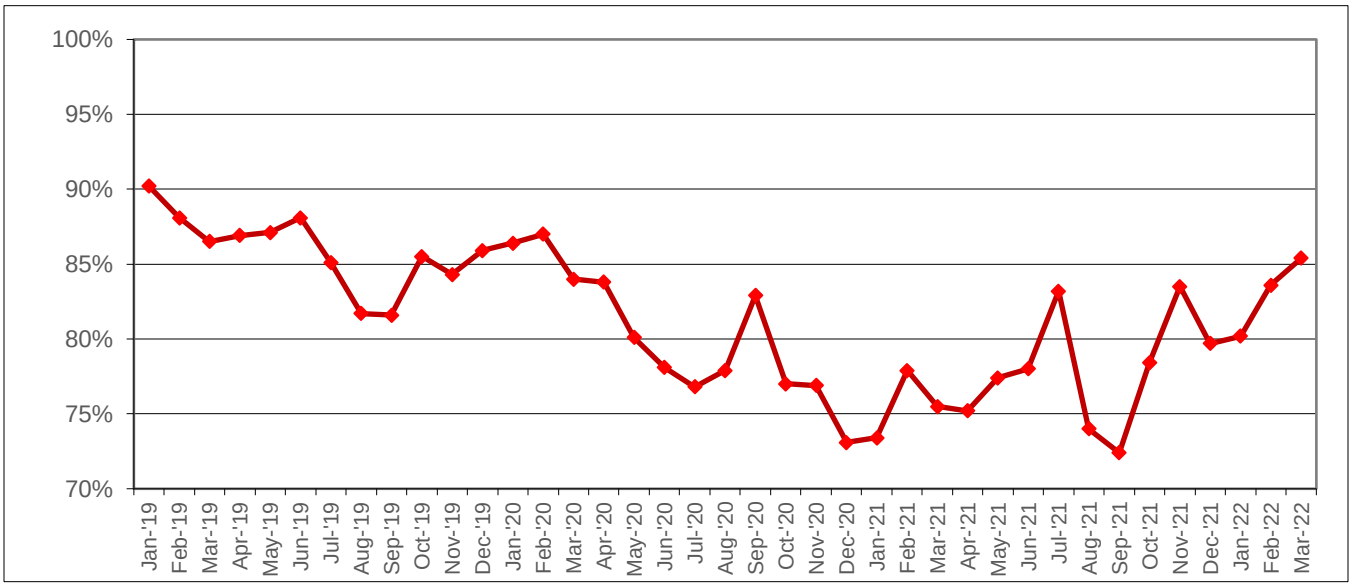


Figure 24—MedStar Priority 1 Response Time Reliability



In the previous data measures, the first three graphs include all 9-1-1 priorities. The last graph is the most urgent Priority 1 measure over time.

On the Fort Worth tab of the Excel file provided to Citygate, the Priority 1 *average response time* for the 12 months from March 2021 through February 2022 was **8:57 minutes**. "Average" corresponds with the middle of the data set, and in response time, the data distribution is not a perfect bell curve. If it was, the high end of the response time in minutes would be 17:54 minutes. For the same period (March–February), the percentage of goal against MedStar's 85 percent at 11:00-minute Priority 1 target was **78.43 percent.** MedStar last met or exceeded 85 percent in the City in March 2022, after two years of strained performance during the pandemic. At that point, the average Priority 1 response time was 7:52 minutes, indicating the higher end of response times was 14:00–15:00 minutes.

Finding #19: MedStar does not report response times to the public and agencies transparently enough using a best practices fractile at 90 percent. A percentage measure without the minutes at that percentage point does not meet national best practices for response time reporting.

Finding #20: Based on MedStar's reporting, since January 2019, the 85 percent or 90 percent minutes to Priority 1 emergency ambulance requests have been in the low-to-mid teens of 14:00–17:00 minutes, without the added time at Police 9-1-1 dispatch.

7.3 CITYGATE STUDY MEASURES

Using the updated three years of data, Citygate and MedStar analyzed Priority 1 incidents to determine the 90 percent fractile completion time. The 90 percent fractile analysis means that 90 percent of the incidents had times at or ***less than*** the times below. In other words, only 10 percent of the incidents had times ***longer*** than these time stamps. This data only concerns MedStar's units and does not include Police 9-1-1 processing time. The data is *for the City of Fort Worth*—not the entire MedStar service area—and starts with MedStar's first key stroke. These measures are for completed calls—meaning a unit arrived on-scene and, where necessary, transported—so the measures do not include calls that were cancelled en route to the scene.

Table 32—MedStar Priority 1 Performance – Fort Worth

Measure	RY 18/19	RY 19/20	RY 20/21
Dispatch	1:23	2:22	2:31
Crew Turnout	00:23	00:25	00:22
Travel Time	10:20	10:18	11:11
Call to Arrival	**12:22**	**13:01**	**14:16**
Travel to Hospital	23:16	22:47	23:34
Time at Hospital	35:53	37:56	40:32
Time On-Scene	32:28	34:55	34:33
Total Incident Duration	**90:45**	**94:54**	**98:36**

The analysis reveals that in RY 20/21, 90 percent of incidents had a response time under 14:16 minutes, and a total duration less than 98:36 minutes. It is important to note that dispatch times in RY 19/20 and 20/21 were extended by an average of 60 seconds due to the implementation of additional COVID-19 screening for calls that were not time critical. In this time, responding Fire and MedStar personnel could be notified of the potential need for enhanced infection control processes prior to contacting a patient.

In Citygate's full data set from RY 17/18 forward, even though it was difficult to separate between dispatch and turnout times during 2017–2018 for MedStar, the MedStar call to arrival times were determined to be accurate by Citygate and MedStar. The following two tables detail Priority 1 completion percentages both before COVID-19 and for RY 20/21:

Table 33—MedStar Priority 1 RY 17/18

Hour	1 Mon	2 Tue	3 Wed	4 Thu	5 Fri	6 Sat	7 Sun	Average Hourly %
00:00	80%	90%	86%	79%	89%	86%	83%	85%
01:00	85%	87%	80%	86%	84%	78%	82%	83%
02:00	87%	87%	84%	76%	91%	79%	82%	83%
03:00	80%	89%	81%	77%	83%	72%	78%	80%
04:00	74%	82%	84%	78%	78%	71%	73%	77%
05:00	93%	77%	78%	82%	88%	70%	81%	81%
06:00	89%	89%	76%	79%	81%	80%	86%	83%
07:00	79%	74%	79%	78%	82%	92%	88%	81%
08:00	67%	84%	86%	87%	85%	84%	87%	82%
09:00	82%	88%	84%	84%	85%	86%	90%	86%
10:00	87%	85%	89%	85%	89%	85%	92%	87%
11:00	81%	85%	85%	83%	85%	78%	91%	84%
12:00	82%	86%	86%	90%	83%	80%	91%	86%
13:00	90%	82%	89%	87%	81%	83%	87%	85%
14:00	86%	84%	84%	84%	80%	90%	90%	85%
15:00	75%	80%	77%	79%	77%	80%	85%	79%
16:00	81%	71%	72%	78%	72%	87%	88%	78%
17:00	84%	77%	84%	79%	77%	85%	85%	82%
18:00	82%	84%	79%	78%	75%	81%	90%	81%
19:00	86%	81%	82%	81%	80%	82%	86%	83%
20:00	92%	86%	78%	82%	83%	88%	85%	85%
21:00	86%	87%	76%	83%	77%	85%	80%	82%
22:00	87%	88%	79%	81%	82%	82%	87%	84%
23:00	87%	84%	82%	89%	85%	85%	86%	85%
Daily %	83%	83%	82%	82%	82%	83%	86%	83%

Table 34—MedStar Priority 1 RY 20/21

Hour	1 Mon	2 Tue	3 Wed	4 Thu	5 Fri	6 Sat	7 Sun	Average Hourly %
00:00	60%	62%	61%	78%	71%	71%	70%	68%
01:00	67%	61%	64%	74%	68%	75%	59%	67%
02:00	58%	74%	63%	70%	67%	60%	58%	63%
03:00	54%	50%	61%	71%	65%	54%	46%	56%
04:00	54%	61%	60%	66%	73%	51%	58%	60%
05:00	69%	67%	65%	69%	76%	66%	63%	68%
06:00	72%	69%	76%	65%	71%	68%	72%	70%
07:00	68%	76%	71%	74%	60%	74%	66%	70%
08:00	73%	71%	71%	66%	69%	74%	75%	71%
09:00	76%	71%	70%	71%	67%	78%	71%	72%
10:00	73%	75%	67%	73%	63%	70%	77%	71%
11:00	64%	72%	70%	67%	64%	70%	75%	69%
12:00	71%	71%	71%	66%	67%	73%	72%	70%
13:00	72%	76%	77%	72%	70%	71%	77%	73%
14:00	74%	71%	69%	67%	70%	67%	75%	71%
15:00	61%	69%	69%	71%	65%	69%	80%	69%
16:00	58%	64%	64%	65%	65%	71%	75%	66%
17:00	61%	58%	67%	65%	57%	71%	70%	64%
18:00	59%	60%	62%	57%	61%	74%	74%	64%
19:00	67%	70%	76%	65%	70%	71%	74%	70%
20:00	68%	63%	74%	70%	71%	66%	69%	69%
21:00	66%	66%	66%	73%	68%	71%	69%	68%
22:00	58%	61%	74%	73%	66%	64%	67%	66%
23:00	72%	66%	73%	71%	68%	72%	63%	69%
Daily %	66%	67%	69%	69%	67%	69%	69%	68%

Given the deployment challenges the City's layout presents, this next data set uses the recent MedStar data to compare 90 percent call to arrival times between MedStar and the Fire Department. The data does not reflect every zip code as some did not have large enough volumes for either agency to provide a statistically significant comparison. Thus, these zip codes are balanced in that both agencies have considerable calls for service.

Table 35—Call to Arrival Response Times – Medstar Versus Fire by Zip Code

Zip Code	MedStar 90% Response	Fire 90% Response
76102	12.7	8.1
76103	13.8	8.1
76104	13.1	7.4
76105	15.1	8.2
76106	18.2	9.5
76107	14.5	8.0
76110	12.9	7.6
76111	14.7	8.5
76112	16.0	9.3
76114	15.8	9.9
76115	14.1	8.9
76118	18.0	10.7
76119	16.1	10.5
76120	16.8	10.9
76123	17.4	10.1
76133	16.4	8.9
76134	15.9	9.5
76164	16.7	7.2
76177	19.4	14.0
76244	18.8	11.7
76137	16.8	11.5
76140	17.1	11.9
76052	21.2	11.0
76135	17.7	10.9
76131	18.0	14.1
76179	19.5	10.9
76108	16.7	10.9
Average	**16.4**	**10.0**

The table reveals that for the zip codes analyzed that contained enough data for both agencies, that 90 percent of the responses had a response time difference ***less than*** 6.4 minutes. Stated another way, only 10 percent of the calls had a response time difference ***greater than*** 6.4 minutes.

The same data is represented visually in the following graph and map.

Figure 25—Differences Delta – MedStar and Fire

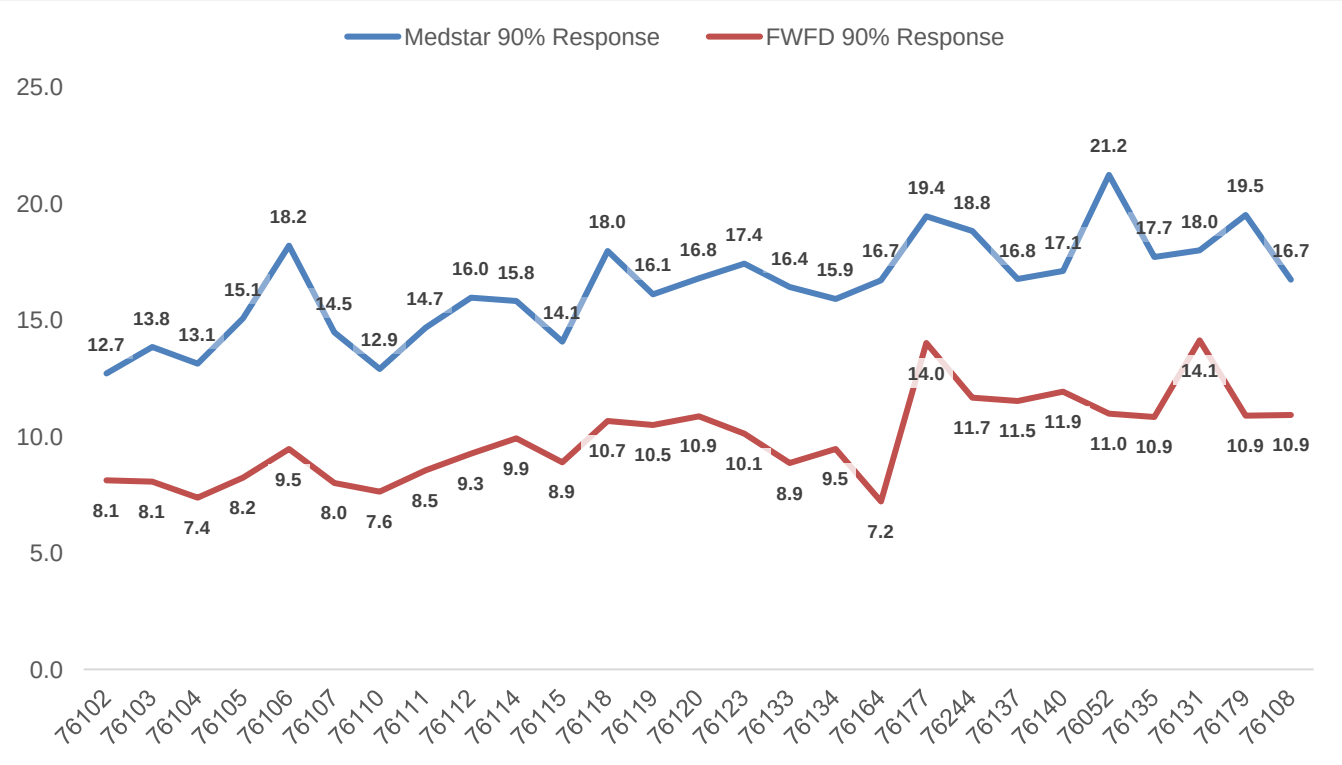
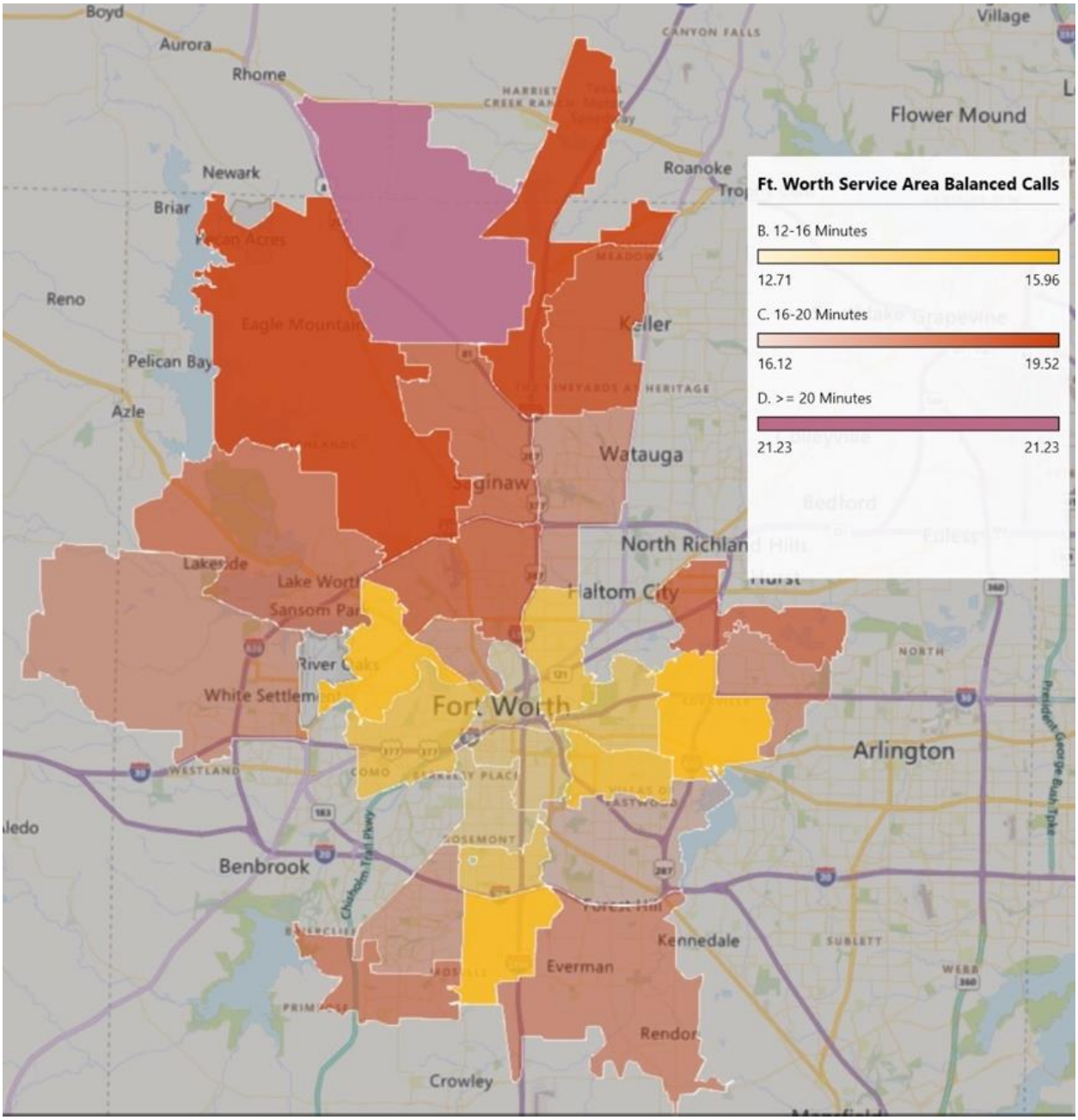


Figure 26—Fort Worth Service Area Balanced Calls



Finding #21: While the COVID-19 pandemic negatively affected MedStar's deployed staffing (as it affected similar staffing across the nation), all data measures in this study point to MedStar having always been challenged to deliver first paramedic arrival via an ambulance at 11:00 minutes 85 percent of the time. The topography of the City makes an 11:00-minute, 85 percent level of deployment expensive for MedStar.

In Citygate's experience with multiple states, for critical (Priority 1) patient care in urban areas, the time for EMS deployment ranges from 8:00–12:00 minutes for *call to arrival* of a fire station paramedic or an ambulance system paramedic. Most urban systems strive for 10:00 minutes or less for the arrival of the first paramedic. Dallas Fire's compliance goal for fire engine paramedics is a response time of 9:00 minutes or less to 90 percent of incidents. At this point in 2022, they are reporting compliance at 84 percent. In Austin, without using fire department paramedics, the paramedic ambulance system goal is 9:59 minutes 91 percent of the time, and their 2021 performance was at 85.6 percent. Austin also expects the fire unit with an EMT to arrive within 8:00 minutes 85 percent of the time, and in 2021, they delivered at 76 percent.

These response systems' rigorous response times revolve around critical life and death calls and the time to flashover when a fire is consuming the room of origin and spreading both vertically and horizontally to other rooms or compartments. In Citygate's experience, urban systems also strive for equity of access for all neighborhoods of similar population density to offer the same response time access to a prompt paramedic level of care.

7.4 Fort Worth Fire Capabilities

The arrival of the first *paramedic to every neighborhood to provide equitable access* to emergency patients is of local policy concern in many communities. In recent years, the Department has already started to add paramedics and firefighters for use in special events, disasters, etc. As of mid-2022, the Department's paramedic capacity is:

- 93 credentialed paramedics assigned to Field Operations could be used as a first response force for ALS (31 per shift). Using some of these for absence relief the Department could field 20+ paramedic engines very soon.
- Another 34 non-credentialed paramedics are mostly assigned outside of field operations and maintain their state certification but are not normally assigned to a fire apparatus.
  - **EMT-B**: 789 personnel

- **Advanced EMT**: 15 personnel

- Every fire engine and standalone quint/ladder unit has a Zoll X monitor/defibrillator with CO monitoring capability ($32,000) and an ALS kit ($3,000) if a paramedic were to be assigned to that station on a particular day/shift.
- In addition, six double-company quints also have Zoll X monitors (Stations 31, 23, 24, 17, 26, 16).
- Every engine and quint is also equipped with a Defibtech CPR device ($14,000).
- Currently, Fire Station 11 is the only designated "paramedic" station and has a paramedic assigned every day. This was done when the station opened because of its remote location.

Finding #22: One way to improve response times for the provision of a first paramedic to every neighborhood would be to use Department crews to deploy one paramedic per fire station 24/7/365.

MedStar has conducted a data-driven reprioritization review as MedStar and the Fire Department correctly identified that the calls categorized as Priority 1 should be only life-threatening emergencies. The current MedStar and Fire dispatch process is overly conservative which has resulted in many non-life-threatening calls being dispatched as Priority 1 calls. Citygate is supportive of utilizing the proposed reprioritization to carve out the minority of 9-1-1 calls that represent life-threatening medical emergencies needing the fastest response times with appropriate resources.

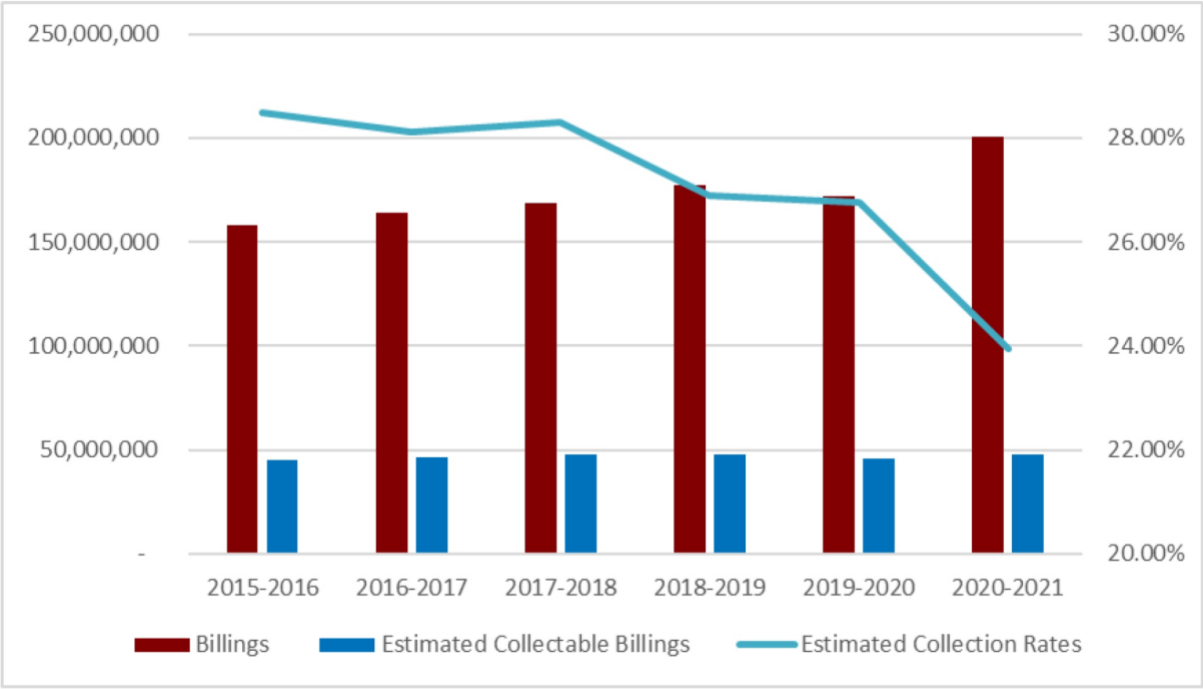
However, the use of statistics indicating fewer patients need prompt paramedic should **not** drive the response time deployment of paramedics. Just like fire stations in every neighborhood, that provide a layer of *equitable access* to a prompt first response, so should be the access to prompt paramedic care, whether used once a day or once a week.

7.5 MedStar Economics

MedStar funds all its services from fees for its services. As such, Medstar operates within a closed economic system, and thus without its member public agencies adding general revenue support. Given the overall crisis in American health care financing, Medicare and Medicaid have never paid the true, full cost of an ambulance transport. They also do not pay for patient care if there is no transport to an emergency room. There are new pilot programs paying for transport using alternative methods and destinations, and MedStar participates in one of these Medicare pilot programs.

Thus, for MedStar to make deployment changes will entail a cost increase. But do they have the revenue available? The following figure shows MedStar's billing collection rate from their last year-end fiscals. No major ambulance company operating solely from billed net revenue can afford quality pay, benefits, and large numbers of deployed ambulances on a declining net revenue under 25 percent. Most are "starving" at +/- 30 percent.

Figure 27—MedStar Billing Rates Versus Collection Rates



If the City should set a service delivery response time goal for the first paramedic to all similar neighborhoods, and MedStar cannot increase service enough within its revenues, what else should the City be aware of as it develops funding choices? In a file dated October 22, 2020, the MedStar Board was presented with a five-year fund balance projection. There were two models—the first with no changes in fees, resulting in a General Fund ending balance deficit by FY 24/25, and the second with fee increases that would keep the General Fund balance in the black by FY 24/25.

Table 36—Previous MedStar Five-Year Economic Forecast

Projection at Typical Transports and Payer Mix, with Rate Increase, O2 and Disposables:

	FY 20/21 Budget	FY 21/22 Projection	FY 22/23 Projection	FY23/24 Projection	FY24/25 Projection
General Fund Beginning Balance	$ 22,833,977	$ 20,827,043	$ 14,712,251	$ 10,954,034	$ 6,480,903
ASPP Payment Received Oct. 1, 2020	$ 1,763,508				
Net Revenue	$ 50,087,540	$ 51,253,301	$ 52,307,738	$ 53,381,204	$ 54,474,077
Operating Expenses	$ (50,239,790)	$ (53,132,328)	$ (54,977,083)	$ (56,573,837)	$ (58,530,653)
Capital Expenses	$ (4,977,270)	$ (6,364,583)	$ (3,279,286)	$ (3,534,269)	$ (3,808,000)
Debt Principle Payments	$ (1,273,956)	$ (1,353,000)	$ (1,395,858)	$ (1,440,089)	$ (1,485,742)
Beginning Accounts Payable	$ (747,371)				
Depreciation Expense (Add Back)	$ 3,380,405	$ 3,481,817	$ 3,586,272	$ 3,693,860	$ 3,804,676
General Fund Ending Balance	$ 20,827,043	$ 14,712,251	$ 10,954,034	$ 6,480,903	$ 935,260

Assumptions:

- Typical transport volume
- Typical Payer Mix
- Starting on Feb. 1, 2021 Bill Disposables and O2.
- Starting in FY22 - 5% Rate increase on BLS Emergency and ALS Emergency Call Types. With annual increase of 2% going forward.
- No increase to BLS and ALS Non-Emergency Rates.
- Starting in FY22 - ALS2 Rate Increase from $1,485 to $2,200
- In FY22 Projected Compensation Increase from Market Study complete by KornFerry of 5%.
- Annual COLA of 3%
- Six Additional Field Personnel added in FY23 and FY25
- Expenses average increase of 3%
- No additional financing. Pay cash for ambulances starting in FY22.

Other Key Variables:

- Changing Payer Mix due to COVID public health shut downs
- Changing Expense Cost

MEDSTAR MOBILE HEALTHCARE

[18]

Revenue decline and multiple-year projections make clear that MedStar is challenged, as are all ambulance operations whose only revenue source is fees. The five-year projection needs to be redone given the effects of COVID-19.

Another indicator that MedStar is revenue constrained or could have increased ambulance deployment is its employee turnover and current junior workforce. Per the most recent MedStar Board of Directors monthly report on June 28, 2022:

- YTD turnover is just over 19.76 percent, the three-year average is 18.6 percent (page 55).
- Total FTE tenure less than or equal to two years is 42.5 percent, less than or equal to five years is 63 percent (page 50).

[18] Source: MedStar

Table 37—MedStar Mobile Healthcare Turnover – FY 21/22[19]

	Full & Part Time Turnover			Full Time Only
	2021-2022	2020-2021	2019-2020	2020-2021
October	1.93%	1.94%	1.44%	1.05%
November	2.38%	1.97%	1.44%	2.40%
December	3.24%	1.97%	1.69%	3.13%
January	1.78%	1.69%	2.24%	1.74%
February	2.52%	1.04%	2.71%	2.55%
March	2.65%	2.45%	2.54%	2.44%
April	3.77%	2.31%	0.63%	3.52%
May	2.37%	2.75%	1.45%	1.75%
June		2.04%	0.41%	
July		2.56%	1.71%	
August		1.81%	2.79%	
September		1.91%	2.19%	
Actual Turnover	19.76%	16.17%	19.91%	18.20%

There is no doubt that COVID-19 has caused, and will continue to cause, staffing challenges for MedStar much like the challenges other companies are facing. Citygate wants to make clear that MedStar Management is very capable and is informing its Board of these challenges. However, the full City Council needs this information as it considers service options.

If the City were to consider a general revenues support to MedStar to increase ambulance coverage inside the City, it should *deeply* understand MedStar's long-term economics as to what is possible in the partnership. Second, if at some point the City's enhanced revenues are large enough, City Council could well want a more direct say on the use of its supplemental funds without facing the possibility of a future MedStar Board making a decision adverse to the City's supplemental deployment program. Governance policy control must be considered along with fiscal support to guide future leaders on both sides.

[19] Source: MedStar

Finding #23: Any request for MedStar to significantly improve first paramedic response times in the City will not be inexpensive, and the agencies need to have a clear discussion about long-term ambulance economics in a metro City approaching one million in population.

Based on this review, Citygate sees at least three possible pathways to improve first paramedic delivery:

1. Maintain the status quo; accept the paramedic ambulance response times that are provided by MedStar on its own, or
2. Ask MedStar to provide an in-depth plan to increase deployment of 9-1-1 paramedic ambulances inside the City, to include accurate, multiple-year cost estimates, and/or
3. Ask the Fire Department to develop a two-part plan to first, deploy existing firefighter/paramedics at one per fire engine at strategically determined fire stations as quickly as possible, starting in the harder-to-serve areas. Second, using predetermined metrics, expand the firefighter/paramedic first response Citywide. This may take the economic pressure off MedStar to materially lower response times.

Citygate submits Option 3 as both the most cost-effective option *and* the fastest pathway to improved first paramedic response times. This is based on a somewhat unique set of circumstances:

- The Department already has a modest paramedic program up and available.
- Based on the analysis in this report's Fire Staffing Study, the fire engines are staffed with four firefighters and should stay that way. Thus, the City already has the sunk cost of a four-firefighter unit in every fire station.
- Given a fire engine-based firefighter/paramedic being available, MedStar does not have to materially improve response times immediately in every neighborhood and only needs to staff the 9-1-1 ambulances with one paramedic and one EMT. The second paramedic comes from Fire and, when needed on a transport, will go with the ambulance to the hospital. There are multiple ways to get the firefighter back to their crew, but in the meantime, there is still a three-firefighter engine available in that station area to respond to another emergency. Thus, the Department is gaining a major advantage from the fire unit fourth crew member.

This page was intentionally left blank

Section 8

Deployment Evaluation and Recommendations

SECTION 8—FIREFIGHTING DEPLOYMENT EVALUATION AND RECOMMENDATIONS

8.1 OVERALL FIRE AND EMS DEPLOYMENT EVALUATION

SOC ELEMENT 8 OF 8
OVERALL EVALUATION

The City is marked by a diversity of populations, land use, and public road patterns that, in some areas, is geographically challenging to the provision of prompt Fire and EMS response times. The rivers, open spaces, and/or a lack of major cross-connecting roadways all hamper quick routing in some areas. Population drives service demand, and development brings population. As different areas develop and increase in population density, the Department's firefighting and ambulance services will need adjustment just to *maintain*, much less *improve*, response times equitably across all neighborhoods—more so when simultaneous incidents occur at peak hours of the day.

Throughout the City, while the substantial growth in EMS incidents over the past decade seems all-consuming, for the foreseeable future there will always be the need for both a first-due firefighting unit and multiple-unit Effective Response Force (ERF) response consistent with current best practices to limit the risk of fire damage to only part of an affected building and keep wildland fires small within the initial attack force's capabilities. Stated this way, *all neighborhoods need a stand-by and readily available firefighting force* that can respond when fires break out, regardless of peak-hour EMS workload. As demonstrated by the recent winter freeze and current extreme heat emergencies, there is also a need for a strong fire department during natural disasters, as the vulnerable members of the City's population will need help from first responders.

Throughout this report, Citygate has conducted in-depth analysis of response times, station locations, dispatching, types of fire apparatus and MedStar's paramedic ambulance deployment. This analysis is based on a combination of geographic information system (GIS) mapping and incident statistics to support Citygate's opinions and overall deployment findings and recommendations.

The effective deployment of fire and ambulance units across the City is challenged by four issues that make cost-effective deployment more difficult:

- Growth in the north City and along almost all other edge areas for effective fire station response times.
- First paramedic delivery, given MedStar's paramedic ambulance response times, and lack of Citywide firefighter/paramedic deployment by the Fire Department.
- Lengthy dispatch processing times given the interplay of three dispatch centers.

- The need for specific, outcome-driven service goals adopted by the City Council to drive investment, improvements, and accountability.

8.1.1 Challenge #1: North City Fire Station Coverage – Station 45 and Planning for Future Growth

The road networks outside of the core City use curvilinear streets with more limited major cross-connecting roadways. Open spaces and unannexed areas bisect the outer City areas. Fire station locations in such curvilinear road networks need tighter station-to-station spacing as the units cannot cover as many public street miles as quickly as they can in a core City grid road network.

The City has been planning for two additional fire stations. Station 45 in the north City will open in September 2022. The City has purchased land for Station 46 in the southwest City. The City and Department were awaiting this study to make a final decision on staffing and unit types for this station. Based on our geographic mapping and response statistics studies, Citygate finds the north City needs three unit types at Station 45—an engine, a quint/ladder, and a Battalion Chief. The station was built to accommodate this. These additions will significantly improve first-unit, multiple-unit ERF, and command chief travel time coverage in that part of the City.

This study also reviewed the City's growth and land use plans, with most growth projected to be in the City's edge areas outside of the loop. The City should not expect that new Station 45, or yet-to-be-designed second new Station 46 in the far southwest corner of the City, will be sufficient.

The City should enable a Department and City planning team to work with developers to understand, at a neighborhood level, how much growth can be expected to occur, and when. The City should adopt trigger point measures for when there are too many populations—residential or business—beyond the reasonable reach of a fire station, so the next needed station is envisioned, the parcel obtained, and the building designed and constructed to open when the trigger point is crossed, not well afterwards. The same, ongoing planning will also synchronize the timing to purchase apparatus and hire additional staffing.

As a start to establishing a trigger point, Citygate suggests the City staff consider:

- When there will be more than 10,000 residents in a contiguous area beyond a five-minute travel time from a station
- When in commercial-only areas, there are more than 5,000 employees (or others) in a contiguous area beyond an 8:00-minute travel time from a station.

With the addition of Stations 45 and 46, the near-term physical fire stations are adequate pending a deeper growth analysis. The Department needs to understand the multiple factors driving slow response times into its response planning for added stations due to growth. In addition, this study identifies 10 existing fire station areas that are approaching incident workload saturation. As existing station areas become too busy, the next logical deployment addition would be two-

firefighter squads for low-acuity EMS and non-fire incident call responses *at peak hours of the day* on an alternative work schedule.

8.1.2 Challenge #2: Paramedic Service Delivery Times – MedStar and Fire

The growth across the City over the last decade or so has strained the MedStar ambulance system to provide a paramedic ambulance within the time frame to even begin *paramedic* level intervention before a serious medical event results in catastrophic harm. MedStar's current response time coverages are not equitable to all neighborhoods, all the time, and are not as responsive as other major American paramedic ambulance systems, where the ambulance is the only paramedic provider.

The Fort Worth decades old EMS delivery system was set up for first responders to arrive providing a BLS level of care and MedStar to arrive with an ALS level of care. However, ALS care to the most severe patients can be started sooner in systems that deploy neighborhood-based firefighter/paramedics. Doing so also provides redundancy if the ambulance were to be significantly delayed as well as a larger force of paramedics Citywide for disaster response. In Fort Worth, the Fire Department responds consistently with a BLS level of care and with an ALS level of care if a paramedic is available on the engine.

MedStar's response goal for the highest Priority 1 incidents is 11:00 minutes at **85 percent** compliance from the time MedStar *receives* (at its separate communications center) a 9-1-1 call from the Police Department communications center.

The Fire Department is also slower than fire services best practices to respond, but given 44 stations at present, it has a station in most neighborhoods and typically arrives before MedStar, as the data in this study identifies. Given the economic and population growth planned in what is soon to be a million-resident City, the faster delivery of a first paramedic to life-threatening Priority 1 calls should be considered.

In our analysis of MedStar operations, Citygate found that two options exist for improvement: (1) add ambulance coverage to deliver 11:00-minute call to arrival at **90 percent** performance *Citywide*, and/or (2) take the partial firefighter paramedic force which already exists and immediately begin the deployment of a fire engine-based paramedic first response, a very common model across the country. Doing so leverages the City's investment in staffing four firefighters per unit, leverages the City's existing costs in stations and apparatus, and does not require MedStar to find the revenues to significantly grow its 9-1-1 ambulance deployment fleet or to deploy two paramedics to critical patients. The few times a second paramedic is needed on a trip to the hospital, the Fire paramedic would go, still leaving a three-person fire engine for other responses.

For special incident response, community events, and to support its own personnel safety at major incidents, the Fire Department has grown a modest paramedic capacity. With little new expense, the Department can field 20–25 paramedic fire engines in harder-to-serve edge neighborhoods as

soon as possible. Growing the program will require a larger investment in paramedic equipment, personnel, and eventual equipment replacement.

8.1.3 Challenge #3: Dispatch Processing-Time Improvement – Three Dispatch Centers

The City uses three emergency communication centers—Police, who answer 9-1-1 calls, a Fire Department center, and a MedStar center. Thus, in the City there are three separate communication/dispatch centers that a 9-1-1 call must navigate. Each of the three computer dispatching systems is electronically linked, and once an incident is started by either the Police or Fire center, that incident can be "sent" to the other centers for dispatching. As for EMS events, most 9-1-1 callers are routed to MedStar by the Police 9-1-1 call taker. The Police dispatcher can stay on the line and listen for Police unit needs. Once MedStar has run through its decision process regarding what to send, the incident is electronically sent to Fire if a Fire unit is needed. If the 9-1-1 call is first answered by Fire, they must send the caller to MedStar. In some instances, a caller could be questioned by one dispatcher, but have one or two others also listening.

The resulting system is complicated, has expensive technology overlaps, and—based on all available dispatch processing time data—is significantly slower than national best practice advice. The three dispatch centers can together add enough time that, even if each center was operating according to best practices, cumulatively, they are slow, and the time lost cannot be made up in driving faster or adding more fire engines and ambulances.

Combined Response-Time Results

The times reported in the previous Fire and MedStar sections are from *when they received the call from the Police communications center*. If their 90 percent Priority 1 performance is added to Police 9-1-1 processing time, then the City's true customer service to the public would measure in the low-to-mid teens in minutes. However, for both deadly medical events and fires that are already serious when called in, *the first unit needed should be arriving to begin to understand and slow the escalation of an emergency within 7:30–8:30 minutes from 9-1-1 answer*.

Based on the previous three-agency response time analysis, the total Priority 1 response times from Police 9-1-1 answer are listed in the following table, along with the impacts modest time savings could deliver. These times are for RY 20/21 without new Fire Station 45 open.

Table 38—Call to First Unit Arrival Police 9-1-1 Plus Fire or MedStar

Agency	RY 20/21 Fire and Medstar Received to First Arrival	Police 9-1-1 Transfer Processing 3-Year Performance 90%	Total
Fire	10:21	2:42	**13:03**
Medstar	14:16	2:42	**16:58**
Fire saves 1:00 minute turnout time *and* Police transfer to 30 seconds	9:21	0:30	**9:51**
Medstar with Police at 30 seconds	**14:16**	**0:30**	**14:46**

In Citygate's experience with multiple states, for critical (Priority 1) patient care in urban areas, the time for EMS deployment ranges from 8:00–12:00 minutes for *call to arrival* of a fire station paramedic or an ambulance system paramedic. Most urban systems strive for 10:00 minutes or less for the arrival of the first paramedic. In Dallas, the system utilizes fire engine paramedics with a response time goal of 9:00 minutes or less to 90 percent of incidents. At this point in 2022, they are reporting compliance at 84 percent. In Austin, without using fire department paramedics, the paramedic ambulance system goal is 9:59 minutes 91 percent of the time, and recently, their 2021 performance was at 85.6 percent. Austin also expects the fire unit with an EMT to arrive within 8:00 minutes 85 percent of the time, and in 2021, they delivered at 76 percent.

In the MedStar analysis section of this report the response times by zip code were compared between Fire and Medstar. In 27 zip codes that had a large data sample size for both Fire and MedStar, from October 2020 through September 2021—on average, across the 27 areas—Fire arrived 6.4 minutes *before* Medstar on 90 percent of the measured responses. Additionally, arrival time at the address does not mean paramedic care to the patient. The paramedics must get to the patient, be quickly briefed by Fire, and then begin intervention.

It is important to keep in mind that for the patient and family, the clock started with the 9-1-1 call, not the arrival of the paramedic ambulance. Thus, from time of call a paramedic arrival of 14:00 minutes added to the steps needed after arrival means paramedic care does not begin for well over 15:00 minutes. This is too long when every minute matters.

Many urban response systems' rigorous response times revolve around Priority 1 calls that are deemed critical life and death calls and the time to flashover when a fire is consuming the room of origin and spreading both vertically and horizontally to other rooms or compartments. In Citygate's experience, urban systems also strive for equity of access for all neighborhoods of similar population density to offer the same response time access to a prompt paramedic level of care.

It will take the addition of planned Stations 45 and 46 plus significant efforts to reduce all critical dispatches to 90–120 seconds, but the Department can deliver first responder services to most neighborhoods in the near-term in the 9:00-minute range.

8.2 RECOMMENDED DEPLOYMENT IMPROVEMENTS

The following summarizes Citygate's findings and recommendation related to deployment improvements.

Based on the technical analysis and findings contained in this study, Citygate offers the following near-term deployment recommendations:

Recommendation #1: **Adopt City Council Deployment Measure Policies**: The Council should consider adopting complete performance measures that begin with Police 9-1-1 call answer and end with the Fire Department and/or an ambulance arriving at the emergency incident. The measures of time should be designed to save patients and to keep small but serious fires from becoming more complex or damaging. With this is mind, Citygate recommends the following outcome-based measures for the major emergency types:

1.1: Geographic Distribution of Fire Stations: To treat medical patients and control small fires, the first-due unit should arrive within 8:30 minutes, 90 percent of the time, from receipt of the 9-1-1 call in the fire dispatch center. This equates to a 90-second dispatch time, 2:00-minute company turnout time, and 5:00-minute travel time.

1.2: Multiple-Unit Effective Response Force for Serious Emergencies: To confine fires near the room of origin and to treat up to five medical patients at once, a multiple-unit response of a *minimum* of three engines, one quint/ladder truck, and one Battalion Chief, totaling a minimum of 17 personnel, should arrive within 11:30 minutes from the time of 9-1-1 call receipt in fire dispatch, 90 percent of the time. This equates to 90-second dispatch time, 2:00-minute company turnout time, and 8:00-minute travel time spacing for multiple units.

1.3: Hazardous Materials Response: To minimize or halt the release of a hazardous substance so it has minimal impact on the community, the Department needs to maintain its hazardous materials response as designed to protect the community from hazards associated with uncontrolled release of hazardous and toxic materials. The first responder unit should arrive to investigate a hazmat release at the operations level within 8:30 minutes, 90 percent of the time, which equates to a 90-second dispatch time, 2:00-minute company turnout time, and 5:00-minute travel time in urban population areas. After assessment and scene evaluation is completed, a determination will be made whether to request additional resources.

1.4: Technical Rescue: To respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue, the first-due company in urban to suburban areas to arrive for assessment of the rescue should achieve a 5:00-minute travel time, 90 percent of the time. Additional resources capable of initiating a rescue should be assembled within a total response time of 11:30 minutes, 90 percent of the time, with the result being a safe and complete rescue/extrication to ensure delivery of patients to a definitive care facility.

Recommendation #2: Reduce fire turnout times through training and data feedback for crew accountability, to 2:00 minutes or less, 90 percent of the time.

Recommendation #3: Reduce dispatch processing time for acute emergencies to 90 seconds or less, 90 percent of the time, from the time of 9-1-1 call answer.

3.1: Immediately task the three dispatch centers to improve existing technology and dispatcher workflows to reduce call-processing time.

3.2: Conduct an in-depth operational and fiscal analysis of merging the three dispatch centers into a consolidated Fort Worth emergency 9-1-1 and non-emergency 3-1-1 center.

Recommendation #4: Given the Department's service needs in the north City, open new Station 45 with an engine company, a quint/ladder company, and a Battalion Chief for improved northern area incident command.

Recommendation #5: Task Medstar and the Fire Department to continue dispatch reprioritization efforts that reduce the number of non-life-threatening complaints categorized as Priority 1 calls, so the system can focus on getting the right resources to the most critical calls in the fastest time possible.

Recommendation #6: The City, Fire Department, and Medstar need to grow their positive, but presently small, programs to deliver compassionate care, social, and mental health services without unduly burdening the 9-1-1 response forces.

Recommendation #7: The City Council should consider tasking MedStar and the Department to immediately study and analyze the cost of:

7.1: Increasing Medstar paramedic ambulance coverage to 90 percent of Priority 1 incidents to 9:50 minutes from the time of 9-1-1 answer at the Police Department, and/or

7.2: The Fire Department implementing paramedic engine first responders with existing resources to work with MedStar paramedics in the most difficult to reach neighborhoods, and then expand the program to all City fire stations.

7.3: In either choice, consider the long-term economic and personnel-related sustainability. If public funds are needed to increase MedStar ambulance coverage, determine whether a need exists for governance changes so the City Council can control the use of general revenues.

Recommendation #8: Direct Fire, Planning, and Fiscal staffs to design and return to Council in no more than six months a new trigger-point threshold for adding fire stations concurrent with City growth, and not long after growth has already taken place.

8.1: Given this study's understanding of City growth, consider a trigger point of more than 10,000 residents in a contiguous area beyond a 5:00-minute *travel* time from a station, or in commercial-only areas, when there are more than 5,000 employees (or others) in a contiguous area beyond an 8:00-minute *travel* time from a station.

Recommendation #9: The Department needs to monitor workloads and response times per unit, and when Unit-Hour Utilization exceed 30 percent for several hours at a time, add peak-hour two-firefighter squads as low-acuity incident responders.

Recommendation #10: For the risks to be protected and the large station areas, the City should continue the practice of staffing 24/7/365 primary fire engines and quints/ladders with four firefighters per crew.

This page was intentionally left blank

Section 9

Administrative Support Services Capacity Review

SECTION 9—ADMINISTRATIVE SUPPORT SERVICES CAPACITY REVIEW

As an element of this Fire and EMS Staffing and Operations Study, Citygate was tasked to review and evaluate the Department's administrative and support staffing allocated to the various Department bureaus and functions, as well as the capital equipment, technology, and facilities needed to support those functions. Citygate was also tasked to:

- Review and evaluate organizational and management systems, including the current structure and effectiveness of the chain of command.
- Analyze overtime expenditures and causes.
- Identify and report impediments for effective use of personnel and service delivery.
- Review and evaluate personnel management practices, including recruitment, selection, promotion, succession planning, health/safety programs, and performance evaluations.
- Review and evaluate training programs and outcomes.
- Conduct a high-level review of the Office of Emergency Management and its current preparedness program for the hazards present in the City, and training of City employees, outside agencies, and the public.
- Assess alternate vehicle/equipment options while maintaining effective fire protection standards.

For overall fire department administration, the National Fire Protection Association (NFPA) recommends, in part, "the [Department] shall have a leader and organizational structure that facilitates efficient and effective management of its resources to carry out its mandate as required [in its mission statement]."[20] Best practices recommend a management organization and headquarters programs with adequate staffing capacity to provide a properly trained, equipped, and supported response force to ensure prompt response and safe, competent service delivery. Compliance regulations for fire services operation are increasing, so the proper hiring, training, and supervision of operational personnel requires a significant leadership and general management commitment.

In addition, the provision of public agency fire services is highly regulated by state law through the Texas Commission on Fire Protection[21] (TCFP) in the State of Texas. Through this process, fire services best practices organizational standards and recommendations have the force of

[20] NFPA 1201 – Standard for Providing Emergency Services to the Public (2015 Edition).
[21] https://www.tcfp.texas.gov/about/our-mission

administrative law. Therefore, all government agencies meeting specified conditions that utilize their employees to provide firefighting services must comply with the TCFP requirements.

9.1 Assessment Methodology

Citygate reviewed the current Department's administrative support organization and evaluated its lines of authority, span of control, and workload capacity gaps, if any. Citygate then made findings relative to that evaluation and provided recommendations for consideration by the Department and City executive management to improve the overall efficacy of the Department's administrative organization.

Our methodology for this review included:

- Obtaining and reviewing hundreds of records and data sets (over two gigabytes)
- Reviewing questionnaires issued to headquarters staff managers and conducting more than 24 primary Fire and City staff interviews, with many more for follow-up and clarifications
- Reviewing relevant position descriptions to understand primary responsibilities and expectations for each function or position
- Requesting and evaluating workload measures, throughput, etc.
- Identifying workload capacity gaps, if any, including what key responsibilities/expectations are not being completed at all or are not being completed to the desired/expected levels or timelines
- Estimating additional workload capacity needed, if any, in full-time equivalent (FTE) personnel to close identified workload capacity gaps and eliminate or minimize any single points of failure
- Recommending structural changes to improve overall organizational efficacy, communications, coordination, and supervisory span of control.

At the start of this review, the Department's headquarters / administrative support organization included 60 personnel that were administratively reassigned from fire station operations to provide the staffing capacity needed to meet workload demand and expectations. Beginning in April 2022, some of these personnel were temporarily transferred back to the Fire Operations Bureau to reduce overtime costs in that bureau. This review evaluated workload capacity and staffing *prior* to any of the Spring 2022 personnel transfers back to the Fire Operations Bureau.

As the staffing in each section to follow is analyzed, Citygate first reviews the need across three priority tiers to study for permanently funding the loaned positions. Second, where near- or long-

term program needs may indicate the need for added personnel beyond the loan program, we present positions for deeper analysis and program need policy consideration.

In summary, while Department and City staff offered insights, opinions, and recommendations, the following review is Citygate's independent perspective. Citygate also balances administrative needs first against safety for personnel and second against compliance with relevant county, state, and federal regulations.

9.2 Fire Department Administrative Support Organization and Loaned Positions Analysis

The City's Fiscal Year (FY) 2021 adopted budget authorized 153 FTE civil service and non-sworn administrative support positions plus 13 Department of Homeland Security grant-funded positions organized into four bureaus as shown in the following figure and summarized in the table following. This administrative organization is responsible for the overall administration and management of all Department programs and services and most administrative functions to support the 861 operational response personnel providing direct services to the City.

Figure 28—Fire Department Administrative Support Organization

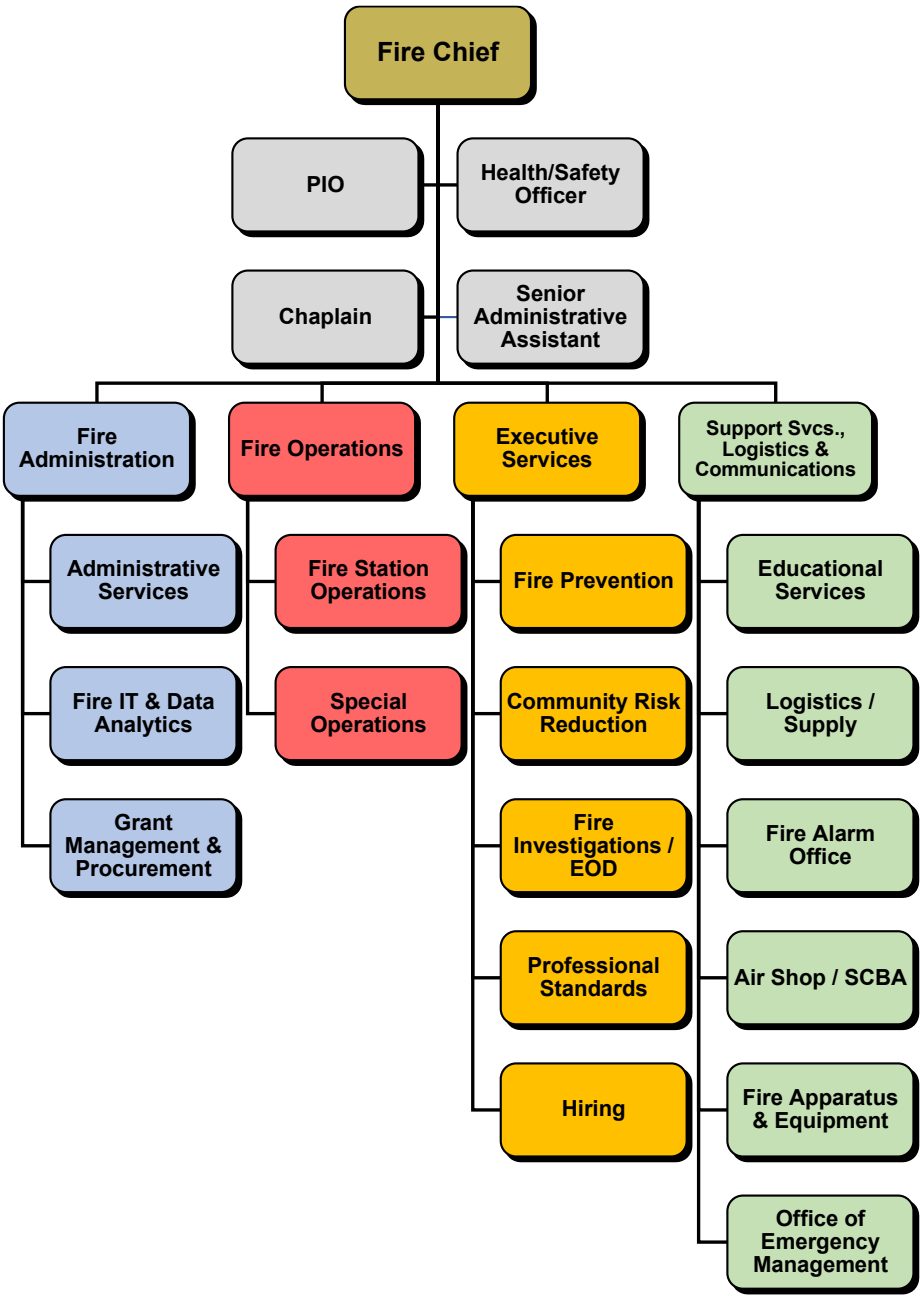


Table 39—Fire Department Administrative Support Organization Staffing Summary

Bureau	Sworn Civil Service FTE	Civilian FTE	Grant-Funded FTE	Total FTE Full/Part-Time
Fire Chief's Office	1	2	0	**3**
Fire Administration Services Bureau	0	16	0	**16**
Fire Operations Bureau	5	1	0	**6**
Executive Services Bureau	44	10	0	**54**
Support Services, Logistics, and Communications Bureau	53	21	13	**87**
Total	**103**	**50**	**13**	**166**

9.2.1 Loaned Positions Overview

Over several years and fire chiefs, the Department has used a practice of "loaning" frontline fire station personnel to other Department headquarters and operational program areas. The practice of loaning frontline fire station staff to Department headquarters functions in lieu of *permanently* funding the needed headquarters positions should have been a temporary, stopgap solution. The practice increases overtime when the fire station personnel assignment must be backfilled by regular or overtime personnel when staffing reaches the minimum level due to firefighters using earned leaved or Departmental vacancies, such as retirements. However, over many years, this practice has grown to 60 positions loaned to headquarters functions. These drivers of overtime have not been modeled well in the budget process because the practice worked on the premise of fiscal neutrality in light of vacancy salary and benefit savings. This worked—*until the onset of the COVID-19 pandemic.* At that point, a combination of vacancies; new pandemic programs, such as testing; along with increased use of workers' compensation sick leave all combined to drive overtime past the point that salary and benefit savings could cover all the loaned positions.

Without an accurate use-of-overtime model forecasting all the moving parts, the Department incurred a significant structural deficit in the budget. In the first pandemic year, federal pandemic funding offset the deficit. In the most recent fiscal year, during Citygate's review, the deficit was large enough to require a review of all the loaned positions by both Citygate and the Department.

Loaned Positions

As a mid-year budget correction due to overtime usage, some loaned positions were returned to fire station staffing, impacting the headquarters programs to different extents. These returned positions are noted in the tables to follow, but Citygate's analysis includes the loaned positions as of March 2022. Our review and resultant recommendations did **not** consider the positions temporarily returned to fire station operations.

There is a deeper explanation of the loaned position economics in **Section 9.5**, but Citygate scrutinized loaned positions in each headquarters program. Thus, each report subsection to follow will identify if the loaned positions are needed *and if other needs exist.*

Table 40—Headquarters "Loaned Positions" Summary (March 2022)

Bureau/Section	Loaned Positions
Fire Chief's Office	**2**
Fire Administration	**0**
Fire Operations	**6**
Fire Operations Administration	1
HOPE Team	5
Executive Services	**25**
Community Risk Reduction	1
Fire Prevention	11
Fire Investigations / EOD	10
Hiring	2
Professional Standards	1
Support Services, Logistics, and Communications	**27**
Educational Services	17
Logistics	2
Fire Alarm Office	8
OEM	0
Total	**60**

9.3 Use of Overtime and Loaned Positions Economics

One component of this assessment is a review of the Department's fiscal operations, particularly where overtime usage is concerned. Citygate conducted several interviews with applicable staff and requested and reviewed various fiscal documents provided by the Department and other City staff.

The loaned positions cost results in increased use of overtime as the loaned positions come from fire station staffing. There are three rotating 24-hour day duty shifts by which one shift is always on duty. The Department anticipates vacancies and tries to "overstaff" each crew above the minimum level of 12 to provide staffing replacements when others are using the various types of earned leave, such as vacation, sick, and workers' compensation injury. When there is not

overstaffing to cover absences, the minimum staffing level per unit and fire station are maintained by hiring back off-shift personnel on overtime. The cost of the loaned positions come from their not being present for minimum station staffing and these loaned vacancies are covered by overtime. When the loan program started over a decade ago, the increased overtime was offset, for years, by salary and benefit savings from the vacancies. Thus, the loaned positions do have a cost, but they were not budgeted as permanent FTEs with salary and benefits.

9.4 THREE FISCAL THEMES

Citygate's analysis identified three basic fiscal themes that have collectively resulted in significantly underfunded Department costs for *existing* levels of service.

9.4.1 Fiscal Theme 1

The Department has been consistently underbudgeted for overtime due to using small-percentage, year-over-year increases instead of modeling the actual drivers of overtime. This systemic underfunding of overtime has not been fully addressed due to the City budget process allowing personnel expense balancing regarding its personnel. The practice utilizes a combination of anticipated salary savings from vacant positions, other grant-related reimbursement funding, and (of late) COVID-19 federal reimbursement funding—all of which are temporary sources of funding. These temporary stopgaps to address the broader issue of underfunding overtime can no longer balance personnel costs. Hiring to replace vacancies has reduced off-setting salary savings. At the same time, other one-time funding sources have lapsed, and labor agreement changes and COVID-19 have increased the use of earned leave dramatically.

9.4.2 Fiscal Theme 2

The Department has used the practice of loaning frontline fire station staff to Department headquarters functions in lieu of permanent funding what it determined were the needed headquarters positions. The use of loaned positions is documented back to April 2016, and according to oral history is believed to be an even older practice. Further, it is apparently not limited as to quantity or length of time by the City's budget process. The loaned positions increased overtime where the fire station assignment must be backfilled by regular or overtime fire personnel. These drivers of overtime have also not been modeled well in the budget process given the use of vacancy offset savings.

9.4.3 Fiscal Theme 3

The City had made changes that increased the use of sick leave in lieu of compensation at retirement as part of pension changes in 2019. In addition, COVID-19 had an unforeseen large impact on increasing workers' compensation time loss.

9.5 GENERAL SUMMARY

Based on the information provided by staff dated March 17, 2022, the Department is anticipating an overall total budget shortfall of approximately $19.5 million at the end of FY 22. This includes estimated salary savings of approximately $9.9 million, anticipated savings in other non-salary/benefit-related areas, and revenue shortfalls as shown in the following table.

This forecast is based on current trends in addition to the known activity that is anticipated in the coming months, and primarily results from more-accurately-modeled anticipated overtime costs and anticipated costs in other salary and benefit-related areas.

Table 41—Fire Department General Fund Financial Activity and Forecast – FY 22

Fiscal Year	2022			2022 Forecast	
Financial Activity (in Thousands)	Revised Budget	Variance Budget to Prior Year Revised Budget	Variance Budget to Prior year Actual	Fire Department Staff Forecast	Variance Forecast to Revised FY 22 Budget
Expenditures					
Civil Service Base Pay (Account #5115101)	84,775	2,190	14,452	74,914	9,860
Overtime (All Accounts)	15,334	590	(13,156)	31,908	(16,574)
Salary Continuance	0	(274)	(4,267)	5,014	(5,014)
Incentive Pay	2,454	1,511	(195)	2,858	(403)
Separation Leave	0	(3,585)	(3,140)	2,386	(2,386)
Salary Continuance (Retired)	0	0	(1,035)	1,246	(1,246)
All Other Salary & Benefits	53,463	1,779	3,169	58,902	(5,439)
Total Salary & Benefits	**156,026**	**2,211**	**(4,172)**	**177,227**	**(21,201)**
General Operation and Maintenance	18,025	(332)	584	18,180	(155)
Transfers & Other	1,894	1,335	1,356	60	1,834
Total Expenditures	**175,945**	**3,215**	**(2,232)**	**195,466**	**(19,522)**
Revenues					
Total Revenues	**3,939**	**(1,522)**	**(3,915)**	**2,728**	**(1,211)**
Operating Results (General Fund Subsidy)	**(172,006)**	**(4,736)**	**(1,682)**	**(192,739)**	**(20,733)**

9.5.1 Revenues and Expenditures

The Department's revised FY 22 budget totaled approximately $3.9 million for estimated revenues and approximately $176 million for estimated expenditures. When compared to the revised FY 21 budget, this represents a decrease in revenues of approximately $1.5 million (28 percent) and an increase in expenditures of approximately $3.2 million (1.9 percent).

This decrease in revenues is caused by a reduction of approximately $1.5 million in the use of fund balance, which was included in the FY 21 revised budget but not included in the FY 22 budget. The increase in expenditures is caused by a combination of increases in salaries and benefits of approximately $2.2 million and increases in transfers of approximately $1 million.

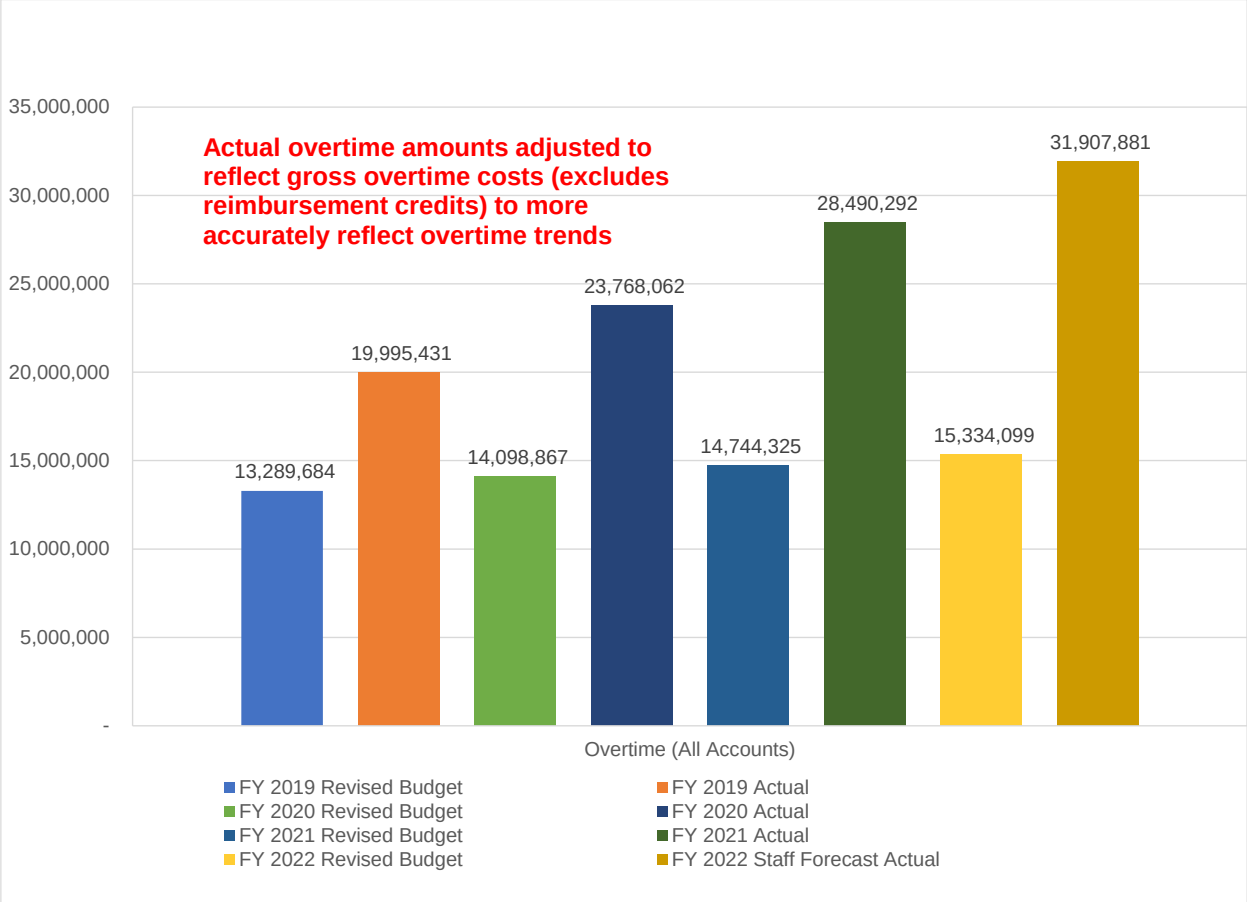
9.5.2 Overtime

A major component of this forecasted shortfall for FY 22 relates to actual, "baked-in" overtime costs. The Department has underbudgeted overtime costs, on average, by approximately $10 million per year between FY 19 and FY 21 (based on actual spending—not including American Rescue Plan Act (ARPA) and CARES Act grants). While the use of a combination of salary savings, COVID-19 funding, and other relief funding did address the issue of overtime costs exceeding the budget in FY 19 and FY 20, these temporary funding sources were insufficient to balance overtime costs in FY 21. A factor which must be considered, and which impacts salary savings, is that not all the salary savings resulting from vacancies were available to offset overtime costs.

Costs in other salary and benefits-related areas, such as salary continuance, incentive pay, and separation leave reduced the amount of salary savings available to address overtime and other operational costs. Between FY 19 and FY 21, budget versus actual deficit costs in these areas were approximately $4.3 million per year. Other salary and benefits-related budget surpluses—such as medical and retirement, which averaged approximately $1.8 million per year during the same period—partially offset the overtime drivers experienced in these areas.

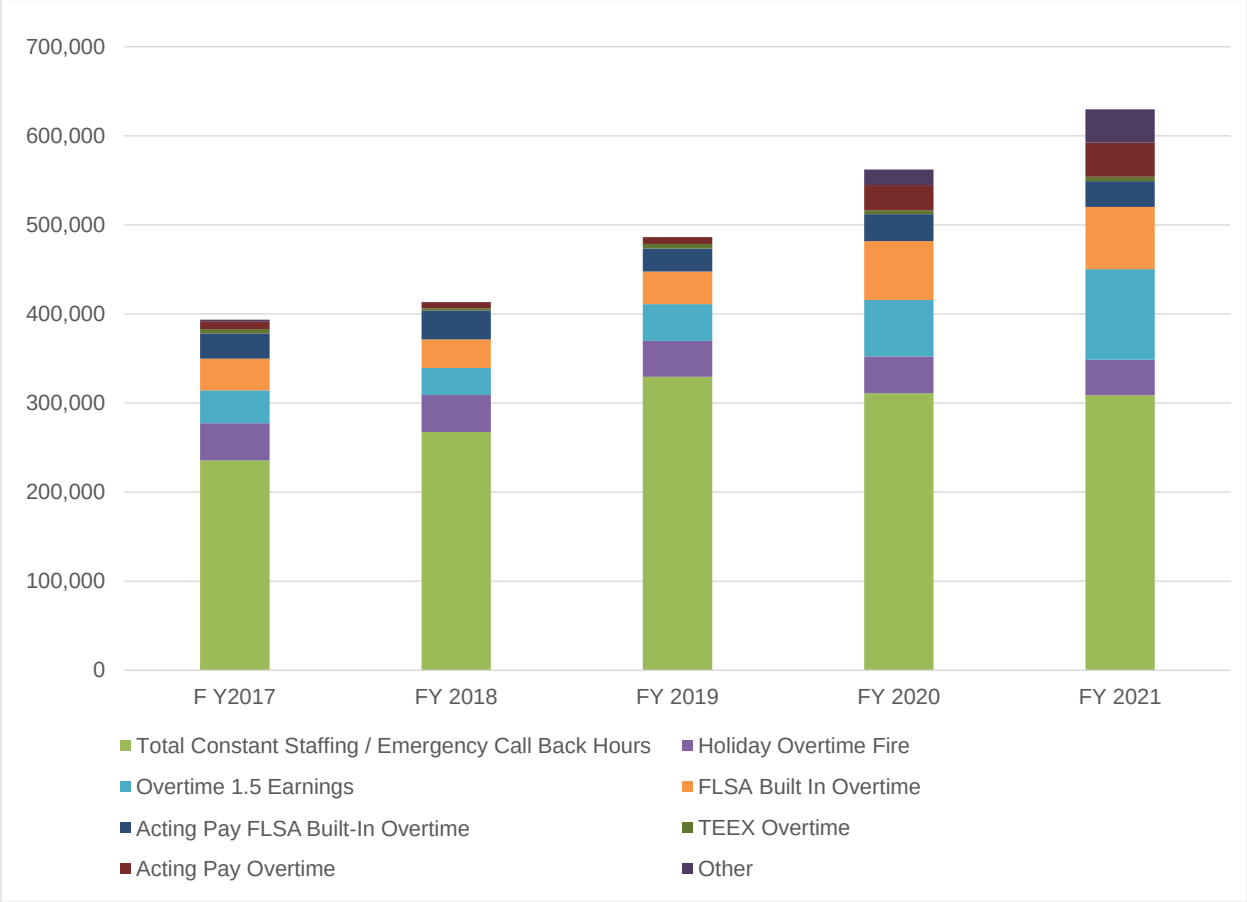
Using Department staff forecast estimates and the information originally submitted to Citygate, the FY 22 year-end net salary and benefits cost deficit is anticipated to be approximately $19.5 million, consisting of approximately $16.6 million of underbudgeted overtime, and approximately $14.5 million in underbudgeted other salary and benefit areas. This deficit is partially offset by anticipated salary savings of approximately $9.9 million.

Figure 29—Overtime Budget versus Actual – FY 19–FY 22



Between FY 17 and FY 21, overtime hours have averaged approximately 497,000 hours annually. As seen in the following figure, for FY 17 – FY 19, the increase in overtime resulted mostly from increased hours related to constant staffing / emergency call back. However, in FY 20 and 21, increases in voluntary "1.5 earning overtime," "acting pay overtime," and "FLSA built-in overtime" represented the majority of the total overtime increase. Hours coded to constant staffing / emergency call back as a percentage of total overtime hours decreased from approximately 60 percent in FY 17 to approximately 49 percent in FY 21. During the same period, overtime hours as a percentage of total overtime hours or 1.5 earning overtime, "acting pay overtime," and FLSA built-in overtime increased from approximately 28 percent in FY 17 to approximately 38 percent in FY 21.

Figure 30—Overtime Hours by Type – FY 17–FY 21



Based on current trends, and with the discontinuation of available COVID-19 relief funding for FY 22, staff anticipates the actual costs for overtime alone are estimated to be approximately $31.9 million by the end of FY 22. There are several factors impacting overtime costs. A large portion of these factors are mandated by FLSA, CBA (constant staffing, leave time, etc.), the loaned employee policy discussed later in this report, and emergency overtime use through the third quarter of 2022. As a percentage of overtime hours coded to constant staffing / emergency call back as a percentage of total overtime, the hours decreased from approximately 60 percent in FY 17 to approximately 49 percent in FY 21. During this same period, overtime hours for 1.5 overtime and FLSA built-in overtime increased from approximately 26 percent in FY 17 to approximately 32 percent in FY 21.

There are several factors which could, from time to time, impact overtime usage in any fire department. One example is when a base salary increase is negotiated and agreed to by the City, since some portion of overtime growth is directly linked to negotiated salary increases due to overtime hourly rates being tied to base salary hourly rates. There are, however, other factors that

impact overtime costs, which include federal/state laws and CBA requirements (constant staffing, emergency call back / forced hire, leave time, workers' compensation / salary continuance, etc.).

9.5.3 Other Salary/Benefit-Related Costs

Other salary and benefit costs, such as salary continuance, separation leave, incentive pay, added FTEs, retirement, and insurance over the past four fiscal years—also contribute to the forecasted cost overrun estimate. The anticipated cost deficit for these items alone totals approximately $14.5 million.

9.5.4 Non-Salary-Related Costs and Revenues

Per the Department staff forecast, $1 million of budgeted revenues from the use of fund balance are not anticipated to be collected. This is offset by reductions in transfers out in the same amount. The remaining anticipated revenue shortfall is more than offset by net anticipated budget surpluses in various general operation/maintenance and transfers out expenditure accounts.

9.5.5 Loaned Positions Impacts

The City currently has a practice of loaning frontline staff positions to other Department operational areas, which strains frontline staff flexibility and increases the need for overtime. Currently, per information provided by City staff, there are 60 frontline staff that are performing other operational duties instead of the duties for which they were hired. Returning these positions to their frontline duties could save the City approximately $7.9 million in overtime costs. This is a very high-level estimate based on the Department's average hourly overtime rate—assuming the third highest hourly rate for the four-position classification utilized for the loaned position program of approximately $45 per hour, and assuming that each loaned position is paid for a total of 2,912 hours per year, which could be available to reduce the amount of overtime hours required each year. This further assumes that the programs for which these loaned positions are utilized would have to be eliminated, which may not be desirable to the City.

There is no one person or City agency responsible for all factors and practices regarding overtime budgeting; the use of loaned positions and fire crew staffing levels all pre-date the current City and Department managers. However, old budget request formulas and vacant position savings will no longer cover for the actual costs of current Department programs. Short of drastic service reductions, several corrections are necessary, and implementing these corrections will take more than one fiscal year.

Fiscal Review Findings and Recommendations

Completion of this assessment resulted in the following findings and recommendations:

Finding #24: The City/Department has a practice of assuming that salary savings have been sufficient to address overtime underbudgeting in the past—which is not accurate for FY 21 and would not have been accurate in FY 20 if not for COVID-19 relief funding.

Finding #25: The City has credited COVID-19 relief funding directly against overtime expense accounts. This has caused fiscal reports to be misleading on their face and has resulted in distorted trend information.

Finding #26: Overtime and salary continuance categories, as a percentage of total salary and benefits costs, have grown at a faster rate than all other salary and benefit categories.

Finding #27: 1.5 overtime, FLSA built-in overtime category hours, and emergency call back time, as a percentage of total overtime hours, accounted for most of the growth in overtime hours for FY 20 and FY 21.

Finding #28: The Department's policy of loaned positions has led to gaps in constant staffing and limitations on availability to handle other frontline services, which has resulted in increased overtime.

Recommendation #11: Cease the practice of accounting for revenues directly against expenditure line items to meet best practice standards and improve the accuracy of fiscal reporting.

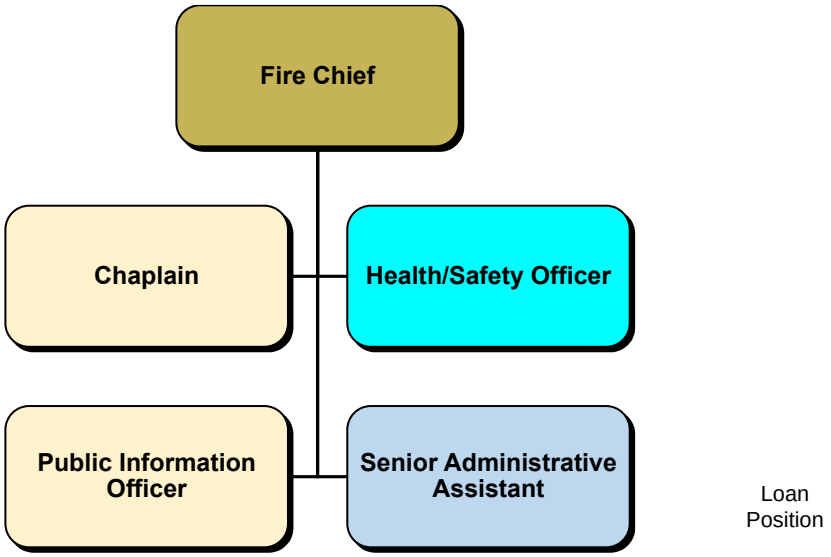
Recommendation #12: Budget the true expected overtime and other salary and benefit-related costs to reflect the actual spending amounts needed for the Department to provide required services. This will improve both budget development efficiency and transparency for the reader of budget documents.

Recommendation #13: Ensure that overtime and other pay and leave codes are used accurately and consistently so that analysis can be accurately and consistently performed.

9.6 FIRE CHIEF'S OFFICE

The Fire Chief's Office includes one sworn civil service and two civilian positions, plus two civil service personnel on loan from their budgeted fire station assignments as shown in the following figure.

Figure 31—Organization Chart – Fire Chief's Office



9.6.1 Key Programs and Responsibilities

Key Fire Chief's Office programs and responsibilities include:

- Overall vision, leadership, direction, and administration of the Department.
- Management of the following core services within the Fire Chief's Office:
  - Employee health and safety
  - Public information
  - Chaplain program
- Ensuring alignment of Department services, actions, and decisions with City Council and community goals and expectations.

9.6.2 Staffing and Workload Assessment

Citygate's assessment of the Fire Chief's Office finds that the Fire Chief has a manageable span of supervisory control for the day-to-day management of the Department as currently organized.

In Citygate's experience with other large fire agencies, an executive management team using key assistants to the Fire Chief and four direct report bureau heads can handle the day-to-day management of the organization while providing the time for the Fire Chief to focus on higher-level, community-wide organizational issues, goals, and objectives.

9.6.3 Summary

Citygate's assessment of the Fire Chief's Office finds that the Fire Chief has a manageable span of supervisory control for the day-to-day management of the Department as currently organized.

Loaned Positions

There are two loaned positions in this unit: the Chaplain and the Public Information Officer. Given the size of the Department, the nature of the services provided, and the hazards to its personnel, Citygate considers both of these positions important to maintain for an organization the size of the Fort Worth Fire Department. Third-party chaplains can help 24/7 and at large incidents; however, the day-to-day support—and with that, trust—must come from a dedicated person. The following table summarizes Citygate's recommendation regarding additional funding needed for FTE capacity, by priority.

Table 42—Additional Funding Needed for FTE Capacity by Priority – Fire Chief's Office

Section/Function	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community	Total
Loaned Positions				
Chaplain	0	1	0	1
Public Information Officer	0	1	0	1
Total	**0**	**2**	**0**	**2**

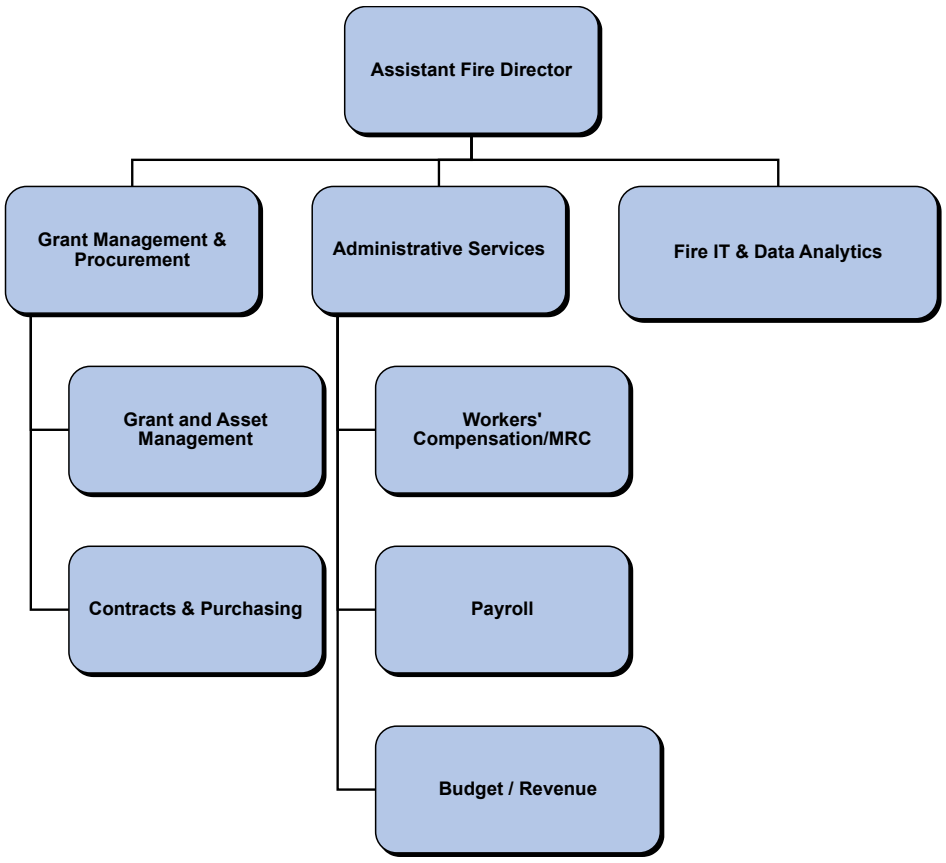
9.7 Fire Administration Bureau

The City's Fire Department consists of 963 authorized sworn positions and 50 non civil service employees (excluding 13 grant-funded positions) with a FY 22 revised budget of approximately $176 million. The Fire Administration Bureau of the Department is comprised of 16 civilian positions plus three contract personnel with a FY 22 revised budget of approximately $18.8 million. The Bureau is responsible for the fiscal and administrative functions of the Department

including budget, payroll, human resources, revenue and grants, asset management, purchasing, and information technology.

The Fire Administration Bureau is organized into three sections under an Assistant Fire Director as summarized in the following figure. In addition, the Bureau utilizes two contract payroll personnel and one fire information technology contract employee.

Figure 32—Organization Chart – Fire Administration Bureau



9.7.1 Administrative Services Section

The Administrative Services Section includes seven full-time personnel and, at present, two contractors for payroll system updates. These staff are responsible for the overall management of the Bureau, workers' compensation coordination, payroll, budget, and revenue.

Budget/Revenue Unit

One Management Analyst with one Administrative Assistant process both budget and revenue transactions for the Department in conjunction with City Financial Management Services Department. This staffing is thin for the volume of goods and services purchased in addition to proactive budget oversight. During the budget preparation season, the two staff positions can fall

behind on billing and tracking received revenue. This limits the time available to prepare an in-depth overtime forecast and tracking tool.

For fire and special event inspections, the same person bills for inspections and receives and processes inspection payments into the system. This is an internal control weakness that should be remedied. Citygate was told that the Department processes approximately 9,000 permits annually. Per staff, most of these payments are not made with cash, but separation of duties is an industry best practice to reduce risk exposure to the City.

Citygate was informed that the unit recently implemented software to support an electronic receipt verification and payment authorization accounts payable process which will help minimize the risks involved with unintended and intended erroneous activity.

Payroll Unit

Processing fire department time reporting and entering that into City payroll systems is complicated for any fire department due to shift work and the regulations imposed by the FLSA within the Department's collective bargaining agreements. A Payroll Coordinator and two Administrative Assistants are currently responsible for Department-level reporting, verification, and processing.

The City implemented a new, Citywide enterprise software system for finance, payroll, and human resources integration. It was also to connect the Department's scheduling software to payroll reporting for hours worked by type and taken as earned leave. However, as has been well documented elsewhere, the rollout in Fire was not conducted well enough, overpayments occurred, and fire employees could not prove their pay because detail regarding hours by type was not reported. Correcting all this resulted in the Department bringing in two contractors to fix and adequately complete the system conversion and integrating the Department's scheduling system.

Given the complexities of fire department payroll tracking for a large agency, Citygate is concerned that two personnel—and neither with software maintenance skills—are enough to avoid single point failure. If either of the two are absent or sick/injured for the long term, the payroll operations for more than 1,000 employees could halt.

The Department had previously requested three additional personnel in the Payroll Unit but were given one and the two contractors. When the contract work is completed, the necessary staffing and capacity to avoid single point failure must be revisited.

Workers' Compensation Unit

There is only one position to track and coordinate Department employee workers' compensation cases with the City's Risk Management Division for claims processing and treating partners. Given the size of the Department and Citygate's knowledge of appropriate tracking claims and treatments to get firefighters back to work, this is a significant workload for one individual, and also represents

another potential single point failure. While most claims are different across multiple treaters, and coordinating payroll appropriately, payroll reports dependent on work status, and reports for the state, require significant time and expertise. This position must also coordinate the return-to-work program for light duty work as employees heal.

9.7.2 Grant Management and Procurement Section

Grants Unit

The Department currently administers approximately $7.8 million in various grants. The Fire Administration Bureau has the responsibility of ensuring that grant funds are properly accounted for given federal, state, and county regulations, which can differ by the type of agency providing the grant. The Department does this work for all emergency services grants Citywide.

There are three positions providing grant oversight: a Grant Management Coordinator, a Grants Specialist tracking fine detail and reporting back to the grant provider, and a Grant Asset Specialist. These positions must control/track all physical assets that the grants have funded.

Two of the three positions are funded by the County-level Urban Areas Security Initiative (UASI), a federal pass-through grant to local agencies. This is due to the City receiving UASI funding. The Department tracks multiple grant types. Two of the larger ones are Federal SAFER grants for line firefighting positions that assist the Department for one to three years with adding firefighters for Department growth.

Given the scope of duties and grant oversight requirements, this level of staffing is appropriate.

Contracts and Purchasing Unit

The Contracts and Purchasing Unit processes and manages all contracts and purchasing. Given the size of the agency and the large quantity of goods and services the Department consumes each year, there are four positions in this unit: a Senior Contract Compliance Supervisor, two Administrative Assistants, and one Administrative Technician. The compliance position handles contracts, and the two assistants handle requests, both to buy and receive goods from the rest of the agency. The technician works on verification that the services or goods were received, and they also staff the front counter at Department headquarters.

The number of positions is just adequate. The Senior Compliance Supervisor position functions more as a manager, and the Department has requested a reclassification for the City Human Resources Department to consider. Given the workflows and volume of contracts and services being purchased, Citygate agrees that this team needs a formal supervisor.

9.7.3 Fire Information Technology and Data Analytics Section

Fire departments increasingly run on technology, and it is more than general business software. There are a multitude of information management, electronic dispatching, and in-apparatus mobile data functions, radios, fire station networking, and incident reporting programs, to name just a few.

In addition, the Fire Information Technology and Data Analytics Section is tasked to report analytics and even some GIS mapping, both of which require different, specialized skills.

Given the broad range of technology and skills needed to support it, this section is staffed by four full-time positions and one contractor. There is one technically skilled Business Process Manager, three levels of analyst, and one specialized contractor.

Citygate also interviewed the City's overall IT Solutions Director and Assistant Directors. In recent years, the City centralized IT (a best practice in Citygate's opinion) and agreed that a few IT positions would stay embedded in both the Police and Fire Departments given their specialized operations, regulations, and need for 24/7/365 mission-critical systems.

Both the Department and the central team believe that the shared system is working and is better than would full centralization. There have been issues to work through, and both sides are committed to the best customer service possible. The central City methods are operating using best practice methods for customer service response time, electronic work orders, and tracking issues to resolution. The Section is also under newer leadership and can better support the Department's needs.

The Section Manager provides analysis and oversight, and the three analysts divide the duties of desktop support, fire records management with dispatch technology, and the EMS reporting database. The contractor handles intense development and specialized upgrade work.

Given the scope of fire technologies to support, the Section's staffing is appropriate and would be lean if the one contractor were removed. There is also a need for on-going advanced incident statistics and analytics to work with fire operations, MedStar, and City planning to model the growth of the City to anticipate where, when, and how to add deployment units.

For routine technology support, Citygate found the newer City IT leadership working to best practices and the Department should embrace using central IT to the greatest extent possible.

9.7.4 Fire Administration Bureau Summary Findings and Recommendations

Citygate finds the overall structural design of the Fire Administration Bureau to be appropriate for its size. Further, we observe that the organizational chart for the Fire Administration Bureau provides a good career path for employees to advance within the Bureau, which is a best practice. Pursuant to this assessment, Citygate recommends that the City consider funding one additional

position in the Workers' Compensation Unit as soon as possible to eliminate a critical single failure point as identified in Section 9.7.1.

Loaned Positions

There are no loaned positions in the Fire Administration Bureau.

Fire Administration Bureau Findings and Recommendations

Finding #29: The Workers' Compensation Unit is inadequately staffed for the size of this fire department, which is a single point failure risk.

Recommendation #14: Ensure that adequate separation of duties is implemented for all areas that could increase financial risk for the Department and the City. These duty separations and electronic limits should be outlined in a written operational manual, either Citywide or by Department.

Recommendation #15: After the contracted payroll upgrade is complete, strongly consider adding one more payroll technician for redundancy and cross training.

Recommendation #16: Immediately add one position to the Workers' Compensation Unit.

Recommendation #17: Ask Department and City IT to study using City central IT Department more for routine desktop support to free up analyst time for other analysis, such as deployment. If this cannot occur, then the Department will need a deployment/advance planning analyst position.

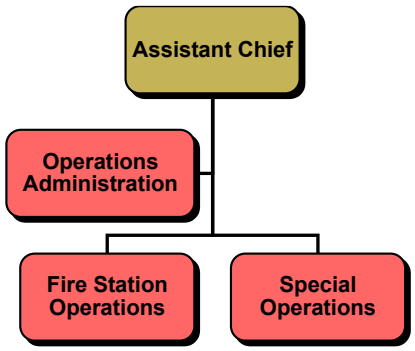
Table 43—Additional Funded FTE Needed by Priority – Fire Administration Services Bureau

Section/Function	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community or Department	Total
Potential (New) Positions for Study				
Administrative Services	0	1	0	1
Grant Management and Procurement	0	0	0	0
Fire Information Technology and Data Analytics	0	0	0	0
Total	**0**	**1**	**0**	**1**

9.8 FIRE OPERATIONS BUREAU

The Fire Operations Bureau administrative organization includes five sworn civil service positions and one civilian position, plus six sworn civil service personnel on loan from their budgeted fire station assignments, organized into two sections under the leadership of an Assistant Chief as shown in the following figure.

Figure 33—Organization Chart – Fire Operations Bureau Administration



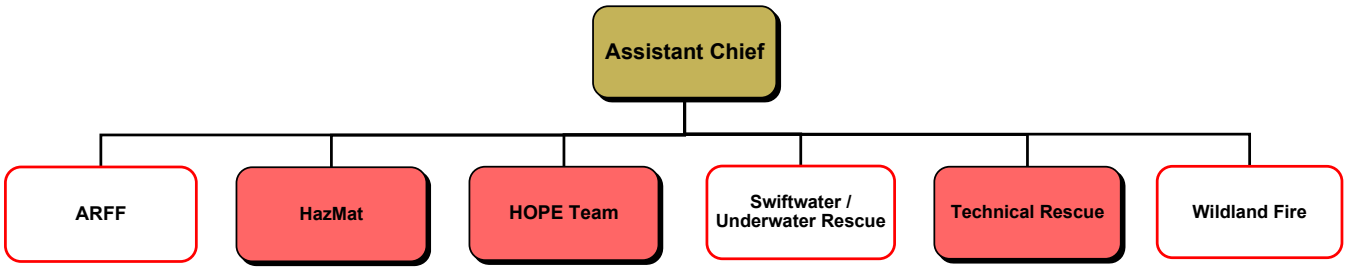
9.8.1 Fire Operations Administration Section

The Fire Operations Administrative Section includes one Battalion Chief and one Administrative Assistant.

9.8.2 Special Operations Section

The Special Operations Section administrative support organization includes four sworn civil service positions, plus six sworn civil service personnel on loan from their budgeted fire station assignments, organized into six programs as shown in the following figure. The non-shaded programs are coordinated by designated field response personnel as collateral duties in addition to their other operational responsibilities.

Figure 34—Special Operations Organizational Chart



Aircraft Rescue and Firefighting (ARFF) Program

The Department has six ARFF units staffed daily: two at Station 44 serving Fort Worth Meacham International Airport, three at Station 35 serving Fort Worth Alliance Airport, and one at Station 33 for an aircraft incident from adjacent Dallas/Fort Worth International Airport. The Department has 45 personnel with TCFP Aircraft Rescue Firefighter certification, which also meets Federal Aviation Administration requirements[22] for airports providing commercial passenger services. TCFP and FAA further require continuing education training and an annual live-fire exercise on an aircraft fire training prop to maintain the certification. The ARFF program is coordinated by a shift Battalion Chief as a collateral responsibility. The Fire Department does not receive any funding from the City's Aviation Department to offset the costs of the ARFF program.

Loaned Positions

There are no loaned positions in the ARFF program.

Hazardous Material Response Program

The Department maintains a minimum of 12 Hazardous Material Technicians on duty daily at Station 2 and an additional eight Technicians at four other stations for response to hazardous materials incidents. While the apparatus at the four satellite stations do not have the same

[22] Federal Aviation Administration, Code of Federal Regulations (CFR) Part 139

hazardous materials equipment inventory as Squad 2, they have equipment appropriate to mitigate minor spills or releases or to initiate actions until arrival of Squad 2.

The hazardous material program coordinator manages all training, certifications, and logistics for the 450 Hazmat Technicians, of which 120 are directly assigned to the program, and applies for and manages grant funding as available.

All response personnel receive eight hours of Hazmat Awareness and 24 hours of Hazmat Fire Responder Operational training. All operational Battalion Chiefs are also certified Hazardous Material Technicians (80 hours) but are not certified Hazardous Material Incident Commanders. Training programs are underway to certify all chief officers at the Hazardous Material Incident Commander level.

Overall, the Hazardous Material Response program is above average in size and scope for a city of Fort Worth's size, risks, and demographics. Because the team at Fire Station 2 is both the primary Technical Rescue Team and Hazardous Material Response Team, the ability to train enough personnel in both disciplines to maintain competency and response capacity is concerning depending on the call volume at Fire Station 2.

Loaned Positions

There are no loaned positions in the hazardous materials program.

HOPE Team

As of March 2022, the HOPE Team included one Fire Lieutenant and four personnel on loan from the Fire Operations Bureau.[23] The HOPE Team was created in late 2018 as a multidisciplinary resource to help those experiencing homelessness and reduce demand on the 9-1-1 system. The team is comprised of Fire Department, Police Department, DRC Solutions (temporary housing), and MHMR Mobile Integrated Outreach Services. Fire Department members assist the homeless community with placement into programs to meet their individual needs such as housing, medical care, mental health care, and 9-1-1 calls for service in the primary homeless corridor. In addition, the HOPE Team has become a central contact point for many other agencies providing services for the homeless, including the Tarrant County Homeless Coalition (TCHC), MHMR Mobile Integrated Outreach Services, John Peter Smith Hospital System, the Presbyterian Night Shelter, Union Gospel Mission, Safehaven, Fort Worth Homeless Veterans, True Worth Place, and the Salvation Army. The team operated five days per week from 7:00 a.m. to 4:00 p.m. until May 2022 when team members were returned to their previous fire station assignments.

In addition to 9-1-1 responses in the homeless corridor, the HOPE Team provided:

[23] The four loans were re-assigned back to fire stations in May 2022

- Homeless camp health and safety checks
- Chicken line health and safety checks
- Teaching first aid and CPR to homeless shelter staff
- Wound care
- Emotional support
- Issue resolution
- Community paramedicine
- Follow-ups
- Treatment plans
- Job placement assistance
- Hydration
- Assisting fire stations with homeless issues in their response area
- Tarrant County Homeless Coalition Homeless Point-in-Time (PIT) counts

The team also assists the Police Department with:

- A soft approach: homeless persons tend to be receptive to a firefighter
- Mental health referrals
- Sidewalk/street accessibility
- Human Trafficking Task Force
- After-hours homeless community patrol assistance
- Traffic control

Since its inception in late 2018, the number of 9-1-1 calls in the homeless corridor have been reduced by nearly 53 percent as summarized in the following table.

Table 44—9-1-1 Call Summary in Fort Worth Homeless Corridor

Year	8:00 AM – 5:00 PM	5:00 PM – 8:00 AM	Weekends	Total
2016	678	730	490	**1,898**
2017	980	1,038	677	**2,695**
2018	830	883	575	**2,288**
2019	896	916	568	**2,380**
2020	592	614	408	**1,614**
2021	426	426	267	**1,119**
Total	**4,402**	**4,607**	**2,985**	**11,994**

Source: Fort Worth Fire Department

Loaned Positions

There were five loaned positions on the HOPE Team including one Lieutenant, one Fire Engineer, and three Firefighters. Citygate's review of the HOPE Team finds that it provides valued, tangible services for Fort Worth's homeless community, and has also reduced 9-1-1 calls in that corridor by more than 50 percent since its inception. The HOPE team is coordinated by the Police Department. However, the program is co-staffed with the Fire Department. If the City chooses to increase the hours of service for HOPE, Fire will need additional staffing to expand services to seven days per week.

Swiftwater/Underwater Rescue (SWUR) Program

The Department has 65 personnel with Swiftwater Rescue Technician and Emergency Response Diving International (ERDI) diver certification, with a minimum requirement of 18 on duty daily, including three each at Stations 7 and 32. The program is coordinated by a shift Fire Captain as a collateral duty.

The program is well trained and equipped and reflects a strong response to the ever-present threat of flash flooding in the City and its suburbs, lakes, and rivers. A significant training commitment is needed to maintain competency, with quarterly dive training sessions required resulting in approximately $50,000 in overtime annually.

Loaned Positions

There are no loaned positions in the swift water/underwater rescue program.

Technical Rescue Program

The Department maintains a minimum of 16 Technical Rescue Technicians on duty daily, with 12 assigned to Squad 2 and the remaining four assigned to three satellite stations. The three satellite stations have varying levels of technical rescue skills and equipment.

The technical rescue program coordinator manages all training, certifications, and logistics for the 108 technicians, and applies for grant funding as available.

Citygate's review of the technical rescue program identified a large gap in technical rescue skill between the technicians and the remainder of the response force, with all personnel only receiving minimal rope rescue training in the initial academy and only the four technical-rescue-designated stations having rope rescue equipment, the remaining 40 stations have no technical rescue capability other than auto extrication.

Overall, the technical rescue program is still evolving and is heavily dependent on federal grant funding for training and equipment. The Department currently requires a two-year commitment for hazmat and technical rescue assignments; however, it could take up to two years just to get a team member trained and certified to TCFP standards.

Loaned Positions

There are no loaned positions in the technical rescue program.

Wildland Fire Program

As identified in the risk assessment appendix of this study, nearly one-third of the City's population lives in a wildland urban interface, and those areas are at high risk for a wildland fire. The Department's wildland fire suppression capacity, in addition to the 39 engines and 13 quints staffed daily at the Departments 44 fire stations, includes 19 type-6 wildland fire engines with 300-gallon water tanks and two water tenders.

All response personnel receive eight hours of wildland firefighting training in the initial academy. Only approximately 60 of the 861 response personnel (7 percent) have also completed the 40-hour National Wildfire Coordinating Group (NWCG) Basic Wildland Firefighting (S-130) course, its prerequisite eight-hour Introduction to Wildland Fire Behavior (S-190) course, and the 16-hour Intermediate Wildland Fire Behavior (S-290) course. Some personnel have also completed the TCFP Fire Officer 1 certification that includes the wildland Engine Boss certification; however, no Department battalion chiefs have either a Strike Team / Task Force Leader or Division/Group Supervisor certification, both of which are basic wildland fire assignments.

The wildland fire program is coordinated by a station Captain as a collateral responsibility. The program currently receives no budget support for training and equipment; as a need arises, funding is allocated from another program's budget based on overall Department priorities. The

Department has also participated in the Texas Institute for Mutual Aid System (TIFMAS) since 2011, with over 50 wildfire and severe weather missions since 2011.

Citygate's review of this program finds that a full-time administrative program coordinator would be beneficial to ensure appropriate training of response personnel and to ensure adequate wildland fire apparatus and equipment to mitigate the City's wildland fire risk as summarized in the following table.

Loaned Positions

There are no loaned positions in the wildland fire program. Pursuant to this assessment, Citygate recommends that the City consider funding a full-time wildland fire program coordinator position as discussed above.

9.8.3 Fire Operations Bureau Administration Summary

Citygate's review of the Fire Operations Bureau administrative support organization finds it to be appropriately staffed to meet current and near-term program responsibilities and expectations, except for needing a full-time Wildland Fire Program Coordinator to ensure appropriate training of response personnel and to ensure adequate wildland fire apparatus and equipment to mitigate the City's wildland fire risk. Citygate thus recommends that the City consider funding additional needed administrative staffing capacity as prioritized in the following table.

Table 45—Additional Funded FTE Needed by Priority – Fire Operations Bureau Administration

Section/Function	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community or Department	Total
Loaned Positions	**0**	**6**	**0**	**6**
Fire Station Operations Administration	0	1	0	
HOPE Team	0	5	0	
Potential (New) Positions for Study	**0**	**1**	**0**	**1**
Wildland Fire Program Coordinator – Fire Captain	0	1	0	

Findings and Recommendations

Finding #30: The Special Operations Section is understaffed by one FTE to coordinate the Wildland Fire Program to ensure appropriate training of response personnel and to ensure adequate wildland fire apparatus and equipment to mitigate the City's wildland fire risk.

Finding #31: The HOPE Team provides valued, tangible services for Fort Worth's homeless community, and has reduced 9-1-1 calls in the homeless corridor by more than 50 percent since its inception.

Finding #32: The four fire station personnel on loan to the EMS/MEDIC 1 program are needed to meet program workload and goals and should thus be fully funded.

Finding #33: Although approximately 30 percent of the City lies in the wildland urban interface, most response personnel have not received recommended best-practice basic wildland fire training.

Recommendation #18: Fund a full-time Wildland Fire Program Coordinator as soon as possible to provide critical coordination and oversight of all wildland-fire-related programs, including training, equipment, mitigation, and prevention.

Recommendation #19: Provide NWCG Basic Wildland Firefighting and Introduction to Wildland Fire Behavior training for all response personnel.

Recommendation #20: Consider increasing the minimum commitment for assignment to the Technical Rescue and Hazmat programs from two to three years.

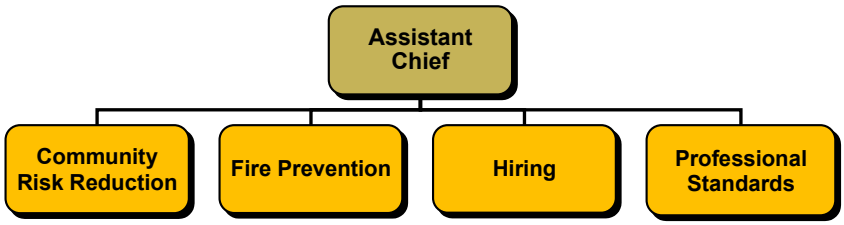
Recommendation #21: Request funding from the City Aviation Department to offset the costs of the AARF program.

Recommendation #22: In lieu of fully funding the HOPE Team, transfer those services to a new, multidiscipline City and/or MedStar program.

9.9 EXECUTIVE SERVICES BUREAU

The Executive Services Bureau includes 44 sworn civil service positions and 10 civilian positions, plus 25 sworn civil service personnel on loan from their budgeted fire station assignments, organized into four sections under an Assistant Chief as shown in the following figure.

Figure 35—Executive Services Bureau Organization Chart



9.9.1 Community Risk Reduction Section

With five sworn civil service positions and one civilian position plus one sworn civil service loan position and a cadre of 15–20 volunteers, the Community Risk Reduction (CRR) section provides a broad array of outreach/public education programs focused on reducing the incidence and consequence severity of fires and other hazardous conditions/events throughout the City including:

- Fire extinguisher training
- Smoke alarm installation
- Vaccination administration for homebound persons
- Blood pressure / diabetes monitoring
- CPR/AED training in partnership with MedStar and Safe Communities Coalition
- Water safety program
- Bicycle safety
- Fall prevention program
- Evacuation planning and drills
- Citizen's Fire Academy
- Youth Fire Prevention and Intervention Program (state mandated)
- Learn Not to Burn programs for elementary school students
- Reading program in partnership with the Fort Worth Independent School District

- Fire clowns
- Fire safety house
- Fire and life safety presentations
- Fire prevention seminars for multi-family occupancy property owners
- Assisting the Tarrant County Food Bank with food distribution during the COVID-19 crisis
- Fire Explorer Program in partnership with the Fort Worth Independent School District
- Providing staffing support for other Fire Department programs and events including Mayfest (4-5 days), Parade of Lights, etc.

At the time of this review in Spring 2022, very little CRR work was being performed due to concurrent Hiring Section workload for the full-time and part-time staff, re-assignment of the Fire Engineer and two Firefighters back to the Fire Operations Bureau, and no overtime authorized. While no empirical data is available to prove any direct or indirect correlation between these programs and service demand and/or consequence severity, Citygate finds they do provide intrinsic value to the community based on more than 20 years conducting fire department studies.

Loaned Positions

There was one loaned position in the Community Risk Reduction Section program until April 2022 performing critical program functions/tasks to reduce/minimize the incidence and consequence severity of fires and other hazardous conditions/events. Citygate thus recommends that the City consider for permanent funding the loaned position in the following priority.

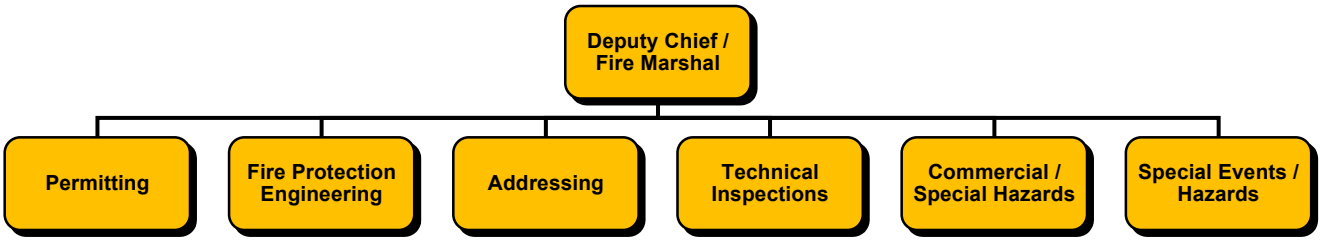
Table 46—Recommended Funded Loaned Positions by Priority – CRR Section

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community or Department	Total
Loaned Positions				
Firefighter	0	1	0	**1**

9.9.2 Fire Prevention Section

The Fire Prevention Section provides services with 20 sworn civil service positions and 6 civilian positions, plus 11 sworn civil service personnel on loan from their budgeted fire station assignments as of March 2022. The personnel are organized into six subsections as shown in the following figure.

Figure 36—Organization Chart – Fire Prevention Section



Key Fire Prevention Section programs and responsibilities include:

- Adoption and enforcement of City and state fire codes
- Review of all proposed new development projects and building permits for conformance with applicable fire and life safety codes, ordinances, and regulations
- Inspection of new building construction for conformance with applicable fire and life safety codes, ordinances, and regulations
- Plan review and inspection of fire protection and detection systems for conformance with applicable codes, ordinances, and regulations, and for appropriate design, installation, and operation.
- Inspection of designated building occupancies for conformance with applicable fire and life safety codes, ordinances, and regulations
- Assignment of addresses and plats
- Certificate of Occupancy inspections
- Inspection and permitting of technical/hazardous operations
- Inspection and permitting of special events
- False fire alarm ordinance enforcement
- Response to public information requests

The TCFP governs training and qualifications for Fire Prevention Plans Examiners and Fire Inspectors. The NFPA[24] also provides recommended best practices for fire prevention services. The Texas Education Agency requires annual inspection of all school facilities, and the Administrative Code requires inspection of nursing homes, day care facilities, hospitals, jails, and assisted living facilities. The Railroad Commission of Texas also requires inspection of LPG tank cars.

The following table summarizes inspection workload for the most recent three-year period.

Table 47—Occupancy Inspection Summary (2019–2021)

Occupancy Type	3-Year Total		
	Assigned	Completed	Percent Completed
Mandated Inspections			
Daycare/Nursing Homes	1,040	736	70.77%
Hospitals	397	320	80.60%
Schools	855	453	52.98%
Apartments (R-2)	616	70	11.36%
Highrise/Hotel	500	206	41.20%
Total	**3,408**	**1,785**	**52.38%**
Discretionary Inspections			
High-Risk Occupancies – Battalion 1	1,258	704	55.96%
High-Risk Occupancies – Battalion 2	889	346	38.92%
High-Risk Occupancies – Battalion 3	459	270	58.82%
High-Risk Occupancies – Battalion 4	554	320	57.76%
High-Risk Occupancies – Battalion 5	1,192	675	56.63%
High-Risk Occupancies – Battalion 6	465	334	71.83%
High-Risk Occupancies – Battalion 7	472	242	51.27%
Total	**5,289**	**2,891**	**54.66%**

The following table summarizes other fire prevention workload for the same three-year period.

[24] NFPA 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2029 Edition)

Table 48—Workload Summary – Fire Prevention Section (2019–2021)

Workload	2019	2020	2021	Total
Plan Reviews	**1,740**	**1,818**	**1,641**	**5,199**
Sprinkler System	862	779	708	
Alarms/Access Control	878	1,039	933	
Technical Permits	**1,863**	**2,128**	**2,069**	**6,060**
Access	199	236	395	
Alarm/Access Control System	636	750	647	
Sprinkler System	536	674	580	
Underground	201	176	177	
Standpipe	25	37	21	
Fire Suppression System	120	117	123	
Tanks	146	138	126	
Operating Permits	**192**	**172**	**185**	**549**
Flammable	10	15	16	
Hot Work	4	4	6	
Mobile Fueling	48	59	56	
Tent	10	18	24	
Open Flame	88	64	66	
Trench	1	5	13	
Other	31	7	4	
Technical Inspections	**4,194**	**3,513**	**3,215**	**10,922**
After Hours Requests	115	97	105	
Tank/HAZMAT System	523	216	180	
Suppression System	129	95	109	
Fire Alarm	846	799	800	
Access	187	117	110	
Sprinkler System	1,587	1,480	1,313	
Standpipe	50	22	11	
Contractor Consult/Site Visit	150	144	167	
Underground Work	607	543	420	

Citygate's review finds the Fire Prevention Section well organized into appropriate functional subsections with clear lines of authority and an appropriate supervisory span of control. As Table 47 shows, only 52 percent of mandated occupancy inspections were completed over the most recent three years, with 55 percent of high-risk discretionary inspections completed over the same period. According to the Fire Marshal, this was due to a lack of inspection capacity and other workload as summarized in Table 48. In addition, the number of special events requiring review

and inspection continues to increase to more than 600 annually at present, with only one inspector assigned to this function/responsibility

Citygate finds that the Fire Prevention Section has *insufficient* staffing capacity to meet its current and anticipated near-term workload *with the re-assignment of six loaned personnel back* to the Fire Operation Bureau as of May 2022. In addition to the 11 loaned positions, Citygate recommends the study the current and upcoming program needs and up to 10 additional positions might be necessary depending on customer service delivery policy choices as summarized in the following table to meet current and near-future workload demand.

Loaned Positions

There are 11 loaned personnel assigned to the Fire Prevention Section performing critical program functions/tasks to reduce/minimize the incidence and consequence severity of fires and other hazardous conditions/events in Fort Worth. Pursuant to this assessment, Citygate finds these positions are necessary to meeting mandated occupancy/use permitting and/or inspection workload, and discretionary inspection of high-risk occupancies.

Table 49—Additional Funded FTE Needed by Priority – Fire Prevention Section

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community or Department	Total
Loaned Positions	**11**	**0**	**0**	**11**
Fire Captain	0	0	0	
Fire Lieutenant	2	0	0	
Fire Engineer	1	0	0	
Firefighter	8	0	0	
Potential (New) Positions for Study	**1**	As high as **9**	**0**	**10**
Clerical support – Public Information Requests	1	0	0	
Technical Inspections	0	5	0	
Special Events Team – FF/Engineer	0	4	0	

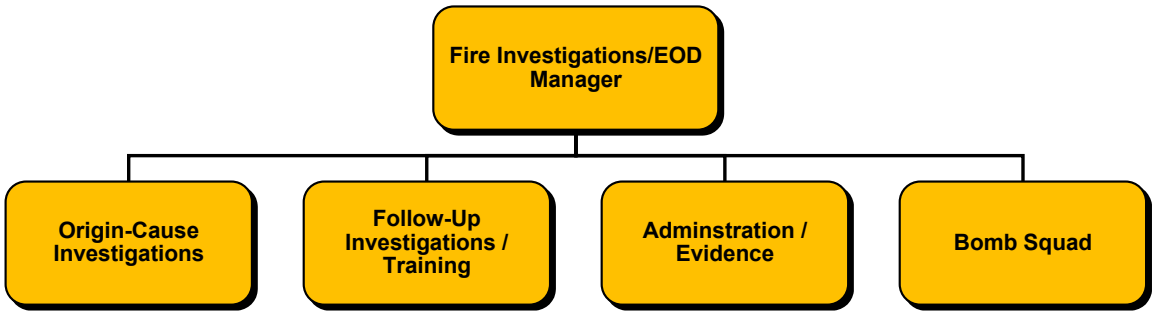
9.9.3 Fire Investigations / EOD Section

With 14 sworn civil service positions and one civilian position plus 10 sworn civil service personnel on loan from their budgeted fire station assignments, the Fire Investigations / Explosive Ordinance Disposal (EOD) Section provides the following services:

- Origin/cause investigation of:
  - Suspicious, unknown cause, or arson fires (policy)
  - Fires used in commission of another crime
  - Fire involving City-owned buildings or vehicles
  - Fires involving a juvenile fire setter
  - Fire or explosive event on federal property
  - Any explosion or incendiary device
  - Death or severe injury resulting from a fire
- Fireworks permits
- Personnel background investigations

At the time of this review in early 2022, the section was organized into four subsections under a Battalion Chief as shown in the following figure and table.

Figure 37—Organization Chart – Fire Investigations / EOD Section



At the time of this review, 13 investigators, including three supervisors, were assigned primarily to fire investigation. A two-person team (eight personnel total) is assigned to each shift to conduct primary origin/cause investigation on that shift. The remaining investigators and supervisors conduct case follow-up, evidence management, and other administrative duties including fireworks permits, records and reports, training management, background investigations, etc. From this group, a second two-person team is on call each day as a back-up to the shift-based team for

multiple or more complex fire incidents. Four of the eight personnel on loan from the Fire Operations Bureau were re-assigned back to fire station assignments in May 2022, thus reducing the Section's staffing capacity by 17 percent.

Seven of the investigators and one supervisor are also assigned to the bomb squad, with four also assigned to an explosive detection canine. In addition to responding to hazardous device incidents and bomb threats, squad members provide protective sweeps at many of the large community events, including Texas Christian University Football, Texas Motor Speedway, and Dickies Arena. Squad members also provide protective sweeps for VIP guests visiting the City, including high-ranking military and political figures. Bomb squad members also serve as a tertiary, on-call back-up to fire investigators and staff fire investigation positions during vacancies due to illness, vacation, promotion, or transfer. The section maintains two-person bomb team availability on call 24/7.

Citygate's review of the Fire Investigations / EOD Section found it well organized and managed to meet its responsibilities with assigned personnel very passionate about their job and operating at a high level. In 2021, the section responded to 759 incidents, of which 223 (29 percent) were assigned for follow-up investigation. Of those, 148 (66 percent) were determined to be arson or criminal cases, 38 of which were filed with the District Attorney's Office. The Section also issued approximately 100 fireworks permits and conducted nearly 200 new applicant background investigations. While the Section was able to meet its primary responsibilities with its staffing level prior to the re-assignment of the four members on loan from the Fire Operations Bureau, supervisors routinely respond to fire incidents to conduct origin and cause investigations and routinely conduct case follow-up in addition to their other duties. Furthermore, according to Section staff, there are not enough personnel available for adequate case follow-up.

Current Department procedure[25] calls for the dispatch of the on-duty/on-call two-person investigation team to all working fires, which section staff related has evolved to include essentially any fire where suppression action is taken, regardless of any suspicion of arson or a crime. This response workload could be significantly reduced, providing additional capacity for other section responsibilities, by providing all company officers with 40 hours of preliminary fire investigation training, and only dispatching the on-duty investigation team to large, complex fires, fires with injuries or fatalities, or fires where the cause cannot be determined by the company officer or is believed to be arson.

One area of responsibility that requires a significant amount of time is the new firefighter applicant background investigations. Section staff conducted nearly 300 background investigations in 2021 after normal work hours on overtime. With each background investigation taking approximately

[25] Fort Worth Fire Department Standard Operating Procedure S 7803 (October 2019)

eight hours, which equates to approximately 2,400 hours, or nearly 1.25 FTEs.[26] The background investigation currently occurs near the front end of the candidate screening process, preceding the polygraph, situational exercise, and traditional interview, each of which has a failure rate (particularly the situational exercise). Citygate suggests that the City consider moving the background investigation to later in the hiring process to reduce the number of investigations required, preferably following the conditional offer of employment.

The Fire Investigations / EOD Section relies heavily on grant funding, particularly for the bomb squad and canine units, which receive no base funding in the Department budget. In addition, this section is spread out across four separate facilities. A main office, which is a historic building adjacent to Fire Station 2 that originally served as the first fire alarm office in the 1930s, lacks sufficient space for all section staff and equipment, is in poor condition, and in need of major repairs/rehabilitation. The shift-based investigation team works out of a small space at the rear of Station 2. Evidence is stored at a third location, and some apparatus are stored at a fourth location. According to Section staff, there is sufficient space designated and available at the Bob Bolen Public Safety Complex to consolidate all Section staff, vehicles, equipment, and evidence in one location; however, funding has yet to be provided to make the needed improvements.

Citygate's review finds the Fire Investigations / EOD section is underbudgeted to meet its current workload and recommends that the City consider funding additional positions as prioritized in the following table to provide the staffing capacity needed for core mission and functions.

Loaned Positions

AS of March 2022, there were ten 10 loaned personnel assigned to the Fire Investigations / EOD Sections performing significant program functions/tasks to reduce/minimize the incidence and consequence severity of fires in Fort Worth. Later in Spring 2022, four of the loans were returned to Fire Operations. Pursuant to this assessment, Citygate finds these loan positions important to providing the staffing capacity needed to meet the core mission and functions in these two sections.

[26] FTE = full-time equivalent capacity assuming 1 FTE = 1,960 annual hours

Table 50—Additional Funded FTE Needed by Priority – Fire Investigations / EOD

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community or Department	Total
Loaned Positions	**0**	**10**	**0**	**10**
Investigator	0	4	0	4
Bomb Squad	0	6	0	6

Citygate further recommends that the City:

- Provide base budget funding for the bomb squad and canine units.
- Fund needed improvements at the Bob Bolen Public Safety Complex to house all Fire Investigations / EOD staff, equipment, and vehicles.
- Provide all company officers with 40 hours of preliminary fire investigation training.
- Consider revising the investigator callout criteria to large complex fires, fires with injuries or fatalities, or fires where the cause cannot be determined by the company officer or is believed to be arson.
- Consider other funding sources to assist the Fire Investigations / EOD Section such at the Crime Control and Prevention District (CCPD).
- Consider moving the background investigation to later in the hiring process to reduce the number of investigations required, preferably following the conditional offer of employment.

9.9.4 Hiring Section

The Hiring Section supports the City's recruitment and hiring process for new Firefighters with two sworn civil service positions plus two sworn civil service personnel on loan from the Fire Operations Bureau. Section responsibilities include advertising, recruitment seminars/workshops, and processing the 700–800 applications through pre-screening, written examination, orientation, physical ability testing, background investigation, polygraph examination, interview, medical screening, and aerial ladder and SCBA evaluation for the two to three hiring cycles each year.

Each cycle takes approximately four to five months to hire the approximately 35 Fire Trainees hired for each eight-month training academy class.

Citygate's review of the Hiring Section found it to be understaffed to meet all current workload responsibilities and expectations.

Given the Department's strategy to increase the number of minority and female applicants through an aggressive recruitment program,[27] the number of applicants for each recruitment/hiring cycle, and the anticipated number of hiring cycles needed annually to maintain full authorized response staffing, Citygate recommends that the City consider funding the positions in the following priority order to ensure sufficient capacity to meet all section workload responsibilities and expectations.

Loaned Positions

There are two Firefighters on loan from the Fire Operations Bureau to assist with firefighter recruitment and hiring. Citygate finds this extra staffing capacity essential to meet program expectations and workload.

Table 51—Recommended Additional FTE Needs by Priority – Hiring Section

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community or Department	Total
Loaned Positions	**0**	**2**	**0**	**2**
Recruiter	0	2	0	
Potential (New) Positions for Study	**0**	**1**	**1**	**2**
Recruiter	0	0	1	
Administrative Assistant	0	1	0	

9.9.5 Professional Standards Section

The Professional Standards Section conducts all formal investigations as assigned by the Fire Chief, provides responses to public information requests (PIR) involving personnel information, tracks all Department accidents and develops accident facts summary reports, facilitates Accident

[27] Source: 2020 Fort Worth Fire Department Annual Report, page 21

Review Board meetings, coordinates scheduling for employee drug testing, and other assigned duties with two sworn civil service positions plus one sworn civil service position on loan from the Fire Operations Bureau.

The City's collective bargaining agreement with the Fort Worth Professional Firefighters Association[28] requires at least 36 hours written notification to an employee prior to any interview conducted as part of a formal administrative investigation that could result in disciplinary action taken against the employee. In addition, Texas Local Government Code[29] requires any disciplinary action be imposed within 180 days of the date of the incident or event giving rise to the disciplinary action, with some exceptions for criminal cases. According to section staff, investigations generally take a minimum of 2-6 weeks to complete with some taking significantly longer. Over the previous three years, the section has conducted an average of about 20 investigations a year. Section staff are challenged to meet the 180-day deadline with concurrent caseload and when the Department learns of the incident or event long after it occurred.

The Texas Public Information Act requires governmental bodies to respond to a public information request (PIR) within ten days. The Department is also considering establishing a Board of Inquiry for non-injury-causing accidents, and the workload impacts of that on Section staff has not yet been determined.

Citygate's review of the Professional Standards Section finds it to be appropriately organized and meeting best practices relative to investigator training and certification. The Section is *understaffed*, however, to meet its current and anticipated near-term workload, including mandated timelines for PIR responses and employee notification of formal administrative investigations, formal investigations, and other assigned workload. Citygate thus recommends that the City consider funding one FTE clerical support to ensure sufficient staffing capacity to meet current and anticipated near-term section workload.

Loaned Positions

There is one loaned position assigned to the Professional Standards Section. Citygate's assessment finds this additional position is needed to ensure sufficient staffing capacity to meet section workload demand, and thus recommends that the City consider funding the loan position capacity plus additional (new) capacity as summarized in the following table.

[28] Collective Bargaining Agreement Between the City of Fort Worth and the Fort Worth Professional Firefighters Association, IAFF Local 440, Article 21 – Disciplinary Procedures
[29] Texas Local Government Code, Title 5, Chapter 143

Table 52—Recommended Additional FTE Needs by Priority – Professional Standards Section

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community or Department	Total
Loaned Positions	**0**	**1**	**0**	**1**
Firefighter	0	1	0	
Potential (New) Positions for Study	**0**	**2**	**0**	**2**
Administrative Assistant	0	1	0	
Investigator	0	1	0	

9.9.6 Executive Services Summary

Citygate's review of the Executive Services Bureau finds it to be well organized into appropriate functional sections with clear responsibilities, good leadership, appropriate lines of authority, and adequate supervisory spans of control. Citygate further finds *all sections of the Bureau are understaffed* to meet current workload demand, predominantly due to the Department's extensive incremental transfer of operational response personnel over the past several years to provide the staffing capacity needed to meet workload demand in the various administrative support bureaus and sections. Since 2017, 25 operational response personnel have been administratively re-assigned to the Executive Services Bureau (32 percent of total bureau staffing). Citygate thus recommends that the City give serious consideration to restoring and permanently funding the lost staffing capacity and/or additional staffing capacity needed to meet workload demand by priority as summarized in the following table. Citygate further recommends that the City and Department consider the following capital facility and operational policy and procedural recommendations to improve overall Bureau efficacy.

Table 53—Additional Funded FTE Needs by Priority – Executive Services Bureau

Section/Function	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community or Department	Total
Loaned Positions	**11**	**14**	**0**	**25**
Community Risk Reduction	0	1	0	1
Fire Prevention	11	0	0	11
Fire Investigations / EOD	0	10	0	10
Hiring	0	2	0	2
Professional Standards	0	1	0	1
Potential (New) Positions for Study	**1**	**12**	**1**	**14**
Fire Prevention	1	9	0	10
Hiring	0	1	1	2
Professional Standards	0	2	0	2

Findings and Recommendations

Citygate's review of the Executive Services Bureau yielded the following findings and recommendations:

Finding #34: Very little if any Community Risk Reduction Section work was being performed at the time of this review due to the re-assignment of the loaned Firefighter position back to his/her fire station assignment, the concurrent work required of the Community Risk Reduction Section Manager as the Hiring Section Manager, and no overtime authorized.

Finding #35: Community Risk Reduction programs provide value in helping to reduce/minimize the incidence and consequence severity of fires and other hazardous conditions/events in the City.

Finding #36: The Fire Prevention Section has *insufficient* staffing capacity to meet its current and anticipated near-term mandated workload demand and discretionary workload to inspect high-risk occupancies.

Finding #37: New employee background investigations, conducted after normal work hours by Fire Investigations / EOD staff on overtime, took approximately 2,400 hours to complete in 2021.

Finding #38: The Fire Investigations / EOD Section is challenged to meet its workload responsibilities with current staffing.

Finding #39: The bomb squad and canine units receive no base budget funding and must rely on grant funding each year to sustain training, equipment, and operations.

Finding #40: The Hiring and Professional Standards sections have insufficient staffing capacity to meet program goals, expectations, and workload demand.

Recommendation #23: The City should study and consider permanently funding Executive Services Bureau positions filled by personnel on loan from the Fire Operations Bureau, to ensure near term sufficient staffing capacity to sustain mandated, best practice, and high value workload demand.

Recommendation #24: Provide all company officers with 40 hours of preliminary fire investigation training.

Recommendation #25: Consider revising the investigator callout criteria to large complex fires, fires with injuries or fatalities, or fires where the cause cannot be determined by the company officer or is believed to be arson.

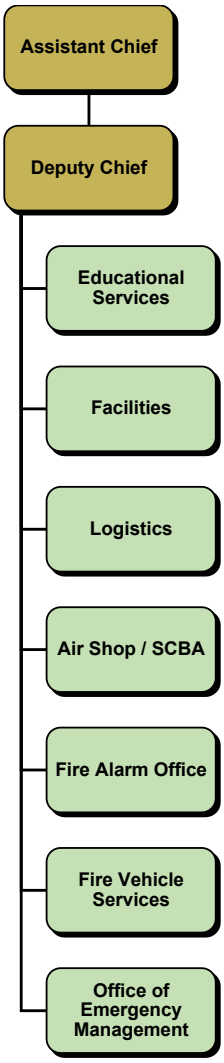
Recommendation #26: The City should consider moving the background investigation to later in the hiring process to reduce the number of investigations required, preferably following the conditional offer of employment.

Recommendation #27:	Provide base budget funding for the bomb squad and canine units if the grant funding were to be lost.
Recommendation #28:	Fund needed improvements at the Bob Bolen Public Safety Complex to house all Fire Investigations / EOD staff, equipment, and vehicles as funding can be made available.

9.10 Support Services, Logistics, and Communications Bureau

The Support Services, Logistics, and Communications Bureau provides recruit training, fire and EMS continuing education, and professional development; facilities maintenance coordination; uniforms, personal protective equipment, and station supplies; employee health and wellness; SCBA testing and maintenance; dispatch and communications; fire vehicle services and equipment maintenance coordination and repairs; and emergency management services with 53 sworn civil service, 21 civilian, and 13 grant-funded positions, plus 23 sworn civil service personnel on loan from their budgeted Fire Operations Bureau assignments, organized into seven sections as shown in the following figure.

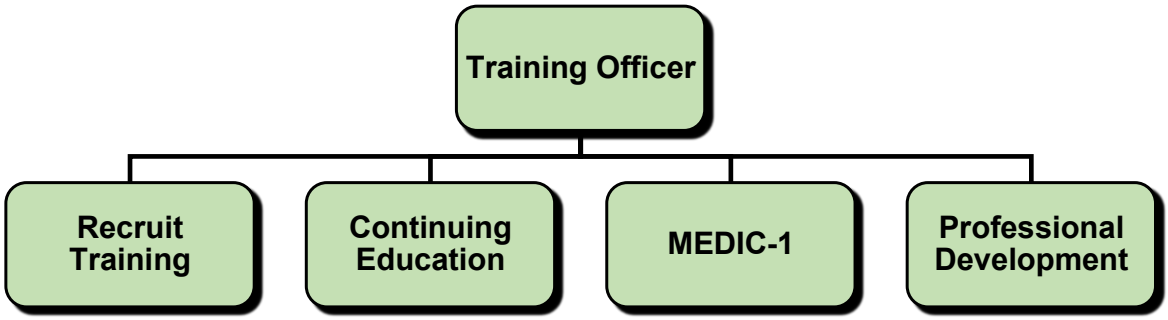
Figure 38—Organization Chart – Support Services, Logistics, and Communications Bureau



9.10.1 Educational Services Section

The Educational Services Section (ESS) is responsible for ensuring all Department civil service employees meet the initial and continuing education training standards established by the TCFP with a staff of 22 personnel, including nine on loan from the Fire Operations Bureau, under the leadership of the Battalion Chief Training Officer and organized into four functional subsections as shown in the following figure. An Athletic Trainer position is funded through a health and wellness partnership between the City's Risk Management Department and Baylor Scott and White Institute for Rehabilitation Sports Health.

Figure 39—Organization Chart – Educational Services Section



TCFP regulations stipulate that all fire service instructors possess the appropriate level Fire Service Instructor certification for the subject they are instructing, and further establishes minimum annual continuing education requirements to maintain those certifications.

Recruit Training Unit

The Recruit Training Unit includes eight positions plus five loan personnel from the Fire Operations Bureau. The Unit also utilizes shift-based operations personnel as subject matter expert instructors for many elements of the fire academy curriculum. Unit staff are responsible for training of new Fire Trainees as authorized to maintain the Department's budgeted operational staffing. The TCFP Certification Curriculum Manual recommends a basic fire suppression course include a minimum of 936 hours of training to qualify for TCFP Firefighter II certification. The Department's training academy is 31 weeks in length, including 12 weeks of Emergency Medical Technician curriculum. The remaining 19 weeks of training are needed to meet TCFP requirements for structure firefighter. For eligible candidates with two or more years of qualified experience and a Texas EMT certification, a lateral program is available that reduces the academy to 12 weeks. Upon completion of the fire academy training, Fire Trainees are required to sit for and pass the Texas Firefighter examination. Upon graduation, Fire Trainees are promoted to Firefighter and enrolled in the Department's Apprenticeship Program. Started in 1985, the Apprenticeship Program is a collaboration between the US Department of Labor and the Department that requires apprentice firefighters to maintain their skills by documenting and participating in evaluations every six months for three years. Upon completion of the program, firefighters receive a Journeyman Firefighter designation from the Department of Labor.

The following table summarizes recruit training over the most recent four years.

Table 54—Recruit Fire Trainee Academy Summary (2019-2022)

Recruit Class Number	End Date	Number of Students at Start	Number of Students Graduated	Failure / Resignation Percent
85	August 2019	30	28	6.6%
86	February 2020	7	7	0.0%
87	January 2021	37	35	5.4%
88	June 2021	28	26	7.1%
89	June 2021	6	6	0.0%
90	January 2022	37	34	8.1%
91	August 2022	34	29	14.7%
Total		**179**	**165**	**7.8%**

As the previous table shows, the Recruit Training Unit has trained an average of 45 Fire Trainees annually over the previous four fiscal years, with an average graduation rate of 92 percent, which in Citygate's experience and opinion reflects the high quality of the program and commitment of the instructor staff.

Loaned Positions

There are five loaned positions in the Recruit Training Unit. From this review, Citygate finds these loaned positions important to provide the staffing capacity needed to meet regulatory standards for new firefighter training.

Citygate's review finds the Recruit Training Unit to be appropriately organized to deliver the required TCFP curriculum; however, it is straining to meet the mandated 5:1 student to instructor ratio,[30] and is also utilizing five FTE on loan from the Fire Operation Bureau. Citygate thus recommends the City consider fully funding the five loan positions to ensure adequate sustained capacity to meet this unit's workload demand.

Continuing Education Unit

Title 37 of the Texas Administrative Code establishes continuing education requirements for the following:

- Structural fire protection personnel
- Aircraft rescue firefighting personnel

[30] Texas Administrative Code, Title 37, Part 13; Chapter 427; Subchapter A; Rule 427.18

- Marine fire protection personnel
- Fire inspection personnel
- Arson Investigator and Fire Investigator personnel
- Hazardous Materials Technician
- Head of a fire department
- Fire service instructor
- Wildland firefighter

The Department contracts with Lexipol to provide and track online fire service continuing education training for Department personnel. With over 1,000 training courses and videos available, Lexipol's Fire Rescue 1 Academy training resources meet all state and federal requirements and recognized fire service best practices. The Continuing Education Unit also coordinates delivery of in-person continuing education training and maintains Department training records with four positions plus four loan personnel.

Citygate's review of the Department's Continuing Education Unit finds that it is meeting the required training with over 26,000 hours of in-person fire and EMS continuing education annually and 44,000 hours of virtual learning through the Lexipol Fire Rescue 1 program.

Loaned Positions

There are four loaned personnel in the Continuing Education Unit. Citygate's review finds these positions important to ensure the staffing capacity needed to meet regulatory standards and best practices to maintain firefighting and EMS knowledge and skills proficiency.

EMS Training Unit

The Department's EMS Training Unit includes four positions plus two sworn civil service personnel on loan from the Fire Operations Bureau. The Unit has adopted a strategic plan to reinforce Basic Life Support (BLS) EMT-B knowledge and skills while also educating BLS personnel how to better support on-scene operations of Advanced Life Support providers (paramedics) using advanced medical tools and equipment. The section also provides EMS continuing education training for the Department's licensed paramedics through a partnership with the Office of the Medical Director, University of North Texas Health Sciences, and Harris Hospital to provide a hybrid approach with half of the quarterly training satisfying recertification requirements and the other half focused on issues as identified by paramedic polling and quality assurance trends.

Citygate's review of the EMS Training Unit finds it is meeting the Department's EMS training needs with its current staffing level, and thus recommends that the City fully fund the two loan positions to maintain needed staffing capacity.

Loaned Positions

There are two Firefighters in the EMS Training Unit on loan from the Fire Operations Bureau Citygate finds these positions critical to provide the staffing capacity needed to meet regulatory and best-practice EMS training workload.

MEDIC 1 Program

The MEDIC 1 program provides a consistent, efficient, and reliable means of EMS-related support to Fire Operations Bureau response personnel while also providing for EMS administrative and equipment functions, and special needs of the Department's EMS programs that include licensed paramedics as well as staffing to the City's HOPE Team with 4 personnel on loan from the Fire Operations Bureau.

MEDIC 1 personnel are state-certified paramedics credentialed by the Office of the Medical Director (located in MedStar) to provide patient care at the assist level in the local protocols. MEDIC 1 personnel work a hybrid 40-hour-per-week schedule with one 24-hour shift as the Duty Paramedic and two eight-hour days in the EMS office performing other administrative duties. Weekend staffing is on overtime.

MEDIC 1 "Duty Paramedic" (24-hour shift) duties and responsibilities include, but are not limited to, the following:

- Automatically respond to all structure fires to provide medical monitoring in rehabilitation team and/or assist the Incident Commander (IC) with the Medical Branch, if established.
- Respond to mass casualty incidents (MCI), active threats, hazardous materials (hazmat), and other special rescue incidents as Medical Supervisor / Medical Branch.
  - For hazmat and confined space operations, perform pre-entry and post-entry physical assessments.
- Responds to other incidents as requested by IC / Shift Commanders.
- Responds to reported firefighter injuries 24/7 and assists with the initial workers' compensation reporting.
  - 24/7 liaison to workers' compensation health care providers and local emergency departments and healthcare facilities.

- Responds to firefighter bloodborne pathogen exposures 24/7 and assists with the initial workers' compensation reporting and testing.
- Transports hospital surgeon to incidents where field amputation may be necessary (new program).
- Provides after hours emergency resupply and equipment replacement/repair.
- Provides transport for emergency Chempack (Strategic National Stockpile – SNS) response.
- Provides transport of MCI trailer to scenes when requested or necessary.
- On-duty facilitator for electronic patient care reporting program (ePCR) issues *(super-user).*
- Serves as on-duty liaison with MedStar supervisors.

MEDIC 1 "Office Days" (eight-hour days) duties and responsibilities include, but are not limited to, the following:

- Serves as "back-up" to on-duty MED01 when multiple incidents occur simultaneously.
- Facilitator for ePCR issues *(super-user).*
- Develops and maintains the Department's Quality Assurance / Improvement (QA/QI) program.
  - Ensures protocol compliance via QA reviews.
  - Identifies trends and training needs via QA reviews.
- Liaison to the Office of the Medical Director and staff.
  - Sentinel event review and remediation.
  - Responds to requests from Medical Director to schedule and participate in case reviews with operations crews.
- Ensures EMS equipment and supplies daily checks at the operations level are complete.
- Tracks EMS equipment and schedules preventive maintenance.
- Provides special event support, maintenance, and equipment delivery (EMS equipment / automatic external defibrillators (AEDs), MCI trailer, etc.).

- Public Access Defibrillation (PAD) program management and maintenance in City public buildings.
  - Approximately 175 AEDS in 164 facilities throughout the City.
- Maintains Chempack (SNS) program and response.
- Maintains MCI response trailer.
  - Delivery to scenes or events.
  - Purchasing supplies, stocking, and maintenance.
- Orders EMS supplies and medications.
- Conducts research and development for EMS equipment.
- Participates in various committees and task forces (EMS, protocols, system performance, tiered ambulance, meds, etc.) to improve EMS operations in the system.
- Other duties as assigned.

EMS Operations Battalion Chief duties and responsibilities include, but are not limited to, the following:

- Support and management of MEDIC 1 Program
- Payroll approval for Section
- Approve purchasing of EMS supplies and equipment
- Procure purchasing contracts
- Departmental licensing (State FRO, Chempack, Certified labs (CLIA), controlled substances – DEA, etc.)
- Budget development and management
- Grant applications
- Liaison to Medical Director, MedStar, other outside agencies
- Special event support as part of command staff
- Regulatory compliance
- Departmental and outside agency committees

Citygate's review finds the MEDIC 1 Program appropriately organized and staffed to deliver program expectations. All Department EMTs and Paramedics require documented training, recertification, and quality assurance oversight.

Loaned Positions

There is one Captain and three Lieutenants in the MEDIC 1 program on loan from the Fire Operations Bureau. Given the scope of the Department's EMS, EMT, and Paramedic programs, and the mandated state and federal oversight, this program is critical to meet regulatory and recognized best practice oversight and support of the Department's EMS services. Citygate thus recommends that the City consider fully funding this program as an essential element of the Department's EMS services.

Professional Development Unit

The Professional Development Unit provides the following professional development training with two positions plus two sworn civil service personnel on loan from the Fire Operations Bureau:

- Ongoing Fire Apparatus Operator training including emergency driving, engine operations, and aerial ladder truck operations.
- Rank/position-specific professional development curriculum for Lieutenants, Captains, Battalion Chiefs, and Executive Officers.
- Management of the Department's Apprenticeship Program.

Citygate's review finds that the Professional Development Unit provides a key role in the Department by providing key training for personnel desiring to promote. The professional development curriculum being developed will support the mission of the Department by providing the knowledge and skills needed to be successful at each level of the organization. In Citygate's opinion, this unit needs to maintain its current staffing level to meet organizational needs and will need one additional FTE in the future to provide needed additional curriculum coordination capacity. Citygate therefore recommends that the City fully fund the two FTE on loan from the Fire Operations Bureau, plus one additional FTE as funding allows.

Loaned Positions

There is one Fire Engineer and one Firefighter in the Professional Development Unit on loan from the Fire Operations Bureau. Citygate finds these positions are needed to sustain this best practice program, and therefore recommends that the City fully fund the two loaned positions plus the one additional future position to provide needed curriculum coordination.

Educational Services Section Summary

Citygate's review of the Educational Services Section finds it to be a critical element of the Department providing the initial, continuing education, and professional development training needed to meet regulatory requirements and industry best practices to maintain the knowledge and skills necessary to provide high quality services while also minimizing the City's liability exposure. Citygate further finds all units of the Section are appropriately staffed to meet current workload demand, including the 17 sworn civil service personnel on loan from the Fire Operations Bureau. Citygate thus recommends that the City consider permanently funding the loan positions and additional staffing capacity needed to meet workload demand by priority as summarized in the following table.

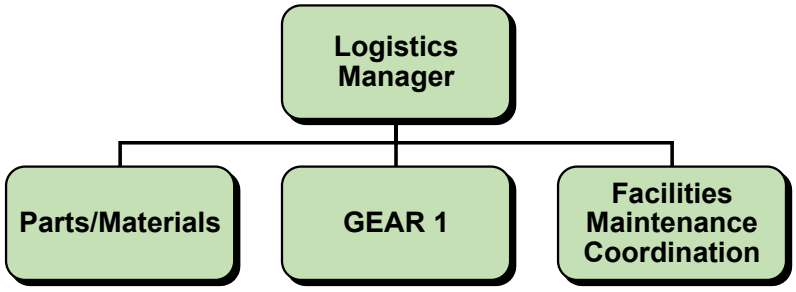
Table 55—Recommended Additional FTE Needed by Priority – Educational Services Section

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community	Total
Loaned Positions	**17**	**0**	**0**	**17**
Recruit Training	5	0	0	5
Continuing Education	4	0	0	4
EMS Training	2	0	0	2
MEDIC 1	4	0	0	4
Professional Development	2	0	0	2
Potential (New) Positions for Study	**0**	**1**	**0**	**1**
Professional Development	0	1	0	1

9.10.2 Logistics Section

The Logistics Section is responsible for the purchase, maintenance, repair, and distribution of all personal protective clothing, station uniforms and equipment, and procurement and distribution of over 800 fire station-related supplies from a central supply warehouse with 10 positions plus two sworn civil service personnel on loan from the Fire Operations Bureau, organized into three units under the supervision of a Fire Captain as shown in the following figure.

Figure 40—Organization Chart – Logistics Section



The Department's GEAR-1 mobile PPE exchange program was implemented to support firefighter health and safety cancer mitigation by providing 24/7 on-site incident PPE exchange to prevent potential carcinogen contamination of fire apparatus and fire stations. The section also procures, cleans, and maintains all Department PPE in conformance with TCFP requirements and NFPA recommendations.[31] The Facilities Unit coordinates fire station maintenance and repairs with the City's Property Management Department Facilities Maintenance Section.

Loaned Positions

There are two loaned Firefighter positions assigned to the Logistics Section. Citygate's review finds these two positions important to ensure sufficient staffing to meet current workload demand, and thus recommends that the City consider fully funding these two positions.

Citygate's review of the Logistics Section finds it to be appropriately organized and staffed to provide key support services for the Department's facilities and personnel. Of note is the Department's GEAR-1 program to mitigate carcinogen contamination in fire apparatus and stations, a commendable and progressive program to facilitate firefighter health and wellness.

[31] NFPA 1500 Standard on Fire Department Occupational Safety, Health, and Wellness Program (2021 Edition)

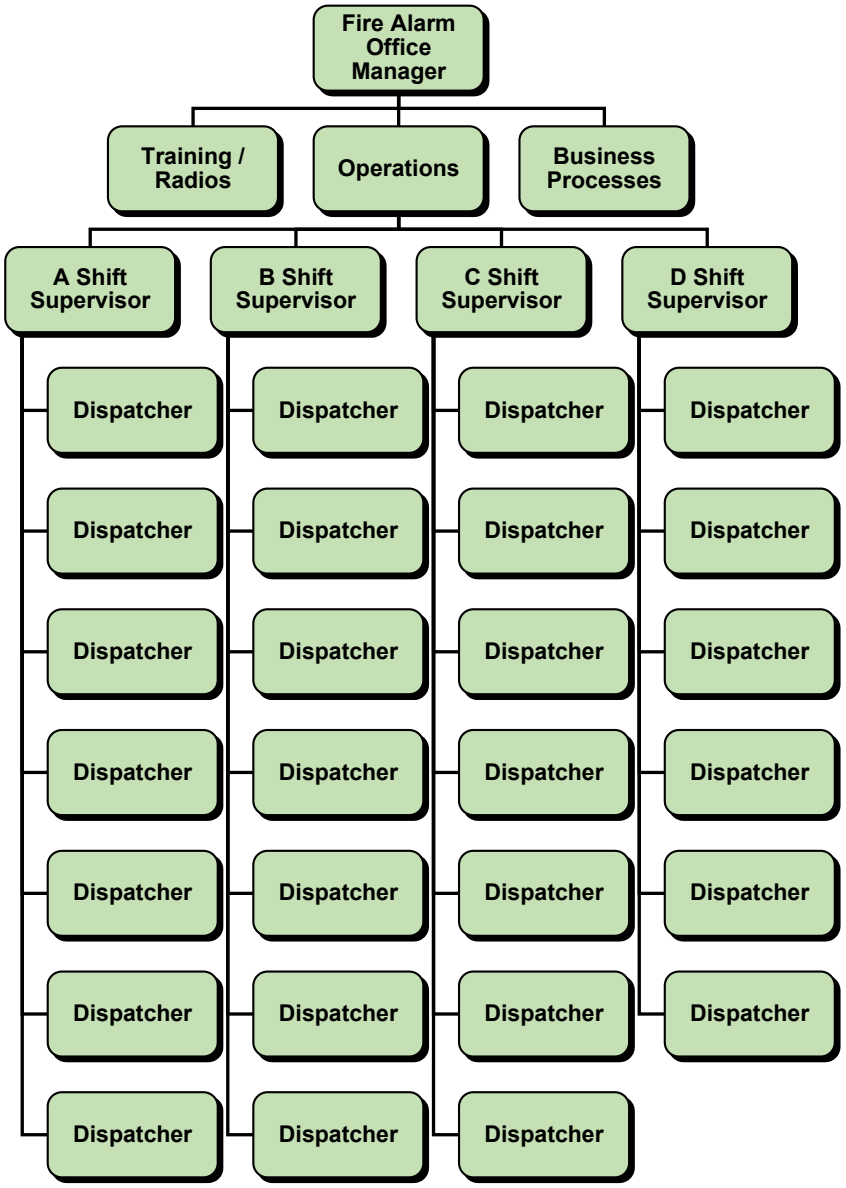
Table 56—Additional Funded FTE Needed by Priority – Logistics Section

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community	Total
Loaned Positions	**2**	**0**	**0**	**2**
Firefighter	2	0	0	2

9.10.3 Fire Alarm Office

The Fire Alarm Office (FAO) tracks response resources status; receives all emergency calls related to fire incidents, fire alarms, or other non-police related emergency incidents; dispatches the appropriate response resources; coordinates emergency communications; and maintains appropriate incident records with two sworn civil service positions and one civilian position, plus eight sworn civil service personnel on loan from the Fire Operations Section, organized under the supervision of a Fire Captain as shown in the following figure.

Figure 41—Organization Chart – Fire Alarm Office



Fire calls are transferred to the FAO from the adjacent Police Department Communications Center which is also the City's primary 9-1-1 Public Safety Answering Point (PSAP). Medical calls are transferred to a remote MedStar dispatch center from the Police Department call-taker, and medical calls requiring a Fire Department response are then transmitted to the FAO computer-aided dispatch (CAD) system directly from the MedStar CAD system. The FAO also functions as a secondary Public Safety Answering Point (PSAP) for 9-1-1 calls. Dispatch personnel work 12-hour shifts with five to six Firefighter or Engineer dispatchers under the supervision of a shift Lieutenant.

In response to increasing 9-1-1 call volume resulting in extensive hold times and/or callers hanging up, the City implemented a program allowing callers to directly access fire and EMS dispatchers without having to wait on hold for an available Police call-taker. While this program has reduced call waiting times and 9-1-1 hang-ups due to long wait times, it has also increased FAO telephone call volume by up to 200 additional calls per day, many of which are law enforcement requests that must be transferred back to a Police Department dispatcher. In addition, the FAO is dispatching for the adjacent rural communities of Lake Worth, Saginaw, and River Oaks, adding approximately 7,500 incidents annually, and will begin dispatching for Haslet in September 2022, adding an anticipated 500–700 incidents annually.

The following table summarizes emergency incident and 9-1-1 rollover call workload for FAO staff for the last three fiscal years.

Table 57—Primary Workload Summary by Year – Fire Alarm Office

Workload	FY 2019	FY 2020	FY 2021	Total
Incidents	121,503	120,546	138,800	**380,849**
9-1-1 Rollover Calls	133,551	165,595	45,940[1]	**345,086**
Total	**255,054**	**286,141**	**184,740**	**725,935**

[1] Through May 18, 2022

As the previous table shows, primary FAO emergency workload averaged about 690 calls/incidents per day, or 28 per hour.

Citygate's review of the FAO also noted exclusive use of uniformed civil service personnel in lieu of the non-uniformed civilian workforce found in nearly all other emergency communications centers previously evaluated. In most cases, a fire department provides a uniformed company or chief officer to support the civilian staff with the operational experience needed to make key decisions quickly as emergency communications center workload escalates. In the case of Fort Worth, Citygate would typically recommend that the City evaluate the cost and operational impacts of using a non-uniformed civilian workforce; however, Citygate was provided a February 2019 communication from Human Resources Director Brian Dickerson to Assistant City Manager Valerie Washington evaluating that issue. The communication concludes that civilianizing the FAO workforce would not result in a significant cost reduction, and would, in Human Resources' estimation, cost more in direct costs and have the potential for considerable disruption in efficient delivery of services in emergency situations. Without verifying the data and resultant analysis, Citygate finds no fault with the scope and methodology of the analysis.

Loaned Positions

There are eight personnel on loan from the Fire Operations Bureau assigned to the Fire Alarm Office. Citygate's review finds these eight positions are needed to ensure sufficient staffing to handle routine and surge workload capacity.

Citygate's review of the FAO found no official dispatch training program or quality assurance / quality improvement program in place, and found the current space completely utilized with no room for expansion. As discussed in **Section 6** of this report, Citygate recommends that the City conduct an economic and operational feasibility analysis to merge the three dispatch centers as the best solution to improve 9-1-1 call processing and dispatch performance. Citygate further recommends that in the interim, the City maintain the current FAO staffing levels and fully fund the eight loaned positions, plus one additional firefighter position to equalize staffing across all four work shifts as summarized in the following table.

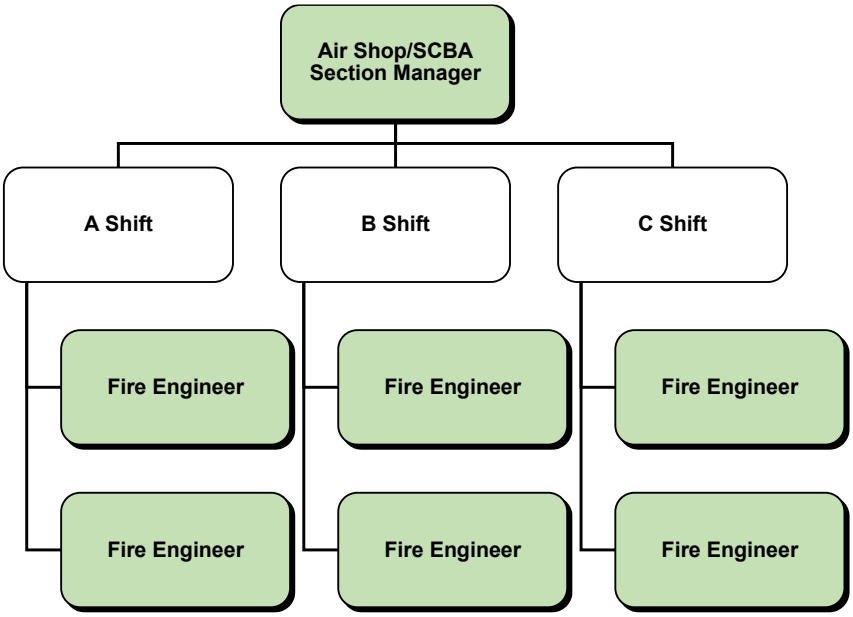
Table 58—Additional Funded FTE Needs by Priority – Fire Alarm Office

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community	Total
Loaned Positions	**8**	**0**	**0**	**8**
Fire Captain	1	0	0	1
Fire Engineer	3	0	0	3
Firefighter	4	0	0	4
Potential (New) Positions for Study	**0**	**1**	**0**	**1**
Firefighter	0	1	0	1

9.10.4 Air Shop / SCBA Section

The Air Shop / SCBA Section is responsible for the procurement, testing, maintenance, and repair of all Self-Contained Breathing Apparatus (SCBA) used by the Department with seven sworn civil service positions under the supervision of a Fire Lieutenant as shown in the following figure.

Figure 42—Organization Chart – Air Shop/SCBA Section



The Air Shop / SCBA Section also manages hydrostatic testing and refilling of all SCBA and EMS oxygen cylinders and coordinating annual fit testing of all SCBA masks in conformance with Occupational Health and Safety Administration regulations. Section personnel respond to all working fires, providing on-scene SCBA air cylinders and refilling and replacing any damaged masks or SCBAs. The Section recently replaced all existing SCBAs in conformance with TCFP[32] and OSHA[33] requirements, and NFPA[34] recommendations.

Loaned Positions

There are no loaned positions in the Air Shop / SCBA Section.

Citygate's review of the Air Shop / SCBA Section finds it appropriately staffed and organized to ensure Department compliance with all applicable laws, regulations, and recommended best practices relative to firefighter respiratory protection. Citygate recommends that the City continue to fund this program at its current staffing level and consider transitioning to a digital record management system to provide improved, more secure, and more accessible records.

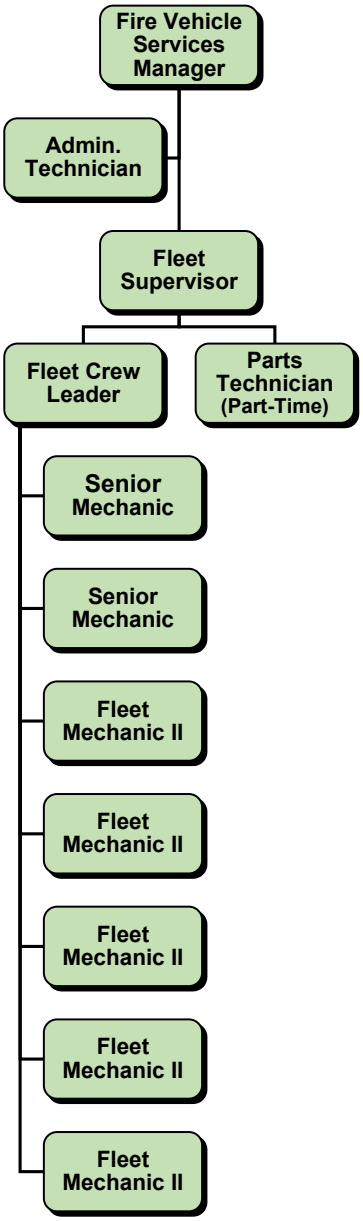
[32] Texas Administrative Code, Title 37, Part 13, Section 435.3
[33] Occupational Health and Safety Administration Standard 1910.134
[34] NFPA 1981 Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters

9.10.5 Fire Vehicle Services Section

The Fort Worth Property Management Department's Vehicle Services Section is responsible for the procurement, maintenance, repair, and disposal of the City's entire 4,200 vehicle fleet, and provides those services from its large fleet maintenance facility on James Avenue that includes 70 maintenance bays and administrative offices.

While fire apparatus maintenance and repairs are predominantly performed by Vehicle Services Section staff at the James Avenue shop, the Fire Department established its own approximately 10,000 square-foot Fire Vehicle Services shop facility adjacent to the FAO on Bolt Street to assist the Property Management Department's mission by coordinating maintenance and repair of the fire fleet with the James Avenue shop. The Fire Department Vehicle Services Section includes two sworn civil service positions and nine civilian positions under a Fire Vehicle Services Section Manager (Fire Lieutenant) organized as shown in the following figure.

Figure 43—Organization Chart – Fire Vehicle Services Section



In addition to coordinating apparatus repairs with the City vehicle services shop based on availability of reserve apparatus, the Section also develops fire apparatus specifications; acceptance testing and upfitting of new fire apparatus with tools, hoses, ladders, and equipment; fire hose and ladder testing; nozzle repair; specialized metal fabrication; testing of new fire equipment; minor repairs (e.g., check engine light, warranty issues); stocking/distribution of Diesel Exhaust Fluid (DEF); maintenance/repair of all Department small engine equipment (lawnmowers, weed eaters, pumps, etc.); and initial orientation and operational training on new

apparatus for response personnel. The mechanics are certified Automotive Services Excellence (ASE) and Emergency Vehicle Technicians (EVT). Between the two shops, recommended best practices[35] procedures are followed except for annual weight testing.

Citygate's interviews of both departments' vehicle services staff revealed different opinions regarding in-service criteria, Citywide procurement policies/procedures, workload priorities, inter-department costs, and quality and timeliness of work to maintain full operational response capacity. While acknowledging this, the Property Management Department and City Vehicle Services Section management also offered to provide four segregated service bays and office space at the James Avenue facility. Doing so would help integrate the two shops' functions and staff to improve coordination, communication, and cooperation to facilitate better overall fleet maintenance efficiency.

The Department provides services with a fleet of 175 apparatus and vehicles as summarized in the following table.

[35] NFPA 1071 Standard for Emergency Vehicle Technician Professional Qualifications; NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles; NFPA 1914 Standard for Testing Fire Department Aerial Devices

Table 59—Fire Fleet Summary

Vehicle Type	Front Line	Reserve	Total	Reserve to Front Line Ratio
Attack (ARFF)	3	3	**6**	100%
Blocker Apparatus	2	0	**2**	0%
Boat	7	0	**7**	0%
Bomb Containment Vessel	1	0	**1**	0%
Bomb Trailer	2	1	**3**	50%
Bus – 26 Passenger	1	0	**1**	0%
Engine – Type 1 Structure	39	26	**65**	67%
Engine – Type 6 Wildland	15	0	**15**	0%
Incident Command/Support	0	1	**1**	n/a
Ladder Truck	4	3	**7**	75%
Lighting/Air	3	0	**3**	0%
Military 6x6 High-Ground Clearance	1	0	**1**	0%
Pickup Truck	3	2	**5**	67%
Quint (Engine with aerial ladder)	13	9	**22**	69%
Rehab	0	1	**1**	n/a
Rescue – ARFF	3	1	**4**	33%
Rescue – Heavy	2	1	**3**	50%
Squad	1	2	**3**	200%
SUV	9	4	**13**	44%
Support Utility – GEAR 1	1	0	**1**	0%
Tow Truck	2	0	**2**	0%
Truck – Flatbed	2	0	**2**	0%
Truck – Medium Duty (Ford F-450/F-550)	4	0	**4**	0%
Van	1	0	**1**	0%
Water Tanker	2	0	**2**	0%
Total	**121**	**54**	**175**	

Source: Fort Worth Fire Department Vehicle Services Section

Of note from Table 59 is the high ratio of reserve engines, ladder trucks, and quints to front-line apparatus as highlighted. While an appropriately sized reserve fleet is needed to ensure front-line apparatus receive scheduled preventive maintenance as recommended by the apparatus manufacturer as quickly as possible, these reserve ratios are more than three times the typical 20

percent (1:5) reserve to front-line ratio seen in Citygate's experience. According to the Fire Vehicle Services Section Manager, this high reserve ratio is needed due to poor operational reliability of the current reserve fleet, including 12 apparatus manufactured by a company that has been out of business since 2014, and for which few if any parts are still available.

To provide sufficient reserve capacity for front-line maintenance/repairs, training, and special events, the Department's strives to maintain a minimum of six reserve engines and two reserve aerial apparatus (ladder trucks/quints) available daily; however, as the following figures show for a recent 13-month period, the Department was largely unable to meet that goal, resulting in front-line apparatus maintenance and repairs backlogged 50 to 60 days at the time of this review.

Figure 44—Reserve Engine Availability (February 2021–March 2022)

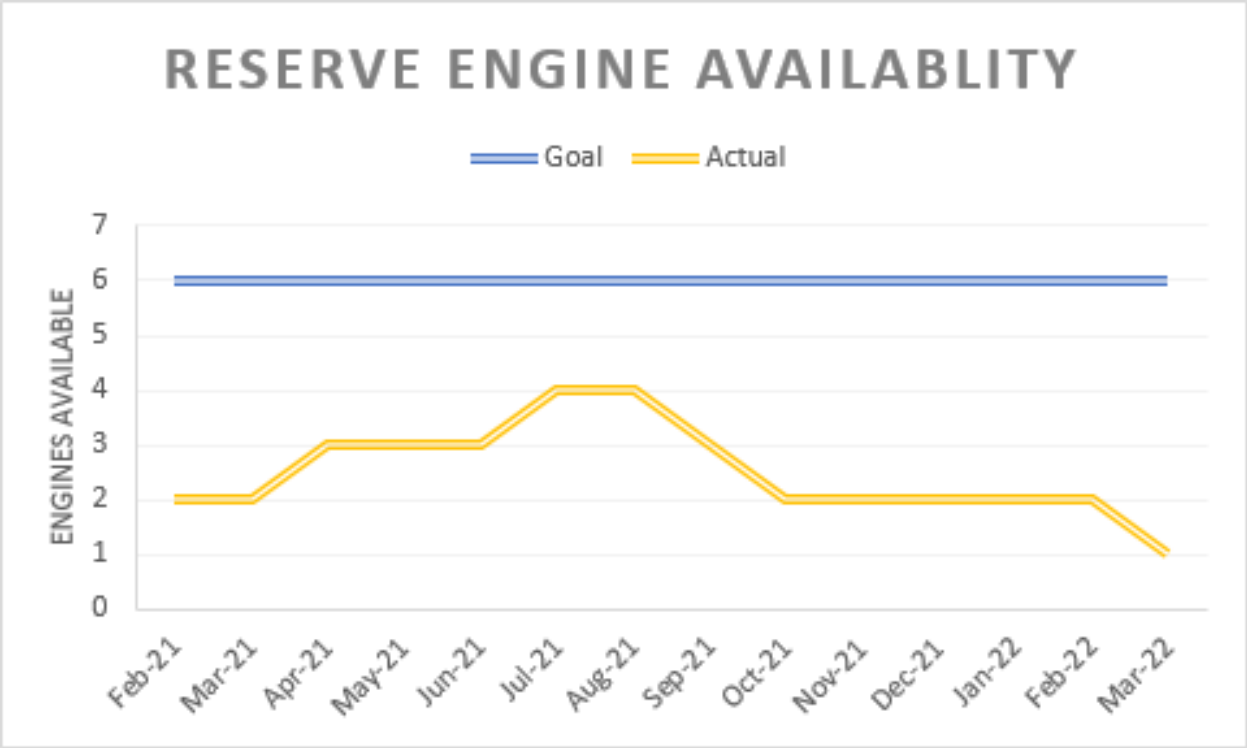
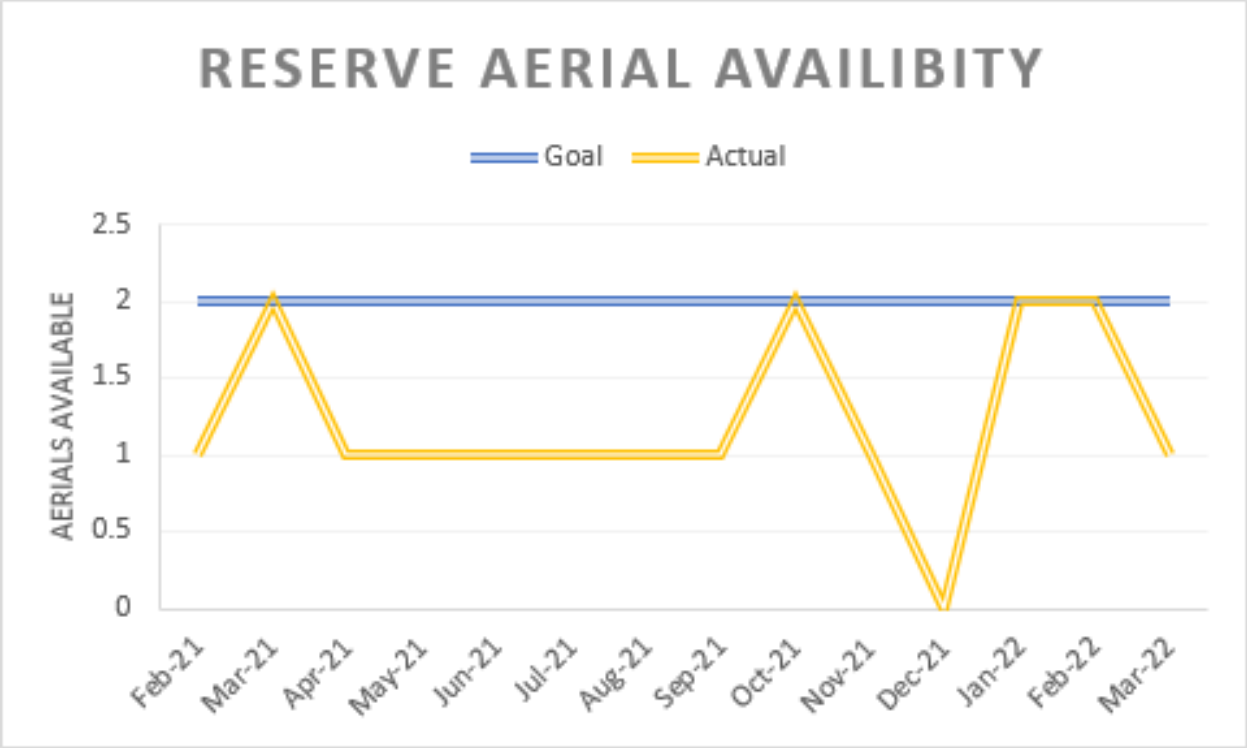


Figure 45—Reserve Aerial Apparatus Availability (February 2021–March 2022)



The City's FY 20 though FY 24 Adopted Capital Improvement Plan provides $37.4 million over five fiscal years to provide "consistent scheduled replacement of front-line emergency response apparatus to avoid crisis replacement that would require emergency funding and to maintain a safe and efficient apparatus fleet." While this plan assumes an expected useful service life of 15–20 years for fire apparatus,[36] this review suggests that the City may need to consider reducing the expected useful service life given the unreliability of the current reserve apparatus fleet and resultant impact on front-line apparatus maintenance and repair.

Citygate's review further notes that reserve apparatus lack *all equipment except fire hose*, and crews must transfer all other tools and equipment from the front-line apparatus to the reserve apparatus. This process typically takes two to three hours for a crew to complete before the reserve apparatus is available for response. In addition, the Department has no fully equipped engines, ladder trucks, or quint engine/ladder apparatus ready for immediate deployment for additional Citywide surge capacity during high resource drawdown periods or for a major incident response as fast as off-duty personnel can be made available for staffing.

[36] Planned life cycle of 10-12 years front-line service and additional 5-8 years reserve service

Citygate's review of the Fire Vehicle Services Section finds that it provides value to the Department and City relative to procurement, inspection, troubleshooting, minor maintenance, and other services associated with very specialized and technical fire apparatus in support of the City Vehicle Service Section's mission. Citygate further recommends that Fire Department and Property Management Department management diligently work to integrate some if not all Fire Vehicle Services functions and staff into the James Avenue shop facility to improve coordination, communication, and cooperation to facilitate better overall fleet maintenance efficacy. Due to space limitations at the current Fire Department Vehicle Services facility, Citygate makes no finding or recommendation relative to additional personnel.

Loaned Positions

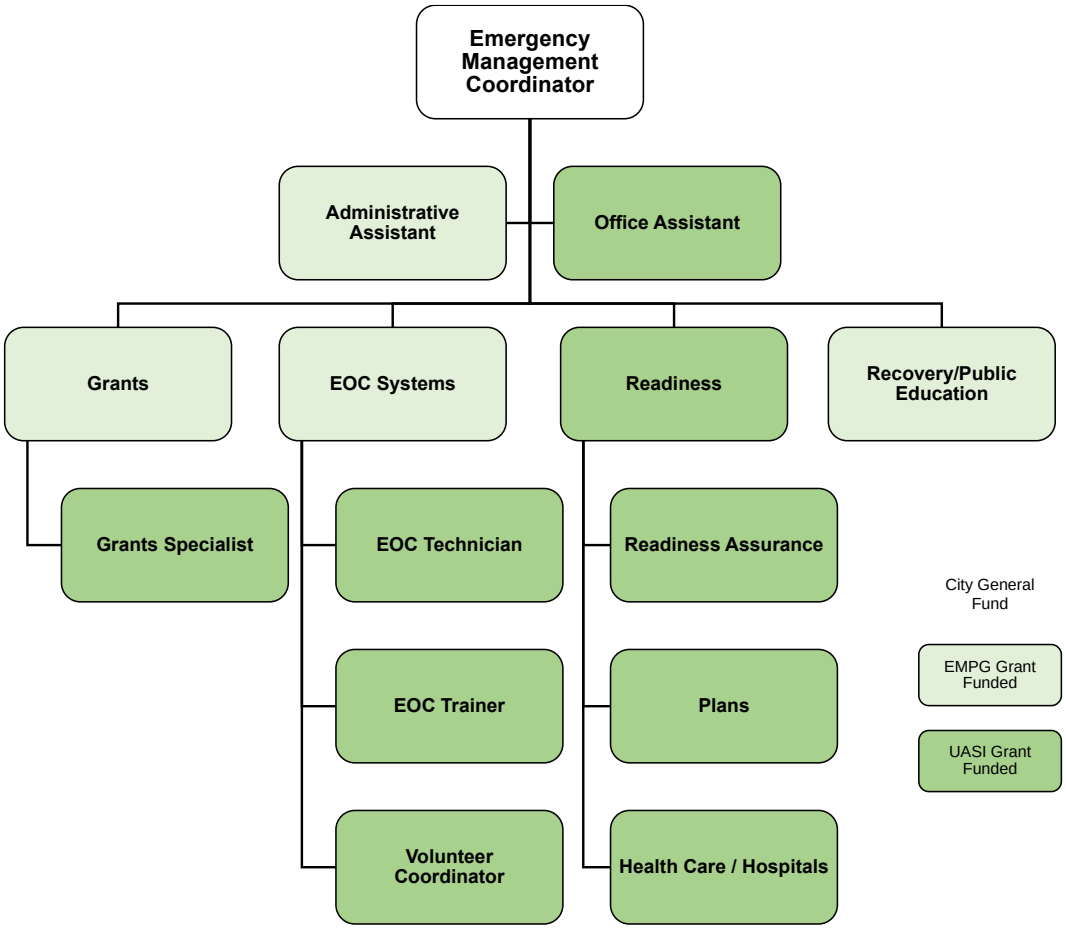
There are no loaned positions in the Fire Vehicle Services Section.

9.10.6 Office of Emergency Management

Section 418.101 of the Texas Government Code requires every political subdivision of the state to be responsible for disaster preparedness and coordination of response. Chapter 11.5-5 of the Fort Worth Code of Ordinances establishes the Office of Emergency Management (OEM) as a unit of the Fire Department, with a coordinator under the supervision of the Fire Chief to carry out the responsibilities of the office.

At the onset of the COVID-19 pandemic, OEM was staffed with one civilian position and 13 grant-funded positions organized into four sections under the supervision of the Emergency Management Coordinator as shown in the following figure.

Figure 46—Organization Chart – Office of Emergency Management



In FY 22, one grant-funded position was transferred to the Grants Management and Procurement Section of the Fire Administration Bureau, and four personnel resigned. The Emergency Management Coordinator position is currently vacant and under recruitment. In addition, the City has been notified that funding for two of the three Emergency Management Program Grant (EMPG) positions will not be renewed next calendar year, and if so, the respective personnel will be issued layoff notices.

Key OEM responsibilities include:

- Development and maintenance of the City Emergency Operations Plan,
- Maintaining Joint Emergency Operations Center (JEOC) readiness.
- Conducting first responder and JEOC staff training and exercises.
- Providing natural disaster, terrorism, and other hazard information to the public.

- Issuing public warnings, alerts, and emergency information.
- Coordination of disaster response resources.
- Coordination of disaster recovery operations.
- Management of Department of Homeland Security grants.

Loaned Positions

There are no loaned positions in OEM.

Citygate's review finds OEM to be appropriately organized with clear lines of authority and supervisory span of control; however, it is currently *understaffed* to meet its core mission and key responsibilities. Citygate therefore recommends that the City consider dedicated funding of sufficient baseline staffing to meet its core mission as prioritized in the following table or establish the OEM as a subdivision of the City Manager's Office to provide the City Manager more direct oversight of that office's functions in alignment with state law and the City's Emergency Management Director line of succession.

Table 60—Grant-Funded Staffing Needs by Priority – OEM

Function/Position	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community	Total
Potential (New) Positions for Study	**0**	**13**	**0**	**13**
Administrative Assistant	0	1	0	1
Office Assistant	0	2	0	2
Assistant Emergency Management Coordinator	0	2	0	2
Emergency Management Officer I	0	5	0	5
Emergency Management Officer II	0	1	0	1
EOC Technician	0	1	0	1
Grant Specialist	0	1	0	1

9.10.7 Support Services, Logistics, and Communications Bureau Summary

Citygate's review of the Support Services, Logistics, and Communications Bureau finds it to be appropriately organized to deliver essential and best-practice support services; however, four of

the six sections are understaffed to meet mandated or expected workload demand. Citygate thus recommends that the City consider funding additional FTE personnel as prioritized in the following table as funding is available.

Table 61—Additional Funded FTE Needs by Priority – Support Services, Logistics, and Communications Bureau

Section/Function	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community	Total
Loaned Positions	**27**	**0**	**0**	**27**
Educational Services	17	0	0	17
Logistics	2	0	0	2
Fire Alarm Office	8	0	0	8
Potential (New) Positions for Study	**0**	**15**	**0**	**15**
Educational Services	0	1	0	1
Fire Alarm Office	0	1	0	1
OEM	0	13	0	13

Findings and Recommendations

Following are Citygate's findings and recommendations pursuant to its evaluation of the Support Services, Logistics, and Communications Bureau.

Finding #41: The Support Services, Logistics, and Communications Bureau relies on 23 loaned positions from the Fire Operations Bureau to meet current and anticipated near-term program needs and workload demand.

Finding #42: The Educational Services Section is challenged to maintain a sufficient cadre of certified instructors to maintain the required 5:1 student to instructor ratio for most training.

Finding #43: The Fire Alarm Office has no training program or quality assurance / quality improvement program in place.

Finding #44: The Fire Alarm Office facility is antiquated and undersized for current needs.

Finding #45: The Office of Emergency Management relies heavily on grant funding for staffing needed to meet its core mission.

Finding #46: The Logistics Section warehouse stores many supply items that can be ordered and delivered the same day or next from local or online suppliers.

Finding #47: Some functions/positions in the Support Services, Logistics, and Communications Bureau could be performed by civilian employees at a lower cost.

Finding #48: The Department's GEAR-1 PPE exchange program supports the Department's commitment to employee health and wellness by preventing potential carcinogen contamination in its fire apparatus and station facilities.

Finding #49: The Department is *significantly challenged* to maintain a desired 20 to 25 percent daily availability of reserve apparatus due to the poor operational reliability of much of the current reserve apparatus fleet.

Finding #50: Scheduled preventive maintenance and repairs of front-line fire apparatus was backlogged 50 to 60 days at the time of this review due to lack of available reserve apparatus.

Finding #51: The Department's reserve fire apparatus lack all tools and equipment except hoses, and it typically takes two to three hours for a crew to fully outfit a reserve apparatus for response.

Finding #52: The Department has no fully equipped engines or trucks/quint apparatus ready for immediate deployment for Citywide surge capacity during high resource drawdown periods or for a major incident response as fast as off-duty personnel can be made available for staffing.

Finding #53: The Office of Emergency Management is *understaffed* to meet its core mission and program responsibilities.

Recommendation #29: The City should consider permanent funding of loaned positions in the Support Services, Logistics, and Communications Bureau as soon as possible and as prioritized in Table 61.

Recommendation #30: Consider creating a consolidated City Communications Department combining the Police Department, Fire Department, and MedStar dispatch centers.

Recommendation #31: Update or replace the existing Fire Alarm Office facility to meet current state and national standards and space needs.

Recommendation #32: Reduce the inventory of non-emergency supplies in the Fire Logistics warehouse by identifying products that could be ordered for same day or next day delivery from local or online suppliers.

Recommendation #33: Consider transitioning Air Shop / SCBA records to a digital record management system.

Recommendation #34: Evaluate positions within the Support Services, Logistics, and Communications Bureau that could be performed by civilian personnel with equal competency at a lower cost.

Recommendation #35: Consider a one-time purchase of up to 10 fire apparatus *above* scheduled Capital Improvement Plan replacement to provide critically needed daily reserve apparatus fleet capacity and operational reliability.

Recommendation #36: Consider a one-time purchase of five additional fully equipped engines or quint apparatus, in addition to the previous recommendation, to provide Department-wide response surge capacity for immediate deployment during high resource drawdown periods or for a major incident response as off-duty personnel can be made available for staffing; these units would not be intended for use as regular reserve apparatus for use when front-line apparatus are out of service for maintenance/repair.

Recommendation #37: Consider including the full standard inventory of hoses, ladders, tools, and equipment with future fire apparatus purchases.

Recommendation #38: Consider providing all current reserve fire apparatus with a full inventory of hoses, ladders, tools, and equipment to provide immediate operational readiness.

Recommendation #39: Consider reducing the scheduled Capital Improvement Plan replacement schedule for fire apparatus from 15 to 20 years to 12 to 15 years to ensure adequate operational reliability of reserve apparatus.

Recommendation #40: The Fire Department and City Property Management Department vehicle services management staff should integrate services where feasible to improve coordination, communication, and cooperation to facilitate better overall fleet maintenance efficacy.

Recommendation #41: Provide dedicated funding of sufficient OEM baseline staffing to meet its core mission or establish the OEM as a subdivision of the City Manager's Office to provide the City Manager more direct oversight of that office's functions in alignment with state law and the City's Emergency Management Director line of succession.

9.11 Administrative Support Services Capacity Review Summary

Citygate's assessment of the Department's administrative support organization yielded the following summary results:

9.11.1 Overall Findings and Recommendations

Following is a summary list of all findings and recommendations included in this section.

Findings

Finding #24: The City/Department has a practice of assuming that salary savings have been sufficient to address overtime underbudgeting in the past—which is not accurate for FY 21 and would not have been accurate in FY 20 if not for COVID-19 relief funding.

Finding #25: The City has credited COVID-19 relief funding directly against overtime expense accounts. This has caused fiscal reports to be misleading on their face and has resulted in distorted trend information.

Finding #26: Overtime and salary continuance categories, as a percentage of total salary and benefits costs, have grown at a faster rate than all other salary and benefit categories.

Finding #27: 1.5 overtime, FLSA built-in overtime category hours, and emergency call back time, as a percentage of total overtime hours, accounted for most of the growth in overtime hours for FY 20 and FY 21.

Finding #28: The Department's policy of loaned positions has led to gaps in constant staffing and limitations on availability to handle other frontline services, which has resulted in increased overtime.

Finding #29: The Workers' Compensation Unit is inadequately staffed for the size of this fire department, which is a single point failure risk.

Finding #30: The Special Operations Section is understaffed by one FTE to coordinate the Wildland Fire Program to ensure appropriate training of response personnel and to ensure adequate wildland fire apparatus and equipment to mitigate the City's wildland fire risk.

Finding #31: The HOPE Team provides valued, tangible services for Fort Worth's homeless community, and has reduced 9-1-1 calls in the homeless corridor by more than 50 percent since its inception

Finding #32: The four fire station personnel on loan to the EMS/MEDIC 1 program are needed to meet program workload and goals and should thus be fully funded.

Finding #33: Although approximately 30 percent of the City lies in the wildland urban interface, most response personnel have not received recommended best-practice basic wildland fire training.

Finding #34: Very little if any Community Risk Reduction Section work was being performed at the time of this review due to the re-assignment of the loaned Firefighter position back to his/her fire station assignment, the concurrent work required of the Community Risk Reduction Section Manager as the Hiring Section Manager, and no overtime authorized.

Finding #35: Community Risk Reduction programs provide value in helping to reduce/minimize the incidence and consequence severity of fires and other hazardous conditions/events in the City.

Finding #36: The Fire Prevention Section has *insufficient* staffing capacity to meet its current and anticipated near-term mandated workload demand and discretionary workload to inspect high-risk occupancies.

Finding #37: New employee background investigations, conducted after normal work hours by Fire Investigations / EOD staff on overtime, took approximately 2,400 hours to complete in 2021.

Finding #38: The Fire Investigations / EOD Section is challenged to meet its workload responsibilities with current staffing.

Finding #39: The bomb squad and canine units receive no base budget funding and must rely on grant funding each year to sustain training, equipment, and operations.

Finding #40: The Hiring and Professional Standards sections have insufficient staffing capacity to meet program goals, expectations, and workload demand.

Finding #41: The Support Services, Logistics, and Communications Bureau relies on 23 loaned positions from the Fire Operations Bureau to meet current and anticipated near-term program needs and workload demand.

Finding #42: The Educational Services Section is challenged to maintain a sufficient cadre of certified instructors to maintain the required 5:1 student to instructor ratio for most training.

Finding #43: The Fire Alarm Office has no training program or quality assurance / quality improvement program in place.

Finding #44: The Fire Alarm Office facility is antiquated and undersized for current needs.

Finding #45: The Office of Emergency Management relies heavily on grant funding for staffing needed to meet its core mission.

Finding #46: The Logistics Section warehouse stores many supply items that can be ordered and delivered the same day or next from local or online suppliers.

Finding #47: Some functions/positions in the Support Services, Logistics, and Communications Bureau could be performed by civilian employees at a lower cost.

Finding #48: The Department's GEAR-1 PPE exchange program supports the Department's commitment to employee health and wellness by preventing potential carcinogen contamination in its fire apparatus and station facilities.

Finding #49: The Department is *significantly challenged* to maintain a desired 20 to 25 percent daily availability of reserve apparatus due to the poor operational reliability of much of the current reserve apparatus fleet.

Finding #50: Scheduled preventive maintenance and repairs of front-line fire apparatus was backlogged 50 to 60 days at the time of this review due to lack of available reserve apparatus.

Finding #51: The Department's reserve fire apparatus lack all tools and equipment except hoses, and it typically takes two to three hours for a crew to fully outfit a reserve apparatus for response.

Finding #52: The Department has no fully equipped engines or trucks/quint apparatus ready for immediate deployment for Citywide surge capacity during high resource drawdown periods or for a major incident response as fast as off-duty personnel can be made available for staffing.

Finding #53: The Office of Emergency Management is *understaffed* to meet its core mission and program responsibilities.

Recommendations

Recommendation #11: Cease the practice of accounting for revenues directly against expenditure line items to meet best practice standards and improve the accuracy of fiscal reporting.

Recommendation #12: Budget the true expected overtime and other salary and benefit-related costs to reflect the actual spending amounts needed for the Department to provide required services. This will improve both budget development efficiency and transparency for the reader of budget documents.

Recommendation #13: Ensure that overtime and other pay and leave codes are used accurately and consistently so that analysis can be accurately and consistently performed.

Recommendation #14: Ensure that adequate separation of duties is implemented for all areas that could increase financial risk for the Department and the City. These

duty separations and electronic limits should be outlined in a written operational manual, either Citywide or by Department.

Recommendation #15: After the contracted payroll upgrade is complete, strongly consider adding one more payroll technician for redundancy and cross training.

Recommendation #16: Immediately add one position to the Workers' Compensation Unit.

Recommendation #17: Ask Department and City IT to study using City central IT Department more for routine desktop support to free up analyst time for other analysis, such as deployment. If this cannot occur, then the Department will need a deployment/advance planning analyst position.

Recommendation #18: Fund a full-time Wildland Fire Program Coordinator as soon as possible to provide critical coordination and oversight of all wildland-fire-related programs, including training, equipment, mitigation, and prevention.

Recommendation #19: Provide NWCG Basic Wildland Firefighting and Introduction to Wildland Fire Behavior training for all response personnel.

Recommendation #20: Consider increasing the minimum commitment for assignment to the Technical Rescue and Hazmat programs from two to three years.

Recommendation #21: Request funding from the City Aviation Department to offset the costs of the AARF program.

Recommendation #22: In lieu of fully funding the HOPE Team, transfer those services to a new, multidiscipline City and/or MedStar program.

Recommendation #23: The City should study and consider permanently funding Executive Services Bureau positions filled by personnel on loan from the Fire Operations Bureau, to ensure near-term sufficient staffing capacity to sustain mandated, best practice, and high value workload demand.

Recommendation #24: Provide all company officers with 40 hours of preliminary fire investigation training.

Recommendation #25: Consider revising the investigator callout criteria to large complex fires, fires with injuries or fatalities, or fires where the cause cannot be determined by the company officer or is believed to be arson.

Recommendation #26: The City should consider moving the background investigation to later in the hiring process to reduce the number of investigations required, preferably following the conditional offer of employment.

Recommendation #27: Provide base budget funding for the bomb squad and canine units if the grant funding were to be lost.

Recommendation #28: Fund needed improvements at the Bob Bolen Public Safety Complex to house all Fire Investigations / EOD staff, equipment, and vehicles as funding can be made available.

Recommendation #29: The City should consider permanent funding of loaned positions in the Support Services, Logistics, and Communications Bureau as soon as possible and as prioritized in Table 61.

Recommendation #30: Consider creating a consolidated City Communications Department combining the Police Department, Fire Department, and MedStar dispatch centers.

Recommendation #31: Update or replace the existing Fire Alarm Office facility to meet current state and national standards and space needs.

Recommendation #32: Reduce the inventory of non-emergency supplies in the Fire Logistics warehouse by identifying products that could be ordered for same day or next day delivery from local or online suppliers.

Recommendation #33: Consider transitioning Air Shop / SCBA records to a digital record management system.

Recommendation #34: Evaluate positions within the Support Services, Logistics, and Communications Bureau that could be performed by civilian personnel with equal competency at a lower cost.

Recommendation #35: Consider a one-time purchase of up to 10 fire apparatus *above* scheduled Capital Improvement Plan replacement to provide critically needed daily reserve apparatus fleet capacity and operational reliability.

Recommendation #36: Consider a one-time purchase of five additional fully equipped engines or quint apparatus, in addition to the previous recommendation, to provide Department-wide response surge capacity for immediate deployment during high resource drawdown periods or for a major

incident response as off-duty personnel can be made available for staffing; these units would not be intended for use as regular reserve apparatus for use when front-line apparatus are out of service for maintenance/repair.

Recommendation #37: Consider including the full standard inventory of hoses, ladders, tools, and equipment with future fire apparatus purchases.

Recommendation #38: Consider providing all current reserve fire apparatus with a full inventory of hoses, ladders, tools, and equipment to provide immediate operational readiness.

Recommendation #39: Consider reducing the scheduled Capital Improvement Plan replacement schedule for fire apparatus from 15 to 20 years to 12 to 15 years to ensure adequate operational reliability of reserve apparatus.

Recommendation #40: The Fire Department and City Property Management Department vehicle services management staff should integrate services where feasible to improve coordination, communication, and cooperation to facilitate better overall fleet maintenance efficacy.

Recommendation #41: Provide dedicated funding of sufficient OEM baseline staffing to meet its core mission or establish the OEM as a subdivision of the City Manager's Office to provide the City Manager more direct oversight of that office's functions in alignment with state law and the City's Emergency Management Director line of succession.

Recommendation #42: Based on Citygate's analysis of the Fire administration team, we recommend deeper study for likely needed phased personnel additions to impacted headquarters sections.

Citygate's review of the headquarters programs staffing included a review of every loaned position and, if necessary, possible additional positions over time as the City grows, to meet the demands on Department services. The following table shows Citygate's recommended priority for loaned positions to be studied for resolution of permanent funding or to constrain some programs. Such in-depth analysis will also allow for longer term policy consideration. Also, while conducting the in-depth headquarters staffing review, the City should also undertake a more detailed study of the use of non-sworn personnel.

The following table summarizes the loan personnel considered Priority 1 (important to maintain regulatory and needed services at current levels) for further review:

Table 62—Loaned Positions Needed by Priority

Bureau/Section	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels	Priority 2 Good to Have as a Recognized Best Practice	Priority 3 Adds Value to Services Provided to the Community	Total
Loaned Positions	**38**	**22**	**0**	**60**
Fire Chief's Office	**0**	**2**	**0**	**2**
Chaplain	0	1	0	
Public Information Officer	0	1	0	
Fire Administration Services Bureau	**0**	**0**	**0**	**0**
Fire Operations Bureau	**0**	**6**	**0**	**6**
Fire Station Operations Administration	0	1	0	
HOPE Team	0	5	0	
Executive Services Bureau	**11**	**14**	**0**	**25**
Community Risk Reduction	0	1	0	
Fire Prevention	11	0	0	
Fire Investigations / EOD	0	10	0	
Hiring	0	2	0	
Professional Standards	0	1	0	
Support Services, Logistics, and Communications Bureau	**27**	**0**	**0**	**27**
Educational Services	17	0	0	
Logistics	2	0	0	
Fire Alarm Office	8	0	0	

Where the above analysis indicated the potential for near- or long-term program needs beyond the loan program, those positions require deeper analysis and program need policy consideration.

Section 10

Next Steps and List of Findings and Recommendations

SECTION 10—NEXT STEPS AND LIST OF FINDINGS AND RECOMMENDATIONS

10.1 NEXT STEPS

As a first step, City Council should adopt updated, clearly measurable response time goals for the Department based on best practices, starting with the 9-1-1 call receipt in Fire dispatch. The Council needs to require regular reporting to provide accountability for the Department to meet its goals. The goals identified in Recommendation #1 are consistent with both national best practices and the risks to be protected in Fort Worth. Measurement and planning, as Fort Worth continues to evolve, will be necessary for the Department to meet these goals.

Based on this evaluation, Citygate offers these next steps to move the Department forward.

10.1.1 Immediate to Near-Term

- Adopt a set of updated response time policies.
- Direct staff to significantly lower dispatch-processing time within the three current centers' technology and procedures.
- Improve first paramedic response times to all neighborhoods by directing the deployment of the already available firefighter paramedics *as soon as possible.*
- Staff new Fire Station 45 with an engine, a quint/ladder, and a Battalion Chief as fast as the staff can be hired and promoted.
- Study for permanent funding the loaned positions by priority and study additional positions against customer service needs. Final funding and program delivery should include Council policy direction.

10.1.2 Longer-Term

- Establish a Fire and Planning Department team to model ongoing growth against the Department's deployment goals for added fire stations and/or units.
- Adopt a Council policy that identifies a trigger point for adding fire stations coinciding with population growth and new neighborhoods.

10.2 FINDINGS AND RECOMMENDATIONS

10.2.1 Findings

Finding #1: Apart from budget measures, the City Council has not separately adopted fire, EMS, and specialty response performance goals, including sufficiently specific

specialty response goals for all-risk emergencies that specify the beginning time measure from the point that Police communications dispatch receives the 9-1-1 phone call, nor do the current goals reflect risks and outcome expectations. Clarifying deployment goals will meet the best practice recommendations of the CFAI.

Finding #2: There are significant gaps in first-unit coverage of public streets within a 4:00-minute travel time from a station.

Finding #3: Delivering a large ERF coverage is challenging except where the "core stations" can respond inwardly to the center of a multiple-station area.

Finding #4: The uncongested single ladder/quint truck coverage at 78.5 percent is substantial and can be improved to 82.5 percent by adding a quint to new Station 45.

Finding #5: Given the road network and topography of the City with open space areas, first-due unit coverage at 4 minutes is challenging. However, the impact of using a **5:00**-minute travel time goal for fire station spacing is *significant.* The first-due unit uncongested coverage increases to 82.6 percent with the inclusion of planned Fire Stations 45 and 46.

Finding #6: The impacts of growth on the fire station system are going to be most significant outside of the loop, where fire station placement is weakest, and these impacts must be carefully projected for the eventual addition of more fire stations and crews.

Finding #7: The Department's time-of-day, day-of-week, and month-of-year calls for service demands occur in consistent, predictable patterns. The service demand is always sufficiently high in all fire station areas to require an all-day, year-round response system.

Finding #8: Battalions 1 and 5 have the greatest number of simultaneous single-station incidents. This is one of the reasons travel times remain longer than desired.

Finding #9: The engine and truck/quint company unit-hour utilization measures for daylight hours are not yet close to (nor exceeding) 30 percent. Based on this measure alone, no station immediately needs a second or third "reliever" company.

Finding #10: While no unit has excessive workload at this time, in addition to the long-term planning for added stations, the Department could also need infill companies where workload measures (such as UHU) are excessive, and the response time of a second-due cover unit is too long. Both types of planning should begin with a focus on the top ten busiest areas, as identified in this study.

Finding #11: The City is meeting urban best practices by staffing with four firefighters per unit and given workloads, risks, and large station areas, maintaining this staffing level is necessary.

Finding #12: As Station areas become too busy, the next logical deployment addition would be two-firefighter squads for low-acuity EMS and other, non-fire incident types of call responses at peak hours of the day on an alternative work schedule.

Finding #13: Call-processing times of 1:47 minutes to 90 percent of Fire and EMS incidents are only 17 seconds slower than Citygate's recommendation of 1:30 minutes where no language or location identification barriers exist. Modest workflow improvements can easily improve this measure to 1:30 minutes.

Finding #14: Turnout times of 3:01 minutes for 90 percent of Fire and EMS incidents are significantly longer than the 2:00 minutes recommended by Citygate and require a focused improvement effort.

Finding #15: The Department's fire unit travel times are higher than the NFPA's urban best practice recommendation of 4:00 minutes, but the City's station spacing is challenged with a difficult road network and open spaces. A 5:00-minute travel time to 90 percent of the public road network, as the GIS models in this study indicate, would be more feasible for the physical spacing of added fire stations.

Finding #16: First-due unit call to arrival times to Fire and EMS incidents at 10:21 minutes in RY 20/21 are longer than a best practice-based goal of 7:30 minutes. However, this includes 1:00 minute of turnout time to be reduced and new Station 45 is not yet in operation.

Finding #17: An ERF of four engines, one ladder truck / quint, and two Battalion Chiefs reached 90 percent of building fires in 20/21 with a travel time of 18:41 minutes. This occurs due to the Department's standard response of 22 firefighters, which is greater than a minimum best practice ERF of 17 firefighters in 8:00 minutes travel time.

Finding #18: The City's public safety dispatch-processing times from 9-1-1 answer are significantly longer than best practices or for acute need customer service.

Finding #19: MedStar does not report response times to the public and agencies transparently enough using a best practices fractile at 90 percent. A percentage measure without the minutes at that percentage point does not meet national best practices for response time reporting.

Finding #20: Based on MedStar's reporting, since January 2019, the 85 percent or 90 percent minutes to Priority 1 emergency ambulance requests have been in the low-to-mid teens of 14:00–17:00 minutes, without the added time at Police 9-1-1 dispatch.

Finding #21: While the COVID-19 pandemic negatively affected MedStar's deployed staffing (as it affected similar staffing across the nation), all data measures in this study point to MedStar having always been challenged to deliver first paramedic arrival via an ambulance at 11:00 minutes 85 percent of the time. The topography of the City makes an 11:00-minute, 85 percent level of deployment expensive for MedStar.

Finding #22: One way to improve response times for the provision of a first paramedic to every neighborhood would be to use Department crews to deploy one paramedic per fire station 24/7/365.

Finding #23: Any request for MedStar to significantly improve first paramedic response times in the City will not be inexpensive, and the agencies need to have a clear discussion about long-term ambulance economics in a metro City approaching one million in population.

Finding #24: The City/Department has a practice of assuming that salary savings have been sufficient to address overtime underbudgeting in the past—which is not accurate for FY 21 and would not have been accurate in FY 20 if not for COVID-19 relief funding.

Finding #25: The City has credited COVID-19 relief funding directly against overtime expense accounts. This has caused fiscal reports to be misleading on their face and has resulted in distorted trend information.

Finding #26: Overtime and salary continuance categories, as a percentage of total salary and benefits costs, have grown at a faster rate than all other salary and benefit categories.

Finding #27: 1.5 overtime, FLSA built-in overtime category hours, and emergency call back time, as a percentage of total overtime hours, accounted for most of the growth in overtime hours for FY 20 and FY 21.

Finding #28: The Department's policy of loaned positions has led to gaps in constant staffing and limitations on availability to handle other frontline services, which has resulted in increased overtime.

Finding #29: The Workers' Compensation Unit is inadequately staffed for the size of this fire department, which is a single point failure risk.

Finding #30: The Special Operations Section is understaffed by one FTE to coordinate the Wildland Fire Program to ensure appropriate training of response personnel and to ensure adequate wildland fire apparatus and equipment to mitigate the City's wildland fire risk.

Finding #31: The HOPE Team provides valued, tangible services for Fort Worth's homeless community, and has reduced 9-1-1 calls in the homeless corridor by more than 50 percent since its inception

Finding #32: The four fire station personnel on loan to the EMS/MEDIC 1 program are needed to meet program workload and goals and should thus be fully funded.

Finding #33: Although approximately 30 percent of the City lies in the wildland urban interface, most response personnel have not received recommended best-practice basic wildland fire training.

Finding #34: Very little if any Community Risk Reduction Section work was being performed at the time of this review due to the re-assignment of the loaned Firefighter position back to his/her fire station assignment, the concurrent work required of the Community Risk Reduction Section Manager as the Hiring Section Manager, and no overtime authorized.

Finding #35: Community Risk Reduction programs provide value in helping to reduce/minimize the incidence and consequence severity of fires and other hazardous conditions/events in the City.

Finding #36: The Fire Prevention Section has *insufficient* staffing capacity to meet its current and anticipated near-term mandated workload demand and discretionary workload to inspect high-risk occupancies.

Finding #37: New employee background investigations, conducted after normal work hours by Fire Investigations / EOD staff on overtime, took approximately 2,400 hours to complete in 2021.

Finding #38: The Fire Investigations / EOD Section is challenged to meet its workload responsibilities with current staffing.

Finding #39: The bomb squad and canine units receive no base budget funding and must rely on grant funding each year to sustain training, equipment, and operations.

Finding #40: The Hiring and Professional Standards sections have insufficient staffing capacity to meet program goals, expectations, and workload demand.

Finding #41: The Support Services, Logistics, and Communications Bureau relies on 23 loaned positions from the Fire Operations Bureau to meet current and anticipated near-term program needs and workload demand.

Finding #42: The Educational Services Section is challenged to maintain a sufficient cadre of certified instructors to maintain the required 5:1 student to instructor ratio for most training.

Finding #43: The Fire Alarm Office has no training program or quality assurance / quality improvement program in place.

Finding #44: The Fire Alarm Office facility is antiquated and undersized for current needs.

Finding #45: The Office of Emergency Management relies heavily on grant funding for staffing needed to meet its core mission.

Finding #46: The Logistics Section warehouse stores many supply items that can be ordered and delivered the same day or next from local or online suppliers.

Finding #47: Some functions/positions in the Support Services, Logistics, and Communications Bureau could be performed by civilian employees at a lower cost.

Finding #48: The Department's GEAR-1 PPE exchange program supports the Department's commitment to employee health and wellness by preventing potential carcinogen contamination in its fire apparatus and station facilities.

Finding #49: The Department is *significantly challenged* to maintain a desired 20 to 25 percent daily availability of reserve apparatus due to the poor operational reliability of much of the current reserve apparatus fleet.

Finding #50: Scheduled preventive maintenance and repairs of front-line fire apparatus was backlogged 50 to 60 days at the time of this review due to lack of available reserve apparatus.

Finding #51: The Department's reserve fire apparatus lack all tools and equipment except hoses, and it typically takes two to three hours for a crew to fully outfit a reserve apparatus for response.

Finding #52: The Department has no fully equipped engines or trucks/quint apparatus ready for immediate deployment for Citywide surge capacity during high resource drawdown periods or for a major incident response as fast as off-duty personnel can be made available for staffing.

Finding #53: The Office of Emergency Management is *understaffed* to meet its core mission and program responsibilities.

10.2.2 Recommendations

Recommendation #1: **Adopt City Council Deployment Measure Policies**: The Council should consider adopting complete performance measures that begin with Police 9-1-1 call answer and end with the Fire Department and/or an ambulance arriving at the emergency incident. The measures of time should be designed to save patients and to keep small but serious fires from becoming more complex or damaging. With this is mind, Citygate recommends the following outcome-based measures for the major emergency types:

1.1: Geographic Distribution of Fire Stations: To treat medical patients and control small fires, the first-due unit should arrive within 8:30 minutes, 90 percent of the time, from receipt of the 9-1-1 call in the fire dispatch center. This equates to a 90-second dispatch time, 2:00-minute company turnout time, and 5:00-minute travel time.

1.2: Multiple-Unit Effective Response Force for Serious Emergencies: To confine fires near the room of origin and to treat up to five medical patients at once, a multiple-unit response of a *minimum* of three engines, one quint/ladder truck, and one Battalion Chief, totaling a minimum of 17 personnel, should arrive within 11:30 minutes from the time of 9-1-1 call receipt in fire dispatch, 90 percent of the time. This equates to 90-second dispatch time, 2:00-minute company turnout time, and 8:00-minute travel time spacing for multiple units.

1.3: Hazardous Materials Response: To minimize or halt the release of a hazardous substance so it has minimal impact on the community, the Department needs to maintain its hazardous materials response as designed to protect the community from hazards associated with uncontrolled release of hazardous and toxic materials. The first responder unit should arrive to

investigate a hazmat release at the operations level within 8:30 minutes, 90 percent of the time, which equates to a 90-second dispatch time, 2:00-minute company turnout time, and 5:00-minute travel time in urban population areas. After assessment and scene evaluation is completed, a determination will be made whether to request additional resources.

1.4: Technical Rescue: To respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue, the first-due company in urban to suburban areas to arrive for assessment of the rescue should achieve a 5:00-minute travel time, 90 percent of the time. Additional resources capable of initiating a rescue should be assembled within a total response time of 11:30 minutes, 90 percent of the time, with the result being a safe and complete rescue/extrication to ensure delivery of patients to a definitive care facility.

Recommendation #2: Reduce fire turnout times through training and data feedback for crew accountability, to 2:00 minutes or less, 90 percent of the time.

Recommendation #3: Reduce dispatch processing time for acute emergencies to 90 seconds or less, 90 percent of the time, from the time of 9-1-1 call answer.

3.1: Immediately task the three dispatch centers to improve existing technology and dispatcher workflows to reduce call-processing time.

3.2: Conduct an in-depth operational and fiscal analysis of merging the three dispatch centers into a consolidated Fort Worth emergency 9-1-1 and non-emergency 3-1-1 center.

Recommendation #4: Given the Department's service needs in the north City, open new Station 45 with an engine company, a quint/ladder company, and a Battalion Chief for improved northern area incident command.

Recommendation #5: Task Medstar and the Fire Department to continue dispatch reprioritization efforts that reduce the number of non-life-threatening complaints categorized as Priority 1 calls, so the system can focus on getting the right resources to the most critical calls in the fastest time possible.

Recommendation #6: The City, Fire Department, and Medstar need to grow their positive, but presently small, programs to deliver compassionate care, social, and mental health services without unduly burdening the 9-1-1 response forces.

Recommendation #7: The City Council should consider tasking MedStar and the Department to immediately study and analyze the cost of:

7.1: Increasing Medstar paramedic ambulance coverage to 90 percent of Priority 1 incidents to 9:50 minutes from the time of 9-1-1 answer at the Police Department, and/or

7.2: The Fire Department implementing paramedic engine first responders with existing resources to work with MedStar paramedics in the most difficult to reach neighborhoods, and then expand the program to all City fire stations.

7.3: In either choice, consider the long-term economic and personnel-related sustainability. If public funds are needed to increase MedStar ambulance coverage, determine whether a need exists for governance changes so the City Council can control the use of general revenues.

Recommendation #8: Direct Fire, Planning, and Fiscal staffs to design and return to Council in no more than six months a new trigger-point threshold for adding fire stations concurrent with City growth, and not long after growth has already taken place.

8.1: Given this study's understanding of City growth, consider a trigger point of more than 10,000 residents in a contiguous area beyond a 5:00-minute *travel* time from a station, or in commercial-only areas, when there are more than 5,000 employees (or others) in a contiguous area beyond an 8:00-minute *travel* time from a station.

Recommendation #9: The Department needs to monitor workloads and response times per unit, and when Unit-Hour Utilization exceed 30 percent for several hours at a time, add peak-hour two-firefighter squads as low-acuity incident responders.

Recommendation #10: For the risks to be protected and the large station areas, the City should continue the practice of staffing 24/7/365 primary fire engines and quints/ladders with four firefighters per crew.

Recommendation #11: Cease the practice of accounting for revenues directly against expenditure line items to meet best practice standards and improve the accuracy of fiscal reporting.

Recommendation #12: Budget the true expected overtime and other salary and benefit-related costs to reflect the actual spending amounts needed for the Department to provide required services. This will improve both budget development efficiency and transparency for the reader of budget documents.

Recommendation #13: Ensure that overtime and other pay and leave codes are used accurately and consistently so that analysis can be accurately and consistently performed.

Recommendation #14: Ensure that adequate separation of duties is implemented for all areas that could increase financial risk for the Department and the City. These duty separations and electronic limits should be outlined in a written operational manual, either Citywide or by Department.

Recommendation #15: After the contracted payroll upgrade is complete, strongly consider adding one more payroll technician for redundancy and cross training.

Recommendation #16: Immediately add one position to the Workers' Compensation Unit.

Recommendation #17: Ask Department and City IT to study using City central IT Department more for routine desktop support to free up analyst time for other analysis, such as deployment. If this cannot occur, then the Department will need a deployment/advance planning analyst position.

Recommendation #18: Fund a full-time Wildland Fire Program Coordinator as soon as possible to provide critical coordination and oversight of all wildland-fire-related programs, including training, equipment, mitigation, and prevention.

Recommendation #19: Provide NWCG Basic Wildland Firefighting and Introduction to Wildland Fire Behavior training for all response personnel.

Recommendation #20: Consider increasing the minimum commitment for assignment to the Technical Rescue and Hazmat programs from two to three years.

Recommendation #21: Request funding from the City Aviation Department to offset the costs of the AARF program.

Recommendation #22: In lieu of fully funding the HOPE Team, transfer those services to a new, multidiscipline City and/or MedStar program.

Recommendation #23: The City should study and consider permanently funding Executive Services Bureau positions filled by personnel on loan from the Fire Operations Bureau, to ensure near-term sufficient staffing capacity to sustain mandated, best practice, and high value workload demand.

Recommendation #24: Provide all company officers with 40 hours of preliminary fire investigation training.

Recommendation #25: Consider revising the investigator callout criteria to large complex fires, fires with injuries or fatalities, or fires where the cause cannot be determined by the company officer or is believed to be arson.

Recommendation #26: The City should consider moving the background investigation to later in the hiring process to reduce the number of investigations required, preferably following the conditional offer of employment.

Recommendation #27: Provide base budget funding for the bomb squad and canine units if the grant funding were to be lost.

Recommendation #28: Fund needed improvements at the Bob Bolen Public Safety Complex to house all Fire Investigations / EOD staff, equipment, and vehicles as funding can be made available.

Recommendation #29: The City should consider permanent funding of loaned positions in the Support Services, Logistics, and Communications Bureau as soon as possible and as prioritized in Table 61.

Recommendation #30: Consider creating a consolidated City Communications Department combining the Police Department, Fire Department, and MedStar dispatch centers.

Recommendation #31: Update or replace the existing Fire Alarm Office facility to meet current state and national standards and space needs.

Recommendation #32: Reduce the inventory of non-emergency supplies in the Fire Logistics warehouse by identifying products that could be ordered for same day or next day delivery from local or online suppliers.

Recommendation #33: Consider transitioning Air Shop / SCBA records to a digital record management system.

Recommendation #34: Evaluate positions within the Support Services, Logistics, and Communications Bureau that could be performed by civilian personnel with equal competency at a lower cost.

Recommendation #35: Consider a one-time purchase of up to 10 fire apparatus *above* scheduled Capital Improvement Plan replacement to provide critically needed daily reserve apparatus fleet capacity and operational reliability.

Recommendation #36: Consider a one-time purchase of five additional fully equipped engines or quint apparatus, in addition to the previous recommendation, to provide Department-wide response surge capacity for immediate deployment during high resource drawdown periods or for a major incident response as off-duty personnel can be made available for staffing; these units would not be intended for use as regular reserve apparatus for use when front-line apparatus are out of service for maintenance/repair.

Recommendation #37: Consider including the full standard inventory of hoses, ladders, tools, and equipment with future fire apparatus purchases.

Recommendation #38: Consider providing all current reserve fire apparatus with a full inventory of hoses, ladders, tools, and equipment to provide immediate operational readiness.

Recommendation #39: Consider reducing the scheduled Capital Improvement Plan replacement schedule for fire apparatus from 15 to 20 years to 12 to 15 years to ensure adequate operational reliability of reserve apparatus.

Recommendation #40: The Fire Department and City Property Management Department vehicle services management staff should integrate services where feasible to improve coordination, communication, and cooperation to facilitate better overall fleet maintenance efficacy.

Recommendation #41: Provide dedicated funding of sufficient OEM baseline staffing to meet its core mission or establish the OEM as a subdivision of the City Manager's Office to provide the City Manager more direct oversight of

that office's functions in alignment with state law and the City's Emergency Management Director line of succession.

Recommendation #42: Based on Citygate's analysis of the Fire administration team, we recommend deeper study for likely needed phased personnel additions to impacted headquarters sections.

This page was intentionally left blank

APPENDIX A

FORT WORTH INCIDENT RESPONSE STATISTICAL ANALYSIS – UNIT HOUR UTILIZATION

This page was intentionally left blank

Station-Hour Demand

Hour	22	26	31	23	24	16	37	17	29	36	05	14
00:00	23.66%	13.17%	14.00%	19.99%	15.88%	13.77%	17.38%	16.50%	14.65%	10.26%	9.95%	12.46%
01:00	12.59%	11.93%	14.62%	13.06%	14.95%	10.57%	10.97%	16.95%	11.80%	12.38%	8.38%	11.12%
02:00	11.83%	10.47%	13.37%	14.86%	13.03%	10.26%	14.76%	16.26%	11.50%	8.61%	10.96%	9.68%
03:00	14.22%	10.11%	12.00%	13.29%	11.73%	10.91%	9.95%	10.55%	9.67%	8.60%	8.71%	8.37%
04:00	9.10%	10.41%	9.47%	11.19%	9.48%	10.00%	7.47%	10.42%	10.27%	6.77%	8.11%	8.17%
05:00	12.00%	10.48%	11.95%	12.28%	11.07%	8.23%	7.27%	10.43%	8.81%	8.44%	9.42%	6.99%
06:00	18.11%	10.74%	12.56%	8.52%	10.68%	11.59%	10.56%	10.17%	10.49%	9.25%	9.96%	8.35%
07:00	14.65%	15.43%	15.73%	13.70%	12.71%	13.41%	13.72%	13.10%	13.33%	15.35%	11.60%	11.27%
08:00	17.44%	19.59%	15.61%	16.67%	15.55%	18.42%	21.11%	17.32%	14.44%	13.28%	14.02%	11.76%
09:00	20.27%	23.13%	18.73%	19.00%	22.01%	21.61%	22.49%	19.41%	15.89%	15.88%	13.54%	14.51%
10:00	25.92%	24.19%	20.15%	19.20%	23.97%	23.26%	16.45%	22.81%	17.29%	18.07%	13.81%	15.47%
11:00	23.51%	25.21%	24.87%	19.62%	20.55%	21.98%	21.86%	23.87%	17.07%	16.60%	19.85%	17.86%
12:00	28.99%	24.22%	22.97%	22.06%	25.58%	21.45%	21.40%	20.84%	20.20%	27.47%	16.88%	18.16%
13:00	29.49%	28.52%	22.07%	21.62%	20.85%	21.07%	25.34%	18.02%	21.67%	26.24%	21.36%	19.02%
14:00	25.95%	29.94%	25.76%	21.41%	22.66%	23.70%	24.02%	19.36%	17.20%	19.70%	18.74%	15.26%
15:00	40.93%	28.80%	28.18%	26.27%	27.89%	24.83%	34.85%	24.97%	22.87%	24.03%	20.05%	18.00%
16:00	33.72%	28.54%	26.67%	24.25%	25.01%	24.40%	27.83%	22.19%	23.25%	18.43%	21.07%	20.10%
17:00	29.50%	30.90%	25.29%	29.15%	26.07%	27.31%	24.80%	25.18%	20.46%	21.55%	19.66%	22.29%
18:00	28.10%	28.28%	28.94%	24.76%	26.22%	25.52%	21.58%	25.90%	22.34%	15.80%	21.95%	21.11%
19:00	23.04%	23.44%	28.25%	24.54%	21.23%	22.55%	21.62%	21.03%	19.99%	22.26%	17.51%	23.11%
20:00	21.77%	24.47%	25.04%	27.19%	23.93%	19.99%	17.55%	21.18%	20.40%	18.36%	18.29%	16.04%
21:00	17.91%	20.30%	23.42%	26.80%	19.85%	21.33%	16.55%	18.08%	17.90%	16.02%	17.18%	17.85%
22:00	17.79%	19.66%	20.78%	19.46%	16.55%	19.19%	17.04%	17.03%	16.99%	13.67%	14.34%	13.76%
23:00	13.35%	11.96%	15.74%	18.01%	14.78%	14.32%	11.03%	13.44%	14.42%	11.55%	10.10%	11.51%
Overall	**21.41%**	**20.16%**	**19.84%**	**19.45%**	**18.84%**	**18.32%**	**18.23%**	**18.13%**	**16.37%**	**15.77%**	**14.81%**	**14.68%**
Runs	**4,747**	**5,548**	**5,231**	**5,601**	**5,456**	**5,255**	**3,912**	**5,274**	**4,883**	**3,654**	**5,369**	**4,940**

Station-Hour Demand (Cont.)

Hour	07	04	13	03	20	42	12	40	15	10	28	01
00:00	10.11%	13.28%	14.64%	8.07%	8.81%	4.07%	9.83%	9.81%	7.77%	9.06%	7.35%	7.23%
01:00	10.28%	7.95%	15.69%	8.06%	15.33%	5.13%	11.09%	11.22%	9.00%	9.86%	6.12%	7.23%
02:00	9.44%	6.65%	6.05%	6.28%	7.96%	5.66%	10.07%	4.42%	7.63%	7.32%	6.56%	6.69%
03:00	8.52%	7.02%	6.73%	6.16%	7.97%	5.84%	6.08%	3.30%	6.92%	5.18%	4.72%	5.27%
04:00	9.94%	7.56%	9.06%	6.02%	7.52%	4.70%	4.01%	8.28%	5.64%	5.15%	4.52%	5.18%
05:00	8.74%	8.23%	4.86%	6.85%	6.93%	5.21%	5.71%	4.32%	6.22%	5.49%	4.56%	5.11%
06:00	10.90%	9.37%	6.41%	5.86%	6.05%	5.76%	4.52%	4.38%	6.45%	5.80%	5.93%	6.24%
07:00	11.46%	9.24%	9.58%	7.87%	8.24%	6.70%	7.04%	9.57%	7.08%	5.67%	9.53%	6.00%
08:00	13.71%	11.40%	8.59%	11.15%	9.84%	15.57%	7.04%	12.83%	7.77%	8.63%	8.42%	8.81%
09:00	12.35%	13.06%	16.70%	12.32%	12.30%	9.59%	9.61%	10.74%	10.88%	9.79%	11.51%	8.06%
10:00	14.07%	13.23%	18.44%	12.67%	11.55%	20.92%	14.45%	16.09%	11.48%	10.17%	10.57%	9.72%
11:00	13.95%	17.85%	19.88%	14.11%	11.71%	11.41%	13.22%	11.18%	10.67%	12.04%	10.94%	9.18%
12:00	14.98%	16.69%	18.68%	15.26%	11.42%	18.82%	14.60%	11.07%	9.49%	11.64%	10.91%	11.18%
13:00	16.03%	17.77%	13.87%	14.70%	13.38%	21.28%	13.58%	20.38%	12.97%	13.34%	11.42%	10.58%
14:00	16.88%	17.67%	17.12%	12.89%	15.70%	15.17%	13.02%	14.20%	11.11%	11.13%	11.42%	13.79%
15:00	18.19%	15.11%	20.63%	14.13%	14.20%	15.62%	11.78%	12.82%	13.59%	12.49%	14.98%	11.41%
16:00	18.89%	18.41%	18.65%	15.08%	15.35%	20.12%	12.92%	14.53%	14.94%	13.04%	15.58%	14.81%
17:00	19.99%	18.91%	24.46%	17.57%	14.95%	20.49%	14.38%	14.72%	14.15%	15.33%	12.47%	14.61%
18:00	18.65%	18.78%	16.73%	17.89%	16.75%	18.07%	12.17%	12.74%	14.44%	14.58%	13.11%	15.99%
19:00	19.07%	20.64%	12.43%	15.62%	16.72%	11.41%	15.73%	13.24%	13.37%	15.58%	13.02%	13.56%
20:00	17.64%	17.10%	13.55%	15.53%	15.00%	13.61%	13.29%	11.72%	15.12%	12.92%	10.76%	10.43%
21:00	16.53%	16.71%	11.45%	15.30%	12.61%	10.33%	13.23%	10.07%	10.85%	11.50%	11.90%	11.44%
22:00	16.60%	16.75%	8.98%	11.43%	11.59%	7.27%	12.38%	6.56%	10.95%	11.38%	7.57%	9.90%
23:00	11.51%	10.86%	9.28%	10.59%	8.94%	4.75%	8.45%	7.23%	9.55%	8.56%	7.53%	8.11%
Overall	**14.10%**	**13.76%**	**13.44%**	**11.73%**	**11.70%**	**11.56%**	**10.76%**	**10.64%**	**10.33%**	**10.24%**	**9.64%**	**9.61%**
Runs	**4,160**	**4,223**	**2,553**	**3,644**	**3,216**	**1,958**	**3,101**	**2,030**	**2,752**	**3,320**	**2,418**	**2,682**

Station-Hour Demand (Cont.)

Hour	39	02	25	30	06	08	09	21	27	19	32	33
00:00	5.74%	7.03%	8.38%	5.30%	6.11%	6.55%	6.50%	7.76%	4.94%	6.71%	3.31%	6.94%
01:00	6.37%	12.87%	13.41%	6.21%	7.67%	4.31%	7.23%	5.76%	4.65%	4.13%	5.11%	5.31%
02:00	7.19%	7.51%	6.46%	5.50%	10.13%	6.00%	7.67%	5.10%	5.46%	5.41%	5.39%	6.50%
03:00	5.13%	6.08%	4.42%	4.80%	6.56%	5.19%	4.42%	4.01%	3.57%	4.29%	5.23%	6.69%
04:00	5.31%	6.02%	3.76%	5.06%	5.06%	3.19%	5.02%	3.99%	5.26%	4.77%	3.97%	6.15%
05:00	6.33%	2.72%	6.49%	4.01%	3.80%	4.03%	4.39%	4.02%	4.75%	3.33%	5.47%	5.43%
06:00	6.37%	5.99%	5.95%	5.46%	6.17%	5.56%	6.95%	4.06%	4.14%	5.38%	5.18%	5.99%
07:00	10.93%	6.81%	7.88%	7.86%	4.86%	5.10%	5.38%	6.66%	3.27%	6.48%	7.68%	6.54%
08:00	11.90%	7.59%	8.22%	9.77%	6.98%	7.25%	8.89%	8.38%	6.64%	9.02%	6.73%	5.62%
09:00	10.33%	9.25%	8.48%	11.01%	9.61%	9.35%	9.88%	10.25%	8.52%	8.28%	7.16%	7.41%
10:00	10.80%	8.91%	9.63%	11.11%	7.88%	9.86%	10.09%	9.58%	5.84%	8.08%	8.08%	6.65%
11:00	11.19%	10.67%	9.24%	10.17%	9.45%	10.37%	11.00%	9.48%	6.08%	8.70%	8.60%	5.12%
12:00	12.46%	11.46%	11.37%	10.58%	9.56%	10.69%	10.30%	12.56%	10.17%	9.18%	11.60%	7.32%
13:00	10.88%	10.92%	11.87%	11.29%	9.94%	13.29%	10.73%	11.64%	14.14%	9.72%	9.67%	8.07%
14:00	11.32%	10.44%	7.98%	9.72%	9.62%	9.27%	10.30%	8.48%	21.57%	9.02%	10.04%	10.45%
15:00	12.28%	11.37%	12.70%	11.29%	10.56%	11.70%	11.34%	12.56%	15.81%	8.12%	7.75%	9.01%
16:00	13.48%	12.25%	9.84%	11.47%	9.99%	13.70%	11.71%	9.30%	9.65%	11.44%	11.25%	8.81%
17:00	12.67%	12.29%	11.43%	12.52%	14.89%	16.73%	11.84%	12.24%	11.83%	11.51%	7.19%	9.43%
18:00	11.88%	12.47%	11.74%	10.43%	10.44%	10.53%	10.42%	11.10%	16.38%	11.20%	10.92%	10.77%
19:00	11.40%	12.82%	10.90%	9.70%	13.34%	10.03%	8.30%	12.66%	6.41%	10.80%	11.36%	7.90%
20:00	10.70%	12.64%	10.53%	10.72%	7.72%	11.03%	7.97%	9.48%	7.87%	9.83%	11.00%	8.89%
21:00	9.17%	10.66%	8.36%	8.76%	10.21%	7.52%	8.31%	9.43%	6.95%	9.34%	8.70%	7.06%
22:00	8.07%	8.87%	9.26%	7.01%	8.35%	7.95%	7.47%	7.82%	4.48%	7.87%	5.55%	8.81%
23:00	6.27%	6.83%	6.15%	6.95%	7.53%	5.70%	8.63%	6.91%	4.45%	8.61%	4.54%	6.83%
Overall	**9.51%**	**9.35%**	**8.94%**	**8.61%**	**8.60%**	**8.54%**	**8.53%**	**8.47%**	**8.03%**	**7.97%**	**7.56%**	**7.40%**
Runs	**2,583**	**2,838**	**2,311**	**2,277**	**2,448**	**2,749**	**2,223**	**2,434**	**1,277**	**2,373**	**1,964**	**1,698**

Station-Hour Demand (Cont.)

Hour	38	18	41	34	11	35
00:00	5.35%	2.49%	4.33%	3.15%	2.33%	2.33%
01:00	3.90%	5.39%	2.64%	2.52%	2.68%	1.25%
02:00	4.34%	5.17%	5.02%	3.22%	2.85%	0.85%
03:00	3.30%	4.82%	2.37%	2.10%	0.91%	0.99%
04:00	2.85%	3.17%	2.15%	1.74%	2.14%	2.11%
05:00	4.77%	4.09%	1.97%	1.92%	0.87%	0.91%
06:00	6.33%	2.51%	2.88%	1.76%	2.50%	1.82%
07:00	4.57%	4.78%	4.73%	2.68%	3.88%	1.59%
08:00	7.39%	6.25%	6.05%	4.28%	3.96%	2.27%
09:00	8.32%	8.07%	6.03%	3.41%	4.25%	4.59%
10:00	7.39%	7.25%	5.78%	5.38%	4.04%	3.09%
11:00	8.62%	9.99%	5.24%	3.43%	5.62%	2.15%
12:00	8.49%	7.67%	8.42%	5.20%	3.20%	2.78%
13:00	6.99%	7.92%	5.63%	4.22%	5.71%	3.08%
14:00	9.26%	8.47%	6.95%	5.16%	4.07%	1.58%
15:00	7.85%	10.72%	10.77%	3.23%	4.39%	3.82%
16:00	11.01%	9.69%	7.09%	5.00%	4.47%	3.02%
17:00	10.90%	10.61%	8.70%	4.16%	5.71%	4.43%
18:00	9.75%	8.70%	7.45%	5.53%	4.78%	3.16%
19:00	8.70%	8.37%	5.84%	4.49%	4.27%	2.93%
20:00	9.38%	7.74%	5.86%	4.99%	4.77%	2.08%
21:00	8.68%	5.53%	5.81%	3.99%	3.70%	2.29%
22:00	5.80%	5.86%	5.53%	2.68%	2.70%	2.12%
23:00	4.83%	5.26%	4.19%	2.69%	3.03%	1.17%
Overall	**7.03%**	**6.69%**	**5.48%**	**3.62%**	**3.62%**	**2.35%**
Runs	**1,730**	**1,898**	**1,245**	**842**	**889**	**515**

Unit-Hour Utilization – Engines

Hour	E29	E31	E26	E22	E24	E23	E16	E17	E37	E07	E04	E14
00:00	14.65%	11.74%	11.47%	15.81%	14.52%	17.57%	12.08%	15.21%	10.67%	10.98%	13.97%	12.17%
01:00	12.05%	13.20%	10.40%	11.20%	13.26%	11.90%	10.25%	15.85%	10.43%	11.20%	8.53%	11.03%
02:00	12.07%	11.93%	9.52%	10.82%	12.83%	13.67%	10.16%	14.14%	10.20%	9.81%	7.75%	9.28%
03:00	9.83%	10.57%	8.94%	12.46%	10.59%	11.72%	10.35%	9.01%	9.52%	9.26%	7.18%	7.92%
04:00	10.45%	8.48%	9.80%	8.51%	5.55%	4.05%	8.65%	5.63%	7.50%	10.51%	7.89%	8.28%
05:00	8.98%	10.68%	9.99%	11.17%	7.14%	4.00%	7.48%	6.14%	6.82%	9.31%	8.10%	7.37%
06:00	11.17%	11.51%	9.76%	12.23%	7.18%	3.61%	10.07%	6.68%	9.46%	11.41%	9.86%	8.27%
07:00	13.85%	14.48%	14.79%	12.74%	12.21%	12.91%	12.28%	12.51%	12.73%	12.07%	9.95%	11.80%
08:00	15.02%	12.97%	16.40%	14.94%	13.96%	14.45%	16.16%	14.33%	13.89%	13.69%	11.66%	10.34%
09:00	16.33%	14.69%	18.68%	13.37%	19.16%	14.94%	15.59%	16.27%	13.74%	13.96%	14.49%	12.69%
10:00	17.70%	16.00%	18.82%	18.29%	18.43%	14.63%	17.47%	16.89%	15.29%	15.16%	14.36%	13.83%
11:00	18.08%	19.92%	21.28%	18.12%	17.92%	15.70%	18.66%	20.08%	17.22%	14.48%	17.53%	15.40%
12:00	20.71%	18.75%	19.65%	18.59%	20.21%	17.28%	18.83%	17.58%	14.76%	16.29%	17.25%	16.46%
13:00	23.66%	18.76%	22.29%	16.84%	18.26%	18.64%	17.08%	15.59%	22.09%	16.73%	18.65%	17.28%
14:00	17.68%	22.60%	24.75%	16.22%	19.61%	17.60%	19.81%	17.01%	18.73%	17.92%	18.38%	14.62%
15:00	23.51%	22.85%	22.89%	20.97%	25.97%	21.59%	19.85%	21.52%	21.46%	18.95%	16.14%	16.21%
16:00	23.91%	22.22%	22.63%	23.48%	20.87%	21.27%	20.40%	18.91%	21.91%	20.19%	19.04%	19.70%
17:00	21.74%	22.93%	23.21%	21.78%	22.44%	25.96%	22.18%	20.44%	27.06%	21.12%	20.18%	19.82%
18:00	22.74%	22.72%	21.22%	23.56%	21.52%	20.85%	20.24%	19.89%	21.06%	19.70%	20.16%	18.50%
19:00	21.35%	22.35%	20.06%	21.52%	19.63%	21.58%	18.89%	18.14%	19.25%	19.86%	21.47%	20.94%
20:00	21.56%	20.51%	20.33%	21.53%	20.84%	23.47%	17.63%	18.42%	17.54%	18.27%	21.76%	16.40%
21:00	18.31%	20.58%	17.53%	17.74%	18.00%	22.52%	17.70%	18.61%	16.64%	17.54%	18.57%	17.12%
22:00	17.60%	17.97%	16.74%	17.29%	15.66%	16.38%	16.23%	15.89%	15.76%	17.23%	16.85%	12.34%
23:00	14.53%	13.25%	10.06%	13.83%	14.21%	16.93%	13.24%	11.67%	11.06%	12.01%	11.34%	11.18%
Overall	**16.98%**	**16.74%**	**16.72%**	**16.38%**	**16.25%**	**15.97%**	**15.47%**	**15.27%**	**15.20%**	**14.90%**	**14.63%**	**13.71%**
Runs	**5,119**	**4,692**	**4,876**	**4,753**	**5,094**	**4,918**	**4,689**	**4,867**	**3,959**	**4,494**	**4,690**	**4,797**

Unit-Hour Utilization – Engines (Cont.)

Hour	E05	E36	E20	E03	E10	E28	E15	E39	E12	E25	E01	E09
00:00	10.48%	10.08%	9.35%	7.91%	9.54%	7.29%	7.74%	5.38%	8.94%	8.74%	6.68%	6.62%
01:00	8.84%	10.57%	15.95%	8.50%	10.14%	6.48%	8.99%	7.40%	10.15%	13.77%	7.11%	7.85%
02:00	11.47%	7.06%	8.48%	6.58%	8.99%	8.13%	7.65%	7.58%	9.50%	7.11%	6.77%	7.98%
03:00	8.94%	8.09%	8.37%	6.43%	5.31%	5.23%	6.94%	5.28%	5.58%	4.69%	5.15%	4.92%
04:00	8.39%	6.37%	7.86%	6.09%	5.27%	4.88%	5.41%	5.46%	3.37%	4.10%	4.77%	5.29%
05:00	9.66%	7.56%	7.19%	7.31%	5.56%	4.65%	6.27%	6.28%	5.50%	6.54%	4.37%	4.87%
06:00	10.38%	8.89%	6.52%	6.13%	6.68%	6.31%	6.61%	7.00%	3.97%	6.06%	6.47%	7.05%
07:00	12.18%	10.70%	8.63%	8.11%	6.06%	9.88%	6.83%	11.15%	6.62%	8.00%	6.14%	5.94%
08:00	11.17%	12.74%	10.51%	11.43%	9.38%	9.56%	7.70%	12.86%	7.07%	8.71%	8.74%	10.32%
09:00	9.55%	15.48%	12.83%	12.80%	10.97%	11.79%	11.12%	10.53%	8.15%	7.11%	10.62%	9.98%
10:00	10.77%	14.63%	12.50%	13.36%	11.14%	10.89%	10.89%	11.37%	15.13%	11.17%	8.24%	11.10%
11:00	13.53%	15.92%	12.76%	16.17%	12.44%	12.06%	11.64%	11.70%	10.68%	9.56%	9.97%	11.18%
12:00	12.52%	15.95%	12.46%	16.18%	13.49%	12.86%	10.58%	12.82%	11.84%	11.90%	10.68%	10.78%
13:00	15.54%	15.37%	13.84%	14.77%	13.83%	11.94%	13.04%	11.33%	12.78%	12.38%	10.49%	11.25%
14:00	11.98%	15.71%	16.57%	13.63%	11.45%	12.18%	10.80%	11.74%	11.55%	8.64%	13.16%	10.91%
15:00	14.46%	18.73%	15.57%	15.19%	13.28%	16.48%	13.16%	14.11%	10.77%	13.48%	10.66%	13.20%
16:00	14.60%	15.79%	16.28%	16.27%	14.03%	16.42%	13.64%	13.99%	12.01%	11.73%	13.31%	12.20%
17:00	15.81%	18.90%	16.33%	18.35%	16.04%	13.54%	13.73%	14.01%	12.79%	12.18%	13.32%	12.77%
18:00	22.92%	14.38%	18.10%	18.51%	15.70%	14.53%	14.68%	12.56%	10.18%	12.43%	15.61%	12.14%
19:00	18.68%	17.38%	18.10%	16.46%	16.63%	14.13%	12.68%	11.95%	13.89%	11.32%	13.68%	9.86%
20:00	18.97%	15.78%	15.91%	16.30%	16.32%	12.09%	15.15%	11.39%	13.23%	10.70%	9.53%	8.49%
21:00	18.08%	14.29%	13.48%	15.78%	12.39%	12.65%	10.87%	9.79%	12.08%	8.59%	10.89%	9.02%
22:00	15.41%	13.77%	12.81%	11.79%	12.08%	7.83%	11.40%	7.88%	11.26%	9.75%	10.01%	8.30%
23:00	11.19%	10.71%	9.89%	11.28%	8.80%	7.88%	8.95%	6.65%	7.64%	6.10%	8.16%	9.00%
Overall	**13.15%**	**13.12%**	**12.51%**	**12.31%**	**11.06%**	**10.40%**	**10.27%**	**10.01%**	**9.78%**	**9.37%**	**9.36%**	**9.21%**
Runs	**5,238**	**3,663**	**3,599**	**4,008**	**3,703**	**2,703**	**2,889**	**2,754**	**2,970**	**2,544**	**2,743**	**2,477**

Unit-Hour Utilization – Engines (Cont.)

Hour	E30	E06	E02	E08	E19	E40	E32	E21	E18	E38	E27	E41
00:00	6.96%	5.98%	6.94%	6.80%	7.05%	5.09%	3.64%	6.88%	2.54%	5.69%	3.64%	4.06%
01:00	6.70%	7.83%	12.82%	3.80%	4.26%	5.37%	5.48%	5.63%	5.56%	3.78%	3.94%	2.65%
02:00	5.81%	10.56%	8.99%	7.21%	5.93%	3.88%	5.31%	4.78%	5.79%	4.25%	3.37%	5.04%
03:00	6.63%	6.42%	5.11%	4.81%	4.40%	3.03%	5.60%	3.78%	5.02%	3.78%	3.71%	2.61%
04:00	5.17%	5.09%	5.40%	4.19%	5.15%	5.02%	4.21%	4.07%	3.11%	3.25%	5.59%	2.08%
05:00	4.07%	3.76%	2.99%	4.13%	3.51%	4.08%	5.77%	4.04%	4.08%	4.22%	3.86%	2.24%
06:00	5.74%	5.97%	5.67%	6.11%	5.49%	3.92%	5.16%	4.20%	3.00%	6.14%	5.07%	3.18%
07:00	8.09%	5.19%	6.77%	5.01%	6.86%	5.25%	8.52%	6.01%	4.95%	4.38%	4.23%	4.97%
08:00	10.13%	7.25%	7.38%	6.08%	9.22%	11.74%	7.33%	7.56%	6.76%	6.83%	6.96%	6.39%
09:00	11.18%	9.74%	8.33%	8.76%	8.52%	10.12%	7.39%	8.64%	8.94%	7.73%	5.15%	6.02%
10:00	11.20%	8.09%	7.88%	8.68%	8.93%	11.27%	8.15%	8.41%	7.78%	5.98%	5.42%	6.81%
11:00	10.56%	10.43%	8.94%	9.72%	9.11%	7.92%	9.24%	9.37%	10.54%	7.41%	6.30%	5.59%
12:00	10.80%	11.84%	10.27%	9.95%	9.74%	9.48%	12.42%	10.49%	10.11%	7.17%	5.22%	8.51%
13:00	11.76%	10.47%	11.71%	12.89%	9.93%	8.39%	9.53%	10.63%	8.78%	6.29%	6.87%	5.80%
14:00	10.13%	9.80%	8.50%	9.04%	9.30%	11.94%	9.83%	7.91%	9.24%	8.89%	6.58%	9.87%
15:00	11.72%	12.22%	11.16%	11.26%	8.86%	10.43%	8.30%	11.03%	11.08%	7.51%	6.06%	10.02%
16:00	11.98%	12.03%	12.14%	13.55%	13.08%	9.87%	11.70%	8.18%	11.42%	10.44%	7.89%	7.57%
17:00	13.03%	15.71%	11.49%	15.94%	12.46%	10.56%	7.86%	10.26%	11.51%	9.74%	10.39%	8.99%
18:00	10.72%	10.30%	12.03%	10.82%	12.09%	11.15%	11.22%	9.76%	9.65%	8.73%	11.61%	7.63%
19:00	10.35%	13.49%	11.46%	10.57%	11.08%	9.89%	13.04%	11.92%	10.31%	8.75%	6.81%	5.90%
20:00	11.32%	8.07%	11.89%	13.48%	10.57%	10.35%	11.09%	8.43%	8.87%	9.25%	6.16%	5.87%
21:00	9.18%	10.24%	10.03%	7.30%	9.66%	9.57%	9.28%	8.53%	6.30%	8.49%	7.23%	6.04%
22:00	7.23%	8.39%	8.74%	8.28%	8.70%	6.24%	5.64%	7.14%	6.22%	5.37%	4.66%	5.55%
23:00	7.08%	8.08%	6.72%	5.64%	8.76%	7.07%	5.58%	6.22%	5.46%	5.05%	4.72%	4.18%
Overall	**9.06%**	**9.04%**	**8.89%**	**8.50%**	**8.44%**	**7.98%**	**7.97%**	**7.66%**	**7.38%**	**6.63%**	**5.89%**	**5.73%**
Runs	**2,469**	**2,624**	**2,897**	**2,807**	**2,569**	**1,947**	**2,117**	**2,264**	**2,189**	**1,766**	**1,644**	**1,315**

Unit-Hour Utilization – Engines (Cont.)

Hour	BSH22	BSH42	E34	BSH37	E11	BSH13	BSH27	BSH36	BSH40
00:00	5.51%	0.09%	3.26%	5.70%	2.29%	6.77%	2.01%	0.53%	4.00%
01:00	2.12%	1.48%	2.52%	0.89%	2.78%	3.14%	1.86%	1.29%	5.47%
02:00	1.38%	1.46%	3.68%	5.22%	3.49%	0.36%	2.45%	1.94%	0.10%
03:00	0.54%	0.47%	2.18%	0.97%	0.92%	0.74%	0.51%	0.43%	0.00%
04:00	0.14%	0.78%	1.55%	0.00%	2.24%	3.36%	0.24%	0.26%	2.92%
05:00	1.00%	0.39%	1.92%	0.58%	0.93%	0.55%	0.16%	0.58%	0.19%
06:00	5.63%	0.41%	1.90%	1.12%	2.51%	1.06%	0.05%	0.52%	0.33%
07:00	2.83%	0.62%	2.92%	1.37%	4.10%	3.77%	0.00%	4.71%	4.32%
08:00	2.05%	6.46%	4.39%	8.00%	3.96%	1.09%	0.58%	0.90%	1.05%
09:00	5.16%	2.47%	3.14%	9.33%	4.26%	4.92%	3.38%	1.28%	0.66%
10:00	5.96%	11.82%	5.47%	2.31%	3.97%	6.83%	1.02%	3.51%	3.63%
11:00	3.42%	1.94%	3.63%	5.22%	5.70%	5.31%	0.56%	1.10%	3.15%
12:00	9.48%	9.30%	5.29%	6.89%	3.32%	9.44%	6.05%	15.11%	2.48%
13:00	9.48%	13.41%	4.38%	4.91%	6.11%	3.47%	8.58%	11.65%	12.09%
14:00	9.57%	5.60%	6.53%	6.77%	4.13%	4.16%	16.16%	4.88%	3.69%
15:00	18.38%	6.98%	3.26%	14.57%	4.36%	7.82%	11.77%	6.79%	2.23%
16:00	8.54%	11.41%	5.10%	6.60%	4.60%	6.32%	3.53%	3.36%	5.47%
17:00	8.32%	10.25%	6.48%	1.59%	5.78%	9.75%	5.30%	4.10%	4.85%
18:00	6.11%	8.27%	5.69%	1.85%	4.94%	4.93%	8.49%	2.27%	2.45%
19:00	1.93%	2.32%	4.73%	2.91%	4.43%	1.37%	0.92%	5.77%	3.25%
20:00	0.55%	5.65%	5.00%	0.42%	4.85%	1.64%	3.02%	3.30%	2.22%
21:00	0.74%	2.34%	4.06%	0.89%	3.90%	0.61%	1.35%	1.82%	1.47%
22:00	0.06%	0.43%	2.74%	2.21%	2.77%	0.45%	1.91%	0.45%	0.85%
23:00	0.00%	0.00%	2.48%	0.03%	3.04%	1.10%	0.77%	1.29%	0.20%
Overall	**4.54%**	**4.35%**	**3.85%**	**3.76%**	**3.72%**	**3.71%**	**3.36%**	**3.24%**	**2.79%**
Runs	**164**	**205**	**883**	**175**	**918**	**168**	**154**	**161**	**133**

Unit-Hour Utilization – Engines (Cont.)

Hour	BSH28	BSH32	WAT41	BSH25	BSH11
00:00	0.00%	0.11%	0.00%	0.17%	0.00%
01:00	0.12%	0.00%	0.00%	0.11%	0.07%
02:00	0.00%	0.02%	0.00%	0.00%	0.00%
03:00	0.00%	0.06%	0.00%	0.00%	0.00%
04:00	0.21%	0.00%	0.00%	0.00%	0.00%
05:00	0.00%	0.00%	0.00%	0.00%	0.00%
06:00	0.00%	0.06%	0.00%	0.00%	0.00%
07:00	0.05%	0.00%	0.00%	0.00%	0.00%
08:00	0.11%	0.52%	0.00%	0.00%	0.00%
09:00	0.42%	0.25%	0.00%	0.00%	0.00%
10:00	0.00%	0.08%	0.00%	0.11%	0.07%
11:00	0.17%	0.27%	0.05%	0.52%	0.17%
12:00	2.51%	0.21%	1.71%	0.45%	0.00%
13:00	0.50%	1.02%	0.00%	0.00%	0.27%
14:00	0.76%	1.03%	0.23%	0.40%	0.00%
15:00	1.13%	0.11%	1.39%	0.29%	0.08%
16:00	0.86%	0.17%	0.07%	0.05%	0.05%
17:00	0.17%	0.48%	0.00%	0.00%	0.00%
18:00	0.45%	0.37%	0.00%	0.00%	0.05%
19:00	0.54%	0.23%	0.00%	0.00%	0.13%
20:00	0.44%	0.11%	0.00%	0.00%	0.00%
21:00	0.47%	0.05%	0.00%	0.00%	0.11%
22:00	0.15%	0.00%	0.00%	0.00%	0.00%
23:00	0.35%	0.00%	0.00%	0.00%	0.00%
Overall	**0.39%**	**0.21%**	**0.14%**	**0.09%**	**0.04%**
Runs	**88**	**43**	**9**	**13**	**11**

Unit-Hour Utilization – Quints/Trucks

Hour	Q13	Q33	Q42	Q17	Q23	Q24	Q26	Q31	Q16	T01	Q12	Q35
00:00	7.15%	6.84%	3.39%	5.13%	4.72%	3.19%	2.57%	3.07%	2.16%	2.01%	1.39%	2.31%
01:00	11.82%	5.62%	3.19%	3.62%	2.18%	3.50%	2.06%	2.89%	0.86%	1.96%	3.10%	1.84%
02:00	5.33%	6.53%	3.98%	5.18%	2.63%	1.92%	1.78%	2.42%	1.15%	2.95%	2.24%	0.98%
03:00	5.44%	6.88%	4.91%	4.01%	2.26%	2.14%	1.73%	2.89%	2.02%	1.78%	2.21%	1.15%
04:00	5.02%	6.33%	3.38%	6.84%	10.20%	6.45%	1.15%	1.76%	2.19%	1.49%	1.10%	2.69%
05:00	4.04%	5.55%	4.79%	8.41%	11.57%	6.47%	2.33%	3.08%	1.17%	2.32%	1.40%	1.04%
06:00	5.17%	6.22%	5.54%	6.30%	7.27%	6.06%	2.30%	3.06%	2.83%	3.67%	1.99%	2.04%
07:00	6.17%	6.82%	6.34%	4.21%	3.04%	2.39%	2.71%	3.10%	2.76%	1.70%	2.08%	1.91%
08:00	7.45%	5.68%	9.51%	6.42%	3.98%	4.22%	5.47%	4.32%	4.44%	3.40%	2.28%	2.56%
09:00	11.81%	7.39%	8.07%	6.89%	5.69%	6.89%	6.68%	4.88%	7.56%	3.21%	2.11%	4.30%
10:00	11.28%	6.59%	9.95%	9.29%	6.23%	7.81%	7.06%	5.94%	7.78%	2.62%	4.13%	3.52%
11:00	14.08%	5.19%	9.07%	8.60%	4.97%	5.11%	7.73%	7.04%	5.57%	4.13%	4.22%	3.49%
12:00	9.84%	7.43%	10.20%	6.85%	6.86%	9.06%	7.57%	6.39%	7.87%	2.80%	4.99%	3.03%
13:00	10.28%	8.05%	9.20%	5.70%	5.53%	4.99%	8.61%	5.09%	5.92%	3.02%	3.24%	3.37%
14:00	12.49%	10.86%	9.67%	6.91%	6.05%	6.65%	8.13%	5.78%	6.70%	4.20%	3.75%	2.25%
15:00	12.35%	9.09%	8.71%	8.33%	7.57%	8.45%	8.91%	8.32%	7.26%	3.49%	2.88%	4.04%
16:00	12.58%	9.10%	9.67%	8.43%	7.05%	8.40%	8.46%	7.06%	6.54%	5.81%	3.64%	3.39%
17:00	14.63%	9.53%	10.60%	10.41%	6.50%	8.55%	10.87%	9.26%	7.73%	6.50%	4.25%	4.94%
18:00	11.93%	11.09%	10.25%	12.70%	6.93%	9.75%	9.50%	8.63%	10.03%	4.97%	4.59%	4.90%
19:00	10.86%	8.18%	10.04%	8.30%	6.48%	7.08%	7.26%	9.21%	7.12%	5.79%	4.84%	2.96%
20:00	10.95%	9.12%	8.31%	6.20%	7.47%	6.70%	6.28%	6.51%	4.59%	3.65%	4.24%	3.43%
21:00	10.79%	7.44%	8.23%	4.67%	7.28%	6.05%	4.23%	6.36%	5.93%	2.64%	3.30%	2.85%
22:00	9.03%	8.95%	7.22%	5.13%	4.64%	3.25%	4.00%	4.92%	5.78%	3.08%	3.01%	3.14%
23:00	8.35%	6.97%	4.88%	3.68%	3.63%	3.78%	3.02%	3.34%	2.80%	1.93%	1.86%	1.19%
Overall	**9.54%**	**7.56%**	**7.46%**	**6.76%**	**5.87%**	**5.79%**	**5.43%**	**5.22%**	**4.95%**	**3.30%**	**3.04%**	**2.81%**
Runs	**2,450**	**1,732**	**1,860**	**2,001**	**1,860**	**1,933**	**1,750**	**1,625**	**1,583**	**903**	**1,006**	**672**

Unit-Hour Utilization – Quints/Trucks (Cont.)

Hour	T08	T02	Q21	T14	Q38
00:00	0.95%	0.44%	1.52%	0.54%	0.07%
01:00	0.77%	0.51%	0.68%	0.89%	0.11%
02:00	2.09%	2.25%	1.05%	0.36%	0.05%
03:00	1.48%	1.05%	0.28%	0.19%	0.44%
04:00	0.74%	1.53%	0.23%	0.09%	0.19%
05:00	0.96%	0.54%	0.01%	0.27%	0.62%
06:00	2.11%	1.59%	0.53%	0.68%	0.46%
07:00	1.11%	1.22%	1.43%	1.08%	0.48%
08:00	2.35%	2.23%	1.32%	1.27%	0.49%
09:00	2.07%	3.82%	3.17%	1.77%	0.75%
10:00	2.87%	2.55%	1.93%	1.75%	0.56%
11:00	2.87%	1.67%	2.62%	2.06%	0.74%
12:00	3.29%	3.02%	2.97%	1.80%	0.76%
13:00	3.24%	1.74%	1.92%	0.82%	0.65%
14:00	1.99%	3.02%	2.06%	1.12%	1.00%
15:00	2.17%	3.08%	3.06%	2.41%	0.50%
16:00	4.08%	2.45%	2.48%	1.48%	0.50%
17:00	6.71%	3.92%	3.69%	2.27%	0.34%
18:00	3.46%	3.55%	2.60%	1.63%	0.43%
19:00	2.25%	3.51%	2.99%	1.27%	0.01%
20:00	1.89%	2.12%	2.04%	1.11%	0.10%
21:00	1.46%	1.78%	2.48%	0.21%	0.29%
22:00	1.78%	2.10%	1.08%	0.45%	0.94%
23:00	1.26%	0.84%	1.10%	0.75%	0.05%
Overall	**2.25%**	**2.11%**	**1.80%**	**1.10%**	**0.44%**
Runs	**772**	**710**	**590**	**395**	**124**

This page was intentionally left blank

APPENDIX B

FORT WORTH 9-1-1 EMERGENCY CALL PATHWAY MANAGEMENT

This page was intentionally left blank

Emergency Call Flow Chart (Updated 3/1/22)

- Emergency Incident Occurs
  - Resident Calls 9-1-1
    - Call rings to nearest Primary Public Safety Answering Point based on address and or cell tower location. In Fort Worth that is the Police 9-1-1 center. [PD Call Received]
      - Initial call taker triages the call to determine if Police (PD), Fire (FD) or EMS (MedStar) or all 3 are needed for response. [PD Time First Call Taking Keystroke]
        - Initial call taker determines that there is a need for medical assistance, call is transferred to MedStar Ambulance. Call taker stays on phone and processes the call for Police if there is a need for Police. [PD Time Call Taking Complete]
          - Address and phone number verified [M Call Received]
            - MedStar conducts Medical ProQA questioning.
              - Once determined that there is a medical call with a life safety issue, MedStar sends a CAD to CAD interface incident to FD. [FD In Dispatch Queue], [FD Call Received]
                - FAO determines the appropriate fire response and dispatches the call as long as there is not a staging notification. [FD Dispatched]
                - Fire apparatus dispatched to the incident. [FD In Dispatch Queue], [FD Dispatched]
        - If citizen requests FD, the call is transferred to FAO over 9-1-1. [PD Time Call Taking Complete]
          - Dispatcher enters auto number indicator and auto location indicator (ANI/ALI) info and call details. [FD Call Received], [FD Time First Call Taking Keystroke]
            - FAO determines the appropriate fire response and determines if staging is needed.
              - Fire apparatus dispatched to the incident. [FD In Dispatch Queue], [FD Dispatched]
              - If there is a legitimate need to stage, the call is placed into priority six no response queue until a Police Unit is dispatched. [FD Staged]
                - PD is dispatched. [PD In Dispatch Queue]
                - PD unit en route. [PD En Route]
                - Fire apparatus dispatched to the incident. [FD In Dispatch Queue], [FD Dispatched]
                - PD completes call and disconnects. [PD Time CallTaking Complete]
        - Initial call taker determines that there is a need for Only Police response, call taker creates a CAD incident. [PD Time Call Taking Complete]
          - PD is dispatched. [PD In Dispatch Queue]
      - Due to coall volume, caller gets recording asking them to press 2 for fire emergency, 3 for medical emergency or stay on line.
        - Caller presses 2 or 3.
  - Call transferred to 10-Digit Alternative #
    - Call rings to FAO. [FD Call Received]
      - Caller has an emergency requiring PD presence. [FD Time First Call Taking Keystroke]
        - Dispatcher determines if incident involves life threatening event with active assault.
          - If yes, Dispatcher enters ANI/ALI info and call details.
            - FD will send this call to PD Dispatch Coordinator (DC) desk.
              - PD DC desk assigns an officer as needed and then has the responsibility to transfer the caller to MedStar as they have always done.
          - If no, Dispatcher enters ANI/ALI info and call details. Dispatcher hits "more to follow" which sends a CAD to CAD ticket to Medstar.
            - MedStar receives the CAD to CAD ticket. [M Call Received]
              - FD will send this call to PD Dispatch Coordinator (DC) desk.
                - PD DC desk assigns an officer as needed and then has the responsibility to transfer the caller to MedStar as they have always done.
              - MedStar confirms address and callback number with sending agency. [M Call Received]
                - MedStar conducts callback (3 attempts, 7 rings each attempt).
                - Voice contact made?
                  - If yes, EMD interrogation initiated, ProQA launch. [M Pre-Alert]
                    - Determine if cardiac arrest or ineffective breathing reported. [M Response Plan P1+FD]
                      - Interrogation results in Final Code. [M Response Plan], [M Priority Number], [M Dispatched]
                        - Protocol specific instructions given
                          - Pre-arrival instructions, post dispatch instructions or routine disconnect
                            - Pre-Arrival Instructions: Arrest, airway, childbirth, or choking instructions given. [M En Route]
                              - Call taker disconnects when EMS or FD arrives at patient's side. [M Arrived]
                            - Post Dispatch Instructions: Bleeding control, unstable patient, danger/violent patient.
                              - Stay on the line and monitor the patient.
                                - Call taker disconnects when EMS or FD arrives at patient's side. [M Arrived]
                            - Routine Disconnect: Caller is instructed to prepare for EMS arrival, to call back if anything changes and call is discoonnected.
                        - Emergency call volume forces call taker to apply emergency rule. (Once final code is reached, the emergency rule can be applied at any point in the proocol.
                          - Call taker gives URGENT DISCONNECT instructions and answers next ringing 911.
                  - If no, Process through ProQA with info provided by sending agency. [M Response Plan], [M Priority Number P1/P2/P3]
                    - MedStar Sent. [M Dispatched]
                    - Final code requiring First Responder. [M Response Plan +FD]
                      - CAD to CAD incident sent to FD for First Responder Activation (Update incident received from FD).
                    - Scene safety concern requiring Police. [M Response Plan +PD]
                      - CAD to CAD incident sent to PD for Police response request (Update incident received from PD).
      - Caller has an emergency requiring medical attention only. [FD Time First Call Taking Keystroke]
        - Dispatcher enters ANI/ALI info and call details. Dispatcher hits "more to follow" which sends a CAD to CAD ticket to Medstar.
          - MedStar receives the CAD to CAD ticket. [M Call Received]
            - FAO transfers caller to MedStar and stays on call (if call volume allows) to determine if FD assistance needed.
        - Fire apparatus dispatched to the incident. [FD In Dispatch Queue], [FD Dispatched]
      - Caller has a fire emergency. [FD Time First Call Taking Keystroke]
        - Fire apparatus dispatched to the incident. [FD In Dispatch Queue], [FD Dispatched]
        - FAO completes call and disconnects. [FD Time Call Taking Complete]
  - Auto Alarm
  - Resident Calls Non-Emergency #
  - Resident walks up to FD station/unit.
    - Station/Unit contacts FAO via radio to report incident and report address info.
      - FAO creates incident ticket in CAD.
        - Determine if Station/Unit can respond to incident.
          - If Yes, Station/Unit responds to incident.
          - If no, Additional Fire apparatus dispatched to the incident.
  - Resident walks up to PD station/unit.
  - MedStar initiated incident (e.g. patient walk-up, unit drove up on emergency scene, etc.).
    - Crew confirms location, provides nature of incident, priority, need for FD and need for PD [M Call Received]
      - Dispatcher EMDs call with known information. Adjusts response plan to meet crew request [M Response Plan], [M Priority Number P1/P2/P3]
        - Unit placed on scene of call [M Arrived]
        - CAD to CAD incident sent to FWFD for First Responder activation (update incident received from FWFD). [FD Call Received]
        - CAD to CAD incident sent to FWPD for police response request (update incident received from FWPD). [PD Call Received]

RESPONSIBLE PARTY COLOR CODE: Caller / Resident | FWPD | FWFD | MedStar