CITY OF YUMA
FIRE DEPARTMENT

FIRE SERVICES AND FACILITIES PLAN
2007

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RESOLUTION NO. R2008-13

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF YUMA, ARIZONA, AMENDING RESOLUTION R2002-34, THE CITY OF YUMA GENERAL PLAN, PROVIDING A MINOR TEXT AMENDMENT TO CHAPTER 8, PUBLIC SERVICES ELEMENT, BY UPDATING THE CITY OF YUMA 2000 FIRE SERVICES AND FACILITIES PLAN

WHEREAS, the General Plan of the City of Yuma was adopted in 2002 by Resolution R2002-34 for the orderly and balanced development of lands through efficient and systematic land use planning; and,

WHEREAS, the City of Yuma, in partnership with Yuma County, developed the City/County Joint Land Use Plan (JLUP), which was adopted by resolution R96-38; and,

WHEREAS, the land use plan provides a vision of development into the future based on the existing development, the needs of the community and the desires of property owners; and,

WHEREAS, the City of Yuma Planning and Zoning Commission held public hearings on January 14, 2008 and January 28, 2008 for General Plan Amendment Case No. GP2007-008, regarding the request for a Minor text Amendment to City of Yuma 2002 to the City of Yuma General Plan, Chapter 8, Public Services Element as a result of an update to the City of Yuma 2000 Fire Services and Facilities Plan; and,

WHEREAS, due and proper notice of the public hearings were given in the time, form, substance and manner as provided by law, including publication of such notice in The Sun on December 29, 2007; and,

WHEREAS, as the community grows and prospers, it may be necessary to amend the JLUP to reflect development trends and opportunities; and

WHEREAS, the proposed General Plan Amendment meets the goals and objectives of the General Plan, and retains an adequate mixture and balances of land uses.

NOW THEREFORE, BE IT RESOLVED by the City Council of the City of Yuma, Arizona that Resolution R2002-34, the City of Yuma General Plan, Chapter 8, Public Services Element, be amended by updating the City of Yuma 2000 Fire Services and Facilities Plan, as described in exhibit A, attached hereto and by this reference made a part hereof.

Adopted this 20th day of February, 2008.

APPROVED:

Lawrence K. Nelson
Mayor

ATTESTED:

Brigitta M. Kuiper
City Clerk

APPROVED AS TO FORM:

Steven W. Moore
City Attorney

CITY OF YUMA

FIRE SERVICES AND FACILITIES PLAN

PREPARED BY THE CITY OF YUMA

DEPARTMENT OF COMMUNITY DEVELOPMENT
AND
FIRE DEPARTMENT

DECEMBER 2007

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ACKNOWLEDGEMENTS

We wish to thank the members of the City of Yuma Fire Department, who have offered their time, provided information, and have actively participated in reviewing and developing options for the Fire Services and Facilities Plan.

The study for this plan would have been incomplete without the efforts of the Geographic Information Systems Division of the Information Technology Services Department for the development and completion of the Travel Time and Station Location and Service Area maps, which aided in the visioning for this Plan.

The evaluation and recommendations are those of the Fire Services and Facility Committee. Principal members of the study team and their prime responsibilities are as follows:

Jack McArthur – Fire Chief/Department Director

Art Castricone – Fire Marshal/Demand Projection and Station Location Analysis

Noah Cullis – Senior Planner/Project Manager

Brian Brady – Geographic Information Systems (GIS) Analyst and Administrator

Eric Gutierrez – Senior GIS Technician

Kayla Holiman – Fire Inspector/Facility and Apparatus Photography

Juan Huerta – Fire Code Plans Examiner/Facility Design Evaluation

Traci Frazer – Computer Support Specialist/Statistical Analyst

Mike Erfert - Public Information Officer/On Scene Photography

COMMUNICATION... ACCESSIBILITY... COMMITMENT... INNOVATION...

CITY OF YUMA MISSION STATEMENT

"The City of Yuma Government exists to provide structure, process, and leadership of public discussion and decision making.

As stewards of the community's assets, we are committed to providing quality public goods and services which promote the health, safety, and welfare of all the individuals and entities who reside in, work in, or visit our community.

We are dedicated to furthering the social and economic wellbeing of our citizens, now and in the future."

CITY OF YUMA FIRE DEPARTMENT VISION STATEMENT

"The City of Yuma Fire Department is a dynamic, professional organization that anticipates and meets the needs of our customers. We are guided by the values of loyalty, mutual respect and compassion. We provide exceptional customer service through community interaction and teamwork."

CITY OF YUMA FIRE DEPARTMENT MISSION STATEMENT

"To instill a sense of safety, security, and pride in those we serve through professional emergency intervention, education and prevention services."

EXECUTIVE SUMMARY

The City of Yuma, Arizona is an urban metropolitan area that has experienced rapid growth over the past decade from 63,150 in 1996 to 92,160 in 2006. The City continues to expand through development and population growth.

Part of the Public Services Element of the City of Yuma 2002 General Plan is the strategic placement of new fire stations and facilities throughout the community. This is essential to emergency services delivery in order to maintain the highest possible level of public service and an excellent Insurance Service Office (ISO) community rating. Since January 25, 1900, the City of Yuma Fire Department has made substantial strides to identify areas to improve fire and emergency response and the implementation of new technologies to better serve the expanding Yuma community. It is the purpose of this Fire Services and Facility Plan to further fortify and develop this vision into the next decade.

CURRENT OPERATIONS

The residents of the City of Yuma are well served by their Fire Department. The average response time for incident calls is under eight minutes, which places Yuma at the leading edge with cities of its size. The response times take into consideration the time required to process the call placed to the 911 center, dispatch and the turnout time for crews to assemble and drive to the incident site. The travel time maps measure “wheels rolling” from departure from the fire station to the incident site.

The Fire Department has evolved from the traditional services of fire prevention and containment to its current mission, which has been broadened to include a range of sophisticated emergency response for rescue and mitigation services. Currently, emergency medical service (EMS) accounts for 80 percent of all emergency response for the Fire Department.

The City of Yuma maintains a balanced fleet of state of the art fire apparatus. These late model units serve a full range of emergency operations, which include ladder, engine, water and high angle rescue as well as hazardous materials response and mitigation.

DEMAND PROJECTIONS

As the population grows, so does the demand for more firefighters and more facilities to house them. This document provides an inventory of existing facilities and identifies new facilities to serve the City of Yuma as a growing community.

I. INTRODUCTION

FIRE SERVICES AND FACILITIES PLAN

This document is an update to the original plan adopted as a portion of the City of Yuma 2002 General Plan. Arizona Revised Statute (A.R.S. §9-461.05) requires communities with a population of 50,000 or larger to adopt a plan for fire services as a component of the Public Services Element. The Public Services Element encourages the placement of new stations and infrastructure needs for the fire and emergency medical services within the City of Yuma.

The City of Yuma is steadily increasing its size in population and geographic area. The City of Yuma's current population is 92,160 and is projected to reach 128,694 within the next ten years. The number of emergency response calls has increased as well as the variation to the type of calls over the past decade. Emergency Medical Services (EMS) response to incidents now account for 84 percent of all emergency calls for the Fire Department.

Scope

This Plan evaluates the level of service provided by the amount and effectiveness of current firefighting personnel in fire stations, deployment of resources and the mixture of units and their staffing. During the preparation of this Plan, alternatives for the future (in light of the anticipated continued growth in population and area) have been considered. The following items are specifically addressed:

- An overview of the current response system in place for calls associated with the Fire Department.
- An inventory and evaluation of the quality of existing fire station facilities and their housed apparatus.
- A description of future demand forecast for emergency services provided by the Fire Department.
- A description of how the plan is to be incrementally implemented throughout the next ten years.

Research in developing this Plan is focused on increasing and maintaining a high level of service through efficient staffing of personnel, equipment, apparatus and proper location of future facilities.

Plan Criteria

The Fire Department has a goal of an average drive time of 4 minutes for the first unit and 6 minutes for the second unit for emergency calls. This criterion is based upon the amount of time it takes from wheels rolling to the arrival of personnel. To assist in the quickest response, a series of travel distance maps were created by inputting the City's roadway system into a mapping and algorithm program. The

program calculates the shortest distance between the location of an incident and the nearest fire station to respond to a dispatched call.

The Plan illustrates the rise in the City's population in comparison to the increase in incidents ranging from fire to EMS calls. Therefore, additional fire stations and other fire facilities are necessary to fulfill the emergency needs of a growing community.

The criterion for what is expected in size and design for new facilities is addressed, along with the need for more space in the form of apparatus bays, dorms, service rooms and storage.

Methodology

A committee comprised of the Department of Community Development and the Fire Department staff began this project by reviewing the existing plan and disseminating areas that could be improved upon or that had not been explored. The Fire Department provided considerable information about current practices, strategic delivery of service, history background and the needs for new facilities, apparatus and equipment. A study of the Fire Department's calls over the past ten years was reviewed extensively and inserted into the Plan. The committee toured and studied each fire station, numerous apparatus, spoke with various members of fire administration, firefighting and EMS crews and participated in emergency ride-a-longs with crews.

The committee met monthly to discuss emergency service and facility issues facing the Fire Department. Issues included meeting the demands of population and developmental growth, storage needs for vehicle apparatus, equipment and fire/emergency crews. Design issues of existing versus future fire stations were also discussed.

The committee worked together to research and gather data about existing facilities and future locations. Interviews were conducted with the Battalion Chiefs, Fire Captains, and crews to obtain the point of view of those who use and maintain the facilities on a daily basis.

Fire departments of cities near the same population size were contacted and asked a series of questions related to their department size, square miles covered, amount of current fire stations and the number of personnel who were assigned to each station. This information was organized into a table for comparison. After all of the data was obtained and disseminated, the committee discussed how the Plan should be organized and presented.

Organization of this Report

Chapter I provides an introduction and overview of the Plan. Chapter II discusses the current and future organization and operation of the City's Fire Department. Chapter III addresses the fire facilities inventory analysis. Chapter IV addresses demand and forecast of the Fire Department. Chapter V presents an implementation plan of the Fire Services and Facilities Plan itself.

II. THE CURRENT SYSTEM

THE DEPARTMENT

The City of Yuma Fire Department serves 92,160 year round residents. The City is located in Yuma County that has a diverse economy, which includes agriculture, tourism and two U.S. military installations.

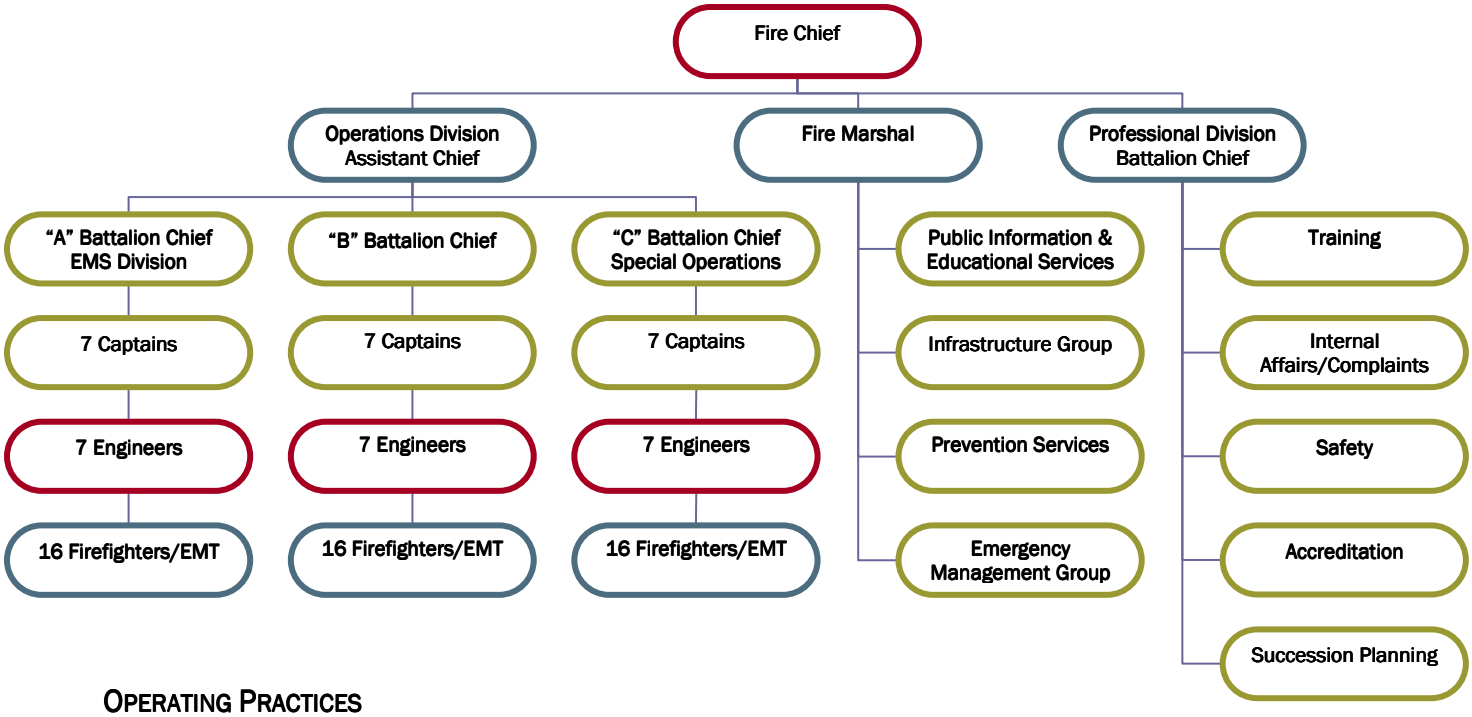
The Fire Department was founded by the City Council on January 25, 1900 following a devastating fire claiming the lives of five civilians, who were ill equipped to fight a fire in a multi-story mercantile building. The equipment acquired for this volunteer force included a hand-drawn ladder truck, a hook and pole with chain attachment, two pikes, ten buckets, rope, four extinguishers and one hand drawn hose cart. Three additional hose carts were soon added. In 1915, a pre-alarm system (telegraph) was installed providing notification to the Fire Department. By 1918, a truck with a hose bed and chemical extinguisher had been acquired and the main fire station had located to City Hall where it remained until 1958. In 1922, an additional truck (pumper) was added as a result of rapid population growth and another was later added in 1927. By 1945, Fire Station No. 2 (1098 S. 6th Avenue) opened. Another fire pumper was also acquired. By 1957, Fire Station No. 3 (2450 S. Madison Avenue) was opened and a ladder truck was added to the force. Station No.1 was relocated from City Hall to 298 W. 4th Street in 1958.

The Fire Department provides full service for 57.8 square miles out of a total 111.97 square miles of the City. The remaining area includes emergency medical response within the Barry M. Goldwater range. As development occurs, the Fire Department will protect an even larger area and a larger population. This creates a challenge for maintaining service levels in the face of increased demand over a larger area. The Fire Department provides a full range of fire services including rescue, fire and hazardous materials response.

Fire suppression is the traditional service provided by fire departments and consists solely of the activities directly involved in fighting hostile fires that threaten life and property. The ability of the fire department to effectively and efficiently provide fire suppression services is the primary basis for communities receiving benefit of an organized fire department.

The following chart illustrates the current organization of the City of Yuma Fire Department. Administration of the Fire Department rests upon the Fire Chief and Assistant Fire Chief. Battalion operations are administered through the Battalion Chief. The minimum staffing per crew is 26, which includes 1 Battalion Chief, 7 Captains, 7 Engineers and 16 Firefighters.

City of Yuma Fire Department Organizational Chart



OPERATING PRACTICES

Unit Staffing – The City of Yuma Fire Department staff includes 130 employees. Staffing includes the areas of administration, fire prevention and operations. Tables 2.1 and 2.2 detail the amount of staff positioned to each area and the amount of staff in relation to the overall number of incident calls over a ten year period between 1996 and 2006. The number of incidents has almost doubled since 1996, while the amount of staff has only increased by 30 percent.

Table 2.1: City of Yuma 2007 Fire Department Staffing

Assignment	Number of Positions
Administration	15
Community Risk Reduction	9
Operations	106
Total	**130**

Table 2.2: Trend in Incidents and Staffing

Date	Incidents	Staffing
1997	5,718	86
1998	5,676	101
1999	6,823	109
2000	6,823	113
2001	7,587	113
2002	8,453	103
2003	8,778	105
2004	9,208	105
2005	9,208	110
2006	10,046	122

Figure 2.1: Trend in Incidents, 1997-2006

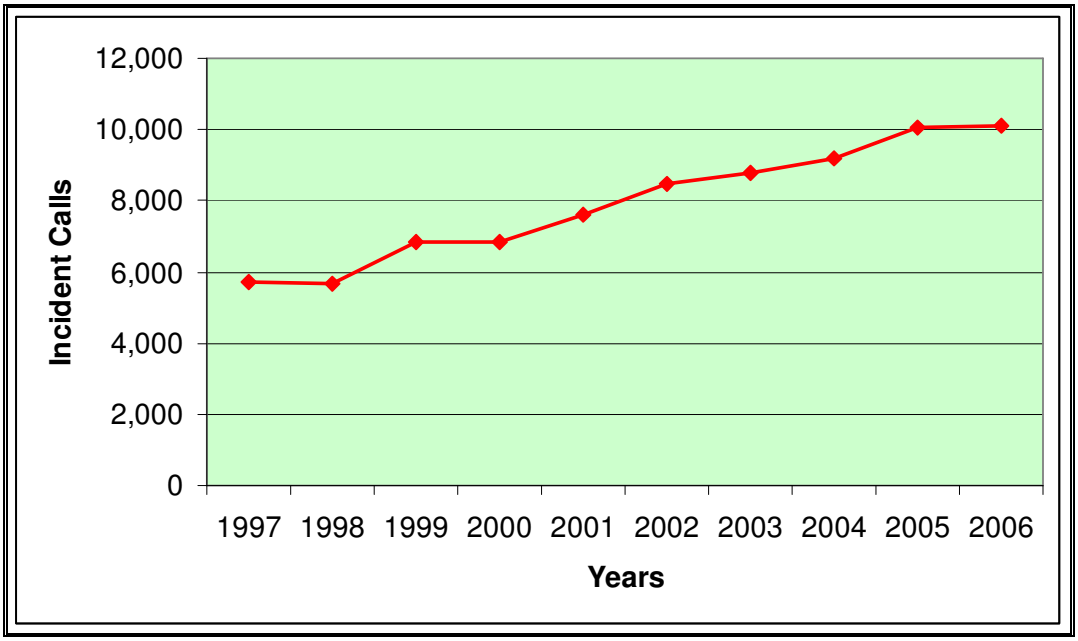


Figure 2.1 graph illustrates a steady trend in the amount of incidents over a ten year span between 1997 and 2006. From 1997 to 1998 the trend is steady. Then in 1999, an increase of 6,000 calls rises to 7,000 calls and then levels off for a year. A substantial increase of incident calls occurs from under 8,000 calls in 2001 reaching 10,000 calls in 2005.

RESPONSE COMPLEMENT – The Department's standard response for each type of fire call is as follows:

Commercial and Residential Fires - A ladder, rescue company, three engine companies and the battalion chief will respond, which is a commitment of at least fifteen fire and EMS personnel.

Semi Tractor Trailer or Recreational Vehicle or Similar Fires – For a "Special Duty 1" assignment, two engine companies and the battalion chief will respond, which is a commitment of at least seven firefighting personnel.

Passenger Car or General Fire Alarm – For a "Special Duty 2," a single engine company will respond, which includes a minimum of three firefighter/EMS personnel.

DISPATCHING - The City of Yuma Public Safety Communications Center services the City of Yuma Fire Department. The center handles emergency and non-emergency call taking and dispatching for all EMS, Police and Fire incidents in the City of Yuma and is staffed with 34 personnel.

Public safety dispatching in itself is very complex, and the agency utilizes several operating systems to provide timely, accurate response to calls for service within the city limits. It is the primary 9-1-1 Public Safety Answering Point (PSAP) for the City of Yuma.

Fire Dispatchers are certified in and use the Association of Public Safety Communications Officials (APCO) Emergency Medical Dispatch (EMD) program. The APCO EMD Program and EMD Guide cards provide a reliable method for call prioritization and effective use of fire resources. Once the call is prioritized and dispatched using the guide cards, the dispatcher can also provide pre-arrival instructions to the caller and provide the responding units with a short report of information regarding the circumstances of the call. Current mandatory staffing allows for no less than 2 fire radio dispatchers on duty during peak call hours of 11:00 AM to 3:00 AM, and no less than 1 during the hours of 3:00 AM to 10:00 AM, in addition to the support provided by fellow on-duty Police dispatchers.

The Fire Department and communications center have several redundancies in place to ensure efficient and timely delivery and receipt of calls for service. When a call is dispatched from the communications center, a message is sent to a pager in each fire unit via the City of Yuma's alpha paging system which contains location and type of emergency incident. A vocal announcement is transmitted over the portable radios and to each fire station and finally a call is sent to the dispatched units via mobile dispatch center (MDC) with the call/location information. Every Fire Department vehicle is equipped with a Motorola MDC and it can acknowledge receipt of a call for service at the push of a button. This has cut down on the amount of radio traffic between dispatch and the responding units. The MDCs and pagers also act as methods for sharing pertinent and time sensitive information with regard to weather warnings and road closures, etc.

CURRENT SERVICE LEVELS - The Insurance Services Office (ISO) provides a rating service evaluating the resources and abilities of individual fire departments. ISO ratings range in a numerical order from 1 to 10, while a rating of 10 means there is no available fire service. The City of Yuma Fire Department has an outstanding ISO rating of 3. This rating directly correlates to residential and commercial fire insurance rates. The proficiency of the Fire Department provides our citizens with reduced fire insurance premiums, compared to the surrounding areas.

Related to the ability to quickly respond to fires is the distribution of fire stations. Fire stations, the point of service delivery, are evaluated regarding their consistent distribution and spacing throughout the community (de-centralized). The ISO has a standard that reflects the belief that fire suppression services can be most effectively delivered to an area approximately 6 ½ miles around each fire station. These areas have been traditionally drawn in the shape of a polygon, which represents travel distances (road miles) from each fire station. Influencing factors of natural and/or manmade barriers are taken into consideration as new fire station locations are identified. Recent improvements in mapping technology allow for station response districts and locations to be charted with respect to road limitations (speed limits) and other barriers.

EMERGENCY MEDICAL SERVICE (EMS) - Requests for EMS have consistently comprised over 80% of the Department's total call volume for the past several years. In 2007, the Department is anticipating to exceed 8,500 EMS runs.

EMS was initiated in the early 1960's by providing trained personnel in cardiopulmonary resuscitation (CPR) and responses to drowning incidents. The early 1970's expanded this service with a new, fully equipped van with extrication and patient stabilization equipment. The first Emergency Medical Technician (EMT) was trained at Arizona Western College in 1974. The Fire Department had six personnel who received their EMT certification at that time.

Technical Rescue operations are identified in the organizational structure of the City of Yuma Fire Department as Special Operations. This encompasses the disciplines of water, rope, confined space, trench rescue, structural collapse and palm tree rescue. With these capabilities, an effective and efficient program was established to rescue trapped or endangered persons using these skills.

LADDER TRUCK COVERAGE – Currently ladder truck coverage for the City of Yuma is performed by one platform ladder truck housed at Station No. 2 with the support of two smaller telescoping ladder trucks strategically located at Stations No. 1 and No. 5. A second platform ladder truck will be purchased and brought in to service when the City's population reaches 116,000.

RESERVE APPARATUS – Reserve apparatus is used when a front–line apparatus goes out of service for mechanical problems or in the event of a major emergency in which off-duty crews are called in as additional companies.

INCIDENT TYPES - The City of Yuma Fire department manages a series of differing incident type calls. The majority of calls is considered emergencies and therefore requires quick response of efficient and trained firefighting and EMS personnel, equipment and apparatus. The following is a description of each type of incident call to which the Fire Department responds.

TABLE 2.3 CALLS FOR SERVICE PER YEAR

YEARS	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TYPES OF CALLS										
Fire	326	271	328	339	360	325	350	394	341	362
EMS/Rescue	4,655	4,747	5,397	5,626	6,246	6,978	7,235	7,609	8,389	8,330
Hazmat	207	144	142	137	207	166	188	173	177	150
Service	62	58	111	104	110	120	109	120	147	146
Overpressure	6	4	10	5	29	32	26	14	15	25
Good Intent	202	182	232	237	260	515	420	456	457	506
False Alarm	248	265	297	315	343	290	426	427	488	529
Special	6	5	44	60	32	27	24	15	32	49
TOTAL	**5,718**	**5,676**	**6,823**	**6,823**	**7,587**	**8,453**	**8,778**	**9,208**	**10,046**	**10,097**

FIRE SUPPRESSION – It is a common misconception that fire suppression is the major role of the Fire Department. Fire incidents shown in table 2.3 only include working fires or where there was actual fire damage. Fire incidents have been steady with a slight increase over the last 10 year period. This is similar to other cities experiencing growth like Yuma's according to Table 2.4.

EMS/RESCUE - EMS includes medical emergencies and automobile accidents with injuries. EMS is also seen in some instances as a last resort for health care for the uninsured. Because EMS calls are so large in number, any increase in utilization of these services on a per capita basis has major consequences for the overall demand of service provided by the Fire Department. It is expected that the demand for EMS will continue to increase. As shown in Table 4.3, EMS/Rescue calls have a positive rate of growth per capita in most years.

HAZARDOUS MATERIALS - Since 1990, the City of Yuma Fire Department has had a Hazardous Materials Response program designed and staffed to protect the community from the hazards associated with the uncontrolled release of hazardous materials. Hazardous condition calls are those incidents which could have, but did not cause a fire or medical incident, but still required attention of the Fire Department on an emergency basis. Hazardous conditions include the release of natural gas, flammable liquid spills with no fire, hazardous materials, and downed electrical wires.

SERVICE CALLS - Incidents that are not strictly defined as emergencies but receive a fire or EMS response and some Fire Department action are considered service calls. Service calls may include incidents involving broken water pipes, individuals who have fallen or any number of unusual events including rescuing animals and assisting the public with items such as locked vehicles or buildings.

GOOD INTENT – Good intent calls occur when a citizen reports an emergency and when fire services arrive on the scene, the situation that was called in is not an emergency. Good intent calls appear to increase as the knowledge of contacting fire

and emergency service is made available. The use of cellular phones has enabled residents' access to 911 emergency operators easier and has probably added to the increase in these types of calls. After a large decrease from the years of 2001 to 2004, service calls climbed sharply once more from 2004 to 2005 at 3.3 percent rate of growth. Continued growth of these calls is expected.

FALSE ALARMS – The rise in home and business electric security systems has increased the number of false fire alarms. False alarms are alarm systems or 911 calls that turn out to be false. False alarms remained steady during the first half of the period, then, in 2002, rose sharply.

INNER-CITY COMPARISONS - Table 2.4 presents comparisons of the City of Yuma and four other cities in the western United States with populations that range from 72,000 to 108,000. It is interesting to compare fire departments with other cities with similar populations. The City of Yuma Fire Department had a greater number of runs than the Fire Department of Roseville, California which has a greater population. The distribution of population served per fire station of each community is also interesting to observe. The City of Clovis, CA Fire Department reports that it serves 22,500 people per their four fire stations with a population of 90,000. The City of Parker, CO shares the same amount of population but serves their community of 15,000 people amongst their six fire stations. The City of Silverdale, WA has the highest amount of firefighters with the least population count. Each fire department is assembled to meet their communities' needs with the resources available to them.

Table 2.4, 2006 CITY COMPARISONS

Municipality	Population	Area Served (Sq Miles)	Uniformed Personal	Fire 1000	Number of Stations	Population Per Station	Square Miles Per Station	No. of Runs	Firefighters per Station	Runs 1000 Pop
Roseville, CA	108,000	36	105	.97	8	13,500	5	10,000	13.1	93
Yuma, AZ,	94,925	58	92	1.03	5	17,755	10	10,098	18.4	114
Parker, CO	90,000	17	94	1.04	6	15,000	3	5,264	15.7	58
Clovis, CA	90,000	4.5	73	.81	4	22,500	1	7,105	18.3	79
Silverdale, WA	72,000	115	184	2.55	12	6,000	10	7,458	15.3	104

RESPONSE COVERAGE - Overall coverage for the City is sufficient. If the City continues to annex and grow in population, coverage for some areas may become difficult, and positive response times could begin to diminish city-wide, reaching unacceptable limits if facility planning is not completed.

According to Table 2.5, the average response times are the longest for Station No. 5, which covers a larger area and distances greater than the other Fire Stations in the City. Station No. 3 appears to have the quickest response times, since it is located between heavily residential and commercial developed areas. The Department operates from five stations with a normal on-duty staffing of 26 personnel. The average response time for EMS calls is 6 minutes, and the average response time for fire related calls is under 8 minutes.

Currently, both the central portion and fringe areas of the City are receiving adequate coverage. Some of the areas on the fringe are less developed, resulting in fewer calls for longer travel time.

Table 2.5, 2006 Average Response Times per Fire Station

Fire Station	Fire Related Average Time	EMS Related Average Time
No. 1	8:06	5:50
No. 2	6:55	6:10
No. 3	7:28	5:22
No. 4	7:32	6:02
No. 5	10:13	7:53

FIRE STATION RESPONSE AREA MAPS - The first map is representative of the City's urban boundaries and identifies all active fire stations. The second map displays the total build out of fire stations within a ten year period. The area shown is bounded on the west by Somerton Avenue, County 18th to the south, Avenue 10E to the east and County 7th to the north. Each map identifies the travel distance in relation to each station.

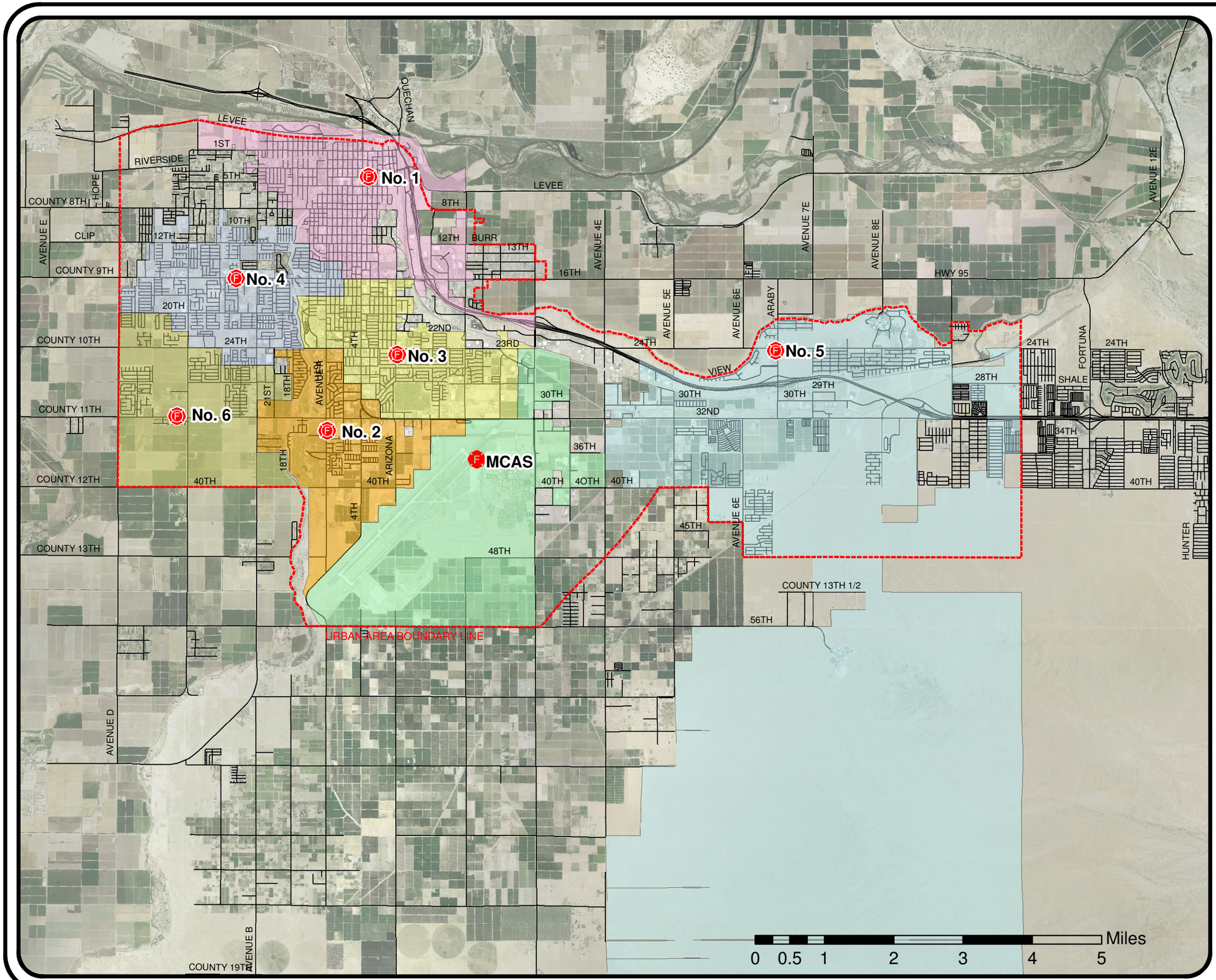
TRAVEL TIME MAPS

Travel time, which is considered the elapsed time between the time when fire companies are dispatched and their arrival on scene, proves useful when analyzing the quality of emergency service and response a fire department provides. The standards the Fire Department must meet are set by the National Fire Protection Association (NFPA) and insurance companies. These standards include benchmarks for travel time distances. It is a fundamental goal of fire departments and agencies to protect against loss of life and property from fire and medical emergencies. Increases in population and development prompt review of current travel distance maps to ensure that a high level of service is maintained.

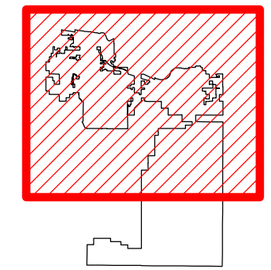
Analysis of the time it takes for personnel to respond to an emergency incident is one of the most important performance variables by which to measure the fire service. The response time is impacted by the distance between a fire station and an emergency scene. This is referred to as the square-root law, which is a mathematical equation that plays a crucial part in the analysis of where to position new fire stations and training facilities in order to reduce travel distances. A reduction in the time taken to respond to an emergency scene increases a fire department's ability to save lives and property.

The following maps were designed using a travel algorithm computer program which is based upon the square root law to determine the time and distance required for each fire station using current service areas and roadway data. The three colors of green, yellow and red depict travel time depending on the distance the incident call is from a specific fire station. Green represents a 4 minute response; yellow represents a 6 minute response; and red represents an 8 minute response.

(Note: The response times should not be confused with the time distance maps. The response times show the time it takes for a call to be received by Dispatch until firefighters or EMS arrive on scene. The travel distance maps illustrate how long it takes for emergency crews to arrive on scene at time of "wheels rolling" or when they leave the fire station. Therefore, there is some differentiation between actual average response times and the Travel Time and Location maps.)



City of YUMA



Fire Facilities Plan December 2007

FIRE STATION RESPONSE AREAS- 2007

- M.C.A.S.
- FIRE STATION
- Urban Area Boundary
- MCAS
- Station1
- Station3
- Station4
- Station5
- Station6

NOTES:

a) The maps and or Geographic Information System (GIS) products contained herien were prepared for use by the City of Yuma (City) for its internal purposes only and were not designed or intended for use by the members of the general public. The City makes no representation of warranty as to accuracies and in particular, the accuracy in labeling, dimensions, contours, property boundaries, or placement of any map features herien.

b) The City makes no warranty of merchantability or warranty of fitness for use for a particular purpose, expressed or implied with respect to this product.

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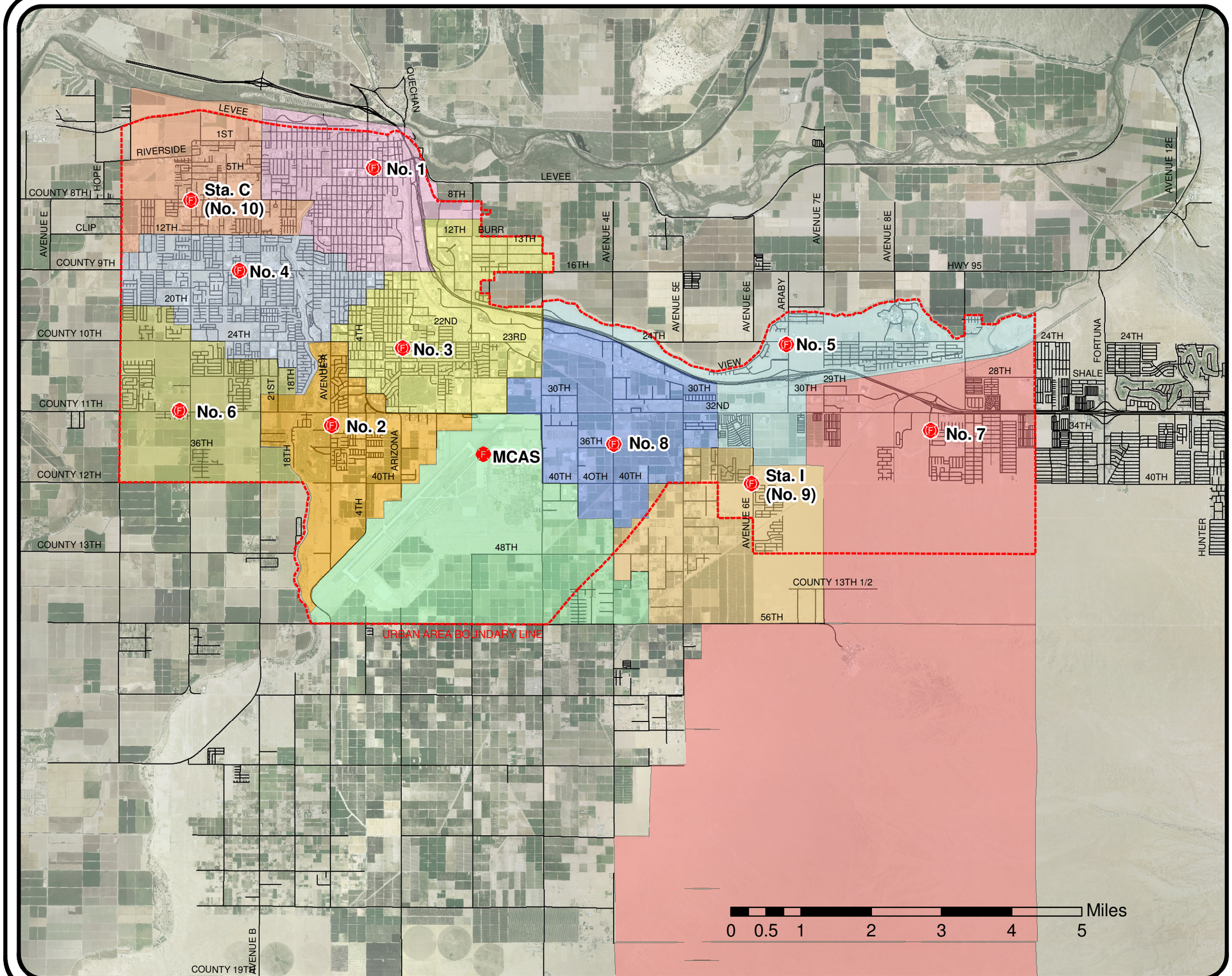

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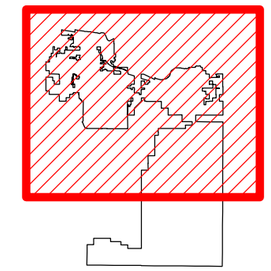

N

Fire Facilities Plan December 2007

FIRE STATION RESPONSE AREAS- 2017

- M.C.A.S.
- FIRE STATION
- Urban Area Boundary

SERVICE AREA

- Station 1
- Station 2
- Station 3
- Station 4
- Station 5
- Station 6
- Station 7
- Station 8
- Station I (No. 9)
- Station C (No. 10)
- Station MCAS

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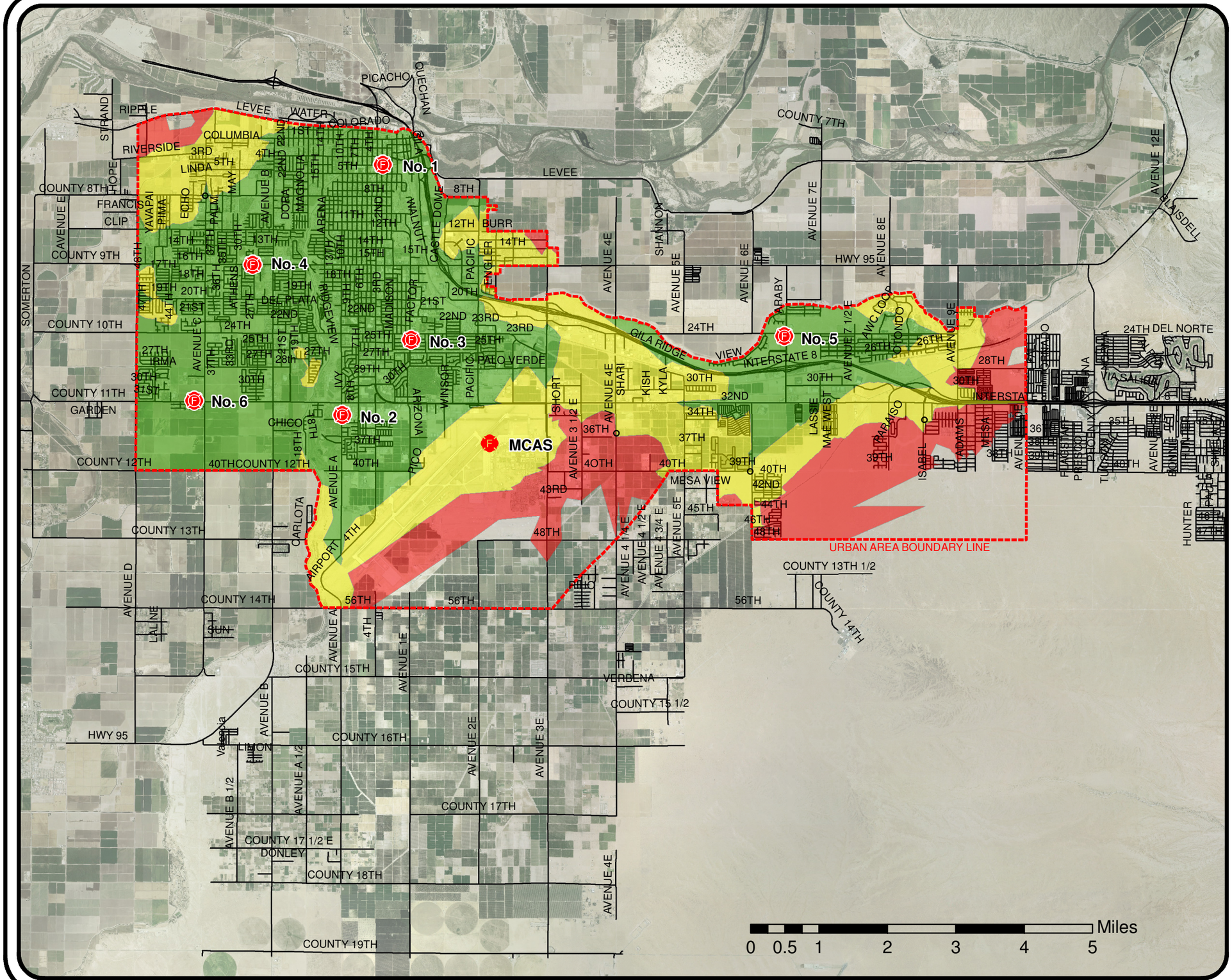

City of YUMA

Fire Facilities Plan December 2007

FIRE STATION TRAVEL TIMES- 2007

- M.C.A.S.
- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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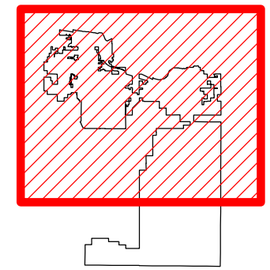

Fire Facilities Plan December 2007

FIRE STATION TRAVEL TIMES- 2017

- M.C.A.S.
- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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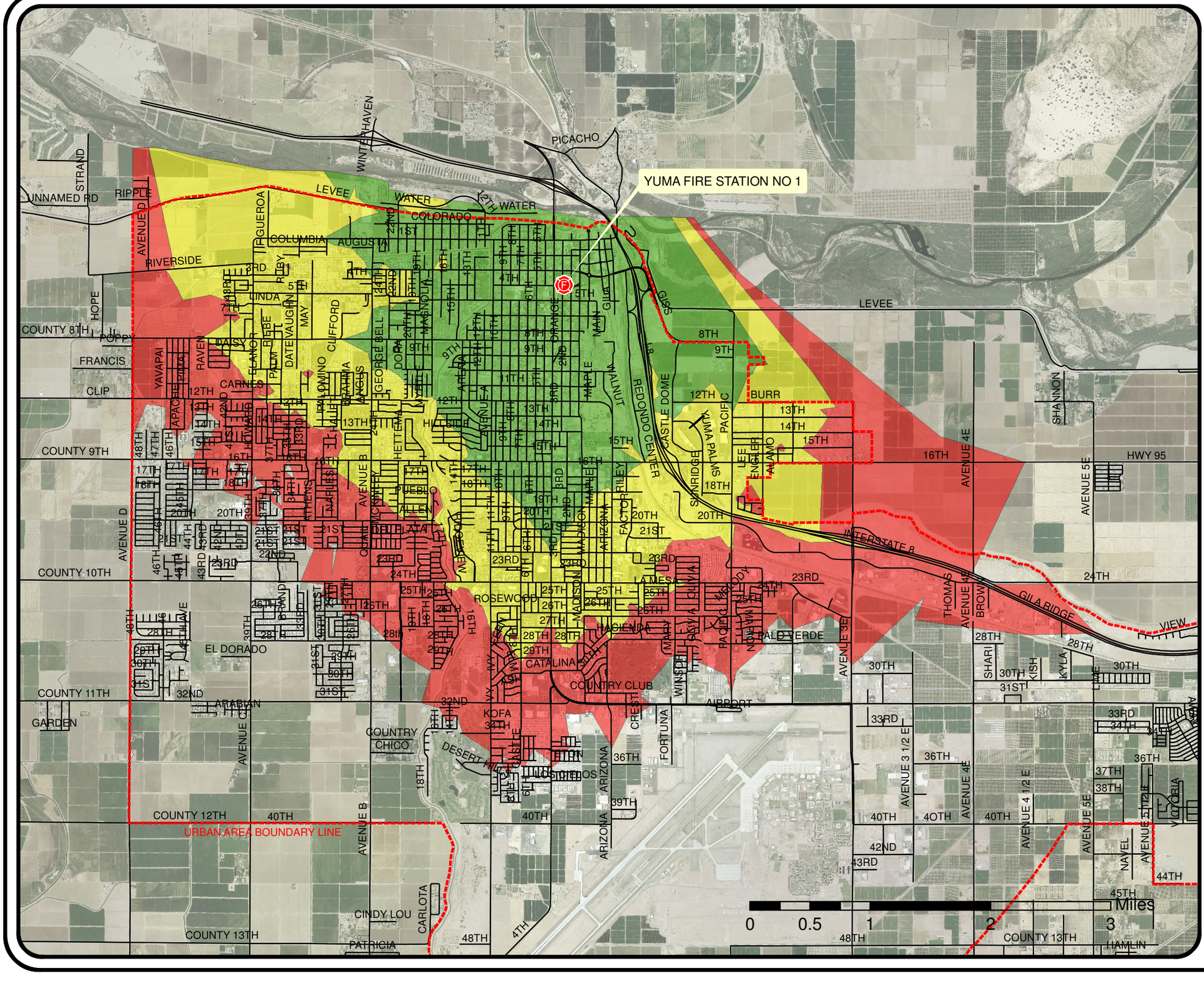

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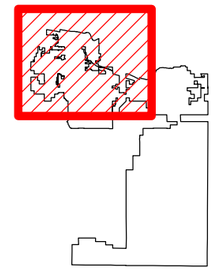

Fire Facilities Plan December 2007

FIRE STATION NO. 1 TRAVEL TIMES- 2007

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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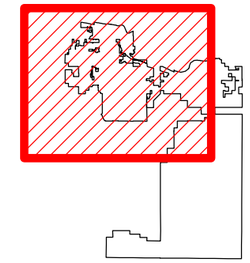

Fire Facilities Plan December 2007

FIRE STATION NO. 2 TRAVEL TIMES- 2007

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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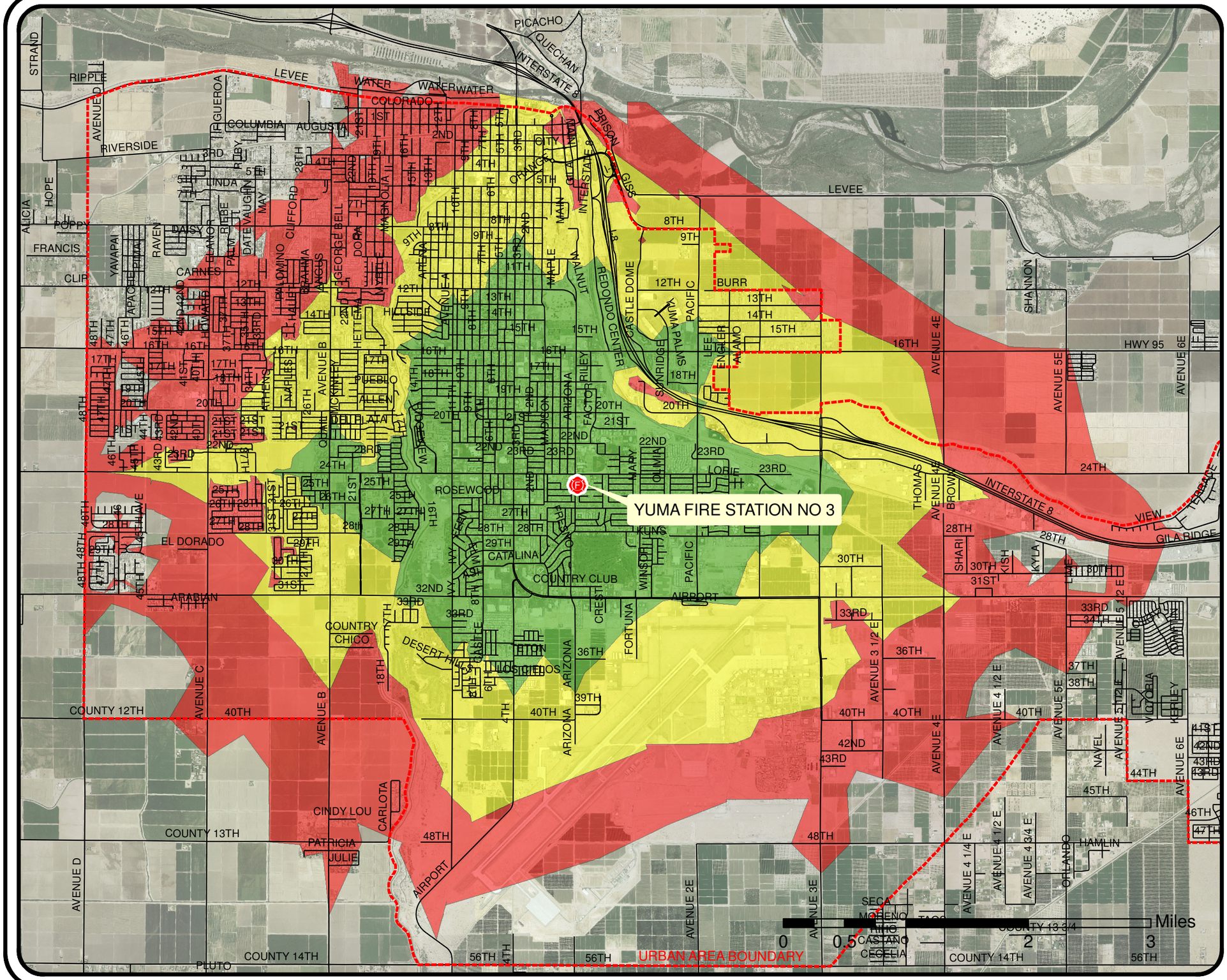

City of YUMA

Fire Facilities Plan December 2007

FIRE STATION NO. 3 TRAVEL TIMES- 2007

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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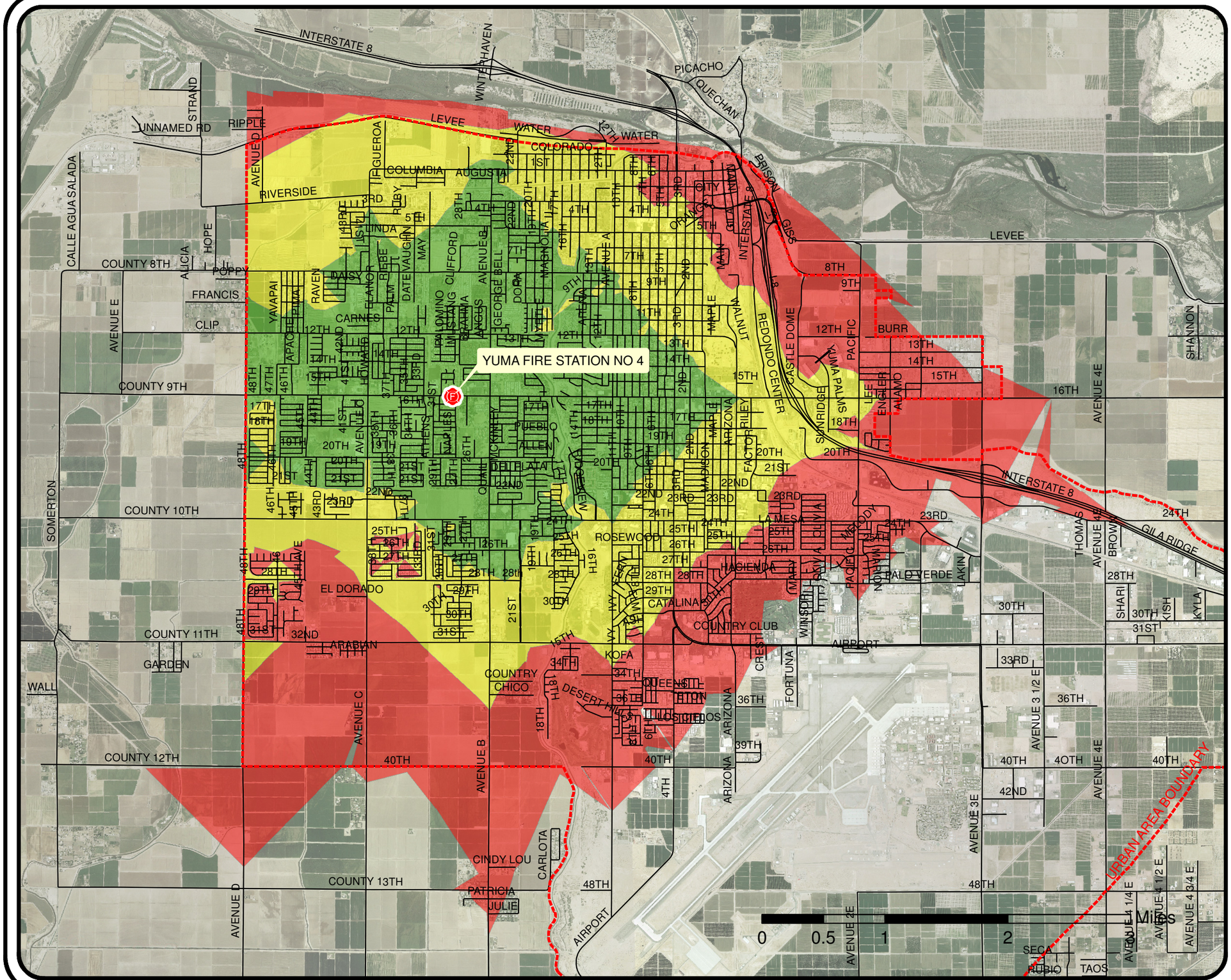

City of YUMA

Fire Facilities Plan December 2007

FIRE STATION NO. 4 TRAVEL TIMES- 2007

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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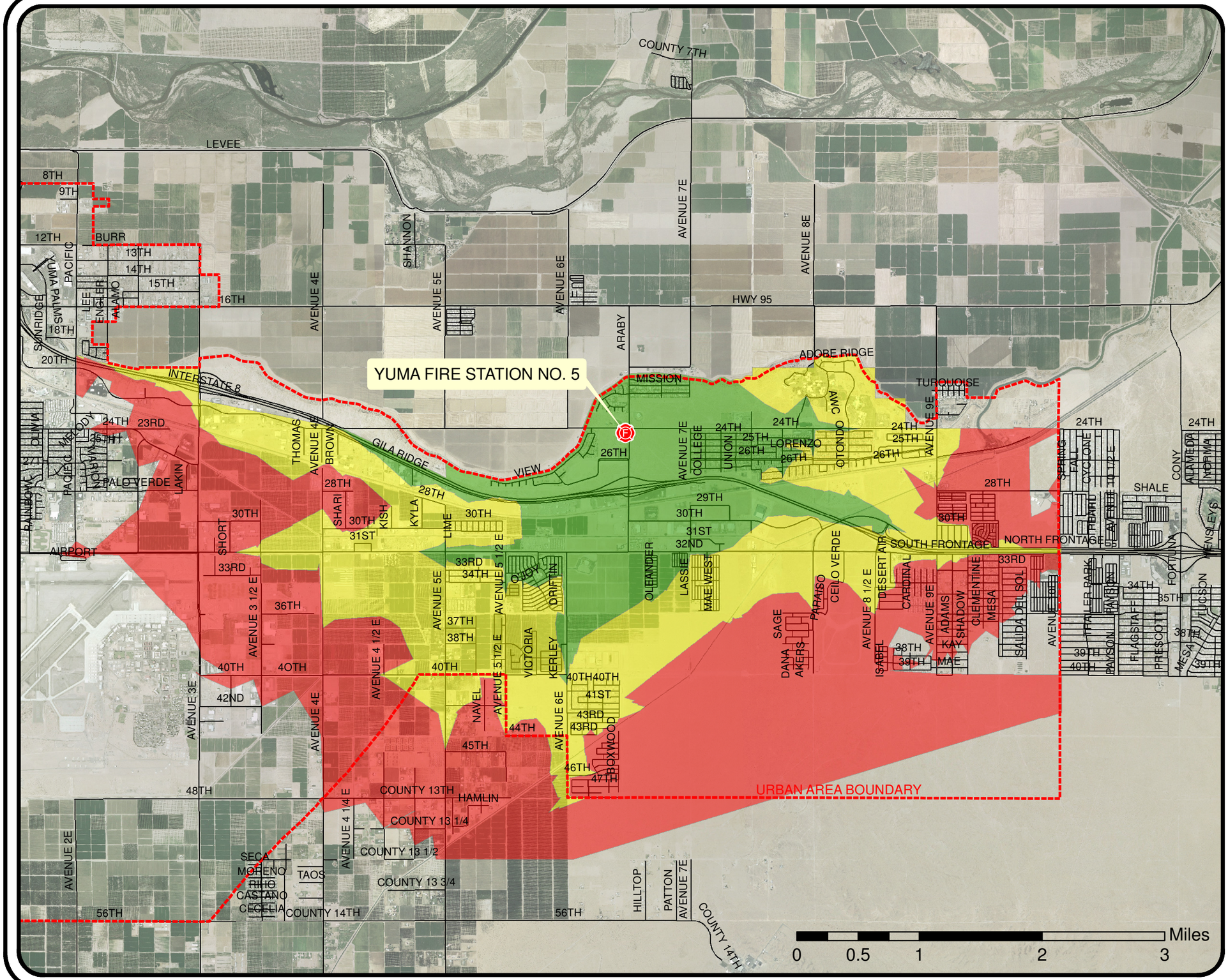

City of YUMA

Fire Facilities Plan December 2007

FIRE STATION NO. 5 TRAVEL TIMES

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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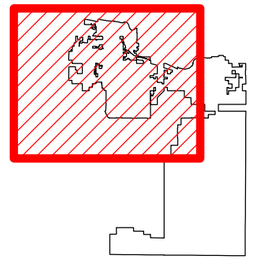

Fire Facilities Plan December 2007

FIRE STATION NO. 6 TRAVEL TIMES- 2007

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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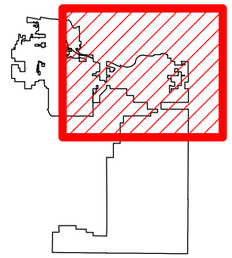

Fire Facilities Plan December 2007

FUTURE FIRE STATION NO. 7 TRAVEL TIMES

FIRE STATION

Urban Area Boundary

0 - 4 MINUTES

4 - 6 MINUTES

6 - 8 MINUTES

FUTURE YUMA FIRE STATION 7

URBAN AREA BOUNDARY

Miles

0 0.5 1 2 3

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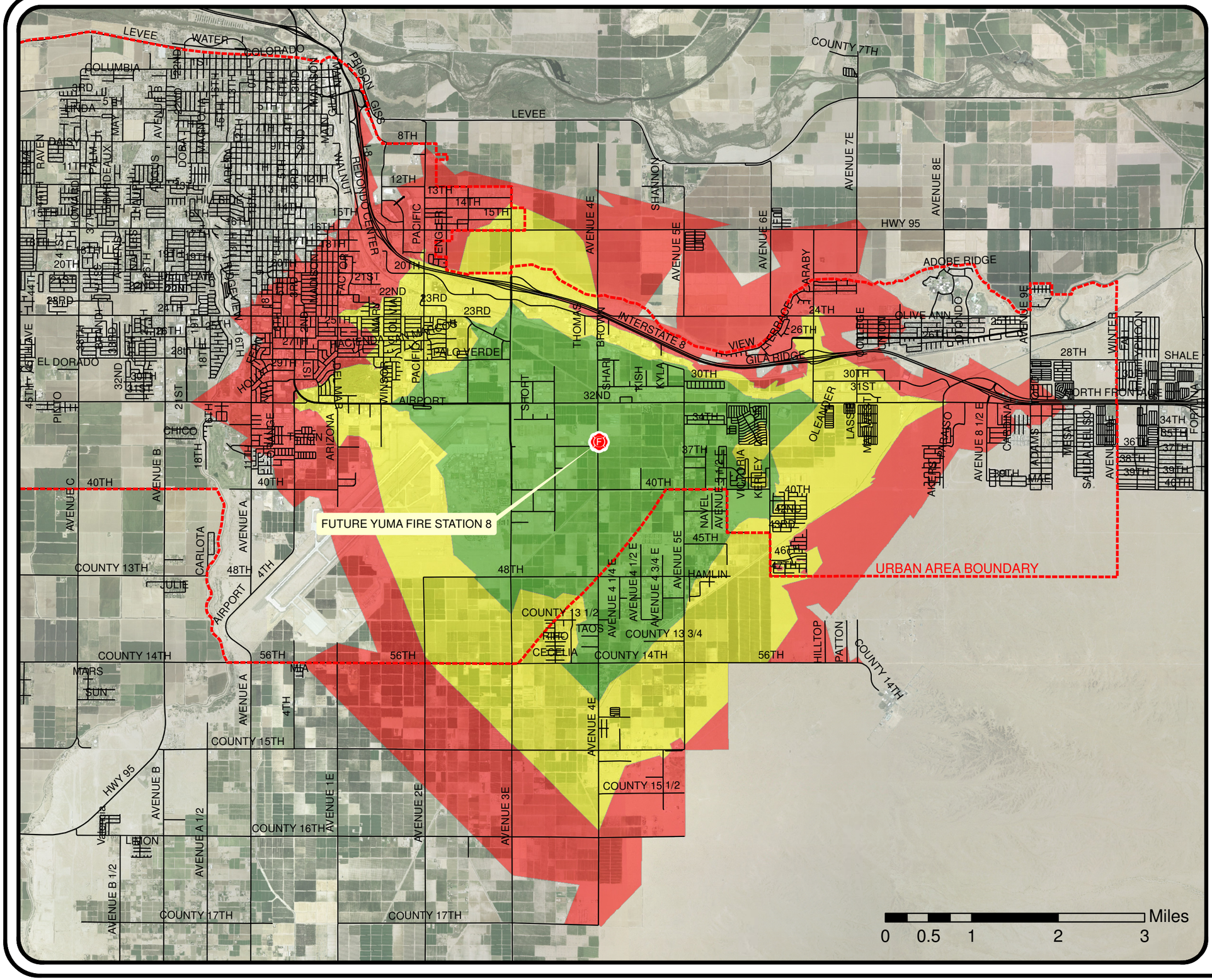

City of YUMA

Fire Facilities Plan December 2007

FUTURE FIRE STATION NO. 8 TRAVEL TIMES

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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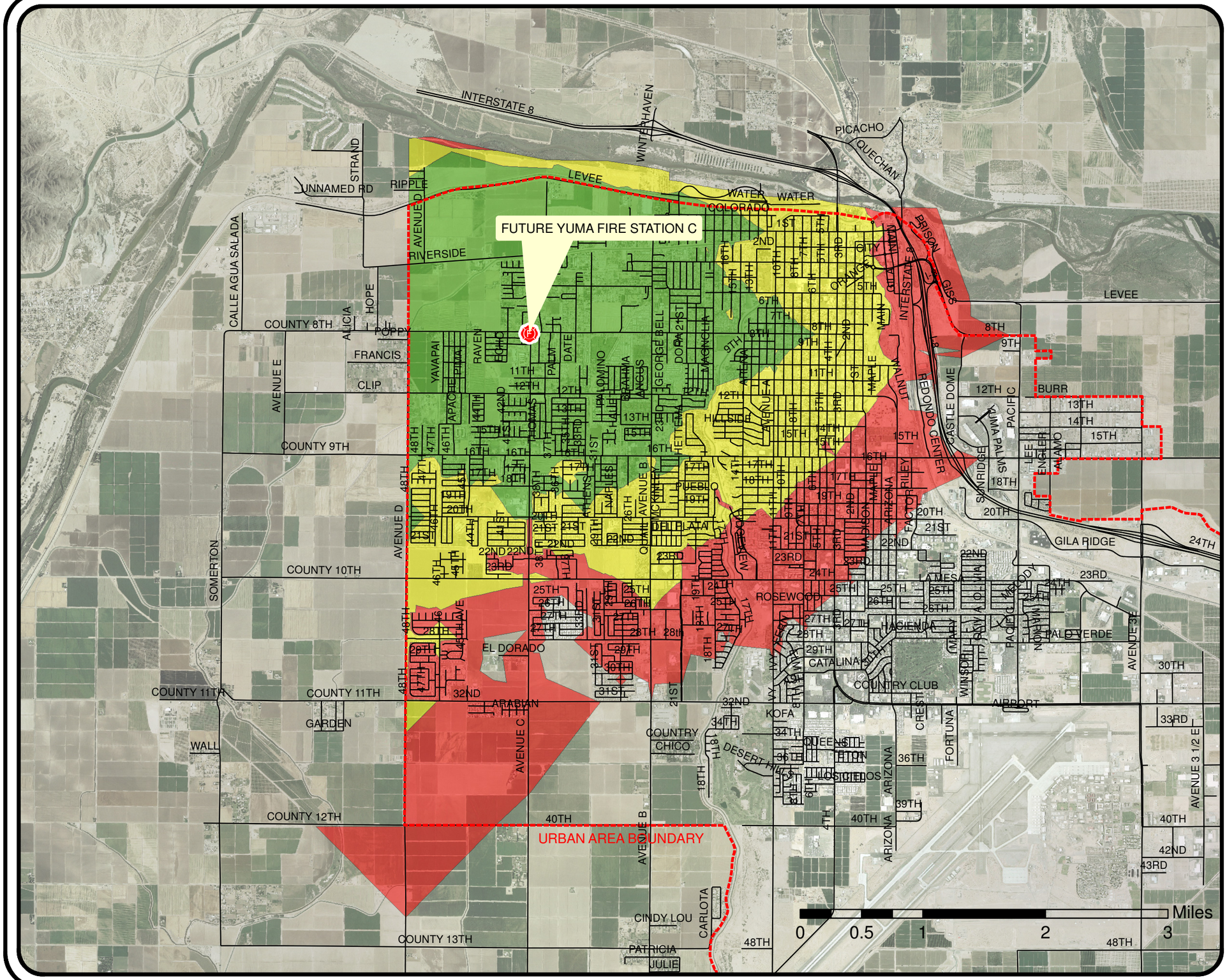

City of YUMA

Fire Facilities Plan December 2007

FUTURE FIRE STATION C TRAVEL TIMES

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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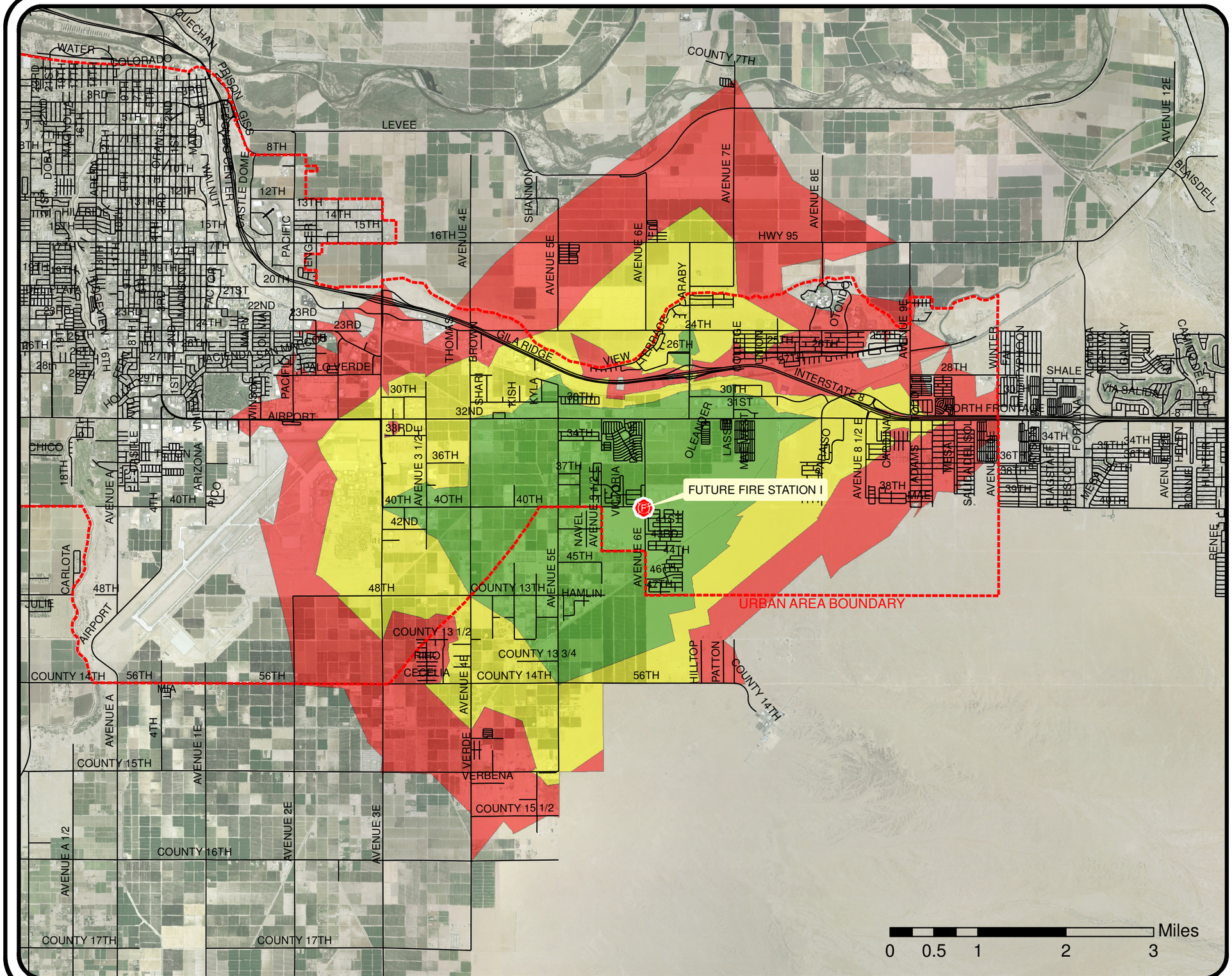

City of YUMA

Fire Facilities Plan December 2007

FUTURE FIRE STATION I TRAVEL TIMES

- FIRE STATION
- Urban Area Boundary
- 0 - 4 MINUTES
- 4 - 6 MINUTES
- 6 - 8 MINUTES

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COMMENTARY ON RESPONSE AREA MAPS AND TRAVEL TIME MAPS

RESPONSE AREA MAPS

The first two maps (pages 11 and 12) illustrate the response areas for the existing and build-out of fire stations to the year 2017. The first map includes six fire stations plus the aide agreement with the Marine Corps Air Station Fire Department. (*Note: The response area indicated for Fire Station No. 5 includes the Barry M. Goldwater Range, while this area is within the incorporated City limits, it is served as a wilderness area and therefore typically requires little or no emergency response.)*

The second map features the Fire Department's facilities full build-out to the year 2017. This map illustrates how the Fire Department is planning to maintain their current high level of service as the population and built environment enlarges. The projected build-out of four new fire stations (No. 7, 8, 9 and 10) will satisfy the future demand for emergency service.

TRAVEL TIME MAPS

The first travel time current-build map (page 13) illustrates the estimated combined travel time provided by Fire Stations No. 1 through 6. Travel time coverage illustrates the Fire Department's ability to travel to an incident within 0 to 4 minutes (green) at 54 percent of the time within 4 to 6 minutes (shown in yellow) at 29 percent of the time and 6 to 8 minutes (shown in red) within 17 percent of the time. The second map demonstrates how increasing the amount of fire stations strategically located reduces the amount of travel time. The full build-out travel time map (page 14) depicts a 0 to 4 minute response (shown in green) within 75 percent of the time, 4 to 6 minutes (shown in yellow) at 18 percent of the time and within 6 to 8 minutes (shown in red) a 7 percent of the time. By comparing the current-build and full-build-out maps, a 22 percent increase of the 0 to 4 minute travel time coverage is shown. Therefore, as the build-out of fire stations occur, the time required to travel to emergency incidents decreases. (*Note: Areas within the urban boundary, which are not shaded are identified as being outside the 8 minute travel time designation boundary.)*

The remaining maps illustrate the travel time for each individual current and future fire station with the 0-4, 4-6 and 6-8 minute travel time coverage.

The Response Area Maps and the Travel Time Maps project the Fire Department planned response to current and future emergency service demands of the community.

III. FIRE FACILITIES INVENTORY ANALYSIS

Currently, the Fire Department operates five stations with a sixth station under construction and two more planned for the near future. The following information details the current status of the five fire stations and the next three fire stations that will be constructed within the next five years.

The information shown provides a brief description of Station No. 1 through Station No. 5, including build date, location, and the number and type of apparatus housed at each station. Deficiencies are noted, along with proposed improvements. Each fire station has its own character in reference to design, function, history and location.

Other facilities, like the training ground and classrooms have provided the necessary hands-on training to both recent hires and seasoned firefighters. Proposed changes to these facilities are discussed in detail in the following inventory.

Fire Station Headquarters established in 1926 located behind the former City Hall at 180 W 1st Street.

Operational Department Facilities
Drill Ground and Classroom
298 W. 4th Street

DRILL GROUND

Facility Functions and Capability: The Fire Department drill ground is located on the northern one-half of the site housing Fire Station No. 1. The drill ground consists of a reinforced, poured concrete burn building, liquid propane gas (LPG) training props ("Christmas tree" and leaking valve); asphalt driving surface and fire hydrants. These facilities and props provide firefighters the opportunity to sharpen firefighting techniques and skills, practice ground ladder evolutions, vehicle extrication, car fire responses and other general Fire Department training exercises.

CLASS ROOM

Facility Functions and Capability: The present classroom building was built in 1977 and consists of the traditional classroom. This building has 900 square feet of classroom area with a 255 square foot addition that houses the fire truck driver simulator. The classroom includes non-fixed tables and chairs. The room also has a large screen television with DVD and VCR capabilities. This room can accommodate 47 people. The room is equipped with whiteboards and projector screens to accommodate presentation style instruction. The classroom also includes training props and structures, a drafting pit and the fire apparatus-driving simulator. A new training facility is currently under design and is expected to be operational by late 2008.

SPECIFIC ISSUES

Design: The location of the classroom and drill ground is adjacent to a residential area, a church and the downtown Yuma County Library. This situation hinders and limits training exercises (smoke, ash and noise). The training props, installed by the State Fire Marshal's Office, are unused as a result of the potential impact of soil and ground water contamination. Public complaints have also been received regarding the appearance of this site. The present lot size, configuration and facility locations do not allow for driver training, confined space, or high-rise training activities. Routine maintenance and upgrades have kept this facility functional, but technology upgrades are necessary. Enhancements, such as a computer with a projector and computers with internet access would make the classroom room more functional. Currently, these training facilities and the drill ground fall short of meeting Department needs. The drill ground and training structures (burn building, drill tower, LPG props and driving area) are planned to be relocated to the Public Safety Training Facility, which will meet the National Fire Protection Association (NFPA) standards. Site plans will accommodate the variety of activities and facilities needed by the Department to appropriately and safely train personnel. A new location has already been identified for a future training ground and classroom. The proposed drill ground will utilize non-polluting sources of heat and smoke. Training fire props will use liquid propane gas and artificial smoke, which will cause less impact to the neighboring properties.

Battalion Fire Station No. 1
298 W. 4th Street
Services, Facilities and Apparatus

Fire Station No. 1 was built in 1958 on a 3.75 acre property as a three bay structure with a total of 9,944 square feet capable of housing eight firefighting personnel. This station serves a 6.5 square mile area of the City. A new fire station is planned to be built on the north end of the existing property facing Giss Parkway and will replace the outdated facility.

FACILITY FUNCTIONS AND CAPABILITY: This station includes the Battalion Chief's office and headquarters, the emergency medical services (EMS) decontamination equipment and fire apparatus maintenance.

SPECIFIC ISSUES

DESIGN: This station is almost fifty years old. Sleeping quarters consist of one large room, instead of separate sleeping facilities for males and females.

CONSTRUCTION: Low apparatus door heights limit the ability to house taller vehicles. The center bay door was enlarged in 1995 to provide necessary clearance for an aerial apparatus.

Potable piping throughout the station is a mix of different materials, creating electrolysis, which has led to water leaks and mold.

SAFETY: The fire station is lacking an active fire protection system like fire sprinklers. It is also lacking a fire alarm system. Asbestos is still present above ceilings in the now abandoned chilled water refrigeration system and in some of the existing floor tile in the dormitory. The apparatus bays lack a required vehicle exhaust extraction system.

ENVIRONMENT: Use of the underground fuel storage tank and crankcase waste oil storage containers has been discontinued to minimize leak risks. The Arizona Department of Environmental Quality (ADEQ) records indicate that this site has undergone Underground Storage Tanks closure; no indication of soils contamination was identified.

CODE COMPLIANCE: Fire Station No. 1 does not meet current ADA (Americans with Disabilities Act) standards for building construction. The open dormitory (sleeping quarters for firefighters) does not meet NFPA (National Fire Protection Association) Section 1500 for firefighter's health and safety. This station meets all of the criteria established by OSHA and Homeland Security.

STAFF FACILITIES: The shift commander wing does not accommodate the normal day-to-day operations of shift management.

EFFICIENCY: Marginally functional.

HOUSED APPARATUS

ENGINE AND RESCUE SERVICE COMPANY

One Telescoping Ladder Engine, Rescue Squad, Heavy Rescue Truck with TRT equipment, Battalion Chief Vehicle, Fire Investigation Vehicle, Mass Casualty Truck, One Reserve Engine, Water Rescue Vehicle with jet skis, and the Exit Drills In The Home (E.D. I.T.H.) Trailer.

Residential Fire Station No. 2
3284 S. Avenue A
Services, Facilities and Apparatus

Fire Station No. 2 was constructed in 1997 on 1.26 acres located in the 3200 block of South Avenue A. The three bay structure was designed and built to meet all current seismic and "essential facility" standards. The building contains 11,910 square feet designed to house up to ten personnel. This station was designed with an office capable of serving as a back-up dispatch center. This same room is used routinely as a small office for police patrol use. Station #2 has an approximate service area of 9 square miles.

FACILITY FUNCTIONS AND CAPABILITIES: The operational support functions provided at this station are the repair and maintenance of the following equipment: hazmat/special operations, nozzles, appliances, and fire hose. The fire hydrant maintenance program is run out of this station.

SPECIFIC ISSUES

DESIGN: Due to sun exposure there is a need to construct a shade structure on the west side of the apparatus doors to provide additional work area for outside maintenance and training. Pursuit of funding and construction of this feature would enhance this facility. The hose rack is not functional and requires redesign.

CONSTRUCTION: This station meets all of the criteria established by OSHA (occupational safety and health association), ADA (American Disabilities Act), NFPA (National Fire Protection Association), and Homeland Security.

SAFETY: There are golf ball hazards due to the driving range to the north of the fire station.

ENVIRONMENT: No identified issues.

CODE COMPLIANCE: No identified issues.

STAFF FACILITIES: Training opportunities are limited to inside activities due to lack of outside space. Not enough functional workstations for additional personnel. The apparatus bay is not climate controlled.

EFFICIENCY: This modern fire station meets the standards and needs of emergency response, special projects and housing first response teams.

Housed Apparatus

ENGINE, LADDER AND HAZMAT COMPANY

Fire Engine Pumper, Platform Ladder Truck and Special Operation/Hazmat Truck

Residential Fire Station No.3
508 E. 25th Street
Services, Facilities and Apparatus

Fire Station No. 3 was constructed in 2005 on 2.27 acres at the northeast corner of Arizona Avenue and 25th Street, serving an area of 5 square miles. This station is the community's newest fire facility and consists of a three bay, 9,475 sq. ft. structure. The current service area for Station No. 3 is approximately four square miles. This station is capable of housing eight personnel in private dorms.

FACILITY FUNCTIONS CAPABILITIES: The operational support functions provided at this station are: receiving, storage, maintenance and supply of personal protective equipment; and the wild land strike team program equipment.

SPECIFIC ISSUES

DESIGN: No identified issues.

CONSTRUCTION: This station meets all of the criteria established by OSHA, ADA, NFPA, and Homeland Security.

SAFETY: No identified issues.

ENVIRONMENT: No identified issues.

CODE COMPLIANCE: No identified issues.

STAFF FACILITIES: No identified issues.

EFFICIENCY: This modern fire station meets the standards and needs of emergency response, special projects and housing first response teams.

HOUSED APPARATUS

ENGINE AND RESCUE SERVICE COMPANY

Engine Pumper, Rescue Squad, Reserve Engine Pumper

Residential Fire Station No. 4
2850 W. 16th Street
Services, Facilities and Apparatus

Fire Station No. 4 was built in 1978 on 1.8 acres located in the 2800 block of West 16th Street between Avenues B and C. Fire Station No. 4 is a two bay 6,500 square foot fire house and was the first fire station to be equipped with automatic fire sprinklers. This station is capable of housing six personnel. Fire Station No. 4 has an approximate 6 square mile service area.

FACILITY FUNCTIONS AND CAPABILITIES: The operational support functions provided at this station include an indoor de-contamination area for the cleaning and sanitizing of emergency medical equipment as well as laundry equipment for uniforms and station linens, hose testing and EMS supply cache.

SPECIFIC ISSUES

DESIGN: The station bay openings have a low vertical clearance; therefore, the fire station does not accommodate aerial apparatus. Retrofitting the bays to provide the necessary clearance is not cost effective. The station's apparatus floor area is equipped with a mechanics pit that may be used as a back-up facility for apparatus maintenance on a limited basis.

CONSTRUCTION: There is a need to remodel the sleeping cubicles within the dormitory to increase privacy. The establishment of a private captains' office is necessary. Upgrades to overcome ADA deficiencies are also necessary. This station meets all of the criteria established by OSHA and NFPA.

SAFETY: The facility's perimeter is not completely secure per Homeland Security Regulations.

ENVIRONMENT: The installation of a vehicle exhaust extrication system and the replacement of existing landscaping vegetation with drought tolerant plants and trees to reduce irrigation water usage is necessary.

CODE COMPLIANCE: The facility is not ADA compliant specific to the grade of ramps and walkways.

STAFF FACILITIES: Staff facilities fall short of a functional captains' office and an appropriate dormitory.

EFFICIENCY: This station location is adequate and meets acceptable response times for its designated run area.

HOUSED APPARATUS

ENGINE COMPANY

Engine Pumper

Residential Fire Station No. 5
6490 E. 26th Place
Services, Facilities and Apparatus

Station No. 5 was built in 1999 on a 4.2 acre parcel. The structure was built to meet all seismic and essential facility standards. This fire station includes three bays that accommodate fire apparatus. The facility has a total of 11,910 square feet designed to house up to ten personnel. Fire Station No. 5 has an approximate 8 square mile service area.

FACILITY FUNCTIONS AND CAPABILITIES: This station, in addition to fire suppression and EMS, provides a series of functions, which include the self-contained breathing apparatus (SCBA), portable fire extinguisher maintenance program, a grid maintenance program, child passenger safety program, wildland strike team equipment and assistance with the Arizona Western College Fire Academy and assistance with the Yuma County Mobile Command Unit. The detached classroom has a seating capacity for forty-nine students.

SPECIFIC ISSUES

DESIGN: No identified issues.

CONSTRUCTION: It is necessary to abandon the existing septic tank and connect to sanitary City sewer system-connection located in 26th Street. This station meets all of the criteria established by OSHA, ADA, NFPA, and Homeland Security.

SAFETY: Engine bays are not equipped with a vehicle exhaust extrication system.

ENVIRONMENT: No identified issues.

CODE COMPLIANCE:: No identified issues.

STAFF FACILITIES: Engine bays are not environmentally controlled.

EFFICIENCY: This modern fire station meets the standards and needs of emergency response, special projects and housing first response teams.

HOUSED APPARATUS

ENGINE SERVICE COMPANY

Quint Engine Pumper

Engine Pumper

3000-gallon Water Tender

PROJECTED FIRE FACILITIES

Three new fire stations are projected for construction within the next three to four years. The first is Fire Station No. 6 and follows the newly constructed replacement of Fire Station No. 3, which was completed in 2005. Fire Stations No. 7 and No. 8 will be built on the East Mesa in an area of the City experiencing both heightened residential and commercial activity. Two additional fire stations have been identified as Fire Stations No. 9 and No. 10 to serve as the community and the demand for fire and emergency services increase.

After a new building bid proposal is awarded by the City of Yuma, designs and needs of new facilities are reviewed and discussed by the Fire Department's Architectural Review Committee. The committee is headed by the Fire Marshal and includes Fire Department staff as well as other City staff invited to participate. These departments may include the Department of Community Development and the Public Works Department. Architects and the committee meet to discuss opportunities, challenges and essentially the vision of how the new facility will appear and its functions and the people it will serve when completed. Finally, plans for the new facility are submitted to the City for review in order to obtain all necessary permits to grant permission to build.

These proposed facilities, after they are constructed and are outfitted with firefighters, equipment and apparatus, will add levels of service to new areas currently being developed. The following is a short description of each of the three new fire stations.

Residential Fire Station No. 6

Currently under construction, Fire Station No. 6 is located at Avenue C and 32nd Street. This facility is designed to be a two bay fire station that will serve the local neighborhoods of the area. The station will include captains' and firefighters' quarters and dorms, kitchen, exercise room, day room and areas for the station assigned projects. This Fire Station is scheduled to open March 2008.

Residential Fire Station No. 7

Fire Station No. 7 is proposed as a two bay station in the area of Avenue 8 ½ E and 32nd Street. The station will include captains' and firefighters' quarters and dorms, kitchen, exercise room, day room and areas for the station assigned projects. This Fire Station is scheduled to open in 2009.

Joint Fire and Police Training Facility

In 2007 approximately 30 acres were committed to a joint training facility for the Fire and Police Departments. The site is located at the northeast corner of 36th Street and Avenue 4E. The joint training facility will include a high speed driving track, streetscapes, and props for a full array of law enforcement and fire training. Design of the joint training facility will be master planned to ensure all training and educational needs are satisfied. This facility is anticipated to be completed by 2012.

Battalion Fire Station No. 8

Proposed to be adjacent to the joint fire and police training facility located at Avenue 4E and 36th Street, Station No. 8 will serve as the second battalion station for the Fire Department. The fire station will consist of four bays and an office for the second battalion chief. This site will also be the location for the new training ground. This fire station is scheduled when population and

service delivery demands dictate. This fire station is anticipated to be completed some time between 2012 and 2017 dependent upon growth and service demand.

Fire Station No. 9 (C)

Fire Station No. 9, also identified as Fire Station "C" because the timing for this fire station to be established in comparison to Station "I" is still uncertain. This fire station will be located in the vicinity of 40th Street and Avenue 6E. The fire station will include captains' and firefighters' quarters and dorms, kitchen, exercise room, day room and areas for the station assigned projects. This fire station is anticipated to be needed by 2017.

Fire Station No. 10 (I)

Fire Station No. 10 identified as Fire Station "I" because the timing for this fire station to be established in comparison to Station "C" is still uncertain. This fire station will be located in the vicinity of 8th Street and Avenue B. The station will include captains' and firefighters' quarters and dorms, kitchen, exercise room, day room and areas for the station assigned projects. This fire station is anticipated to be needed by 2017.

IMPLICATIONS OF NEW FIRE STATIONS

Staffing of the Fire Department occurs through the ratio of: One Firefighter for every 1,000 residents and every 12 firefighters equal a fire station. Each fire station that is established will consist of one Engine Company and as time passes will obtain a rescue and perhaps a ladder company. Figure 3.2 illustrates the potential growth of facilities based upon population and firefighting personnel. Numbers are subject to the population growth of the City of Yuma.

Figure 3.2 Fire Department Growth Increment by Population

Currently the City of Yuma Fire Department is comprised of one battalion for Fire Stations No. 1 through No. 5. A battalion is comprised of: one Battalion Chief, 7 fire stations and 84 firefighters. The Fire Department has three rotating crews. The introduction of Station No. 8 will establish the second battalion. Future station facilities must be able to meet the demands of today's emergency calls and today's firefighter. Areas for storage appear to be an increasing need for fire crews.

Fire Station Form and Function

Fire station facilities must include the necessary amenities to support firefighting personnel and apparatus in order to properly serve the community now and in years to come. The functional areas within a fire station must include at a minimum the following:

Apparatus Bay: The apparatus bay serves to house all apparatus assigned to that fire station. An apparatus bay should include both front and rear entrances to make departures and arrivals easy, safe and efficient. Adequate space between emergency

apparatus should be provided to allow easy movement for staff entering and exiting vehicles, as well as to provide access for maintenance.

Administrative and Training Areas: These areas include office, decontamination area, work/equipment maintenance and conference rooms. Offices for battalion chiefs and captains should be separate and provide adequate privacy for concentration and discretion. Areas promoting station training, maintenance for fire equipment and storage should be designed in all future fire stations and be considered in existing building upgrades.

Residential Areas: These areas include the dorms, day room, bathrooms, showers, kitchen and fitness rooms. Dorms shall include individual rooms to meet NFPA 1500 code requirements in order to provide privacy and secure storage of personal items. Each station shall include separate male and female bath and shower rooms. The kitchen area should be open and include adequate seating for crews. Layout and size of the kitchen should be accommodating for a variety of meal preparation. The dayroom/recreation room should be designed with comfort and durability in mind. The fitness room should include features of full height and width mirrors and weight lifting/exercise equipment to provide physical exercise workout exercise for firefighting and EMS crews.

Figure 3.3, 3.4 and 3.5 display floor plans of residential, commercial and industrial fire station configurations. The main characteristics of the stations are the separate dorms located on both sides of the station, exercise room, large kitchen and dining area, day room, captains' quarters/office and the apparatus bay, which would house at least one engine company and perhaps either a rescue or ladder company. Other areas of each plan include showers and bathrooms, watch and project rooms, laundry and turnout rooms. Rooms to support mechanical equipment, 72-hour emergency preparedness supplies, and electrical equipment rooms are also provided within fire stations. It is essential to include space for storage and maintenance of emergency apparatus, and equipment.

Figure 3.3 Residential Two-Bay Fire Station Floor Plan Configuration

(Breckenridge Group Architects)

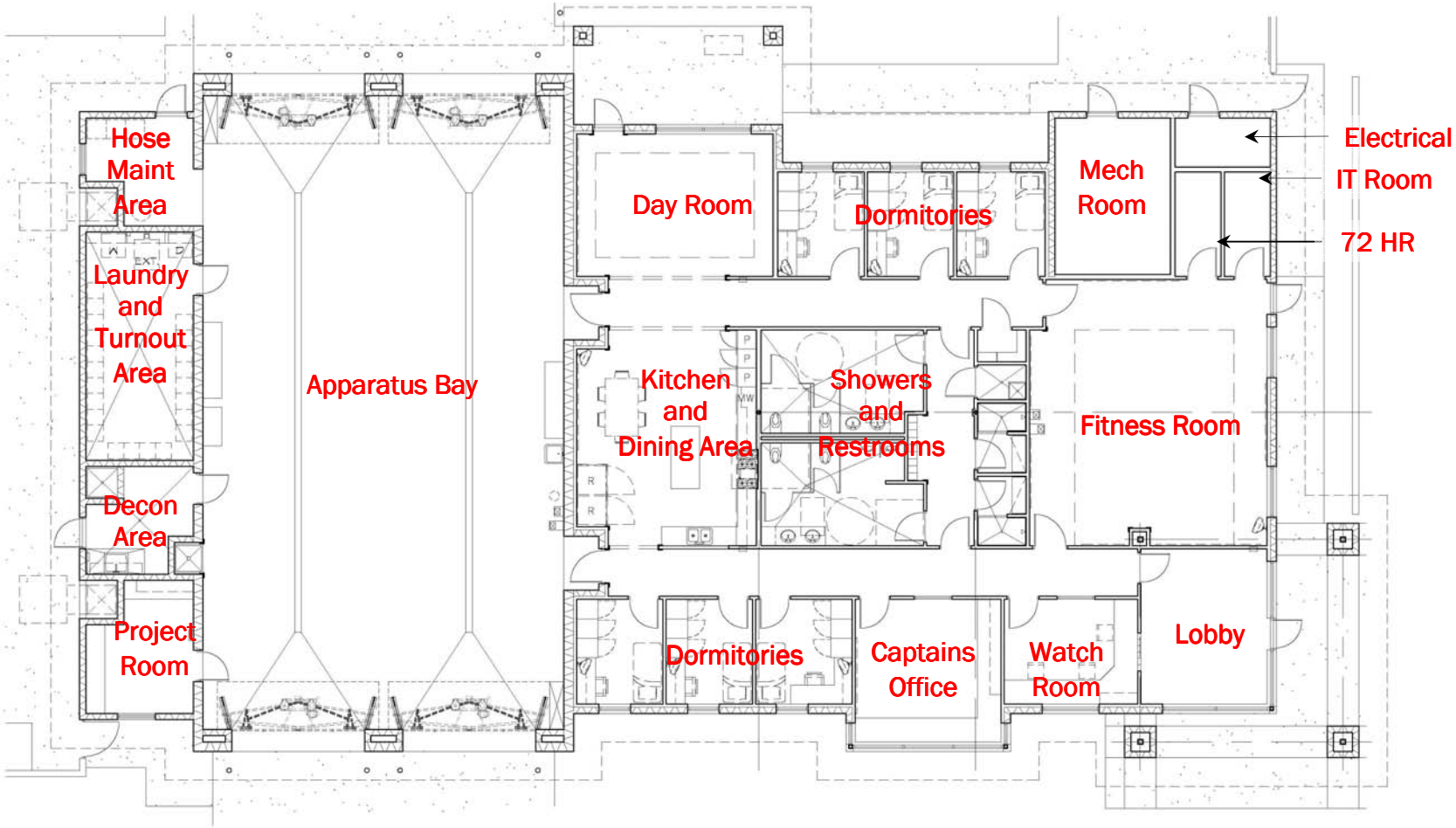


Figure 3.4 Commercial Three-Bay Fire Station Floor Plan Configuration

(Breckenridge Group Architects)

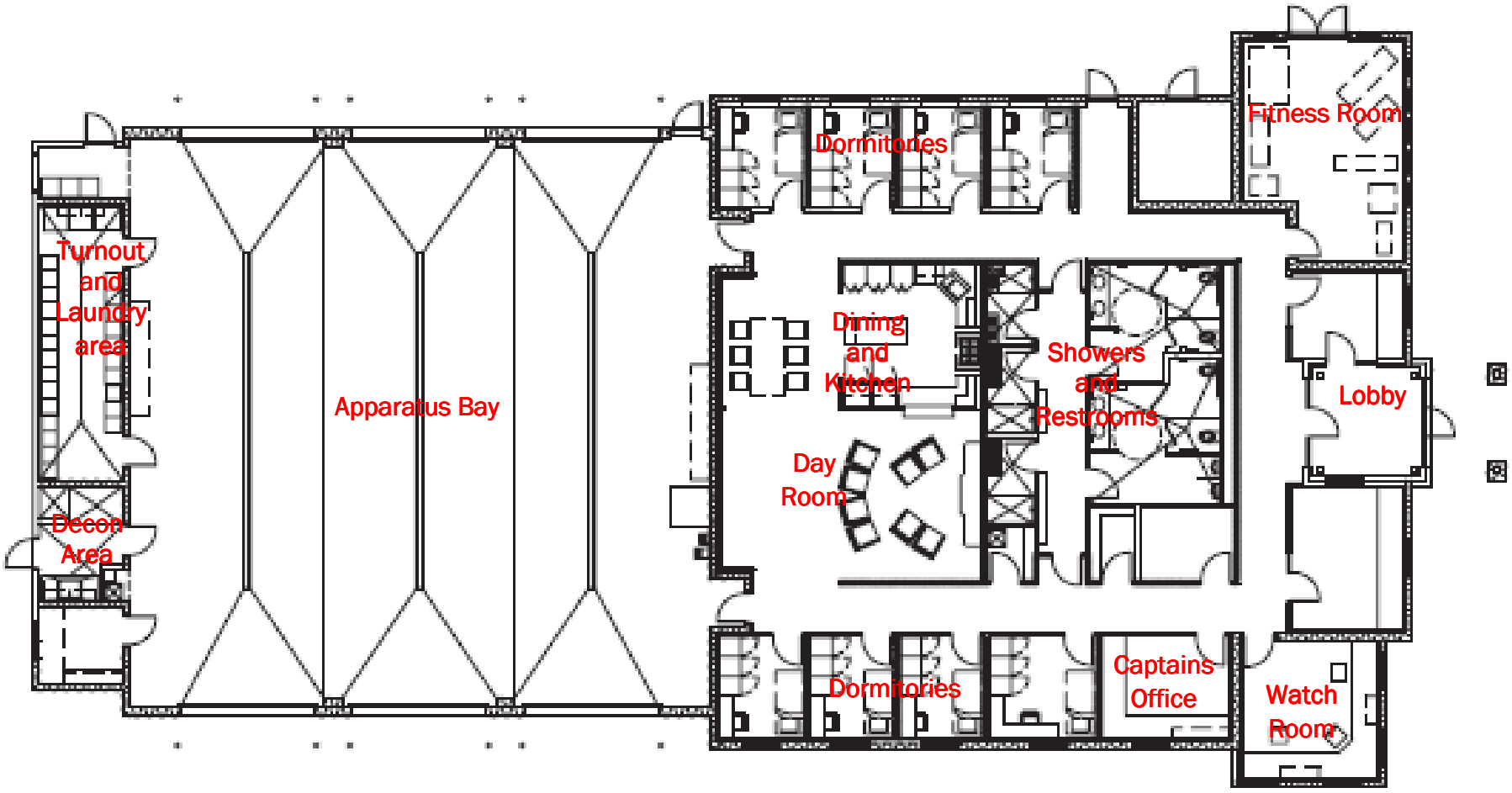
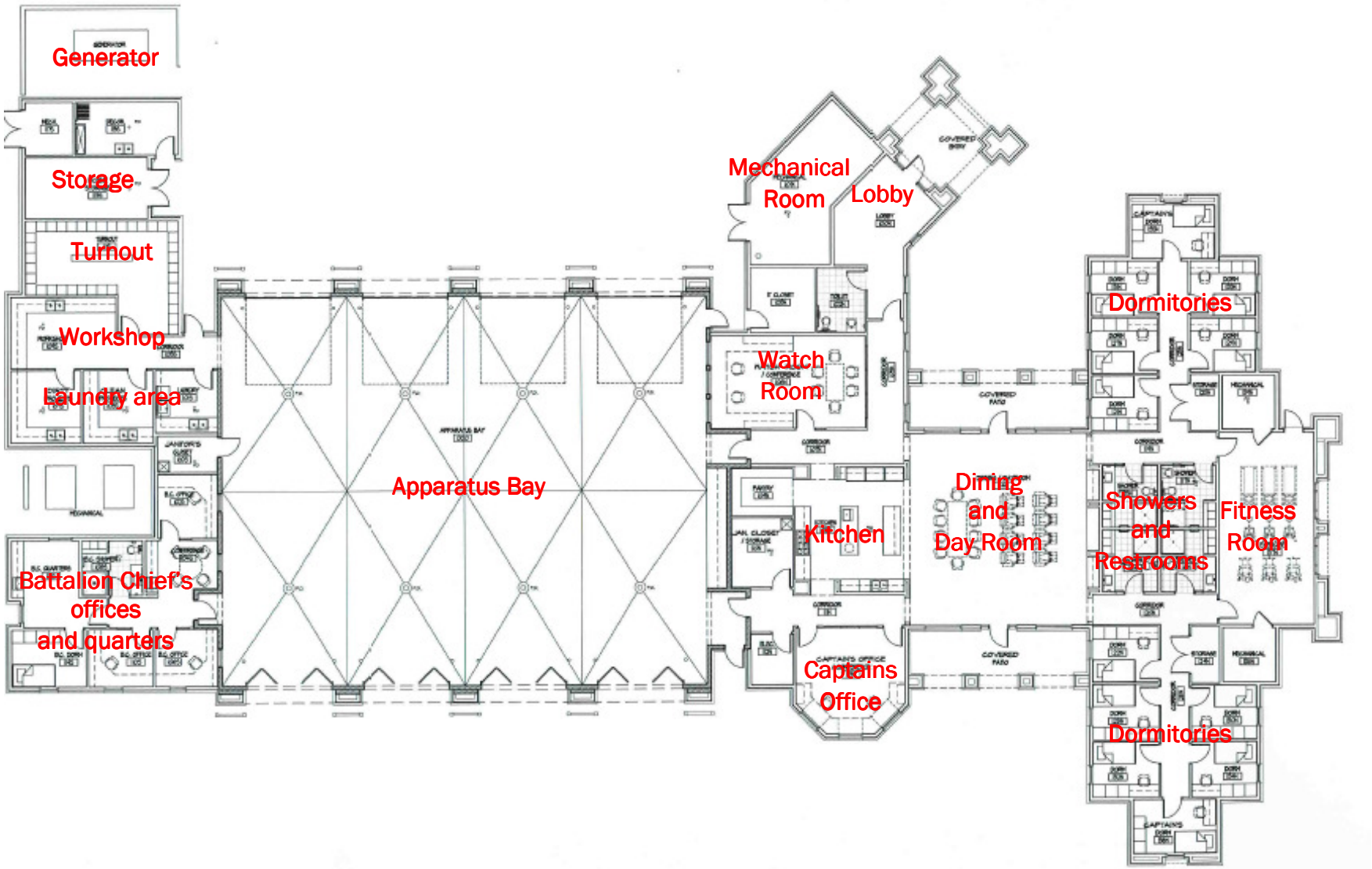


Figure 3.5 Industrial Four-Bay Fire Station Floor Plan Configuration

(Pearlman Architects of Arizona)



IV. DEMAND FORECAST

One of the purposes of this study is to forecast the future demand for Fire Department services throughout the City of Yuma for the next 6 year period. During this process, review of the last ten years is done to assist in determining future demand. The process of obtaining the future demand is described in this chapter.

As the City continues to expand through population growth, annexations and development, the demand for fire and emergency medical services will expand. The growth of the City by area impacts response time, while growth in population increases the demand for additional fire stations, firefighters and apparatus.

PAST TRENDS

The population of the City has increased by 15 percent over the ten-year period growing from 63,150 to 92,160. The City can attribute some of this growth to annexations. The annexed areas being developed include low, medium and high-density residential areas and commercial areas.

Table 4.1 Resident Population Served and Calls for Service, 1997-2006

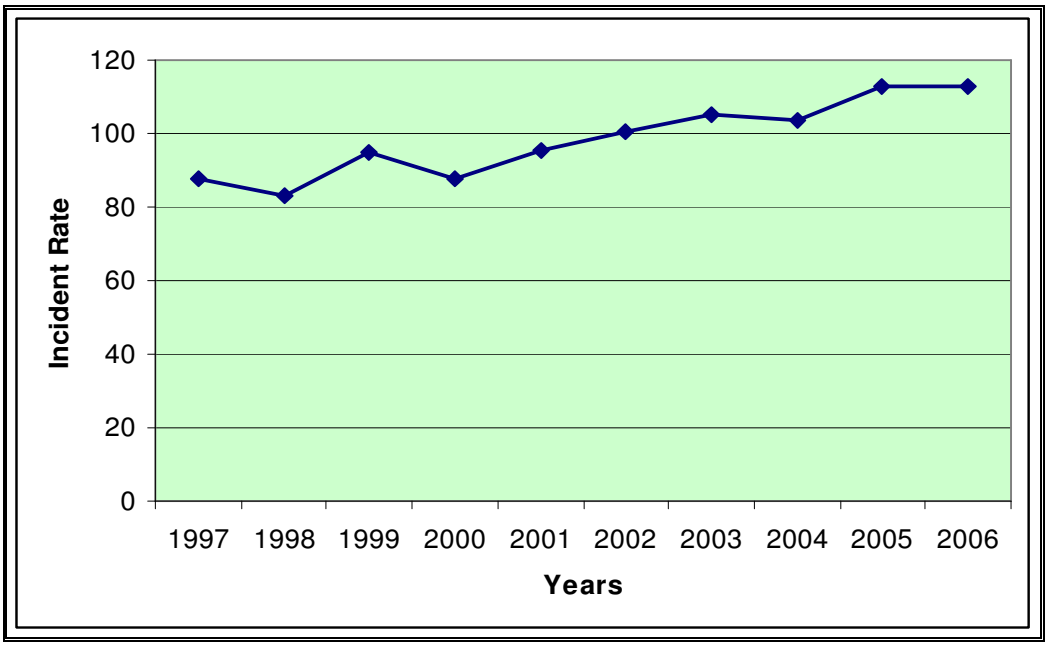
YEARS	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
POPULATION (000's)	65,130	68,160	69,055	77,530	79,530	81,380	83,330	86,070	88,775	92,160
TYPES OF CALLS										
Fire	326	271	328	339	360	325	350	394	341	362
EMS/Rescue	4,655	4,747	5,397	5,626	6,246	6,978	7,235	7,609	8,389	8,330
Hazmat	207	144	142	137	207	166	188	173	177	150
Service	62	58	111	104	110	120	109	120	147	146
Overpressure	6	4	10	5	29	32	26	14	15	25
Good Intent	202	182	232	237	260	515	420	456	457	506
False Alarm	248	265	297	315	343	290	426	427	488	529
Special	6	5	44	60	32	27	24	15	32	49
TOTAL	5,718	5,676	6,823	6,823	7,587	8,453	8,778	9,208	10,046	10,097

Table 4.1 shows the trend in calls per capita by type of call. The call categories used here conform to the National Fire Incident Reporting System standards.

The number of incidents reported to the Fire Department increased by 4,461 from 1996 to 2006 going from 5,636 to 10,097. This is an increase of 44 percent, which is 13 percent faster than the growth of the population. Therefore, at least half of the call volume is a result of greater demand per capita.

Most types of calls experienced an increase over the past ten years. EMS rescue calls have had the largest increase of about 45 percent, which accounts for much of the overall increase in calls since 1996. Fire calls appear to have decreased during the past ten years but fluctuate considerably from year to year.

Figure 4.1: Total Incidents, 1997-2006



The total number of all calls has risen significantly between 1997 and 2006. In 2005, incident calls leveled with a slight increase leading into 2006. A significant factor for the increase is contributed to EMS calls, which attributed to at least 80 percent of all calls.

Forecast Methodology

The per capita rates show fluctuation over time for almost all categories of calls. While there was a significant increase in EMS calls, there was a general increase in the amount of good intent calls and false alarms, while the fire calls per capita decreased. Trends of calls per capita appear to be moving slightly upward while the trend of hazardous condition calls per capita appears to move downward, with fluctuations from year to year.

Figure 4.2: Resident Population, 1997-2006

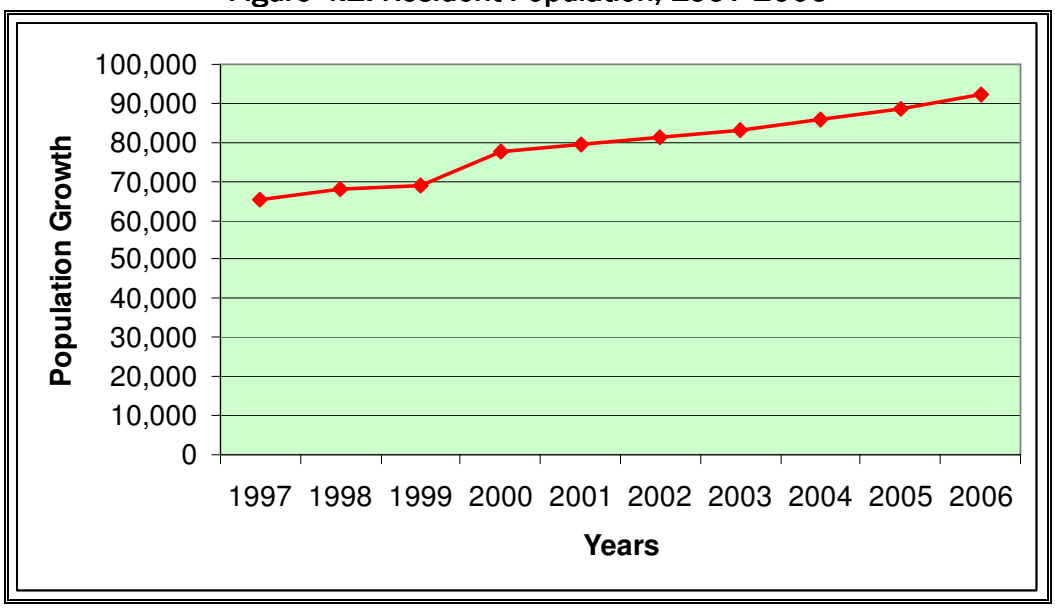
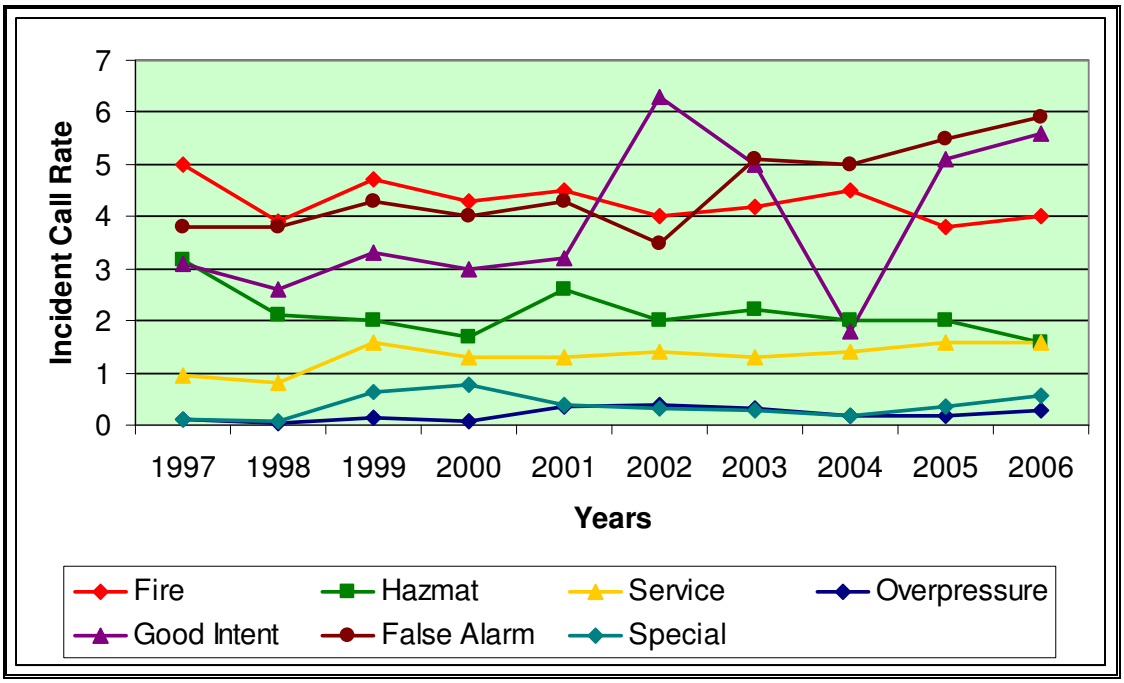


Table 4.2: Trend in Calls per 1,000 Population by Type, 1997-2006

YEARS	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
POPULATION (000'S)	65,130	68,160	69,055	77,530	79,530	81,380	83,330	86,070	88,775	92,160
INCIDENT TYPES										
Fire	5.00	3.9	4.7	4.3	4.5	4.0	4.2	4.5	3.8	4.0
EMS/Rescue	71.47	69.6	78.1	72.5	78.5	85.7	86.8	88.4	94.4	93.5
Hazmat	3.17	2.1	2.0	1.7	2.6	2.0	2.2	2.0	2.0	1.6
Service	.95	.8	1.60	1.3	1.3	1.4	1.3	1.4	1.6	1.6
Overpressure	.09	.05	.14	.06	.36	.39	.31	.16	.16	.28
Good Intent	3.10	2.6	3.3	3.0	3.2	6.3	5.0	1.8	5.1	5.6
False Alarm	3.8	3.8	4.3	4.0	4.3	3.5	5.1	5.0	5.5	5.9
Special	.09	.07	.63	.77	.40	.33	.29	.17	.36	.55
TOTAL	87.67	82.92	94.77	87.91	95.33	100.59	105.3	103.5	112.92	113.03

Figure 4.3 includes all calls except EMS (because their numbers largely outweigh the remaining calls). The balance of call types includes fire, false alarm, and good intent. Fire calls have actually been steady with a slight increase. Hazardous materials calls are also in decline. Collectively, calls are growing. This is caused by an increase in EMS and false alarm calls. In comparison, the remaining calls, such as fire, hazmat, special duty and service calls have a minimal fluctuation. Good intent calls rose sharply in 2002 and then rapidly declined two years later but then went on the rise for the following two years.

Figure 4.3 Calls per 1,000 by Type (Excluding EMS Calls) 1997-2006



The pattern shown here is not uncommon. Figure 4.4 illustrates EMS calls increasing. Residents are using EMS increasingly more. This may be due to the combination of a gradually aging population and increasing awareness of emergency medical services. There has also been an increase in the installation of automatic alarm systems; therefore, system (false) alarms are also on the increase.

Figure 4.4 EMS/Rescue Calls per 1,000 Population 1997-2006

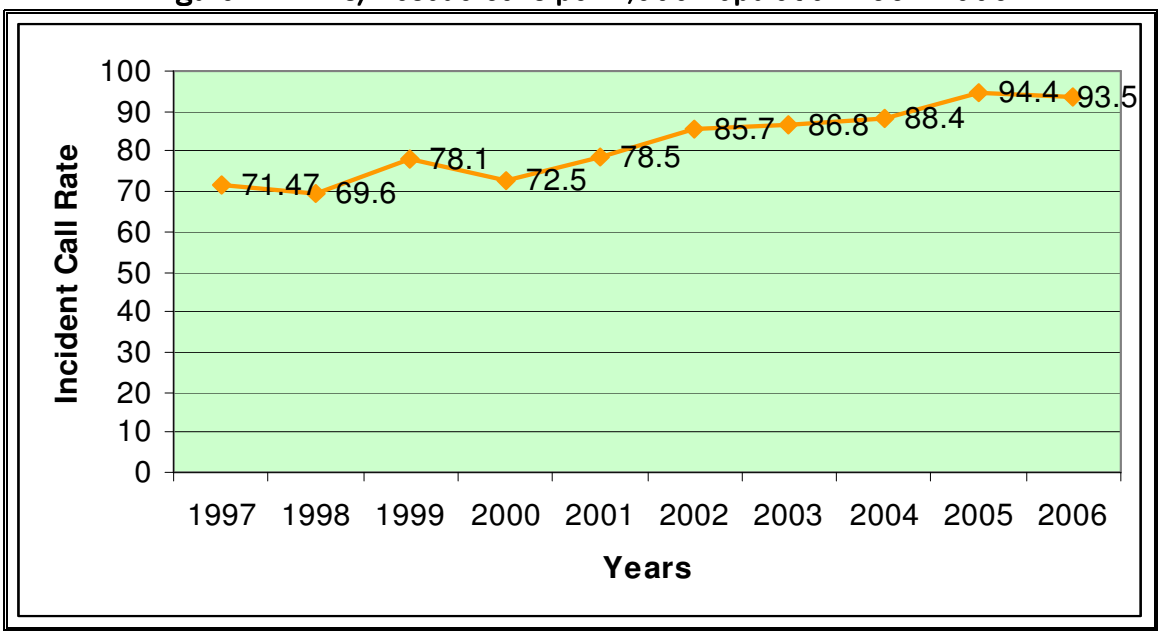


Table 4.3 Total Incidents by Fire Station, 1997 – 2006

Fire Station	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
No. 1	1,907	1,832	2,022	2,055	2,166	2,351	2,417	2,461	2,711	2,855
No. 2	527	637	751	822	1,085	1,448	1,673	1,779	2,129	1,990
No. 3	2,109	1,985	2,281	2,231	2,393	2,434	2,367	2,462	2,460	2,581
No. 4	1,313	1,178	1,268	1,342	1,460	1,732	1,754	1,748	1,855	1,781
No. 5	44	45	244	361	470	482	551	728	837	811
MCAS	0	0	0	12	13	6	16	30	54	72
Total	5,718	5,677	6,566	6,823	7,587	8,453	8,778	9,208	10,046	10,097

Figure 4.5 Total Incidents by Fire Station, 1997 – 2006

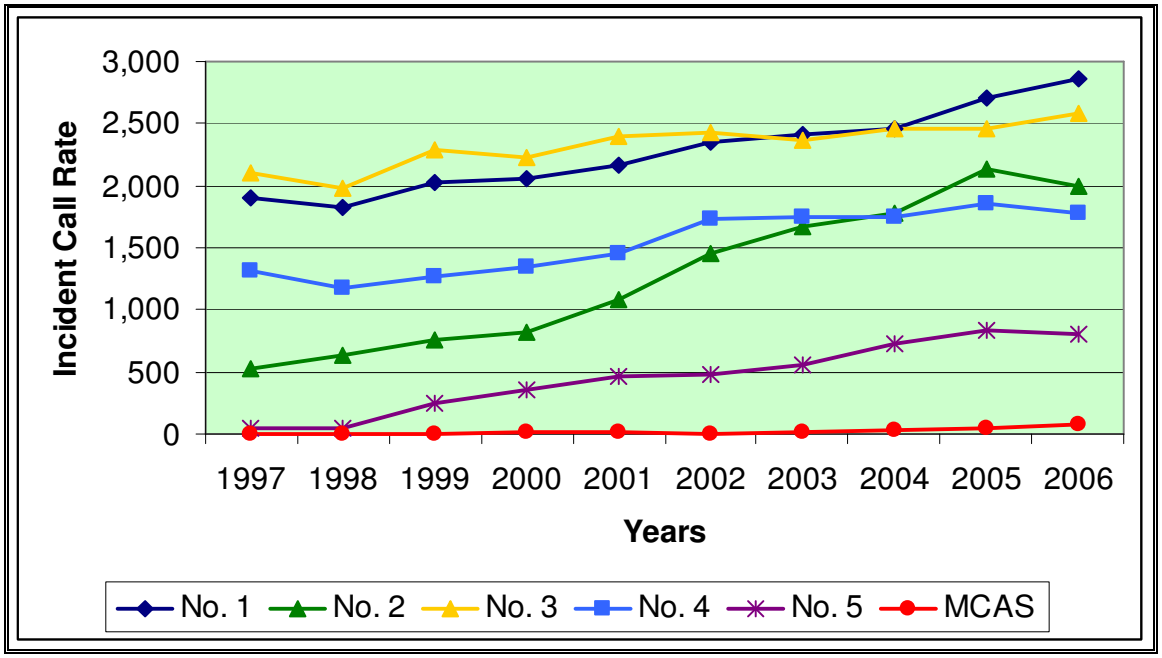


Figure 4.5 depicts Table 4.4 data reflecting activity of each fire station over a ten year span. Stations No. 1 and No. 3 appear to compete for the busiest of the five stations. Station No. 5 has the least amount of calls. As the vacant land in the service area for Station No. 5 begins to develop, incident calls are expected to increase. The U.S. Marine Corps Air Station (MCAS) has the lowest number of residential calls. The MCAS fire station was included in the comparison, because that station responds to calls for the City of Yuma Fire Department. They provide fire and emergency medical service to a small area in the City, in addition to its response to the needs of the air station.

Table 4.6: Responses by Station and Percentage of Total Responses

Fire Station	2003		2004		2005		2006	
No. 1	2,417	27%	2,461	28%	2,711	27%	2,855	28%
No. 2	1,673	19%	1,779	20%	2,129	21%	1,990	20%
No. 3	2,367	27%	2,462	27%	2,460	25%	2,581	26%
No. 4	1,754	20%	1,748	19%	1,855	19%	1,781	18%
No. 5	551	6%	728	8%	837	8%	811	8%
MCAS	16	.1%	30	.3%	54	.5%	72	.7%
Total Responses	8,778		9,208		10,046		10,097	

2007-2017 Forecast

The change in population resulting from development of economic growth is the basis for the forecast of future fire facilities. Forecast rates were determined by using the increases noted above and applying the past rates of increases by service call type and projecting those numbers out to 2017.

Current Forecast

Table 4.7 shows the projected growth trend of the calls for the City of Yuma Fire Department with a 3 percent annual increase.

Table 4.7: Current Trends Forecast

Current Rate 3%	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Estimated Pop (000's)	94,925	97,773	100,706	103,727	106,838	110,043	113,344	116,744	120,246	123,852	127,567
Fires	372	383	394	405	417	429	442	455	469	483	497
EMS	8,580	8,837	9,102	9,375	9,656	9,945	10,243	10,550	10,866	11,192	11,528
Hazmat	155	160	165	170	175	180	185	191	197	203	209
Service Calls	150	155	160	165	170	175	178	183	188	194	200
Good Intent Calls	521	537	553	570	587	605	623	642	661	681	701
False Alarms	545	561	578	595	612	630	649	668	688	709	730
Total Calls	10,323	10,633	10,803	11,436	11,778	12,130	12,290	12,689	13,069	13,462	13,865

Commentary on Forecast – The current rate forecast at three percent demonstrates a steady increase in residential population and the demand for fire and emergency service. By 2017 the population of Yuma will be 127,567. Therefore, an increase in fire and emergency services also appears as the demand by a larger population is established. At a glance in the next ten years, the trend in responses to fire calls will increase by 125, responses to EMS calls will increase by 2,948 and responses to false alarm calls will increase by 185.

V. IMPLEMENTATION

Implementation of this plan will begin with construction and grand opening of Fire Station No. 6 and will continue to proceed until Fire Stations No. 7, 8, 9 and 10 are completed. The Fire Services and Facility Plan will be reviewed and updated every five years to reflect current growth and development needs and to maintain the vision of the Fire Department.

IMPLEMENTATION ACTION PLAN	
Years	**Projects**
2007	• Begin construction of Fire Station No. 6 • Begin design of new Fire Station No. 1 • Begin design of new training facility
2008	• Complete construction of Fire Station No. 6 • Complete design and begin construction of new Fire Station No. 1 • Complete design of Fire Station No. 7 • Complete phase 1 of the new training facility (burn building, training tower, and streetscape)
2009	• Complete construction and grand opening of new Fire Station No. 1 • Begin construction of Fire Station No. 7 • Acquire property for Fire Station No. 9
2010	• Complete construction and grand opening of Fire Station No. 7 • Complete design of second phase of new training facility(14,000 square feet classroom and other outbuildings)
2011	• Begin construction of second phase of new training facility • Purchase property for Fire Station No. 10
2012-2017	• New facility development will depend upon population growth and demand of fire and emergency services • Complete design and construction of Fire Stations No 8, 9 and 10

All of the previously identified factors and features essential for constructing new facilities suggest that strategic locations and design are essential. Participation of Fire Department staff in predevelopment meetings, annexations and accompanying agreements and the capital improvement program (CIP) will continue to offer recommended direction. In regard to future development, this Plan will be used to identify locations where new fire facilities and services will be established.

This Plan is based upon the municipal footprint of the City of Yuma 2002 General Plan. Any area established or incorporated outside of this footprint shall be considered on a case by case basis for providing facilities for fire and emergency protection. The build out of ten fire stations described in this Plan provide for the area identified within the City of Yuma 2002 General Plan as the ultimate City boundary. Any expansion of the urban boundary beyond this plan will require a review and possible expansion resulting in additional facilities.