Wake County Fire Commission

Administrative Sub-Committee

Long Range Planning – Creation of a “Standard of Service” for the non-incorporated areas of Wake County.

WAKE COUNTY
NORTH CAROLINA

Wake County
Board of Commissioners
Goals and Objectives

- PS1.1 – Establish a County-wide standard for fire service in the unincorporated areas and develop a plan to achieve and sustain agreed upon service levels.

Focus areas…

Response Plans (for each incident type)	Minimum Staffing Levels	Performance Objectives for incident ops.	Response Time Goals

Step 1 – Conduct Risk Assessment
Step 2 – Perform Critical Task Analysis
Step 3 – Evaluate baseline performance
Step 4 – External input
Step 5 – Determine and adopt response times and performance objectives.

Step 1 - Conducting a Risk Assessment

- Establish Risk Classifications (Fire, EMS, Hazmat, TR)
- For each classification, identify each possible risk (grass fire, vehicle fire, single family dwelling fire, gas leak, medical call, MVA, etc).
- Use a methodology to categorize each risk (low, moderate, high, maximum).
- Calculate for each rural response district (43)

Building a Risk Assessment Classifications

FIRE	EMS	HAZMAT	TR
• Grass Fire • Woods Fire • Trash Fire • Vehicle Fire • Fire Alarm • Sm non-dwelling • Lg. non-dwelling • Cooking Fire • Chimney Fire • Single Family • Multi Family • Comm. Fire • Target Haz.	• Walk-in • Lift Asst. • Medical Call < 6 • MVA < 6 • Any medical call with 6 or more patients	• Investigations • CO Incident • Small Fuel Spill • Lg. Fuel Spill • LP or Natural gas leak • Hazmat release requiring tech response or large evacuations	• Person locked in vehicle/building • Elevator entrapment • Vehicle/machinery extrication • Swift water • Trench • Confined Space • High/low angle

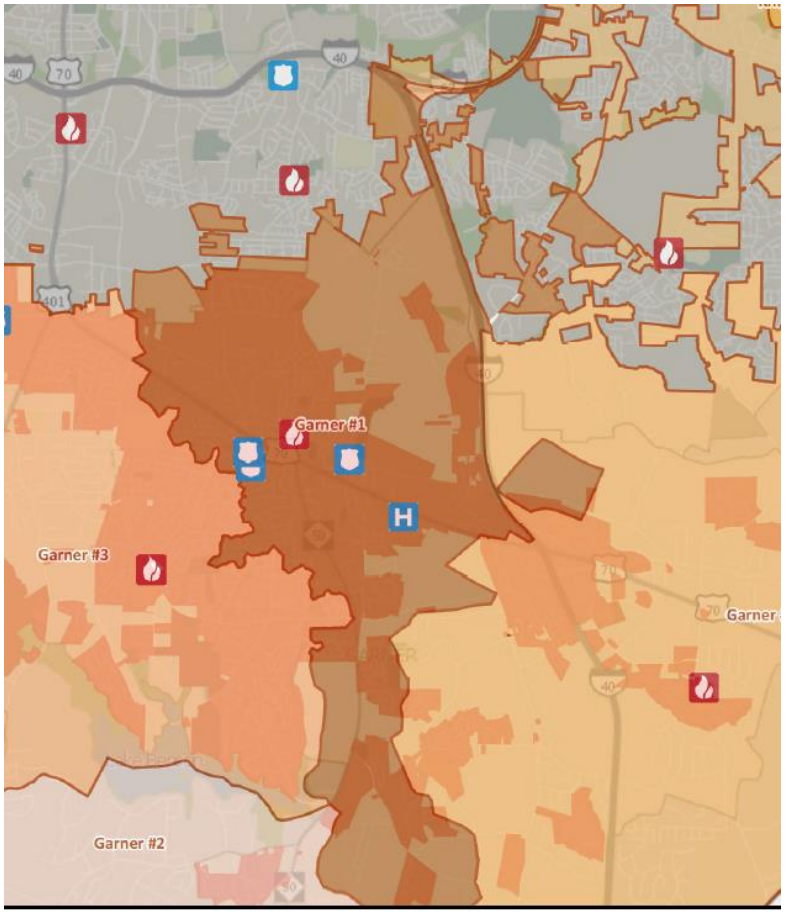
How to measure Risk…

- 3 Axis Approach, measuring:
  - Probability of a risk occurring
  - Consequence of the risk occurring
  - Impact on fire department resources if the risk occurs.

Risk Assessment Example

Garner Station 1
Rural

- 35 road miles
- 6.642 Square miles
- 1,538 population
- 232 per sq. mile



Example Risk Assessment

Wake County Fire Risk Assessment

Fire	Probability	Consequence	Impact	Risk Score	Risk Assessment
Electrical Problem	2	2	2	4.90	Low
Grass/Woods/Trash Fire	4	2	2	8.49	Low
Vehicle Fire	4	2	2	8.49	Low
Automatic Alarms	4	2	2	8.49	Low
Chimney Fire	2	4	6	19.80	Moderate
Cooking Fire, contained	2	4	6	19.80	Moderate
Structure Fire (Less than 5,000 sqft)	2	4	8	25.92	High
Structure Fire (5,001-10,000 sqft)	2	5	8	31.27	Maximum
Structure Fire (greater than 10,000 sqft)/Target Hazards	2	8	8	48.00	Maximum

Fire Department:	Garner Fire - Rescue
Station District:	Station 1
Years Evaluated:	2018

Garner Sta. 4	2015		2016		2017		2018		Total
Total number of calls for service	497		604		567		553		2221
Fire	2015	Risk	2016	Risk	2017	Risk	2018	Risk	Risk Average
Electrical/Odor Investigation	7	8.49	13	8.49	4	4.49	9	8.49	**7.49**
Woods/Trash/Grass	20	8.49	17	8.49	28	8.49	28	8.49	**8.49**
Vehicle Fires	5	8.49	12	8.49	7	8.49	7	8.49	**8.49**
Fire Alarms	28	8.49	27	8.49	19	8.49	20	8.49	**8.49**
Chimney	0	19.8	0	19.8	0	19.8	0	19.8	**19.80**
Cooking-Contained	1	19.8	0	19.8	0	19.8	2	19.8	**19.80**
Structure less 5000	7	33.94	2	25.92	5	33.94	5	33.94	**31.94**
Structure 5K-10K	0	31.27	0	31.27	0	31.27	0	31.27	**31.27**
Structure greater 10K	0	48	0	48	0	48	0	48	**48.00**
Haz Mat	2015	Risk	2016	Risk	2017	Risk	2018	Risk	Risk Average
Investigations/Odor	4	4.49	2	4.49	6	8.49	2	4.49	**5.49**
Small Fuel Spill	3	4.49	1	4.49	1	4.49	0	4.49	**4.49**
Large Fuel Spill	0	13.86	0	13.86	0	13.86	0	13.86	**13.86**
CO Incident	0	13.86	1	13.86	0	13.86	1	13.86	**13.86**
LP/Natural Gas Leak	0	13.86	3	13.86	1	13.86	1	13.86	**13.86**
Haz Mat Release	0	28.14	0	28.14	0	28.14	0	28.14	**28.14**
EMS	2015	Risk	2016	Risk	2017	Risk	2018	Risk	Risk Average
Walk In	0	8.49	0	8.49	0	8.49	0	8.49	**8.49**
Medical Call	189	19.8	210	19.8	195	19.8	191	19.8	**19.8**
MVA Less than 6	75	26.53	118	26.53	102	26.53	106	26.53	**26.53**
MVA Greater than 6	0	28.14	0	28.14	0	28.14	0	28.14	**28.14**
Tech Rescue	2015	Risk	2016	Risk	2017	Risk	2018	Risk	Average
Lock In	0	4.49	1	4.49	0	4.49	1	4.49	**4.49**
Elevator	0	4.49	0	4.49	0	4.49	0	4.49	**4.49**
VMR Extrication	1	13.86	2	13.86	1	13.86	1	13.86	**13.86**
Confined Space/Trench/Swift water/High angle	0	28.14	0	28.14	0	28.14	1	28.14	**28.14**

Step 2 – Critical Task Analysis, Developing Effective Response Force

High/Maximum Fire Risk Critical Tasks	
Critical Task	Number of Personnel
Command/Safety/Accountability	1
Fire Attack	4
RIT	2
Search/Rescue	2
Vent/Utilities/Ladder ops	3
Pump Operator	1
Fire Suppression ERF	13
3 Engines, 1 Rescue/Ladder, 1 Chief	
Non-Hydrant Response	
Tanker Response (3 Tankers) *removed from ERF	3
Water Supply Engine	3
Total ERF	16/19

Critical Task Analysis

- This answers the question of why you need the number of firefighters you say you need at a certain type of emergency incident.
- This also starts to tie all the steps together and explain why they were important steps to get to a data driven recommendation.
- The risk assessment identifies that the need (risk) exists and categorizes it (low, moderate, high, maximum), which provides information to determine the needed resources to respond (number of firefighters).

Step 3 – Baseline Performance Evaluation

- Current travel time performance
- Emergency response only
- Evaluated first apparatus travel times
- Evaluated effective response force (ERF) travel times
- Included GIS modeling to ensure county wide representation

First Unit Response Travel Time

Department	Number of Calls	90th Travel Time
Apex	110	8:30
Cary	22	4:48
Durham Highway	184	5:57
Eastern Wake (Knightdale)	554	6:48
Fairview	499	5:31
Fuquay	727	7:37
Garner	1,178	7:41
Holly Springs	94	8:04
Hopkins	75	6:26
Morrisville	130	7:52
Northern Wake	589	6:50
North West Wake Hook	60	13:12
Rolesville	130	6:17
Swift Creek	148	6:16
Wake Forest	282	5:59
Wake New Hope	246	6:43
Wendell	143	7:18
Western Wake	51	6:35
Zebulon	99	6:21

System wide – 7 minutes and 8 seconds (5,242 calls evaluated)

Effective Response Force (ERF) Travel Time

Location	District	Call Type	ERF Travel (16)	ERF Travel (19)
324 Hunters Farm Dr	GFD RURAL GAR17	Structure Fire Residential	10:12	11:47
6208 Hirondelle Ct	HSFD RURAL HSR17	Structure Fire Residential	9:33	11:10
8617 Bostian Dr	FFD RURAL FFR08	Structure Fire Residential	8:01	12:02
1219 S Spring Garden Cir	GFD RURAL GAR17	Structure Fire Mobile Home	8:03	8:06
107 QUAIL CROSSING DR	WFFD RURAL WFR20	Structure Fire Mobile Home	4:53	N/A
117 Belve Dr	GFD RURAL GAR17	Structure Fire Residential	10:42	12:40
1520 Consett Ct	NWFD RURAL NWR33	Structure Fire Residential	10:56	10:56
2729 BROOKWOOD DR	FFD RURAL FFR08	Structure Fire Residential	8:08	8:53
215 GIPSON DR	GFD RURAL GAR42	Structure Fire Residential	10:49	12:15
4926 Fayetteville Rd	GFD RURAL GAR17	Structure Fire High Life Hazar	13:37	N/A
7904 Mitchell Mill Rd	ROFD RURAL RVR06	Structure Fire Residential	10:47	N/A
8433 Greythorne Pl	EWFD RURAL EWR24	Structure Fire Residential	13:38	N/A
9924 Scottie Dr	DUTFD RURAL DVR01	Structure Fire Large Non Dwell	14:31	N/A
5949 Sunset Lake Rd	HSFD RURAL HSR05	Structure Fire Residential	7:40	N/A
3509 Misty River Dr	EWFD RURAL EWR24	Structure Fire Residential	12:17	N/A
3608 Lodge Dr	EWFD RURAL EWR24	Structure Fire Residential	14:29	16:35
6400 Johnson Pond Rd	FVFD RURAL FVR18	Structure Fire Commercial	8:50	N/A
1712 Old Crews Rd	NHFD RURAL NHR40	Structure Fire Mobile Home	7:50	N/A
3816 Benson Rd	GFD RURAL GAR17	Structure Fire Residential	13:08	N/A
5617 Treestand Ct	GFD RURAL GAR17	Structure Fire Residential	12:34	N/A
1504 Old Crews Rd	NHFD RURAL NHR40	Structure Fire Residential	10:25	10:25
3413 Horseshoe Bnd	NWFD RURAL NWR33	Structure Fire Small Non Dwell	7:44	11:30
1924 Rolesville Rd	ROFD RURAL RVR06	Structure Fire Large Non Dwell	4:57	N/A
4213 Bluewing Rd	NHFD RURAL NHR40	Structure Fire Residential	8:05	N/A
6109 Buffaloe Rd	NHFD RURAL NHR40	Structure Fire Mobile Home	13:23	N/A
13019 Creedmoor Rd	NWFD RURAL NWR33	Structure Fire Large Non Dwell	9:49	N/A
5429 Fayetteville Rd	GFD RURAL GAR17	Structure Fire Commercial	8:32	11:37
6805 Rex Rd	HSFD RURAL HSR17	Structure Fire Residential	12:48	N/A
8305 Riley Hill Rd	ZFD RURAL ZFR12	Structure Fire Mobile Home	9:24	N/A
3009 Villawood Cir	FFD RURAL FFR08	Structure Fire Residential	10:48	N/A
6317 People Rd	HSFD RURAL HSR17	Structure Fire Residential	10:20	N/A
126 Buffaloe Acres Ln	GFD RURAL GAR17	Structure Fire Commercial	14:04	N/A
5205 Tustin Ct	FVFD RURAL FVR18	Structure Fire Residential	9:48	N/A
101 Saunders Grove Ln	MFD Rural	Structure Fire Residential	4:42	4:42
7800 Hendricks Rd	MFD Rural	Structure Fire Residential	5:52	5:52
9832 Ten Ten Rd	GFD RURAL GAR17	Structure Fire Large Non Dwell	8:08	12:45
906 Sunny Ln	GFD RURAL GAR17	Structure Fire Residential	8:32	N/A

GIS Modeling for ERFs

Station	# of Staffed	Loc.	Street number	Street name	City	Zip	1st unit station	1st unit travel	2nd unit station	2nd unit travel	3rd unit station	3rd unit travel	4th unit station	4th unit travel	5th unit station	5th unit travel	6th unit station	6th unit travel
Swiftcreek Sta. 1	1	1	4608	Fielding Dr	Raleigh	27606	SC1	4.85	FF1	6.84	FF2	11.91	AF4	12.39	AF4	12.39	HS1	12.89
		2	2500	Mid Pines Rd	Raleigh	27606	S20	1.53	SC1	3.96	GF3	9.17	GF1	9.41	GF1	9.41	WW1	9.52
		3	4909	Yates Mill Pond Rd	Raleigh	27606	SC1	3.89	FF2	7.63	FF1	9.37	GF3	10.25	WW1	12.27	GF1	12.63

Distribution and Concentration of Resources

Distribution – How long does it take for 1 fire resource to response (basic station location analysis).

Concentration – How long does it take for the effective response force to respond (multiple fire stations and/or more than 1 resource at 1 fire station).

Step 4 – External Input from Community Survey

- Produced and Published by Wake County Communications Department
- 1,384 Surveys Completed (all from individuals in the unincorporated areas of Wake County)
- Full survey results in report.

Fire Tax District Community Involvement Survey

What people are saying?

Includes: Strongly Agree, Somewhat Agree & Agree

Top 10 Words to Describe Fire Services

- Professional
- Dedicated
- Responsive
- Efficient
- Caring
- Friendly
- Helpful
- Reliable
- Dependable
- Prompt

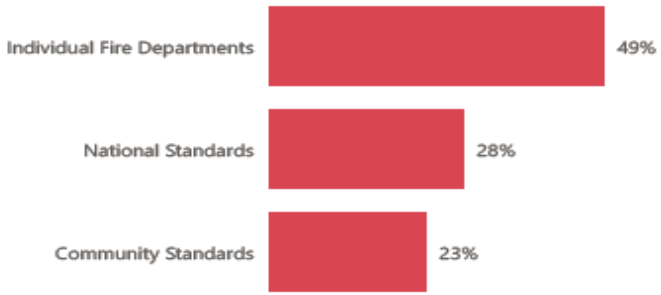
1,384
Survey Responses

74%
Watched Video

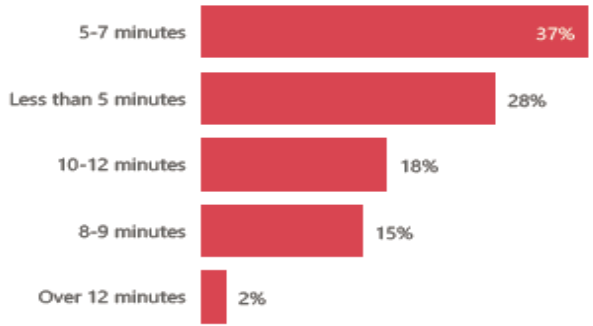
59%
% No Services

What about time standards?

Time Standards



911 Arrival Time



Step 5 – Determine and adopt response times and performance objectives

Response Plans (for each incident type)	Minimum Staffing Levels	Performance Objectives for incident ops.	Response Time Goals

This is the “Standard of Service”

This is the “measuring stick”

FIRE

The first arriving apparatus for all fire risk classifications responding emergency traffic with a minimum of three (3) qualified firefighters should be 7 minutes 0 seconds of travel time in the unincorporated districts of Wake County, 90 percent of the time.

The first arriving apparatus will be capable of proving 500 gallons of water with a pumping capability of 1,250 gallons per minute; establishing incident command procedures, proving initial size-up report; requesting additional resources if needed; initiate fire attack; perform any needed rescues.

The Effective Response Force (ERF) for **any** reported structure fire responding emergency traffic with a minimum of 16 qualified firefighters should be 12 minutes 0 seconds, 90 percent of the time.

The ERF for any structure fire will be capable of establishing a command post; establish personnel accountability; establish a safety officer; secure an initial water supply; operate multiple hose lines; establish a rapid intervention crew; perform search and rescue operations; complete forcible entry; provide ventilation and utility control; perform any needed salvage and overhaul operations.

EMS

The first arriving apparatus for all EMS risk classifications responding emergency traffic with a minimum of two (2) firefighters should be 7 minutes 0 seconds travel time in the unincorporated districts of Wake County, 90 percent of the time.

The first arriving crew will be capable of proving Basic Life Support (BLS) care to include the use of an Automatic External Defibrillator (AED), establishing incident command, and document all needed information.

The ERF for high risk medical calls will be capable of establishing triage and providing additional patient care.

*Note that motor vehicle crashes with injuries is part of the medical risk when only dealing with injured patients. Motor vehicle crashes can involve technical rescue and hazmat risks and are evaluated in those sections.

Technical Rescue

The first arriving apparatus for all Technical Rescue (TR) risk classifications responding emergency traffic with a minimum of three (3) firefighters should be 7 minutes 0 seconds in the unincorporated districts of Wake County, 90 percent of the time.

The first arriving apparatus will be capable of establishing incident command procedures, proving initial size-up report; requesting additional resources if needed; creating a safe area, providing basic stabilization and extrication.

The ERF for moderate and high-risk calls will establish rescue operation groups and/or assist technical rescue teams.

Hazmat

The first arriving apparatus for all Hazmat risk classifications responding emergency traffic with a minimum of three (3) firefighters should be 7 minutes 0 seconds in the unincorporated districts Wake County, 90 percent of the time.

The first arriving apparatus will be capable of proving 500 gallons of water with a pumping capability of 1,250 gallons per minute; establishing incident command procedures, proving initial size-up report; requesting additional resources if needed; mitigate situation if possible; start initial evacuations.

The ERF for moderate and high-risk calls will establish mitigation/containment groups, provide additional evacuation groups, and/or assist hazmat teams.

Plan Moving Forward…

- Monitor response times annually to determine any gaps for first arriving apparatus response time goals (Distribution of Fire Stations).
- Monitor response times annually on all structure fires for all arriving apparatus to determine any gaps in response times for the effective response force time goals (Concentration of Fire Stations).
- Conduct risk assessments every 5 years.
- Conduct critical task analysis every 5 years.

Recommendations…

- Wake County Commissioners should adopt the standard of response performance objectives for Fire, EMS, Hazmat, and Technical Rescue outlined in this study for the unincorporated areas.

- Individual fire districts should meet the standard of response performance. If not, Wake County Fire Services staff will evaluate the individual district to determine where the gaps are and provide recommendations to close the gaps.

- The recommended effective response force (ERF) for structure fires did not include tankers. Tankers are an important part of a structure fire response in the rural areas where hydrants are not available. Tankers were not included in the ERF because these apparatus are not staffed and most rely on volunteers to respond from home to get tankers enroute to a fire, which account for a longer than normal response time. It was not easy to determine through the travel time evaluation the effectiveness of tanker responses in Wake County. A tanker response evaluation is recommended to determine if the county has a problem with getting tankers to fires and if so, provide recommendation to solve it.

Recommendations…

- Call Processing plays a part in total response time, however, this study and recommendation only focused on travel time (station locations). It is recommended that call processing time is evaluated, and recommendations are provided.
- Turn out time plays a part in total response time, however, this study and recommendation only focused on travel time (station location). It is recommended that turn out time is evaluated, and time recommendations are provided.

Questions…