Raleigh Fire Department

Master Plan

Executive Summary

PREPARED FOR

City of Raleigh

Raleigh Fire Department

PREPARED BY

Darkhorse Emergency, in partnership with NC Fire Chief Consulting

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Executive Summary

The Raleigh Fire Department (RFD) Master Plan represents a comprehensive evaluation of the department's current capabilities, future service demands, and strategic recommendations to meet the evolving needs of the City of Raleigh. This master planning effort was initiated in response to Raleigh's position as one of the fastest-growing areas in the country, with an understanding that current infrastructure and personnel investments must be analyzed and planned strategically to meet both current and future emergency service needs.

Key Context:

- Raleigh is experiencing unprecedented growth, with a 1.16% annual population increase.
- RFD's call volume has increased by 17% since 2024, from 47,167 incidents in 2021 to 55,549 in 2024. This growth is anticipated to increase alongside population, up to ~79,000 incidents annually by 2050 (46% increase).
- Geographic expansion through voluntary annexation has the potential to significantly expand RFD's service area, outside of current station coverage

Our Approach

This master planning effort employed a multi-faceted, evidence-based methodology:

Phase 1 - Stakeholder Engagement:

- 7 comprehensive stakeholder workshops covering all levels of RFD
- External partner interviews (City departments, Emergency Communications, Wake EMS)
- Topics: staffing, training, equipment, facilities, communications, and strategic vision

Phase 2 - Performance Diagnostics:

- Comprehensive analysis of 2022-2024 response data using Darkhorse's proprietary analytics platform
- Root cause analysis of response performance gaps
- Benchmarking against NFPA 1710 standards and peer departments

Phase 3 - Predictive Modeling:

- Population growth and call volume forecasting through 2050
- Service area expansion modeling for Northeast and Southeast special study areas
- Resource optimization scenarios and deployment analysis

Phase 4 - Strategic Recommendations:

- Phased implementation plan with clear timelines and resource requirements
- Financial modeling for capital investments and operational costs

- Risk mitigation strategies and performance improvement targets

Key Findings

Current Performance Challenges

Response Time Performance:

- Only 54% of first-due units meet NFPA 1710 response time standards
- 90th percentile total response time: 9 minutes and 3 seconds, vs. 6 minutes/6 minutes 20 seconds targets.
- Alarm handling time: 2 minutes, 46 seconds vs. 1-minute standard.

Root Cause Analysis reveals three primary factors:

1. **Alarm handling delays:** Most cost-effective improvement opportunity (30-second reduction = +8.66% performance).
2. **Unit Workload:** "Busy overgoals" increasing steadily as call volume outpaces resources, additional resources are needed to effective serve Raleigh as it grows.
3. **Geographic Coverage Gaps:** Two critical areas: Wilders Grove and Neuse Crossroads. New stations should be planned to address these gaps.

Identified Resource Gaps:

- RFD's staffing factor of 3.63 is below the industry minimum of 3.75, meaning RFD is understaffed compared to its peers
- RFD is underserved by ladder trucks (6 minutes, 5 seconds response time city-wide)
- Five stations are at or nearing end-of-life and require replacement

Future Demand Projections

Call Volume Growth:

- Current: ~55,000 calls annually
- 2030: Continues steady growth with increasing urban density
- 2050: Nearly 79,000 annual calls (46% increase)

Potential Geographic Expansion:

- Northeast Special Study Area: +8.5 square miles
- Southeast Special Study Area: +17.5 square miles
- Southwest Growth (Asbury Area): Call volume expected to triple by 2050

Highest Impact Growth Areas:

- Station 11: 1,929 calls (2023) → 5,919 calls (2050)
- Station 8: 1,197 calls (2023) → 5,713 calls (2050)
- Station 5: Projected to exceed 5,000 calls annually by 2050

Strategic Recommendations

Immediate Action (Years 1-2)

Priority 1: Improve Alarm Handling

- Target: Reduce alarm handling time by 30 seconds.
- Impact: +8.66% first-due performance, 1,527 fewer late responses annually.
- Collaborate with Raleigh-Wake Emergency Communications Center to refine EMS dispatch protocols and ensure dispatch aligns with patient needs.

Priority 2: Address Staffing Gap

- Hire 18 additional firefighters to achieve a 3.75 staffing factor
- Reduce overtime costs and burnout-related absences
- Establish foundation for future growth

Priority 3: Infrastructure Quick Wins

- Deploy traffic pre-emption systems on major corridors
- Add 4 mechanics to fleet maintenance division
- Expand community risk reduction programs

Mid-Term Expansion (Years 3-10)

Station Infrastructure Modernization

- Replace/relocate 5 aging stations (priority: Station 23, 9, 8, 10, 17)
- Systematic approach, maintaining 3-concurrent-project limit

New Station Development

- Construct Station 30 (Wilders Grove)
- Begin development process for Station 31 (Neuse Crossroads)

Apparatus and Staffing

- Add 4 frontline units and their staff: 2 ladder companies, 1 engine, 1 Quick Response Vehicle
- Transition to 4-firefighter engine companies per NFPA 1710
- Optimize ladder truck deployment city-wide

Formalization of Automatic Aid Agreements

- Priority partnerships include Cary Fire Department for southwestern coverage, Knightdale Fire Department for southeastern expansion areas, and Wake-New Hope Fire Department for northeast coordination.

- These agreements require careful negotiation of operational protocols, cost-sharing arrangements, and performance standards to ensure seamless integration during emergency response.

Long-Term Strategic Goals (Years 10-25+)

Achieve Full Geographic Coverage

- Complete construction of Station 31
- Construct Stations 32 and 33 for annexation areas
- Complete infrastructure renewal (all stations meeting modern standards)
- Implement comprehensive Standards of Cover

Technology, Innovation, and Continuous Improvement

- Pursue CFAI accreditation and continuous improvement framework
- Implement predictive analytics for resource deployment
- Integrate emerging firefighting technologies

Administrative Enhancement

- Add battalion chief positions to maintain 5-station maximum span of control
- Strengthen mutual aid agreements with Cary, Knightdale, Wake-New Hope

Comprehensive Infrastructure Renewal

- Complete the rebuild of Station 17
- Ensure all fire stations meet modern standards for energy efficiency, operational effectiveness, and firefighter health and safety.

Sustainability and Resilience

- Environmental initiatives, inclusing net-zero energy for all new construction, integrating solar, energy storage, and efficient HVAC systems
- Fleet modernization explores alternative fuels and incorporate advanced technologies

Financial Investment Framework

25-Year Investment: Approximately $808 million split into three planning horizons:

Short-Term Planning Horizon (2025-2030)

- Apparatus Costs - $25.2 Million
- Personnel Costs - $9.8 Million
- Station Costs
    - Land Acquisition - $6 Million

    - Design & Construction Costs[1] - $76.1 Million

Total Investment - $116.9 Million

Mid-Term Planning Horizon (2031-2035)

- Apparatus Costs - $47.1 Million
- Personnel Costs - 5.3 Million
- Station Costs
    - Land Acquisition Costs - 4.4 Million
    - Design & Construction Costs - $143.4 Million

Total Investment - $200.2 Million

Long-Term Planning Horizon (2036-2050)

- Apparatus Costs - $196.0 Million
- Personnel Costs - $19.8 Million
- Station Costs
    - Land Acquisition Costs - $1.7 Million
    - Design & Construction Costs - $273.3 Million

Total Investment - $490.8 Million

Revenue Capacity:

- Property tax projections support planned investments
- Total property valuations projected to reach $1.3 trillion by 2050
- Annual property tax revenue capacity: $4 billion by 2050
- Sales tax capacity of approximately $394.4 million by 2050

Cost Management Strategies:

- Proactive land banking to reduce acquisition costs
- Standardized station designs for 10-15% construction savings
- Regional partnerships and automatic aid agreements
- Phased implementation aligned with revenue capacity

[1] Includes Design & Engineering, Construction, Soft, FF&E, and 1st Year Maintenance/Repair Costs

Performance Improvement Targets

By 2030:

- First-due performance: 54% → 75%+ (21% improvement)
- Total response time: 9:03 → 6:30 target range
- Effective Response Force: 48% → >70% compliance

By 2050:

- Maintain NFPA 1710 compliance despite 46% call volume growth
- Achieve comprehensive geographic coverage through strategic station placement
- Establish sustainable financial model for ongoing operations

Key Success and Accountability

Key Performance Indicators:

- NFPA 1710 compliance rates (first-due and ERF)
- Overgoal incident reduction
- Financial sustainability ratios
- Firefighter safety and wellness metrics

Continuous Improvement:

- Regular performance monitoring and plan updates
- Standards of Cover adoption
- CFAI accreditation pursuit
- Data-driven decision making culture

This master plan serves as a vital strategic tool to ensure RFD maintains and enhances its high standards of service delivery, firefighter safety, and community protection as Raleigh continues its trajectory as one of America's premier growth cities

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