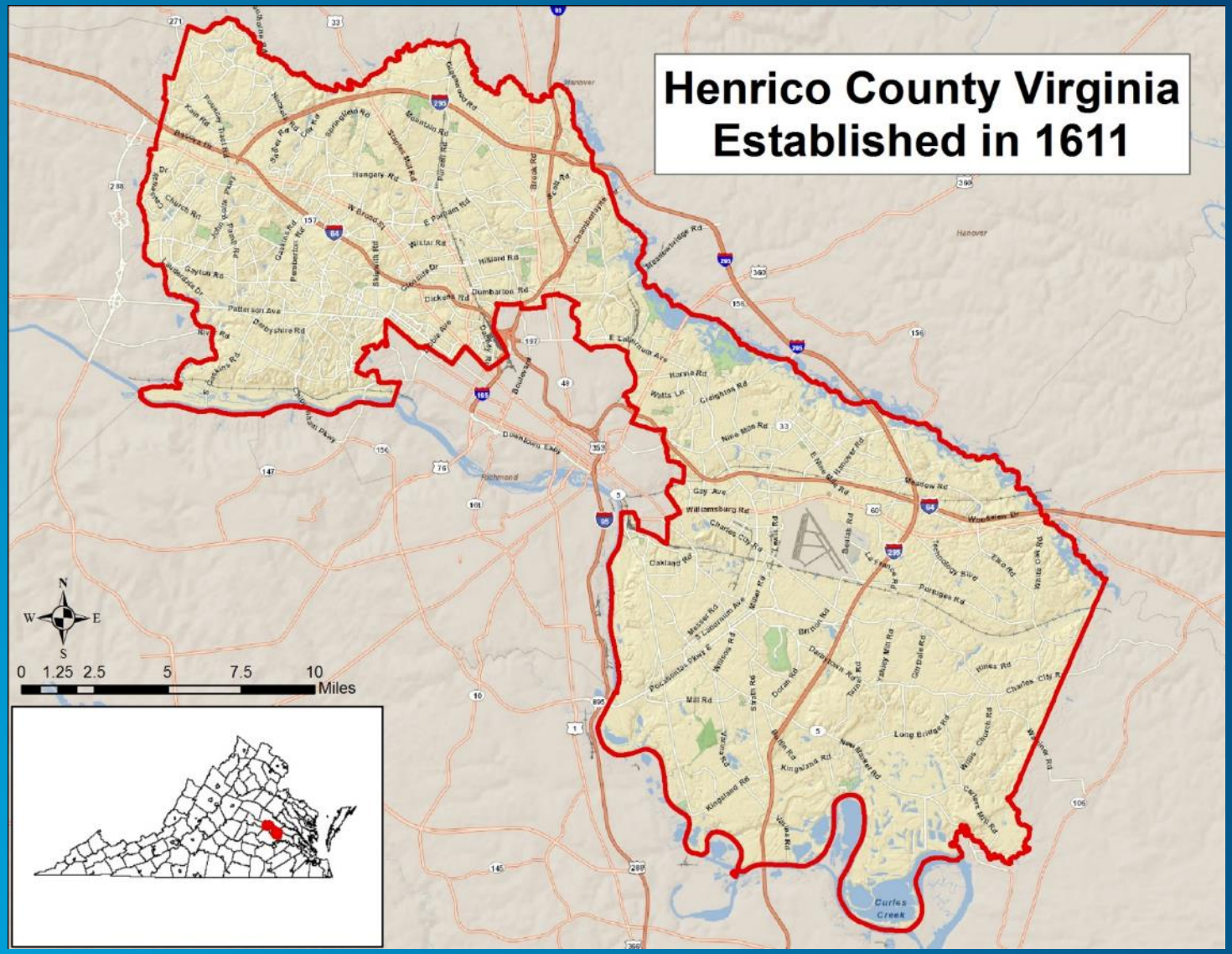
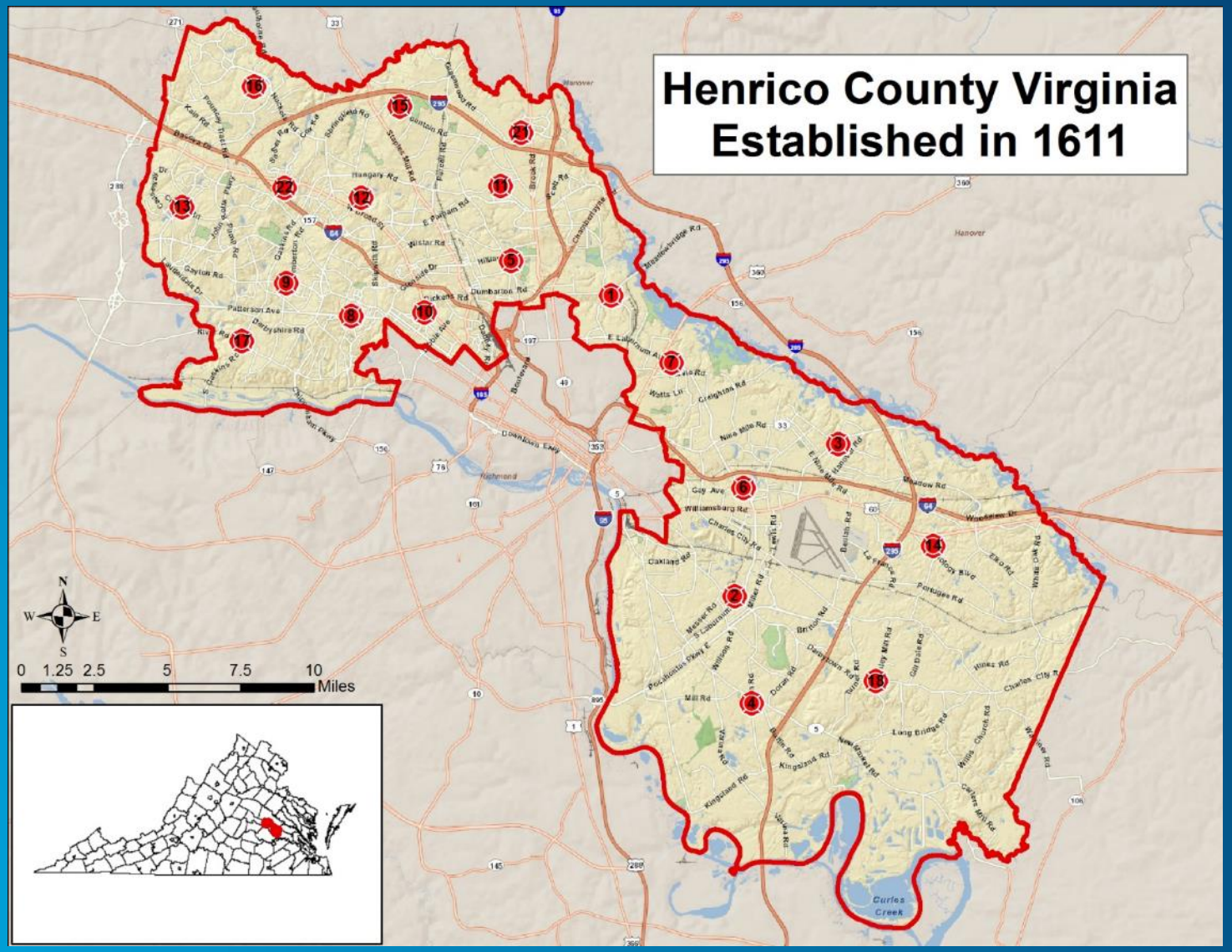
Leveraging Expertise from the Field to Enable Organizational Change

Mike Cox, Chief of Operations
Robin Patton, Applied Technology Specialist
Division of Fire, Henrico County Virginia

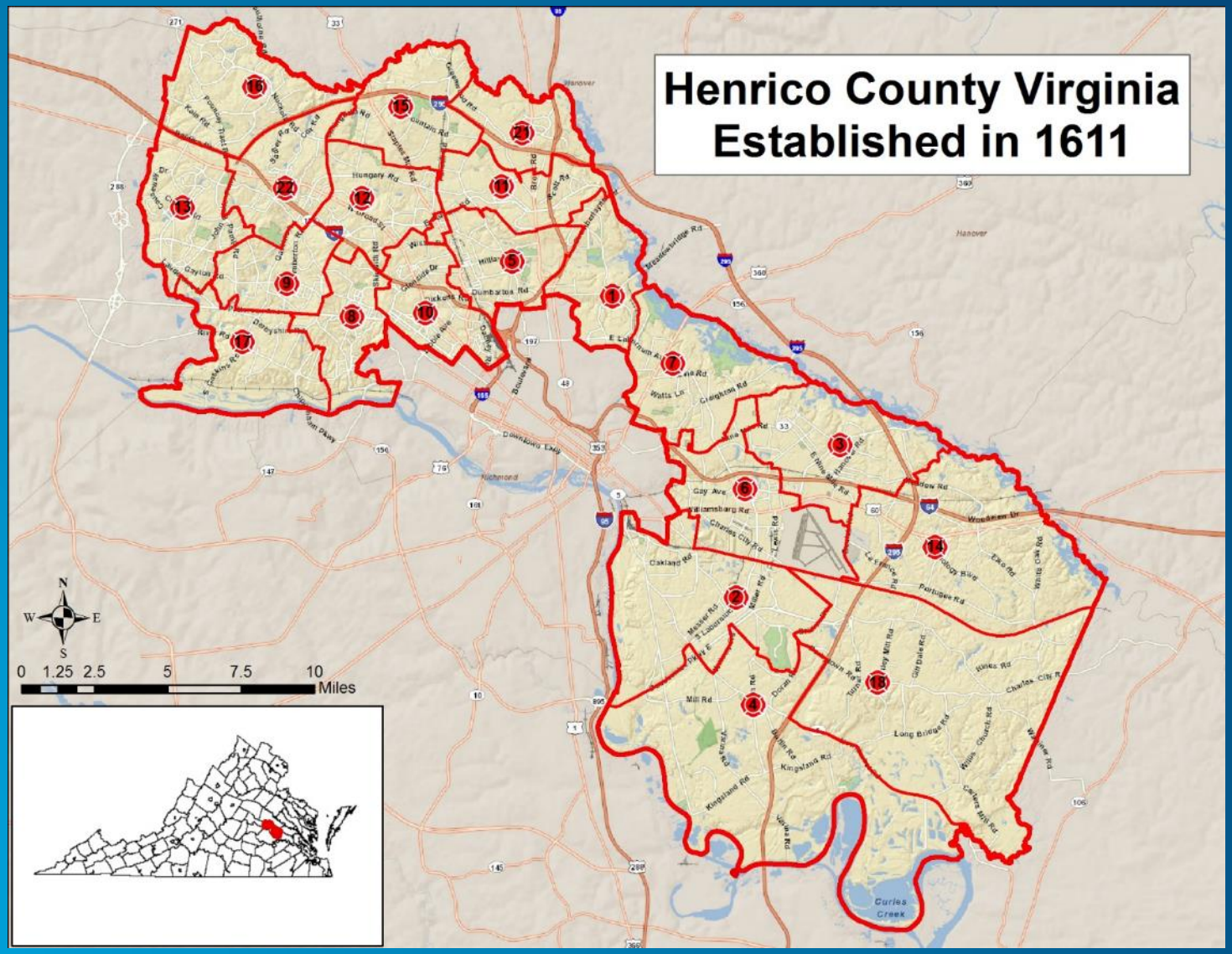
Henrico County Overview



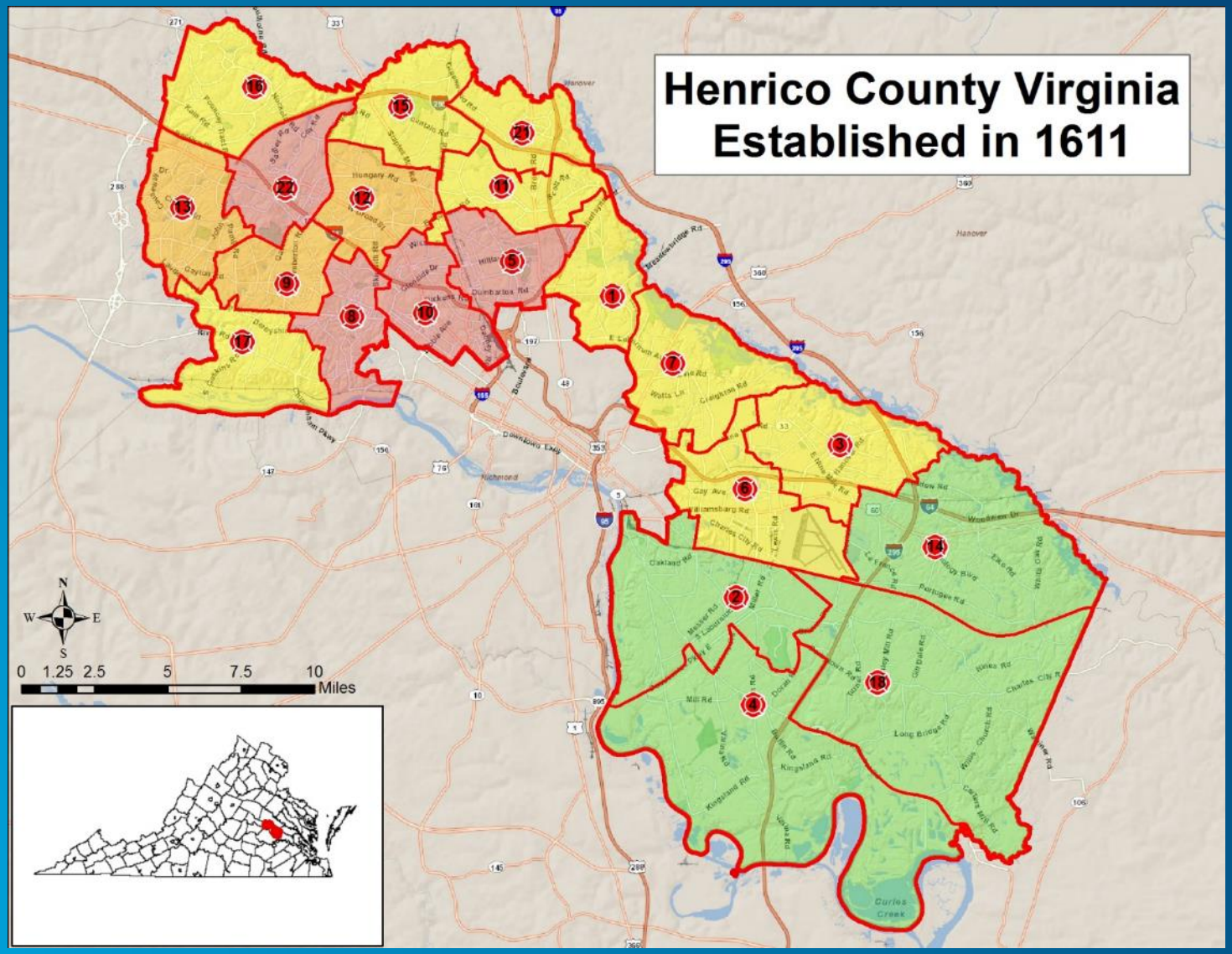
Henrico Division of Fire - Stations



Henrico Division of Fire – Response Districts



Henrico County – Population Density Analysis



- All Hazards Agency
- 548 career employees
- 20 firehouses
- 244 sq miles

We set out to understand our data and improved our organization along the way…

- How we used the Accreditation Standards of Cover and Critical Task Analysis to implement major operational changes and to improve the way we solve problems.
- How this process opened our eyes to the “wicked” data problems that were hiding in our organization.
- How we are using GIS for collaborative problem solving and implementing technology solutions we didn’t know we had.
- How our employees are “jumping in” and transforming the organization.

Commission on Fire Accreditation International

Accreditation

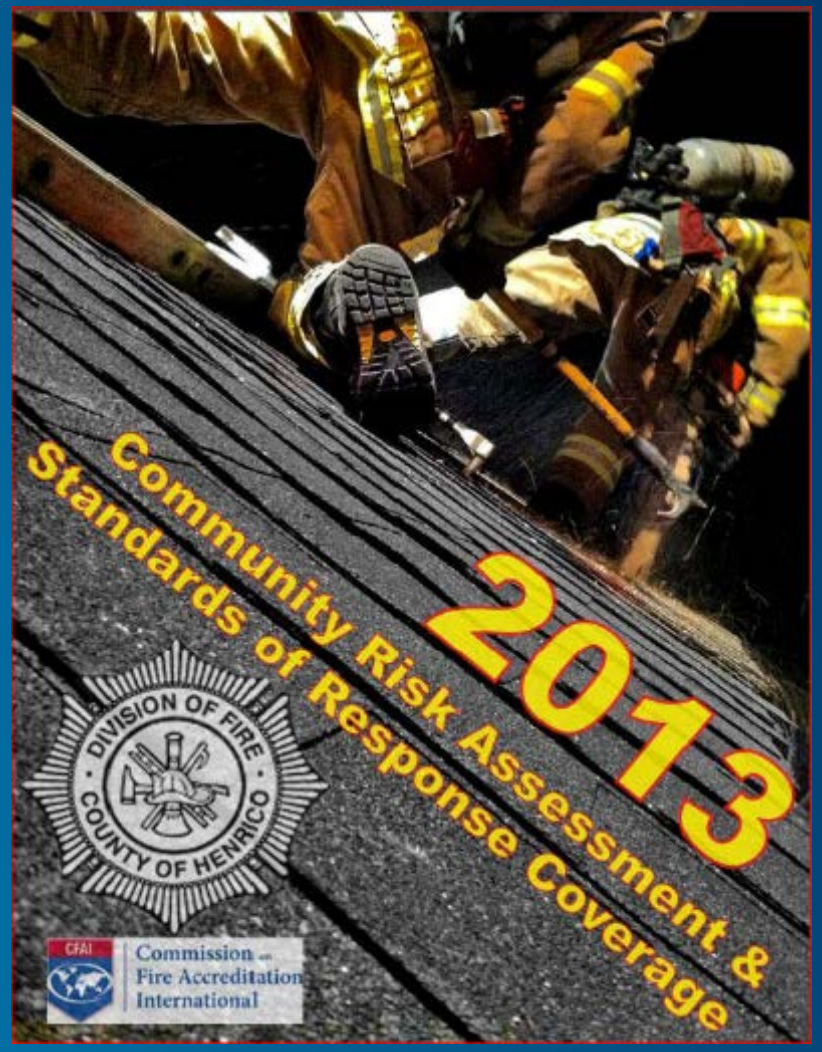
- **Embarked on the Accreditation journey in 1996. Received accreditation first in 1997**
- **9th overall agency to attain International Accreditation**

Re-Accreditation

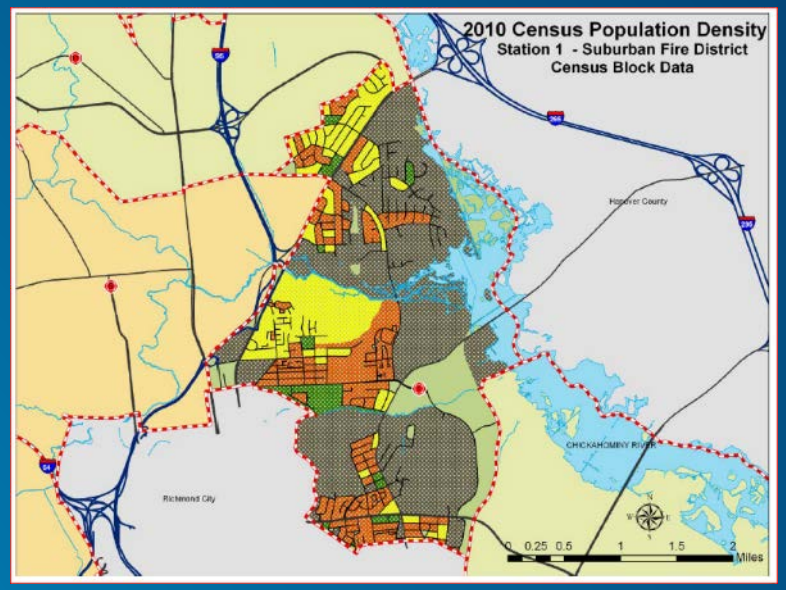
- **New Fire Chief appointed in Fall of 2012**
- **Accreditation documents were due in less than 90 days**
- **No accreditation manager or team in place**

We hired a temporary GIS Specialist to help us prepare the maps we needed for Re-Accreditation…

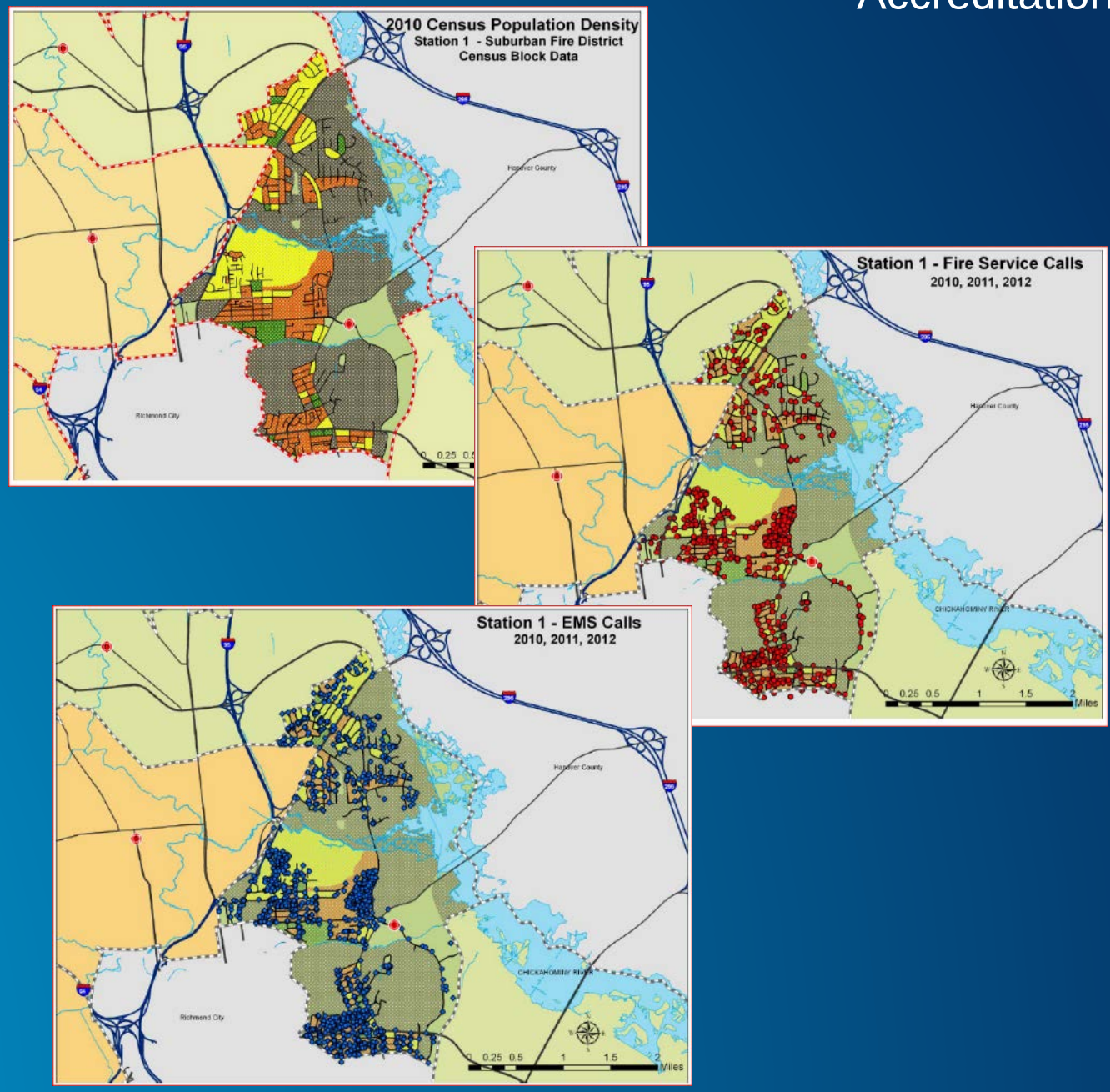
- **Standards of Response Cover**
  - **Conduct Risk Analysis**
    - **Population density – 2010 Census**
    - **Evaluation of demand, location and call type**
  - **Perform Critical Task Analysis**
    - **Deployment Plans**
  - **Measurement of System Performance**
    - **Travel Time Analysis**
    - **Response Times**
  - **Develop Performance Measurements**



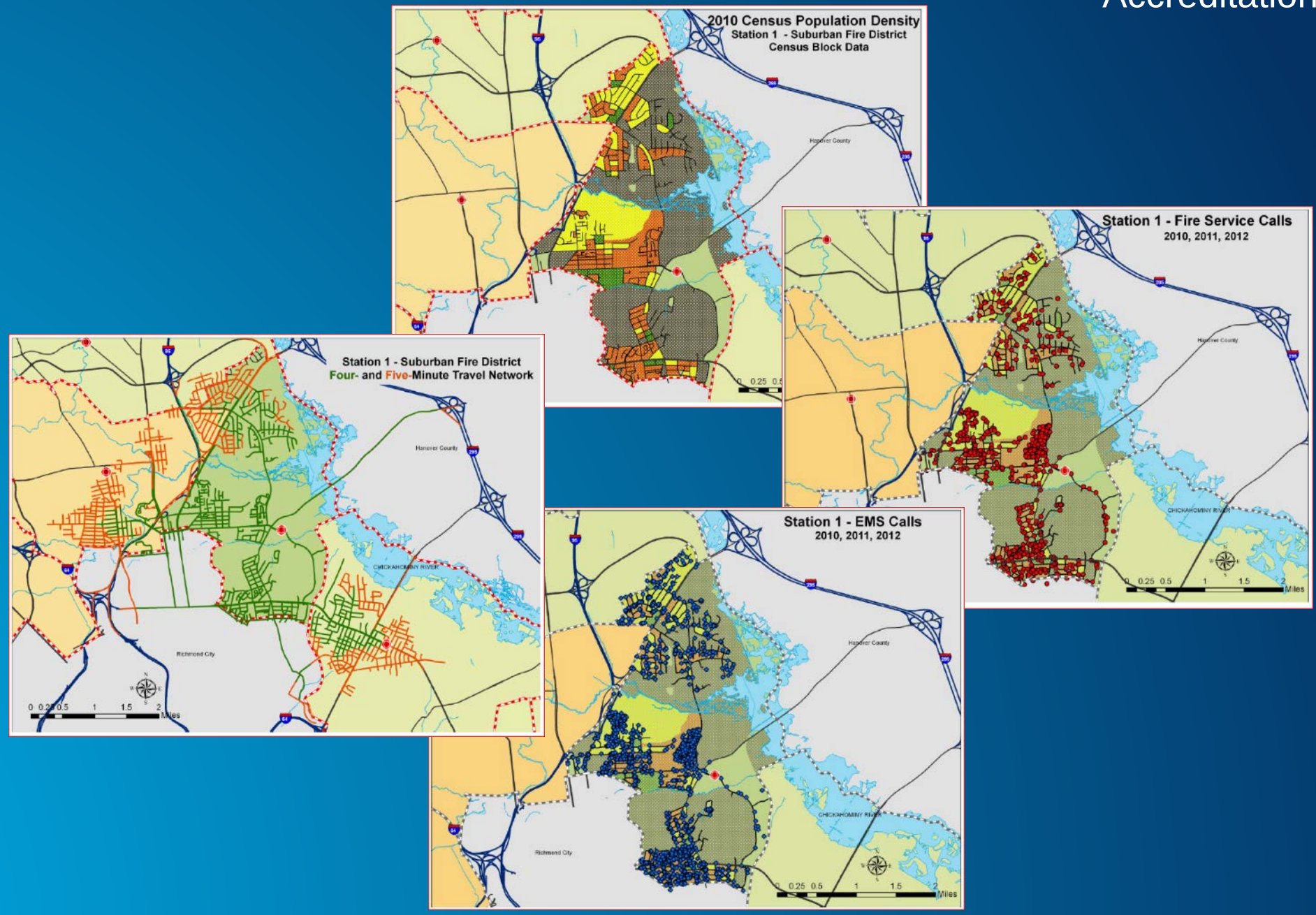
- **30 days later**
  - ✓ **Census Analysis**



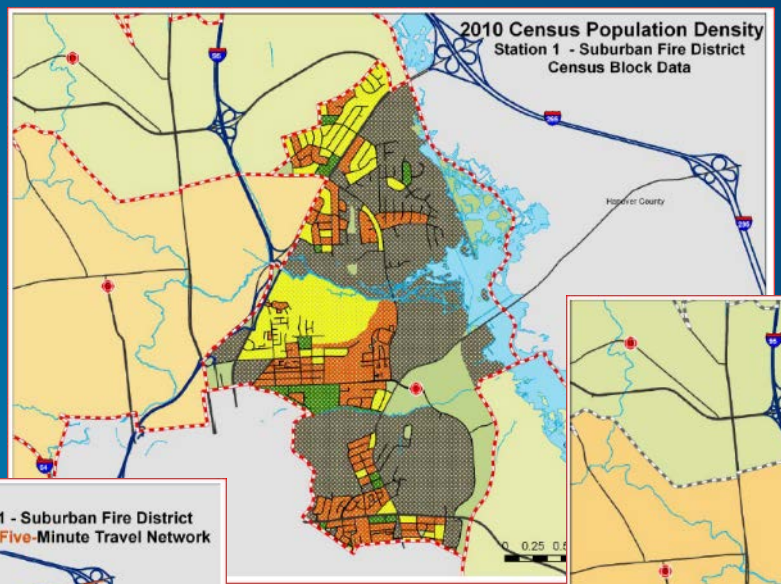
- **30 days later**
  - ✓ **Census Analysis**
  - ✓ **Incidents**

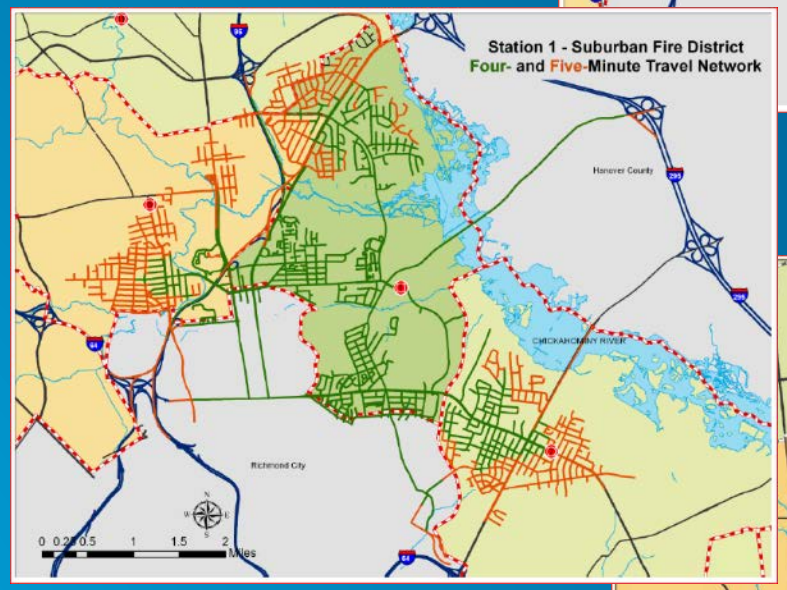


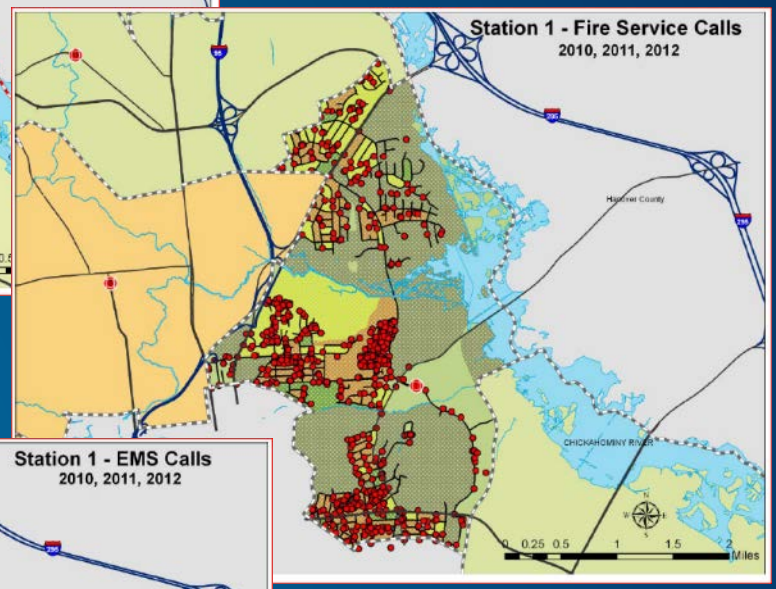
- **30 days later**
  - ✓ **Census Analysis**
  - ✓ **Incidents**
  - ✓ **Bonus – Travel Time Analysis**

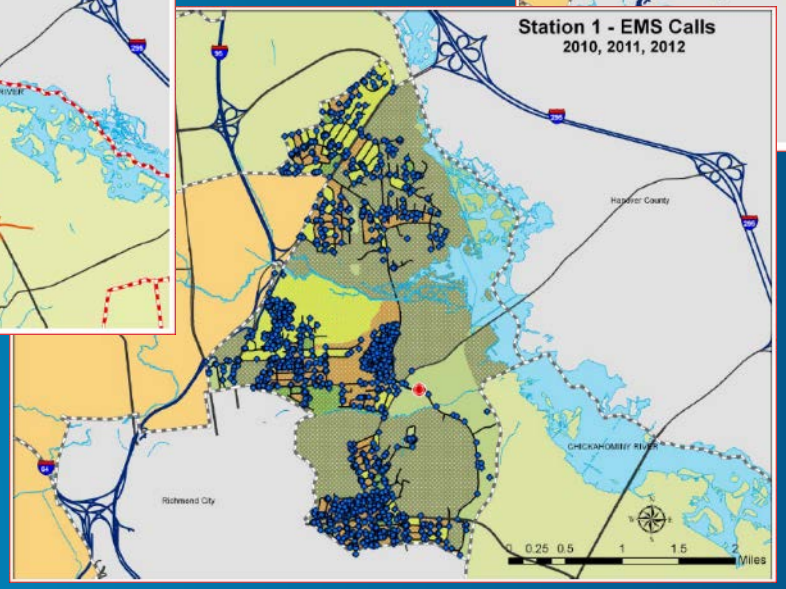


- **30 days later**
  - ✓ **Census Analysis**
  - ✓ **Incidents**
  - ✓ **Bonus – Travel Time Analysis**









Then they asked me if I wanted to stick around and help them look at RISK…

New way of looking at our data revealed some concerns…

- Data Reliability
- Fire Call Classification
- Alarm Assignments
- Structure Fire Hazard Analysis

"Residential"

"Commercial"

"Multi-family"

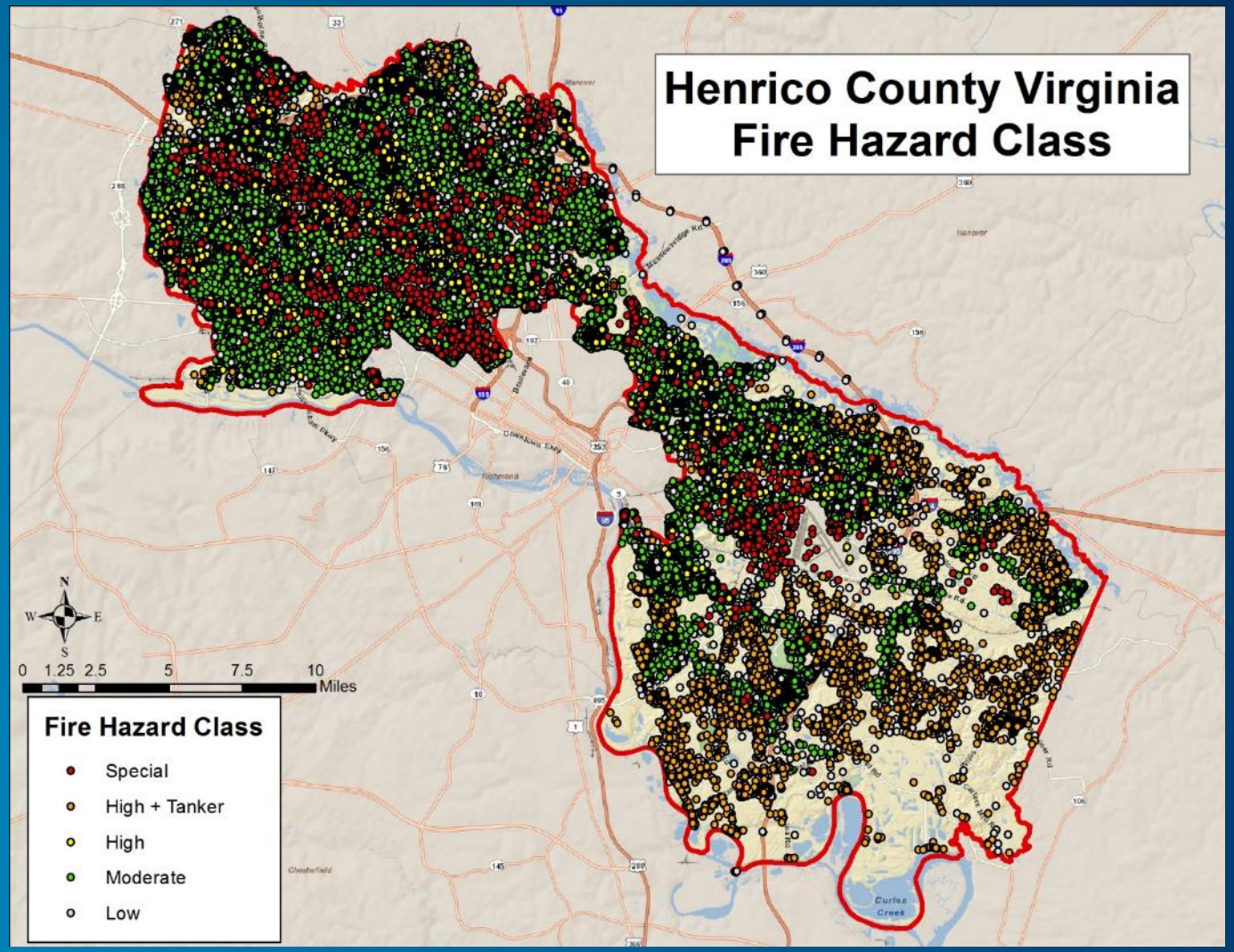
The Troops knew this didn't make sense,
and they knew what we needed to do . . . .

We needed to classify structures not on the USE GROUP but instead use RISK LEVEL.

From:
"Residential"
"Multi-family"
"Commercial"
"Hotel / Motel"

Hazard Classification – for every address

- **Data resources were available**
  - Property classification
    - Building Inspectors Office
  - Square footage
    - Real Estate Assessments
  - Number of Stories
    - Real Estate Assessments
  - Distance to closest fire hydrant
    - GIS Analysis



Structure Fire – Multi-Family

2008: 10 + 16 Firefighters

- Initial Assignment **(16):**
  - 3 Engines
  - 2 Trucks
  - 1 Battalion Chief

- Upgrade **(10):**
  - 1 Engine
  - 1 Truck
  - 1 Fire Medic Unit
  - 1 EMS Supervisor
  - 1 Air Utility

Structure Fire - High Risk

2013: 26 Firefighters

- Initial Assignment:
  - 4 Engines
  - 2 Trucks
  - 2 Fire Medic Units
  - 2 Battalion Chiefs
  - 1 EMS Supervisor
- Working Fire:
  - 1 Air Utility Unit

Structure Fire - High Risk

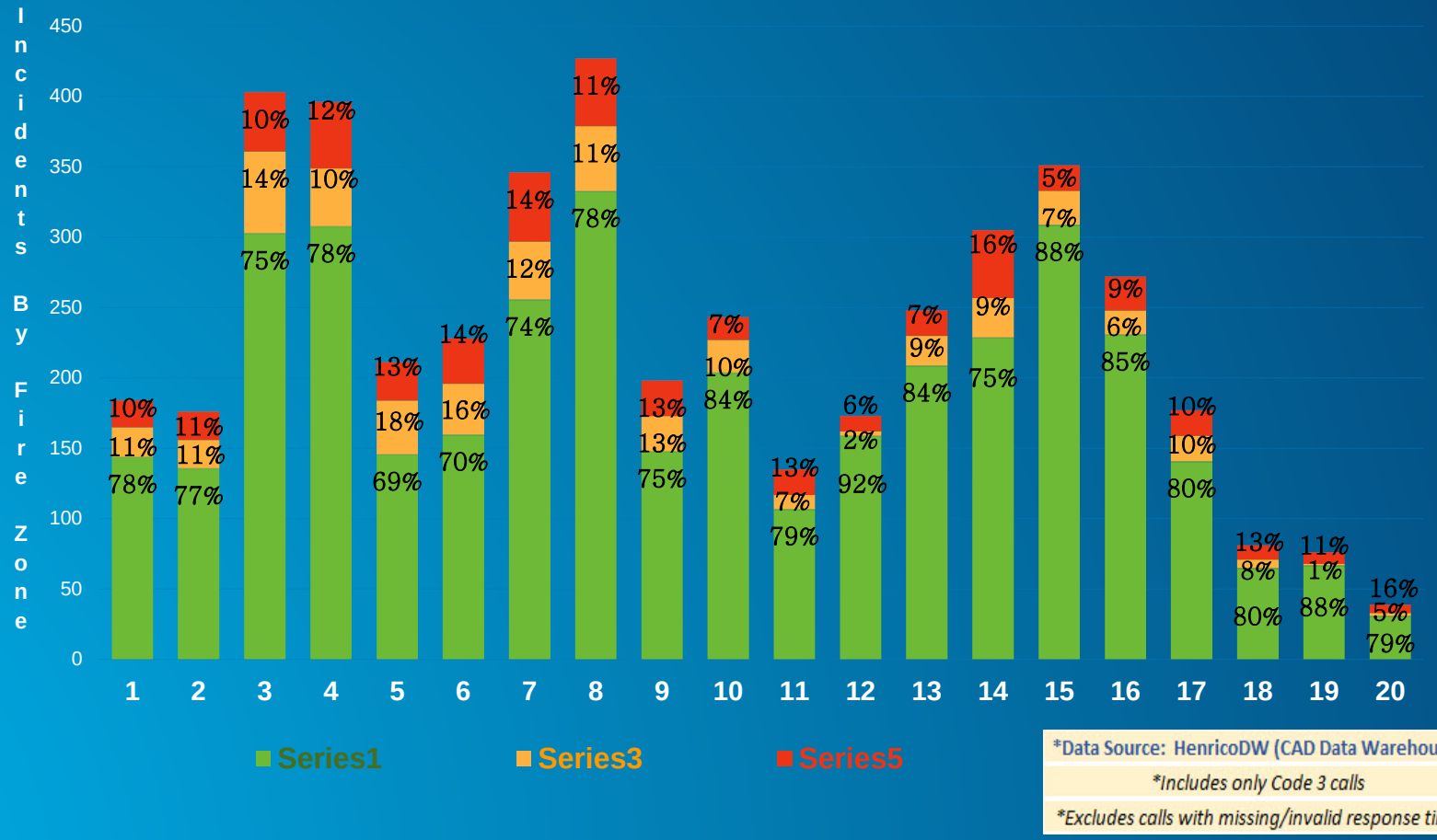
2013: 26 Firefighters

- Initial Assignment:
  - 4 Engines
  - 2 Trucks
  - 2 Fire Medic Units
  - 2 Battalion Chiefs
  - 1 EMS Supervisor
- Working Fire:
  - 1 Air Utility Unit

Service Analysis – Capital Improvement Plan

- **Station Location Analyses had previously been based on solely on distribution through the area of the County.**
- **First Responder Performance is influenced by**
  - **Demands for Service**
  - **Call Type**
  - **Travel Times**
- **We looked at call volumes by station and number of emergency calls where the first unit on scene did not meet the Agency's time goals.**

First Unit Response Time Performance for Fire Incidents By Fire Zone- FY2014



*Data Source: HenricoDW (CAD Data Warehouse)

*Includes only Code 3 calls

*Excludes calls with missing/invalid response time

First Unit Response Time Performance for Fire Incidents By Fire Zone- FY2014

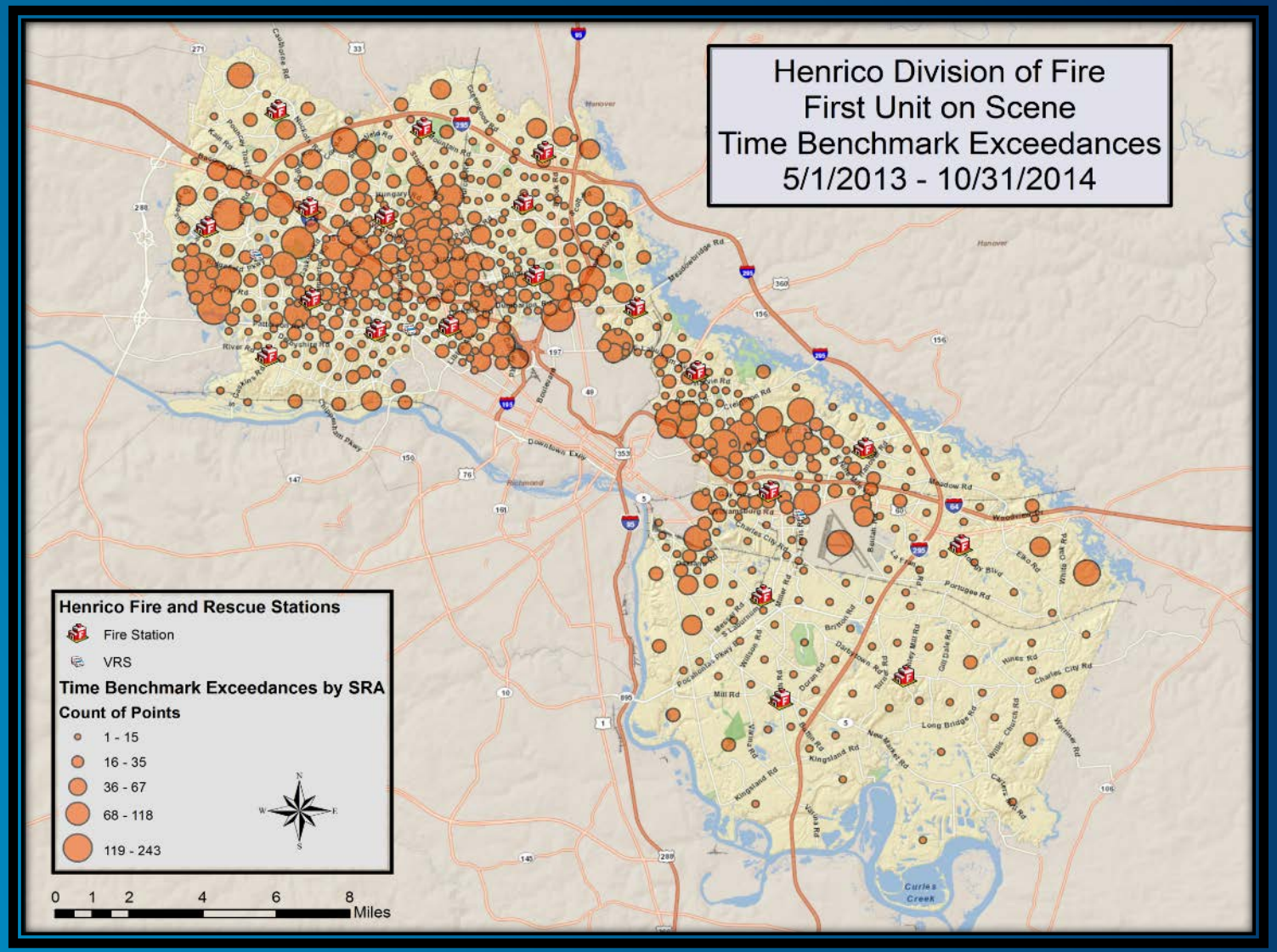
*Data Source: HenricoDW (CAD Data Warehouse)

*Includes only Code 3 calls

*Excludes calls with missing/invalid response time

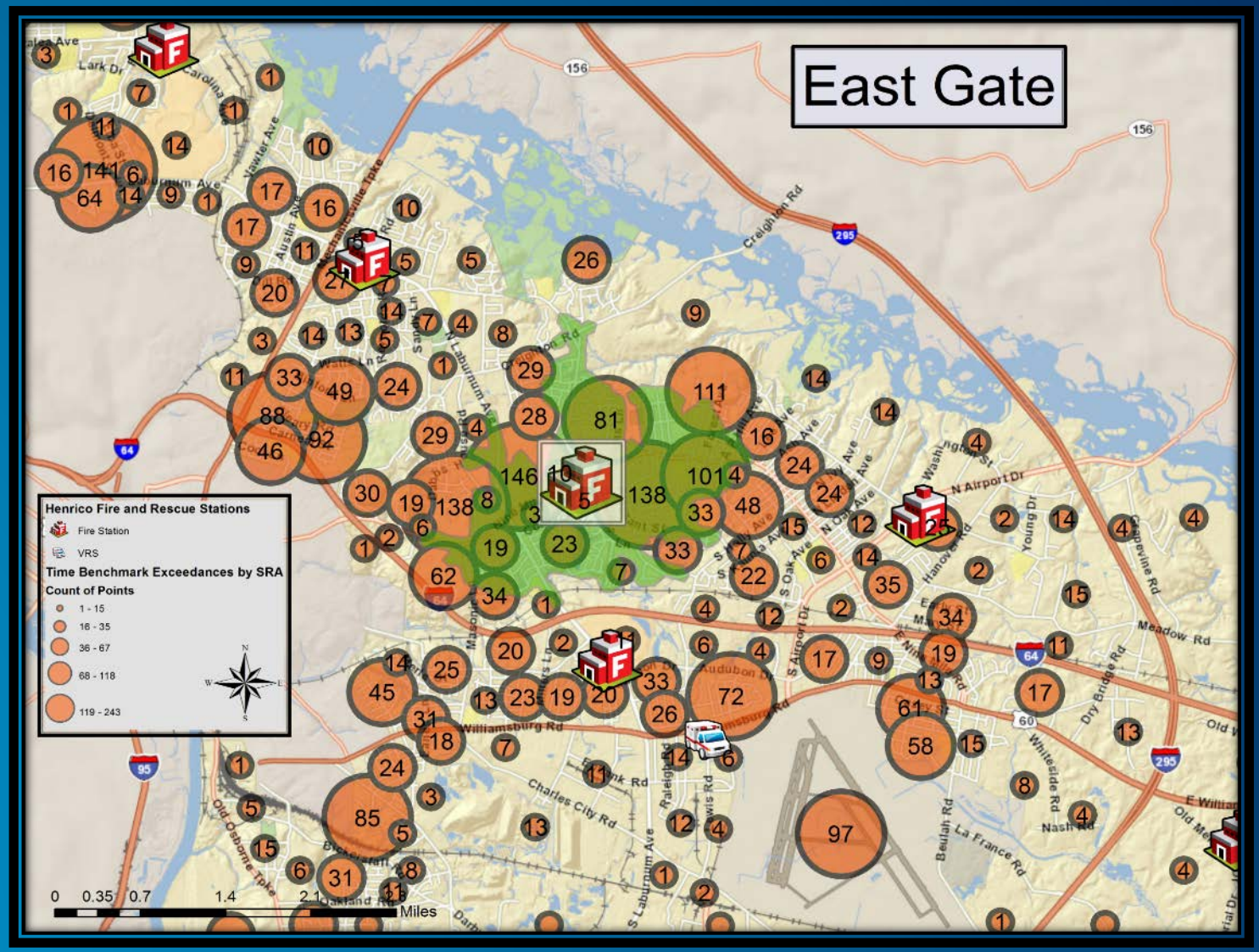
We decided to look at the same data on a map…

1. Calls, by address, where the first unit on scene did not arrive within the Agency's response standard were plotted by address.
2. ArcGIS tools were used to count the number of exceedance points within each Small Reporting Area (SRA).
3. Proportional Symbols were used to represent the exceedance counts for each SRA.



… and new patterns emerged leading us to a new proposal.

1. A high number of response time exceedances occur in an area near stations that are often called into other districts.
2. Using Service Area Analysis we could identify potential station locations to address problem areas.
3. We could use the same data to predict the number of calls the new station would have if it were present now and also how the service from a new station would reduce demand on existing stations.



Public Safety IMT Functions for NASCAR at Richmond Int'l Raceway

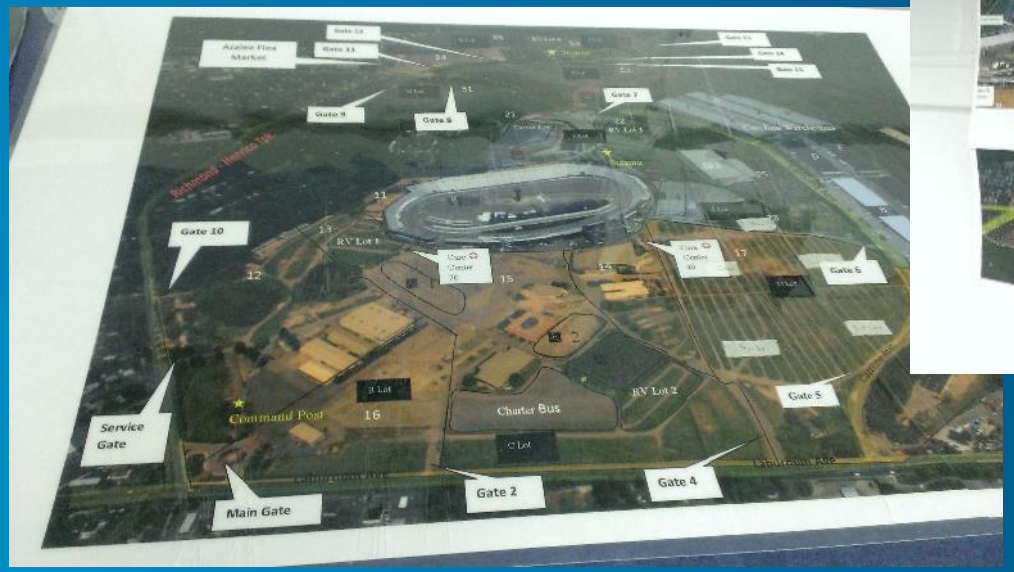
Special Event Operations

- Spectator capacity of 98,000
- More than 50 public safety organizations involved in operations
- 1,200+ individuals report for duty on Saturday
  - Walking teams
  - Bike teams
  - Carts
- FEMA Type 2

Public Safety Service to a 48-hour city…

More than 500 sites for RV and tent camping.

A midway of activities.

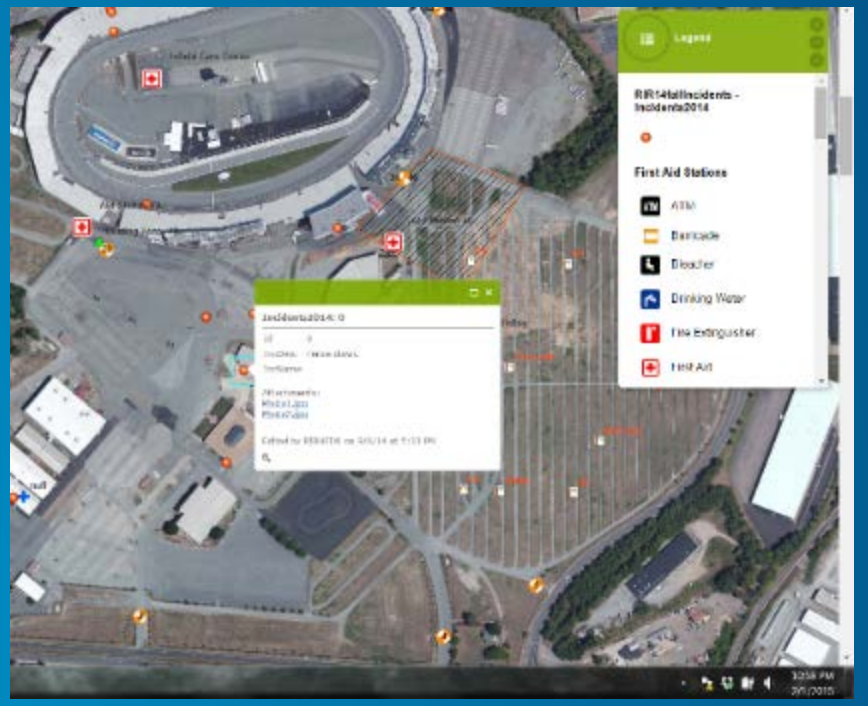


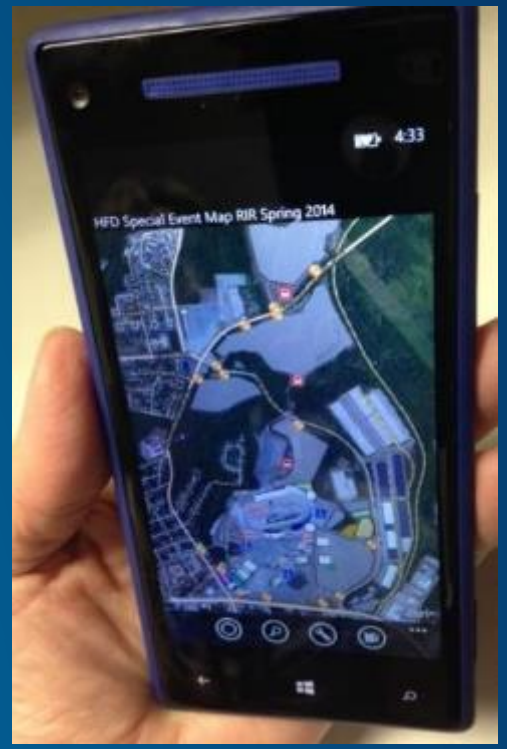
Establishing a Common Operating Picture is Essential.

ArcGIS Online and Public Safety Templates!

Now visual georeferenced information supplements radio communications to and from the field…

- IMT Observers reporting from field
  - Incident locations and photos
  - Reporting issues – locations and photos
- COP Updates to the field





Richmond Raceway
Spring 2015
Data flow diagram

Point Featureservice
Collected locations
within the venue

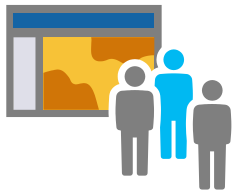
AVL Feed from
Delorme Satellite
tracker

iNetDispatch CAD

Delorme Enterprise

Operational layers
such as buildings,
service points etc.

Locator service built
from AGOL
featureservice

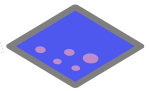


Situational
Operations
Dashboards

Henrico County Fire
ArcGIS Online

Dispatchers

AVL feeds from
Delorme
units “in-Service”



Calls for service

Esri Collector App

Command
Staff Editors

50 x Arc Explorer &
inReach Satellite
tracking
Field personnel

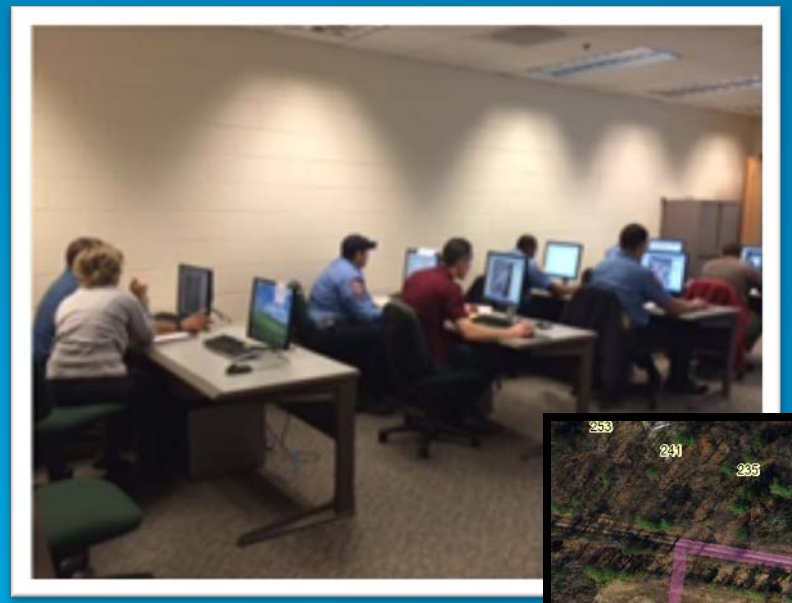
Pre-Incident Planning
Integrating Business Processes and Data Management

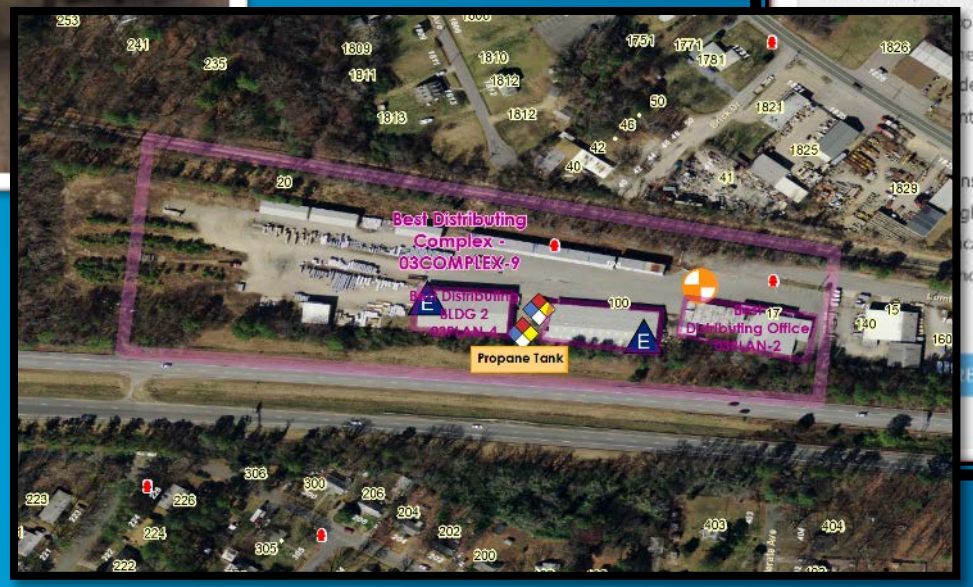
- **Creating Pre-Incident Fire Plan Data**
- **Consistent with NFPA 1620**
- **Using ESRI's Public Safety Template**
- **Phase I – FDCs and Lock Boxes**

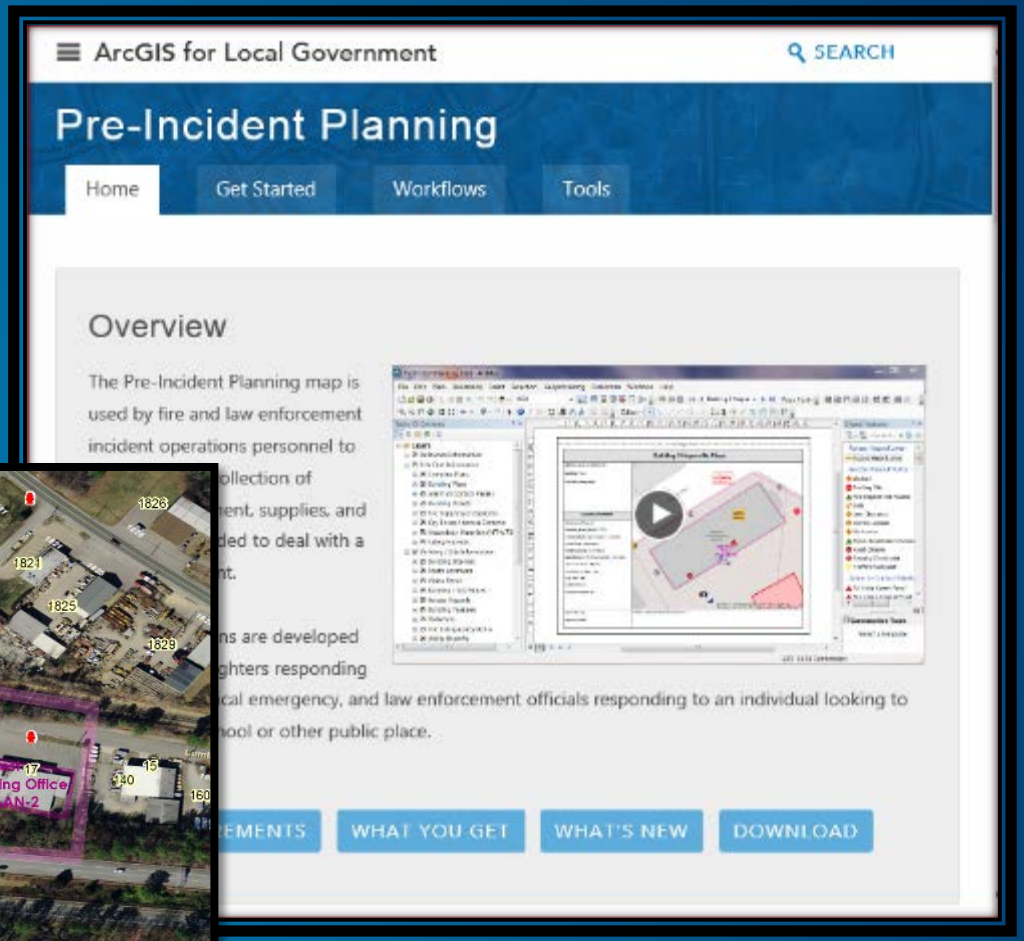
7C		**Develop and implement an enhanced pre-planning system.**	**12 Months**
	7c.1	Evaluate and select an electronic preplanning solution that will meet the needs of the Division.	
	7c.2	Providing training to Division members on the use of the new preplanning system.	
	7c.3	Develop a process to ensure review, standardization, and final approval for all preplans.	

Project linked to the Agency's Strategic Plan

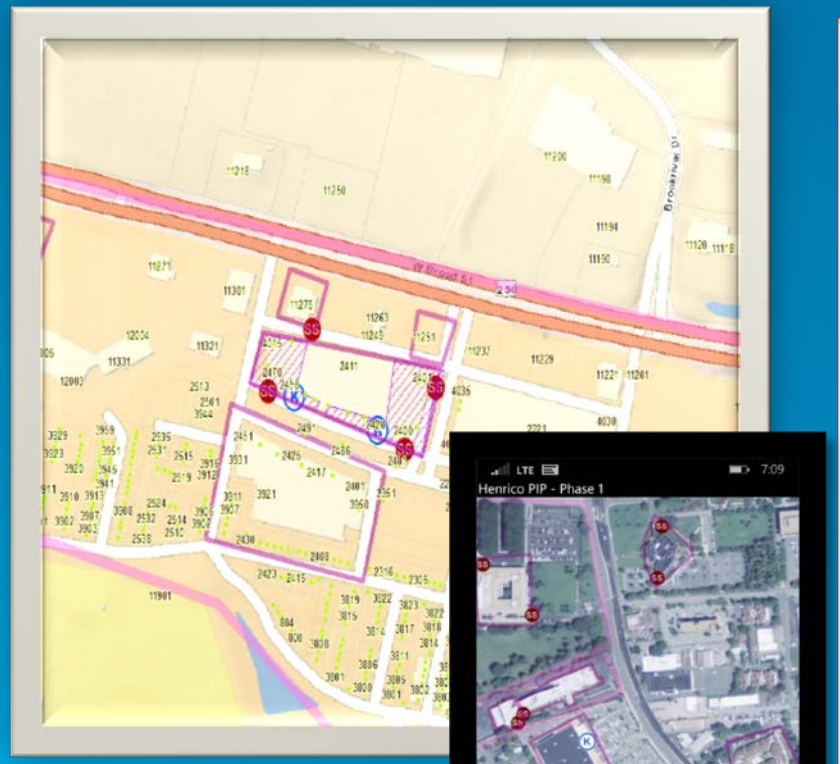
Station representatives gathered as a Working Group to develop an SOG, document the plan process and to configure the template.

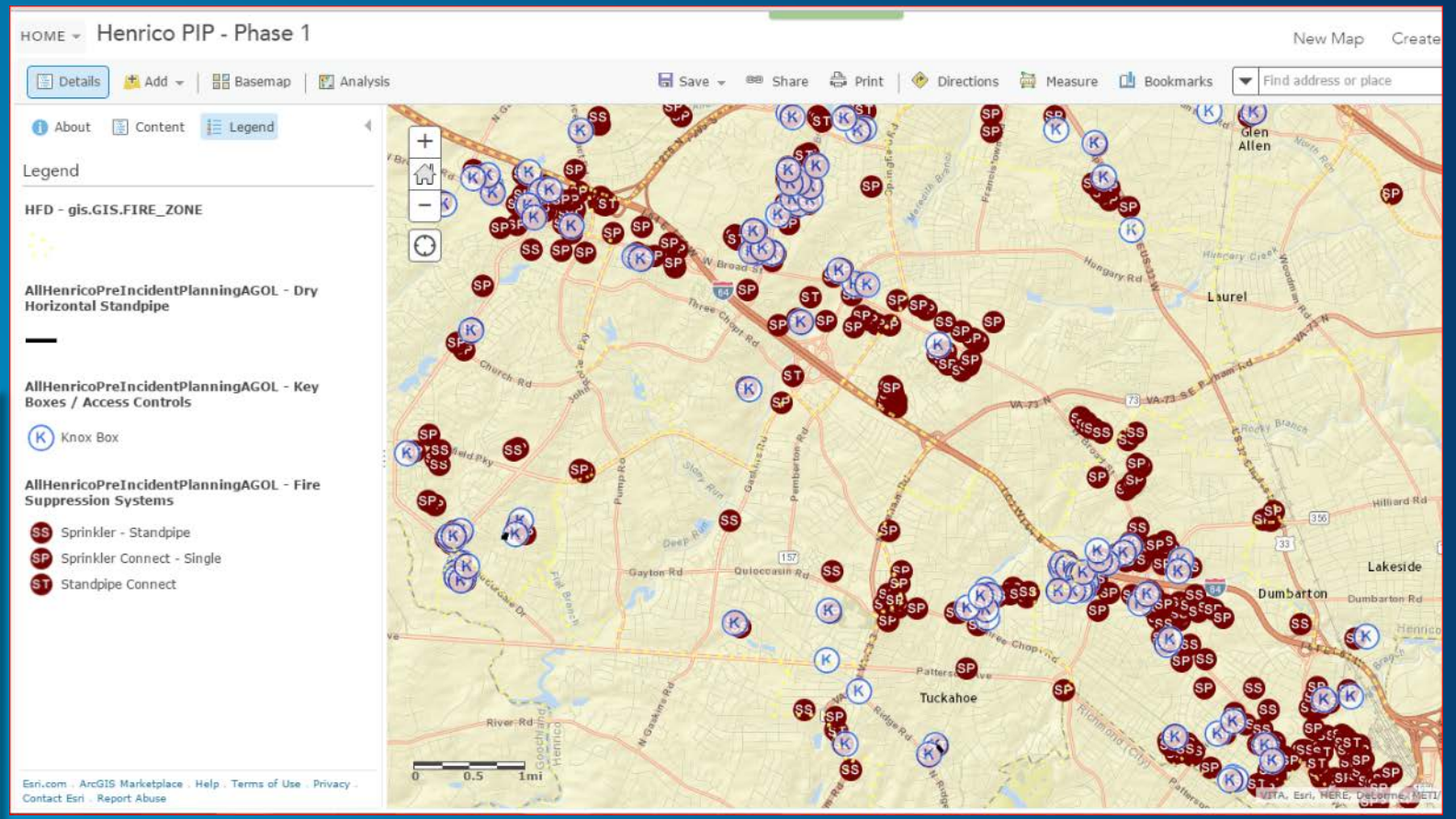






Phase 1 complete – FDCs and Lock Boxes locations throughout the County. Made available in AGOL and to MDCs





And the rural areas said, “That didn’t do much for us but we have an idea ….”

Tanker Water Supply versus Relay Pumping

ORGANIZATION VISION
(EXCERPT FROM 2013-2018 CONTINUOUS IMPROVEMENT STRATEGY)

"Our department and communities will be better served by virtue of our greater utilization of technology and its advances. We recognize the importance of stewardship and will foster greater efficiency and effectiveness through the enhancement of data management processes and optimization of our service delivery model. "

- Organizational self-assessment and analytical review
- Assistance from professional analysts
- Access to enterprise and cloud applications
- Sophisticated employees who not only consume but create and interact with data . . . .

The Ability to Transform the Organization

In a way that leads to . . .

Faster response times

Safer operations

Better outcomes

Added professional credibility