



# CASSIDIAN

## What's going to happen to my GIS data in NG 9-1-1?

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# Data Ownership

## – It's Mine!

- Time Investment
- Cost recovery
- Liability (known issues, legal and not-so-legal)
- Psychology

## Data Ownership

- Share with those you know
  - Agencies within your jurisdiction
  - Adjacent agencies providing similar services
  - Public FoIA - (maps/digital) (scrubbed – no personal information, no critical infrastructure)

# Data Ownership

- Data Needs
  - Jurisdictional Coverage
  - Mutual Aid Coverage
  - Request For Service Coverage
  - Backup operations for other PSAP
- Data Liability
  - Completeness
  - Accuracy – Positional / Attribute

# Data Usage

## – PSAP

- Standard addressing layers
  - Centerlines
  - Address Points
- Jurisdictional boundaries
- Responding Agencies
  - Police
  - Fire
  - Medical

## Data Usage

### – Other useful layers for locating RFS

- Golf Courses including fairway, tee, & hole
- Trails (Hike, Bike, Snowmobile, Horse, etc...)
- Rivers (marked)
- Navigation Buoys
- Hunting Leases
- Agriculture
  - Farm fields
  - Feed Lots
  - ingress/egress gates

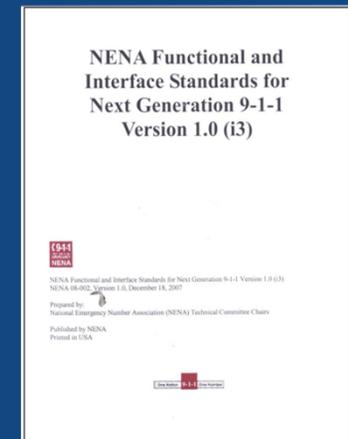
## Data Usage

### – Other Useful layers for assisting RFS

- Emergency Care Facility
- Hydrants/Standpipes
- Utilities
- Floor Plans
- WMS – Weather radar
- Flood Plains
- Evacuation Routes
- Routing Elements

# Is Your GIS Ready For NG 9-1-1?

- Why concentrate on map data now?
- Is your current map data complete and up-to-date?
- Are you sure?
- Is it Standardized?
- Is it Synchronized with the MSAG and ALI?
- Update and Distribution Frequency?
- Do you have a maintenance plan?
- What about the neighbors?



# NG 9-1-1 Data Concerns

- Data must be timely!
  - Road Closures
  - New Addresses
  - Legacy Data Cleanup
  - Annexations, Jurisdictional Changes
  - Responder additions
- Public Safety needs and standards **may not be met with GIS data from other Sources**
- GIS data producers **must understand** the needs of Public Safety and 9-1-1

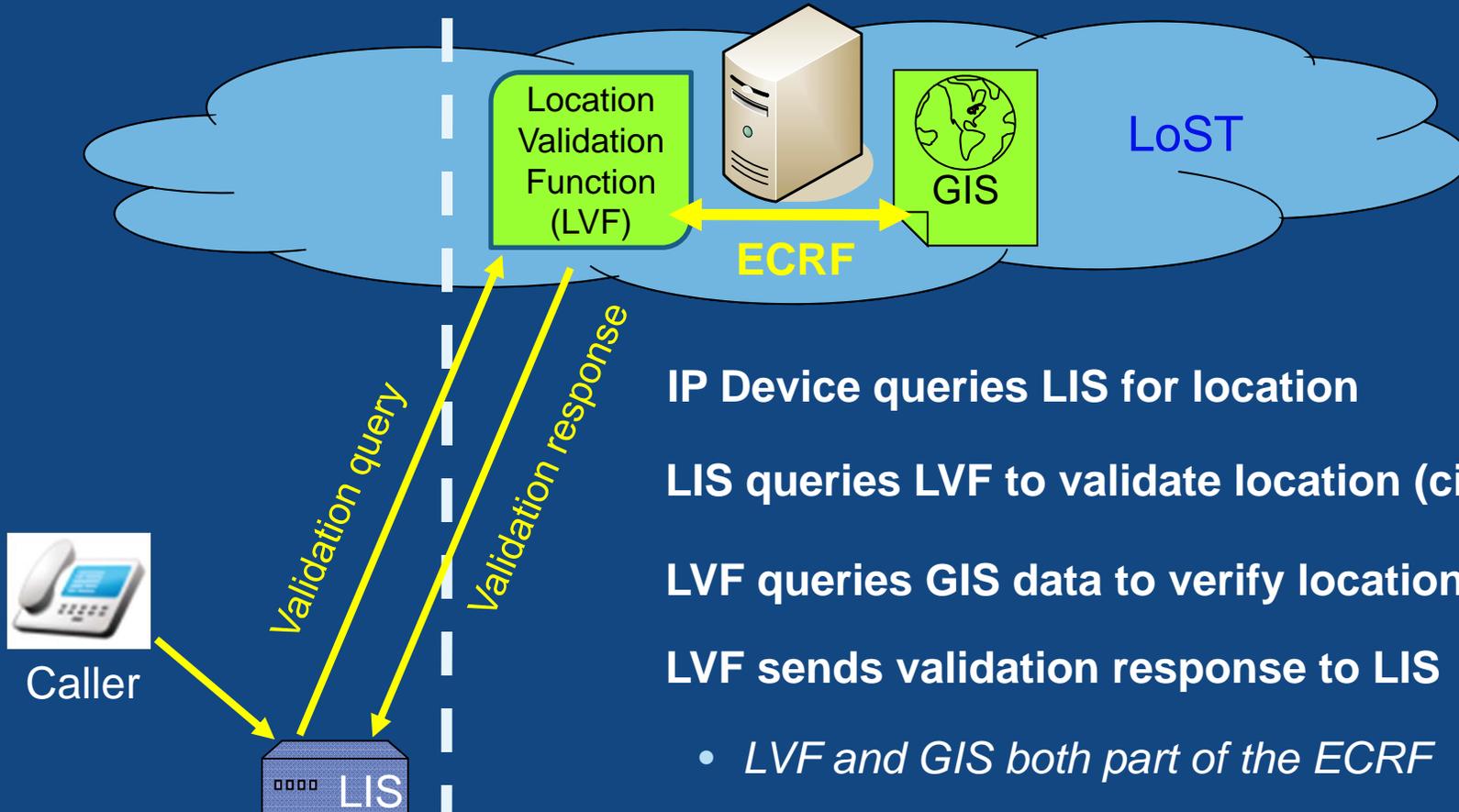


## Where is the MSAG???

- NG9-1-1 uses GIS data, which is more detailed than existing MSAG files
- GIS databases used for location validation and routing “calls” to the PSAP
- The 9-1-1 Authority is responsible for this GIS data
  - A service model will include direct access to GIS databases



# i3 Call Location Flow



IP Device queries LIS for location

LIS queries LVS to validate location (civic or geo)

LVS queries GIS data to verify location

LVS sends validation response to LIS

- *LVS and GIS both part of the ECRF*
- *Location stored in a new format called PIDF-Lo*
- *PIDF-Lo used for all call location data*

**Originating  
Network**

**ESInet**

## i3 Emergency Call Routing via GIS

- GIS replaces the traditional Selective Router and provides automated routing updates based upon changes made to GIS data.
- Routing can be based on any type of policy, or GIS data, or any combination of sources. (no longer using ESN)
- Responders provide service boundaries as polygons with associated contact data
  - Beats, Response Areas, HazMat Teams
- There is no ALI and no MSAG (as we think of them today)
  - Location comes with the call in PIDF-Lo format
  - Location validated against GIS data – MSAG now in GIS
- This new methodology will allow for single-entry changes across the 9-1-1 infrastructure, originating from GIS and migrated to all other databases
- GIS fully integrated into Call Taking, CAD, Emergency Services, Dispatch and Response
- The **ECRF** provides 'Selective Routing' functionality

# i3 Call Routing Component - LIS

## Location Information Server

- Location subsystem typically operated by access network
- Replaces ALI completely – “ALI” as either a civic address or geographic coordinate comes with the call
- Validates civic address or geographic coordinate location against GIS data in ECRF via LVF
- LIS can return value or reference
  - Reference allows update (“rebid”) of location
- Different LIS’s have different IDs
  - Some may use “MAC” address
  - Some may use IP address
  - Some may use telephone number (legacy wireline)

# i3 Call Routing Component - ECRF

## Emergency Call Routing Function

- Based on a new IETF protocol “LoST”
- GIS data is used to route “calls”
- Direct location to route to PSAP (Location, not TN’s, used to route)
- Real time database – in the call path (Location conveyed with the call)
- External ECRF is provided by 9-1-1 to origination networks to route calls to the right ESInet

## i3 Call Location Data Format

- Location information presented to the User-Agent end point will be by one of two methods: **Civic Address** or **Geographic Coordinate** (long / lat – X, Y).
- Civic Addresses are pre-validated, provided to the PSAP as MSAG valid and come with the call. (No ALI dip!)
  - A set of elements that describe detailed street address information.
- A Geographic Coordinate of a location will use the ECRF for selecting the correct PSAP using GIS data.
  - Latitude, longitude, elevation, and the datum which identifies the coordinate system used. (WGS84)
- Location will be stored and exchanged in a new format called PIDF-LO, or Presence Information Data Format - Location Object – (Part of the ALI replacement)

# NENA i3 - PIDF-Lo Format

<u>Validated Address Point</u>	<u>PIDF-LO Element</u>	<u>Example</u>
<b>House Num</b>	HNO	102
House Number Suffix	HNS	
<b>Prefix Directional</b>	PRD	N
<b>Street Name</b>	A6	Franklin
<b>Street Suffix</b>	STS	Ave
<b>Post Directional</b>	POD	E
<b>MSAG Community</b>	A3	Rose
Postal Community	PCN18	Nashville
State Province	A1	TN
County Name	A2	Cook
Postal Code	PC	07654
Country	Country	US
Latitude	gml:coordinates	32.20912
Longitude	gml:coordinates	-86.77791
Building	BLD	A
Floor	FLR	2
Unit	UNIT	7
Room	ROOM	701

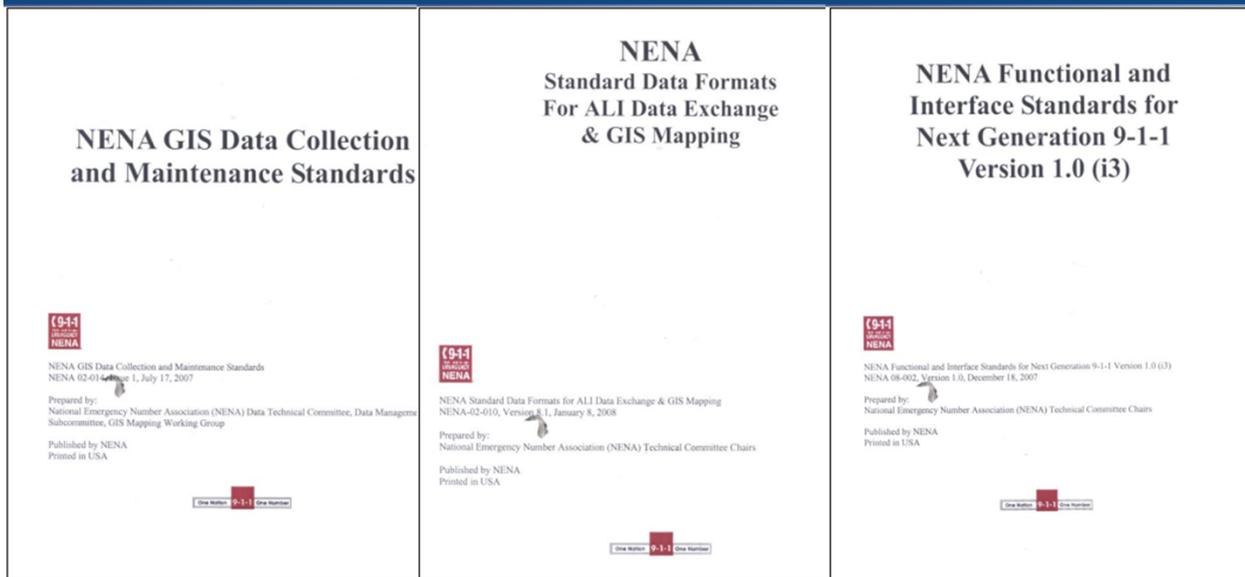
This figure is simplified for illustrative purposes

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# Standards & Synchronization

Standardization and synchronization with the MSAG now will...

- Ensure compliance with NENA and is required for NG9-1-1
- Enable exchange of data with local, regional, state and federal agencies
- Facilitate Interoperability
- Provides higher levels of quality & accuracy
- Streamlines maintenance to improve consistency/integrity of data



## NENA Resources

### Synchronizing GIS with MSAG & ALI

Date added: Thu, 09/24/2009 - 5:59am

#### Document Information

**Full name:** NENA Information Document for Synchronizing Geographic Information System databases with MSAG & ALI  
**Document type:** Informational  
**Standard number:** 71-501

You can find this document at...

<http://www.nena.org/standard/synchronizing-gis-msag-ali>



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## Data Concerns



# Real World Address Ranges

1498	1500	E. County Line Rd	1598	1600
1499	1501		1599	1601



Buffered addressing  
vs.  
Real (potential) addressing

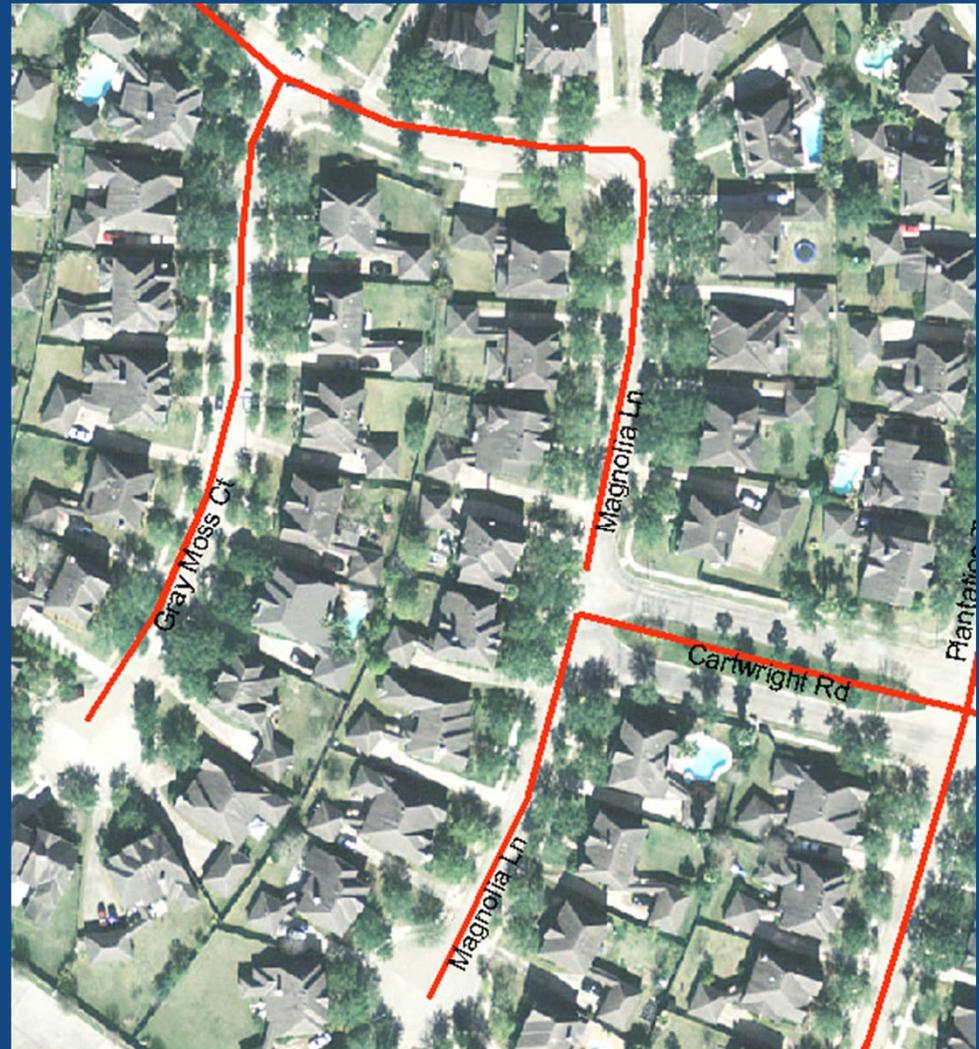
1462	1502	E. County Line Rd	1508	1612
1463	1501		1507	1615



Where will '1505 E County Line Rd' map?

## Question

- Looks ok right?
- How about  
**‘Cartwright Rd’**?
- Don’t forget to ground truth the map layers!
- What was good enough a few years ago for a 9-1-1 map data may not be good enough today.
- In some cases you will need to field verify and not depend on aerial imagery



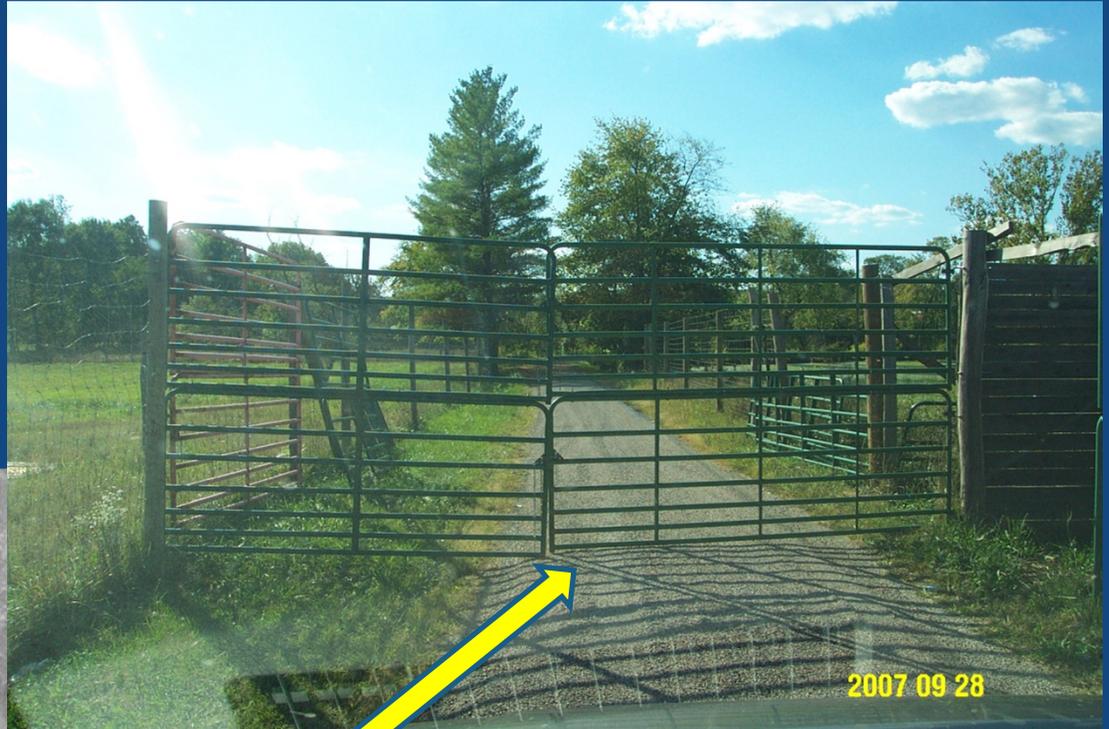
# A non-existent bridge

(note age of tree saplings)



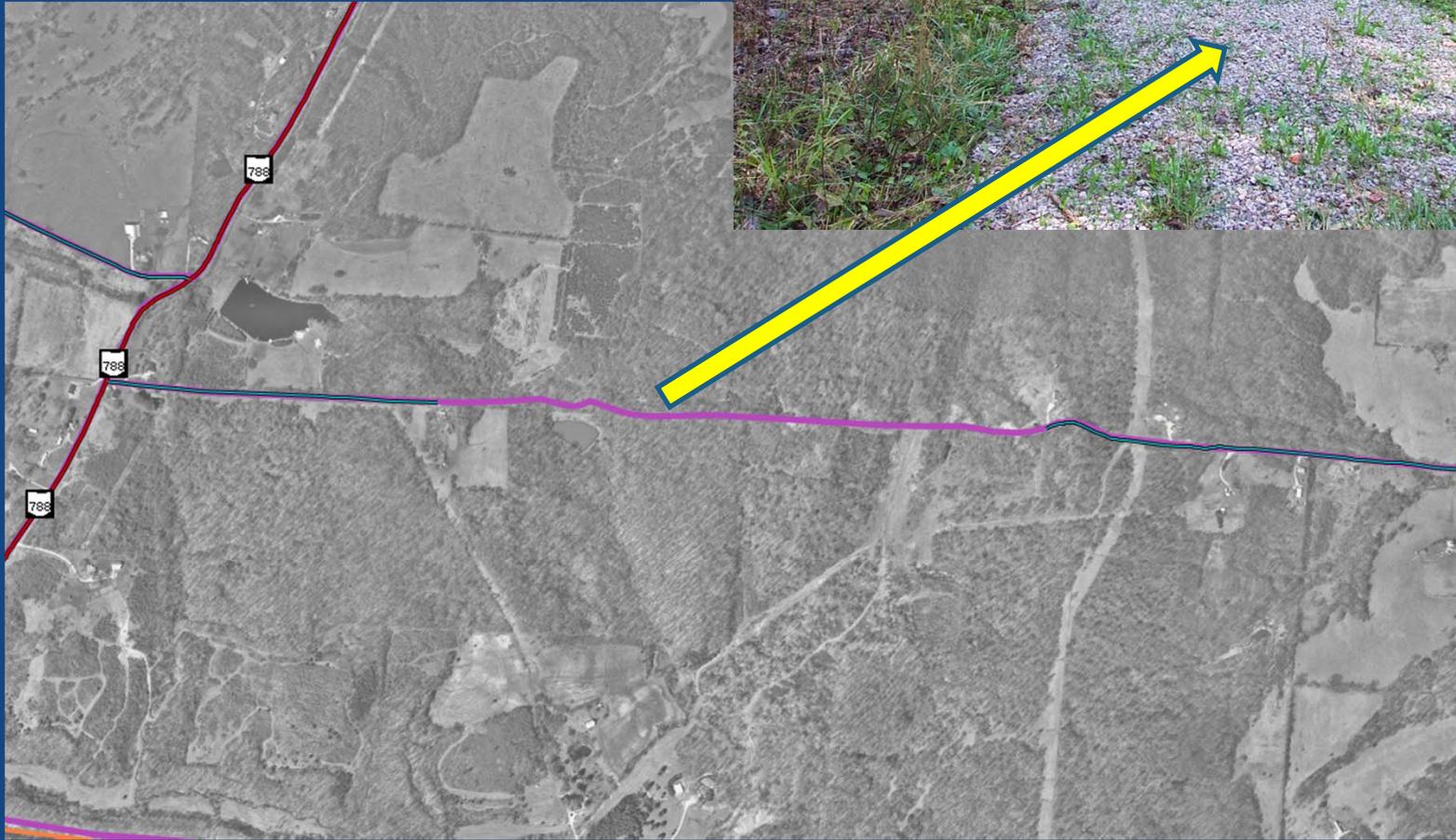
# A gated road blocking travel

(notations may help)



# An unpaved road that won't support some vehicles

(road 'type' may help)



# Unclear Address Proximity



# Driveways and Access Points

## Things to remember on driveways (or DRVWs):

- If structure is not visible from road show a driveway for it.
- Many unnamed roads/driveways require extensive line work
- May need to be named if it has more than one addressed structure
- 'DRVW' or similar can be entered in the street name field or these can be maintained as a separate layer altogether



# ALI/Address to GIS

House Number	Street Name	Street Suffix	Community Name	Location
705	TIFFIN	ST	WASHINGTON	LOT 19
705	TIFFIN	ST	WASHINGTON	LOT 19
705	TIFFIN	ST	WASHINGTON	LOT 19
705	TIFFIN	ST	WASHINGTON	LOT 2
705	TIFFIN	ST	WASHINGTON	LOT 20
705	TIFFIN	ST	WASHINGTON	LOT 21
705	TIFFIN	ST	WASHINGTON	LOT 22
705	TIFFIN	ST	WASHINGTON	LOT 23
705	TIFFIN	ST	WASHINGTON	LOT 25
710	CLAY	ST	STANTON	LOT 53
710	CLAY	ST	STANTON	LOT 54
710	CLAY	ST	STANTON	LOT 57
710	CLAY	ST	STANTON	LOT 58
710	CLAY	ST	STANTON	LOT 58
110	BAUER	CT	CRESTLINE	M1
110	BAUER	CT	CRESTLINE	M2
110	BAUER	CT	CRESTLINE	M3
110	BAUER	CT	CRESTLINE	M4
110	BAUER	CT	CRESTLINE	M4
110	BAUER	CT	CRESTLINE	M5
110	BAUER	CT	CRESTLINE	M6

# PIDF-Lo Format

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Street Suffix	STS	Ave
Post Directional	POD	E
MSAG Community	A3	Rose
Postal Community	PCN18	Nashville
State Province	A1	TN
County Name	A2	Cook
Postal Code	PC	07654
Country	Country	US
Latitude	gml:coordinates	32.20912
Longitude	gml:coordinates	-86.77791
Building	BLD	A
<b>Floor</b>	<b>FLR</b>	<b>2</b>
<b>Unit</b>	<b>UNIT</b>	<b>7</b>
<b>Room</b>	<b>ROOM</b>	<b>701</b>

This figure is simplified for illustrative purposes

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# Boundary Lines

- The **ECRF** will depend upon locally maintained boundary layers for call routing:
  - ✓ PSAP boundary
  - ✓ Fire
  - ✓ Law
  - ✓ EMS
- Check for alignment with other layers
- No overlaps or gaps
- Coincident with roads
- Update as annexations occur or as new facilities are added



**If your map data is inaccurate calls may get routed to the wrong PSAP.**



# Data Maintenance

## Have a documented process in place

- Roads renamed, added, moved, removed
- Annexations, service boundary changes
- Document your maintenance process, just in case...
- Have a training process in place from the beginning
- Communication between all involved parties is key to success
- GIS is regional now, time to adopt that mentality
- Maintenance never ends!



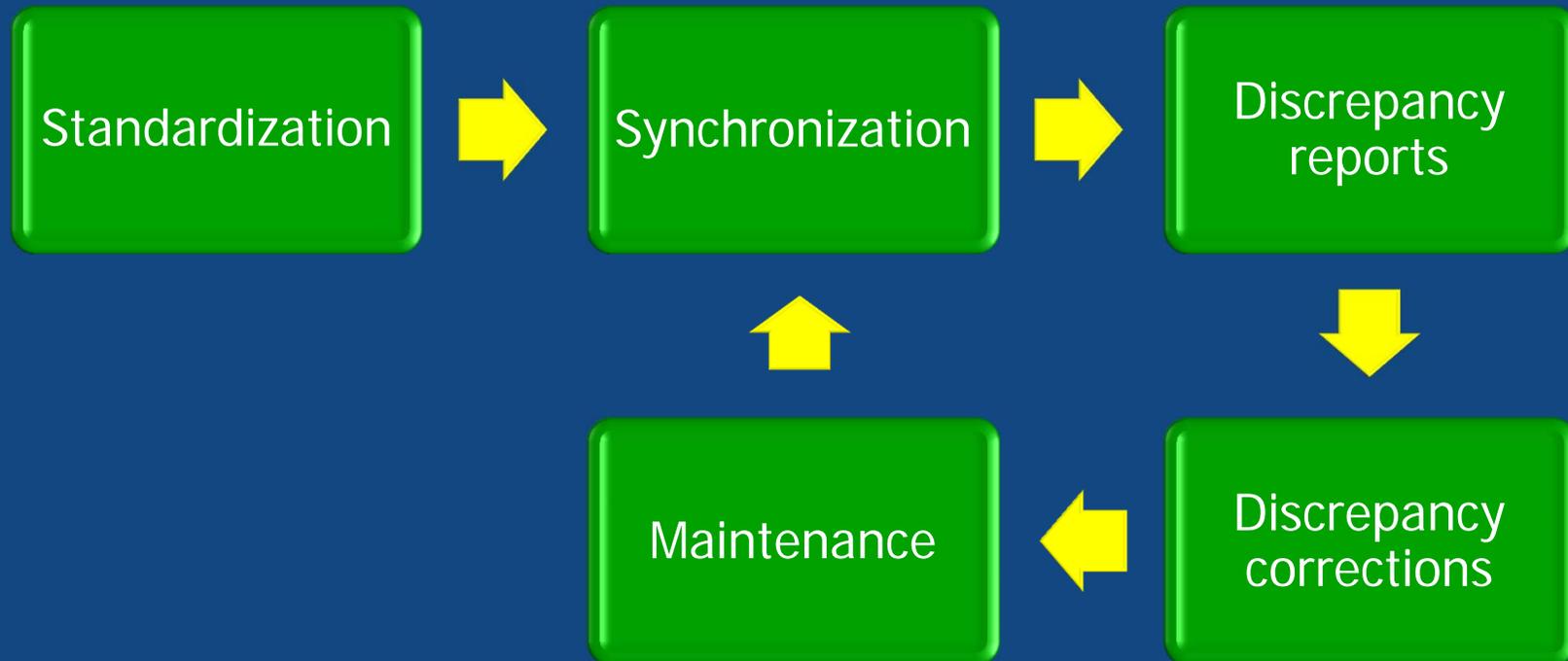
**As with any investment, begin now and don't wait until later to start!**

# Data Maintenance

- Data Maintenance
  - In-House (Maintain Training Level)
  - On-Line (Maintain lower level of training)
  - Contract (Maintain Understanding of processes)

**Don't separate yourself from the requirements, process or result!**

# Synchronization Steps



**Build the circle and close the circle!**

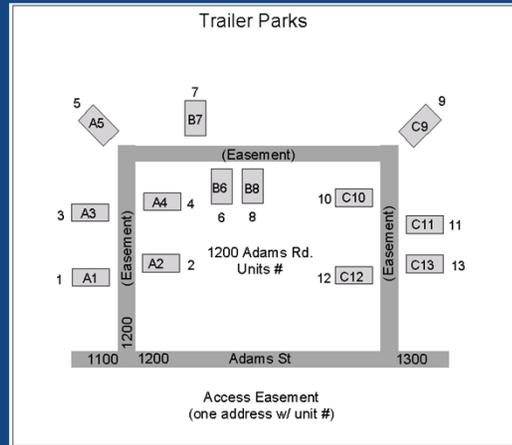
# Other Data

DEFENDING WORLD SECURITY

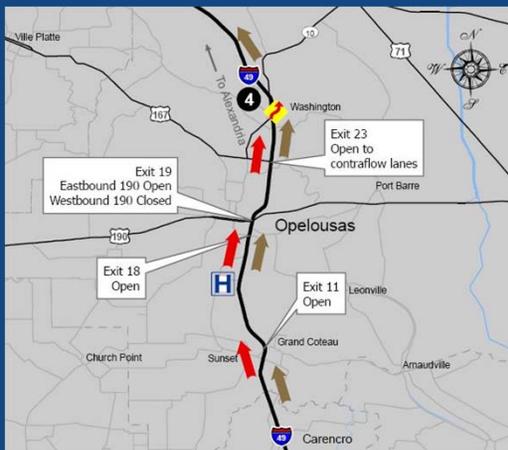
Parcels



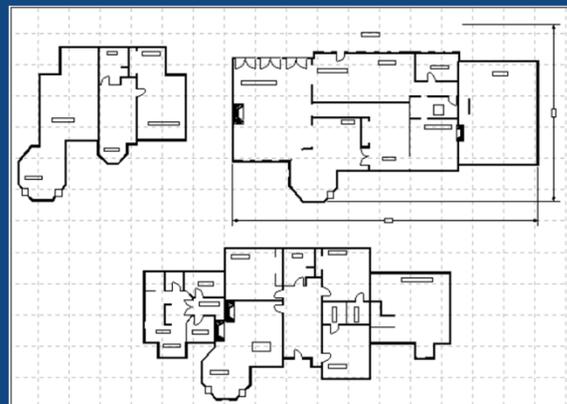
Complex Layouts



Flood Plains



Evacuation & Vehicle Routes



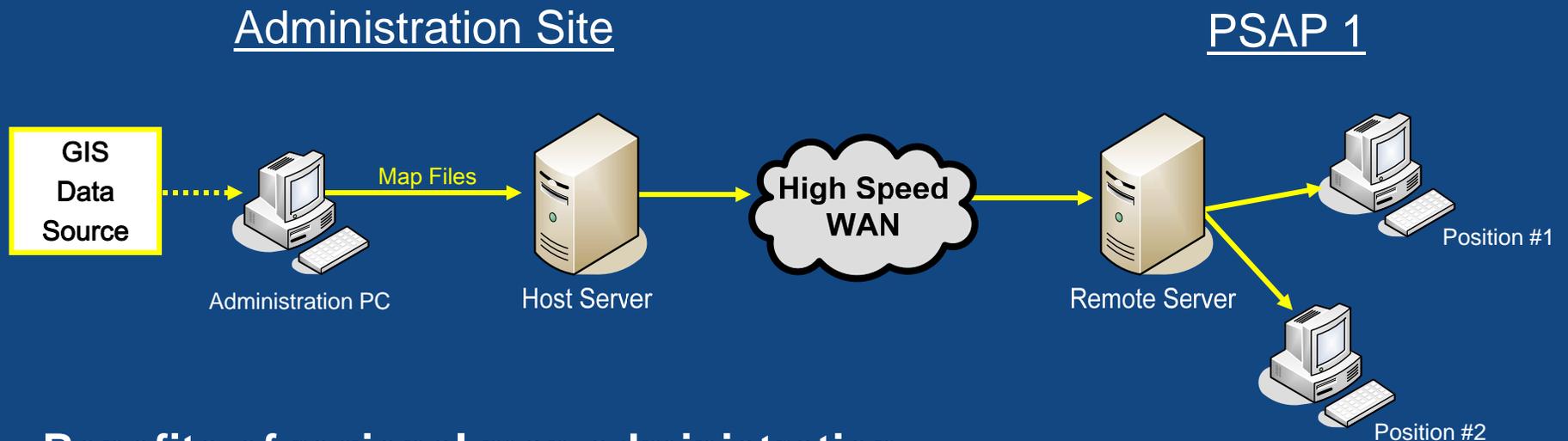
School or Shelter Floor Plans



Web Map Service (weather)

# Enterprise GIS For 9-1-1

As multijurisdictional collaboration on map data development/sharing grows so does the need to provide access to it.



## Benefits of regional map administration

- Manual control when needed
- Automated or timed data distribution
- Immediate access to PSAPs without requiring travel by staff
- Map updates usually small and typically do not impact network traffic
- Limited impact by weather and other local conditions

## **FCC Chairman Genachowski Announces Five Step Action Plan to Improve the Deployment of Next Generation 9-1-1 (NG911)**

*“We need a comprehensive, multi-pronged approach to NG911 implementation: If we do nothing to address NG911 requirements, timelines, costs, and governance, we will see uncoordinated patchwork deployment of NG911 over the next five to ten years, leaving much of the US without any NG911 capability.”*

### **FCC Five-Step Action Plan to Deploy Next Generation 9-1-1**

- 1. Develop location accuracy mechanisms for NG-911: ...***
- 2. Enable consumers to send text, photos, and videos to PSAPs (NPRM): ...***
- 3. Facilitate the completion and implementation of NG911 technical standards: ...***
- 4. Develop a NG911 governance framework: ...***
- 5. Develop an NG911 Funding Model: ...***

## Recent FCC Actions to Improve Public Safety

- **Launched Personal Localized Alerting Network (PLAN):** Recently launched PLAN is a new public safety system that allows customers who own an enabled mobile device to receive geographically-targeted, text-like messages alerting them of imminent threats to safety in their area.
- **Strengthened our Existing Enhanced E-911 Location Accuracy Rules:** In July, the FCC committed to requiring all wireless carriers to meet the more stringent metrics of the handset based location accuracy standard.
- **Laid the Groundwork for a Nationwide, Interoperable Public Safety Broadband Network:** Working with the public safety community, the FCC has begun laying the groundwork for a nationwide, interoperable public safety broadband network, including adopting a standard air interference for such a network.
- **Granted Waivers to Build Out the Public Safety Network:** The FCC has granted 22 waivers for jurisdictions to begin building out the public safety interoperable broadband network, 7 of which have received BTOP grants. We're also working with these jurisdictions so they can start construction.

# Challenges & Opportunities

## GIS becomes Mission Critical Data

- Accuracy of GIS information is essential
- Education is key to success
- Plan for time and funding of GIS projects
- **Collaborate with surrounding entities**
- Streamline maintenance (GIS integration)
- More and better location information coming with “call” is a good thing
- Ability to transfer data between public safety agencies is needed

**Local addressing authorities need to understand that standardization & synchronization will enhance data quality, lower costs, and improve the level of services to the public**



## In Conclusion

- It will be a requirement to share GIS Data in NG9-1-1
- Liability is an issue – “Calls” route based on the data’s accuracy
- Maintenance processes must be in place
- Collaboration with neighboring jurisdictions is a necessity
  - Create agreeable “stitch points” at borders to ensure edge-matching
- Think how you can be helped by your neighbors by providing good data and vice-versa
- Think Regional act Local

# Questions?



# CASSIDIAN

## Where is your emergency?

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