

Collaborative Chemical Planning using ArcGIS Experience Builder



Presented by

Bernardo Salazar, AICP, GISP

Hazmat & Technology Manager, and Chair of the Dallas County LEPC
Dallas County Office of Homeland Security & Emergency Management

Outline

- TIER II Reports: Quick Explanation
- Problem: TIER II Location Accuracy
- Collaborative Verification
- ArcGIS Experience Builder
- Preparing TIER II Data With R
- TIER II Location Verification App
- Summary

TIER II Reports

- Tier II reports provide critical information to emergency responders by identifying the nature and amount of hazardous chemicals facilities use or store onsite.
- Easily accessible, up-to-date and accurate information can help firefighters, police officers and rescue workers make the safest choices possible for your team and surrounding citizens.



Ammonium Nitrate Explosion
15 died (mostly volunteer firefighters)
200 more injured
350 homes damaged
School disruption

April 17, 2013
West Fertilizer Explosion and Fire, West, TX

TIER II Reports



Facilities.csv

Main Table: Facility Name, Address, Owner Address, Lat/LONG, State Fields, etc.

RecordId

ParentRecordId



FacilityIDs.csv

ParentRecordId



Attachments.csv

Attachment folder links

ParentRecordId



ChemicalInventory.csv

Chemical Information

RecordId

RecordId



StorageLocations.csv

Chemical RecordId



MixtureComponents.csv

OtherRecordId



ContactLinks.csv

Contact Link Table

ContactRecordId

RecordId



Contacts.csv

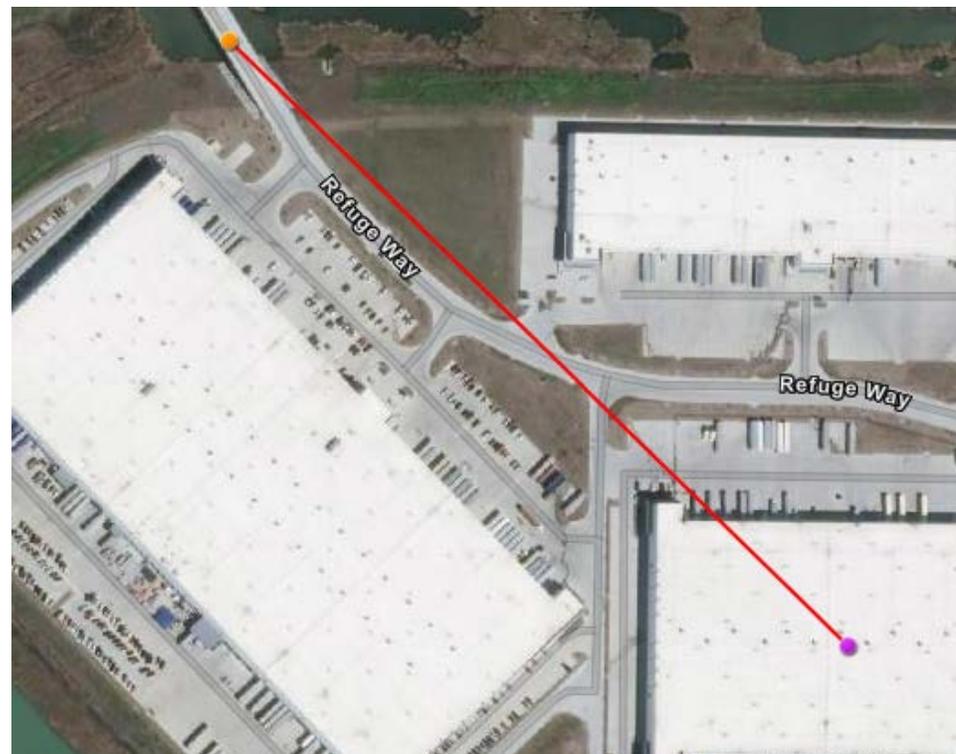
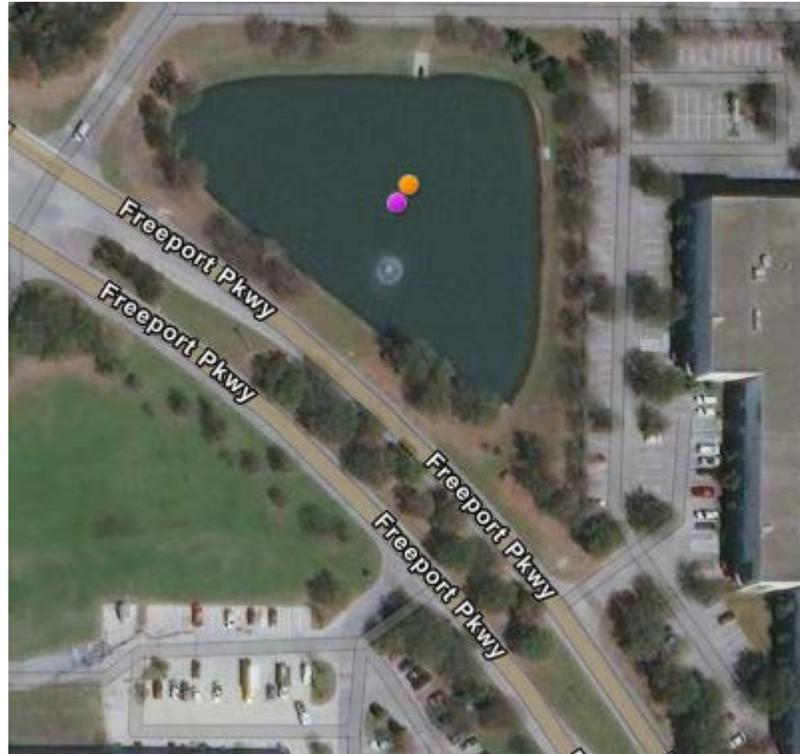
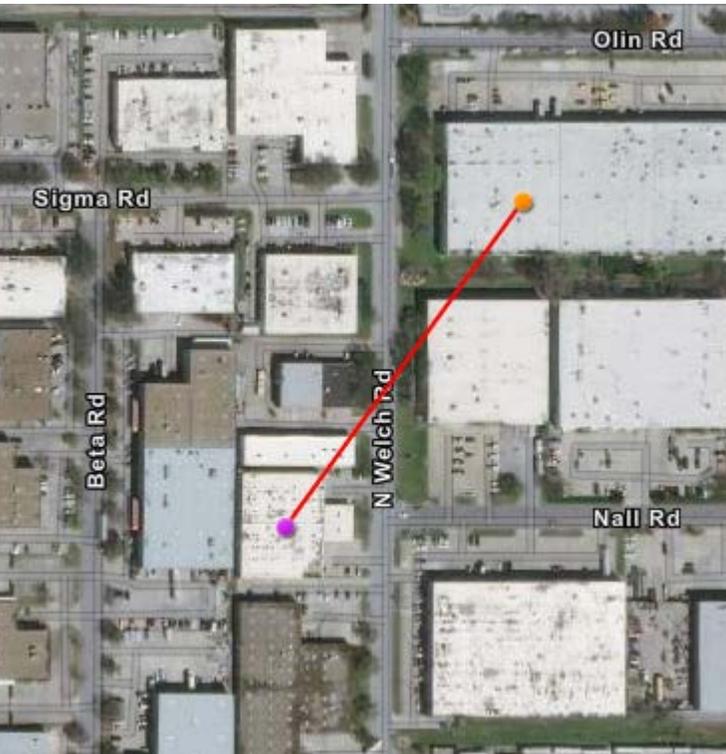
ParentRecordId



Phones.csv

Business Labels: NAICS Codes, Dun & Bradstreet, RMP, TRI

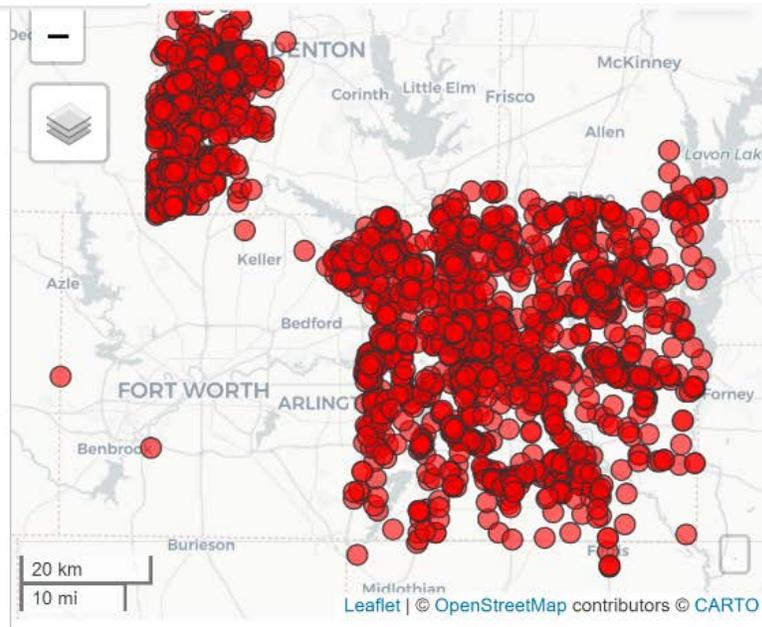
Problem: TIER II Location Accuracy



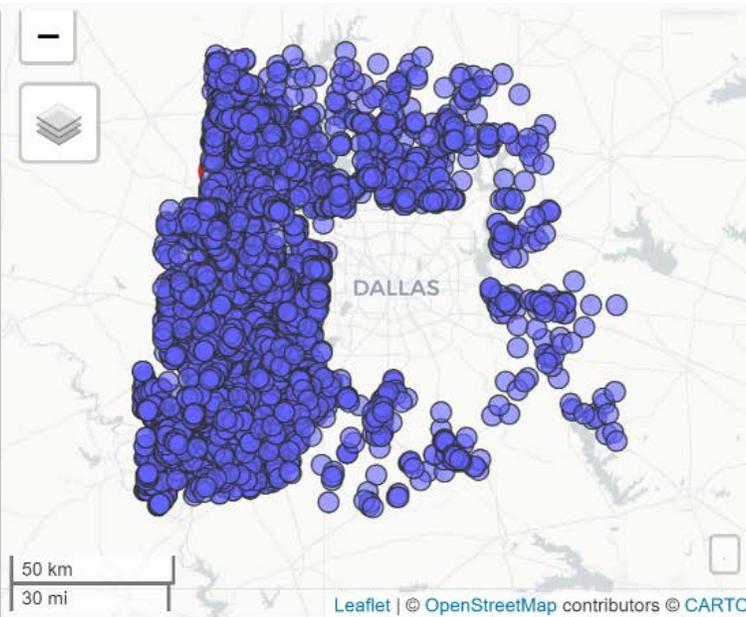
- Self-Reported
- Geocoded

Problem: TIER II Location Accuracy

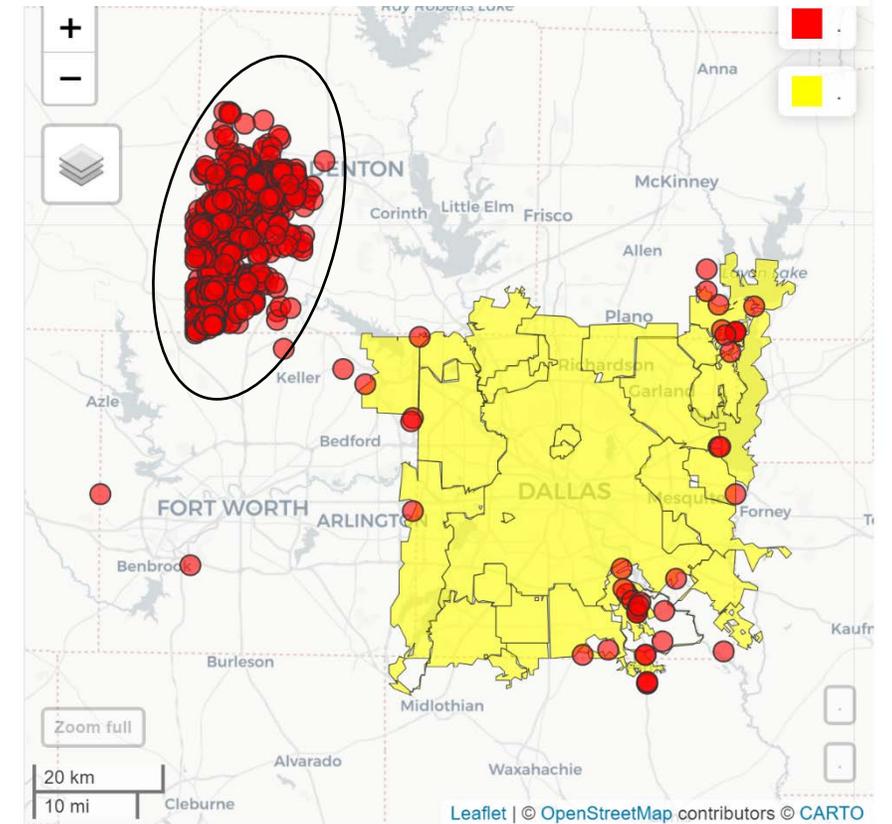
Filtered TIER II Data for Dallas County jurisdictions (Red)



TIER II Locations for non-Dallas County Jurisdictions

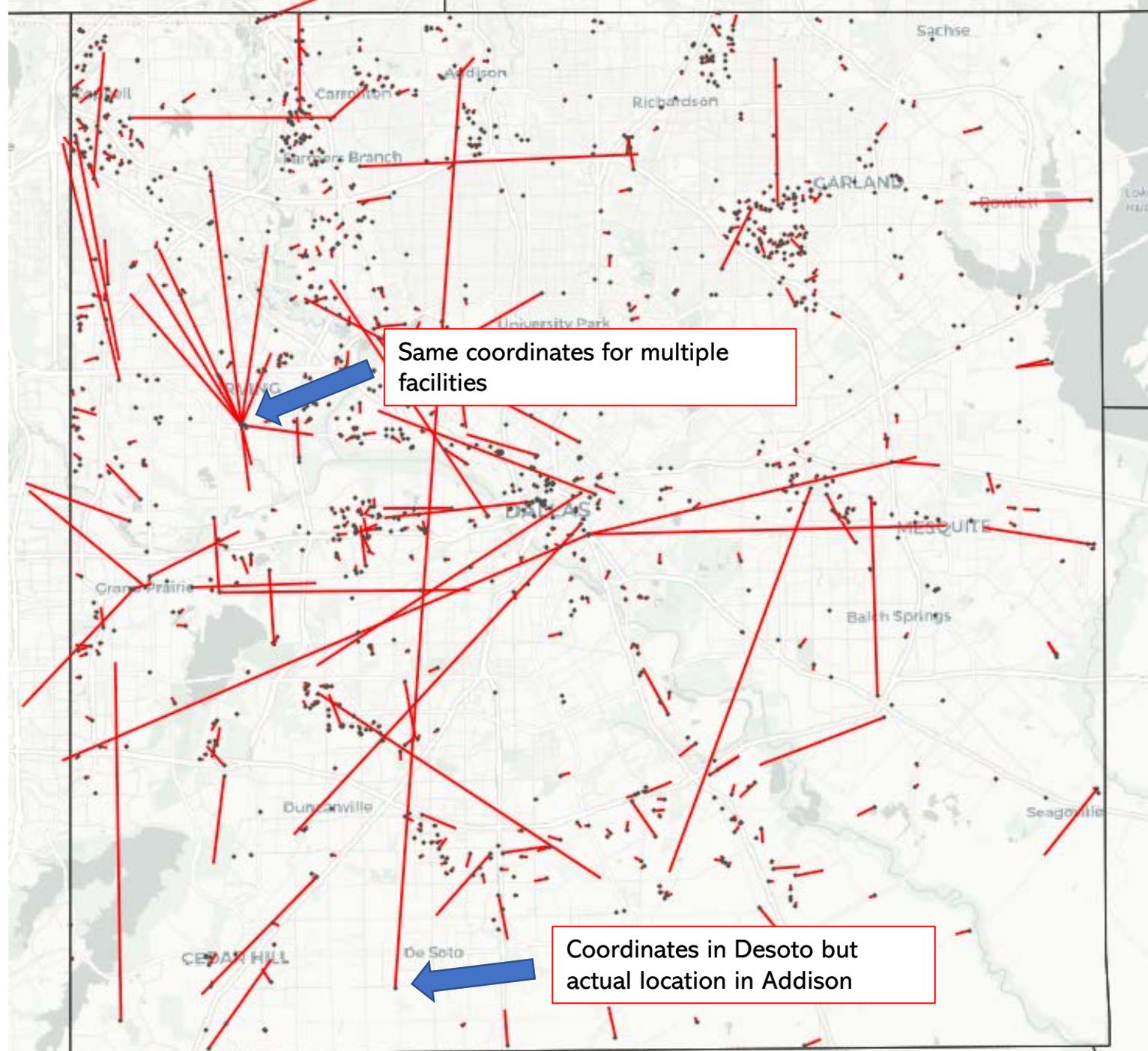


Filtered TIER II Data for Dallas County Not Intersecting/Within jurisdiction boundaries



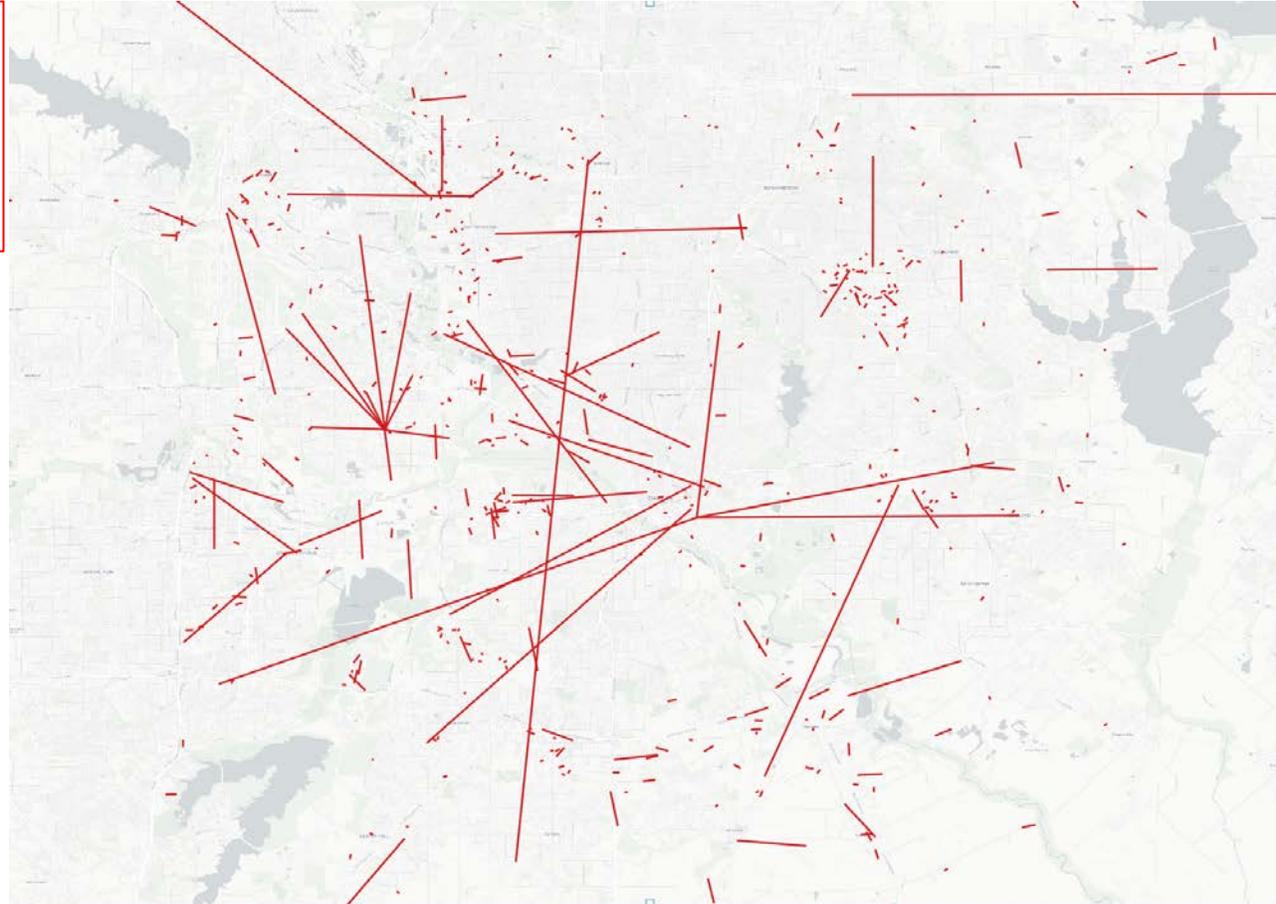
Problem: TIER II Location Accuracy

- Red: Difference between self-reported and geocoded coordinates
- Grey dots represent reported coordinate locations
- 2020 TIER II Reports: 779 (63%) facilities reported correct coordinates



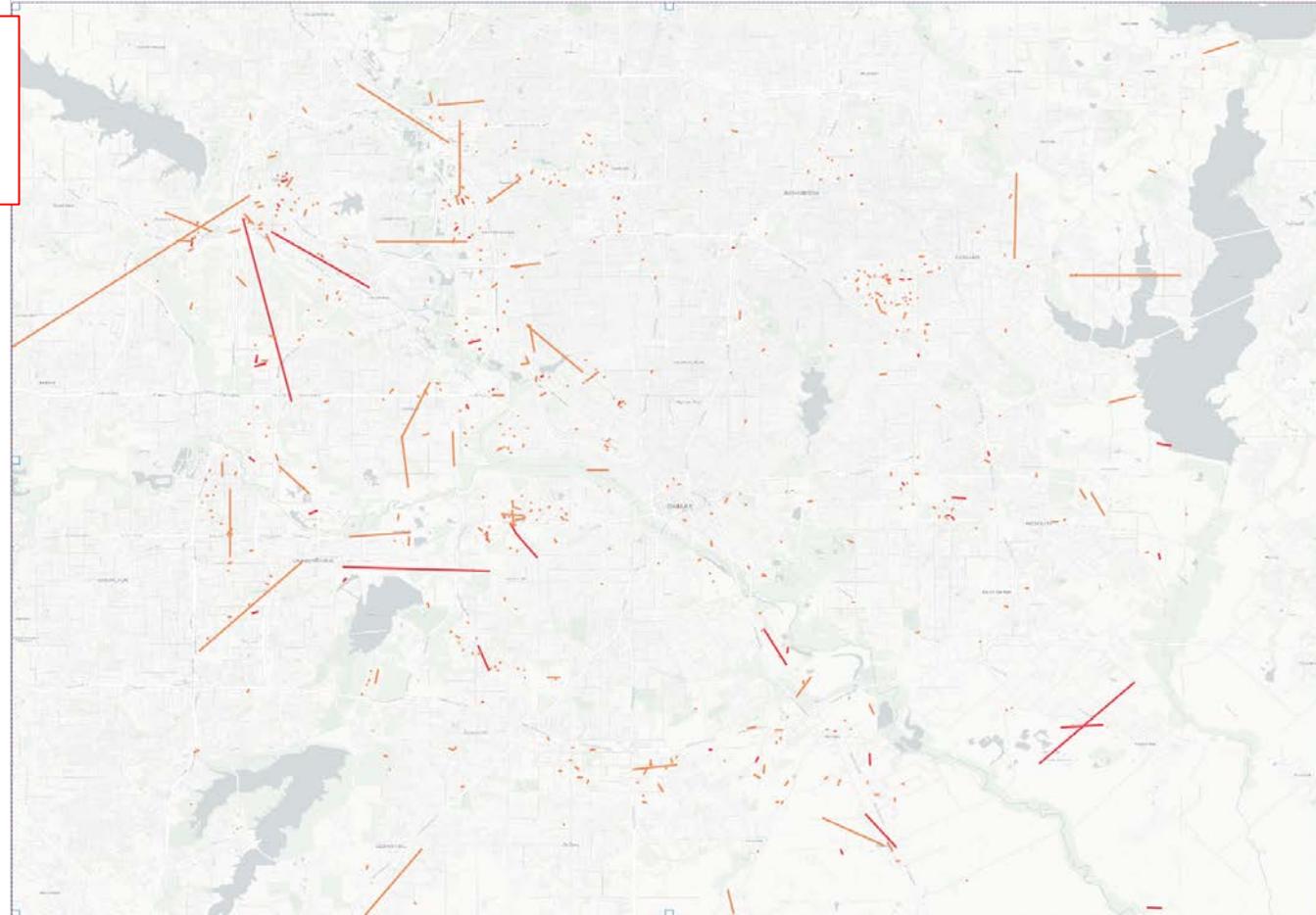
Problem: TIER II Location Accuracy

2020 TIER II Reports -
First year experimenting
with verification. (Long
process, tedious)

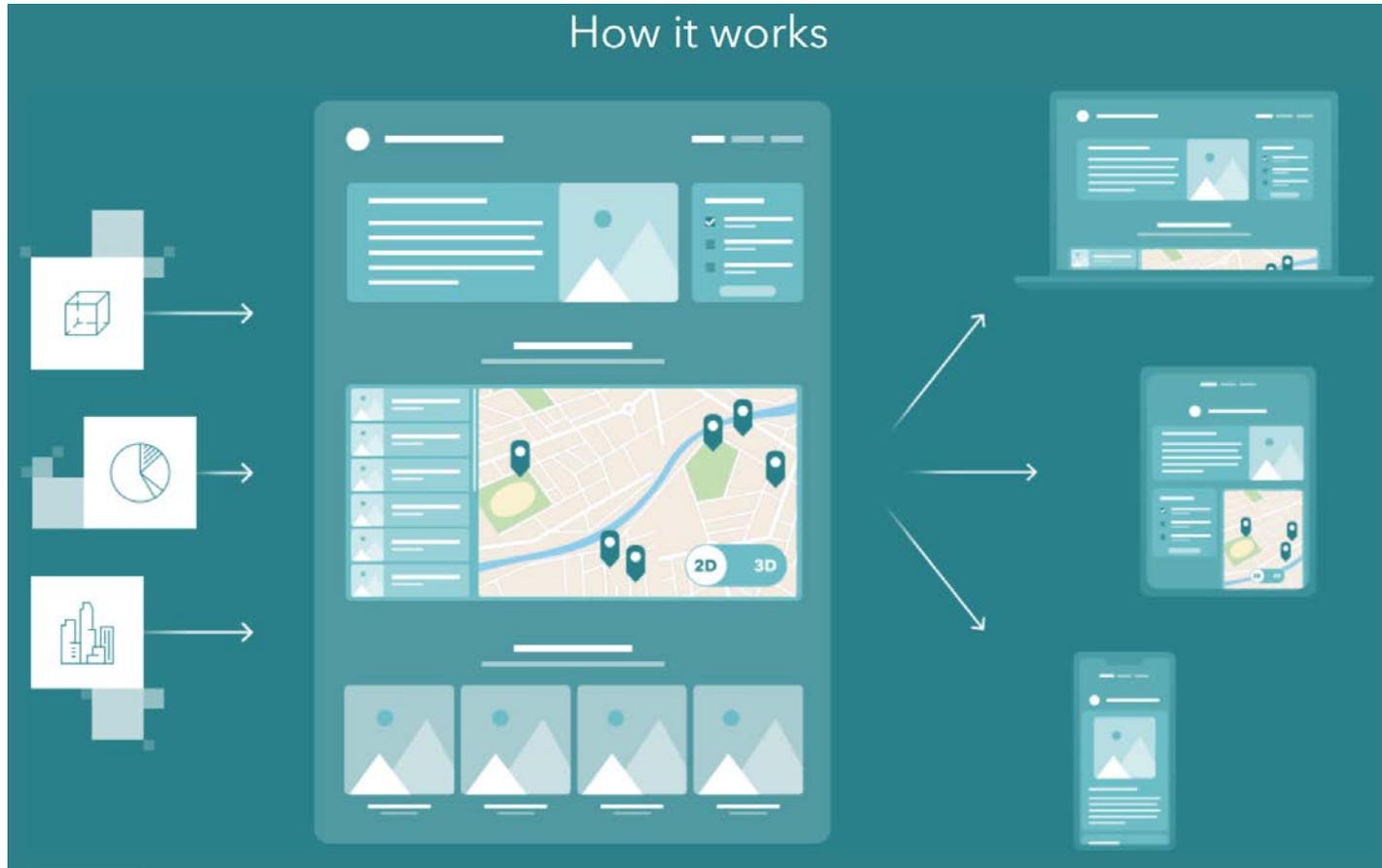


Problem: TIER II Location Accuracy

2021 TIER II Reports -
First time asking facilities
to correct locations



ArcGIS Experience Builder



- ArcGIS Experience Builder quickly transforms data into web apps without writing code
- Mapcentric or nonmapcentric apps
- Choose the tools needed from a rich set of widgets
- Apps easily display on desktops, mobile devices, and tablets

Collaborative Verification

- Share Link and Login information to other partners
- Enables Emergency Managers to work with TIER II without needing to build the tools internally
- Saves edits in real-time
- Less reliance on /work for me
- Shortens verification time

Preparing TIER II With R

R Programming Language

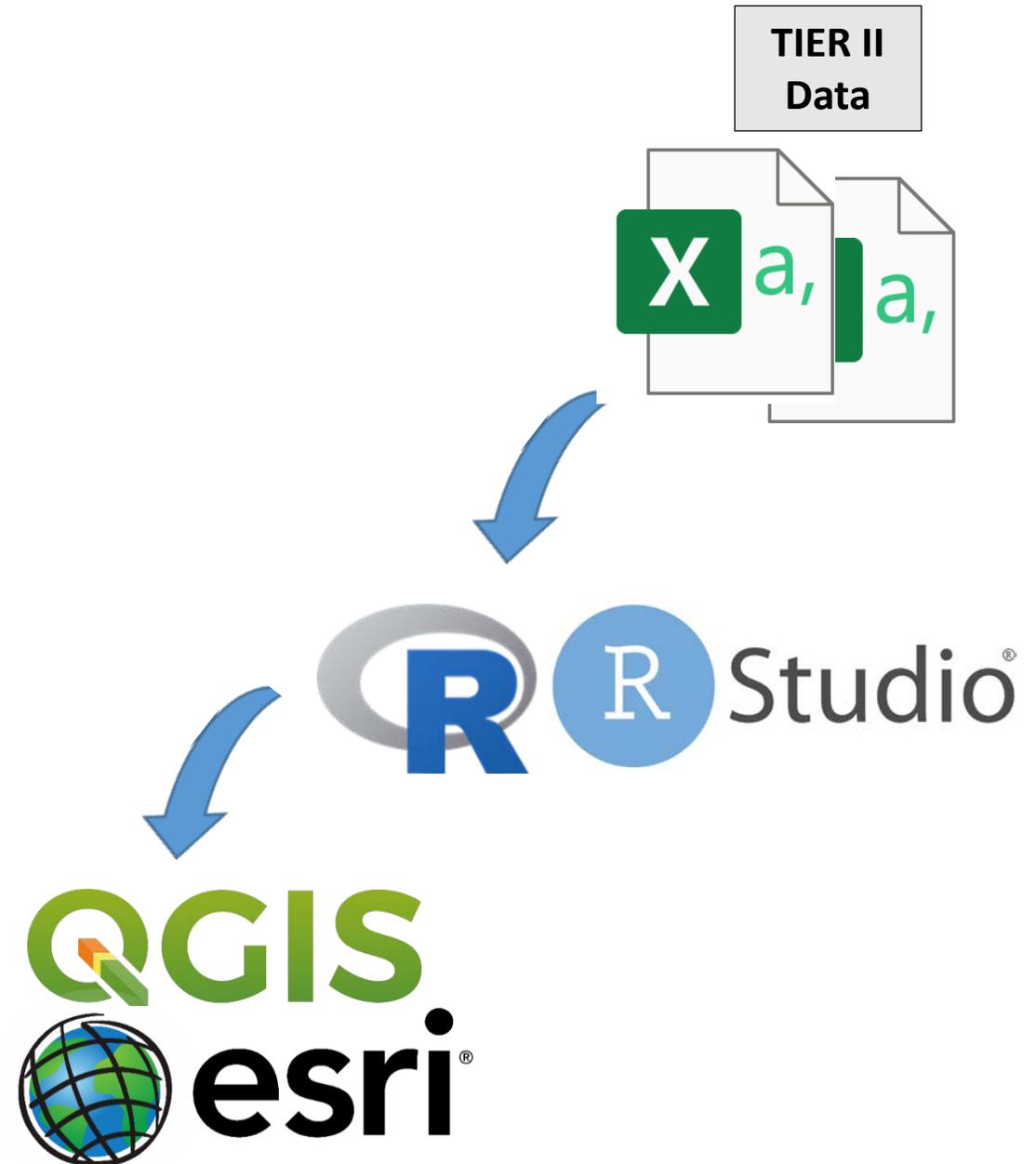
Robust statistical software used by Data Scientists and Data Analysts

Perfect for data mining, cleaning/transformation, and visualization

Growing number of packages available for GIS

Strong community support

It's free!! **(NO CREDITS)**



Preparing TIER II Data

- Download TIER II
- Filter Fields – Unique ID, Address, City, Zip, State, County, Latitude, Longitude
- Create spreadsheet for geocoding to generate a third-party Latitude and Longitude
- Spatially merge TIER II points layer with parcel layers
- Compare TIER II address with parcel address
- Create ‘Difference’ lines using self-report and geocoded Latitudes and Longitude
- Develop a ranking system to flag self-reported Latitude/Longitude using parcel address match and difference length

Preparing TIER II Data

A value of "1" means 100% Match between facility and parcel address – we can use this to filter out priority locations (low similarity)



RecordId	parcel_address	facility_address	dist	similarity	
FATR2021573451211308		2610 FORT WORTH AVE	19	-Inf	✗
FATR2021337345322020		5323 HARRY HINES BLVD	21	-Inf	✗
FATR2021402806062024	7035 SNIDER PLAZA	7035 SNIDER PLZ	2	0.8823529	✓
FATR2021471456821323	308 S AKARD ST	308 S AKARD ST	0	1.0000000	✓
FATR2021267460081354	8507 FOREST LN	12500 TI BLVD	12	0.1428571	✗
FATR2021681369062042	2700 SKILLMAN ST	6115 LLANO AVE	12	0.2500000	✗
FATR2021196341462055	4722 BRONZE WAY	4722 BRONZE WAY	0	1.0000000	✓
FATR2021840460091354	2801 WYCLIFF AVE	2801 WYCLIFF	4	0.7500000	✓
FATR2021969083422059	3429 TOPEKA AVE	3406 SYLVAN AVENUE	11	0.2666667	✗
FATR2021423359722062	39324 LBJ FWY	39324 LYNDON B JOHNSON FWY STE 120	21	-0.6153846	✓
FATR2021743754952059		2610 FOREST LN	14	-Inf	✗
FATR2021861566932056	2600 MOUNTAIN CREEK PKWY	2233-B MOUNTAIN CREEK PARKWAY	8	0.6666667	✗
FATR2021426566962056	8200 W JEFFERSON BLVD	105 HENSLEY FIELD CIR	19	0.0952381	✗

Not always perfect!

Preparing TIER II Data

Distance between self-reported
and geocoded coordinates

Well-Known Text (WKT)

RecordId	distFeet	distMile	geom
FATR2020185536952097	1673.83835	0.31701484	LINSTRING(-96.77217598 32.63593901, -96.76782 32.63869)
FATR2020327536962097	385.02001	0.07292046	LINSTRING(-96.74522296 32.63596499, -96.745452 32.637005)
FATR2020829508422104	512.77014	0.09711556	LINSTRING(-96.73127506 32.86933201, -96.730705 32.868008)
FATR2020554479692105	285.33087	0.05403994	LINSTRING(-96.87638139 32.84728966, -96.8759 32.84796)
FATR2020740523902041	564.95404	0.10699887	LINSTRING(-96.91042667 32.62242822, -96.909913 32.620938)
FATR2020394525872041	154.64817	0.02928943	LINSTRING(-96.76759343 32.91806964, -96.7671 32.918155)
FATR2020119523862041	37704.43608	7.14099168	LINSTRING(-96.76430101 32.86856499, -96.7766 32.7655)
FATR2020597523892041	615.26647	0.11652774	LINSTRING(-96.96300249 32.69256799, -96.961051 32.692935)
FATR2020958436442097	152.97898	0.02897329	LINSTRING(-96.79402198 32.78699218, -96.794283 32.78735)
FATR2020648396912102	550.18642	0.10420197	LINSTRING(-96.93505999 32.83768287, -96.936389 32.83667)
FATR2020305364672116	3169.66796	0.60031590	LINSTRING(-96.90426371 32.78083773, -96.90278 32.77222)
FATR2020914331832095	278.78441	0.05280008	LINSTRING(-96.76976476 32.78393019, -96.769427 32.784641)
FATR2020161419692111	2748.53068	0.52055505	LINSTRING(-97.03028718 32.81676553, -97.021372 32.817356)

TIER II Location Verification App

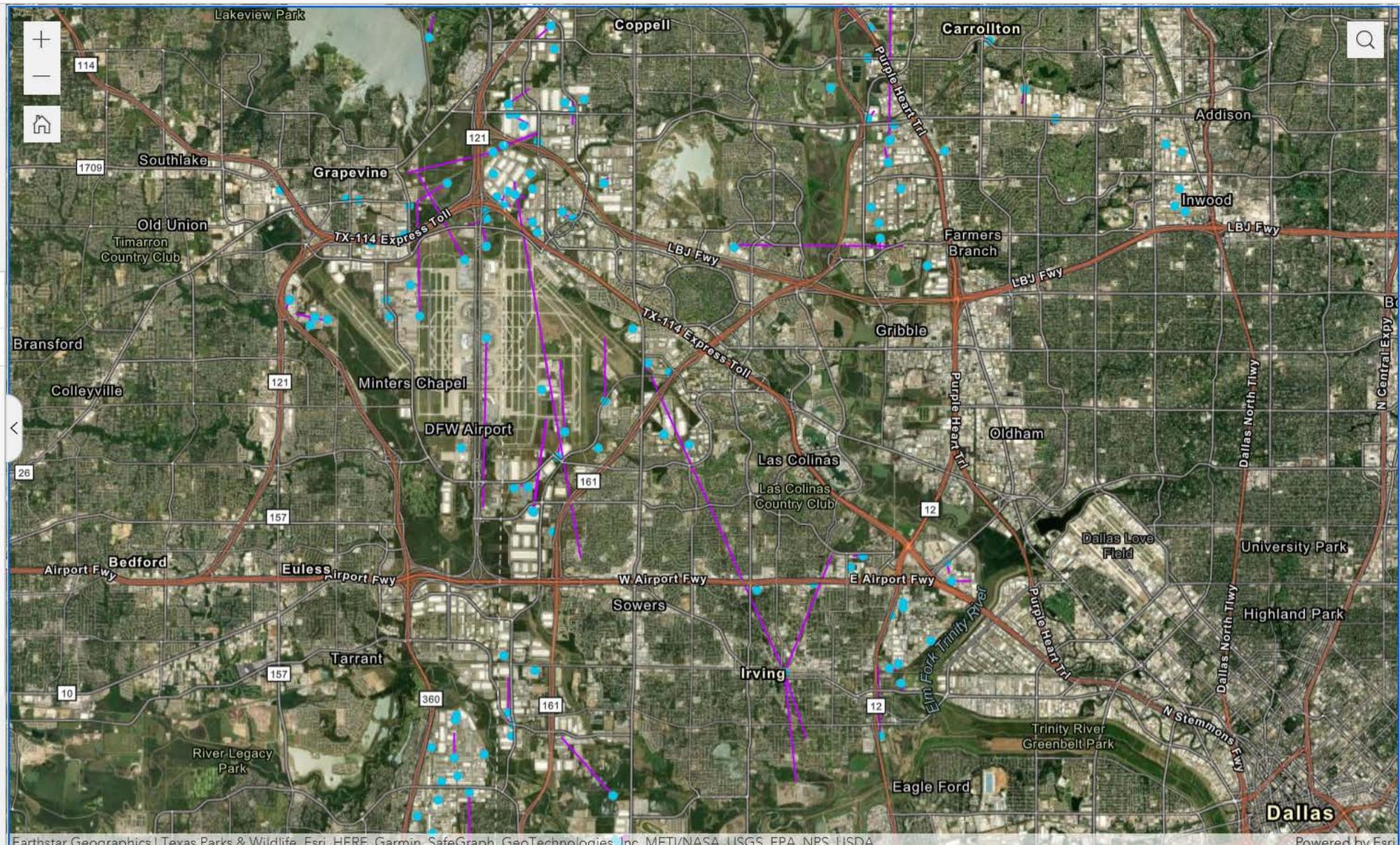
- Directions
1. To start review, click "Select" below and select facility record for more information.
 2. Review location and update the "Location_C" field with comments.
 3. To move point, hover over location until a 4-way directional icon pops up, then click and drag to desired location.
 4. Edit "Checked" field - change the 0 to any number and click "Update" to finish.
 5. Make sure to clear selection by clicking the 'less than' icon next to "Edit Feature" below.

Editor

Snapping

Edit features

Select



- Directions
1. To start review, click "Select" below and select facility record for more information.
 2. Review location and update the "Location_C" field with comments.
 3. To move point, hover over location until a 4-way directional icon pops up, then click and drag to desired location.
 4. Edit "Checked" field - change the 0 to any number and click "Update" to finish.
 5. Make sure to clear selection by clicking the 'less than' icon next to "Edit Feature" below.

Edit feature

Snapping

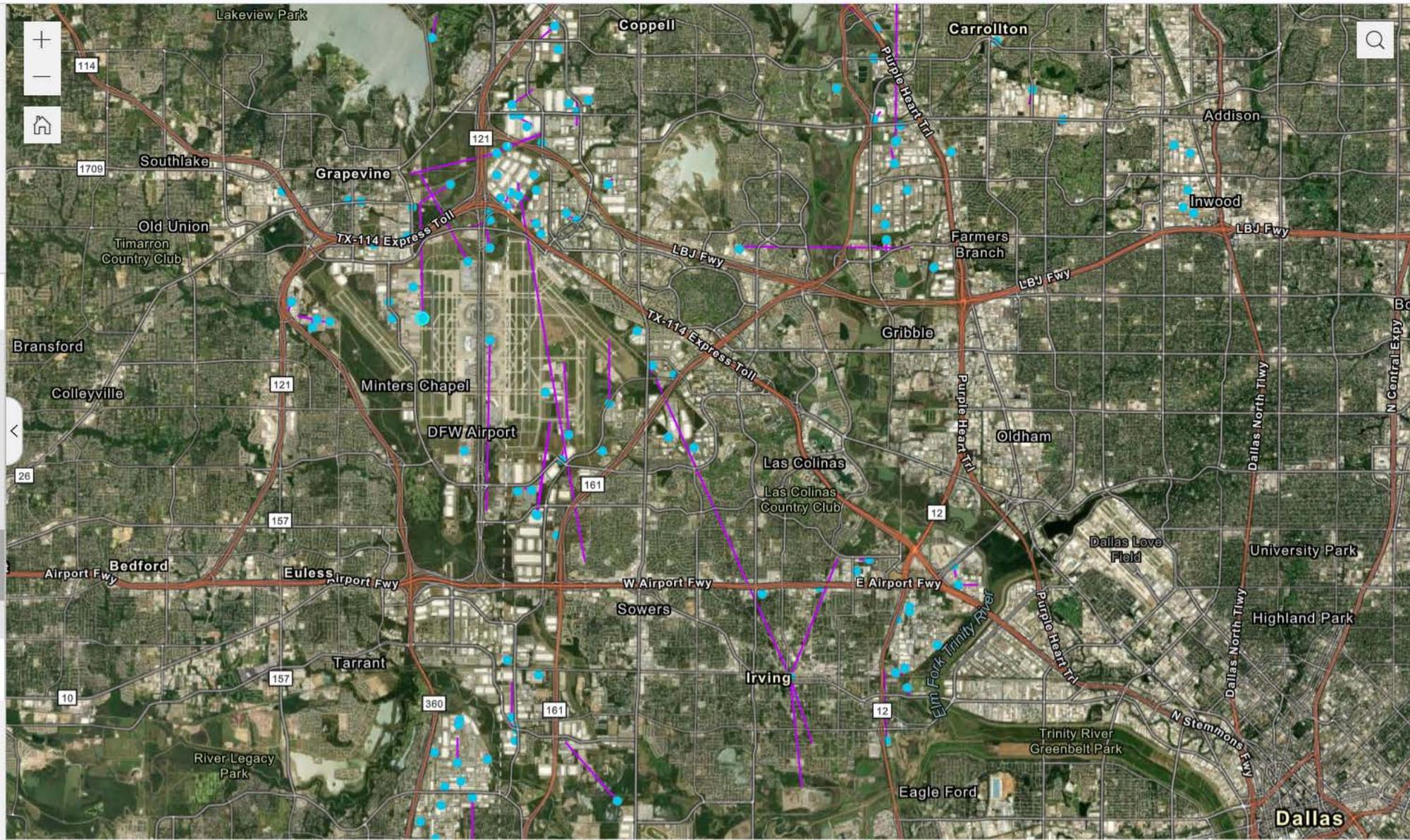
Checked
1

Location_C
Contact Facility

Latitude
32.903945

Longitude

Update











Summary

- TIER II reports and their location accuracy are critical to enhancing/maintaining community safety
- R is a great tool for shaping data to fit ESRI Apps
- ArcGIS Experience builder makes it easy to create apps and allow for collaboration
- Taking responsibility for the data work removes a barrier for Emergency Managers and First Responders

Questions/Comments

Contact Information



Contact information:

Bernardo Salazar, AICP, GISP

bernardo.salazar@dallascounty.org