

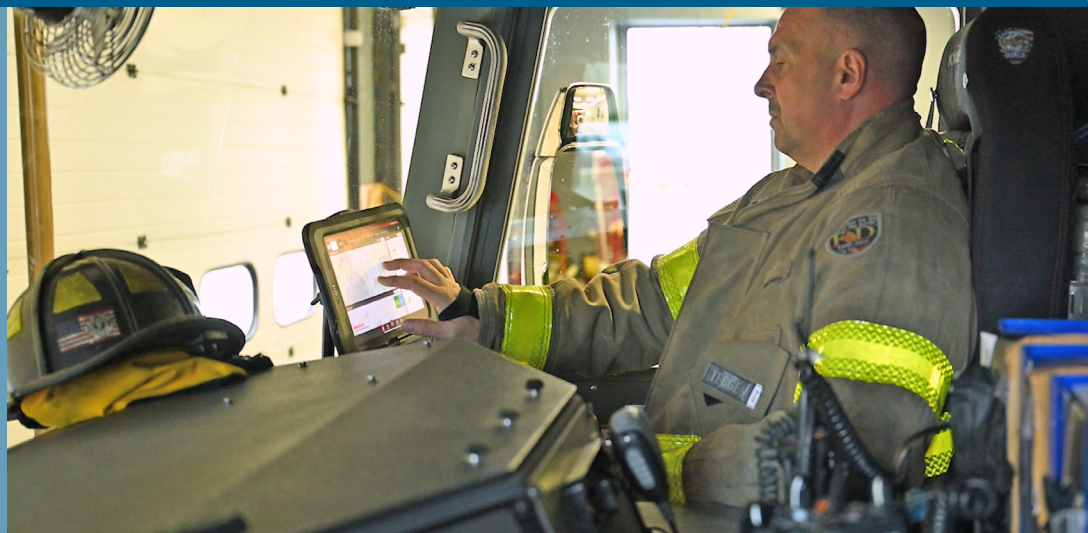
Enhanced Public Safety Through Comprehensive GIS Mapping in Delaware County, Indiana

Spring 2025

For over a decade, the Delaware County 911 public safety system incorporated partially integrated GIS maps within its Computer-Aided Dispatch (CAD) software. However, this system presented significant limitations, including slow map data updates that did not reflect real-world changes promptly. These deficiencies had the potential to cause confusion and response delays.

System Overhaul and Integration

In 2021, a major upgrade to the CAD software (Tyler Technologies/New World Systems) was scheduled, which necessitated a more significant role for the Delaware County Office of Information and GIS Department (OOI-GIS). The OOI-GIS Department had recently been relocated into the Emergency Communications Center as part of the county's COVID-19 response in 2020 and was integrated into the Emergency Management Agency. It was quickly realized that much of the existing CAD GIS data was incompatible with the upgraded software, requiring a major overhaul. This upgrade involved months of work to recreate response boundaries, update address data schema, and develop more efficient update workflows. One of the major tasks was creating a station run order. This analysis was needed to determine the nearest 70 Fire and EMS Stations for each of the 125 individual response quadrants in the county. The GIS routing analysis was conducted using ArcGIS Pro and ESRI's routing services, resulting in *8,750 individual routes*



MFD Officer using the CrewForce Application mounted in the officer's seat of an apparatus at Station 1.

and outputting the required station order lists for integration into the CAD system.

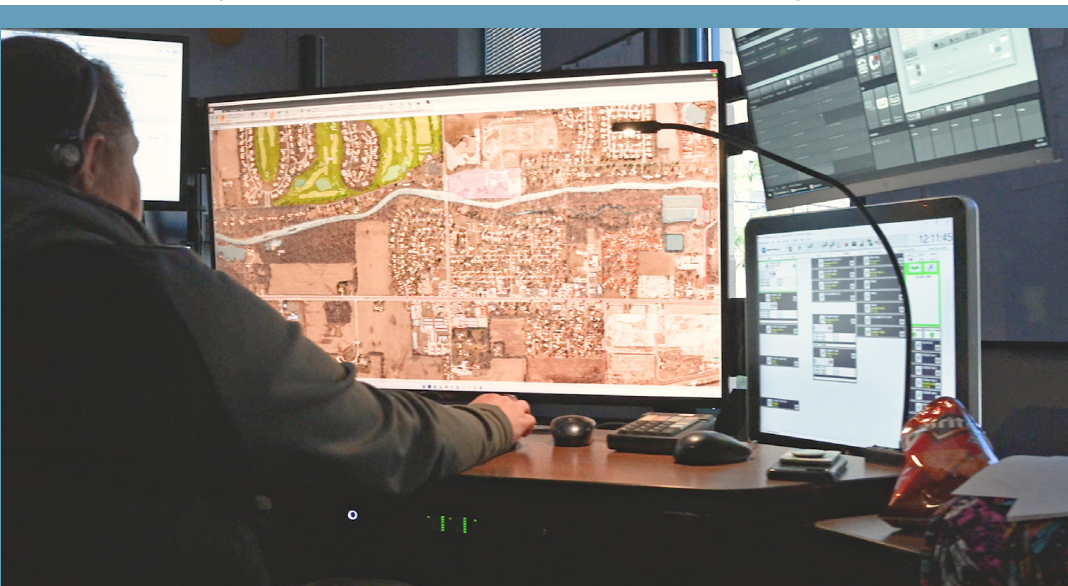
Streamlined Map Updates and New Applications

Procedures were implemented to streamline the flow of new addresses or changes from the Delaware County Metropolitan Plan Commission into the public safety GIS databases. These procedures included forms for tracking and notifications of any address changes, which are input into the County's Master and public safety geodatabases. With the updated CAD system, the GIS Office became directly responsible for map updates, leading to the expansion

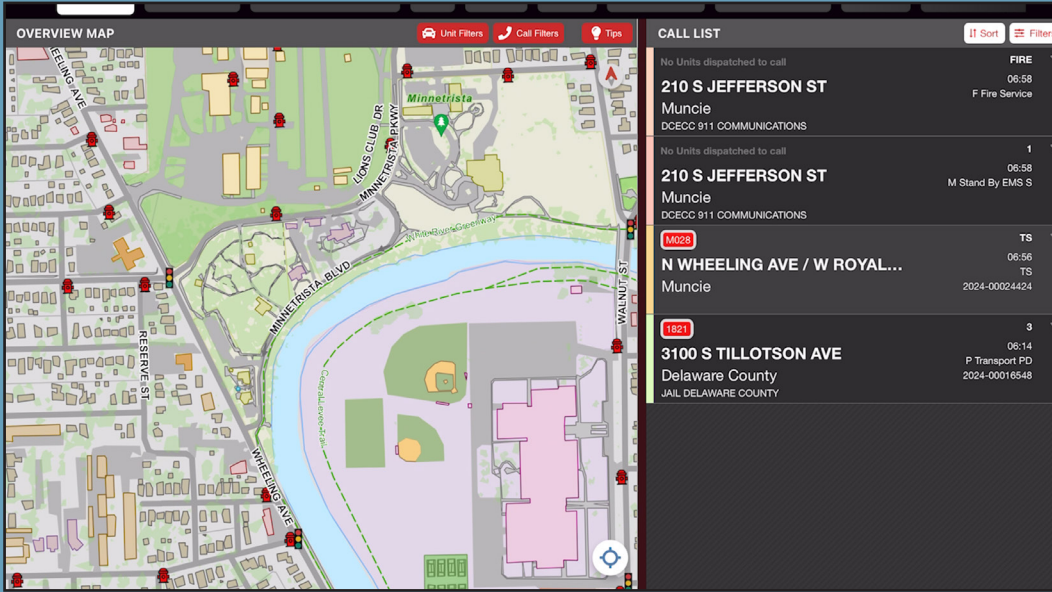
of map service capabilities. Additional map layers were added to the Dispatch map, and feedback from dispatchers was incorporated to improve the map to meet their needs. **A new mobile application was implemented, adding to the existing use of MDT (mobile data terminals) with CAD access in first responders' apparatus.** Many small volunteer fire departments in the county lacked the funds for MDTs, so this lower-cost solution helped bring the dispatch applications to their agencies. The new mobile application from Tyler Technologies, called CrewForce™ (for fire/EMS) and ShieldForce (for law enforcement), provided access to the CAD in a lightweight application on iOS or Android devices. Delaware County provided an initial 5 licenses to every volunteer fire department in the county to get them started. Currently, over 160 devices are in use in the county with this application. The application utilizes a more updated mode of delivering map updates to the devices, allowing extremely detailed maps without the cost of large file sizes. ESRI's Vector Tile and Mobile Map Packages are utilized to deliver the updated maps to each device, where it is stored locally on the device so it is always available in cases where internet connectivity is not available.

Comprehensive Map Details

The map itself is authored in ArcGIS Pro and consists of 78 individual map layers with over 3.5 million map features, covering



911 Dispatcher in the Emergency Communications Center utilizing the upgraded CAD map during a call for service



The CrewForce™ application as viewed on a tablet screen.

at a local school. Room numbers and names, corridors, and stairwells are highlighted on the maps. The ability to quickly determine where an incident or hazard is within the school and have first responders on the scene know exactly the location saves precious time and enhances the situational awareness of every responder on the scene. Currently, the OOI-GIS department is coordinating with the 911 Communications Center to employ and supervise a part-time student intern from Ball State University who is working with local schools to update the floorplans with new construction and renovations, as well as add additional information such as AED locations, fire extinguishers and more.

“GIS has been key in placing essential data in front of our crews and at their fingertips as they respond to emergencies. It has allowed us instant access to important location data, such as fire hydrants, Knox Boxes, sprinkler connections, and general hazardous materials on site. The custom build map file for CrewForce™ ties all these together, along with routing data and a detailed map have proved invaluable to our department’s daily operations in responding to emergencies.”

- Muncie Fire Department Battalion Chief Soren Schaller.

13 counties in Indiana’s IDHS District 6. While Delaware County has the most detail, there was a significant effort to include map details in surrounding counties, including structures, address points, place names, trails, waterways, and fire hydrants. Data was collected from both the counties themselves as well as from the IndianaMap.org data portal. Within Delaware County, even more map details were added.

“The amount of work the GIS Department has put into the maps and applications utilized in our dispatch center and by public safety agency is nothing short of incredible. I am proud to show off what has been accomplished here with our maps when visiting other 911 Centers, and they are in awe of what we have”

- 911 Deputy Director Kyle James

due to the increased hazard of construction vehicles and other activities in those areas. Locations that have a higher-than-average chance of incidents have also been entered into the map. These include recreation trails such as the Cardinal Greenway, with mile markers labeled to help expedite the location of a potential incident. Trails at Prairie Creek Reservoir for hiking, mountain biking, and horse riding have also been added with mile markers labeled as well. Prairie Creek Campground site numbers are also labeled in the map to help first responders find these locations quickly. Plans for 2025 include adding all pier numbers to the map so first responders can quickly locate any boating or other water-related incidents.

Mapping Fire Department Specific Locations

An important item not present on prior public safety maps was the location of fire department connections and other devices related to responses to commercial, industrial or large residential complexes. These include FDC, post-indicating valves, OS&Y valves, fire alarm control panels, electrical panels, elevator and shutoff panels, interior standpipe connections, stairs, and Knox Box locations. The OOI-GIS worked with the City of Muncie and Yorktown Fire Departments to develop a

Mapping Special Hazards

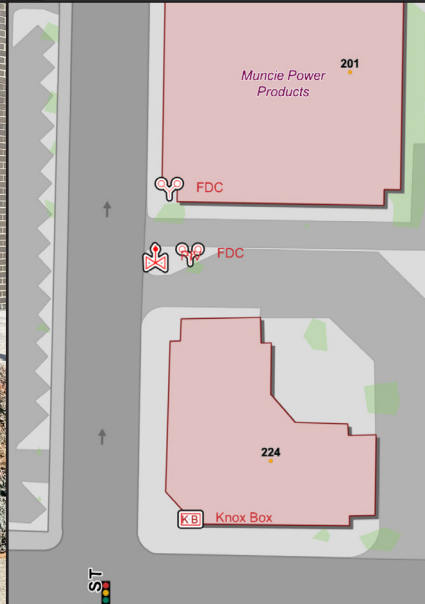
Special hazard locations, such as **Sara Title III EHS - Extremely Hazardous Substance sites, were added.** Every year the Delaware County Emergency Management Agency reviews these locations through the State of Indiana’s Emergency Response Commission’s Hazconnect Tier III manager and coordinates with the OOI-GIS Department to update the data. Large petroleum transmission lines are also included on the map, with details about the managing company, products transported, pipe diameter, and emergency contact numbers, all acquired through the Pipeline and Hazardous Materials Safety Administration’s National Pipeline Mapping System. Additional hazards are mapped, including roads that commonly flood during high water, bridge height and weight restrictions provided by the Delaware County Highway Engineering Department, as well as potential river access paths for both the White and Mississinewa Rivers in the event of a water rescue incident. Large construction areas are also noted on the map

School Floorplans Integration

Another important integration into the map is school floorplans. The local Safe Schools Committee comprised of law enforcement and school administration identified the need for first responders to have access to school floorplans in the event of an incident



School floorplans as displayed in the GIS Public safety map available to dispatchers and first responders.



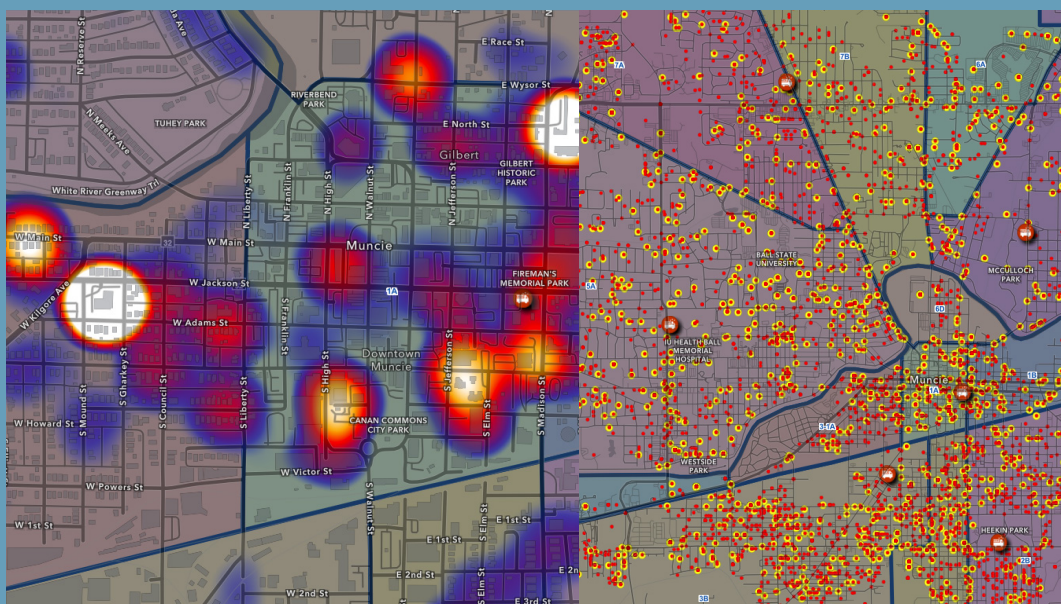
“Access to detailed maps with important information such as fire hydrants, connections, hazards, and more on an incident location allows us to start planning our response to an incident as soon as we get in an apparatus. This increase in situational awareness greatly improves firefighter safety and allows us to be more impactful on the fireground. The Integration of EHS chemical sites and large transmission pipelines is critical for our work in Emergency Management.”

-Cory Kissick, Albany Delaware Township Fire Department Assistant Chief & Homeland Security Emergency Management Agency Deputy Director

Fire department connections and valves and corresponding map features on the public safety map.

system to add these important locations to the map. Utilizing ArcGIS Online and the Field Maps mobile application, Fire Prevention Division collect these features during their inspection process. Their updates are automatically added to the CrewForce™ application whenever a map update is sent. This process has added over 850 features to the map in a little over a year. In addition, fire hydrant locations are also checked, updated, or added as needed.

MFD Sergeant Kevin Gibson is one of the individuals collecting these features in the field. He is tasked with updating the department's fire book pages, which are static, stand-alone printed maps covering the entire city that are used as backup maps and training aids for the department. He utilizes the public safety GIS data to update the maps, enhancing the efficiency of the process where all maps were done by hand not that long ago. " When updating map pages, GIS is important to ensure the proper locations of these vital appliances. We are learning more and more everyday how GIS can help us achieve our goals." -Sergeant Gibson.



Calls for Service maps showing density of calls (hotspot map left) and calls for each responding area (right)

each response zone, providing insights into call volumes and geographic distribution patterns. The findings were subsequently published as a hosted feature service within ArcGIS Online, enabling MFD administration to access the data through an interactive map application. This data then directly contributed to adjusting a number of station orders and response areas, resulting in more balanced run loads across the entire city. In addition, it was able to illustrate the high number of out of primary response zone calls to the northwest areas of the city, directly indicating the benefit of staffing an additional ambulance to service these areas when staffing allows.

MFD Call for Service Analysis

The Muncie Fire Department sought to ensure that emergency response workloads were equitably distributed across its fire stations throughout the city. To achieve this, MFD administration collaborated with the OOI-GIS department to analyze several years' worth of emergency call data and assess the distribution of service demands across various response areas.

To support this effort, tabular datasets containing multiple years of 911 call records were imported into ArcGIS Pro, where they were geocoded and spatially analyzed. This process allowed for the generation of detailed summary reports for

Future Enhancements

In less than 4 years, the capabilities of the Delaware County Public Safety CAD GIS mapping system has increased exponentially, with multiple opportunities in the future to add even more functionality. These enhancements better prepare and inform dispatchers and first responders, which leads to a safer Delaware County.



Kyle Johnson is the Chief Information Officer and Director of the Delaware County Office of Information & GIS Services. With over 25 years of geospatial experience, his department provides professional geospatial, design, and related services to Delaware County offices and agencies, as well as other cities and towns in Delaware County, Indiana. Kyle is also the Chair of the Local Emergency Planning Committee and Vice Chair of the Emergency Management Advisory Council and is a responding unit with Delaware County EMA and Hazmat Response Team. To learn more about the services the Office of Information provides, visit: www.dcingis.org