



Spatializing Public Works

How Geographic Information Systems (GIS) drive municipal alignment in utility verification, pavement indexing, and CIP projects.

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Introduction to Spatial Data in Public Works

Definition of Spatial Data

Spatial data is location-based information crucial for managing assets and assessing risks effectively.

Role in Public Works

Spatial data improves visualization, prioritization, and resource allocation in public works projects.

City Context & Project Scope



City Overview and Growth

DeSoto covers 22 square miles with 56,000 residents, evolving from a quiet community to a growing city with custom neighborhoods and business nodes.



Westmoreland Road Reconstruction

The major reconstruction includes roadway expansion, sidewalks, trails, drainage, retaining walls, and new traffic signals.



Utility Relocation and GIS Role

Relocation of a 48-inch water main requires precise GIS planning to ensure accuracy and avoid service disruptions.

S Westmoreland Road Widening

Scope

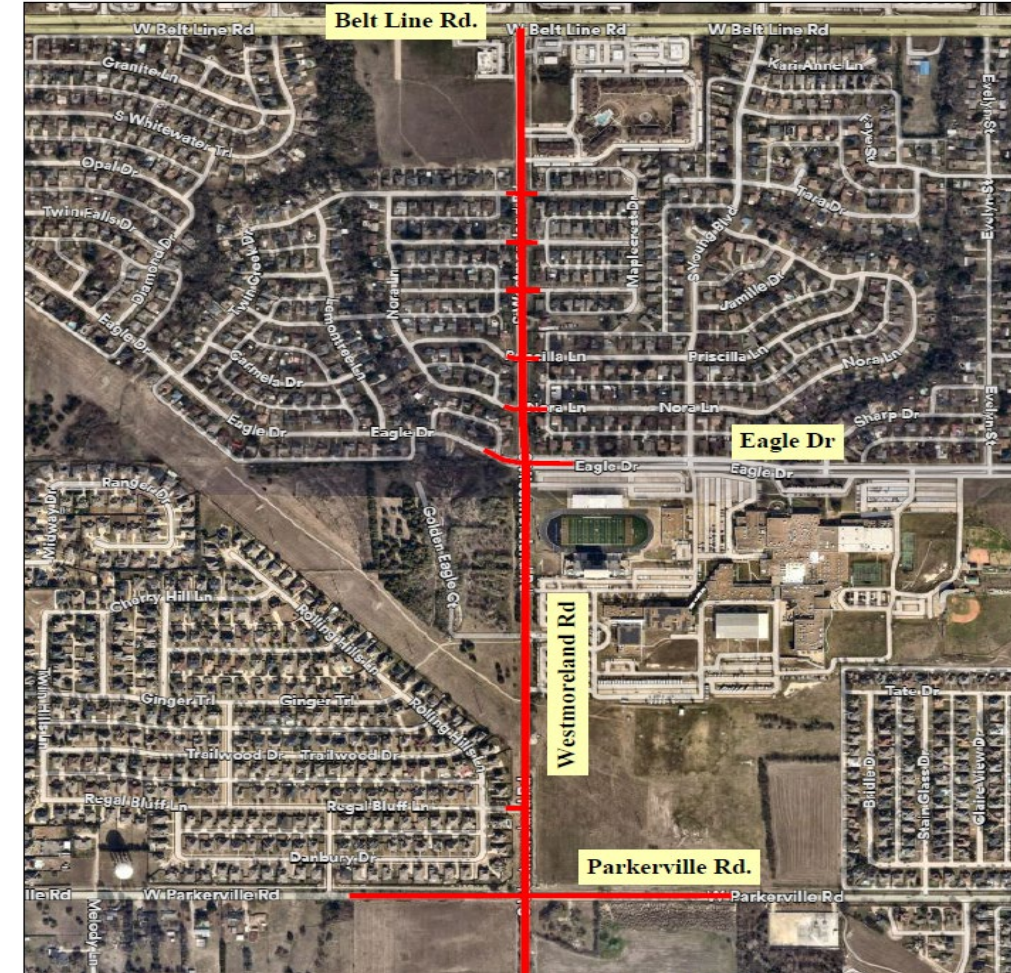
- Widen two-lane asphalt roadway to four-lane divided concrete roadway
- Add median landscaping and streetlights.
- Construct sidewalks, trail, retaining walls, and a traffic signal at Eagle Dr. & Parkerville Rd.
- Upgrade Drainage, storm water, sanitary sewer, and water line.

Funding

- Construction Cost: **\$22.9M**

Timeline

- Construction started: **May 2026**
- Anticipated completion: **March 2028**
- Currently ahead of schedule
- Essential services have remained **uninterrupted**



Integrated GIS Contributions to Infrastructure Projects

Evolving Role of GIS

GIS is moving beyond mapmaking to actively support field operations in construction projects.

Interdisciplinary Collaboration

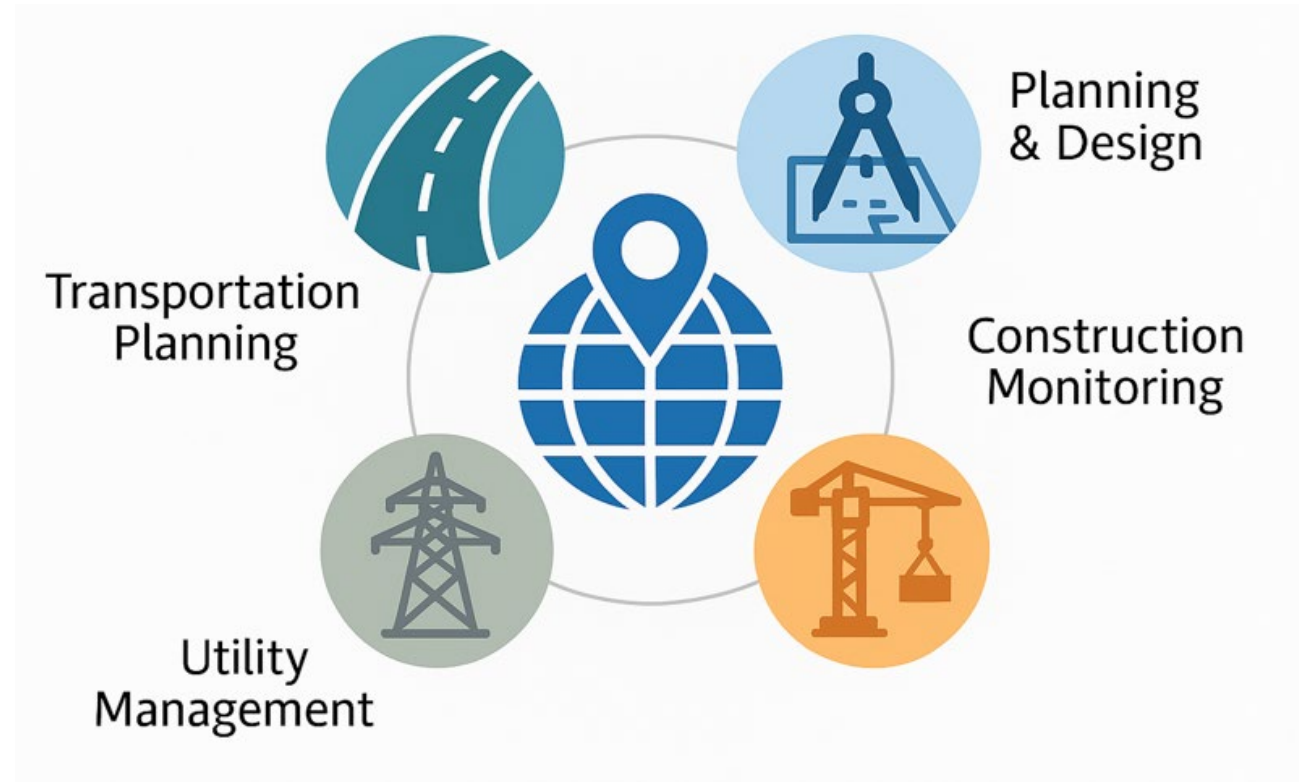
GIS, Engineering, and Public Utilities teams collaborate early to verify infrastructure, mitigate risks and provide transparency to the community.

Pre-Construction Engagement

Early GIS involvement identifies potential issues and ensures accurate asset mapping for smoother projects.

Real-World Impact

Direct GIS engagement with field crews leads to community benefits in large corridor projects.





Collaboration & Relationship Building

Human Collaboration Importance

Technical success relies equally on human collaboration and technology for project effectiveness.

Embedded GIS Team

GIS team stayed integrated with engineering, utilities, and contractors, enhancing transparency and understanding.

Integrated Workflows

Integrating spatial tools across departments and field teams improves efficiency and data sharing.

Trust and Responsiveness

Strong relationships encouraged prompt communication and support and integrating GIS into pre-construction builds trust and collaboration across departments.

Field Verification & Technology

Streamlined Mobile Field Maps

GIS team developed simplified mobile maps from utility layers, optimizing usability by including only essential data.

High-Precision GNSS Equipment

Using iPads combined with GNSS receivers enabled sub-foot spatial accuracy for on-site infrastructure verification. Cross-checking fire hydrants, valves, and meters ensures rapid correction of misaligned or outdated asset locations.

Near-Time Data Syncing

Field data synced to enterprise database, improving availability and collaboration between teams.

Informed Decision-Making

Spatial analytics provide data-driven insights, enabling efficient and safe decision-making during expansions.

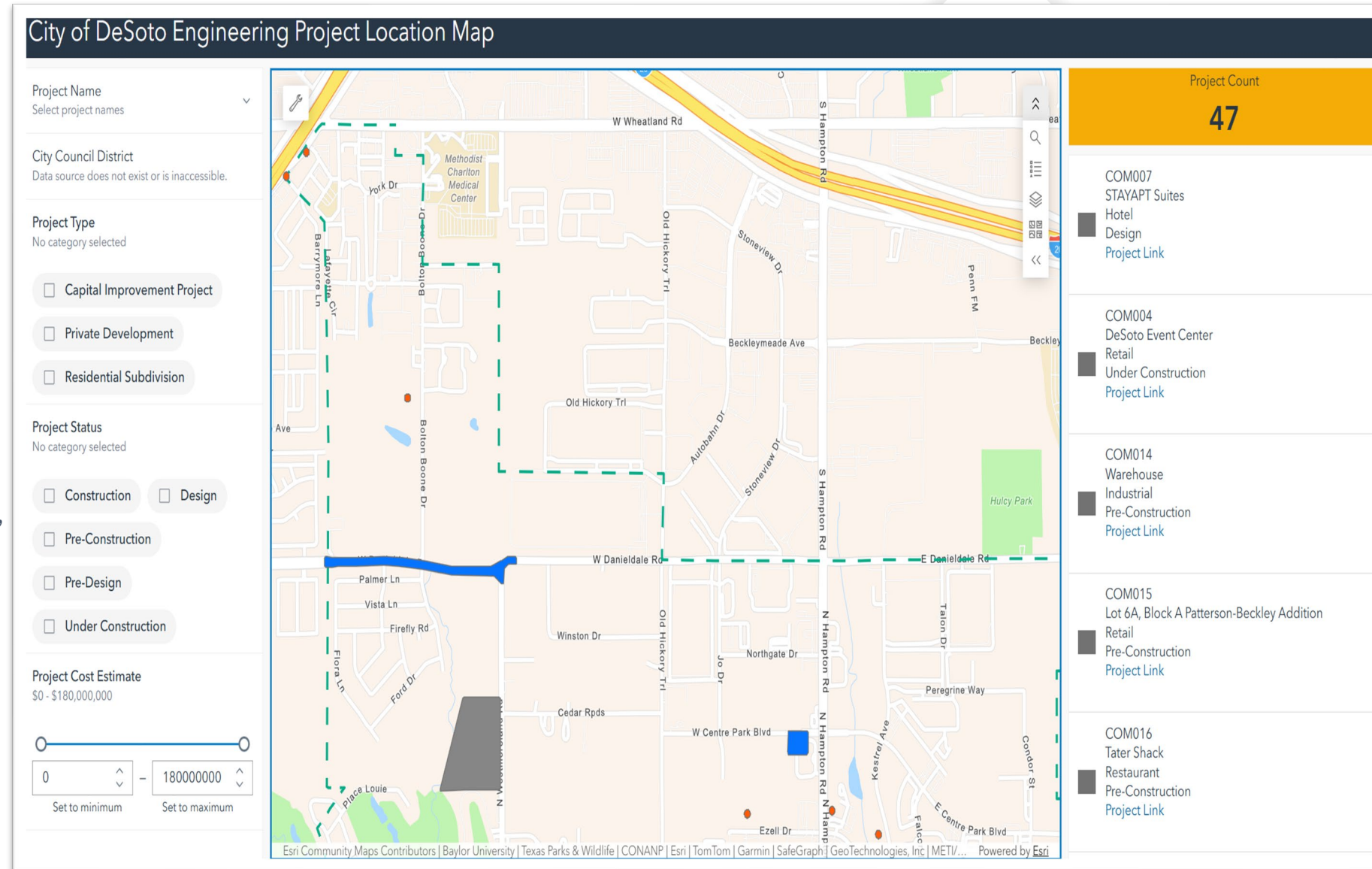


CIP Project Alignment Map

Spatially-Enabled CIP

Mapping the 5-year Capital Improvement Program (CIP) footprint alongside existing utility layers eliminates corridor scheduling conflicts.

Shared coordinate maps visualize water, storm drain, and sewer upgrade footprints alongside current private telecom projects to align corridor improvements.



Systematizing Pavement Maintenance with GIS

Tracking Pavement Conditions

GIS technology allows for systematic tracking of pavement conditions across road networks accurately and efficiently.

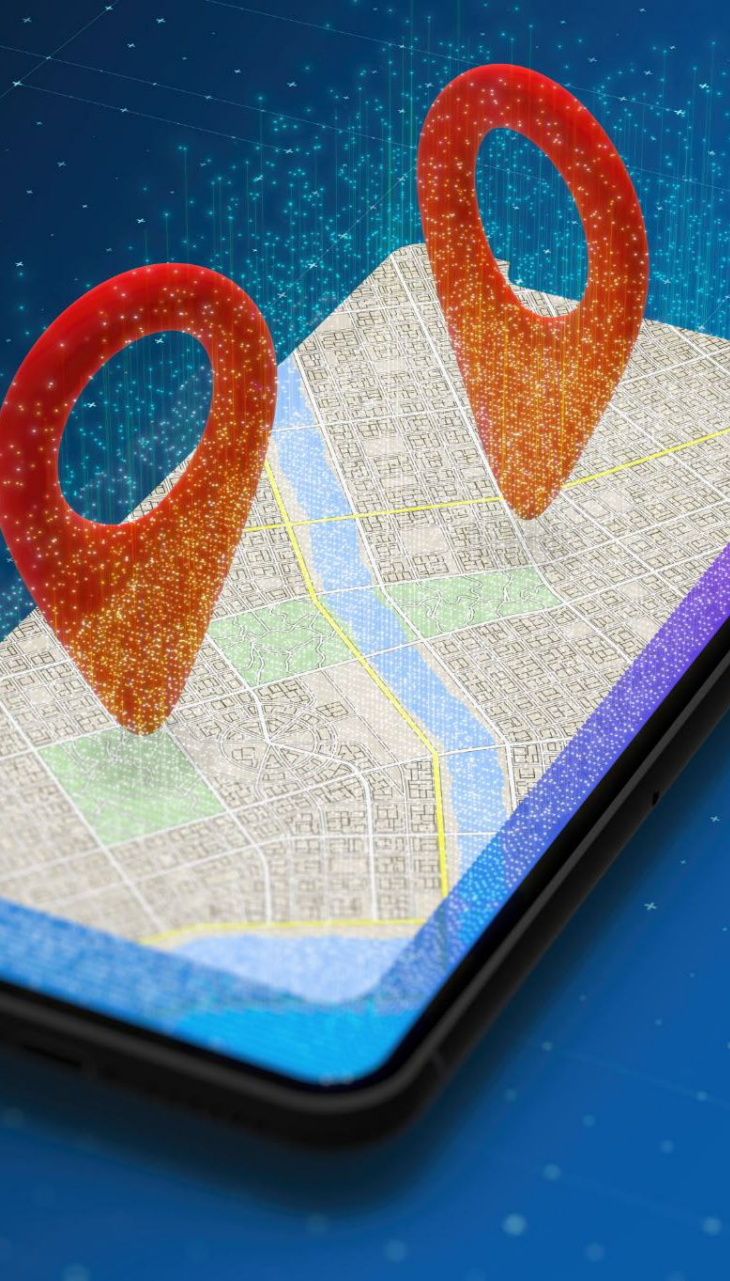
Prioritizing Maintenance Activities

GIS helps prioritize pavement maintenance by identifying critical areas needing urgent attention to maximize impact.

Optimizing Resource Deployment

GIS optimizes allocation of resources for pavement repairs, improving lifespan and overall road quality effectively.





Key Takeaways

Early GIS Engagement

Engaging GIS before construction helps shape planning and prevents conflicts, ensuring accurate decision-making.

High-Accuracy Mobile Maps

Mobile maps provide a unified, reliable dataset for field crews, contractors, and engineers, improving efficiency.

Collaborative Teamwork

Trust and regular communication between departments enhance project success through shared expertise.

GIS Value and Impact

GIS adds both technical and relational value, protecting infrastructure and fostering community trust.

Thank You