

# Implementation of GIS Supporting Facility Management and Administration at Garland ISD

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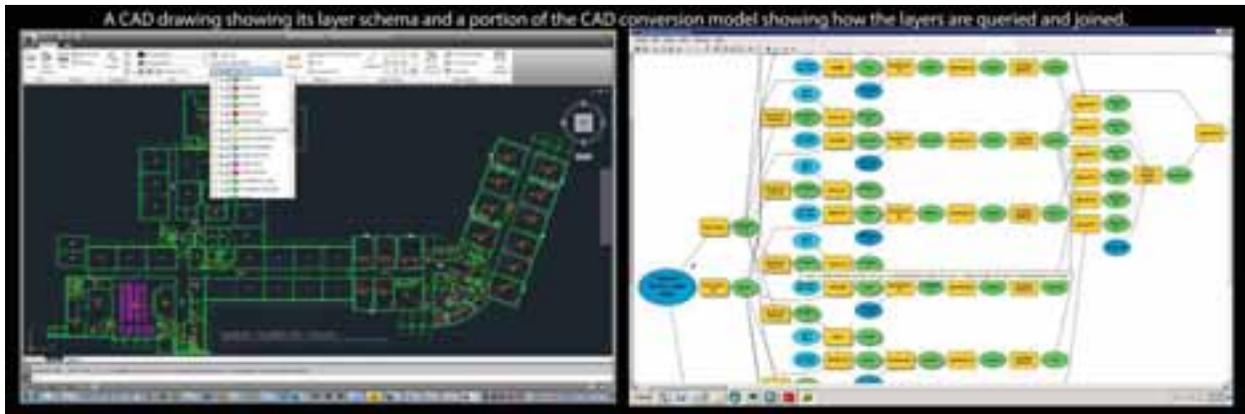
Garland ISD

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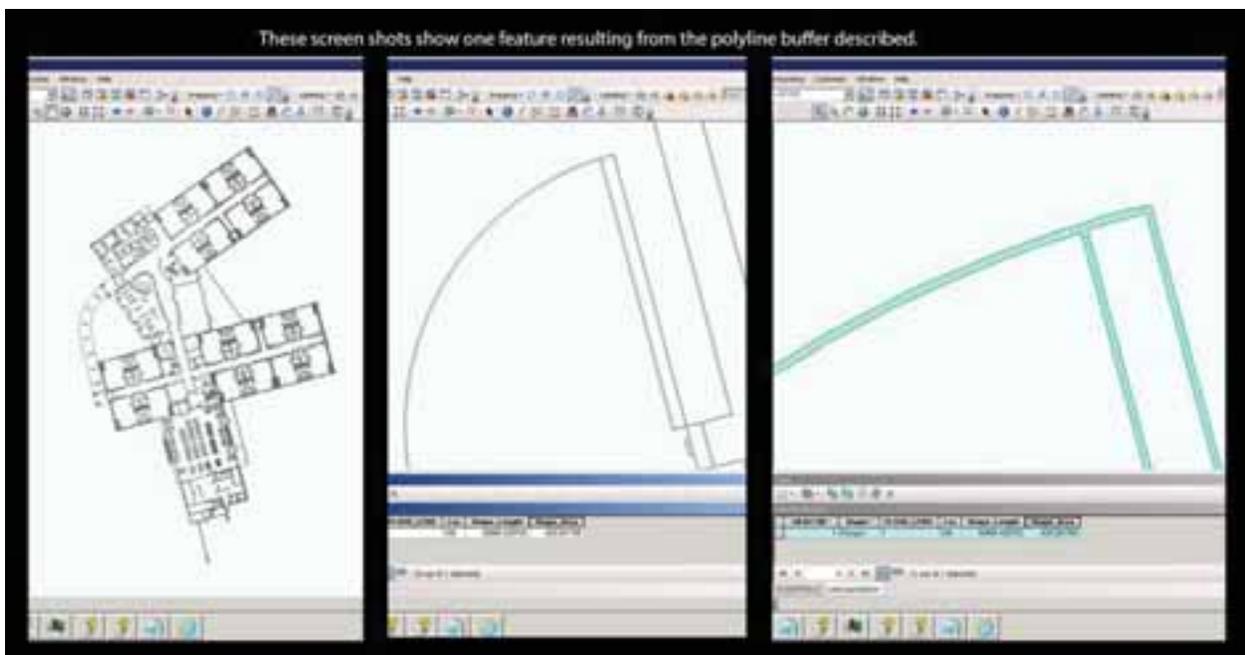
For the past few years the Garland Independent School District facilities department has been developing a GIS infrastructure to aid facility management and administration. Garland ISD covers over 93 square miles and primarily serves the cities of Garland, Rowlett, and Sachse in Dallas county Texas. The district has a bit over 7.6 million square feet of covered space in 7 high schools, 12 middle schools, 47 elementary schools, 2 pre-k centers, 2 stadiums, 1 special events center, and several administrative and special use facilities. Current enrollment is at 58,000 students.

GIS projects for Garland ISD include CAD to GIS data conversion of floor plans, nightly student geocoding against a point based locator, grounds and irrigation zone maps, printed maps for various departments, visualization of building usage, and transportation, including bus routing for daily school attendance, field trips and special events.

Accurate floor plans are essential for the use of GIS in facility management. Prior to the use of GIS, the existing records for Garland ISD buildings were in CAD files. The decision was made early on that the district would continue to keep and maintain these records in the CAD format. The requirement for the GIS system was to be able to convert the CAD drawings and update our GIS system from them as changes are made to the source CAD files. In order to make this process consistent for over 100 drawings and replicable, it was necessary to establish a CAD schema and update all CAD drawings to comply with that schema. A model was then built in ArcGIS model builder that processes the CAD drawings. The model works by analyzing the CAD polygons and CAD annotations, applying a series of structured queries to each and then running spatial joins to apply the annotation text to the polygon that contains the annotation. By repeating this process with variations on queries, building outlines, rooms, corridors, floor surfaces, roof plans, and construction history are derived from the CAD drawing.



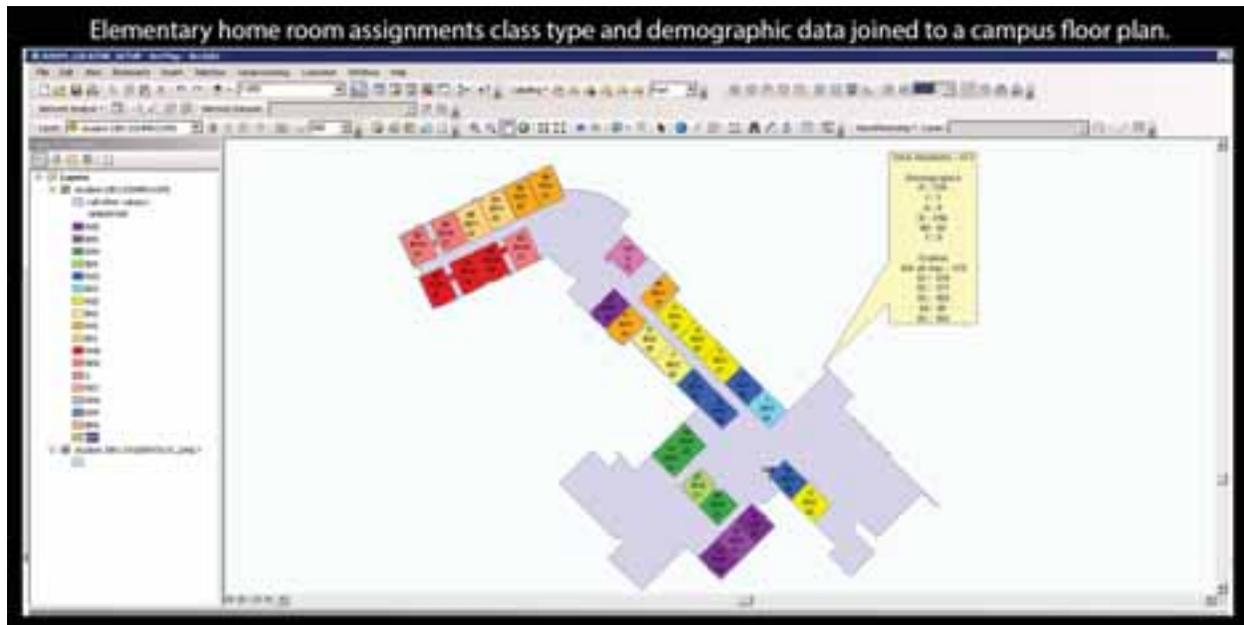
Certain polylines were also desired on the floor plan drawings to show millwork, door swings, furniture and so forth. The number of polylines added up quickly, an elementary school floor plan has perhaps 200 polygons defining rooms and corridors but over 40,000 tiny line features giving the floor plan graphic reference. It was found that map performance, especially in published services, was very slow. The solution that was developed was to set a query to extract the desired line features and to then apply a buffer tool around them with a radius of .25 cm to create a single dissolved polygon feature consisting of a thin buffer around all of our polylines. This single feature allows published services to draw much more quickly than having the system try to draw 40,000 tiny lines.



In addition to room numbers, each building has a location number. By concatenating the location number and the room number with a period "." between them, a district wide room key field, LocRm, is created.

LOC = 102 , Room = 15, LocRm = 102.15

So long as the LocRm is unique it can then be used to join data concerning student schedules or asset management.



Another significant project has been a point based geo-coder for locating students to their home addresses. This is important as knowing the precise distance from a student's home to a school aids the transportation and student services departments in determining student eligibility for bus transportation and in determining the best placement for students when the school they might otherwise attend is full and they need to attend a different campus.

These and other GIS projects as currently served out on the GISD internal network for administrative use. The platform chosen for current applications is Adobe Flex, but a data collection app is under development using HTML 5. Flex was initially chosen because it proved easy to work with and deploy internally. While much of the Flex application has been developed internally, for some of the more advanced widgets and for the HTML 5 project the services of an outside contractor, David McCourt of Softwhere Solutions, have been used.

Beginning at the end of 2012 we began working on data scrubbing for our latest major project which is a network analyst based solution for the district's bus routing needs. This has been a collaborative effort between various departments within GISD and an ESRI Business partner, US Computing. For this project the district purchased new street data and has had a

team of data scrubbers adding in network elements for bus loops around campuses, apartment complex parking lots and other places where a bus, either general education or special ed, which may pick up at the child's home, may need to drive.



It is our intent to have the transportation project fully implemented by the end of summer and to then continue expanding the use of GIS to other departments and personnel within the district.

The work we have accomplished so far would not have been possible without the support and assistance of numerous people and resources. I want to thank a few of those people for everything they have done to make our GIS system possible.

From inside the district

- Jess Hudson – Executive director of School Facilities
- Liz Jennings – Programmer
- Mark Taylor – Program Manager Systems Analyst
- Darrell Willner – Database Administrator
- Kelli Daughtry – CAD Technician
- Wayne Gibbs – Grounds & Irrigation Forman

And From the outside

- Scott Sires – Brookhaven College
- David McCourt – Software Solutions
- The staff at US Computing
- And lastly everyone at ESRI for making GIS software available to educational institutions.