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Public Works Intern

Town of Flower Mound

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1 Company Overview

Flower Mound is centrally oriented in North Texas very close to DFW airport. Flower Mound is known for family oriented community establishment having very good public schools; population around 68050 for 2016 estimated to cross 1milion mark in 2040. It can be located on DFW Metroplex by clicking here.

1.1 Vision

'The Vision of Flower Mound is to preserve our unique country atmosphere, heritage and quality of life while cultivating a dynamic economic development'.

1.2 Core Values

Based on vision, Flower Mound has core values to have 'good schools, excellent customer service, and superior leisure opportunities, great neighborhoods, enduring development'.

1.3 Strategy

Flower Mound strategy outlined below as mentioned in fiscal year 2015-16.

Figure 1 Flower Mound Strategy

2 Products/Services

Town of Flower Mound provides State of the art services to its citizens which concern local municipal government such as

- Utility Services
- Drinking Water
- Street Services
- Drainage and Storm Water Management

In correspondence to Flower Mound's vision, they have excellent customer service record, transparent taxpayer dollar utilization, very good parks for recreational purposes and highly sophisticated people working towards serving citizens.

3 Awards and Recognition

Flower Mound is recognized as 'Safest City in Texas', a study conducted by safehome.org. Several other rewards and recognition are as follows:

- Most Livable city in Texas, No. 13 in America
- No. 1 in Best Cities for Families
- No. 2 Best Places for Young Families in Texas

4 Team – Public Works Department

I was involved Public Works team which is responsible for operation and maintenance of several utility services such as:

- Drinking Water Supply
- Residential/Commercial Irrigation Water Supply
- Sanitary Sewer
- Sewer Lateral

Public Works team will accept complaints from citizens and work towards solving problems such as repair of leaks, evaluate quality of sewer pipes, perform scheduled maintenance work on water supply system, etc.

5 Commercial Irrigation Water Meters Project (C1)

Local municipal government will bill citizens based on volume of water (# of gallons) consumed. Quantification of water consumed is done by installing water meter at properties. Commercial properties usually have 2 water meters; one for drinking water supply and second for irrigation purposes. However, in some cases this number can go up to 8. Previously, these meters were placed inaccurately on map. Some of challenges involved were:

- GPS Location not available
- More than one commercial water meter associated with relatively large real estate
- Access to Corresponding AutoCAD® DXG file not available

This project emphasized on correcting their location on map.

6 Sewer Lateral Creation for Households (S1)

A Sewer Lateral is a small pipeline connecting household sewer to main city sewer network. Previously, this lateral was missing in Flower Mound's utility services geodatabases. This project emphasized in creating laterals. Household may or not may not have lateral depending

upon gravity main (city sewer line) reached neighborhood. If gravity main reached to neighborhood can only have 1 lateral limited in between land parcel and gravity main.

7 Public Works Intern

Working as Public Works Intern, I worked on above mentioned projects. Details of these are as follows. These tasks assigned, I used ArcGIS for Desktop 10.4.1**.**

1. **Commercial Irrigation Water Meters Project (C1)**
   - ➔ To overcome these challenges mentioned in earlier section, I had to manually look for as builds (blueprint for properties).
   - ➔ These blueprints then had to be mapped to direction of street on ArcGIS map. For instance, street A on left side of street B in blueprint while on ArcGIS map, it's on right. Manual interpretation as such had to be done. Screenshot below for sample case:

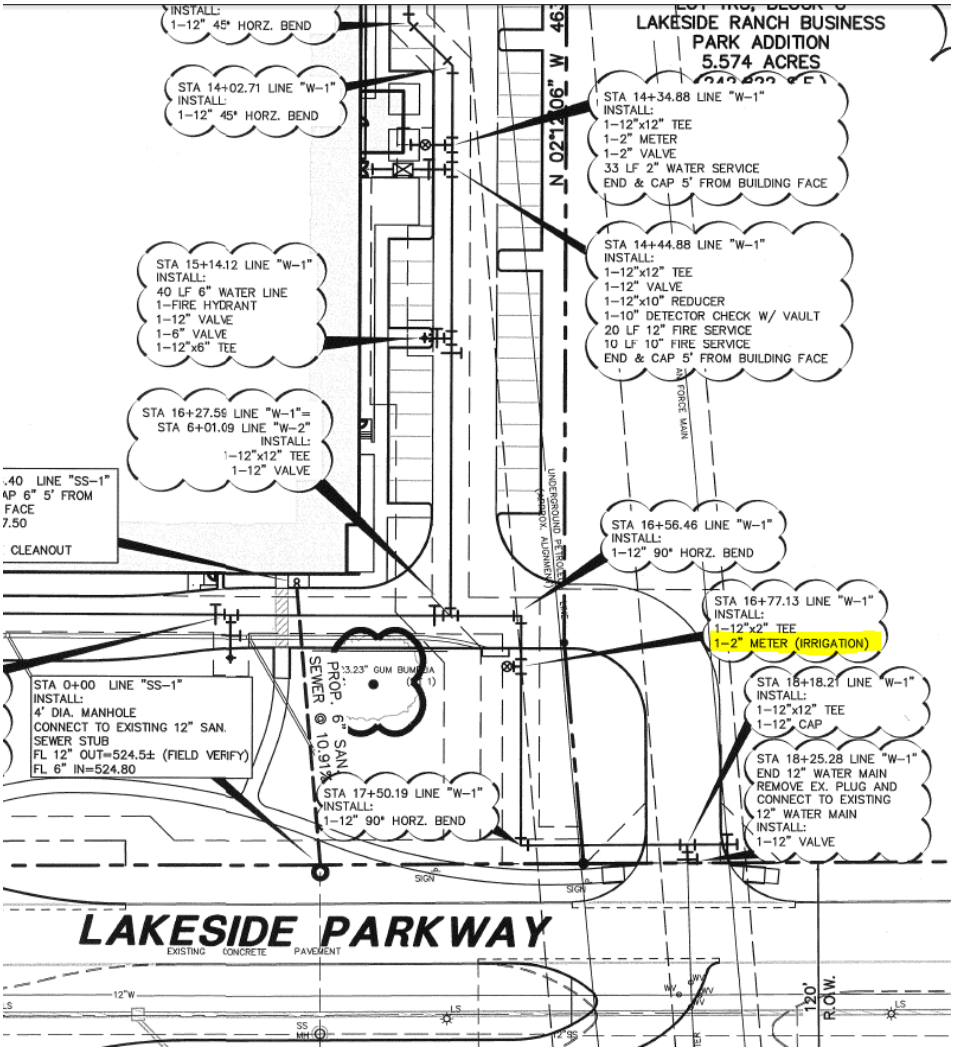

Figure 2 as builds to find Meter Location

This corresponding location then was mapped onto ArcGIS shapefile. Even though this seems lot of manual and tedious work, due to limited no. of inaccurate meters and access to AutoCAD DXG file for digitizing not available, manual process was preferred.

2. **Sewer Laterals Creation for Households (S1)**

   ➔ This project relatively more enthusiastic and challenging. As mentioned, a sewer lateral is small pipeline connecting household sewer line to gravity main.

➔ Sewer lateral mathematically is a line perpendicular to gravity main. This phenomenon was used as strategy to create sewer laterals. Diagrammatically explained below:

Figure 3 Sewer Lateral Diagram

➔ As shown in above diagram, light blue line is gravity main where sewer lateral had to be connected. Solid black line is sewer lateral in ideal case. This sewer lateral line is clearly perpendicular to gravity main starting from land parcel centroid explained below.

➔ 2 parts to create sewer laterals as follows

1. **Starting Point of Sewer Lateral**

   Centroid was selected as a starting point for sewer lateral. Ideally, sewer lateral which falls under local municipal government maintenance work, starts

from anywhere just outside property where all sewer outlets from housing property merges into a one. In some cases, centroid might be not be correct starting point if property size is very big. However, more than likely 2000-2500 sq. ft. house, centroid will be correct starting point. ArcMap has a Data Management tool, Add X,Y Management tool which can be used to add CENTROID for land parcel.

2. **Tool required to draw perpendicular line**

   Open Source tool which draws perpendicular segment from any point to a target line was used. This newly created polyline is apparently sewer lateral. Screenshot give us better idea.

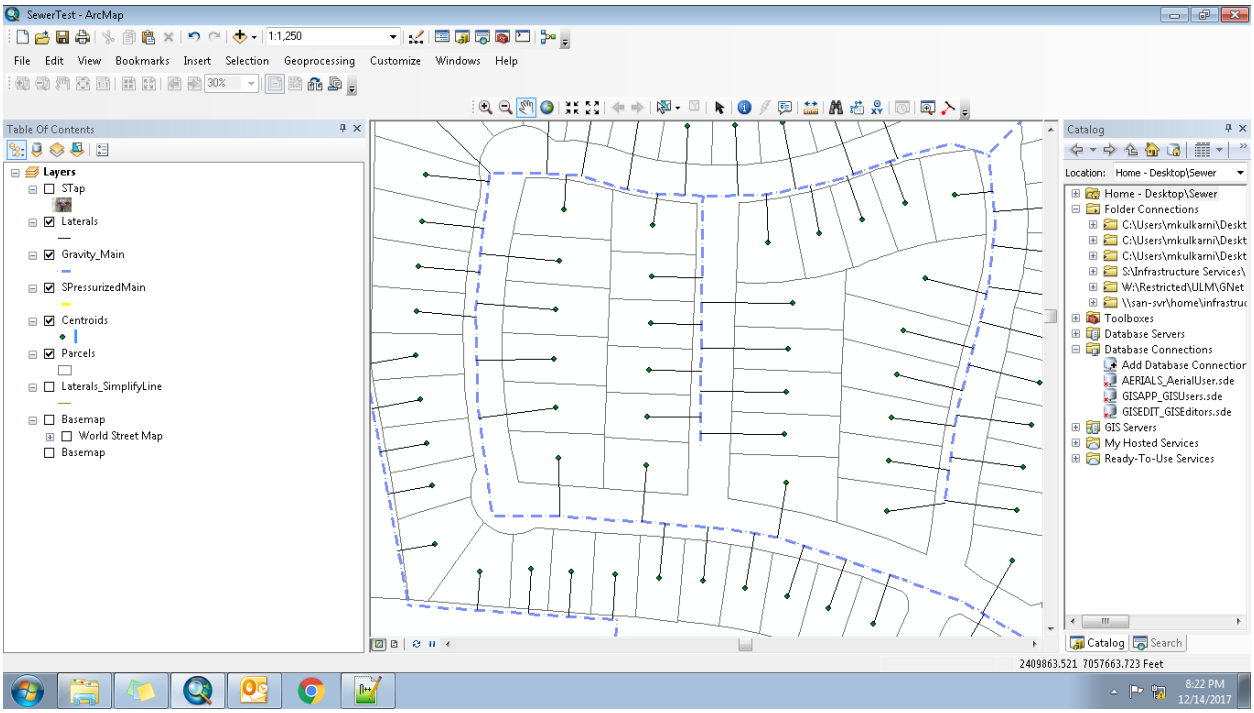

Figure 4 Sewer Lateral Created on Map

➔ These laterals where then later imported as feature classes in Flower Mound's Utility Services geodatabase. Professionally labelled final map screenshot below.

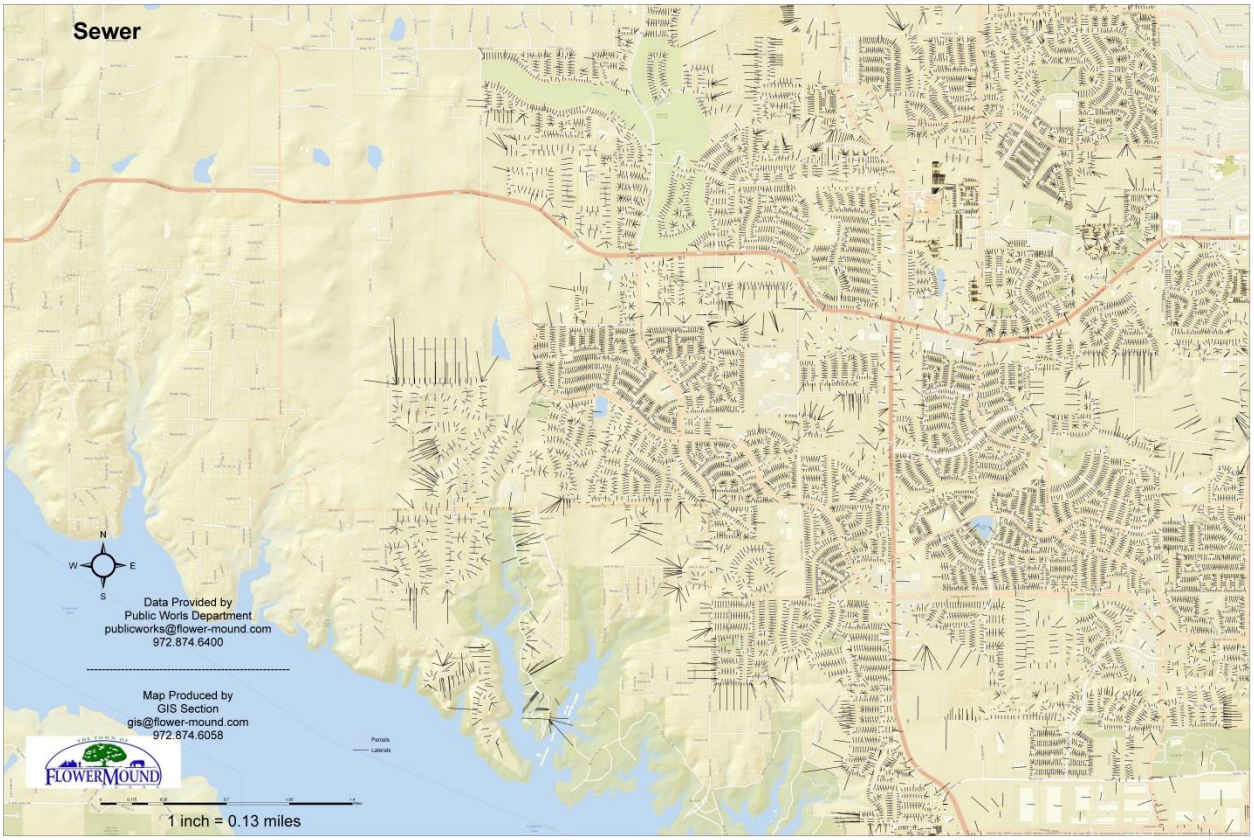

Figure 5 Professionally Labelled Sewer Lateral Map

Summary

- With this internship I got good grasp of Utility Services with local municipal government as well as sanitary sewer design and implementation in real time.
- My internship is going to continue in spring 2018 semester.
- Initial plan is that I am going to be involved in project which deals with integration of GraniteNet and ArcGIS for Desktop. GraniteNet is a video inspection toolkit for testing possible leaks. It needs to have correct raw GIS data which most likely is ESRI shapefile.
- Future job role for me is to help my integrate GraniteNet and ESRI not only with raw GIS data but also pull shapefiles from Web Service and publish back to Web Service corrected data.
- One more job role assigned me is to help my mentor with ArcGIS online application in real time and indirectly tutor him for creating custom maps.