Using GIS to Realign Valve & Hydrant Maintenance Routes

Esri Water Conference
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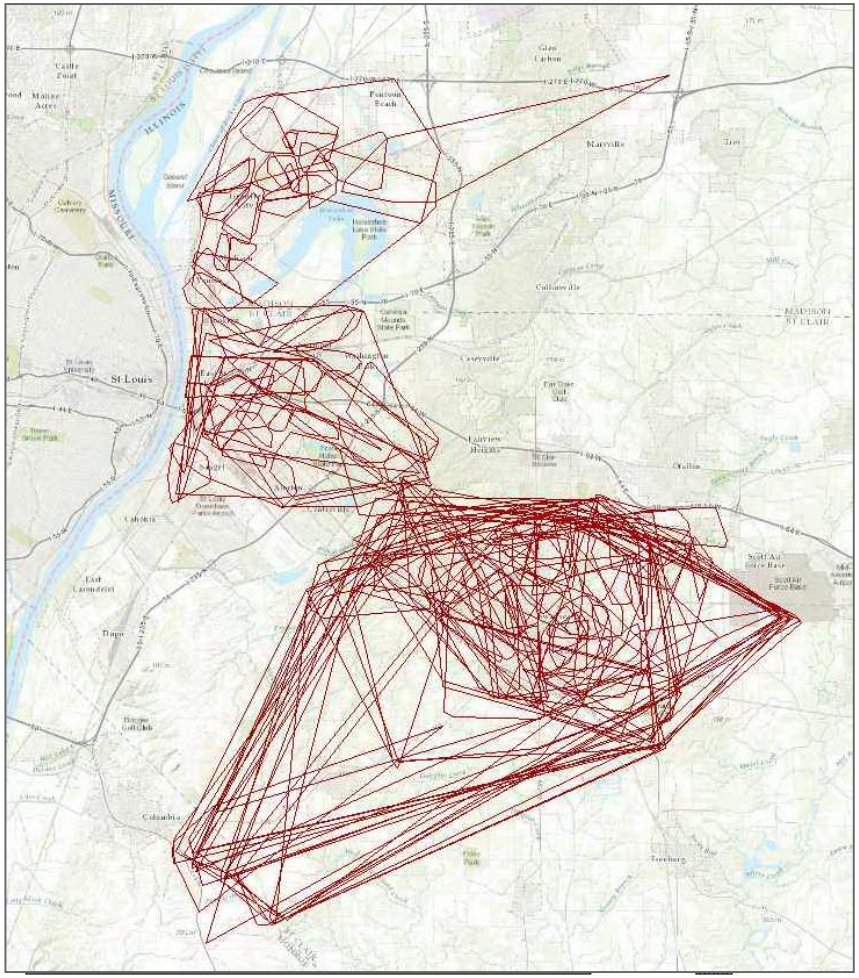
Illinois-American Water

Agenda

- Benefits of GIS
- Valve & Hydrant Maintenance Routes: Before & After
- Valve & Hydrant Maintenance Routes: GIS Workflow

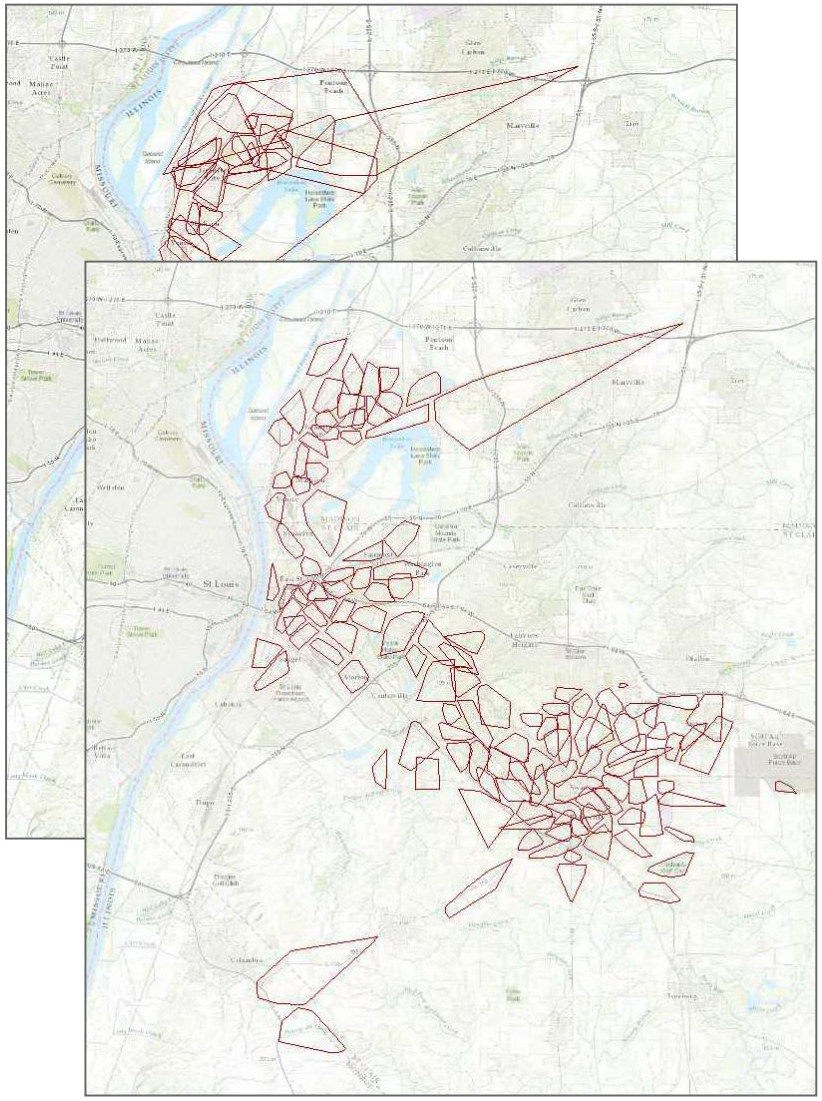
Valve and Hydrant Inspection Regulations

- Hydrants – Every Year
- Large Valves – Every Year
- Small Valves – Every 4 Years
- Hydrant Count: 31,200
- Key Valve Count: 7,813
- Non-Key Valve Count: 73,703
- Total # of assets to be touched each year: 57,438



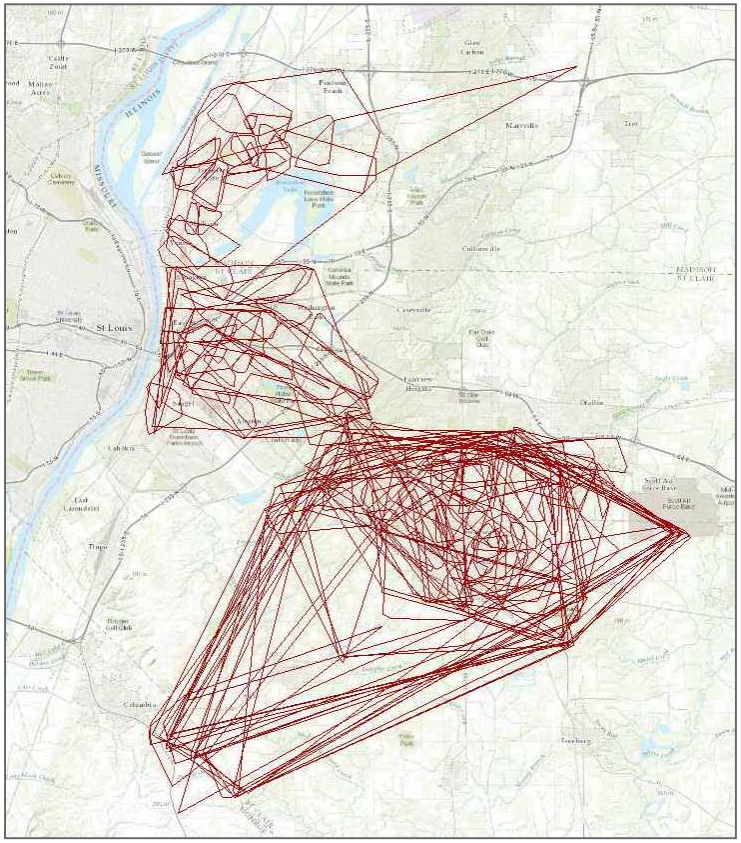
Benefits of GIS

- Knowing exactly where our infrastructure is buried
- Better record keeping and analysis
- Improved communication
- Identification and prioritization of water main replacement projects
- Improved emergency response
- **Efficiency improvements**
- …and so much more…



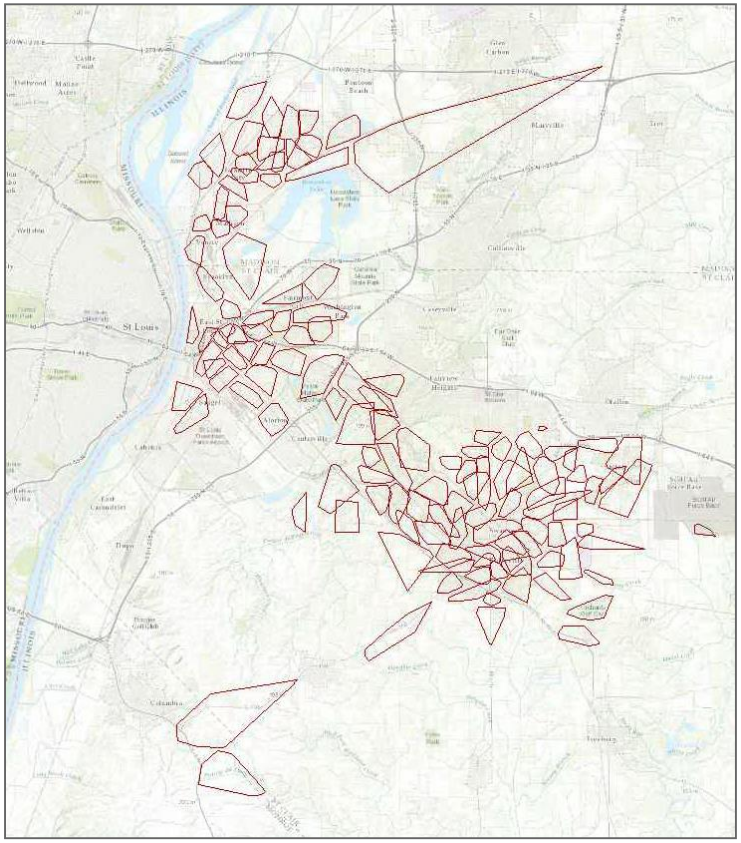
Valve & Hydrant Maintenance Routes: Before & After

Interurban Hydrant Routes | Before & After



Hydrant Routes | Before

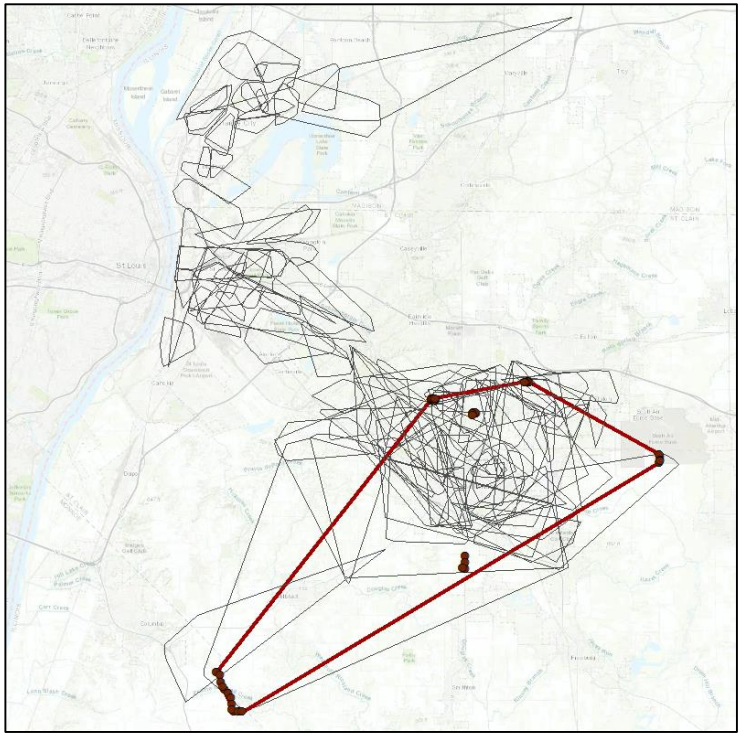
- Hydrants: ~ 2500 miles



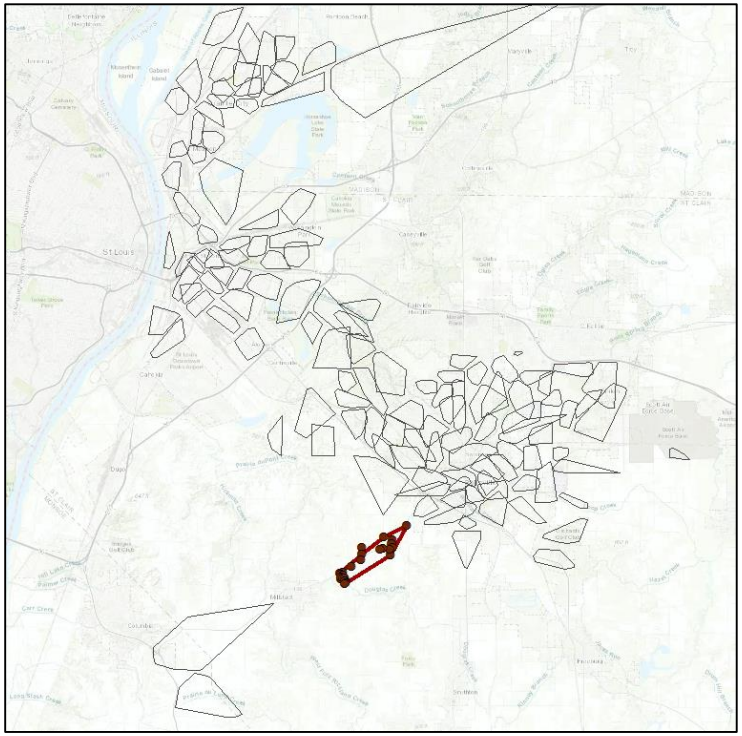
Hydrant Routes | After

- Hydrants: ~ 880 miles

Interurban Hydrant Routes | Before & After

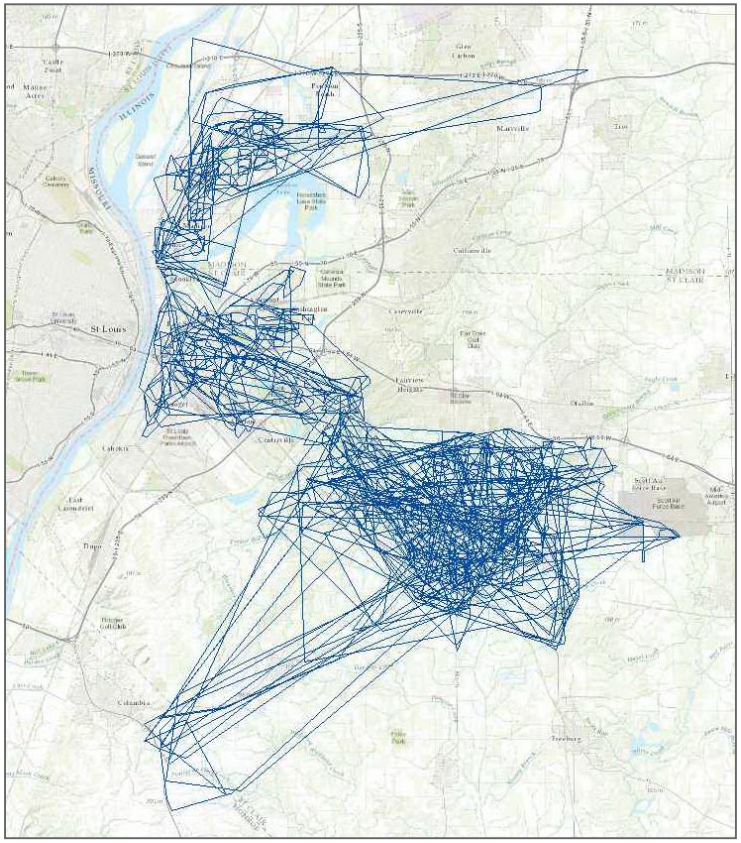


Hydrant Route B422 | Before (41 Miles)



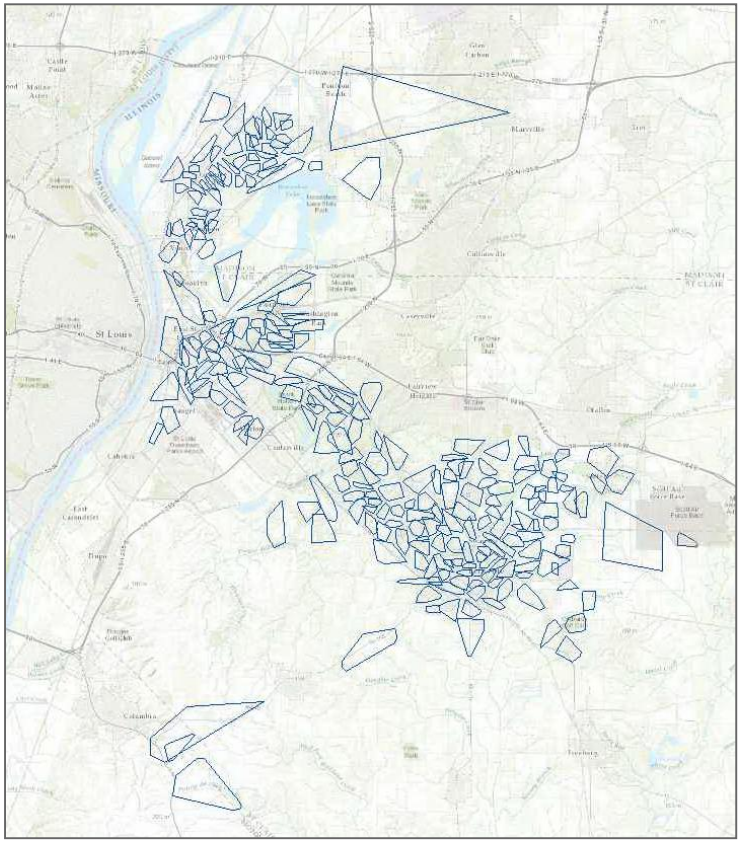
Hydrant Route B422 | Before (6.5 Miles)

Interurban Non-Key Valve Routes | Before & After



Valve Routes | Before

- Non-Key Valves: ~ 3200 miles



Valve Routes | After

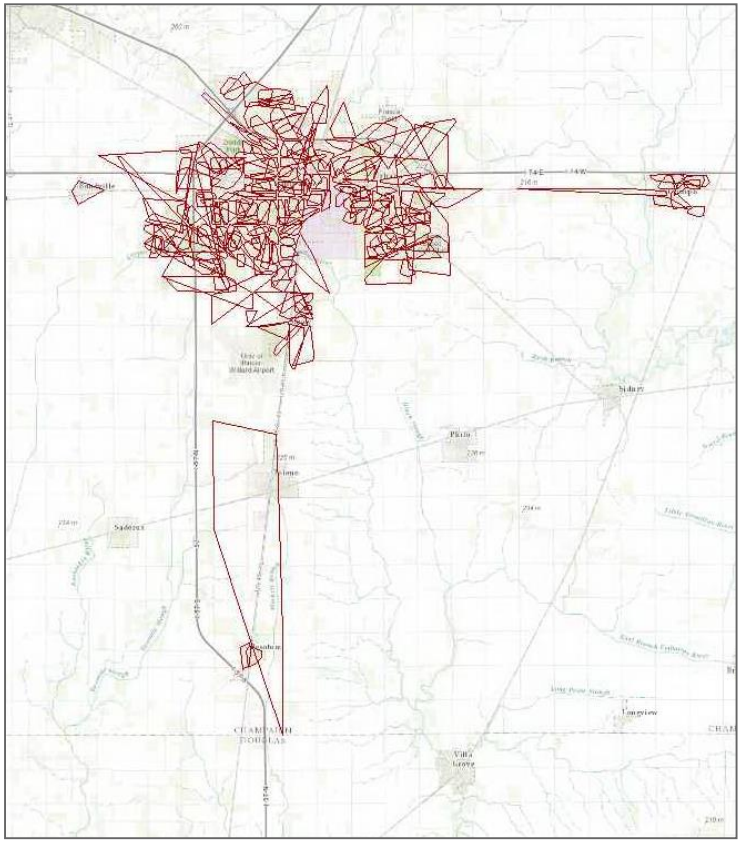
- Non-Key Valves: ~ 915 miles

Interurban Routes | Before & After

In total, we went from traveling a total of 8,251 miles to 2,662 miles for a reduction in miles traveled of 5,589!

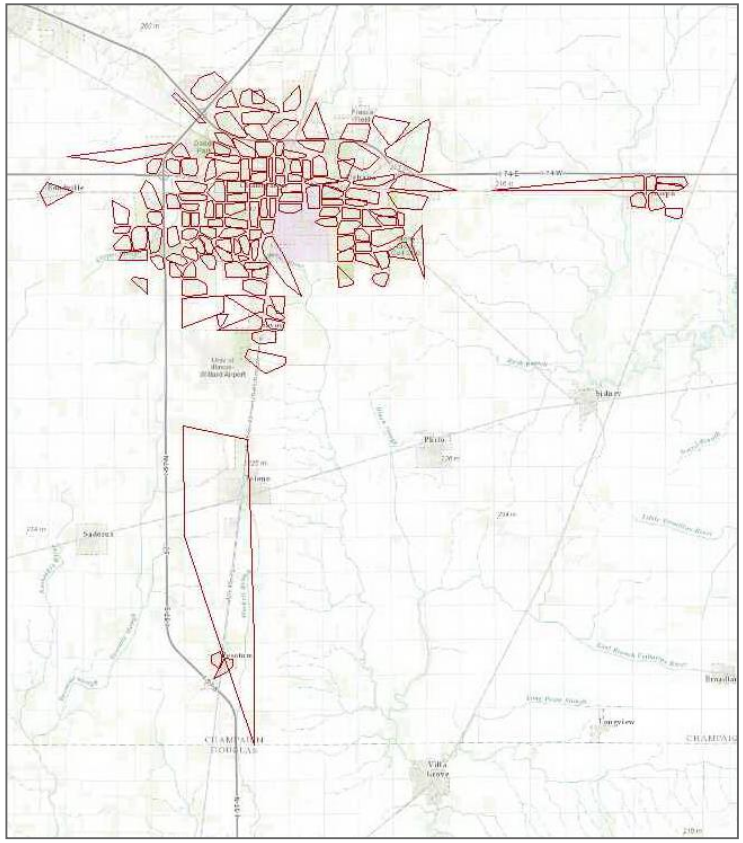
…just in our Interurban district alone.

Champaign Hydrant Routes | Before & After



Hydrant Routes | Before

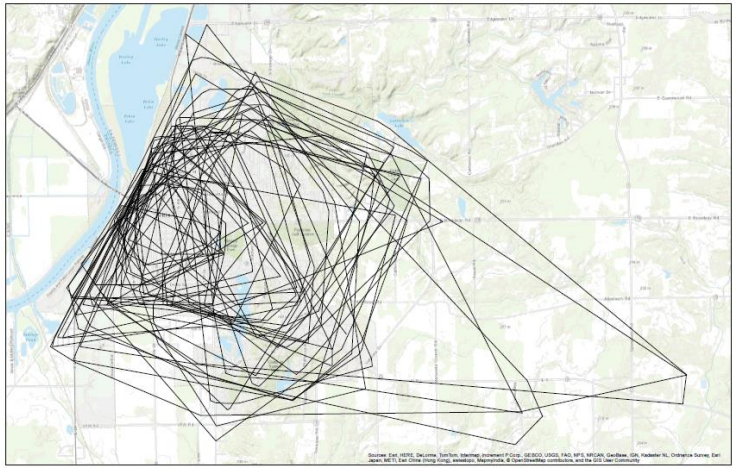
- Hydrants: ~ 1400 miles



Hydrant Routes | After

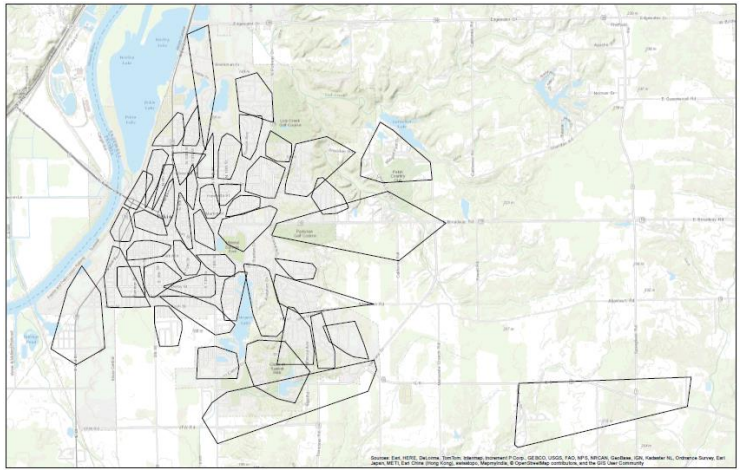
- Hydrants: ~ 520 miles

Pekin Valve Routes | Before & After



Valve Routes | Before

- Valves: ~ 1400 miles



Valve Routes | After

- Valves: ~ 150 miles

Route Realignment | State Totals

- **Before Mileage: 31,047**
- **After Mileage: 11,747**

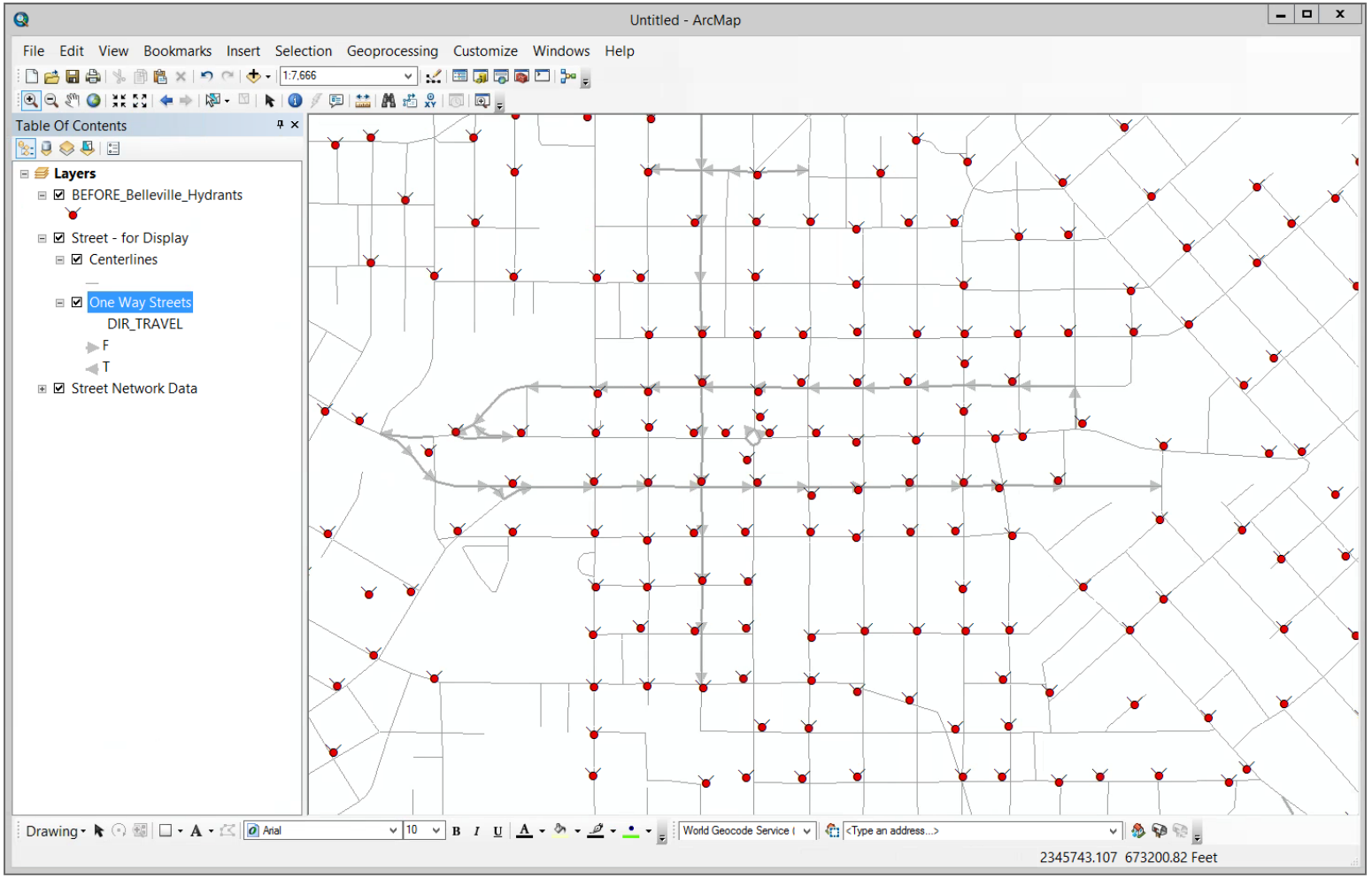
- **Total Mileage Reduction: 19,301**
- **% Reduction: 62%**

- **Total Mileage Reduction per year: 10,004**

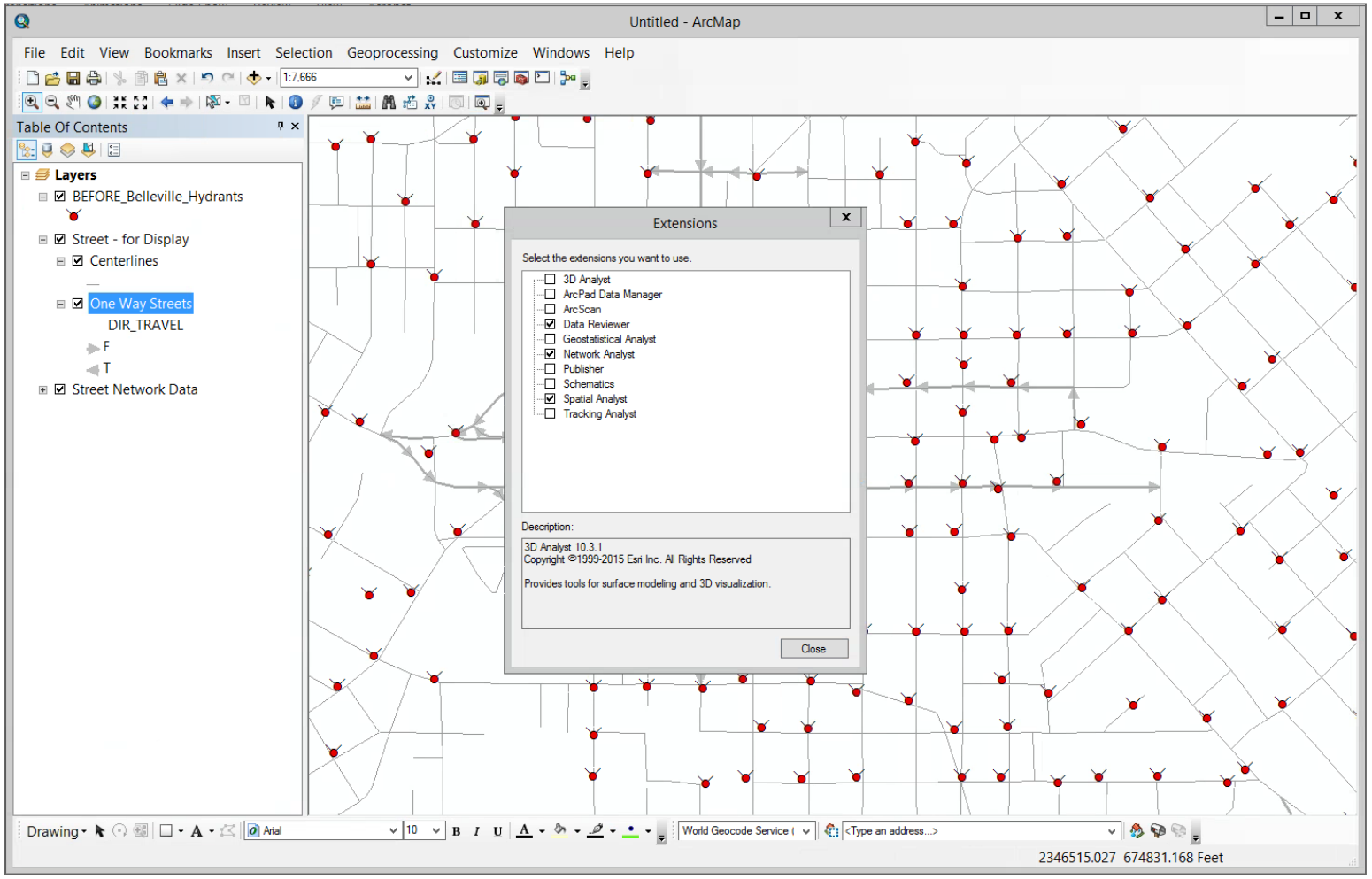
- **Yearly Cost Savings: $106,588.96**

Valve & Hydrant Maintenance Routes: GIS Workflow

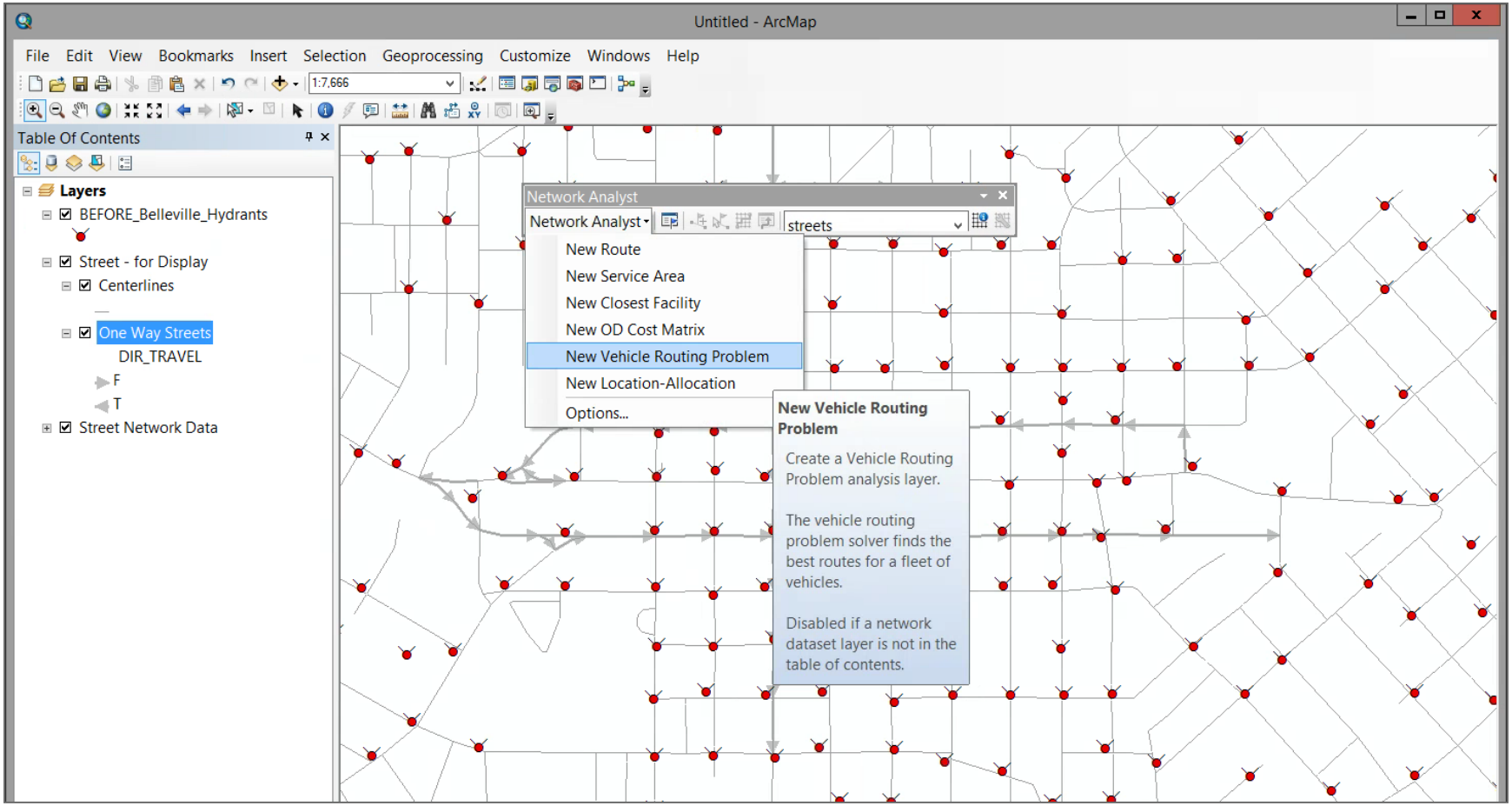
Build your MXD



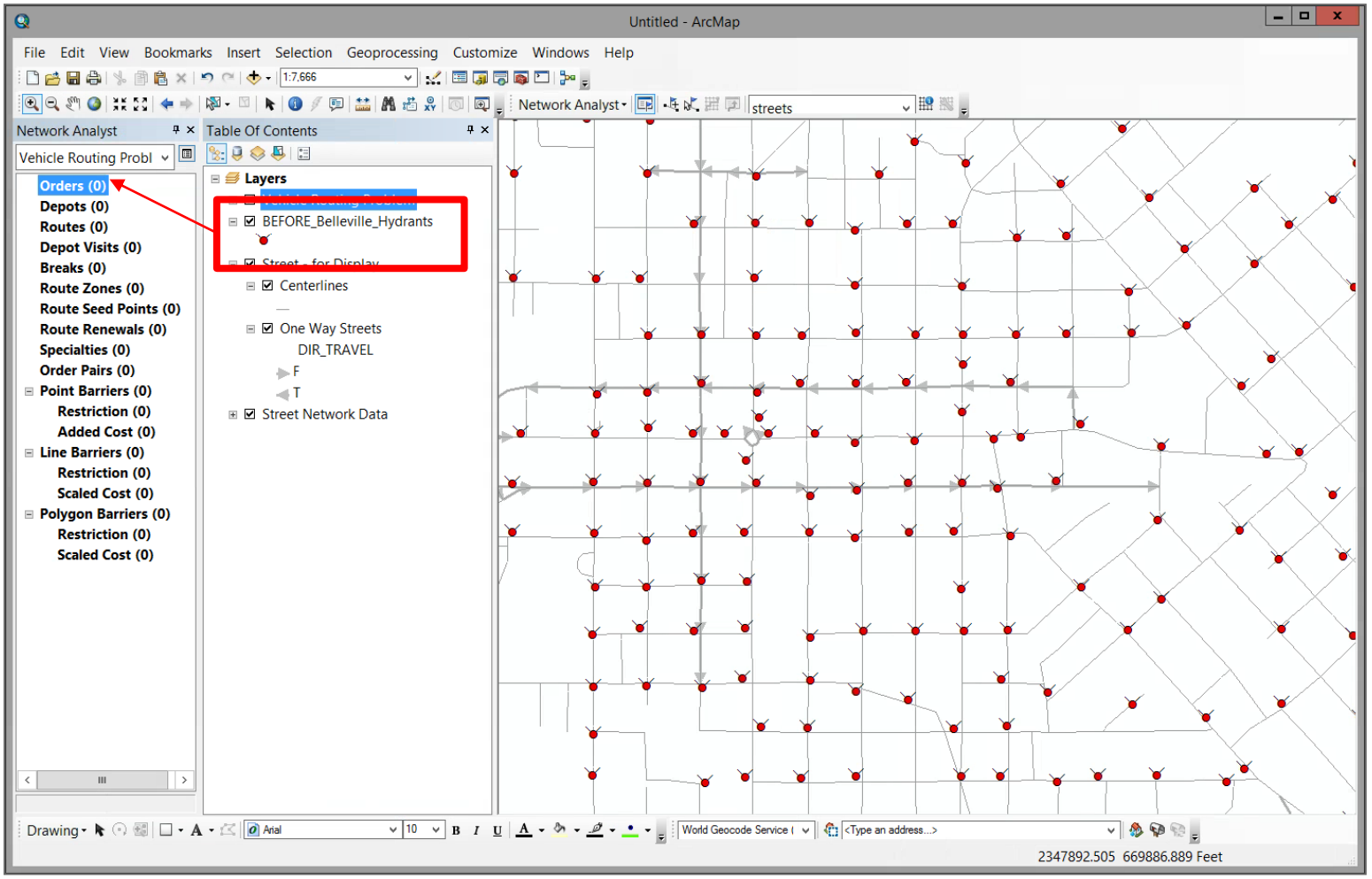
Enable Network Analyst Extension/Turn on Toolbar



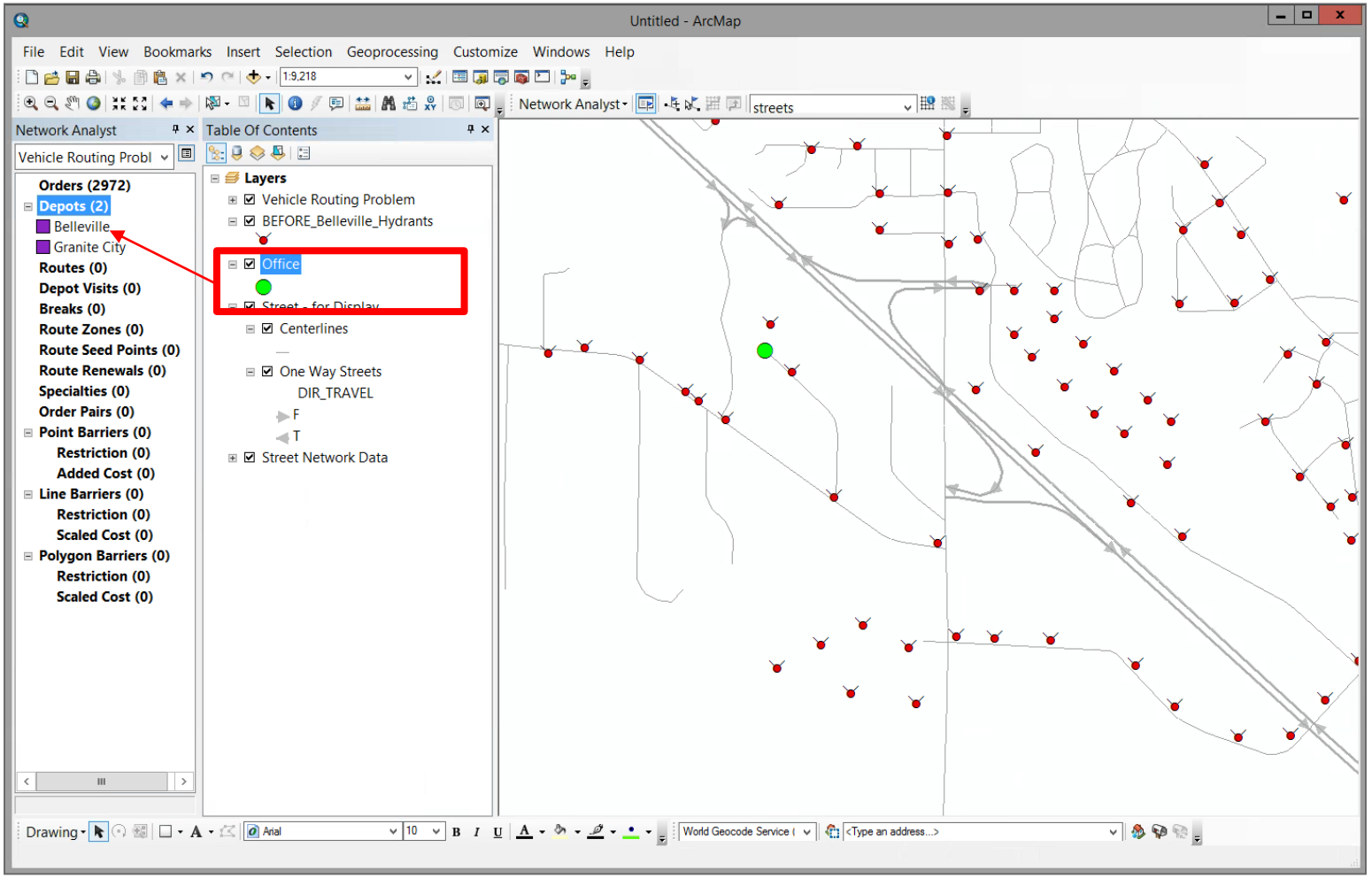
VRP Solver – Defining routes



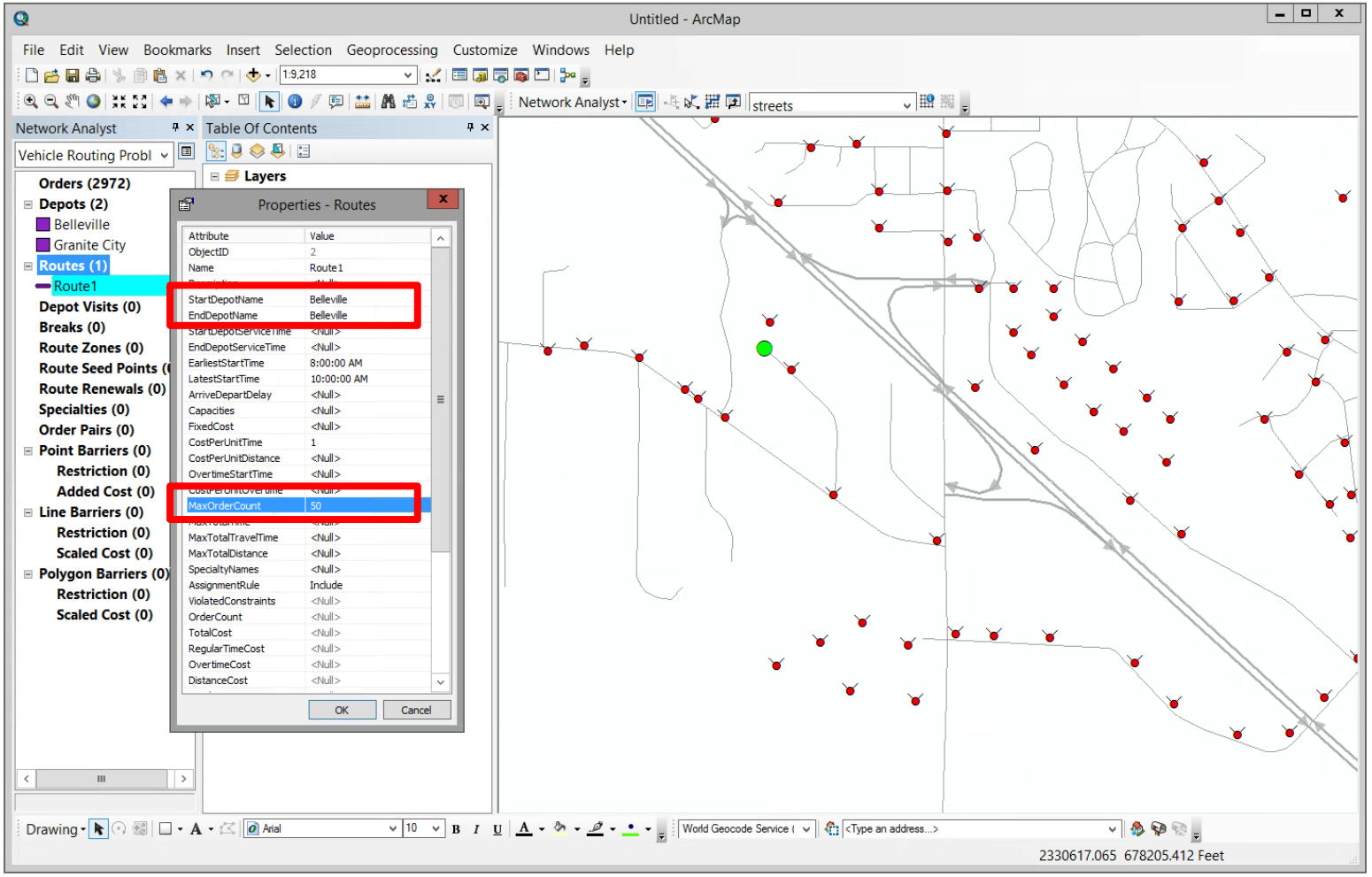
Load Asset as Orders



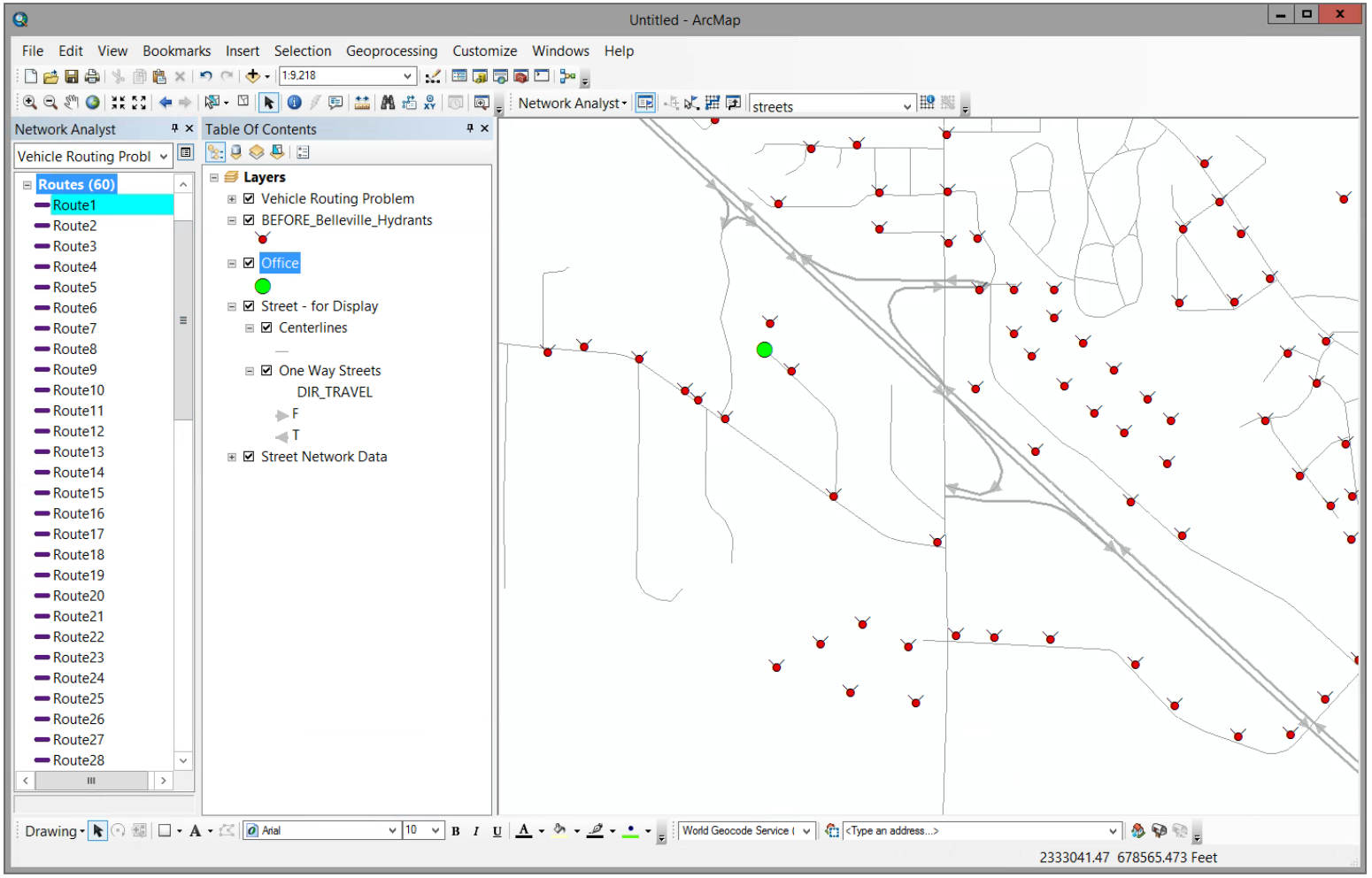
Load Office Location(s) as Depots



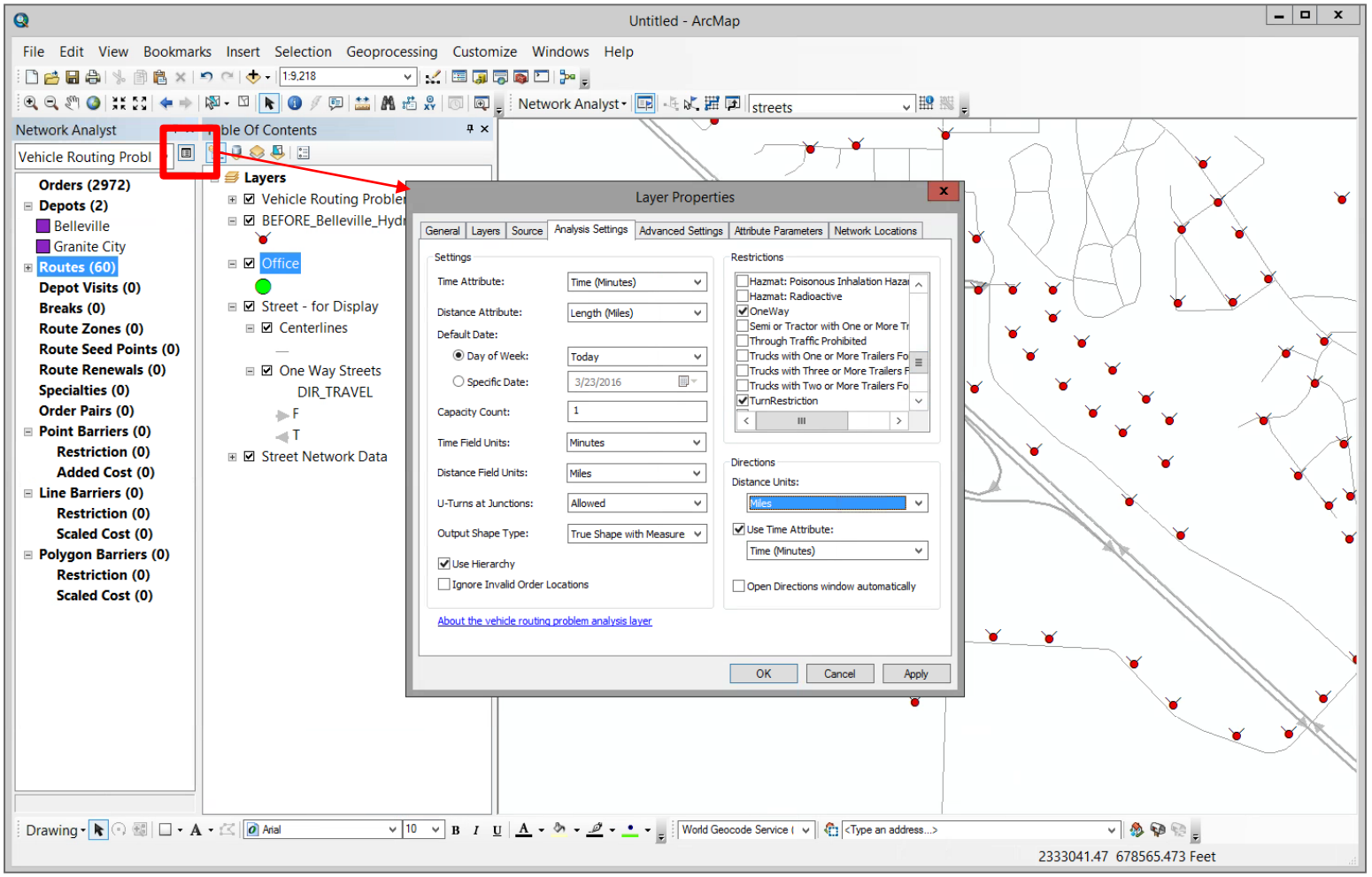
Build Routes



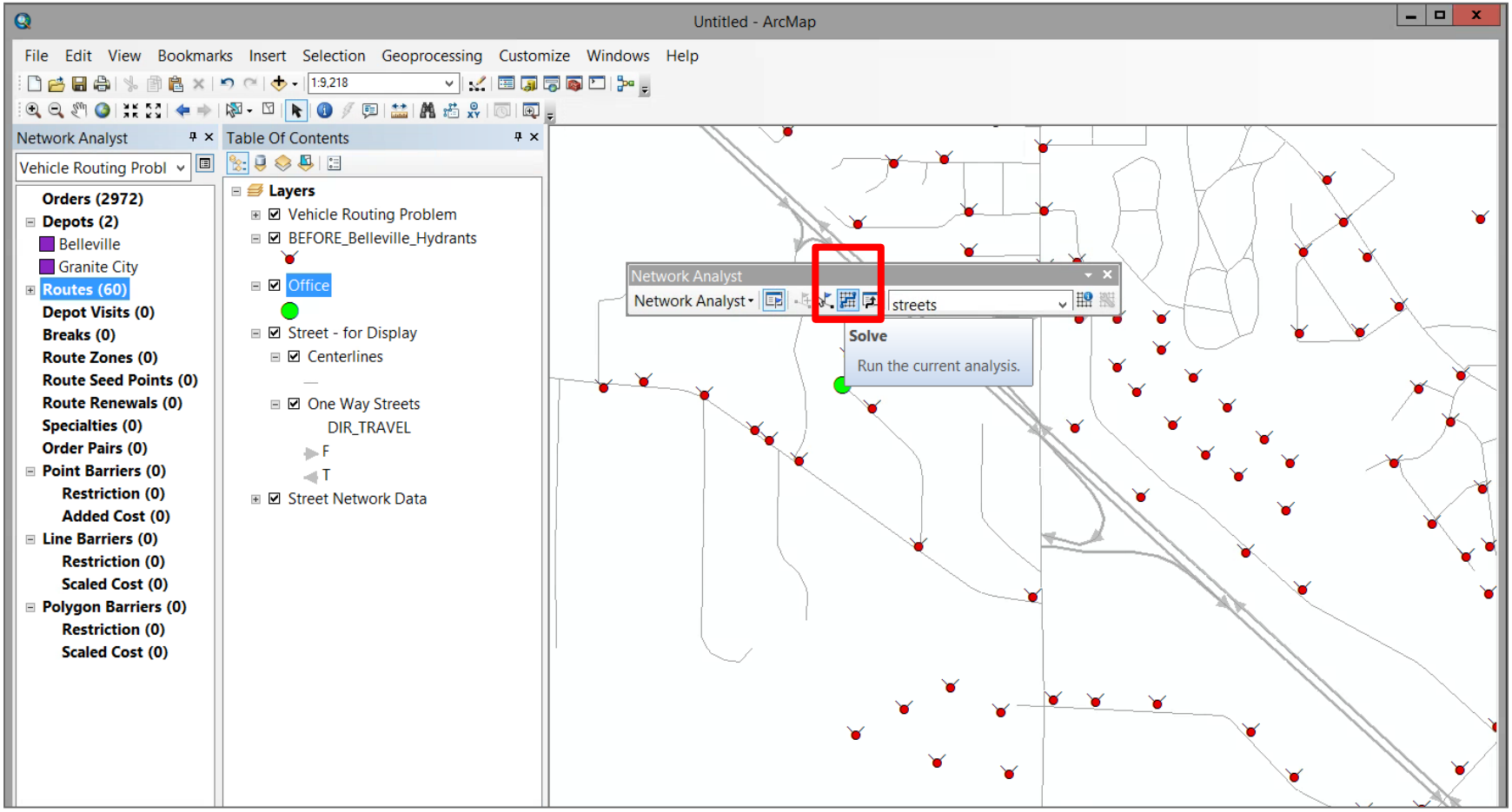
Build Routes



Evaluate/Set Analysis Settings



Solve


Untitled - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
1:9,218
Network Analyst
Vehicle Routing Probl
Orders (2972)
Depots (2)
Belleville
Granite City
Routes (60)
Depot Visits (0)
Breaks (0)
Route Zones (0)
Route Seed Points (0)
Route Renewals (0)
Specialties (0)
Order Pairs (0)
Point Barriers (0)
Restriction (0)
Added Cost (0)
Line Barriers (0)
Restriction (0)
Scaled Cost (0)
Polygon Barriers (0)
Restriction (0)
Scaled Cost (0)
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BEFORE_Belleville_Hydrants
Office
Street - for Display
Centerlines
One Way Streets
DIR_TRAVEL
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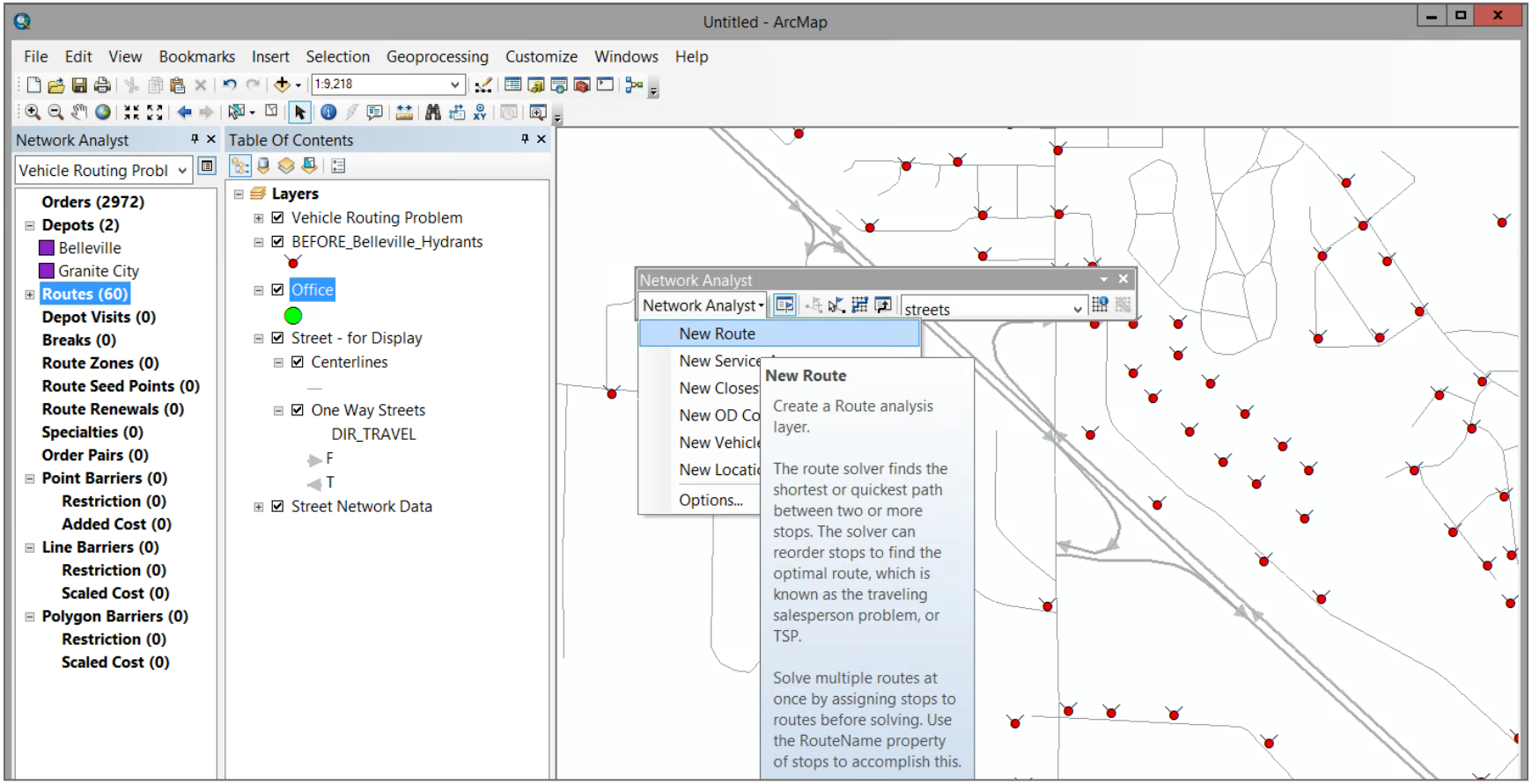
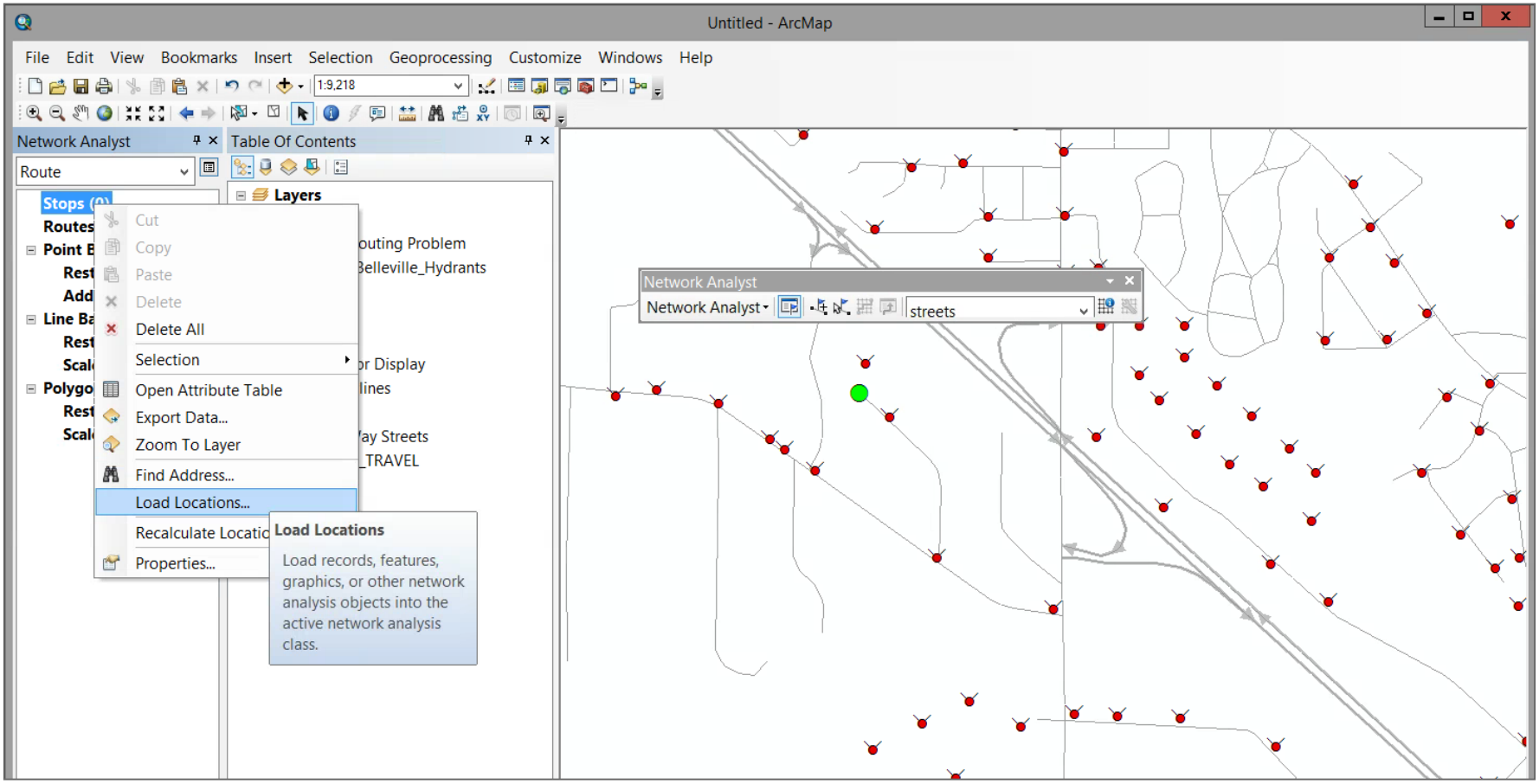
Street Network Data
Network Analyst
Network Analyst
streets
Solve
Run the current analysis.

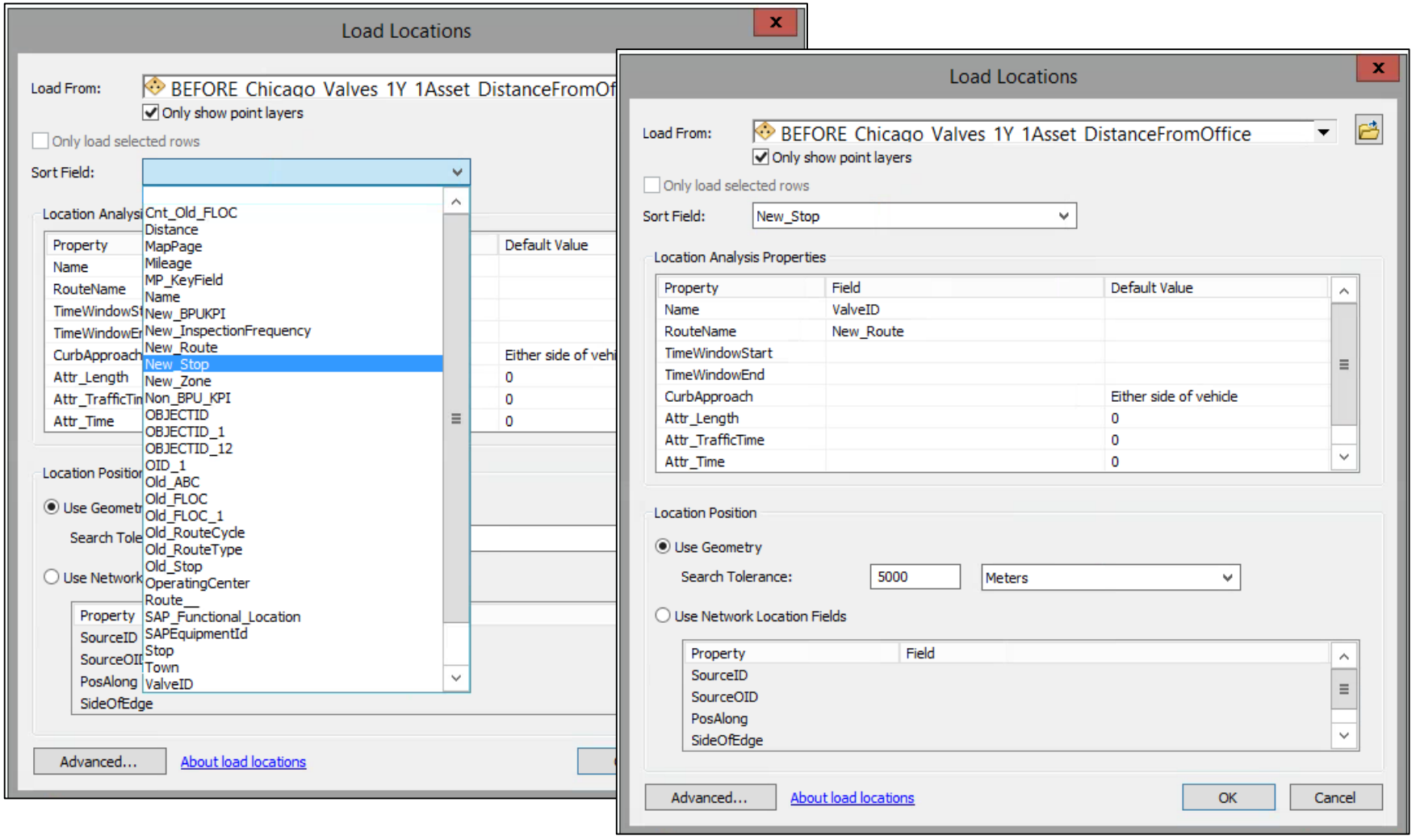
Route Solver – Capturing Mileage



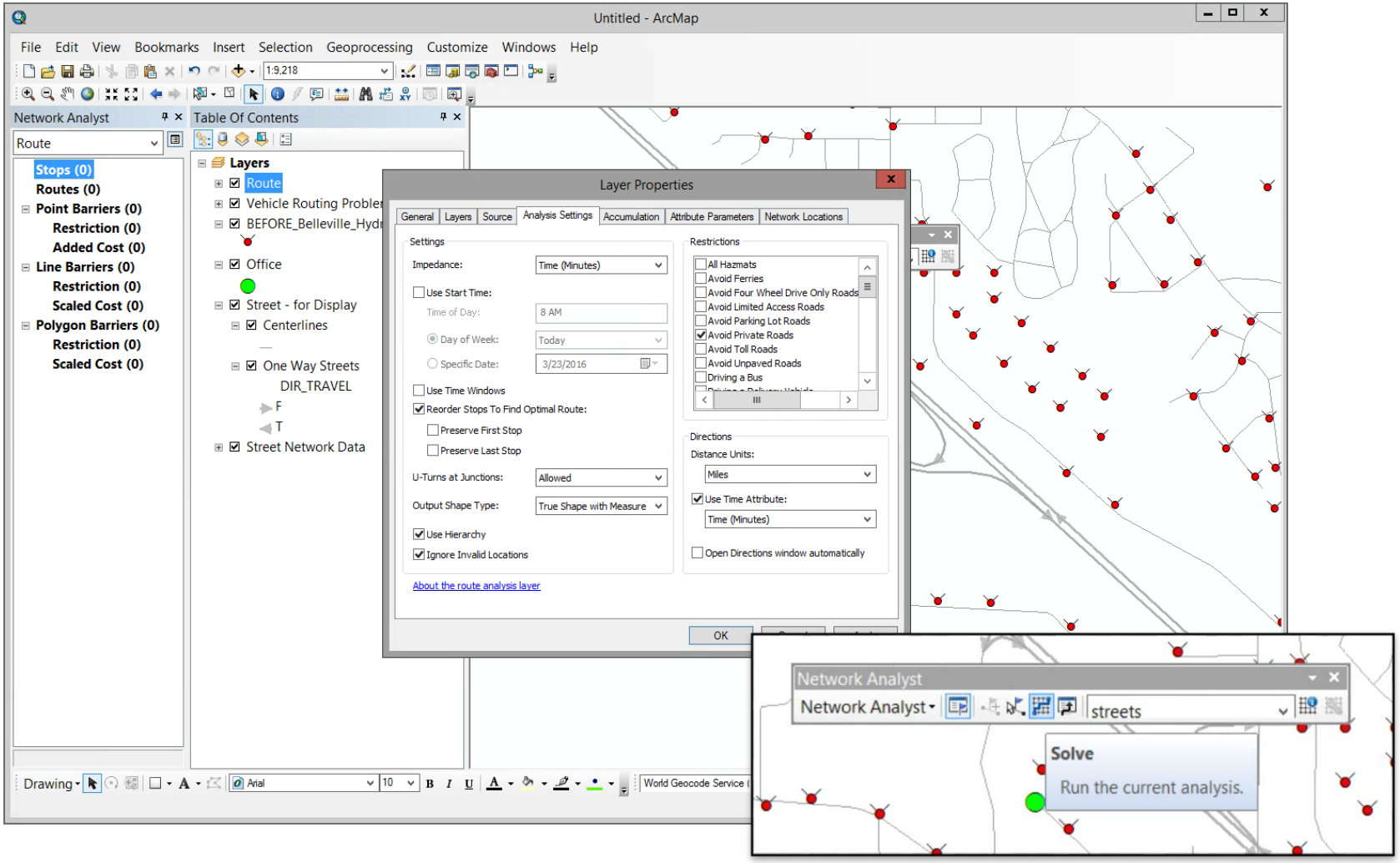
Load Assets as Stops



Loading Assets as Stops



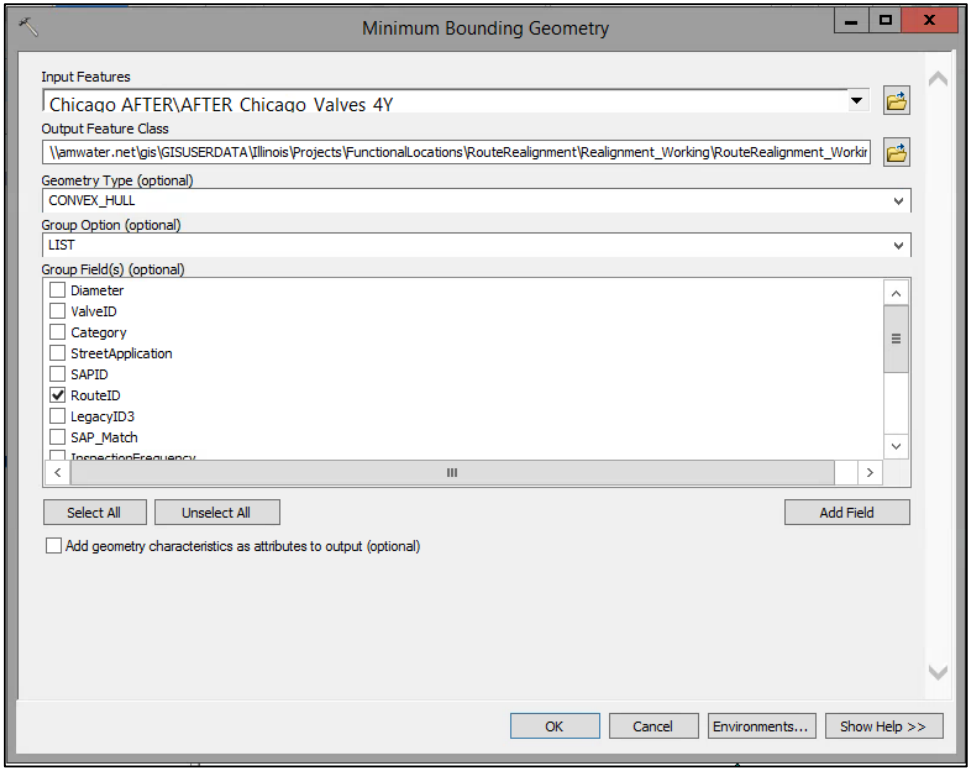
Evaluate/Set Analysis Settings & Solve

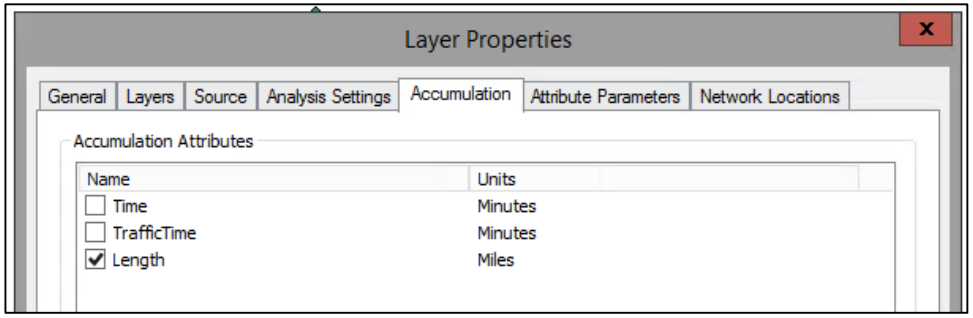


Tips

- **Up-to-date Street Network data**
- **VRP Solver**
  - Analysis Settings
    - One-way
    - Walking
- **Minimum Bounding Geometry GP Tool**
- **Data Driven Pages**

- **Route Solver**
  - Accumulation tab for Before/After Mileage





Questions?

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