CALIPER CORPORATION

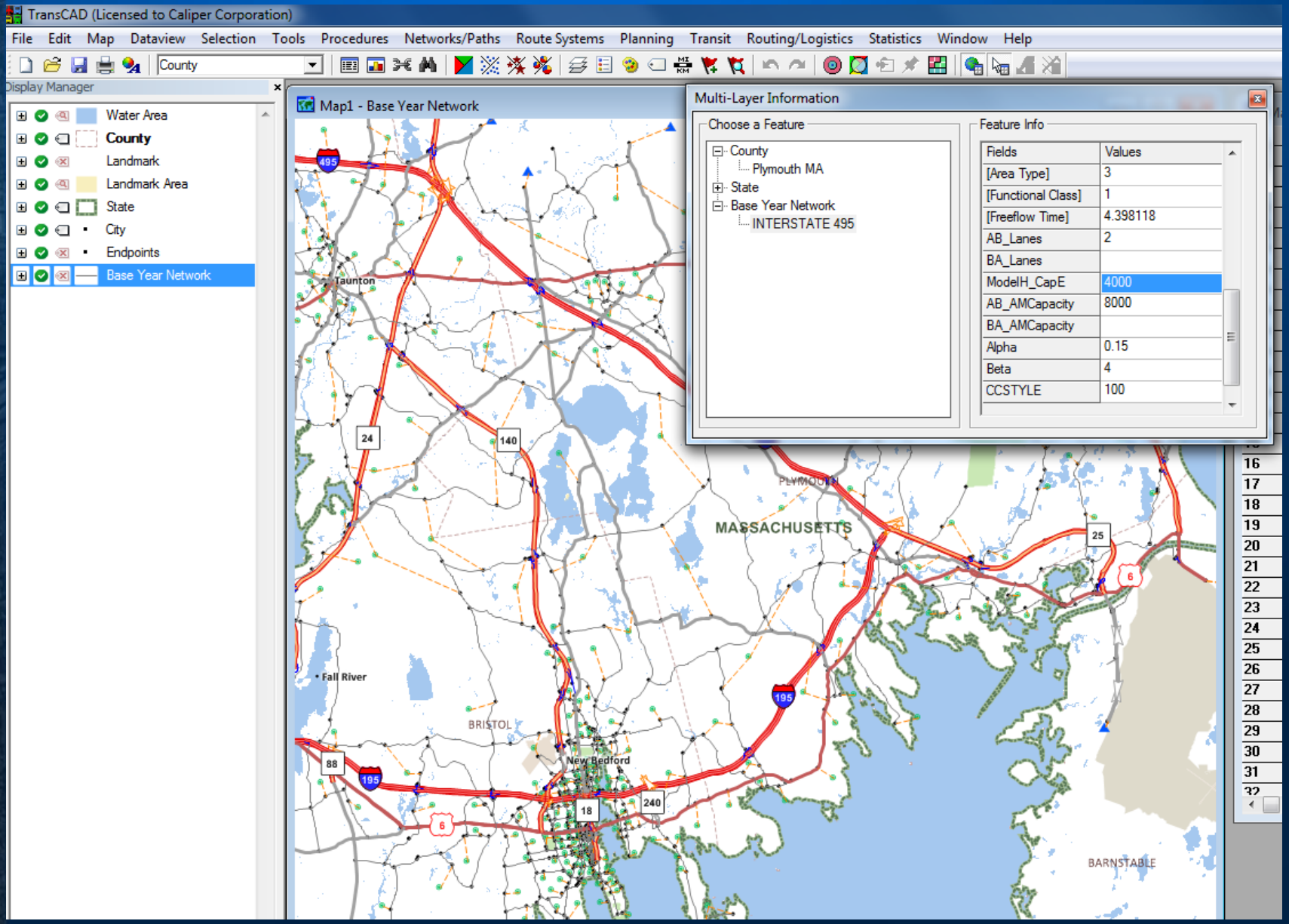
TransCAD, TransModeler And Maptitude

CASPT 2012, Santiago, Chile

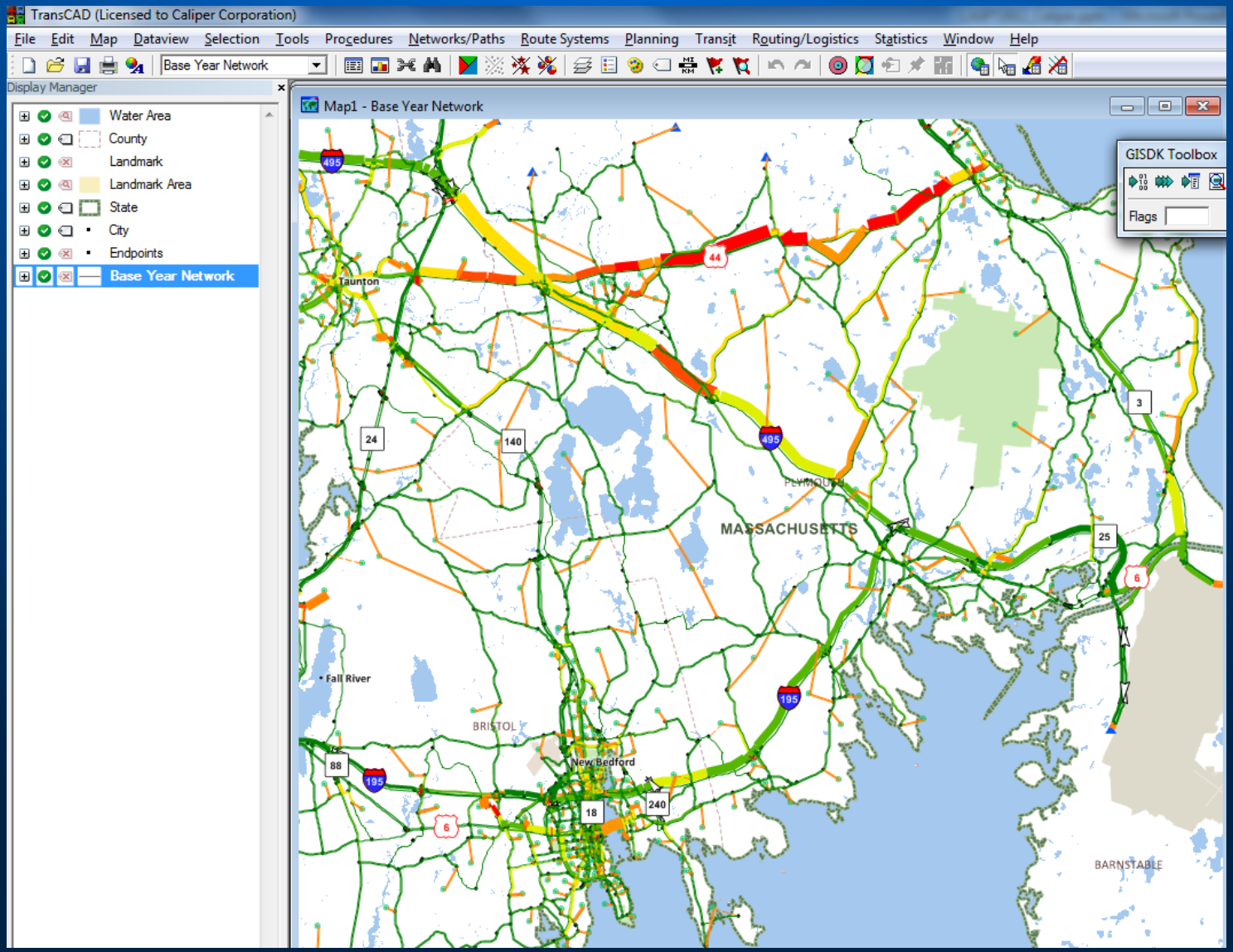
Caliper Corporation

- Founded in 1983
- Headquarters in Newton, MA
- Transportation consultant and developer of TransCAD (GIS based transportation planning software), TransModeler (GIS based traffic simulation software)
- and Maptitude a desktop mapping software)
- Present in over 70 countries of the world

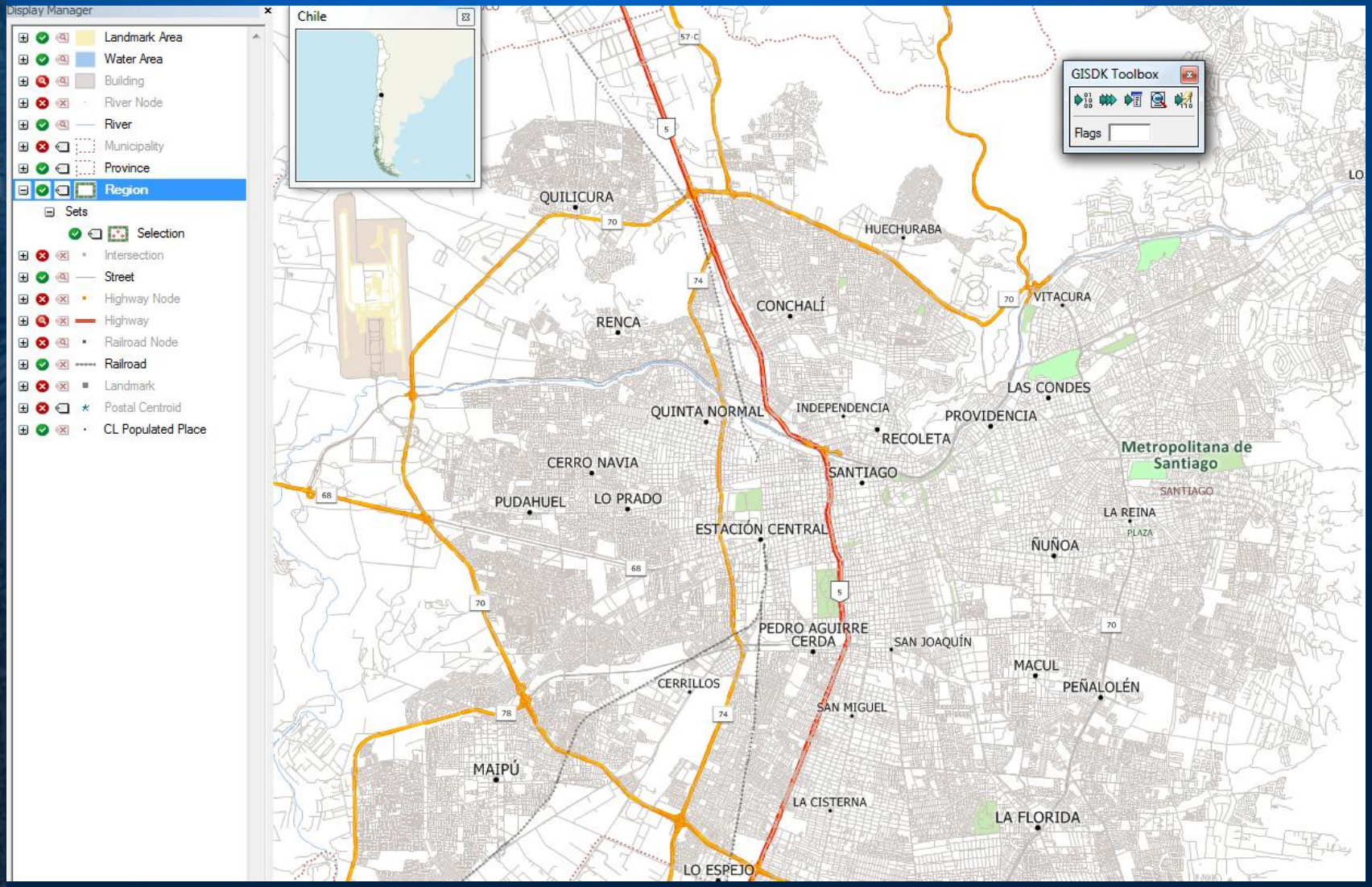
TransCAD: GIS based system



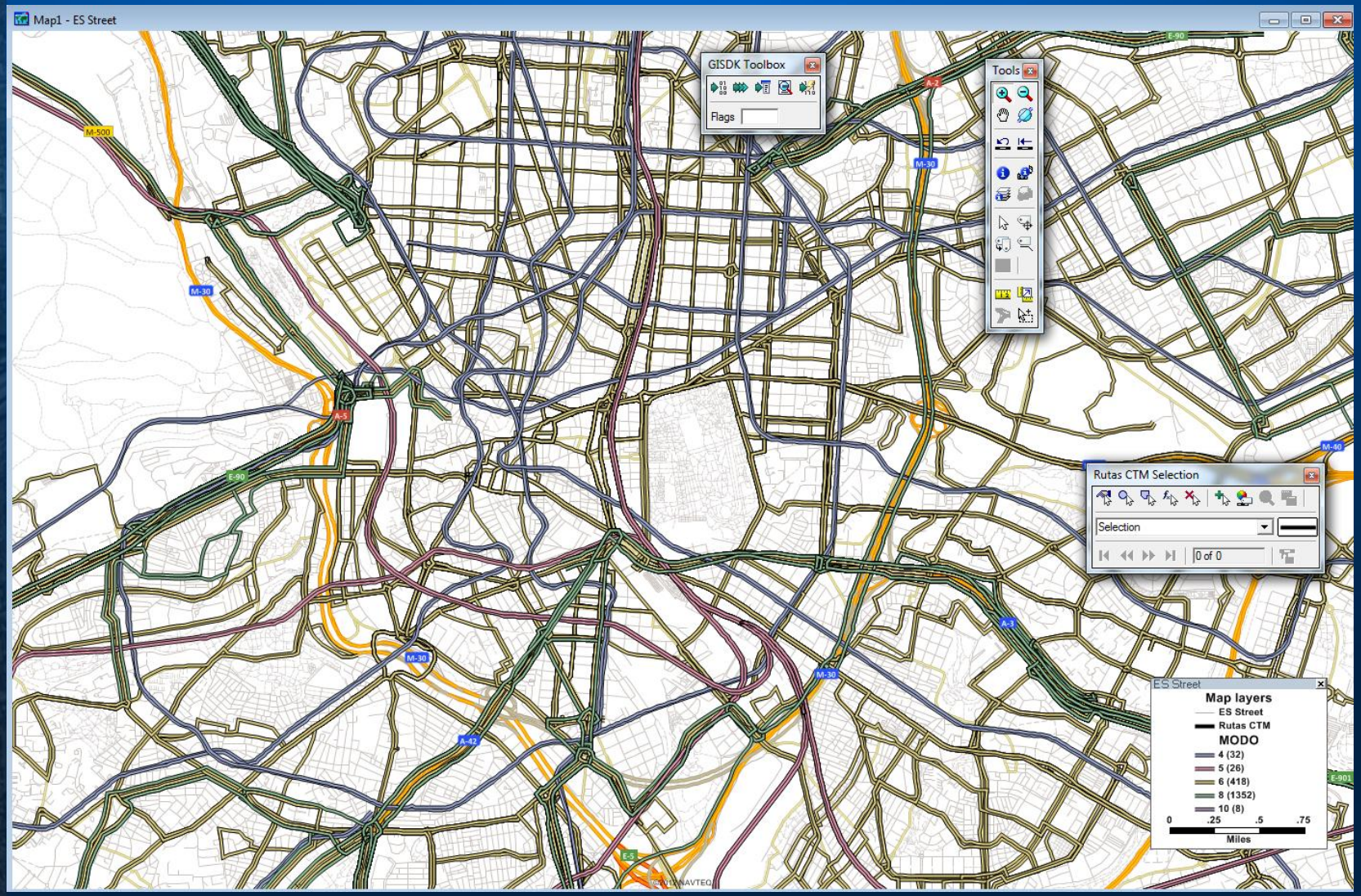
TransCAD: GIS based system



Detailed Cartography Available



Madrid Route System



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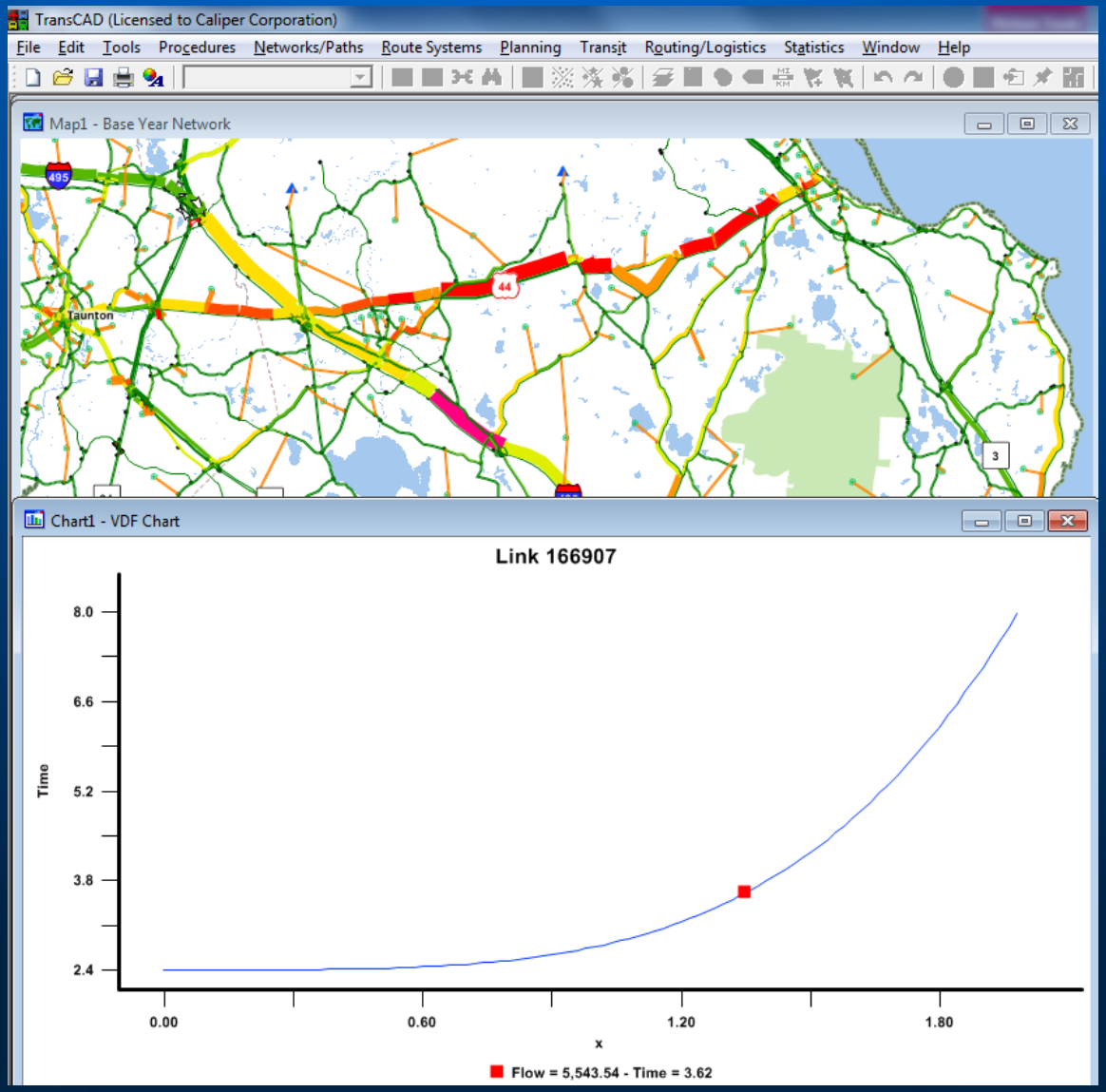
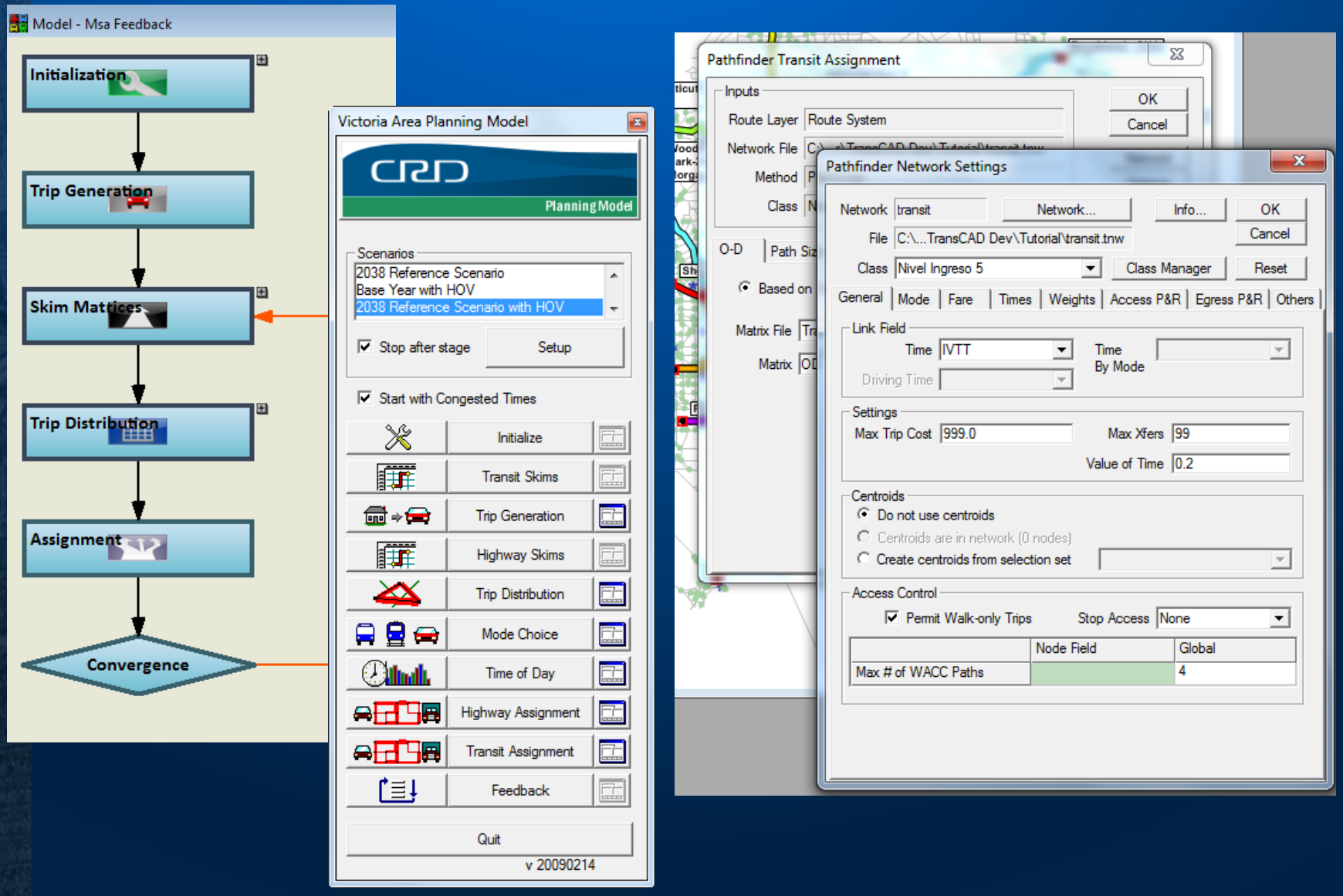
TransCAD: GIS Based



TransCAD Graphical User Interface



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TransCAD: Powerful API

- GISDK Macro Language
- FORTRAN, C++, C Interfaces
- Python, Perl scripting
- DOTNET
- OLE

```
print dk.RunMacro("Echo","gis_ui","string argument",123,{ "key": "value1" , "key2": "value2" })

# while accessing a non-defined function DOES return a run-time exception, try this:
try:
    dk.
except:

table_name   = dk.OpenTable("airports","ffb",["tutorial\\airports.bin",None])
num_rows     = dk.GetRecordCount(table_name,None)
print "table " + table_name + " has " + str(num_rows) + " rows."

    dk.SetView(table_name)
    dk.
options = { 'Index Limit': 0}
query   = "select * where Domestic > 10000"
num_found = dk.SelectByQuery("high traffic","several",query,options)
if ( num_found > 0 ) :
    print str(num_found) + " records match the query: " + query
    dk.SetView("high traffic")
    field_names , field_specs = dk.GetFields(table_name,"All")
    print "field_names: " + str(field_names)
    print "field specs: " + str(field_specs)
    sort_order  = None
    options     = None
    order       = "Row"

    for row in dk.GetRecordsValues(view_set,dk.GetFirstRecord(view_set,None),field_names,sort_order,num_found,order,None):
        print "[row " + str(i) + "] " + str(row)
        i = i + 1

dk.SetSelectMax(None)

# test matrix processing in transcad

matrix_file = dk.GetTempPath() + "python_od_matrix.mtx"
dk.CopyFile("Tutorial\\OD.mtx",matrix_file)
m = dk.OpenMatrix(matrix_file,None)
mc1 = dk.CreateMatrixCurrency(m, "Vehicles",None,None,None)
mc2 = dk.CreateMatrixCurrency(m, "Vehicle Minutes",None,None,None)
mc3 = dk.CreateMatrixCurrency(m, "Travel minutes",None,None,None)
dk.AddMatrixCore(m,"mc_ones")
dk.AddMatrixCore(m,"mc_temp")
mc_ones = dk.CreateMatrixCurrency(m,"mc_ones",None,None,None)
mc_temp = dk.CreateMatrixCurrency(m,"mc_temp",None,None,None)
```

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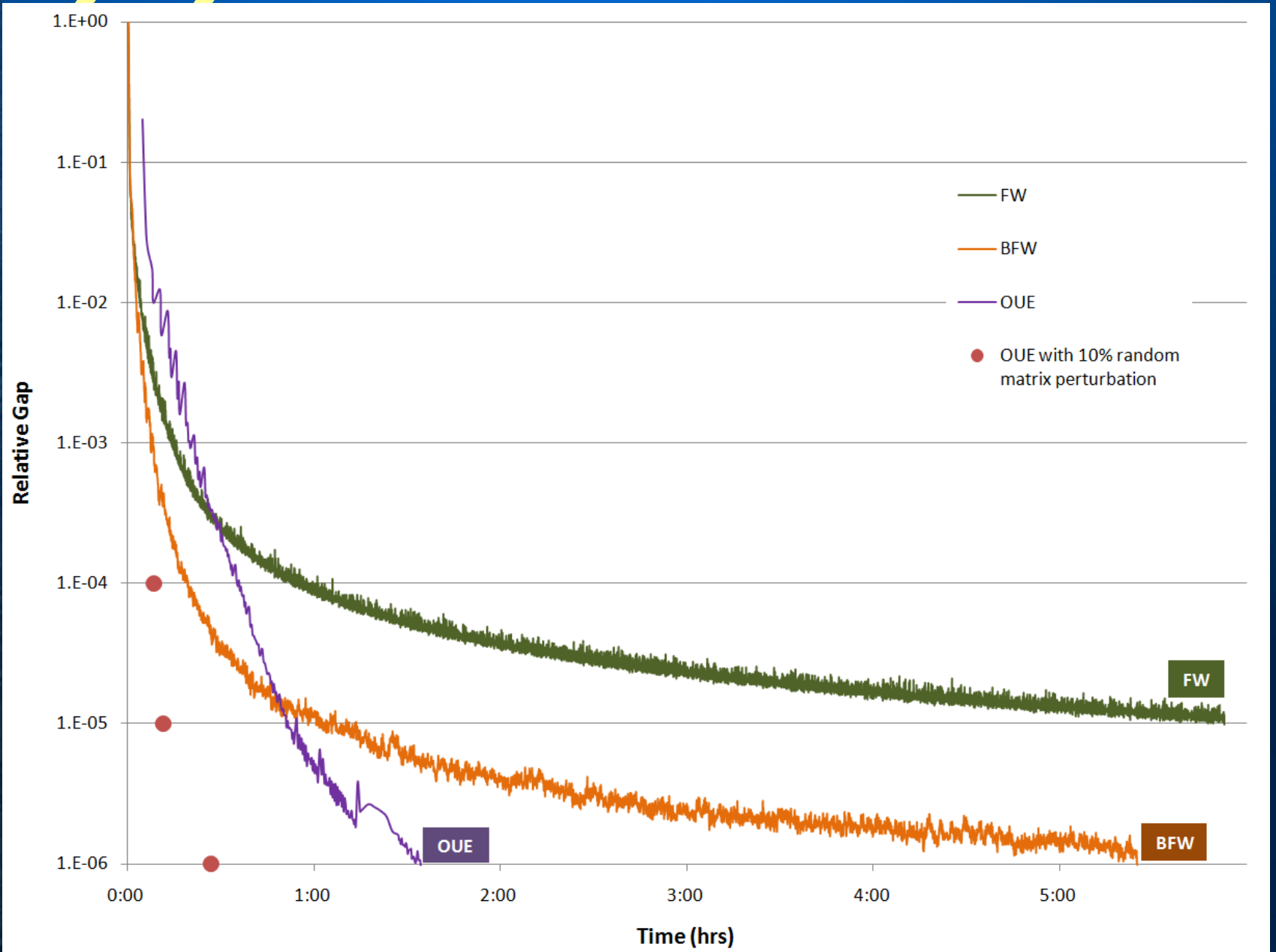
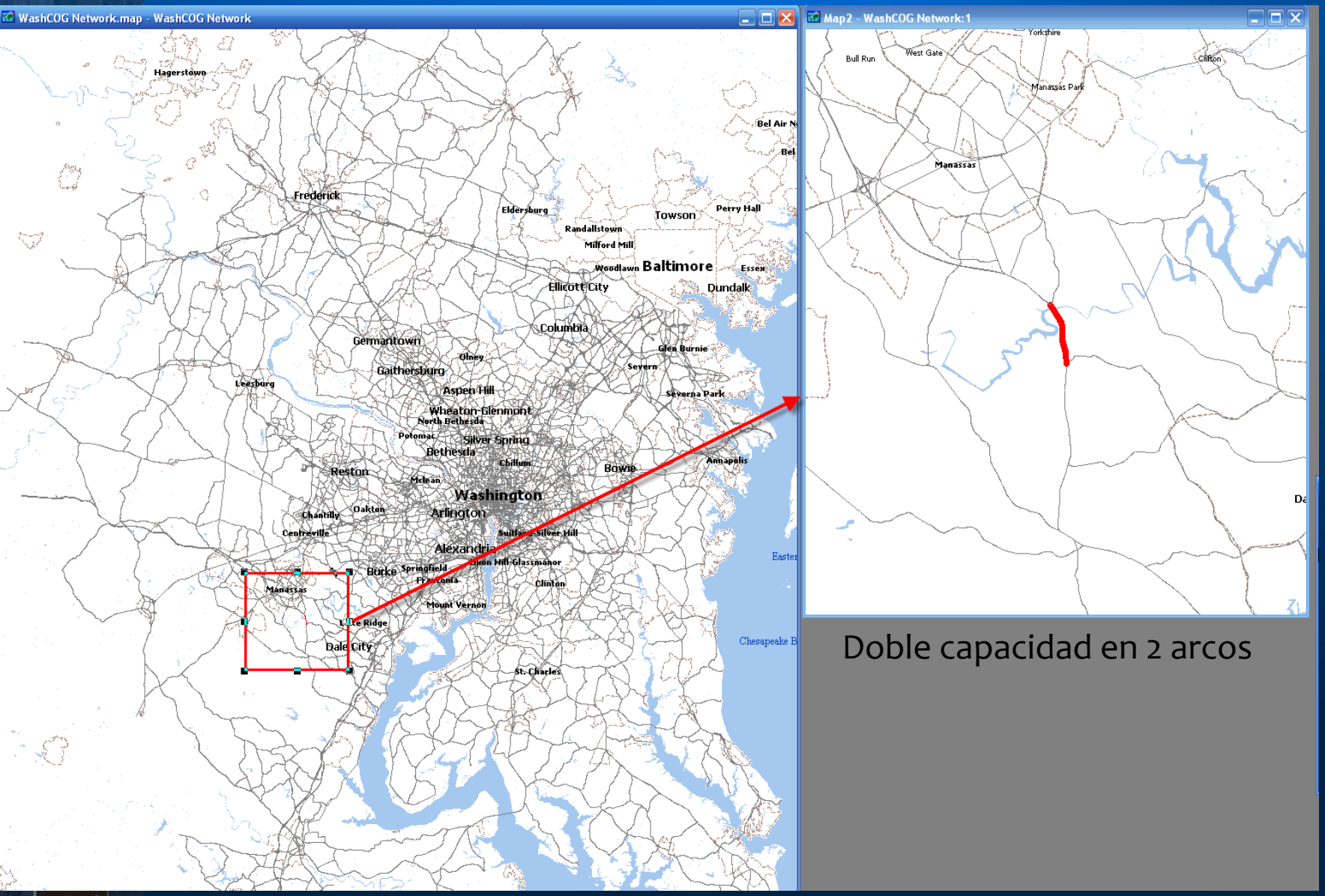
TransCAD: Powerful Computation Engine

- Available as 32 bit or 64 bit application
- Native connection to ESRI enterprise database engines (Geodatabases, SDE)
- Connections to SQL, Oracle, etc
- Googles GTFS (General Transit Feed Specification)
- Most complete transportation modeling library
- Super convergent and fast traffic assignment methods (Origin based assignments, biconjugate traffic assignment methods)

Comparison of FW, BFW, & OUE with 12 cores on a large regional model

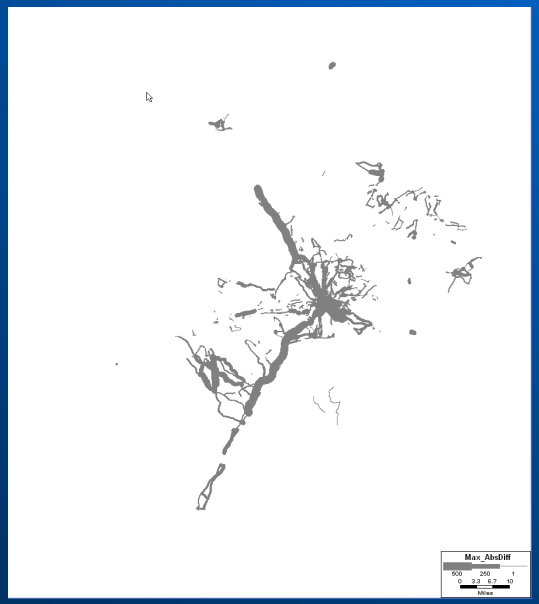


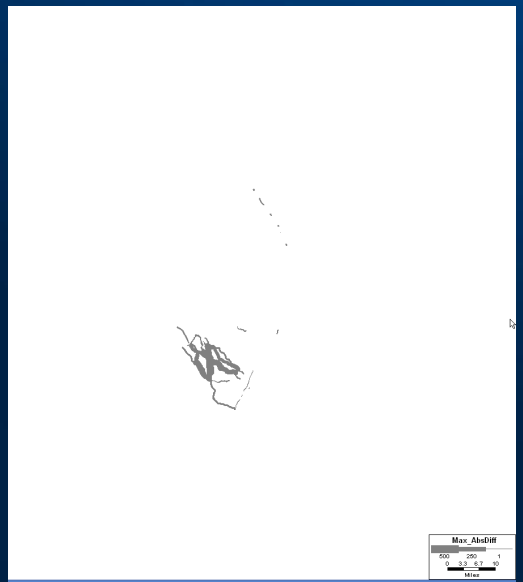
Project Evaluation

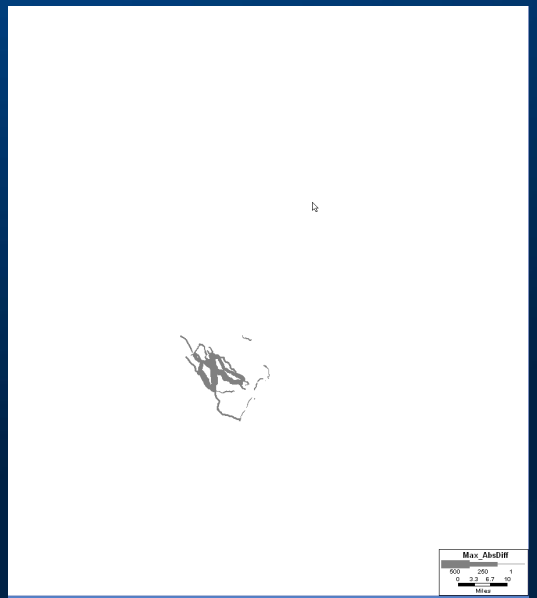


Doble capacidad en 2 arcos

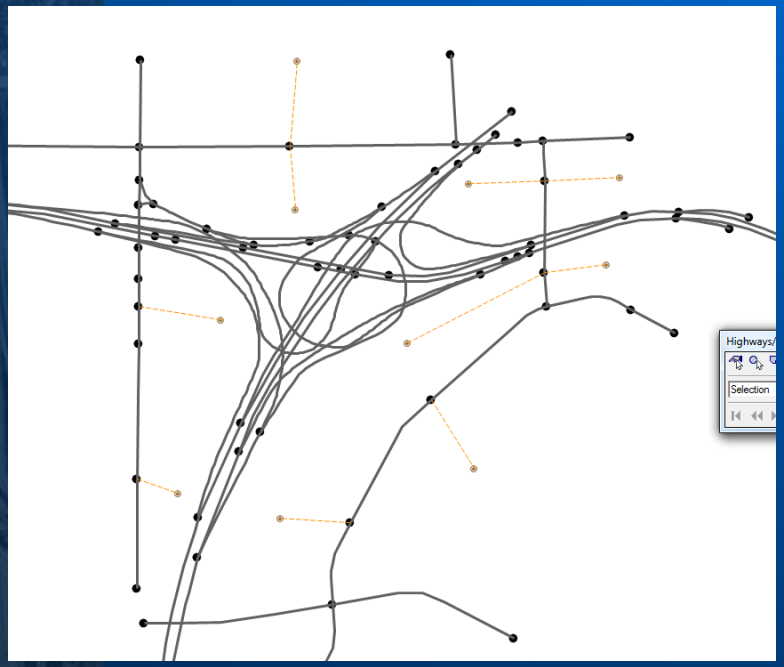
Flow changes with and without project (links with a flow change > 50)

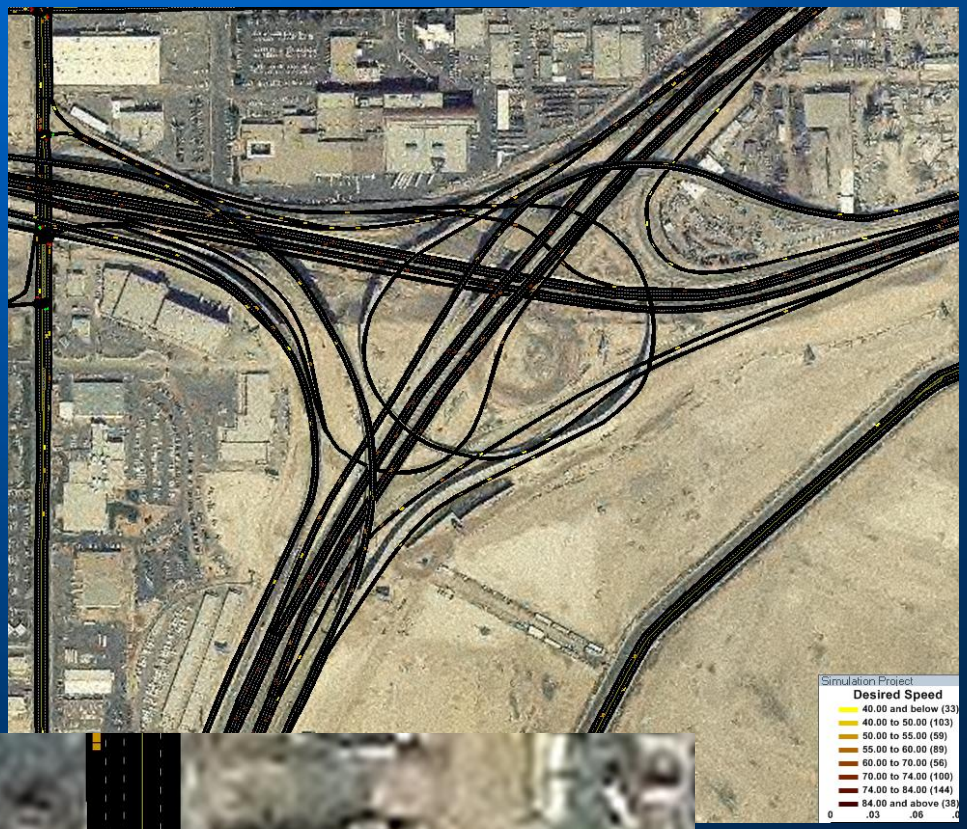


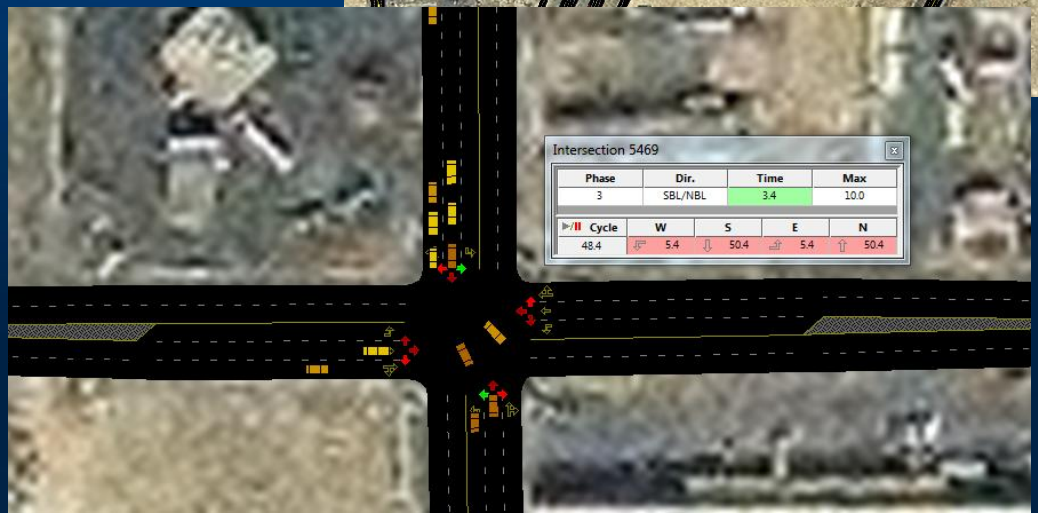




TransCAD to TransModeler







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TransModeler: Simulation Engines

- Microscopic simulation: Car-following, lane-changing, driver's response to traffic signals, signs, incidents, etc.
- Macroscopic simulation: Travel time and delays computed from speed-density relationship and capacity constraints
- Mesoscopic simulation: Similar to macroscopic model, but vehicles are grouped into traffic cells and streams

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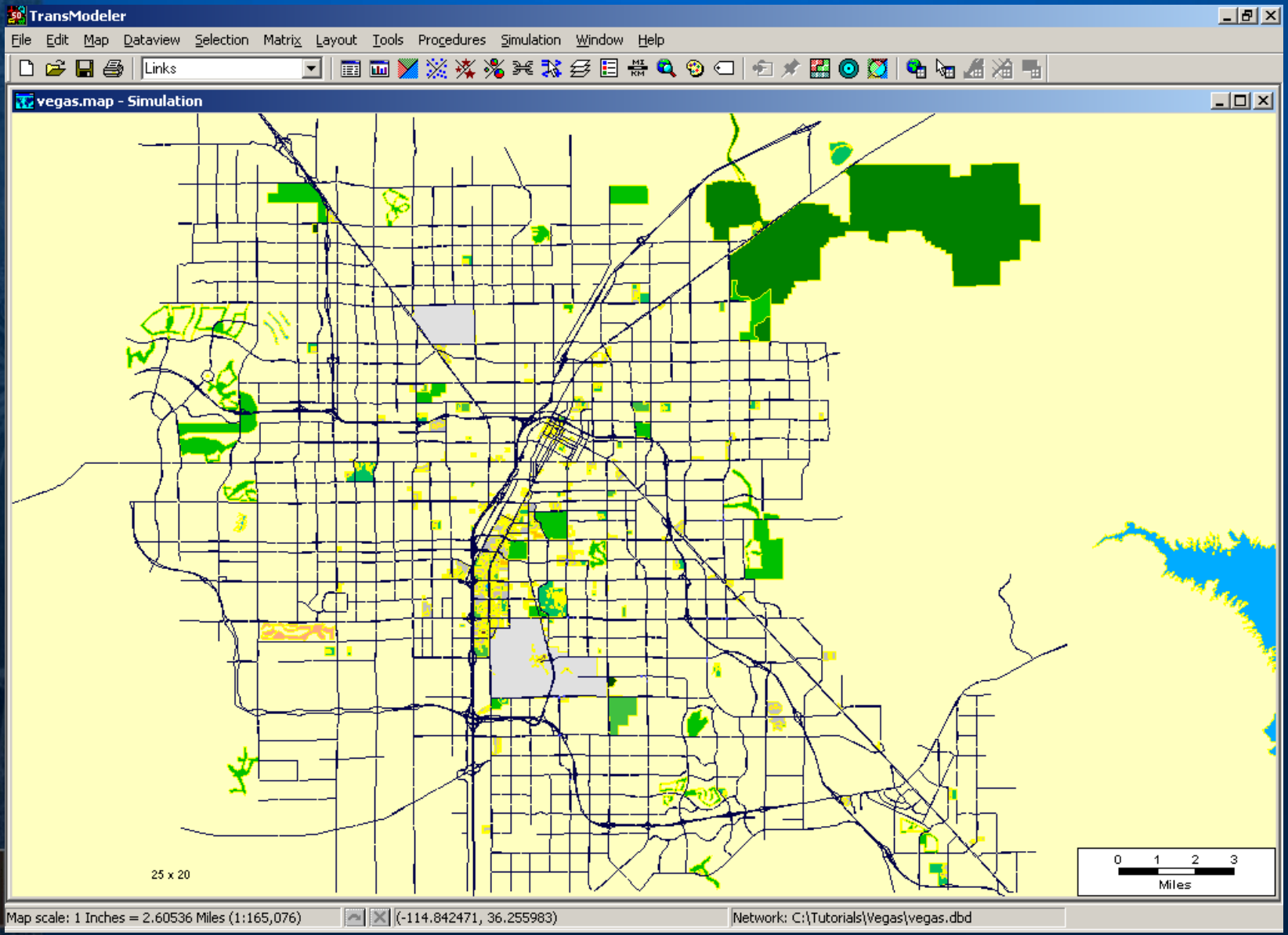
Case Study – Las Vegas



Case Study

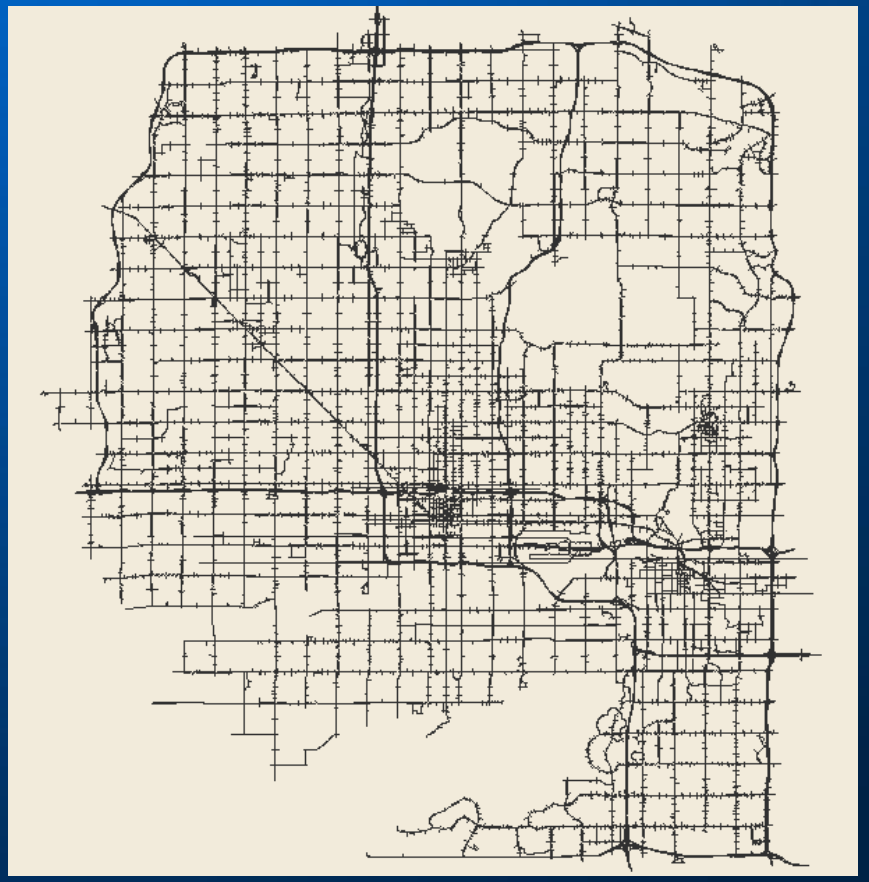
- Las Vegas transportation planning network (3K nodes, 8K links, 10K segments, 20K lanes, 500 signalized intersections)
- Edited for geometric accuracy and to provide info such as turning bays, acc/dec lanes, lane alignment, etc
- Pre-timed signal plans
- Experiment of microscopic and hybrid traffic simulation on a real urban network

Summary of Case Study

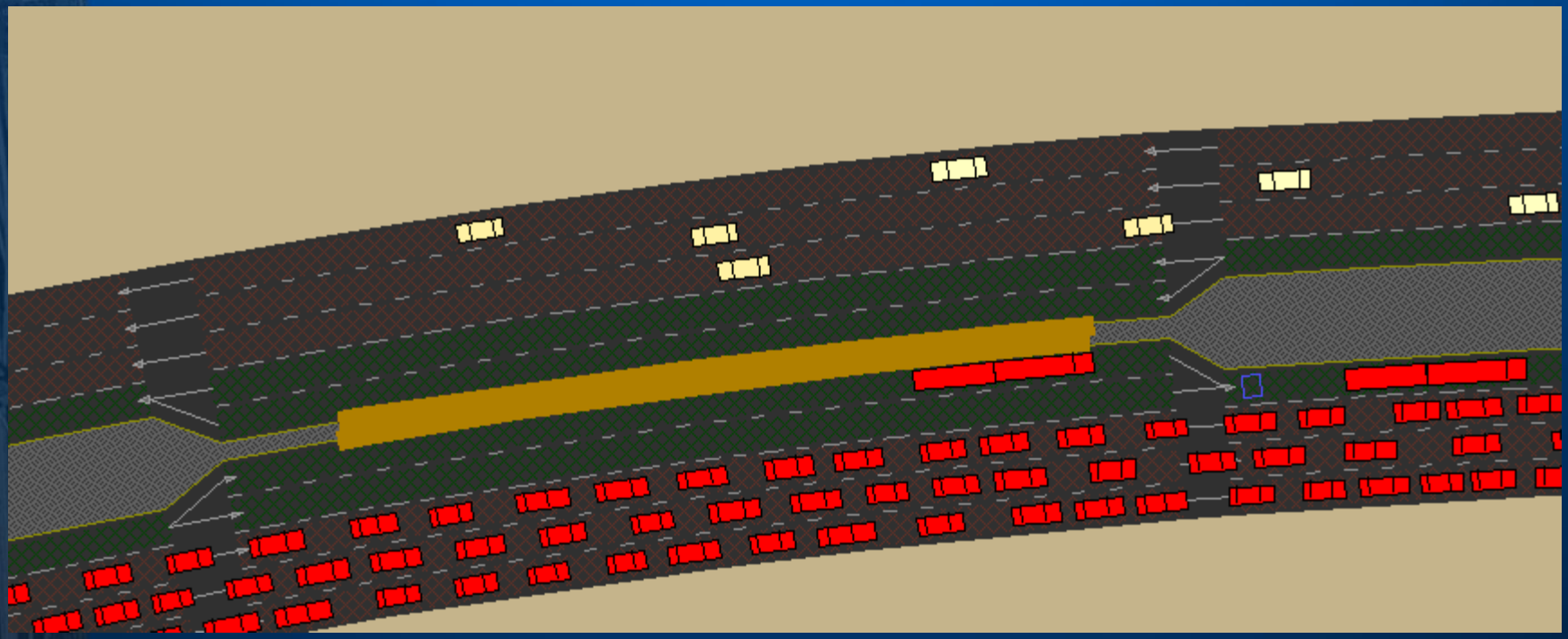
- Time to prepare input data to the model depends on network size and fidelity.
- Running time for one hour simulation (on a PC at 2.4 GHz, 512 MB)
  - Microscopic: 3 hrs. and 44 min.
  - Mesoscopic: 9 min. and 17 sec.
  - Macroscopic: about 1 min.
  - Microscopic and mesoscopic Hybrid: 45 min. and 36 sec.

Regional Microsimulation for Phoenix

- ~500 square miles
- 17,000 nodes; 23,000 links; 890 zones; 1,800 signals
- AM and PM peak periods
  - 3 hours each
  - 1.5-2.0 million trips each



Simulating BRTs



For more information

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