



Workshop-Tennessee Project Implementation in Shelby County, TN

WISE Workshop

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Outline

- Data preparation
- Nexta/DynusT
- WISE Input
- Ongoing efforts

Steps

Extract (sub)network and demand from TransCAD

Use ArcGIS and or Matlab for error checking and excel prep

Fix node2link errors and import network/demand in Nexta and run DynusT

Create workzones/strategies (either in Nexta or in Excel file and convert to xml)

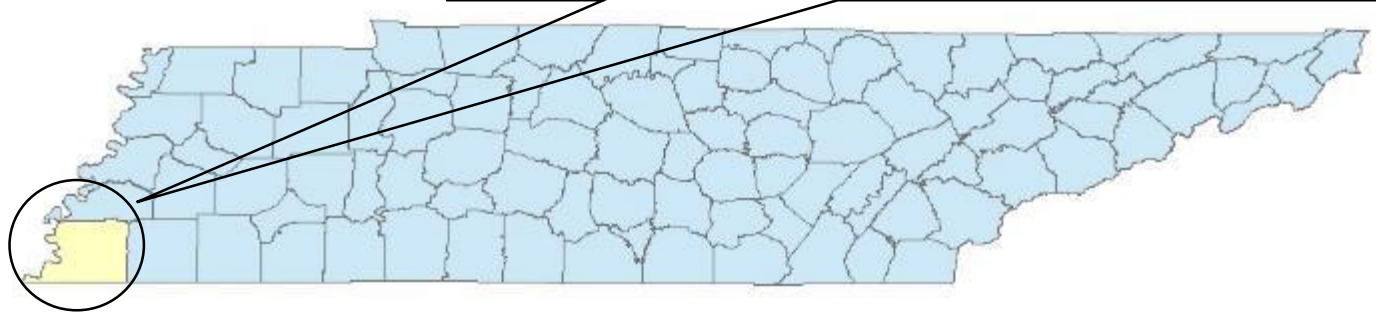
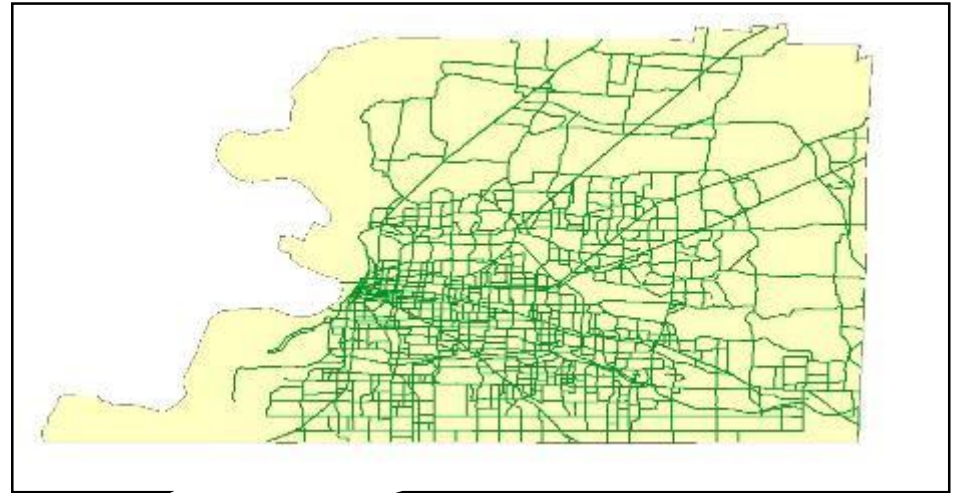
Input data to WISE and run

SHELBY COUNTY

Testbed Shelby County Network

Frequency of Roadway Segments

Rural Interstates	2
Urban Interstates	73
Rural Principle Arterials	16
Urban Principle Arterials	218
Urban Freeways/Expressways	62
Rural Minor Arterials	8
Urban Minor Arterials	501
Rural Major collectors	3
Urban Collectors	572
Rural Minor Collector	47
Local Roads	14661



Testbed

Work zones

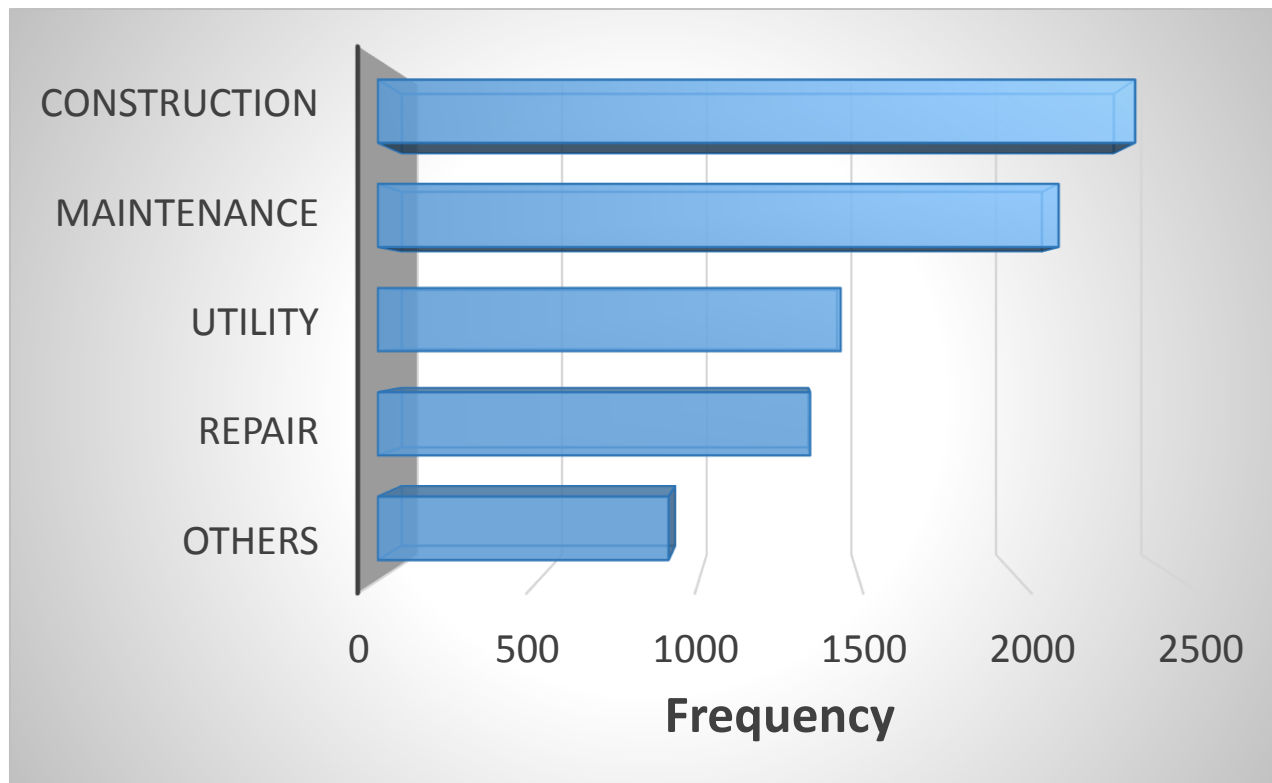
WORKZONES IN SHELBY COUNTY

Work Zone Type	Frequency
ACTIVE	487
LET	51
Total	538



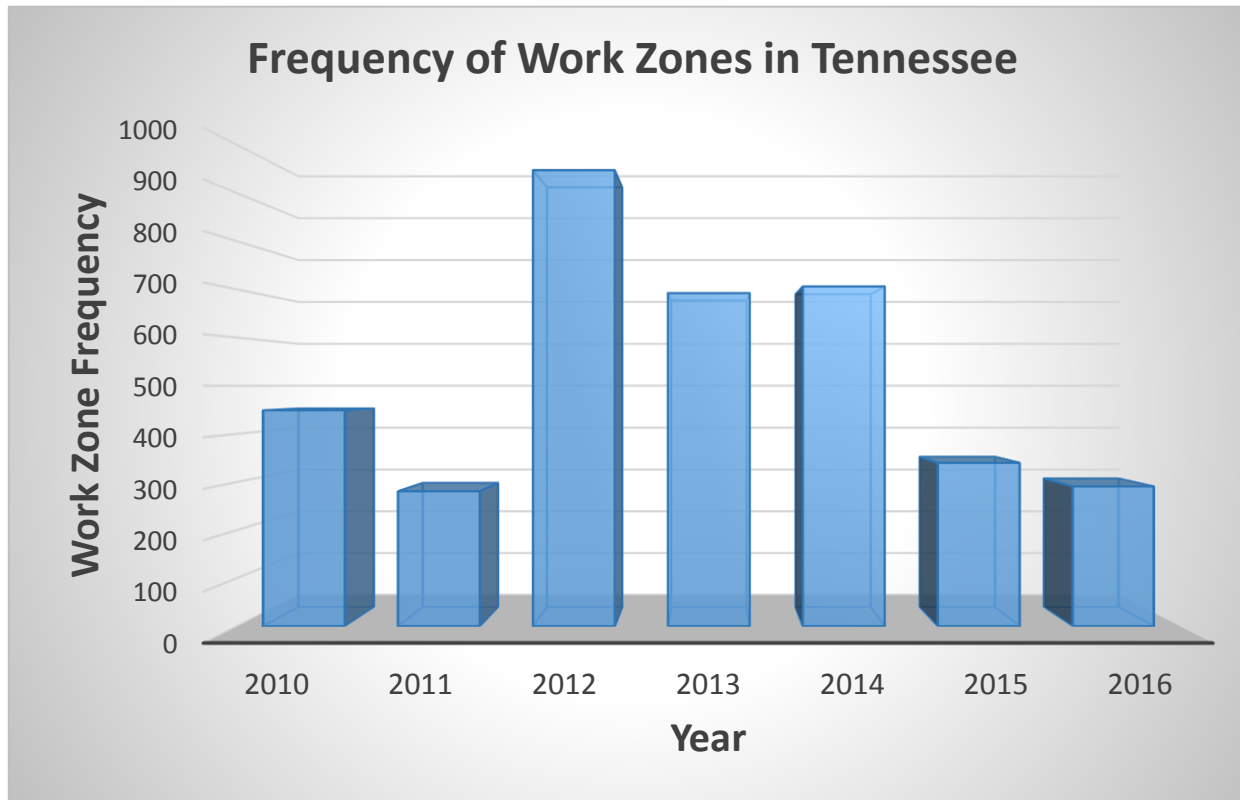
Testbed

Work zone characteristics



Testbed

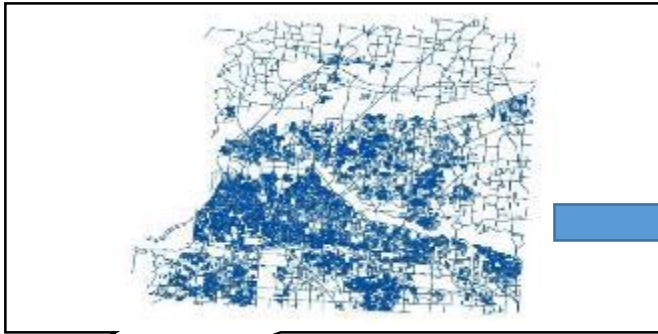
Work zone characteristics



Testbed

Demand/Network Extraction

Shelby county in network



Abstract network



- Demand: ODME or SubArea Analysis
- Export net in shape file
- Export demand in table (from, to, demand)
- NexTA limits: links (23,000), work zones (8)



Shelby county in Tennessee

```
C:\Users\kpufats\Desktop\WISE\WISE DropBox\shelby_int_art_wise\Planning\Main_schedule\Main...
Begin processing WISE INPUT...

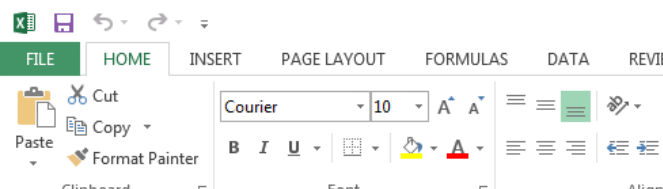
*** WISE Error: Planning Characteristics ***
The number of projects listed is 9.
Currently, the number of projects must be no more than 8.
Please check your input file.

Error_log.txt is located at:
C:\Users\kpufats\Desktop\WISE\WISE DropBox\shelby_int_art_wise\Planning
```


Nexta/DynusT

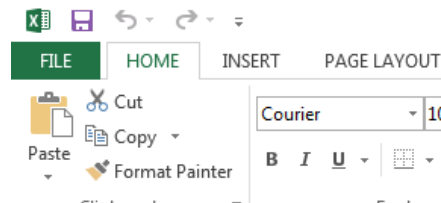
Nodes, Links, Zones, Signals

NODES



	A	B	C	D	E
	ID	Longitude	Latitude	TAZ	CTRL_TYPE
1					
2	2	-90.140863	35.03711		2
3	4	-90.13161	35.008468		4
4	5	-90.120614	35.055654		5
5	6	-90.116037	35.014041		6
6	7	-90.116541	35.029329		7
7	8	-90.10827	35.062659		8
8	9	-90.104211	35.013808		9
9	10	-90.106199	34.998443		10
10	11	-90.101418	35.039585		11
11	12	-90.087961	35.033107		12
12	13	-90.088864	35.010941		13
13	14	-90.088912	35.048542		14

ZONES TO TAZ



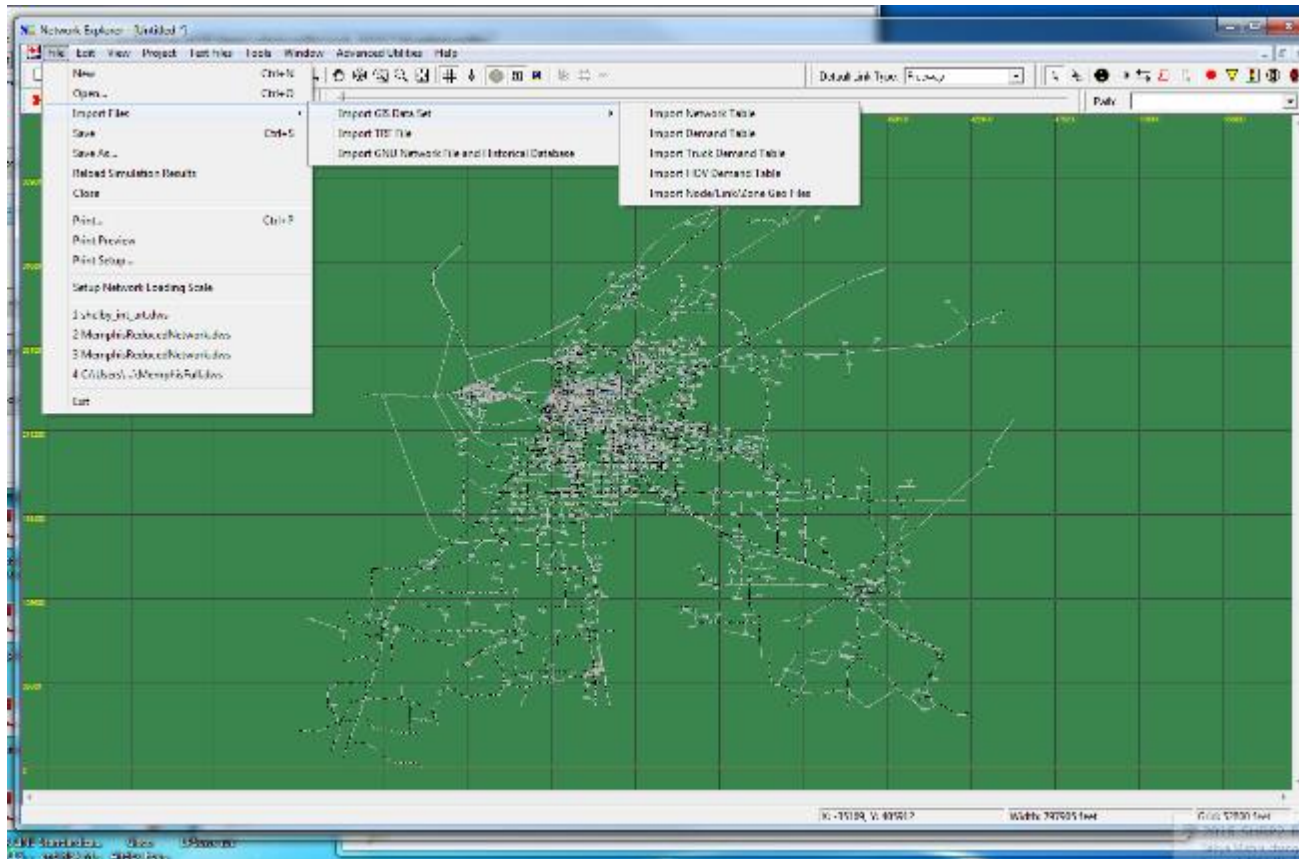
	A	B	C	D
	ZONENO	TAZ		
1				
2	1	2		
3	2	4		
4	3	5		
5	4	6		
6	5	7		
7	6	8		
8	7	9		
9	8	10		
10	9	11		
11	10	12		
12	11	13		
13	12	14		
14	13	15		
15	14	16		
16	15	17		

LINKS

	A	B	C	D	E	F	G	H
	ID	Length	Dir	TYPE	LANES	TAZ	From_ID	To_ID
1								
2	286	5060.183	1		1	1	2	104778
3	273	4652.477	1		1	1	4	100761
4	275	6683.435	1		1	1	4	116511
5	4748	2502.63	1		1	1	5	104777
6	4751	2502.414	1		1	1	5	104765
7	285	3345.535	1		1	1	7	105648
8	4744	2683.317	1		1	1	7	104776
9	4747	2322.551	1		1	1	7	124079
10	4758	6103.796	1		1	1	8	114685
11	5146	3418.335	1		1	1	8	104775
12	5594	2494.335	1		1	1	8	104765
13	5602	4576.535	1		1	1	8	104763
14	5738	2207.024	1		1	1	9	104801
15	5745	2564.459	1		1	1	9	113866
16	4762	2143.632	1		1	1	10	104636
17	4763	2802.165	1		1	1	10	104800
18	4767	2969.736	1		1	1	10	214350
19	5585	1564.253	1		1	1	11	113690

Nexta/DynusT

Create Network/Load DTA Demand



```
File Edit Format View Help

// # of OD demand zones
1783

// # of demand intervals
3

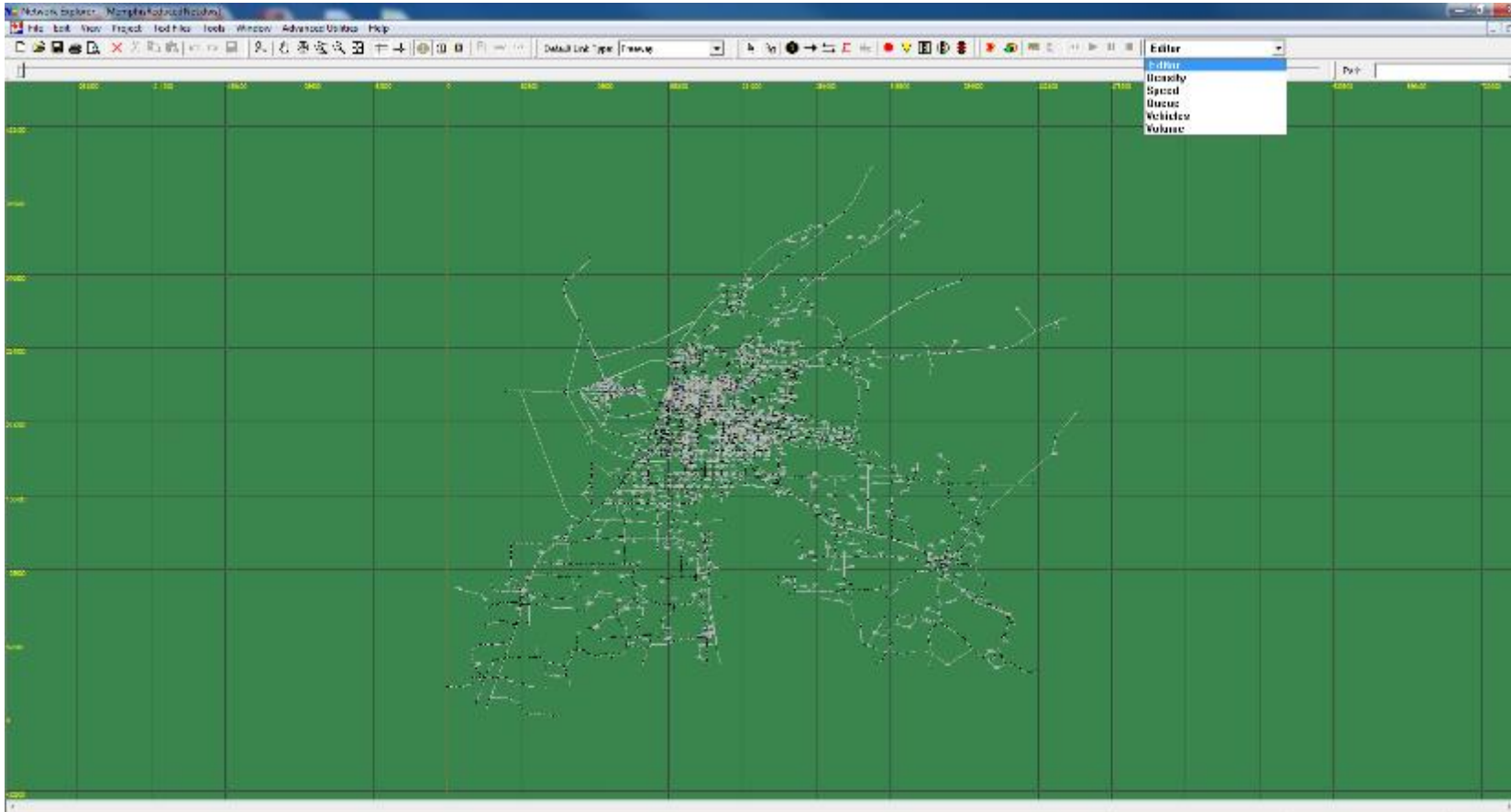
// length of demand interval
60

0.25 0.5 0.25

1,1,17.048342
1,2,0.270135
1,3,0.127261
1,4,0.103830
1,5,0.708613
1,6,0.143627
1,7,0.621479
1,8,0.033488
1,9,0.387423
1,10,0.129321
1,11,0.468115
1,12,0.260829
1,13,0.162640
1,14,0.251610
1,15,0.341884
```

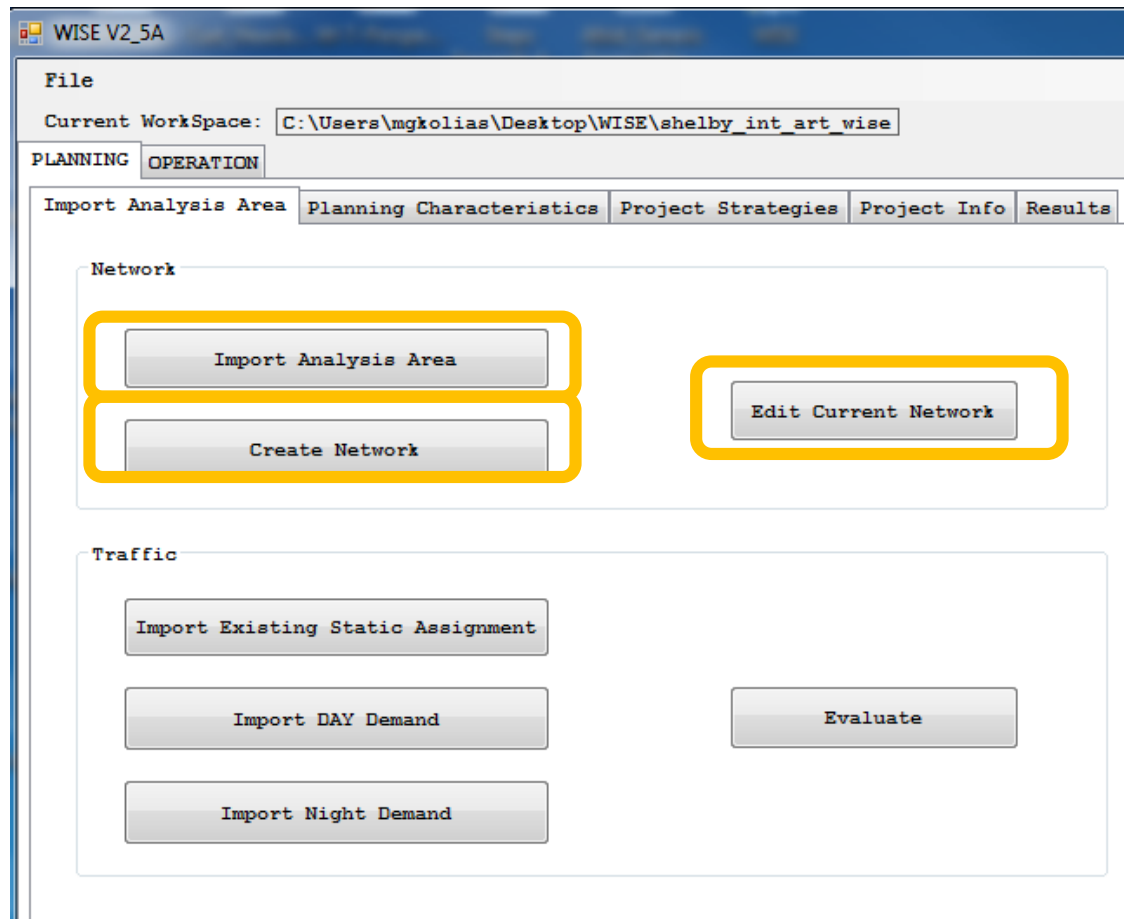
Nexta/DynusT

DTA Output



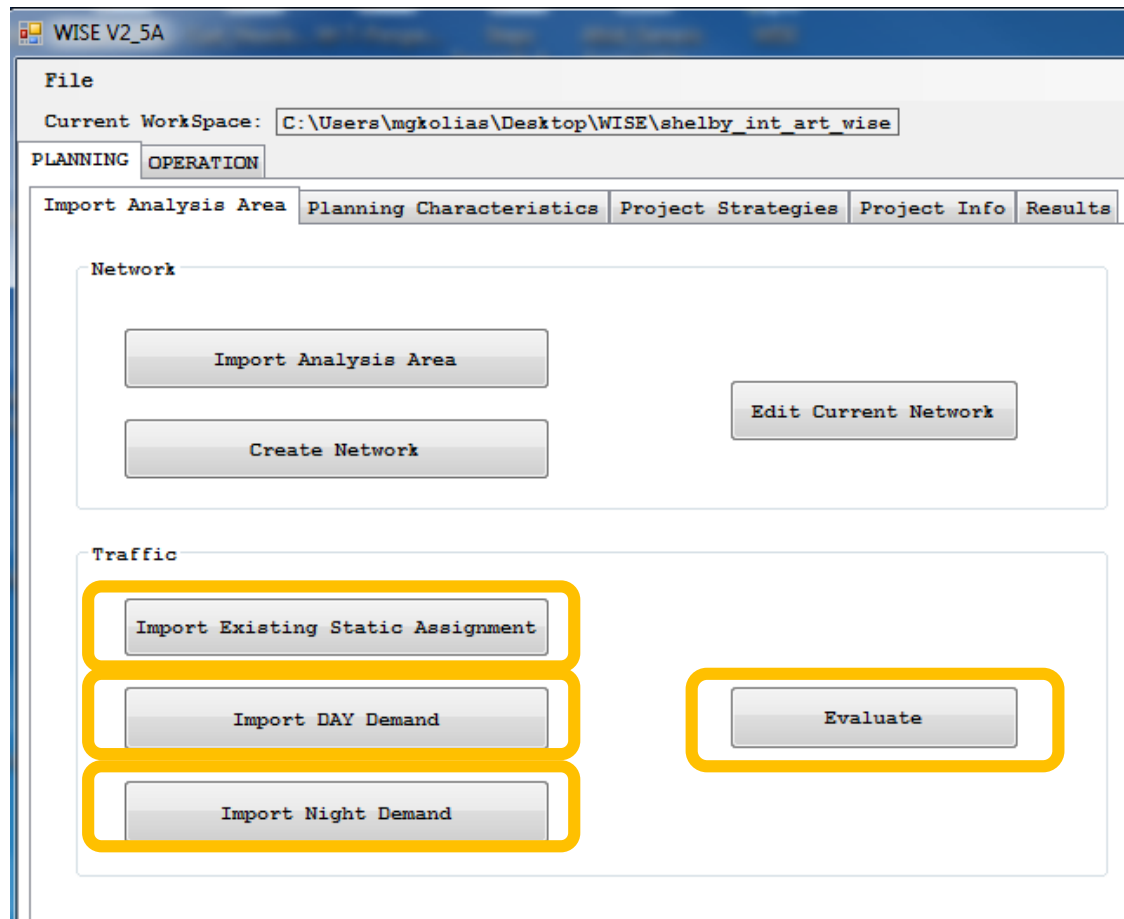
WISE: Traffic Diversion Analysis

Import network from Nexta



WISE: Create workspace

Planning or User Defined Mode



WISE: Traffic Diversion

Operation Mode

Projects: Lists all Projects Within the Planning Mode

Project Modified:

- True if Project Information has been modified since Volume Data was last collected
- False if Project has not been modified since Volume Data was last collected.

ID#	Name	Link	Base Volume	Project Volume	Project Modified
1	test1	NONE	1000	null	TRUE
2	test2	602 509	1000	262.167	True

Base Volume: Nexta/Dynust Volume for Link without a Project:

- Null if Nexta/DynusT has not been run for Base Scenario
- Contains the Volume Collected from Nexta/DynusT when Base Scenario is executed

Project Volume: Nexta/Dynust Volume for Project Link:

- Null if Nexta/DynusT has not been run for Project Scenario
- Contains the Volume Collected from Nexta/DynusT when Project Scenario is executed

Run Selected Project Scenario: Runs Nexta/DynusT for a Single Selected Project in the "Projects" list and collects the "Project Volume" Data

Run Base Scenario: Runs Nexta/DynusT for Base Scenario, not containing any Projects the "Base Volume" Data for all Projects in the "Project" list.

Run Selected Project Scenario

Run Base Scenario

WISE

Planning Data

WISE V2_5A

File

Current Workspace: C:\Users\mgkolias\Desktop\WISE\shelby_int_art_wise

PLANNING OPERATION

Import Analysis Area Planning Characteristics Project Strategies Project Info Results

Seasonal Information

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SEASONAL PREFERENCE												
SEASONAL FACTOR	1	1	1	1	1	1	1	1	1	1	1	1

Start Time of Program* MM 3 YYYY 2015 Value of Time (Dollars/Hour)* 25

End Time of Program* 8 2015

Demand Number of Hours

Day Number of Hours* 3.5 Night Number of Hours* 3.5

Program Description

NONE

*This is a Required Field Validate Planning Characteristics

WISE

Project Strategies



```
<?xml version="1.0" encoding="UTF-8"?>
- <ArrayOfStrategy xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  - <Strategy>
    <StrategyType>Demand-Based Strategy</StrategyType>
    <StrategyName> s1</StrategyName>
    <PercentReduction>2</PercentReduction>
    <Radius>2</Radius>
    <Cost>150000</Cost>
    <DollarPerDay>0</DollarPerDay>
    <DurationReduction>0</DurationReduction>
    <SNo>0</SNo>
  </Strategy>
  - <Strategy>
    <StrategyType>Duration-Based Strategy</StrategyType>
    <StrategyName> s2</StrategyName>
    <PercentReduction>0</PercentReduction>
    <Radius>0</Radius>
    <Cost>0</Cost>
    <DollarPerDay>100000</DollarPerDay>
    <DurationReduction>1</DurationReduction>
    <SNo>0</SNo>
  </Strategy>
</ArrayOfStrategy>
```

Ongoing: Import multiple strategies from csv file

WISE

Work zone data

WISE V2_5A

File

Current WorkSpace: C:\Users\Cadarrius\Desktop\WISE GUI workspace\workspace

PLANNING OPERATION

Import Analysis Area Planning Characteristics Project Strategies Project Info Results

Project : New of 5

Project Name*

Scheduling Details

Earliest Start* MM YYYY

Latest End* MM YYYY

Duration (Months)*

Project Precedence

Project Link NONE

Capacity

Speed

Number of Lanes

Cost in Mi

Day ☐ Night ☐

Demand-Based NONE

Duration-Based NONE

Operation Supplied ☒ 0

☐ null

Validate Project Import Multiple Save/Add Project

Import multiple work zones
Input data format: *.csv

All Projects

	<input type="checkbox"/>	#	Name	Link	Precedence
▶	<input checked="" type="checkbox"/>	1	Project 1	10 11	0
	<input type="checkbox"/>	2	Project 2	22 15	1
	<input type="checkbox"/>	3	Project 3	17 19	0
	<input type="checkbox"/>	4	Project 4	12 3	2
	<input type="checkbox"/>	5	Project 5	5 6	0

Project Info Imported (5)

OK

Delete Project Go To Project

If a project is deleted and then added again the xml file may have to be modified by hand (projectID is not updated unless you exit the program)

WISE Final Step

Sequencing

File

Current Workspace: C:\Users\mgkolias\Desktop\WISE\shelby_int_art_wise

PLANNING OPERATION

Import Analysis Area

Validate Plan

Analyze

C:\Users\mgkolias\Desktop\WISE\shelby_int_art_wise\Planning\Main_schedule\Main_schedule.exe

```
Evaluating Project ID 2.
Evaluating Project ID 3.
Evaluating Project ID 4.
Evaluating Project ID 5.
Evaluating Project ID 6.
Evaluating Project ID 7.
Evaluating Project ID 8.
Iteration 3
Evaluating Project ID 3.
Evaluating Project ID 4.
Evaluating Project ID 5.
Evaluating Project ID 6.
Evaluating Project ID 7.
Evaluating Project ID 8.
Iteration 4
Evaluating Project ID 1.
Evaluating Project ID 4.
Evaluating Project ID 5.
Evaluating Project ID 6.
Evaluating Project ID 7.
Evaluating Project ID 8.
The sequencing algorithm has reached a
stable solution at iteration 3 of 16 iterations.
WISE Project Renewal Sequencing is complete.
Press any key to continue . . .
```

Original Project Link Avg. Travel Time (min):

2015	6	0	0.10	39	0.04
2015	7	0	0.18	1	0.06

Findings

To date

- Major limitation: 8 work zones
 - Action: investigating on how to increase the number of work zones
 - We cannot do (meaningful) sensitivity analysis otherwise
- Network development: Most time consuming
- Errors with no explanation
- User manual needs improvement (part of this project)

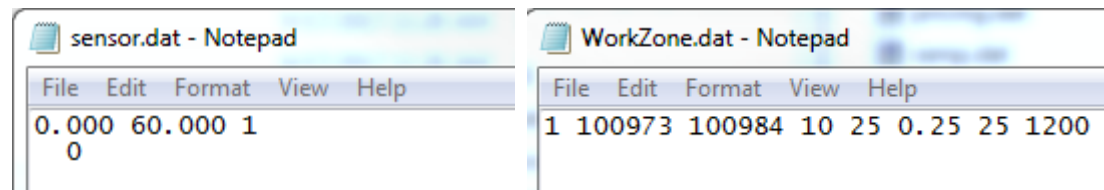
Current Efforts

- User manual with example network
 - Step by step
 - Error handling
- Newer version of Nexta/DynusT
- Automate/Simplify Input



- bus.dat
- incident.dat
- pricing.dat
- ramp.dat
- scenario.dat
- sensor.dat
- toll.dat
- vms.dat
- WorkZone.dat
- control.dat
- destination.dat

- Link Pricing Data
- VMS Data
- Incident Data
- Work Zone Data
- Ramp Metering Data
- Sensor Data



THANK YOU FOR YOUR TIME

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