Iowa Statewide Travel Model Phase III Overview

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MTMUG
Ames, IA

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The Consultant Team

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Outline

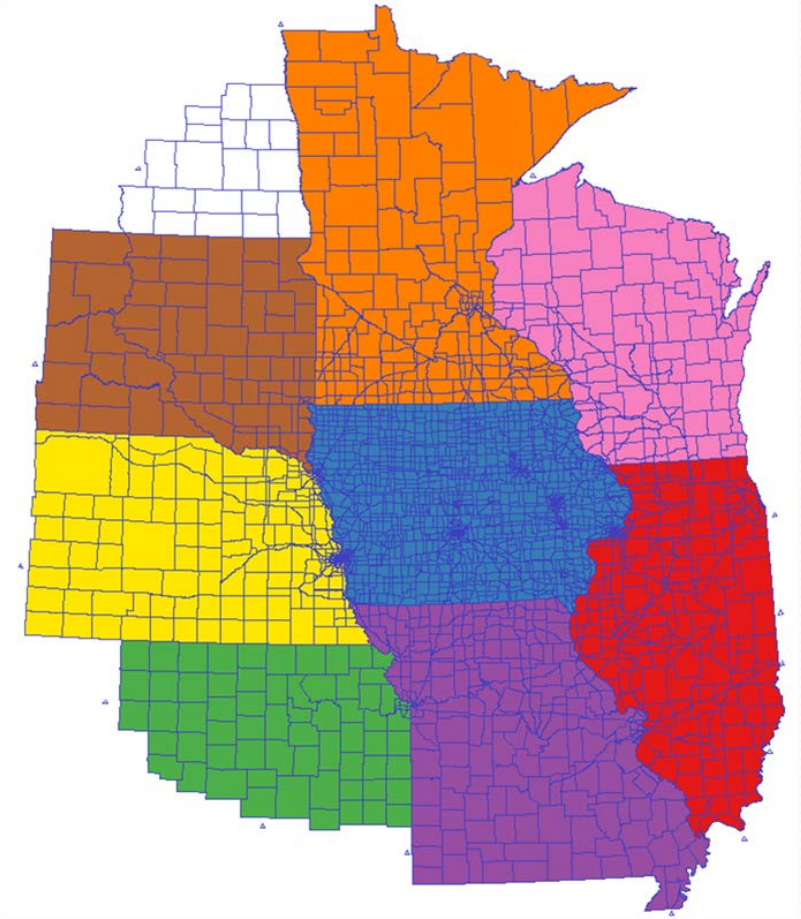
- Philosophy of the Iowa Travel Analysis Model (iTRAM) Update
- What iTRAM is now
- What iTRAM is adding
- Rail Network
- Rail Passenger Model
- Freight Model
- Auto and Truck Model update
- Update and Recalibration of iTRAM
- GISDK Tasks

Philosophy of the Update

- To retain the core iTRAM Statewide Model
- To develop two new modules
  - Commodity freight
  - Passenger Rail
- To update/integrate the core iTRAM model with these modules to a 2010 base year
- Completion by February, 2014

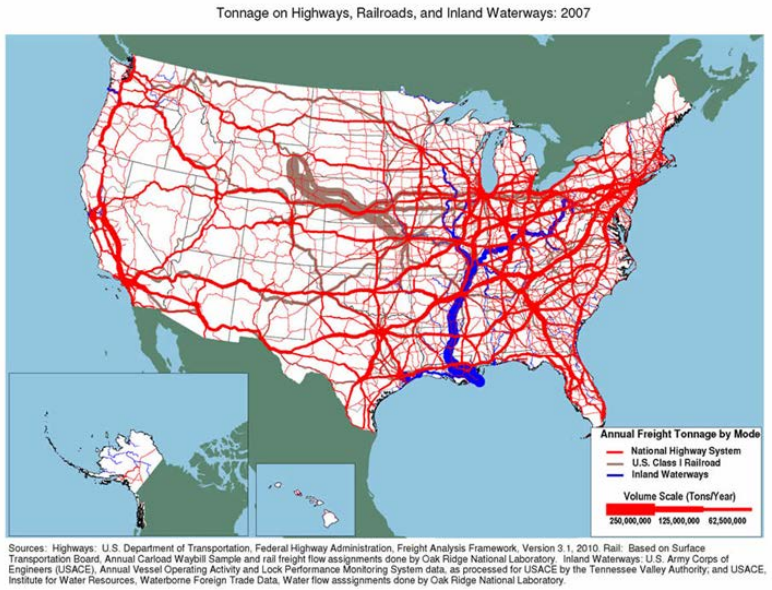
iTRAM Now

- Auto & Truck Model
- 2005 base year
- Traditional 3-step model with a Truck Sub Model
- 3,144 Zones
- National in Scope
- Focus on Iowa, Midwest Buffer, National BEA zones
- Interfaces with MPO Models



iTRAM Phase III

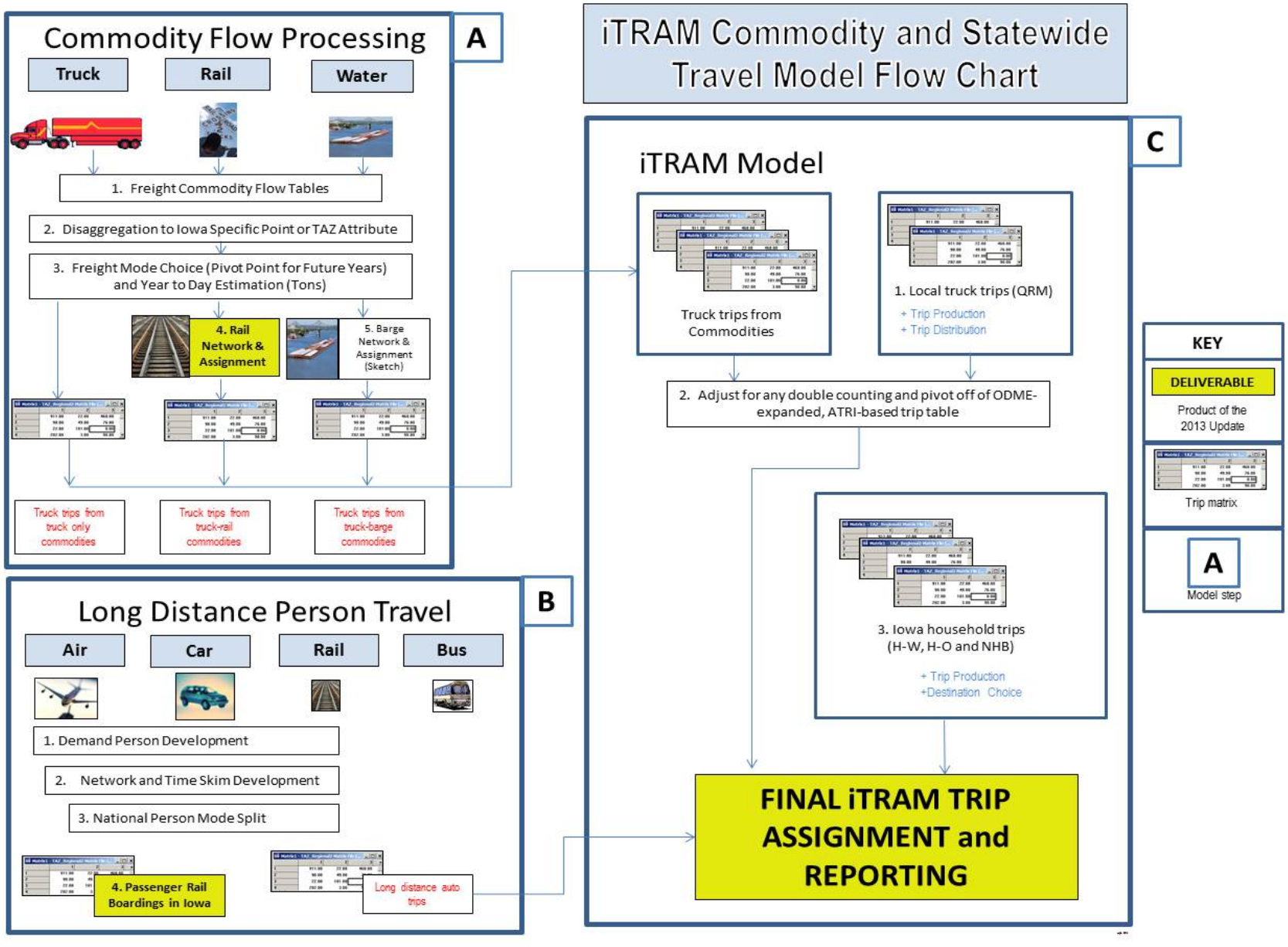
- Original Architecture Included Future Commodity Flow module for Phase III
- FRA Grant to Expand Model
- Support Iowa DOT Rail Planning Efforts
- Passenger Rail
  - Sensitivity analysis – “what ifs”
  - Support Chicago to Omaha Passenger Rail Study



iTRAM Phase III

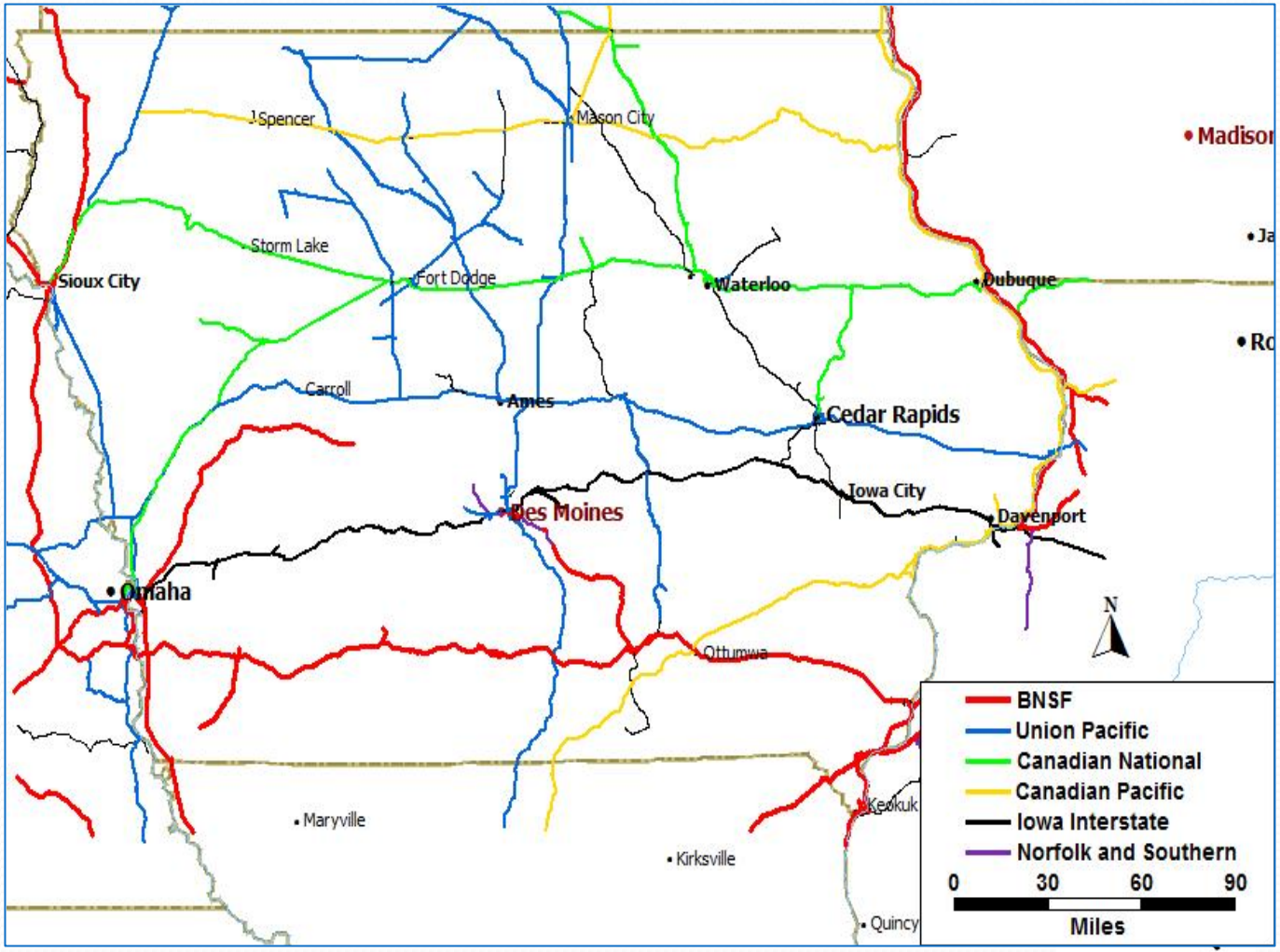
- Freight Rail
  - Supports grant program
  - Freight application jobs (TL sites)
- Truck update with FAF3
- Auto update using CTPP, NHTS, etc.
- Many data sources being used
- DOT staff updating the TAZs and network (with attributes)
- Recalibration of new, integrated iTRAM

iTRAM Phase III Model Flow

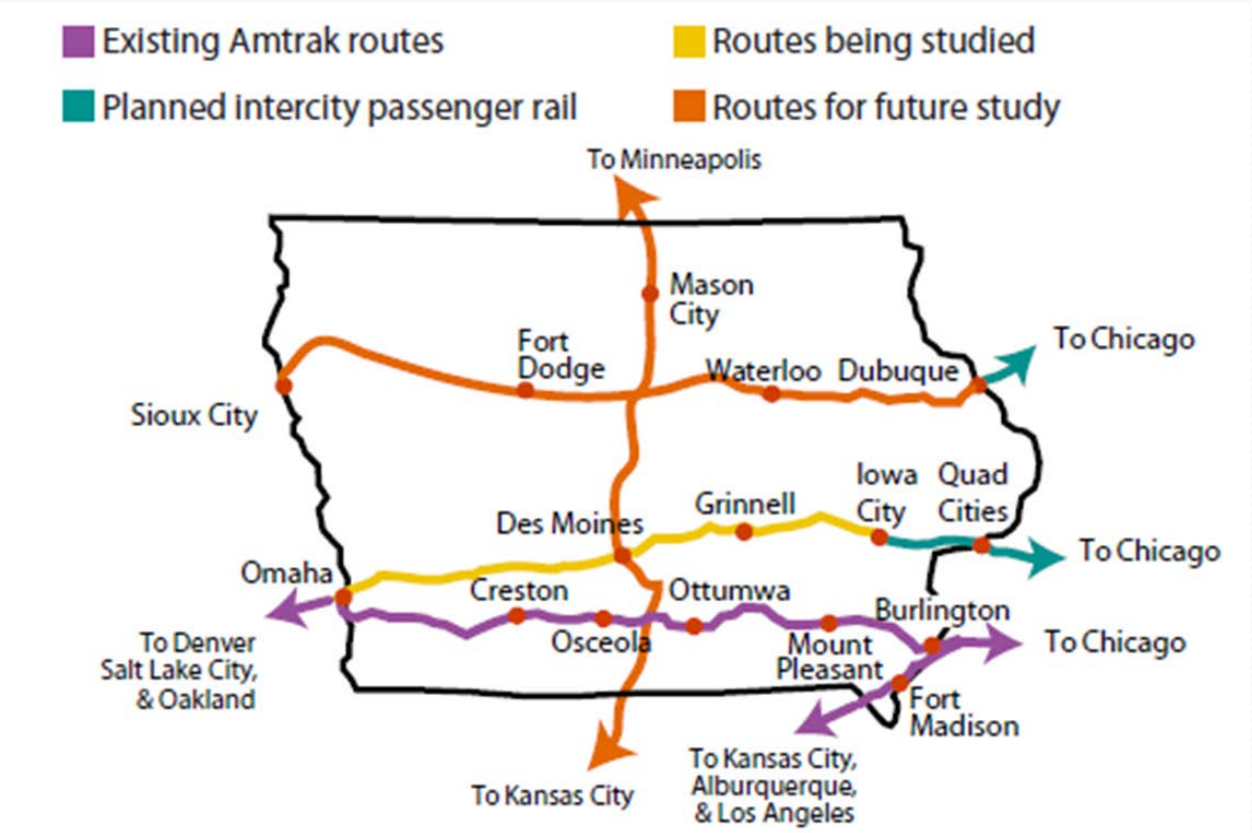


Class I Rail Network plus Iowa Interstate RR

- New GIS Rail Network
- Assignable Network
- Various Attributes
- Linkages to Highway Network



Passenger Rail Model



Passenger Rail Model

- Parallel and independent model
- Built from the main Highway and Truck models
- Overall goals
  - collect and apply travel times and costs across key rail origins and destinations
  - process them into trips and then rail passenger boardings
  - to do sensitivity analysis

Passenger Rail Model

- Designed to forecast ridership between Iowa Urban Areas, AND
- Also between Iowa and Major Metro Areas
  - Chicago
  - Omaha
  - Kansas City
  - Minneapolis
- Preselected O/D pairs, matrix created (where the PR trips begin and end)
- Rail travel times, parking costs, terminal times, fares

Passenger Rail Model

- Nested Logit Mode Choice model - Auto vs. public transport (rail, air and bus), then between rail and air
- Calibrate to Amtrak ridership and the existing air passenger trips from the major OD pairs
- Sensitivity to travel time and fares for “what ifs”
- Coded in GISDK

Freight Model Architecture

- Pivot point for commodity flows
- Rail freight directly from commodity flows
- Trucks pivot off of ATRI trip table based on truck model with three parts
  - Commodity flows by truck (long distance)
  - Commodity flows by truck to/from rail/barge
  - Local trucks (distribution, service)
- Will use and integrate most data sources

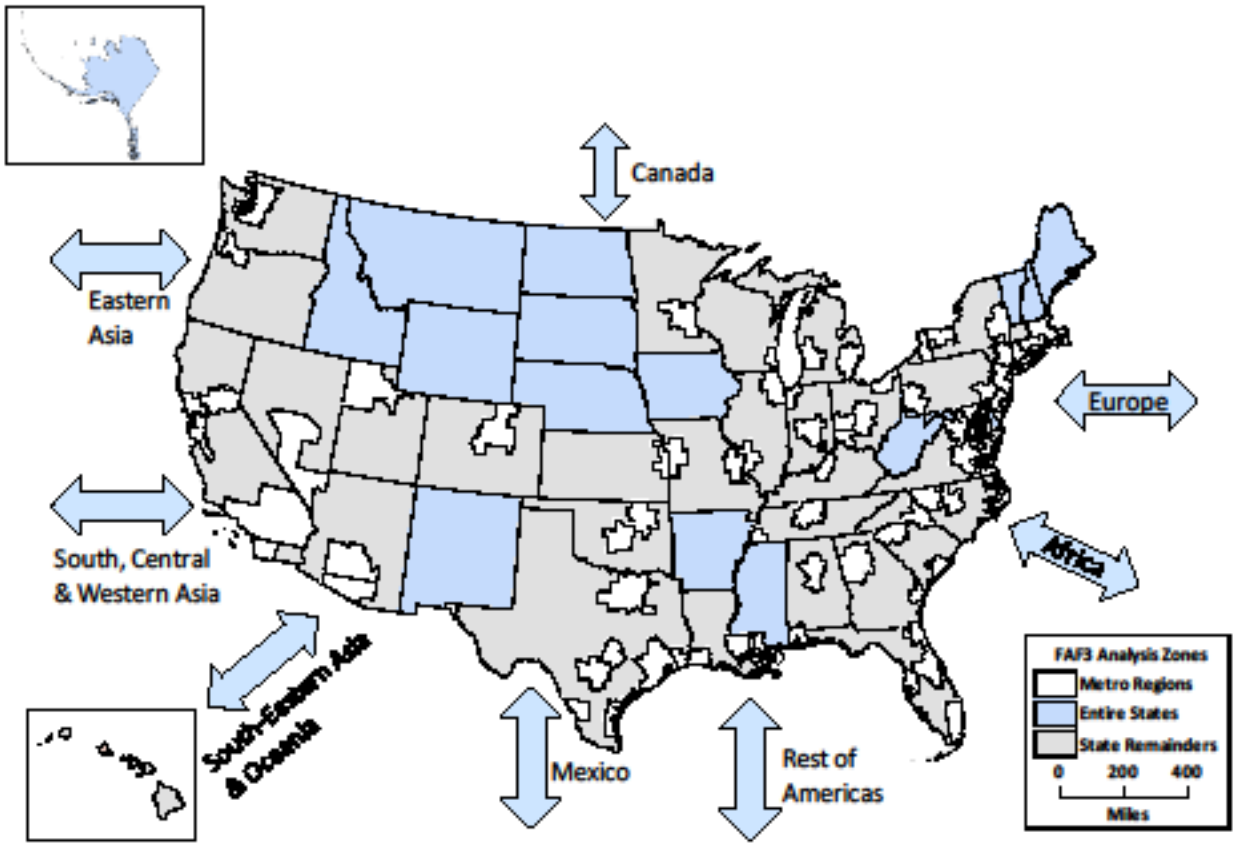
Freight Rail Model

- Iowa Freight to Increase 53% by 2040
- Truck handles 80% of Freight in Iowa, Rail 14%, Water 6%
- Main Union Pacific Line Runs Through Iowa
  - Coal, Grain, Ethanol, Chemicals
  - Union Pacific main carrier
- 18 Railroads total
- 3,945 miles of track
- Began with review of data sources to support model

FAF3

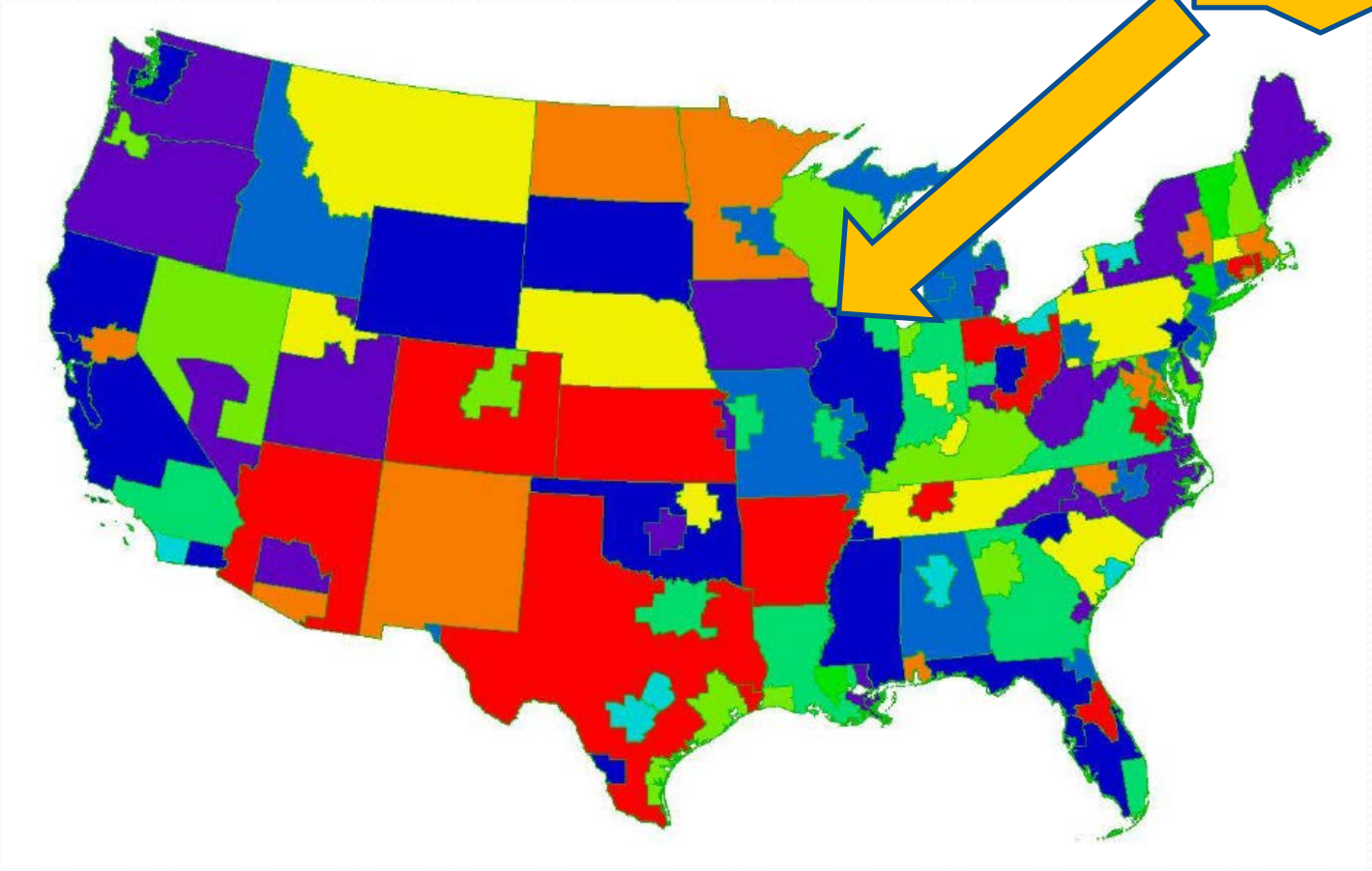
- No Cost FHWA Product
- Commodity Flow Data by mode
- 14 Commodity classifications
- Forecasts to year 2040
- Based on BTS's Commodity Flow Survey
- Limitation: Iowa is ONE FAF zone
- No explicit through traffic O/D

FAF³ Geography



FAF3 Zones

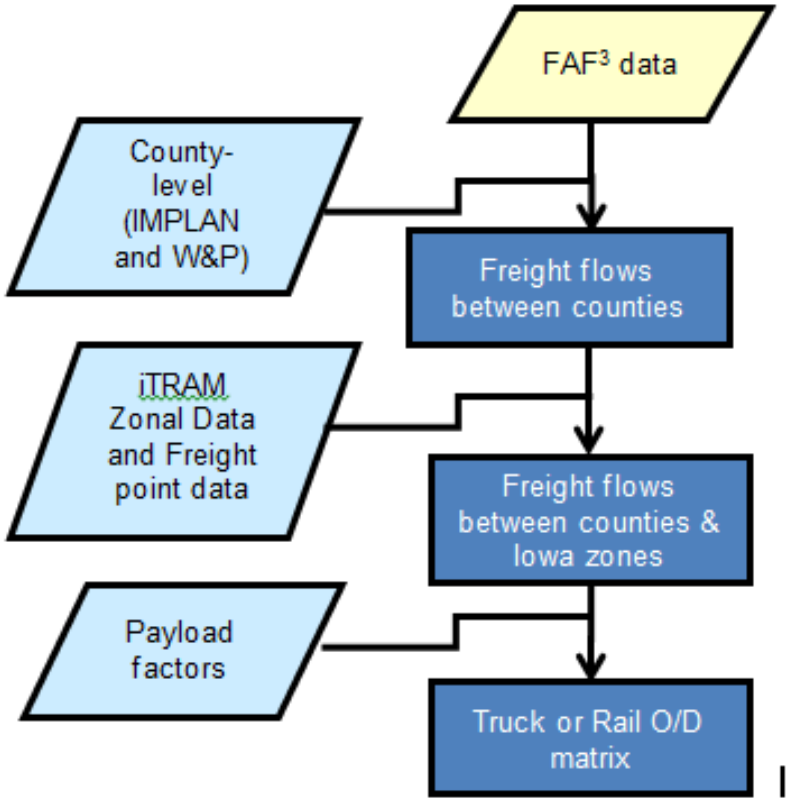
Iowa is One FAF Zone



Disaggregation

- A big issue with FAF3 since Iowa is one FAF district
- Numerous Data Sources identified and collected
- Three Step Process
- Future Year Issues

Tiered Disaggregation Process

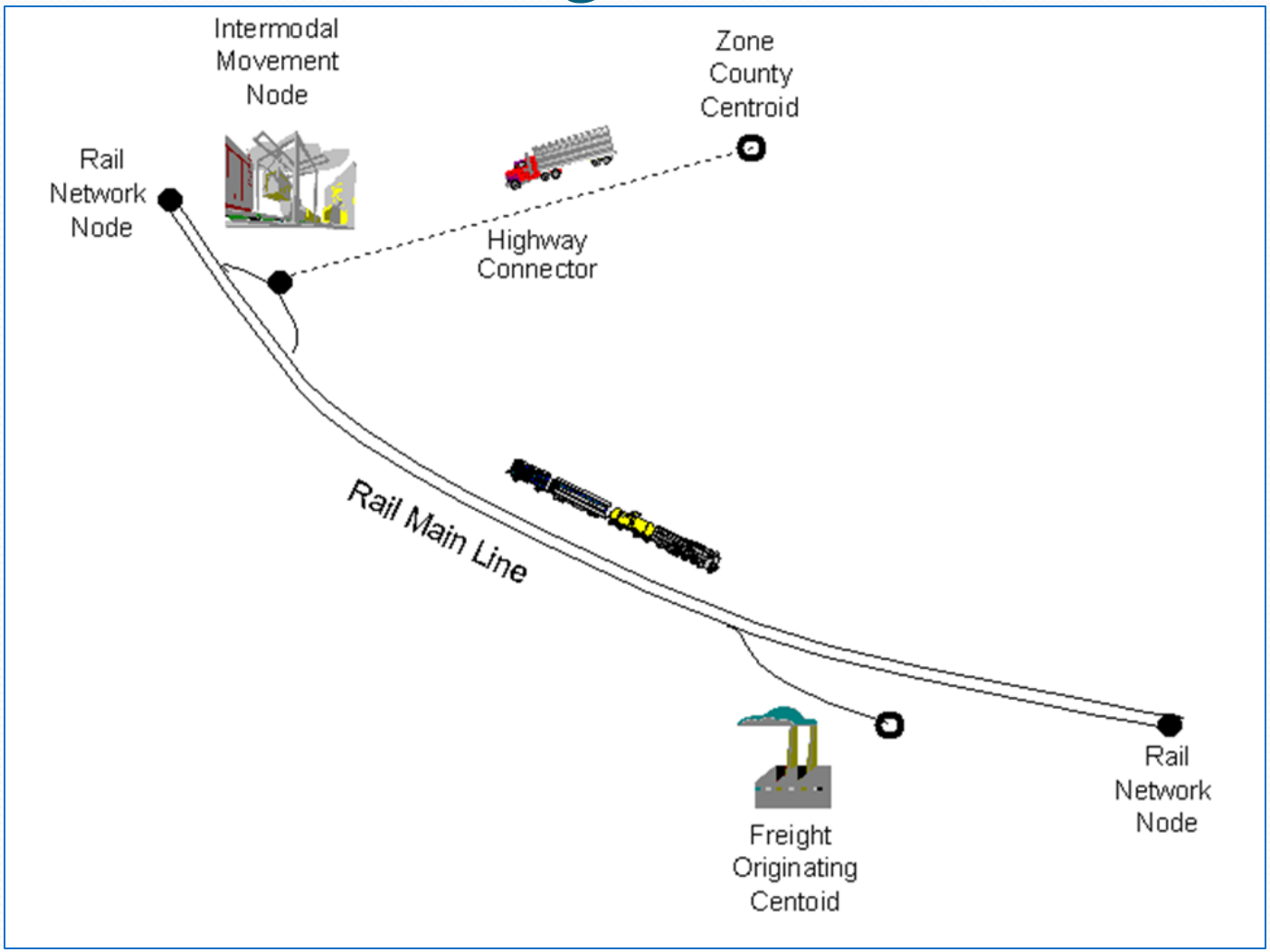


Carload Waybill Sample

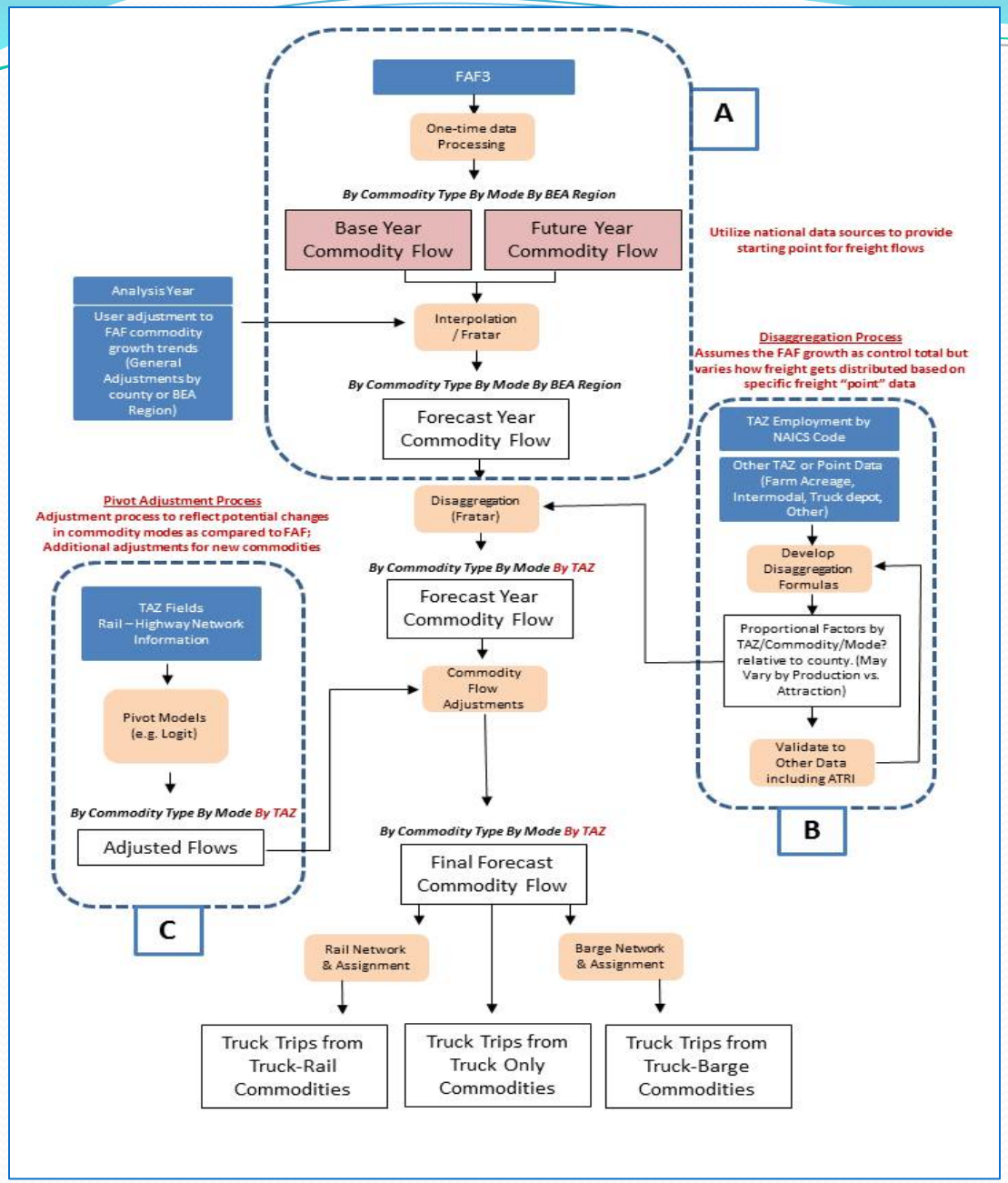
Surface Transportation Board

- Obtained confidential Carload Waybill sample from STB
- Large stratified sample of carload waybills for all U.S. rail traffic from carriers with more than 4,500 annual carloads
- Rail Inc. Rail Station Database
  - GIS Database of National and Iowa Rail Stations
  - Necessary to process Carload Waybill Sample

Network Coding Elements



Freight Forecasting Procedure



Freight Forecasting Issues

- Sensitivity to mode change – example: coal, non-metallic minerals will not shift from rail
- New Commodity – e.g., ethanol (currently no separate category) – how will it behave?
- New Freight Facility – How to test its locational value and magnitude? (need to add the "point" to list of nodes before testing)

Auto and Truck Model Update and Recalibration

- 2010 Base Year
- Updated network and TAZ geography
- Updated network and TAZ atrributes
- Multiple passenger data sources – two are:
  - National Household Travel Survey (NHTS) Add-On
  - 2010 Census Transportation Planning Package (CTPP)
- Revised trip rates from National Household Travel Survey (NHTS) and Iowa add-on (New Trip Generation)

Auto and Truck Model Update and Recalibration

- Special Generators reviewed / updated
- New Destination Choice Models in place of Gravity Model
- Special Generators reviewed / updated
- Validation
- Coded in GISDK revising current iTRAM

NHTS National Household Travel Survey
Our Nation's Travel

- Iowa Add-on Sample in 2009
- Focuses more on rural travel
- 2,000 Usable Surveys
- Trip Rate Development

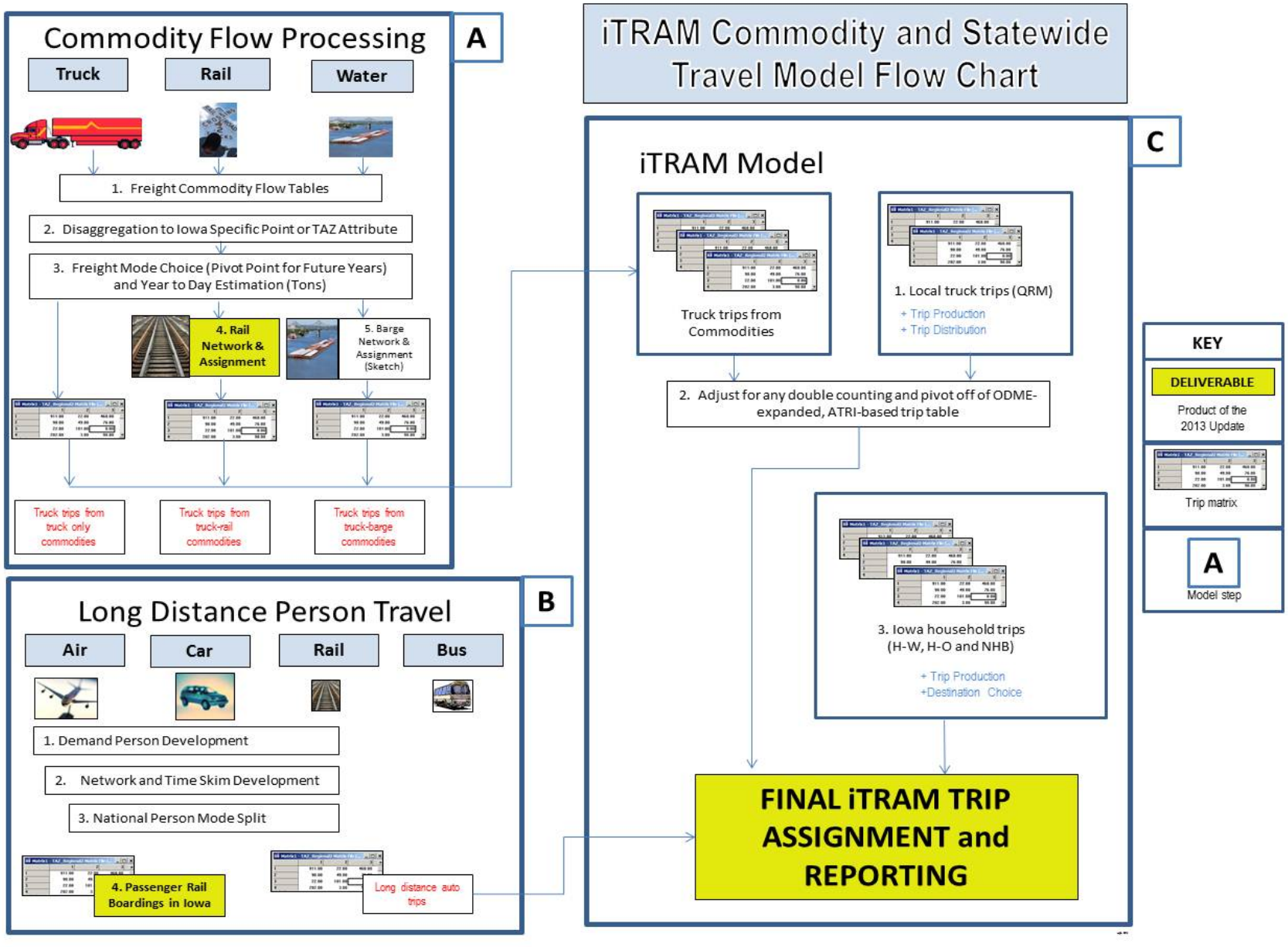
Validation Measures

Model Component	Measure or Report
Trip Generation	Trips/TAZ
	Trips/Person
	Trips/Household (Dwelling Unit)
	Trips by Purpose / Type (%)
Trip Distribution	Average Trip Length by Purpose / Type
	Intrazonal %
Auto Occupancy	Occupancy Rate by Purpose / Type
Trip Assignment	Total Volume Screenline Evaluation
	Total Volume RMSE by Volume Range
	Total Volume RMSE by Functional Class
	Truck Volume RMSE by Volume Range
	Truck Volume RMSE by Functional Class

GIS DK Tasks

- iTRAM will appear similar to the existing GUI
- Separate but connected GUIs for freight and passenger rail
- Planning sensitivity “levers” built in
  - Passenger rail fares
  - Parking cost at rail station
  - Tons of commodities in each scenario year
  - Rail line ownership changes
  - Select link for auto, truck, passenger and freight rail

iTRAM Phase III Model Flow



Status

- Passenger Rail underway, completed in August
- Freight Rail – underway, completion in October
- Highway network and TAZ updating - underway, completion in end of July
- Overall calibration – end of February

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Questions?