



Memorandum

To: Indiana Transportation Partners

From: INDOT, Traffic Engineering Division, Traffic Mobility Office

cc: Korey Chu, INDOT Modeling Engineer

Date: 6/8/2023

Re: Interstate Access Request – Travel Demand Modeling Process Outline

As a part of the Interstate Access Request process, Travel Demand Modeling is sometimes required to predict the amount of future traffic using the system under configurations that are altered from the existing layout. This process typically takes place after the Framework Meeting and will culminate in a Calibration Report which documents the modeling process and a Traffic Forecast Report which contains the predicted turning movement volumes which will be used in alternatives analysis.

Travel Demand Modeling is typically needed when access is added or removed from the Interstate System (but is not needed when access is simply being modified). Examples include the addition or removal of a movement(s) and the addition or removal of an interchange.

The Travel Demand Modeling process uses the gravity method to predict how vehicles will utilize the system to move between many Traffic Analysis Zones. The Metropolitan Planning Organization or Statewide Models are used as a starting point and are modified in the analysis area around the access point.

An outline of this process is included below for quick reference. This outline shows the *typical* process. It is useful for both consultants and applicants in setting expectations for the level of analysis which will be necessary. The entire process typically takes 4 to 6 months to complete.

Travel Demand Modeling First Steps

- Framework Meeting
 - Set Base Model Expectations
 - Establish Need for Travel Demand Model (or not)
 - Establish Study Area
 - Set limits of Sub Area from MPO Model (MPO Area) / Indiana Statewide Travel Demand Model (Non-MPO Area)
 - Establish Background Growth Rate (INDOT Provides)
 - Establish Scenarios
 - Horizon Years (No Build & Build)
 - AM / PM (from model or estimated)
 - Establish Calibration Target Expectations (per industry standards)
- Collect traffic data (Turning Movement Counts)
 - Enough locations to calibrate model
- Coordinate with State (Non-MPO Area) or MPO (MPO Area)
 - Request Sub Area Extract
 - Add recently completed projects (Not currently in model)

Travel Demand Modeling to be Completed by Consultant Team

- Improve Network Detail
 - Check all network attributes in sub area for accuracy i.e. speed/capacity
 - All existing relevant roads are added to the network (and attributes adjusted i.e. speed)
 - Subdivide Traffic Analysis Zones into appropriate grid for future development
 - Add centroid connectors as needed
- Calibrate Base Network Model (Origin Destination Matrix Estimation Process)
 - Calibrate to collected counts per INDOT's target expectations
 - Output is an Origin-Destination table for all nodes
 - *Calibration Report* produced to document procedure and results
- Model Proposed Configuration (Future Build and No Build)
 - No Build (Built off Base Model)
 - Use INDOT Provided Growth Rates
 - Output is projected Traffic Forecast (Turning Movement Counts) for study area
 - Build (Built off No Build Model)
 - Add Development
 - Add Future Land Use Forecast to Traffic Analysis Zones
 - Add Proposed Roads and Changes to Network (i.e. New Interchange)
 - Ensure enough capacity at new interchange to avoid constraining demand
 - Output is projected Traffic Forecast (Turning Movement Counts) for study area (truck and car separately)

Traffic Forecast and Calibration Reports

- Complete *Traffic Forecast Report*
 - Briefly describes process (Typically 1 Page)
 - Includes results with diagrams showing predicted traffic in various scenarios
- Complete *Calibration Report*
 - Discuss data collection, time of day distribution, special considerations, expected development
 - Includes Employment/Housing forecasts and traffic growth predictions
 - Travel Demand Model (Macro)
 - Include information on adjustments to the TAZs
 - Include O-D trip tables
 - Discussion of ODME process
 - Include percent error tables and graphs (RMSE for volume calibration)
 - Indiana typically requires convergence per industry standards (Discuss at Framework Meeting)
 - Tables Required: RMSE by facility type
 - Graphs Required: Scatter plots at appropriate scale to show R^2 best fit line.
 - Present Link-Flow calibration pertaining to established targets (Discuss at Framework Meeting)
 - Traffic Simulation Model (Micro) – Where needed
 - Done in addition to Macro Analysis
 - Speed and travel time data
 - Data field collected or from vehicle probe data
 - Compare collected data to mean of simulation speeds throughout model
 - Compare collected data to simulation travel times for all model paths
 - Indiana typically requires convergence per industry standards (Discuss at Framework Meeting)
 - Discuss targets, calibration range, and acceptable confidence interval at the framework meeting
 - Consider seasonal traffic adjustment needs (special generators)
 - Attach to *Traffic Forecast Report*