Model Application Process for Travel Forecasting Using an Existing Model

# Project Initiation

## PM and Lead Modeler review appropriateness of model and or forecasting process **[Peer Review]** scoped using the Quality Control Process for Model Appropriateness Worksheet

## If necessary, PM obtains a license, copyright agreement, or other authorization to use the model(s) for this project (*normally Alliance prepares a draft email for Client PM to submit to model owner*)

## Lead Modeler determines modeling methodology; if necessary, have client approve **[QA Review]**

## Determine what existing data is available and what data will need to be collected *(see data* collection methodology description for more details about data collection process)

## Determine study area boundaries

## Determine number of scenarios to be modeled

## Determine base year and future years to be modeled

## Determine what output data are needed for analysis, e.g.:

* VMT, VHT, Delay, Travel Times, etc.
* Turning Movements
* Volumes
* LOS
* Select Links
* Data related to client’s performance measures
* Data related to before and after studies (performance measures)
* Transit ridership

## Lead Modeler and PM determine resources (people and equipment) needed and a proposed schedule the coordinate with the Division/Quality Assurance Manager to ensure resources will be available

## PM and Lead Modeler develop work plan and project schedule based on available resources and client needs

## PM initiates Project Modeling Logs so that all modeling activities, statistical checks, quality reviews, variances, and remediation activities can be recorded in the logs

* Project Modeling Process Log (maintained by lead modeler)
* Project Modeling QC Log (maintained by lead modeler)
* Project QC Log (updated from modeling QC log by PM)

## **Division/Quality Manager conducts Quality Assurance Audit of Step 1 before moving to Step 2**

# Initial Modeling Steps

## PM obtains model and relevant documentation, and notifies lead modeler

## Lead modeler installs model

## Lead modeler runs model and compares with documented model results (validation report) **[Statistical Check]**

## Lead modeler makes adjustments as necessary, and informs QA manager and PM that model has been properly installed

## **Quality Manager confirms that model is running correctly before moving to Step 3**

# Determine what modifications need to be made to the model [Peer Review]

1. Lead Modeler provides PM with list of modifications that need to be made to the model to address the objectives of the current project
2. Lead Modeler provides PM with time/resources needed to make listed modifications
3. **PM (in coordination with Division Manager) makes final determination of modifications, resources and schedule (time on task by individual) to be used; posts in Project Work Plan; and gives modelers go ahead to proceed accordingly**

# Make modifications to model (if necessary, as determined in Step 3)

* 1. Lead Modeler defines tasks to accomplish modifications, if necessary

## Examples of common modifications include; add special generators, splitting TAZ, revising TAZ or regional demographic inputs, adding detail or correcting the network layer, improving the models validation in the area of the current analysis, improving specific components of the model deemed important to the analysis.

* 1. Modelers make modifications to support project analysis needs

## **Quality Manager conducts Quality Assurance Audit before moving to Step 5**

# Calibrate and Validate Model (an inherent QC step)

## Modeling team creates a model validation plan and establishes target metrics **[Peer Review]**

## Assigned Modeler runs a base year analysis on the model and compares to target metrics **[Statistical Check]**

## Assigned modeler ensures that the adjusted/refined project model is still valid using the client’s model validation criteria. Validation metrics may include:

* **For Trip Generation**: % of trips by trip purpose; average person trips per person; average person trips per household by trip purpose.
* **For Trip Distribution**: trip length by trip purpose and income group % of difference; coincidence ratio
* **For Mode Choice**: mode share; mode share by trip purpose and income group
* **For Trip Assignment**: percent of Count; Correlation Coefficient; Percent Root Mean Square Error
  + Total VMT; truck VMT; VMT by functional class
  + Other validation metrics are outlined in:FHWA’s *Travel Model Validation and Reasonability Checking Manual, 2nd Ed. (2010)*

## ***Quality Manager conducts Qual*ity Assurance Audit (which may include a quality control meeting with PM and modeling team) before moving to Step 5**

# Code Scenarios and Run Model

## PM obtains detailed description of scenarios from client/prime (*PM should provide a list of specific modeling data needed for each scenario to client to facilitate this process*) – This data should be in the form of both written descriptions as well as maps

## Assigned Modeler complete Quality Control Process for Model Network Layers Worksheet and codes scenarios onto network

## Lead Modeler ensures that coding aligns with the client’s vision **[Peer Review].** This may entail submission of the results to the client for review and comment. **[QA Review]**

## Assigned modeler runsmodel with each scenario, and provide results to Lead Modeler and PM.

## Lead Modeler or external Quality Control Personal reviews the results of each scenario run to determine whether: **[Peer Review]**

* Each step ran correctly
* Correct files were used (make sure old files were not used in the scenario runs)

## Lead Modeler conducts quality assessment on each scenario **[Reasonableness Checks]**

* Check for extremely high or low volumes – could be due to demographic issues
* Check overall VMT – is it reasonable compared to VMT in validation step?

## Assigned modeler makes modifications as necessary and re-runs the model

## Assigned modeler performs d) and e) above iteratively until accuracy is assured

## **Modeling Quality manager reviews prior to moving to Step 7**

# Provide Preliminary Results to Client

## Modeling Team prepares exhibits with model results marked as “DRAFT FOR REVIEW” for client

## Technical writer reviews exhibits **[Quality Check]**

## PM make final review of exhibits **[Quality Check]**

## PM provides results to client and reviews the exhibits with client

## CLIENT reviews results and provides feedback to PM **[Quality Check]**

## Modeling Team address any revisions or suggestions from client

## Repeat steps a through f above until client is satisfied with results

## **Quality Assurance Manager reviews results to ensure that client needs have been met**

# Provide Final Results to Client

## Modeling staff prepares a preliminary draft technical memorandum (using a standard format – either Alliance format or format provided by client/prime) of the modeling methodology and results

## Technical writing staff reviews and provides recommended edits to draft of tech memo to ensure: clarity of language; consistent use of terminology and abbreviations; and use of standard English grammar **[Quality Check]**

## Marketing staff reviews and edits formatting of document to ensure consistency throughout document with established template. **[Quality Check]**

## Project Manager reviews and approve edited draft with modeling staff and create a final draft for client review. **[Quality Check]**

## Project Manager submits draft of tech memo to client for review and comment.

## Project Manager receives comments from client and work with appropriate staff members to address comments (modelers, technical writer, and/or marketing staff) and prepare a final tech memo.

## **Project Manager reviews final tech memo with Quality Assurance Manager prior to submitting to client**

## Project Manger submits final tech memo to client

**Step 9.** **Project Closeout**

1. PM records all lessons learned and submits a copy to the Division Manager and Quality Assurance Manager
2. PM contacts CLIENT 10, 30 and 90 days after submittal to ensure results met expectations
3. PM contacts CLIENT 1 year after submittal to ensure that expectation are still being met and to determine whether client needs additional support (additional contract work)