INTRODUCTION

In 2012 EPA will require the use of MOVES for conducting a quantitative hot spot analysis within FMR nonattainment and maintenance areas.

A Project-Level analysis requires interfacing a traffic model with MOVES, and MOVES with an air dispersion model such as AERMOD. The linking of different model types and the minimization of their use for compliance purposes creates a need to define Best Practices.

The motivation for this research is summarized as follows:

1. "Best Practices" for establishing emissions impacts of traffic operational improvements are needed.
2. The linking of 3 model types – traffic activity, emission, and air dispersion – indicates a need for consistency in how links are defined through the modeling chain.

There is a need for developing practices for preparing a Project-level analysis where a traffic microsimulation model feeds inputs to MOVES. A signal optimization project can be a case study for demonstrating these methods.

RESEARCH TEST BED: TRAFFIC SIGNAL OPTIMIZATION (NHDOT CMAQ PROJECT)

The subject test bed is the NH 102/NH 128 intersection in Londonderry, New Hampshire. This is a fully actuated signalized intersection of two state-maintained arterials. The traffic signal timings were optimized as part of a CMAQ-funded signal-optimization project conducted for the New Hampshire Department of Transportation.

This intersection was selected for the test bed due to the significant reduction in [Hx/C] in vehicle spacing observed in the field after signal optimization. Thus, the "Project-Level" analysis conducted in this research is referred to as a "Laboratory Test Field" (i.e., baseline, or non-optimized) and a "Build" (optimized) scenario.

The following assumptions were used in the modeling test bed:

- Turning lanes were coded with storage lengths obtained from field measurements.
- Approach links were extended 1,200 feet to capture the maximum speed observed in the baseline condition.
- All links are modeled with 6% gradient.
- All vehicles were coded as MOVES SourceType 21 (passenger car).
- Speed distributions were based on the 35 mph (NH128) and 40 mph (NH102) posted speed limits.
- Reduced speed areas were applied within the intersection for left-turning vehicles (speeds ranging from 9-12 mph).
- Intersection approach links were coded for urban behavior and use the Wiedemann 74 car following model.
- 30 model runs for each of the two scenarios (baseline and optimized) were conducted, and the results averaged for analysis.

MODELING ASSUMPTIONS

Traffic microsimulation models generate a significant amount of detail on vehicle performance that is critical for determining air quality impacts. Details such as second-by-second speed/acceleration profiles, vehicle characteristics, and network characteristics can be directly linked with MOVES.

Incorporating Traffic Activity Data into CMAQ

Traffic microsimulation models are used to generate the vehicle activity data. The following assumptions were used in the modeling test bed:

-LINKS AND TRAFFIC ACTIVITY DATA

There is a need for developing practices for preparing a Project-level analysis where a traffic microsimulation model feeds inputs to MOVES. A signal optimization project can be a case study for demonstrating these methods.