A regional air quality analysis, including the I-290 improvements and a pollutant burden analysis for the I-290 project were previously documented in the *Air Quality Sensitivity Analysis* (August 2015). A carbon monoxide intersection analysis documented in *Interstate-290 Carbon Monoxide Build vs. No-Build Analysis for Individual Intersection Locations in Oak Park* (August 2015) was also performed for the I-290 project.

Mobile Source Air Toxic Analysis (MSAT)

Air quality in the U.S. is governed primarily by the federal Clean Air Act (CAA) and is administered by the U.S. Environmental Protection Agency (USEPA). As such, the USEPA regulates mobile source air toxics (MSATs). MSATs are a subset of the 188 air toxics defined by the CAA. MSATs are chemicals emitted from highway vehicles and non-road equipment. Some MSATs are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Others are emitted from the incomplete combustion of fuels or as secondary combustion products. Metals emitted result from engine wear or from impurities in oil or gasoline.

On February 3, 2006, the FHWA released *Interim Guidance on Air Toxic Analysis in NEPA Documents* (FHWA 2006a). This guidance was superseded on December 6, 2012 by FHWA's *Interim Guidance Update on Air Toxic Analysis in NEPA* (FHWA 2012). The purpose of FHWA's guidance is to advise when and how to analyze MSATs in the National Environmental Policy Act (NEPA) environmental review process for highways. This guidance is considered interim since MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

A quantitative MSAT analysis was performed because the project creates new capacity on a facility with over 140,000 average annual daily traffic and is located in proximity to populated areas. A quantitative MSAT analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, between the alternatives. This analysis is derived in part from a study conducted by the FHWA titled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2006b).

I-290 Eisenhower Expressway MSAT Analysis

A quantitative MSAT analysis was performed of the I-290 alternatives to estimate the 2040 MSAT emissions for the I-290 improvement alternatives. Although not required by NEPA, the I-290 Phase 1 Study Round 3 alternatives were analyzed, by comparing the emissions from the four Build alternatives (GP, HOV2+, HOT3+, HOT3+&TOLL) to the No Build alternative.

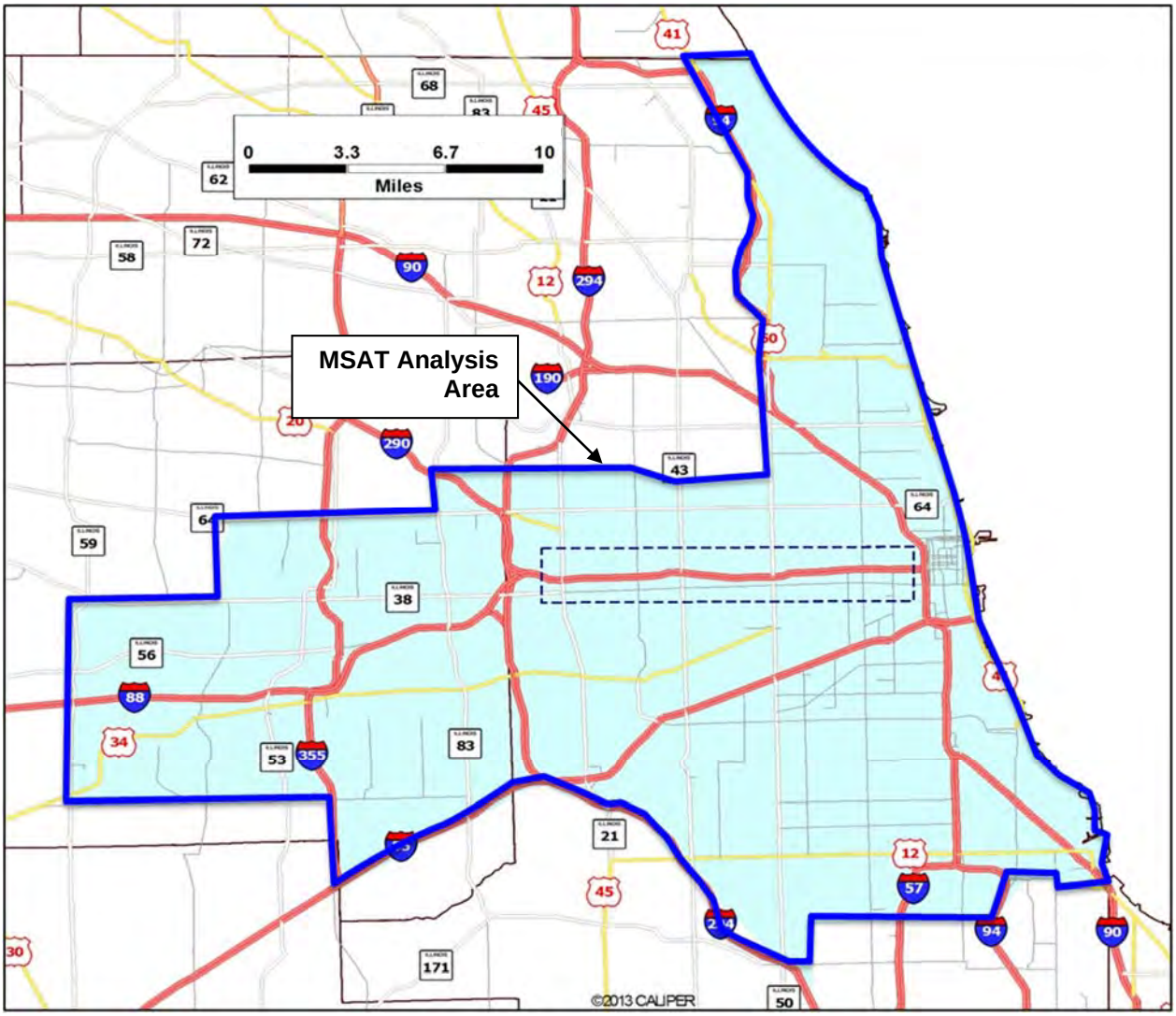
The MSAT analysis area is shown in Figure 1 and represents the general geographic area where changes in traffic volumes are expected to occur as a result of the Round 3 Build alternatives. The I-290 regional travel demand forecasting model was used to define the area where changes in traffic volumes between the Round 3 Build alternatives and the No Build alternative in 2040 are expected to occur. As seen in Figure 1, the analysis area encompasses portions of Cook and DuPage Counties, as roads that lead directly to/from I-290 and those roads where traffic is diverted or attracted are included.

USEPA's MOVES2014 emissions model was used for the MSAT analysis. MOVES2014 represents a major new air model revision, and includes new and updated emissions data from a wide range of test programs and other sources, new effects of fuel properties, new data on

evaporative emissions, new analyses of particulate matter data, and new default data based on more recent inventories. MOVES2014 input factors were obtained from Chicago Metropolitan Agency for Planning (CMAP), the metropolitan planning organization for the Chicago region.

MOVES2014 incorporates forecasted vehicle miles of travel (VMT) and travel speeds (obtained from the I-290 Phase 1 Study travel demand model), as well as specific MOVES2014 input factors, such as inspection and maintenance programs, fleet mix, and travel speed profiles, for the traffic network being analyzed.

Figure 1. I-290 Eisenhower Expressway Improvement MSAT Analysis Area



The MSAT analysis estimated the daily pollutant emissions levels (in pounds) for each of the Round 3 Build alternatives, as well as the No Build Alternative, to provide a basis of comparison. Table 2 summarizes the MSAT emissions of all analysis area roads contained in

the I-290 travel forecasting model, reflecting regional changes in traffic due to the I-290 Build Alternatives, and therefore isolates the effects of the I-290 project.

Table 2. MSAT Analysis (daily pounds)

Pollutant/Parameter	No Build MSAT Emissions (lbs)	GP Lane (% Change from NB)	HOV 2+ (% Change from NB)	HOT 3+ (% Change from NB)	HOT 3+ & TOLL (% Change from NB)
Acrolein	6.391	-0.08%	-0.07%	-0.17%	-0.62%
Benzene	90.412	+0.30%	-0.04%	-0.08%	+0.05%
1,3 Butadiene	0.399	-0.20%	-0.08%	-0.20%	-0.83%
Diesel Particulate Matter (PM)	274.540	+0.10%	-0.13%	-0.16%	-1.11%
Formaldehyde	141.552	-0.07%	-0.07%	-0.17%	-0.60%
Naphthalene	11.944	-0.02%	-0.06%	-0.16%	-0.53%

Source: Parsons Brinckerhoff, 2015

The results of the MSAT analysis are presented in Table 2. The Round 3 Build alternatives all exhibit very minor increases (+0.3% to +0.5%) in vehicle miles of travel (VMT) in the analysis area, but increases in travel speed offset the VMT changes, resulting in overall MSAT reductions for all but three instances for the four Build alternatives. Both the HOV 2+ and HOT 3+ alternatives result in minor decreases in all six air toxic parameters, as compared to the No Build alternative. The HOT 3+ & TOLL alternative result in minor decreases in five out of the six MSATs. The GP Lane alternative results in minor increases in two out of the six pollutants as compared to the No Build alternative. This is in part due to the additional capacity for truck traffic in the form of the general purpose lane addition in each direction, which is not present in the managed lane alternatives.

MSAT Analysis Conclusion

This MSAT analysis shows that there is no meaningful difference in MSAT emission among the Round 3 Build alternatives. Thus, this MSAT analysis will be included in the environmental impact statement, but it does not influence the selection of a preferred alternative.

Overall Air Quality Analysis Conclusions

A pollutant burden, carbon monoxide, and MSAT analyses were performed for this project and results are summarized below:

- Pollutant burden: major transportation-related pollutants, including ozone and particulate matter show no substantial change for the build alternatives. Positive trends (lower pollutant levels than No Build) resulted for managed lane alternatives.

- Carbon monoxide: the carbon monoxide screen for intersection modeling (COSIM) analysis showed carbon monoxide levels at intersections in Oak Park with I-290 to be well below air quality standards.

- MSAT: no meaningful difference in MSAT emissions for the build alternatives. Positive trends (lower MSAT levels than No Build) resulted for managed lane alternatives.

A project level, quantitative analysis for fine particulate matter ($PM_{2.5}$) is required for "Projects of Air Quality Concern." Examples of types of projects that would require a PM2.5 quantitative analysis include:

- New highways or expressway that serves a significant volume of diesel truck traffic *(I-290 project is an existing facility)*

- New exit ramps or other improvements that connect to a bus, freight or intermodal freight facility *(no new ramps proposed)*

- Significant increase in diesel transit buses or diesel trucks, typically an increase of approximately 10,000 diesel trucks *(I-290 managed lane alternatives 70% to 90% below the general threshold of 10,000 trucks per day increase)*

- Expansion of an existing highway that connects to a congested intersection with significant increases in diesel trucks *(I-290 project improves interchange capacity, truck volumes 70% to 90% below the general threshold of 10,000 trucks per day increase)*

Since the I-290 managed lane alternatives provide additional capacity for carpools and/or tolled auto vehicles, additional truck travel is not encouraged. As a result, a quantitative analysis for PM2.5 is not required.