



Chicago Metropolitan Agency for Planning

233 South Wacker Drive
Suite 800
Chicago, Illinois 60606

312 454 0400
www.cmap.illinois.gov

Tier II Consultation Meeting

Agenda

October 24, 2013

Lake County Room

CMAP Offices

Teleconference # 800-747-5150, Access Code 3867454

- 1.0 Call to Order and Introductions** 10:30 a.m.
- 2.0 Agenda Changes and Announcements**
- 3.0 Approval of Minutes – September 20, 2013**
ACTION REQUESTED: Approval
- 4.0 Illiana PM_{2.5}**
IDOT and INDOT are requesting consideration and approval of the parameters for the Illiana PM_{2.5} analysis. Materials are attached.
ACTION REQUESTED: Concurrence on parameters by CMAP and NIRPC consultation teams
- 5.0 PM_{2.5} Proposed Designation Boundaries**
The PM_{2.5} annual standard was revised in January (effective March 18, 2013) to 12.0 micrograms per cubic meter. The Chicago area does not attain that standard; Illinois EPA is holding public meetings and a comment period for their proposed nonattainment area boundary designations. They are proposing the same counties and townships in the Chicago region as the for the 1997 PM_{2.5} standard.
ACTION REQUESTED: Discussion
- 6.0 Tracking Projects of Air Quality Concern (PAQC)**
The current list of projects is attached.
ACTION REQUESTED: Information
- 7.0 CREATE East-West Corridor From Argo Interlocking (Cook) to CP509 (Cook) EW-3 Pullman JCT (01-05-0012)- General Conformity Analysis**
Determination of whether Cook County emission rates or project level rates should be used to estimate light duty emission rates has been requested by IDOT. Materials are attached.
ACTION REQUESTED: Determination of appropriate rates

8.0 Major Capital Project Updates

A brief update on the status of Major Capital Projects is available on the Transportation Committee [minutes page](#).

ACTION REQUESTED: Information

9.0 Other Business

10.0 Public Comment

This is an opportunity for comments from members of the audience. The amount of time available to speak will be at the chair's discretion. It should be noted that the exact time for the public comment period will immediately follow the last item on the agenda.

11.0 Next Meeting

12.0 Adjournment

Tier II Consultation Team Members:

	CMAP		FHWA		FTA		IDOT
	IEPA		RTA		USEPA		

Air Quality Analysis Methodology Particulate Matter (PM_{2.5})



Prepared For:
Illinois Department of Transportation
Indiana Department of Transportation

Prepared By:
Parsons Brinckerhoff

October 2013

TABLE OF CONTENTS

ANNUAL PM _{2.5} HOT-SPOT ANALYSIS.....	1
1. Determine Need	1
2. Determine Approach, Models and Data.....	3
3. Estimate On-Road Vehicle Emissions.....	4
4. Estimate Emissions from Road Dust, Construction and Additional Sources ...	5
5. Select an Air Quality Model, Data Inputs and Receptors	5
6. Determine Background Concentrations From Nearby and Other Sources	6
7. Calculate Design Values and Determine Conformity	6
8. Consider Mitigation or Control Measures	7
9. Document the PM Hot-Spot Analysis.....	8

LIST OF TABLES

Table 1. Preliminary Projected 2040 Bi-Directional AADT.....	2
Table 2. Preliminary Projected 2018 Bi-Directional AADT.....	3
Table 3. Proposed Traffic Analysis Combinations Using Time Periods Defined in CMAP Model/Illiana Corridor Study.....	5

THIS PAGE INTENTIONALLY LEFT BLANK

Annual PM_{2.5} Hot-Spot Analysis

The PM analysis follows EPA's nine-step process, as shown in Exhibit 3-1 on page 19 of the *Transportation Conformity Guidance for Quantitative Hot-spot Analysis in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas* (USEPA, 2010), December 2010, found here: <http://www.epa.gov/otaq/stateresources/transconf/policy/420b10040.pdf>.

1. Determine Need

The Illiana Corridor traverses Will County in Illinois and Lake County in Indiana. Will County is currently classified as moderate non-attainment area and Lake County is classified as a maintenance area for the 1997 (annual) PM_{2.5} standard. As shown in Table 1 and Table 2, the Illiana Corridor is predicted to have between 6,100 to 8,100 Average Annual Daily Traffic (AADT) diesel trucks in 2040 and between 3,450 and 5,340 AADT diesel trucks in 2018. According to Section 93.123(b)(1) of the conformity rule, which defines those projects that require a PM_{2.5} or PM₁₀ hot-spot analysis, this project qualifies as "(i) New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles." This information was brought to the Chicago Metropolitan Agency for Planning (CMAP) on February 14, 2013 and they determined that the project would require a quantitative hot-spot analysis following EPA's *Transportation Conformity Guidance for Quantitative Hot-spot Analysis in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas* (USEPA, 2010), December 2010.

Table 1. Preliminary Projected 2040 Bi-Directional AADT

Section	Projected 2040 AADT		
	Passenger Car	Diesel Truck	Total
Illiana Corridor from I-55 to IL 53	23,600	6,600	30,200
Illiana Corridor from IL 53 to Wilton-Center Road	12,800	6,100	18,900
Illiana Corridor from Wilton-Center Road to US 45	16,000	8,100	24,100
Illiana Corridor from US 45 to I-57	11,800	8,000	19,800
Illiana Corridor from I-57 to IL 50	17,700	7,700	25,400
Illiana Corridor from IL 50 to IL 1	11,300	7,100	18,400
Illiana Corridor from IL 1 to US 41	9,700	7,500	17,200
Illiana Corridor from US 41 to SR 55	9,200	7,400	16,600
Illiana Corridor from SR 55 to I-65	11,200	7,300	18,500
I-55 north of Illiana Corridor	32,200	11,300	43,500
I-55 south of Illiana Corridor	30,900	13,200	44,100
I-57 north of Illiana Corridor	24,600	4,900	29,500
I-57 south of Illiana Corridor	41,700	7,100	48,800
I-65 north of Illiana Corridor	46,000	19,000	65,000
I-65 south of Illiana Corridor	44,600	18,600	63,200

Source: Parsons Brinckerhoff Travel Demand Modeling, B3 Alternative

Table 2. Preliminary Projected 2018 Bi-Directional AADT

Section	Projected 2018 AADT		
	Passenger Car	Diesel Truck	Total
Illiana Corridor from I-55 to IL 53	10,720	3,980	14,700
Illiana Corridor from IL 53 to Wilton-Center Road	6,450	3,450	9,900
Illiana Corridor from Wilton-Center Road to US 45	10,550	5,250	15,800
Illiana Corridor from US 45 to I-57	6,860	5,340	12,200
Illiana Corridor from I-57 to IL 50	9,760	4,640	14,400
Illiana Corridor from IL 50 to IL 1	5,210	4,490	9,700
Illiana Corridor from IL 1 to US 41	3,470	4,530	8,000
Illiana Corridor from US 41 to SR 55	3,840	4,460	8,300
Illiana Corridor from SR 55 to I-65	8,260	4,840	13,100
I-55 north of Illiana Corridor	27,120	8,280	35,400
I-55 south of Illiana Corridor	24,340	9,060	33,400
I-57 north of Illiana Corridor	23,050	3,250	26,300
I-57 south of Illiana Corridor	35,200	4,500	39,700
I-65 north of Illiana Corridor	39,710	13,690	53,400
I-65 south of Illiana Corridor	37,230	13,770	51,000

Source: Parsons Brinckerhoff Travel Demand Modeling, B3 Alternative

2. Determine Approach, Models and Data

a. Approach

In consultation with the interagency working group, those locations of the project with the highest expected air quality concentrations will be analyzed. Based on the data in Table 1 and in consultation with CMAP and NIRPC, the following sites will be analyzed:

- **I-55 to IL-53** – has the highest overall AADT and sensitive receptors nearby such as Midewin Tallgrass Prairie – 8th highest truck volumes, but 1st highest total traffic
- **US 45 to I-57** – (including west of US 45) highest truck volumes, nearby residential, new interchange and farm nearby – will also encompass 3rd highest truck volume site (I-57 to IL-50).
- **IL-1 to US 41** – 4th highest truck volumes, crosses both states, new interchange, has nearby sensitive receptors.

- **SR 55 to I-65** – nearby sensitive receptors, 6th highest truck volumes, 6th highest total traffic, Indiana location
- b. **The analysis will be performed for the opening (2018) and design (2040) years of the project.** Since the project is located in an area designated as nonattainment for the annual PM_{2.5} NAAQS, but attainment for the 24-hour PM_{2.5} NAAQS and 24-hour PM₁₀ NAAQS, the quantitative PM hot-spot analysis will be limited to comparing the project's impact to the **1997 annual PM_{2.5} standard for Indiana and the 2012 annual PM_{2.5} standard for Illinois.**
- c. *PM Emissions*

As agreed upon during the June 20, 2013 Tier II Consultation Meeting, the PM hot-spot analysis will include only directly emitted PM_{2.5} emissions. PM_{2.5} precursors are not considered in PM hot-spot analyses, since precursors take time at the regional level to form into secondary PM. Exhaust, brake wear, and tire wear emissions from on-road vehicles are included in the project's PM_{2.5} analysis. For this analysis, both running and crankcase running exhaust will be considered because start exhaust is unlikely to occur on the roadways included in the model domain. Re-entrained road dust will not be included because the State Implementation Plans do not identify that such emissions are a significant contributor to the PM_{2.5} air quality in the nonattainment area. Emissions from construction-related activities will not be included because they are considered temporary as defined in 40 CFR 93.123(c)(5) (i.e., emissions that occur only during the construction phase and last five years or less at any individual site).
- d. *Model*

The analysis will be performed using the current version of EPA's MOVES emissions model (MOVES2010b) and CAL3QHCR, (dated 12355).
- e. *Data*

MOVES input files have been obtained from the local MPOs (CMAP and NIRPC). Project-specific traffic data, including hourly volume, average vehicle speeds, and facility type, will be obtained for each roadway section in the project area. Hourly vehicle volumes will be obtained for A.M. peak, midday, P.M. peak, and off-peak traffic conditions. In consultation with EPA, the appropriate hourly meteorological data will be obtained and/or purchased. The data is expected to be provided or purchased in the format required for use in CAL3QHCR. The meteorological data will be representative of the terrain, climate, and topography of the study area.

3. Estimate On-Road Vehicle Emissions

On-road vehicle emissions will be estimated using MOVES2010b. MOVES input files have been provided by each of the MPOs. MOVES input relies on link-specific data. The PM emissions vary by time of day and time of year. Volume and speed data for each link will be obtained from the traffic analysts for A.M. peak, P.M. peak, midday, and off-peak traffic conditions. For each intersection and analysis year, MOVES will be

run 16 times (A.M. peak, P.M. peak, midday, and off-peak) using quarterly climate conditions, as developed by the MPOs. For every link, a set of four emission factors in units of grams per mile will be developed for use for each of the analysis years. Traffic projections are currently available for the time periods shown in Table 3, as are the proposed time period groupings for the analysis.

Table 3. Proposed Traffic Analysis Combinations Using Time Periods Defined in CMAP Model/Illiana Corridor Study

Name	Description	From	To	# of Hours	Time period
Period 1	Overnight	8:00 PM	6:00 AM	10	Off peak
Period 2	Pre- AM Shoulder	6:00 AM	7:00 AM	1	AM peak
Period 3	AM Peak	7:00 AM	9:00 AM	2	AM peak
Period 4	Post- AM Shoulder	9:00 AM	10:00 AM	1	AM peak
Period 5	Midday	10:00 AM	2:00 PM	4	Midday
Period 6	Pre- PM Shoulder	2:00 PM	4:00 PM	2	Midday
Period 7	PM Peak	4:00 PM	6:00 PM	2	PM peak
Period 8	Post- PM Shoulder	6:00 PM	8:00 PM	2	PM peak

4. Estimate Emissions from Road Dust, Construction and Additional Sources

Road dust emissions will not be included in the analysis, as described in step 2(b). Construction emissions will not be included because construction will not occur at any individual location for more than five years. No additional sources of PM_{2.5} emissions will be included. It is assumed that PM_{2.5} concentrations due to any other nearby emissions sources will be included in the ambient monitor values used for background concentrations. In addition, this project is not expected to result in changes to emissions from nearby sources.

5. Select an Air Quality Model, Data Inputs and Receptors

a. Model

The USEPA's CAL3QHCR air dispersion model will be used to estimate concentrations of PM_{2.5} due to project operation. The model uses traffic data, emission factor data, and meteorological data to estimate ground-level concentrations of PM_{2.5} at a series of receptors. For each modeled alternative, the model setup will include a series of links, or roadway segments, in the vicinity of the freeflow segment, interchange, or intersection being modeled. A surface roughness of 74cm (corn fields), and an averaging time of 60 minutes, along with the appropriate meteorological data will be used.

b. Data Inputs

Link-specific inputs include length, mixing zone width, hourly volume, and emission factor. A conservative link height of 0 feet will be assumed for all links as confirmed at the Tier II Consultation Meeting on June 20, 2013.

Meteorological input files will be processed using surface data and upper air data as detailed in step 2(e). As recommended in EPA's "Guideline on Air Quality Models" (Appendix W to 40 CFR Part 51), five consecutive years of the most recent and readily available meteorological data (2006-2010) from the Greater Kankakee Airport will be used for the dispersion modeling analysis. For each alternative, CAL3QHCR will be run separately for each of the five years of meteorological data. CAL3QHCR does not distinguish between emissions changes due to seasonal differences; therefore, each season will be run separately, for a total of 20 model runs per alternative.

c. Receptors

Receptors will be placed in order to estimate the highest concentrations of PM_{2.5} to determine any possible violations of the NAAQS. A receptor grid will be placed over the microscale study area with the smallest receptor spacing within the area. Highest concentrations are expected to occur at the intersections/interchanges with the highest-volume roadways. Receptors will be placed along the right of way and five meters away from any project features. Identical receptor grids will be used for No-Build and Build Alternatives in order to directly compare project effects. Receptors that fall within five meters of any project feature or other locations where public would normally be present for a limited time will be removed, according to the PM guidance.

6. Determine Background Concentrations From Nearby and Other Sources

As recommended in the Tier II Consultation Meeting, monitored data from the Braidwood monitoring site will be used as background concentrations. Using EPA's design value database, (<http://www.epa.gov/airtrends/values.html>), the 2010-2012 design value is 9.9 ug/m³ at this location. The design hour background value will be added to the CAL3QHCR modeled design values for comparison to the NAAQS.

This background values will likely be conservative, because it is expected that ambient PM_{2.5} concentrations will be lower in future years as a result of State Implementation Plans and the general trend in declining vehicle emissions due to technological advances. It is assumed that emissions from other nearby sources are already included in the ambient monitoring data.

7. Calculate Design Values and Determine Conformity

The model results (Step 5) will be added to the background concentration(s) (Step 6) for both the Build and No-Build alternatives in order to calculate the design values. The annual PM_{2.5} design value is currently defined as the average of three consecutive years'

annual averages, each estimated using equally-weighted quarterly averages. The NAAQS is met when the three-year average concentration is less than or equal to the 1997 annual PM_{2.5} NAAQS. CAL3QHCR output provides the maximum quarterly average PM_{2.5} concentration at each receptor. For the receptor with the maximum modeled concentration in each alternative, the following steps will be used to determine the design value, as outlined in the guidance:

- i. For each year of meteorological data, determine the average concentration in each quarter.
- ii. Within each year of meteorological data, add the average concentrations of all four quarters and divide by four to calculate the average annual modeled concentration for each year of meteorological data.
- iii. Sum the modeled average annual concentrations from each year of meteorological data, and divide by the number of years of meteorological data used.
- iv. Add the average annual background concentration to the average annual modeled concentration to determine the total average annual concentration.

If the design value in the Build alternative is less than or equal to the relevant PM NAAQS at appropriate receptors, then the project meets conformity requirements. In the case where the design value is greater than the NAAQS in the Build alternative, a project could still meet conformity requirements if the design values in the Build alternative are less than or equal to the design values in the No-Build alternative at appropriate receptors.

8. Consider Mitigation or Control Measures

If the project does not meet conformity requirements, mitigation or control measures to reduce emissions in the project area may be considered by the project sponsors. If such measures are considered, additional modeling will need to be completed and new design values calculated to ensure that conformity requirements are met. Mitigation measures, which must include written commitments for implementation (40 CFR 93.125), include the following:

- i. Retrofitting, replacing vehicles/engines, and using cleaner fuels;¹
- ii. Reducing idling;²

^{1,2} It should be noted that IDOT currently has a special provision for retrofitting diesel construction equipment, and clean fuels and idling restrictions are found in the Department's supplemental specifications and recurring special provisions. These provisions can be found at: <http://www.dot.state.il.us/constructionmanual/preface.html>.

- iii. Redesigning the transportation project itself;
- iv. Controlling fugitive dust; and
- v. Controlling other sources of emissions.

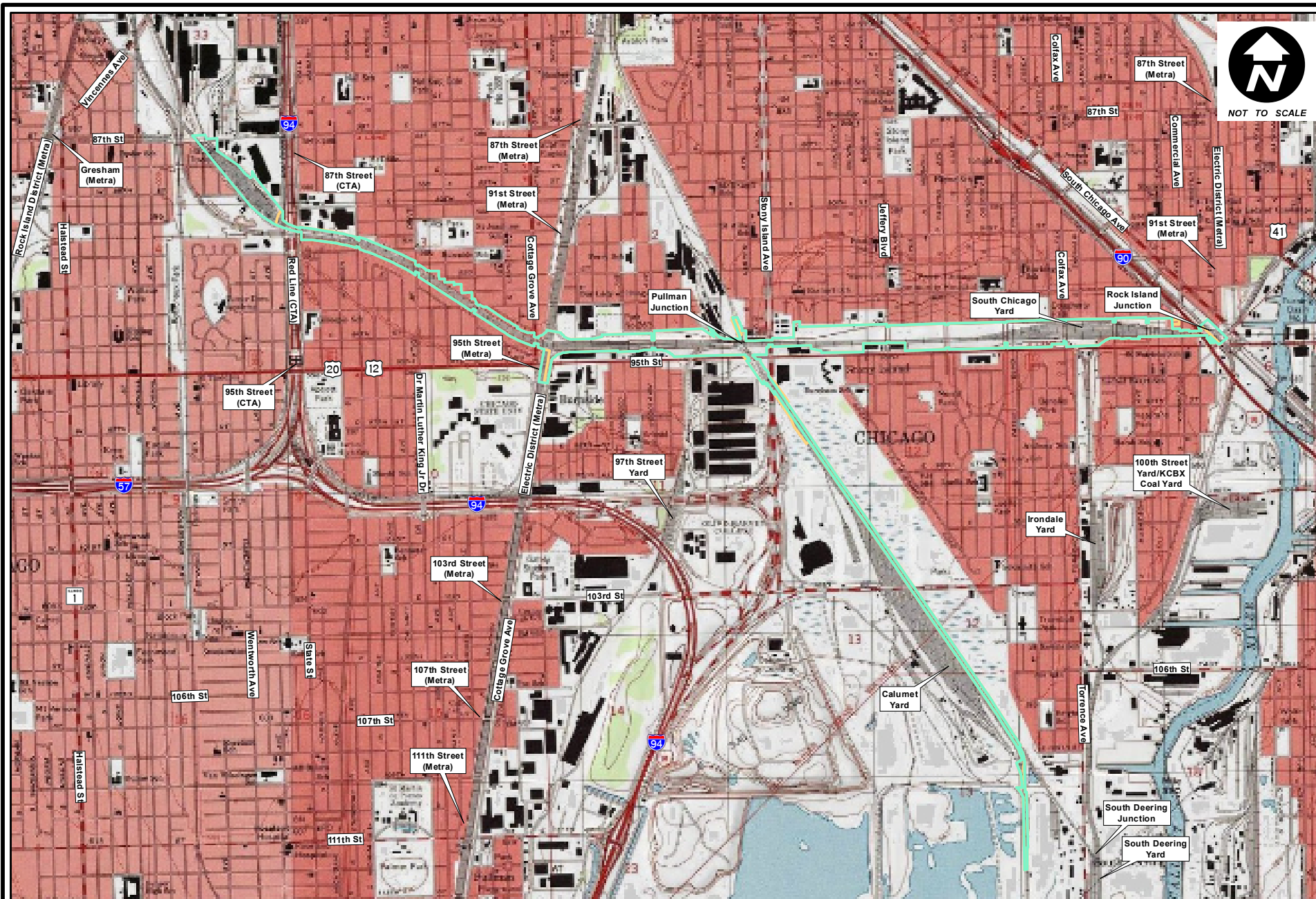
9. Document the PM Hot-Spot Analysis

The PM hotspot analysis and results will be documented in an Air Quality Technical Report. Due to the large volume of input and output files created for this analysis, they will be available electronically upon request.



Tier II Consultation Team Consideration of Projects of Air Quality Concern (PAQC)

Project	TIP ID	Date of latest consideration	Determined to be a PAQC? (Y/N)	Approved Approach	Monitoring for future consideration
Circle Interchange	01-12-0019	2/14/2013	No		
Illiana Expressway	12-02-9024	2/14/2013	Yes	TBD 6/20/13	
I-90 Managed Lanes	03-96-0004				Data supplied to IDOT 6/20/13
Ashland Ave. BRT	16-13-0005	6/20/2013	No		
CREATE Passenger Rail Projects	varies	11/27/2007	Individual projects will be analyzed	Methodology approved	
		8/28/2012	Individual projects will be analyzed	MOVES input parameter table revisions approved	
Elgin - O'Hare East Ext. from Rohlwing Rd. to O'Hare Western Bypass	03-95-0001	2/5/2011	Yes	Concurrence with analysis methodology	
		2/9/2012	Yes	Concurrence with the Hot Spot Analysis completed for the draft EIS	
CREATE - East-West Corridor from Argo Interlocking (Cook) to CP509 (Cook) EW-3 Pullman JCT	01-05-0012	10/24/2013			For discussion 10/24/13



THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Chicago, IL

Source: USGS Base Map Blue Island Quadrangle
USGS Base Map Lake Calumet Quadrangle

Legend

— Addendum A ESR Limit — Original ESRF Limit (2011)

CREATE EW3
ESRF ADDENDUM A

LOCATION MAP

EXHIBIT 1

April, 2013

Background: Copyright © 2011 National Geographic Society, Inc.