

Appendix H. Off-Model Analysis for Incident Detection, Notification and Response Programs on Interstate Highways and Freeways in Durham and Wake Counties

The Incident Management Program reduces congestion by removing inoperable vehicles due to crashes, mechanical break-downs or other reasons. Reducing nonrecurring congestion is the goal of this program.

The Triangle Regional Transportation Management Center (TRTMC) in Raleigh monitors and operates 44 CCTV cameras, 17 DMS, and 5 HAR along Triangle area freeways.

The motorist assistance patrol normal patrol routes include 78 miles on I-85, I-40, I-440, and US 1 and responds to an additional 42 miles on I-40, I-85, I-540, US 64, US 15-501 and NC 147.

The effort is supplemented with the following Regional Traveler Information activities:

- Internet Web Sites – www.ncsmartlink.org, Traffic Patrol Broadcasting through WRAL-TV online
- Call-in Telephone – Traffic Patrol Broadcasting
- Cooperative Agreements for use of live video images– NCSHP, WRAL- TV, WTVD –TV, NBC-17, Time-Warner, Curtis Media Group, Town of Cary, City of Durham, and City of Raleigh
- 511 – Statewide Traveler Information Phone number

The following assumptions and methods (in accordance with the FHWA Region IV's *Off-Model Air Quality Analysis: A Compendium of Practice*, which provided guidance on estimating emissions effects of these projects) were used to quantify the emission benefits from this program:

- Incident management program with components such as the surveillance, motorist assistance patrol and traveler information activities described above has 50% effectiveness.
- Emissions caused by nonrecurring congestion accounts for 4.9% of total emissions.
- The incident management system is assumed to affect only the Interstates and Freeways.
- Interstates and Freeways VMT subject to the non-recurring congestion conditions and program activities is as follows: 50% of VMT in 2015 and 2017, 75% of VMT in 2025 and 100% of VMT in 2035.

Incident management analysis was calculated for the years 2015, 2017, 2025 and 2035.

The tables on the following pages show the application of these parameters in Durham and Wake Counties; a sample calculation is given for Durham County NO_x in 2015.

Durham County Regional Freeway Emissions			
Year	Pollutant		(this table shows the total emissions, by pollutant, from freeway travel in the county [note that 2017 is not a CO analysis year])
	NOx	CO	
2015 Total	2,863	44,450	
2017 Total	2,313		
2025 Total	1,433	46,560	
2035 Total	1,345	50,726	

Emissions Caused by Nonrecurring Congestion (4.9% of total).

Year	Pollutant		(this table is 4.9% of the emissions from the previous table; the amount attributable to non-recurring congestion due to crashes, break-downs, etc. assuming 100% of VMT is subject to non-recurring congestion)
	NOx	CO	
2015 Total	140	2,178	
2017 Total	113		
2025 Total	70	2,281	
2035 Total	66	2,486	

Program Type		Effectiveness		Program in Use =	<table border="1"> <tr><td>1</td><td>2015 Total</td></tr> <tr><td>1</td><td>2017 Total</td></tr> <tr><td>1</td><td>2025 Total</td></tr> <tr><td>1</td><td>2035 Total</td></tr> </table>	1	2015 Total	1	2017 Total	1	2025 Total	1	2035 Total
1	2015 Total												
1	2017 Total												
1	2025 Total												
1	2035 Total												
Incident Detection and Response		50%	1										
Motorist Assistance Patrol		25%	2										
Surveillance		15%	3										

Emissions Reduction

Year	Total Freeway VMT	Percent of VMT Subject to Program	NOx (KG/Day)	CO (KG/Day)
2015 Total	4,234,422	50%	35	545
2017 Total	4,582,690	50%	28	
2025 Total	5,567,647	75%	26	856
2035 Total	6,194,480	100%	33	1,243

Note: Freeway VMT is the total of Urban Interstate, Urban Freeway and Rural Interstate VMT.

Durham Sample calculation (NO_x in Year 2015): Total freeway emissions of 2,863 kg/day are multiplied by 4.9% to get the 140 kg/day of emissions that would be due to non-recurring congestion if all Freeway VMT were subject to non-recurring congestion. These emissions are then multiplied by 50% to get the 70 kg/day of emissions actually due to non-recurring congestion in 2015 in the absence of any incident management program. These emissions are then multiplied by the 50% effectiveness of the incident management program to get the 35 kg/day of NO_x emissions reduction due to the incident management program.

Wake County Freeway Emissions

Year	Pollutant		
	NOX	CO	
2002 Total	5,156	0	2002
2015 Total	6,607	99,244	2015
2017 Total	5,156		2017
2025 Total	3,178	99,068	2025
2035 Total	3,621	93,085	2035

Emissions Caused by Nonrecurring Congestion (4.9% of total).

Year	Pollutant		
	NOX	CO	
2015 Total	324	4863	2015
2017 Total	253	0	2017
2025 Total	156	4854	2025
2035 Total	177	4561	2035

Program Type	Effectiveness		Program in Use =	
Incident Detection and Response	50%	1		1
Motorist Assistance Patrol	25%	2	1	2015 Total
Surveillance	15%	3	1	2017 Total
			1	2025 Total
			1	2035 Total

Year	Emissions Reduction			
	Total Freeway VMT	Percent of VMT Subject to Program	NOX (KG/Day)	CO (KG/Day)
2015 Total	10,369,190	50%	81	1,216
2017 Total	10,794,202	50%	63	
2025 Total	13,100,042	75%	58	1,820
2035 Total	13,114,312	100%	89	2,281

Note: Freeway VMT is the total of Urban Interstate, Urban Freeway and Rural Interstate VMT.