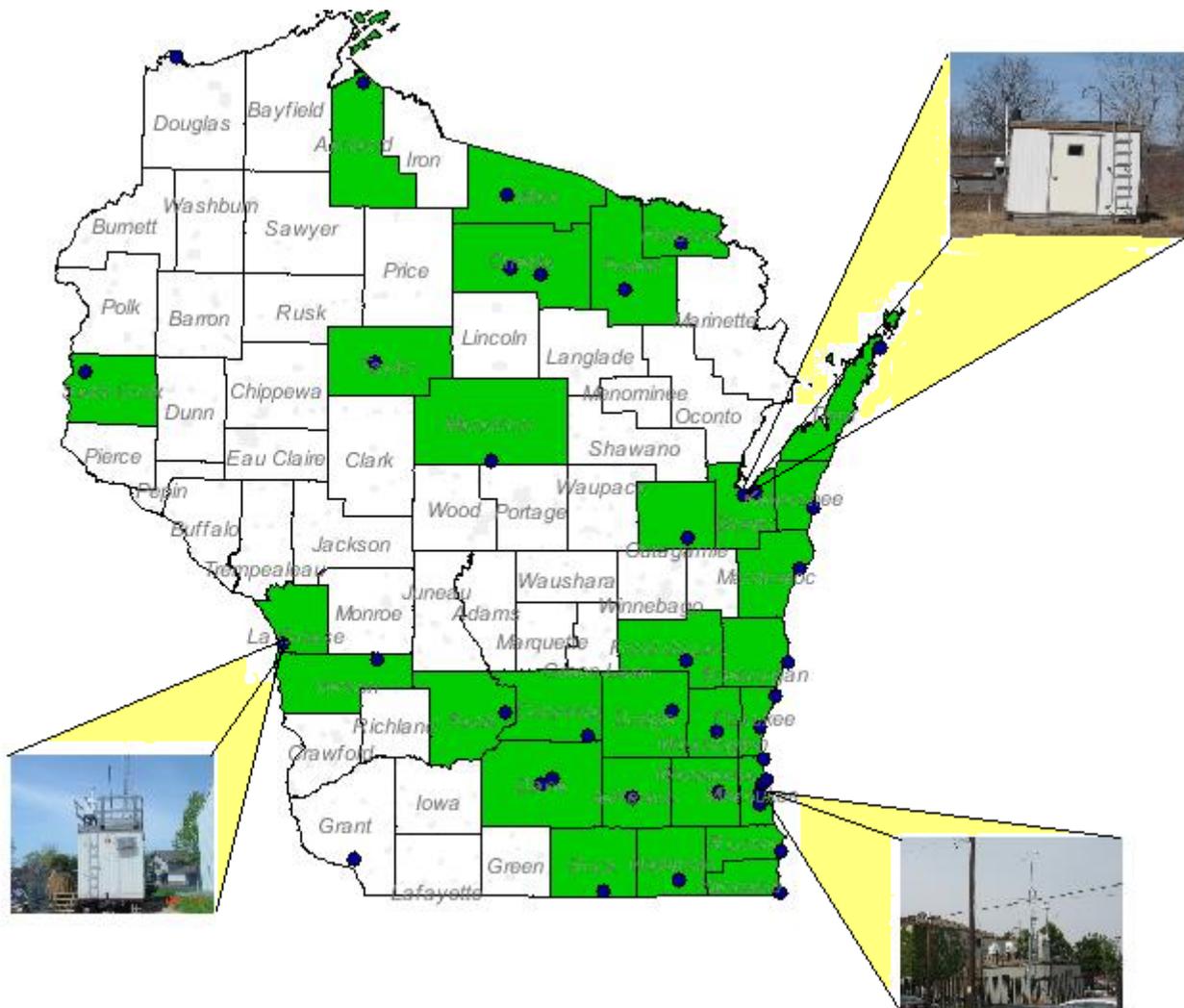




# Wisconsin Department of Natural Resources/Air Monitoring

## Near-Road Network Plan 2013

June 2012



## Signature Page

By the signatures below, the Wisconsin Department of Natural Resources/Air Monitoring certifies that the information contained in this Network document for sampling year 2013 is complete and accurate at the time of submittal to US EPA Region 5. However, due to circumstances that may arise during the sampling year, some network information may change. A notification of change and a request for approval will be submitted to US EPA Region 5 at that time.

Signature \_\_\_\_\_  
Director, Bureau of Air Management

Date \_\_\_\_\_

Signature \_\_\_\_\_  
Chief, Air Monitoring Section

Date \_\_\_\_\_

Signature \_\_\_\_\_  
Quality Assurance Coordinator

Date \_\_\_\_\_

## Table of Contents

Public Notification and Comment Period .....	iv
Disclaimer .....	v
Background .....	1
Siting Criteria.....	1
Technical Approach.....	1
Geographic Area for the Near Road Monitoring Sites .....	2
Approval of the Sites .....	2
Parameters to be Measured.....	3
Project Phases, Work Tasks and Timelines .....	3
Data Handling and Reporting .....	4
Quality Assurance .....	4
Appendix A: Roadway Trailer Site Selection Criteria.....	A-1

## Public Notification and Comment Period

Pursuant to federal requirements, the Wisconsin Department of Natural Resources will provide a 30 day public comment period for review of this ambient air quality monitoring network plan.

Written comments on this monitoring network plan document may be submitted directly to

Mr. Bart Sponseller,  
c/o Air Monitoring Section, Bureau of Air Management,  
P.O. Box 7921,  
Madison, WI 53707,

no later than noon on June 11, 2012. Written comments will have the same weight and effect as oral comments presented at the meeting. A copy of the proposed revision to the Monitoring Plan is available for public inspection at the Bureau of Air Management, 7th Floor, 101 S. Webster Street, Madison, Wisconsin, on the following web address: <http://dnr.wi.gov/air/aq/monitor/netreview.htm> or by mail (at no charge) from Mr. Bart Sponseller at the address noted above.

In accordance with 40 C.F.R. 58.10(a)(1), the Wisconsin Department of Natural Resources, Air Monitoring shall make the annual monitoring network plan available for public inspection for at least 30 days prior to submission to the U.S. Environmental Protection Agency. The annual monitoring network plan details the operation and location of ambient air monitors operated by the Wisconsin Department of Natural Resources Air Monitoring Section.

## **Disclaimer**

The Wisconsin Department of Natural Resources will commit to evaluating sites and creating a near-road network only when federal funding is certain.

Network operations may change during the years without public notice based on unexpected circumstances. Examples of unexpected circumstances include catastrophic equipment failure, construction or demolition activities, loss of site access, or monitor obstructions.

## Background

On February 9, 2010, the U.S. Environmental Protection Agency (EPA) finalized new minimum monitoring requirements for the nitrogen dioxide (NO<sub>2</sub>) monitoring network in support of a 1-hour NO<sub>2</sub> National Ambient Air Quality Standard (NAAQS). In the new monitoring requirements, state and local air monitoring agencies are required to install near-road NO<sub>2</sub> monitoring stations at locations where peak hourly NO<sub>2</sub> concentrations are expected to occur within the near-road environment in large urban areas.

To assist state and local air agencies in identifying candidate near-road monitoring sites, the EPA has released the “Near-Road NO<sub>2</sub> Monitoring Technical Assistance Document” (near-road TAD). A copy of the near-road TAD and additional information on EPA’s near-road monitoring requirements are available from the EPA’s Ambient Monitoring Technology Information Center (<http://www.epa.gov/ttn/amtic/nearroad.html>).

## Siting Criteria

The criteria, for determining where a near road site is required, are set in Section 4.3 of Appendix D to Part 58, CFR. The CFR specifies that there must be one microscale near-road NO<sub>2</sub> monitoring station in each CBSA with a population of 500,000 or more. An additional near-road NO<sub>2</sub> monitoring station is required if the CBSA population is 2,500,000 or more, or if any CBSA with a population of 500,000 or more and has more than one or more road segments with 250,000 or greater annual average daily traffic (AADT). Based on these criteria the MSA 33340, Milwaukee, Waukesha, West Allis, is required to install and operate one near road monitoring site. Contingent on future federal funding, a site will need to be established in the Madison urban area.

## Technical Approach

While point sources are confined to a small geographic area, roadways are ubiquitous in the urban environment. Emissions from the roadway may vary but are generally directly related to the volume of traffic on a roadway. Most of the reports and journal articles suggest that pollutants peak at the roadways and decrease with increasing distance from the roadways. Studies often look at the targeted roadway isolated in the urban environment. In the real world of the urban traffic environment high traffic roadways are part of a larger traffic network. These networks include urban corridors that either feed into or are fed from the high traffic expressways.

The Wisconsin Department of Natural Resources (WDNR) has significant experience in conducting short term air monitoring studies in the near road environment. This experience includes planning for studies, conducting studies, analyzing and reporting data from studies. Wisconsin has developed a protocol for identifying target sites for air monitoring near roadways. This protocol, attached as Appendix A to this plan, will serve as a template for a new protocol for this project. Staff has experience in working with Wisconsin Department of Transportation (WDOT) as well as working with county and city law enforcement when operating near roadways.

The process of identifying target monitoring sites will follow federal guidelines outlined in Section 4.3.2, Appendix D, Part 58, CFR. These require that state and local air agencies consider traffic volumes, fleet mix, roadway design, traffic congestion patterns, local terrain or topography, and meteorology in determining where to best locate new near-road NO<sub>2</sub> monitoring stations. Wisconsin will also consider additional factors that include, satisfying basic monitor siting criteria, site logistics (e.g., access to property and site safety), and nearby population exposure.

While nitrogen dioxide is the primary pollutant of concern at the near road site, the station may provide an opportunity to examine the impact of other pollutants. Additional pollutants may only be monitored if US EPA requires measurement of these or the Department believes there is a need for the data and there is sufficient funding for the equipment and other resources needed for that monitoring.

### **Geographic Area for the Near Road Monitoring Sites**

The WDNR will evaluate areas along the I94\I894 traffic corridor in the Milwaukee Urban Area. While the I94\I894 corridor will be the primary focus we will also consider roadways feeding traffic into or taking traffic from the I94\I894 corridor.

Locations in the target area will be evaluated using a protocol based on the near-road TAD. Wisconsin's protocol will initially focus on the annual average daily traffic volume. As candidate sites are selected we will also look to prioritize candidate sites using additional and relevant criteria for selecting near road sites. This will include using existing Wisconsin RAIMI Modeling results, looking at locally affected populations, with attention to populations in designated Environmental Justice (EJ) areas. Finally we will examine the physical location of target sites assessing the practical operation of a site. Practical factors to be considered in selecting the final site will include; available physical space, long-term access, personnel safety during the installation and during operation, the availability of power and other logistical factors.

### **Approval of the Sites**

During the selection process WDNR will work with affected stake holders to insure general consensus that the site is properly located. Within the WDNR, the Monitoring Section and the Regional Pollutant and Mobile Source Section will determine the initial identification of target sites. External stakeholders including the Wisconsin Department of Health, City of Milwaukee, locally affected business groups and associations, as well as local community organizations. WDOT will be a key stakeholder because the site will be situated within their right-of-way. WDOT approval will be required for the final site. WDNR will keep our regional EPA contact informed of progress and will involve EPA staff in site selection process.

During the site selection process the WDNR may elect to conduct additional short term monitoring using its mobile laboratory, for NO<sub>2</sub> and other parameters. This monitoring would provide preliminary information of pollutant concentrations at the sites. The use of short term preliminary monitoring will be dependent on the availability of both staff time and funding.

The WDNR will prepare a report on the selection process and the final site selected for the near road monitoring. The report will be submitted to the Regional EPA office for approval before moving to the actual installation and operation of the monitoring site.

### **Parameters to be Measured**

The WDNR will at minimum measure concentrations of nitrogen dioxide and carbon monoxide as required by Federal rules. Nitrogen dioxide will be measured using a FEM analyzer based on gas phase titration of NO with O<sub>3</sub> chemiluminescence principle. Carbon monoxide will be monitored using a trace level analyzer using IR spectrophotometry. Ancillary parameters also measured at the site will include the basic meteorological parameters of wind speed, wind direction, and temperature. Wind speed and wind direction will be measured using a sonic anemometer providing fast and sensitive measurements of the wind parameters. The sonic sensor will be calibrated annually by the manufacturer and no on-site meteorological audits are planned.

The near road station will provide an excellent location for the measurement of a number of other air pollutants. The WDNR will add analyzers if US EPA rules require or the Department determines there is a need for additional measurement parameters. This will also be contingent on if and when additional funding is available or if equipment can be secured on loan.

### **Project Phases, Work Tasks and Timelines**

The installation and start of the new near road monitoring site will be conducted in three phases. While the later phases of the project will rely on work done in the previous phase, we expect that the work in each phase will, to some degree, overlap work in the others phases.

Planning – Will include a review of the information for the selection of the best monitoring site. During this phase staff will work internally collect information on traffic volume, traffic flow, and other critical parameters to optimize site selection. This will also include physically examining the target locations to determine the practicality of using a location for a monitoring site. Planning will also include public informational meetings on the proposed monitoring sites.

Implementation – This phase of the project will include getting all necessary approvals and permits to locate at a near roadway site. This phase will include the purchase of all capital equipment and supplies necessary to install and equipment the monitoring station; the physical installation of the site shelter, the met tower, a fence and other safety equipment; and the installation of all equipment in the shelter.

Shakedown – Will include initial operation and calibration of all air monitoring equipment at the station. Included will be a review of existing quality assurance documentation against the project goals. If necessary new guidance and QA documents will be drafted, reviewed and approved for the site operation. Set up and initiate all data collection protocols for measurements performed at the monitoring station.

## **Data Handling and Reporting**

All analyzers and other measurement equipment will be connected to the WDNR's data logger. The Wisconsin loggers are built in-house and operated using the WDNR DAS software. Monitoring data will be collected and stored on the site computer and transmitted one or more time daily to the WISARDS system. Communication between the site and the central WISARDS server will be through a cellular modem. No land line for phone or data will be used at the site. All monitoring data will be stored, edited and otherwise managed in WISARDS. All data will be transmitted to AQS in accordance with EPA data submission protocol and timelines.

## **Quality Assurance**

Unless otherwise required the WDNR will address quality assurance and equipment operation within the WDNR's existing Quality Assurance Project Plans (QAPPs) and Standard Operating Procedures (SOPs). Where necessary the WDNR will draft, review and release new SOPs for any equipment not currently addressed by WDNR SOPs.

## Appendix A: Roadway Trailer Site Selection Criteria

**Background:** The Roadway Mobile Monitoring (RwMM) Trailer was developed to be a mobile laboratory trailer designed to house and support analytical equipment for chemical measurements at remote locations. The RwMM is housed in a fourteen foot utility trailer configured to hold a laboratory in the forward section with a rear alcove to store support gases, pumps and other equipment. Analysis systems housed in the trailer include a gas chromatograph, particulate carbon monitor and an oxides of nitrogen analyzer. The trailer is powered either through a shoreline cable from an outlet or when necessary power is supplied by a propane fueled 10KW electrical generator. The mobile laboratory also provides high quality measurements at multiple locations needed to assess the public's risk.

**Objective:** Develop criteria and a scheme for locating the trailer for short term studies.

**Method:** Wisconsin's criteria/scheme will be based on the EPA's scheme for selecting near roadway monitoring site. The EPA scheme uses criteria of AADT and fleet mix as drivers for selecting sites. Wisconsin will start with the EPA criteria but will input additional criteria to better meet Wisconsin's monitoring goals. Additional criteria will include areas of community interest, sensitive and significant populations, and roadway features of interest to planners.

### Scheme:

1. Select target roadways. Typically these are high traffic roadways in the urban area. The roadway should include examples of different type roadways and may include, interstate highways, urban expressways, and urban traffic routes.
  - a. Evaluate roadways segments and rank by WDOT's Average Annual Daily Traffic (AADT) counts.
  - b. If fleet information is available, calculate the fleet equivalent AADT and recalculate the rank of each roadway segment.
2. Assign Community Interest. This portion of the ranking looks at the community affected by the roadway.
  - a. Is nearby population density known for roadway segments?
  - b. Does the roadway segment run through or border an EJ area?
  - c. Does the roadway segment run through or border an area with a community interest group that could use the data?
  - d. Is the roadway segment within 200 m of a school, a hospital, an elderly resident facility?
  - e. Using the population density, weighted for the factors in 2b, 2c, and 2d. rank segments.
3. Assign Planner/Modeler Interest. This portion of the ranking looks at features that may be of interest to planning and modeling staff.
  - a. Is there a congestion indicator for the roadway segment?
  - b. Is there a traffic control device that will affect flow? Examples include traffic lights or a metered entrance ramps.

## 2013 Wisconsin Near-Road Air Monitoring Network Plan

- c. Are there terrain features that will affect source operation? Examples are hills or inclined entrance ramps.
  - d. Are there terrain feature that will affect pollution dispersion? Examples are tunnels, sunken roadways or noise barriers.
  - e. Rank segments based on criteria listed in 3a through 3d.
4. Selecting candidate roadways. The Monitoring Section staff will take the segment ranked by criteria for 1, 2, & 3 and select candidate sites.
- a. MS staff will visually inspect the site and determine that there is one or more areas of access for the RwMM.
  - b. MS staff will get any permissions from WDOT, local authorities, or private property owners to enter into areas near the roadways.
  - c. MS staff will determine best conditions (WD, periods of peak traffic) for conducting the monitoring operations.