COMMUNAUTÉ URBAINE DE MONTRÉAL

Service de l'environnement
Division de l'assainissement de l'air et de l'eau

827, boul. Crémazie Est
Bureau 302
Montréal (Québec)
H2M 2T8
Téléphone: (514) 280-4330
Télécopieur: (514) 280-4318

Le 20 décembre 2001

Bureau d'audiences publiques sur l'environnement
Édifice Lomer-Gouin
575, rue St-Amable, bureau 2.10
Québec (Québec)
G1R 6A6

À l'attention de Madame Anne-Lyne Boutin,
Coordonnatrice du secrétariat de la commission

OBJET: Projet de modernisation de la rue Notre-Dame à Montréal
Réponses aux questions de vos lettres du 6 et 14 décembre 2001

Madame,

Nous accusons réception de vos lettres du 6 et du 14 décembre 2001 concernant des questions relatives au projet cité en rubrique.

La première question de votre lettre datée du 6 décembre 2001 est l'obtention de notre opinion relative à un propos mentionnant que le trafic sur la rue Notre-Dame génère très peu de matières particulaires et que ces particules semblent surtout provenir du port de Montréal.

Il est évident que les activités du port, caractérisées par la manutention en vrac de matériaux et le camionnage, contribuent à la présence de particules dans le secteur concerné. Ce sont plutôt des particules que l'on peut qualifier de grossières (diamètre entre 2,5 µm et 100 µm). Cependant, la circulation automobile sur la rue Notre-Dame crée aussi un apport de particules dans ledit secteur. La circulation automobile est reconnue toutefois comme une source importante de particules fines ($PM_{2.5}$) émises dans les gaz d'échappement ou produites par l'usure des pneus, par le freinage et par la remise en suspension des abrasifs ou les poussières déposées dans la rue. Les poussières grossières peuvent se transformer en particules fines par fractionnement du à la circulation.

Dans la région de Montréal, une grande partie des particules fines mesurées dans l'air ambiant provient du transport trans-frontalier à partir des régions industrielles des États-Unis. Le chauffage au mazout produit également des particules fines.

...2

En examinant le tableau de l'annexe I découlant de l'échantillonnage des particules au poste 050 au cours de l'année courante à partir du mois d'avril, on peut constater que le pourcentage des $PM_{2.5}$ par rapport aux particules en suspension totales (PST) représente 22 %. La circulation constitue donc l'un des apports à ce 22 % constitué de particules fines alors que les activités du port sont plutôt responsables du 78 % constituées de particules plus grossières. Ces proportions peuvent toutefois être différentes en période hivernale notamment avec l'épandage d'abrasifs et de fondants ainsi que les émissions du chauffage au mazout, sources de particules fines. L'interprétation de ces résultats doit également tenir compte de l'impact différent sur la santé selon les types de particules en présence (fines ou grossières).

Pour répondre à votre deuxième question de votre lettre du 6 décembre 2001, le choix de la localisation de la station d'échantillonnage #50 a été fait en essayant principalement de la situer entre la rue Notre-Dame et le secteur d'habitation résidentielle. La caserne de pompier #13 de la ville de Montréal située au 3250 Ste-Catherine Est correspondait exactement à notre objectif.

En ce qui concerne les critères d'installation, il faut vérifier avec le document produit par Environnement Canada et qui s'intitule «National Air Pollution Surveillance networks – Quality assurance and quality control guidelines» dont vous trouverez en annexe II la table des matières. Ce document, dans les sections 5.2 et 5.3 indique les critères à respecter pour le choix de la localisation de la station et de ses équipements. L'annexe II vous présente les neuf pages de ces deux sections.

Notre station #50 peut être classée de classe II c'est-à-dire pour mesurer une pollution locale à un endroit représentatif d'un secteur pouvant varier de 0.5 à 4.0 km de rayon. Puisqu'on y mesure les particules totales en suspension et les particules fines (PM_{10} et $PM_{2.5}$) nos échantillonneurs doivent rencontrer les critères de la figure 1 et du tableau 5.3.1 présentés dans l'annexe III. On doit noter qu'en aucun cas, on ne parle de critère spécifique aux particules fines; on peut donc appliquer celui des PST qui serait assurément plus restrictifs car les particules fines ont un comportement qui se rapprochent plus de celui des substances gazeuses.

Votre demande concerne particulièrement le positionnement par rapport aux arbres qui est, en effet, un des critères à rencontrer pour la mesure des particules : les échantillonneurs doivent être à plus de 20 mètres des arbres. Étant situé à peu près au milieu du toit de la caserne de pompier, dont la hauteur est de 10,5 mètres, tous les arbres sont à plus de 20 mètres sauf un seul de ceux-ci qui est situé à 20 mètres de l'échantillonneur à PST; quant aux échantillonneurs à $PM_{2.5}$ à PM_{10}, ils sont à plus de 20 mètres de tous les arbres.

...3

En annexe IV, les photos prises à partir du toit vous permettent d'avoir un meilleur aperçu de la localisation de nos échantillonneurs par rapport à leur environnement immédiat.

En réponse à votre demande du 14 décembre 2001, vous trouverez en annexe V, treize (13) tableaux des moyennes quotidiennes des concentrations de particules fines (PST, PM_{10} et $PM_{2.5}$) pour les postes 050 et 028. D'autre part, vous trouverez en annexe VI, douze (12) tableaux pour la qualité de l'indice de l'air pour les mêmes stations pour la période concernée.

Pour de plus amples informations, veuillez communiquer avec monsieur Raynald Francoeur, ingénieur de notre Service, au (514) 280-4329.

Veuillez agréer, Madame, nos salutations distinguées.

Raynald Francoeur, ing., M.Sc.A.

Bernard Seguin, ing., M. Ing.
Surintendant
Assainissement air et eau
Permis, inspections et projets spéciaux

RF/jc

ANNEXE I

Poste 050 situé au 3250, rue Ste-Catherine Est à Montréal

Période	PM10 (SSI)/PST	PM2.5 (TEOM)/PM10 (SSI)	PM2.5 (TEOM)/PST
07 avril au 27 novembre 2001	52 %	41 %	22 %

4.

162

DQ5.1
(annexes II, III et IV)

Projet de modernisation de la rue Notre-Dame à Montréal par le ministère des Transports du Québec

Document transmis par la Communauté urbaine de Montréal

National Air Pollution Surveillance Network

Quality Assurance and Quality Control

Guidelines

Prepared by:

James Mar

Pollution Measurement Division

Technology Development Directorate

Environment Canada

December 1995

Table of Contents

List of Tables

List of Figures

List of Appendices

5.2 Site Selection

The selection of sites for the NAPS network is done in consultation with local governments to meet the network objective of producing data representative of the urban airshed. The sites in the network are divided into two classes: class I and class II. Each class has different requirements for distribution, location, separation and spatial scale of representation.

Class I Sites

Class I sites generally monitor all air quality objective pollutants. These stations are meant to establish air quality trends and therefore are intended to have some degree of permanency.

Distribution of the class I sites is based primarily on the formula of 1 site per 250,000 population and up to 6 sites per urban region. In order to have a national coverage for the network, this population requirement is waived for cities such as St. John's, Newfoundland; Saint John, New Brunswick; Regina, Saskatchewan; and Victoria, British Columbia.

Location for selecting class I sites are based on the following guidelines;

First Station:	in downtown area.
Second Station:	in major residential area with potential for worst air quality.
Third Station:	in major residential area with potential for poor air quality in an area of the city at about 90° from the line established by the first and second stations.
Fourth Station:	in secondary commercial area under the influence of heavy traffic.

Fifth Station: in residential area located in the third quadrant different from the third and the fourth station.

Sixth Station: in residential area located in the fourth quadrant or in a third commercial area.

Separation distances between class I stations are usually in the order of 6 to 8 km.

Class II Sites

Class II sites are for areas having a demonstrated need for air monitoring. They are located to monitor specific urban air pollution problems such as those due to industry, vehicular traffic, waste disposal and power generation. These sites are pollution oriented but not necessarily source oriented. Their purpose is to collect air quality data for the community.

Distribution of class II stations is based on 1 per 100,000 population up to a maximum of 15 less the number of class I stations. For urban areas with population between 25,000 to 100,000 one station is sited when there is a demonstrated requirement.

Location of class II sites are determined after a review of all air quality data collected by existing stations, emission inventory data, meteorological and geographic data. The number of stations and the analyzer requirements are determined from this review so that particular problems of the urban area can be sufficiently characterized.

Separation between class II stations are usually at 3 to 5 km.

Spatial Scale of Representation

There are two spatial scales of representation used to define site selection in the NAPS network:

Middle Scale defines concentrations typical of areas 0.1 km to 0.5 km radius. This category includes measurements to define concentrations along streets and roads (typical areas can be elongated).

Neighbourhood Scale defines concentrations within an extended city area of relatively uniform land use within a radius of 0.5 to 4.0 km.

The site selection process should also take the following factors into consideration:

- reliable electric power source
- accessibility throughout the year
- security of the site from unauthorized access and vandalism
- meet the specifications for sampling shelter and inlet probe installation
- possible interference from local sources and plume dispersion effects

The requirements for site selection are summarized in Table 5.2.

Table 5.2

NAPS Network Station Classification and Distribution Criteria

	Distribution	Separation	Location		Spatial Scale*
Class I	1 per 250,000 of population (with exceptions for regional cities) Maximum 6 sites per urban area	6-8 km between sites	1st site 2nd site 3rd site 4th site 5th site 6th site	Downtown Residential with worst air quality Residential with poor air quality at a 90° quadrant from the 1st and 2nd sites Secondary commercial with heavy traffic Residential in third quadrant Residential in fourth quadrant or third commercial	Middle Neighbourhood Neighbourhood Middle or Neighbourhood Neighbourhood Neighbourhood
Class II	1 per 100,000 of population Maximum no. of sites per urban area =15 - (no. of class I) 1 for population <25,000-100,000>	3-5 km between sites	Sited to satisfy specific pollutant monitoring requirements and objectives.		Neighbourhood but may be middle

*** Definitions of spatial scale of representation**

Middle : Defines concentrations typical of areas of 100m to 500m radius. This category includes measurements to define concentrations along streets and roads (typical areas can be elongated).

Neighbourhood : Defines concentrations within some extended areas of the city that has relatively uniform land use with radius in the 0.5 to 4.0 km range.

5.3 Sampling System

The proper design of the sampling system in a monitoring station is crucial. The temperature stability of the shelter, the location of the sampling probe, the manifold system design, the length and material of transfer lines , the filters and fittings all affect the integrity and true representation of the air sample and the resulting data quality.

Shelter Requirements

Analyzers are housed inside secured buildings or shelters with restricted access to the public. The shelter must be ventilated, heated and air cooled to maintain a stable temperature in the range of 15°C and 30°C throughout the year. It should have good lighting, a reliable electric power supply with a minimum of 110 VAC and 40A service. Telephone service should be available for telemetry and voice communications. An ABC class fire extinguisher and a first aid kit must be furnished in the shelter for emergency situations. The shelter location requirements with respect to the surrounding structures are summarized in Figure 1, Table 5.3.1, and Table 5.3.2.

Probe Siting Criteria

The siting of air sample inlet probes strongly influences the quality of monitoring data. The requirements are summarized in Table 5.3.1 according to the class designation of the monitoring stations and their scale of representation. The siting criteria specified are to be followed as closely as possible to ensure uniform data collection. These criteria are applied to the different classes of NAPS Network monitoring sites in the following order of priority.

1. Probe height
2. Probe distance from roadways and other sources
3. Probe distance from air flow restrictions
4. Probe distance from trees

Class I sites of middle scale representation must meet height and distance requirements, from roadways.

Class I sites of neighbourhood scale representation must meet all criteria for each air pollutant monitored.

Class II sites must meet the criteria for probe height for each monitoring pollutant. Deviations from the distance criteria are examined individually in relation to the monitoring objectives for the site. However, it should be recognized that for neighbourhood scale of representation, all probe siting criteria must be met.

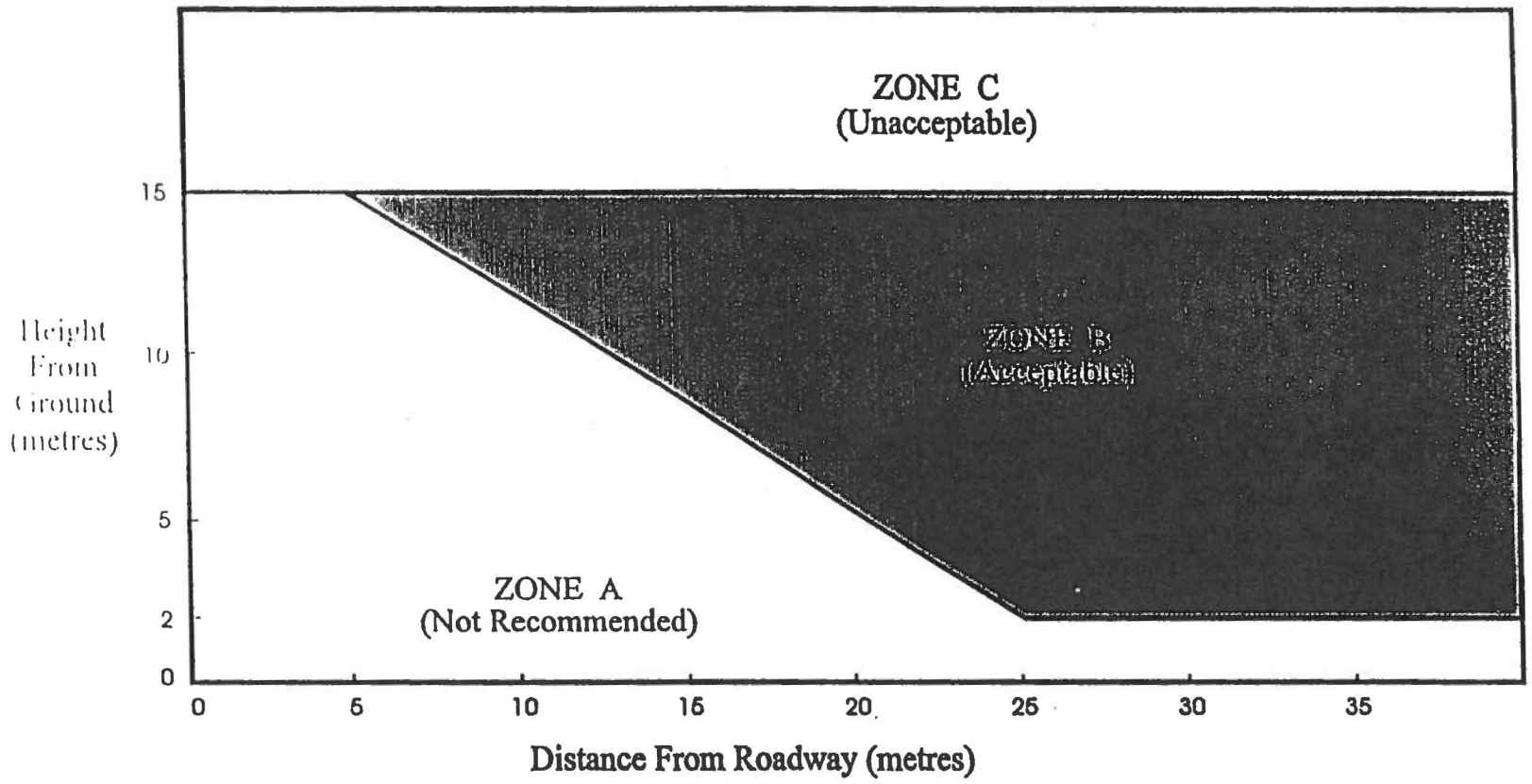


Figure 1
Acceptable Zone for Siting TSP Monitors

Table 5.3.1

NAPS Network Sample Probe Siting Criteria

Pollutant	Height Above Ground (metres)	Distance from Supporting Structure (metres)		Other Spacing Criteria
		Vertical	Horizontal[1]	
TSP (Both Spatial Scales)	2 to 15		>2	a. > 20 metres from trees. b. Distance from the sampler to any air flow obstacle, i.e. buildings, must be > 2×height of obstacle above the sampler. c. Unrestricted air flow in 3 of the 4 wind quadrants. d. No nearby[2] furnace or incineration flues. e. Distance of sampler from roads varies with the height of the sampler from the ground as depicted in figure 1.
SO_2 (Both Spatial Scales)	3 to 15	>1	>1	a. > 20 metres from trees. b. Distance from the sampler to any air flow obstacle, i.e. buildings, must be > 2×height of obstacle above the sampler. c. Unrestricted air flow in 3 of the 4 wind quadrants. d. No nearby[2] furnace or incineration flues. e. Probe height must be > 0.8 of the mean height of surrounding buildings.
CO (Middle Scale)	3 to 5	>1	>1	a. > 10 metres from street intersections or at mid-block location. b. 2-10 metres from roadway.
CO (Neighbourhood Scale)	3 to 10	>1	>1	a. > 35 metres from street curb side. b. unrestricted air flow in 3 of 4 wind directions.
O_3 (Both Spatial Scales)	3 to 15	>1	>1	a. > 20 metres from trees. b. Distance from the sampler to any air flow obstacle, i.e. buildings, must be > 2×height of obstacle above the sampler. c. Unrestricted air flow in 3 of the 4 wind quadrants. d. Spacing from roadway varies with road traffic as specified in Table 5.3.2.
NO_2 (Middle Scale)	3 to 5	>1	>1	a. > 20 metres from trees. b. 10 metres from street intersection or at mid-block location. c. > 2-10 metres from roadway.
NO_2 (Neighbourhood Scale)	3 to 15	>1	>1	a. > 20 metres from trees. b. Distance from the sampler to any air flow obstacle, i.e. buildings, must be > 2×height of obstacle above the sampler. c. Unrestricted air flow in 3 of the 4 wind quadrants. d. Spacing from roadway varies with road traffic as specified in Table 5.3.2.

1 when a probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on the roof.
2 Distance depends on the height of furnace or incinerator flues, type of waste or fuel burned, and quality of fuel (sulphur and ash content). This is to avoid undue influences from nearby sources.

Table 5.3.2

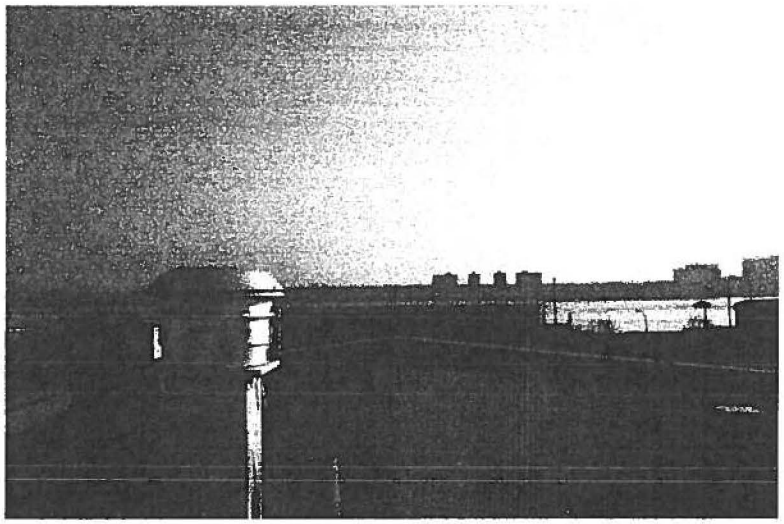
Minimum Distance from Roadways for O_3 and NO_2 Analyzers

Average Traffic (vehicles per day)	≤ 10,000	15,000	20,000	40,000	70,000	≥ 110,000
Minimum Distance between Roadway and Analyzer (metres)	≥ 10	20	30	50	100	≥250

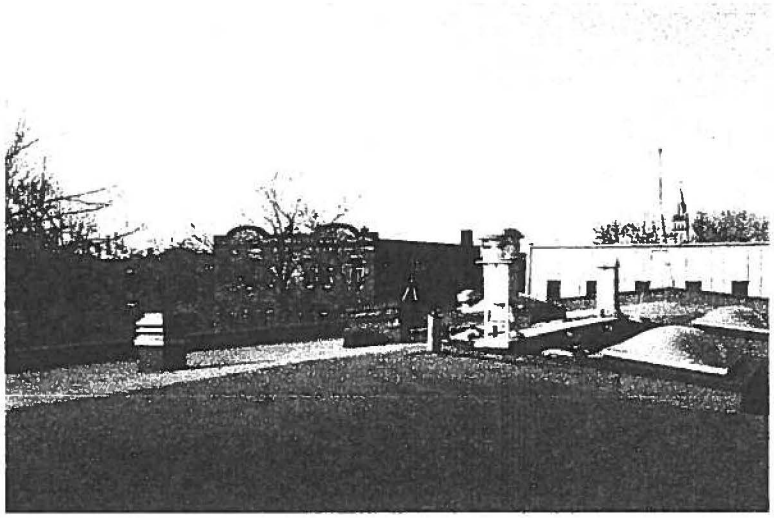
Manifold Design

The design of the air sample inlet manifold is important to obtain high quality data. It serves to reduce the problem of moisture condensation, pressure drop and dust settlement as the air is taken from the exterior to the interior of sampling shelter. The manifold should conserve the integrity of the pollutant concentration of the air sample as it is taken from the air mass and introduced to the inlet of the analyzers. To achieve this goal the manifold design must adhere to the requirements outlined in Appendix II.

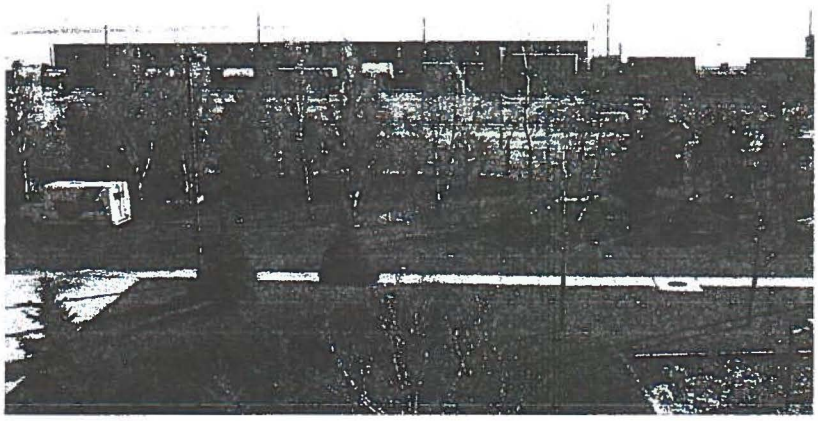
Vue vers le Sud - vers la rue Notre-Dame et le port de Montréal



Vue des arbres les plus rapprochés dans le parc
à l'Ouest des échantillonneurs



Vue du toit de la caserne vers le Sud sur la rue Notre-Dame avec en premier plan la rue Hudon



Vue vers l'Est et les habitations