Section 1.0
Atmospheric Environment

amec foster wheeler

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1.0 ATMOSPHERIC ENVIRONMENT

1.1 Rationale for Selection as a Valued Environmental Component (VEC)

Air quality is influenced by the concentrations of air contaminants in the atmosphere. Air contaminants are emitted by both natural and anthropogenic sources and are transported, dispersed, or concentrated by meteorological and topographical conditions. Such particles eventually settle or are washed out of the atmosphere by rain and are deposited on vegetation, livestock, soil, water surfaces, and other objects. In some cases, contaminants may be redistributed into the atmosphere by wind. The implementation of the Miramichi to Glenwood Area bypass could thereby affect the local atmospheric environment during construction; operations, maintenance and rehabilitation (OMR); or in the event of accidents through releases of air-born contaminant particles.

1.2 Boundaries for Environmental Effects Assessment

1.2.1 Spatial Boundaries

United States Environmental Protection Agency (USEPA) research findings indicate that roadways generally influence air quality within a few hundred metres (m) (150-300 m) downwind from the vicinity of heavily travelled roadways or along corridors with significant trucking traffic or rail activities (USEPA, 2014). The same area could be influenced by construction activities associated with transportation projects. This impact distance will vary by location and time of day or year, prevailing meteorology, topography, nearby land use, traffic patterns, as well as the individual pollutant.

The spatial boundaries (Project Area) for a change in air quality due to the Project are conservatively identified as a zone extending approximately 500 m from the Project's Right of Way (ROW) due to terrain and land use characteristics. The 500 m range would allow mixing of emissions from the Project with ambient air. Sound quality uses a 1 kilometre (km) range for the Project Area, as described in subsection 1.2.1.2. Desktop studies were conducted for a broader Study Area of 5 km.

1.2.1.1 Change in Climate from Generation of Greenhouse Gases (GHGs)

A greenhouse gas (GHG) is a gas that absorbs the infrared radiation (IR) and radiates heat. In the atmospheric environment the IR is produced by sun.

The GHGs that are listed in the Environment Canada national inventory are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), nitrogen trifluoride (NF_3), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs).

The environment surrounding the City of Miramichi form the spatial boundaries for the assessment of the environmental effects on a change to the climate from regional GHG generation.

1.2.1.2 Change in Sound Quality

The Study Area for sound in a rural area is typically one (1) km, beyond which sound typically does not increase background. In this case, the spatial boundary considered was 1 km to each side of the Miramichi – Glenwood area bypass ROW and the noise receptors within it.

1.2.2 Temporal Boundaries

The temporal boundaries for the assessment of this Project were examined for three phases:

- construction of the bypass;
- OMR period of the bypass; and
- accidental releases.

1.3 Methodology

To facilitate the review of identified issues, an understanding and description of the atmospheric environment within which the activities will occur, or potentially have an influence on, was developed from a review of existing information. Potential positive and negative interactions between Project activities and the environment were identified. Where negative interactions were anticipated and potential effects were a concern, methods for mitigating the potential effects were proposed. For the purposes of impact assessment, the interactions (effects) between project outputs, or activities, and the Atmospheric Environment as a VEC are described as either positive or negative, their significance of potential interactions is determined, and the likelihood of the interactions are also considered. For this Project, the atmospheric environment is comprised of three (3) principal components that may be affected by the construction, OMR or accidental releases affiliated with the Project: air quality, climate and sound quality. The methods by which those components are addressed individually are described in the following subsections.

1.3.1 Air Quality Assessment

Air quality in New Brunswick (NB) is monitored by both provincial and federal governments at various stations. Data from the nearest station to the Study Area, located in Bathurst, as well as from the NB Power monitoring station in Lower Newcastle, are available for 2012 and 2013 (New Brunswick Department of Environment and Local Government (NBDELG), 2015). The most current information from the National Pollutant Release Inventory (NPRI) was also reviewed (Environment and Climate Change Canada, 2016). Effects on existing air quality from all three phases of the Project were assessed.

1.3.2 Climate Assessment

The existing climate of the Study Area based upon climate normals using the latest data gathered from 1981 to 2010 at the Environment Canada weather station within the Study Area, Miramichi Airport (Miramichi A) (Environment Canada, 2016a). The anticipated global temperature increase is also considered, which may be indicated by the presence of CO_2. CO_2 is not generally considered a “traditional pollutant” and its cycle and movement pattern is relatively unknown. This parameter is therefore not monitored regionally, but globally (NBDELG, 2001).

1.3.3 Sound Quality Assessment

The proposed Miramichi – Glenwood area bypass ROW transverses a predominantly rural area with pockets of higher population and sensitive receptors (a funeral home and elementary school). Four of these locations were chosen to conduct baseline noise monitoring to determine current sound levels near these receptors as shown in Figure 1.1.
The receptors may be described as follows:

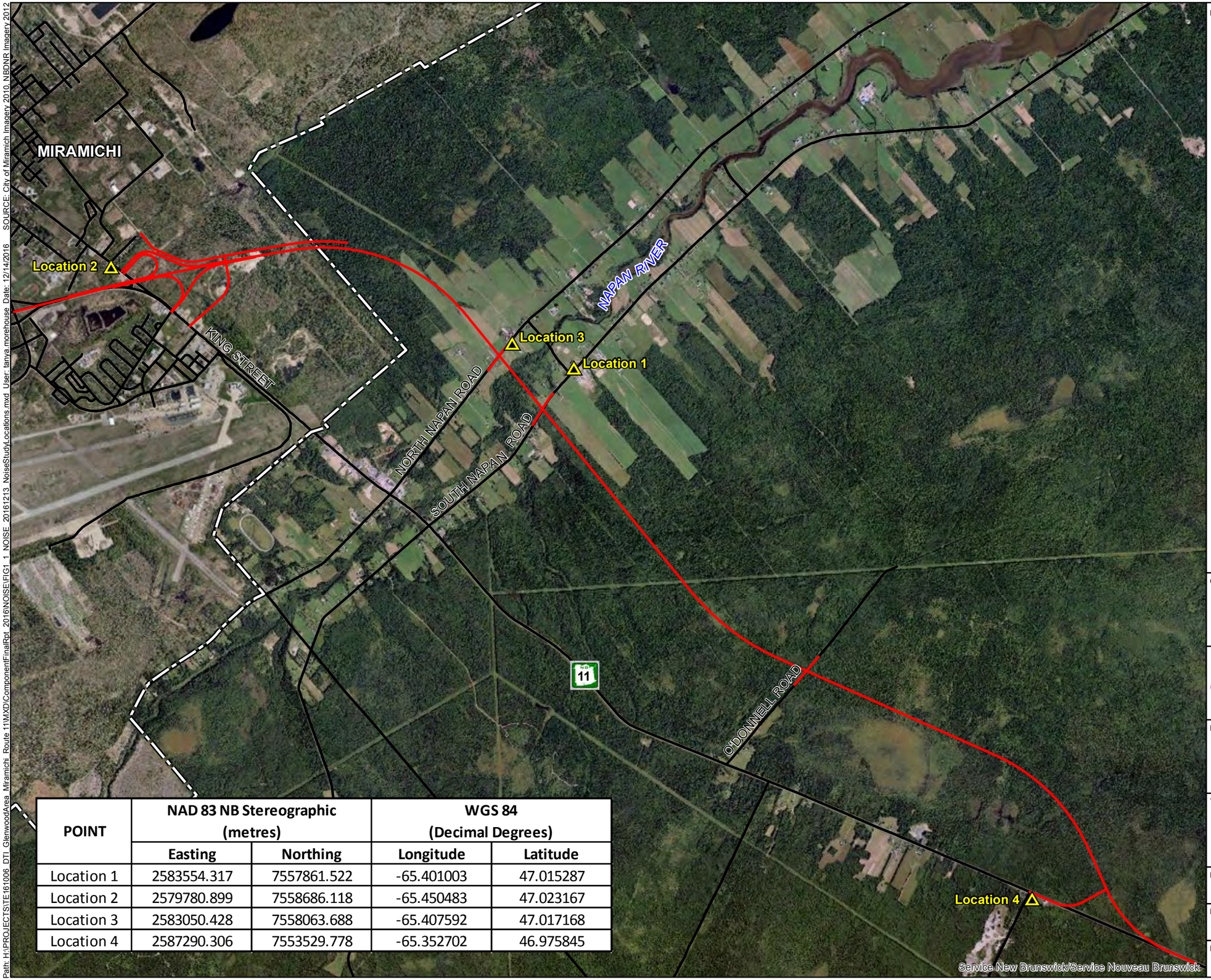
- Location 1: Napan Elementary School, located approximately 560 m north of the Project.
- Location 2: Adams Funeral Home, located adjacent to the proposed interchange of Route 11 with the bypass.
- Location 3: 617 North Napan Road, the nearest residence to the proposed ROW in North Napan.
- Location 4: 3 MacDonald Road, the nearest residence to the proposed interchange of the Route 11 bypass with Route 11 at Black River.

Noise monitoring was conducted at all four locations using Casella CEL-633C1 Type I integrating sound level meters with logging capability. The meters were re-calibrated prior to each dispatch in the field and equipped with windscreens. Monitoring was performed from the 22 to 26 of June, 2016, for 43 to 54 continuous hours per location. A-weighted hourly equivalent sound levels were used to calculate the 24-hour equivalent sound level for one full calendar day, excluding hourly data collected during inclement weather events. The results of the baseline noise monitoring are presented in Section 1.4.3.

Noise levels predicted during construction were based on the United States Department of Transportation Federal Highway Administration (FHWA), Roadway Construction Noise Model, version 1.1 (RCNM) (FHWA, 2006a). Model inputs considered noise received from the receptor to the perimeter of the proposed ROW.

1.4 Description of Existing Environment

The three components that comprise the atmospheric environment as a VEC for this Project are described for the region of northern New Brunswick and Miramichi using the most current data available from Environment Canada and NBDELG.



POINT	NAD 83 NB Stereographic (metres)		WGS 84 (Decimal Degrees)	
	Easting	Northing	Longitude	Latitude
Location 1	2583554.317	7557861.522	-65.401003	47.015287
Location 2	2579780.899	7558686.118	-65.450483	47.023167
Location 3	2583050.428	7558063.688	-65.407592	47.017168
Location 4	2587290.306	7553529.778	-65.352702	46.975845

LEGEND:

- Noise Monitoring Location
- Bypass Alignment
- Road Network
- Municipal Area (Miramichi)

N W E S

0 200 400 800 1,200 1,600 2,000
Metres

CLIENT:
NEW BRUNSWICK
DEPARTMENT OF
TRANSPORTATION AND INFRASTRUCTURE

amec foster wheeler

PROJECT:
ENVIRONMENTAL FIELD STUDIES
VALUED ENVIRONMENTAL COMPONENT ASSESSMENT
ROUTE 11 GLENWOOD AREA TO
MIRAMICHI BYPASS PROJECT

TITLE:
NOISE
MONITORING LOCATIONS

DATUM:	DWN BY:	DATE:
NAD 83 CSRS	TM	Sept 2016
PROJECTION:	CHK'D BY:	SCALE:
NB Stereographic	CD / DP	1:30,000
PROJECT NO:	REV NO:	FIGURE NO:
TE161006	R0	1.1

Path: H:\PROJECTS\TE161006_DTI_GlenwoodArea_Miramichi_Route 11\MXD\ComponentFinalRpt_2016\NOISE\FIG1_1_NOISE_20161213_NoiseStudyLocations.mxd User: tanya.morehouse Date: 12/14/2016 SOURCE: City of Miramichi Imagery 2010, NBDNR Imagery 2012

1.4.1 Air Quality

Air quality in New Brunswick is routinely monitored by the provincial and federal governments at various stations, usually located in or near population centres. Both the air quality standards under Schedule B of the *New Brunswick Clean Air Act* and the New Brunswick Air Quality Objectives (NBAQOs) established by the Province under the same Act provide Guidelines and Objectives that apply to various components, including Total Suspended Particulate (TSP): 120 micrograms per cubic metre (µg/m^3) per 24 hour averaging period and 70 µg/m^3 per 1 year averaging period. Table 1.1 lists the NBAQOs established under the provincial *Clean Air Act*.

Table 1.1 Air Quality Guidelines in New Brunswick

Pollutant	Averaging Period			
	1-hour	8-hour	24-hour	1 year
Carbon monoxide (CO)	30 ppb*	13 ppb		
Hydrogen sulphide (H_2S)	11 ppb		3.5 ppb	
Nitrogen dioxide (NO_2)	210 ppb		105 ppb	52 ppb
Sulphur dioxide (SO_2)***	339 ppb		113 ppb	23 ppb
TSP			120 µg/m^3	70 µg/m^3

Source: NBDELG, 2015
*ppb – parts per billion
** The standards for SO_2 are 50% lower in Saint John, Charlotte, and Kings Counties.

In 2012 all Canadian provinces, with the exception of Quebec, agreed to participate in a new federal air quality management system adopted by the Canadian Council of Ministers of the Environment (Canadian Council of Ministers of the Environment (CCME), 2012a) as part of the revised *Canadian Environmental Protection Act*. The Air Quality Management System is a comprehensive approach for improving air quality in Canada and is the product of collaboration by the federal, provincial and territorial governments and stakeholders and replaces the Canada-Wide Standards (CWS) that had been in place since 2000 (CCME, 2000). It includes:

- New Canadian Ambient Air Quality Standards (CAAQs) to set the bar for outdoor air quality management across the country.
- Industrial emissions requirements that set a base of performance for major industries in Canada.
- A framework for air zone management within the provinces and territories that enables action tailored to specific sources of air emissions in a given area.
- Regional airsheds that facilitate coordinated action where air pollution crosses a border.
- Improved intergovernmental collaboration to reduce emissions from the transportation sector.

The closest NBDELG monitoring station in relation to the Project is located in Lower Newcastle, approximately 8 km to the northeast of the Project; however, this station reports ozone (O_3) only. The Bathurst monitoring station, located approximately 67 km north of the Project, monitors ground level fine particulate matter ($PM_{2.5}$ - Particles less than 2.5 µmin diameter), O_3 and nitrogen oxides (NO_x) (NBDELG, 2015).

1.4.1.1 Emissions

There are two industrial sources of emissions that report to the NPRI located in approximately 3 - 4 km to the west of the Project (Environment and Climate Change Canada, 2016):

- Energie Varlero Inc. Miramichi Marine Terminal (reports Volatile Organic Compounds (VOC) only).
- Produits Forestiers Arbec Inc. (reports criteria air contaminants (CACs), except sulphur oxides (SO_x).

The new federal Air Quality Management System is designed to address the challenges of air quality management, including cross-jurisdictional issues, and deliver a Canada-wide approach that provides flexibility to deal with regional differences in air quality issues while, at the same time, ensuring a level of consistency so that Canadians can be assured of good air quality outcomes. As part of this approach, CCME has also created an Air Zone Management Framework (AZMF) which categorizes provincial regions by existing air quality and management goals. The Project Study Area lies within the Central Air Zone of New Brunswick, which is considered "green" and whose mandate is to retain low $PM_{2.5}$ levels (CCME, 2012b). In this Zone, threshold values of 0 to 10 µg/m^3 for daily average and 0 to 4 µg/m^3 for annual average $PM_{2.5}$ have been established, which are much lower than the CAAQs (NBDELG, 2015).

1.4.1.2 Particulate Matter

Particulate matter (PM) refers to those particulates in the air, such as smoke, soot, and dust that do not settle readily and thereby remain suspended. PM is a broad class of chemically and physically diverse substances that can either be in a solid or liquid state, or in a combination of these two states. PM greater than 10 micrometres (µm) in size creates problems such as visibility reduction, soiling, material damage, and vegetation damage.

Particulate matter becomes a potential human health hazard when the particle size is equal to, or less than, 10 µm in diameter (PM_{10}) (NBDELG, 2001). These particles are typical of dust granules that are invisible to the naked eye as individual specks. Such particles are commonly generated from building materials, combustion, human activities and outdoor sources, including atmospheric dust and combustion emissions from mobile and stationary sources. PM_{10} data is not monitored in either Bathurst or Lower Newcastle (NBDELG, 2015).

Particles of 2.5 µm or less ($PM_{2.5}$) are small enough to inhale into the lungs and are believed to cause respiratory and cardiovascular problems. These particles are visible as clouds of smoke and are typically high in sulphates, nitrates, carbon and heavy metals, being produced by fossil fuel combustion, vehicle exhaust and industrial emissions (NBDELG, 2001).

Standards for fine PM and ground-level ozone have been developed, which are illustrated in Table 1.2. CAAQs are currently in development for NO_2 and SO_2.

Table 1.2 Canadian Ambient Air Quality Standards for Fine Particulate Matter ($PM_{2.5}$) and Ozone

Pollutant	Averaging Time	Standards (numerical values)		Metric
		2015	2020	
$PM_{2.5}$	24-hour (calendar day)	28 µg/m^3	27 µg/m^3	The 3-year average of the annual 98th percentile of the daily 24 hour average concentrations.
$PM_{2.5}$	Annual (calendar year)	10 µg/m^3	8.8 µg/m^3	The 3-year average of the annual average concentrations.
O_3	8-hour	63 ppb	62 ppb	The 3-year average of the annual 4th highest daily maximum 8 hour average concentrations.

Source: CCME, 2012a

For the Bathurst station in 2013 the daily metric value was recorded as 18 µg/m^3 (below the 28 µg/m^3 standard) and annual metric was recorded 8 µg/m^3 (below the 10 µg/m^3 standard).

1.4.1.3 Combustion Gases

These gases are produced by the combustion of fossil fuels:

- **Carbon Monoxide (CO)**

CO is formed from the incomplete combustion of carbon compounds. The NBDELG has set an air quality guideline for CO of 30 ppb for a 1-hour averaging period. Due to the relatively small size and density of the population in New Brunswick, there were no exceedances of NBAQOs for carbon monoxide in any of the provincial monitoring sites in 2013 (NBDELG, 2015).

- **Nitrogen Oxides (NO and NO_2)**

Nitric oxide (NO) is released in the exhaust of internal combustion engines and furnaces. NO is an unstable compound and is readily converted to NO_2, which contributes to the formation of acid rain and is a primary precursor pollutant in the formation of smog. NBDELG has set an air quality guideline of 210 ppb, 105 ppb and 52 ppb per 1 hour, 24 hour and 1 year averaging periods, respectively. No exceedances of NO_2 standards were recorded during 2013 in Bathurst, nor anywhere else in the Province in 2012 or 2013 (NBDELG, 2015).

- **Sulphur Dioxide (SO_2)**

Sulphur dioxide (SO_2) is produced by burning oil and coal for energy production and space heating; each containing sulphur as an impurity in various concentrations. Other potential sources of SO_2 to the environment include oil refineries, pulp and paper mills, and vehicles. Industries in New Brunswick are responding by using lower or near-zero sulphur fuels as well as reducing production and electricity-generation rates. NBDELG has established an episode control program in Saint John, which requires SO_2 is to be monitored by some industries as part of their Approval to Operate. There were no exceedances of this parameter in at the Lower Newcastle station operated by NB Power in 2012 or 2013 (NBDELG, 2015).

1.4.1.4 Ozone (O_3)

Introduced in 2012, the ozone CAAQ is based on the fourth worst day of the year. In all cases, the calculated annual statistic is averaged over a three year period. For the Lower Newcastle station the recorded annual metric is 50 ppb, which is below the 63 ppb standard for 2015 and 62 ppb goal for 2020.

1.4.1.5 Greenhouse Gases (GHGs) Emissions

In its 2014 - 2020 Climate Change Action Plan, the Province of New Brunswick has established 2020 and 2050 provincial GHG emissions reduction targets of 10% below 1990 levels by 2020 and 75% to 85% below 2001 levels by 2050. In 2014, the national reported emissions of GHGs for Canada were 732 Megatonnes (MT) of carbon dioxide equivalent (CO_2e) *(National Inventory Report 1990-2014*) (Environment and Climate Change Canada, 2016). In New Brunswick the annual emissions for 2013 and 2014 were similar at approximately 15 MT of CO_2e per year representing approximately 2.0 % of the national GHG emissions (Environment and Climate Change Canada, 2016).

As per the National Inventory report it is a 28% reduction of GHG emissions in New Brunswick in comparison with GHG levels in 2005 (Environment and Climate Change Canada, 2016).

1.4.2 Climate

The following describes the current climatology of Miramichi, NB, and expected changes due to global warming trends and regulatory changes.

1.4.2.1 Temperature

The information in this section is based upon climate normals using the latest data gathered from 1981 to 2010 at the Environment Canada weather station nearest the Study Area, Miramichi Airport (Miramichi A), New Brunswick (Environment Canada, 2016a). During the winter, the air mass is cold and unaltered with a January daily mean temperature of -10.8°C and, in the summer, the air mass is predominantly warm continental, with a July daily mean temperature of 19.1°C. The extreme maximum and minimum temperatures recorded were +25.2°C and -16.6°C, respectively as shown in Table 1.3 (Environment Canada, 2016a). Comparison against the previous 1971-2000 Climate Normal Data for Miramichi illustrates that the daily annual mean temperature has increased by 0.2°C, but the extreme maximum temperature recorded (37.8°C) remains unchanged. According to the New Brunswick Climate Change Action Plan 2014 - 2020, annual average temperatures have increased by 1.5°C in New Brunswick over the past 100 years (Government of New Brunswick, 2014).

Table 1.3 Temperature Data (1981 to 2010) Miramichi A Climate Station (Government Canada, 2016)

Temperature (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average	-10.8	-8.9	-3.4	3.2	10.0	15.7	19.1	18.5	13.5	6.9	0.7	-6.2	4.9
Daily Maximum	-5.0	-2.8	2.1	8.5	16.3	22.2	**25.2**	24.6	19.5	12.3	4.9	-1.3	10.5
Daily Minimum	**-16.6**	-14.9	-8.9	-2.1	3.7	9.3	13.0	12.3	7.4	1.5	-3.4	-11.1	-0.8

CO_2 is known as a GHG. It is projected to account for approximately half of the anticipated world temperature increase. Major contributors of CO_2 are stationary sources (such as power plants) and mobile sources (particularly vehicles that burn fossil fuels; specifically oil, gasoline, and diesel). Both Canada and the Province of New Brunswick have Climate Change Action Plans that list reduced future emission targets and methods for achieving them. New Brunswick's goal for 2020 is to lower 1990's emissions levels by 10% (Government of New Brunswick, 2014).

As a party to the United Nations Framework Convention on Climate Change (UNFCCC), Canada is required on an annual basis to prepare and submit a national inventory of anthropogenic GHG emissions from sources (e.g. fuel combustion, industrial processes) and removals of GHG emissions by sinks (e.g. growing plants and trees). The most recent dataset available (2013) estimates Canada's GHG emissions to be at 726 MT, 78% of which were CO_2 resulting from the combustion of fossil fuels (Environment Canada, 2015).

The Government of Canada intends to develop a framework for the collaboration of all provinces to implement carbon pricing policies and achieve a new national target. Canada also aims to fulfil the G20 commitment to phase-out subsidies for the fossil fuel industry (Environment Canada, 2016b).

1.4.2.2 Precipitation

The average annual precipitation in the Study Area as measured at Miramichi A is 1072.4 millimetres (mm), of which approximately 291.4 centimetres (cm) is in the form of snowfall (Environment Canada, 2016a). High seasonal water flows are generally experienced in April and May as a result of snowmelt. Stream flow typically decreases through the summer as a result of high evaporation and depleting groundwater storage. Flow typically increases in the fall due to lower temperature and reduced evaporation. Average precipitation by month and year is shown in Table 1.4.

Table 1.4 Precipitation Data (1981 to 2010) Miramichi A Climate Station (Environment Canada, 2016a)

Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	21.5	18.1	34.1	58.7	97.5	86.3	99.9	93.1	83.8	87.0	75.2	38.6	793.9
Snowfall (cm)	70.4	54.6	59.6	25.8	1.7	0	0	0	0	2.6	26.8	49.9	291.4
Precipitation (mm)	87.0	70.9	90.8	84.9	99.5	86.3	99.9	93.1	84.5	89.7	100.6	85.3	1072.4

1.4.2.3 Wind Data

Wind direction and speed data from the Miramichi A climate station (Environment Canada, 2016a), are presented in Table 1.5.

Table 1.5 Wind Data (1981 to 2010) Miramichi A Climate Station (Environment Canada, 2016a)

Wind	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Hourly Speed (kilometres per hour (km/h))	72	89	72	72	77	74	64	56	89	64	72	77
Direction of Maximum Hourly Speed	NE	S	E	NE	S	S	S	W	S	S	S	SE
Maximum Gust Speed (km/h)	111	109	115	103	129	116	89	124	135	113	121	143
Direction of Maximum Gust	N	NE	SE	NE	S	SW	NW	SW	S	S	S	S

1.4.3 Background Sound Quality

The A-weighted 24-hour equivalent sound levels ($L_{Aeq-24h}$) calculated from measured 1-hour equivalent sound level (L_{Aeq-1h}) data are presented in Table 1.6. The L_{Aeq-1h} data was collected over, and represents, a complete calendar day excluding data collected during periods of inclement weather. Inclement weather conditions were defined as:

- humidity levels above 90% or precipitation has occurred;
- wind velocity has exceeded 20 km/h; or
- temperature is outside the operating range defined by the manufacturer of sound level meter (i.e., -10 °C to +50 °C).

Weather data was obtained from the Environment Canada weather station identified as Miramichi RCS. The locations where the noise monitoring was completed are presented on Figure 1.1.

Table 1.6 Noise Monitoring Results

Receptor ID	Receptor Description	Address	Date[1]	$L_{Aeq-24h}$ (dBA[2])
L1	Napan Elementary School	225 South Napan Road	23 June, 2016	60
L2	Adams Funeral Home	140 King Street	23 June, 2016	61
L3	Residence	617 North Napan Road	25 June, 2016	51
L4	Residence	3 MacDonald Road	25 June, 2016	58

Note:
1. The $L_{Aeq-24h}$ value was calculated from measured 1-hour L_{Aeq} data obtained over a complete calendar day excluding data collected during inclement weather.
2. dBA is the symbol for A-weighted decibels.

The noise monitoring results show that L1, L2 and L4 have similar $L_{Aeq-24h}$ values and L3 is characterized by a substantially lower level by 7-10 dBA. L1 is in the vicinity of an elementary school; L2 is in an urban area and L4 is located adjacent to the existing Route 11. Whereas L4 is located within a rural area. The differences in sound levels at L1, L2 and L4 and sound levels at L3 can be attributed to their respective locales. The noise monitoring results for the four receptor locations are provided in Appendix 1A, weather data for the monitoring period is presented in Appendix 1B.

For public exposure in rural settings, the Province of New Brunswick does not have specific guidelines for environmental noise (with the exception of specific industries, such as oil and gas). Health Canada has not set threshold values for noise, but recommends that mitigation measures be employed if levels of 75 dB (decibels) are exceeded for more than a year (Health Canada, 2010). New Brunswick Department of Transportation and Infrastructure (NBDTI) defines noise sensitive areas as residential or commercial areas affected from noise from machinery used during construction and OMR of highway facilities and considers noise levels exceeding 65 dBA over a 24 hour period (Leq) to be excessive and requiring mitigation measures (NBDTI, 2010).

1.5 Potential Effects Assessment

1.5.1 Construction Phase Potential Effects

Pathways for potential effects on the atmospheric environment during construction include overburden disturbance, emissions of combustion gases from construction vehicles and equipment and noise disturbances to local receptors.

1.5.1.1 Potential Effects on Air Quality

There are potentially localized, short-term effects on air quality surrounding the proposed ROW during construction.

1.5.1.2 Potential Effects on Climate

Section 1.2 identified that for this project, the spatial boundaries for the assessment of the environmental effects on a change to the climate from regional GHG generation is localized to the environment surrounding the City of Miramichi. It is estimated that Project construction activities would contribute less than 10,000 tonnes of CO_2e, representing approximately 0.07% of the New Brunswick's 2014 GHG emissions and these emissions. Construction activities will be limited to use of construction vehicles and equipment, asphalt placement and small tracts of forest and

wetland. These activities are anticipated to be short term, causing temporary increases of GHG emissions that do not warrant further calculation.

1.5.1.3 Potential Effects on Sound Levels

Elevated noise levels will occur during the construction period. Sources of noise during construction will be heavy equipment operations and potentially blasting.

Table 1.7 below presents typical utilizations and maximum sound levels for construction equipment anticipated to be utilized for this project. The model results of the RCNM are presented in Table 1.8.

Table 1.7 Construction Equipment Sound Levels at a Distance of 15 m (50 ft)[1]

Equipment	Usage Factor	Maximum Sound Level L_{Amax} (dBA)
Blasting	1%	94
Backhoe	40%	80
Compactor (ground)	20%	80
Concrete Mixer Truck	40%	85
Concrete Pump Truck	20%	82
Crane	16%	85
Dozer	40%	85
Dump Truck	40%	84
Excavator	40%	85
Flat Bed Truck	40%	84
Front End Loader	40%	80
Generator	50%	82

Note:
1. Adapted from the FHWA, 2006b.

Table 1.8 Estimated Sound Pressure Levels during Construction

Receptor ID	Distance to Construction (m)	Predicted Construction L_{Aeq} (dBA)	Predicted Construction $L_{Aeq\text{-}24h\ (dBA)}$
L1	400	58	55
L2	150	66	63
L3	140	67	64
L4	40	78	75

Note:
The predicted construction LAeq-24h assumes the equipment listed in Table 1.8 operates simultaneously with the usage factors shown between the hours of 07:00 and 19:00.

Predicted construction noise levels at L1, L2 and L3 are below 65 dBA (LAeq-24h) and the noise levels at L4 are above 65 dBA. L1 to L3 are located at distances of greater than or equal to 140 m from the construction area whereas L4 is located only 40 m away. Thus the higher expected noise levels at L4 are due exclusively to the proximity of L4 to the area of construction. The modelled scenario assumes that all the equipment would be working concurrently at the closest location relative to the receptors, however it is more likely the equipment will be operating at various locations along the ROW and will be continually moving.

1.5.1.4 Operation, Maintenance and Rehabilitation (OMR) Phase Potential Effects

Emissions and noise generated by vehicles using the proposed by-pass will occur during the OMR Phase of the Project on a continuous basis.

1.5.1.5 Potential Effects on Air Quality

Combustion gas and related particulate emissions by general public vehicles and maintenance equipment may effect localized air quality during the operational phase of the Project. These emissions are not anticipated to negatively affect air quality in the region because no increase in traffic volume attributable to the Project is anticipated. It is possible that during the OMR Phase of the Project a reduction in emissions compared the current alignment would result in that general traffic flow would be improved and maintenance requirements reduced.

Furthermore, the temporary and localized negative effects of emissions generated by maintenance activities using heavy equipment and vehicles will be mitigated by implementation of industry acceptable best management practices.

1.5.1.6 Potential Effects on Climate

As described in 1.5.1.5., compared to existing conditions, GHG emissions during the OMR phase of the Project are not expected to increase as the Project does not increase the volume of traffic and because of anticipated improvements in traffic flow, may result in a reduction in GHG emissions.

1.5.1.7 Potential Effects on Sound

The Project may result in elevated noise levels at nearby receptors during the OMR phase of the Project. The “2014 Traffic Map” provided by NBDTI indicates the Annual Average Daily Traffic (AADT) values along Route 11 at its intersection with Route 8 and near Glenwood. The corresponding AADTs are 8100 and 5600, respectively. The traffic volume increases with proximity to Miramichi. It is a reasonable assumption that this traffic influx onto Route 11 comes from the local roads between Glenwood and Route 8. However, the proposed Bypass has no interchanges between Black River to Route 8. Therefore we can assume that when the Bypass is operational 5600 vehicles per day will utilize it and that the remainder of the 2500 vehicles will continue to utilize the existing Route 11. The “Traffic Trend Map” provided by NBDTI shows a 1.5 percent traffic volume growth from 2012 to 2013 and a 1.5% decline from 2013 to 2014 (NBDTI, 2014). The net traffic growth between 2012 and 2014 is nil based upon the values at the Kouchibouguac Traffic Count Station which lies 29 km south of Glenwood. However, as a conservative estimate we will assume a 1.5% annual growth rate to Project volumes out to the future year of 2026. The corresponding AADTs on the Bypass and the existing Route 11 for 2026 are 6695 and 2989, respectively. Predicted sound levels at the receptors along the proposed Project are presented below in Table 1.9.

Table 1.9 Predicted Sound Pressure Levels during Operation

Receptor ID	Measured Existing $L_{Aeq-24h}$ (dBA)	Predicted Road Traffic $L_{Aeq-24h}$ (dBA)
L1	60	31
L2	61	42
L3	51	35
L4	58	38

Based on the assumptions presented and the FHWA Traffic Noise Model (TNM) (2004) sound levels, and using the $L_{Aeq-24h}$ metric, sound levels are not likely to increase at nearby receptor locations, since the existing baseline sound levels exceed the predicted contribution from road traffic on the new Bypass by more than 10 dBA. Furthermore, the predicted sound levels from road traffic on the Bypass are also below the adopted NBDTI level of 65 dBA ($L_{Aeq-24h}$) (FHWA, 2004).

1.5.2 Accidents, Malfunctions and Unplanned Events

There is a potential for accidents to occur during all phases of the Project. Accidents which may impact the atmospheric environment are fire or accidental release of chemicals or fuels with consequent evaporation to the atmosphere.

Fires can arise during construction due to heavy equipment catching fire or the accidental ignition of brush during ROW clearing. If allowed to spread to adjacent forest lands, both local and regional air quality could be negatively affected.

Uncontrolled release of chemical or fuels may affect the local air quality during both the construction and OMR phases of the Project.

1.6 Mitigation Measures

Table 1.10 presents by a summary of Potential Effects, Standard NBDTI Environmental Management Manual (EMM) Mitigation Measures and any additional mitigation measures recommended in order to minimize potential effects to the atmospheric environment during construction and OMR.

Table 1.10 Summary of Mitigation Measures for Air Quality

Environmental and Project Component	Summary of Potential Effects	Standard NBDTI EMM Mitigation Measures[1]	Additional Recommended Mitigation Measures
Construction			
Air Quality (Including: Dust, Particulate Matter and Emissions)			
Construction	• Generation of particulate matter including dust • Combustion gas emissions of NO_X, CO, VOCs and SO_2 from construction equipment.	5.6 Dust Control 5.7 Erosion Control 5.8 Excavation, Blasting and Aggregate Production 5.10 Fire Prevention and Contingency 5.16.2 Grading 5.17.1 Portable Asphalt Plants 5.17.2 Pits 5.17.3 Stockpiling 5.17.4 Quarries 5.17.5 Temporary Access Roads 5.17.7 Marshalling Yards and Laydown Areas 5.19.2 Idling	• No additional mitigation measures are anticipated to be required.
GHG Emissions			
Construction	• GHG emissions from construction equipment.	5.19.2 Idling	• No additional mitigation measures are anticipated to be required.
Noise			
Construction	• Aggravating and elevated noise levels at nearby receptors from construction equipment.	5.8 Excavation, Blasting and Aggregate Production 5.23.6 Noise Sensitive Areas	• Monitoring complaints received from stakeholders related to noise from the construction of the Project and follow-up measures to the degree possible be implemented by the contractor and NBDTI.
Operation, Maintenance and Rehabilitation (OMR)			
Air Quality (Including: Dust, Particulate Matter and Emissions)			
OMR Phase	• Generation of particulate matter including dust from vehicles travelling along the Bypass. • Generation of dust and particulate matter during routine maintenance and resurfacing of the Bypass.	5.6 Dust Control 5.7 Erosion Control 5.8 Excavation, Blasting and Aggregate Production 5.10 Fire Prevention and Contingency 5.15.2.1 Application and Removal of Protective Coatings	• No additional mitigation measures are anticipated to be required.

Table 1.10 Summary of Mitigation Measures for Air Quality

Environmental and Project Component	Summary of Potential Effects	Standard NBDTI EMM Mitigation Measures[1]	Additional Recommended Mitigation Measures
	• Combustion gas emissions of NO_X, CO, VOCs and SO_2 from vehicles using the Bypass.	5.16 Summer Highway Maintenance	
GHG Emissions			
OMR Phase	• GHG emissions from vehicles using the Bypass. • GHG emissions from maintenance equipment along the Bypass.	5.19.2 Idling.	• No additional mitigation measures are anticipated to be required.
Noise			
OMR Phase	• Aggravating and elevated noise levels at nearby receptors from construction equipment.	5.23.6 Noise Sensitive Areas.	• Monitoring complaints received from stakeholders related to noise from the maintenance operations of the Bypass and follow-up measures to the degree possible be implemented by the contractor and NBDTI.
Accidents, Malfunctions and Unplanned Events			
Fire			
Construction and OMR Phases	• Localized and reduced air quality in region. • Reduction in visibility and potentially shut down of road. • Emission of chemical and fuel vapours negatively affecting local air quality.	5.10 Fire Prevention and Contingency 5.13 Storage and Handling of Petroleum Products 5.14 Storage and Handling of Other Hazardous Materials 5.24 Working Near Pipelines and Other Underground Services.	• No additional protective measures required.

Note:
1. Source: NBDTI Environmental Management Manual (EMM) (2010)

1.7 Significance of Residual Effects

A Project related adverse change in air quality that exceeds regulatory limits on a repeated or sustained basis at any location outside the property boundaries of the Project would be considered a significant adverse effect on air quality. A net reduction in air pollutants at any location attributable to the Project would be a positive effect.

Potential effects on air quality due to particulate matter and gaseous emissions during construction and OMR phases are expected to be localized and of short duration. With proper implementation of the identified mitigation measures, no significant adverse residual effects are likely,

Potential effects on air quality due to GHG emissions during construction are expected to be localized and of short duration. With proper implementation of the identified mitigation measures, no significant adverse residual effects are likely. During the OMR phase of the project, due to improved traffic flow, a reduction in GHG emissions may result in a positive effect on regional air quality.

During both construction and OMR phases of the project, it is likely that the NBDTI 24 hour Leq noise guideline of 65 dBA will not be exceeded on a repeated and sustained basis at the closest noise receptors.

Table 1.11 identifies the likelihood of the potential proposed Project activities to cause significant adverse environmental effects to air quality following application of mitigation measures described in the previous section.

The residual effects of the Project are not expected to have a significant effect on air quality outside the proposed Project ROW.

The residual effects of the Project on sound quality are expected to be limited and localized events that can be rectified through the application of identified mitigation measures in Table 1.10.

Table 1.11 Significance of Residual Effects to Air Quality after Mitigation

Project Related Environmental Effect	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological Context	Significant Effect
Construction – Activities / Interactions						
Emissions from construction equipment.	M	L	Construction Period	Yes	Localized to immediate Project Area, unlikely to affect regional air quality.	No
GHG emissions from operation of construction equipment.	L	L	Construction Period	Yes	Localized to immediate Project Area, unlikely to affect regional air quality.	No
Elevated noise in area due to construction equipment.	M	L	Construction Period	Yes	Localized to immediate Project Area, unlikely to affect regional air quality.	No
Operation, Maintenance and Rehabilitation (OMR) – Activities / Interactions						
Air emissions from vehicles using bypass.	L	L	OMR Period	Yes	Air emissions not expected to increase as traffic volume not expected to change.	No
GHG emissions from general public vehicles and maintenance equipment.	L	L	OMR Period	Yes	GHG emissions not expected to increase as traffic volume not expected to change.	No
Elevated noise at receptors due to traffic noise.	M	L	OMR Period	Yes	Localized to properties located in close proximity to bypass.	No

Notes:

Magnitude:

High (H) Values regularly exceed guidelines (Entire Route 11 affected);
Moderate (M) Values affected, but generally below guidelines (Route 11 between Glenwood and Miramichi affected); and
Low (L) Values not affected (Sections of Route 11 between Glenwood and Miramichi affected).

Geographic Extent:

High (H) Entire Route 11 affected;
Moderate (M) Route 11 between Glenwood and Miramichi affected; and
Low (L) Sections of Route 11 between Glenwood and Miramichi affected.

1.8 Monitoring and Follow-up Requirements

Monitoring of complaints received from stakeholders related to noise or fugitive dust from the construction or OMR of the Bypass and follow-up measures to the degree possible be implemented by the contractor and NBDTI.

No other monitoring activities are recommended for the effects of the Project on the atmospheric environment.

1.9 Atmospheric Environment - References

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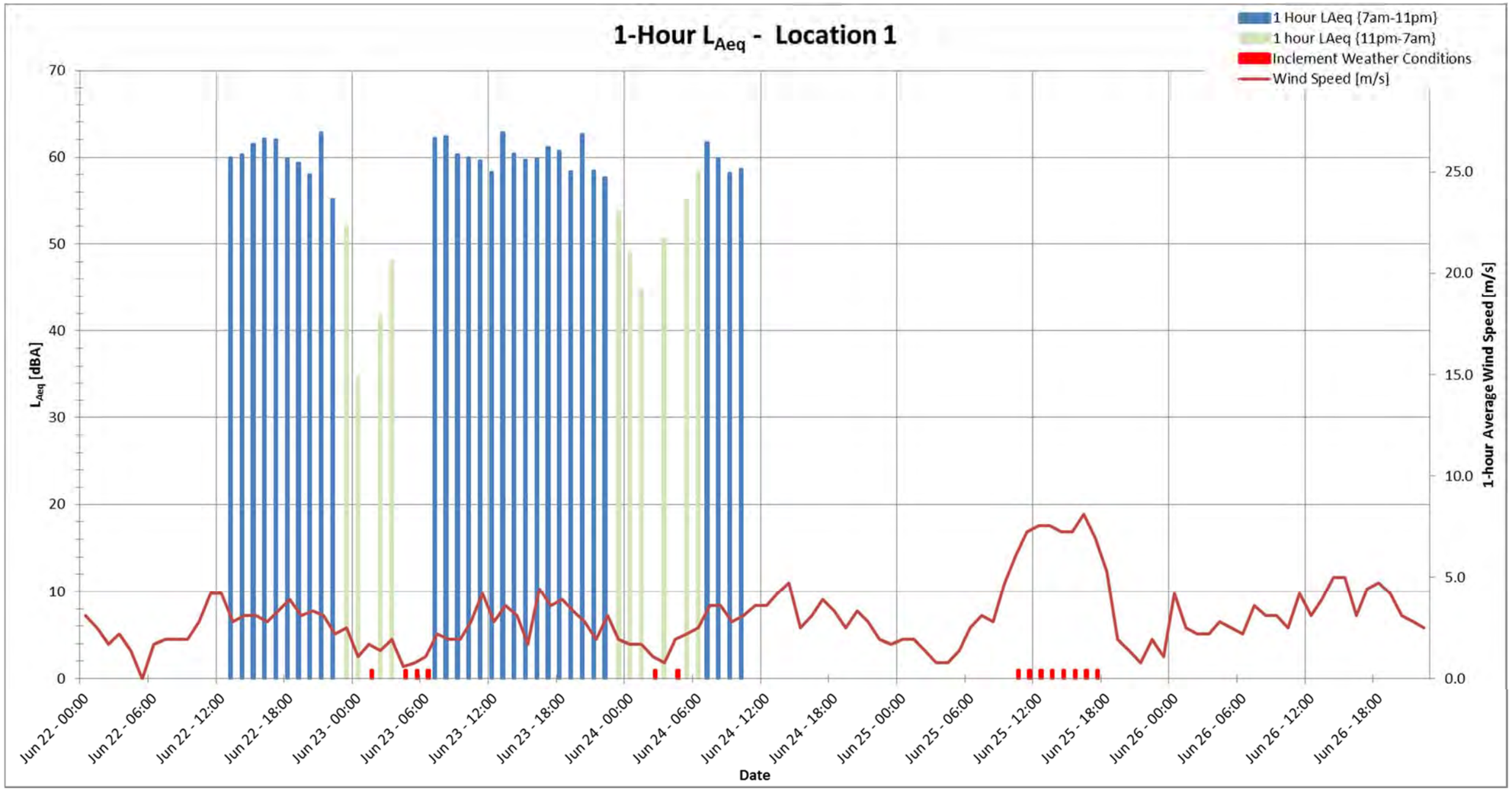
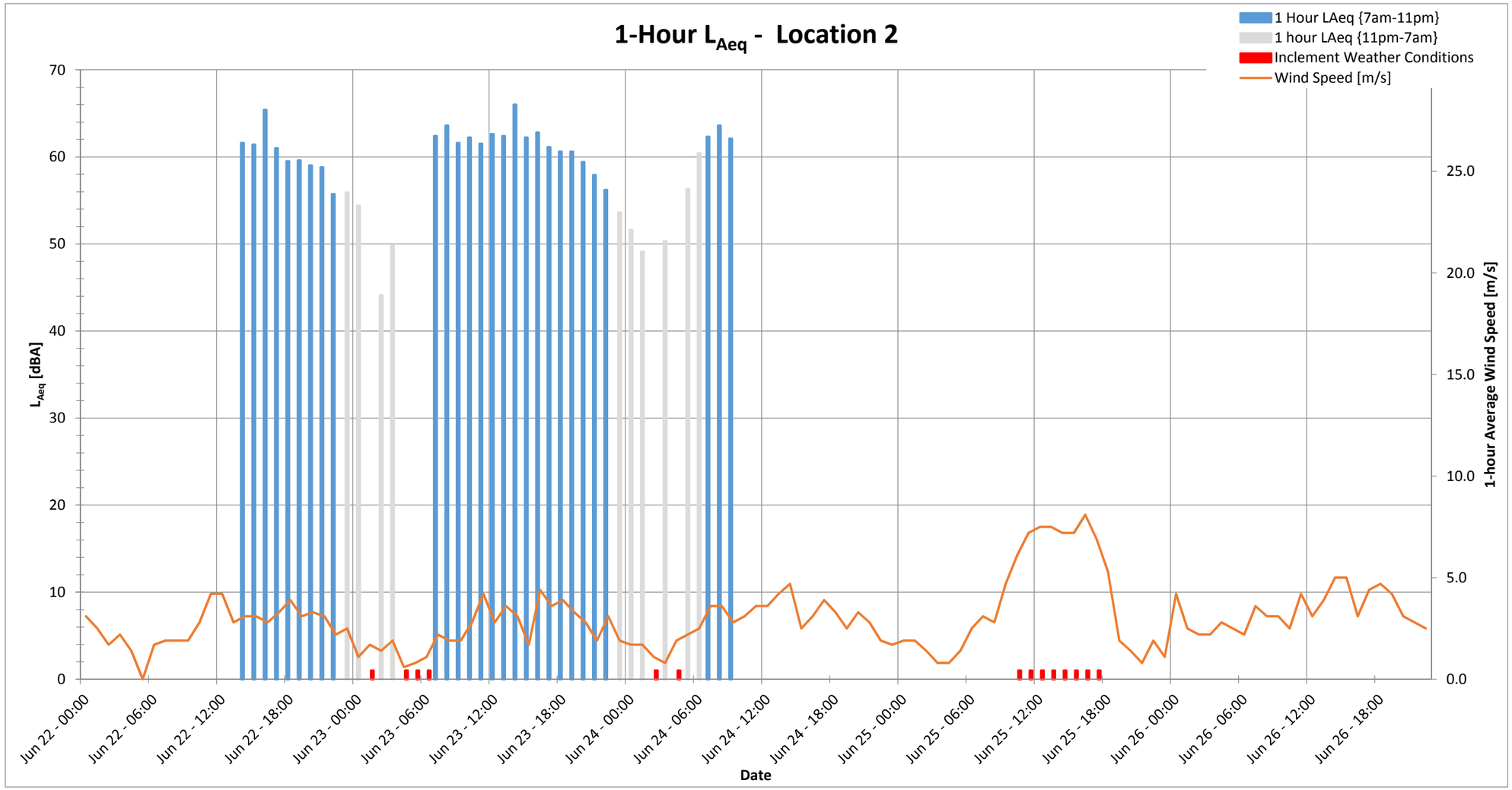
APPENDIX 1A
Background Noise Measurements Data

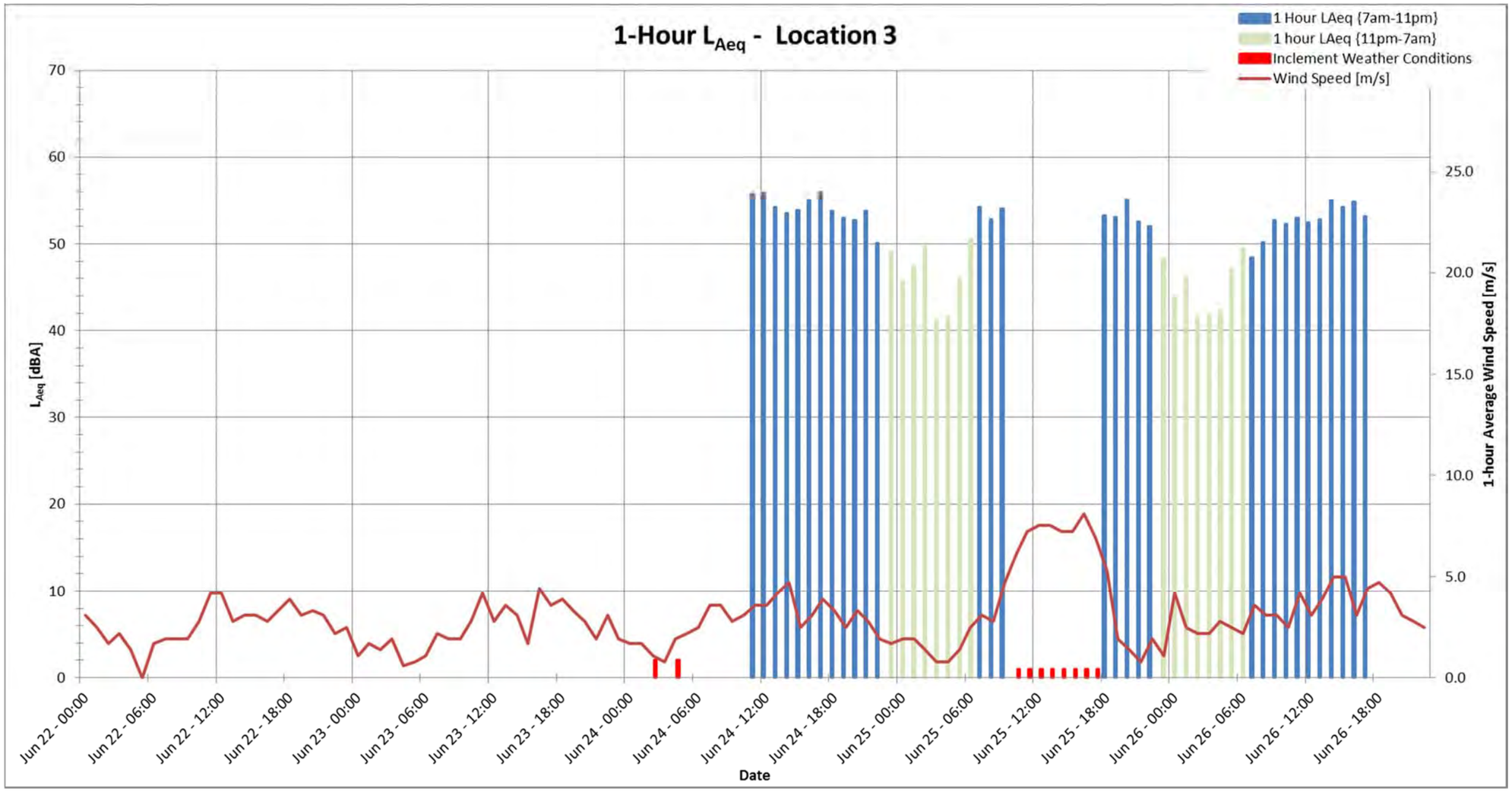
Appendix 1A Background Noise Measurements Data



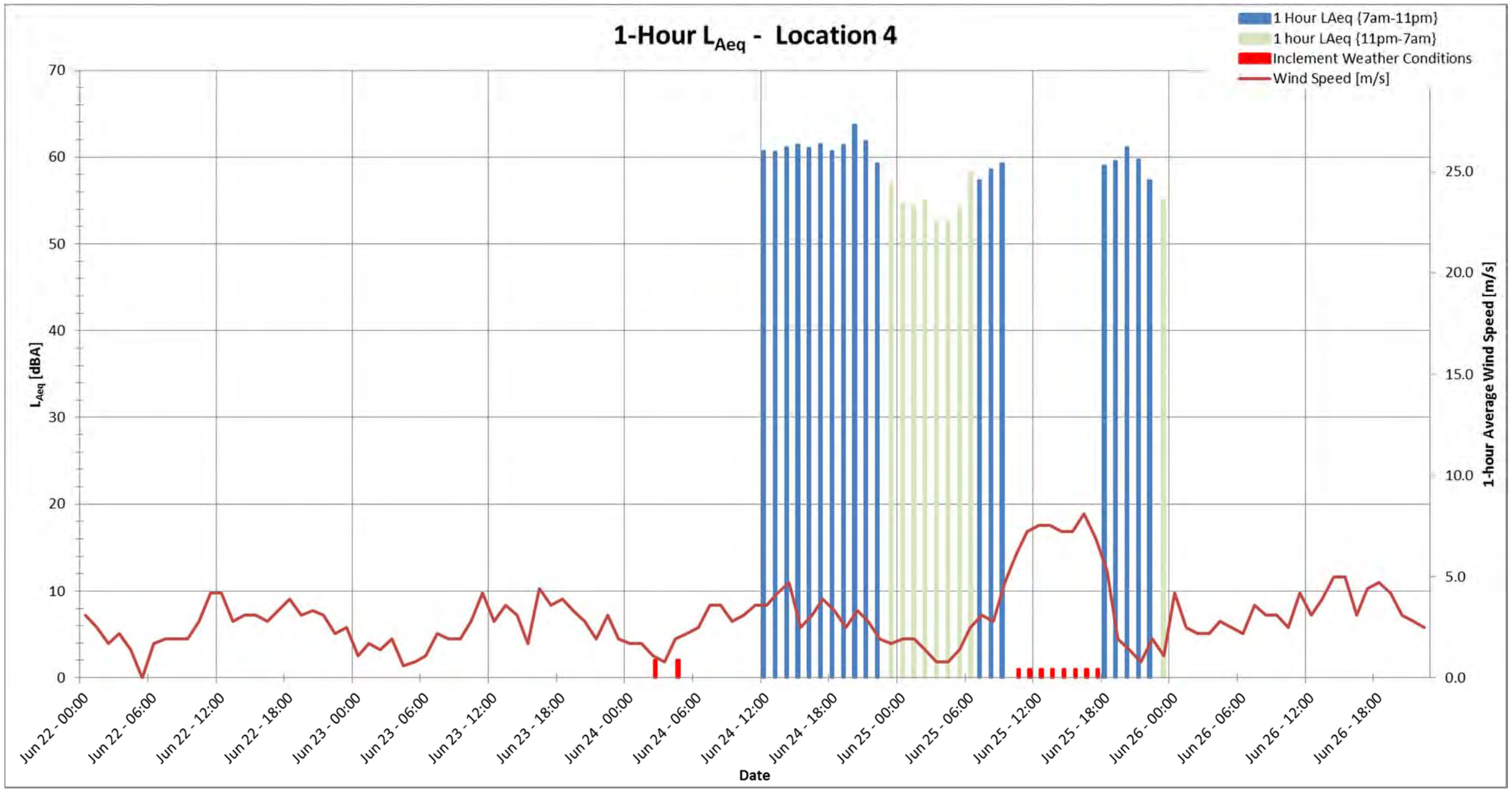
Appendix 1A Background Noise Measurements Data



Appendix 1A Background Noise Measurements Data



Appendix 1A Background Noise Measurements Data



APPENDIX 1B
Weather from 22-26 June, 2016 at Miramichi RCS

Station Name: Miramichi RCS
Province: New Brunswick
Latitude: 47.01
Longitude: -65.47
Elevation: 33
Climate Identifier: 8100989
WMO Identifier: 71744
TC Identifier: ACQ

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

Legend

E	Estimated
M	Missing
NA	Not Available
‡	Partner data that is not subject to review by the National Climate Archives

Date/Time	Year	Month	Day	Time	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Wind Dir (10s deg)	Wind Spd (km/h)	Stn Press (kPa)
22/06/2016 0:00	2016	6	22	0:00	16.7	8.8	60	26	11	100.1
22/06/2016 1:00	2016	6	22	1:00	15.4	8.2	62	27	9	100.13
22/06/2016 2:00	2016	6	22	2:00	13.7	8.5	71	26	6	100.17
22/06/2016 3:00	2016	6	22	3:00	12.7	8.5	76	27	8	100.21
22/06/2016 4:00	2016	6	22	4:00	11.8	8.2	79	28	5	100.22
22/06/2016 5:00	2016	6	22	5:00	10.3	7.7	84		0	100.29
22/06/2016 6:00	2016	6	22	6:00	12.1	9.1	82	23	6	100.36
22/06/2016 7:00	2016	6	22	7:00	14.9	9.2	69	26	7	100.4
22/06/2016 8:00	2016	6	22	8:00	16.9	9.3	61	28	7	100.42
22/06/2016 9:00	2016	6	22	9:00	18.8	8.1	50	24	7	100.42
22/06/2016 10:00	2016	6	22	10:00	20	8	46	23	10	100.4
22/06/2016 11:00	2016	6	22	11:00	21	6.9	40	22	15	100.36
22/06/2016 12:00	2016	6	22	12:00	23	7.4	37	22	15	100.31
22/06/2016 13:00	2016	6	22	13:00	23.1	7.2	36	20	10	100.25
22/06/2016 14:00	2016	6	22	14:00	24.1	7.1	34	22	11	100.22
22/06/2016 15:00	2016	6	22	15:00	23.5	7.3	35	23	11	100.18
22/06/2016 16:00	2016	6	22	16:00	25.1	6.6	31	26	10	100.12
22/06/2016 17:00	2016	6	22	17:00	24.8	7	32	23	12	100.09
22/06/2016 18:00	2016	6	22	18:00	24.6	6.7	32	23	14	100.07
22/06/2016 19:00	2016	6	22	19:00	17.1	11.5	70	4	11	100.12
22/06/2016 20:00	2016	6	22	20:00	16.8	11.5	71	3	12	100.17
22/06/2016 21:00	2016	6	22	21:00	15.4	12.4	82	4	11	100.25
22/06/2016 22:00	2016	6	22	22:00	14.7	12.3	86	4	8	100.23
22/06/2016 23:00	2016	6	22	23:00	14.7	12.5	87	5	9	100.18
23/06/2016 0:00	2016	6	23	0:00	14	12.1	88	34	4	100.2
23/06/2016 1:00	2016	6	23	1:00	12.9	11.7	92	29	6	100.22
23/06/2016 2:00	2016	6	23	2:00	13.6	11.3	86	6	5	100.21
23/06/2016 3:00	2016	6	23	3:00	13.2	11.6	90	17	7	100.19
23/06/2016 4:00	2016	6	23	4:00	12.8	11.3	91	18	2	100.26
23/06/2016 5:00	2016	6	23	5:00	12.3	11	92	34	3	100.22
23/06/2016 6:00	2016	6	23	6:00	13.3	11.8	91	24	4	100.28
23/06/2016 7:00	2016	6	23	7:00	16.1	12.4	79	26	8	100.31
23/06/2016 8:00	2016	6	23	8:00	17.7	12.8	73	27	7	100.34
23/06/2016 9:00	2016	6	23	9:00	18.8	10.9	60	25	7	100.35
23/06/2016 10:00	2016	6	23	10:00	20.5	12.4	60	25	10	100.36
23/06/2016 11:00	2016	6	23	11:00	20.8	9.2	48	28	15	100.34
23/06/2016 12:00	2016	6	23	12:00	20.7	8.4	45	31	10	100.37
23/06/2016 13:00	2016	6	23	13:00	21	9.2	47	26	13	100.31
23/06/2016 14:00	2016	6	23	14:00	21.8	9.8	46	24	11	100.27
23/06/2016 15:00	2016	6	23	15:00	23	6.1	34	29	6	100.23
23/06/2016 16:00	2016	6	23	16:00	22.3	6.1	35	27	16	100.22
23/06/2016 17:00	2016	6	23	17:00	21	7.3	41	29	13	100.3
23/06/2016 18:00	2016	6	23	18:00	20.7	7.2	42	30	14	100.35
23/06/2016 19:00	2016	6	23	19:00	19.3	7.3	46	27	12	100.41
23/06/2016 20:00	2016	6	23	20:00	17.9	6.7	48	27	10	100.46
23/06/2016 21:00	2016	6	23	21:00	16.5	8.9	61	29	7	100.51
23/06/2016 22:00	2016	6	23	22:00	15.6	9.3	66	27	11	100.61
23/06/2016 23:00	2016	6	23	23:00	14.2	10	76	22	7	100.63
24/06/2016 0:00	2016	6	24	0:00	12.9	10.1	83	24	6	100.66
24/06/2016 1:00	2016	6	24	1:00	12.1	10.4	90	26	6	100.69
24/06/2016 2:00	2016	6	24	2:00	11.1	9.7	91	24	4	100.73
24/06/2016 3:00	2016	6	24	3:00	10.7	9.1	90	27	3	100.73
24/06/2016 4:00	2016	6	24	4:00	9.4	8.1	91	27	7	100.75
24/06/2016 5:00	2016	6	24	5:00	9.4	7.8	90	26	8	100.81
24/06/2016 6:00	2016	6	24	6:00	10.8	7.8	82	26	9	100.85
24/06/2016 7:00	2016	6	24	7:00	12.4	7.6	73	28	13	100.93
24/06/2016 8:00	2016	6	24	8:00	14.8	8.2	65	27	13	101
24/06/2016 9:00	2016	6	24	9:00	16.6	8.6	59	27	10	101.01
24/06/2016 10:00	2016	6	24	10:00	18.5	8.2	51	28	11	101.03
24/06/2016 11:00	2016	6	24	11:00	18.6	6.6	46	30	13	101.05
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24/06/2016 15:00	2016	6	24	15:00	22.3	5.1	33	30	9	101.1
24/06/2016 16:00	2016	6	24	16:00	22.8	5.8	33	24	11	101.12
24/06/2016 17:00	2016	6	24	17:00	22.9	4.6	30	28	14	101.12
24/06/2016 18:00	2016	6	24	18:00	23.1	4.9	31	26	12	101.16
24/06/2016 19:00	2016	6	24	19:00	22.4	6.2	35	26	9	101.21
24/06/2016 20:00	2016	6	24	20:00	19.9	7.1	43	25	12	101.29
24/06/2016 21:00	2016	6	24	21:00	17.5	7.8	53	25	10	101.39
24/06/2016 22:00	2016	6	24	22:00	16.1	7.9	58	26	7	101.43
24/06/2016 23:00	2016	6	24	23:00	14.6	7.4	62	26	6	101.46
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25/06/2016 1:00	2016	6	25	1:00	12.4	8.2	76	26	7	101.5
25/06/2016 2:00	2016	6	25	2:00	11.5	7.4	76	24	5	101.53

Station Name: Miramichi RCS
Province: New Brunswick
Latitude: 47.01
Longitude: -65.47
Elevation: 33
Climate Identifier: 8100989
WMO Identifier: 71744
TC Identifier: ACQ
All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

Legend

E	Estimated
M	Missing
NA	Not Available
‡	Partner data that is not subject to review by the National Climate Archives

Date/Time	Year	Month	Day	Time	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Wind Dir (10s deg)	Wind Spd (km/h)	Stn Press (kPa)
25/06/2016 3:00	2016	6	25	3:00	10.2	7	81	21	3	101.57
25/06/2016 4:00	2016	6	25	4:00	9.8	6.8	81	21	3	101.56
25/06/2016 5:00	2016	6	25	5:00	9.5	7.2	85	27	5	101.59
25/06/2016 6:00	2016	6	25	6:00	10.7	8	83	24	9	101.61
25/06/2016 7:00	2016	6	25	7:00	13.7	8.1	69	22	11	101.66
25/06/2016 8:00	2016	6	25	8:00	18.1	8.6	54	25	10	101.67
25/06/2016 9:00	2016	6	25	9:00	21.6	10.4	49	22	17	101.65
25/06/2016 10:00	2016	6	25	10:00	23.9	10.5	43	22	22	101.63
25/06/2016 11:00	2016	6	25	11:00	25.5	10.4	39	24	26	101.62
25/06/2016 12:00	2016	6	25	12:00	26.9	10.1	35	24	27	101.56
25/06/2016 13:00	2016	6	25	13:00	28.2	10	32	22	27	101.55
25/06/2016 14:00	2016	6	25	14:00	28.7	10.9	33	22	26	101.53
25/06/2016 15:00	2016	6	25	15:00	29.2	10.2	31	22	26	101.48
25/06/2016 16:00	2016	6	25	16:00	29.2	10.3	31	23	29	101.48
25/06/2016 17:00	2016	6	25	17:00	29.1	10.8	32	22	25	101.47
25/06/2016 18:00	2016	6	25	18:00	28.4	11.3	35	23	19	101.49
25/06/2016 19:00	2016	6	25	19:00	25.4	12	43	1	7	101.56
25/06/2016 20:00	2016	6	25	20:00	23.6	11.6	47	30	5	101.61
25/06/2016 21:00	2016	6	25	21:00	20.9	13.5	62	26	3	101.65
25/06/2016 22:00	2016	6	25	22:00	18.9	12.7	67	19	7	101.67
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26/06/2016 2:00	2016	6	26	2:00	16.8	11.7	72	24	8	101.6
26/06/2016 3:00	2016	6	26	3:00	15	11.3	78	23	8	101.65
26/06/2016 4:00	2016	6	26	4:00	14.9	11.2	79	21	10	101.66
26/06/2016 5:00	2016	6	26	5:00	14.7	11.1	79	24	9	101.76
26/06/2016 6:00	2016	6	26	6:00	15.9	11.9	77	23	8	101.77
26/06/2016 7:00	2016	6	26	7:00	18.2	12.4	69	23	13	101.76
26/06/2016 8:00	2016	6	26	8:00	20.9	14	65	24	11	101.76
26/06/2016 9:00	2016	6	26	9:00	23.5	14	55	22	11	101.74
26/06/2016 10:00	2016	6	26	10:00	26.2	15.1	50	23	9	101.75
26/06/2016 11:00	2016	6	26	11:00	28.3	13.2	39	24	15	101.7
26/06/2016 12:00	2016	6	26	12:00	29.6	14.9	41	21	11	101.64
26/06/2016 13:00	2016	6	26	13:00	30.5	12.5	33	21	14	101.6
26/06/2016 14:00	2016	6	26	14:00	31	12	31	23	18	101.56
26/06/2016 15:00	2016	6	26	15:00	31.2	11.5	30	25	18	101.51
26/06/2016 16:00	2016	6	26	16:00	31.4	11.2	29	20	11	101.47
26/06/2016 17:00	2016	6	26	17:00	31.6	10.6	27	19	16	101.42
26/06/2016 18:00	2016	6	26	18:00	30.9	11.5	31	20	17	101.41
26/06/2016 19:00	2016	6	26	19:00	29.1	11.2	33	19	15	101.41
26/06/2016 20:00	2016	6	26	20:00	25.8	11.1	40	19	11	101.41
26/06/2016 21:00	2016	6	26	21:00	23.8	12.1	48	16	10	101.43
26/06/2016 22:00	2016	6	26	22:00	21.8	12.8	57	15	9	101.4
26/06/2016 23:00	2016	6	26	23:00	20.2	12.5	61	8	4	101.37