



Wood Buffalo Environmental Association
Ambient Air Monitoring Station
Site Documentation

Mackay River

LAST UPDATED: FEBRUARY 5, 2021



Table of Contents

WBEA Monitoring Network	4
Vision.....	4
Mission.....	4
General Site Information	9
Station	9
Location.....	9
Owner/Operator/Approval Holder	9
Site Description.....	9
Site Influences.....	10
Localized Sources (within 20 metres of station).....	10
Roadway Influences	10
Major Point Sources.....	10
Analytical Equipment	11
Support Equipment.....	11
Site photos	15
Station Photos.....	17



Tables and Figures

Table 1.0 - Pollutant Parameters monitored in the WBEA network.....	5
Table 1.1 – Meteorological Parameters monitored in the WBEA network.....	6
Table 1.2 – Time-Integrated Parameters monitored in the WBEA network	7
Figure 1.0 – WBEA Network Monitoring Sites	8
Figure 2.0 – Area Topographic map showing AMS 20	12
Figure 3.0 – Plan view sketch for AMS 20 site	13
Figure 4.0 – Aerial photo showing AMS 20.....	14
Figure 5.0 – Environ Looking North	15
Figure 5.1 – Environ Looking East	15
Figure 5.2 – Environ looking South	16
Figure 5.3 – Environ Looking West	16
Figure 5.4 – Meteorological Tower.....	17
Figure 6.0 – Photo showing the inlet and sample manifold	17
Figure 6.1 – Curb shot of the monitoring station	18
Figure 6.2 –Photo of front and back of instrument rack	18
Figure 7.0 – Windrose (Five Year)	19



WBEA Monitoring Network

Vision

People are empowered to make informed decisions to ensure a safe and healthy environment.

Mission

The Wood Buffalo Environmental Association is a multi-stakeholder, consensus-based organization that leads in state of the art environmental monitoring to enable informed decision-making.

Continuous ambient air quality and meteorological data are collected under the Ambient Air Monitoring (AAM) group in WBEA. The WBEA currently operates 29 permanent continuous monitoring stations, each measuring various air quality parameters. The continuously measured air quality parameters include SO₂, H₂S, TRS, O₃, NO_x, NO, NO₂, NH₃, CO, CO₂, PM_{2.5}, THC, NMHC, and CH₄. All sites also measure ambient air temperature, wind speed, wind direction, and relative humidity. Selected sites measure barometric pressure, global radiation, precipitation, surface wetness, vertical wind speed, vertical temperature gradient, and visibility. The ambient air monitoring parameters for each station are summarized in Table 1.0 and 1.1. The WBEA also maintains and operates five portable monitoring stations. The configuration of these stations differs depending on their task. Three are configured for compliance monitoring and are equipped to measure SO₂, H₂S, NO_x, NO, NO₂, THC, wind speed, wind direction, temperature. One portable is equipped to monitor all these compliance parameters as well as PM_{2.5}. The last portable is set up to operate gas chromatography systems and currently has a Sulphur and VOC GC installed to collect speciated data for the Odour Monitoring Program within WBEA.

Since 1998 WBEA has maintained time-integrated sampling for PM_{2.5}, PM₁₀, VOC and PAH. The sampling for time-integrated monitoring has evolved with a better understanding of technology, analytical laboratory methods and sample deployment and collection methods. Time-integrated samples in the WBEA ambient air monitoring network are collected on the National Air Pollution Surveillance (NAPS) schedule every 6 days for a 24-hour period. The time-integrated parameters for each station are summarized in Table 1.2.



WBEA ID	TYPE	STATION NAME	SO ₂	NO/NO ₂ /NO _x	O ₃	PM _{2.5}	TRS	H ₂ S	THC	Methane	CO	CO ₂	NH ₃
										NMHC			
1	COMMUNITY	BERTHA GANTER-FORT MCKAY	X	X	X	X	X		X	X	X	X	X
2	COMPLIANCE	MILDRED LAKE	X					X	X	X			
3	METEOROLOGICAL	LOWER CAMP MET TOWER											
4	COMPLIANCE	BUFFALO VIEWPOINT	X	X	X	X		X	X	X			
5	COMPLIANCE/METEOROLOGICAL	MANNIX	X					X	X	X			
6	COMMUNITY	PATRICIA MCINNES	X	X	X	X	X		X	X			X
7	COMMUNITY	ATHABASCA VALLEY	X	X	X	X	X		X	X	X		
8	COMMUNITY/COMPLIANCE	FORT CHIPEWYAN	X	X	X	X					X	X	
9	ATTRIBUTION	BARGE LANDING	X	X		X	X		X	X			
11	COMPLIANCE	LOWER CAMP	X					X	X	X			
13	COMPLIANCE/ATTRIBUTION	FORT MCKAY SOUTH	X	X	X	X	X		X	X			
14	COMPLIANCE/COMMUNITY	ANZAC	X	X	X	X	X		X	X			
17	COMPLIANCE	WAPASU	X	X	X	X		X	X				
18	BACKGROUND	STONY MOUNTAIN	X	X	X	X	X		X	X	X	X	
19	COMPLIANCE	FIREBAG	X	X				X	X				
20	COMPLIANCE	MACKAY RIVER	X	X				X	X				
21	COMMUNITY	CONKLIN	X	X	X	X	X		X	X			
22	COMMUNITY	JANVIER	X	X	X	X	X		X	X			
23	COMPLIANCE	FORT HILLS	X	X		X	X		X	X			
25	EMERGENCY RESPONSE	WASKOW OHCI PIMATISIWIN	X					X					
26	COMPLIANCE	CHRISTINA LAKE	X	X				X					
27	COMPLIANCE	JACKFISH 2/3	X	X				X					
29	COMPLIANCE	SURMONT 2	X	X		X		X	X				
30	COMPLIANCE	ELLS RIVER	X	X		X	X			X			
501	COMPLIANCE	LEISMER	X	X				X	X				
505	COMPLIANCE	SAWBONES BAY	X	X				X	X				
506	COMPLIANCE	JACKFISH 1	X	X			X						
508	COMPLIANCE	KIRBY NORTH	X	X				X	X				

Table 1.0 - Pollutant Parameters monitored in the WBEA network



WBEA ID	TYPE	STATION NAME	Temperature	RH	BP	Wind Speed	Wind Direction	Vertical Wind Speed	Solar Radiation	Precipitation	Leaf Wetness
1	COMMUNITY	BERTHA GANTER-FORT MCKAY	X	X		X	X		X	X	X
2	COMPLIANCE	MILDRED LAKE	X	X		X	X				
3	METEOROLOGICAL	LOWER CAMP MET TOWER	X	X		X	X	X			
4	COMPLIANCE	BUFFALO VIEWPOINT	X	X		X	X				
5	COMPLIANCE/METEOROLOGICAL	MANNIX	X	X		X	X	X			
6	COMMUNITY	PATRICIA MCINNES	X	X		X	X				
7	COMMUNITY	ATHABASCA VALLEY	X	X	X	X	X				
8	COMMUNITY/COMPLIANCE	FORT CHIPEWYAN	X	X		X	X		X		X
9	ATTRIBUTION	BARGE LANDING	X	X	X	X	X				
11	COMPLIANCE	LOWER CAMP	X	X		X	X				
13	COMPLIANCE/ATTRIBUTION	FORT MCKAY SOUTH	X	X		X	X				
14	COMPLIANCE/COMMUNITY	ANZAC	X	X		X	X				X
17	COMPLIANCE	WAPASU	X	X		X	X			X	
18	BACKGROUND	STONY MOUNTAIN	X	X		X	X		X	X	X
19	COMPLIANCE	FIREBAG	X	X		X	X				
20	COMPLIANCE	MACKAY RIVER	X	X		X	X			X	
21	COMMUNITY	CONKLIN	X	X		X	X				
22	COMMUNITY	JANVIER	X	X		X	X				
23	COMPLIANCE	FORT HILLS	X	X		X	X				
25	EMERGENCY RESPONSE	WASKOW OHCI PIMATISIWIN	X	X		X	X				
26	COMPLIANCE	CHRISTINA LAKE	X	X		X	X				
27	COMPLIANCE	JACKFISH 2/3	X	X		X	X				
29	COMPLIANCE	SURMONT 2	X	X		X	X				
30	COMPLIANCE	ELLS RIVER	X	X		X	X				
501	COMPLIANCE	LEISMER	X	X		X	X				
505	COMPLIANCE	SAWBONES BAY	X	X		X	X				
506	COMPLIANCE	JACKFISH 1	X	X		X	X				
508	COMPLIANCE	KIRBY NORTH	X	X		X	X				

Table 1.1 – Meteorological Parameters monitored in the WBEA network



WBEA ID	TYPE	STATION NAME	VOC	PM _{2.5} Mass,	PM _{2.5}	PM ₁₀ Mass,	PAH	PRECIP
				Metals and Ions	Mass, ECOC	Metals and Ions		
1	COMMUNITY	BERTHA GANTER-FORT MCKAY	X	X	X	X	X	X
6	COMMUNITY	PATRICIA MCINNES	X	X		X	X	
7	COMMUNITY	ATHABASCA VALLEY	X	X		X	X	
9	ATTRIBUTION	BARGE LANDING	X					
13	COMPLIANCE/ ATTRIBUTION	FORT MCKAY SOUTH	X			X		
14	COMPLIANCE/COMMUNITY	ANZAC	X	X		X	X	
17	COMPLIANCE	WAPASU			X			X
18	ENHANCED DEPOSITION/ BACKGROUND	STONY MOUNTAIN			X			X
21	COMMUNITY	CONKLIN	X	X		X	X	
22	COMMUNITY	JANVIER	X	X		X	X	
30	COMPLIANCE	ELLS RIVER	X			X		

Table 1.2 – Time-Integrated Parameters monitored in the WBEA network



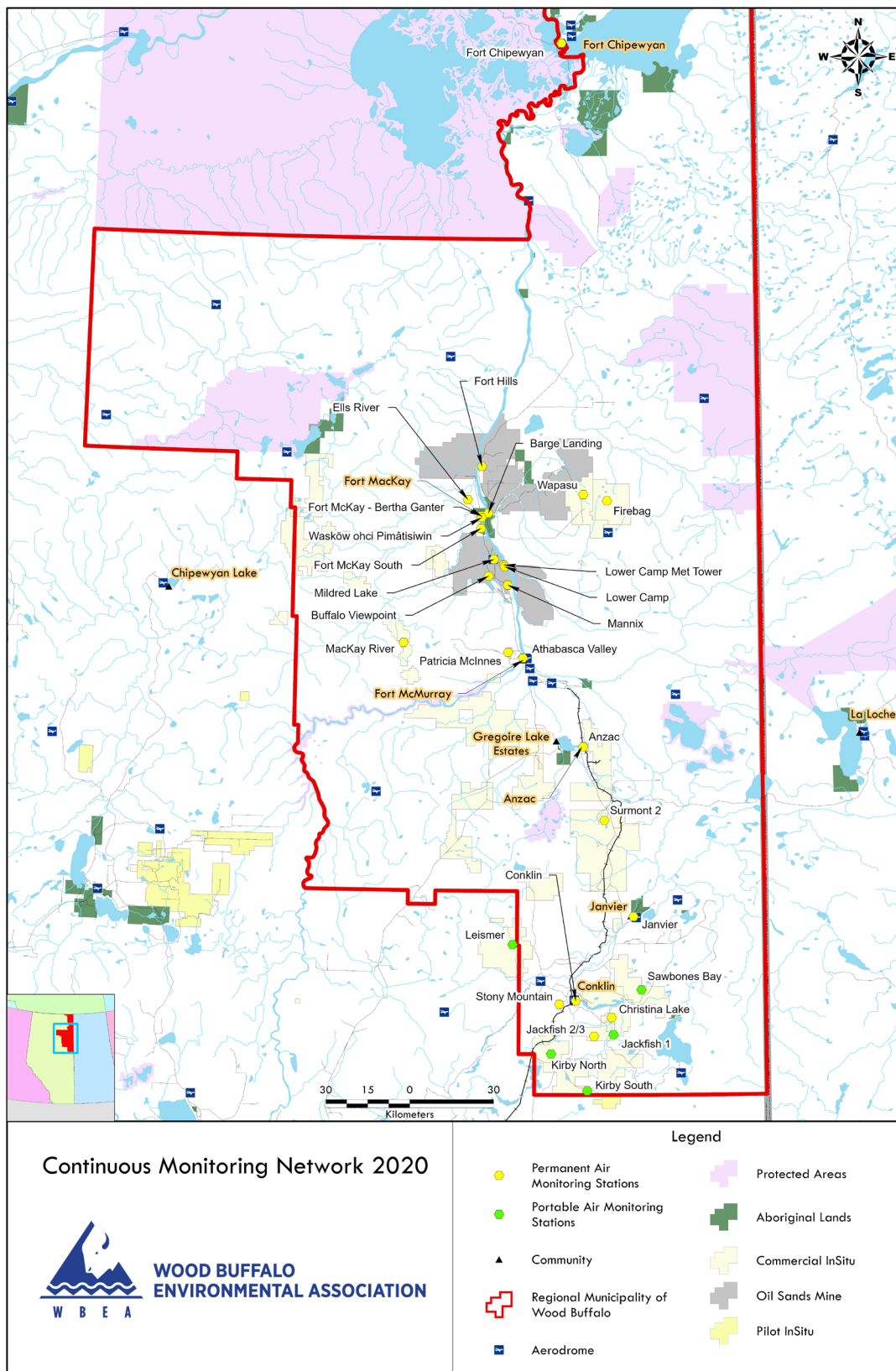


Figure 1.0 – WBEA Network Monitoring Sites



General Site Information

Station

Station ID	AMS 20
Station name	Mackay River
Date station established	January 07, 2016

Location

Station street address	NA
Legal land description	10-01-090-14 W4
Latitude	56°46'45.49"N
Longitude	112° 5'19.48"W
UTM East	433447
UTM North	6293395
Nearest community	Fort McMurray
Community population	112000

Owner/Operator/Approval Holder

Operating Agency	Wood Buffalo Environmental Association
Name of Approval Holder	PetroChina Canada Ltd.
Approval number	254465-00-00
Contact Name	Matt Going
Address	NA
Phone number	780-446-0779
Email address	environment@petrochinacanada.com

Site Description

Land use by sector	0 – 90 degrees	Forest and SAGD project
	91 – 180 degrees	Forest and SAGD project
	181 – 270 degrees	Forest
	271 – 360 degrees	Forest
Site elevation (above sea level)	498	
Angle of elevation to nearby buildings	Greatest angle	0 degree
	Building direction	None
Airflow restrictions	North	None
	East	None
	South	None
	West	Yes
Sample manifold	Type	All glass
	Inlet height above roof	1 meter
	Type	Cup and vane



Meteorological Sensors	Height above ground	10 m
	Distance from station	Attached to north end of the station

Site Influences

Localized Sources (within 20 metres of station)

Type	Distance (m)	Description

Roadway Influences

Type	Traffic Volume	Distance (m)	Description
Gravel road	Low	30	Access road

Major Point Sources

Facility Name	Source Type	Production Capacity	Distance from site (km)	Compass direction from site
Petrochina Canada Ltd.	Oil and Gas industry	35000 b/ day	5	North



Analytical Equipment

Parameter	Owner	Make	Model	Serial Number	Date Installed
Sulfur Dioxide	WBEA	Thermo Scientific	43i	1501301450	January 07, 2016
Hydrogen Sulfide	WBEA	Teledyne/API	T101	196	January 07, 2016
Oxides of Nitrogen	WBEA	Thermo Scientific	42i	1505164379	January 07, 2016
Total Hydrocarbons	WBEA	Thermo Scientific	51i	1501663727	January 07, 2016
Temperature/RH	WBEA	Vaisala	HMP155	F5010002	September 26, 2018
Wind speed	WBEA	Met One	010C-1	P22395	January 07, 2016
Wind direction	WBEA	Met One	020C-1	N9937	January 07, 2016
Precipitation Gauge	ECCC	OTT	Pluvio 2	363524	2020

Support Equipment

Name	Description	Make	Model	Serial Number
Datalogger	Datalogger	Campbell Scientific	CR3000	9627
Datalogger	Datalogger	Campbell Scientific	CR310	6239
Zero air generator	Zero Air Generator	Teledyne/API	701	4766
HVAC	Heating and air conditioning system. Wall mount unit	BARD	1 ton	NA
Shelter / Building	Air monitoring portable	ITB	8 x 16 trailer	ITB-15-16552
Gas Dilution Calibrator	Mass flow controlled gas dilution	Teledyne/API	T700	1220
Hydrogen generator	H2 for THC analyzer	AMA	HG 300	171067042



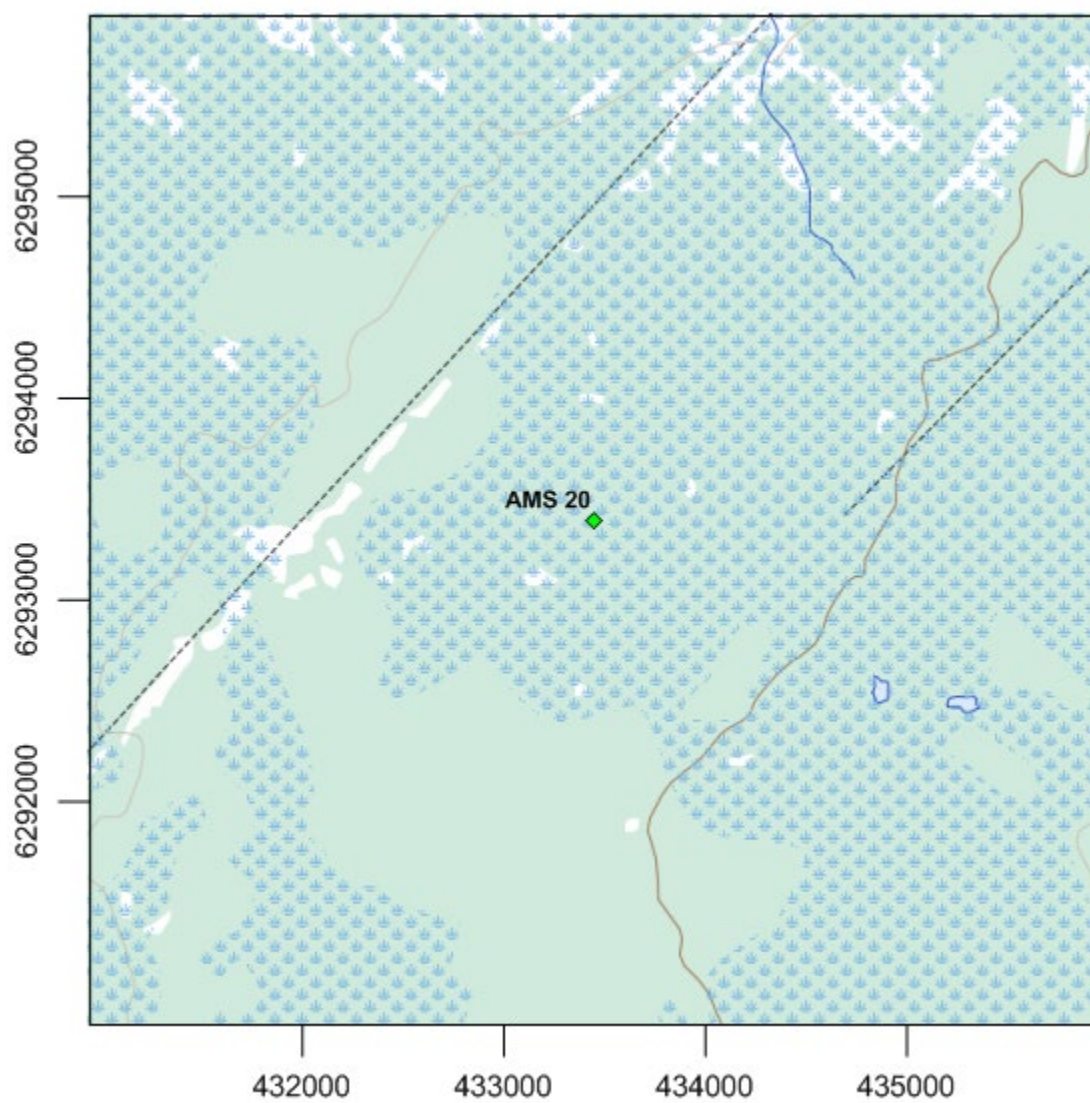
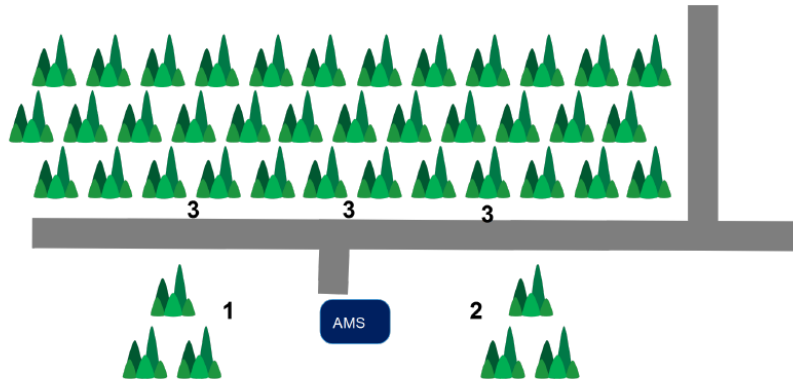


Figure 2.0 – Area Topographic map showing AMS 20





Station Name: AMS 20 - Mackay River



Obstacle	Distance from the station (m)	Height of the Obstacle (m)
1 Trees	30	8.5
2 Trees	40	13
3 Treeline	60	10
4 Treeline	110	20
5 Pond	110	0

Figure 3.0 – Plan view sketch for AMS 20 site





Figure 4.0 – Aerial photo showing AMS 20



Site photos

The following photos show the environment surrounding the monitoring station.



Figure 5.0 – Environ Looking North



Figure 5.1 – Environ Looking East





Figure 5.2 – Environ looking South



Figure 5.3 – Environ Looking West





Figure 5.4 – Meteorological Tower

Station Photos

The following photos show the monitoring station and instrumentation.

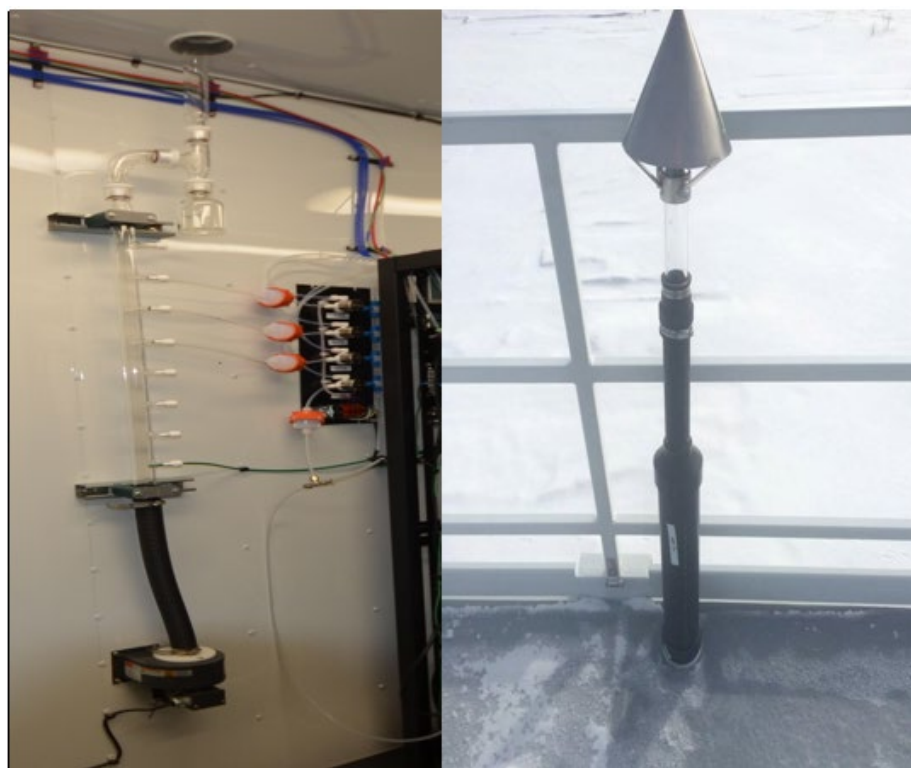


Figure 6.0 – Photo showing the inlet and sample manifold





Figure 6.1 – Curb shot of the monitoring station



Figure 6.2 –Photo of front and back of instrument rack





Wood Buffalo Environmental Association
Wind Rose 2016 - 2020

Wind Speed (WS) - km/h
Mackay River

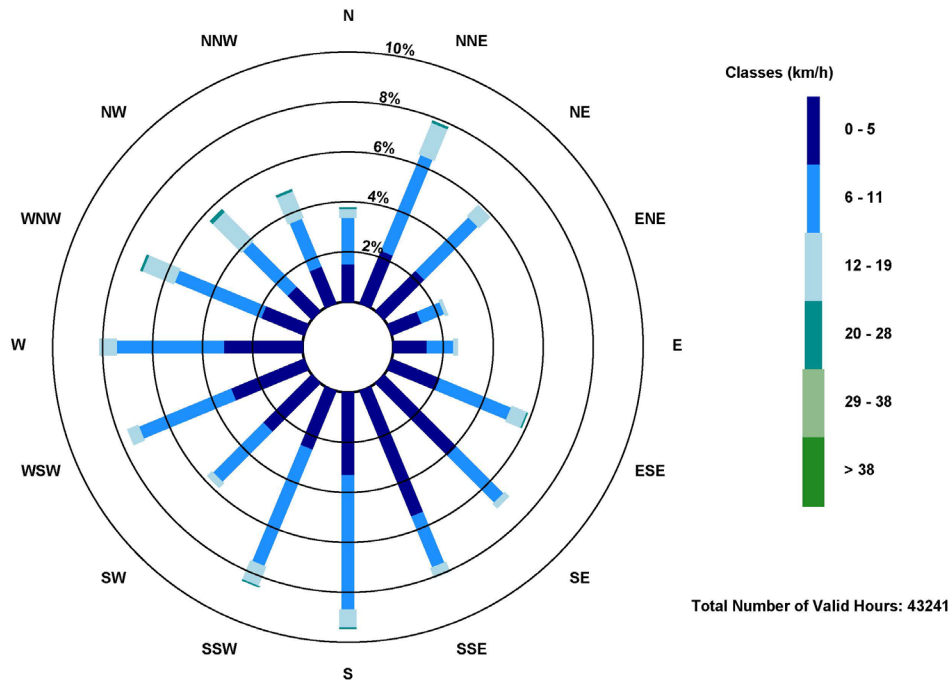


Figure 7.0 – Windrose (Five Year)

