

Wood Buffalo Environmental Association
Ambient Air Monitoring Station
Site Documentation

Fort McKay South

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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
Station Equipment.....	12
Analytical Equipment.....	12
Meteorological Equipment	12
Support Equipment	12
Site photos	17
Station Photos.....	20



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 13.....	13
Figure 3.0 – Aerial image showing AMS 13.....	14
Figure 4.0 – Plan view image for AMS 13 – Fort McKay South	15
Figure 5.0 – Elevation image for AMS 13 – Fort McKay South	16
Figure 6.0 – Environment looking North Figure 6.1 – Environment looking East	17
Figure 6.2 – Environment looking South Figure 6.3 – Environment looking West.....	18
Figure 6.4 – Meteorological Tower	19
Figure 7.0 – Photo showing the inlet and sample manifold.	20
Figure 7.1 – Curb shot of the monitoring station.....	21
Figure 7.2 –Photo of the front and the back of instrument rack	22
Figure 8.0 – Windrose (2018-2022).....	23



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 Sulphur Dioxide (SO₂), Hydrogen Sulfide (H₂S), Total Reduced Sulphur (TRS), Ozone (O₃), Total Oxides of Nitrogen (NO_x), Nitric Oxide (NO), Nitrogen Dioxide (NO₂), Ammonia (NH₃), Carbon Monoxide (CO), Carbon Dioxide (CO₂), Particulate Matter less than 2.5µm (PM_{2.5}), Total Suspended Particulates (TSP), Total Hydrocarbon (THC), Total and Non-Methane Hydrocarbon (NMHC). All sites also measure ambient air temperature (AT), wind speed (WS), wind direction (WD), and relative humidity (RH). Selected sites measure barometric pressure (BP), global radiation (GR), precipitation (PC), leaf wetness (LW), vertical wind speed (VWS), vertical temperature gradient (VTG) and Present Weather Detector (PWD). 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, WS, WD, AT, RH. 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. In 2015, the WBEA moved to duplicate sampling for the PM₁₀ and PM_{2.5} time integrated parameters for 2 reasons; (1) to have duplicate mass measurements for QA purposes, (2) to have separate filters for subsequent metals and ion analysis. Elemental and Organic Carbon (ECOC) sampling began on August 7, 2012 at the Bertha Ganter site. ECOC was added and the Wapasu and Stony Mountain sites on May 1, 2018. All 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 WBEA also collects precipitation samples for chemistry analysis through the National Atmospheric Deposition Program (NADP) at here site. These samples are collected every Tuesday at 12:00

The time-integrated parameters for each station are summarized in Table 1.2.



Table 1.0 provides a listing of stations with their names and corresponding WBEA identification number and the air quality parameters measured by continuous methods at each site. Parameters measured include hydrogen sulphide (H₂S), total reduced sulphur (TRS), sulphur dioxide (SO₂), nitrogen dioxide (NO₂), total hydrocarbons (THC), methane (CH₄), non-methane hydrocarbons (NMHC), ammonia (NH₃), carbon monoxide (CO), and carbon dioxide (CO₂). Sites are categorized as industrial or community, based on the setting in which they are located.

WBEA ID	TYPE	STATION NAME	SO ₂	NO ₂	O ₃	PM _{2.5}	TRS	H ₂ S	THC	NMHC	CO	CO ₂	NH ₃
1	COMMUNITY	BERTHA GANTER-FORT MCKAY	X	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	X			
501	COMPLIANCE	LEISMER	X	X				X					
505	COMPLIANCE	SAWBONES BAY	X	X				X					
506	COMPLIANCE	JACKFISH 1	X	X				X					
507	COMPLIANCE	KIRBY SOUTH	X	X				X	X				
508	COMPLIANCE	KIRBY NORTH	X	X				X	X				

Table 1.0 - Pollutant Parameters monitored in the WBEA network



Table 1.1 provides a listing of stations and meteorological parameters measured by continuous methods. Parameters measured include ambient temperature, relative humidity, wind speed, wind direction, vertical wind speed, solar radiation, precipitation, and leaf wetness

WBEA ID	TYPE	STATION NAME	Temperature	RH	BP	WS	WD	VWS	GR	PC	LW
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		X		
501	COMPLIANCE	LEISMER	X	X		X	X				
505	COMPLIANCE	SAWBONES BAY	X	X		X	X				
506	COMPLIANCE	JACKFISH 1	X	X		X	X				
507	COMPLIANCE	KIRBY SOUTH	X	X		X	X				
508	COMPLIANCE	KIRBY NORTH	X	X		X	X				

Table 1.1 – Meteorological Parameters monitored in the WBEA network



Table 1.2 provides a listing of stations and air quality parameters measured by time integrated methods. Parameters measured include volatile organic compounds (VOC), particulate matter less than 2.5 µm aerodynamic diameter (PM_{2.5}) and associated metals and ions, particulate matter less than 10 µm aerodynamic diameter (PM₁₀) and associated metals and ions, polycyclic aromatic hydrocarbons (PAH), and precipitation samples.

WBEA ID	TYPE	STATION NAME	VOC	PM _{2.5}	PM _{2.5}	PM ₁₀	PAH	PRECIP
					ECOC			
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	
8	COMPLIANCE/COMMUNITY	FORT CHIPEWYAN	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	
23	COMPLIANCE	FORT HILLS	X			X		
30	COMPLIANCE	ELLS RIVER	X			X		

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



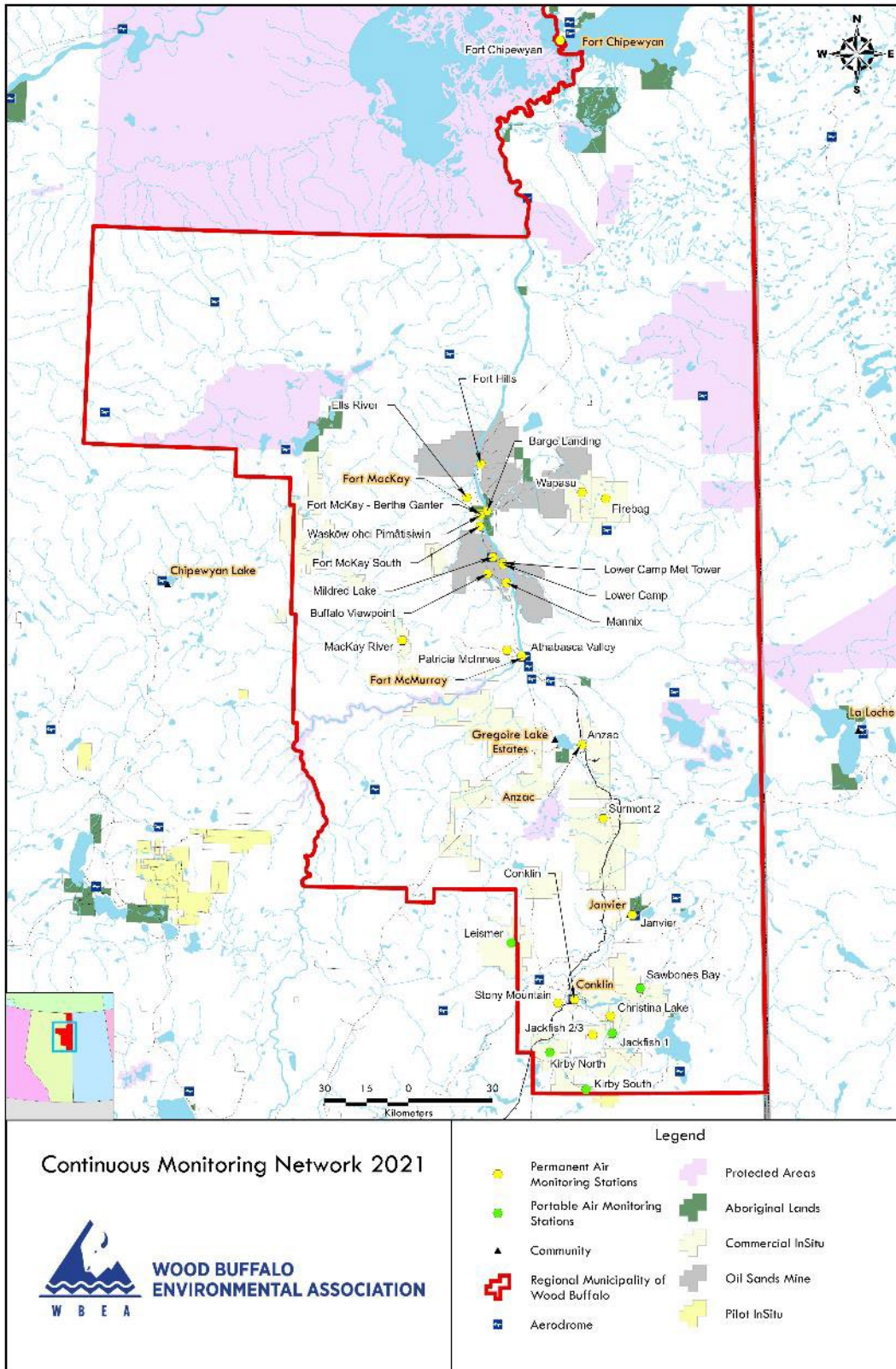


Figure 1.0 – WBEA Network Monitoring Sites



General Site Information

Station

Station ID	AMS 13
Station name	Fort McKay South
Date station established	2002

Location

Station street address	None
Legal land description	4-13-094-11 W4
Airshed Zone	Wood Buffalo Environmental Association
Latitude	57.149175
Longitude	-111.642344
UTM East	461136
UTM North	6334175
Nearest community	Fort McKay
Community population	757
Census Year	2021

Owner/Operator/Approval Holder

Operating Agency	Wood Buffalo Environmental Association
Address of Operating Agency	Unit 3, 805 Memorial Drive, Fort McMurray, Alberta T9K 0K4
Name of Approval Holder	Syncrude Canada Ltd
Approval number	026-02-00
Contact Name	Brooke Bennett
Address	Bag 4009, MD 4160, Fort McMurray, Alberta, T9H 3L1
Phone number	780-790-5692
Email address	Bennett.brooke@syncrude.com

Site Description

Land use by sector	0 – 90 degrees	Forest
	91 – 180 degrees	Forest
	181 – 270 degrees	Forest
	271 – 360 degrees	Forest
Site elevation (m) (above sea level)	268 m	
Angle of elevation to nearby buildings	Greatest angle	None
	Building direction	None
Airflow restrictions	North	None
	East	None
	South	None



	West	None
Distance to nearest trees (m)	North	150
	East	108
	West	56
	South	150
Sample manifold	Type	All glass
	Inlet height above roof	1 metre
Meteorological Sensors	Type	Cup and vane
	Height above ground (m)	10 m
	Distance from station (m)	0 m

Site Influences

Localized Sources (within 20 metres of station)

Type	Distance (m)	Description

Roadway Influences

Type	Traffic Volume	Distance (m)	Description
Asphalt	High	326	Main Road to Fort McKay and CNRL Horizon
Dirt	Low	99	Road to AMS 13
Dirt	Very Low	10	Access Road to AMS 13

Major Point Sources

Facility Name	Source Type	Production Capacity	Distance from site (km)	Compass direction from site
CNRL Horizon	OilSands Plant	250,000	21.9	N
Syncrude	Tailings pond	350,000	6.2	SW
Syncrude	OilSands Plant		12.3	S
Fort McKay Enterprises Ltd.	Laydown Yard		1	SE
Bouchier Group	LayDown Yard		1	SE
BME Ltd.	Laydown Yard		1	SE



Wood Buffalo Water Treatment Plant	Water Treatment Plant		4.9	N
CNRL Albian	Tailings pond		9.2	NE
CNRL Albian	Oilsands Plant	255,000	14.1	NE

Station Equipment

Equipment Owner: Syncrude Canada Ltd.

Analytical Equipment

Parameter	Make	Model	Serial Number	Date Installed
SO2	Teledyne/API	T100	599	2016
TRS	Thermo Scientific	43i-TLE	1180540017	2016
NO2	Thermo Scientific	42i	1410661329	2016
THC	Thermo Scientific	55i	1331259521	2022
O3	Teledyne/API	T400	3871	2021
PM 2.5	Teledyne/API	T640	319	2018
PM 10	Thermo Scientific	2000i	20001203861408	2016
PM 10	Thermo Scientific	2000i	20001203861408	2016
VOC	Tisch	TE123	1023	2016
TRS converter	Thermo Scientific	CDN-101	521	2016

Meteorological Equipment

Parameter	Make	Model	Serial Number	WMO Site Class	Date Installed
AT/RH	Vaisala	HMP155	G430047	Class 3	2016
WS	Met One	010C-1	N10022	Class 4	2022
WD	Met One	020C-1	W16101	Class 4	2021

Support Equipment

Name	Description	Make	Model	Serial Number
Datalogger	Datalogger	Campbell Scientific	CR3000	11038
Gas Dilution Calibrator	Dynamic dilution calibrator	Teledyne/API	T700	2248
Zero air generator	Zero Air Generator	Teledyne/API	701	1117
Shelter / Building	Air monitoring portable	C&V	8 x 16 trailer	5201657
HVAC	Heating and air conditioning system. Wall mount unit	Intherem	E2EB-010HB	E2E011101302



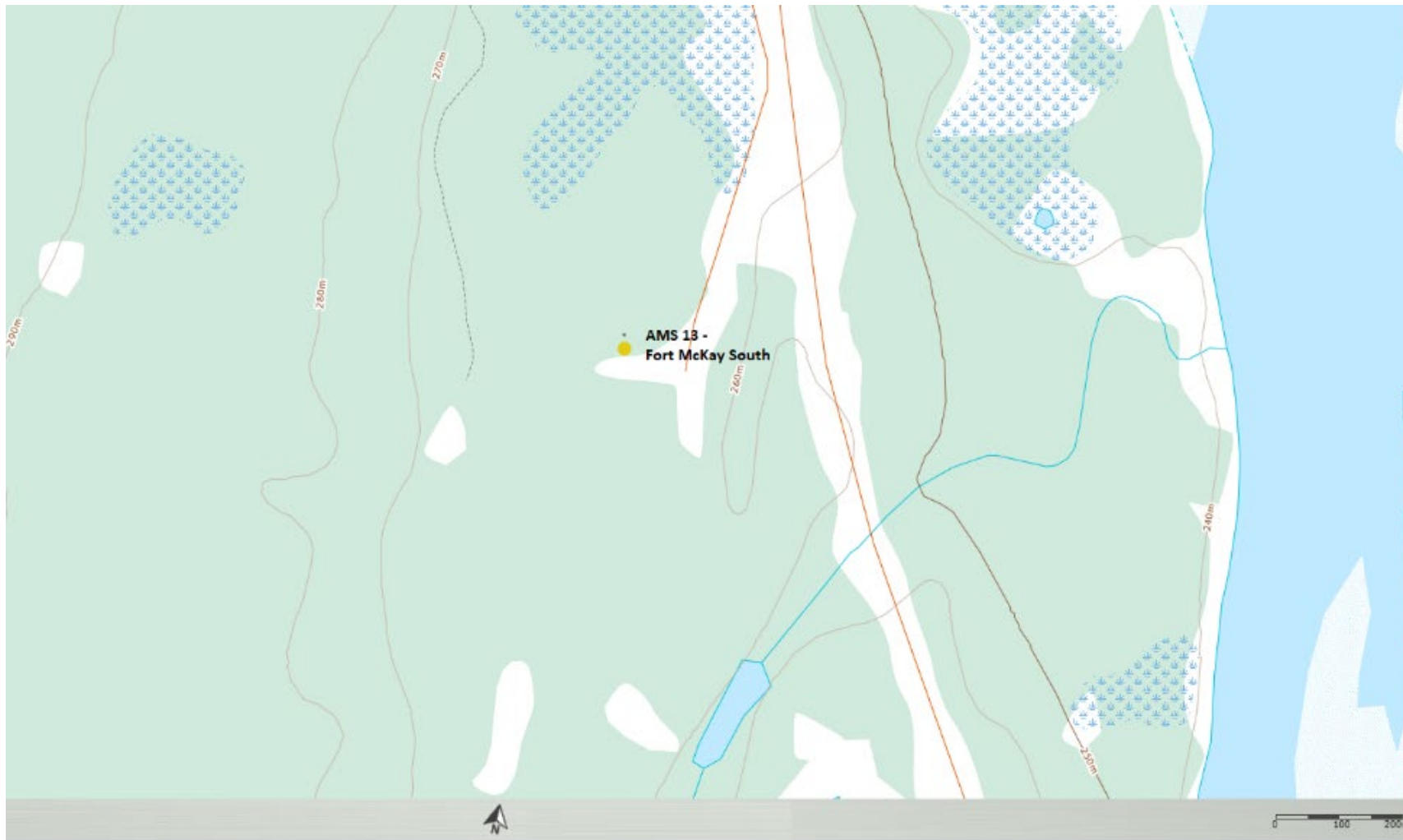


Figure 2.0 – Area Topographic map showing AMS 13



Figure 3.0 – Aerial image showing AMS 13



Figure 4.0 – Plan view image for AMS 13 – Fort McKay South

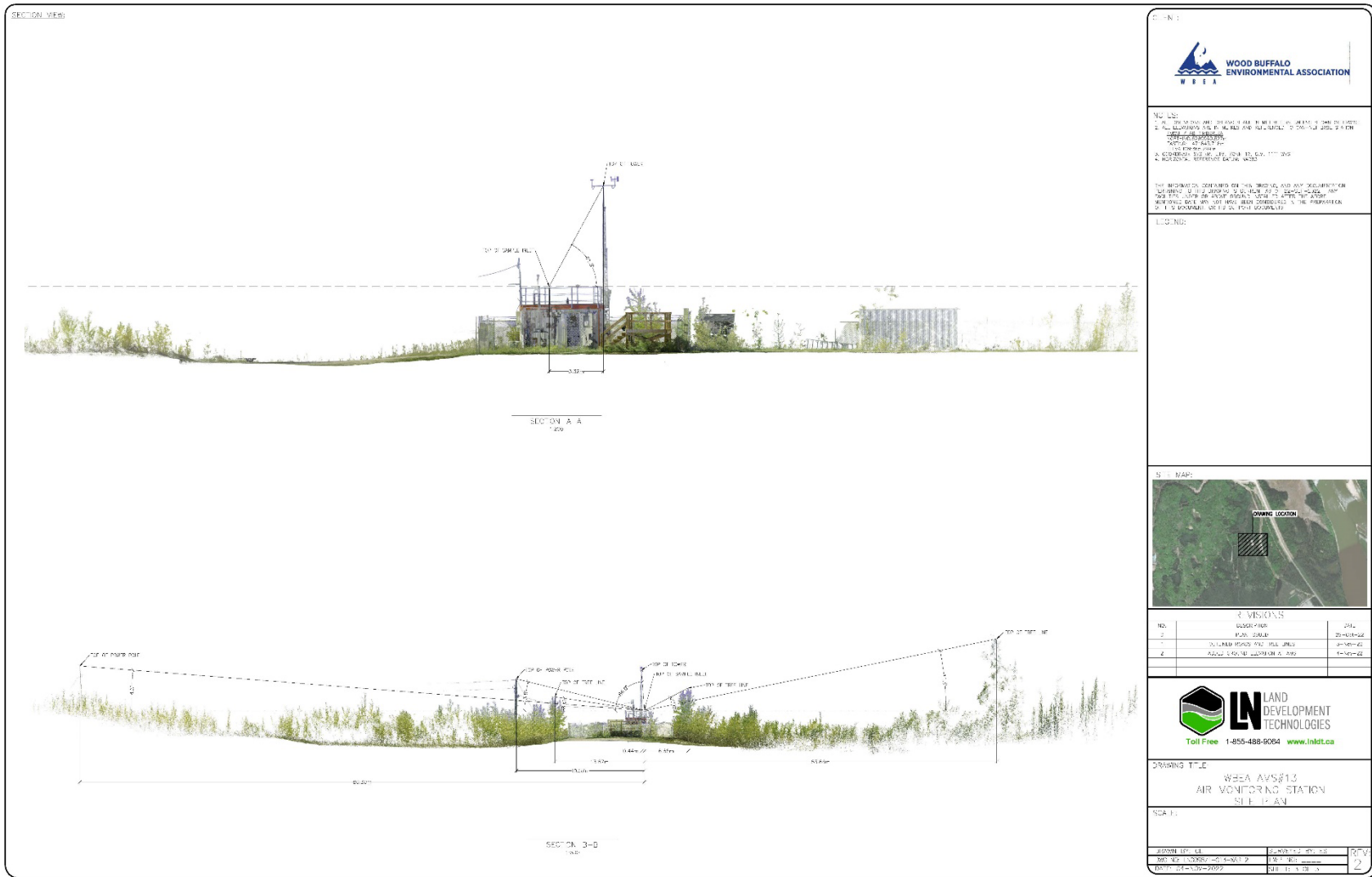


Figure 5.0 – Elevation image for AMS 13 – Fort McKay South

Site photos

The following photos show the environment surrounding the monitoring station.



Figure 6.0 – Environment looking North



Figure 6.1 – Environment looking East

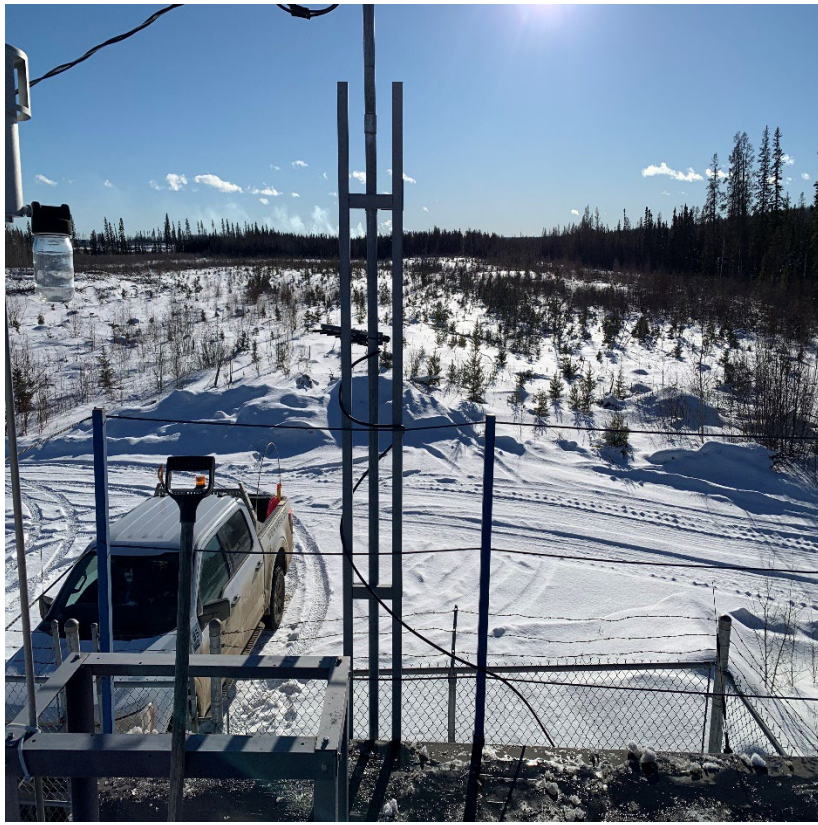


Figure 6.2 – Environment looking South



Figure 6.3 – Environment looking West



Figure 6.4 – Meteorological Tower

Station Photos

The following photos show the monitoring station and instrumentation.



Figure 7.0 – Photo showing the inlet and sample manifold.



Figure 7.1 – Curb shot of the monitoring station.



Figure 7.2 –Photo of the front and the back of instrument rack



Wood Buffalo Environmental Association
Wind Rose 2018 - 2022

Wind Speed (WS) - km/h
Fort McKay South

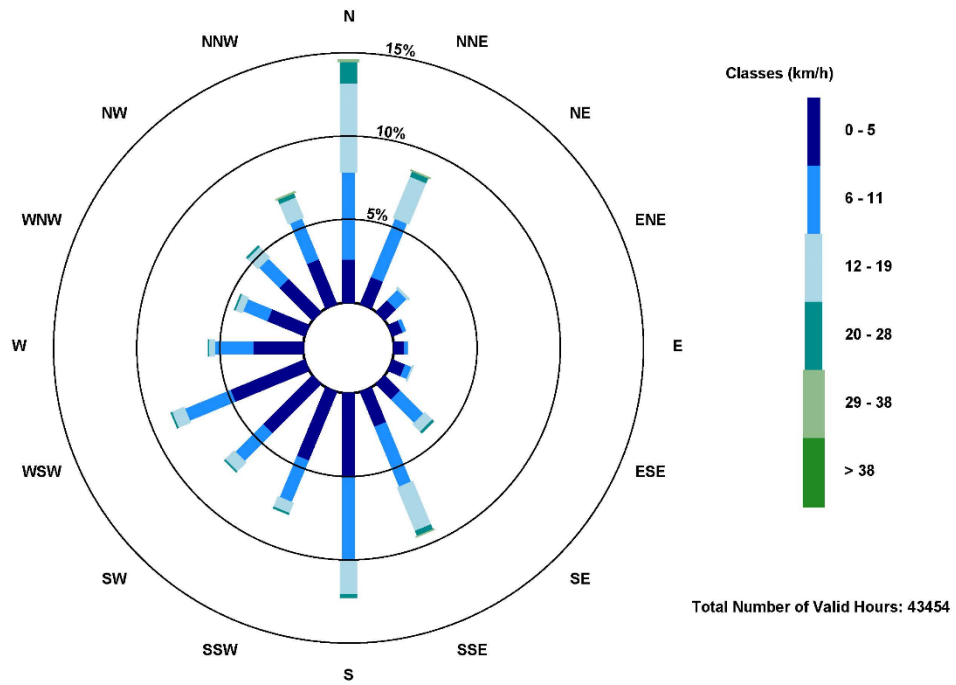


Figure 8.0 – Windrose (2018-2022)