



Wood Buffalo Environmental Association  
**Ambient Air Monitoring Station**  
**Site Documentation**

Ells River

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## 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 SO<sub>2</sub>, H<sub>2</sub>S, TRS, O<sub>3</sub>, NO<sub>x</sub>, NO, NO<sub>2</sub>, NH<sub>3</sub>, CO, CO<sub>2</sub>, PM<sub>2.5</sub>, THC, NMHC, and CH<sub>4</sub>. 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 SO<sub>2</sub>, H<sub>2</sub>S, NO<sub>x</sub>, NO, NO<sub>2</sub>, THC, wind speed, wind direction, temperature. One portable is equipped to monitor all these compliance parameters as well as PM<sub>2.5</sub>. 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<sub>2.5</sub>, PM<sub>10</sub>, 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.



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 (H<sub>2</sub>S), total reduced sulphur (TRS), sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), total hydrocarbons (THC), methane (CH<sub>4</sub>), non-methane hydrocarbons (NMHC), ammonia (NH<sub>3</sub>), carbon monoxide (CO), and carbon dioxide (CO<sub>2</sub>). Sites are categorized as industrial or community, based on the setting in which they are located.

WBEA ID	TYPE	STATION NAME	SO <sub>2</sub>	NO/NO <sub>2</sub> /NO <sub>x</sub>	O <sub>3</sub>	PM <sub>2.5</sub>	TRS	H <sub>2</sub> S	THC	Methane	CO	CO <sub>2</sub>	NH <sub>3</sub>
										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



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	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



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<sub>2.5</sub>) and associated metals and ions, particulate matter less than 10 µm aerodynamic diameter (PM<sub>10</sub>) and associated metals and ions, polycyclic aromatic hydrocarbons (PAH), and precipitation samples.

WBEA ID	TYPE	STATION NAME	VOC	PM <sub>2.5</sub> Mass,	PM <sub>2.5</sub>	PM <sub>10</sub> Mass,	PAH	PRECIP
				Metals and Ions	Mass, ECOG	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



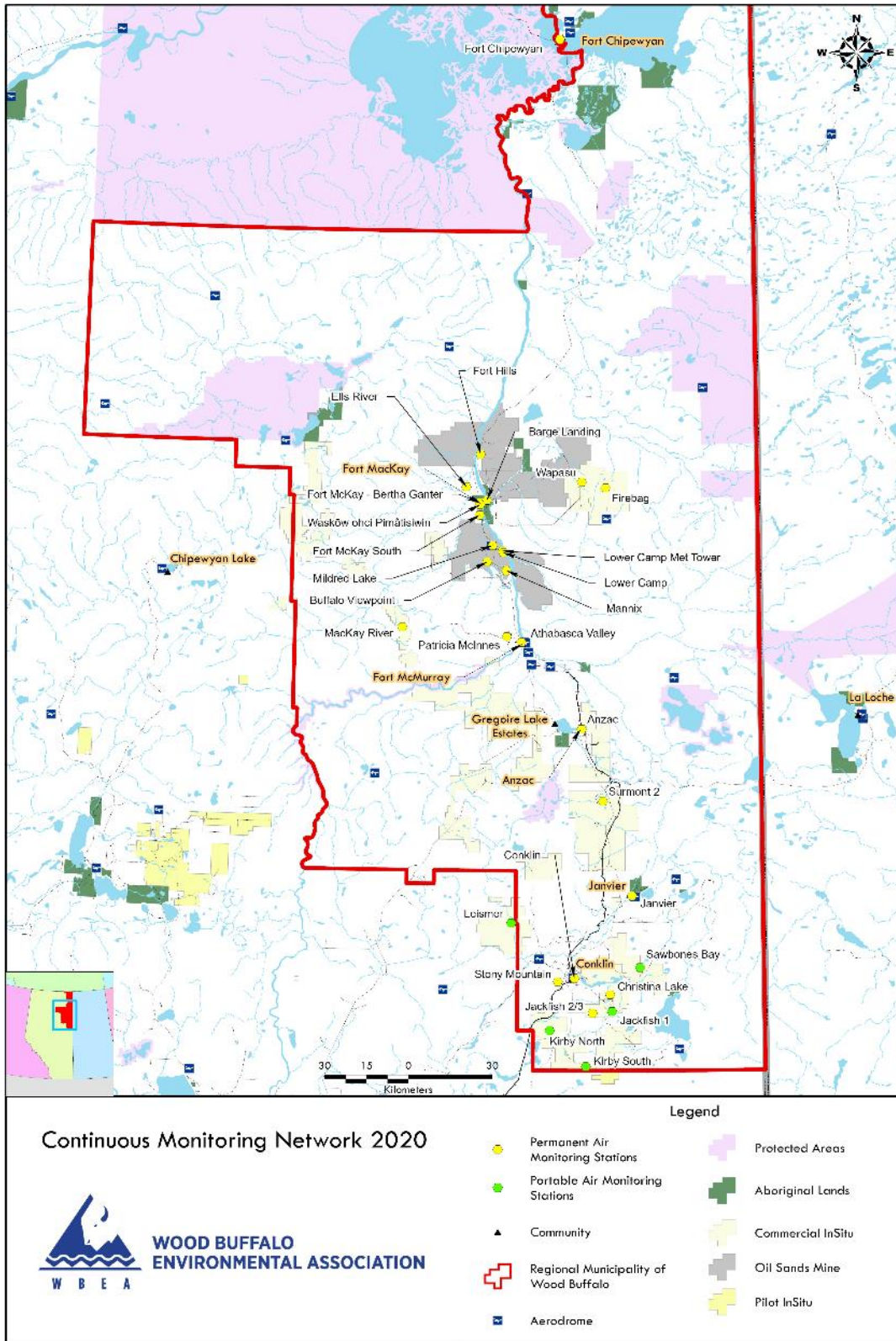


Figure 1.0 – WBEA Network Monitoring Sites





## General Site Information

### Station

Station ID	AMS 30
Station name	Ells River
Date station established	2020

### Location

Station street address	Located at about 300 m northwest of the Total Joslyn camp.
Legal land description	12-04-096-11 W4
Latitude	57.2413040
Longitude	-111.7220072
UTM East	456424
UTM North	6344478
Nearest community	Fort Mackay
Community population	742

### Owner/Operator/Approval Holder

Operating Agency	Wood Buffalo Environmental Association
Name of Approval Holder	Canadian Natural Resources Ltd.
Approval number	149968-01-00
Contact Name	Malathi Velmurugan
Address	2100, 855 – 2 Street SW Calgary, AB T2P 4J8
Phone number	(780) 714-4436
Email address	<a href="mailto:Malathi.Velmurugan@cnrl.com">Malathi.Velmurugan@cnrl.com</a>

### Site Description

Land use by sector	0 – 90 degrees	Pond
	91 – 180 degrees	Forest / Highway
	181 – 270 degrees	Forest
	271 – 360 degrees	Forest
Site elevation (above sea level)	304	
Angle of elevation to nearby buildings	Greatest angle	12 degrees
	Building direction	East
Airflow restrictions	North	No
	East	No
	South	No
	West	No
Sample manifold	Type	All glass
	Inlet height above roof	1 metre
	Type	Cup and vane



Meteorological Sensors	Height above ground	10
	Distance from station	7

## Site Influences

### Localized Sources (within 20 metres of station)

Type	Distance (m)	Description
Cell tower compound	14	Compound that holds the equipment for the cell tower to function

### Roadway Influences

Type	Traffic Volume	Distance (m)	Description
Paved road	Very low	50 M West	Old horizon highway
Paved road	High	250 M East	Horizon highway
Dirt road	Very low	100 M East	Dirt road around the pond

### Major Point Sources

Facility Name	Source Type	Production Capacity	Distance from site (km)	Compass direction from site
CNRL Horizon Oil Sands	Oil plant		10km	North
CNRL Horizon	Open mining		7km	North



## Analytical Equipment

Parameter	Owner	Make	Model	Serial Number	Date Installed
Sulfur Dioxide	WBEA	Thermo Scientific	43i	710321322	2020
Hydrogen Sulfide	WBEA	Thermo Scientific	43-TLE	1410661331	2020
Oxides of Nitrogen	WBEA	Thermo Scientific	42i	0710321429	2020
Non-Methane Hydrocarbon	WBEA	Thermo Scientific	55i	1193585650	2020
Particulate Monitor	WBEA	API Teledyne	T640	324	2020
Temperature/RH	WBEA	Vaisala	HMP155	F5010003	2020
Wind speed	WBEA	Met One	010C-1	J4337	2020
Wind direction	WBEA	Met One	020C-1	J2732	2020
Particulate Sampler	WBEA	Thermo Scientific	2000i	2000I2 0383 1308	2020
Particulate Sampler	WBEA	Thermo Scientific	2000i	2000I2 204961409	2020
Particulate Sampler	WBEA	Thermo Scientific	2000i	2000I2 205231411	2020
Particulate Sampler	WBEA	Thermo Scientific	2000i	2000I2 206011510	2020
Summa Canister Sampler	WBEA	Tisch Environmental	TE – 123	1030	2020

## Support Equipment

Name	Description	Make	Model	Serial Number
Datalogger	Datalogger	Campbell Scientific	CR3000	11040
Zero air generator	Zero Air Generator	Teledyne/API	701	1004
HVAC	Heating and air conditioning system. Wall mount unit	BARD	1 ton	
Shelter / Building	Air monitoring portable	ITB	8 x 16 trailer	2N9MF73895
Gas Dilution Calibrator	Mass flow controlled gas dilution	Teledyne/API	T700	1223



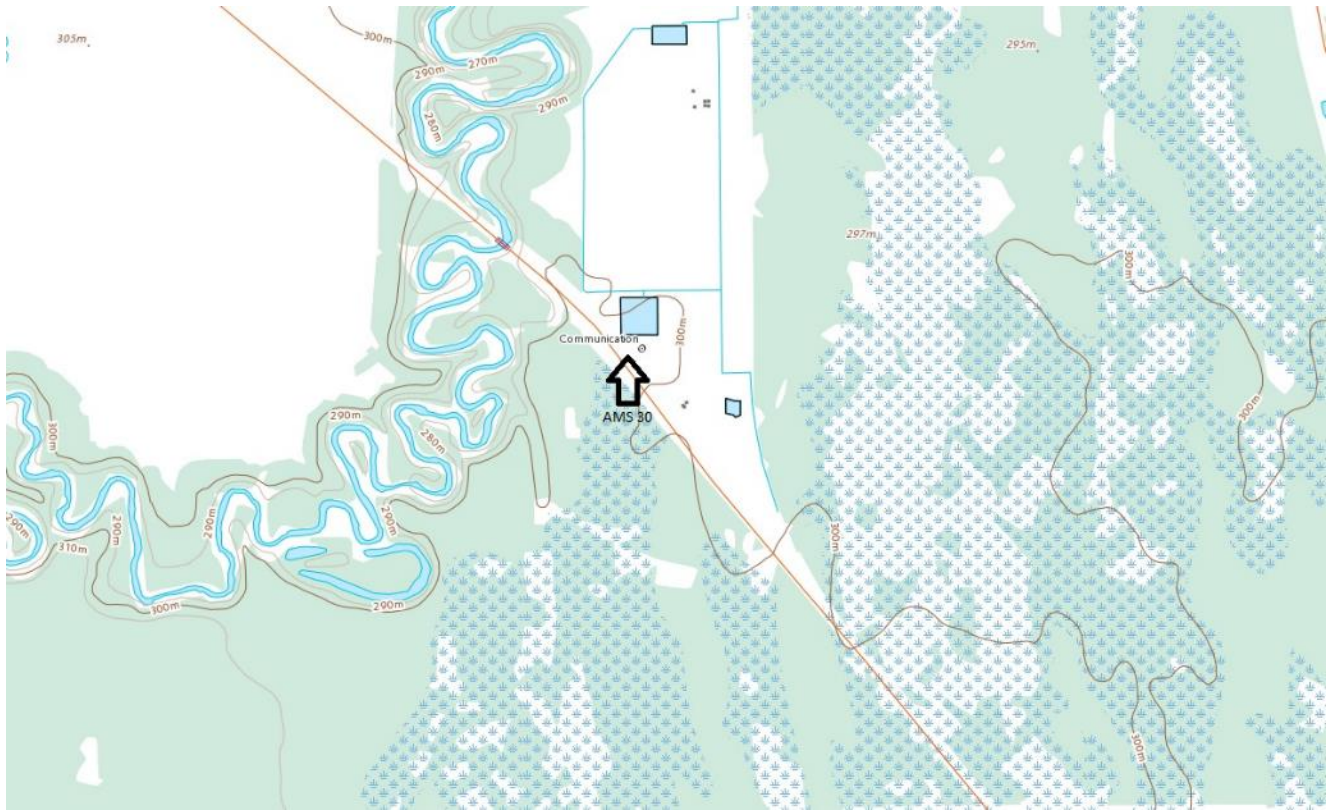
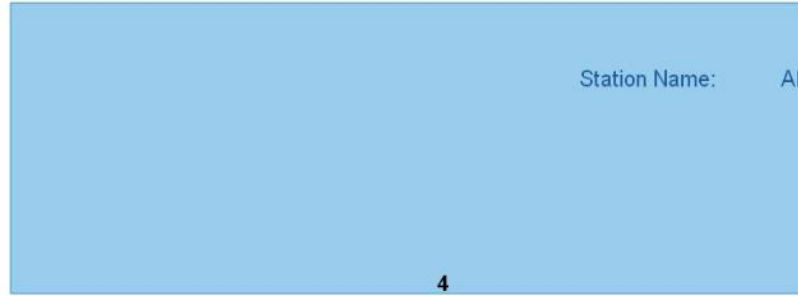
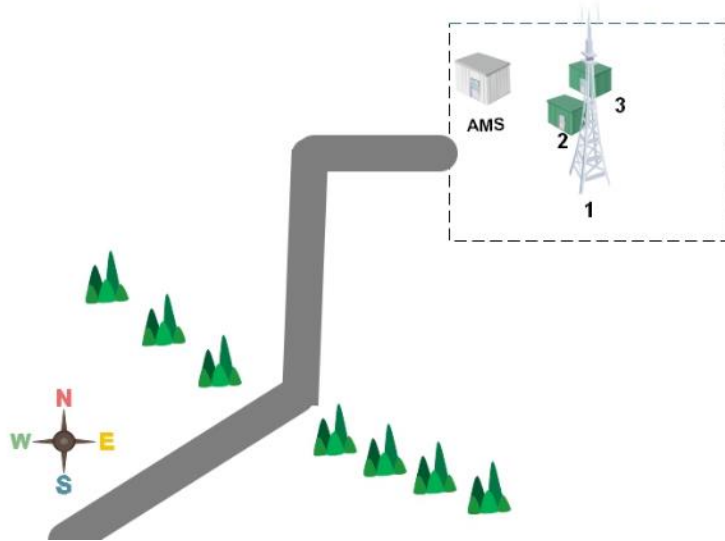


Figure 2.0 – Area Topographic map showing AMS 30





Station Name: AMS 30 Ells River



Obstacle	Distance from the station (m)	Height of the Obstacle (m)
1 Tower	27	100
2 Tower Compound 1	14	3
3 Tower Compound 2	26	5
4 Pond	25	0

Figure 3.0 – Plan view sketch for AMS 30 site





Figure 4.0 – Aerial photo showing AMS 30





## 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



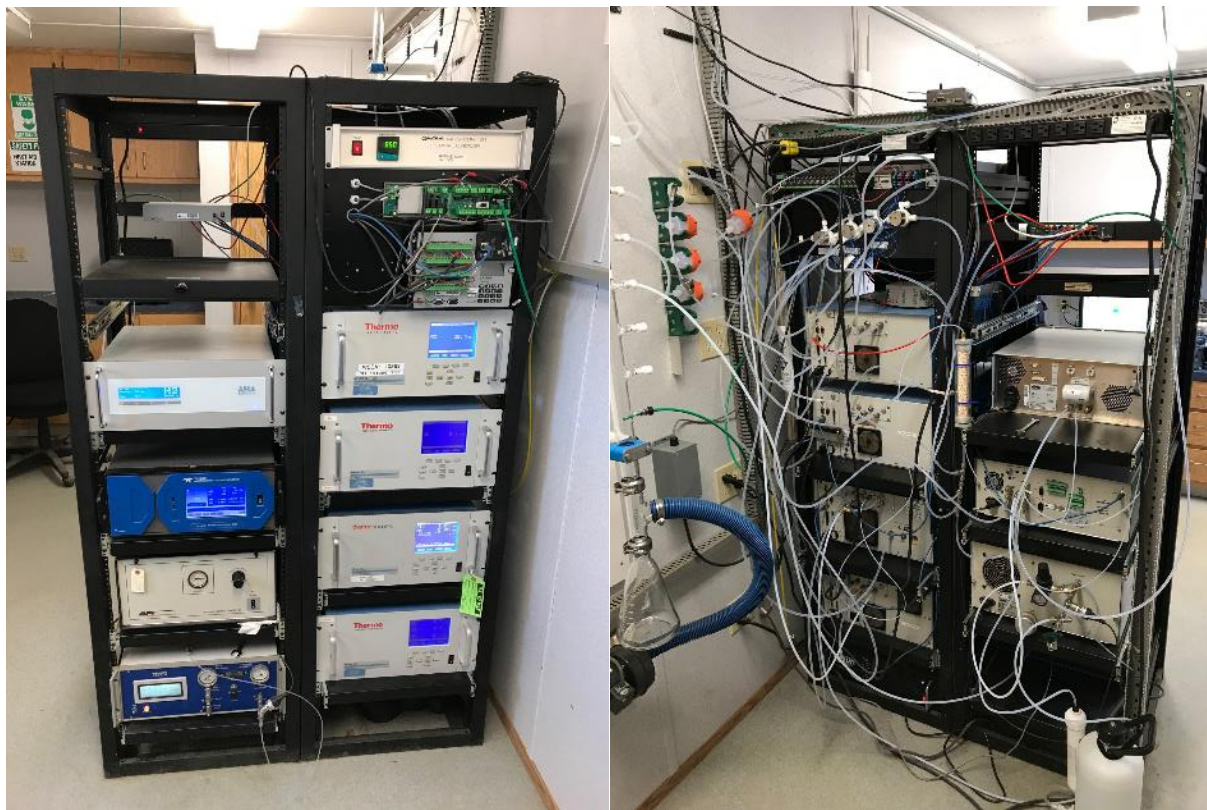


Figure 6.2 –Photo of front and back of instrument rack





Wood Buffalo Environmental Association  
Wind Rose 2016 - 2020

Wind Speed (WS) - km/h  
Ellis River

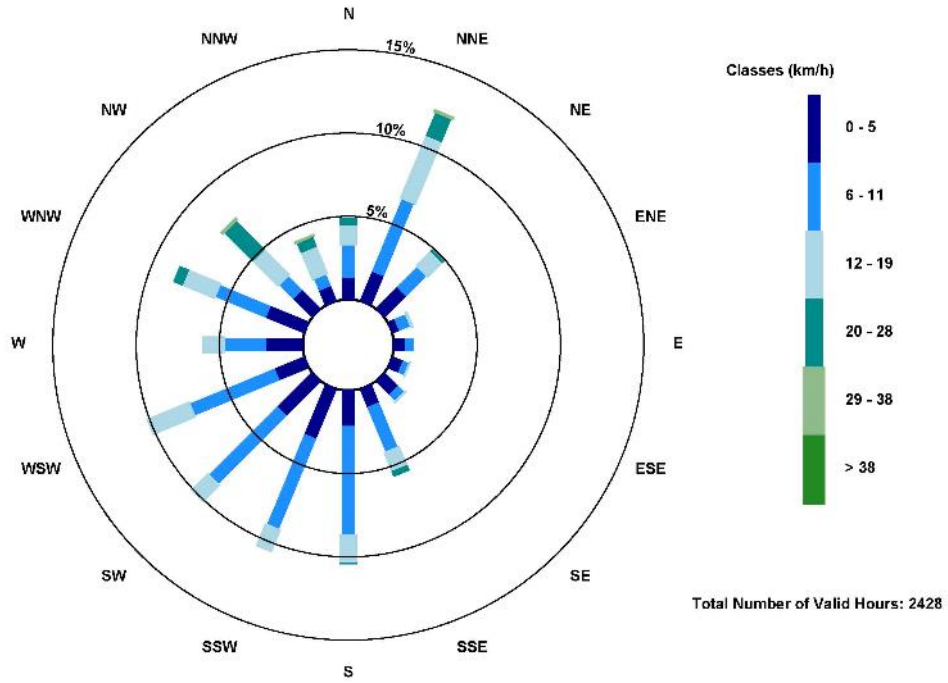


Figure 7.0 – Windrose (2016-2020)

