



Wood Buffalo Environmental Association
Ambient Air Monitoring Station
Site Documentation

Kirby North

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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 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



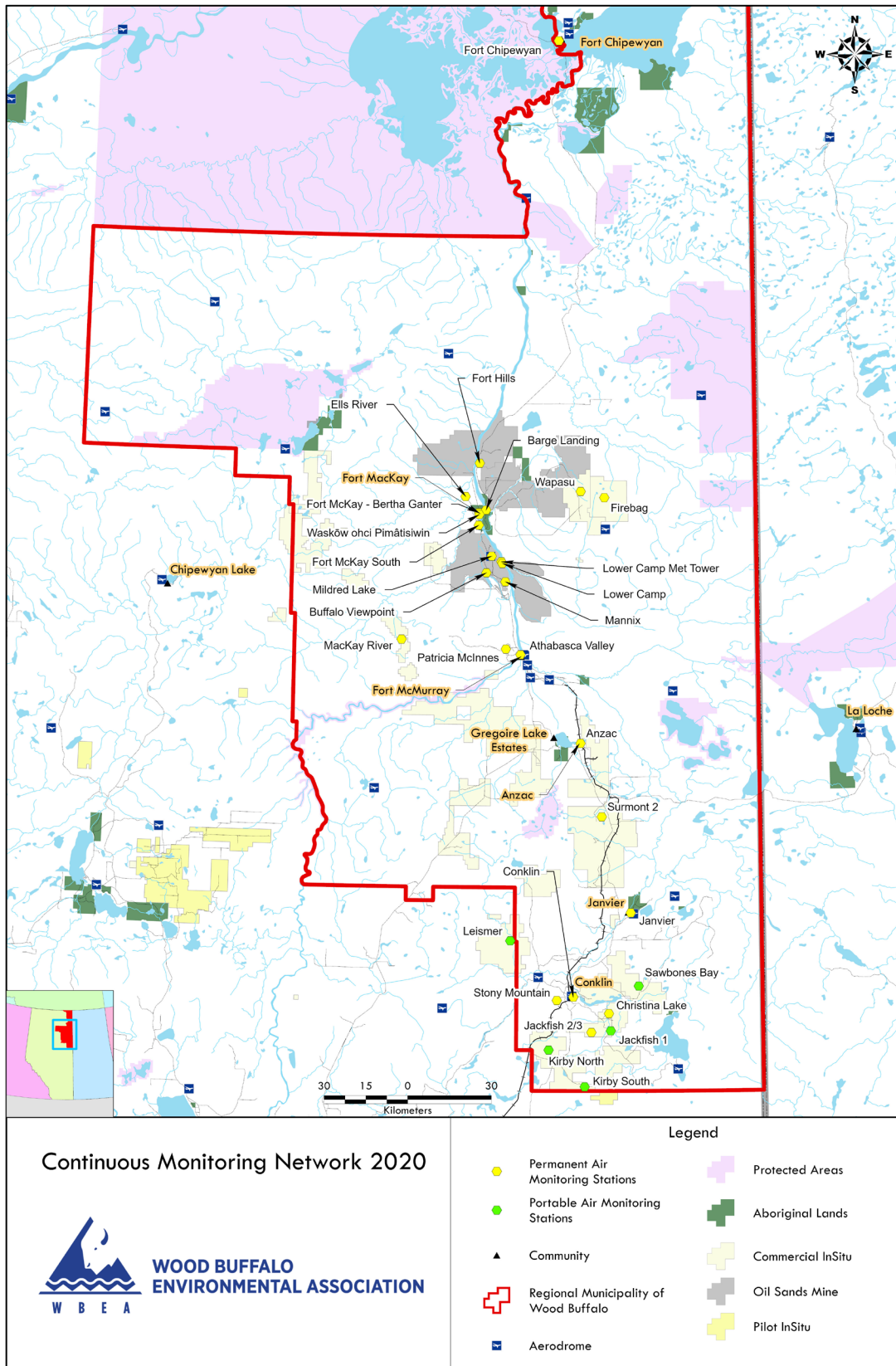


Figure 1.0 – WBEA Network Monitoring Sites



General Site Information

Station

Station ID	AMS 508
Station name	Kirby North
Date station established	04/16/2019

Location

Station street address	Industrial Pad
Legal land description	Industrial - SAGD
Latitude	55.4616480
Longitude	-111.2188230
UTM East	12U 486163mE
UTM North	6146186mN
Nearest community	Conklin
Community population	185

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	Kale Bromley
Address	2100, 855 – 2 Street S.W. Calgary, AB
Phone number	(403) 517-6700
Email address	Kale.Bromley@cnrl.com

Site Description

Land use by sector	0 – 90 degrees	SAGD Plant
	91 – 180 degrees	SAGD Land / Forest
	181 – 270 degrees	SAGD Land / Forest
	271 – 360 degrees	SAGD Plant
Site elevation (above sea level)	700m	
Angle of elevation to nearby buildings	Greatest angle	N/A
	Building direction	N/A
Airflow restrictions	North	None
	East	None
	South	None
	West	None
Sample manifold	Type	All glass
	Inlet height above roof	1 metre
	Type	Cup and vane



Meteorological Sensors	Height above ground	10m
	Distance from station	7m

Site Influences

Localized Sources (within 20 metres of station)

Type	Distance (m)	Description
SAGD Pad	1	Station is located on the SE side of the pad

Roadway Influences

Type	Traffic Volume	Distance (m)	Description
Dirt Road	Medium	50m West	Road used to access the SAGD plant

Major Point Sources

Facility Name	Source Type	Production Capacity	Distance from site (m)	Compass direction from site
Kirby North	SAGD Plant	N/A	100	West



Analytical Equipment

Parameter	Owner	Make	Model	Serial Number	Date Installed
Sulfur Dioxide	CNRL	Thermo	43iQ	1182340007	2019-04-16
Hydrogen Sulfide	CNRL	API	T101	158	2020
Oxides of Nitrogen	CNRL	API	T200	4259	2019-04-16
Temperature/RH	CNRL	Vaisala	HMP155	F5010010	2019-04-16
Wind speed	CNRL	Met One	010C-1	X16479	2019-04-16
Wind direction	CNRL	Met One	020C-1	X16495	2019-04-16
Total Hydrocarbon	CNRL	Thermo	51i	1182340005	2019-04-16

Support Equipment

Name	Description	Make	Model	Serial Number
Datalogger	Datalogger	Campbell Scientific	CR3000	2372
Zero air generator	Zero Air Generator	Teledyne/API	T701H	4890
Hydrogen Generator	H2 supply for THC	AMA	HG300	180267050
HVAC	Heating and air conditioning system. Wall mount unit	BARD	1 ton	
Shelter / Building	Air monitoring portable	ITB	8 x 16 trailer	17541-1
Gas Dilution Calibrator	Mass flow controlled gas dilution	Teledyne/API	T700	3804



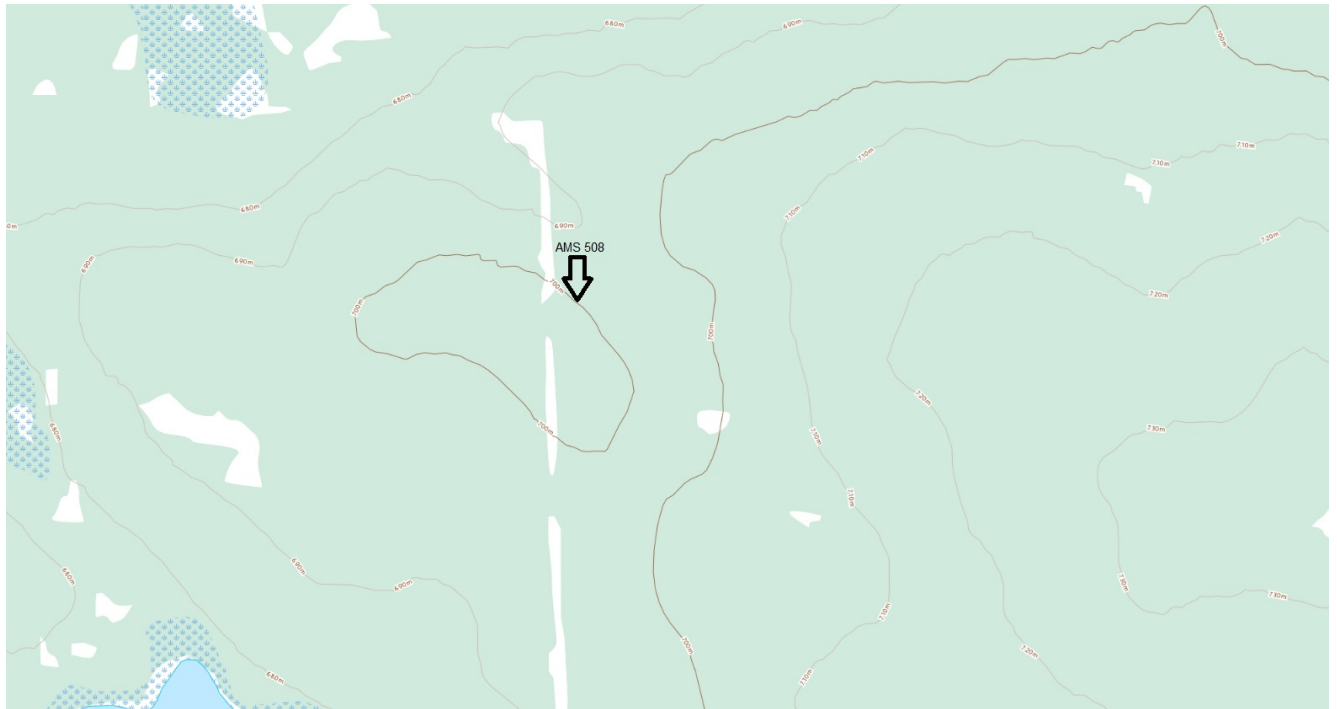


Figure 2.0 – Area Topographic map showing AMS 508





Station Name: AMS 508 - Kirby North

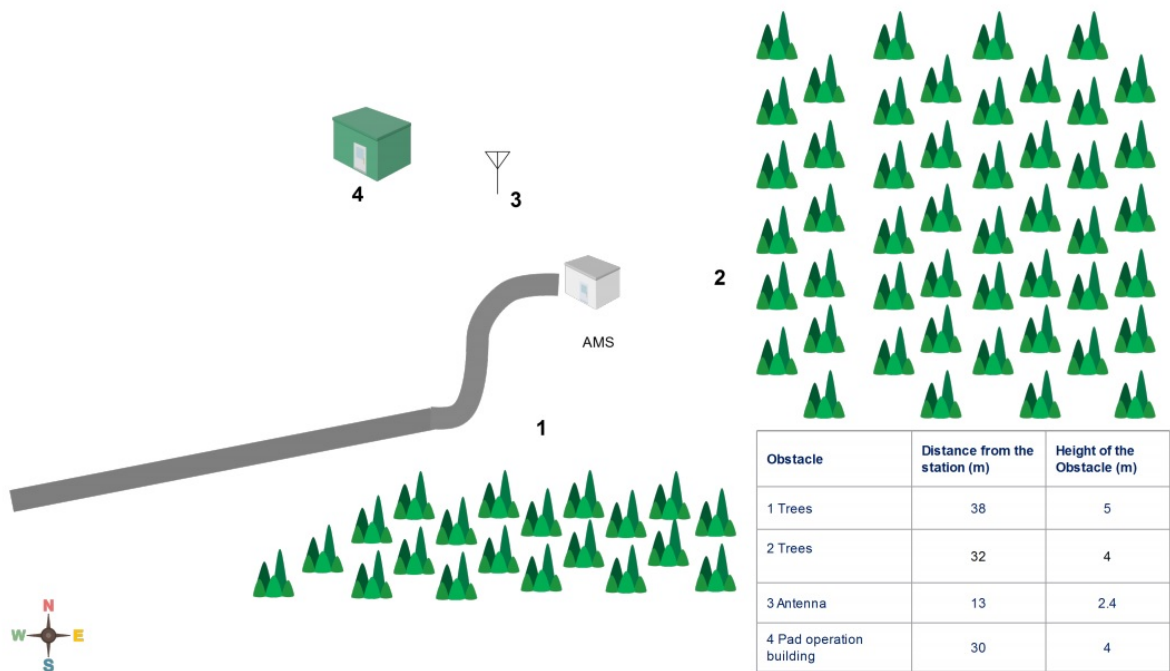


Figure 3.0 – Plan view sketch for AMS 508 site





Figure 4.0 – Aerial photo showing AMS 508



Site photos

The following photos show the environment surrounding the monitoring station.

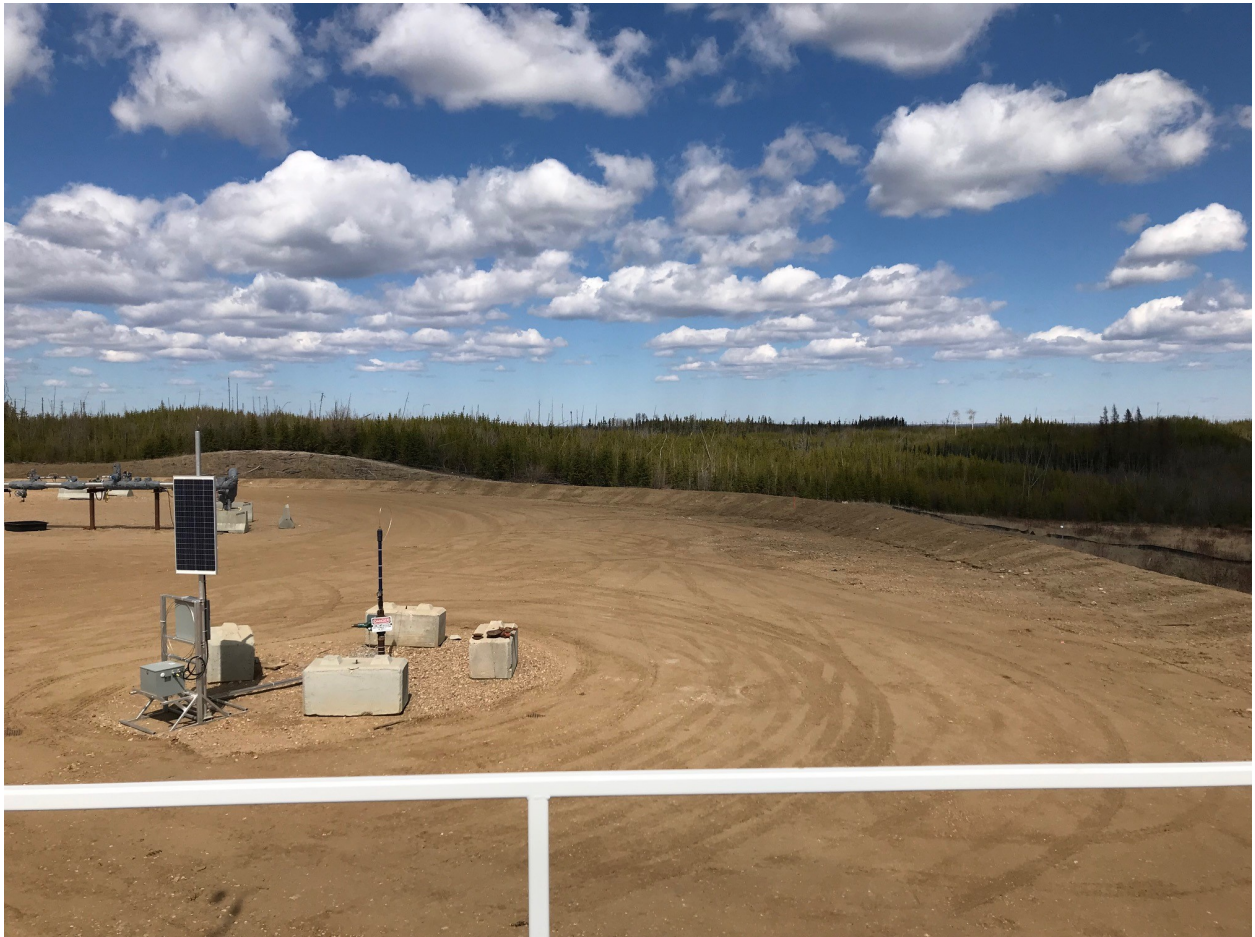


Figure 5.0 – Environ Looking North





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
Kirby North

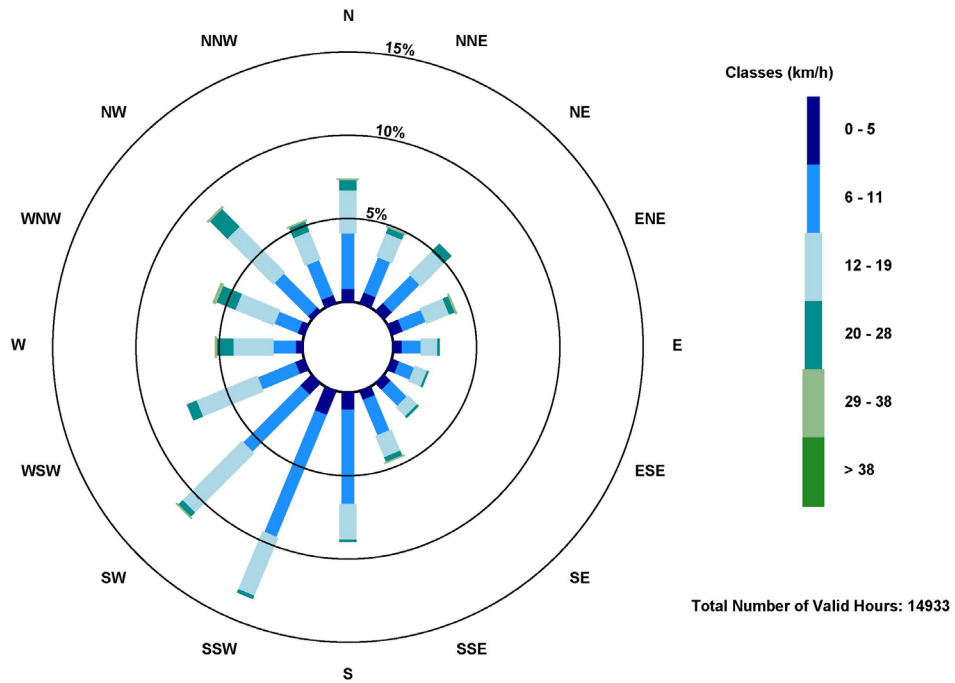


Figure 7 – Windrose (Five Year)

