Wood Buffalo Environmental Association

Ambient Air Monitoring Station Site Documentation

Monday Creek

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WBEA Monitoring Network

Vision

Empower all stakeholders and rights holders with environmental data to make informed decisions.

Mission

A multi-stakeholder, consensus-based organization providing world-class environmental monitoring and reporting.

The Region

From north-central Alberta to the borders of Saskatchewan and the Northwest Territories, the Regional Municipality of Wood Buffalo (www.woodbuffalo.ab.ca) covers 68,454 square kilometres, making it the second largest municipality in Canada. It was established in 1995 through an amalgamation of the City of Fort McMurray and Improvement District No. 143. The Athabasca Oil Sands Region (AOSR) is within the municipality, and includes both traditional bitumen mining operations and in situ oil production. The region also encompasses the communities of Fort McMurray, Fort Chipewyan, Fort McKay, Anzac, Janvier, and Conklin.

The Network

Continuous ambient air quality and meteorological data are collected under the Ambient Air Monitoring (AAM) group in WBEA. The WBEA currently operates 28 permanent continuous monitoring locations, each measuring various air quality parameters. The continuously measured air quality parameters include Sulphur Dioxide (SO_2), Hydrogen Sulfide (H_2S), Total Reduced Sulphur (TRS), Ozone (O_3), Total Oxides of Nitrogen (NO_X), Nitric Oxide (NO), Nitrogen Dioxide (NO_2), Ammonia (NH_3), Carbon Monoxide (CO), Carbon Dioxide (CO_2,) Particulate Matter less than 2.5µm ($PM_{2.5}$), Total Suspended Particulates (TSP), Total Hydrocarbon (THC), Methane and Non-Methane Hydrocarbons (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 six portable monitoring stations. Five of these stations are used for compliance monitoring at sites that require less than 12 months per year. One portable is set up for gas chromatography systems and currently has a Sulphur and VOC GC installed to collect speciated data for the Odour Monitoring Program within WBEA.

Time Integrated Sampling

Since 1998 WBEA has maintained time-integrated sampling for $PM_{2.5}$, PM_{10}, VOC and PAH at permanent monitoring sites. The sampling for time-integrated monitoring has evolved with a better understanding of technology, analytical laboratory methods and sample deployment and collection methods.

In 2012, the WBEA moved to Hivol PUF sampling for PAH compounds from the previous low volume method. This was done to achieve a lower detection limit for the target analytes. In 2015, the WBEA moved to duplicate sampling for the PM_{10} 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 three sites; Bertha Ganter, Wapasu and Stony Mountain. These samples are collected every Tuesday at 12:00.

In 2022, the WBEA added a dustfall sampling network to better understand the larger size settleable particulate in the region. These sites are currently located at the community sites and are collected on a monthly frequency.

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_2S), total reduced sulphur (TRS), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), total hydrocarbons (THC), methane (CH_4), non-methane hydrocarbons (NMHC), ammonia (NH_3), carbon monoxide (CO), and carbon dioxide (CO_2). 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_2S	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/ METEORLOGICAL	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	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			
33	COMPLIANCE	MONDAY CREEK	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				
511	COMPLIANCE	BLACKGOLD	X	X				X	X				
512	COMPLIANCE	HANGINGSTONE EXPANSION	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	AT	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/ METEORLOGICAL	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	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		
33	COMPLIANCE	MONDAY CREEK	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				
511	COMPLIANCE	BLACKGOLD	X	X		X	X				
512	COMPLIANCE	HANGINSTONE EXPANSION	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 (PM_{10}) and associated metals and ions, polycyclic aromatic hydrocarbons (PAH), and precipitation samples.

WBEA ID	TYPE	STATION NAME	VOC	$PM_{2.5}$	$PM_{2.5}$ ECOC	PM_{10}	PAH	PRECIP
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.

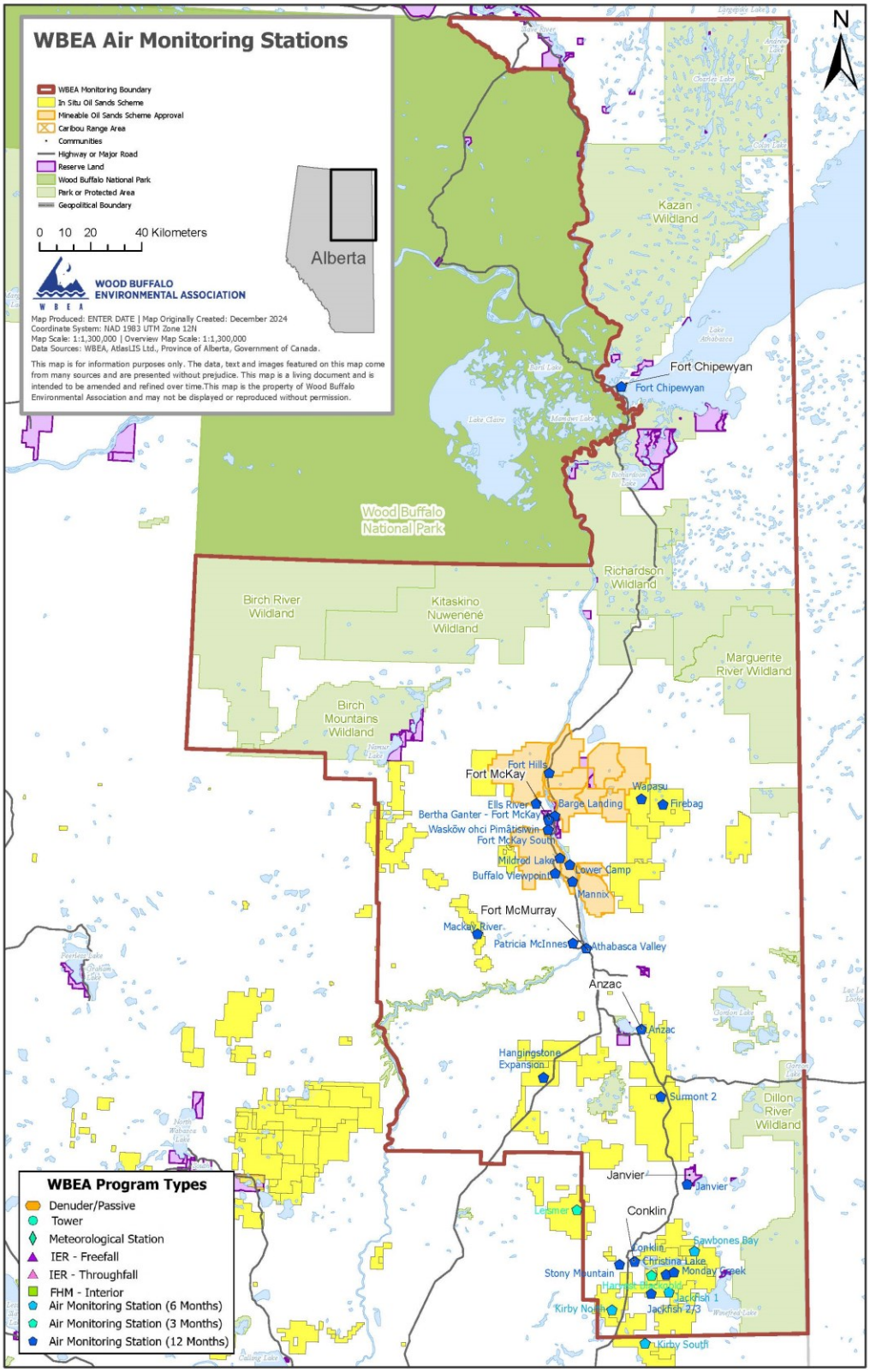

Figure 1.0 – WBEA network monitoring sites

General Site Information

Station

Station ID	AMS 33
Station name	Monday Creek
Date station established	November 7, 2024

Location

Station street address	Located close to a non-operational well-pad L04 at Cenovus SAGD site
Legal land description	3-16-76-6 W4
Latitude	55.593883
Longitude	-110.834154
UTM East	507816.87
UTM North	6159249.07
Nearest community	Conklin
Community population	178

Owner/Operator/Approval Holder

Operating Agency	Wood Buffalo Environmental Association
Name of Approval Holder	Cenovus Energy Inc.
Approval number	48522-01-00
Contact Name	Sean Nichols
Address	500 Centre Street SE Calgary, AB T2P 0M5
Phone number	780-608-7176
Email address	Sean.nichols@cenvous.com

Site Description

Land use by sector	0 – 90 degrees	SAGD Operations
	91 – 180 degrees	SAGD Operations
	181 – 270 degrees	SAGD Operations
	271 – 360 degrees	SAGD Operations
Site elevation (Above sea level)	569.6m	
Angle of elevation to nearby building	Greatest angle	N/A
	Building direction	N/A
Airflow restrictions	North	N/A
	East	N/A
	South	N/A
	West	N/A
Distance to nearest trees (m)	North	N/A
	East	N/A
	West	N/A
	South	70
Sample manifold	Type	All glass
	Inlet height above roof	1 meter
Meteorological Sensors	Type	Cup and vane
	Height above ground	10
	Distance from station	7

Site Influences

Localized Sources

Type	Distance (m)	Description
Well-pad	100	Two well-pads to the West and East of station.

Roadway Influences

Type	Traffic Volume	Distance (m)	Description
Dirt/gravel	Medium	20	Used by site workers

Major Point Sources

Facility Name	Source Type	Production Capacity	Distance from site (m)	Compass direction from site
Cenovus Christina Lake	SAGD Facility		2700	SW

Analytical Equipment

Parameter	Owner	Make	Model	Serial Number	Date Installed
SO2	Cenovus	Thermo Instruments	43I	1152430005	2024
H2S	Cenovus	Thermo Instruments	43iQTL	12333331547	2024
NO2	Cenovus	Thermo Instruments	42I	1182340006	2025

Meteorological Equipment

Parameter	Make	Model	Serial Number	WMO Site Class	Date Installed
AT/RH	Vaisala	HMP155	G4330034	4	2024
WS	Met One	010C-1	P22395	2	2024
WD	Met One	020C-1	N13744	2	2024

Support Equipment

Name	Description	Make	Model	Serial Number
Datalogger	Datalogger	Campbell Scientific	CR3000	7881
Zero air generator	Zero Air Generator	Teledyne/API	701	832
HVAC	Heating and air conditioning system. Wall mount unit	BARD	1 ton	NA
Shelter / Building	Air monitoring portable	ITB	8 x 16 trailer	NA
Gas Dilution Calibrator	Mass flow controlled gas dilution	Teledyne/API	T700	3253
Tower	10 Meter crank up	Aluma	T-135	217224002

Figure 2.0 – Area topographic map showing AMS 33.

Figure 3.0 – Plan view image for AMS 33 site.

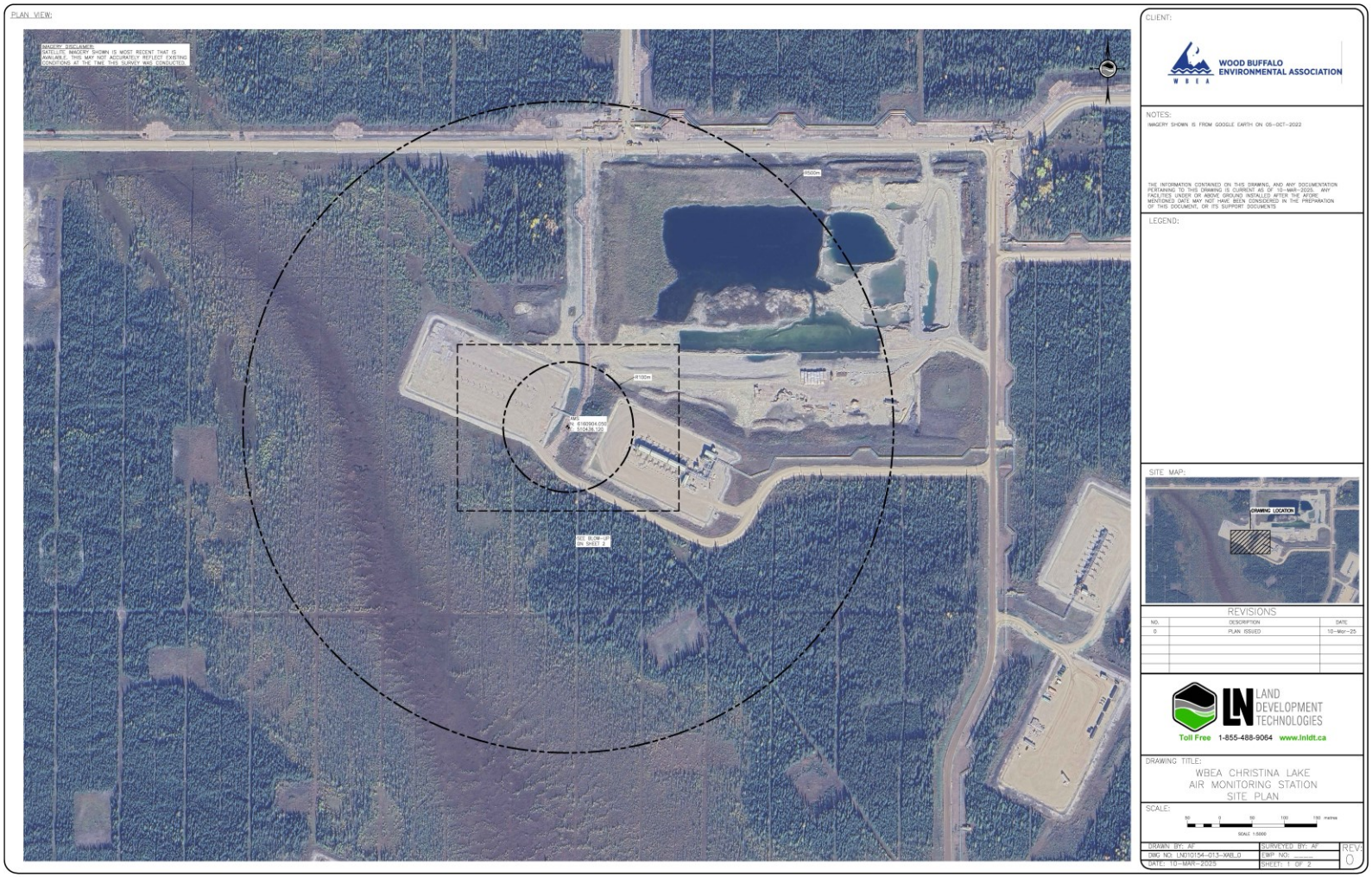

Figure 4.0 – Aerial photo showing AMS 33.

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 front and back of instrument rack.

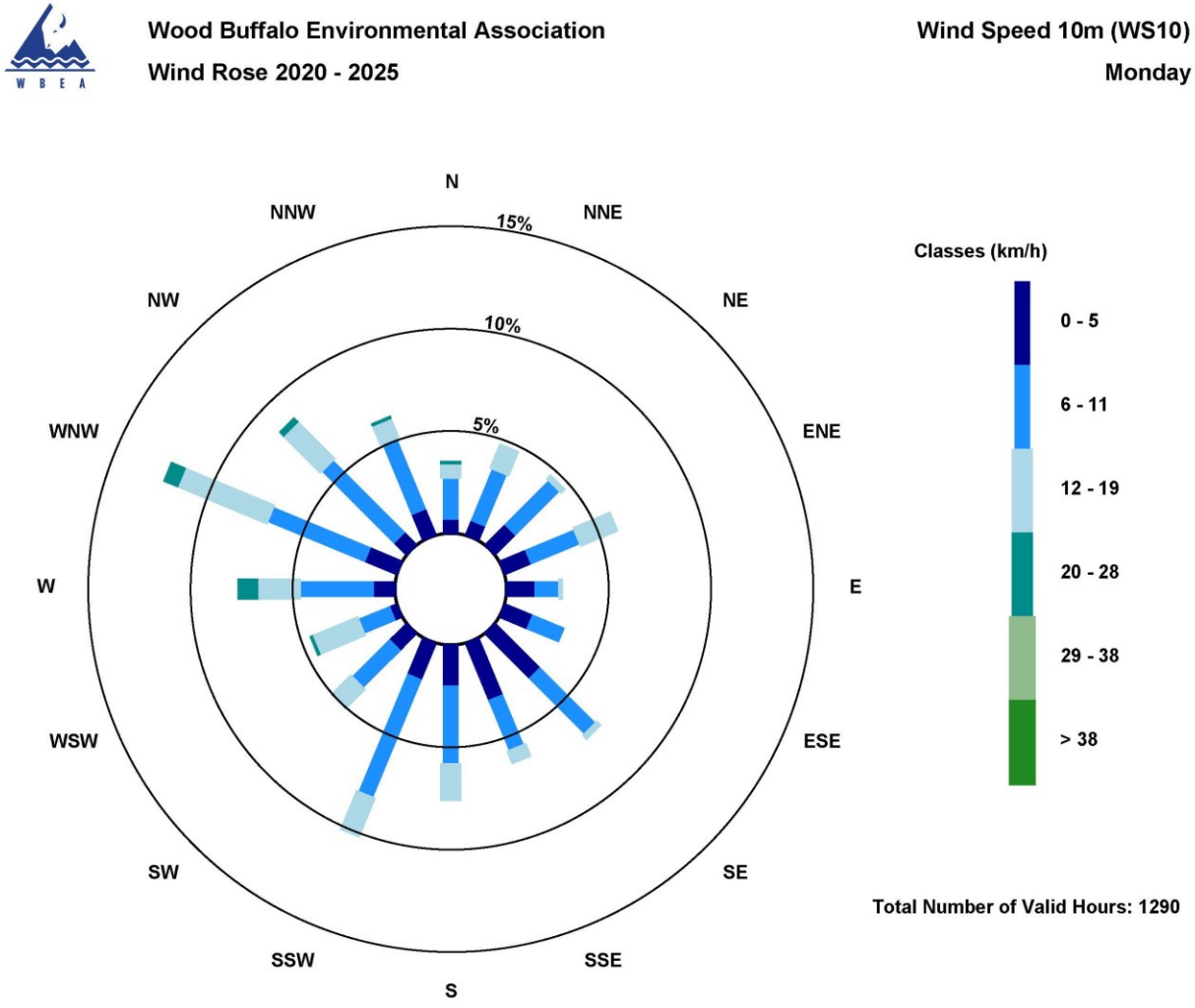

Figure 8.0 – Windrose (Five Year).