



Peace Airshed Zone Association

Ambient Air Monitoring Network Summary

**Continuous Ambient Air Quality Monitoring Program
Annual Report
2016**

Operations



Peace Airshed Zone Association 2016 Annual Ambient Air Monitoring Report

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March 10th, 2016

Alberta Environment
 11th Floor, Oxbridge Place
 9820-106 Street
 Edmonton Alberta T5K 2J6

RE: Peace Airshed Zone Association (PAZA) – 2016 Annual Ambient Air Monitoring Report

Please find enclosed for your review the Peace Airshed Zone Association (PAZA) 2016 Ambient Air Monitoring Network Annual Report.

This report is submitted by PAZA on behalf of the industrial member companies to satisfy the requirements of the following facility Operating Approvals:

Company	Facility	LSD	EPEA Approval Number
Advantage Oil & Gas Ltd.	Glacier	05-02-076-13-W6	262479-00-00
Alberta Power (2000) Ltd. (an ATCO company)	Sturgeon	SW-06-069-21-W5	10283-02-02
ATCO Power Canada	Poplar Hill	11-19-073-08-W6	67774-01-01
ATCO Power Canada	Valleyview	SW-06-069-21-W5	147709-01-01
AltaGas Ltd.	Pouce Coupe	03-03-081-13-W6	247673-00-00
	Ante Creek	02-26-068-25-W5	266694-00-00
	Gordondale	16-31-78-11-W6M	287474-00-00
Apache Canada Ltd.	House Mountain	01-08-070-10-W5	10137-02-02
Birchcliff Energy Ltd.	Pouce Coupe	03-22-078-12-W6	252529-00-00
Canadian Natural Resources Limited	Bonanza	11-25-081-11-W6	00000029-01-00
	Progress/Gordondale	01-01-077-10-W6	00010036-02-00

Company	Facility	LSD	EPEA Approval Number
	Gold Creek	13-26-067-05-W6	00010446-02-00
	Teepee Creek	SE-2-074-04-W6	00001635-02-00
	Sturgeon/Valleyview	02-02-069-22-W5	1633-02-00
Canfor Forest Products	Grande Prairie	SW-23-071-06-W6	152645-01-00
Conocophillips Canada Energy Partnership	Wembley	06-19-073-08-W6	00000212-01-00
Devon Canada	NW Belloy (Dunvegan)	16-36-079-03-W6	00009810-02-00
	Eaglesham (South)	02-14-077-25-W5	00047669-01-00
	North Normanville	03-36-079-23-W5	00047455-01-00
	West Culp	05-34-078-25-W6	00136284-00-00
	Cecil	08-15-084-08-W6	00010032-02-00
Encana Corporation	Sexsmith	04-08-075-07-W6	00010002-01-00
Enerplus Resources	Pouce Coupe	SW-06-069-21-W5	1464-02-03
Exshaw Oil Corporation	Spirit River	03-10-077-07-W6	344521-00-00
Grande Prairie Generation Inc.	Northern Prairie Power Project	04-19-073-08-W6	00238762-00-00
Long Run Exploration	Eaglesham	01-25-076-01-W6	00241532-00-00
	Kakut	14-12-075-03-W6	00248469-00-00
	Donnelly	06-01-077-21-W5	00000087-02-00
	Puskwaskau	03-26-074-01-W6	00017524-01-00
Longview Oil Corp.	Sunset House	06-22-070-20-W5	138884-01-00
Penn West Petroleum Ltd.	Tangent	13-29-080-23-W5	00001746-02-00

Company	Facility	LSD	EPEA Approval Number
	Pouce Coupe	16-07-078-11-W6	00000614-01-00
Petrus Resources	Rycroft	08-25-077-06-W6	11351-02-00
	Spirit River	08-34-077-06-W6	11096-02-00
Spectra Energy Midstream Corporation	Fourth Creek	16-11-082-09-W6	00000263-01-00
	Gordondale	11-26-079-09-W6	00011495-01-01
	Pouce Coupe/Bonanza	3-23-080-13-W6	00070203-01-01
Suncor Energy Inc.	Progress	07-22-078-09-W6	00011428-02-00
TAQA North Ltd.	Valhalla	13-21-076-09-W6	00017620-01-00
Veresen Energy	Hythe Brainard	11-18-074-12-W6	00010910-02-00
Weyerhaeuser Canada	Grande Prairie Pulp and Wood Plant	01-14-070-05-W6	00000113-02-00

The PAZA network consists of seven continuous air monitoring stations including Henry Pirker (Grande Prairie), Evergreen Park, Smoky Heights, Beaverlodge, Valleyview, Falher and a portable station. The portable station was located near the community of Rycroft and will be referred to as the Rycroft-Portable station in this report. The station began reporting data on March 2nd, 2016.

The Falher station, having completed its contracted mandate, was relocated to the Donnelly area in August 2016.

There were no 1-hour, 24-hour or annual averages of sulphur dioxide, nitrogen dioxide, ozone, or carbon monoxide above the Alberta Ambient Air Quality Objectives (AAAQO).

There were five (5) 1-hr averages of hydrogen sulphide above the AAAQO of 10 pbb.

There were twelve (12) 1-hr averages and one (1) 24-hour average of PM_{2.5} above the Alberta Ambient Air Quality Guidelines (AAAQG) of 80 µg/m³ and 30 µg/m³, respectively.

	Date	Time (Hour Ending)	Location	Recorded Concentration ($\mu\text{g}/\text{m}^3$)
One (1) 1-hr average $\text{PM}_{2.5}$	15-Nov	18:00	Henry Pirker	90.4
One (1) 1-hr average $\text{PM}_{2.5}$	4-Jan	23:00	Smoky Heights	213.9
One (1) 1-hr average $\text{PM}_{2.5}$	18-Jan	18:00	Smoky Heights	146.7
One (1) 1-hr average $\text{PM}_{2.5}$	3-May	21:00	Smoky Heights	84.7
One (1) 1-hr average $\text{PM}_{2.5}$	6-May	22:00	Smoky Heights	89.8
One (1) 1-hr average $\text{PM}_{2.5}$	22-Nov	1:00	Smoky Heights	88.9
One (1) 1-hr average $\text{PM}_{2.5}$	24-Nov	19:00	Smoky Heights	84.1
One (1) 1-hr average $\text{PM}_{2.5}$	29-Nov	14:00	Beaverlodge	200.1
One (1) 1-hr average $\text{PM}_{2.5}$	22-Apr	17:00	Rycroft-Portable	110.1
One (1) 1-hr average $\text{PM}_{2.5}$	15-May	23:00	Rycroft-Portable	123.9
One (1) 1-hr average $\text{PM}_{2.5}$	16-May	0:00	Rycroft-Portable	86.3
One (1) 1-hr average $\text{PM}_{2.5}$	21-Jun	16:00	Rycroft-Portable	111.3
	Date	Time (Hour Ending)	Location	Recorded Concentration (ppb)
One (1) 1-hr average H_2S	14-May	22:00	Valleyview	28.3
One (1) 1-hr average H_2S	3-Jul	6:00	Valleyview	11.3
One (1) 1-hr average H_2S	19-Oct	21:00	Valleyview	14.4
One (1) 1-hr average H_2S	9-Dec	17:00	Valleyview	38.4
One (1) 1-hr average H_2S	9-Dec	18:00	Valleyview	20.6

	Date	Location	Recorded Concentration ($\mu\text{g}/\text{m}^3$)
One (1) 24-hr average $\text{PM}_{2.5}$	9-Jan	Henry Pirker	33.9

The passive monitoring network consists of forty-six (46) sampling locations. The parameters measured at each site are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3) and/or hydrogen sulphide (H_2S). There were no exceedences of the AAAQO for sulphur dioxide, nitrogen dioxide, ozone, or hydrogen sulphide.

Figure 1 shows the location of the continuous monitoring sites, and Figure 2 shows the location of the passive monitoring sites.

Additional information about PAZA, including its membership, objectives and details on the monitoring network are included on the web at [http://www.PAZA.ca/](http://www.PAZA.ca).

We trust that the report satisfies your requirements and if you have any questions or concerns please contact Patrick Andersen, PAZA Program Manager 780.833.4343 or 403.505.1041

Sincerely,

On Behalf of the Peace Airshed Zone Association,



Patrick Andersen, B.Sc.
Program Manager

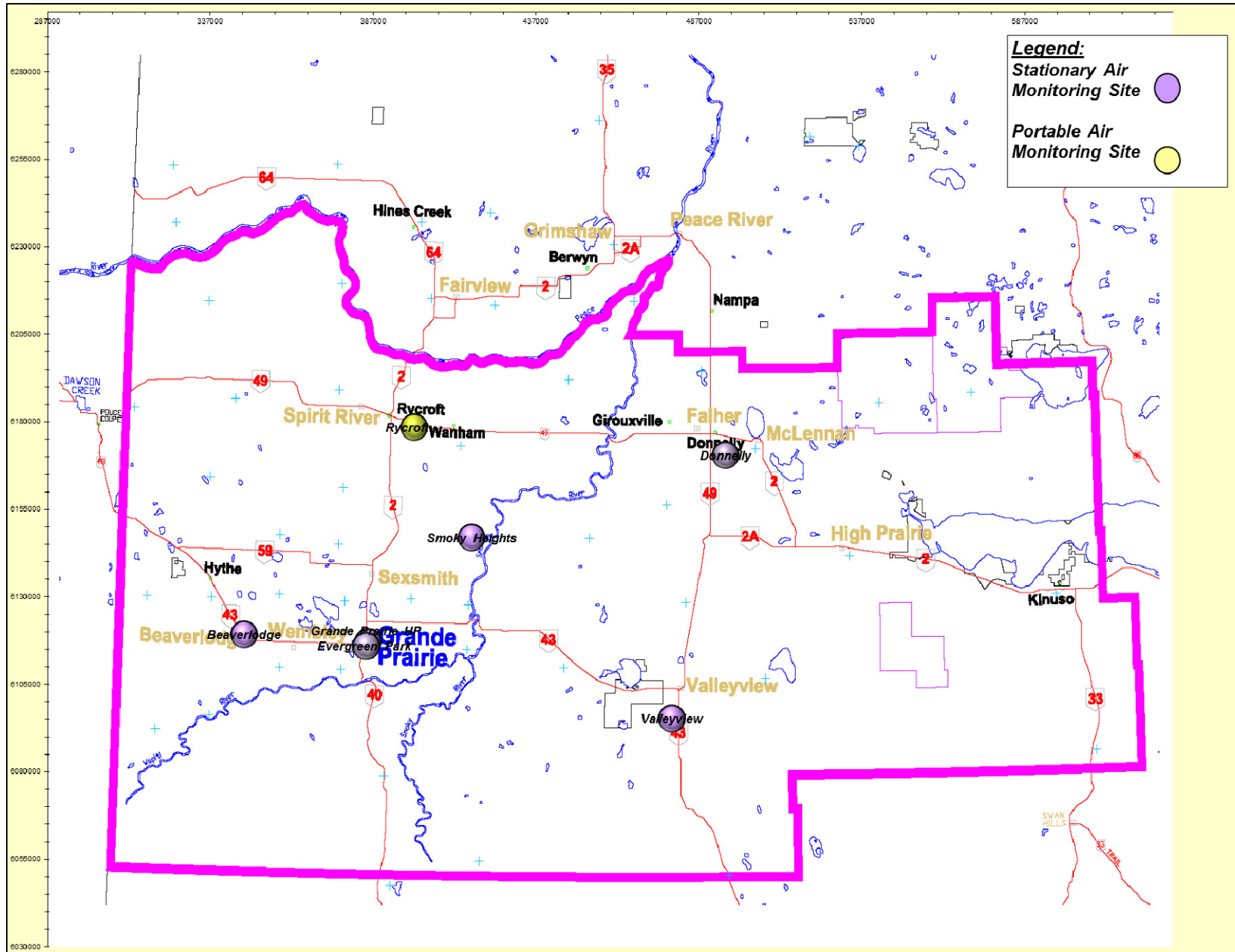


Figure 1. Peace Airshed Zone Association – Continuous Air Monitoring Network

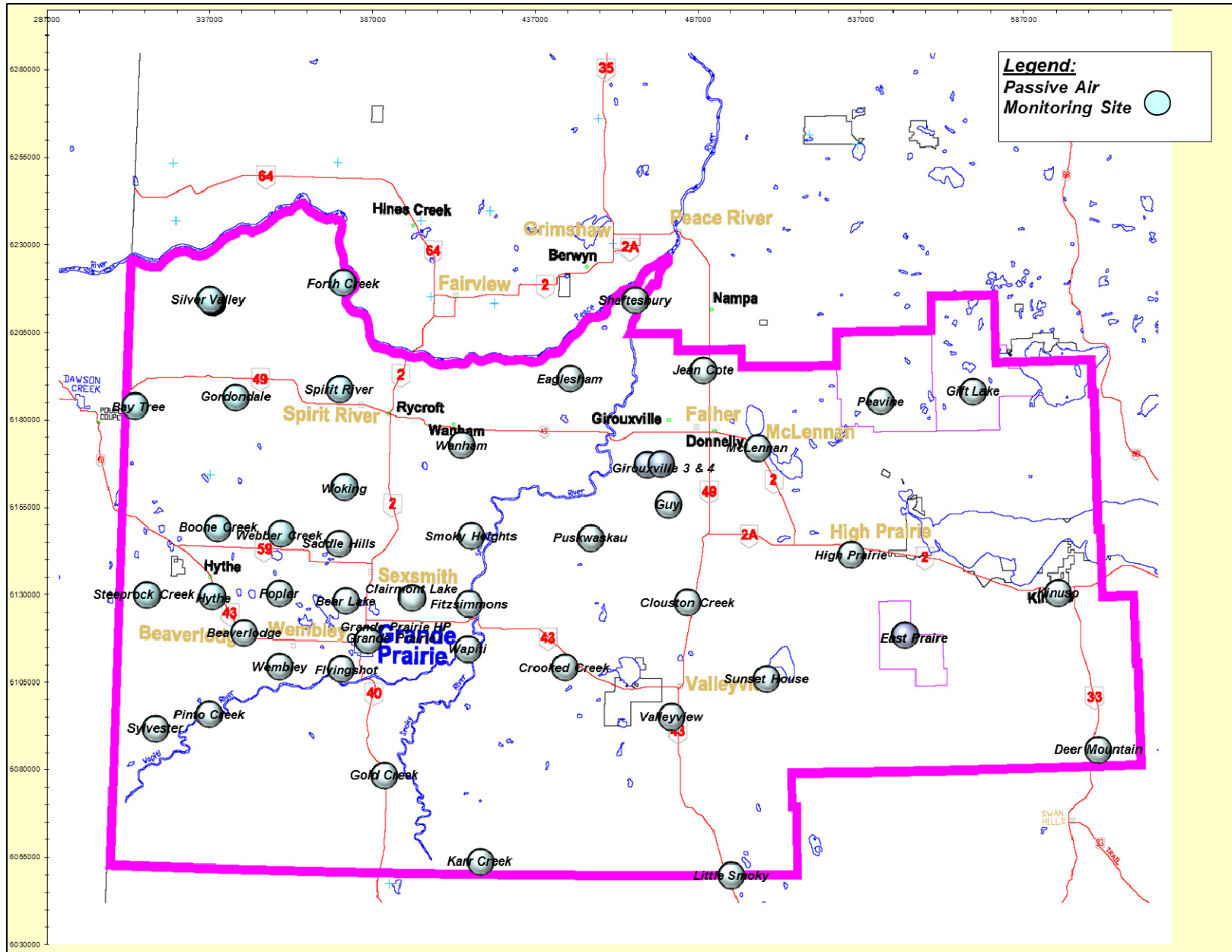


Figure 2. Peace Airshed Zone Association – Passive Air Monitoring Network

PAZA
HENRY PIRKER
CONTINUOUS AMBIENT AIR MONITORING STATION

2016
ANNUAL SUMMARY TABLES

Table 1. Henry Pirker - Key Parameters – Continuous Monitoring Data – 2016 Summary

Parameter	Monitoring Station	Annual Average	Maximum Values				Operational Time (%)	Readings above AAAQO	
			24-hr	Date	1-hr	Date		24-hr	1-hr
Sulphur Dioxide SO₂ measured in ppb	Henry Pirker	0.13	5.38	Jan 09	36.26	May 29 15:00	99.9	0	0
Nitrogen Dioxide NO₂ measured in ppb	Henry Pirker	8.53	36.21	Jan 04	62.92	Mar 01 00:00	99.9	-	0
Ozone O₃ measured in ppb	Henry Pirker	20.83	50.35	May 15	63.96	Jun 05 17:00	99.9	-	0
Carbon Monoxide CO measured in ppm	Henry Pirker	0.21	0.70	Jan 12	1.77	Jan 12 11:00	99.9	-	0
Total Hydrocarbons THC measured in ppm	Henry Pirker	2.06	2.68	Dec 26	5.33	Aug 19 00:00	98.4	-	-
Total Reduced Sulphur TRS measured in ppb	Henry Pirker	0.28	0.93	Jan 21	4.99	Jul 11 01:00	99.9	-	-
Particulate Matter PM_{2.5} measured in µg/m³	Henry Pirker	5.94	33.88	Jan 09	90.36	Nov 15 18:00	99.9	1	1

Table 2. Sulphur Dioxide (SO₂) – Henry Pirker 2016 Summary and Frequency Distribution

Henry Pirker		SO ₂ (ppb)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 20	20 - 60	60 - 110	110 - 170	170 - 340	>340
January	705	0.62	5.38	Jan 09	15.69	Jan 09 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
February	662	0.06	0.24	Feb 23	3.17	Feb 23 10:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	709	0.12	0.56	Mar 02	3.22	Mar 02 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
April	685	0.04	0.16	Apr 14	0.74	Apr 14 11:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
May	708	0.14	2.16	May 29	36.26	May 29 15:00	100.0	0	0	99.86	0.14	0.00	0.00	0.00	0.00
June	685	0.04	0.36	Jun 06	2.53	Jun 06 14:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
July	707	0.02	0.09	Jul 09	1.01	Jul 09 03:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
August	705	0.04	0.29	Aug 08	4.03	Aug 08 01:00	99.5	0	0	100.00	0.00	0.00	0.00	0.00	0.00
September	686	0.04	0.24	Sep 30	1.28	Sep 20 10:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	706	0.08	0.45	Oct 16	1.87	Oct 03 20:00	99.7	0	0	100.00	0.00	0.00	0.00	0.00	0.00
November	686	0.12	0.49	Nov 28	1.09	Nov 28 14:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
December	707	0.30	1.13	Dec 12	7.43	Dec 12 08:00	99.6	0	0	100.00	0.00	0.00	0.00	0.00	0.00
Annual	8351	0.13	5.38	Jan 09	36.26	May 29 15:00	99.9	0	0	99.99	0.01	0.00	0.00	0.00	0.00

Table 3. Nitrogen Dioxide (NO₂) – Henry Pirker 2016 Summary and Frequency Distribution

Henry Pirker		NO ₂ (ppb)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 25	25 - 50	50 - 110	110 - 210	>210	
January	705	19.77	36.21	Jan 04	56.39	Jan 12 11:00	100.0	0	0	66.52	32.48	0.99	0.00	0.00	
February	661	16.13	31.72	Feb 05	62.92	Mar 01 00:00	100.0	0	0	74.58	25.11	0.30	0.00	0.00	
March	707	9.13	20.81	Mar 01	46.38	Mar 10 21:00	100.0	0	0	94.63	5.37	0.00	0.00	0.00	
April	684	4.85	10.69	Apr 17	35.13	Apr 16 22:00	100.0	0	0	98.83	1.17	0.00	0.00	0.00	
May	707	4.21	13.58	May 02	30.43	May 02 23:00	100.0	0	0	99.29	0.71	0.00	0.00	0.00	
June	684	2.89	5.62	Jun 29	19.83	Jun 08 08:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
July	706	2.77	5.04	Jul 01	16.09	Jul 01 01:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
August	702	3.64	6.76	Aug 26	21.75	Aug 12 22:00	99.5	0	0	100.00	0.00	0.00	0.00	0.00	
September	685	4.51	9.01	Sep 26	24.40	Sep 23 11:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
October	706	6.34	16.62	Oct 20	31.19	Oct 11 21:00	99.9	0	0	98.87	1.13	0.00	0.00	0.00	
November	684	13.88	24.02	Nov 04	53.00	Nov 29 15:00	100.0	0	0	90.50	9.36	0.15	0.00	0.00	
December	704	14.45	31.90	Dec 15	57.71	Dec 20 10:00	99.5	0	0	79.40	20.03	0.57	0.00	0.00	
Annual	8335	8.53	36.21	Jan 04	62.92	Mar 01 00:00	99.9	0	0	91.94	7.90	0.17	0.00	0.00	

Table 4. Ozone (O₃) – Henry Pirker 2016 Summary and Frequency Distribution

Henry Pirker O ₃ (ppb) 2016															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 2	2 - 10	10 - 20	20 - 40	40 - 82	>82
January	708	10.38	26.12	Jan 29	39.80	Jan 28 16:00	100.0	0	0	30.65	27.54	24.29	17.51	0.00	0.00
February	662	18.95	34.56	Feb 06	39.91	Feb 25 15:00	100.0	0	0	12.24	15.41	20.09	52.27	0.00	0.00
March	709	26.79	36.27	Mar 28	47.27	Mar 13 16:00	100.0	0	0	3.53	5.22	13.12	73.06	5.08	0.00
April	685	32.08	45.00	Apr 19	58.10	Apr 19 17:00	100.0	0	0	1.31	2.92	8.76	65.40	21.61	0.00
May	708	29.62	50.35	May 15	63.36	May 15 15:00	100.0	0	0	2.82	6.78	16.81	49.15	24.44	0.00
June	686	30.24	49.70	Jun 04	63.96	Jun 05 17:00	100.0	0	0	0.15	1.75	13.56	68.08	16.47	0.00
July	709	22.39	29.60	Jul 30	41.82	Jul 18 19:00	100.0	0	0	0.00	8.89	32.02	58.11	0.99	0.00
August	705	18.60	27.85	Aug 06	45.61	Aug 09 15:00	99.5	0	0	0.00	20.57	36.60	42.41	0.43	0.00
September	687	18.61	31.25	Sep 24	37.35	Sep 27 03:00	100.0	0	0	1.75	20.09	30.57	47.60	0.00	0.00
October	708	12.72	20.95	Oct 07	35.75	Oct 22 15:00	99.9	0	0	8.90	29.10	45.76	16.24	0.00	0.00
November	687	9.40	27.98	Nov 14	34.59	Nov 14 14:00	100.0	0	0	33.62	28.24	21.25	16.89	0.00	0.00
December	705	20.28	36.36	Dec 18	39.28	Dec 21 06:00	99.5	0	0	14.33	15.18	17.30	53.19	0.00	0.00
Annual	8359	20.83	50.35	May 15	63.96	Jun 05 17:00	99.9	0	0	9.07	15.16	23.42	46.61	5.74	0.00

Table 5. Carbon Monoxide (CO) – Henry Pirker 2016 Summary and Frequency Distribution

Henry Pirker CO (ppm) 2015															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 0.1	0.1 - 1.0	1.0 - 2.5	2.5 - 5.0	5.0 - 13.0	> 13.0
January	707	0.36	0.70	Jan 12	1.77	Jan 12 11:00	100.0	0	0	0.00	98.30	1.70	0.00	0.00	0.00
February	662	0.29	0.51	Feb 05	1.54	Feb 09 10:00	100.0	0	0	0.00	98.64	1.36	0.00	0.00	0.00
March	709	0.23	0.34	Mar 01	0.91	Mar 01 01:00	100.0	0	0	0.00	100.00	0.00	0.00	0.00	0.00
April	685	0.19	0.27	Apr 17	0.69	Apr 16 22:00	100.0	0	0	0.44	99.56	0.00	0.00	0.00	0.00
May	709	0.17	0.27	May 02	0.60	May 02 22:00	100.0	0	0	0.00	100.00	0.00	0.00	0.00	0.00
June	685	0.15	0.18	Jun 29	0.42	Jul 01 00:00	100.0	0	0	0.00	100.00	0.00	0.00	0.00	0.00
July	709	0.14	0.22	Jul 01	0.67	Jul 01 01:00	100.0	0	0	11.14	88.86	0.00	0.00	0.00	0.00
August	704	0.16	0.22	Aug 02	0.45	Aug 21 23:00	99.5	0	0	0.28	99.72	0.00	0.00	0.00	0.00
September	687	0.14	0.22	Sep 23	0.51	Sep 22 08:00	100.0	0	0	7.28	92.72	0.00	0.00	0.00	0.00
October	706	0.19	0.35	Oct 20	1.07	Oct 11 21:00	99.9	0	0	0.14	99.72	0.14	0.00	0.00	0.00
November	685	0.30	0.51	Nov 03	1.26	Nov 15 10:00	100.0	0	0	0.00	99.56	0.44	0.00	0.00	0.00
December	706	0.25	0.47	Dec 20	1.54	Dec 20 08:00	99.6	0	0	0.99	98.30	0.71	0.00	0.00	0.00
Annual	8354	0.21	0.70	Jan 12	1.77	Jan 12 11:00	99.9	0	0	1.70	97.94	0.36	0.00	0.00	0.00

Table 6. Total Hydrocarbons (THC) – Henry Pirker 2016 Summary and Frequency Distribution

Henry Pirker															THC (ppm)		2016	
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	*AAQO		Number of Readings in Concentration Range								
								24-Hr	1-Hr	0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 5.0	5.0 - 10.0	>10.0			
January	679	2.22	2.60	Jan 24	2.84	Jan 03 03:00	96.2	0	0	0.00	24.01	62.30	13.70	0.00	0.00			
February	624	2.08	2.32	Feb 21	2.78	Feb 01 01:00	94.4	0	0	0.00	33.17	65.22	1.60	0.00	0.00			
March	707	2.02	2.20	Mar 01	2.50	Mar 01 02:00	100.0	0	0	0.00	54.74	45.12	0.14	0.00	0.00			
April	661	1.94	2.06	Apr 01	2.40	Apr 01 07:00	96.9	0	0	0.00	90.77	9.23	0.00	0.00	0.00			
May	708	1.96	2.19	May 07	3.12	May 07 08:00	100.0	0	0	0.00	82.77	16.38	0.85	0.00	0.00			
June	685	1.94	2.06	Jun 28	2.44	Jul 01 00:00	100.0	0	0	0.00	86.72	13.28	0.00	0.00	0.00			
July	680	2.00	2.21	Jul 18	3.26	Jul 29 06:00	96.9	0	0	0.00	67.50	29.12	3.38	0.00	0.00			
August	704	2.08	2.35	Aug 13	5.33	Aug 19 00:00	99.5	0	0	0.00	50.00	44.32	5.54	0.14	0.00			
September	686	2.03	2.27	Sep 22	3.23	Sep 17 04:00	100.0	0	0	0.00	63.56	33.53	2.92	0.00	0.00			
October	706	2.04	2.34	Oct 20	3.03	Oct 11 20:00	99.7	0	0	0.00	50.85	48.02	1.13	0.00	0.00			
November	666	2.21	2.59	Nov 24	4.74	Nov 24 20:00	97.4	0	0	0.00	13.36	77.03	9.61	0.00	0.00			
December	701	2.15	2.68	Dec 26	3.20	Dec 26 21:00	99.5	0	0	0.00	18.40	73.61	7.99	0.00	0.00			
Annual	8207	2.06	2.68	Dec 26	5.33	Aug 19 00:00	98.4	0	0	0.00	53.15	42.94	3.90	0.01	0.00			

Table 7. Total Reduced Sulphur (TRS) – Henry Pirker 2016 Summary and Frequency Distribution

Henry Pirker															TRS (ppb)		2016	
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	*AAQO		Number of Readings in Concentration Range								
								24-Hr	1-Hr	0 - 1	1 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	>10			
January	708	0.45	0.93	Jan 21	2.37	Jan 20 17:00	100.0	0	0	97.46	2.54	0.00	0.00	0.00	0.00			
February	662	0.32	0.66	Feb 05	1.08	Feb 13 11:00	100.0	0	0	99.85	0.15	0.00	0.00	0.00	0.00			
March	708	0.23	0.41	Mar 01	1.00	Mar 09 11:00	100.0	0	0	99.86	0.14	0.00	0.00	0.00	0.00			
April	683	0.15	0.50	Apr 19	0.90	Apr 19 08:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00			
May	708	0.14	0.43	May 02	0.81	May 02 08:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00			
June	682	0.19	0.42	Jun 28	1.26	Jun 29 05:00	100.0	0	0	99.56	0.44	0.00	0.00	0.00	0.00			
July	707	0.34	0.61	Jul 10	4.99	Jul 11 01:00	100.0	0	0	98.02	1.70	0.28	0.00	0.00	0.00			
August	703	0.31	0.67	Aug 24	2.98	Aug 24 04:00	99.5	0	0	98.15	1.71	0.14	0.00	0.00	0.00			
September	686	0.30	0.69	Sep 22	3.26	Sep 22 10:00	100.0	0	0	99.27	0.58	0.15	0.00	0.00	0.00			
October	706	0.26	0.60	Oct 20	1.12	Oct 20 11:00	99.9	0	0	99.58	0.42	0.00	0.00	0.00	0.00			
November	686	0.40	0.83	Nov 29	1.84	Nov 29 22:00	100.0	0	0	96.50	3.50	0.00	0.00	0.00	0.00			
December	705	0.31	0.68	Dec 15	1.33	Dec 20 10:00	99.5	0	0	98.58	1.42	0.00	0.00	0.00	0.00			
Annual	8344	0.28	0.93	Jan 21	4.99	Jul 11 01:00	99.9	0	0	98.90	1.05	0.05	0.00	0.00	0.00			

*No Alberta Environment Objectives or Guidelines for TRS

Table 8. Particulate Matter (PM_{2.5}) – Henry Pirker 2016 Summary and Frequency Distribution

Henry Pirker		PM _{2.5} (µg/m ³)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 2	2 - 6	6 - 11	11 - 17	17 - 30	> 30
January	744	13.30	33.88	Jan 09	49.19	Jan 04 19:00	100.0	1	0	6.45	22.04	23.66	16.94	23.12	7.80
February	690	5.70	11.83	Feb 12	47.20	Feb 02 20:00	100.0	0	0	28.26	36.23	24.35	6.81	3.62	0.72
March	744	4.34	7.63	Mar 27	30.63	Mar 27 01:00	100.0	0	0	21.51	59.27	13.31	4.17	1.61	0.13
April	720	4.30	10.63	Apr 17	36.24	Apr 19 21:00	100.0	0	0	23.61	57.78	14.17	2.08	1.81	0.56
May	743	5.69	16.19	May 02	69.83	May 03 00:00	99.9	0	0	30.69	38.22	16.69	9.15	4.31	0.94
June	716	4.47	11.05	Jun 28	43.53	Jul 01 00:00	100.0	0	0	32.68	40.08	20.81	4.19	2.09	0.14
July	743	5.52	16.44	Jul 17	38.06	Jul 01 01:00	99.9	0	0	22.75	44.41	21.53	7.81	3.36	0.13
August	740	4.90	9.11	Aug 09	18.92	Aug 05 23:00	99.5	0	0	17.84	51.35	26.76	3.24	0.81	0.00
September	716	3.73	9.93	Sep 28	39.75	Sep 22 09:00	99.7	0	0	42.04	39.80	12.57	4.47	0.98	0.14
October	743	4.88	11.45	Oct 20	40.90	Oct 23 09:00	99.9	0	0	11.84	62.72	20.19	4.31	0.81	0.13
November	720	8.23	17.73	Nov 29	90.36	Nov 15 18:00	100.0	0	1	5.28	34.17	36.25	16.39	7.78	0.14
December	735	6.03	15.27	Dec 25	33.46	Dec 01 21:00	99.6	0	0	33.06	28.16	18.64	14.83	4.90	0.41
Annual	8754	5.94	33.88	Jan 09	90.36	Nov 15 18:00	99.9	1	1	22.92	42.92	20.72	7.87	4.63	0.95

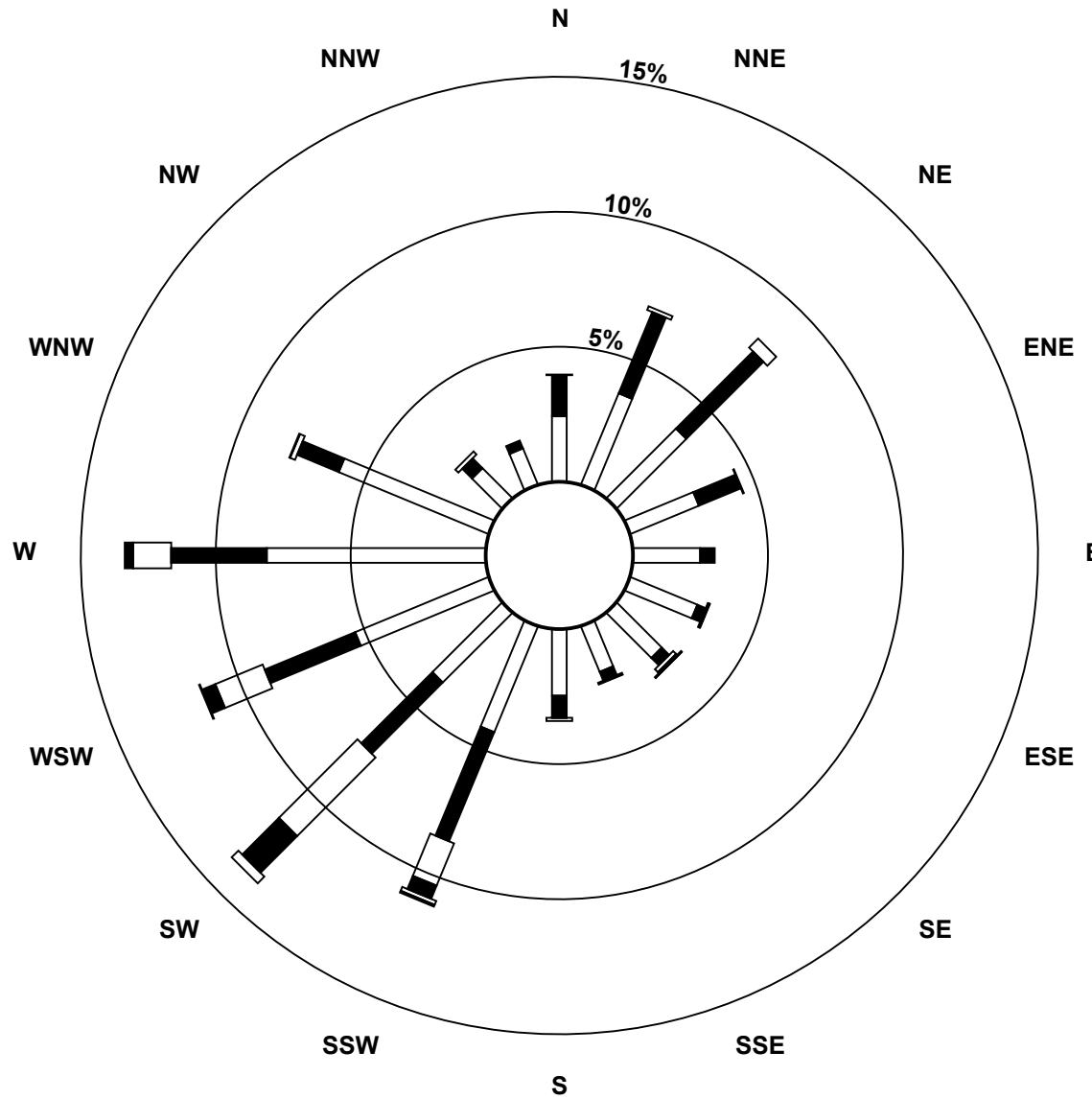
Table 9. Wind Speed and Wind Direction Frequency Distribution – Henry Pirker 2016 Summary

Henry Pirker								2016
Direction	# of Readings	% of wind speed (km/hr)						Totals
		0 - 5	6 - 11	12 - 19	20 - 28	29 - 38	> 38	
N	331	2.30	1.45	0.02	0.00	0.00	0.00	3.77
NNE	588	3.47	3.09	0.14	0.00	0.00	0.00	6.70
NE	679	3.46	3.83	0.44	0.00	0.00	0.00	7.74
ENE	372	2.61	1.59	0.03	0.00	0.00	0.00	4.24
E	252	2.36	0.51	0.00	0.00	0.00	0.00	2.87
ESE	259	2.55	0.32	0.06	0.02	0.00	0.00	2.95
SE	250	2.24	0.36	0.15	0.05	0.03	0.01	2.85
SSE	187	1.73	0.33	0.05	0.02	0.00	0.00	2.13
S	283	2.34	0.77	0.11	0.00	0.00	0.00	3.22
SSW	921	4.02	4.15	1.61	0.50	0.15	0.07	10.49
SW	1145	3.46	3.53	3.90	1.82	0.33	0.00	13.04
WSW	952	5.07	3.44	1.80	0.50	0.03	0.00	10.85
WSW	1113	7.69	3.36	1.33	0.30	0.00	0.00	12.68
WNW	658	5.70	1.58	0.18	0.03	0.00	0.00	7.50
NW	187	1.49	0.49	0.15	0.00	0.00	0.00	2.13
NNW	147	1.38	0.30	0.00	0.00	0.00	0.00	1.67
Totals	8324	51.88	29.11	9.97	3.25	0.55	0.08	95

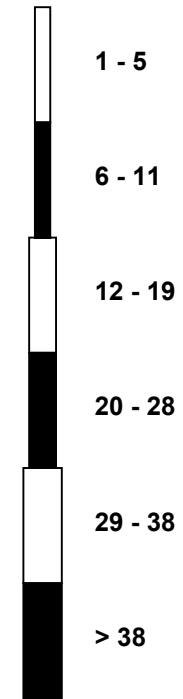
Wind Rose

Wind Speed (WS) (km/h)

Henry Pirker - 2016



Wind Speed Classes (km/h)



PAZA
EVERGREEN PARK
CONTINUOUS AMBIENT AIR MONITORING STATION

2016
ANNUAL SUMMARY TABLES

Table 10. Evergreen Park - Key Parameters – Continuous Monitoring Data – 2016 Summary

Parameter	Monitoring Station	Annual Average	Maximum Values				Operational Time (%)	Readings above AAAQO	
			24-hr	Date	1-hr	Date		24-hr	1-hr
Sulphur Dioxide SO₂ measured in ppb	Evergreen Park	0.17	1.14	Feb 11	10.38	Feb 22 14:00	99.8	0	0
Total Reduced Sulphur TRS measured in ppb	Evergreen Park	0.35	1.98	Nov 27	8.68	Nov 27 22:00	99.8	-	-
Particulate Matter PM_{2.5} measured in µg/m³	Evergreen Park	4.11	26.45	Jun 11	144.23	Jun 11 20:00	99.6	0	3

Table 11. Sulphur Dioxide (SO₂) – Evergreen Park 2016 Summary and Frequency Distribution

Evergreen Park		SO ₂ (ppb)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 20	20 - 60	60 - 110	110 - 170	170 - 340	>340
January	694	0.23	0.82	Jan 12	1.52	Jan 10 16:00	98.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
February	641	0.36	1.14	Feb 11	10.38	Feb 22 14:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	709	0.16	0.56	Mar 03	2.82	Mar 01 16:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
April	684	0.11	0.30	Apr 16	2.44	Apr 16 19:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
May	705	0.19	0.53	May 07	8.21	May 07 12:00	99.5	0	0	100.00	0.00	0.00	0.00	0.00	0.00
June	685	0.13	0.28	Jun 02	1.33	Jun 30 19:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
July	708	0.16	0.59	Jul 17	3.23	Jul 17 01:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
August	709	0.10	0.35	Aug 14	0.85	Aug 14 14:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
September	686	0.10	0.30	Sep 24	4.02	Sep 24 17:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	705	0.10	0.21	Oct 26	1.34	Oct 16 13:00	99.7	0	0	100.00	0.00	0.00	0.00	0.00	0.00
November	686	0.15	0.43	Nov 30	2.04	Nov 03 08:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
December	708	0.24	0.53	Dec 21	1.40	Dec 08 21:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
Annual	8320	0.17	1.14	Feb 11	10.38	Feb 22 14:00	99.8	0	0	100.00	0.00	0.00	0.00	0.00	0.00

Table 12. Total Reduced Sulphur (TRS) – Evergreen Park 2016 Summary and Frequency Distribution

Evergreen Park		TRS (ppb)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	*AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 1	1 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	>10
January	693	0.44	1.32	Jan 12	1.94	Jan 12 18:00	98.0	0	0	91.77	8.23	0.00	0.00	0.00	0.00
February	639	0.45	1.07	Feb 04	2.72	Feb 04 16:00	100.0	0	0	92.64	7.20	0.16	0.00	0.00	0.00
March	708	0.33	0.69	Mar 31	2.86	Mar 30 23:00	100.0	0	0	97.74	2.12	0.14	0.00	0.00	0.00
April	685	0.32	1.01	Apr 10	3.38	Apr 10 03:00	100.0	0	0	97.96	1.31	0.73	0.00	0.00	0.00
May	704	0.26	0.46	May 27	1.28	May 09 05:00	99.5	0	0	99.86	0.14	0.00	0.00	0.00	0.00
June	686	0.32	0.52	Jun 10	1.75	Jun 10 06:00	100.0	0	0	99.56	0.44	0.00	0.00	0.00	0.00
July	706	0.32	0.53	Jul 06	1.29	Jul 04 07:00	100.0	0	0	99.29	0.71	0.00	0.00	0.00	0.00
August	708	0.31	0.58	Aug 05	1.85	Aug 05 02:00	100.0	0	0	98.59	1.41	0.00	0.00	0.00	0.00
September	684	0.23	0.41	Sep 22	1.93	Sep 22 10:00	100.0	0	0	99.42	0.58	0.00	0.00	0.00	0.00
October	706	0.28	0.84	Oct 19	3.10	Oct 19 03:00	99.7	0	0	98.73	1.13	0.14	0.00	0.00	0.00
November	686	0.41	1.98	Nov 27	8.68	Nov 27 22:00	100.0	0	0	95.04	3.21	1.02	0.15	0.58	0.00
December	706	0.53	1.06	Dec 29	2.22	Dec 27 00:00	100.0	0	0	88.24	11.76	0.00	0.00	0.00	0.00
Annual	8311	0.35	1.98	Nov 27	8.68	Nov 27 22:00	99.8	0	0	96.57	3.19	0.18	0.01	0.05	0.00

*No Alberta Environment Objectives or Guidelines for TRS

Table 13. Particulate Matter (PM_{2.5}) – Evergreen Park 2016 Summary and Frequency Distribution

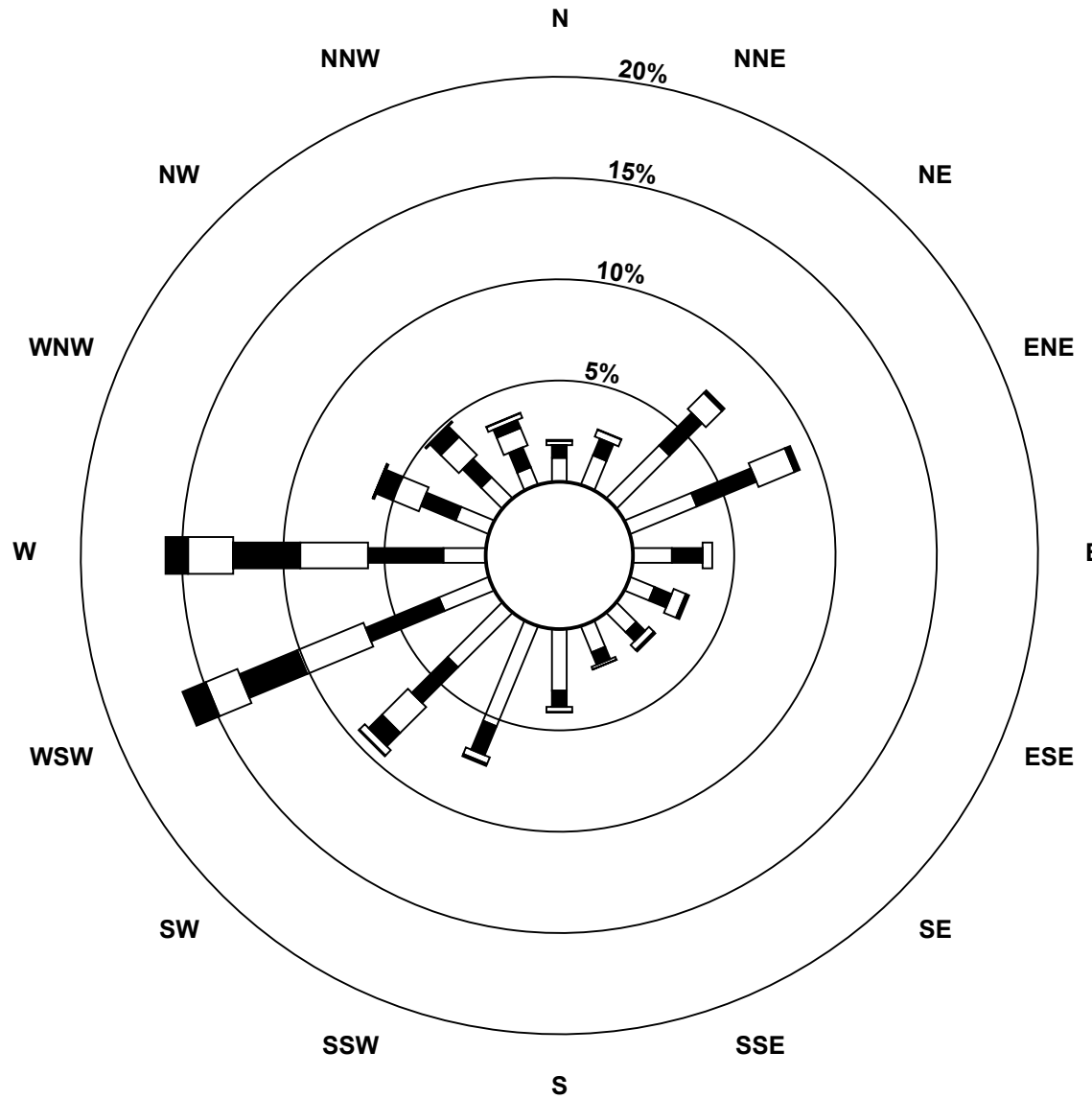
Evergreen Park		PM _{2.5} (µg/m ³)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 2	2 - 6	6 - 11	11 - 17	17 - 30	> 30
January	726	3.15	11.10	Jan 12	23.22	Jan 12 16:00	97.9	0	0	50.41	29.48	16.12	3.86	0.14	0.00
February	665	3.73	12.30	Feb 18	32.56	Feb 04 15:00	99.0	0	0	46.92	33.53	12.18	5.26	1.95	0.15
March	742	2.64	9.95	Mar 14	63.83	Mar 14 06:00	99.7	0	0	57.55	31.54	7.14	2.70	0.67	0.40
April	717	2.80	8.34	Apr 12	47.65	Apr 28 15:00	100.0	0	0	55.65	33.19	7.67	1.53	1.67	0.28
May	736	5.18	14.76	May 24	26.02	May 24 10:00	99.3	0	0	29.21	40.63	16.03	10.05	4.08	0.00
June	718	6.16	26.45	Jun 11	144.23	Jun 11 20:00	99.7	0	3	27.99	39.00	20.75	6.55	3.62	2.09
July	740	6.68	23.79	Jul 10	58.91	Jul 04 09:00	100.0	0	0	42.16	23.65	12.97	7.16	11.49	2.57
August	741	2.70	6.98	Aug 27	25.32	Aug 27 13:00	99.6	0	0	50.20	39.14	8.10	2.02	0.54	0.00
September	718	2.37	5.53	Sep 30	53.00	Sep 26 14:00	99.7	0	0	63.09	26.74	6.69	2.92	0.42	0.14
October	741	3.11	6.55	Oct 07	24.55	Oct 08 11:00	99.7	0	0	49.53	33.33	12.69	3.64	0.81	0.00
November	718	4.11	11.06	Nov 30	27.49	Nov 30 16:00	100.0	0	0	39.14	37.47	15.32	6.27	1.81	0.00
December	742	6.74	13.87	Dec 12	39.43	Dec 04 18:00	100.0	0	0	21.16	32.61	25.07	16.31	4.72	0.13
Annual	8704	4.113	26.45	Jun 11	144.227	Jun 11 20:00	99.6	0	3	44.42	33.36	13.39	5.69	2.66	0.48

Table 14. Wind Speed and Wind Direction Frequency Distribution – Evergreen Park 2016 Summary

Evergreen Park								2016
Direction	# of Readings	% of wind speed (km/hr)						Totals
		0 - 5	6 - 11	12 - 19	20 - 28	29 - 38	> 38	
N	161	1.18	0.63	0.21	0.05	0.00	0.00	2.07
NNE	221	1.57	0.89	0.36	0.03	0.00	0.00	2.84
NE	564	3.69	2.27	1.13	0.17	0.00	0.00	7.26
ENE	696	3.56	3.18	1.93	0.28	0.00	0.00	8.96
E	304	1.92	1.52	0.48	0.00	0.00	0.00	3.91
ESE	236	1.30	0.91	0.64	0.18	0.00	0.00	3.04
SE	189	1.36	0.62	0.33	0.12	0.00	0.00	2.43
SSE	171	1.39	0.66	0.14	0.01	0.00	0.00	2.20
S	319	3.04	0.80	0.26	0.01	0.00	0.00	4.11
SSW	571	5.34	1.54	0.35	0.12	0.00	0.00	7.35
SW	736	3.81	2.50	1.81	0.93	0.37	0.05	9.47
WSW	1254	2.65	3.93	3.54	3.09	1.70	1.24	16.14
WSW	1229	2.10	3.72	3.35	3.31	2.23	1.12	15.82
WNW	464	1.76	1.85	1.44	0.82	0.08	0.01	5.97
NW	374	1.47	1.29	1.26	0.73	0.05	0.01	4.81
NNW	281	0.94	1.06	0.93	0.42	0.24	0.03	3.62
Totals	7770	37.09	27.35	18.16	10.27	4.67	2.46	100

Wind Rose

Wind Speed (WS) (km/h)
Evergreen Park - 2015



Wind Speed Classes (km/h)



PAZA

SMOKY HEIGHTS

CONTINUOUS AMBIENT AIR MONITORING STATION

2016

ANNUAL SUMMARY TABLES

Table 15. Smoky Heights - Key Parameters – Continuous Monitoring Data – 2016 Summary

Parameter	Monitoring Station	Annual Average	Maximum Values				Operational Time (%)	Readings above AAAQO	
			24-hr	Date	1-hr	Date		24-hr	1-hr
Sulphur Dioxide SO₂ measured in ppb	Smoky Heights	0.46	2.71	Feb 12	17.42	Mar 30 08:00	99.7	0	0
Total Reduced Sulphur TRS measured in ppb	Smoky Heights	0.10	0.84	Jun 10	7.23	Jun 10 05:00	99.3	-	-
Particulate Matter PM_{2.5} measured in µg/m³	Smoky Heights	4.89	30.15	Jul 11	100.78	Dec 28 04:00	99.5	0	2

Table 16. Sulphur Dioxide (SO₂) – Smoky Heights 2016 Summary and Frequency Distribution

Smoky Heights		SO ₂ (ppb)						2016							
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 20	20 - 60	60 - 110	110 - 170	170 - 340	>340
January	707	0.78	1.93	Jan 19	8.49	Jan 25 18:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
February	639	0.93	2.71	Feb 12	11.42	Feb 14 22:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	708	0.64	1.66	Mar 30	17.42	Mar 30 08:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
April	682	0.37	0.98	Apr 23	6.58	Apr 12 23:00	99.4	0	0	100.00	0.00	0.00	0.00	0.00	0.00
May	709	0.30	0.78	May 02	5.60	May 02 03:00	99.9	0	0	100.00	0.00	0.00	0.00	0.00	0.00
June	681	0.30	0.94	Jun 21	9.18	Jun 12 05:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	0.00
July	701	0.33	0.91	Jul 14	5.73	Jul 18 04:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	0.00
August	700	0.31	1.78	Aug 13	15.05	Aug 13 13:00	98.8	0	0	100.00	0.00	0.00	0.00	0.00	0.00
September	687	0.26	0.80	Sep 20	3.03	Sep 20 10:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	708	0.37	1.19	Oct 13	5.31	Oct 30 22:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
November	686	0.39	0.99	Nov 27	6.78	Nov 04 20:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
December	703	0.51	1.92	Dec 16	8.24	Dec 16 11:00	99.1	0	0	100.00	0.00	0.00	0.00	0.00	0.00
Annual	8311	0.46	2.71	Feb 12	17.42	Mar 30 08:00	99.7	0	0	100.00	0.00	0.00	0.00	0.00	0.00

Table 17. Total Reduced Sulphur (TRS) – Smoky Heights 2016 Summary and Frequency Distribution

Smoky Heights		TRS (ppb)						2016							
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	*AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 1	1 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	>10
January	706	0.13	0.50	Jan 11	1.06	Jan 12 06:00	100.0	0	0	99.72	0.28	0.00	0.00	0.00	0.00
February	639	0.11	0.30	Feb 04	0.53	Feb 18 20:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	709	0.05	0.12	Mar 19	0.24	Mar 25 12:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
April	680	0.05	0.14	Apr 20	0.50	Apr 20 04:00	99.4	0	0	100.00	0.00	0.00	0.00	0.00	0.00
May	707	0.07	0.28	May 27	0.68	May 22 06:00	99.9	0	0	100.00	0.00	0.00	0.00	0.00	0.00
June	680	0.10	0.84	Jun 10	7.23	Jun 10 05:00	99.3	0	0	98.68	1.03	0.00	0.29	0.00	0.00
July	702	0.19	0.36	Jul 27	2.82	Jul 02 02:00	99.3	0	0	99.57	0.14	0.28	0.00	0.00	0.00
August	698	0.25	0.40	Aug 05	0.90	Aug 03 00:00	98.8	0	0	100.00	0.00	0.00	0.00	0.00	0.00
September	674	0.06	0.19	Sep 12	0.78	Sep 13 05:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	705	0.04	0.14	Oct 07	0.47	Oct 05 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
November	676	0.06	0.34	Nov 30	0.74	Nov 23 08:00	98.9	0	0	100.00	0.00	0.00	0.00	0.00	0.00
December	678	0.14	0.45	Dec 21	1.23	Dec 30 00:00	95.8	0	0	99.41	0.59	0.00	0.00	0.00	0.00
Annual	8254	0.10	0.84	Jun 10	7.23	Jun 10 05:00	99.3	0	0	99.78	0.17	0.02	0.02	0.00	0.00

*No Alberta Environment Objectives or Guidelines for TRS

Table 18. Particulate Matter (PM_{2.5}) – Smoky Heights 2016 Summary and Frequency Distribution

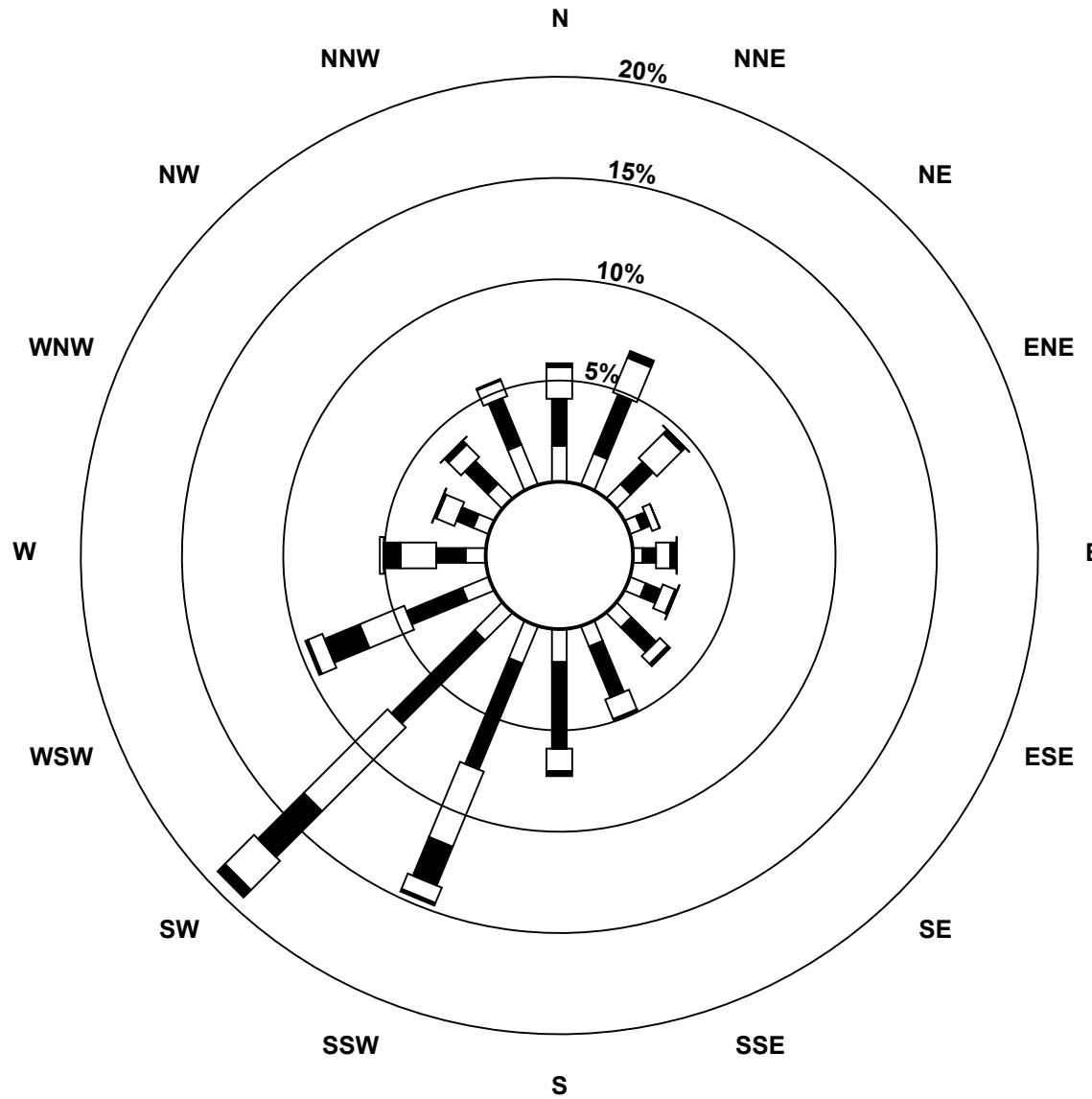
Smoky Heights		PM _{2.5} (µg/m ³)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 2	2 - 6	6 - 11	11 - 17	17 - 30	> 30
January	738	3.00	11.53	Jan 06	68.05	Jan 06 20:00	99.2	0	0	53.52	30.76	13.41	1.08	0.81	0.41
February	670	3.59	9.93	Feb 12	33.61	Feb 13 00:00	99.7	0	0	43.58	36.42	15.07	4.03	0.75	0.15
March	741	1.80	5.47	Mar 22	30.91	Mar 23 00:00	99.6	0	0	66.94	28.21	3.78	0.40	0.54	0.13
April	716	1.73	3.94	Apr 10	12.15	Apr 28 18:00	99.4	0	0	66.62	30.87	1.96	0.56	0.00	0.00
May	739	5.66	17.20	May 27	59.78	May 26 05:00	99.7	0	0	29.23	41.81	15.16	7.31	5.41	1.08
June	715	6.32	12.34	Jun 30	46.60	Jun 10 15:00	99.3	0	0	15.80	41.26	30.77	7.83	3.78	0.56
July	739	8.98	30.15	Jul 11	78.15	Jul 09 21:00	99.3	0	0	16.24	43.71	15.97	8.66	8.39	7.04
August	734	5.00	10.31	Aug 24	62.00	Aug 02 22:00	98.7	0	0	13.76	62.81	17.71	4.22	0.82	0.68
September	720	3.38	7.75	Sep 24	25.36	Sep 24 21:00	100.0	0	0	26.67	62.50	10.14	0.42	0.28	0.00
October	737	4.53	11.18	Oct 07	73.83	Oct 06 15:00	100.0	0	0	19.27	59.57	18.59	1.49	0.54	0.54
November	720	5.35	15.82	Nov 05	32.28	Nov 09 02:00	100.0	0	0	26.39	40.83	22.50	7.50	2.64	0.14
December	737	9.31	25.28	Dec 11	100.78	Dec 28 04:00	99.1	0	2	7.60	37.58	28.63	15.20	6.78	4.21
Annual	8706	4.887	30.15	Jul 11	100.779	Dec 28 04:00	99.5	0	2	32.14	43.03	16.14	4.89	2.56	1.25

Table 19. Wind Speed and Wind Direction Frequency Distribution – Smoky Heights 2016 Summary

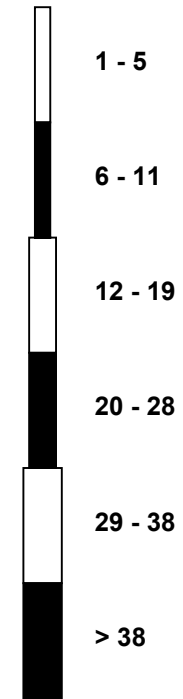
Smoky Heights								2016
Direction	# of Readings	% of wind speed (km/hr)						Totals
		0 - 5	6 - 11	12 - 19	20 - 28	29 - 38	> 38	
N	505	1.78	2.32	1.56	0.19	0.00	0.00	5.85
NNE	607	1.67	3.15	1.85	0.36	0.00	0.00	7.04
NE	390	1.00	1.54	1.72	0.25	0.01	0.00	4.52
ENE	127	0.60	0.46	0.39	0.01	0.00	0.00	1.47
E	186	0.48	0.66	0.71	0.30	0.01	0.00	2.16
ESE	208	0.83	0.80	0.65	0.10	0.02	0.00	2.41
SE	298	1.03	1.72	0.54	0.16	0.00	0.00	3.45
SSE	424	1.08	2.72	1.04	0.07	0.00	0.00	4.91
S	626	1.62	4.28	1.10	0.25	0.00	0.00	7.26
SSW	1268	1.99	5.66	4.02	2.06	0.82	0.14	14.70
SW	1668	1.92	5.81	5.85	3.20	2.03	0.52	19.33
WSW	826	1.41	2.98	2.39	1.88	0.78	0.14	9.57
WSW	451	1.00	1.45	1.76	0.82	0.20	0.00	5.23
WNW	242	0.82	0.89	0.96	0.10	0.02	0.00	2.80
NW	324	1.02	1.58	0.88	0.27	0.01	0.00	3.76
NNW	478	2.14	2.48	0.83	0.08	0.00	0.00	5.54
Totals	8628	20.41	38.49	26.27	10.12	3.91	0.80	100

Wind Rose

Wind Speed (WS) (km/h)
Smoky Heights - 2015



Wind Speed Classes (km/h)



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BEAVERLODGE
CONTINUOUS AMBIENT AIR MONITORING STATION

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Table 20. Beaverlodge - Key Parameters – Continuous Monitoring Data – 2016 Summary

Parameter	Monitoring Station	Annual Average	Maximum Values				Operational Time (%)	Readings above AAAQO	
			24-hr	Date	1-hr	Date		24-hr	1-hr
Sulphur Dioxide SO₂ measured in ppb	Beaverlodge	0.23	2.62	Feb 10	14.16	Feb 10 16:00	99.6	0	0
Nitrogen Dioxide NO₂ measured in ppb	Beaverlodge	3.33	20.20	Jan 09	34.92	Feb 04 20:00	99.6	0	0
Ozone O₃ measured in ppb	Beaverlodge	29.12	53.30	May 12	72.61	May 24 15:00	99.6	0	0
Particulate Matter PM_{2.5} measured in µg/m³	Beaverlodge	3.33	20.20	Jan 09	34.92	Feb 04 20:00	99.6	0	0

Table 21. Sulphur Dioxide (SO₂) – Beaverlodge 2016 Summary and Frequency Distribution

Beaverlodge SO ₂ (ppb) 2016															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 20	20 - 60	60 - 110	110 - 170	170 - 340	>340
January	710	0.33	0.89	Jan 05	1.79	Jan 05 04:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
February	641	0.73	2.62	Feb 10	14.16	Feb 10 16:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	709	0.28	0.97	Mar 03	3.24	Mar 03 20:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
April	687	0.14	0.83	Apr 25	2.76	Apr 25 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
May	710	0.28	0.64	May 15	4.49	May 15 15:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
June	687	0.16	0.62	Jun 16	3.87	Jun 17 06:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
July	710	0.10	0.45	Jul 06	2.18	Jul 06 14:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
August	710	0.11	0.46	Aug 15	1.94	Aug 14 13:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
September	664	0.10	0.30	Sep 24	1.03	Sep 22 11:00	96.7	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	702	0.14	0.49	Oct 28	4.53	Oct 28 23:00	98.9	0	0	100.00	0.00	0.00	0.00	0.00	0.00
November	687	0.16	1.11	Nov 08	7.04	Nov 08 16:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
December	710	0.26	0.77	Dec 20	1.64	Dec 08 11:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
Annual	8327	0.23	2.62	Feb 10	14.16	Feb 10 16:00	99.6	0	0	100.00	0.00	0.00	0.00	0.00	0.00

Table 22. Nitrogen Dioxide (NO₂) – Beaverlodge 2016 Summary and Frequency Distribution

Beaverlodge NO ₂ (ppb) 2016														
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range				
								24-Hr	1-Hr	0 - 25	25 - 50	50 - 110	110 - 210	>210
January	702	5.88	20.20	Jan 09	34.86	Jan 09 09:00	99.5	0	0	98.01	1.99	0.00	0.00	0.00
February	638	4.53	11.92	Feb 17	34.92	Feb 04 20:00	100.0	0	0	99.53	0.47	0.00	0.00	0.00
March	706	2.63	6.33	Mar 23	19.62	Mar 23 06:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00
April	686	1.54	2.55	Apr 21	9.68	Apr 02 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00
May	708	2.24	3.54	May 21	14.26	May 23 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00
June	681	1.88	4.55	Jun 29	15.38	Jun 29 09:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00
July	704	1.59	3.32	Jul 11	9.39	Jul 28 06:00	99.7	0	0	100.00	0.00	0.00	0.00	0.00
August	708	2.01	3.32	Aug 25	15.17	Aug 14 04:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00
September	660	2.18	4.89	Sep 24	10.38	Sep 22 07:00	96.7	0	0	100.00	0.00	0.00	0.00	0.00
October	701	3.48	8.20	Oct 28	16.53	Oct 28 08:00	98.9	0	0	100.00	0.00	0.00	0.00	0.00
November	686	3.52	10.00	Nov 30	28.60	Nov 30 19:00	100.0	0	0	99.85	0.15	0.00	0.00	0.00
December	709	8.53	17.19	Dec 27	26.75	Dec 21 17:00	100.0	0	0	99.44	0.56	0.00	0.00	0.00
Annual	8289	3.33	20.20	Jan 09	34.92	Feb 04 20:00	99.6	0	0	99.74	0.26	0.00	0.00	0.00

Table 23. Ozone (O₃) – Beaverlodge 2016 Summary and Frequency Distribution

Beaverlodge O ₃ (ppb) 2016															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 2	2 - 10	10 - 20	20 - 40	40 - 82	>82
January	705	27.27	37.01	Jan 17	39.58	Jan 25 22:00	99.5	0	0	1.56	2.84	20.99	74.61	0.00	0.00
February	641	28.95	40.09	Feb 24	46.31	Feb 28 20:00	100.0	0	0	0.00	2.18	12.32	78.47	7.02	0.00
March	710	38.49	45.77	Mar 30	52.26	Mar 17 18:00	100.0	0	0	0.00	0.00	0.85	50.42	48.73	0.00
April	686	38.20	47.68	Apr 30	55.33	Apr 27 15:00	100.0	0	0	0.00	0.00	3.21	51.90	44.90	0.00
May	709	42.68	53.30	May 12	72.61	May 24 15:00	100.0	0	0	0.00	0.00	1.83	38.36	59.80	0.00
June	686	29.59	43.59	Jun 06	58.50	Jun 03 17:00	100.0	0	0	0.00	1.90	17.64	65.74	14.72	0.00
July	710	25.61	36.13	Jul 03	51.19	Jul 02 19:00	100.0	0	0	0.00	2.11	21.55	71.27	5.07	0.00
August	710	24.68	32.45	Aug 26	44.89	Aug 26 17:00	100.0	0	0	0.00	5.35	24.51	68.03	2.11	0.00
September	664	23.00	30.72	Sep 12	39.18	Sep 12 22:00	96.7	0	0	0.00	10.24	23.64	66.11	0.00	0.00
October	702	25.36	37.13	Oct 13	44.25	Oct 18 15:00	98.9	0	0	0.14	3.99	24.64	70.09	1.14	0.00
November	688	27.95	40.65	Nov 27	42.53	Nov 27 06:00	100.0	0	0	0.58	6.69	14.53	74.85	3.34	0.00
December	710	17.61	38.81	Dec 31	42.08	Jan 01 00:00	100.0	0	0	4.79	27.32	27.04	39.15	1.69	0.00
Annual	8321	29.12	53.30	May 12	72.61	May 24 15:00	99.6	0	0	0.59	5.22	16.06	62.42	15.71	0.00

Table 24. Particulate Matter (PM_{2.5}) – Beaverlodge 2016 Summary and Frequency Distribution

Beaverlodge PM _{2.5} (µg/m ³) 2016															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 2	2 - 6	6 - 11	11 - 17	17 - 30	> 30
January	702	5.88	20.20	Jan 09	34.86	Jan 09 09:00	99.5	0	0	98.01	1.99	0.00	0.00	0.00	0.00
February	638	4.53	11.92	Feb 17	34.92	Feb 04 20:00	100.0	0	0	99.53	0.47	0.00	0.00	0.00	0.00
March	706	2.63	6.33	Mar 23	19.62	Mar 23 06:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
April	686	1.54	2.55	Apr 21	9.68	Apr 02 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
May	708	2.24	3.54	May 21	14.26	May 23 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
June	681	1.88	4.55	Jun 29	15.38	Jun 29 09:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
July	704	1.59	3.32	Jul 11	9.39	Jul 28 06:00	99.7	0	0	100.00	0.00	0.00	0.00	0.00	0.00
August	708	2.01	3.32	Aug 25	15.17	Aug 14 04:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
September	660	2.18	4.89	Sep 24	10.38	Sep 22 07:00	96.7	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	701	3.48	8.20	Oct 28	16.53	Oct 28 08:00	98.9	0	0	100.00	0.00	0.00	0.00	0.00	0.00
November	686	3.52	10.00	Nov 30	28.60	Nov 30 19:00	100.0	0	0	99.85	0.15	0.00	0.00	0.00	0.00
December	709	8.53	17.19	Dec 27	26.75	Dec 21 17:00	100.0	0	0	99.44	0.56	0.00	0.00	0.00	0.00
Annual	8289	3.334	20.20	Jan 09	34.924	Feb 04 20:00	99.6	0	0	99.74	0.26	0.00	0.00	0.00	0.00

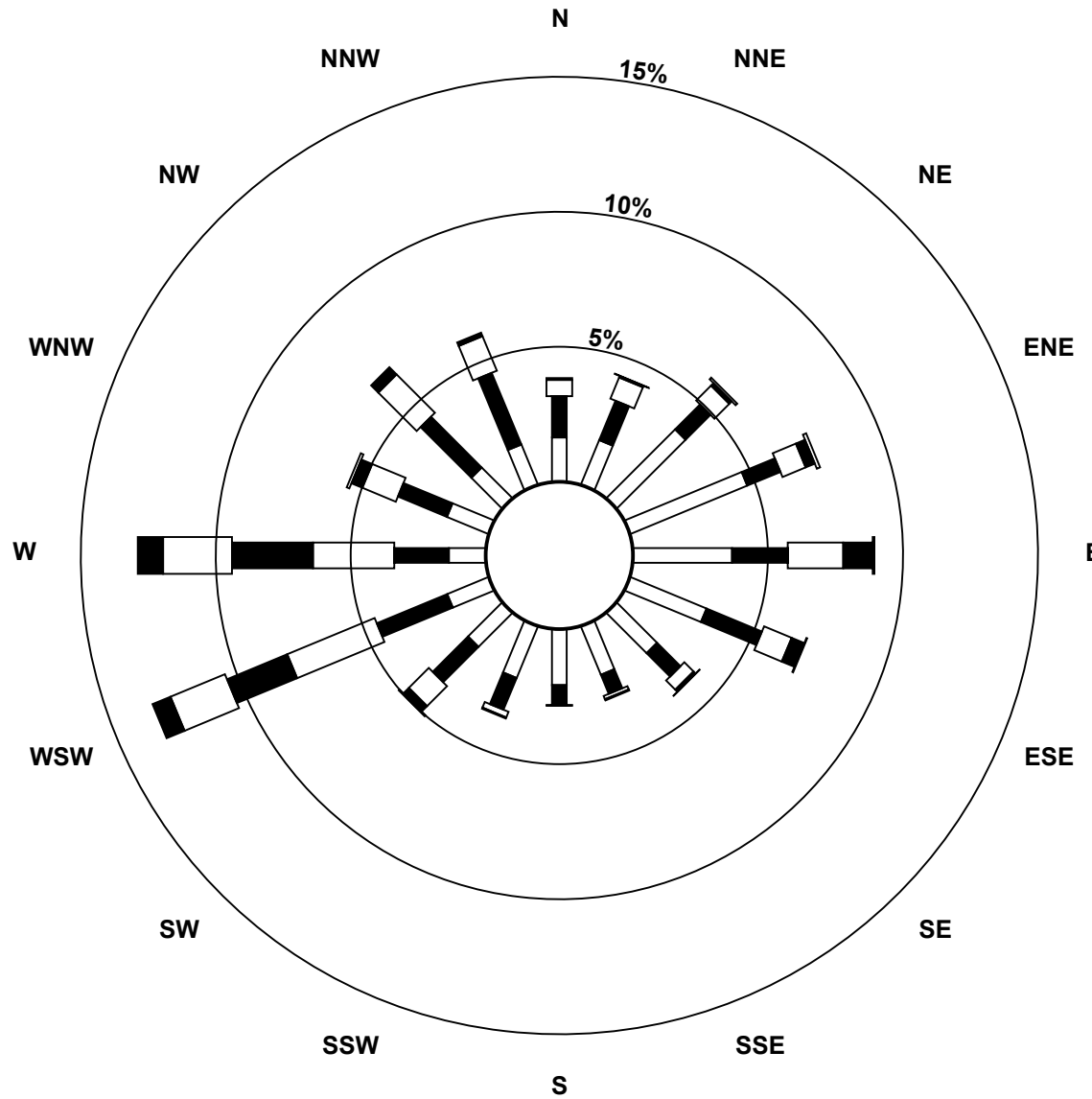
Table 25. Wind Speed and Wind Direction Frequency Distribution – Beaverlodge 2016 Summary

Beaverlodge								2016
Direction	# of Readings	% of wind speed (km/hr)						Totals
		0 - 5	6 - 11	12 - 19	20 - 28	29 - 38	> 38	
N	327	1.65	1.53	0.60	0.07	0.00	0.00	3.85
NNE	364	1.79	1.58	0.85	0.06	0.01	0.00	4.28
NE	502	3.61	1.31	0.78	0.13	0.08	0.00	5.90
ENE	633	4.69	1.33	0.93	0.36	0.13	0.00	7.45
E	760	3.67	2.06	2.06	1.09	0.06	0.00	8.94
ESE	589	3.06	2.22	1.11	0.51	0.04	0.00	6.93
SE	335	2.12	1.22	0.48	0.11	0.01	0.00	3.94
SSE	245	1.94	0.76	0.13	0.05	0.00	0.00	2.88
S	241	2.07	0.74	0.02	0.00	0.00	0.00	2.83
SSW	307	2.07	1.27	0.22	0.05	0.00	0.00	3.61
SW	426	1.79	1.85	1.05	0.28	0.05	0.00	5.01
WSW	1131	1.66	2.82	3.51	2.41	2.19	0.72	13.30
WSW	1096	1.36	2.02	3.01	3.00	2.55	0.94	12.89
WNW	469	1.67	1.96	1.34	0.44	0.11	0.00	5.52
NW	566	1.61	2.66	2.01	0.38	0.00	0.00	6.66
NNW	511	1.61	2.87	1.39	0.14	0.00	0.00	6.01
Totals	8502	36.37	28.21	19.48	9.07	5.22	1.66	100

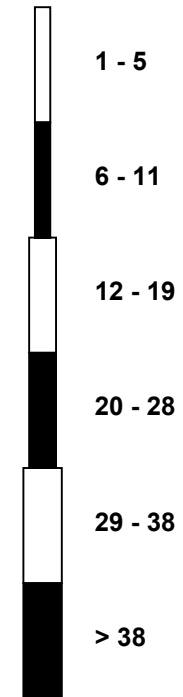
Wind Rose

Wind Speed (WS) (km/h)

Beaverlodge - 2015



Wind Speed Classes (km/h)



PAZA
VALLEYVIEW
CONTINUOUS AMBIENT AIR MONITORING STATION

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Table 26. Valleyview - Key Parameters – Continuous Monitoring Data – 2016 Summary

Parameter	Monitoring Station	Annual Average	Maximum Values				Operational Time (%)	Readings above AAAQO	
			24-hr	Date	1-hr	Date		24-hr	1-hr
Sulphur Dioxide SO₂ measured in ppb	Valleyview	1.08	21.59	Nov 21	111.96	Mar 12 10:00	99.8	0	0
Hydrogen Sulphide H₂S measured in ppb	Valleyview	0.24	3.15	Dec 03	24.29	Dec 03 15:00	99.8	0	5

Table 27. Sulphur Dioxide (SO₂) – Valleyview 2016 Summary and Frequency Distribution

Valleyview		SO ₂ (ppb)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 20	20 - 60	60 - 110	110 - 170	170 - 340	>340
January	707	0.63	3.46	Jan 16	12.26	Jan 16 20:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
February	641	0.43	1.44	Feb 19	8.29	Feb 19 09:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	710	0.75	5.64	Mar 12	111.96	Mar 12 10:00	100.0	0	0	99.86	0.00	0.00	0.14	0.00	0.00
April	671	0.96	4.61	Apr 29	28.86	Apr 29 19:00	98.1	0	0	99.70	0.30	0.00	0.00	0.00	0.00
May	709	0.33	1.70	May 01	6.56	May 01 11:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
June	687	0.85	6.66	Jun 20	33.53	Jun 28 10:00	100.0	0	0	98.98	1.02	0.00	0.00	0.00	0.00
July	708	3.15	10.80	Jul 28	49.69	Jul 26 09:00	100.0	0	0	96.47	3.53	0.00	0.00	0.00	0.00
August	709	1.18	5.19	Aug 06	44.17	Aug 04 02:00	100.0	0	0	99.29	0.71	0.00	0.00	0.00	0.00
September	686	1.44	7.50	Sep 03	31.00	Sep 20 23:00	100.0	0	0	99.13	0.87	0.00	0.00	0.00	0.00
October	707	1.34	8.63	Oct 12	85.73	Oct 12 18:00	100.0	0	0	98.87	0.99	0.14	0.00	0.00	0.00
November	686	1.63	21.59	Nov 21	102.72	Nov 21 23:00	100.0	0	0	98.10	0.87	1.02	0.00	0.00	0.00
December	709	0.27	2.06	Dec 16	8.07	Dec 16 12:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
Annual	8330	1.08	21.59	Nov 21	111.96	Mar 12 10:00	99.8	0	0	99.20	0.69	0.10	0.01	0.00	0.00

Table 28. Hydrogen Sulphide (H₂S) – Valleyview 2016 Summary and Frequency Distribution

Valleyview		H ₂ S (ppb)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 1	1 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	>10
January	707	0.33	1.15	Jan 08	5.57	Jan 08 20:00	100.0	0	0	94.63	4.81	0.28	0.28	0.00	0.00
February	639	0.28	2.12	Feb 02	14.02	Feb 02 19:00	100.0	0	1	98.12	0.94	0.31	0.16	0.16	0.31
March	709	0.22	0.88	Mar 22	13.07	Mar 22 23:00	100.0	0	1	98.31	1.55	0.00	0.00	0.00	0.14
April	672	0.25	0.69	Apr 28	3.44	Apr 26 23:00	98.1	0	0	95.54	3.72	0.74	0.00	0.00	0.00
May	709	0.21	0.75	May 26	4.61	May 26 11:00	100.0	0	0	96.47	3.10	0.42	0.00	0.00	0.00
June	686	0.19	0.52	Jun 22	4.47	Jun 22 05:00	100.0	0	0	98.40	1.31	0.29	0.00	0.00	0.00
July	707	0.31	0.95	Jul 27	7.64	Jul 27 22:00	100.0	0	0	95.05	3.54	1.13	0.14	0.14	0.00
August	708	0.17	0.35	Aug 26	3.08	Aug 12 14:00	100.0	0	0	98.73	1.13	0.14	0.00	0.00	0.00
September	685	0.20	0.61	Sep 14	4.33	Sep 14 05:00	100.0	0	0	97.96	1.61	0.44	0.00	0.00	0.00
October	708	0.16	0.41	Oct 12	4.73	Oct 12 19:00	100.0	0	0	99.44	0.42	0.14	0.00	0.00	0.00
November	686	0.15	0.36	Nov 22	3.86	Nov 05 06:00	100.0	0	0	98.98	0.87	0.15	0.00	0.00	0.00
December	709	0.36	3.15	Dec 03	24.29	Dec 03 15:00	100.0	0	3	97.04	2.40	0.14	0.00	0.00	0.42
Annual	8325	0.235	3.15	Dec 03	24.290	Dec 03 15:00	99.8	0	5	97.39	2.12	0.35	0.05	0.03	0.07

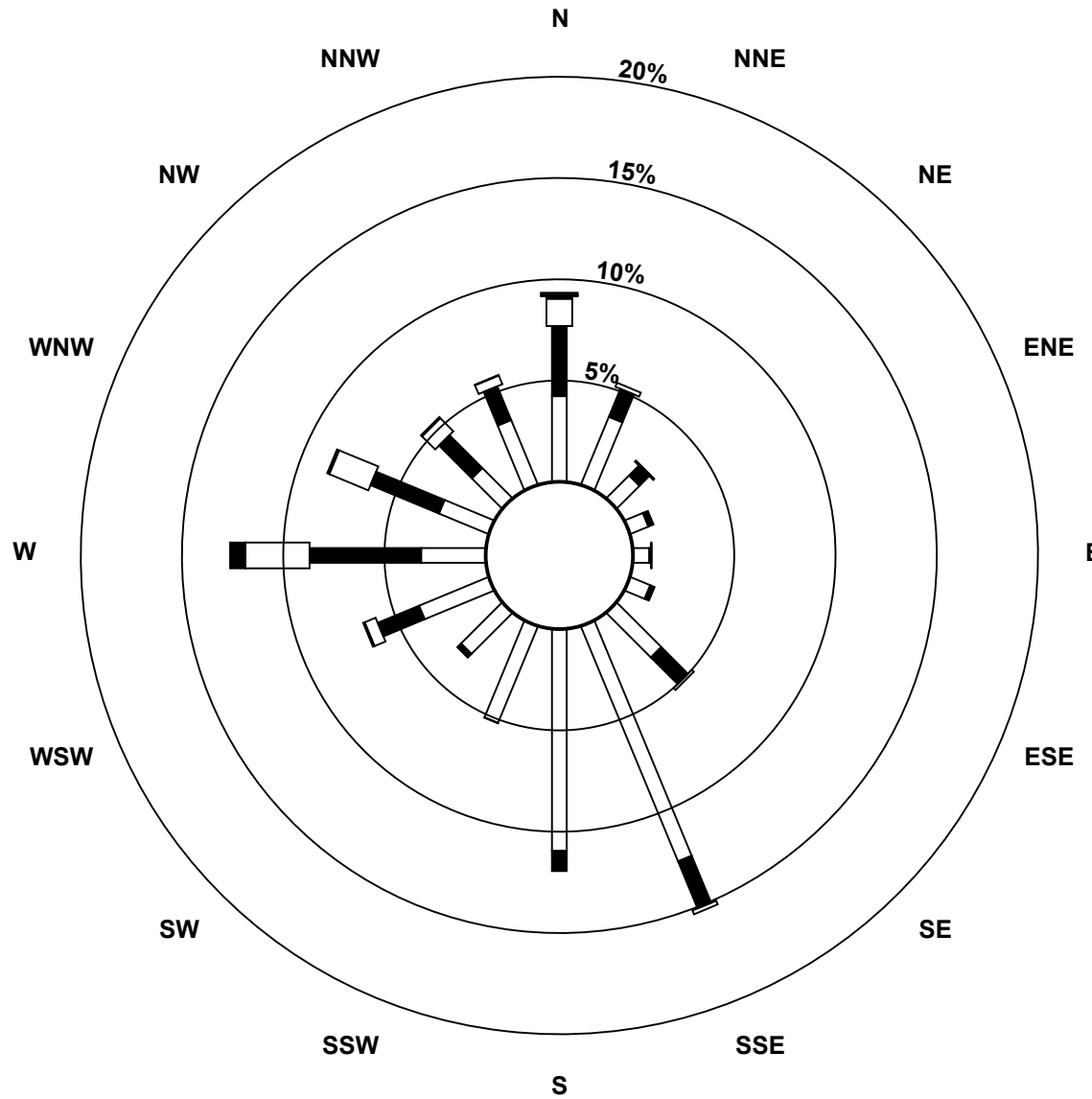
Table 29. Wind Speed and Wind Direction Frequency Distribution – Valleyview 2016 Summary

Valleyview								2016
Direction	# of Readings	% of wind speed (km/hr)						Totals
		0 - 5	6 - 11	12 - 19	20 - 28	29 - 38	> 38	
N	602	4.23	3.46	1.35	0.12	0.05	0.12	9.33
NNE	344	3.63	1.49	0.22	0.00	0.00	0.00	5.33
NE	152	1.60	0.68	0.08	0.00	0.00	0.00	2.36
ENE	80	0.98	0.26	0.00	0.00	0.00	0.00	1.24
E	59	0.81	0.09	0.00	0.02	0.00	0.00	0.91
ESE	84	1.07	0.23	0.00	0.00	0.00	0.00	1.30
SE	330	3.12	1.86	0.14	0.00	0.00	0.00	5.12
SSE	985	12.56	2.51	0.20	0.00	0.00	0.00	15.27
S	770	10.95	0.99	0.00	0.00	0.00	0.00	11.94
SSW	334	5.16	0.02	0.00	0.00	0.00	0.00	5.18
SW	202	2.87	0.26	0.00	0.00	0.00	0.00	3.13
WSW	425	3.72	2.20	0.59	0.08	0.00	0.00	6.59
WSW	814	3.19	5.50	3.18	0.74	0.00	0.00	12.62
WNW	549	2.65	3.66	2.09	0.11	0.00	0.00	8.51
NW	348	2.11	2.29	0.91	0.08	0.00	0.00	5.40
NNW	371	3.46	1.80	0.47	0.03	0.00	0.00	5.75
Totals	6449	62.10	27.32	9.23	1.18	0.05	0.12	100

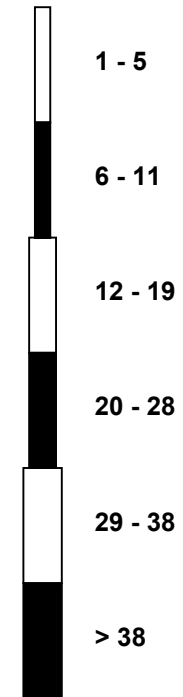
Wind Rose

Wind Speed (WS) (km/h)

Valleyview - 2015



Wind Speed Classes (km/h)



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FALHER
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Table 30. Falher - Key Parameters – Continuous Monitoring Data – 2016 Summary

Parameter	Monitoring Station	Annual Average	Maximum Values				Operational Time (%)	Readings above AAAQO	
			24-hr	Date	1-hr	Date		24-hr	1-hr
Sulphur Dioxide SO ₂ measured in ppb	Falher	0.16	0.81	Jan 17	2.22	Jan 18 00:00	100.0	0	0
Hydrogen Sulphide H ₂ S measured in ppb	Falher	0.15	1.05	Jan 30	5.65	Jan 30 08:00	100.0	0	0

Table 31. Sulphur Dioxide (SO₂) – Falher 2016 Summary and Frequency Distribution

Falher SO ₂ (ppb) 2016															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 20	20 - 60	60 - 110	110 - 170	170 - 340	>340
January	708	0.18	0.81	Jan 17	2.22	Jan 18 00:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
February	540	0.15	0.27	Feb 12	0.91	Feb 12 16:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
November	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual	1248	0.16	0.81	Jan 17	2.22	Jan 18 00:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00

Table 32. Hydrogen Sulphide (H₂S) – Falher 2016 Summary and Frequency Distribution

Falher H ₂ S (ppb) 2016															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 1	1 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	>10
January	706	0.16	1.05	Jan 30	5.65	Jan 30 08:00	100.0	0	0	99.01	0.57	0.28	0.14	0.00	0.00
February	539	0.14	0.39	Feb 09	1.06	Feb 09 15:00	100.0	0	0	99.81	0.19	0.00	0.00	0.00	0.00
March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
November	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual	1245	0.150	1.05	Jan 30	5.655	Jan 30 08:00	100.0	0	0	99.41	0.38	0.14	0.07	0.00	0.00

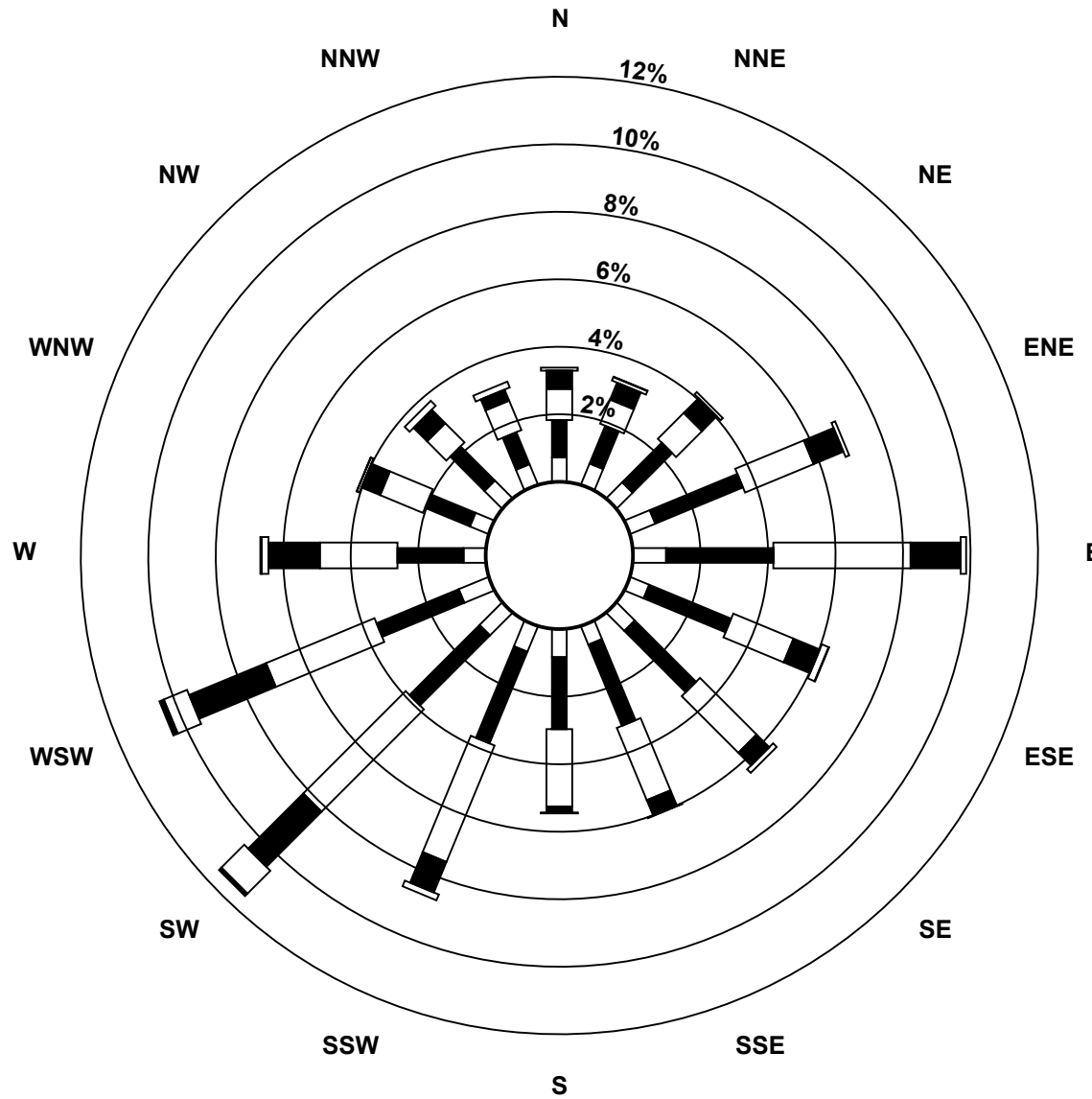
Table 33. Wind Speed and Wind Direction Frequency Distribution – Falher 2016 Summary

Falher								2016
Direction	# of Readings	% of wind speed (km/hr)						Totals
		0 - 5	6 - 11	12 - 19	20 - 28	29 - 38	> 38	
N	57	1.73	0.94	1.73	0.08	0.00	0.00	4.47
NNE	88	1.96	2.83	2.12	0.00	0.00	0.00	6.91
NE	108	1.57	3.38	2.75	0.63	0.16	0.00	8.48
ENE	99	2.12	2.28	2.35	0.55	0.47	0.00	7.77
E	84	2.12	1.49	2.75	0.24	0.00	0.00	6.59
ESE	77	1.73	1.88	2.28	0.16	0.00	0.00	6.04
SE	62	0.86	2.12	1.73	0.16	0.00	0.00	4.87
SSE	69	1.02	1.96	2.20	0.24	0.00	0.00	5.42
S	61	1.02	2.83	0.94	0.00	0.00	0.00	4.79
SSW	95	1.96	2.98	1.81	0.39	0.31	0.00	7.46
SW	113	1.18	2.04	1.88	2.20	0.94	0.63	8.87
WSW	85	0.71	1.73	2.98	0.86	0.16	0.24	6.67
WSW	68	0.78	1.49	2.51	0.55	0.00	0.00	5.34
WNW	68	1.10	1.96	1.73	0.55	0.00	0.00	5.34
NW	52	1.26	1.65	1.18	0.00	0.00	0.00	4.08
NNW	49	1.18	1.02	1.02	0.63	0.00	0.00	3.85
Totals	1235	22.29	32.57	31.95	7.22	2.04	0.86	97

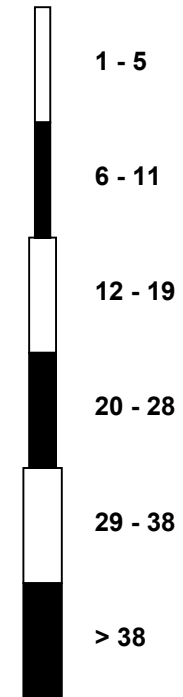
Wind Rose

Wind Speed (WS) (km/h)

Falher - 2015



Wind Speed Classes (km/h)



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Rycroft-Portable
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Table 34. Rycroft-Portable - Key Parameters – Continuous Monitoring Data – 2016 Summary

Parameter	Monitoring Station	Annual Average	Maximum Values				Operational Time (%)	Readings above AAAQO	
			24-hr	Date	1-hr	Date		24-hr	1-hr
Sulphur Dioxide SO ₂ measured in ppb	Rycroft-Portable	0.20	1.01	Jun 20	6.81	Aug 19 10:00	99.8	0	0
Nitrogen Dioxide NO ₂ measured in ppb	Rycroft-Portable	2.00	12.62	Dec 17	22.18	Jun 08 01:00	99.8	-	0
Ozone O ₃ measured in ppb	Rycroft-Portable	2.00	12.62	Dec 17	22.18	Jun 08 01:00	99.8	-	0
Total Hydrocarbons THC measured in ppm	Rycroft-Portable	1.88	2.14	Mar 10	2.35	Mar 10 02:00	99.3	-	-
Total Reduced Sulphur TRS measured in ppb	Rycroft-Portable	0.30	0.54	Aug 21	1.57	Jun 30 13:00	99.8	-	-
Particulate Matter PM _{2.5} measured in µg/m ³	Rycroft-Portable	2.48	20.76	May 15	123.90	May 15 23:00	98.4	0	4

Sulphur Dioxide (SO₂) – Rycroft-Portable 2016 Summary and Frequency Distribution

Rycroft Portable		SO ₂ (ppb)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 20	20 - 60	60 - 110	110 - 170	170 - 340	>340
January	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
March	676	0.34	0.87	Mar 09	3.19	Mar 09 13:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
April	678	0.21	0.67	Apr 01	1.87	Apr 02 16:00	99.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
May	709	0.17	0.50	May 05	2.34	May 05 07:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
June	685	0.25	1.01	Jun 20	3.73	Jun 06 10:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
July	708	0.13	0.40	Jul 10	2.15	Jul 11 00:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
August	709	0.11	0.43	Aug 16	6.81	Aug 19 10:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
September	685	0.18	0.45	Sep 13	3.40	Sep 13 17:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	699	0.11	0.55	Oct 30	6.10	Oct 03 11:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	0.00
November	685	0.20	0.64	Nov 08	3.51	Nov 09 16:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
December	705	0.27	0.67	Dec 30	3.67	Dec 30 12:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	0.00
Annual	6939	0.20	1.01	Jun 20	6.81	Aug 19 10:00	99.8	0	0	100.00	0.00	0.00	0.00	0.00	0.00

Nitrogen Dioxide (NO₂) – Rycroft-Portable 2016 Summary and Frequency Distribution

Rycroft Portable		NO ₂ (ppb)										2016			
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 25	25 - 50	50 - 110	110 - 210	>210	
January	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
February	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
March	675	1.81	5.75	Mar 08	10.91	Mar 10 02:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
April	676	1.49	2.25	Apr 25	6.85	Apr 30 21:00	98.9	0	0	100.00	0.00	0.00	0.00	0.00	
May	708	1.99	4.16	May 16	14.18	May 16 05:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
June	683	2.26	8.30	Jun 08	22.18	Jun 08 01:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
July	706	1.28	1.77	Jul 05	4.63	Jul 05 23:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
August	708	1.21	1.83	Aug 20	4.73	Aug 25 02:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
September	683	1.15	2.48	Sep 29	10.58	Sep 28 22:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
October	699	1.48	3.94	Oct 20	12.12	Oct 20 02:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	
November	683	3.46	10.59	Nov 29	20.13	Nov 29 21:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	
December	704	3.81	12.62	Dec 17	21.24	Dec 07 23:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	
Annual	6925	2.00	12.62	Dec 17	22.18	Jun 08 01:00	99.8	0	0	100.00	0.00	0.00	0.00	0.00	

Ozone (O₃) – Rycroft-Portable 2016 Summary and Frequency Distribution

Rycroft Portable		O ₃ (ppb)										2016				
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range						
								24-Hr	1-Hr	0 - 2	2 - 10	10 - 20	20 - 40	40 - 82	>82	
January	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
February	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
March	675	1.81	5.75	Mar 08	10.91	Mar 10 02:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
April	676	1.49	2.25	Apr 25	6.85	Apr 30 21:00	98.9	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
May	708	1.99	4.16	May 16	14.18	May 16 05:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
June	683	2.26	8.30	Jun 08	22.18	Jun 08 01:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
July	706	1.28	1.77	Jul 05	4.63	Jul 05 23:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
August	708	1.21	1.83	Aug 20	4.73	Aug 25 02:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
September	683	1.15	2.48	Sep 29	10.58	Sep 28 22:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
October	699	1.48	3.94	Oct 20	12.12	Oct 20 02:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
November	683	3.46	10.59	Nov 29	20.13	Nov 29 21:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
December	704	3.81	12.62	Dec 17	21.24	Dec 07 23:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	6925	2.00	12.62	Dec 17	22.18	Jun 08 01:00	99.8	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Reduced Sulphur (TRS) – Rycroft-Portable 2016 Summary and Frequency Distribution

Rycroft Portable		TRS (ppb)										2016				
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	*AAAQO		Number of Readings in Concentration Range						
								24-Hr	1-Hr	0 - 1	1 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	>10	
January	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
March	650	0.28	0.51	Mar 08	0.74	Mar 17 16:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
April	678	0.31	0.48	Apr 09	0.81	Apr 27 05:00	99.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
May	708	0.29	0.47	May 08	1.29	May 01 15:00	100.0	0	0	99.86	0.14	0.00	0.00	0.00	0.00	0.00
June	686	0.34	0.50	Jun 27	1.57	Jun 30 13:00	100.0	0	0	99.85	0.15	0.00	0.00	0.00	0.00	0.00
July	708	0.32	0.52	Jul 28	0.79	Jul 29 03:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
August	709	0.38	0.54	Aug 21	1.13	Aug 21 02:00	100.0	0	0	99.72	0.28	0.00	0.00	0.00	0.00	0.00
September	685	0.28	0.42	Sep 26	1.11	Sep 26 19:00	100.0	0	0	99.85	0.15	0.00	0.00	0.00	0.00	0.00
October	699	0.27	0.45	Oct 26	0.80	Oct 02 14:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
November	686	0.28	0.48	Nov 25	0.67	Nov 02 16:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
December	705	0.27	0.37	Dec 14	0.54	Dec 15 01:00	99.3	0	0	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	6914	0.30	0.54	Aug 21	1.57	Jun 30 13:00	99.8	0	0	99.93	0.07	0.00	0.00	0.00	0.00	0.00

*No Alberta Environment Objectives or Guidelines for TRS

Total Hydrocarbon (THC) – Rycroft-Portable 2016 Summary and Frequency Distribution

Rycroft Portable		THC (ppm)											2016		
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	*AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 5.0	5.0 - 10.0	>10.0
January	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
March	514	1.98	2.14	Mar 10	2.35	Mar 10 02:00	100.0	0	0	0.00	71.40	28.60	0.00	0.00	0.00
April	678	1.91	1.96	Apr 10	2.04	Apr 29 06:00	99.0	0	0	0.00	98.23	1.77	0.00	0.00	0.00
May	709	1.90	1.95	May 06	2.07	May 16 07:00	100.0	0	0	0.00	97.32	2.68	0.00	0.00	0.00
June	663	1.85	1.92	Jun 20	2.12	Jun 30 14:00	96.9	0	0	0.00	98.64	1.36	0.00	0.00	0.00
July	707	1.81	1.88	Jul 13	2.09	Jul 13 05:00	100.0	0	0	0.00	98.44	1.56	0.00	0.00	0.00
August	708	1.82	1.88	Aug 09	2.06	Aug 09 06:00	100.0	0	0	0.00	99.44	0.56	0.00	0.00	0.00
September	686	1.82	1.90	Sep 29	2.03	Sep 29 10:00	100.0	0	0	0.00	99.85	0.15	0.00	0.00	0.00
October	688	1.94	2.05	Oct 19	2.21	Oct 19 15:00	97.9	0	0	0.00	83.58	16.42	0.00	0.00	0.00
November	685	1.90	2.08	Nov 24	2.17	Nov 24 01:00	100.0	0	0	0.00	92.55	7.45	0.00	0.00	0.00
December	704	1.84	1.97	Dec 17	2.06	Dec 16 23:00	99.2	0	0	0.00	98.86	1.14	0.00	0.00	0.00
Annual	6742	1.88	2.14	Mar 10	2.35	Mar 10 02:00	99.3	0	0	0.00	93.83	6.17	0.00	0.00	0.00

*No Alberta Environment Objectives or Guidelines for THC

Particulate Matter (PM_{2.5}) – Rycroft-Portable 2016 Summary and Frequency Distribution

Rycroft Portable		PM _{2.5} (µg/m ³)											2016		
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 2	2 - 6	6 - 11	11 - 17	17 - 30	> 30
January	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
March	729	1.25	3.93	Mar 08	7.57	Mar 08 02:00	100.0	0	0	76.95	22.22	0.82	0.00	0.00	0.00
April	711	2.43	10.95	Apr 22	110.07	Apr 22 17:00	99.0	0	1	64.84	25.18	7.45	1.69	0.56	0.28
May	740	4.49	20.76	May 15	123.90	May 15 23:00	99.5	0	2	45.81	34.32	11.22	4.73	2.03	1.89
June	711	2.37	11.53	Jun 21	111.27	Jun 21 16:00	98.8	0	1	56.54	37.41	5.20	0.28	0.28	0.28
July	742	2.70	9.26	Jul 17	27.18	Jul 18 21:00	100.0	0	0	51.48	38.27	7.28	2.29	0.67	0.00
August	743	2.20	4.68	Aug 08	11.67	Aug 16 17:00	99.9	0	0	56.93	38.22	4.58	0.27	0.00	0.00
September	718	1.55	7.64	Sep 29	21.30	Sep 29 23:00	99.7	0	0	74.79	21.87	2.09	0.56	0.70	0.00
October	714	1.51	4.09	Oct 23	12.55	Oct 23 11:00	96.0	0	0	73.67	23.53	2.38	0.42	0.00	0.00
November	660	3.89	10.12	Nov 29	25.53	Nov 04 17:00	91.8	0	0	43.64	28.48	23.48	3.79	0.61	0.00
December	738	2.42	8.15	Dec 25	25.14	Dec 23 09:00	99.2	0	0	59.21	28.86	11.11	0.54	0.27	0.00
Annual	7206	2.480	20.76	May 15	123.902	May 15 23:00	98.4	0	4	60.39	29.84	7.56	1.46	0.51	0.25

Table 41. Wind Speed and Wind Direction Frequency Distribution – Rycroft-Portable 2016 Summary

Rycroft Portable								2016
Direction	# of Readings	% of wind speed (km/hr)						Totals
		0 - 5	6 - 11	12 - 19	20 - 28	29 - 38	> 38	
N	215	1.06	1.55	0.38	0.01	0.00	0.00	3.00
NNE	480	1.30	2.66	2.38	0.35	0.00	0.00	6.69
NE	589	1.60	3.26	2.58	0.72	0.04	0.00	8.21
ENE	254	1.60	1.49	0.40	0.01	0.03	0.00	3.54
E	99	1.07	0.31	0.00	0.00	0.00	0.00	1.38
ESE	96	1.05	0.29	0.00	0.00	0.00	0.00	1.34
SE	199	1.76	0.93	0.07	0.01	0.00	0.00	2.77
SSE	577	3.02	4.70	0.26	0.06	0.00	0.00	8.04
S	1285	5.88	10.83	1.02	0.18	0.00	0.00	17.91
SSW	651	3.99	3.74	1.21	0.14	0.00	0.00	9.07
SW	558	2.82	2.30	1.90	0.54	0.22	0.00	7.78
WSW	890	1.95	2.97	3.44	2.66	1.32	0.06	12.40
WSW	683	1.83	2.98	2.77	1.23	0.63	0.08	9.52
WNW	282	1.38	1.49	0.86	0.18	0.01	0.00	3.93
NW	168	1.24	0.81	0.22	0.07	0.00	0.00	2.34
NNW	149	0.91	0.88	0.21	0.08	0.00	0.00	2.08
Totals	7175	32.45	41.18	17.71	6.26	2.26	0.14	100

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Donnelly
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Table 42. Donnelly - Key Parameters – Continuous Monitoring Data – 2016 Summary

Parameter	Monitoring Station	Annual Average	Maximum Values				Operational Time (%)	Readings above AAAQO	
			24-hr	Date	1-hr	Date		24-hr	1-hr
Sulphur Dioxide SO ₂ measured in ppb	Donnelly	0.14	0.65	Dec 14	2.23	Dec 30 13:00	99.9	0	0
Hydrogen Sulphide H ₂ S measured in ppb	Donnelly	0.15	0.76	Aug 21	5.15	Nov 28 03:00	99.9	0	0

Table 43. Sulphur Dioxide (SO₂) – Donnelly 2016 Summary and Frequency Distribution

Falher SO ₂ (ppb) 2016															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 20	20 - 60	60 - 110	110 - 170	170 - 340	>340
January	708	0.18	0.81	Jan 17	2.22	Jan 18 00:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
February	540	0.15	0.27	Feb 12	0.91	Feb 12 16:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
November	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual	1248	0.16	0.81	Jan 17	2.22	Jan 18 00:00	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00

Table 44. Hydrogen Sulphide (H₂S) – Donnelly 2016 Summary and Frequency Distribution

Falher H ₂ S (ppb) 2016															
Month	# of Readings	Average	24-hr Maximum	Date	1-hr Maximum	Date	Operational Time (%)	AAAQO		Number of Readings in Concentration Range					
								24-Hr	1-Hr	0 - 1	1 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	>10
January	706	0.16	1.05	Jan 30	5.65	Jan 30 08:00	100.0	0	0	99.01	0.57	0.28	0.14	0.00	0.00
February	539	0.14	0.39	Feb 09	1.06	Feb 09 15:00	100.0	0	0	99.81	0.19	0.00	0.00	0.00	0.00
March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
November	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual	1245	0.150	1.05	Jan 30	5.655	Jan 30 08:00	100.0	0	0	99.41	0.38	0.14	0.07	0.00	0.00

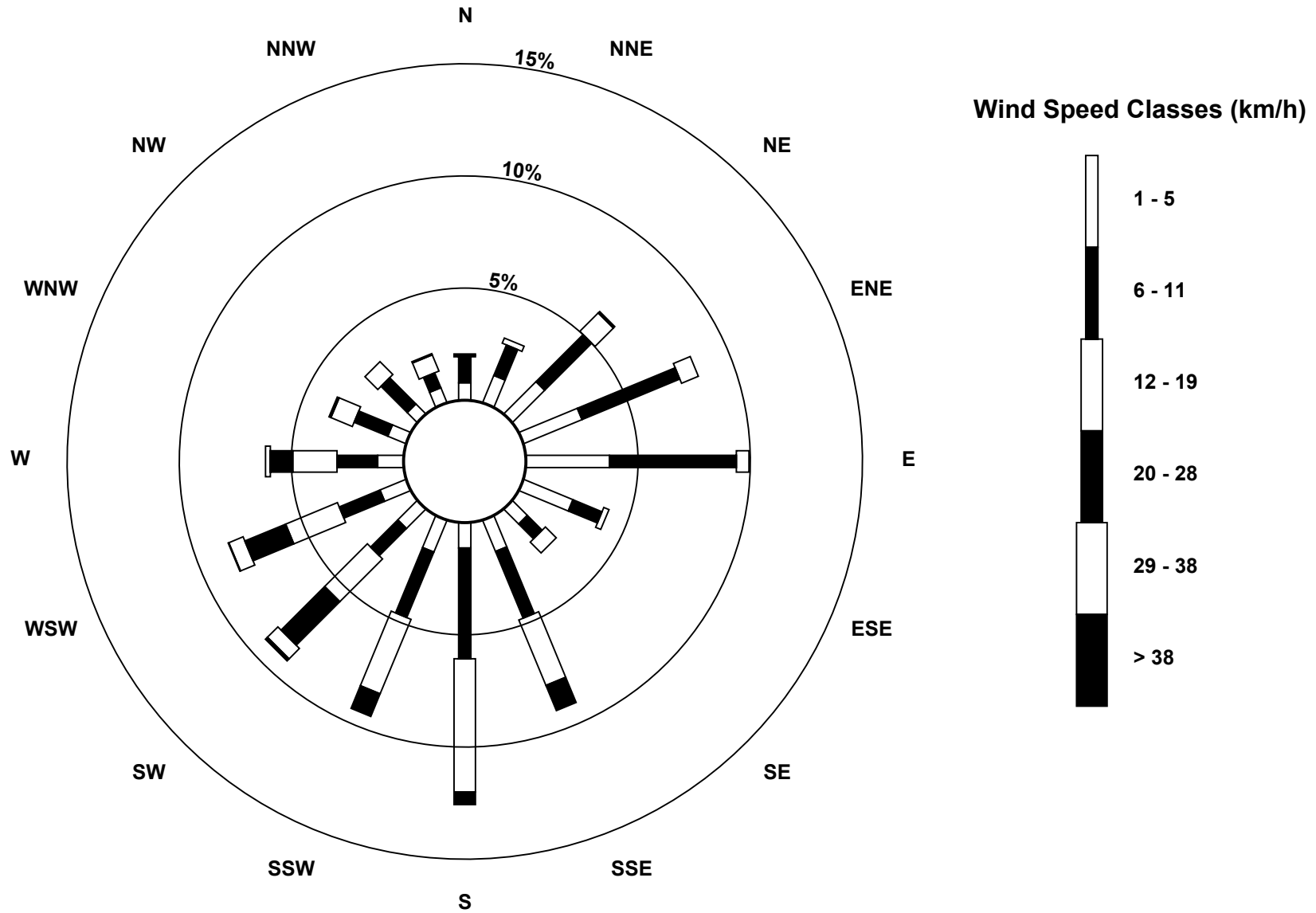
Table 45. Wind Speed and Wind Direction Frequency Distribution – Donnelly 2016 Summary

Falher								2016
Direction	# of Readings	% of wind speed (km/hr)						Totals
		0 - 5	6 - 11	12 - 19	20 - 28	29 - 38	> 38	
N	57	1.73	0.94	1.73	0.08	0.00	0.00	4.47
NNE	88	1.96	2.83	2.12	0.00	0.00	0.00	6.91
NE	108	1.57	3.38	2.75	0.63	0.16	0.00	8.48
ENE	99	2.12	2.28	2.35	0.55	0.47	0.00	7.77
E	84	2.12	1.49	2.75	0.24	0.00	0.00	6.59
ESE	77	1.73	1.88	2.28	0.16	0.00	0.00	6.04
SE	62	0.86	2.12	1.73	0.16	0.00	0.00	4.87
SSE	69	1.02	1.96	2.20	0.24	0.00	0.00	5.42
S	61	1.02	2.83	0.94	0.00	0.00	0.00	4.79
SSW	95	1.96	2.98	1.81	0.39	0.31	0.00	7.46
SW	113	1.18	2.04	1.88	2.20	0.94	0.63	8.87
WSW	85	0.71	1.73	2.98	0.86	0.16	0.24	6.67
WSW	68	0.78	1.49	2.51	0.55	0.00	0.00	5.34
WNW	68	1.10	1.96	1.73	0.55	0.00	0.00	5.34
NW	52	1.26	1.65	1.18	0.00	0.00	0.00	4.08
NNW	49	1.18	1.02	1.02	0.63	0.00	0.00	3.85
Totals	1235	22.29	32.57	31.95	7.22	2.04	0.86	97

Wind Rose

Wind Speed (WS) (km/h)

Donnelly - 2016



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PASSIVE MONITORING

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Table 46. SO₂ Passive - 2016 Summary

MONITORING SITE		Sulphur Dioxide Passive (parts per billion)												MAXIMUM VALUE	ANNUAL AVERAGE
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
1	Silver Valley	0.4	0.2	0.5	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.3	0.5	0.2
2	Bay Tree	0.2	0.3	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.2
3	Forth Creek	0.4	0.3	0.4	0.2	0.2	0.1	0.1	N/S	0.2	0.1	0.2	0.3	0.4	0.2
4	Gordondale	0.4	0.4	0.4	0.3	0.2	0.3	0.1	0.1	0.2	0.2	N/S	0.2	0.4	0.3
5	Boone Creek	0.5	0.2	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.5	0.2
7	Steepprock Creek	0.5	0.3	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.3	0.5	0.2
9	Spirit River	0.4	0.3	0.3	0.2	0.2	0.3	0.1	0.2	0.1	0.1	0.2	0.3	0.4	0.2
10	Woking	0.4	0.5	0.6	0.4	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.6	0.6	0.3
11	Webber Creek	0.7	0.4	0.4	0.3	0.3	0.1	0.1	0.3	0.1	0.2	0.3	0.4	0.7	0.3
12	Hythe	0.9	0.3	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.1	0.3	0.9	0.3
14	Sylvester	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.1
16	Beaverlodge	1.2	0.3	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	1.2	0.3
17	Poplar	0.6	0.4	0.4	0.2	0.2	0.2	0.1	0.2	0.1	0.3	0.3	0.3	0.6	0.3
18	Saddle Hills	0.5	0.4	0.5	0.4	0.5	0.2	0.4	0.2	0.1	0.1	0.2	0.3	0.5	0.3
19	Wanham	0.5	0.4	0.4	0.2	0.1	0.3	0.1	0.2	0.2	0.1	0.2	1.2	1.2	0.3
20	Shaftesbury	0.2	0.3	0.2	0.2	0.4	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.4	0.2
21	Eaglesham	0.4	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.4	0.2
23	Bear Lake	0.7	0.4	0.3	0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.3	0.7	0.2
24	Wembley	0.9	0.3	0.2	0.2	0.1	0.2	0.0	0.1	0.1	0.2	0.2	0.2	0.9	0.2
25	Pinto Creek	0.4	0.1	0.1	0.1	BDL	0.1	0.0	0.2	0.0	0.1	0.0	0.2	0.4	0.1
26	Flyingshot	0.6	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.6	0.2
27	Grande Prairie I	0.7	0.3	0.3	0.2	0.2	0.1	0.0	0.2	0.2	0.2	0.2	0.3	0.7	0.3
28	Clairmont Lake	0.7	0.4	0.7	0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.4	0.7	0.3
29	Smoky Heights	0.7	0.5	0.7	0.2	0.3	0.3	0.3	0.5	0.2	0.2	0.3	0.5	0.7	0.4
30	Fitzsimmons	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.3	0.3	0.1
32	Gold Creek	0.4	0.3	0.2	0.5	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.5	0.2
33	Wapiti	0.2	0.2	0.3	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.0	0.2	0.3	0.1
34	Puskwaskau	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1
35	Jean Cote	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.2
36	Guy	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.1
37	Crooked Creek	0.3	0.1	0.1	0.2	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.1
38	Karr Creek	0.3	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.1
39	Clouston Creek	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.1
40	McLennan	0.2	0.2	0.2	0.4	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.4	0.2
41	Valleyview	0.5	0.3	0.2	0.2	0.3	0.1	0.0	0.1	0.1	0.2	0.2	0.5	0.5	0.2
42	Sunset House	0.3	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2
43	High Prairie	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.3	0.1
44	Peavine	0.1	0.1	0.1	0.1	BDL	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1
45	Gift Lake	0.1	0.1	0.1	0.1	BDL	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1
46	Little Smoky	0.2	0.1	0.4	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.4	0.1
47	Kinuso	0.2	0.4	0.2	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.4	0.1
48	Deer Mountain	0.2	0.1	0.3	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.1	0.3	0.1
49	Grande Prairie HP	0.6	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.3	0.6	0.2
62	East Prairie	0.1	0.2	0.1	0.2	0.1	0.1	0.0	0.2	0.0	0.1	0.0	0.1	0.2	0.1
Average		0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.3		0.2
Peak		1.2	0.5	0.7	0.5	0.5	0.3	0.4	0.5	0.3	0.3	0.3	1.2	1.2	

BDL=Below Detection Limit (>0.02ppm); N/A=Sample not collected (damaged, missing, inaccessible, etc)

Table 47. NO₂ Passive - 2016 Summary

MONITORING SITE		Nitrogen Dioxide Passive (parts per billion)												MAXIMUM VALUE	ANNUAL AVERAGE
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
1	Silver Valley	1.9	0.8	0.5	0.5	0.6	0.7	0.4	0.7	0.7	0.9	1.6	1.6	1.9	0.9
2	Bay Tree	3.0	1.2	0.6	0.8	0.3	0.2	0.2	0.4	0.4	1.2	1.7	1.5	3.0	1.0
3	Forth Creek	1.8	0.6	0.4	0.5	0.3	0.3	0.2	N/S	0.6	0.5	1.3	0.9	1.8	0.7
4	Gordondale	2.0	1.5	1.1	0.6	0.4	0.9	0.7	0.9	1.0	1.0	N/S	2.0	2.0	1.1
5	Boone Creek	2.7	1.0	0.5	0.5	0.8	0.3	0.2	0.4	0.6	1.2	1.3	1.3	2.7	0.9
7	Steepprock Creek	1.5	0.3	0.2	0.2	0.2	N/S	N/S	0.6	0.4	1.1	1.3	1.6	1.6	0.7
9	Spirit River	2.3	1.0	0.6	1.0	0.7	1.0	0.4	1.2	1.0	0.7	1.6	1.9	2.3	1.1
10	Woking	1.3	0.5	0.4	0.5	0.6	0.4	0.2	0.6	0.5	0.7	1.4	1.5	1.5	0.7
11	Webber Creek	4.9	2.1	0.9	1.2	1.3	0.8	0.4	0.8	1.1	1.6	3.2	3.1	4.9	1.8
12	Hythe	3.7	1.0	0.5	0.8	1.0	0.5	0.3	0.9	0.6	1.4	2.4	1.6	3.7	1.2
14	Sylvester	1.7	0.5	0.6	0.5	0.5	0.3	0.2	0.4	0.3	1.1	1.2	0.8	1.7	0.7
16	Beaverlodge	4.2	2.0	1.2	0.5	0.5	0.4	0.4	0.7	1.0	1.9	4.1	3.4	4.2	1.7
17	Poplar	3.6	1.6	1.0	1.4	2.0	1.3	0.5	0.6	1.0	1.4	3.4	2.0	3.6	1.7
18	Saddle Hills	1.7	0.6	0.3	0.3	0.4	0.5	0.2	0.4	0.7	0.7	1.0	1.1	1.7	0.7
19	Wanham	1.6	0.5	0.4	0.4	0.3	0.3	0.2	0.3	0.7	0.8	1.3	1.4	1.6	0.7
20	Shaftesbury	1.6	1.0	0.7	0.3	0.7	0.7	0.3	0.4	0.5	0.7	1.2	1.5	1.6	0.8
21	Eaglesham	1.5	0.3	0.2	1.8	2.0	0.8	0.2	0.3	0.4	0.6	1.4	1.6	2.0	0.9
23	Bear Lake	3.2	1.2	0.5	1.6	2.8	1.1	0.4	1.0	1.1	1.1	3.9	2.5	3.9	1.7
24	Wembley	4.2	1.6	1.2	1.9	2.4	1.4	0.4	0.6	1.1	1.3	2.9	2.2	4.2	1.8
25	Pinto Creek	2.4	0.5	0.5	0.3	0.3	0.2	0.3	0.7	0.7	1.2	2.5	1.3	2.5	0.9
26	Flyingshot	5.3	1.8	1.0	0.8	0.6	0.7	0.3	0.8	0.9	2.2	3.5	2.8	5.3	1.7
27	Grande Prairie I	18.2	8.4	4.7	2.4	2.7	1.6	0.8	1.7	3.0	8.1	10.2	10.8	18.2	6.0
28	Clairmont Lake	3.5	1.4	0.6	1.0	0.8	1.2	0.5	0.9	1.5	1.3	3.3	1.9	3.5	1.5
29	Smoky Heights	4.1	1.4	0.7	0.3	0.6	0.4	0.3	0.4	0.7	0.8	2.3	1.8	4.1	1.2
30	Fitzsimmons	3.5	1.2	0.5	0.5	0.4	0.7	0.5	0.4	1.0	0.9	2.4	1.6	3.5	1.1
32	Gold Creek	7.1	4.6	2.1	1.3	1.0	0.6	0.8	1.0	1.2	1.7	5.1	4.7	7.1	2.6
33	Wapiti	4.3	1.7	0.6	0.7	0.4	0.6	0.5	1.2	1.1	1.1	2.9	2.4	4.3	1.5
34	Puskwaskau	1.4	0.6	0.3	0.2	0.2	0.2	0.2	BDL	0.2	0.4	0.8	1.0	1.4	0.5
35	Jean Cote	1.9	0.7	0.2	1.0	1.7	1.3	0.3	0.4	0.5	0.8	2.3	1.2	2.3	1.0
36	Guy	1.6	1.2	0.5	0.3	2.1	3.4	0.6	0.3	0.5	0.7	1.2	0.9	3.4	1.1
37	Crooked Creek	2.7	1.4	0.4	0.5	0.6	0.4	0.3	0.6	0.7	1.4	2.4	2.1	2.7	1.1
38	Karr Creek	2.8	1.9	0.6	0.5	0.3	0.5	0.3	0.5	0.6	1.1	1.4	1.2	2.8	1.0
39	Clouston Creek	2.1	1.3	0.6	0.2	0.8	1.1	0.2	0.4	0.6	0.6	1.3	1.2	2.1	0.9
40	McLennan	1.8	0.5	0.3	0.5	1.1	1.6	0.5	0.4	0.5	0.8	1.5	1.2	1.8	0.9
41	Valleyview	3.6	1.0	0.9	0.4	0.3	0.5	0.4	0.9	0.6	0.7	1.9	1.3	3.6	1.0
42	Sunset House	2.3	0.6	0.4	0.2	0.3	0.5	0.3	0.3	0.5	1.0	2.0	1.2	2.3	0.8
43	High Prairie	2.6	1.0	0.6	0.4	0.8	0.6	0.3	0.5	BDL	0.9	3.2	1.1	3.2	1.1
44	Peavine	1.3	0.4	0.2	0.1	BDL	0.1	BDL	BDL	0.2	0.4	0.8	0.7	1.3	0.5
45	Gift Lake	1.0	0.6	0.2	0.1	0.2	0.1	BDL	0.1	0.3	0.6	1.1	0.9	1.1	0.5
46	Little Smoky	6.0	3.3	1.0	0.9	0.8	0.9	0.6	0.9	1.7	3.0	4.8	3.9	6.0	2.3
47	Kinuso	2.2	0.8	0.7	0.3	0.2	0.2	0.3	0.5	0.4	0.6	1.7	0.8	2.2	0.7
48	Deer Mountain	1.6	0.7	0.4	0.3	0.1	0.2	0.3	0.2	0.5	0.5	1.5	0.5	1.6	0.6
49	Grande Prairie HP	15.2	10.4	4.4	2.0	1.5	1.1	0.9	2.1	4.2	5.3	8.7	11.3	15.2	5.6
62	East Prairie	1.0	0.3	0.4	0.2	0.3	BDL	0.1	BDL	0.3	0.5	0.8	0.4	1.0	0.4
Average		3.4	1.5	0.8	0.7	0.8	0.7	0.4	0.7	0.8	1.3	2.5	2.1		1.3
Peak		18.2	10.4	4.7	2.4	2.8	3.4	0.9	2.1	4.2	8.1	10.2	11.3	18.2	

BDL=Below Detection Limit (>0.03ppm); N/A=Sample not collected (damaged, missing, inaccessible, etc)

Table 48. O₃ Passive - 2016 Summary

MONITORING SITE		Ozone Passive (parts per billion)												MAXIMUM VALUE	ANNUAL AVERAGE
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
1	Silver Valley	31.2	44.7	56.5	37.5	36.8	N/S	22.6	15.2	23.4	22.5	27.9	35.3	56.5	32.1
2	Bay Tree	26.7	41.6	43.4	33.1	33.9	30.0	22.4	15.5	21.5	21.5	26.7	25.8	43.4	28.5
3	Forth Creek	32.8	40.1	49.9	39.7	42.7	32.0	27.4	N/S	26.5	24.1	32.5	41.9	49.9	35.4
4	Gordondale	33.5	40.3	45.6	43.0	36.1	29.6	22.4	16.8	25.9	30.1	33.0	29.9	45.6	32.2
5	Boone Creek	29.4	46.3	52.3	45.8	30.5	26.2	21.2	12.8	21.5	28.1	24.1	33.7	52.3	31.0
7	Steepprock Creek	39.4	42.5	56.5	43.5	39.2	29.3	26.0	14.2	23.2	23.1	28.9	33.2	56.5	33.3
9	Spirit River	32.3	37.6	47.4	37.1	36.3	29.2	21.1	14.8	26.3	28.6	25.2	33.1	47.4	30.7
10	Woking	31.4	40.5	49.7	34.6	33.1	28.5	23.6	13.5	23.2	27.6	19.5	37.7	49.7	30.3
11	Webber Creek	28.6	37.9	48.6	34.7	33.7	30.0	19.4	13.3	18.1	19.4	21.0	28.5	48.6	27.8
12	Hythe	28.5	45.3	54.4	36.0	32.8	30.2	18.7	14.1	22.3	24.4	18.0	30.3	54.4	29.6
14	Sylvester	25.3	34.7	43.3	28.2	26.9	26.3	16.6	11.3	16.0	25.9	19.8	37.5	43.3	26.0
16	Beaverlodge	34.4	40.9	54.0	46.6	35.2	32.7	29.0	18.9	27.4	26.3	24.4	31.5	54.0	33.4
17	Poplar	30.0	43.8	46.2	28.3	34.0	30.5	20.1	13.8	20.3	24.3	20.2	31.9	46.2	28.6
18	Saddle Hills	33.9	46.8	50.0	38.7	32.4	28.5	19.3	14.8	20.0	22.0	24.9	29.2	50.0	30.1
19	Wanham	36.4	47.5	48.2	40.0	45.3	36.5	27.5	19.0	25.0	26.6	28.9	39.3	48.2	35.0
20	Shaftesbury	32.3	41.0	44.3	36.8	42.1	29.3	27.2	14.0	22.2	21.7	23.6	34.5	44.3	30.7
21	Eaglesham	27.7	44.8	57.8	35.8	38.6	27.1	18.2	16.0	19.4	21.1	17.1	34.0	57.8	29.8
23	Bear Lake	33.7	56.0	59.2	36.9	27.5	31.8	21.2	12.3	20.3	23.1	23.4	32.9	59.2	31.5
24	Wembley	29.4	42.8	52.7	33.1	30.1	31.9	19.4	14.5	16.3	28.1	23.2	32.3	52.7	29.5
25	Pinto Creek	30.4	43.1	55.3	39.8	30.2	34.2	22.7	16.8	18.7	24.8	15.9	36.0	55.3	30.6
26	Flyingshot	23.6	40.1	46.6	37.5	27.8	34.5	23.1	12.3	17.4	16.6	15.6	29.7	46.6	27.1
27	Grande Prairie I	18.7	30.6	39.1	28.5	29.8	36.4	23.0	17.0	19.5	14.8	13.1	27.3	39.1	24.8
28	Clairmont Lake	39.4	46.7	57.1	39.8	32.1	32.9	18.1	15.3	21.6	24.8	22.6	34.7	57.1	32.1
29	Smoky Heights	30.8	44.0	56.1	41.8	32.8	34.0	30.4	19.8	29.8	20.9	19.3	30.4	56.1	32.5
30	Fitzsimmons	25.5	45.0	50.4	31.0	26.7	25.1	14.2	11.8	20.7	17.7	14.6	33.2	50.4	26.3
32	Gold Creek	14.4	25.5	34.3	28.2	27.5	24.0	17.9	9.9	14.8	16.5	10.6	23.6	34.3	20.6
33	Wapiti	25.6	44.3	53.5	40.6	27.6	27.9	24.6	16.7	22.6	22.5	20.4	34.4	53.5	30.1
34	Puskwaskau	26.6	34.1	42.9	31.2	27.2	21.6	15.7	9.4	17.7	16.3	15.2	26.4	42.9	23.7
35	Jean Cote	36.5	50.2	72.2	38.0	35.3	29.5	24.2	14.2	19.9	20.3	20.4	37.4	72.2	33.2
36	Guy	39.5	41.8	42.4	44.3	32.2	30.2	19.5	14.7	21.2	24.3	19.1	34.3	44.3	30.3
37	Crooked Creek	31.1	47.2	52.4	36.9	29.2	29.6	19.1	16.5	19.5	21.0	24.7	33.9	52.4	30.1
38	Karr Creek	27.4	31.6	37.5	21.9	25.0	28.3	18.9	12.0	15.8	14.5	15.4	25.3	37.5	22.8
39	Clouston Creek	36.7	35.0	50.4	43.7	33.9	30.1	20.3	13.3	21.7	23.5	23.3	33.8	50.4	30.5
40	McLennan	31.1	49.5	57.8	38.1	31.6	35.0	N/S	17.5	26.1	24.2	21.5	26.9	57.8	32.7
41	Valleyview	32.4	39.3	40.8	40.7	36.9	31.1	26.5	16.0	21.3	23.6	21.9	33.1	40.8	30.3
42	Sunset House	37.0	45.3	47.0	42.1	42.6	38.3	20.8	23.3	23.3	25.2	22.5	37.0	47.0	33.7
43	High Prairie	32.6	44.5	55.7	36.1	31.3	30.8	17.3	13.5	25.5	24.5	20.0	38.5	55.7	30.9
44	Peavine	28.9	43.6	47.6	33.6	29.7	25.6	18.4	11.9	17.9	19.7	18.2	33.0	47.6	27.4
45	Gift Lake	29.6	39.4	47.4	33.6	28.6	25.4	16.2	10.7	14.3	18.1	17.8	24.1	47.4	25.4
46	Little Smoky	23.0	36.6	45.7	37.1	29.8	28.0	19.0	17.3	15.2	13.8	15.9	25.9	45.7	25.6
47	Kinuso	30.8	37.5	36.7	38.6	29.5	27.8	21.1	15.0	21.3	23.9	22.1	35.6	38.6	28.3
48	Deer Mountain	30.9	40.3	42.3	42.0	26.7	26.6	18.7	14.0	19.1	22.7	18.0	32.6	42.3	27.8
49	Grande Prairie HP	17.7	26.6	40.5	39.3	28.7	36.0	25.4	18.5	20.4	17.3	11.0	22.0	40.5	25.3
62	East Prairie	23.2	38.1	37.4	34.4	28.7	28.4	19.6	12.3	19.7	16.8	19.6	34.2	38.1	26.0
Average		30.0	41.3	48.8	37.0	32.5	30.0	21.3	14.7	21.0	22.2	20.9	32.2		29.4
Peak		39.5	56.0	72.2	46.6	45.3	38.3	30.4	23.3	29.8	30.1	33.0	41.9	72.2	

BDL=Below Detection Limit (>0.01ppm); N/A=Sample not collected (damaged, missing, inaccessible, etc)

Table 49. H₂S Passive - 2016 Summary

MONITORING SITE		Hydrogen Sulphide Passive (parts per billion)												MAXIMUM VALUE	ANNUAL AVERAGE
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
1	Gift Lake	0.5	0.3	0.3	BDL	0.2	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.5	0.2
2	Girouxville 3	0.5	0.3	0.3	0.2	BDL	0.1	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.3
3	Girouxville 4	0.5	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.2	0.2	0.3	0.5	0.3
Average		0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	
Peak		0.5	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.5	

BDL=Below Detection Limit (>0.01ppm); N/A=Sample not collected (damaged, missing, inaccessible, etc)

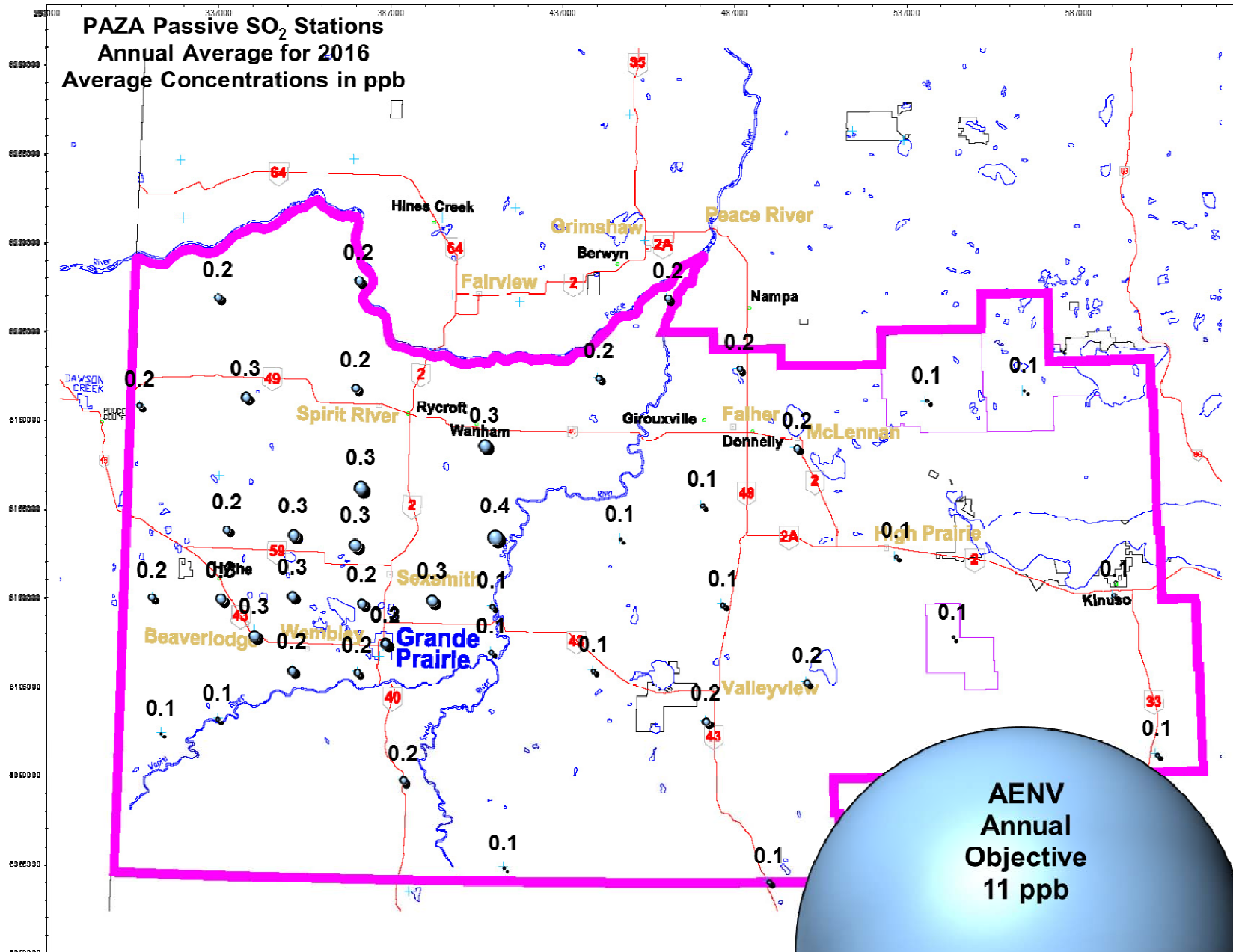


Figure 11. PAZA SO₂ Bubble Chart – 2016 Annual Average

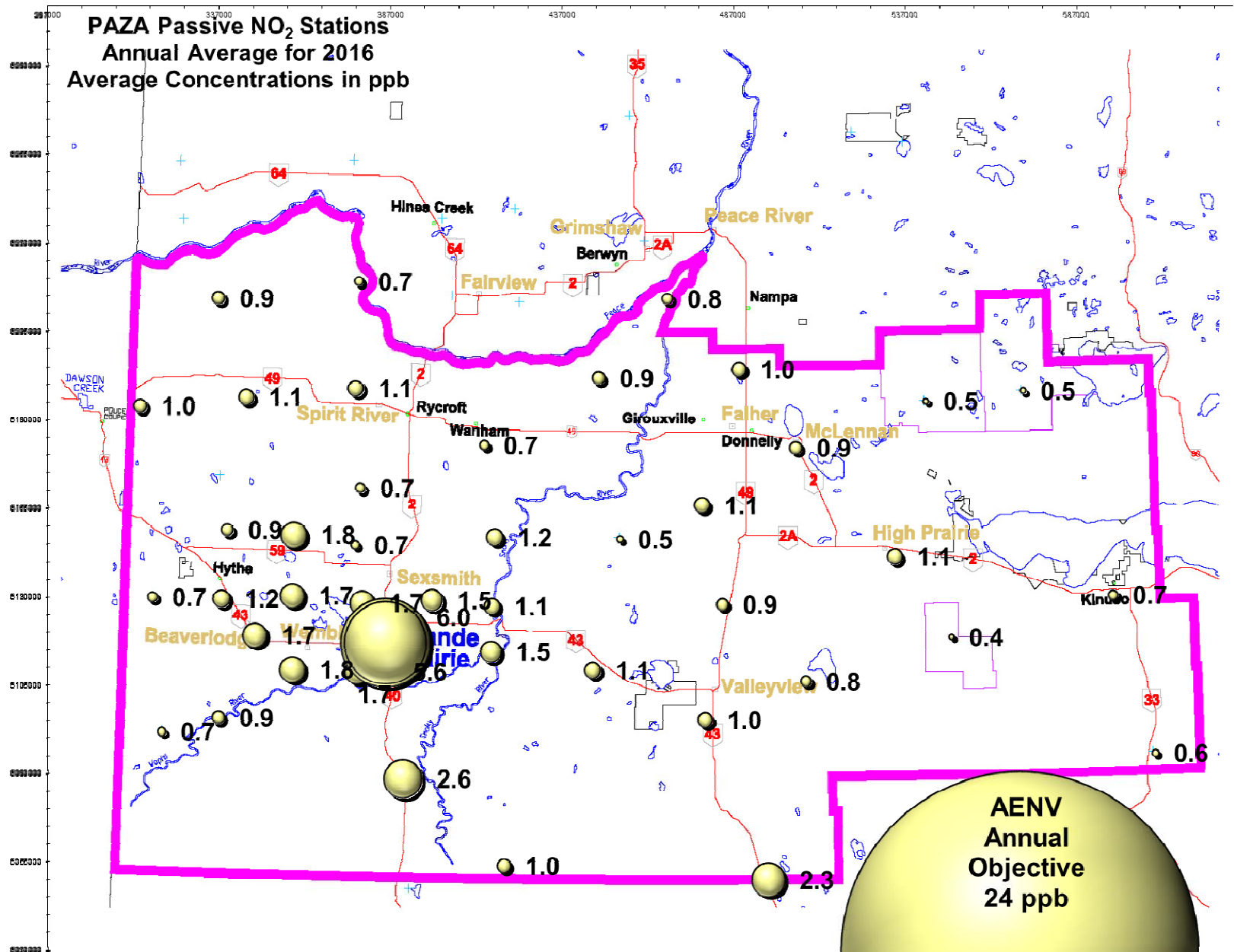


Figure 12. PAZA NO₂ Bubble Chart– 2016 Annual Average

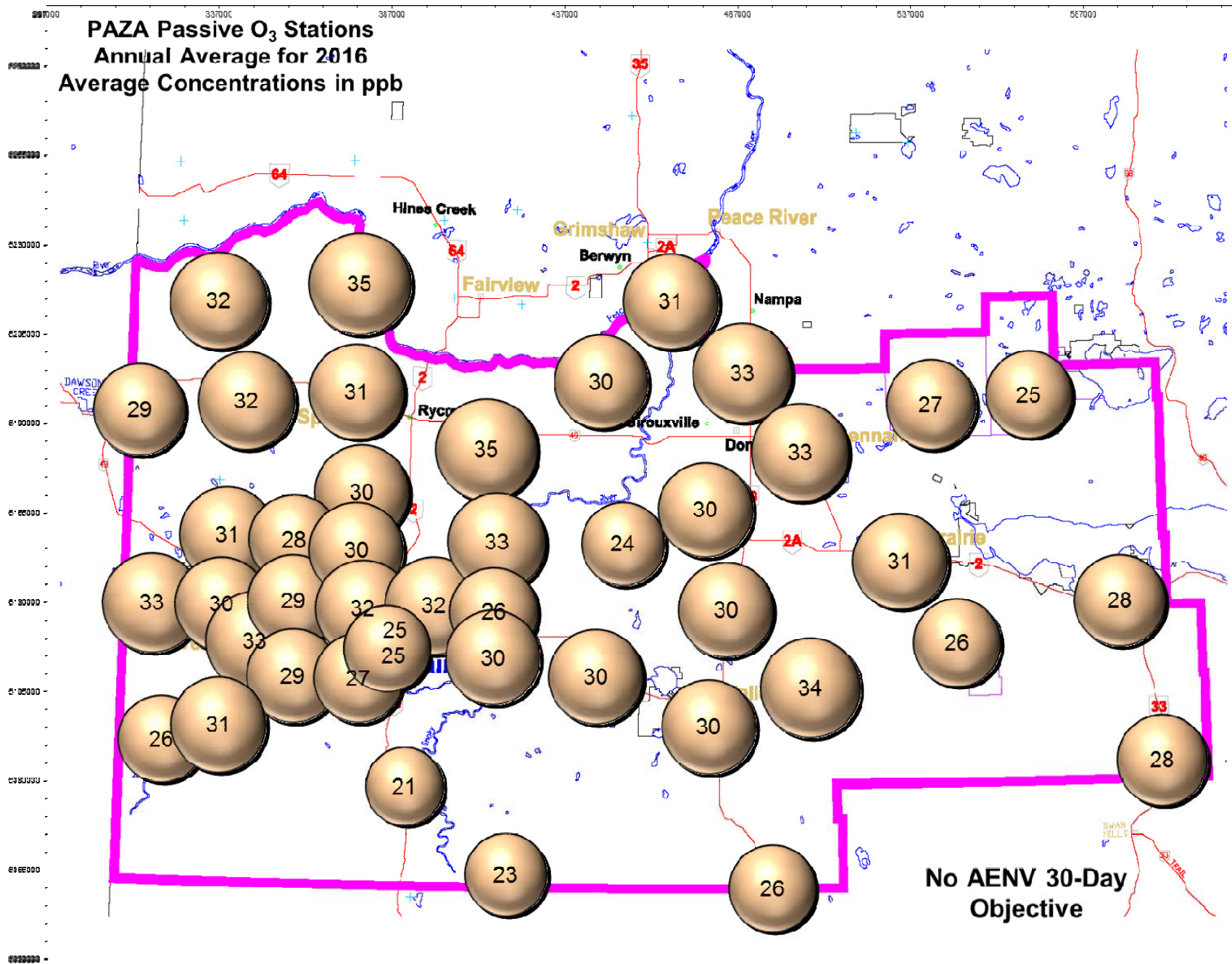


Figure 13. PAZA O₃ Bubble Chart – 2016 Annual Average

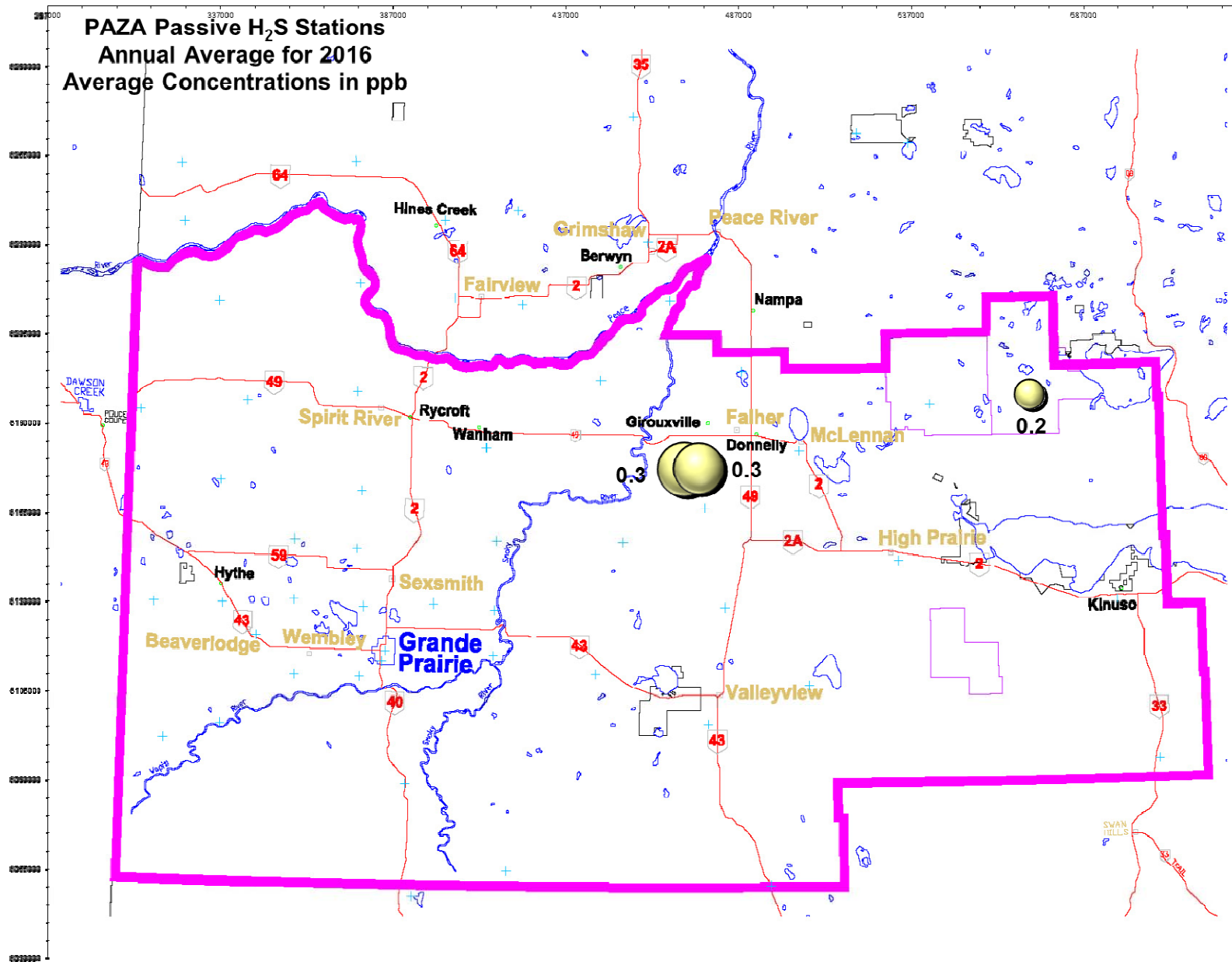


Figure 14. PAZA H₂S Bubble Chart – 2016 Annual Average