



## Knox County Health Department

140 Dameron Avenue, Knoxville, TN 37917

Brian Rivera, P.E.  
Division Director  
Air Quality  
Knox County Health Department  
140 Dameron Ave,  
Knoxville, TN 37917-6413

Oct 29, 2020

Re: Fourth Quarter Air Monitoring Audit

Dear Mr. Rivera:

On Oct. 21, 2020 – Oct 23, 2020 internal quality assurance performance audits were performed on Air Quality's monitoring network. All instruments were within acceptance criteria. Audit calculations, site evaluations, additional field notes and photos are included in the following audit report.

Each physical location was inspected, and a site evaluation performed. The new continuous monitor at Rule was found to be set too low for siting criteria. The Program Manager and Operator were notified and are working on a solution. Each site was well maintained. Small trees at the Ameristeel site may need to be trimmed to maintain 10 M dripline requirement and the Burnside tree continues to be right at the acceptable limit. The fire extinguishers were visibly inspected.

Logbooks were reviewed with the following deficiencies found:

- SN4006 (East Knox Ozone)– sticky form left mostly blank from 10/8 and skipped pages. Forms and logbooks should be filled out immediately after the activity. Blank spaces must be X'ed out to prevent backfilling. Auditor X'ed out blank pages.
- SN218920606 (Springhill 2025) no documentation of semi-annual maintenance (7/20)

The laboratory clean room was inspected. The filter preparation area was clean. The PM<sub>2.5</sub> storage temperature log was reviewed. Storage temperatures continue to exceed 4.1 °C at times. The exceedance did not affect any filters stored due to higher ambient run temperatures. Filters must be maintained at ≤ 4.0°C or ≤ the ambient temperature of the sampling event, in order to have 30 days to weigh the filters. The Program Manager and Operator have continued the increased defrosting and temperature checks. Additional temperature problems have been noted with shipping of filters.

If there are any questions regarding this audit, please email [Rebecca.Larocque@knoxcounty.org](mailto:Rebecca.Larocque@knoxcounty.org) or call 865-215-5941

*Rebecca Larocque*

**Rebecca Larocque**  
Environmental Specialist  
Knox County Health Department

Ozone Audit Calculations

Date: 10/21/2020  
 Site: Springhill

Audit SN: 179  
 Analyzer SN: 2013

Date: 10/22/2020  
 Site: East Knox

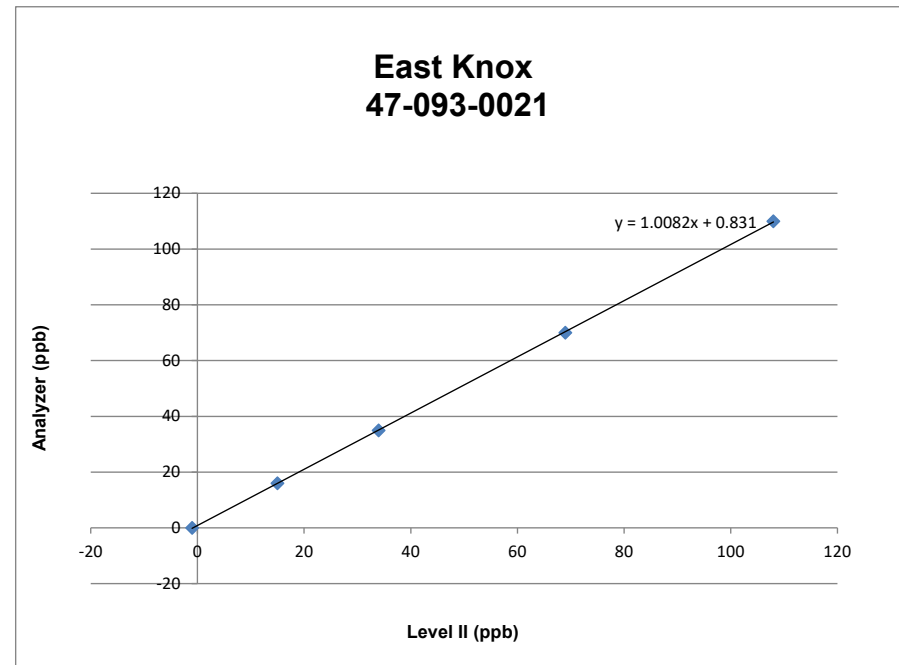
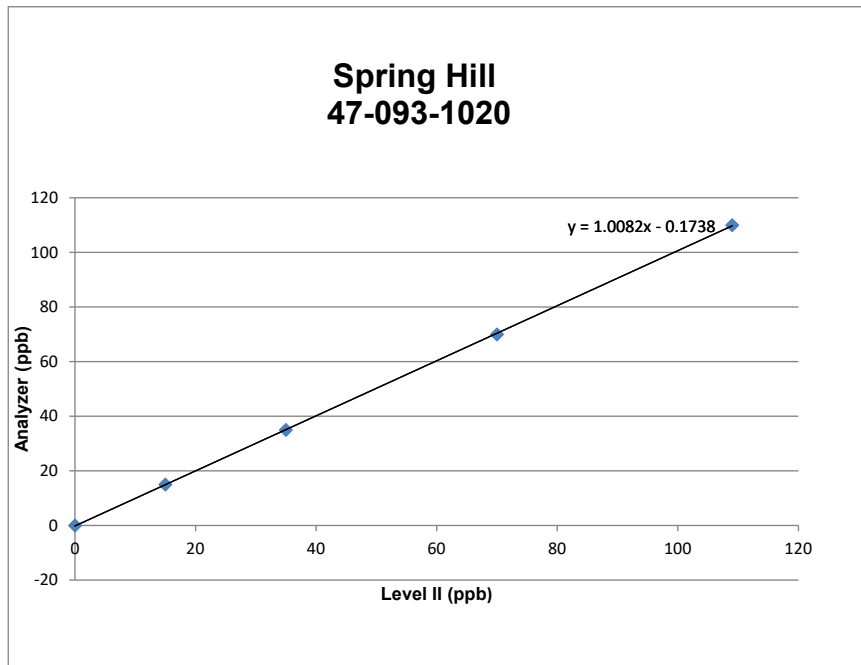
Audit SN: 179  
 Analyzer SN: 4006

Collection Time	Target	Analyzer	Audit Standard	Difference	% Difference
est	ppb	ppb	ppb	ppb	%
8:20:00 AM	110	109	110	-1.0	-0.91
8:30:00 AM	70	70	70	0.0	0.00
8:41:00 AM	35	35	35	0.0	0.00
8:51:00 AM	15	15	15	0.0	0.00
9:01:00 AM	0	0	0	0.0	N/A

Collection Time	Target	Analyzer	Audit Standard	Difference	% Difference
est	ppb	ppb	ppb	ppb	%
8:35:00 AM	110	108	110	-2.0	-1.82
8:45:00 AM	70	69	70	-1.0	-1.43
8:56:00 AM	35	34	35.0	-1.0	-2.86
9:06:00 AM	15	15	16.0	-1.0	-6.25
9:17:00 AM	0	-1	0.0	-1.0	NA

Slope 0.991868 correlation 0.999982  
 Intercept 0.17 R2 0.999964

Slope 0.991830 correlation 0.999982  
 Intercept -0.82 R2 0.999964



Notes: Pressure stable, no back pressure compensation performed

Notes: Pressure stable, no back pressure compensation performed. Brass cap on stainless port of calibrator. Replaced with stainless cap. Best to keep like with like to reduce damage. Logbook not fully filled out see photos.

PM 2.5 Audit Calculations

Reference device used for Audit: **Streamline Pro** Serial number : HL190706  
 Date of Certification: Jun-20

Date: 10/22/2020  
 Site: Bearden Official Monitor Serial number: 218940606

	units	System Value	Reference Value	Difference (S-R)	%	Acceptance Criteria
Time	hh:mm:ss	12:39:00 PM	12:39:21 PM	0:00:21		+/- 1 Min.
Filter T	°C	28.4	27.7	0.7		+/- 2° C
Ambient T	°C	25.4	26.4	-1		+/- 2° C
Pressure	mmHg	741	739	2		+/- 10 mmHg
Flow Rate	lpm	16.69	16.79	-0.1	-0.6%	+/- 4%

Notes: LC 8 mmHg,

Date: 10/22/2020  
 Site: Bearden Collocated Monitor Serial number: 218930606

	units	System Value	Reference Value	Difference (S-A)	%	Acceptance Criteria
Time	hh:mm:ss	12:57:00 PM	12:57:03 PM	0:00:03		+/- 1 Min.
Filter T	°C	29.4	29.3	0.1		+/- 2° C
Ambient T	°C	27.1	28	-0.9		+/- 2° C
Pressure	mmHg	737	739	-2		+/- 10 mmHg
Flow Rate	lpm	16.61	16.78	-0.17	-1.0%	+/- 4%

Notes:LC 6 mmHg

Date: 10/23/2020  
 Site: Springhill Monitor Serial number: 218920606

	units	System Value	Reference Value	Difference (S-A)	%	Acceptance Criteria
Time	hh:mm:ss	8:12:00 AM	8:12:03 AM	0:00:03		+/- 1 Min.
Filter T	°C	15.3	16.2	-0.9		+/- 2° C
Ambient T	°C	16.8	17.4	-0.6		+/- 2° C
Pressure	mmHg	735	737	-2		+/- 10 mmHg
Flow Rate	lpm	16.7	16.74	-0.04	-0.2%	+/- 4%

Notes: LC 6 -  
 Logbook Semi-  
 Annual  
 maintenance not  
 recorded.

Date: 10/23/2020  
 Site: Rule Monitor Serial number: 226541005

	units	System Value	Reference Value	Difference (S-A)	%	Acceptance Criteria
Time	hh:mm:ss	9:07:00 AM	9:06:44 AM	0:00:16		+/- 1 Min.
Filter T	°C	18.8	19.8	-1		+/- 2° C
Ambient T	°C	20	20.1	-0.1		+/- 2° C
Pressure	mmHg	735	736	-1		+/- 10 mmHg
Flow Rate	lpm	16.72	16.75	-0.03	-0.2%	+/- 4%

Notes:LC 3mmHg

Date: 10/23/2020  
 Site: AirLab Monitor Serial number: 225760909

	units	System Value	Reference Value	Difference (S-A)	%	Acceptance Criteria
Time	hh:mm:ss	10:13:00 AM	10:13:21 AM	0:00:21		+/- 1 Min.
Filter T	°C	22.8	23.6	-0.8		+/- 2° C
Ambient T	°C	22.3	23.2	-0.9		+/- 2° C
Pressure	mmHg	735	738	-3		+/- 10 mmHg
Flow Rate	lpm	16.7	16.78	-0.08	-0.5%	+/- 4%

Notes:LC 3mmHg

PM 2.5 Audit Calculations

Reference device used for Audit: SLP

Serial number : HL190706  
Date of Certification: 6/19/2020

Date: 10/23/2020  
Site: AirLab

Monitor Serial number: 192

T640 X

	Units	System	Reference	Difference	%	Criteria
Time	hh:mm:ss	9:45:33 AM	9:45:00 AM	0:00:33		+/- 1 Min.
Shelter T	°C	26	26	0		+/- 2° C
Amb T	°C	21.8	22.5	-0.7		+/- 2° C
Pressure	mmHg	736.7	738.4	-1.7		+/- 10mmHg
Total Flow	lpm	16.73	16.87	-0.14	-0.829875519	+/- 4 %
MainFlow	lpm	5.03	4.93	0.1	2.028397566	+/- 4 %

Notes: LC 0.0/0.0  
SN140793699 shelter  
thermometer, Blank  
spaces in log book.

Date: 10/23/2020  
Site: Rule

Monitor Serial number: SN675

	Units	System	Reference	Difference	%	Criteria
Time	hh:mm:ss	8:47:50 AM	8:47:04 AM	0:00:46		+/- 1 Min.
Shelter T	°C	23	21	2		+/- 2° C
Amb T	°C	18.9	19	-0.1		+/- 2° C
Pressure	mmHg	734.1	736.1	-2		+/- 10mmHg
Flow Rate	lpm	4.95	5.1	-0.15	-2.941176471	+/- 4 %

Notes: LC 0.0, Shelter  
Thermometer  
SN99287906

Date: \_\_\_\_\_  
Site: \_\_\_\_\_

Monitor Serial number: \_\_\_\_\_

	Units	System	Reference	Difference	%	Criteria
Time	hh:mm:ss			0:00:00		+/- 1 Min.
Shelter T	°C			0		+/- 2° C
Amb T	°C			0		+/- 2° C
Pressure	mmHg			0		+/- 10mmHg
Flow Rate	lpm			0	#DIV/0!	+/- 4 %

Notes:

Date: \_\_\_\_\_  
Site: \_\_\_\_\_

Monitor Serial number: \_\_\_\_\_

	Units	System	Reference	Difference	%	Criteria
Time	hh:mm:ss			0:00:00		+/- 1 Min.
Shelter T	°C			0		+/- 2° C
Amb T	°C			0		+/- 2° C
Pressure	mmHg			0		+/- 10mmHg
Flow Rate	lpm			0	#DIV/0!	+/- 4 %

Notes:

Date: \_\_\_\_\_  
Site: \_\_\_\_\_

Monitor Serial number: \_\_\_\_\_

	Units	System	Reference	Difference	%	Criteria
Time	hh:mm:ss			0:00:00		+/- 1 Min.
Shelter T	°C			0		+/- 2° C
Amb T	°C			0		+/- 2° C
Pressure	mmHg			0		+/- 10mmHg
Flow Rate	lpm			0	#DIV/0!	+/- 4 %

Notes:

Lead Audit Calculations

Reference device used for Audit: Hivol cal

Serial number : 96  
Date of Certification: 4/7/2020

Date: 10/22/2020 Bar Press 738.8 mmHg  
Monitor ID: P2875 Temp 27.7 °C  
Site: Burnside Official

**Qa CFM**

	Stag Press: <u>27.6</u> inH2O
39.72	Pa: <u>51.5568</u> mmHg
39.76	Po/Pa: <u>0.930215</u> unitless
39.71	Flow <u>1.13</u> (from table)
39.61	%D: <u>0.89%</u> {Flow- Qa/Qa}x 100
39.6	% D Design <u>-0.88%</u> {Qa - 1.13/1.13}
39.69	
39.47	
39.08	
39.29	
39.42	

39.54 CFM  
1.120 m<sup>3</sup>/min

Date: 10/22/2020 Bar Press 738.5 mmHg  
Monitor ID: P-4302 Temp 29.3 °C  
Site: Burnside Colloc

**Qa CFM**

	Stag Press: <u>28</u> inH2O
40.08	Pa: <u>52.304</u> mmHg
40.13	Po/Pa: <u>0.929175</u> unitless
40.13	Flow <u>1.137</u> (from table)
40.14	%D: <u>0.22%</u> {Flow- Qa/Qa}x 100
40.14	% D Design <u>0.40%</u> {Qa - 1.13/1.13}
40.12	
39.96	
39.91	
39.93	
40.11	

40.07 CFM  
1.135 m<sup>3</sup>/min

Date: 10/22/2020 Bar Press 738 mmHg  
Monitor ID: P-4304 Temp 31.2 °C  
Site: Ameristeel

**Qa CFM**

	Stag Press: <u>27.2</u> inH2O
40.54	Pa: <u>50.8096</u> mmHg
40.59	Po/Pa: <u>0.931152</u> unitless
40.59	Flow <u>1.152</u> (from table)
40.56	%D: <u>0.39%</u> {Flow- Qa/Qa}x 100
40.55	% D Design <u>1.55%</u> {Qa - 1.13/1.13}
40.53	
40.51	
40.52	
40.37	
40.48	

40.52 CFM  
1.148 m<sup>3</sup>/min

Notes: Burnside collocated Po/Pa off the chart, extrapolated the value. Higher pressure filters

Speciation Audit Calculations

Reference device used for Audit: **SLP**

Serial number : HL190706

Date of Certification: 6/19/2020

Leak Test		
	Pass	Fail
URG 3000	0	
SASS Channel 1	0	
SASS Channel 2	0	

Pressure {Ambient}			
	System	Reference	Difference
URG 3000N	738.5	740.9	-2.40
SASS	739	741	-2.00

Flow Rate

	System	Reference	% Difference
URG 3000N	22.02	21.89	0.59%
SASS channel 1	6.6	6.6	0.00%
SASS Channel 2	6.7	6.6	1.52%

Temperature

	System	Reference	Difference
URG 3000N Ambient	15.5	15.5	0.00
SASS ambient	14.7	15.2	-0.50
SASS filter channel 1	15	15.4	-0.40
SASSfilter Channel 2	15	15.2	-0.20

55

9-28-20 DC 8:22 EST Parameter Check, FHX, ZPS

Operator		Acceptable Range	Sample Flow		Acceptable Range
Operator		NA	720 - 880 cc/min		837
Date		9-28-20	Sample Temp.		10 - 50 °C
Time (DL)		± 2 min of NIST	Photo. Lamp		57 - 59 °C
O3 Meas.		2500 - 4800 mV	Box Temp.		10 - 50 °C
O3 Ref.		2500 - 4800 mV	Slope		0.85 - 1.15
Pressure		~2 inHg Ambient	Offset		-10.0 → +10.0 ppb
Shelter Temp.		15 - 35 °C	Changed External Inline Filter		1st Silica Gel ≥ 25% Blue?
Min. / Max		(RESET) Max.			

Operator: D. Colvin  
 Date: 9-28-20  
 Logger Disable: 9:00 EST  
 Logger Enable: 9:48 EST  
 (Circle one) Pass Fail

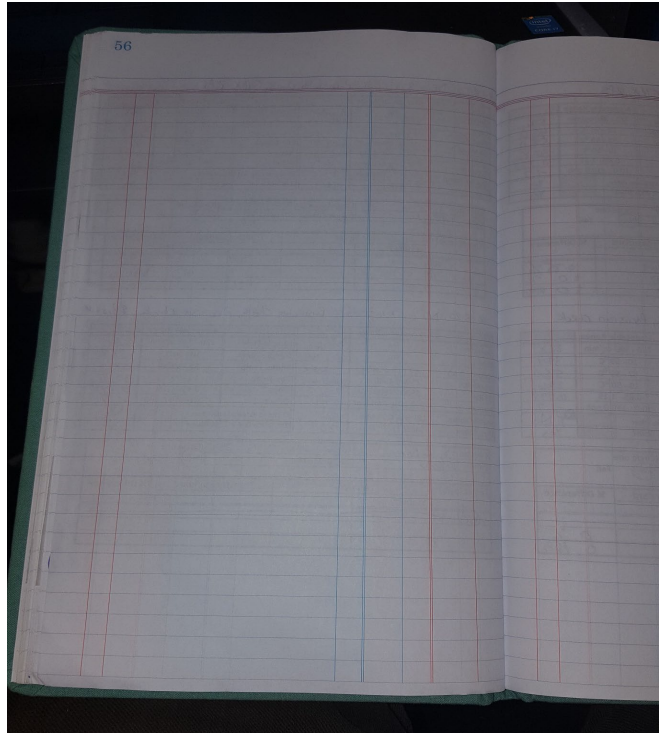
Target (ppb)	Stability	Analyzer	Transfer Standard	% Difference
400	0.9	398	407	-0.75
70	0.7	70	71	-1.41
0	0.2	-1	-1	0

10-8-20 DC 7:45 EST Parameter Check, Precision Check, Silica

Operator		Acceptable Range	Sample Flow		Acceptable Range
Operator		NA	720 - 880 cc/min		830
Date		10-8-20	Sample Temp.		10 - 50 °C
Time (DL)		± 2 min of NIST	Photo. Lamp		57 - 59 °C
O3 Meas.		2500 - 4800 mV	Box Temp.		10 - 50 °C
O3 Ref.		2500 - 4800 mV	Slope		0.85 - 1.15
Pressure		~2 inHg Ambient	Offset		-10.0 → +10.0 ppb
Shelter Temp.		15 - 35 °C	Changed External Inline Filter		1st Silica Gel ≥ 25% Blue?
Min. / Max		(RESET) Max.			

Operator: D. Colvin  
 Date: 10-8-20  
 Logger Disable: 7:45 EST  
 Logger Enable:  
 (Circle one) Pass Fail

Target (ppb)	Stability	Analyzer	Transfer Standard	% Difference
400				
70				
0				



SN218920606 (Springhill 2025)

Maintenance Criteria				
Monthly Includes:	Clean Pm10 Inlet, First stage Inlet and VSCC. Perform Clock, Temp Pressure and Flow QC check and external leak check			Dates recorded on Verification Sticky
Quarterly:	Inspect V Seals, O-rings, and clean down tube			
	Date Performed	Date Due	Date Performed	Date Due
Q1	3-11-20	3/20	Q3	9-2-20
Q2	6-3-20	6/20	Q4	12/20
Bi-Annually	Exchange particulate trap filter, replace batteries.		Clean air filters	
	Date Performed	Date Due	Date Performed	Date Due
1	2-12-20	2/20	2	7/20
Annually:	Date Performed	Date Due	Other	
Calibration	7-15-20	7/20	Date Performed	
			Pump Rebuild	

Site Name: Air Lab  
 AQSNo: 47-093-1013  
 Coordinate 35.980756, -83.925802

Date: 10/23/2020  
 Site Address: 939 Stewart St  
 Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height <sup>1</sup>	Flow (hi or Low)	Separation from samplers <sup>1</sup>	Pass/Fail	Distance to Road <sup>1</sup>	Pass/Fail
PM2.5 filter based	Middle	4.6	low	1.7	Pass	15.3	Pass
PM 2.5/10 continuous	Middle	4.8	low			15.8	Pass

Obstruction type <sup>2</sup>	Obst. Height <sup>1</sup>	Obst. Distance <sup>1,2</sup>	Pass/Fail	Tree	
				Dripline <sup>1</sup>	Pass/ Fail
Closest Tree (E)	15M	25M	Pass	17.5M	Pass

<sup>1</sup> All Measurements in meters  
<sup>2</sup> Including vertical and horizontal separation from walls &/or parapets if applicable

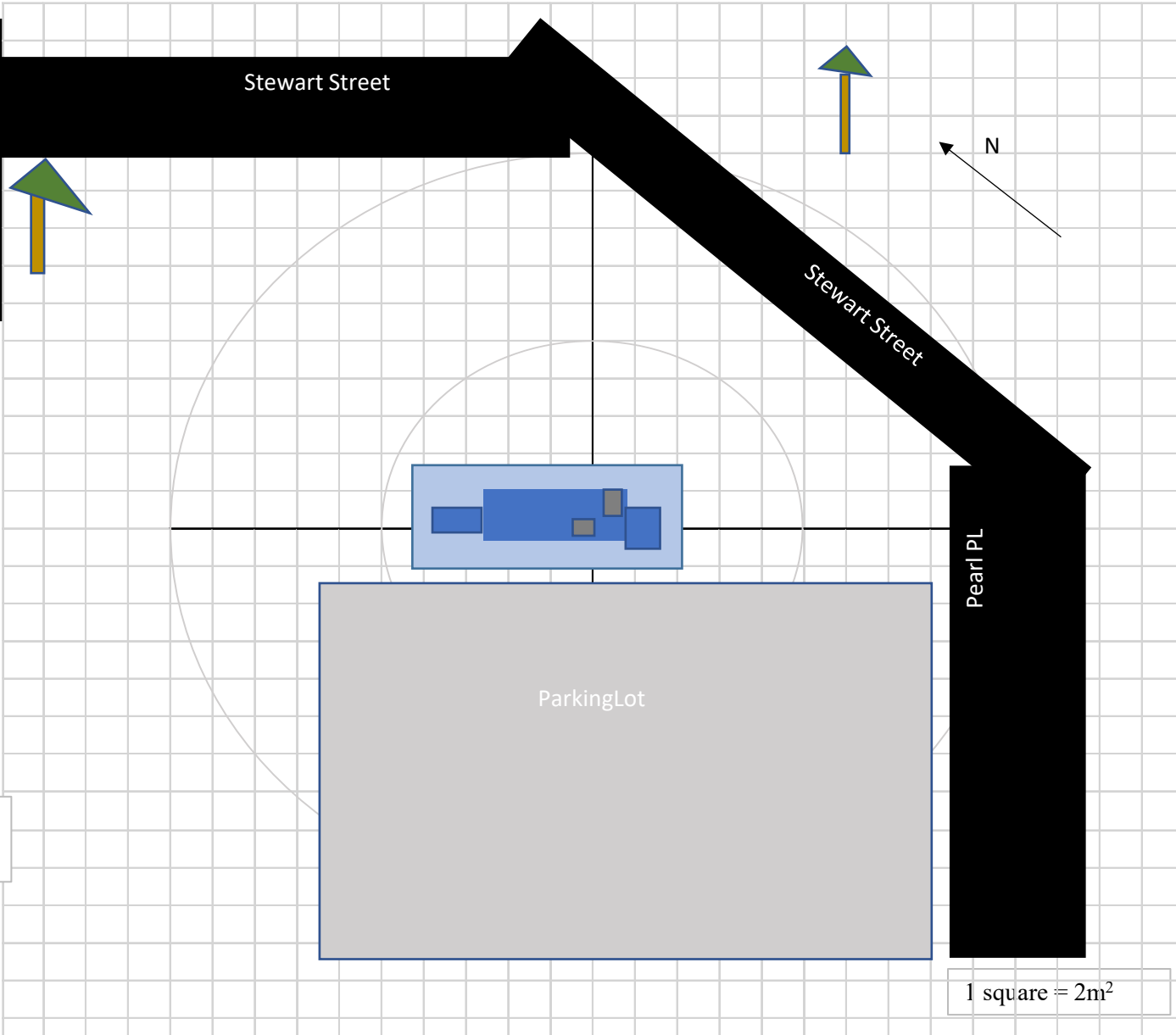
Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume  
 Obstruction Distance must be  $\geq 2 * (\text{Obst height} - \text{probe height})$   
 Tree Dripline must be >10 m away, prefer >20m  
 Horizontal and vertical distance on rooftop 1m for O<sub>3</sub>/gases - 2m for all others  
 Unrestricted air flow must be  $\geq 270^\circ$



Site Drawing

Estimated Degree of Unrestricted Air Flow: 360°

- Indicate:
- North
  - Shelter
  - Probe Postic
  - Nearby trees
  - Roadways
  - Buildings
  - Other Obstructions
  - Source if Applicable



Primary Wind  
Direction : 220° SSW

Photos facing out from monitor to cardinal direction

North



South



East



West



Photos from cardinal direction facing in towards monitor

North



South



East



West





Site Name: Ameristeel  
 AQSNo: 47-093-0023  
 Coordinates: 35.98102, -83.9544

Date: 10/22/2020  
 Site Address: 1526 New York Ave  
 Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height <sup>1</sup>	Flow (hi or Low)	Separation from samplers <sup>1</sup>	Pass/Fail	Distance to Road <sup>1</sup>	Pass/Fail
Lead	Microscale	4.8M	Hi	N/A		12.8M	Pass

Obstruction type <sup>2</sup>	Obst. Height <sup>1</sup>	Obst. Distance <sup>1,2</sup>	Pass/Fail	Tree	
				Dripline <sup>1</sup>	Pass/ Fail
Small trees NNE	4.9M	12.4M	Pass	11M	Pass
Large Tree SW	15.8M	34.4M	Pass	>20M	Pass

<sup>1</sup> All Measurements in meters

<sup>2</sup> Including vertical and horizontal separation from walls &/or parapets if applicable

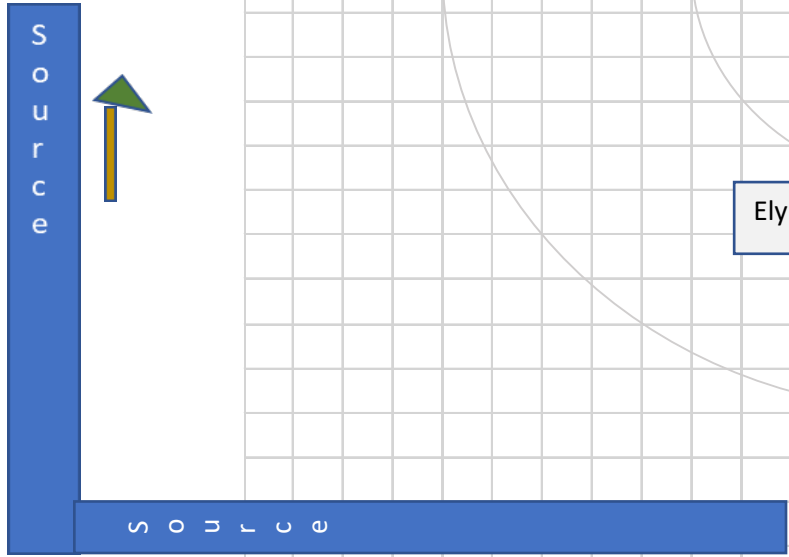
Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume  
 Obstruction Distance must be  $\geq 2 \times$  (Obst height - probe height)  
 Tree Dripline must be >10 m away, prefer >20m  
 Horizontal and vertical distance on rooftop 1m for O<sub>3</sub>/gases - 2m for all others  
 Unrestricted air flow must be  $\geq 270^\circ$

**Site Drawing**

Estimated Degree of Unrestricted Air Flow: 360°

- Indicate:
- North
  - Shelter
  - Probe Postions
  - Nearby trees
  - Roadways
  - Buildings
  - Other Obstructions
  - Source if Applicable

Primary Wind  
Direction : 220° SSW



Photos facing out from monitor to cardinal direction

North



South



East



West



Photos from cardinal direction facing in towards monitor

North



South



East



West







Site Name: Bearden  
 AQSNo: 47-093-0028  
 Coordinate 35.94195, -84.035

Date: 10/22/2020  
 Site Address: 1000 Francis Street  
 Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height <sup>1</sup>	Flow (hi or Low)	Separation from samplers <sup>1</sup>	Pass/Fail	Distance to Road <sup>1</sup>	Pass/Fail
PM2.5	Neighborhood	2.44	Low	2.5	Pass	39.6	Pass
PM2.5 collocate	Neighborhood	2.44	Low			41.5	Pass

Obstruction type <sup>2</sup>	Obst. Height <sup>1</sup>	Obst. Distance <sup>1,2</sup>	Pass/Fail	Tree	
				Dripline <sup>1</sup>	Pass/ Fail
Tallest Tree ENE	11.2M	20M	Pass	18M	Pass
Tallest Tree S	13.7M	26.4M	Pass	>20M	Pass
Tallest TreeSSW	16M	29M	Pass	>20M	Pass
Tallest Tree NNW	10M	18.4M	Pass	17.2M	Pass

<sup>1</sup> All Measurements in meters

<sup>2</sup> Including vertical and horizontal separation from walls &/or parapets if applicable

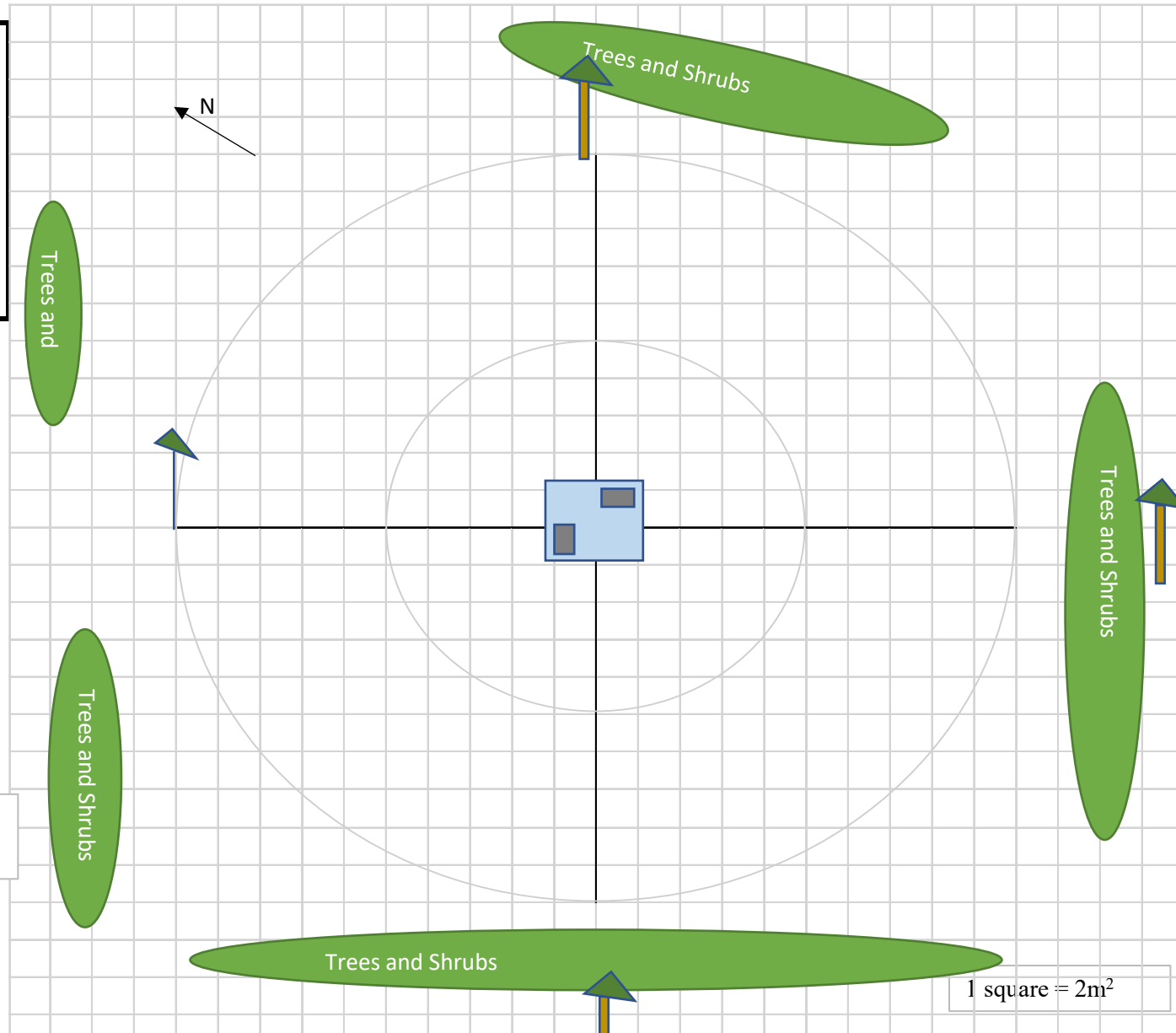
Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume  
 Obstruction Distance must be  $\geq 2 * (\text{Obst height} - \text{probe height})$   
 Tree Dripline must be >10 m away, prefer >20m  
 Horizontal and vertical distance on rooftop 1m for O<sub>3</sub>/gases - 2m for all others  
 Unrestricted air flow must be  $\geq 270^\circ$

Site Drawing

Estimated Degree of Unrestricted Air Flow: 360°

- Indicate:
- North
  - Shelter
  - Probe Postions
  - Nearby trees
  - Roadways
  - Buildings
  - Other Obstructions
  - Source if Applicable

Primary Wind Direction : 220° SSW



Photos facing out from monitor to cardinal direction

North



South



East



West



Photos from cardinal direction facing in towards monitor

North



South



East



West





Site Name: Burnside  
 AQSNo: 47-093-0027  
 Coordinate 35.98306, -83.9523

Date: 10/22/2020  
 Site Address: 2522 Burnside St, 37921  
 Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height <sup>1</sup>	Flow (hi or Low)	Separation from samplers <sup>1</sup>	Pass/Fail	Distance to Road <sup>1</sup>	Pass/Fail
Lead - Official	Neighborhood	2M	Hi	2.56M	Pass	24.0M	Pass
Lead Collocated	Neighborhood	2M	Hi	2.56M	Pass	23.8M	Pass

Tree					
Obstruction type <sup>2</sup>	Obst. Height <sup>1</sup>	Obst. Distance <sup>1,2</sup>	Pass/Fail	Dripline <sup>1</sup>	Pass/ Fail
Tree SW quadrant	20	18		10.5	Pass
Firehouse	6.2	26.2	Pass		

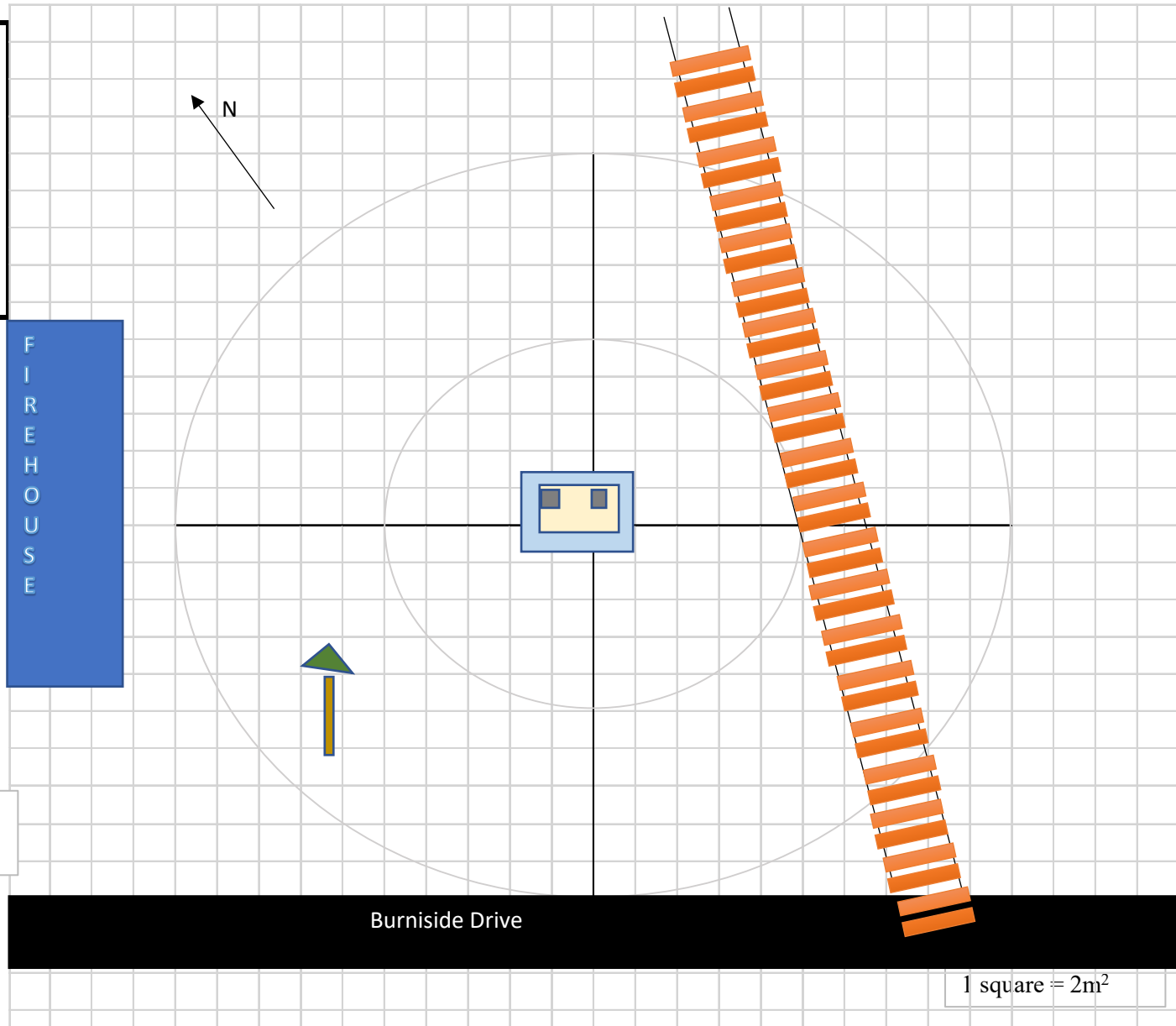
<sup>1</sup> All Measurements in meters  
<sup>2</sup> Including vertical and horizontal separation from walls &/or parapets if applicable

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume  
 Obstruction Distance must be  $\geq 2 * (\text{Obst height} - \text{probe height})$   
 Tree Dripline must be  $>10$  m away, prefer  $>20$ m  
 Horizontal and vertical distance on rooftop 1m for O<sub>3</sub>/gases - 2m for all others  
 Unrestricted air flow must be  $\geq 270^\circ$

Site Drawing

Estimated Degree of Unrestricted Air Flow: 270°

- Indicate:
- North
  - Shelter
  - Probe Postions
  - Nearby trees
  - Roadways
  - Buildings
  - Other Obstructions
  - Source if Applicable



Primary Wind  
Direction : 220° SSW

Burnside Drive

1 square = 2m<sup>2</sup>



Photos facing out from monitor to cardinal direction

North



South



East



West



Photos from cardinal direction facing in towards monitor

North



South



East



West





Site Name: East Knox  
 AQSNo: 47-093-0021  
 Coordinate 36.0855,-83.7649

Date: 10/22/2020  
 Site Address: 9315 Rutledge Pike  
 Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height <sup>1</sup>	Flow (hi or Low)	Separation from samplers <sup>1</sup>	Pass/Fail	Distance to Road <sup>1</sup>	Pass/Fail
Ozone	Urban	4M	Low	n/a		180M	Pass

Obstruction type <sup>2</sup>	Obst. Height <sup>1</sup>	Obst. Distance <sup>1,2</sup>	Pass/Fail	Tree	
				Dripline <sup>1</sup>	Pass/ Fail
Pine West	18.2M	34.4M	Pass	>20M	Pass
Tallest Pine WSW	18.6M	31M	Pass	>20 M	Pass
Smaller closer brush	6M	15M	Pass	13.4	Pass
This site should be monitored for tree growth carefully, keep smaller brush maintained					

<sup>1</sup> All Measurements in meters

<sup>2</sup> Including vertical and horizontal separation from walls &/or parapets if applicable

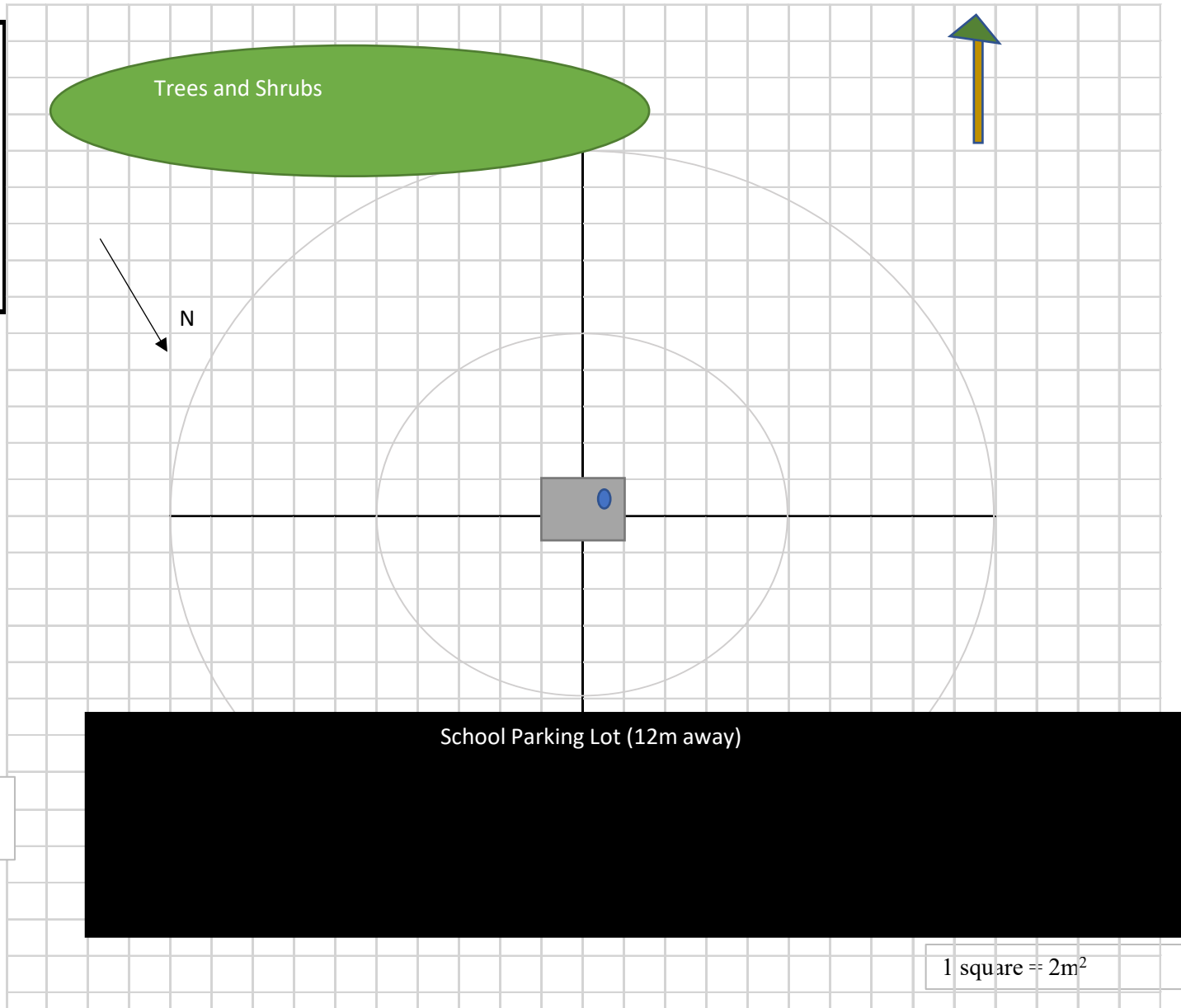
Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume  
 Obstruction Distance must be  $\geq 2 \times$  (Obst height - probe height)  
 Tree Dripline must be >10 m away, prefer >20m  
 Horizontal and vertical distance on rooftop 1m for O<sub>3</sub>/gases - 2m for all others  
 Unrestricted air flow must be  $\geq 270^\circ$

**Site Drawing**

Estimated Degree of Unrestricted Air Flow:

310

- Indicate:
- North
  - Shelter
  - Probe Postions
  - Nearby trees
  - Roadways
  - Buildings
  - Other Obstructions
  - Source if Applicable



Primary Wind  
Direction : 220° SSW

Photos facing out from monitor to cardinal direction

North



South



East



West



Photos from cardinal direction facing in towards monitor

North



South



East



West







Site Name: Rule  
 AQSNo: 47-093-1017  
 Coordinate 35.97773, -83.9504

Date: 10/23/2020  
 Site Address: 1613 vermont Ave  
 Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height <sup>1</sup>	Flow (hi or Low)	Separation from samplers <sup>1</sup>	Pass/Fail	Distance to Road <sup>1</sup>	Pass/Fail
Pm2.5	Neighborhood	2.36M	Low	n/a		>42M	Pass
PM2.5 continuous	Neighborhood	1.83	Low	3.5M	Pass	> 42 M	Pass

Obstruction type <sup>2</sup>	Obst. Height <sup>1</sup>	Obst. Distance <sup>1,2</sup>	Pass/Fail	Tree	
				Dripline <sup>1</sup>	Pass/ Fail
WaterTower	23.4M	65.2M	Pass		
Tallest tree W	9.2M	32M	Pass	>20M	Pass

<sup>1</sup> All Measurements in meters

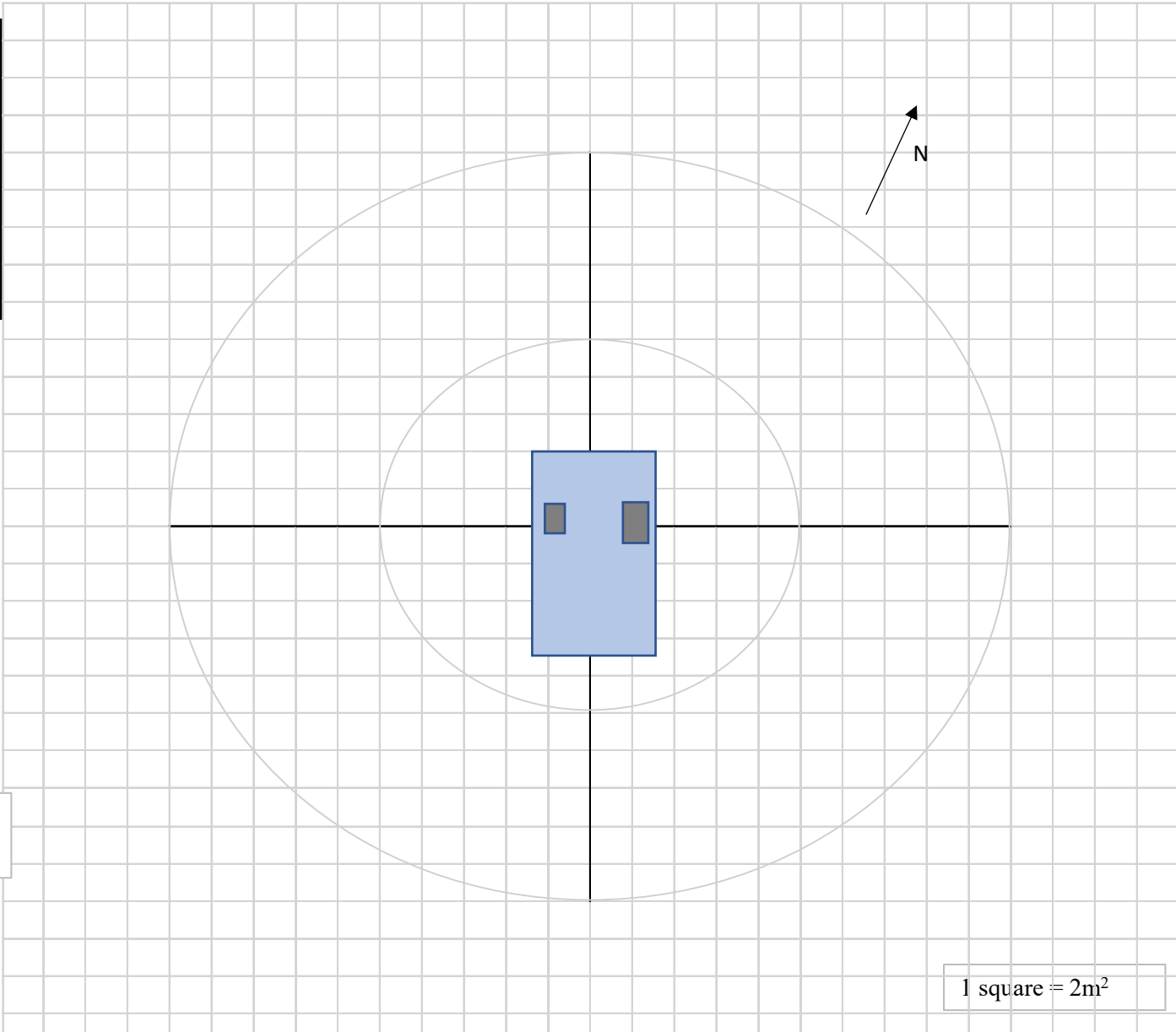
<sup>2</sup> Including vertical and horizontal separation from walls &/or parapets if applicable

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume  
 Obstruction Distance must be  $\geq 2 * (\text{Obst height} - \text{probe height})$   
 Tree Dripline must be >10 m away, prefer >20m  
 Horizontal and vertical distance on rooftop 1m for O<sub>3</sub>/gases - 2m for all others  
 Unrestricted air flow must be  $\geq 270^\circ$

**Site Drawing**

Estimated Degree of Unrestricted Air Flow: 360°

- Indicate:
- North
- Shelter
- Probe Postions
- Nearby trees
- Roadways
- Buildings
- Other Obstructions
- Source if Applicable



Primary Wind  
Direction : 220° SSW

Photos facing out from monitor to cardinal direction

North



South



East



West



Photos from cardinal direction facing in towards monitor

North



South



East



West





Site Name: Springhill  
 AQSNo: 47-093-1020  
 Coordinate 36.0114, -83.8739

Date: 10/21/2020  
 Site Address: 4711 Mildred Drive  
 Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height <sup>1</sup>	Flow (hi or Low)	Separation from samplers <sup>1</sup>	Pass/Fail	Distance to Road <sup>1</sup>	Pass/Fail
Ozone	Neighborhood	4.3	Low	2.1	Pass	36.2	Pass
PM2.5	Neighborhood	4.6	Low	1.3	Pass	37.8	Pass
URG Speciation	Neighborhood	4.6	Low	1.3	Pass	36.2	Pass
SASS speciation	Neighborhood	4.4	Low	1.5	Pass	36.2	Pass

Obstruction type <sup>2</sup>	Obst. Height <sup>1</sup>	Obst. Distance <sup>1,2</sup>	Pass/Fail	Tree	
				Dripline <sup>1</sup>	Pass/ Fail
Tree NE	16.4	24.6	Pass	19M	Pass
Tallest Pine E	21.6	28		19.4M	Pass
small brush measured to fence				13M	Pass

<sup>1</sup> All Measurements in meters  
<sup>2</sup> Including vertical and horizontal separation from walls &/or parapets if applicable

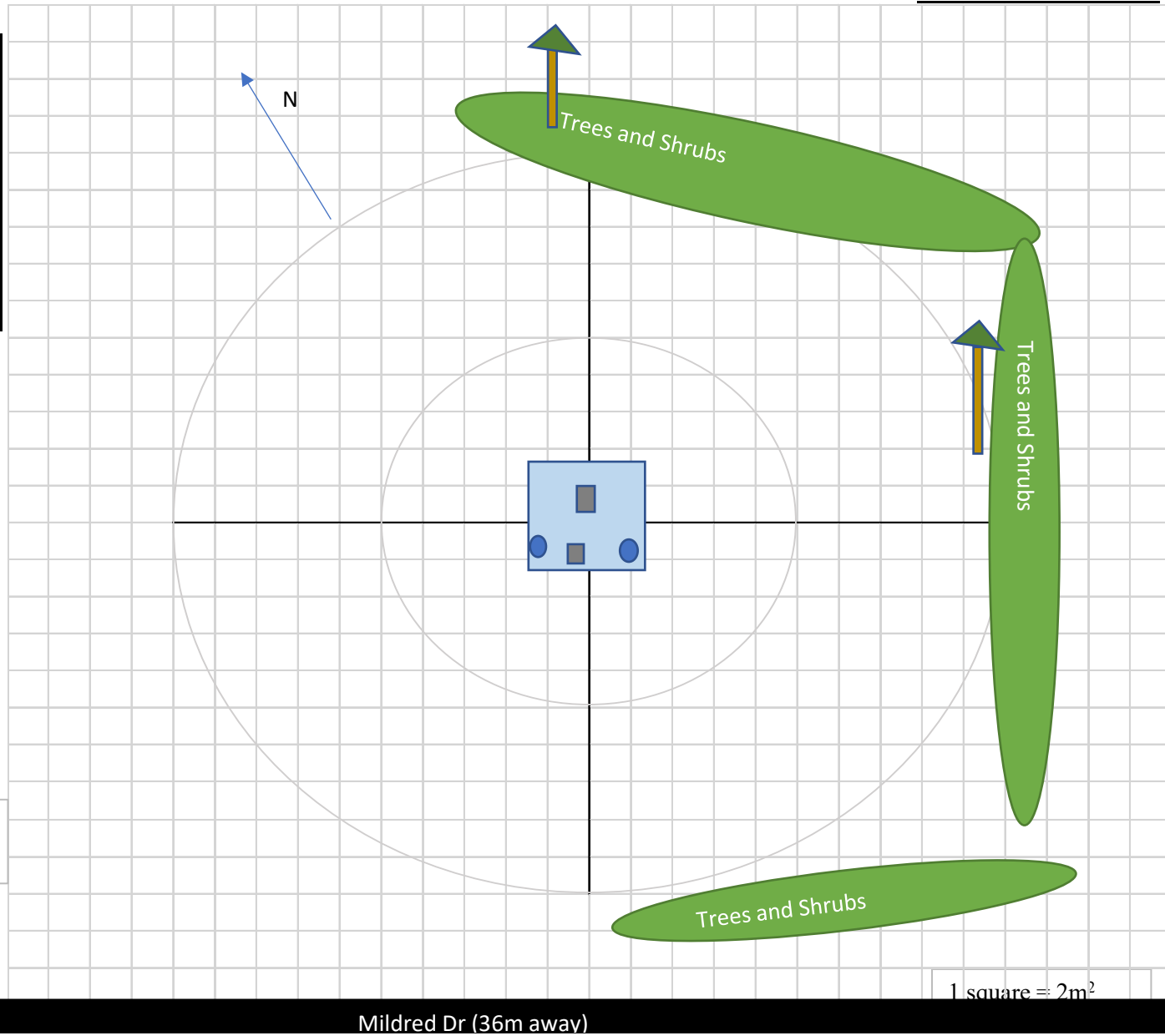
Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume  
 Obstruction Distance must be  $\geq 2 * (\text{Obst height} - \text{probe height})$   
 Tree Dripline must be >10 m away, prefer >20m  
 Horizontal and vertical distance on rooftop 1m for O<sub>3</sub> gases - 2m for all others  
 Unrestricted air flow must be  $\geq 270^\circ$

**Site Drawing**

Estimated Degree of Unrestricted Air Flow: 330°

- Indicate:
- North
  - Shelter
  - Probe Postions
  - Nearby trees
  - Roadways
  - Buildings
  - Other Obstructions
  - Source if Applicable

Primary Wind  
Direction : 220° SSW



Photos facing out from monitor to cardinal direction

North



South



East



West





Photos from cardinal direction facing in towards monitor

North



South



East



West





Site Name: Eg1 box

Date: 10-22-20

Generate Time est	Read Time est	Target ppb	Analyzer ppb	Audit STD ppb	Stability ppb
8:25	8:35	110	108	110	0.3
8:35	8:45	70	69	70	0.3
8:46	8:56	35	34	35	0.4
8:56	9:06	15	15	16	0.3
9:07	9:17	0	-1	0	0.3

Audit std Serial #: 179

Analyzer Serial #: 4006

TEST PARAMETER	CALIBRATOR VALUE	ACCEPTABLE RANGE
Output Flow (lpm)	4.9	3.0 to 5.5
Reg. Press. (psig)	13.4	10 to 17 psig
Box Temp (°C)	32.7	20 to 35
O3 Gen. Ref. (mV)	—	-25 to 5000
O3 Gen. Drive (mV)	—	-25 to 5000
O3 Lamp Temp (°C)	48.0	47 to 49
Photo. Meas. (mV)	4410.8	2500 to 4700
Photo. Ref. (mV)	4410.8	2500 to 4700
Photo. Flow (lpm)	0.7999	0.720 to 0.880
Photo. Lamp Temp. (°C)	58.0	57 to 59
Photo. Smp. Prs. (inHg-A)	28.1	≈ Amb. -1 inHg
Photo. Smp. Temp. (°C)	42.8	25 to 48
Slope (unitless)	0.977	0.850 to 1.150
Offset (ppb)	0.8	-10.0 to +10.0

TEST PARAMETER	ANALYZER VALUE	ACCEPTABLE RANGE
Stability (ppb)	0.4	< 1 ppb @ zero
O3 Meas. (mV)	4002.1	2500 to 4800
O3 Ref. (mV)	4000.4	2500 to 4800
Pressure (inHg-A)	27.2	≈ Amb. -2 inHg
Sample Flow (cc/min)	842	720 to 880
Sample Temp. (°C)	41.5	10 to 50
Photo. Lamp Temp. (°C)	58.0	57 to 59
Box Temp (°C)	32.7	10 to 50
Slope (unitless)	0.998	0.85 to 1.15
Offset (ppb)	-1.7	-10.0 to +10.0

Excess Flow @ Trans. Std. Vent: 4 LPM

External ZAS Pressure: 24 psi

	System	Reference	Difference
Logger Time	8:26:34	8:26:36	0
Analyzer	8:27:00	8:26:56	+4 sec

Disable log 8:12  
jump on 8:15  
restart 9:26

	Serial #	Actual (°C)	Ref (°C)	Diff (°C)
Shelter Temp Sensor Display		22.4	26.0	-3.6
Data Logger Display		26.3	26.0	0.3
Shelter Thermometer (back up)	140559788	25	26	-1.0
Shelter Thermostat		24.4	26.0	-1.6

pressure stable 28.1

Brass fitting in stair base part of calibrator - corrected...

found at 9:07

Site Name: Springhill

Date: 10-21-20

Generate Time est	Read Time est	Target ppb	Analyzer ppb	Audit STD ppb	Stability ppb
8:10 <sup>ast</sup>	8:20	110	109	110	0.1
8:20	8:30	70	70	70	0.3
8:31	8:41	35	35	35	0.3
8:41	8:51	15	15	15	0.2
8:51	9:01	0	0	0	0.2

Audit std Serial #: 179

Analyzer Serial #: 2013

TEST PARAMETER	CALIBRATOR VALUE	ACCEPTABLE RANGE
Output Flow (lpm)	4.8	3.0 to 5.5
Reg. Press. (psig)	12.8	10 to 17 psig
Box Temp (°C)	33.2	20 to 35
O3 Gen. Ref. (mV)	—	-25 to 5000
O3 Gen. Drive (mV)	0.0	-25 to 5000
O3 Lamp Temp (°C)	48.0	47 to 49
Photo. Meas. (mV)	4429.8	2500 to 4700
Photo. Ref. (mV)	4429.7	2500 to 4700
Photo. Flow (lpm)	0.7999	0.720 to 0.880
Photo. Lamp Temp. (°C)	58	57 to 59
Photo. Smp. Prs. (inHg-A)	28.1	≈ Amb. -1 inHg
Photo. Samp. Temp. (°C)	43.6	25 to 48
Slope (unitless)	0.977	0.850 to 1.150
Offset (ppb)	0.8	-10.0 to +10.0

TEST PARAMETER	ANALYZER VALUE	ACCEPTABLE RANGE
Stability (ppb)	0.2	< 1 ppb @ zero
O3 Meas. (mV)	4077.7	2500 to 4800
O3 Ref. (mV)	4077.7	2500 to 4800
Pressure (inHg-A)	26.9	≈ Amb. -2 inHg
Sample Flow (cc/min)	748	720 to 880
Sample Temp. (°C)	44.5	10 to 50
Photo. Lamp Temp. (°C)	58.0	57 to 59
Box Temp (°C)	35.7	10 to 50
Slope (unitless)	1.026	0.85 to 1.15
Offset (ppb)	-0.2	-10.0 to +10.0

Excess Flow @ Trans. Std. Vent: 3.5/4

External ZAS Pressure: 24

8:15:42 PL

	System	Reference	Difference
Logger Time	8:15:42	<del>8:15:42</del>	0
Analyzer	8:18:00	8:16:43	1m17s

	Serial #	Actual (°C)	Ref (°C)	Diff (°C)
Shelter Temp Sensor Display	74.9°F	23.8	27.4	-3.6
Data Logger Display		27.6	27.4	0.2
Shelter Thermometer (back up)	1405-52841	27	27	0
Shelter Thermostat	80°F	26.6	27.4	-0.8

Disable logger:  
7:54

power on  
7:54  
power off  
@ 9:02

no back pressure stable @ 28.1

Ref Device: SP  
 Serial Number: 190706

Calibration Date: 6/2020

Site Name: Boards Office Date: 10-22-20

Sampler ID: <u>218940606</u>	System	Reference	Difference	Acceptance Criteria
Time (in EST)	<u>12:39:00</u>	<u>12:39:21</u>	<u>-21 sec</u>	+/- 1 Min.
Filter Temperature	<u>28.4</u>	<u>27.7</u>	<u>0.7°C</u>	+/- 2° C
Ambient Temperature	<u>25.4</u>	<u>26.4</u>	<u>-1°C</u>	+/- 2° C
Barometric Pressure	<u>741</u>	<u>739</u>	<u>2 mmHg</u>	+/- 10 mmHg
Sample Flow	<u>16.69</u>	<u>16.79</u>	<u>-0.6%</u>	+/- 4%

Leak Check

8 <25mmHG

*left paper towels in top*

Site Name: Boards Cello Date: 10-22-20

Sampler ID: <u>218930606</u>	System	Reference	Difference	Acceptance Criteria
Time (in EST)	<u>12:57:00</u>	<u>12:57:03</u>	<u>-3 sec</u>	+/- 1 Min.
Filter Temperature	<u>29.4</u>	<u>29.3</u>	<u>0.1°C</u>	+/- 2° C
Ambient Temperature	<u>27.1</u>	<u>28.0</u>	<u>-0.9°C</u>	+/- 2° C
Barometric Pressure	<u>737</u>	<u>739</u>	<u>-2 mmHg</u>	+/- 10 mmHg
Sample Flow	<u>16.61</u>	<u>16.78</u>	<u>-1.07%</u>	+/- 4%

Leak Check

6 <25mmHG

Site Name: Springs 11 Date: 10-23-20

Sampler ID: <u>218920606</u>	System	Reference	Difference	Acceptance Criteria
Time (in EST)	<u>8:12:00</u>	<u>8:12:03</u>	<u>-3 sec</u>	+/- 1 Min.
Filter Temperature	<u>15.3</u>	<u>16.2</u>	<u>-0.9°C</u>	+/- 2° C
Ambient Temperature	<u>16.8</u>	<u>17.4</u>	<u>-0.6°C</u>	+/- 2° C
Barometric Pressure	<u>735</u>	<u>737</u>	<u>-2 mmHg</u>	+/- 10 mmHg
Sample Flow	<u>16.70</u>	<u>16.74</u>	<u>-0.24%</u>	+/- 4%

Leak Check

6 <25mmHG

Site Name: field Date: 10-23-20

Sampler ID: <u>226541005</u>	System	Reference	Difference	Acceptance Criteria
Time (in EST)	<u>9:07:00</u>	<u>9:06:44</u>	<u>16 sec</u>	+/- 1 Min.
Filter Temperature	<u>18.8</u>	<u>19.8</u>	<u>-1°C</u>	+/- 2° C
Ambient Temperature	<u>20.0</u>	<u>20.1</u>	<u>-0.1°C</u>	+/- 2° C
Barometric Pressure	<u>735</u>	<u>736</u>	<u>-1 mmHg</u>	+/- 10 mmHg
Sample Flow	<u>16.72</u>	<u>16.75</u>	<u>-0.2%</u>	+/- 4%

Leak Check

3 <25mmHG

Site Name: Airlah Date: 10-23-20

Sampler ID: <u>25760909</u>	System	Reference	Difference	Acceptance Criteria
Time (in EST)	<u>10:13:00</u>	<u>10:13:21</u>	<u>-21 sec</u>	+/- 1 Min.
Filter Temperature	<u>22.8</u>	<u>23.6</u>	<u>-0.8°C</u>	+/- 2° C
Ambient Temperature	<u>22.3</u>	<u>23.2</u>	<u>-0.9°C</u>	+/- 2° C
Barometric Pressure	<u>735</u>	<u>738</u>	<u>-3 mmHg</u>	+/- 10 mmHg
Sample Flow	<u>16.70</u>	<u>16.78</u>	<u>-0.5%</u>	+/- 4%

Leak Check

3 <25mmHG

*Burnside*  
*2:14:43*  
*26°C sunny*

TSP/Pb **Please circle Reference device used for Audit**

HiVol Cal	DeltaCal	Trical	TetraCal
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Serial Number: 96 Calibration Date: \_\_\_\_\_

Date: 10-22-20 Timer: 2:08:49 Cell Time: 2:09:24 Date: 10-22-20 Timer: 2:14:45 Cell Time: 2:14:12

Site: Burnside Official Site: Burnside Collocated  
 Orifice: P02875 Orifice: P04302

**QaCFM For TSP**

39.72
39.76
39.71
39.61
39.60
39.69
39.47
39.08
39.29
39.42

Amb Pres: 738.8 (27.7) *REV*  
 Temp: 27.7 24.7  
 Stag Pres: 27.6

**QaCFM For TSP**

40.08
40.13
40.13
40.14
40.14
40.12
39.96
39.91
39.93
40.11

Amb Pres: 738.5  
 Temp: 29.3  
 Stag Pres: 28.0

Leak Check: 23.8 {Between 17-24 inH20} Leak Check: 23.7 {Between 17-24 inH20}

Date: 10-22-20 Timer: 2:51:04 Cell Time: 2:38:26 Date: \_\_\_\_\_ Timer: \_\_\_\_\_ Cell Time: \_\_\_\_\_

Site: Ameristeel Site: \_\_\_\_\_  
 Orifice: P04304 Orifice: \_\_\_\_\_

*2:34*  
*27°C*

**QaCFM For TSP**

40.54
40.59
40.59
40.56
40.55
40.53
40.51
40.52
40.37
40.48

Amb Pres: 738  
 Temp: 31.8  
 Stag Pres: 27.2

**QaCFM For TSP**


Amb Pres: \_\_\_\_\_  
 Temp: \_\_\_\_\_  
 Stag Pres: \_\_\_\_\_

Leak Check: 22.2 {Between 17-24 inH20} Leak Check: \_\_\_\_\_ {Between 17-24 inH20}

Ref Device: SLP  
 Serial Number: HC 190706 Calibration Date: 6, 19, 2020

Site Name: AirLab Date: 10-23-20

*disc 9:45*

T640x	SN: 192	System	Reference	Difference	Acceptance Criteria
Time (in EST)		9:45:33	9:45:00	33sec	+/- 1 Min.
Shelter Temperature		26	26	0°C	+/- 2° C
Ambient Temperature		21.8	22.5	-0.7°C	+/- 2° C
Barometric Pressure		736.7	738.4	-1.7 <sup>mmHg</sup>	+/- 10mmHg
Total Flow (16.67 l/min)[(Sys-Ref) / ref] * 100		14.73	16.87	-0.83%	+/- 4%
Main Flow		5.03	4.93	2.03%	+/- 4%

Leak Check  

0.0	0.0
-----	-----

 SN: 140793699  
*disc 9:58 done*

*switch sticky to master*

Site Name: ulu Date: 10-23-20

*start*  
 Leak Check  

0.0
-----

 SN: 99287906  
*8:55*

T640	SN: 075	System	Reference	Difference	Acceptance Criteria
Time (in EST)		8:47:50	8:47:04	+46sec	+/- 1 Min.
Shelter Temperature		21	23	+2°C	+/- 2° C
Ambient Temperature		18.9	19.0	-0.1°C	+/- 2° C
Barometric Pressure		734.1	736.1	-2.0 <sup>mmHg</sup>	+/- 10mmHg
Flow		4.75	5.10	-2.9%	+/- 4%

*\* old m.r max need replacement*

Site Name: \_\_\_\_\_ Date: \_\_\_\_\_

T640	SN:	System	Reference	Difference	Acceptance Criteria
Time (in EST)					+/- 1 Min.
Shelter Temperature					+/- 2° C
Ambient Temperature					+/- 2° C
Barometric Pressure					+/- 10mmHg
Flow					+/- 4%

Leak Check  

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 SN: \_\_\_\_\_

Site Name: \_\_\_\_\_ Date: \_\_\_\_\_

T640	SN:	System	Reference	Difference	Acceptance Criteria
Time (in EST)					+/- 1 Min.
Shelter Temperature					+/- 2° C
Ambient Temperature					+/- 2° C
Barometric Pressure					+/- 10mmHg
Flow					+/- 4%

Leak Check  

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 SN: \_\_\_\_\_

*Blank space los books*

*ITS - log. shelf T w/ probes H showing Error @ airLab*

Please circle Reference device used for Audit

Streamline Pro	TetraCal
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Serial Number: HL 190706 Calibration Date: 6-19-20

Site Name: Spring Hill Date: 10-21-20

*Accl*  
*System*  
*9:56:00 / 9:57:26*

~~9:23:09 9:23:13~~

URG SN:	System	Reference	Difference	Acceptance Criteria
Time (in EST)	<del>9:23:09</del>	<del>10:23:09</del>	-1.26	+/- 5 Min.
Ambient Temperature	15.5	15.5	0	+/- 2° C
Barometric Pressure	738.5	740.9	-2.4	+/- 10 mmHg
Sample Flow (16.67 l/min) [(Sys- Ref) / Ref] * 100	22.02	21.89	0.66	+/- 10 %

Leak Check  
Passed  
Pass/Fail

Site Name: Spring Hill Date: 10-21-20

SASS SN:	System	Reference	Difference	Acceptance Criteria
Time (in EST)	9:23:09	9:23:13	4 sec	+/- 5 Min.
Ambient Temperature	14.7	15.2	-0.5° C	+/- 2° C
Barometric Pressure	739	741	-2	+/- 10 mmHg
Filter Temp 1	15.0	15.4	-0.4	+/- 2° C
Filter Temp 2	15.0	15.2	-0.2	+/- 2° C
Sample Flow 1 (sys-ref/ref)*100	6.6	6.6	0%	+/- 10 %
Sample Flow2[(Sys-ref) / ref] * 100	6.7	6.6	1.5%	+/- 10 %

Leak Check  
0/0  
Pass/Fail

Comments: